Comparative Ethnobotany of the Chinantec and Mixe
of the Sierra Norte, Oaxaca, Mexico

by

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Note on linguistic conventions

In any work on ethnobiological classification, we face the challenge of not only writing foreign words, indigenous terms and scientific names, but also providing common English equivalents for them. The task is complicated because we lack common names for many plants, literal translations for many foreign words and standard ways of transcribing indigenous languages.

In this dissertation, I make non-English expressions easily recognizable by writing indigenous language terms (e.g. ***'ma***^{L} ***'uɨ***$^{\prime L}$ «hog-plum tree») in italicized bold type, and Spanish words (*susto*, or «magical-fright disease») and scientific names (*Oreomunnea mexicana* (Standley) Leroy) in italicized type.

Translations

As can be seen in these example, 'glosses', or approximate translations of foreign terms, are given in brackets (« ») and are placed just before or after the non-English expression. In the particular case of labels for animals and plants – which make up the majority of the indigenous terms cited in this dissertation – there are distinct ways of translating 'literal names', which refer exclusively to particular species and have no other apparent general meaning and 'metaphorical/descriptive names', which can be translated word-by-word (Balée and Moore 1991). For literal plant names, I give commonly accepted English plant names as part of the gloss (e.g. ***'ma***^{L} ***'uɨ***$^{\prime L}$ «hog-plum tree», which refers to *Spondias* spp.). Whenever practical, the common English names are taken from The Plant Book by David Mabberly (1987), which is a standard reference on botanical categories and names. If there is no common English name, I give the scientific name of the plant as part of the gloss (for example, ***'ma^{L} 'uɨ$^{'L}$*** «*Clusia* tree», which refers to several *Clusia* species). For metaphorical names, I give glosses that are derived from a morpheme-by-morpheme translation of the indigenous term (such as ***'ma^{L} 'uɨng$^{'LM}$ ló^{L} yúu^{M}*** «red peeling-bark tree», which refers to *Oreomunnea mexicana*).

In the detailed analysis of Chinantec and Mixe plant categories presented in Chapters 6 & 7, I discuss the etymology and meaning of each botanical life-form and generic name. When data are available, I provide reconstructed cognate terms from proto-Chinantec, proto-Otomangue, proto-Oaxacan Mixe, proto-Mixe and proto-Mixe-Zoque as well as notes on the distribution of current cognates of the botanical name in Mixe, Chinantec and other indigenous communities. Following common linguistic practice, each reconstructed term is marked with a superscript asterisk (e.g. ****hmáá$^{'H}$***, a reconstructed term which is cognate with ***'ma^{L} jmo$^{'H}$***, the Comaltepec Chinantec term for *Cecropia* spp.), which denotes a term which has not been attested by a linguist and is not in current use. A gloss of each folk specific name is given, followed by the botanical family and species name (when identified) to which the indigenous name refers. For example, the folk specifics which correspond to *Oreomunnea mexicana* (Standley) Leroy, are listed as:

(A) ***'ma^{L} 'uɨng$^{'LM}$ ló^{L} tee^{L}*** «white peeling-bark tree» [JUG *Oreomunnea mexicana*]

(B) ***'ma^{L} 'uɨng$^{'LM}$ ló^{L} yúu^{M}*** «red peeling-bark tree» [JUG *Oreomunnea mexicana*]

Translation is usually considered an art of making sense of foreign words and phrases, but in academic works it is equally important to provide definitions of technical terms and special usages that may be unfamiliar to some readers. In chapter four, I define many of the specialized terms and concepts (indicated by **bold** type) used by ethnobiologists. Elsewhere in the dissertation, I put quotation marks around English words when they are used for the first time in a special or technical sense. In these few cases, I provide a definition immediately before or after the word (as in the example of 'literal' and 'metaphorical/descriptive' names given above). I have avoided using quotation marks to indicate glosses of indigenous concepts or special uses of English terms, though this is common practice in anthropological writing.

Transcription

Accurate transcription of terms from non-written indigenous languages is not simple, especially for phonetically complex, tonal languages such as Chinantec. Various alphabets for Chinantec and Mixe have been proposed over the last century, and none has been accepted unanimously by linguists, local people, government agencies and other interested parties. I use a standardized phonemic orthography for Totontepec Mixe (based on Schoenhals and Schoenhals 1964) and Chinantec Mixe (based on SIL 1984), but I make no attempt to standardize the recorded or reconstructed cognate terms from other communities given for comparative purposes. When even the dialects of Comaltepec Chinantec and Totontepec Mixe are transcribed in distinct ways by different linguists (e.g. Anderson 1989, Kaufman 1963, Rensch 1989, Wichmann 1991), it would be tedious and fruitless to propose an arbitrary standardized transcription for indigneous terms from throughout the region. Reconstructed Mixe terms are given in the phonemic orthography utilized by Søren Wichmann (1991) and Terence Kaufman (Kaufman 1963; Campbell & Kaufman 1980, 1983). Reconstructed Chinantec terms follow the phonemic orthography devised by Calvin R. Rensch (1989).

Judi Lynn Anderson of the Summer Institute of Linguistics provided the transcription of Chinantec terms in the early 1980s, and I have modified her orthography only slightly. In this transcription, Comaltepec Chinantec has 9 vowels, 5 of which are familiar to English and Spanish speakers. The vowels are ***a***, ***ea***, ***e***, ***i***, ***ɨ***, ***o***, ***ø***, ***u*** and ***ʉ***. Long vowel sounds are represented by doubling the vowel in the transcribed word, such as in ***tii***^{L} «thin». Nasalization can occur with all vowels and is indicated by underlining, as in ***a̲*** (nasalized low back vowel). There are 17 consonants in this transcription of Comaltepec Chinantec: voiceless stops /***p t k***/, voiced stops /***b d g***/, nasals /***m n ñ ng***/, fricative /***s***/, affricates /***ch ds***/, voiced oral continuant /***l***/, vibrant /***r***/ and laryngeals / ***' j***/. Initial consonant clusters, observable in many Chinantec plant names, are composed of laryngeals / ***' j***/ followed by /***g m n ñ ng l***/. Labialization, which can occur after /***k g ' j***/, is transcribed as ʷ after velar stops /***k g***/ and as ***u*** after laryngeals /***' j***/. Palatalization, written as ***i***, can follow all consonants, except bilabials or ***r***. In Spanish loan words and Chinantec words derived from Spanish, I have conserved the use of 'c' (a sound represented by ***k*** in Chinantec) as in ***crúu***^{H} «cross». A simplified guide to pronunciation of Chinantec speech sounds for English speakers is given in table I. For comparison, I give Rensch's (1989) Comaltepec Chinantec phonetic table (table II), which is the basis for many reconstructed terms.

There are 3 tones levels in Comaltepec Chinantec, low /^{L}/, mid /^{M}/ and high /^{H}/. These may be combined in four tone glides, which in this early transcription were interpreted as three rising tones /^{LM} ^{MH} ^{LH}/ and one falling tone /^{HL}/. An accented vowel (such as ó) indicates a syllable with 'ballistic stress', a combination of pitch and stress characteristic of Chinantec languages which tends to raise high tones and lower low tones.

In more recent works on Comaltepec Chinantec, Anderson (1989) has simplified, reinterpreted and standardized her orthography, making it easier to compare with the transcription used for other dialects of Chinantec. The five vowels common to Chinantec and Spanish have remained the same, but ***ea*** is now written as ***ä***, ***ɨ*** as *ï* and ***ø*** as *ë*. ***ʉ*** is now considered as a palatalized 'u' (***iu***) automatically rounded to ***ü*** when not followed by a nasal consonant. It is not transcribed in the phonemic orthography (e.g. ***tʉ́***^{LM} «rifle» becomes ***tiú***^{LM}). This gives a system of 8 vowels, of which 6 are primary (***a***, ***e***, ***i***, *ï*, ***o***, ***u***) and 2 (***ä***, *ë*) are considered marginal to the system. Lengthening is indicated by a colon following the vowel (e.g. ***tii***^{L} «thin» becomes ***ti:***^{L}); nasalization is represented by a tail (inverted comma) under the vowel (e.g. ***a̲*** becomes ***ą***). All consonants remain the same except for ***ds*** (now *z*) and ***j*** (now ***h***) and ***ng*** (now ***ŋ***). The palatalized n /***ñ***/ has been reinterpreted as a palatalized velar n /***ŋ***/. Because there is always palatal glide between velar consonants /***k g ng***/ and front vowels /***e i***/ which follow them, the palatalization is not written (e.g. ***ñi'***^{LM} «moss» becomes ***ŋi'***^{LM}). Labialization is standardized as a ***u*** when it follows both velar stops and laryngeals (e.g. ***k***^{w}***ea***^{LH} is now written as ***kuä***^{LH}). The three tone levels have been preserved, but two of the four tone glides are considered as rising tones /$^{LM\ LH}$/ and two as falling tones /$^{HM\ HL}$/. In future publications, I plan to modify the transcription of Chinantec terms to be consistent with these standardized conventions, but I have maintained the earlier orthography for this dissertation.

Table I. Key to pronunciation and transcription of Chinantec consonant and vowel sounds for English speakers (IPA = International Phonetic Association; n/a = not applicable).

Chinantec symbol	IPA symbol	English example	Notes on pronunciation and transcription
a	a	f*a*ther	low back vowel, unrounded; as Spanish *a*
b	b	*b*oat	
ch	č	*ch*urch	
d	d	*d*ate	
ds	z	n/a	
e	e	d*a*te	mid front vowel, unrounded; as Spanish *e*
ea	(?)	n/a	
f	f	*f*ather	
g	g	*g*ate	
i	i	f*ee*t	high front vowel, unrounded; as Spanish *i*
ɨ	(?)	*n/a*	
j	x	*h*ouse	softer than Spanish *j*; harder than English 'h'
k	k	*c*at	sometimes written as *qu* before e and i and *c* before a, o and u
l	l	*l*ake	
m	m	*m*any	
n	n	*n*ight	
ng	ŋ	ha*ng*	velar n
ñ	(?)	ca*ny*on	palatalized n
o	o	h*o*pe	mid back vowel, rounded; like Spanish *o*
ø	(?)	*n/a*	
p	p	*p*ack	
r	r	n/a	vibrant
s	s	*s*ack	
t	t	*t*ack	
u	u	sh*oo*t	high back vowel, rounded; as Spanish *u*
ʉ	(?)	n/a	palatalized *u*, becoming rounded
'	?	n/a	glottal stop; pronounced before 'apple' in some English dialects

Consonants

	labial	alveolar	palatal	velar	laryngeal
voiceless stop	p	t		k	?
voiced stop	b	d		g	
		c			
fricative		s			h
affricate			ž		
nasals	m	n	ŋ		
lateral	w	l	y		
trill		r			

Vowels

palatal		non-palatal	
i	iö	ɨ	u
e	ɨa	•	a
			o
V:			
Ṿ			

Table II. Phonetic symbols used by Rensch (1989) for Comaltepec Chinantec sounds.

Alvin Schoenhals of the Summer Institute Linguistics provided the transcription of Totontepec Mixe terms, which I modified slightly to reflect preferences of some members of the community. For English speakers, the transcription and pronunciation of Mixe is easier than Chinantec, because Mixe hasno tones and no nasalized vowels. The Mixe spoken in Totontepec Mixe has more vowels (9) than any other Mixe dialects (most have 6 vowels), but most are familiar to English speakers, unlike several Chinantec vowels.

The vowels, all which may be lengthened, are ***a***, ***a̲***, ***e***, ***e̲***, ***i***, ***o***, ***o̲***, ***u*** and ***u̲***. Long vowel sounds are represented by doubling the vowel in the transcribed word, such as in ***niiv*** «chile pepper». There are 20 consonant sounds in Totontepec Mixe: b, c, d, f, g, j, k, l, m, n, ñ, p, r, s, t, ts, v, x, y and a glottal stop. Two consonants (b, f) are found only in Spanish loan words and another two (l, r) are found primarily in Spanish loan words and rarely in Mixe words. In Spanish loan words, I have conserved the use of 'c' (a sound represented by ***k*** in Mixe) as in *café* «coffee», 'z' (represented by ***s*** in Mixe) as in *zanahoria* «carrot», and 'll' (represented by ***y*** in Mixe) as in *camello* «camel». Some transcriptions of Mixe (including Schoenhals and Shoenhals 1963 Totontepec Mixe dictionary) adopt the Spanish convention of representing ***k*** as 'c' (before a, o and u) or 'qu' (before e and i), but I have consistently used ***k***. The biggest controversy in Totontepec Mixe transcription is the use of ***o*** and ***o̲***. Alvin Schoenhals, observing that the Spanish *o* (a rounded mid back vowel) is uncommon in other dialects of Mixe, transcribes it as ***o̲***, and represents the Mixe o as ***o***. Some community members, who wish to use widely-known Spanish orthography in their transcription of Mixe, leave the Spanish *o* as ***o***, and reserve the use of o̲ for the Mixe o. I have maintained the Schoenhals convention in this thesis, but I am converting to local usage for community educational materials and future scientific publications. A simplified guide to pronunciation of Mixe vowel and consonant speech sounds for English speakers is given in table III. For comparison, I have given Wichmann's (1991) Totontepec Mixe phonetic table (table IV).

Table III. Key to pronunciation and transcription of Mixe consonant and vowel sounds for English speakers (IPA = International Phonetic Association; n/a = not applicable).

Mixe symbol	IPA symbol	English example	Notes on pronunciation and transcription
a	a	father	low back vowel, unrounded; as Spanish *a*
a̲	ə	sun	mid back vowel, unrounded; further back than vowel in 'sun'
b	b	boat	only in Spanish loan words
c	k	cat	maintained in some Spanish loan words; equivalent to Mixe *k*
ch	č	church	
d	d	date	
e	e	date	mid front vowel, unrounded; as Spanish *e*
e̲	æ	cat	low front vowel, unrounded; very similar to vowel in 'cat'
f	f	father	only in Spanish loan words
g	g	gate	not common in Mixe
i	i	feet	high front vowel, unrounded; as Spanish *i*
j	x	house	softer than Spanish *j*; harder than English 'h'
k	k	cat	sometimes written as *qu* before e and i and *c* before a, o and u
l	l	lake	in Spanish loan words and rarely in Mixe
ll	(?)	yet	maintained in Spanish loan words; equivalent to Mixe *y*
m	m	many	
n	n	night	
ñ	(?)	canyon	palatalized n
o	(?)	n/a	low back vowel, rounded
o̲	o	hope	mid back vowel, rounded; like Spanish *o*
p	p	pack	
r	r	n/a	longer than Spanish *r*; onomatopoeic in Mixe bird names
s	s	sack	
t	t	tack	
ts	ž	cats	pronounced with tongue further back than for Mixe *t*
u	u	shoot	high back vowel, rounded; as Spanish *u*
u̲	ɨ	n/a	high back vowel, unrounded; as get ('git') of some Americans
v	v	very	
x	š	show	tongue retroflexed and further back than in English 'sh'
y	(?)	yet	
z	s	sack	in Spanish loan words; equivalent to Mixe *s*
'	ʔ	n/a	glottal stop; pronounced before 'apple' in some English dialects

Consonants						Vowels		
	labial	alveolar	palatal	velar	laryngeal			
voiceless stop	p	t		k	?	i	ī	u
voiced stop		d		g		E	ɨ	ʊ
fricative	v	s	š		h	e	a	o
affricate			ž					
nasal	m	n						
lateral			y					

Table IV. Phonetic symbols used by Wichmann (1991) for Totontepec Mixe sounds

Preface and Acknowledgements

The state of Oaxaca, where most agricultural lands and forests are owned by communities of indigenous people, is an excellent place to study the classification and management of botanical resources (de Avila and Martin 1993). In the Valley of Oaxaca, the remaining agroforestry systems and polycultures ensure productivity of agricultural yields while conserving the soil, water and other key parts of the valley ecosystem. In the Sierra, continued cultivation of corn, beans, squash and many other crops maintains the genetic diversity of cultivated plants as well as commercial and subsistence production. In addition, local people supplement their agricultural yields with hundreds of non-cultivated edible, medicinal and other useful plants. Economic specialization in various indigenous communities has given rise to a diversity of crafts made from natural materials. Throughout the state, weekly marketplaces provide the opportunity to observe the exchange of cultivated and wild plants from various ecological and ethnic zones (Martin 1992).

Some 16 years ago, during my first sojourn in Oaxaca, I began to explore how to document local ecological knowledge, analyze the resulting data and apply the findings in practical ways that would promote the continuing growth and evolution of Oaxaca's diverse cultures and forests. This dissertation, one product of my quest, focuses on the way Chinantec and Mixe people classify and use plants found in diverse temperate and tropical ecosystems of the Sierra Norte of Oaxaca. In the first chapter, I present a regional description of the Sierra Norte that integrates ethnographic, ethnohistorical, archeological, ecological and linguistic perspectives. I focus in the second chapter on the Chinantec, and in particular on the inhabitants of

Santiago Comaltepec, a highland community. The third chapter describes Mixe culture, and in particular the municipality of Totontepec, also in the highlands. In chapter 4, I describe the concepts and define the technical terms that researchers employ to compare scientific and indigenous knowledge of plants. The fifth chapter reviews the methodology I use to collect and analyze data on folk botanical classification. A detailed description of Chinantec folk botanical categories of Santiago Comaltepec is presented in chapter six and in chapter seven I give a similar treatment of Mixe botanical classification. In chapter eight, I analyze these data by referring to generalizations on ethnobiological categorization and nomenclature described in Brent Berlin's (1992) recent monograph Ethnobiological Classification.

How did I choose this academic approach and geographic area? At first, I didn't wander far from home in my own botanical explorations. I merely crossed the street in East Lansing, my home town, to attend Michigan State University. I completed my bachelor's degree in 1980, but not before having my first exposure to tropical ecology. I accompanied John Beaman, a professor of botany, from the snow-capped volcanoes and sweltering lowlands of Mexico and Guatemala, where we collected plants during the summer of 1978. Several days in the mountains of Oaxaca convinced me of the value of carrying out a long-term study of the region.

Not long after graduating in 1980, I sold my temperate possessions and moved to the tropics. It wasn't a job that lured me to Mexico, but just a lingering dream drawn from my first trip to the tropics: to discover which plants were being used for food, medicine and other purposes in the indigenous communities and peasant markets of Oaxaca.

After a year in Mexico, I opted to pursue a doctorate in anthropology at the University of California at Berkeley. I focused on ethnobiology, the study of people's interactions with nature in the past and present, including how they classify and manage plants. My theoretical approach was guided by Brent Berlin, who has carried out pioneering work on ethnobiological classification in Mexico and Peru. I owe my methodological orientation to Eugene Hammel, who taught me how to use computers, statistics and common sense in designing my research. Thomas Duncan, a botanist, provided many insights on scientific classification of plants.

In 1985, I returned to Oaxaca to work among the Chinantec, Mixe and Zapotec Indians of the northern mountains. I collaborated with Stefano Varese, a Peruvian anthropologist who was coordinating the Oaxaca regional office of *Culturas Populares*, a program of Mexico's *Secretaría de Educación Pública*, which brought together cultural promoters from Chinantec, Mixe and Zapotec communities (Martin 1987, Varese and Martin 1993). While interacting with Stefano, his staff and his indigenous coworkers, I came to appreciate the complexities of applying basic ethnobotanical research to community development.

In 1988, towards the end of my stay in Oaxaca, several colleagues and I began to create a non-profit group known as SERBO: *Sociedad para el Estudio de los Recursos Bióticos de Oaxaca*, translated in English as the Society for the Study of the Biotic Resources of Oaxaca (de Avila and Martin 1990). Alejandro de Avila, Leo Schibli, Silvia Salas, Rafael García Soriano, and other members of SERBO have provided me with many interesting perspectives on my work in the Sierra Norte.

From 1989 to 1991 – between moves to Morocco and France, and consultancies with the World Wide Fund for Nature (WWF) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) – I analyzed the results of my Oaxacan research and wrote the bulk of this dissertation. Since 1992, I have been working as a field coordinator in the People and Plants Initiative, a joint program of WWF–International, UNESCO and the Royal Botanic Gardens, Kew. The primary goal of People and Plants is to provide support and training to people from developing countries who are working at the interface bewteen ethnobotany, biodiversity conservation and community development (Martin 1994). The Sierra Norte of Oaxaca was chosen as one of the primary project sites, allowing me to continue my activities in collaboration with both SERBO and the WWF Mexican Office in Oaxaca. My interactions with Alan Hamilton, Malcolm Hadley, Michel Pimbert, Hew Prendergast, Tony Cunningham, Yildiz Aumeeruddy, Alison Semple and others involved in People and Plants have given me the opporunity to explore how the results of ethnobotanical research can be applied to conservation and development around the world. Alvaro González, Javier Castañeda and other staff members of the WWF Mexican Office have provided numerous insights on the relationship between nature and culture in Oaxaca.

Now, 17 years after first setting foot in Oaxaca, I am putting the finishing touches on my dissertation. Developing a thesis over such a long period of time has its disadvantages. The volume of words and pages expand, while colleagues wonder when the final product will emerge. Travels to other countries and sorties into other academic fields distract our attention, making it difficult to focus again on the analysis and writing up of data collected long ago. But there are advantages as well. Continuing plant collections, interviews and reading provide bits of data that fill in the holes of a descriptive ethnobotany. New analytical techniques and theoretical insights acquired along the way allow us to strenghten our hypothesis-testing. Participation in applied conservation and development projects provides us a different perspective on the research, allowing us to reformulate conclusions based on an academic approach. In addition, we have time to return the results to the communities where we work before publish our findings for a larger public. This is particularly critical in the case of ethnobiological research, because of the current controversy over who benefits from the intellectual property rights and commercial exploitation of local people's knowledge of plants and animals.

Writing my dissertation over a number of years provided me the opportunity to develop a general approach to linking ethnobotanical fieldwork, scientific analysis and application of results (Martin 1995). This model, shown in figure I, has emerged through my work not only in Mexico but also in similar projects in Bolivia and Malaysia, as part of the People and Plants Initiative. Underlying the entire strategy are three basic activities, shown across the top of the diagram: (1) participatory research on botanical resources, (2) joint qualitative and quantitative analysis of the data; and (3) practical application of the results to reinforce conservation and community management of biodiversity. These activities reflect major trends in ethnobiology: a focus on increasingly detailed fieldwork guided by methods from various academic disciplines; sophisticated data analysis that responds to a new emphasis on theory building and hypothesis testing; and a concern to go beyond

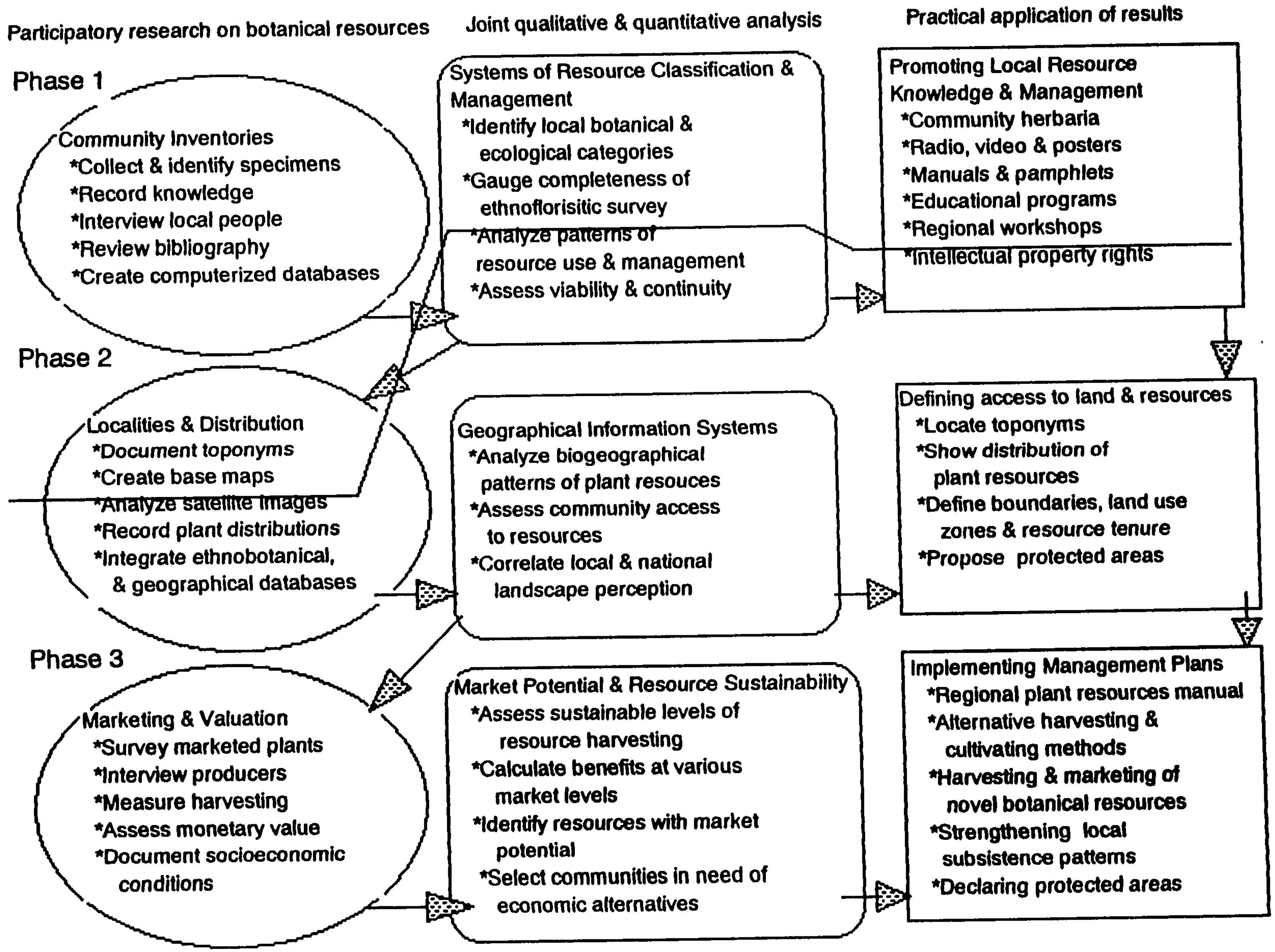

Figure I. A model for ethnobotanical research (line shows progress in Sierra Norte ethnobotanical project).

academia to find solutions for global ecological and social crises.

In a first phase of the work, there is an emphasis on discovering – through community based inventories – what plant resources exist in the region and how they are managed and used by local people. After finding out what plants are there, we focus on where the resources are found. This requires documenting geographical places (often designated by place names) where local people harvest resources and locating these sites on maps and satellite images. In the final phase, participants concentrate on the subsistence and monetary value of local plants, including assessment of marketing, harvesting sustainability and identification of novel resources with economic potential.

All activities and phases are carried out by a team comprising local people, protected area personnel, members of NGOs and external researchers, among others. The involvement of local people is fundamental, and can include providing information through interviews, making plant collections, participating in joint analysis of results and promoting a research plan that addresses issues of particular concern to the community (Martin and Pimbert 1993).

Ethnobiological classification – including a focus on the distribution, management and use of plants – forms a small part of this overall plan. Yet these studies are essential if we are to understand how local populations perceive the environment and manage natural resources. The integration of local and global perspectives in conservation and development projects requires the careful documention of indigenous knowledge, including a rigorous comparison with the principles and perspectives of Western science. As we embark on joint efforts to manage natural areas and promote community development, we need the equivalent of a bilingual encyclopedia that compares and contrasts our different ways of looking at the local environment. Studying the evolution and transformation of ethnobotanical knowledge helps us to understand the dynamics of cultural resistance – why the detailed ecological knowledge of ethnic minorities persists, why they maintain the use of a diversity of plants in everyday subsistence – and how we can reinforce these tendencies in projects on biodiversity conservation and community development.

I had this practical side of ethnobotany in mind as I carried out the basic research presented in this dissertation. As I seek to apply my findings to enhance the cultural and ecological diversity of the Sierra Norte, I am discovering that Carlos Fuentes' defense of literature applies as well to ethnobiological knowledge:

> "It is an expression of the cultural, personal and spiritual diversity of mankind. [It] is a harbinger of a multipolar and multicultural world, where no single philosophy, no single belief, no single solution, can shunt aside the extreme wealth of mankind's cultural heritage. Our future depends on expanding the freedom of the multiracial and the polycultural to express themselves in a world of shifting, decaying, and emerging power centers."

The research I carried out in Totontepec and Comaltepec was never meant to end just in a scholarly text that preserves a slice of culture for posterity. Its broader goal is to ensure that Chinantec and Mixe ways of perceiving nature remain a living tradition.

In collaboration with my partners in the SERBO, I am seeking to return the results of this study to local people in the Sierra Norte. To begin this process, we are producing pamphlets on useful plants for distribution in the communities. These simple brochures – which provide summaries of local classification and use of the flora as well as results of scientific studies and assessments of economic value – are reviewed by community members, who collect additional information on the preparation and use of the plants we describe. Returned to members of SERBO, they are revised and reprinted to be once again circulated in the communities. The information contained in each circular reflects not only cultural consensus about how plants are used, but also the opinions of local specialists who hold an uncommon but rich knowledge of botanical resources.

Our intention is that the ethnobotanical information be integrated into community-level efforts to ensure the wise use of forest resources. At the *Instituto Cultural Mixe Kong Oy*, a preparatory school in Totontepec, more than 30 students have enrolled in courses that cover subjects such as Mixe literacy, music, agriculture and traditional medicine. Various conservation initiatives are planned, including restoration of deforested areas in the municipality and assessment of the value of non-forest resources.

Some students from the *Instituto* have participated in refining the ethnobotanical data contained in the botanical pamphlets. They carry a mini-herbarium from house to house, where they query elders about the plants, thus recreating a traditional way of passing knowledge from one generation to the next. Other ethnobotanical promoters are continuing to collect plants, searching for previously uncollected specimens in the remotest corners of the municipality.

A similar initiative will soon be proposed to the municipal authorities of Santiago Comaltepec. The villagers who are responsible for protecting the community's natural resources have expressed interest in creating a management plan for the extensive cloud forests in the north of the municipality and could profit from the documentation of local botanical resources.

Once these municipal-level initiatives are well underway, the SERBO ethnobotany team plans to convene regional seminars that will bring together a small number of researchers and residents who are currently focusing on useful plants in either Chinantec, Mixe and Zapotec communities of Oaxaca. Our goal will be to discover pan-regional botanical categories, compare data from diverse ethnobotanical studies and explore the practical application of the results. One final product, an account of the useful plants of northern Oaxaca, will be loyal to the wealth of cultural and biological diversity in the region.

I would like to give my warm acknowledgement to the indigenous people of the Sierra Norte of Oaxaca, who are maintaining their own multicultural and multilingual world in the face of many political and economic changes. I am indebted to the residents Totontepec and Santiago Comaltepec for their hospitality and their detailed explanations of the use and classification of local plants. Special thanks are due to the following people and their families: Juan Arelí Bernal Alcantara, José Rivera Reyes, Esaú Velasco and Eloy Vargas Ruíz of Totontepec as well as to Margarita López López, Ricardo Luna López, Eusebio López Hernández, Hermenegildo López Hernández, Leonardo Hernández Hernández, and Saul Hernández of Santiago Comaltepec.

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1. Botanical and Ethnographic Synopsis of the Sierra Norte of Oaxaca

The State of Oaxaca

Oaxaca, a land of diversity, is the most complex geographical region in Mexico and occupies an important place in Mesoamerica (Kirchoff 1952). The state is formed by the convergence of two principal mountain chains, the Sierra Madre Occidental and the Sierra Madre Oriental. The resulting topographical and geological variety produce diverse climates and vegetation types, including all the major ecological zones of Mexico described by Rzedowski (1978).

It is estimated that half of the state is still covered with forests in relatively good ecological condition, while the other half contains disturbed vegetation and agricultural zones (Flores and Gérez 1988:131). Oaxaca is generally considered to have the most diverse flora of any Mexican state, probably comprising more than 10,000 species of vascular plants. The fauna is similarly rich, including 536 species of vertebrate animals that are endemic to Mesoamerica (Flores and Gérez 1988:132).

With a surface area of 95,364 km^2, Oaxaca is the 5th largest state in the Republic of Mexico. The state is found between $15^{\circ}38'00''$ and $18^{\circ}48'30''$ W latitude and $93^{\circ}52'00''$ and $98^{\circ}30'30''$ N longitude. Its political division, with 570 municipalities grouped into eight regions and thirty districts, is the most complex in Mexico.

According to the census of 1990 (INEGI 1992), Oaxaca has approximately 2,997,129 inhabitants who live in a total of 587,131 households, giving an average of 5.1 residents per households. The population density in the state is 31.4 people per km^2. More than half of the population speak an indigenous language, including nearly 300,000 people who do not speak Spanish. These indigenous people belong to fifteen, loosely-defined ethno-linguistic groups, each one comprising speakers of distinct dialects. Although there exist significant cultural differences between these semi-isolated populations of indigenous people, they share cultural elements widespread in Mesoamerica before the Conquest and they are united by a history of five centuries of Spanish and Mexican hegemony (Brintnall 1979; Nolasco A. 1972, 1978). Over one-half of the economically active population - some 475,000 individuals - is dedicated agriculture, cattle-raising and other rural activities.

The Sierra Norte of Oaxaca

The Sierra Norte, which is found to the northwest of Oaxaca City, has been delimited is various ways. In the traditional division of Oaxaca into seven regions, the Sierra Norte was grouped together with the Sierra Sur into a single zone. Given the different ecological and ethnic characteristics of these two montane areas, most recent treatments consider them as distinct.

In one widely-accepted summary, the *Región Sierra Norte* comprises 3 districts and 59 municipalities of northern Oaxaca that are found between 16°45' and 18°10' N latitude and 96°06' and 98°30' W longitude (Moguel 1979). Delimited in this way, the Sierra Norte has a territorial extension is 9,375 km^2, being the fifth largest region with 9.8% of the state's total land surface. The minimum altitude is 320 meters above sea level and the maximum is nearly 3400 meters. Many researchers prefer to split up the region into smaller areas based on cultural, ecological or geographical criteria.

Cultural History of the Sierra Norte

In the introduction to their book on Otomanguean culture history, Josserand and her colleagues (1984:8–9) sketch out a strategy for elucidating the past that serves as a framework for understanding the cultural history of any Mesoamerican ethnolinguistic group. They employ an approach combining: 1) archaeology, documenting cultural development from the Lithic Stage to the Conquest and beyond; 2) linguistics, revealing not only how various languages are related to each other but also how they have diversified into distinct dialects; and 3) ethnohistory, contributing information from not only oral tradition but also historical documents on the colonial and modern stages of development.

In the following discussion of the Sierra Norte, I add several additional dimensions to this approach. I present a geographical account of the Sierra Norte, and of four neighboring regions. I describe the various ecological zones, demonstrating the biotic diversity that characterizes the Sierra. I then draw upon the trio that Josserand et al advocate - archaeology, ethnohistory and linguistics. I later consider various trends in Mexican ethnography, and how anthropologists have characterized the ecological relationship that local people have with the natural environment. Finally I turn to ethnobiology, the study of how humans interact with their natural environment. Together, these various lines of evidence provide a unified portrait of the ethnolinguistic groups found today in the Sierra Norte of Oaxaca. In subsequent chapters on the Chinantec and Mixe ethnolinguistic groups, I draw upon the themes and perspectives presented here.

Geography

The Sierra Norte, the most complex of the eight geographical regions of Oaxaca, is a deeply dissected mountain range that forms the southernmost portion of the Sierra Madre Oriental of Mexico. It extends approximately from northwest to southeast across the northern portion of Oaxaca, rising at several points to more than 3000 meters above sea level.

In the following discussion, I describe a large part of northern Oaxaca that includes not only the Sierra Norte but also some neighboring municipalities that are in the Isthmus, Gulf Coast, Cañada and Central Valley regions. This area, which corresponds to the area colleagues and I are including in a floristic study (Martin et al n.d.; see appendix 3), includes 13 districts and 184 municipalities.

Within this region, the population is predominately indigenous, including four major groups (the Mazatecs, Chinantecs, Zapotecs and Mixes) and four smaller populations – Cuicatecs, Mixtecs, Ixcatecs (nearly extinct) and Nahuatl–speakers (de la Fuente 1965). Large concentrations of non–indigenous Spanish speakers are found in the neighboring urban areas of the Central Valley, Isthmus, Gulf Coast and Cañada regions. Winter (1989:10–11), an archaeologist, recognizes that the major ethnic divisions constitute four subareas in the Sierra Norte, which he calls the Chinantla, the Zapotec Sierra, the Mixe region and the Mazatec region.

The Sierra is separated into a series of broad climatic zones that result from the interrelated conditions of exposure and elevation. The Gulf escarpment – the precipitous slopes that face the Gulf of Mexico – constitutes a humid zone that includes both tropical and temperate areas. The high Sierra is a cold zone which reaches its maximum point at Cerro Zempoaltepetl, some 3400 meters above sea level. The remaining mountains are in a temperate rain shadow. The climate becomes progressively drier and more tropical as the Sierra drops in elevation towards the Valley of Oaxaca. These microenvironments provide conditions favorable to numerous vegetational zones characterized by the flora and fauna of diverse tropical and temperate origins. These vegetational and climatic zones are further described below in the section on ecology.

Throughout the Sierra, subsistence agriculture persists as a central element of peasant production. Corn and beans are grown in all temperate and many tropical areas, and there is limited planting of wheat in drier areas. Different commercial enterprises predominate in each climate zone. There is some cattle ranching in tropical areas, while coffee-growing is common in the temperate humid zone, and logging widespread in the pine forests of the temperate and cold dry zones. Migration to Oaxaca City, Mexico City and the United States is an expanding part of the peasant economy.

Given the continuing interaction between the Sierra Norte and adjoining areas of the state, a synopsis of four adjoining regions serves to put the Sierra in its geographical and social context. Much of the following discussion is drawn from a paper that summarizes ethnobiological research that has been carried out in Oaxaca (de Avila and Martin 1990).

Along the eastern side of the Sierra runs the Cañada, a deep valley that drains into the Papaloapan basin, the major river system of northern Oaxaca. The Cañada, which is characterized by a hot, dry climate and xerophytic vegetation, is predominately populated by Spanish-speaking people, some of whom are of indigenous origin. The valley bottom, which extends for some 100 kilometers, has a width of between 3 and 10 kilometers and an average elevation of about 1000 meters above sea level (Poleman 1964:34).

Aided by extensive irrigation systems, the valley has been planted with profitable sugar cane fields, tropical fruit-tree orchards and other commercial agricultural crops. Above the Cañada, the piedmont eventually rises into Cuicatec, Zapotec and Chinantec villages along the western escarpment of the Sierra Norte. For the inhabitants of these villages, the Cañada is the route to markets and services in Oaxaca and Mexico City. The federal government is seeking to create a protected area that covers part of the Cañada.

To the north, the Sierra dwindles into the Oaxacan portion of the Gulf Coastal Plain, which forms part of the lower Papaloapan basin. Until the last century, this region was covered with tropical evergreen forest. Throughout the 1900s, the natural vegetation has been increasingly supplanted by sugar cane fields, cattle pastures, and plantations of banana, tobacco, pineapple and rubber trees. The majority of the population is Spanish-speaking and non-indigenous, but a large number of lowland Zapotec, Chinantec and Mixe communities persist. The highland Chinantec, Mazatec and Zapotec, who inhabit the upper basin of the Papaloapan River, are partially dependent on the trade routes and agricultural plantations of the Gulf Coastal Plain.

The Valley of Oaxaca delimits the Sierra to the south. The valley floor, at an average of 1500 meters above sea level, is a relatively ample alluvial plain that has sustained dense populations since pre-colombian times (Winter 1989:34). The original vegetation has disappeared completely, both in the valley floor as well as in the severely eroded foothills of the northern and southern mountains (Smith 1978). These drastic ecological changes have not been matched by widespread acculturation – a large part of the valley is still inhabited by Zapotec peasants and merchants, who maintain a mixed economy of subsistence agriculture complemented with crafts production, horticulture, regional marketing and small-scale industry. A major commercial and governmental center of southeastern Mexico, the valley has a large non-indigenous population in Oaxaca City and other urban areas.

Inhabitants of the Zapotec, Chinantec and Mixe villages of the Sierra Norte have access to the central valley through a network of paved highways and dirt roads. These indigenous people visit the urban centers to take advantage of commercial opportunities and governmental services not available in their communities. Many agricultural products and crafts bound for Oaxacan urban areas and Mexico leave the southern part of the Sierra via the central valley. In addition, some mountain-dwellers take part in the weekly peasant markets of Tlacolula, Oaxaca and Etla, and many others migrate to the Valley to work as wage laborers.

To the west, the Sierra recedes into the Isthmus of Tehuantepec, an extensive coastal plain between the Gulf of Mexico and Pacific Ocean which is traversed by a chain of low mountains. Tropical deciduous and thorn forests predominate along the Pacific coastal plain, while the mountains summits are covered by cloud and conifer-oak forest. The evergreen tropical forest of the northern region has largely disappeared. Zapotec and Spanish speakers are interspersed by various smaller indigenous groups, including Huave, Mixe and Zoque speakers. Commercial production of corn, sorghum and oil-producing plants predominates, though traditional subsistence farming persists in some areas. Since the last century, commerce across the Isthmus has promoted the rise of several urban centers near the Pacific Coast. At present, industrial and urban development continues to be spurred by the recent construction of an oil pipeline, a large oil refinery and new coastal shipping installations.

These changes are occurring far from most of the inhabitants of the Sierra Norte and have little direct impact upon them. Chinantec and Zapotec speakers from the western-most villages of the Sierra have little contact with their Isthmanian counterparts, since commercial and migratory routes transect the Central Valley, Gulf Lowlands and Cañada more than the Isthmus. The easternmost Zapotecs and Mixes that inhabit lowland areas are the most directly affected by Isthmus affairs.

Ecology

Characterizing the vegetation types of Mesoamerica has proven to be a formidable puzzle. Given the great diversity of biological species, climate zones and topography, ecologists have struggled to make sense of the complex interrelationships between the biotic and physical components of the natural environment.

In this thesis, I draw primarily upon the vegetational analysis presented in Lorence and García (1989). For each of five vegetational categories, I describe the elevational range, climate and forest cover. In following chapters, I will discuss how these vegetation types correlate to indigenous people's classification of plants and other elements of the natural environment. These vegetation types, called by slightly different names, have also been described by Beard (1944), Miranda and Hernández

X. (1963), Rzedowski (1978) and other authors.

1) Tropical Evergreen Forest is found at 100 to 1200 meters (330 - 3960 feet) above sea level. Low temperatures range between 15° and 21° centigrade (60° - 70° Fahrenheit) with average high temperatures ranging from 27° - 30° C (80° - 86° F). Average yearly rainfall is between 3200 to 3700 millimeters (125 - 145 inches), the majority of it distributed over 9 - 10 months of the year, from May to February. The resulting climate is hot and humid, classified as Af in the Koppen system.

The forest canopy reaches to more than thirty meters, covering two other arboreal strata supporting abundant vines and epiphytes, as well as a shrub understory and herbaceous ground cover. The dominant trees include *Terminalia amazonica*, *Spondias mombin*, *Vochysia hondurensis*, *Pouteria sapota* and many other species. Much of the tropical evergreen forest has been converted to cattle pastures, corn fields, citrus groves and sugar cane patches. Some remnants are found along major lowland rivers and in more remote parts of the Sierra. This vegetation type corresponds to Lorence and García's (1989:256) Lowland, Submontane and Riparian Tropical Ombriphilous Forests. Rzedowski refers to it as *Bosque Tropical Perennifolio*, and Miranda and Hernández X. as *Selva Alta Perennifolia*.

2) Montane Cloud Forest occupies a niche from 1200 - 2250 meters (3960 - 7380 feet) above sea level. Low temperatures range from 12° - 15° C (54° - 59° F) while highs reach 21° - 26° C (70° - 79° F). Rainfall, much of it coming in the form of fog, averages 2700 - 3200 millimeters (100 - 125 inches) per year. The majority of it is spread over eight to nine months, from May to January. The climate is classified as humid montane, Cf in the Koppen system.

The vegetation is composed of epiphyte-covered, evergreen and deciduous trees that rise 20 - 30 meters above the forest floor, which in turn is densely blanketed with shrubs, tree ferns, palms and herbs. Dominant species vary widely from area to area, but often include *Liquidambar styraciflua*, *Pseudalmedia oxyphyllaria*, *Ticodendron incognitum*, *Weinmannia pinnata*, many *Lauraceae* and other trees. Rzedowski and Palacios-Chavez (1977) have described a particularly interesting cloud forest of *Oreomunnea mexicana* in the Chinantla. In general, cloud forest is well preserved at higher elevations (1800 - 2250 meters above sea level) where cultivation is not feasible, but is often replaced at lower elevations by coffee plantations and agroecosystems of corn, beans, squash, bananas and other crops. This vegetation type corresponds to Lorence and García's (1989:256-257) Tropical Ombrophilous Montane and Broad-leaved Cloud Forest. Rzedowski refers to this vegetation type as *Bosque Mesófilo de Montaña*, and Miranda and Hernández X. as *Bosque Caducifolio*.

3) The Evergreen Conifer Forest is restricted to high montane areas from 2750 to 3400 meters (9020 - 11,160 feet) above sea level. Low temperatures average 3° - 9° C (37° - 48° F), with highs ranging from 15° - 18° C (59° - 64° F). Frosts are common throughout the year, and snow occasionally accumulates on the ground in the winter months. Average yearly precipitation can vary between 2000 - 2700 millimeters (79 - 106 inches) per year, depending on if the forest is on the wet side or in the rain shadow of the mountain summit. The rain usually falls in a span of 7 - 8 months, from May until December. The climate ranks as Cw, temperate subhumid, on the Koppen scale.

The dominant trees, which reach 20 – 30 meters, include several species of *Abies* and *Pinus*. Other trees and shrubs with coriaceous, broad leaves are represented, especially *Arbutus xalapensis, Litsea glaucescens* and *Quercus laurina*. Vines are common, but epiphytic flowering plants are scarce, lichens and mosses being found in their place. Since the mid–1950s, the Evergreen Conifer Forest has been increasingly exploited to meet the demands for pulp and timber in the Sierra and adjoining lowlands. The vegetation type is equivalent to Lorence and García's (1989:258–259) Evergreen (Nongiant) Conifer Forest with Conical Crowns. In Spanish, it has been called *Bosque de Abies* by Rzedowski, and *Bosque de Abetos and Oyameles* by Miranda and Hernández X.

4) Pine–Oak Forest extends from 1000 to 2750 meters (3280 – 9020 feet) above sea level. The most broadly defined of the five vegetational categories, it is found in diverse locations in the Sierra – below the evergreen conifer forest, both below and above the montane cloud forest, and sometimes intermingling with the highest reaches of the tropical deciduous and tropical perennial forest. Low temperatures range from 9° – 15° C (48° – 59° oF), with highs reaching 18° – 26° C (64° – 79° F). Average annual precipitation can vary from 1300 – 3200 millimeters (51 – 126 inches), falling over 6 – 9 months of the years, from May to October or January. This variable climate can be classified as temperate subhumid to humid, BS or Cw according to Koppen.

Pine and oak trees of 10 to 30 meters dominate the forest, forming pure or mixed stands that include variable combinations of some 12 species of Pinus and over thirty species of *Quercus*. These trees may be intermixed with diverse species of deciduous or evergreen trees and shrubs, and epiphytes (particularly bromeliads) and ground-cover herbs are common in some areas. There are still extensive stands of pine-oak forest in the Sierra, but many trees have been cut for wood, fuel and pulp, and in many places the forest has been converted by local farmers to agricultural fields suitable for cultivation of subsistence crops or small-scale cattle raising. Pine-Oak Forest includes the Evergreen Coniferous Woodland and Evergreen (Nongiant) Conifer Forest with Rounded Crowns of Lorence and García (1989:258,260). It correlates closely with Rzedowski's *Bosque de Coníferas y de Quercus*, and the *Pinar*, *Bosque de Escuamifolios*, *Encinar* of Miranda and Hernández X.

5) Tropical Deciduous Forest is found from 1000 to 2300 meters (3280 - 7540 feet) above sea level. Low temperatures vary from 9° to 15° C (48° - 59° F) and highs reach 21° to 27° C (70° - 81° F). Precipitation is relatively sparse, averaging between 800 and 1300 millimeters (32 - 51 inches) per year, this falling mostly over 5 - 6 months from June to October. The climate is considered as temperate to hot subhumid, Aw to Cw in the Koppen system.

The forest canopy reaches 4 to 20 meters, and the dominant trees are highly branched and deciduous, their leaves falling at the beginning of the dry season. Common trees include many species of *Quercus*, leguminaceous genera such as *Acacia*, *Eysenhardtia* and *Pithecellobium*, and resin-containing trees like *Bursera*, *Procera* and *Pseudosmodingium*. The oaks occasionally intermix at higher elevations with *Pinus oaxacana*, *P. patula*, *P. rudis* and other conifers. Tropical deciduous forest has been greatly affected by humans. The oak trees are selectively felled for fuel and charcoal-making and other forest trees are cleared for wheat and corn cultivation. Areas with poor shallow soil have been overgrazed by goats and sheep. This vegetation type combines the Drought Deciduous Woodland and Lowland (and Submontane) Forest of Lorence and García (1989:259,260–261), the *Bosque Tropical Caducifolio* and *Bosque de Quercus* of Rzedowski, and the *Encinar* and *Selva Baja Caducifolia* of Miranda and Hernández X.

These vegetation types traverse the Sierra in bands that run from northwest to southeast. Tropical evergreen forest covers the northeastern humid lowlands, giving way to montane cloud forest along rain–drenched mountain slopes that face the Gulf Coast. At higher elevations, conifer–oak forests cover mountain summits on both the dry and the wet side of the Sierra. Tropical deciduous woodland and xerophytic vegetation are found in drier areas approaching the Oaxaca valley. Associated secondary vegetation covers vast areas of the lower elevations, from 100 to 1800 meters above sea level, and is present in deforested areas on higher slopes.

Archaeology

Archaeological studies could yield important data on how early settlers of the Sierra made a living from their natural surroundings. However, Sierra archaeology is in its infancy. Few sites have been excavated, artifacts have yet to be studied in detail and no paleobotanical research has been carried out in the area (Cline 1959).

As a result, most of the prehispanic events of the Sierra must be construed from the archaeological evidence of neighboring regions – the Oaxaca Valley, the Cañada and Tehuacán Valley, and to a lesser extent the Gulf Coast and Isthmus (Flannery 1968; Flannery and Schoenwetter 1970; Winter et al 1984). This evidence comes from four stages of the pre–hispanic era – the lithic, the village, the urban and the city–state - which are summarized in table 1.1.

Although a detailed review of the archaeological literature is beyond the scope of this thesis, several studies deserve mention because of their relevance to ethnobotanical studies in southern Mexico, and to the cultural differentiation of Mixe–Zoque and Otomangue speakers. Throughout this discussion, it is important to remember the tentative nature of the linguistic and archaeological data, and to recall the caveat of Suárez (1983:154):

> "The identification of linguistic groups with archaeological cultures is in general very difficult. Moreover, for the specific case of Mesoamerica one has to take into account the many gaps still existing in the archaeological knowledge of the area, and also the fact that the historical study of linguistic families has not reached the degree of refinement necessary for tackling these problems on a firm basis."

The first question to pose is when the first people arrived in Oaxaca, and began to explore its great wealth of plants, animals and ecological niches. Archeologists and historians consider that America was one of the last places to be settled by humans (Ponting 1991). The first step was to pass the Bering Strait during the height of the last glaciation, when reduced sea levels created a natural land bridge to Alaska. From there, these ancestors of the indigenous peoples of the Americas had to await a warmer climate which caused the major ice sheets of North America to retreat, opening passageways to the south east. Although the date of this migration is uncertain, many researchers believe that it began some 13,000 years ago and that people had reached the southern–most parts of South America within a few thousand years. If this interpretation is correct – and some archeologists would push the date back some 10,000 – 17,000 years earlier – we can assume there were people in Oaxaca at least 12,000 years ago.

To find specific data on the lifestyles of the first people to the region, we must turn to evidence from the Lithic period, from 10,000 B.C. to 1500 B.C. One major Lithic study addresses the prehistory of the Tehuacán Valley (Byers 1967, MacNeish et al 1967), an area of Puebla state that is contiguous with the Cañada of Oaxaca. The first volume of this study, dedicated to environmental conditions and subsistence patterns, documents the gathering, cultivation and domestication of various plant species. It also discusses various techniques of hunting and plant cultivation, and estimates their relative importance to subsistence throughout the prehispanic era (MacNeish 1967:290–309). In comparing the results of several Mesoamerican archaeological sites, MacNeish notes that lowland and highland cultures, found in distinct ecological zones, had different lifestyles. He concludes (1967:307),

> "the specific aspects of sustenance, food preparation, and subsistence activities that changed through time in the unique ecological zone that includes the Tehuacán Valley cannot be considered typical of all Mesoamerica, nor can one generalize that all other ecological zones of Mesoamerica underwent the same type of evolution in subsistence pattern as did the Tehuacán Valley".

The highland cultural pattern that MacNeish describes has come to be known as the "Tehuacán Tradition". In addition to the Tehuacán Valley, sites from Oaxaca, Hidalgo, Queretero and the Basin of Mexico have produced

Years	TG	Oaxaca Events	Sierra Events	Linguistic Events
10000 9000 8000 7000 6000 5000 4000 3000 2000 1500	L I T H I C	Arrival of first humans; presence of hunter and gatherer bands; emergence of agriculture & the Tehuacán tradition.	At first uninhabited, then visited by hunters and gatherers?	9 OM branches differentiate in central & southern Mexico; proto-MZ spoken in lowland Isthmus.
1400 1300 1200 1100 1000 900 800 700 600 500	V I L L A G E	Establishment and general increase of permanent agricultural villages; exchange with other regions, including Olmec civilization.	Probable occupation of some areas near the Valley and Gulf Coast.	OM branches begin internal division; MZ splits into 3 branches; some MZ words are borrowed widely.
400 300 200 100 B.C. A.D. 100 200 300 400 500 600 700 800	U R B A N	Gradual rise of small urban centers; development of writing, ritual and agricultural calendars, monumental architecture, social stratification; rise and eventual decline of Monte Alban and other cities.	Definite establishment of many, dis-persed settlements in the Chinantla, the Zapotec and Mazatec Sierra & the Mixe region.	Division of Chinantec, Zapotec and Mazatec into distinct dialects; differentiation of Mixe and Zoque, subsequent internal division of each language into dialects.
900 1000 1100 1200 1250 1300 1350 1400 1450 1500	C I T Y - S T A T E	Possible initial population decline; later appearance of metal objects, polychrome pottery, and elaborate codices; eventual domination by or alliance with Nahuatl-speakers of Central Mexico.	Population growth and regional conflict promote more colonization, including marginal zones; emergence of city-states?	Continuing geographical isolation reinforces differentiation of dialects; no apparent exchange of loan words between Nahua, OM & MZ languages.
1520	Arrival of Spanish, cultural and linguistic domination in Sierra Norte & Oaxaca.			

Table 1.1. The time spans, events and linguistic development of Otomangue (OM) and Mixe-Zoque (MZ) in the pre-hispanic era.

archaeological remains that pertain to this tradition, characterized by distinctive projectile points, stones used to grind corn and other plants and evidence of cultivated plants indicating the onset of agriculture (Winter 1989:18–19).

Who were the inhabitants of these dispersed sites? There is widespread consensus that they were speakers of Otomanguean languages, whose present-day distribution overlaps the range of the Tehuacán Tradition. Some researchers link the internal differentiation of Otomanguean to emergence of villages and agriculture some six to seven thousand years ago (Josserand et al 1984:9–10; Winter et al 1984:65–100).

Another important study was carried out by Kent Flannery and his colleagues in Guila Naquitz, a Lithic site in the Oaxaca Valley which borders on the Zapotec Sierra. Many of the plant remains represent species that are still being used by the indigenous people of the Valley and Sierra (Flannery 1986). Studies of this caliber in the Sierra Norte would resolve many of the pending questions of when populations first moved into the area and whether the first inhabitants were nomadic hunters and gathers, sedentary agriculturalists or a mixture of both.

The shift from the lithic to the village stage is obscure since the period from 3000 to 1500 B.C. is not well documented. As Winter (1989:21) notes,

"Since plant domestication and cultivation began by 5000 B.C. or earlier, it was not simply agriculture that marked the change from nomadism to permanent settlement. Villagers must also have had a nutritionally adequate combination of productive, high–yield plants, which included corn, beans, squash, avocado, and others. And they must have developed food storage methods".

During the village stage, the distinct cultural patterns of the highlands and the lowlands apparently became more marked. The highland tradition, for which more archaeological sites have been documented, is characterized by piedmont settlements found near rivers. These early inhabitants were probably Otomangue speakers who exploited the wild plants and animals of pine–oak, tropical deciduous and riverine cypress–willow forests. They likely practiced slash–and–burn agriculture, cultivating corn, beans, squash and other plants in rich alluvial soils (Winter 1989:22). The harvest was partially stored in bell–shaped pits carved into the ground near house sites. The houses are assumed to be similar to some dwellings that can still be seen in parts of the Sierra – square rooms constructed of poles and stems, lashed together with fibrous vines and then covered with mud. Thin poles formed the roof frame upon which bundles of palm or grass thatch were tied (Winter 1989:23).

Lowland settlements were apparently located on raised areas along major tropical rivers. Some of the carriers of this tradition were apparently Mixe–Zoque speakers who occupied a broad expanse of lowland territory from the Gulf of Mexico to the Pacific Ocean, covering parts of the present–day states of Oaxaca, Chiapas, and Veracruz. Based on the limited archaeological work that has been carried out on these sites, Winter (1989:22) visualizes the following characteristics,

"Houses, probably made of sticks with thatch roofs, were likely to have been cool, ... Food was probably stored in bags and nets suspended from the rafters rather than in underground pits. Fish and shellfish gathered from rivers and lagoons supplemented a diet based on cultivated corn. Spherical ceramic pots with small holes in the top called *tecomates*, were used for cooking".

Winter believes that these cooking vessels indicate that the lowland diet was partially composed of stews that contained diverse ingredients (1989:24).

Although relative cultural differentiation and geographical isolation persisted, elaborate trade networks were forming among the distinct regions. In the middle part of the Village stage, dating from 1300 B.C., the first traces of Olmec culture appeared along the Gulf Coast of Veracruz, where this civilization later flourished between 800 B.C. and 400 B.C. Certain symbols and religious concepts apparently became widespread at this time, constituting a pan-Mesoamerican culture and perhaps manifesting interaction between Mixe-Zoque, Otomangue speakers and Maya speakers.

The final centuries of the Village stage witnessed the emergence of several regional centers that are assumed to have been culturally distinct and politically autonomous (Winter 1989:30). One of these was located in the lowland Chinantla, near the present day village of Ayotzintepec. It is possible that the inhabitants of this site were speakers of a Chinantec language and that the adjacent montane region was already settled.

Archaeological research of the Urban and City-State stages has focused on the emergence of major population centers in the Oaxaca Valley, the Mixteca and other areas. Many advanced cultural elements such as writing, calendrical systems, and social stratification became evident in the Urban stage. The population size of human settlements increased. Monte Alban, a site in the Central Valleys of Oaxaca, was the largest, comprising some 25,000 inhabitants.

Settlements in the Sierra Norte also grew in size and number. This demographic expansion has been correlated with the diversification of languages. Chinantec, Zapotec, Mixe and Mazatec began to differentiate into separate dialects towards the end of the Urban stage, approximately 500 A.D. - 700 A.D.

The Valley Zapotec probably exerted some measure of control over what is now the Sierra Zapoteca, and the lowland Chinantec may have colonized parts of the mountainous Chinantla (Winter 1989:63,69). Sites in the Mixe region are poorly known. Artifacts from the Isthmus region reveal possible interaction with the Valley of Oaxaca in early Urban times and with Chiapas in late Urban times. Some unique carved stones may represent Mixe-Zoque objects of the late Urban stage (Winter 1989:66-67).

The decline of Monte Alban and population centers towards the end of the Urban stage remains an enigma. There was apparently an abrupt reduction in population and in social complexity, perhaps related to a deterioration of local ecological conditions and agricultural production.

Several hundred years later, a new organization of human settlements arose - the city-state. Politically-integrated and socially stratified, these populations of several thousand people inhabited a principal city surrounded by number of towns, hamlets and ranches. Together, these settlements functioned like a state, which Winter (1989:71) defines as,

> "an autonomous political unit encompassing several communities within a well-defined territory, [that] has centralized government, a social and

political hierarchy, and the power to tax (or exact tribute from) its members".

Did such city-states exist in the Sierra Norte of Oaxaca? Again, lack of archaeological research precludes a definitive answer. Winter states that many sites from this stage have been located in the Mixe region, but none has been excavated. The same applies for the Zapotec Sierra and for the mountainous portions of the Chinantla (Winter 1989:95–98). With or without a centralized political organization, colonization of the Sierra continued. A number of dispersed settlements were founded in marginal areas and the ethnic borders between Zapotecs, Mixes, Chinantecs, and Mazatecs became established. It is likely that established city-states in the Oaxaca Valley and the Gulf lowlands exerted some control over Sierra Zapotec and Chinantec communities, perhaps precluding the formation of strong political organizations in these areas. On the other hand, there is evidence that some militarily powerful city-states arose in the Mixe highlands, including one which was apparently centered around Totontepec.

Sites from the lowland Chinantla have yielded gold ornaments and polychrome pottery apparently of local manufacture as well as artifacts from Central Mexico that indicate Aztec occupation or contact. There is some indication that the Chinantec settlement around Tuxtepec was under Aztec control some time before the arrival of the Spanish. While Nahuatl-speakers were intruding from the north, Huave speakers were arriving in the Isthmus. In a process that perhaps began in the late Urban stage, the arrival of these groups eventually divided the contiguous Mixe-Zoque region into isolated groups of Mixe, Zoque, Popoluca and Tapachultec communities (Lowe 1977).

The course of cultural development in both lowlands and highlands was greatly affected by the arrival of the Spanish. In the section on ethnohistory, I discuss certain aspects of the history of the Sierra Norte, starting with the Conquest of Mexico. But first I characterize the languages of the Sierra Norte, and how they reflect the archaeological events described above.

Linguistics

Mesoamerica, from northern Mexico to northern Panama, is a land of linguistic diversity. Suarez (1983:xvi–xvii) lists 12 extant language families in the region (table 1.2), comprising over 80 languages that are still spoken at the current time. Within the region, the geographical unit of highest linguistic diversity is the state of Oaxaca, where five of the language families are represented and more than a hundred mutually unintelligible dialects may be spoken by an estimated 1,200,000 people (ibid 1983:16). The majority of these speakers belong to one of the two of the major language families, Otomangue or Mixe–zoque. Although linguists and anthropologists have advanced several hypotheses concerning the prehistory of these groups (Fernández de Miranda et al 1959) it is important to keep in mind the warning by Suarez (1983:154) that it is difficult to

Number	Name	Code
I	Uto–Aztecan	U–A
II	Totonac–Tepehua	T–T
III	Otomanguean	OTO
IV	Tarascan	TAR
V	Cuitlatec	CUI
VI	Tequistlatec–Jicaque	T–Q
VII	Huave	HUA
VIII	Mixe–Zoque	M–Z
IX	Mayan	MAY
X	Xinca	XIN
XI	Lenca	LEN
XII	Chibchan	CHB
XIII	Arahuacan	ARA
XIV	Misumalapan	MIS

Table 1.2. Mesoamerican Language Families (Suarez, 1983:xvi–xvii).

identify present linguistic groups with archaeological cultures.

Mixe–Zoque is the less complex of the two language families. It is divided into two major language groups, Zoquean and Mixean, both of which are represented in Oaxaca (figure 1.1; this classification has been modified by Wichmann 1991, as discussed in chapter 3). Proto-Mixe-Zoque began diversifying around 1600 B.C. (Kaufman 1963, 1964, 1973). Historically, Mixe–Zoque is associated with the Isthmus of Tehuantepec, the Gulf Coast lowlands of Veracruz and Tabasco, and the Pacific Coast of Chiapas and Guatemala (Winter et al 1984). Campbell and Kaufman (1976) have suggested that Mixe–Zoque speakers are the descendants of the Olmec population that dominated the Gulf Coast lowlands during the Preclassic, some 3500 to 2600 years ago.

A. Zoquean [ZOQ]
- 1. Chiapas Zoque
- 2. Oaxaca Zoque
- 3. Sierra Popoluca
- 4. Texistepec

B. Mixean [MIX]
- a. Mixe
  - 5. Mixe languages[1]
  - 6. Sayula Popoluca
  - 7. Olutla Popoluca
- b. Tapachultec
  - 8. Tapachultec[2]

Figure 1.1. Classification of Mixe–Zoque languages (Suarez, 1983). ([1] Languages represented in the Sierra Norte of Oaxaca [2] Extinct languages)

Speakers of Mixe–Zoque languages are now spread throughout four states (Wichmann 1991). There are over 88,000 Mixe speakers in the mountains and lowlands of Oaxaca. Zoque speakers are found primarily in Oaxaca and Chiapas, but there is also a small population in Tabasco. Together they number some 26,400 people. Approximately 18,600 speakers of the so-called Popoluca languages are located in montane and coastal plain areas of Veracruz (Foster 1940; Suarez 1983:169).

A. Otopameam [OTP]
  a. Pamean
    1. North Pame
    2. South Pame
    3. Chichimec
  b. Otomian
    4. Otomi languages
    5. Mazahua
    6. Matlatzinca
    7. Ocuiltec
B. Popolocan [POP]
  a. Popoloc-Ixcatec
    8. Popoloc languages
    9. Chocho
    10. Ixcatec[1,2]
  b. Mazatecan
    11. Mazatec languages [1]
C. Subtiaba-Tlapanec [S-T]
    12. Tlapanec
    13. Subtiaba[2]
D. Amuzgo [AMZ]
    14. Guerrero Amuzgo
    15. Oaxaca Amuzgo
E. Mixtecan [MXT]
  a. Mixtec
    16. Mixtec languages[1]
  b. Cuicatec
    17. Cuicatec[1]
  c. Trique
    18. Copala Trique
    19. Chicahuaxtla Trique
F. Chatino-Zapotec [C-Z]
  a. Chatino
    20. Chatino languages
  b. Zapoteco
    21. Zapotec languages[1]
G. Chinantecan [CHN]
    22.Chinantec languages[1]
H. Chiapanec-Mangue [C-M]
    23. Chiapanec[2]
    24. Mangue[2]

Figure 1.2. Classification of Otomanguen Languages (Suarez, 1983). [1]Languages represented in the Sierra Norte of Oaxaca [2]Extinct languages.

The most complex of all Mesoamerican language families is Otomanguen (Hopkins and Josserand 1979, Rensch 1976). Suarez considers it to be a "hyper-family", an assemblage of language groups each of which could be considered a family in its own right. Otomanguean is divided into eight groups (figure 1.2), each with a estimated degree of internal differentiation equal to that of other Mesoamerican language families such as Uto-Aztecan, Mixe-Zoque or Mayan. Glottochronological data suggest that differentiation of Otomanguean began around 4500 B.C. (Swadesh 1967). Hopkins (1984) estimates that by 3500 years ago, at the beginning of the Preclassic, the eight branches were already independent, with some showing internal diversification. Historically, Otomanguean is associated with the highlands northwest of the Isthmus of Tehuantepec, including the Valley, Cañada and

Sierra Norte of Oaxaca. This geographical location suggests a correspondence with the Tehuacán Tradition. This conjecture is strengthened by the fact that the time-frame for diversification of Otomangue roughly matches the shift from appropriation of wild natural resources to a greater reliance on agricultural production and the concurrent domestication of corn, beans, squash and other Mesoamerican food plants (Winter et al 1984).

Even after diversification of the various branches of Otomanguean, there was continued contact between the different ethno-linguistic groups. Josserand et al (1984:1) cite linguistic evidence that indicates, "mutual spheres of influence that reflect important networks in Otomanguean prehistory". In particular, populations of the Gulf escarpment were probably interacting with Otomanguean speakers from the Puebla and Tehuacán valleys, the central Mexican highlands and other areas. Speakers of Otomanguen languages remain the predominant group in the Mesoamerican highlands north of the Isthmus, and are represented in some lowlands areas of the Gulf and Pacific coasts. They number more than one million and comprise the greater part of the indigenous population in the states of Oaxaca, Mexico, Guerrero and Puebla.

Ethnohistory

Ethnohistory can be seen from two perspectives, the oral traditions that exist within an indigenous group and the historical accounts written by outsiders. In Mesoamerica, most myths and legends have a prehispanic origin, yet their current form reflects the changes that have occurred in recent times. Several compilations of folklore have been published by anthropologists and linguists who have worked with ethno-linguistic groups of northern Oaxaca, including the Mixe (Miller 1956) and the Chinantec (Weitlaner 1977). No in-depth analysis, such as that proposed by Levi-Strauss, has been conducted on the structure of these oral traditions, or how they relate to the culture and history of the local people.

Most of our historical information comes from archival documents and accounts written over the last four centuries and from a few pictorial works that date from the prehispanic era (Hamnett 1971; Pérez García 1956; Weitlaner 1961). Of the works known from Oaxaca, only a few pertain to the Sierra Norte. The Borgia codices, which portray certain aspects of ritual and divination, are thought by some to have originated in the Mazatec or Chinantec region (Winter 1989:78). The Valley Zapotec improvised an iconographic writing system. Interpretation of some glyphs found on stone slabs at Monte Albán indicate that the ruling Zapotec reigned over many areas outside the Valley of Oaxaca, perhaps including some communities of the northern Sierra. Several maps and *lienzos*, although produced in the 16th century, employ glyphs to depict the delimitation of some communities and the ascendancy of ruling families (Winter 1989:79). For example, the Lienzo de Guevea, originally painted in 1540, depicts the Zapotec village of Guevea de Humbolt which is located in the Isthmanian portion of the Sierra Norte.

There are many 16th century documents written in Spanish that describe the late prehispanic era as well as the early colonial period. Many administrative documents describe land disputes, relocation of indigenous populations, payments of tributes and other subjects. These archives, many of which have yet to be studied, give a detailed view of the colonial history of certain communities of the Sierra

Norte (Chance 1978, 1979; Cline 1946, 1949; Frey n.d.; Taylor 1972).

Towards the end of the 16th century, the Spanish crown asked that a questionnaire be filled out in many communities. The resulting *Relaciones Geográficas* contain much valuable information about prehispanic customs, local natural resources and the effects of the Conquest on the indigenous population. Several *Relaciones* are known from the Sierra Norte, including ones from and Mixe Chinantec communities.

The arrival of Dominican friars soon after the Conquest resulted in another set of valuable documents. Priests who lived in native communities recorded their observations on local languages and customs. The writings by Fray Juan de Cordoba, who lived with the Valley Zapotec, yield important information on how the Zapotec classified the natural world in the 16th century (Marcus and Flannery 1978), as well as descriptions of religious beliefs and social organization (Winter 1989:81).

No Dominican writings from the 16th century appear to have come from priests living in Sierra villages, but there are such documents from the 17th and 18th centuries. Fray Francisco Burgoa (1934a, 1934b), who lived in Villa Alta for several years, published two major works in Spanish, the *Palestra Historial* and the *Geográfica Descripción*. De la Barreda wrote the *Doctrina Christiana* in Chinantec, a book that he prepared after spending twenty years in a highland Chinantec community (Cline 1958). These works contain a good deal of information on the Zapotec, Mixe and Chinantec of the Sierra Norte, but the accounts are often tainted by the clerics' prejudices against the indigenous people as well as a tendency to cite legends, historical fact and personal impressions in the same tone (Winter 1989:81).

These various sources allow us to reconstruct some of the Colonial history of the Sierra Norte. Spanish soldiers arrived in Oaxaca during the latter part of 1521, initiating a series of changes in native lifestyles, languages and political organization. There appears to have been some early exploration of the Sierra. The Spanish were impressed with their finds of gold, silver and other metals in the region (Gay 1950:358; Gerhard 1972:54).

Military campaigns were common, and the indigenous people seem to have been alternately friends and foes of the Spanish soldiers. The Chinantec were reputed to have formed an alliance with the Spanish to battle other indigenous groups. The Zapotec also joined forces with the Spanish in a series of largely unsuccessful campaigns against the Sierra Mixe.

What could not be accomplished by military force was carried out by priests and colonists. Soon after the Conquest, the Sierra was divided up into *encomiendas*, regions containing numerous communities and extensive lands. These were granted to various conquistadors, who were given the right to extract tribute and labor from the local people. At the same time, these colonists were expected to teach Spanish to indigenous people and to encourage their conversion to Catholicism. Dominican priests entered the Sierra in 1531, some ten years after the first military expeditions, to lead the proselytization.

Towards the end of the 16th century, the Spanish crown began to implement a program of *congregación*, concentrating dispersed populations into centralized villages that facilitated administrative and religious control. This program met with varying degrees of success, as I show in the specific discussions of *congregación* in

Mixe and Chinantec populations.

Throughout its history after colonization, there have been alternating trends of economic integration and isolation of Oaxaca in the international economy (Murphy and Stepick 1991). The 17th and 18th centuries were marked by demographic growth for the indigenous communities of the Sierra Norte, as local people recovered from the population losses incurred during epidemics and forced relocation. This growth was matched by relative isolation from the international economic and political order. Despite the development of colonial cochineal and textile *repartimientos* in the Sierra Juarez, the 17th century was a time of general economic depression in Mexico. Wolf (1959) states that Indian villages reacted to this era of instability by stressing community unity and self-sufficiency, while at the same time shunning involvement with the outside world. This led to a renewed reliance on subsistence agriculture, diminished contact with other ethnic groups and sparse interaction with priests, merchants and colonists.

At the beginning of the 19th century, the Sierra Norte was in a period of relative economic decline. Unlike other more urbanized regions of Oaxaca state, roads in the Sierra were nonexistent, complicating communication and transportation of goods to the Oaxaca Valley and the Gulf Lowlands. Sierra haciendas, which had never developed into large enterprises, suffered from the general decline of Mexican export agriculture. Traditional sources of wealth such as cotton weaving and cochineal production were suffering from competition from other zones of production and mining was not able to flourish because of the political uncertainties of an unstable Mexico. Farming and craft production were limited to Indian communities

(Frey n.d.:2).

In the face of this economic stagnation, Sierra peasant villages continued their strong tradition of subsistence activities accompanied by craft and agricultural production for the regional market system. Despite the uncertainties of the world market, activities such as mining, cotton weaving, cochineal production and cultivation of cash crops were the basis for economic specialization of distinct subregions. This specialization followed environmental and cultural lines, with different villages providing goods and services according to the knowledge, resources and technology at hand.

As Mexico entered the 19th century, independence and the definitive end of the Spanish trade monopoly were not far away. Most academics have portrayed the Sierra Norte as a culturally-conservative society that moved through the 19th century without notable social changes (Frey n.d.:3). The peasant hinterland was depicted as a vast area of socially undifferentiated, independent villages that carried out traditional subsistence activities on their communal lands, not much affected by the political and economic systems that were developing around them. Frey challenges this view, suggesting that the Sierra was in fact going through a process of social and economic differentiation that led to the development of what he calls 'indigenous petty capitalist producers'. This peasant elite derived its wealth principally from agriculture, and by the end of the 19th century, it had evolved into an important economic and political element of indigenous villages.

In the early twentieth century, as popular classes began to challenge Porfirio Diaz on the national level, Mexico entered into a period of political and economic crises that culminated in the revolution of 1910 (Waterbury 1975). Carranzista forces occupied Oaxaca in 1916, effectively isolating the Sierra Norte and curtailing textile, coffee and mining production. The sudden loss of market access precipitated a shift in Sierra economy – after suffering during some initial years of famine, the *serranos* quickly dropped commercial production and returned to making a living by practicing subsistence agriculture. Still in control of their communal lands and without major lines of communication to other parts of Oaxaca and Mexico, the Chinantec and other Indians reverted to a lifestyle similar to that of lean times in the colonial and post–independence days of the 17th, 18th and 19th centuries. Frey (n.d.:27) considers that this new period of economic isolation, and the maintenance of the Sierra as a zone of traditional production, lasted until the recent period of national economic development that began in the 1950s.

As in the Sierra, commercial agriculture in the Gulf lowlands continued to stagnate in the early part of the 20th century. Throughout the civil unrest and economic crisis of the revolutionary period, large landowners were able to maintain control over their haciendas and their contracted laborers, many of whom came from the Sierra in search of wages. But with delays in the construction of a national highway system, distribution of agricultural produce remained difficult, and the major agricultural zones were limited to semi–urban areas with access to the railroad (Poleman 1964:60–61).

Two crops which did compete on the world market – tobacco and bananas – reached their zenith before the advent of national development programs in the 1950s. The production of Valle Nacional tobacco, destined for the export market, peaked around the turn of the century. As quality declined and the Revolution disrupted production, Oaxacan tobacco lost its place in the world market. Production of export quality bananas began in the mid–1920s but after 15 years of profitable business, banana blight began to reduce yields drastically so that by the 1950s production was oriented only to the domestic market (Poleman 1964:70–71). Despite these impediments to economic growth, the lowlands – as a center of incipient commercial agriculture – retained the potential for rapid modernization and have been the focus of great investment by the national government in recent decades.

The promise of land redistribution and other benefits for rural Mexicans tendered by the 1917 constitution began to come true only with the presidency of Lázaro Cárdenas from 1934 – 1940. First came the redistribution of lowland territory in the form of *ejidos*, government-owned lands given in perpetuity to peasant communities. This was followed by a national development program aimed at modernizing the lowland economy, gaining access to some remote parts of the Sierra, and exploiting the forest resources of the Oaxacan hinterland. Under the aegis of an integrated development plan called the "Papaloapan Project", agricultural initiatives were combined with efforts to control the floodwaters of the Papaloapan river basin, Mexico's second largest watershed. Two major dams were constructed and the resulting reservoirs – which displaced thousands of lowland Chinantec and Mazatec people – provided irrigation for agriculture and electricity for industrial development. The resulting commercial agriculture in the lowlands was based on the cultivation of sugar cane, pineapples, beans, bananas, rice, tobacco and chile (Poleman 1964:68).

The same style of agricultural production continues until this day. Cattle grazing and tobacco production are on the increase and the other cash crops are maintaining their levels of production. Agricultural expansion was paralleled by vast industrial development which included the construction of a brewery, sugar refinery and pulp mill. These various industries and plantations continue to function at present, drawing labor and resources from the Sierra.

While the lowlands were going through a period of economic expansion, the Sierra was increasingly the target of governmental development programs. This penetration has been achieved on several different levels as in other parts of Mexico (Corbett and Whiteford 1983). In most cases, national programs act to change the ideas and customs of local people. Government workers seek to achieve this by not only by introducing new institutions (e.g. schools and agricultural extension offices) but also by co-opting traditional political organization, including elements such as communal labor (*tequio*) or the body of locally-elected authorities.

An important benchmark in this process was the beginning of extensive logging of Sierra forests in 1956. Under the aegis of a 25-year concession to semi-private and private companies, the government began to build a network of roads in the Sierra. With greater communication came additional programs and services - schools, electricity, agricultural extension, health care and a myriad of other initiatives that have grown and ebbed with the political and economic cycles of Mexico.

The influence of a hegemonic state - first Spanish and then Mexican - has had a profound impact on the indigenous perception of the natural environment. The classification of plants has been modified to include many introduced species, and folk nomenclature is now replete with names derived from Spanish. Local people, drawn increasingly into a market economy over the past four centuries, have often modified their ways of managing natural resources.

Ethnography

If we are to draw from ethnography an initial understanding of the cultural and ecological differentiation of indigenous groups, we must first look at the paradigms that have dominated Mexican anthropology since the turn of the century. Over the last seventy years, Mexican ethnography has combined basic tenets of major schools of European and American anthropology with perspectives unique to Mexican social scientists. This development has provided a variety of theoretical frameworks that shape not only the way that fieldwork is carried out, but also how the results are interpreted. In each of these approaches, we find distinct ways of considering the interaction between indigenous people and their environment. Hewitt de Alcantara (1984) provides a detailed analysis of the major trends in Mexican anthropology.

In general, ethnographers of the Sierra Norte have tended to shun empirical studies of how humans relate to the natural environment, preferring instead to emphasize the mental, social or economic bases of culture. In the following sections, I provide a synopsis of three perspectives reflected in the works of various anthropologists who have studied the indigenous cultures of Oaxaca.

Ethnographic Particularism

The development of Mexican anthropology is due in part to the direct collaboration of major American and European anthropologists with local counterparts, resulting in a peculiarly Mexican adaptation of major currents of anthropological theory. One of the first instances was the interaction between Franz Boas and one of his students at Columbia University, Manuel Gamio.

Their school of ethnographic particularism focused on the collection of empirical data on the indigenous groups of Mexico. This catalogue of learned social behavior described in detail the culture of many groups but lacked a theoretical framework in which to analyze the resulting data. As Hewitt de Alcantara (1984:20) concludes, "the relationship between each cultural trait and all others was not particularly clear, nor was there any good reason why a specific element should have taken one form and not another".

This style of anthropology is exemplified by Frederick Starr (1899, 1900, 1902), the first anthropologist to visit the Sierra Norte of Oaxaca. Although his research primarily concerned the physical anthropology of indigenous people, he published ethnographic notes based on his visits to southern Mexico in 1898, 1899 and 1900. Starr traced the development of cultural traits to the local environment, demonstrating his inclination towards environmental determinism. This tendency was shared by later ethnographers such as Bernard Bevan (1938), who made excursions to the Chinantec part of the Sierra in 1934 and 1936. Together, they set the stage for later structural–functional accounts of community isolation by discussing the geographical boundaries that divided the various indigenous areas of the Sierra.

Community Studies and Functionalists

Fieldwork methodology was infused with theory upon the arrival of structural–functionalism to Europe and America. Robert Redfield (1930) carried out the first major functionalist studies in Tepotzlán, Morelos and Chan Kom, Yucatán, and in turn influenced a large number of Mexican and American anthropologists who carried out community studies in other areas. Redfield and other practitioners of functionalism in Mexico followed anthropological research designs proposed by Kroeber (1952, 1984), Radcliffe-Brown (1952) and Malinowski (1948). Their studies were limited to relatively isolated rural communities. Because they were attempting to illustrate how culture works as an integrated whole, they often omitted descriptions of social change and conflict between neighboring ethnic groups and communities.

These studies concentrated on the ways in which on "... a small, relatively isolated, illiterate peasant community could meet the physical, social and psychological requirements of daily life, without recourse to any of the trappings of modernity" (Hewitt de Alcantara 1984:21). Similar to practitioners of Boasian particularism, functionalists strived to make as detailed a study as possible of the culture in a single community.

Ideally, both particularism and functionalism should have included a precise description of the ecological conditions of each community and a detailed consideration of the environmental constraints on culture. But on the contrary, this relationship was only briefly explored in many of these early studies. Given that Boasian particularism was uninspired by any strong theoretical orientation, it is perhaps not surprising that its practitioners produced only a rudimentary account of the subsistence ecology of ethnic groups.

In the case of functionalists, who studied communities that were highly dependent on the natural environment, the discrepancy can be explained by the emphasis on the mental rather than material aspects of culture – they were more interested in the world view of community members that the actual mechanism of how they made a living. Perhaps reacting to the environmental determinism of an earlier generation, they were searching for psychological explanations of culture. Hewitt de Alcantara (1984:27) suggests that many ethnographers working in Mexico have tended to follow Redfield's emphasis on world view, since "... while the physical environment could set limits beyond which men could not venture, it could not determine the particular use which those same men would make of the resources at their disposal". Even a new group of functionalists, represented by George Foster (1940, 1953, 1969, 1978), Oscar Lewis (1960) and Ralph Beals (1960, 1969, 1973), maintained and further developed Redfield's emphasis on the mental aspects of culture, even while they challenged his insistence upon isolation and culture contact as the major determining factors of social change.

Cultural Ecology

Cultural ecologists sought to go beyond community boundaries to explore the relationship between rural inhabitants and the broader social, political and economic order of which they form an integral part. Drawing inspiration from Julian Steward (1955), cultural ecologists tended to deemphasize mental organization of reality, paying closer attention to the ecological adaptations required by the local environment (Hewitt de Alcantara 1984:70). Motivated in part by Marxist thought, anthropologists such as Eric Wolf (1957, 1959, 1966) and Angel Palerm (1967, 1980) accepted that the complex knowledge and management of natural resources was an integral part of the cultural definition of peasantry. However, they rarely investigated this aspect with an eye to empirical detail, since they were more concerned with detailing the articulation between the peasant and the capitalist modes of production.

Archaeologists have been more concerned than anthropologists with applying ecological theory to the case of Oaxaca. Flannery presents a multivariate model that draws upon ecological perspectives to explain the emergence of agriculture in the Central Valley, and in southern Mexico in general (Flannery 1986).

Several ethnographers have given a superficial portrayal of the relation between the ethnolinguistic groups, ecological zones and production in the Sierra (de la Fuente 1965:35; Nader 1969). They emphasize that each of the local ethnolinguistic groups has a different pattern of access to the ecological zones of the Sierra. The vision that emerges from these portrayals is that the highland Chinantec inhabit a broad range of vegetation types, while the Mixe are primarily restricted to the humid montane forests, and the Sierra Zapotec are dwellers of the dry montane pine and deciduous forests. In accordance with this access to ecological zones, the inhabitants of each region have different capacities to produce agricultural and forestry products. The cloud forest Mixes produce coffee for export. The Zapotecs in the dry forests cut large quantities of timber to sell to local saw and pulp mills, and harvest tree fruits for sale in regional markets. The Chinantecs raise small amounts of cattle in the lowlands, plant coffee in the humid forest and cut timber in the pine woodland. All three groups grow corn, beans, tree fruits and other crops for subsistence consumption throughout their communal lands.

The relative ability to market these agricultural and forestry products also varies among the groups. The Zapotecs, who are rather close to Oaxaca City and have long been the travelling merchants and migrant laborers of the Sierra, have traditionally maintained greater access to commercial markets than the Chinantecs and Mixes. The Chinantecs, connected to Oaxaca and Veracruz by a paved road built twenty years ago, are increasingly involved in migration, commercial agriculture and forestry. They have a more direct access to national markets than the Mixes, who typically sell their produce in regional periodic marketplaces or through Zapotec middlemen.

Although this general image of Sierra ethnicity, ecology and economy is true, peasants tends to utilize a variety of climatic zones within their own communal lands, thus diminishing the impact of ecological limits from one community to another. Even the Mixe who live in the humid forest seek out pine trees for construction lumber, and many Zapotec communities have ranches in humid areas where they can grow coffee. The Chinantec certainly span many ecological areas, but at any one time they concentrate their productive activities in the zone that can ensure the highest income or subsistence level. Access to markets is not a simple affair, either. Although the Zapotec control many elements of Sierra commerce, there are relatively remote Chinantec communities that specialize in itinerant trade.

In the end, ethnographic studies from the Sierra Norte offer us scarce empirical detail on the way that indigenous people interact with the environment. For a more careful account of their perception and utilization of the plants, animals and ecological zones, we must turn to the few ethnobiological studies that have been carried out in the Sierra and adjoining regions.

Ethnobiology

Many researchers consider that ethnobotany originated as the search for medicinal and other useful plants found in lands explored by Europeans (Davis 1990; Ford 1978). The anecdotes recounted by travellers to distant lands encouraged academics to begin systematic studies. By the end of the 19th century, researchers were striving to make either inventories of the plants used by a particular ethnic group or cross-cultural comparisons of how a particular species is used (Castetter 1944; Gilmore 1932).

As explained in more detail in Chapter 4, ethnobotanical studies expanded in the 20th century. Several lines of research became apparent, and each one encouraged a different relationship between academics and local people. In some studies, the emphasis has been primarily on the utility of plants and only secondarily on the cultures who know about them. The object of the research has been to learn the properties of plants with the hope of discovering new products that may be commercialized in regional, national or world markets. This style of ethnobotany, called economic botany, developed as Europeans and Americans explored the natural resources of the countries they had colonized in the Third World. Economic botanists, supported by botanical gardens and research institutes, sought to discover new species of plants useful in the agriculture, commerce and industries of the developed world.

Practitioners of ethnoscience, which emerged in the 1950s, took an anthropological and linguistic approach to analyzing folk knowledge of the natural environment. One of the important achievements of this line was to provide a methodology and theoretical framework for the cross-cultural analysis of folk biological knowledge (Berlin 1992; Bright and Bright 1965; Conklin 1954, 1962; Frake 1962; Werner 1969).

Ethnobotany's dual origin as the search for raw plant materials and the quest to understand perception of the local environment provided the stimulus for creating a line of applied research which demonstrated the growing relevance of ethnobiology to appropriate economic development (Caballero 1986; Toledo 1976, 1982; Toledo et al 1985). Since the 1970s, ethnobiologists have worked together with local people to study the environment, thus promoting the revalidation of traditional knowledge and local control of natural resources (de Avila and Martin 1990; Varese and Martin 1993). One of the main goals of this approach has been to promote interest within communities so that local people mobilize themselves to carry out ethnobotanical studies dedicated to their own needs.

In Mexico, ethnobotanists followed the path of this historical development with important innovations and applications along the way. Various *Codices*, *Relaciones* and other historical documents give us a glimpse of folk botanical knowledge in prehispanic times. Many of these chronicles of plant use and classification were elaborated by priests who worked closely with indigenous people in the 16th century. Bernardino de Sahagún, a Franciscan priest, includes much information on natural history in his encyclopedic ethnography of the Aztec. In Oaxaca, the Dominican Fray Juan de Córdova recorded folk knowledge of the natural environment in his Zapotec dictionary and other linguistic works (Marcus and

Flannery 1978).

European and American botanists began collecting plants in Oaxaca in the 1800s, but provided little information on indigenous names and uses. Although ethnobotany was defined as a separate field of inquiry in the late 19th century, the first modern ethnobotanical studies in Mexico were carried out in the first half of the twentieth century. The results of Richard Evans Schultes' classic study of economic botany in Oaxaca are contained in his doctoral dissertation (1941a) and numerous articles (1940a, 1940b, 1940c, 1940d, 1941b, 1941c). Schultes, a renowned ethnobotanist who trekked through the Sierra Norte in 1938 and 1939, recorded the indigenous names and uses of hundreds of species, providing us with a valuable document on the status of ethnobotanical knowledge in the Sierra some fifty years ago. Messer (1978a, 1978b, 1981) addressed some issues of ethnoscience in her study of Mitla Zapotec ethnobotany.

In Mexico, botanists, anthropologists and medical doctors from many governmental offices have carried out ethnobotanical projects in collaboration with local people. The results of their research has been returned to the communities through exhibits and publications of useful plants. These research projects have generally been less systematic and rigorous than economic botany or ethnoscientific studies. One of the greatest challenge facing these governmental programs is to incorporate traditional ethnobotanical knowledge in health, agricultural and educational projects that are carried out in indigenous communities (Martin 1987).

The indigenous promoters involved in these governmental projects sometimes continue to investigate and promote their traditional knowledge even after the official programs have ended (López Hernández n.d.). Some participate in academic research projects, while still others have organized fellow community members to form autonomous ethnobotanical projects. Still others have gone on to study anthropology or botany at the university level to continue their ethnobotanical research.

Numerous applied projects of ethnobotany have been carried out in the Sierra Norte. The Oaxaca regional office of *Culturas Populares*, a popular education program, sponsored projects on the useful plants of Mixe, Chinantec and Zapotec communities. In the same area, the *Instituto Nacional de la Nutrición* carried out nutritional analyses of edible greens and field trials of medicinal herbs used to treat gastro–intestinal disorders. The *Instituto Nacional Indígenista* promoted traditional knowledge of medicinal herbs, including the establishment of medicinal plant gardens in some Mixe communities.

Beyond these three approaches, there has been several ethnobotanical studies in the Sierra that focus on specific anthropological, phytochemical or other issues. Many researchers have shown interest in the ritual use of hallucinogenic mushrooms and plants among the Mazatec, Chinantec, Mixe and other Sierra groups (MacDougall 1960; Ortiz de Montellano and Browner 1985; Rubel and Gettelfinger–Krejci 1976; Schultes n.d.; Wasson 1963, 1966). A number of studies have outlined the names and uses of selected plants in particular indigenous communities (Browner 1984, 1985a, 1985b; Lipp 1971; Reko 1923, 1949). A multidisciplinary approach is found in studies by Heinrich and his colleagues, which focus on the ethnobotany and phytochemistry of medicinal plants of Guichicovi, a lowland Mixe community, and other areas of northern Oaxaca (Heinrich and Barrera 1993; Heinrich, Rimpler and

Barrera 1992; Heinrich, Velazco and Ramos 1990). Key linguistic information on variation in plant nomenclature is found in bilingual and etymological dictionaries, many published by the Summer Institute of Linguistics (e.g. Rensch 1989; Schoenhals and Schoenhals 1965) and in other sources (Kaufman 1963, Wichmann 1991). The entire corpus of ethnobotanical literature from the Sierra Norte is small, but each work sets the stage for a wider comparative work on the classification and use of plants in the diverse ethnic and ecological zones of the region.

2. The Chinantec of the Sierra Norte

Chinantec Culture History

The Chinantla has been a difficult area to delimit. Richard Evans Schultes (1941c), an ethnobotanist who carried out research in the area in the late 1930s, asserted that it corresponds only to humid temperate and tropical forests found along the Gulf slopes of the Sierra Norte. Anthropologists tend to emphasize ethnic and linguistic boundaries instead of ecological ones (Stebbins 1984:47). The Chinantla that I refer to in this thesis includes all settlements where Chinantec is the primary language spoken.

Reconstruction of the cultural history of the Chinantec is limited by the paucity of documentation for northern Oaxaca. Early exploration was curtailed because of the difficulty of access, lack of broad expanses of tillable lands, absence of valuable resources and dispersed populations (Bevan 1938:3; Weitlaner and Cline 1969:523). There is little archaeological evidence to draw upon (Cline 1959). Ethnographic materials on the Chinantec are less plentiful than for groups such as the Zapotec and Mixtec (Barábas and Bartolomé 1973; Cline 1956; de la Fuente 1947, 1949; Ford, 1947; Gwaltney 1970, 1981; Kearney 1972; I. Weitlaner 1936; R. Weitlaner 1939, 1951; Whitecotton 1977).

Nevertheless, several sources do allow a preliminary sketch of Chinantec culture history. Although archival documents are few, they have been extensively studied by historians and anthropologists. Linguists have worked in many villages, clarifying the relationship between the different Chinantec languages and reconstructing proto-Chinantec phonology and vocabulary (Rensch 1968, 1989). The ecology and geography of the area are relatively well understood, permitting an accurate mapping of Chinantec access to diverse vegetation and climate zones.

Since before the arrival of the Spanish and up to the present day, numerous historical events have had an impact on the culture and geographical distribution of the Chinantec people. In the first part of this chapter, I briefly discuss six historical periods and their possible relationship with changes in the Chinantec's knowledge and management of the natural environment. I give general information on the Chinantec in general for the prehispanic era, but I pay increasingly more attention to the highland populations for later historical periods. In the second part of the chapter, I describe the municipality of Santiago Comaltepec, where I carried out detailed ethnobotanical research.

1) Prehispanic Period (9500 B.C. - 1520 A.D.)

According to tentative linguistic evidence, the Otomanguean language family began to diversify during the Lithic stage, at least 6400 years ago.

Code	Communities
Oji	Ojitlan
Usi	Usila
TMQ	Tlacoatzintepec, Mayultianguis, Quetzalapa
Chi	Chiltepec
Soc	Sochiapan
Tep	Tepetotutla
Tla	Tlatepusco
Pal	Palantla
VaN	Valle Nacional
Ozu	Ozumacin
A-L	La Alicia, Rio Chiquito, Lalana
Lea	Lealao
Q-Y	Quiotepec, Yolox
Com	Comaltepec

Table 2.1. The fourteen mutually unintelligible Chinantecan languages.

Swadesh (1967:95-96) infers from glottochronological data that Chinantec is relatively isolated from other Otomanguean branches, showing a separation of nearly

5000 years from languages such as Trique and Ixtlan Zapotec. As with several other branches of this language family, Chinantecan was well differentiated by 3500 years ago, at the beginning of the Village stage. At that time, the Chinantec were probably occupying their present location along the Gulf coastal plain, the Gulf escarpment and perhaps the northern highlands of what is now Oaxaca (Hopkins 1984:42–44).

Chinantec underwent internal differentiation during the Urban stage, perhaps as a result of the formation of political entities inside and outside of the Chinantla (Hopkins 1984:52). Glottochronological data indicate that this diversification began at least 1500 years ago (Swadesh 1967:95), resulting in the approximately 14 mutually unintelligible Chinantec languages recognized today (Rensch 1989:4). The principal communities where these languages are spoken, as well as the language abbreviations that I use in this thesis, are listed in table 2.1.

Various subgroupings have been proposed for the Chinantec. Bevan (1938) suggested that there were four basic divisions based on the geographic distribution, cultural traits and self-description of the inhabitants of various villages (table 2.2). Weitlaner and Cline

Chinantec sub-group	Included languages
North and West	Oji, Usi, TMQ, Chi, Soc
Central (hu-hmei)	Tep, Tla, Pal, VaN, Ozu
Southeast (wa-hmi)	A-L, Lea
Highlands (dzah-hmi)	Q-Y, Com

Table 2.2. The four sub-groups of Chinantec people according to Bevan (1938).

Chinantec sub-group	Included languages
Central (I)	Tep, Tla, Pal, VaN, Ozu
Eastern (II)	A-L, Lea
Western (III)	Q-Y, Com
Northern (IV)	Oji, Usi
Northwestern (V)	TMQ, Chi, Soc

Table 2.3. The five sub-groups of Chinantec people according to Weitlaner and Cline (1969).

(1969) changed this classification only slightly, modifying the geographical names and dividing Bevan's 'North and West' group into a Northern and Northwestern division (table 2.3).

Rensch (1989:3–9) offers a critical evaluation of these schemes and proposes one of his own. He posits five basic groups, based on recent data concerning mutual intelligibility and patterns of phonological and lexical change between Chinantec languages. Although similar to the earlier proposals, he divides Weitlaner and Cline's 'Central group' into two divisions and unites their Northern and Northwestern groups, much as Bevan had originally proposed.

In examining patterns of sharing in 47 phonological innovations that occur in one or more of the Chinantec languages, Rensch found that there is a northern group that is more innovative and a southern one that is more conservative. Of all the languages, Comaltepec Chinantec is the most conservative, exhibiting just 4 of the 47 phonological changes.

Rensch (1989:7) also identified 36 word sets that reflect lexical changes, each of which has occurred in at least two of the languages. The patterns of innovation support his subgroupings and further indicate the distinctiveness and conservative tendency of the western highland languages. Seven sets distinguish Quiotepec and Comaltepec Chinantec from all other languages and the other 29 word sets do not involve any variant from the western highlands.

Rensch notes that the language groups follow geographical boundaries, lending credence to the idea that physical separation between populations promotes linguistic diversification. Rensch (1989:7) succinctly defines the lay of the land in the

Chinantla: "The western highlands are separated from the lower Chinantla by the high and difficult terrain of the Cerro Pelón area ... The northern and southern river systems are divided by a transverse spur of the Sierra Madre called the Cerro Armadillo, which runs deep into the lowlands nearly to the confluence of the Santo Domingo and the Valle Nacional rivers".

Rensch's classification of Chinantec languages – along with included communities, relative frequency of linguistic changes and geographical location – is given in table 2.4.

Group #	Included Communities	Linguistic Changes	Geographical Location
1	Oji, Usi, TMQ, Soc, Chi	Innovative	Northern Lowlands
2	Tep, Pal	Innovative	Cerro Armadillo
3	VaN, Ozu	Conservative	Southern Lowlands
4	A-L, Lea	Conservative	Southern Lowlands
5	Q-Y, Com	Conservative	Western Highlands

Table 2.4. Subgrouping of Chinantec-speakers based on mutual intelligibility, linguistic changes and geographical location (Rensch 1989:3–9).

A summary of the process of Otomanguean and Chinantecan linguistic diversification from the Lithic Stage to the present day is illustrated in figure 2.1. Chinantec is one of eight branches of the Otomanguean family, which started diversifying some 6400 years ago. All of these branches were distinct by 3500 years ago. Chinantec began to diversify at least 1500 years ago, resulting in the 5 language groups and 14 languages found in Oaxaca today. According to the 1990 census, these languages are spoken by some 109,100 Chinantecs living in Mexico, of which 90,322 are found in Oaxaca state, primarily in the Gulf coastal lowlands and northern Sierra of Oaxaca state. Some 17% of the Mixe population has migrated to Mexico City, the United States and other areas outside of Oaxaca.

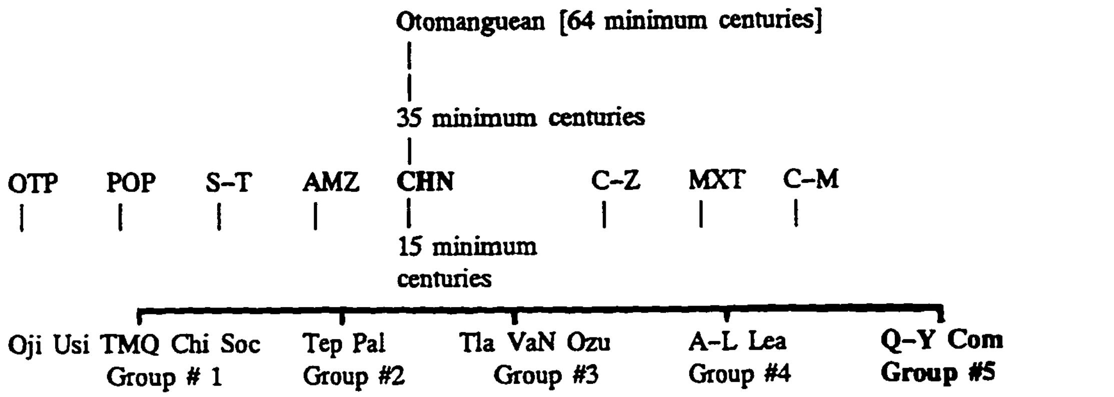


Figure 2.1. Diagram of the diversification of Otomanguean and Chinantecan language families (Abbreviations for the present-day Chinantec Languages are given in table 2.1. Abbreviations for Otomanguean branches are given in figure 1.2).

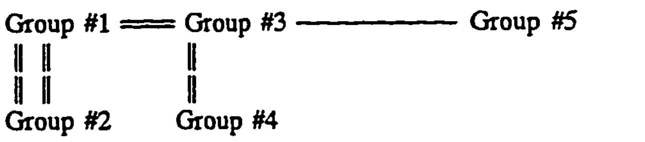


Figure 2.2. Rensch's estimation of the affinities between the five sub-groups of Chinantec languages (1989:6).

Rensch draws on the measures of mutual intelligibility and linguistic innovations to consider the affinities between the various groups. He concludes that the western highland languages (group #5) are the most dissimilar from the others, that groups 1 and 2 are quite similar and that group 3 shows affinities to both group 1 and 4. He also notes that group 2 is not particularly closely allied to groups 3 and 4 (figure 2.2).

In the Urban stage, linguistic differentiation of Chinantec may have been propelled by the migration of some Chinantec populations towards the Gulf Coast and others toward the Valley of Oaxaca, initiating the geographical differences found at present (Winter et al 1984:88). This demographic shift could be related to a combination of processes such as population growth and resettlement, strengthening of community cohesiveness or regional conflict (ibid 1984:69).

Such reasoning is evident in a popular version of Sierra history written by Perez Garcia, who collected oral traditions in Oaxaca and consulted some published sources. He states that the Chinantla split into two subgroups around 900 years ago as a result of fighting between the descendants of a single, powerful ruler. Civil strife continued for 200 years, leading to a definitive division between the two putative subareas. In the 15th century, continuing dissent in one area led to the establishment of a third community that included the ancestors of the present-day highland Chinantec (Pérez García 1956:95–96).

Although these claims are as yet uncorroborated by archaeological documentation, they may have some basis in Chinantec prehistory. Cline (1952-53:281–286) speaks of a division of prehispanic Chinantec communities into two broad groups which he calls *La Chinantla Grande* and *La Chinantla Pinchinche*. He suggests that they divided towards the end of the 13th century, the inhabitants of the *Chinantla Grande* forming a population center in the lowlands and the residents of the *Chinantla Pinchinche* residing in the mountains. The *Chinantla Pinchinche* later subdivided into two kingdoms around 1435.

Rensch asserts that geographical and linguistic data support the conclusions drawn from historical documents. He notes that the two relaciones from the lowland Chinantla – further described below – likely correspond to distinct centers of linguistic diversity, Usila (his group 1) and Valle Nacional (group 3). Other colonial documents point to an early center of population around Yolox, in the highlands (group 5). Rensch (1989:7) concludes, "The picture of centers located in the northern lowland river system, the southern lowland river system and the western highlands fits well with the linguistic groupings and with the major topographical features of the Chinantla". It should be remembered that Rensch's group 1 is closely related to group 2, that group 3 is close group 4 and that group 5 is a relatively isolated group. This suggests that all current Chinantec populations may be traced to this original division of territories.

We have no information about prehispanic contacts between the Chinantec and the indigenous peoples who are now their neighbors in the north of Oaxaca. There have been no reports of loanwords of prehispanic origin in the Chinantec languages and Otomanguean appears in general to have borrowed few words from other Mesoamerican languages (Suarez 1983:156).

Reports of the relationship between the Chinantec and the Aztec prior to the arrival of the Spanish are rather ambiguous. Bevan (1938:49–50), citing the *Codice Mendozino* and other historical documents, states that the Chinantec paid tribute to Moctezuma. He also suggests that by the time the Spanish arrived, Moctezuma had ceased to exert power over the Chinantec. The extent to which Chinantec were dominated prior to the Spanish invasion is unknown, but the distribution of the Chinantec population does not appear to have been changed by Aztec hegemony. The Sierra was already occupied during the period of Aztec dominance and there is nothing in the ethnohistorical record to indicate that populations migrated to new settlements as a result of coercion.

Lack of archaeological and paleobotanical research precludes analysis of the development of agriculture and ethnobotanical knowledge in the Chinantla. Colonization of lands presently occupied by the Chinantec implies empirical discovery of the properties of some unfamiliar plants, encounter with new environmental frontiers and selection of cultivars suited to new climatic zones.

At present, our only vague clues to these processes come from historical linguistics. The reconstruction of proto-languages can corroborate archaeological and historical hypotheses about the lifestyles of early cultures (Amador H. and Casasa G. 1979:13). By defining the vocabulary that was putatively employed in pre-hispanic times, linguists may infer which items were a part of the culture when linguistic diversification began. For example, Amador H. and Casasa G. (1979:15) list several plant names that can be reconstructed in proto-Otomanguean. Evidence of some of these cultivated plants are found in the archaeological record and all are widely used in Mesoamerica at present.

Rensch's reconstruction of 968 vocabulary terms from proto-Chinantec allows a similar view of Chinantec subsistence culture that dates to at least 1500 years ago. In table 2.5, I list some terms for plants, animals and technologies that are widely distributed in Chinantec languages and have been reconstructed in proto-Chinantec.

Valuable information on pre-hispanic agricultural production and payment of tributes come from the *Relaciones*, documents written by Spanish priests in the latter part of the 16th century that describe many aspects of life in indigenous communities. No *Relación* exists for the highland Chinantla, but two such documents

– translated into English by Bevan (1938:129–144) – describe lowland areas not unlike the tropical humid zone of Santiago Comaltepec. The *Relación* of Usila, a community that still exists to the northeast of Comaltepec, relates that the tribute paid to

Botany	Zoology	Technology
agave	coati	basket
anona	iguana	clear land
avocado	mojarra fish	cleared brush
beans	monkey	clay griddle
cacao	rabbit	cook
chayote	shrimp	hammock bridge
chile	tapir	grinding stone
edible tuber	turkey	ladder
firewood	etc.	medicine
gourd		woven mat
incense		etc.
maize		
papaya		
pine		
pineapple		
prickly pear		
reed		
squash		
zapote		
etc.		

Table 2.5. English glosses of some botanical, zoological, and technological terms reconstructed in proto-Chinantec (Rensch 1989).

Moctezuma's regional Governor in Tuxtepec and to a native *cacique* or local leader, consisted of "... much cocoa, cotton, corn, red peppers, kidney beans, cotton cloth, straw mats and all kinds of native fruits". It also mentions several rituals imposed by the Aztec on the Chinantec which included human sacrifice, offerings of 'copal and other fragrant odors', fasting and penance by dressing in *chichicastli* or urticaceous leaves." Regarding plants in the native diet, the *Relación* suggests continuity from pre-hispanic times to the 16th century: "...they ate what they eat now; namely corn, kidney beans, guacamotes, red peppers and also many types of fruit found in the region". Two crops of corn were harvested every year and plantations of cotton and cocoa were found along rivers (ibid 1938:131–133).

The *Relación* of Chinantla, a town that existed somewhere north of

Comaltepec, perhaps near the present day location of Valle Nacional, paints a similar picture of the role of plants in subsistence and tribute. The regional leader received "cocoa, corn, ... kidney beans, gourds and other edible vegetables and [villagers] gave their personal services in sowing his fields and clearing his peanut plantations". Ritual fasting was also imposed by the Aztecs. The *Relación* mentions that rubber-tree resin was chewed to endure the hunger. Description of the pre-hispanic diet adds a few plants to those found in the Usila account: "They ate bread made of corn [and?] of two kinds of sweet potoatoe, one of which is called *guacamote*...[t]he other is called *pusquavcamote* and from this they make tortillas. {They also ate} red peppers, kidney beans ... They drank {chocolate made from} ground cocoa and *jocopoçole* which is {made from} corn dough and the ground stone of the mammee. They make wine from a pineapple which resembles the Castillian pineapple and also make a wine from mammee" (ibid 1938:138-139). These plants and methods of food preparation are still found today in the Oaxaca Valley and mountains.

2) Spanish contact, *encomiendas* and epidemics (1520 - 1599)

The Chinantec were probably contacted by the Spaniards soon after the landing of Hernán Cortés in 1519, with initial exploration of the Chinantla for mineral wealth beginning as early as 1520. Spanish contact had a broad impact on the Chinantec's relationship to the natural environment since it predicated the epidemics that greatly reduced the indigenous population, the forced relocation of human settlements and the introduction of new plant species.

The *Relaciones* document some of these changes. Concerning introduced illnesses, the Usila document relates, "The old natives say that when the Marquis came ... there fell upon them a great pestilence of which a great number died; that when this pestilence had spent itself there came a great famine among the Indians by which they were practically annihilated" (Bevan 1938:130). This was apparently in contrast to their life in prehispanic times: "They said that formerly they lived longer, because they did not experience nor did they know of sickness other than chills and fevers; that after the Spaniards came, they were given to diseases of the bowels and to small pox, of which some of them died; and that they neither know or understand what is the cause" (ibid 1938:132). The *Relación de Chinantla* suggests similar widespread mortality from new diseases (ibid 1938:139).

Population decline was dramatic – the Chinantla document suggests a decrease from 100,000 fighting men to about 1000 and the *Relacion* of Usila states that only 400 Indians were left from an original population of 16,000 (1938:52). Although such figures are approximate, they suggest that the population may have been reduced to 90% of its original number, similar to the percentage documented for some other regions of Mexico. Since some aspects of ethnobotanical knowledge were probably restricted to local curers or *curanderos*, some communities may have been left with only a rudimentary repertoire of common household remedies when knowledgeable medicine men died.

'Knowledge drift' or catastrophic loss of ethnobotanical lore may be reflected in the Relaciones by the different answers that were given to questions about health and the use of medicinal plants. In the case of Usila, the Relacion states that "there exist in this province herbs with which the natives treat fevers, chills, intestinal troubles and knife wounds: also herbs to counteract the poison when they are bitten by snakes and other reptiles and many other herbs for the many diseases whose names they do not know in the Mexican or Castillian languages" (ibid 1938:133).

In Chinantla, there would appear to be an absence of knowledge about curative herbs, "... in this province there is sarsaparilla. The Indians do not make use of it as medicine nor do they have any medicines. Even when two {persons} are living in one house and one falls ill, they give him no treatment" (ibid 1938:142). Although this may be related to contrasting levels of knowledge in the two zones, it is more likely a cause of differing degrees of interest or skills among the Spanish who conducted interviews for the *Relaciones* in various regions, or the openness of local people.

A major loss of ethnobotanical knowledge due to drastic population reduction remains speculative, but changes in the management of the local environment are better documented. Bevan points out that after the epidemics, famine was common since villagers were too few in number to control the vigorous tropical vegetation and cultivate the land. The Chinantla *Relación* gives an idea of the change in the management of the environment after the arrival of the Spanish:

> "[The Chinantec] live less long and have more illness than formerly because the country was then more thickly populated with Indians who cultivated and tilled the land and cleared the jungle. At the present time there are great jungles and forests which make all the region wild, swampy and unhealthy. The Indians being so few and scattered over more than fifty leagues of territory and the region being damp and rainy since it rains eight months in the year, they are not able to clear the ground so that the winds play over it

and dry it as of old." (ibid 1938:139).

Another historical event that had an impact on folk biological knowledge was the introduction of new plant and animal species to the Chinantla. The Relaciones imply that a few non–native food plants – bananas, peanuts and yams – were introduced before the arrival of the Spanish. Similarly, some medicinal herbs and healing practices were probably borrowed from the Aztec, as is indicated in the Chinantla document, which states that the Chinantec "... have adopted a remedy used by the Mexicans, which consists in inhaling smoke from the ***puquietl***, a hollow stick of bamboo, which they filled half full with henbane, named by the natives ***piçietl*** and with balsam" (ibid 1938:140). The Spanish introduced several food plants that were quickly integrated into Chinantec agriculture. These included citrus fruits – lemons, oranges, limes and shandys – as well as small vegetable and fruit crops such as radishes, lettuce, cabbage, cucumbers and melons (ibid 1938:133). There is no documentation of the early arrival of non–native medicinal and ornamental plants found in the highland Chinantla today, but it is probable that these were introduced gradually throughout the colonial and later periods.

The relocation of the Chinantec to different ecological zones must have had a great impact on local environmental knowledge. At first, the Spaniards forced Chinantec laborers to move from hot, tropical regions to gold–producing areas of the cool mountains. Later, in order to control the economic production and oversee the religious conversion of the Indians, the Spanish began to impose political boundaries and to move entire communities.

A few years after contact with the Spanish, the Sierra Norte was split into *encomiendas*. The local people that lived in these territories had to render part of their production and wealth to an appointed Spanish overlord. With disregard for ethnic boundaries, the Spanish divided the highland Chinantla into two encomiendas, both of which were primarily Zapotec. Some highland Chinantec settlements were included in the encomienda of Tecuicuilco, while other towns were placed in the encomienda of Atlatlauca. These territories may have been based on ecological and agricultural production zones, because the Tecuicuilco *encomienda* would have formed a unit of primarily temperate conifer-oak forested villages, while the Atlatlauca *encomienda* would have been primarily restricted to the tropical deciduous forest and woodlands along the edge of the Cañada. Historical documents do not reveal if there was increased contact between the Zapotec and Chinantec as a result of the imposed boundaries, nor do we find evidence for exchange of ethnobotanical knowledge, domesticated food plants cultivars or wild food and medicinal plants between the two ethnolinguistic groups.

3) Congregation and Crown administration (1599 - 1810)

There is evidence that the Chinantec were eager to maintain their cultural identity, struggling to separate themselves from the neighboring Zapotec.

Towards the end of the 16th century, the Spanish Crown ordered that dispersed villages and ranches be forcibly united into congregations – centralized communities that were to facilitate the religious indoctrination and political administration of Indian subjects. The first plan for the Sierra Norte called for the Chinantec to be incorporated into a Zapotec-speaking congregation centered around San Pablo Macuiltianguis. After the Chinantec protested, Crown officials approved a

Historical Name	Climate	Forest	Current Name	Present Status
Yoloxinequilla	TED	POF	San Pedro Yolox	MUN
Quiotepec	TED	POF	San Juan Quiotepec	MUN
Chinatepec	TED	POF	Santiago Comaltepec	MUN
Chichicazapa	TRH	TEF	?	RCH?
Llagas	CLD	CNF	San Francisco de las Llagas	AGA
Malinaltepec	TRD	TDF	San Miguel Maninaltepec	AGA
Tamazulapa	TRH	TEF	?	RCH?
Cuasimulco	TRH	TEF	Cuasimulco	AGA
Nieves	CLD	CNF	San Martin Nieves	AGA
San Martin	TRH	TEF	San Martin Soyalapa	AGA

Table 2.6. Climate, current name and present status of 16th century settlements putatively congregated to form Santiago Chinantepeque (presently Santiago Comaltepec). Climate Codes: CLD = Cold, TED = Temperate dry, TRD = Tropical Dry, TRH = Tropical Humid; Forest Type Codes: CNF = Conifer Forest, POF = Pine-Oak Forest, TDF = Tropical Deciduous Forest, TEF = Tropical Evergreen Forest, Status Codes: AGA = Agencia MUN = Municipality, RCH = Ranch.

separate community on the border of Zapotec country not far from Macuiltianguis (Cline 1955).

After the end of the rainy season in 1603, the future inhabitants of the community began to clear the site and construct religious and civil buildings. Nearly 300 people - 88 married couples, 27 unmarried adults and 94 children - were relocated. According to Cline, they had come from nine communities: [San Pedro] Yoloxinequilla, [San Juan] Quiotepec, [Santiago] Chinatepec, San Juan Chichicazapa, [San Francisco de las] Llagas, [San Miguel] Malinaltepec, [San Martin] Nieves, Tamazulapa, Cuasimulco and San Martín Soyalapa. The original locations of these communities are reconstructed in a map drawn by Cline, allowing us to infer the climatic and vegetational zones from which these diverse Chinantecs embarked (table 2.6). The resulting congregation must have been a composite of Chinantecs speaking different dialects and accustomed to subsisting in ranches dispersed in distinct ecological zones.

After being forced to destroy their old villages, these Chinantec were forbidden to return to their original settlements unless given permission from Crown civil and religious authorities. Once settled in their new community, the Chinantec were granted agricultural plots location on which they were to raise subsistence crops.

In a published account by a resident of Comaltepec, we find a similar version of the congregation. López Hernández (1982) states that the community was founded by Don Alonso de Quiróz, who brought together the small villages of Tamazulapan, Chichicazapam and Yolox to form a new community called Santiago de los Yólos Xiquimila, which soon changed its name to Santiago Chinantepeque de los Yólos Xiquimila. Buildings and religious artifacts from the original settlements were burned.

After an unspecified time, the original inhabitants of Yolox returned to the site of their initial village, leaving the rest of the Chinantec in the relocated site. Today the two communities, San Pedro Yolox and Santiago Comaltepec, are several kilometers distant. López Hernández states that soon after becoming established, Santiago Comaltepec received a title that defined the boundaries of its communal lands as granted by the Crown. These lands, which range from tropical to temperate zones just like the original congregated communities, are delimited by a series of traditional geographical boundaries formalized by a Presidential Resolution in 1953.

We can assume that the congregation of Santiago Chinantepeque brought together Chinantecs who had a repertoire of ecological knowledge, cultivated plants and subsistence strategies derived from the diverse ecological zones represented in the newly formed community. In the absence of historical records, we can only speculate whether or not this cultural interaction gave rise to a broader, hybrid classification system that incorporated plants and categories known by different segments of the population. The potential enrichment of indigenous botanical lore may have facilitated the management of the diverse environment which the Chinantec inhabited.

The current day location of municipalities, agencias and ranches points to a historical process of Chinantec recolonization of territories once occupied by pre-Congregation settlements. Despite the prohibition by Crown officials on rebuilding old hamlets, the Chinantecs would probably have sought access - either openly or covertly - to the natural resources in the various ecological zones on their traditional lands.

This process of recolonization may have begun soon after Congregation and probably continued through independence. The 17th and 18th centuries were apparently periods of demographic growth as the indigenous population recovered from the initial onslaught of epidemics, famine and forced relocation. Fragmentation of congregated communities likely commenced as the population grew, as conflicts arose between formerly distinct communities and as villagers emigrated to distinct ecological zones in search of agricultural lands suited to the cultivation of diverse crops. Despite the stated prohibition on resurrecting old settlements, at least part of this migration can be explained by Chinantec seeking to return to their original lands and familiar productive activities. Little else is known about this period perhaps because, as Weitlaner and Cline (1969:523) suggest, many factors "relegated the

Chinantla to a marginal position in colonial days".

4) Economic Integration (19th century)

As the hegemony of the Spanish crown slipped away in the 19th century, the economic specialization of different ethnic regions became increasingly refined. The Chinantec, who had access to a broad range of ecological niches and associated cultural traditions, achieved a broad range of specializations. They produced small amounts of cochineal and temperate cash crops, worked a silver and lead mine, supplied tropical produce to Zapotec neighbors and transported goods across the rugged continental divide. In spite of the variety of products that the Chinantla yielded, none was the basis for accumulation of significant wealth. Nonetheless, this diversity of goods and services provided continuity in the local economy, softening the ups-and-downs experienced in the economically-specialized subregions of the Sierra (Frey n.d.:9-11).

This condition strengthened the flexible economic strategy by which the Sierra Chinantec adapted to variable market conditions - a strategy based on the oscillation between subsistence and commercial production and the back-and-forth movement between the climatic zones of the highland Chinantla. When there was a boom in the Zapotec mining towns to the south, the Chinantec increased production and export of wheat, cattle and other goods from the dry tropical zone. When coffee was introduced and promised a good market price, they shifted to the montane cloud forest where the climate was adequate for coffee production. When external demand for agricultural goods dropped, they fell back on subsistence production in the cabecera and ranches. From the 1800s up until today, these market conditions guided the Chinantec's management of the natural environment and their exploitation of the diverse ecological zones in their community.

Frey characterizes the economic situation of several 19th century periods and suggests how each affected the highland Chinantec. In the first half of the century, the Sierra economy was dominated by subsistence agriculture and the regionally-specialized production of goods for local and world markets. The Chinantec zone was the least specialized, given its access to diverse ecological zones. Frey suggests that a decreasing production of cochineal and limited holdings of cattle resulted in a shift from tropical dry to tropical humid lands, where the corn harvest was more bountiful and sugarcane cultivation provided raw sugar *(panela)* for sale in regional markets.

Towards the middle of the century, further shrinking of labor-intensive cotton and cochineal production produced a shift towards greater subsistence production and increased pressure on land. This tendency was particularly strong in the Chinantla, which was distant from the remaining commercial enterprise of the Sierra – the gold and silver mines of southern Sierra Zapotec villages. The Chinantec appear to have reacted in diverse ways. Some migrated outside of the area to find work, others braved tropical diseases and animals to cultivate the land in humid-zone ranches, while still others dedicated themselves to cattle-raising and dry-zone farming.

The rise of Porfirio Díaz to power in the 1870s set the stage for new commercial enterprises. Mining boomed and regional power bosses brought textile mills and coffee to the Sierra Norte. With new tobacco plantations in the Gulf Lowlands, and a recently constructed rail line in the Oaxaca Valley, commercial traffic along the dirt trails of the Sierra increased. The Chinantec followed the economic expansion, introducing coffee–growing to the little exploited temperate humid zone, engaging in trade along the Camino Real from Oaxaca to Valle Nacional and producing cattle and grains on dry lands to supply the mining centers of the southern Sierra.

5) Revolution and National Development (20th century)

The Sierra had a curious role in the rising tide of sentiments against Porfirio Díaz that culminated in the revolutionary period of 1910 – 1917. The penury of lowland haciendas just to the north apparently did not affect the *serranos*. They still held control over their communal lands and were not forced to work under the near slavery conditions common in the Gulf lowlands and other areas (Turner 1967). In addition, the political bosses of the Sierra benefitted from their alliance with Díaz, who had begun his career in northern Oaxaca (Waterbury 1975).

When the revolution began, most Sierra villages sided with the conservative forces of Carranza. Many battles were waged in the Sierra and often the battlelines were drawn along the boundaries of villages which had long been in conflict over lands. Other *serranos* followed the war to other fronts and some villages, like Santiago Comaltepec, lost numerous men in the fighting.

The goals of the revolution – and in particular the restoration of communal lands – were not realized until well after the fighting stopped. Many reforms were not carried out until the 1930s, when Cardenas was elected president.

As national development was spurred in the 1950s, the economic changes in the Gulf coastal plain began to have an impact on the Chinantec communities of the

Sierra Norte (Villa Rojas 1948). Even before commercial production lapsed in the Sierra during the Revolution, some Chinantec migrated to the lowlands in search of work on tobacco plantations and some occasionally made temporary visits to the lowlands to work as agricultural laborers. With the advent of the pulp mill, private and government-operated companies began to construct roads into the mountains, obtaining access to pine forests and isolated communities. With augmented communication came an increase in national health, educational and agricultural programs. Sierra peasants began to dedicate more time to two activities, logging and coffee-growing. The resulting production, marketed primarily through the major cities of the Oaxacan coastal plain, Valle Nacional and Tuxtepec, brought Sierra people into increasing contact with urban areas and non-indigenous people. At present, temporary and permanent migration to urban centers of Mexico and the United States is exercising ever greater impact on highland Chinantec communities.

Santiago Comaltepec - A Highland Chinantec Village

Santiago Comaltepec is a highland Chinantec municipality situated in the northern part of Ixtlán district. It extends across nearly 200 square kilometers of territory divided between communal lands and private property. Present-day settlements in Comaltepec range in size from ranches of several families to the head village of over one thousand people. The communities are distributed along the territorial extension of the municipality, spanning a 45-kilometer elevational and ecological gradient.

Lands within the municipality, including those of two *agencias de policia*, add up to 184 km^2. Chuparrosa, a *ranchería*, includes 9 km^2, and Soledad Tectitlán, an *agencia municipal*, adds another 5 km^2. The 1990 census counted 993 males and 979 females, giving a total of 1972 residents living in 364 households. Based on these figures, there are an estimated average of 5.4 persons per household and a population density of 9.7 people per km^2. Approximately 42 km^2 of agricultural lands are available in the community, equaling an average of some 1.4 hectares per person or 7.6 hectares per family.

1125 of these inhabitants live in the head community of Santiago Comaltepec, accounting for 57% of the municipal population. This *cabecera* is centered in a panhandle that corresponds to the western portion of the municipality and is separated from the eastern humid forests by Cerro Pelón, Cerro Humo Chico and other tall mountain peaks that rise above 3000 meters.

Two other communities are found on this dry, western side – Chuparrosa, a hot country ranch that was purchased from a nearby Zapotec community, and Soledad Tectitlán, an *agencia municipal* whose residents speak a different dialect of Chinantec and are effectively independent from Comaltepec municipal affairs. Chuparrosa has a semi-permanent population of some twenty families, while Tectitlán has 276 permanent residents.

Two *agencias de policía*, La Esperanza and Soyalapan, account for most of the population of the extensive eastern portion of the municipality. Medium-sized ranches such as Puerto Eligio and Vista Hermosa are found along the side of the paved highway that winds through the wet country. In addition, many small ranches inhabited by one to several families are located 2 – 6 kilometers off the road along dirt paths. Part of the population moves back and forth between these humid-zone

Community	Number of households	Total Population	Number of Men	Number of Women
Municipality	364	1972	993	979
Comaltepec	214	1125	573	552
Rancho Cerro Redondo	4	24	14	10
La Esperanza	41	273	129	144
Rancho Aguacatal	3	11	7	4
Rancho Mamey	6	25	12	13
Puerto Antonio	4	19	11	8
Puerto Eligio	8	24	10	14
Soyalapam	28	159	78	81
Tectitlan	49	276	137	139
Rancho Trucha	4	16	9	7
Rancho El Relampago	1	7	n/a	n/a
Vista Hermosa	1	11	n/a	n/a
Humo Chico	1	2	n/a	n/a

Table 2.7. Characterization of number of households, total population and number of men and women in the various communities of Comaltepec municipality according to the 1990 census.

settlements and the *cabecera*, making it difficult to pinpoint the exact number of permanent residents. Table 2.7 summarizes population figures from the 1990 census for the various settlements in the municipality of Santiago Comaltepec.

These various settlements are spread along the territorial extension, elevational gradient and ecological zones of the municipality. Soyalapan is found at 200 meters above sea level and other humid zone communities are stepping stones to increasingly higher elevations – Puerto Eligio at 700 meters, Metates at 800, Vista Hermosa at 1500 and La Esperanza at 1600. There is a large uninhabited zone that begins at 1600 meters above sea level on the humid side of the sierra. It rises to 3100 meters on the crest of the mountain chain and extends down to 2100 meters in the rain-protected southern slopes.

The dry zone of the municipality is smaller in extension than the wet zone. The lands around Comaltepec (2100 meters) descend gradually to Chuparrosa (1800 meters) and Tectitlán (1700 meters) and finally arrive to the banks of the Rio Grande, some 1300 meters above sea level.

Nearly half of the families in Comaltepec divide their time between the dry zone and the humid zone. Another quarter live permanently in the humid zone and the remaining quarter reside in the municipal seat, cultivating lands in the dry zone. There is some accumulation of private land. Half of the men have some private holdings and 13% own plots of 1 hectare or more. All village members have access to communal agricultural land, which can be cultivated by anyone who chooses to clear and maintain plots that are not currently in use by another individual.

Some elderly individuals are monolingual Chinantec-speakers, but most residents are proficient in both Chinantec and Spanish. The 1990 census reports that 91% of the population over 5 years old is bilingual. The percentage of bilingual speakers has been increasing rapidly since 1930 (table 2.8).

Year	Monolingual	Bilingual
1930	614 (82.2%)	133 (17.8%)
1940	680 (70.1%)	278 (29.9%)
1950	0* (0%)	1238* (100%)
1960	465 (34.7%)	877 (65.3%)
1970	n/a	n/a
1980	327 (19.4%)	1361 (80.6%)
1990	145 (9.0%)	1465 (91.0%)

Table 2.8. Number of monolingual (Chinantec) and bilingual (Chinantec & Spanish) inhabitants in Santiago Comaltepec. The figures do not include children under 5 years old and exclude a small number of people 5 years and older who did not indicate language ability or who spoke only Spanish at the time of the interview. *The data from 1950 may be inaccurate.

There is both a primary and a secondary school in the head village and primary schools in some of the hamlets. Almost all children and young adults read and write Spanish. Foreign linguists (Anderson 1989) have developed a writing for the local dialect of the complex Chinantec language, but few villagers are proficient in its use.

Migration to the United States started to become a major element of the productive activities of the Comaltepec Chinantec in the 1980s, stimulated by the neighboring Zapotec Indians who act as guides to the border and middlemen for the illegal crossing. At present, over 20% of the inhabitants has stayed in California for periods ranging from a few months to a several years. Many Comaltepec Chinantec have settled down permanently in Mexico City or Oaxaca City, but few reside permanently in the United States.

Accurate figures for rates of population change in the municipality are hard to attain because of the dispersion of its settlements and the varying rate of migration over the past few decades. The community started with approximately 300 inhabitants congregated from nine Chinantec communities. A major part of the population apparently left to return to San Pedro Yolox, perhaps leaving Comaltepec with fewer than two hundred residents in the colonial period. Mexican national census data indicate that the population had grown to 755 people by 1930, to 1240 by 1950, to 1836 by 1970 and to 2096 by 1980 (Stebbins 1984; Weitlaner and Cline 1969). Given the new propensity of the Chinantec to migrate to the United in moderate numbers, there is apparently no net population growth – and perhaps a small decrease in inhabitants – at the current time. The 1990 census figure of 1972 inhabitants implies that there has been a drop of 124 people over the last ten years.

There are no protected areas within the municipal limits, but some community members have proposed an ecological reserve – perhaps declared jointly with a neighboring Zapotec community – that would cover a portion of the community's cloud forest. Village authorities are enacting changes in the municipal laws that would allow greater communal control over natural resources and would set the legal base for creating protected zones. A local non-profit group has been working with Comaltepec and neighboring Chinantec and Zapotec communities to explore a proposed protected area – the *Sierra de Cuasimulco* – that includes pine-oak, cloud and lowland forests.

Large-scale exploitation of pine forests by a lowland pulp mill occurred in the 1960s and 1970s, leading to the construction of many major roads, including a paved highway that runs the length of the municipality. Since the end of the 25-year forestry concession in 1981, this exploitation has given away to management by a community forestry brigade. A major forest fire claimed many hectares of pine forest in 1983 and the brigade has since harvested most of the scorched trees, selling the wood to a pulp mill in lowland Oaxaca. A large area of cloud forest is potentially endangered by a major dam on the Soyalapam River that the federal power company is said to be planning. There is no significant extractivism, nature tourism or bioprospecting in the area, although all have been mentioned as possible elements of an overall land management strategy.

Comaltepec Chinantec and their Natural Environment

Early ethnographers of the Chinantec, such as Frederick Starr and Bernard Bevan, subscribed to the theory that the environment had an overwhelming impact on culture, an idea that was common among practitioners of ethnographic particularism and functionalism.

Starr (1900:69), the first ethnographer to set foot in the northern Sierra of Oaxaca, described the vegetation and climate of the Chinantec in the following terms:

> "The Chinantla, in scenery, is one of the most beautiful parts of mountainous Mexico. The great mountains, clad usually with magnificent forests, the trees of which are loaded with bromelias, orchids and other aerial or parasitic plants and the vast valleys are wonderfully bold and varied. The climate, however, is disagreeable; there is practically no dry season and chilly and drenching rains, dismal fogs and settling clouds frequently shut out the attractive scenery".

Bevan (1938:10) agrees with this picture of the environment and goes on to paint a desperate portrait of Chinantec subsistence:

> "... the climate and vegetation have exercised a more predominant effect on the life of the natives than can be true for almost any other tribe in Mexico. The Chinantec is bound down to his surroundings, fighting for his very existence and fighting no human adversary but a wild forest whose strength is continuously fortified by the almost incessant rains. These cause the growth not only of the beautiful trees and flowers but a greedy tangle of undergrowth spreading mercilessly over trees and land and against which the unfortunate Chinantec must wage unceasing war to cultivate his food-bearing crops."

The ecological knowledge of the inhabitants of Santiago Comaltepec belies this portrayal. The Comaltepec Chinantec and their highland neighbors have a lifestyle based on access to a diversity of ecological zones. As part of their basic strategy to adapt to the extremes of the environment, they classify not only individual plants and animals, but also many other aspects of the living and non–living parts of natural habitats. For the Chinantec, pristine forests and agricultural fields form part of a single ecological system, because the areas they cultivate are one stage in the complex succession of plant communities on both the dry and humid side of the Sierra. Subsistence production begins in cultivated fields and extends deep into local forests where the Chinantec find plants and animals to supplement their diet, health care and rituals.

The Chinantec's detailed knowledge of the local environment is codified in a system of classification that recognizes different soils, climatic zones, successional stages and seasons (Martin 1993). Just as plants are grouped into life–form, generic and specific classes, these ecological concepts are assigned to a series of ranked categories. These indicate the unity that the Chinantec see between agriculture, forests, soils and climate. For example, the term ***g^{w}óo'^{LH}*** is used to express both «climate» and «soil», much in the same way that Spanish–speaking peasants employ the word *tierra* (i.e. *tierra negra* is «black soil» but *tierra caliente* is translated as «hot country»). The classifier ***jee^{LH}*** (literally «within» or «inside») may used to characterize both cultivated fields and forests; ranches, for example, are referred to as ***je^{LnuuHL}*** «inside the wild», mature secondary forests are ***jee^{LH} 'ma^{L}*** «inside trees» and a cornfield is ***jee^{LH} k^{w}ɨɨ^{L}*** «inside corn plants». This unity is also reflected in the ecological knowledge that forms a part of each named plant category. The Chinantec link each plant to a certain range of soil types, climates, successional stages and seasons of the year. This perception of the local environment allows them to know when and where resources are available and as such forms an integral part of their subsistence strategy. In chapter 6, I will return to the ecological categories that I discuss below to illustrate the interrelationship between plant categories and the classification of other aspects of the local environment.

Climate

When speaking in Spanish about climate types, the Chinantec refer to the system of three cropping zones commonly recognized by Mexican peasants. These vertical zones are characterized by elevation and temperature and only secondarily by rainfall. Most of the municipal territory is in *tierra caliente*, which can range from sea level to over 2000 meters and is suitable country for cattle–raising and cultivation of sugar cane, wheat, bananas and citrus fruits. *Tierra templada*, which surrounds the municipal seat of Comaltepec, covers a small area that lies above hot country at between 1500 and 2200 meters above sea level. It is the best zone for cultivation of corn, beans and squash, especially where rainfall is sufficient for two corn crops per year. Because of the cool temperatures and absence of killing frosts, it is also the zone of coffee production where humidity permits. *Tierra fria* begins at over 2200 meters above sea level and extends to the 3000+ meter peaks that divide the municipality into dry and humid sides. This cold country is suited to the cultivation of hardy legumes such as peas and fava beans, as well as some varieties of corn.

The classification of climates in Chinantec is more complex, taking into account precipitation, temperature, elevation and suitability for different types of agricultural production. Five categories are recognized. From Soyalapan to Metates, the climate is hot and humid (*g^{w}óo$^{'LH}$ ginée^{L}*), appropriate for citrus crops, bananas, chilies and cattle-raising. Vista Hermosa and La Esperanza are in wet country (*g^{w}óo$^{'LH}$ 'ojmɨ^{H}*), at the upper elevational limits for coffee cultivation. Above these two communities lies a cloud forest containing *Cedrela*, *Oreomunnea*, *Swietenia* and other unexploited cloud forest hardwoods. The cold zone (*g^{w}óo$^{'LH}$ g^{w}ɨ$^{'L}$*) divides the humid and dry sides of the municipality and characterizes the extensive pine forests that yield large quantities of timber. A small area of temperate, dry country (*g^{w}óo$^{'LH}$ kiʉ̱ʉ̱^{L}*) surrounds Comaltepec, providing a healthy climate in which to reside and one suited to cultivation of subsistence crops. Chuparrosa and several abandoned ranches below Comaltepec are located in the hot zone (*g^{w}óo$^{'LH}$ gli^{M}*), where wheat can be planted in the fall months and where the rainy summertime often yields a good harvest of beans and corn. This was formerly area of the cochineal production and cattle raising, activities which are still carried out on a small scale. Different varieties of corn are available for cultivation in these diverse zones, making subsistence cropping a common element in all parts of the municipality.

The Chinantec climate zones correlate well with rainfall, temperature, vegetation and elevational patterns in the community. Precipitation steadily increases from Chuparrosa to Soyalapan. The heavy rainfall on the humid side of the Sierra, spread over 8 – 10 months, allows for two or occasionally three corn crops per year (called in local Spanish *temporal*, *tonamil* and *aventurero*).

On the dry side, where the heaviest rain falls over a period of 5 – 6 months, one annual corn crop (*temporal*) is usually guaranteed in the fields around

Comaltepec and, if rains start by June, also in Chuparrosa. The temperature is hottest at the low elevations around Soyalapam, moderate in the wet country around La Esperanza and the dry country of Chuparrosa, increasingly cooler around Comaltepec and cold on Cerro Pelon and other high peaks.

Climate Type	Precipitation Range (mm/yr)	Temperature Range (°C)	Elevation Range (m)	Forest Type
g^{w}*óo*$^{\prime LH}$ *glɨ́*^{M} «hot, dry land»	800–1300	16–21	1000–2300	Tropical Deciduous
g^{w}*óo*$^{\prime LH}$ *ki*<u>*ʉʉ*</u>^{L} «temperate land»	1300–2000	15–18	1600–2200	Pine - Oak
g^{w}*óo*$^{\prime LH}$ *g*^{w}*ɨ*$^{\prime L}$ «cold land»	2000–2700	9–14	2200–3200	Evergreen Coniferous
g^{w}*óo*$^{\prime LH}$ *'ojmɨ*^{H} «wet land»	2700–3200	16–20	1000–2200	Montane Cloud
g^{w}*óo*$^{\prime LH}$ *ginée*^{L} «hot, humid land»	3200–3700	21–25	100–1000	Tropical Evergreen

Table 2.9. Comaltepec Chinantec climate zones and their correlation to precipitation, temperature range, elevation range and vegetation type.

The climate types roughly overlap the distribution of the five forest types represented in Comaltepec and described in Chapter 1. Secondary associations of tropical deciduous forest are found along the Rio Grande and in adjacent areas of hot, dry climate including Chuparrosa. Primary and secondary pine–oak forests are dominate the temperate dry climate zone near Comaltepec but also reach into high–elevation humid zones. Well preserved montane cloud forest is found above La Esperanza and associated secondary formations at lower elevations of «wet country». Remnants of primary tropical evergreen forest mix with diverse stages of secondary growth from Metates to the Soyalapan River. The correlation between the Chinantec climate zones and precipitation, temperature, elevation and vegetation are summarized in table 2.9.

Ecological Succession

Among the Chinantec, cultivation is seen as one stage in a cyclical process of ecological succession. In the dry zones, «primary forest» (*'ngø*^{LH}) may be cut and burned to prepare a «swidden» (*giee*^{L}) which, when

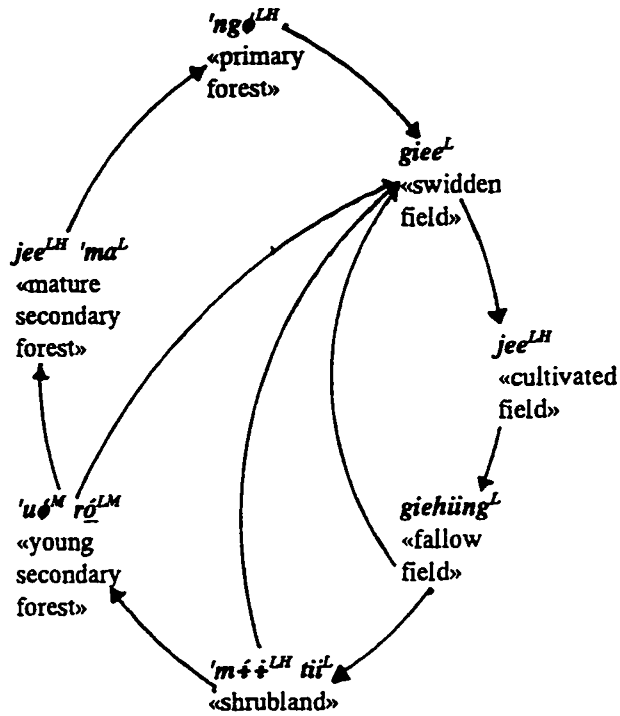


Figure 2.3. Chinantec conception and management of ecological succession in the dry zones.

planted, becomes a «cultivated field» (*jee*^{LH}). «Cultivated fields» can be of three types – «cornfields», usually including intercropped beans and squash (*jee*^{LH} *k*^{w}*ɨɨ*^{L}), «beanfields» (*jee*^{LH} *jnuu*^{L}) and, in the hottest areas, «wheatfields» (*jee*^{LH} *k*^{w}*ɨ*^{LM} *'iee*^{L}). After 2 – 5 years of cultivation, the fields are left «fallow» (*giehüng*^{L}) for a period of 3 – 7 years, during which time they convert to «shrubland» (*'mɨɨ*^{LH} *tii*^{L} – literally «thin secondary forest»). If left undisturbed, the shrubland is succeeded after 7 –15 years by «young secondary forest» (*'uø*^{M} *ró*^{LM}) and eventually by «mature secondary forest» (*jee*^{LH} *'ma*^{L}), perhaps 20 – 50 years after fallowing. Depending on rainfall and elevation, secondary forest may be dominated by «pines» (*'mɨɨ'^LH^ kɨɨ^HL^*), «oaks» (*'mɨɨ'^LH^ 'mayúu'^M^*) or «thorny Leguminosae» (*'mɨɨ'^LH^ 'matóo^LM^*). The Chinantec assume that mature forest eventually reverts to «primary forest», but say that they have not observed the process. The various stages of ecological succession are illustrated in figure 2.3.

Although swiddens prepared from forested sites produce higher crop yields, such sites are now distant from the village center. Clearing a primary or advanced secondary forest is also time-consuming and for these reasons dry zone farmers prefer to maintain their agricultural fields in early stages of ecological succession.

In the humid zones, the same basic cycle of ecological succession is observed but there is a greater diversity of primary forests, cultivated fields and secondary associations. Primary forest may be of three types – impenetrable (*mó'L 'gaang^L^*, literally «imposing mountain»), typical (*'ngø^LH^*) and open (*'ngø^LH^ jɨɨ'^LH^*, literally «slender primary forest»). As in the dry zone, the «swidden» is referred to as *giee^L^* and «cultivated fields» are classified as one of many types of *jee^LH^*, most commonly planted with coffee (*jee^LH^ 'macafée^LH^*), bananas (*jee^LH^ 'matoo^L^*), corn (*jee^LH^ k^w^ɨɨ^L^*), sugar cane (*jee^LH^ k^w^ɨñi^H^*), *tepejilote* palms (*jee^LH^ 'mali^LH^*) or chilies (*jee^LH^ 'ma'úu^L^*).

When yields drop and swiddens are abandoned after 3 – 5 years of cultivation, the forest reverts directly to «shrubland» (*'mɨɨ'^LH^ tii^L^*), bypassing the «fallow field» (*giehiing^L^*) stage of the dry zones. The «shrubland» is further classified according to the dominant plants that recolonize the site. There are, for example, secondary shrub formations dominated by *Mimosa albida* (*'mɨɨ'^LH^ toku'^LM^*), a weedy medicinal plant that is believed to enrich the soil. Depleted soils

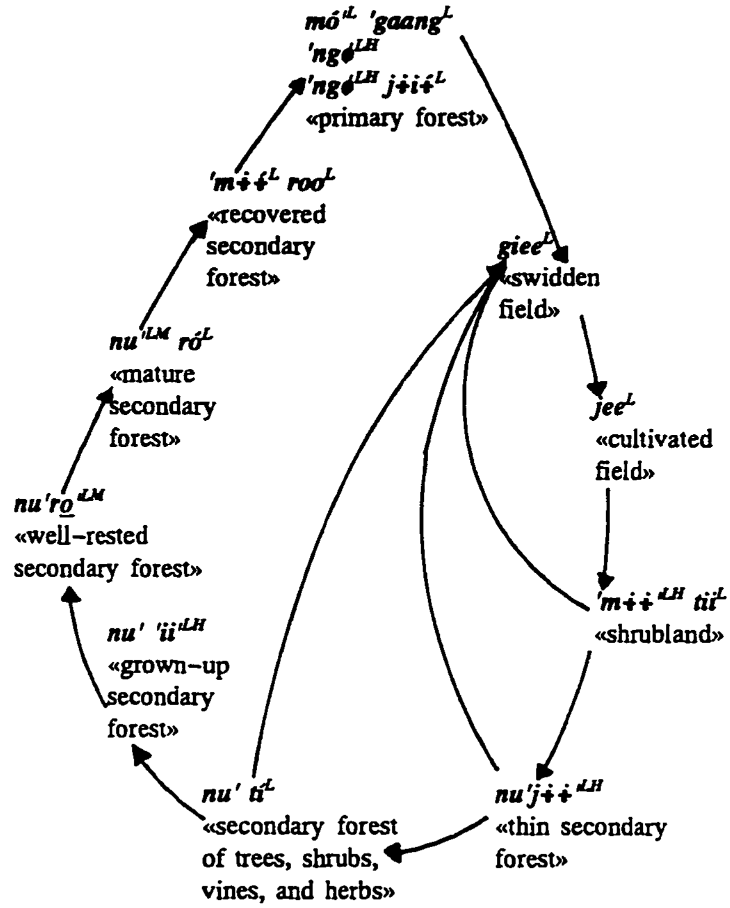


Figure 2.4. Chinantec conception and management of ecological succession in the humid zones.

revert to fern patches of *Sticherus brevispubis* (*'mɨɨ*$^{'LH}$ *mɨnoo*^{H} *jɨɨ*$^{'LH}$), while slightly richer land gives rise to tree ferns, *Alsophila firma* (*'mɨɨ*$^{'LH}$ *mɨnoo*^{H} *tó̲o*^{LM}). Humid, rich soils revert directly to large herbaceous monocots such as *Heliconia* (*'mɨɨ*$^{'LH}$ *mosii*^{M}) or *Canna* (*'mɨɨ*$^{'LH}$ *moikiu*^{MH}).

As small trees and large shrubs begin to replace the ferns, large herbs and weedy shrubs, the vegetation is characterized as «slender secondary vegetation» (*nu*$^{'LM}$ *jɨɨ*$^{'LH}$). Again, the associations are typed according to the dominant species, which indicate the fertility of the site. Poorer areas are colonized by communities of plants such as *Vismia mexicana* (*'mɨɨ*$^{'LH}$ *'manée*^{M}) and *Hedyosmum mexicanum* (*'mɨɨ*$^{'LH}$ *'macrúu*^{H}), while more fertile soils support tree clusters dominated by species such as *Liquidambar styraciflua* (*'mɨɨ*$^{'LH}$ *'malea*^{LH}) and *Rapanea* spp.

(***'mɨ́ɨ***$^{'LH}$ ***'majli***^{HL}). When the secondary forest grows, the vegetation begins to return to a multiple–strata forest composed of trees, shrubs, vines and herbs (***nu***$^{'LM}$ ***tii***^{L}) and eventually reaches a stage of «grown–up secondary forest» (***nu***$^{'LM}$ ***'ũ***$^{'LH}$), which is characterized by associations of fast–growing large trees such as *Lozanella enantiophylla* (***'mɨ́ɨ***$^{'LH}$ ***'ma'luu***^{M}) and *Heliocarpus* spp. (***'mɨ́ɨ***$^{'LH}$ ***'maje***^{LH}). Then follows «well–rested secondary forest» (***nu***$^{'LM}$ ***ro̲***$^{'LM}$), such as that composed of stands of *Senna multijuga* (***'mɨ́ɨ***$^{'LH}$ ***'mak***^{w}***i̲***$^{'LM}$), which gives way to «mature secondary forest» (***nu***$^{'LM}$ ***ró***^{LM}), exemplified by areas covered by groves of *Lauraceae* (***'mɨ́ɨ***$^{'LH}$ ***'mag***^{w}***ɨ́ɨ***^{HL}) and tropical *Quercus* species (***'mɨ́ɨ***$^{'LH}$ ***'ma'iée***^{H} ***too***^{M}). Completion of the succession is marked by the emergence of «recovered secondary forest» (***'mɨ́ɨ***$^{'LH}$ ***roo***^{L}) in which tall tropical trees such as *Terminalia*, *Weinmannia* and *Oreomunnea* abound. Regeneration of the primary forest types has not been observed by the Chinantec, but they assume that it could happen many years after succession begins. The various stages of ecological succession in the humid zone are illustrated in figure 2.4.

Succession in the humid zones is not a unilineal process, but rather can result in diverse formations of secondary vegetation in distinct areas. Differences in dominant species, time of recovery and the size of the secondary forest result from the diverse microclimatic and soil conditions that give rise to a patchwork of ecological niches up and down the wet mountains and piedmont.

Clearing a primary forest is an arduous task, but one that pays off initially by ensuring increased yields and later serves to claim the site for continued cultivation of cash and subsistence crops. Once this original deforestation is complete, the

Chinantec rarely abandon the site. Instead of allowing mature secondary forest to return, they prefer to maintain the plots in early secondary stages by cutting and burning the vegetation every few years to cultivate subsistence crops, or by planting perennial cash crops such as coffee and sugar cane.

Soils

The climate classifier *g*^{w}*óo*$^{'LH}$ is also used to characterize different types of soils. The soil names can be divided into two sets, those that refer to the color and texture and those that refer to the quality of the soil for cultivation. The terms are related – black soil (*g*^{w}*óo*$^{'LH}$ *'ui*$^{'M}$) is good soil (*g*^{w}*óo*$^{'LH}$ *'o*$^{'H}$), but white sand soil (*g*^{w}*óo*$^{'LH}$ *tóo*$^{'LH}$ *tee*^{L}) is considered to be poor and eroded (*g*^{w}*óo*$^{'LH}$ *sɨɨ*^{L}). The main soil types are:

1) *g*^{w}*óo*$^{'LH}$ *'ui*$^{'M}$ «black soil» is considered to be the best soil for agriculture, because it is rich in organic matter, conserves humidity well and may be planted for many years in succession.

2) *g*^{w}*óo*$^{'LH}$ *k<u>u</u>loo*^{MH} «chalky soil» was formerly used for making lime, an important ingredient in the flattened corn breads called *tortillas*. This type of soil is not considered suitable for agriculture.

3) *g*^{w}*óo*$^{'LH}$ *née*^{M} «yellow soil» is the most common soil type in Comaltepec and is considered suitable for agriculture but must be fallowed more often than black soil. A variety of heavier consistency, *g*^{w}*óo*$^{'LH}$ *née*^{M} *te*$^{'M}$ («yellow sticky soil»), is not appropriate for cultivation since it is difficult to plow and work, but it was formerly used as a material for the local clay pot industry, particularly in the neighboring town of Quiotepec.

4) ***g^{w}óo***$^{'LH}$ ***rø***^{L} «green soil» is an uncommon soil type, apparently restricted to areas of mineral outwash and little used for agriculture.

5) ***g^{w}óo***$^{'LH}$ ***sii***^{LH} «gravelly soil» is a well-drained soil that is quite poor in nutrients, making it a marginal soil type for most agricultural purposes.

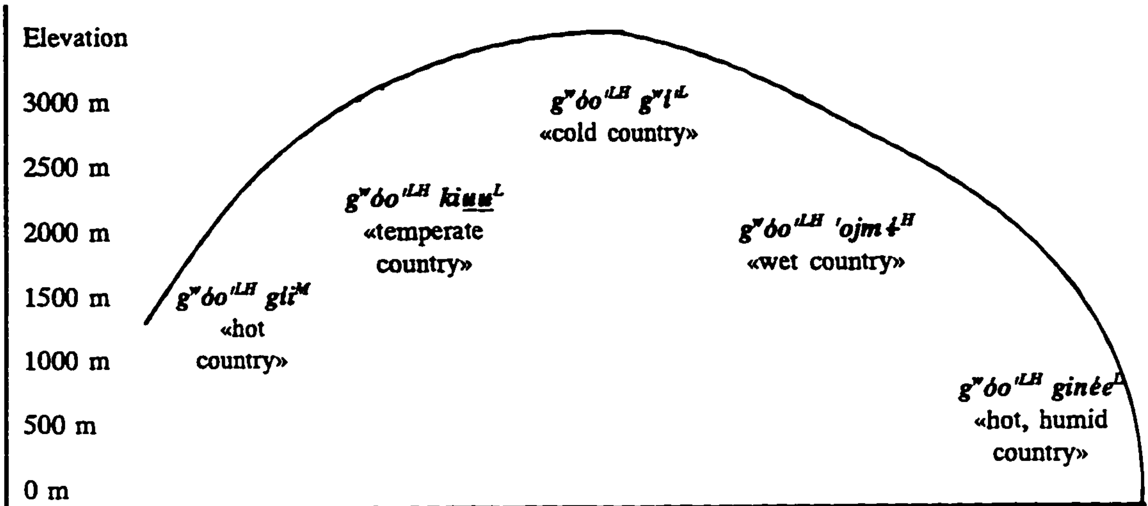
6) ***g^{w}óo***$^{'LH}$ ***tee***^{L} «white soil» is a poor quality soil that is not cultivated.

7) ***g^{w}óo***$^{'LH}$ ***tóo***$^{'LH}$ «sand soil», found along river banks, is considered to be good for agriculture since it is nutrient-rich and well-drained, but danger of flooding restricts its use. The quality changes with soil color. Black is preferred, while yellow and white soils are considered to be less fertile. These three varieties have Chinantec names: ***g^{w}óo***$^{'LH}$ ***tóo***$^{'LH}$ ***tee***^{L} «white sand soil», ***g^{w}óo***$^{'LH}$ ***tóo***$^{'LH}$ ***'ul***$^{'M}$ «black sand soil» and ***g^{w}óo***$^{'LH}$ ***tóo***$^{'LH}$ ***née***^{M} «yellow sand soil».

8) ***g^{w}óo***$^{'LH}$ ***yʉ̠ʉ̠***^{M} «red soil» is similar to yellow soil in that it is common in the village and is much used for cultivation, but must be fallowed more often than black soil.

Human ecological zones in Santiago Comaltepec

The Chinantec have access to a broad range of ecological niches in which they carry out a variety of subsistence and commercial activities (figure 2.5). In ranches located in the hot dry zone, wheat is planted in the autumn months and the rainy summertime often yields a good harvest of beans and corn. This was formerly an area of cochineal production and cattle raising. A small area of temperate, dry country surrounds Comaltepec, providing a healthy climate in which to reside and one suited to cultivation of subsistence crops and fruit trees. The cold zone divides the humid and dry sides of the municipality and holds reserves of extensive pine forests that yield large quantities of commercial timber. The inhabitants of the humid country dedicate themselves to the cultivation of coffee. In the lowlands, the climate is hot and humid, appropriate for citrus crops, bananas, chilies and cattle-raising.



Walking distance	7.5 km	7.5 km	10 km	10 km	10 km
Subsistence activities	cultivation of corn, beans, squash, and chilies; gathering of edible greens, wild fruits, medicinal plants; limited hunting and fishing; firewood collecting; tending home gardens and other activities.				
Commercial activities	cultivation of corn, beans, and wheat, formerly cattle raising and cochineal production	limited poultry and small animal raising; store owners sell diverse plant products	pine logging	coffee growing	cultivation of citrus fruits, bananas chilies, and corn; cattle raising

Figure 2.5. A schematic view of Chinantec human ecological zones.

Different varieties of corn are available for cultivation in these diverse zones, making subsistence cropping a common element in all parts of the municipality. The heavy rainfall on the humid side of the Sierra, spread over 8 – 10 months, allows for two or occasionally three corn crops per year. On the dry side, where the heaviest rain falls over a period of 5 – 6 months, one annual corn crop is usually guaranteed in the fields around Comaltepec and, if rains start by June, also in dry, hot ranches.

This range of productive zones has encouraged the formation of a flexible economic scheme by which the Chinantec adapt to variable market conditions – a strategy based on the oscillation between subsistence and commercial production and the back–and–forth movement between the climatic zones of the highland Chinantla. When there was a boom in the Zapotec mining towns to the south, the Chinantec increased production and export of wheat, cattle and other goods from the dry tropical zone. When coffee was introduced and promised a good market price, they shifted to the montane cloud forest where the climate was adequate. When external demand for agricultural goods dropped, they fell back on subsistence production in the *cabecera* and ranches. From the 1800s up until today, these market conditions guided the Chinantec's management of the natural environment and their exploitation of the diverse ecological zones in their community.

The range of productive zones also influences the access that the Chinantec have to plant resources. As shown in chapter 6, each botanical category is partly defined by its ecological distribution. The internal migration of the Chinantec from temperate to hot and dry to humid zones – in response to changing economic opportunities – has affected their dependence on and use of various food, medicinal and other useful plants.

3.The Mixe of the Sierra Norte

Mixe Culture History

The Mixe, who call themselves ***ayuujk***, can be considered one of the peoples of the Americas without history (Wolf 1982), because relatively little is known about their past. A rather speculative account of Mixe culture history can be sketched from published linguistic, historical and ethnographic information on the region (de la Cerda Silva 1940; Campbell and Kaufman 1976; Kaufman 1963; Kuroda 1984; Lipp 1982, 1991; Nahmad 1965; Sanchez Castro 1952; Schmieder 1930; Wichmann 1991). Early documentation comes from Dominican missionaries and is based in part on accounts heard outside the Mixe region (e.g. in neighboring Zapotec villages). Because missionaries and neighbors often have jaded opinions, the veracity of this information may be questioned. The remaining historical and ethnographic data is derived from various anthropologists and travelers who spent short periods of time in Mixe country. None of these authors carried out much original archival research (such as that of Cline or Frey for the Chinantec), and it is hard to distinguish between what is fact and what is folklore in their accounts of the early history of the Mixe. Some of the linguistic evidence is based on controversial techniques such as glottochronology. For these reasons, the following reconstruction should be viewed as tentative and in need of much independent corroboration.

I follow the same general historical outline that I presented in Chapter 2 for the Chinantec. Throughout this review, and particularly for the prehispanic period, I also draw upon comparative data from Zoque peoples and what were formerly called Popoluca communities and are now considered either Zoque or Mixe.

1) Prehispanic Period (9500 b.c. - 1519 a.d.)

There has been abundant speculation on the origin and early history of the Mixe people. An unsubstantiated hypothesis that the Mixe migrated from Peru has been repeatedly cited and has even come to form a part of the folklore in some indigenous communities (Ballesteros and Rodriguez 1974:121–122; Lipp 1982:10). Another apocryphal version, improvised by the historian Jose Antonio Gay (1881:24–28), is that the Mixe were originally from the Slavic part of Europe. Some anthropologists uncritically recount these versions. Others, including some local residents, believe that the origin of the Mixes is to be found much closer to their present home.

While some linguists imagine that Mixe–Zoque forms a distant link between Caucasian languages of western Asia, and Aymara languages of South America, most recent studies have been more concerned with its connections to other Mesoamerican languages and cultures. A widely–discussed hypothesis linking Mixe–Zoque and Maya was first proposed by McQuown (1942). Fernandez de Miranda et al (1959:57) calculated that Mixe separated from Maya and from Totonacan approximately 6000 years ago. Wonderly (1949), who presented the first modern study of Mixe–Zoque linguistic classification, questioned this idea and suggested that there is little possibility of carrying out a systematic reconstruction when the putative relationship between two languages groups is so distant.

Despite this caveat, speculation on distant genetic relationships between languages and broad classification of linguistic systems has continued. Veogelin and Voegelin (1977:231) placed Mixe in the Penutium phylum – a grouping in their classification of the world's languages - following Freeland's (1931) earlier proposal. Witkowski and Brown (1978, 1981) and Brown and Witkowski (1979) expanded on McQuown's hypothesis, including Mayan–Zoquean (or Macro–Mayan) together with Totonac–Tepehua languages in a broad phylum which they call Mesoamerican. This proposal has in turn been criticized by Campbell and Kaufman (1980, 1983), who question the methods used to establish distant genetic relationships between languages.

Campbell and Kaufman (1976) had earlier proposed a controversial hypothesis of Mixe culture history which stresses an independent origin in the lowlands along the Gulf Coast of Mexico. They suggest that the Olmecs - who are recognized in the archeological record since 1300 B.C. and who achieved cultural dominance in parts of Mesoamerica between 800 B.C. to 400 B.C. - were Mixe–Zoque speakers. They present three tentative lines of evidence: 1) the geographical range of prehispanic and present–day MZ speakers overlaps that of Olmec archaeological sites; 2) the time-depth of MZ roughly corresponds to the beginning of Olmec civilization; and 3) the loan–words that spread from MZ to other languages refer to terms that are diagnostic of Mesoamerican culture, thus reflecting hegemony of a MZ–speaking group at an early stage in history (ibid 1976:80,82,88). The first two lines of evidence are circumstantial, and the number and importance of loan words have been challenged (Suarez 1983:156–157, Wichmann 1991:222–226).

The archeological evidence for such a nexus is ambiguous, but at least some artifacts point to a link between Olmec civilization and Mayan cultures (Suarez 1983:151). Additional research is needed to clarify the putative relationship between

Mixe-Zoque, Mayan and the Olmec civilization.

Main Division	Subgroup	Language	Code	Proto-languages		
Mixean	Oaxaca Mixean	Lowland Mixe	LM	Proto Oaxaca Mixean (pOM)	Proto Mixean (pM) 1300 year time depth?	Proto Mixe-Zoquean (pMZ) 3500 year time depth? Internal differentiation 2800 years ago?
		Midland Mixe	MM			
		South Highland Mixe	SHM			
		North Highland Mixe	NHM			
		Tapachulteco	TaM			
		Oluta Popoluca	OlP			
		Sayula Popoluca	SaP			
Zoquean	Gulf Zoquean	Ayapa Zoque	AyZ		Proto Zoquean (pZ) 1400 year time depth?	
		Texistepec Zoque	TxZ			
		Soteapan Zoque (Sierra Popoluca)	SoZ			
	Chimalapa (Oaxaca) Zoquean	Santa María Chimalapa Zoque	StMaC hZ			
		San Miguel Chimalapa Zoque	SnMi Chz			
	Chiapas Zoquean	North Zoque	NZ			
		Northeast Zoque	NEZ			
		Central Zoque	CZ			
		South Zoque	SZ			

Table 3.1. Wichmann and Nordell's classification of Mixe-Zoquean languages (Wichmann 1991: 1-12). Time depth for proto languages from Kaufmann (1974).

According to glottochronological studies, the Mixe-Zoque language family can be traced to at least 3600 years before the present (Fernandez de Miranda et al 1959:56; Kaufman, 1974:83). Since the early 1960s, linguists have realized the essential distinction between Mixe and Zoque (Kaufmann 1963, 1964; Nordell 1962; Wichmann 1991:3). Several languages once considered peripheral – such as

Tapachultec (now extinct) and those called Popoluca (Oluta, Sayula and Sierra Popoluca) - have now been attributed either to Mixe or Zoque. This classification is now widely accepted, and was adopted by Suarez in his overview of Mesoamerican languages (1983:xvi–xvii; see also figure 1.1). Kaufman suggests that the Mixe-Zoque nucleus began a process of internal differentiation at least some 2800 years ago. Some 1300 - 1400 years ago, the two branches began to split into the languages that exist today (table 3.1).

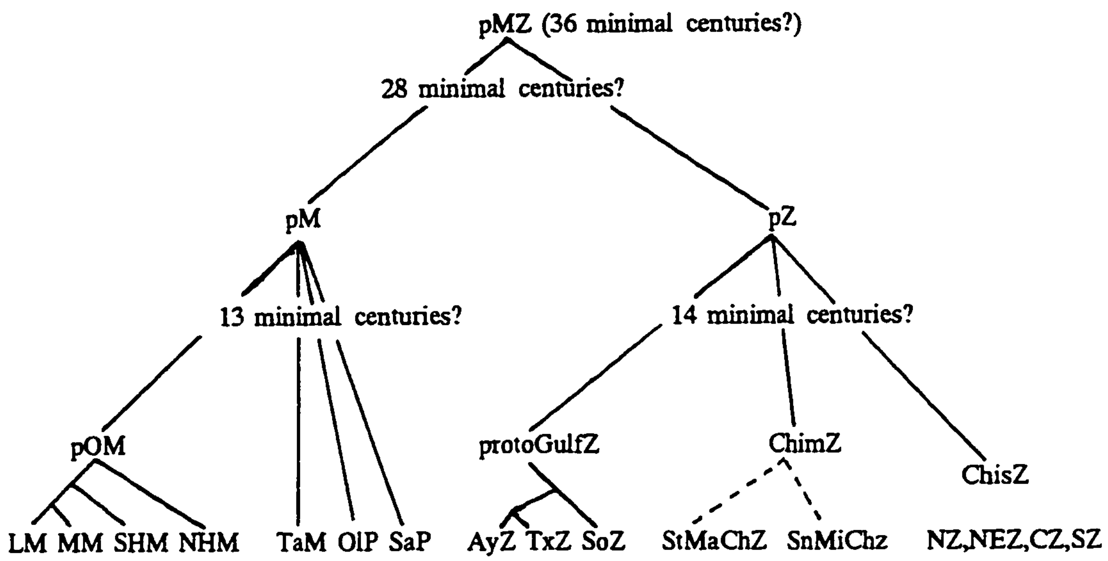


Figure 3.1. Wichmann and Nordell's classification of Mixe–Zoquean languages (Wichmann 1991:8).

Foster (1969:448) suggested there were at least two distinct Mixe languages, "Western" and "Eastern", but recognized that dialect differences had not been fully documented. Suarez (1983:18) provided newer data, based on intelligibility tests, showing that Mixe comprises 11 mutually unintelligible languages. Wichmann (1991) with the assistance of the late Mixean linguist Norman Nordell, has presented a new classification of Mixe–Zoquean languages based on over 5000 comparative sets of linguistic terms that contain at least 2 cognates each (figure 3.1, table 3.1). He recognizes and reconstructs terms of four subgroups, which correspond to proto-Mixe-Zoquean (pMZ), proto-Mixe (pM), proto-Oaxacan-Mixe (pOM) and proto-Zoque (pZ).

In this revised classification, Wichmann and Nordell recognize 4 languages, 6 dialect areas and dialects from some twenty communities within the Oaxacan Mixean branch (table 3.2). He states that Camotlán Mixe is rather distinct and could be considered a separate dialect area in a finer language classification (ibid:132). He notes that in general Mixe is more diversified in the mountains than in the lowlands, reflected in the greater number of dialects in midland and highland areas.

Language	Dialect area	Dialects (communities)	Dialect code
North Highland Mixe	[unique?]	Totontepec	To
		Huitepec	Hu
South Highland Mixe	Zempoaltepetl	Ayutla	Ay
		Tamazulapan	Tm
		Tlahuitoltepec	Tl
	Non-Zempoaltepetl	Mixistlán	Mi
		Tepantlali	Tp
		Tepuxtepec	Tu
Midland Mixe	North Midland	Cotzocón	Ct
		Jaltepec	Ja
		Matamoros	Ma
		Puxmetacan	
	South Midland	Cacalotepec	Cc
		Juquila	Ju
Lowland Mixe	[Camotlán]	Camotlán	Ca
	[Non-Camotlán]	San José El Paraíso	SJ
		Coatlán	Cn
		Guichicovi	Gu
		Mazatlán	Mz

Table 3.2. Wichmann and Nordell's classification of Oaxacan Mixean languages (Wichmann 1991:1-12).

Wichmann's (ibid:9) discussion of the Oaxacan Mixean branch of the family tree presented in figure 3.1 has implications for a regional historical study of Mixe ethnobotany:

"...if LM and SHM are compared, a proto-language can be reconstructed which can be taken as the basis from which MM evolved. On the other, hand it excludes the possibility of comparing MM and LM with the aim of reconstructing the evolutionary basis of NHM. It also tells us that LM is closer to MM than to SHM, [e.g.] LM and MM have three degrees of vowel length, whereas SHM and NHM have two degrees; LM and MM agree on basing one subclass of verbs analogically on another verb class; etc. SHM and MM also share certain innovations, mostly in what concerns the vocalism. Finally NHM [languages] are set off from SHM, MM and LM by [various] innovations ... as well as by retentions ... The three successive nodes summarize these relations, which ... remain hidden when just a single node is employed"

Given the lack of data from many other Mixe-Zoquean languages, Wichmann does not attempt to clarify the internal relationships of other branches in the family tree.

The linguistic reconstruction of proto-Mixe-Zoque vocabulary allows a glimpse of early subsistence patterns. Some botanical, zoological and technological terms found among the approximately 450 items that Campbell and Kaufman have reconstructed for proto-Mixe-Zoque are listed in table 3.3.

These terms indicate that by 1600 B.C., proto-Mixe-Zoque culture had many elements that are a basic part of the Mesoamerican subsistence tradition. These early Mixe-Zoque speakers were agriculturists, probably cultivating corn, beans, squash, several tubers and many fruits. They collected wild or semi-domesticated food plants such as greens and fruits. Other products were derived from wild or domesticated species - resin and latex, tobacco and fibers. There is evidence that these people engaged in hunting and fishing, and recognized a broad range of bird, mammal and fish species that were probably eaten. The early Mixe-Zoque demonstrated some amount of forestry and carpentry skills, knowing how to prepare wood and binding material, build houses and make utensils. Wichmann (1991:226) calls into question some of these linguistic reconstructions (such as tobacco), but confirms others. A regional survey of technical terms and names for plants and animals would be necessary to elucidate the full set of terms that can be attributed to proto-Mixe-Zoque speakers.

Botany	Zoology	Technology
agave fiber	armadillo	to clear land
anona	bee, wasp	cornfield
avocado	coati	cord
bean	coyote	to fish
cacao	crab	to harvest
chayote tuber	deer	ladder
chile	fish	to plane wood
chokecherry	iguana	to sow
corn	jaguar	to spin thread
copal incense	monkey	to twist rope
coyol palm	rabbit	
edible greens	turkey	
guava		
jicara gourd		
manioc		
palm mat		
rubber		
squash		
sweet potato		
tobacco		
tomato		
water gourd		
zapote		

Table 3.3. English glosses of some botanical, zoological, and technological terms reconstructed for proto-Mixe-Zoque (Campbell and Kaufman 1976).

Mixe-Zoque speakers once formed a continuous population across the Isthmus of Tehuantepec (Foster 1969:448), but present-day communities are dispersed in various zones of Oaxaca, Chiapas, Veracruz and Tabasco. Historical data on population movements, along with a glimpse at linguistic maps of Mesoamerica

(Kaufman 1973; Suarez 1983), provide evidence that the Mixe–Zoque territory was divided by the intrusion of other ethnolinguistic groups. Nahua-speaking groups migrated along the southern Gulf Coast to Central America around 800 A.D. (Suarez 1983:149). The Mixe–Zoque apparently were pushed away from the Pacific Coast by Zapotec speakers, and to a lesser extent by the Huave, a group of enigmatic origins that arrived to the Isthmus in late pre-hispanic times (and who some authors erroneously linked culturally and linguistically to the Mixe). Foster (1969:453) concludes that Popoluca communities were split off by Nahua-speaking invaders and that the Zapotec separated Mixe from Zoque. Because Tzotzil populations currently separate the Zoque populations of Oaxaca and Chiapas, it is possible the Mixe–Zoque territory was diminished by Mayan speakers who intruded from the east (Lowe 1977).

It is probable that Mixe, Zoque and Popoluca speakers were themselves on the move, searching out new lands. They migrated to the mountainous areas of Oaxaca, Chiapas and Veracruz, regions that may have been uninhabited during much of the early Village stage. There has been much speculation on the reason for this migration. Juan Arelí Bernal Alcantara (pers. comm.), an agronomist who is a native and resident of Totontepec, suggests that there may have been a spiritual reason – the search for a sacred mountain – or that the Mixes were seeking to escape conflict or some widespread epidemic. All of these arguments have some merit, but none is definitive. The lowlands of Oaxaca were certainly disease-ridden, with an high incidence of malaria and other fever-causing illnesses. The encounter with other indigenous peoples would have led to considerable conflict over territory, verified to some extent by historians. And Mixe ritual is still centered on the sacred power of mountains, especially Mt. Zempoaltepetl – the 'twenty peaks' that constitute Oaxaca's highest range (Gonzalez Villanueva 1989:115–117).

These factors may have been compounded by those mentioned by Winter et al for the Otomanguean populations – population growth and resettlement, and the strengthening of community coheviseness accompanied by friction with neighboring villages of the same ethnicity.

Kaufman has suggested that glottochronological data can help us deduce the dates of such population movements (1974:48). The division of the nucleus into separate Mixe and Zoque branches at the end of the Village stage may correspond to a migration towards highland areas of southern Mexico after a number of centuries of cultural evolution in the lowlands. If the later differentiation within these two branches coincides with the dispersion and geographical isolation of populations, then we might speculate that many important Mixe and Zoque communities were founded sometime in the 7th or 8th century.

Were Mixe–Zoques the carriers of the lowland tradition who migrated only relatively recently to a mountain environment? This is one of the broader and more memorable conclusions that Beals drew from his three–month trek through Mixe country, and it colors his entire interpretation of their highland culture. The following observation from Beals (1973:8) is typical,

> "The most typical Mixe houses with great high roofs and ample ventilation suggest the need for airiness found deep in tropical jungles, not on windswept foggy mountain heights. The habitually scanty clothing – in a

region where snow sometimes falls many still wear light cotton garments without even a blanket for covering at night - and the methods of cultivation and rotation of fields are all better adapted to the warm lowlands".

The little historical information that we have at hand appears to support the claim of a lowland origin and a highland migration. Burgoa, a Dominican priest who was stationed in Villa Alta from in the 17th century, relates that by the beginning of the 14th century, Mixe lands extended form Rio Nexapa to Coatzocoalcos in Veracruz, and from Villa Alta to the Isthmus of Tehuantepec in Oaxaca (Burgoa 1934:2,407). This extension must have included Popoluca as well as Mixe speakers, and there is reason to believe that this territory was partially inhabited by Nahuat speakers. The idea that the Mixe formerly occupied a larger extension than at present appears to correlate with the geographical separation indicated by the great linguistic diversity between the numerous Mixe dialects (Fernández et al 1959:149).

The idea is also corroborated by Mixe oral tradition. Bernal Alcantara (pers. comm.) states that some inhabitants of his village and of the *agencia* Huitepec hold the popular belief that their ancestors came from a place called Monte Mixtán, located near Playa Vicente, Veracruz. The people of Totontepec considered these lands as their communal property, even in recent decades. Bernal Alcantara describes a pilgrimage to Otatitlán, Verzcruz that was made annually by up to 60 villagers from Totontepec. Although the purpose in recent times was to visit the crucified Christ of Otatitlán, Bernal Alcantara speculates that this yearly trek may have had a prehispanic origin related to the desire of returning to ancient lands.

If the lowlands were the homeland of the Mixe, the mountains of Oaxaca later became their refuge and today their heartland. The mountain settlements formed a virtual fortress for the Mixe, who withstood many attacks over the course of several centuries. At the beginning of the 15th century, the Mixes repelled attacks by Zapotec and Mixtec warriors under the command of the King of Zaachila, a Valley settlement that exists to this day as an important market town.

The Mixe were equally successful in protecting themselves from the military aggression perpetrated by the Aztecs. At the beginning of the 16th century, the Mixes truncated the Aztec trade routes into the resource–rich Gulf Coastal lowlands. The Aztec king Ahuitzol moved against them and captured two towns. Later Moctezuma II attempted to establish economic relationships with the Mixes. His emissaries were killed, and the Aztec king sent his troops to capture the Mixe stronghold at Jaltepec. The Aztec formed an alliance with the restive Valley Zapotecs and succeeded in controlling the fortress town of Quetzaltepec. The Zapotec attacked again in 1510, but were ultimately unsuccessful in making inroads against the Mixes (Lipp 1982:11 - 12).

2) Spanish contact and Mixe Resistance (1519 - 1531)

The story of early Mixe and Spanish relations is one of armed aggression and successful resistance. Soon after the Spanish conquest, the reigning Spanish crown official in Tuxtepec, Gonzalo de Sandoval, tried to gain the submission of the Mixe nobility. They refused to accept his overtures, and the Crown authorized a series of military expeditions against the Mixe beginning in 1522. The military ability of the Mixe, combined with the difficult terrain in which they lived, helped to defuse the Spanish offensives on each occasion.

Soon after the first battles, the Mixe sent a peaceful commission of twenty elders offering gold and jewelry. The group was perhaps offering allegiance and peaceful coexistence instead of subservience. Sandoval accepted, and distributed the communal land holdings of the Mixe to his captains as *encomiendas*, land grants that included the rights to native labor and the extraction of tribute, as well as the obligation to educate and Christianize the local inhabitants.

In 1523, the Mixe rebelled against the Spaniards, acting in alliance with neighboring villages. Hernan Cortés sent another military expedition to quell the rebellion. The director, Rodrigo Rangel, achieved no success and returned to Mexico after two months. In 1524, yet another expedition was sent, this time reinforced with experienced Aztec warriors, but again the Mixe were successful in resisting the onslaught.

In the face of these defeats, the Spaniards tried a new tactic. They constructed a series of garrison towns around the perimeter of the Mixe region, including one at Villa Alta. By 1531 Antonio de Acevedo y Pacheco was able to use these garrisons as a base to pacify some of the perimeter towns, but the Mixe heartland never fell to Spanish military conquests (Lipp 1982:12).

3) Colonial Period: Dominicans and colonists (1532 - 1800)

Although the conflict with the Spanish soldiers ended in a stalemate, Catholic missionaries and Spanish colonists had an easier time penetrating the Mixe fortress.

Dominican priests arrived to the Mixe region in 1532 and established numerous parishes between 1572 and 1748. These priests were not able to protect the Mixe from heavy taxation and brutal treatment at the hands of the Spanish Crown.

Despite pacification by the Dominicans, the Mixe rebelled repeatedly, most notably in 1570 and 1661.

Perhaps because of the aggressiveness of the Mixe, or perhaps the lack of resources in the region, few settler families followed the missionaries and soldiers into Mixe country. The Dominican historian Arroyo reported that only thirty Spanish families arrived in Villa Alta. Of these, only a few ventured further to establish themselves in Mixe communities.

As limited as it was, the interaction between Mixe–Zoque speakers and the Spanish marked the beginning of the exchange of objects and loan words between the two cultures. Many of the Spanish words borrowed in the indigenous languages were terms that described objects new to the native culture – European plants and animals, manufactured goods or religious concepts. A study of these loan words together with historical accounts can clarify when certain items were introduced.

Clark (1977) uses tentative phonological evidence to provide a historical reconstruction of the adoption of loan–words by speakers of Sayula Popoluca, a language of the Veracruz coastal zone that is closely related to Mixe. He divides post–hispanic Mexican history into three periods, the first of which corresponds to the time from the Conquest to the middle part of the 17th century. In this first period, botanical terms for garlic, yam and watermelon were apparently borrowed from Spanish as were animal names for cow, rooster, horse, rabbit, cat, mule and duck. The majority of these species are of European origin, and others were probably given additional salience because of their widespread use by the Spanish. The arrival of missionaries is reflected in terms borrowed for priest, god, saint sponsor, cross and

Catholic mass. Introduced manufactured goods are evidenced by words for needle, button, razor, soap, money and many other objects. Similar concepts and articles were introduced to the Mixe, and probably led to similar linguistic borrowing.

The Spanish crown issued a decree for the *reducción* or centralization of Mixe settlements in 1600. Unlike the Chinantla, where the decree caused major changes in settlement patterns, the *reducción* in the Mixe region merely introduced plaza architecture and central government into the head villages. Although there was some concentration of population in cabeceras, most families remained dispersed in ranches (Kuroda 1984:14).

Other ethnographers concur that Mixe they were originally living in dispersed settlements and that congregation by Spanish served to begin the creation of centralized Mixe villages. Beals (1973:14) states, "The town among the Mixe is primarily, if not wholly, a Spanish institution. The early references to the Mixe speak of them as dwelling in kinship groups in isolated and inaccessible rancherias." Foster subscribes to this idea and finds it relevant for Popoluca but not for Zoque populations (1969:463).

Throughout the 17th and 18th centuries, the colonial government gradually extended its administrative control over the Mixe region. Land titles were granted in 1712 to five villages, including Totontepec (Kuroda 1984:15). The *encomienda* system – which gave Spanish overlords rights to land, labor and production – continued in effect, and goods were received as tribute from the Mixe region until 1789 (Chance 1978:42).

The Dominican friars advanced further in their attempts to convert the Mixes to Catholicism. They built numerous temples fitted with costly bells and other religious articles. However, the Dominicans gradually lost influence in the Mixe region and in other parts of Mexico. By the 1780, the Dominicans had left, and the Mixe region was left in the hands of a few secular priests (Kuroda 1984:16).

Even as the clergy was leaving, the contact with Spanish colonists was increasing in some Mixe villages. The linguistic acculturation of the Mixe advanced and the arrival of these colonists undoubtedly introduced many new terms into the Mixe vocabulary. Clark (1977:130) has suggested Spanish terms for «animal», «sugar», «ox», «lemon», «mulberry», «skunk» as well as other Spanish plant and animal names were introduced into Sayula Popoluca during this time (i.e. his period II, 1650 - 1900).

4) Economic Integration (19th Century - early 20th century)

The war of Independence and the intervention of the French did not have a great impact on the Mixe region, which was still rather isolated from national events. De la Fuente relates that the pro-Independence Zapotecs of Yalalag attacked Mixistlán, whose inhabitants were reticent to join the political cause.

The lowlands and piedmont areas of the northern part of Oaxaca were greatly affected by the introduction and commercial production of several cash crops, most notably coffee. In some areas, an authoritarian system of haciendas or large plantations developed and local people were pressed into labor as virtual slaves in the sugar cane, banana, tobacco and coffee plantations.

In the Mixe region, coffee was introduced around the turn of the century, and was widely cultivated by the beginning of the Revolution. Coffee cultivation and other forms of agricultural production remained at the family level and the Mixe avoided the abuses of the hacienda system.

5) Revolution and National Development (20th century)

The Revolution had less impact on the Mixe than on other ethnic groups of Mexico. Since the Mixe had maintained control over their territory even during the Porfiriato, they did not stand to benefit from the land reform promised by revolutionaries. The presence of armed revolutionaries and the general disruption of trade probably forced them to depend more strongly on their subsistence production.

However, the revolution did create the political climate for the emergence in some major communities of local political bosses such as the cacique of Ayutla, an army colonel whose rise and fall of is described by Beals (1973). These leaders sought to integrate the Mixe region into the new Mexican Republic and they attempted to eradicate some traditional customs which they saw as primitive.

An important post–revolutionary event was the demarcation of the Mixes District in 1939. As a new administrative unit, it became the first and only district that roughly followed ethnolinguistic lines. Luis Rodríguez, a cacique from Zacatepec, came to power. He replicated some earlier forms of economic domination, extracting tribute and labor from subordinate villages and plying these into a position of influence with the state and national authorities. He and the political leaders of Totontepec, Ayutla and other important villages attempted to modernize the Mixe region, attacking many traditional beliefs and customs in the process. The relationship between local political leaders was by no means peaceful and Rodriguez himself was assassinated by a member of the opposition in 1958.

Since the late 1950s, the Mixe region has witnessed the waning power of political bosses and the increase of state and national intervention. The *Comisión Federal de Electricidad* (the national electric company) and the *Comisión del Papaloapan* (a national development program for Oaxaca and Veracruz) helped to bring roads, electricity, water systems and other innovations to the area. The main unpaved road from Oaxaca and Mitla to the Mixe region, which was begun by the ambitious cacique from Ayutla, did not reach Ayutla and Tamazulapan until 1966, and arrived to more northerly villages in the 1970s. As of 1995, it has paved up to Ayutla. Electricity arrived in 1969 to Ayutla and Tamazulapan (Kuroda 1984:19) and came to more northern communities in the 1980s. The *Secretaría de Educación Pública* built a number of primary and secondary schools, starting with a school in Ayutla in the 1930s. CONASUPO, a national program of food distribution to economically marginal areas, has opened numerous stores that sell corn, milk and other basic food items.

More governmental agencies penetrated the Mixe region in the 1970s, many of which established regional offices in Ayutla, in some of the larger municipios and in the *cabecera del distrito* or district seat of Zacatepec. Along with the road came the arrival of merchants and buyers, including many Zapotec and some Mixe.

Throughout the first half of the nineteenth century, the Mixe churches remained in the hands of secular priests. In the early 1960s, the Salesian order arrived and established parishes in six communities, including Totontepec (Kuroda 1984:19). The Salesians have been active in the area since that time, and have founded schools, medical clinics and small industries in several communities.

It is also during this century that a few anthropologists visited Mixe–Zoque populations. Despite the current-day separation between Mixe, Zoque and Popoluca communities, there is a common impression among ethnographers that these ethnolinguistic groups manifest a unique cultural tradition. Foster (1969:459) states that, "the three groups clearly comprise a major historical cultural unit: basic subsistence patterns, house types, weaving and women's dress, and folklore and religious beliefs reveal a considerable degree of underlying homogeneity which set them off from other Indian groups".

These ethnographers share a prejudice that Mixe–Zoques are less–evolved than neighboring ethnolinguistic groups, something that ethnographers explain by poor adaptation to the mountain environment. To Beals (1973:8), the Mixe are "ill adapted to the rainy, cold and foggy mountains and suggesting influence from north and east rather than from the Zapotec in their relatively dry climate". Foster (1969:458) states, "The Mixe and Popoluca represent a cultural stratum less developed than that of the Zapotec and Aztec to the north and west, and less developed that of Mayan–speaking peoples to the east". These questionable conclusions are drawn from their relatively limited fieldwork in Oaxaca and Veracruz.

Today the Mixe occupy an extension of some 6478 km^2 in the northeastern part of Oaxaca State, which corresponds to a little less 7% of the state's surface area. There are probably over 55,000 Mixe speakers, representing 2.3% of the state's population. The population growth rate is difficult to verify, but the figures that Lipp draws from several sources appear to indicate rates of between 0.4% and 3.4% of annual growth since the last century. Still harder to estimate is the number of monolingual Mixes, and how this number has changed over the years.

The Mixe inhabit not only 17 *municipios* in the Mixes district but also 3 *municipios* in Juchitan and 1 in Yautepec district. There are also Mixe *agencias* in Tehuantepec and Villa Alta districts. Since each of the 21 municipalities comprises several settlements, there are hundreds of villages, hamlets and ranches in the Mixe ethnolinguistic region.

Totontepec - A Highland Mixe Municipality

Totontepec is a highland Mixe municipality, situated in the northwestern corner of the Mixes district, which covers 318.95 km^2 of territory within its roughly pentagonal borders.

The *cabecera* or «municipal seat», also called Totontepec, is a large community found nearly in the center of the municipality. It is surrounded by ten hamlets or agencias (table 3.4). Chinantequilla, Tepitongo and Amatepec lie roughly to the north; Jareta, Metepec and Huitepec are located to the south; Tiltepec is to the southwest; and Moctum, Ocotepec and Jayacastepec are in the southeast sector of the municipality.

Community Name (Spanish)	Community Name (Mixe)	Municipal Status
Amatepec	*Tse̲'xuka'm*	*Agencia Municipal*
Chinantequilla	*Ma̲vya'am*	*Agencia de Policia*
Huitepec	*Maaxy Keetsp*	*Agencia Municipal*
Jareta	*Tsatso'oxum*	*Agencia Municipal*
Jayacastepec	*Vinjipu̲ Ko̲jm*	*Agencia de Policia*
Metepec	*Tsaa'chp*	*Agencia Municipal*
Moctum	*Ma̲j_doonm*	*Agencia Municipal*
Ocotepec	*Maaxu̲n Ko̲jm*	*Agencia de Policia*
Tepitongo	*Pu̲u̲go̲jm*	*Agencia Municipal*
Tiltepec	*Tu̲'puts Ko̲j*	*Agencia de Policia*
Totontepec	*Añu Kojm*	*Cabecera*

Table 3.4. Spanish name, Mixe name and legal status of communities in the Municipality of Totontepec.

Community members suggest that this pattern of village settlement reflects the necessity to defend Totontepec from the aggressive attacks of other indigenous groups and the Spanish in previous centuries. It is also possibly related to a pattern of access to various ecological zones, and a splintering into smaller communities as population grows and conflicts arise.

All of these settle-ments are located in the cloud forest, but the vegetation changes from one village to another according to elevation, rainfall and temperature (table 3.5). Many of these communities also have access to pine-oak forest at higher elevations and lowland evergreen forest in patches at lower elevations.

Community Name	Elevation in m	Rainfall in mm	Low temper-ature range ^{o}C	High temper-ature range ^{o}C
Amatepec	1900	>1700	8 - 13	17 - 23
Chinantequilla	1200	>2000	13 - 19	21 - 27
Huitepec	2100	<1700	7 - 12	16 - 22
Jareta	1700	1700	12 - 14	20 - 25
Jayacastepec	1800	2000	12 - 14	17 - 23
Metepec	2200	<1700	9 - 12	17 - 22
Moctum	1600	>1700	12 - 15	20 - 25
Ocotepec	1100	>1700	13 - 16	22 - 27
Tepitongo	1500	>1700	11 - 15	20 - 25
Tiltepec	2000	<1700	8 - 12	19 - 22
Totontepec	1860	1700	9 - 13	17 - 23

Table 3.5. Elevation, rainfall and average low and high temperatures in various communities of Totontepec.

The municipality ranges in elevation from 500 to over 3000 meters above sea level. The elevation of the *cabecera* and the 10 communities is listed in table 3.5. Except for Chinantequilla and Ocotepec, which were formerly ranches, these elevation figures are well within 1360 and 2575 meters above sea level, the limits noted by Beals for other Mixe communities (1973:11).

Rainfall varies from 1700 to 2500 mm per year, although precipitation may be much higher in some localized areas. Low temperatures range from 6 – 9° C in the drier winter months and from 9 – 15° C in the wetter summer months. High temperatures range from 15 – 21° C in the winter months and from 24 –30° C in summer months.

Year	Monolingual	Bilingual
1930	2459 (73.4%)	890 (26.6%)
1940	2693 (70.0%)	1153 (30.0%)
1950	2905* (76.6)	889* (23.4)
1960	1588 (41.9%)	2202 (58.1%)
1970	n/a	n/a
1980	937 (25.8%)	2695 (74.2%)
1990	869 (20.1%)	3436 (79.9%)

Table 3.6. Number of monolingual (Mixe) and bilingual (Mixe & Spanish) inhabitants in Totontepec. The figures do not include children under 5 years old and exclude a small number of people 5 years and older who did not indicate language ability or who spoke only Spanish at the time of the interview. *The data from 1950 are inconsistent with the trend shown in other years and may be inaccurate.

According to the 1990 census (INEGI 1992), there are 5394 inhabitants (2647 males, 2747 females) living in a total of 1116 households. There are thus an average of 4.8 persons per household and a population density of 16.9 people per km^2. Although there is a high rate of monolingualism among the Mixe, most inhabitants of Totontepec are fluent in both Mixe and Spanish. The 1990 census reports that 79.9% of the population over 5 years old is bilingual, a percentage which has been increasing over at least the last 60 years (table 3.6). This is in part due to the arrival of the Spanish family Alcantara to the region in the late 17th century. In the late 19th century, one of the family's descendants settled in the community and had a great impact on the local culture, including the extent of bilingualism.

In Totontepec, the municipal center, there are 1745 inhabitants in 356 households. Jayacastepec and Tiltepec, the two largest agencias, have a combined population of 1165 people in 244 households. Eight of the agencias are

Community	Number of households	Total Population	Number of Men	Number of Women
Municipality	1116	5394	2647	2747
Totontepec	356	1745	819	926
Jayacastepec	140	689	341	348
Chinantequilla	91	423	214	209
Moctum	28	138	67	71
Metepec	39	197	97	100
Huitepec	72	307	152	155
Ocotepec	55	255	137	118
Tiltepec	104	476	236	240
Amatepec	79	429	229	200
Jareta	61	289	139	150
Tepitongo	91	446	216	230

Table 3.7. Number of households, total population and number of men and women in various communities of Totontepec municipality.

rather small, having a combined population of 2484 people in some 516 households. In these communities there is a range of between some 200 and 450 inhabitants living in about 25 to 100 households (table 3.7).

According to figures from various volumes of the *Censo General de Población* (table 3.8), considered by many to be an unreliable source of information particularly at the municipal level, it appears that the overall population and number of houses in Totontepec is growing steadily. This is probably realistic considering that the relatively high birth rate in the municipality is balanced by relatively high infant mortality rates and levels of migration. Permanent migration to Mexico and Oaxaca City has been common for several decades, but temporary migration to the United States is barely initiating at present.

Totontepec is a nucleated village (Lipp 1983:37), showing the Spanish style plaza that Beals and Foster trace to the Crown program of *reducción*. There are two types of land holdings in Totontepec, communal lands and private property.

Year of Census	Number of Houses	Municipal Population
1930	n/a	3894
1940	n/a	3846
1950	n/a	4387
1960	859	4527
1970	n/a	n/a
1980	1092	5164
1990	1194	5394

Table 3.8. Change in number of houses and population levels in Totontepec as reflected in national censuses taken from 1930 to 1990.

Communal lands may be worked for many years by the same family, but they are not inheritable. If abandoned, they revert to the community. Most agricultural production takes place on private property. Many residents have small plots of private property near the community which range in size from 1/2 hectare to 20 hectares per family. Only a few families hold large extensions of good agricultural land.

Most families have a ranch at lower elevations to the north or northeast of the community. Although some people live permanently in the more distant ranches, most make short visits to the closer ranches to cultivate their fields and coffee groves.

There are two primary schools and one secondary school in the community. In recent years, educational opportunities have expanded even further. Post-secondary students can continue to study at a community-founded preparatory school or at a governmental technical school. Today almost all young people read and write Spanish. Foreign linguists and Mixe cultural groups have developed phonemic writing systems in Mixe, but few villagers are proficient in using them.

There are no protected natural areas in the municipality, but there have been some formal initiatives, dating back to 1984, to regulate the utilization and conservation of forest resources. A Oaxaca-based non-profit organization is joining forces with community members in Totontepec to explore ***ketstekum***, an area of high priority for conservation which includes cloud forests on the western edge of the municipality.

A single unpaved road reached the community in 1977 and construction of secondary roads to various hamlets is underway at present. There has been no large-scale logging operation in the municipality, but there is selective cutting of valuable hardwoods such as cedars (species of *Cedrela* and *Swietenia*). Deforestation is heavy near communities and roadways, particularly under 1600 meters above sea level. High elevation cloud forest is potentially threatened by a plan to harvest oak trees for charcoal production.

Dioscorea tubers were extracted on a large-scale in the 1970s, but there are no significant extractive activities at present. The community, an 8-hour bus ride from Oaxaca City, is too remote to attract the interest of tourists.

History of the community

Bernal Alcantara (pers. comm.) suggests that the founders of Totontepec arrived in the 7th or 8th century, a date that corresponds well to glottochronological and historical evidence for movements among the Mixe people as a whole. Local legend has it that these original colonizers settled in a site presently called ***pa'tm*** which means «there below» in Mixe, and which is known in Spanish as ***llano grande***, «large plain». This corresponds to a large field east of the community where many residents own private land on which they cultivate corn, beans and squash. According to the legend, the original members of the community stayed at this site until the 13th or 14th century, when a severe epidemic caused the death of many children. The inhabitants then moved to the present location of Totontepec, at the base of a peculiarly-shaped mountain called in Mixe ***anu keets*** «thunder cliff,rock» or *La Mitra* «bishop's hat» in Spanish.

During the epoch of the Aztec civilization (1300 - 1500 a.c.), the Mixes of Totontepec combined forces with those of Quetzaltepec to successfully repel the Zapotec and Nahuatl forces. They were equally successful in repelling Spanish attacks in the first decade after the Conquest. The Spanish finally founded a fortress town of Villa Alta on the 23rd of January, 1531 (Bernal Alcantara pers. comm.). This village is still called ***vuu't viinm***, «fenced place» in Totontepec Mixe, although it has long ceased to be a military garrison.

As for the Mixes in general, Spanish contact with the residents of Totontepec came not through domination by military forces, but rather by the penetration of Dominican missionaries (Arroyo 1961). The Catholic church was built in Totontepec between 1572 and 1676, becoming the first missionary center in the Mixe region.

Although the Mixe region never received large groups of Spanish settlers, some Spaniards held great influence over particular villages. One was the Alcantara family, the first lay Spaniards to establish an ongoing contact with the Mixe of Totontepec. The patriarch of the family came in 1795 to cast the bell for the church.

His great grandson, José Alcantara Soto (1871 - 1938), was an influential person in the community. His parents and grandparents had apparently taught him about medicine, carpentry, horticulture, blacksmithing, bread-baking, soap-making and other skills. José Alcantara was president of the community six times between 1908 and 1925. He is said to have married four women and to have had a total of 26 children.

Since the Salesians arrived in the Mixe region in the 1960s, Totontepec has been one of their main centers of operation. They created a cultural center in which they have operated a primary school since 1966 and in which they have operated small industries including a carpentry workshop, a small dairy and a sugarcane press. The Salesians have shown a general appreciation of Mixe culture and two clerics have published anthropological works on the Mixe which include some information gathered in Totontepec (González V. 1989; Ballesteros R. and Rodríguez E. 1974).

Since the 1950s, various government offices have implemented several development programs in Totontepec. The *Comisión del Papoloapan* introduced the potable water system of Totontepec in 1964–1965. In 1975, CONASUPO began operations, providing basic food items at a guaranteed price. Before the completion of the highway, Totontepec was connected to the Oaxaca valley by airplane. The air service was begun in 1948 by linguists from the Summer Institute of Linguistics, and there were apparently semi-regular flights from Mitla to Totontepec for many years. The unpaved highway arrived in Totontepec in August of 1977. It cuts the municipality roughly in two, passing through Metepec, Totontepec, Amatepec and Chinantequilla before continuing on to San Juan Comaltepec and Choapan in the District of Choapan. A separate highway from Ayutla to Zacatepec crosses the municipality of Totontepec, passing above Huitepec and Jayacastepec.

With the arrival of the road, other services and government programs began to arrive. The Post Office was introduced in 1977 and electricity was installed in 1982. A secondary school was built in the late 1980s, allowing students a total of nine years of education in Totontepec. A group of community members – led by a local agronomist, Juan Arelí Bernal Alcantara – has begun a preparatory school called the *Instituto Comunitario Mixe "Kong Oy"*. Over thirty Mixe students who wish to continue their education without leaving home have enrolled in the school, which offers courses in Mixe literacy, music, agriculture, traditional medicine and sustainable use of forest resources.

Several government programs implemented in recent years have carried out some rudimentary ethnobotanical projects. The *Oaxacan Regional Office of Culturas Populares*, a program of the *Secretaría de Educación Pública*, prepared two cultural promoters who went on to create a garden of medicinal herbs near the community medical clinic. In subsequent years, both the *Instituto Mexicano de Servicio Social* [IMSS], which runs the clinic, and the *Instituto Nacional Indigenista* [INI] demonstrated interest in maintaining the garden. The *Instituto Nacional de la Nutrición* [INN] trained a health promoter, and set out to document some herbal remedies for gastrointestinal conditions and to analyze the nutritional content of some edible greens. The *Instituto Nacional de Educación para Adultos* [INEA] has expressed interest in preparing materials on herbal remedies as part of its literacy campaign in the community. These various episodes of external contact are summarized in table 3.9.

The history of relatively close contact with outsiders has created an atmosphere in Totontepec that is rather more open than other Mixe communities. Beals (1973:2) considers Totontepec as one of four 'progressive' villages in the Mixe region, the others being Ayutla, Juquila and Zacatepec. He defines the progressive villages as "characterized by a number of ladino (i.e. Spanish-speaking and

Europeanized) people who are politically in the ascendancy, not only in

Period	Group	Activity
1520 - 1532	Soldiers	Military conflict
1532 - 1789	Crown administrators	Encomienda & congregation
1572 - 1780	Dominican Friars	Catholic indoctrination
1700s	Spanish colonists	Widespread acculturation
1960s -	Salesian missionaries	Religious, social programs
1960s -	Mexican officials	Development, educational programs

Table 3.9. Summary of time periods, groups and characterization of activities promoted by outsiders in Totontepec.

their own villages, but throughout the region. They are generally ignorant of the non-Christian rituals and beliefs practiced by their fellow tribesman and, when they come into contact with these beliefs, persecute those who practice them within their own villages". Beals notes there is a certain amount of clandestine resistance of traditional beliefs even in these progressive villages. At present, perhaps in response to the general trend of cultural revival and promotion in the Sierra, there is a renewed curiosity and greater tolerance for these beliefs and practices.

Totontepec Mixe and their Natural Environment

The Mixes of Totontepec, like other speakers of North Highland Mixe, Zempoaltepetl-area South Highland Mixe and North Midland Mixe dialects, are inhabitants of the cloud forest. Early anthropologists, betraying a tendency for the dramatic and the simplistic in their ethnographic description, exaggerated the Mixe maladaptation to the humid mountain environment. The following quote from Beals (1973:7-8) is typical of the environmental determinism that we witness in several early accounts of the Mixe,

"The poverty of Mixe civilization may be ascribed in part to the habitat. Almost of necessity the Mixe live close to the bitter level of bare subsistence.

Their country is beautiful and picturesque, but it also extremely inhospitable. The magnificent forests are still a tremendous obstacle to the extension of their crude hillside agriculture. If today it is only by grueling toil that a man may carve a field out of the forest, the difficulties in the days of stone axes must have been tremendous. The cold and humid climate saps men's energies in the constant effort to keep warm with insufficient clothing and insufficient housing. An abundant fauna preys upon the fields and at times upon the men. Dangerous parasites and insects attack the Mixe and communicate unusual, debilitating and often fatal diseases. When fields are cleared, they usually lie on precipitous slopes down which boulders hurtle at any time. Fields and houses are often liable, particularly in the rainy season, to be swept away in great landslides. Much of Mixe life must be spent in combatting and foreseeing these endless contingencies and in wresting an inadequate subsistence from the soil and the forests."

Beals, who did not have the opportunity to carry out a detailed research on the culture during his three months in Mixe country, uses the concept of maladaptation and primitiveness to interpret diverse aspects of Mixe knowledge. It is not surprising to find in his writings the fallacious argument that the Mixe are largely ignorant of local plants (Beals 1973:95): "In some towns there are men or women known for their ability to use herbs, but their knowledge is slight and experimental... There are a few well-recognized herbs, evidently, but I could find nothing to indicate that herbal curers ... possessed any extensive knowledge". This stands in contrast to de la Fuente's (1965:36) observation that the Zapotecs have adopted Mixe methods of curing, and that Mixe curers practice in Yalalag.

Far from having their life determined by their surroundings – or being maladapted to or ignorant of their environment – the Mixe have a detailed ecological knowledge which allows them to make a living from the diverse vegetational zones they inhabit. It is true they live in relative poverty, but so do many indigenous people of Mexico, a fact that may be better analyzed by their historical role as peasants since colonial times.

The following section summarizes of how the Mixe of Totontepec classify the local environment. Each topic – climate, soils, vegetation types and so on – requires a much more in depth investigation than I was able to carry out during my fieldwork, but the following serves as an introduction to some parameters of ethnobotanical knowledge.

Climate

The Mixe classification of climatic zones is much like that employed by peasants throughout southern Mexico. The Mixe recognize a «hot zone» (***an it***), a «temperate zone» (***mukojk an it***), and a «cold zone» (***xox it***). These terms are used for macroclimatic regions, which may be correlated with rainfall, temperature, elevation and vegetation type (table 3.10).

Climate Type	Rainfall (mm/year)	Temperature Range C	Elevation Range (m)	Forest Type
xox it	1300 - 1700	6 - 21	2000-3400	MC, PO
mukojk an it	1700 - 2100	9 - 24	1400-2000	MC
an it	2100 - 2500	15 - 30	400-1400	MC, TE

Table 3.10. Summary of the Mixe climate zones and their approximate correlation to precipitation, temperature, elevation and vegetation. Note: MC = Montane Cloud Forest, PO = Pine-Oak Forest, TE = Tropical Evergreen Forest

Beals encountered this same climate classification in the communities that he visited (1973:8). Lipp similarly divides the Mixe region into three ecological and climatic strata, a tropical zone from 400 – 1200 meters above sea level, a temperate zone from 1200 – 2000 meters and a cold zone from 2000 – 3400 meters (1982:10). These zones correspond closely with the Totontepec Mixe climatic categories.

The *cabecera* of Totontepec is located in «temperate country», but has close access to both hot and cold zones. In general, people consider that the forests and mountains above the village are «cold country», and that the ranches and tropical rivers below constitute «hot country». In addition, they locate the agencias in one or more of these zones – Chinantequilla and Ocotepec are «hot country» communities, Huitepec is in «cold country», and so on.

These terms may also be used to describe the microclimates around the village. The Mixe are aware of the many subtle changes in temperature, humidity and exposure that occur in the cultivated fields around Totontepec. A plot of land in the Llano de la Virgen above the village may be considered as pertaining to «cold country» while another plot in the Llano Grande just below is in «hot country».

Soils

The Mixe have a classification of soils paralleling that of the Chinantec. Soils are distinguished by color, texture and utility. Certain soils – especially black and humid soils – are preferred for agriculture. Clay soils are the source of pottery materials. The names of some Mixe soil types are given in table 3.11.

Ecological Succession

The Mixe have a detailed understanding of the various stages of vegetational growth on their agricultural lands. This knowledge is closely linked to decisions about where and when to cut and burn forest and shrub cover as well as how many years to cultivate a specific plot of land. Certain plants indicate the fertility of the soils and their presence can affect the number of years that land must be rested before new cultivation.

Mixe name	Spanish translation	English Translation
po'ts naax	*tierra amarilla*	«yellow soil»
poo'p naax	*tierra blanca*	«white soil»
tsapts naax	*tierra colorada*	«red soil»
tso'ojmk naax	*tierra morada*	«purple soil»
yak naax	*tierra negra*	«black soil»
po'o naax	*tierra areñosa*	«sandy soil»
tsa naax	*tierra pedregosa*	«rocky soil»
naxtsaaj	*gravilla*	«gravel»
na'tsuts naax	*tierra arcillosa*	«clay soil»
ta'ajts naax	*tierra seca*	«dry soil»
nik naax	*tierra humeda*	«humid soil»
tooy naax	*tierra quemada*	«burned soil»
oy naax	*tierra buena*	«good soil»

Table 3.11. Mixe soil categories with equivalent glosses in Spanish and English.

Both wild and cultivated vegetation are characterized as types of ***kam***, which may be loosely translated as «field», or more literally as «place of». Each kind of ***kam*** is identified by the dominant species cover. For example, grasslands are called ***tsoots kam*** «grass place», oak forest is ***xojkam*** «oak place», a blackberry patch is ***tsa'am ju'u kam*** «blackberry place», and a fern meadow is ***tsimkam*** «fern place».

Cultivated vegetation	Wild vegetation
mokkam «cornfield»	***tsa'am ju'u kam*** «blackberry fields»
tsa'amkam «banana plantation»	***tsimikam*** «fern meadow»
cafekam «coffee plantation»	***xojkam*** «oak forest»
xakkam «beanfield»	***pajpukkam*** «pine forest»
vaxkkam «sugar cane field»	***tsoots kam*** «grasslands»

Table 3.12. Mixe names of cultivated and natural vegetation types.

Cultivated fields follow this same pattern of naming. The *milpa*, or cornfield, is called ***mokkam*** «corn field», a sugarcane plantation is referred to as

vaxkam «sugarcane field», a coffee grove is ***cafekam*** «coffee field», and so on. Several examples of wild and cultivated vegetation are given in table 3.12.

The Mixe recognize that many other species grow in each wild vegetation type and cultivated plot, and can list the most commonly found plants. For instance, the cornfield is planted not only with corn, but also with squash, beans and chilies. Husk tomatoes and many edible greens sprout up among the domesticated plants.

Conversely, the distribution of any species can be expressed as its association to a particular kind of ***kam***. Mushrooms, for example, are typically associated with a particular type of vegetation. The distribution of ***mox xey*** «good–oak mushroom» is restricted to oak forests, while ***mookjachijtuk*** «corn smut» is available in cornfields, and ***tsiijn mox*** «pitch–pine mushroom» is found on the forest floor of the ***tsinkam*** «pitch–pine forest».

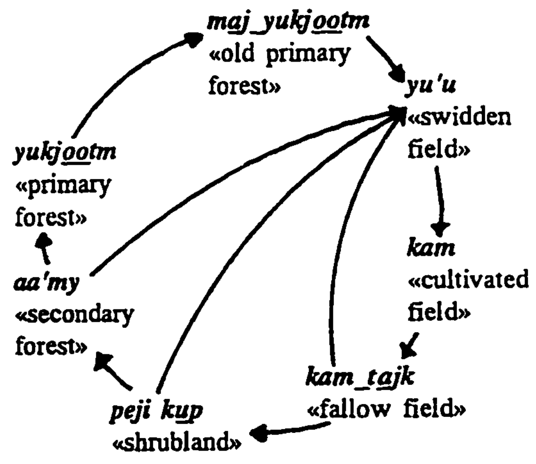


Figure 3.2. Mixe classification of stages of ecological succession.

The Mixe recognize several stages of ecological succession, illustrated in figure 3.2. Primary forest is called ***yukjootm***. ***yuk*** is a frequently used Mixe prefix that connotes wilderness, especially that of high mountain areas, ***jootm*** means literally «inside of». The Mixe term for primary forest thus connotes «inside the wilderness». The oldest primary forest, composed of tall and wide–girthed trees, is called ***maj_yukjootm***.

When forest cover is slashed-and-burned, the resulting field is called ***yu'u*** «prepared field», referred to as a *rozo* in Spanish. As discussed above, a cultivated field is called ***kam***, and is further distinguished by the type of crop that is planted.

After several years of cultivation - varying according to the fertility of the soil - a field is left to rest. Weedy herbs began to colonize the site, and these fallow fields are called ***kam_tajk*** «field home». After a few years, when fast-growing shrubs begin to cover the sites, they are referred to as ***peji kam*** «thin field». Eventually, the area reverts to secondary forest or ***aa'my*** «open forest».

The Mixe are uncertain whether this secondary forest will eventually return to primary forest, principally because most disturbed sites are maintained in early stages of succession, or are reconverted to agricultural fields. ***kam_tajk*** may be replowed, while ***peji kam*** and ***aa'my*** can be again cut and burned in preparation for renewed cultivation.

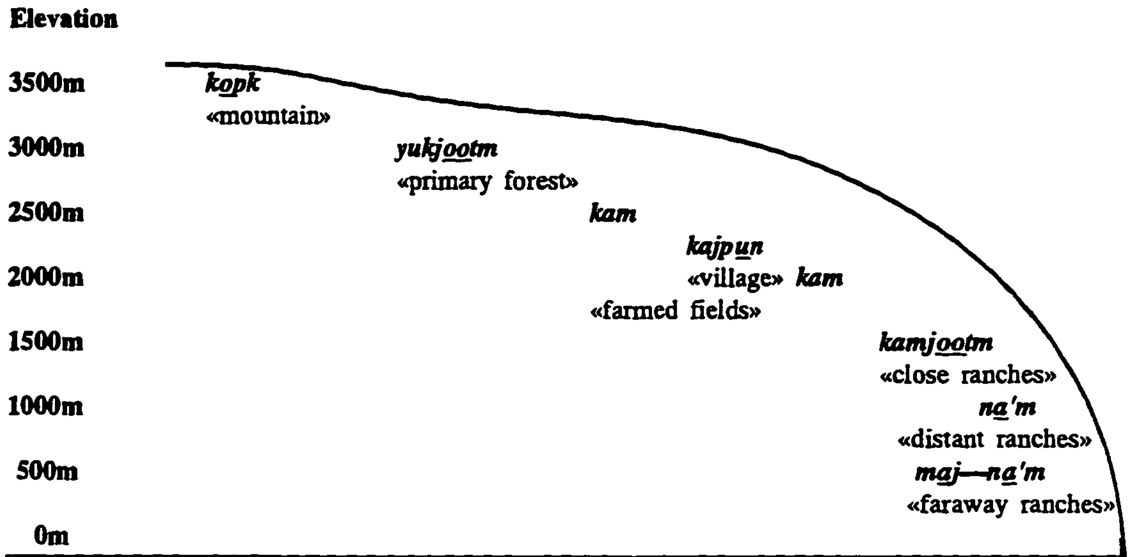
Human Ecology

In addition to characterizing vegetation types and stages of ecological succession, the Mixe have a series of names for the different zones they inhabit and exploit (figure 3.3). Hovering above all human settlements are the mountain peaks (***kopk***) that symbolize wilderness and supernatural power for the Mixe. The most sacred to the Mixe of Totontepec is ***añu keets***, a peak in the form of a bishop's hat that towers above the village. Along the high slopes, principally to the west and southwest of the village, the Mixe find the greatest expanses of primary forest that remain. These wild areas yield useful hardwoods, medicinal herbs and some edible plants.

The house (*tajk*) is the center of human activity, and is surrounded by a home garden (*atok*) often delimited by a fence. The home garden is planted with a mixture of fruit trees, medicinal herbs and edible greens. Corn and other subsistence crops are planted in plots of land that are within the limits of the ***kajpun***, or village. Cultivated fields, called ***kam***, form a patchwork around the community, and contain not only agricultural crops but also a number of semi-domesticated edible greens.

The cultivation zone continues with a series of ranches that are found at lower elevations to the north and northeast of the community. These ranches are classified according to their distance from the community, as well as their elevation and climate. ***kamjootm*** are 1 - 2 hours walk from the community, and are generally found at approximately 1400 to 1600 meters above sea level. ***na'm*** are middle distance ranches, some 2 - 4 hours walk from the head community, and are located at 1000 - 1400 meters elevation. ***maj_na'm*** are the distant ranches that are 4 - 8 hours walk, and are situated between 500 and 1000 meters above sea level.

As in the Chinantec community of Comaltepec, these diverse productive zones provide various niches for cultivating domesticated crops and harvesting wild and managed plant resources.



Distance	18 km	2 km	20 km
Cultural Description	Wild area, uninhabited, associated with sacred rites; better known by adult men than other members of the community	Domesticated area, the ***tajk*** «house» surrounded by the ***atok*** «home garden» is center of domestic activity	Mixture of wild and domesticated areas; secondary residences associated with a relatively rustic lifestyle
Subsistence Activities	cutting of hardwoods and pines for construction; gathering of wild edible and medicinal plants; hunting	cultivation of corns, beans, and other crops; gathering of semi-cultivated greens and firewood	cultivation of corn and other crops, especially a wide variety of native and exotic beans; gathering of semi-cultivated and wild useful plants
Commercial Activities	none	corn harvest partially marketed locally; imported plants sold in stores and market	coffee growing; production of bananas, citrus fruits, and others tropical crops for local sale and consumption

Figure 3.3. A schematic view of Totontepec Mixe human ecological zones.

4. History, Theory and Concepts of Ethnobotany

Ethnobotany and traditional ecological knowledge are new terms for old concepts. The documentation of local people's perception of the environment began thousands of years ago as Greek, Egyptian, Chinese, Indian, Arabic and Native American scholars recorded folk ways of classifying and using plants and animals. The onset of European colonization of Africa, Asia and the New World gave added impetus to study local knowledge of tropical and temperate ecosystems.

Towards the end of the 19th century, academics began to use the prefix ethno– to refer to the way that indigenous people see the natural world, in contrast to the perspective of natural scientists, and they coined terms such as ethnobotany and ethnozoology to describe the various emerging interdisciplinary fields of study. These approaches have developed rapidly in the 20th century, giving rise to innovative theoretical orientations, concepts and methods.

Historical development of ethnobotany

When searching the past for the world's first ethnobotanists, scientists have sketched two possible suspects. One, archeological, is the first human who had the intellectual skills to discover the utility of a wide range of plants, based on an understanding of their appearance, distribution and useful properties. The other, historical, is the first scholar who set out to record how local people classify, manage and use plants. If ethnobotany is considered as the study of how other cultures – or other social groups of one's own culture – interact with the plant world, then we must by definition choose the latter portrait.

Although archaeological studies abound, setting an even approximate date of the emergence of local ecological knowledge is speculative. It is widely assumed that people have been observing natural phenomena, classifying biological organisms and discovering their uses ever since the beginning of human culture. But to which part of the human experience is linked the emergence of detailed knowledge of the environment? An understanding of the natural phenomena was one of the bases of the emergence of agriculture some 6000 – 10,000 years ago (Ponting 1991:41, Flannery 1986). Yet environmental knowledge certainly reaches even further back into history, when hunting and gathering dominated subsistence activities. The discovery of Middle Stone Age barbed spear points in Africa demonstrates that humans were developing technologies for fishing some 90,000 years ago. Early human ancestors, who are now thought to have lived on the African continent as far back as 2.5 million years ago, apparently fashioned stone tools for harvesting and processing food, probably allowing them to adapt to new environmental conditions (Wilford 1995).

Just as no one knows exactly when local ecological knowledge appeared on the cultural landscape, there is no clue to when the original scholars came on the scene. There must be many tombs of the unknown ethnobotanist – people who made a conscious effort to gather information on what other people knew about the plant world around them. These first insightful observations are as probably as old as culture contact itself. We can only speculate on the activities of these researchers lost in antiquity, because we have no written records of their endeavors.

This brings us to define the first ethnobotanists, in yet a narrower way, as scholars who recorded the botanical knowledge of others in written documents which still exist today. Thus the origin of ethnobotany can be set arbitrarily at some two to five thousand years ago, when students of natural history from Greek and Roman, Chinese, Indian, Arabic, Native American and other cultures began to record and folk beliefs and publish them in scholarly texts (Ford 1978). Original studies focused on medicinal botany, agriculture and horticulture, activities that drew heavily on the knowledge of local people.

An overview of these early texts and later works reveals that ethnobotany and natural history have evolved – much like the biological species and ecosystems that are their focus – through a process of punctuated equilibrium. Certain historical periods are marked by an intensive effort to expand empirical knowledge of natural phenomena, often by incorporating local lore, whereas other epochs are characterized by an unquestioned acceptance of established perspectives.

Early scholars of medical botany and related fields in Europe

Europeans and other people trained in a Western academic tradition usually trace their intellectual history back to the era of Greek philosophers, who lived more than 2300 years before our time (Duroselle 1990). This is when classical botany and zoology were brought into existence by scholars such as Aristotle, who sought to summarize all current knowledge about plants and animals in encyclopedic works. It was as part of this endeavor that scholars in the Western tradition first made a systematic study of what local people knew about the environment. In part, Aristotle and other early naturalists such as Theophrastus – who, as author of Enquiry into Plants, is considered the father of botany – rejected many local supernatural beliefs in their quest to understand the natural world. But at times they drew upon the upon common sense explanations and empirical knowledge of rural people when describing the classification and use of plants and animals (Atran 1990).

Among the people who followed in the footsteps of these early naturalists is Dioscorides, a military physician born in Asia Minor in the 1st century A.D. He wrote *De Materia Medica*, a treatise on medicinal plants which was the standard reference of botanists, medical doctors and other scholars in Europe for one and a half thousand years. Apart from drawing upon previous herbals (Blunt and Raphael 1979), Dioscorides learned much about herbal remedies by interacting with local people he encountered during his wide-ranging travels with the Roman army in the Mediterranean region. Pliny the Elder, a Roman scholar who was one of Dioscorides' contemporaries, recorded additional plant lore in his 37-volume encyclopedia called *Naturalis Historia* or Natural History. He devoted nine volumes to medicinal plants, making frequent reference to traditional practices and knowledge.

Although the information was not always documented, other cultures and civilizations of the same epoch probably drew upon the rich empirical knowledge held by agriculturalists and other people who were living close to nature. As the American botanist H.H. Bartlett (1950) wrote,

> "Although they had no Dioscorides to record it, the illiterate barbarians of northern Europe probably had a folk science and terminology nearly as extensive and useful as that of Greece or Italy. Contemporaneously, an equivalent folk science would have been found in Egypt, in Ethiopia, in Palestine, in Persia, in Mesopotamia."

The doldrums of the Middle Ages

The documentation of local ecological knowledge which marked the origin of biological thought in Greek and Roman Antiquity was much less evident in the Middle Ages. The decline of the Roman Empire virtually halted scholarly research on natural history and resulted in the destruction of much existing literature of the epoch. Throughout the Middle Ages, Europeans based their studies of medicinal plants almost entirely on the works of Theophrastus, Pliny, Dioscorides and other early naturalists (Blunt and Raphael 1979). Physicians from across the continent relied heavily on *De Materia Medica*, often trying unsuccessfully to match the local flora to the approximately 600 Mediterranean species described by Dioscorides instead of documenting the folk knowledge of the region. As anthropologist Scott Atran (1990) has summarized,

> "After Aristotle, the practice of copying descriptions and illustrations of living kinds from previous sources superseded actual field experience in the schools of late antiquity. Well into the Renaissance, scholastic "naturalists" took it for granted that the local flora and fauna of northern and central Europe could be fully categorized under the Mediterranean plant and animal types found in ancient works. Herbals and bestiaries of the time were far removed from any empirical base."

Despite this stagnation on the part of European scholars, general knowledge of medicinal plants was enriched by the flow of information coming from the Arab world, particularly through Spain and Sicily. Although dedicated in part to translating the works of Aristotle and other classical writers, Arab-educated medieval scholars also pursued empirical research which they sought to apply to practical ends in medicine, astronomy, mathematics and other fields. They were able to draw upon traditional knowledge of medicinal plants that dates back to the Egyptian pharaohs. The Ebers Papyrus, discovered by Egyptologist Georg Moritz Ebers in 1872, attests to the detailed preparation of traditional remedies used in North Africa in the 16th century B.C. (Joyce 1994).

Maimonides, a Jewish scholar resident in southern Spain during the 12th century, contributed works such as a *Book Explaining Medicinal Drugs* and a *Treatise on Poisons* (Duroselle 1990). Although it is not known how much local botanical wisdom was incorporated in these texts, the descriptions of specific plants were partially drawn from the traditional practices of Jewish pharmacists throughout Europe and north Africa who were passing their profession and knowledge from one generation to the next.

Scholars from other cultural traditions

A similar pattern – initial empirical discovery and cross–cultural learning mixed with centuries of blind faith in written works – is evident in other cultural traditions. Georges Métailié (1993), a French specialist on Chinese natural history and science, notes that the first scholarly studies of traditional ecological knowledge in China date back at least to the 5th century B.C., some two hundred years before early Greek philosophers began forming their ideas about botany and medicine. During this epoch, the Chinese philosopher Confucius encouraged his students to study ancient knowledge, including traditional names of plants and animals, as a way of understanding Chinese society of his era. Even before the time of Confucius, the

Chinese were producing books on the use of medicinal plants. From the emperor Shen Nung, a knowledgeable herbalist who lived in 2700 B.C., we have a book of 365 plant medicines now referred to the *Pen Tsao Kang Mu* (Joyce 1994).

In the first or second century A.D. – about the time that Dioscorides was afoot in the Mediterranean – Chinese scholars published the first of many *materia medica*, referred to generally as *bencao* in Chinese, which contain information on minerals, plants and animals used traditionally in the treatment of illness. Medical doctors of the 5th century revised these initial *bencao*, providing a major reclassification of the various types of natural medicines used at the time. This materia medica went unchanged and unchallenged for many centuries, much as the classic work of Dioscorides in Europe.

At the end of the 16th century, a Chinese doctor named Li Shizhen began to emulate the practice of empirical observation that Confucius had advocated many centuries before. His major work, the *Bencao gangmu*, was based on information that he obtained not only by studying ancient texts but also by travelling to the countryside to talk with rural people (Métailié 1993).

Ayurveda, a system of medicine which began in India during the 5th century B.C. and spread to Sri Lanka and other countries by the 3rd century B.C., was partially based on local knowledge. The remedies used in this oriental medical practice were first discovered by shepherds and forest-dwellers familiar with the appearance and properties of medicinal plants (Pandey 1989). Their knowledge was discussed in various literary works called *vedas* which were written during the classical period in India. Ayurvedic scholars later compiled additional empirical observations in a series of books referred to as the *Nighantus*. During the subsequent period of foreign domination and internal conflict which brought innovation and documentation of local knowledge to a standstill, these standard texts of ayurveda remained unchanged.

Other ancient written sources that document local ecological knowledge were in part the product of culture contact and changes in political and economic dominance. In the New World, for example, the Aztecs broadened their own sophisticated knowledge of medicine and agriculture as they learned of new plants used by the many different Mesoamerican cultures they conquered. As Standley (1920:9, quoted in Williams 1990:253) notes, 'the true history of botanical activity in Mexico begins at a much earlier date [than 1519], for the native inhabitants, who had already reached a high degree of civilization, may be said to have begun scientific researches'. The Aztecs cultivated many newly discovered species in extensive botanical highland gardens tended by gardeners from various geographical regions of Mesoamerica (Williams 1990). The depth and richness of the pre-conquest indigenous knowledge of the natural world is demonstrated by illustrated scholarly works (Ortiz de Montellano 1992; Paso y Troncoso 1886), including the *Badianus Manuscript*, an illustrated herbal written in 1552 by two Aztecs who had been educated by Catholic missionaries (Emmart 1940). One author, Martín de la Cruz, was an indigenous physician who had acquired his medical knowledge empirically. The Mayas and Incas had similar literate traditions and they doubtlessly recorded some aspects of the ecological knowledge of the various ethnic groups they dominated at the height of their political power and cultural development. Many of these New World written sources of local knowledge were victims of the conquest, destroyed by overzealous missionaries and conquerors who wished to impose Catholicism, Western culture and European languages on the people of the New World.

The Renaissance and the exploration of the tropics

During the 16th and 17th century in Europe, Renaissance botanists began to emulate the methods that Dioscorides had applied some 1500 years previously, bringing an end to the intellectual stagnation that characterized the Middle Ages. They carefully observed plants in the field and inquired about their local names and uses in Germany, Holland, Italy and other parts of Europe. This experience served them well when faced with the influx of exotic species from areas of the world discovered and colonized by Europeans in the 15th and 16th centuries. The diversity of biological organisms discovered by explorers stimulated Linnaeus and other natural scientists to formulate many of the concepts that are the building blocks of modern-day systematics. The shift from manuscript herbals produced by hand to printed herbals published in large numbers allowed new botanical knowledge to be disseminated widely.

The colonial quest to exploit local knowledge and economically important species inspired adventurers, missionaries and natural historians to record their observations on traditional uses and names of plants in many parts of both the New World and the Old World. As ethnobotanist Richard Ford (1978) has described,

> "A rapid progression of expeditions came to North America to discover and to colonize, and the chronicles of adventure are a record of the utilitarian

value of an unfamiliar landscape and the use the indigenous people made of it. Its economic potential certainly had priority to any interest in attitudes about the land. The observations of [many explorers] ... provided the first natural history of North America and the bases for the beginning of ethnobotany."

From the 16th century onwards, researchers began to focus increasing attention on the ecological wealth of tropical countries and the benefits it promised for Europeans. To this end, scholars drew upon the knowledge of local people, who continually experiment with useful domesticated species cultivated in their gardens and wild plants harvested in fields and forests (Haverkort and Millar 1994). European and American scholars consulted both written sources – such as Ayurvedic works and Chinese pharmacopeias – as well as oral history to produce extensive encyclopedias of useful plants from around the world. One such early works is the *Coloquios dos Simples e Drogas e Cousas Medicinais da India* (translated into English as Colloquies on the Simples and Drugs of India), written by the Portuguese explorer Garcia ab Orta in 1563. Orta, who lived from approximately 1500 to 1568, was the son of Spanish jews who fled to Portugal. Beekman (1993:108) writes of his work "The *Coloquios* represented the fruit of thirty years of practical experience in India. ... he described betel–chewing (the use of sirih) and the use of bangue or cannabis... Furthermore Orta was one of the first Western scholars to take seriously and express admiration for Chinese civilization."

Another notable example is the herbal of Rumphius, a 17th century natural historian from Germany who spent nearly 50 years in Asia, working for the Dutch East–Indies Company. Increasingly released from his administrative duties but still under the employ of the Company, he focused his attention on studying useful plants, animals and minerals in various regions of what now constitutes Indonesia. He provided descriptions of over 700 medicinal or toxic plants, published posthumously in the 6 volumes of the *Ambonese Herbal* (Beekman 1993).

Other works of this epoch include a book on medicinal plants of the New World by Nicolas Monardes, a Spanish physician from Seville; the *Tractado de las drogas, y medicinas de las Indias orientales* work by Christoval Acosta; and the *Natural History of the West Indies* by the Spanish writer, military man and administrator Ovideus (Gonzalo Fernández de Oviedo), who fought against and learned from the Indians of the New World. The tradition of writing detailed descriptions of useful plants has continued in this century, with works such as *A Dictionary of Economic Products from the Malay Peninsula*, produced in 2 volumes by I.H. Burkhill (1935), and *The Healing Forest, Medicinal and Poisonous Plant of the Northwest Amazonia* by Richard Evans Schultes and Richard Raffauf (1990).

Although Orta, Rumphius and his counterparts approached natural history as a holistic phenomenon, scholarly activity in later centuries reveals a fragmentation of research into distinct disciplines, marking the beginning of reductionism in the sciences. As Gross and Levitt (1994) have noted,

> 'The nineteenth century turned science into a profession... The subdivisions of science came to be ever more clearly defined, and the intense specialization that marks the science of our own day took shape. At the same time, the link between theoretical science and direct technological innovation became concretized in the growth of institutions, both educational and

commercial...'

For example, pharmacognosy – the study of naturally occurring compounds that can be used medicinally and in other ways – became recognized as a separate field of endeavor in the early part the 19th century. It focused on the identification, preparation and commercialization of drugs, which mostly came from plants at the time (Evans 1989). This enterprise, combined with tropical exploration, yielded such novel cures as quinine, successfully used to control malaria in Europe and other regions (Lewington 1990).

The christening of ethnobotany and related disciplines

By the end of the 19th century, researchers began to recognize the study of traditional knowledge as a separate discipline. John W. Harshberger (1896), an American botanist and agronomist, initiated the fashion of using the prefix *ethno-* to indicate the study of local people's natural history. In 1896, he published an article entitled "Purposes of ethnobotany", and the term quickly replaced names such as «aboriginal botany» and «botanical ethnography» which had been used by other authors. In the words of Richard Ford (1978), after a "half century of scientific attention and an even longer history of casual observations" the study of other people's interaction with nature finally had a name and recognition as a distinct line of academic endeavor.

The emergence of ethnobotany and related fields coincided with important developments in the natural and social sciences towards the end of the 19th century. The diverse branches of natural history – botany, zoology, pharmacognosy and others – began to mature into distinct disciplines, each with separate methods and goals.

Scott Atran (1990) has characterized this as the "breakaway of science", a time when natural historians began to leave behind common sense descriptions of natural phenomena – drawn in part from folk biology – in order to embrace rigorous experimental methods. Social scientists began to focus on separate aspects of human society and culture, with the consequent emergence of fields such as anthropology, linguistics and sociology.

As research on traditional ecological knowledge expanded in the late 19th and early 20th century, several lines of research became apparent, reflecting the diversity of researchers who began to appreciate the importance of the subject. Although these approaches originated in Europe and the United States, they have now been embraced by researchers in many developing countries who have subsequently adapted the techniques and concepts to their own goals and local conditions. The emergence of professional societies of ethnobotanists in developing countries, ranging from the Indian Society of Ethnobotanists in 1980 to the *Asociación Mexicana de Etnobiología* in 1993, are evidence of this trend.

Botanists, who have focused primarily on the utility of plants and only secondarily on indigenous culture, began to refer to their approach as 'economic botany' (Simpson and Ogorzaly 1986). The object of their research has been to document local uses of plants and to organize the resulting data according to the Western system of plant classification. They have produced detailed works on plants employed by local people for food, medicine, textiles, utensils and many other purposes, much in the tradition of early herbals.

Research on the commercial value and utility of plants expanded as botanists from the United States and Europe explored the New World and Old World tropics in search of products that would increase the wealth of developed countries and the well-being of people in general. Today, economic botanists continue to look for marketable products in tropical forests and elsewhere, but they are increasingly interested in how the commercialization of these resources can contribute to resolving the poverty, malnutrition and diminished social status of rural people as well as spurring economic development in developing countries (Plotkin 1994, Plotkin and Famolare 1992). An increasingly important offshoot of this enterprise is bioprospecting (a term derived from 'biodiversity prospecting'), the search for useful and novel chemical constituents in plants, animals, fungi and other biological organisms (Reid *et al* 1993).

While biologists were establishing economic botany, anthropologists and other social scientists were developing a different perspective on traditional ecological knowledge. Interested in a systematic appraisal of local people's culture and their interaction with the local environment, they focused on the empirical categories, social rules, symbolic systems and modes of behavior that reflect how the natural world was perceived from a local perspective (Frake 1980; Levi-Strauss 1966). These early anthropological studies formed the foundations for a new approach – referred to as 'ethnoscience' – which advocated rigorous analyses of folk knowledge, with particular emphasis on systems of ethnobiological classification (Conklin 1962). Drawing upon the empirical tradition in American anthropology and new techniques devised by linguistic and cognitive anthropologists, ethnoscientists sought to discover the basic principles which underlay the way that humans perceive and classify the world. Thus, while economic botany emerged as an utilitarian practice firmly rooted in economic development, ethnoscience developed as an intellectual endeavor oriented towards a deeper understanding of human culture and cognition.

Although studies of local ecological knowledge have tended to be divided along the lines of scholarly disciplines over the last century, there is a new movement to integrate these various perspectives. This approach has spurred Mexican ecologist Victor Toledo and other researchers to use the term 'ethnoecology', referring to integrated studies of traditional ecological knowledge. Toledo (1991, 1992) considers that conventional studies carried out by both economic botanists and ethnoscientists present a limited vision of local people's interaction with the natural environment. In particular, he criticizes their emphasis on analyzing single domains of folk knowledge - such as plants, animals, climates and systems of nomenclature - while neglecting to generate a holistic vision that integrates these dimensions. In addition, he points to the limitations of focusing on the study of traditional knowledge without considering its role in basic productive activities in rural communities. His concerns are also methodological - economic botany and ethnoscience have often concentrated on the empirical side of folk knowledge, excluding symbolic and other interpretive approaches that could give a broader picture of how people perceive their natural surroundings.

Ethnoecology provides an opportunity for reintegration of various disciplines of natural science, counteracting the increasing reductionism of science. As French ethnobotanist Jacques Barrau (1993) has noted,

"There is perhaps today a renewed interest in the methods [of natural history]: methods that we can clearly refine but that appear in any case as being a good means, not to achieve that global understanding which we can hardly hope to attain because of the breadth and depth of knowledge, but to put back together the pieces of the puzzle that have been dispersed by scientific hyperspecialization."

In this respect, ethnoecology holds the promise of providing a holistic view of natural science without rejecting empirical methodology or resorting to the nihilistic tendencies that characterize current intellectual trends such as postmodernism and poststructuralism (Gross and Levitt 1994, Martin 1995). The emergence of ethnoecology at the end of the 20th century fits well with calls to reintegrate various lines of scientific research to support, not undermine, community development and biodiversity conservation (Shiva 1993).

One outcome of this search for a new approach has been an increased emphasis on 'advocacy' or 'applied ethnoecology', in which there is a direct relationship between indigenous people and academics as co–promoters of ethnoecological research, community development and conservation of biodiversity (Martin 1994a). Its goal is not only to document local knowledge but also to change the social and economic policies that are at the root of many problems which affect rural populations. This approach has found fertile territory in the thought and action of a new generation of ethnoecologists who seek to blend scientific research with an awareness of political and environmental problems. As Victor Toledo (1982) has written,

'The worsening of the ecological crisis on a world scale, the loss of biotic and genetic resources, deforestation in the tropics, the great advances in the indigenous struggles and the spread of the environmental movement and the movement for democracy have shaken the consciousness of a great many researchers'.

Trends in the theory and application of ethnoecology

In the Western academic tradition, the assessment of traditional ecological knowledge has ranged from derogatory to exclamatory. Some scholars have claimed that local people have a simplified conception of nature that is pre-scientific and mystical (Levy-Bruhl 1923). This is said to contrast with the elaborate systems of classification, empirical observation, mathematical analysis, logical reasoning and experimentation that are the cornerstones of Western science (Tambiah 1990). The opposite extreme is represented by those who argue that local people, thanks to their acute powers of perception, have a combined empirical and spiritual knowledge of nature that equals or even surpasses the comprehension of natural scientists (von Hildebrand 1992).

While social scientists have argued about human mentality, environmentalists have been busy debating whether local people are the saviors or the destroyers of the natural world. In the most romantic view, forest dwellers are seen to inhabit an idealized paradise, molding their social behavior to the natural limits of the local environment. In the most negative appraisal, rural dwellers are condemned for contributing to widespread deforestation and a reduction in biodiversity because they engage in practices such as shifting agriculture, firewood gathering and harvesting of other forest products. Furthermore, they are blamed for the rural population explosion that is linked to the rapid depletion of resources in many areas. The impact of more agriculturalists cutting and burning more hectares of virgin forest has painted a vivid image of ecological destruction in the minds of the general public. Many conservationists now believe that such an image belies the rationality of local peoples' interaction with the natural environment and are considering them as possible allies in their quest to preserve the environment.

There are many intermediate points of view in these debates, and as consensus prevails over dissention, researchers are taking a detailed multidisciplinary approach to discover how local people perceive, manage and use the natural environment (Alcorn 1989, 1994). There is increasing agreement that traditional ecological knowledge is key to the rational management of natural areas, and that local people will play a central role in documenting biodiversity and participating in conservation and development programs (Berlin 1984; Janzen *et al* 1993; Johnson 1992; Varese and Martin 1993). As noted by Joanne Barnaby, executive director of the Dene Cultural Institute, and David B. Brooks of the International Development Research Centre of Canada (Barnaby and Brooks 1992),

> "In recent years, the value of the traditional knowledge of indigenous peoples, and particularly their traditional environmental knowledge, has been recognized. This has unleashed a flood of research. Some of the research has been undertaken by scientists working alone, but the most innovative responses to this trend have been developed by indigenous researchers working in collaboration with Western scientists. They recognized early on that the main objective was not simply to collect reels of audio or video tape as a form of

folklore, but to catalogue this information so that it could be compared from one region and one culture to other regions and cultures, and, even more, so that it could be brought to bear on policies for sustainable development in remote and typically fragile ecosystems".

Although some colleagues argue for the need to take a scientifically rigorous approach to ethnobiological research (Johns *et al* 1990; Phillips and Gentry 1993a, 1993b), there are others who argue for an interpretive analysis or a rapid appraisal that dispenses with rigid methodology and complex statistical analyses (Malhorta *et al* 1992). There is room for all of these orientations in ethnobiology. One of the main challenges of the future will be to incorporate them into a single comprehensive understanding of how people interact with their environment.

In the 100 years since its formal recognition, ethnobiology has grown into a discipline of international importance. In various countries, researchers have been developing theory and hypotheses to explain the logic behind traditional ecological knowledge. However, within anthropology this emergence has not been synonymous with general acceptance. Ethnobiologists have developed a sophisticated methodology that borrows elements from ecology and other biological disciplines, but they remain somewhat aloof from general anthropological theory concerning social change, symbolic logic and ethnic identity.

Comparative ethnobiology, the cross-cultural study of human perception and use of the natural environment, provides the means for reintroducing an empirical perspective to anthropology and other academic fields. As ethnobiologists progress from studying single communities to conducting research on ethnically and ecologically complex regions, they seek both a broad description of the cultural and ecological landscape, and a deeper analysis of people's classification and management on biological resources.

As researchers have sought to link theoretical issues to applied projects, several trends have emerged. A closer look at various research directions reveals the potential role that ethnobotanists can play in conservation and development initiatives. The following theoretical issues and practical concerns guide the analysis of the data I provide in this dissertation, as well as the results of ethnofloristic inventories I am coordinating in the Beni Biosphere Reserve in the Bolivian Amazon and Kinabalu Park in the Malaysian part of Borneo.

Structure and content of traditional ecological knowledge

Since the 1950s, ethnoscientists have been exploring the structure of ethnobiological classification (Conklin 1954). Based upon their work in many diverse cultures, they have described the complex interrelated sets of categories for plants, animals, soils, climates, vegetation, illnesses, food and many other cultural domains and natural phenomena (Toledo 1991). Much attention has focused on describing the similar ways in which local people and scientists perceive the natural world (Berlin 1973). Many generalizations on the categorization, naming and identification of plants and animals are widely accepted (Berlin 1992), whereas others continue to provoke controversy (Ellen 1986, Friedberg 1986), especially among anthropologists who place emphasis on cultural relativity – the concept that there are no moral values or perceptions of reality that are shared by all people (Sperber 1985:8).

In particular, there is disagreement over why people are motivated to classify the various elements of the environment (Ellen and Reason 1979; Morris 1984). Some researchers seek a utilitarian explanation, suggesting that people help to fulfill their basic subsistence needs by naming and classifying the useful plants, animals, soils and other natural features (Hunn 1982; Randall and Hunn 1984). Those who follow an intellectualist line argue that there is a universal human tendency to categorize plants and animals according to their overall appearance or, alternately, their symbolic importance. These researchers note that local people tend to group organisms with a similar morphology or behavior, regardless of their cultural utility. Yet other colleagues propose an ecological rationale, noting that some aspects of ethnobiological classification can be elucidated by reference to the diversity of environmental zones in the region (Bulmer 1974). In addition to these three dimensions - which can belong to what Malinowski (1948) has termed the profane realm of culture - many researchers call attention to the spiritual and ritual aspects of traditional botanical knowledge, which Malinowski has referred to as the sacred domain of culture (Rosaldo 1972). Most ethnoecologists agree that classification is motivated by a combination of these factors, but there continues to be much debate about which is the most important dimension.

As has been discussed throughout this chapter, the classic references on ethnobiological classification are Berlin et al's (1974) botanical ethnography of Tzeltal-speakers and Berlin's (1992) overview of theoretical principles of categorization and nomenclature. Brown (1984) has looked at the classification of life-forms in many different cultures from around the world and his approach has provoked strong responses from other researchers (e.g. Randall and Hunn 1984;

comments in Brown 1985, 1986). Toledo (n.d. 1991) provides an overview of ethnobotanical research in Latin America and a theoretical outline for ethnoecology.

These studies of ethnobiological classification are essential if we are to understand – in the context of Western science – how local people perceive the environment and manage natural resources (Clay 1988). As we embark on joint efforts to protect natural areas and participate in community development, we need a bilingual and bicultural perspective that outlines the correspondence between our different ways of looking at the local environment, allowing us to contribute to joint management of wildlands (Martin 1994a).

Variation in knowledge

Within and between communities, there are significant differences in what people know about the environment (Berlin 1992:199–231). For example, some plants are known by just about everybody, but others are known only to curers, the elderly, women or members of another subset of the populations (Browner 1991). We find significant divergence between people living in separate communities, belonging to distinct ethnic groups, speaking different languages or subsisting in diverse ecological zones (Balée and Moore 1991; Berlin *et al* 1973). These differences can be explained in part by the fact that each person's knowledge is correlated with sociological factors such as age, gender, occupation, education, social status and zone of residence (Ellen 1979; Weller 1984, 1987). Perception and management of plants and animals is also affected by each individual's experience in life – if he or she has suffered from a major illness, migrated to other communities, worked as an apprentice to a plant specialist and so on.

Although anthropologists have long been intrigued by cultural diversity, studies on variation in ethnobiological knowledge are relatively recent (Hays 1974, 1976; Bennett and Gómez 1991; Brown 1976). Provoked in part by claims to the universality of folk knowledge, academics have studied variation across different social groups, ethnic minorities and types of plants (Boster 1986a; Gardner 1976; Werner 1969). Berlin et al (1973) compared the classification of plants by two neighboring groups of Maya speakers – the Tzeltal and Tzotzil of Chiapas, Mexico – to discover how many plant categories they held in common. Balée and Moore (1991) have followed in their footsteps with a similar study of Tupi-Guarani speakers. Browner (1991) looked at the difference in men's and women's knowledge of plants used to control reproduction in a Chinantec community of Oaxaca. Boster (1980, 1986b) documented how different Aguaruna speakers from Peru perceived and classified various forms of manioc. Other researchers have carried out elegant studies of variation in other cultural domains, including the perception and classification of illness (Garro 1986; Mathews 1983; Weller 1983).

If conservation and development workers are to collect accurate ethnoecological data as a part of their work, they should be sure to consult a representative sample of local people (Johnson 1992). When we work with few participants, we run the risk of recording a biased version of local ecological knowledge. By sampling the variety of opinions in the community, we can provide a relatively loyal account of how people perceive the natural world. The resulting patterns of agreement between different individuals can reveal the most popular and useful plant and animal species, soil types, forest zones and other elements of the landscape (Malhotra et al 1992; Trotter 1986). These results ensure accuracy when preparing natural resource management plans and popular manuals that will be returned to local communities (de Avila and Martin 1990).

Change in knowledge over time

Knowledge about the natural environment is not static. It changes as people move from one region to another, as youth reinterpret what they have learned from their elders and as people from distinct communities come into contact with each other. Archaeology, linguistic reconstruction, archival research and oral history open a window to the past, allowing us to discover which elements of ecological knowledge and resource management have persisted throughout decades or centuries of political, demographic and economic change (Josserand *et al* 1984; Roosevelt 1989). We can assess which species, ethnobiological categories and ecological practices have become widespread through borrowing across cultural boundaries or have disappeared or become modified over time. Historical research that spans recent centuries allows us to assess the impact of Westernization and other forms of culture contact on indigenous ways of perceiving and managing the natural world (Balée 1989).

An important aspect of this trend concerns how knowledge is passed on from one generation to another. Stross (1973), for example, has documented how children learn botanical categories in a Tzeltal-speaking community of Chiapas, Mexico. Another approach is to consult historical documents and to compare the ethnobotanical lore recorded therein with current knowledge. Marcus and Flannery (1978) compared Zapotec plant categories discussed in a 16th-century document with those recognized by contemporary Zapotec-speakers from the Valley of Oaxaca and found much similarity despite 400 years of difference in time. Whitaker and Cutler (1966) compared the seeds of squashes used by prehispanic populations of central Mexico with those collected in a Puebla market and discovered that the same varieties had persisted over thousands of years.

Many researchers have attempted to discover which elements of local knowledge have an indigenous origin and which have been introduced from Western culture during colonial and independence periods. In particular, anthropologists such as George Foster (1953, 1978) have discussed the humoral or hot – cold system of classifying foods, medicines, diseases and other cultural domains, searching for their origin either in European traditions or indigenous cultures of Latin America. Alfred Crosby (1972, 1986) has discussed the biological impact of European colonialism on indigenous people and Eric Wolf (1982) has addressed the cultural impact of imperialism. Various works by Marshall Sahlins (1972) describe the encounter of Western and traditional economies.

Many regions of the world are passing through an intense period of change characterized by not only the destruction of wildlands and loss of biological diversity, but also the disappearance of traditional ecological knowledge and environmental management systems. In some rural areas, the younger generation is not learning what their elders know about the environment. Specialized knowledge held by only a few curers or spiritual leaders is lost when no apprentice is found to carry on traditional medical or religious practices. This loss of knowledge is often linked to increasing contact with national and international cultures and is often exacerbated by formal education and migration.

Participants in ethnoecological projects should assess the extent of culture loss and search for ways of promoting the survival of local ways of classifying, using and managing natural resources (NAS 1992:90–111). They should also search for ways to protect the economic interests and intellectual property rights of communities whose knowledge is exploited in commercial enterprises (Gray 1991). When local people are full partners in conservation and development projects, they are stimulated to retain and build upon the empirical knowledge that has developed over the tens, hundreds or thousands of years they have resided in the region (WRI et al 1992:79–95). Studying the evolution of ethnoecological knowledge helps us to understand the dynamics of cultural resistance, allowing us to understand why local ecological practices persist and how we can reinforce the trend (Williams and Baines 1993).

Knowledge and production

In order to subsist and to earn a living, local people draw upon their detailed knowledge of the diverse microenvironments in their communities (Toledo 1976). From the cultivation of domesticated plants to the protection of wild useful species, they manage vegetation zones in a way that is often energy-efficient and sustainable (Alcorn 1981b, 1984; Altieri 1987). They capitalize on the use-value of natural resources when they harvest plants and animals for self-consumption and on their exchange-value when they barter or sell agricultural and forest products (Lescure and Pinton 1993; Martin 1992; Toledo et al 1985).

The connection between production and ethnobotanical knowledge has been explored from anthropological, ecological and economic perspectives. Peters et al

(1989) assessed the market value of rain forest products known by indigenous people and concluded that gathering could be more profitable than logging in parts of the Amazon basin. Toledo (1991:3–12) presents a cogent argument for including the productive activities of peasants and indigenous people as an integral part of ethnobotanical studies. Clay (1988) provides an overview of the subject for Latin America; important case studies are given in Alcorn (1984) and Posey (1983, 1984).

By investigating the link between knowledge and production, we can better calculate the value of tropical forests (Plotkin and Famolare 1992). This allows us to evaluate the hidden costs of tropical forest destruction, the economic benefits derived from both subsistence and commercial use of wild species and the environmental advantages of maintaining forest cover as a way of buffering local climate and preserving the purity of local air, water and soil (WRI 1993). Indigenous and folk systems of knowledge and production can serve as an integral part of appropriate development schemes in rural areas (Redford and Padoch 1992).

Scientific co-validation of folk knowledge

One of the main activities of ethnoecologists is to understand the rationale behind the way local people interact with the natural environment. In research laboratories, scientists carry out a broad array of analyses that corroborate the efficacy of local uses of plants and animals, ranging from the identification of active compounds in medicinal plants to appraisal of the quality of tropical woods or the nutrient content of wild foods. In the field, ecologists assess how the yields of agroecosystems compare with those achieved by large-scale monocultures and to what extent traditional methods of resource management are sustainable.

Ethnobiologists compare folk botanical categories with scientific taxa, judging if folk classification makes sense in terms of botanical systematics. This range of activities is aimed at revealing the logic, from a scientific perspective, of the thought and practices of local people.

There is a wealth of literature on the covalidation of folk knowledge, ranging from case studies of a single species to comprehensive reviews of the flora, traditional medicine or diet of a certain region. Johns' (1991) study of the use of potatoes in the Andes is exemplary in that it demonstrates a variety of approaches to analyzing the role of a single plant in human diet and culture. A compendium of papers on food plants from tropical forests has been edited by Hladik et al 1993. The TRAMIL work group (Robineau 1991), composed mainly of Caribbean researchers, has developed a pragmatic approach to evaluating and distributing the results of empirical studies on medicinal plants. Berlin et al (1990) are conducting a multidisciplinary evaluation of traditional remedies and medical knowledge in the highlands of Chiapas. Bernardo Ortiz de Montellano (1992) has addressed the covalidation of folk medical knowledge in his recent monograph on Aztec medicine. Phillips and Gentry (1993) have demonstrated the importance of hypothesis testing in ethnobotanical research, drawing upon their research in the Peruvian Amazon.

Scientific co-validation allows us to understand how traditional ecological knowledge can be applied into management of protected areas, community development and optimization of the value of plants and animals that are consumed locally or commercialized (Brokensha et al 1980). Based on what they have learned in the field and laboratory, researchers can act as consultants to local people, offering advice on the sustainable use of biological organisms. This research plays an important role in convincing conservation and development specialists who are skeptical about having local people participate in projects. Above all, these studies reveal the breadth of local people's ecological knowledge and the wealth of resources available in natural areas, highlighting their potential value on the world market and their contribution to human welfare (Schultes 1991).

Cognitive mapping of the landscape

Many local people have a special ability to keep mental track of the location of biological resources, geographical landmarks and different types of forest. They also have an aptitude for assessing the quality of the environment, including differentiating ecological zones that are well managed from those that are degraded. This expertise comes in part from their sophisticated perception of how the various elements of the ecosystem – organisms, soils, climate, topography and so on – form an interdependent whole (Toledo 1991).

This cognitive mapping of the landscape explains their mastery in locating scarce plant resources and in selecting plant populations that yield the best fruit, the most potent medicine or the best materials for construction. It also reveals their adeptness at selecting the best place to cultivate the earth, create human settlements and leave forested areas which contribute to soil fertility, water purity and other environmental benefits (Tabor and Hutchinson 1994). This talent for land use planning comes from their long–term observation of nature, potentially allowing them to avoid some of the consequences of catastrophes such as droughts, floods and hurricanes as well as yearly fluctuations in climate.

Although a diverse range of works have contributed to understanding cognitive mapping of the environment (e.g. Baker *et al* 1992), it is a relatively new trend among ethnobiologists and no monographic studies have yet been published.

The ability of some local people to integrate and recall complex information on the local environment often gives them special proficiency as stewards of ecological resources (McNeely *et al* 1990:73–74). Conservationists can draw upon this expertise when deciding how to zone protected areas into various land–use zones and promote local participation in development projects (Wells and Brandon 1992:32–33). This knowledge also provide partial justification for official recognition of local people's customary land rights and use of natural resources (Davis 1993).

Ritual, religion and symbolism

Local knowledge of the environment plays an important role in ritual practices and is a recurring element in cosmology, myths and legends (Levi–Strauss 1966; Reichel–Dolmatoff 1976). Some researchers assert that indigenous people have a way of relating to the natural environment – linked to their spiritual understanding of the universe – which is fundamentally different from that found in Western culture. A central element in this conception is that indigenous people are at one with environment, inextricably linked to nature in a way that contrasts with Western people's need to dominate and destroy the natural world. A common way for outsiders to gain access to the world of ritual and religion has been through apprenticeship with spiritual leaders, often accompanied by the use of mind–altering plants (Schultes and Raffauf 1992).

Some anthropologists assert that the study of symbolism must be approached not with a rigorous methodology, but rather with intuitive interpretation. Perhaps for this reason, the symbolic and religious aspects of ecological knowledge have attracted little empirical study. There are some ethnographic treatments of symbolic ecological knowledge which are rich in description, most notably by Victor Turner (1967) who discusses the ritual use of plants in Africa. Claude Lévi-Strauss (1966) draws upon ethnographic evidence from many sources in writings on the symbolic classification of plants. In a similar vein of structural analysis, Philippe Descola (1987, 1994) has published monographs on the ecological symbolism of Shuar-speakers in Ecuador. The literature on the use of hallucinogenic plants is vast. Much of it dates from the peak of interest in the 1960s and 1970s and can be traced to Richard Evans Schultes (Schultes and Hoffman 1992) and his collaborators and students, including H. Gordon Wasson (1963, 1966) and Wade Davis.

Spiritual beliefs about the forest and associated taboos on the use of natural resources are important elements of conservation and sustainable use of natural resources in many cultures (Kemf 1993). When people begin to abandon these beliefs, traditional controls on resource exploitation disappear, sometimes leading to rapid devastation of formerly protected areas. It is important to make an accurate ethnographic record of these belief systems and to verify empirically what impact they have on conservation and utilization of natural resources. Conservationists should explore ways of integrating these belief systems into the management of protected areas.

Structure and content of traditional ecological knowledge

Since the mid 1950s, ethnoscientists have been exploring the ways in which local people classify the natural environment (Conklin 1954). Based upon their work in diverse cultures, they have described complex interrelated sets of categories for plants, animals, soils, climates, vegetation, illnesses, food and other cultural domains and natural phenomena.

Much attention has focused on describing universal similarities in the ways in which local people perceive the natural world (Berlin 1992). Many generalizations on the categorization, naming and identification of plants and animals are widely accepted, whereas others continue to provoke controversy, especially among anthropologists who place emphasis on cultural relativity, or the uniqueness of each ethnic group (Ellen and Reason 1979; Sperber 1985). In particular, there is disagreement over why people are motivated to classify various elements of the environment. Some researchers seek a utilitarian explanation, suggesting that people enhance their ability to fulfill their basic subsistence needs by naming and classifying useful plants, animals, soils and other natural features (Malinowski 1948; Friedberg 1986; Hunn 1982). Those who follow an intellectualist line of reasoning argue that there is a universal human tendency to categorize plants and animals according to their overall appearance or symbolic role (Brown 1984; Levi–Strauss 1966). These researchers note that local people tend to group organisms with a similar morphology or behavior, regardless of their cultural utility. In a similar vein, some colleagues propose an ecological rationale, noting that some aspects of ethnobiological classification can be elucidated by reference to role of plants and animals in the diverse environmental zones found in any region (Atran 1985). Most ethnoecologists are coming to a consensus that classification is motivated by a combination of these and other factors, but there continues to be much debate about which is the most important dimension (Turner 1988).

These studies of ethnobiological classification are essential if we are to understand – in the context of Western science – how local people perceive and manage natural resources. When carried out in a participatory way, ethnobiological inventories provide an opportunity for local people, park rangers and students to work together and learn from each other as they explore and protect the natural environment (Martin 1994b). They provide the baseline data needed to produce bilingual and bicultural resource manuals that compare and contrast our different ways of classifying, managing and using biological organisms (de Avila and Martin 1990). These manuals – particularly when they are written for and by communities – in turn contribute to applied programs of conservation and development by highlighting culturally significant species that local people are harvesting from the wild, managing in agroforestry systems or cultivating in gardens and fields. Often, these species can be proposed for use in initiatives that promote reforestation, sustainable harvesting of minor forest products or cultivation of useful plants – in agroforestry systems or crop polycultures – that contribute to the well-being and income of local people (Nabhan 1992).

Variation in ecological knowledge and practices

There are significant differences in the way local people perceive and use biological resources (Berlin 1992:199–231). For example, some plants are known by just about everybody, but others are known only to curers, the elderly, women or members of another group of people (Browner 1991). We find significant divergence between people living in separate communities, belonging to distinct ethnic groups, speaking different languages or subsisting in diverse ecological zones (Balée and Moore 1991). These differences can be explained in part by the fact that each person's knowledge is correlated with sociological characteristics such as age, gender, occupation, education, social status and zone of residence (Garro 1986). Perception and management of plants and animals is also affected by each individual's experience in life – if he or she has suffered from a major illness, migrated to other communities, worked as an apprentice to a plant specialist and so on.

Conservation and development workers must be aware of these differences when they seek to assess the depth and breadth of traditional knowledge as well as the diversity of ecological practices in a particular area. If they work with few participants, they run the risk of recording a biased version of local ecological knowledge. In contrast, by sampling the variety of opinions in the community – by consulting a representative cross-section of local people – they can provide a relatively loyal account of perception the natural world. The resulting patterns of agreement between different individuals can reveal the most culturally significant plant and animal species, soil types, forest zones and other elements of the landscape. These results ensure accuracy when preparing natural resource management plans and popular manuals that will be returned to local communities. They can also play a role in understanding which specialist user groups hold knowledge, and how they are transmitting it over time.

Change in ecological knowledge and practices over time

Knowledge about the natural environment and ways of managing biological resources are not static. They change as people move from one region to another, as youth reinterpret what they have learned from their elders and as cultures come into contact with each other. Archaeology, linguistic reconstruction, archival research and oral history open a window to the past, allowing us to discover which elements of ecological knowledge and resource management have persisted throughout decades and centuries of political, demographic and economic change (Josserand *et al* 1984). We can assess which species, ethnobiological categories and ecological practices have persisted, changed or disappeared over time as well as those that have become widespread through borrowing across cultural boundaries (Balée 1989a; Berlin *et al* 1973). Historical research that focuses on world events in recent centuries allows us to assess the impact of Westernization and other forms of culture contact on indigenous ways of perceiving and managing the natural world (Crosby 1972, 1986; Wolf 1982).

Many regions of the world are passing through an intense period of change characterized by not only the destruction of wildlands and loss of biological diversity, but also the transformation of traditional ecological knowledge (Williams and Baines 1993). In some rural areas, the younger generation is not learning what their elders know about the environment, particularly as traditional ways of using biological organisms and managing natural areas fade away. Specialized knowledge held by only a few curers or spiritual leaders is lost when no apprentice is found to carry on traditional medical or religious practices (Plotkin 1994). This loss of knowledge is often linked to increasing contact with national and international cultures and is often exacerbated as local people incorporate formal education, major religions and migration into their lifestyles.

Participants in ethnoecological projects can assess the extent of cultural transformation and search for ways of promoting the survival of local ways of classifying, using and managing natural resources. When local people participate in the joint management of forests and resources, they are stimulated to retain and build upon the empirical knowledge and practices they have acquired over the tens, hundreds or thousands of years they and their ancestors have resided in the region. Studying the evolution of ethnoecological knowledge helps us to understand the dynamics of cultural resistance, allowing us to understand why local ecological knowledge persists and how we can reinforce it. These studies also highlight the impact that local people have had on the natural environment over time, often providing not only evidence that they are responsible for maintaining biological diversity but also creative ideas for conservation in the future (Balée 1989b).

Traditional ecological knowledge, practices and production

In order to ensure subsistence production and to earn a living, local people draw upon their detailed ecological knowledge to manage the diverse microenvironments in their communities (Alcorn 1984a, 1989). From the cultivation of domesticated plants to the harvesting of wild useful species, they engage in many ecological practices that are often energy-efficient and sustainable. They capitalize on the consumptive use value of natural resources when they harvest plants and animals for subsistence purposes and on the productive use value when they barter or sell agricultural and forest products (Toledo 1980). They also benefit – as does the whole world – from the non-consumptive value that comes from ensuring the viability of ecosystem function in general, including its watersheds, cycles of photosynthesis and respiration, climate, soils and other elements.

By investigating the link between local knowledge, practices and production, we can understand better the value of tropical forests (Peters *et al* 1989) and the rationality of resource harvesting decisions made by small-scale farmers and gatherers of forest products (Pinedo-Vasquez 1992). This allows us to evaluate the hidden costs of tropical forest destruction, the economic benefits derived from both subsistence and commercial use of wild species and the environmental advantages of maintaining forest cover as a way of buffering local climate and preserving the purity of local air, water and soil (Munasinghe 1992). These perspectives allow conservationists, development specialists and communities to explore the impact of current productive practices, propose new methods of managing fields and forests, and select new biological species that can be gathered or cultivated locally. Studies of local systems of resource management can also enrich the work of ecologists who seek to restore the diversity and value of forest ecosystems that have damaged by mismanagement or natural catastrophes (Clüsener Godt and Hadley 1993; Posey 1988).

Scientific co-validation of folk knowledge and practices

One of the main activities of ethnoecologists is to understand the rationale behind the way local people interact with the natural environment. In research laboratories, scientists carry out a broad array of analyses that corroborate the efficacy of local uses of plants and animals, ranging from the identification of active compounds in medicinal plants (Elisabetsky 1986) to appraisal of the quality of tropical woods or the nutrient content of wild foods (Johns 1990). In the field, ecologists assess how the yields of agroecosystems compare with those achieved by large-scale monocultures and to what extent traditional methods of wildlands management are sustainable (Altieri 1987; Ramakrishnan 1992). Ethnobiologists compare folk botanical categories with scientific taxa, judging if folk classification makes sense in terms of botanical systematics (Berlin 1973, 1992; Hunn 1975). This range of activities is aimed at revealing the logic, from a scientific perspective, of the thought and practices of local people.

Based on what they have learned in the field and laboratory, researchers and local people can act as consultants to each other, offering advice on the sustainable use of biological organisms. Scientific co-validation allows us to understand how traditional knowledge can be incorporated into management of protected areas and how to optimize the value of plants and animals that are consumed locally or commercialized (Redford and Padoch 1992). These studies reveal the breadth of local people's ecological knowledge and the wealth of resources available in natural areas, highlighting their potential value on the world market and their contribution to human welfare (Oldfield and Alcorn 1991). In addition, this research plays an important role in convincing protected area managers who are skeptical about having local people participate in conservation and development projects (Kemf 1993).

Cognitive mapping of the landscape

Many local people have a special ability to keep mental track of the location of biological resources, geographical landmarks and different types of forest (Hunn 1990). They also have an aptitude for assessing the quality of the environment, including differentiating ecological zones that are well managed from those which are degraded (Davis 1993). This expertise comes in part from their sophisticated perception of how the various elements of the ecosystem - organisms, soils, climate, topography and so on - form an interdependent whole.

This cognitive mapping of the landscape in part explains their mastery in locating scarce plant resources and in selecting plant populations that yield the best fruit, the most potent medicine or the best materials for construction. It also reveals their adeptness at selecting the best place to cultivate the earth, create human settlements and leave forested areas which maintain soil fertility, water purity and other environmental benefits. This talent for land use planning comes from their long-term observation of nature, potentially allowing them to avoid some of the consequences of catastrophes such as droughts, floods and hurricanes as well as yearly fluctuations in climate. These skills often go to waste when local people are forced onto marginal lands or find themselves pressured by economic needs to overexploit the resources available to them.

The ability of some local people to integrate and recall complex information on the local environment often gives them special proficiency as stewards of community reserves and other protected areas. Their ability to assess the quality of useful biological resources and to locate areas where these organisms are found in greatest density makes them indispensable members of teams that seek to identify priority areas for conservation and management. Foresters and conservationists can draw upon this expertise when deciding how to zone natural areas according to various land-use options.

Ritual, religion and symbolism

Nature plays an important role in rituals and spiritual practices and is a recurring element in myths, legends and stories (Levi–Strauss 1966; Reichel–Dolmatoff 1976). Some researchers assert that indigenous people have a way of relating to the natural environment - linked to their cosmology or understanding of the universe - which is fundamentally different from that found in Western culture (Davis 1991). A central element in this conception is that indigenous people are at one with environment, inextricably linked to nature in a way that contrasts with Western people's need to dominate and destroy the natural world. A common way for outsiders to gain access to the world of ritual, magic and religion of indigenous peoples has been through apprenticeship with spiritual leaders, often accompanied by the use of mind–altering plants (Furst 1976; Rubel and Gettelfinger–Krejci 1976; Schultes and Hofmann 1992).

Whether or not these generalized notions of differences between Western and Indigenous thought are valid in all cases, it is undeniable that spiritual beliefs about the forest and associated taboos on the use of natural resources are important elements of conservation and sustainable use of natural resources in many cultures. When people begin to abandon these beliefs, traditional controls on resource exploitation often disappear, leading to rapid devastation of formerly protected areas. It is important to make an accurate ethnographic record of these belief systems and to verify empirically what impact they have on conservation and utilization of natural resources. In areas where the belief systems are still viable elements of local culture, conservationists should explore ways of integrating them into the management of protected areas.

The comparison of scientific and ethnobiological classification

Throughout the history of ethnobotany, as theory and methods have been refined, the scientific literature on local classification, use and management of biological resources has grown not only in volume but also in quantity of specialized concepts and terms. The following synopsis of folk and scientific perception of plants serves to introduce the vocabulary and notions that are employed to describe and analyze Chinantec and Mixe plant classification in the rest of the dissertation.

This perspective is drawn from the work of researchers from various disciplines who have characterized local people's interaction with plants and animals, vegetation types, climates, stages of ecological succession and other aspects of the natural environment. Their insights have demonstrated how different folk systems can be compared among each other and with the perspective offered by natural scientists.

Plant classification

Why are people motivated to classify plants and other aspects of nature? Ask biologists and you will find a nearly unanimous response – a basic goal of natural science is to catalog all known forms of life. Plant taxonomists, in their quest to identify and name all plants, are merely putting the botanical house in order. As Ernst Mayr (1982:134) observes in his book, *The Growth of Biological Thought*, "[w]hatever level of diversity one is dealing with, the first step in its study is obviously that of inventory taking. It is the discovery and description of the different "kinds" of which a particular class consists, whether they be ... different tissues and organs in anatomy, different normal and abnormal cells and cellular organelles in cytology, different kinds of associations and biota in ecology and biogeography, or different kinds of species and higher taxa in taxonomy. The foundation which description and inventory taking lays forms the basis on which all further progress in the relevant sciences depends."

Local people differ from biologists in that they recognize only a subset of the plants that grow in their local environment. Why do they choose to categorize and name some species, while they ignore the rest?

Pose this question to ethnobotanists and you are sure to provoke a heated debate. Most researchers agree that people pay attention to the morphological similarities and differences between plants and devise their botanical categories accordingly. That is why local people tend to group phylogenetically related plants in folk categories – they see the same discontinuities in nature that botanists and other natural scientists have recorded (Berlin 1992).

An alternative – and often complementary – explanation is that plants are categorized according to how they are used. That the majority of species recognized in any folk classification are employed in some way by the local people is the first indication that cultural utility is an important factor in local perception of plants (Brown 1984, 1985; Randall and Hunn 1984).

The ecological distribution of plants is another factor which affects folk botanical classification. Species abundance varies from one vegetation type to another and some plants are more obvious in the landscape or more accessible to local people than others. Plants that are in accessible ecological zones, or that are abundant and widely distributed, tend to be more commonly represented in folk classification than rare plants found in distant localities (Atran 1985).

Ernst Mayr (1982:140–141) captures the essence of these dimensions of ethnobiological classification in his observations of the origins of taxonomy,

> "Not surprisingly, man did not ignore the incredible richness of organic life all around him; in fact, he had diverse reasons for studying it. There was, first of all, his ever present curiosity about his environment, and his wish to know it and understand it. There was also the purely practical need to know which animals and plants might be useful to him, particularly as food and, in the case of plants, as medicine... The passion of some seventeenth- and eighteenth-century authors for the study of nature had, however, still another reason. Already the Greeks had extolled the harmony of nature: The whole world forms a *Kosmos*, a word implying for the Greeks beauty and order. Whether nature was considered the perfect product of the creator or, as interpreted by Seneca and the pantheists, as being one and the same with god, many devout scientists, such as John Ray, Isaac Newton, and Carl Linnaeus were convinced of the existence of a deep-seated hidden order and harmony in nature which it was their task to unravel and explain."

When we talk to local people, we quickly realize that these and other dimensions come together in folk perception of plants. When asked about a particular plant, they are apt to describe its appearance, use and distribution. They may also mention its symbolic or ritual importance. These elements of perception are linked in an overall representation of the plant world which serves as a framework for not only understanding biological diversity but also managing the natural environment and carrying out productive activities such as farming or commercialization of forest products.

Categorizing, naming and identifying biological organisms

Both folk and scientific classification may be divided into three facets – categorization, nomenclature and identification (Jones and Luchsinger 1972). **Categorization** is the procedure of dividing the plant world into different classes, each containing similar plants. **Nomenclature** refers to the naming of scientific and folk categories. **Identification** is the manner in which individual plants are assigned to an established named category.

Before looking in more detail at these three activities, it is important to understand a fundamental concept in classification – the distinction between systems which are natural versus artificial or – put in another way – general-purpose versus special-purpose. A **general-purpose classification** is devised by looking at a large number of characters that represent different aspects of an object or organism. For example, in a general botanical classification, plants are categorized according to the attributes they share, including the aspect of the leaves, flowers, fruits and other plant organs observed in the field, as well as anatomical, genetic and chemical features discovered in the laboratory. These attributes are often interrelated. Certain assortments of morphological characteristics, secondary metabolites, chromosome numbers and ecological adaptations tend to appear together in one group of plants and not in another. Categories are formed by choosing organisms with the highest number of shared attributes, but these organisms do not necessarily have any one attribute in common. All features are considered simultaneously and some may be given more importance, or weight, than others. For instance, most higher plant classifications emphasize flower and fruit characters, which means these reproductive organs are weighted more heavily than vegetative parts. Because they are based on a diverse array of attributes, general-purpose classifications are useful for a large number of potential applications.

A **natural classification** is a general-purpose system that scientists use when they are classifying plants, animals, soils, vegetation types or climates. In a natural system, organisms related by descent (or soils, climates and other non-living features of the environment derived by a common process of formation) are placed in the same category. For example, all plants that come from the same ancestor or all soils that develop from the same parent material are considered to be related. Natural classifications are predictive – they permit us to assume that a certain property we discover in one organism will be present in other members belonging to the same category. If we find a chemical such as an alkaloid in one plant species, we are apt to find it in related species of the same genus or family. If one type of black soil is fertile, it is likely that others are equally nutrient-rich. Said in another way, the information content of natural classifications is high, which means that we are able to infer a lot about an organism or object simply by knowing to which category it belongs.

A **special-purpose classification**, also called an **artificial classification**, is based on one or few characters of particular interest to the person or group doing the classifying. For example, Linnaeus, the 18th century Swedish botanist who codified many elements of the modern system of plant taxonomy, devised an artificial classification of flowering plants based on the number of stamens, which are the male reproductive organs in flowers. When he encountered a new plant, he would simply add it to his system by counting the number of stamens contained in each of its flowers. In artificial systems such as this, objects related by descent or formation often end up being divided among different categories simply because they differ in a single feature which has been given exaggerated importance. Artificial systems are useful for the specific purpose for which they are designed, but they are not predictive – they do not allow us to infer other information about the plant.

Ernst Mayr (1982:147–148) characterizes artificial classification systems in the following way,

> "An understanding of the difference between classification and identification schemes is crucial in the evaluation of so-called 'special-purpose classifications', such as 'classifications' of medicinal plants on the basis of specific curative properties. Such classifications are actually nothing but identification schemes, or so it seems to the modern taxonomist. When the Greek physician Dioscorides ordered plants according to their curative properties, he wanted to safeguard the use of the right species for its specific medicinal purpose. Since most medicines were derived from plants almost up to modern times, pharmacopeias served simultaneously as manuals of plant identification.
>
> Some special-purpose classifications, however, are not identification keys but actually serve the purpose implied by their name. This is true, for instance, when plants are classified in the ecological literature according to

growth form or habitat. The usefulness of such classifications is very limited. Yet, prior to the sixteenth century virtually all attempts at 'classification' were of this utilitarian type. In the consideration of classifications, it is therefore very important to have a clear understanding of the various possible objectives of a classification."

For the most part, folk botanical classifications are general-purpose systems. Folk categories are based on a large number of interrelated features observed by local people. Cross-cutting and parallel classifications, further described below, serve a specific purpose and are thus artificial.

Categories of scientific classification

The art of classifying consists of grouping different organisms into various categories (Sokal 1974). Both scientific and folk classification contain a series of ranked botanical categories, ranging from ones that are very general and broadly-delimited to ones that are very specific and narrowly-delimited.

The scientific categories most frequently cited by botanists are the family, genus, species and subspecies, the last being more or less synonymous with variety. All are natural categories, ones based on a large number of characteristics and that allow us to predict where newly discovered plants will fit into the system.

Families are considered by many botanists to be the broadest natural category in the scientific model of plant classification. Families contain one to many similar **genera**, which are typically the easiest categories to recognize in the field. Genera may include from one to several hundred species.

The **species** is the most fundamental category in scientific botanical classification. For many centuries, species were defined only by appearance, that is, as a group of plants which look alike. Nowadays, a species is defined in many technical ways - as all individual organisms that are capable of breeding together, have a nearly identical genetic make-up, descend from a common ancestor and so on. One common experimental way of confirming the limits of a species is through a breeding test, cross-pollinating two individuals to see if they produce fertile offspring. For example, one corn plant can be naturally cross-pollinated by another corn plant, but not by a bean plant. This tells us that all corn plants are in one species and bean plants in another. In practice, many botanists are still primarily concerned with morphological criteria. They define what is a species by comparing the appearance of a group of related plants.

When a species comprises two or more populations which are morphologically distinct, geographically isolated or both, it is often divided into subcategories. If found in nature, these are called **subspecies** or **varieties**. Among domesticated species, these distinct populations are referred to as **cultivars**, a name which is derived from the term 'cultivated varieties'. Particularly ancient or primitive cultivars which have become adapted to a specific region or habitat are called **landraces**, although some researchers have begun using the term **folk seeds** to emphasize the important role that local people play in developing and maintaining the diversity of domesticated plant varieties. Table 4-1 summarizes these major scientific categories. The scarlet runner bean, *Phaseolus coccineus* L. subsp. *coccineus* is used to illustrate how they are named.

Because families are broad categories containing many organisms, they tend to be defined by relatively few morphological characters. The delimitation of genera are based on a larger number of characters than families. Species are defined by the largest number of features. Unlike families and genera, which typically vary widely in morphology, ecology and distribution, species have a uniform appearance, are usually restricted to a certain habitat or region and often depend on specific animal, bird or insect species for pollination and fruit distribution.

According to Cronquist's (1981) widely-accepted system of flowering plant classification, there are at least 380 families worldwide. These include an estimated 60,000 genera and over 250,000 species. If ferns, mosses and other plants treated in folk classification were considered, these numbers would increase considerably. As botanists further explore the tropics, they are discovering many new species, numerous new genera and even a few new families.

Rank	Type of Name	No. of members	Example
Kingdom	monomial ending in *-ae*	1	*Plantae*
Division	monomial ending in *-phyta*	1	*Magnoliophyta*
Class	monomial ending in *-opsida*	2	*Magnoliopsida*
Subclass	monomial ending in *-idae*	11	*Rosidae*
Order	monomial ending in *-ales*	72	*Fabales*
Family	monomial ending in *-aceae*	more than 380	*Fabaceae*
Genus	monomial with no uniform ending	more than 60,000	*Phaseolus*
Species	binomial	more than 250,000	*Phaseolus coccineus* L.
Subspecies, variety, cultivar, landrace, folk seeds	trinomial, if formally named	n/a (not every species is further subdivided)	*Phaseolus coccineus* L. subsp. *coccineus*

Table 4-1. A summary table of the scientific classification of flowering plants according to Arthur Cronquist. The scarlet runner bean, *Phaseolus coccineus* L. is employed as an example.

Categories of ethnobiological classification

A scheme of folk classification devised by Brent Berlin and his colleagues employs a structure and terminology similar to those of biological systematics (Berlin 1992; Berlin *et al* 1973). Although some researchers assert that it gives a Westernized version of folk knowledge, it has proven to be useful for comparing the biological categories of local people.

For Berlin (1982:26), ethnobiological categorization is "the conceptual organization of plants and animals into a coherent cognitive structure". Table 4–2 gives a synopsis of folk botanical categories he proposes, using Mixe classification of the scarlet runner bean as an example of how they are named. The folk ranks cited in this table are described briefly in the following section. A more elaborate description of each is given in chapter 8, illustrated many examples from Chinantec and Mixe plant classification.

Rank	Type of name	Number of members in one system	Mixe name and English gloss
Kingdom	often unnamed	single member	unnamed
Life–form	primary lexeme	few (from 2 – 12)	***aa'ts*** «vine»
Intermediate	often unnamed	n/a	***xajk*** «bean»
Generic	primary lexeme	upper limit of 500 – 600	***maj_xajk*** «large bean»
Specific	usually secondary lexeme	.typically less numerous than generics; nearly 20% of generics usually contain specifics	***yak maj_xajk*** «black large bean»
Varietal	secondary lexeme	relatively few varietals exist	n/a

Table 4–2. A summary of folk classification of plants, employing Mixe categorization of the scarlet runner bean, *Phaseolus coccineus* L. as an example.

The most general category is the **kingdom** of plants, which is implicitly recognized by local people and is often contrasted with animals. It contains all higher plants and may also include mushrooms, mosses, lichens and other similar organisms. **Life-forms** are broad, distinctive classes - such as trees, vines or grasses - recognized by their habit, their distribution in a specific ecological zone, their utility or by a combination of all these factors.

Intermediates are small groupings of several generics that are perceived to be similar in some way. These groupings are called intermediates because they are in between life-forms and generics, the most important categories in the folk hierarchy. Intermediates are also called **covert categories**, because they often go undetected in folk classifications, are usually unnamed and may not be recognized by everyone in the community. For example, the oak tree genus, which is very diverse in the northern Sierra of Oaxaca, is divided into several named folk generics by the people of Comaltepec. Although most Chinantec-speakers realize that all oaks belong to a single class of trees, they do not give a name to this overall category - it is an intermediate in Chinantec botanical classification.

Generics are the most salient categories in folk botany. They are the first to be learned by children and are frequently mentioned in interviews, surveys and general conversation. This is in part because each generic typically corresponds to a morphologically distinct organism, found in a certain sector of the community and distinguished by its cultural significance.

Most generics are included in - or **affiliated** to - a life-form, although some morphologically distinct or economically important plants may be **unaffiliated**, or independent of all life–forms. For example, many edible beans are included in the Mixe life–form that corresponds to vine, but corn is unaffiliated – it is not considered to be an herb, grass, tree or part of any other life–form. This is probably because corn is of primary importance in the diet and economy of the local people and because it looks very different than other plants grown in the Sierra Norte.

Some generics are further divided into **specific** categories. In English, as in many languages, the generic that corresponds to «oaks» is divided into many specifics that are called «pin oak», «black oak», «bur oak» and so on. The Chinantec recognize many different specific types of corn, which are given names such as «black corn», «white corn» and «red corn». These specifics are distinguished by the color of the dried kernels, the geographical locality in which the plants flourish, the length of time it takes the cobs to mature and other features.

Very rarely, specifics are partitioned into **varietals**. For example, the Mixe have a specific corn category called «ancient corn», which they further subdivide into varietals known as «yellow ancient corn», «white ancient corn», «large ancient corn», «red ancient corn» and «black ancient corn».

In general, specifics and varietals are differentiated by a few morphological characters such as coloration, size or shape of plant parts. They may also be linked to a particular use or microclimate in the community. Specifics and varietals often correspond to agricultural or other culturally significant plants. They are usually more prevalent in the folk classifications of traditional agriculturalist societies than among nomadic people who depend largely on foraging and hunting for survival.

The folk botanical classifications of traditional cultivators in tropical areas around the world contain roughly the same numbers of categories at each rank. By definition there is a single member at the rank of Kingdom. Depending on the definition of life-form that is employed, there are typically between 2 and 10 of these broad classes in any one classification. Generics are the most numerous categories in any one system, often reaching an upper limit of 500 to 600. Approximately 20% of the generics are further subdivided into specific categories, that tend to number from 2 to 10 per generic. The total number of specifics varies widely. There may be hundreds in a folk botánical classification, but they rarely surpass the number of generic categories. Very few specifics are further split into varietals, which are relatively rare in folk botanical classification. Intermediate categories have been insufficiently documented to permit an estimate of their frequency.

Nomenclature in scientific classification

Plant systematists meet at an international congress every six years to decide what is acceptable practice in plant classification. Rules for the naming of plants are set out in a book, *The International Code of Botanical Nomenclature*, which is updated after each of these congresses. To be accepted as valid by the international botanical community, each scientific name must be in agreement with the extensive rules set out in the Code and must be published in the scientific literature.

Formerly, a species name consisted of a long, morphological description. Linnaeus, following the example of folk taxonomy in Europe, devised the binomial system in which each plant is designated by a name consisting of two words. This made it is easier to write and talk about botanical species. Scientific names became arbitrary, not revealing much about the appearance of the plants. This system, though burdened by the growing number of plants species recognized by botanists and the increasingly detailed rules, provides a standard way for people of all languages to refer to plants.

As can be seen in table 4–1, each rank above genus is labeled by a monomial – a name composed of a single word – that has a standard ending. All subclasses end in *–idae*, all classes in *–ales* and so on. Genera are also single–word names. They have no standard ending but are always capitalized. Species names – also called Latin names, scientific names or binomials – consist of two words, the genus plus a modifier called a specific epithet, which is not capitalized. All species names are followed by one or more authors, who originally published the name. The subspecific name, if any, follows. If it is different from the specific epithet, authors are given. Figure 4–1 shows the classification of the scarlet runner bean, indicating the various components of the scientific name.

Plantae [Kingdom]
Magnoliophyta [Division]
Magnoliopsida [Class]
Rosidae [Subclass]
Fabales [Order]
Fabaceae [Family]
Phaseolus [Genus]
Phaseolus coccineus L. [Species]

Phaseolus	*coccineus*	Linnaeus	subsp. *coccineus*
Genus name	**Specific epithet**	**Author**	**Subspecies, varietal name**

Figure 4–1. The classification of the scarlet runner bean, indicating the various parts of a scientific name.

Of the many different ranks, we typically refer to only three or four when we report ethnobotanical information – the family, genus, species and occasionally the subspecies, as follows: *Phaseolus coccineus* L. subsp. *coccineus* (Fabacaeae). The scientific name is italicized or underlined, excluding the family, author(s) and designation as "subsp." or "var.".

Nomenclature in ethnobiological classification

Although folk botanical nomenclature is not guided by any set of written rules, there are striking similarities in the way that plants are named by local people around the world. The technical terms used to describe the structure of folk names have become well established in the scientific literature, but they may be difficult to understand for readers without a linguistic background. Above all, understanding the concept of **lexeme**, a term coined by linguistic anthropologists, is essential when describing folk biological names. Although more or less a synonym for 'name', ethnobiologists prefer to use the term 'lexeme' because it allows a more precise definition of how different types of names are used to label categories at various ethnobiological ranks. Because a lexeme is equivalent to a name, ethnobiologists typically refer to **primary lexemes** as primary (or general) names and **secondary lexemes** as secondary (or specific) names. I follow these conventions in the following description of ethnobiological nomenclature.

A basic step in analyzing the structure of folk botanical names is to grasp the difference between primary and secondary names and to distinguish between the various types of primary names. A **primary name** is considered to be 'semantically unitary', which means that it is a single expression, even if composed of more than one constituent. In fact, many primary names have just a single constituent, such as the English bird names ***eagle*** or ***hawk***. Other primary names are composed of more than one constituent, yet they function in language as a simple name. For example, in

English we think of (and write) ***bluebird*** as a single word, even though it is composed of two easily recognizable constituents – "blue" and "bird". Primary names are thus said to be unitary, because people say, write and think of them as single words.

Secondary names are formed from primary names by adding a modifier which further describes the plant or animal. In English, for instance, we speak of different types of ***eagles*** – the ***bald eagle***, the ***golden eagle*** and so on. In each of these cases, a primary name – "eagle" – is made into a secondary name by adding a modifier, such as "bald" or "golden".

In practice, primary names can be distinguished from secondary names in a variety of ways. We can recognize some primary names right away because they are composed of a single constituent. But how do we tell apart compound names such as ***bluebird*** (a primary name) and ***blue finch*** (a secondary name)? There is no *a priori* linguistic distinction between the terms, but the difference often becomes apparent when we hear the names used in everyday speech and when we ask about folk categories in diverse social contexts. True names can be distinguished from descriptive phrases in a similar way. In English, for example, we can talk of «bluebirds» and «blue birds», meaning in one case a particular species and in the other instance all birds which are blue.

As noted above, there are several types of primary names. In English, for example, ***oak*** is the general name for a class of hardwood trees, ***crabgrass*** is the general name for weedy species of grass and ***redwood*** is a general name for a conifer that grows on the west coast of the United States. All three are primary names, but the structure of each is different. Oak is **simple**, composed of a single word that we cannot break down further. The other names are said to be **complex**, because we can break down crabgrass into 'crab' + 'grass' and redwood into 'red' + 'wood'.

Note that crabgrass includes the name of 'grass', the higher category or life-form to which the plant belongs. This type of name is called a **productive primary name**. Redwood does not include the name of 'tree', the life-form in which it is included. General names of this sort are called **unproductive primary lexemes**. A general scheme which summarizes these types of names is presented in figure 4-2.

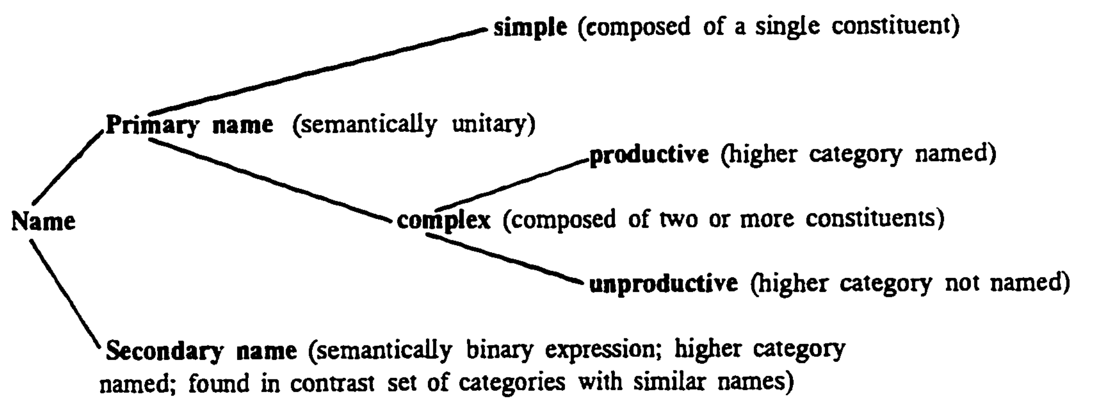


Figure 4-2. A diagram of the different types of folk plant names, or lexemes, with key characteristics mentioned in parentheses.

As noted above, plant names that are formed of a primary name and a modifier are called **secondary names**. These specific names are composed of a general name that indicates the higher category in which the plant is included, plus one or more words that describe the plant in some way. For example, English speakers have several specific names for types of oaks, including ***pin oak***, ***red oak*** and ***white oak***. Each of these names is composed of a general name (oak), and a modifier (pin, red or white). Categories labeled by specific names always belong to sets having two or more members, each contrasting with the others.

Folk names, unlike scientific names, often reveal information about the appearance, utility or distribution of the plant. This is particularly true for the names of specific and varietal categories, which typically contain a modifier that alludes to the color, origin or other property of the plant. Mentioning these features probably serves as a mnenomic device which helps people to remember which names goes with which plant.

Identification in scientific classification

Mayr (1982:147–148) states, "[t]he procedure of identification is based on deductive reasoning. Its purpose is to place an investigated individual into one of the classes of an already existing classification." Botanists use several methods to assign an unknown plant to a named category. They often begin with the scientific literature, including the **floras, monographs** and **revisions** that describe the plants of a certain region or taxonomic group. Many of these works contain a **species key** which comprises a series of short descriptions that compare and contrast the morphological features of different plants. After using the key to arrive at a tentative identification, the herbarium is consulted to verify if the unknown plant matches previous collections of the suspected species.

Plants which are particularly difficult to identify are sent to a specialist of the taxonomic group to which they belong. Once a botanist is familiar with the flora of a certain region, he or she can recognize the plants on sight, without having to consult the herbarium, the scientific literature or specialists.

Identification in ethnobiological classification

Local people do not usually have herbaria or written works to consult, but they are able to recognize by sight hundreds of different plants. Researchers have proposed two cognitive processes to explain this ability. One is referred to as *gestalt* identification, meaning that the plant is distinguished as a whole by immediate recognition of the overall aspect – or perhaps the overall pattern of characteristics – of the organism. Although a folk category may include a number of different types of plants, one kind is often considered to be a **prototype** – more typical than the others because it is distinctive in appearance, abundant near the community or preferred for a particular use. Through *gestalt* identification, local people recognize a plant because it matches this prototype, or best example, of the category. Plants which are similar to this prototype – in appearance, use or ecological role – are included in the **extended range** of the folk category.

In the other process, a plant is identified by examining one or more of its salient features – the color of the stem, the taste of the fruit, the appearance of the bark – that differentiate it from similar plants. Often, the two processes are combined. A general impression is gained from looking at the whole plant and is confirmed by looking for certain key features.

Identification is aided by seeing plants in their natural habitat (where they are growing in forests or fields) or in their cultural context (the conditions under which they are being used). For example, the Chinantec, Mixe and Zapotec people of the Sierra Norte of Oaxaca distinguish between two types of cherry trees. *Prunus serotina* Ehrh. subsp. *serotina* is a wild subspecies that bears small acrid fruits that are considered inedible, whereas *P. serotina* Ehrh. subsp. *capuli* McVaugh has large sweet fruits which are eaten. Although the two subspecies are difficult to identify when they are not bearing fruit, local people are aided by noting the location of the tree. The wild subspecies is found in the forest, whereas the edible subspecies is semi-cultivated in and around human settlements.

The correspondence between folk and scientific classification

There is an implicit assumption in the preceding discussion that a relationship exists between scientific and folk botanical classification. As Eugene Hunn (1977) remarked after studying folk classification in southern Mexico, "... [local people] demonstrate an intimate and empirically reliable knowledge of the local flora and fauna and share with the field worker an appreciation of the ordered complexity of the living world".

Do local people and academics really classify nature in a similar way? Champions of cultural relativity consider the question heresy. They believe that each culture has a distinct view of reality rooted in its language. In the words of Edward Sapir (1921), an American linguist who was an early proponent of this view, "the worlds in which different societies live are distinct worlds, not merely the same world with different labels attached". Some researchers assume that biologists construct taxonomies for the sake of furthering scientific knowledge, whereas local people classify nature as a means of fulfilling subsistence needs.

In the 1950s and 1960s, this view was questioned by two different groups of scholars who proposed alternative ways of looking at local ecological knowledge. French anthropologist Claude Lévi-Strauss (1966) demonstrated the cross-cultural similarities in the way people think about nature, pointing out universal parallels in the symbolic classification of plant and animals.

In the United States, ethnoscientists began to take a closer look at folk classification. Harold Conklin (1954) showed that the Hanunóo of the Philippines have a system of botanical categories as complex as that devised by plant taxonomists. Some years later, Brent Berlin and his colleagues (1973, 1974) carried out extensive fieldwork among the Tzeltal Maya of southern Mexico and devised the general principles of folk classifications described above. The general model of folk classification inspired by these studies explicitly recognizes that local people and academics perceive the natural environment in a similar way.

How can this shared knowledge be characterized and measured? The simplest way is to describe the correspondence between folk categories and scientific taxa. This approach is most successful for folk generic and subgeneric taxa, which often correspond to a single species, group of species or genus. The most common way of characterizing correspondence is to show how a single folk generic **maps onto** scientific species. Folk generics often show a **one-to-one correspondence** with scientific species. Species of great cultural significance are **overdifferentiated**, or split into many distinct categories by local people. Species that are less important culturally or less distinctive in appearance are usually **underdifferentiated** - they are lumped into a single folk generic. These concepts are further illustrated in the analysis of Chinantec and Mixe botanical in chapter 8.

As part of their analysis of Tzeltal Maya folk botany, Brent Berlin and his colleagues (1974) looked at the correspondence between plant generics and botanical species in a systematic way. The results of their analysis are shown in table 4-3.

They found that most generic categories included one and only one scientific species, which is called one-to-one correspondence. There were very few cases of over-differentiation, that is, when two or more folk generics correspond to a single scientific species. Finally, there was under-differentiation in over 1/3 of the cases. Berlin considered two types of underdifferentiation – when a generic refers to two or more species of (1) the same genus or (2) more than one scientific genus. As an example of the first type, he gives the category ***ch'ilwet***, which refers to some five species of *Lantana*, a genus in the *Verbenaceae*. The second is exemplified by ***tah***, a folk generic which includes several species of *Pinus* and at least one species of *Abies*, both genera of the *Pinaceae*. Other researchers have found cases of overdifferentiation in which plants from genera in distinct families are included in the same folk generic.

Type of correspondence	Number of generics	% of generics
One-to-one	291	61%
Under-differentiation, type 1	98	21%
Under-differentiation, type 2	65	14%
Over-differentiation	17	4%
Total	N = 471	100%

Table 4-3. Correspondence of Tzeltal plant generics to local botanical species.

When speaking of correspondence, it is essential to define which folk and scientific categories are being compared. As in the example cited by Berlin, most comparisons are between folk generics and botanical species. In addition, it is possible to compare any folk rank with any scientific rank. At higher ranks, the relationship between folk and scientific taxa is less exact than at the generic or subgeneric level. The content of kingdom is generally similar in the two systems –

local people and scientists disagree little on what constitutes a «plant». The delimitation of intermediate categories often agrees quite well with the circumscription of a particular botanical family. Life–forms do not always correspond to botanical taxa, but they make sense to botanists because they often correlate well with descriptions of plant habit - tree, vine, herb and so on. A few life–forms, such as «grass», «fern» or «palm», correspond to a botanical family or higher category.

	Scientific	Folk
Extent of flora described	Complete coverage of world flora sought	Most distinctive species of the local flora recognized
Hierarchical Depth	Deep; 9 major and many intermediate ranks	Shallow; typically 6 ranks
Naming	Guided by the International Code of Plant Nomenclature, a rule book that is modified by consensus of the international botanical community; names are arbitrary	Part of oral tradition; influenced by contact with other cultures, migration to new habitats, shifts in productive activities and other social transformations; names often refer to the morphology, origin or use of the plant
Basis for delimiting categories	Morphological similarity, aided by breeding, genetic, chemotaxonomic and other studies	Primarily morphological similarity, but also utility, ecological distribution & associations and symbolic features
Identification	Familiar plants sight identified; unknown plants identified by using scientific literature (including keys) and comparison with herbarium specimens	Characterized by two processes - *gestalt* recognition of whole plant and reference to particular morphological characters; ecological and cultural context aid identification

Table 4–4. A summary comparison of scientific and folk plant classification.

The similarities between folk and scientific perception of plants do not end with the correspondence between taxa. There is also a resemblance in the structure of folk and scientific classification. Both systems are hierarchical, which means they contain a series of ranked categories that range from broad (including many, diverse types of plants) to narrow (including a few, very similar plants). Folk hierarchies are relatively shallow, consisting of 6 ranks. The scientific system is relatively deep, comprising nine major and many minor ranks.

Scientific categories are mutually exclusive at each rank. A given plant belongs to one and only one species, genus, family and so on. This is generally true for folk taxa as well – a plant is generally considered to belong to a single generic, life–form or category of another ethnobiological rank. Some folk generics are exceptions to this rule, because they are ambiguously classified in more than one life–form or overlap with other folk generics.

One of the major differences between folk and scientific classification is the extent to which the local and world flora is classified in each system. Plant taxonomists strive to discover and give a name to every plant in the world. Local people recognize only a subset of the plants in the local environment, essentially those considered distinctive because of their appearance, use or ecological distribution. These and other characteristics are summarized in table 4–4.

Cross–cutting categories and parallel classifications

Some plant categories used by local people do not fit into the general system of folk classification described above. For example, the Chinantec have words for fruit (*'o*^{L}*huɨɨ*^{L}) and for firewood (*k*^{w}*ɨɨ*^{LH}), the Mixe have terms for edible greens (*tsu'up*) and for medicinal plants (*tsoojy*). These named categories are delimited primarily by their use and do not correspond to life–forms, generics or categories of any other ethnobiological rank. Classes such as these are called **cross–cutting categories**, because they usually include plants from several different life–forms, thus cutting across the general–purpose classification of plants.

Some cross-cutting classifications are based on other criteria than use. For instance, local people throughout the world classify plants according to their **humoral property**, the perceived quality of being hot, temperate or cold, typically in reference to their effect on the human body. Among the Chinantec and Mixe, this hot-cold system of classification - which some people think is indigenous and others believe was introduced by the Spanish - is applied only to plants which are consumed, either as medicine or food. Plants with large quantities of essential oils, such as mints and mustards, tend to be considered as hot. Succulent plants, such as begonias and species of *Crassulaceae*, are usually thought of as cold. Humoral property is not correlated with the division of plants into life-forms. Some herbs might be considered as hot and others as cold and the same holds true for trees, vines and other broad folk taxa.

At times, these systems of classification are extensive and complex, providing an alternate way of ordering the majority of plants known by the people of a certain culture. These broad systems of categorizing plants on a specific feature are referred to as **parallel classifications**. Jacques Tournon (n.d.), a French ethnobotanist who carries out research in Mexico and Peru, has noted that the Shipibo-Conibo of the Peruvian Amazon classify many plants in two ways - as members of folk generic categories and as ***rao***, a category of plants, animals and minerals that are classified by the way they affect human health and behavior. Depending on the context in which they are discussing the plants, the Shipibo-Conibo use either the generic name or the ***rao*** name, or sometimes both. For example, *Hura crepitans* L., a spiny tree with copious toxic latex, is usually called by the generic name ***anà***, but is also referred to as ***peque rao*** in the context of its use as a treatment for persistent skin wounds caused by leishmaniasis, a tropical disease.

Parallel and cross-cutting systems of classifications have also been described by plant taxonomists, who call them special-purpose classifications. The most notable is the division of plants according to habit. For example, John Hutchinson (1973) devised a system of ordering many plants on the basis of their woodiness, erectness and other features of gross morphology. He placed predominately woody plant families in a class called Lignosae and non-woody families in the Herbaceae. Taxonomists have generally rejected this approach, choosing instead to follow a natural system which emphasizes differences in floral and fruit anatomy and many other morphological characteristics. Nevertheless, plant ecologists have found that classifying plants by habit is useful for defining vegetation types or stages of ecological succession. Many follow the system devised by C. Raunkiaer (1934), a Danish plant ecologist who published his work on botanical life-forms in the early part of this century. Raunkiaer, who worked in temperate forests, perceived five types of plant habit, which he defined by observing the position of the **perennating bud** - the organ from which new plant growth arises. In his system, **phanerophytes** are woody plants - trees and shrubs that have the terminal bud at least 25 centimeters above the ground. **Chamaephytes** are woody or semi-woody perennials that bear their bud above ground, but no higher than 25 centimeters; they are what we call sub-shrubs in English. Herbaceous plants are divided into three classes. The bud of **hemicryptophytes** is born at the ground surface, while the new growth of **cryptophytes** emerges from within soil or water. **Therophytes** arise each year from seed. Many researchers add a sixth life–form, **epiphytes**, which are herbaceous plants that grow on the trunks and limbs of woody species well above the forest floor. Raunkiaer's concept of life–form is still used by botanists and has been adopted as well by researchers interested in folk classification of plants.

Ethnobotanists find that exploring alternative systems of classification is helpful in some research projects. For example, if we are interested in the fuel sources of a community, we will want to determine if a general category for firewood exists and how it is structured. No matter what the scope of the research, it should be clearly defined which categories constitute part of the general folk classification, which belong to alternative, special–purpose ways of ordering the plant world and how the two systems are interrelated.

Management of plant resources

Characterizing the way a plant is managed is an essential part of making an ethnobotanical inventory. The extent to which a plant is manipulated by humans is considered by many researchers as an indication of its cultural significance. Brent Berlin and his colleagues (1974), for example, divided plants into four levels of importance when analyzing Tzeltal Maya and Aguaruna management of plants – cultivated, protected, significant and not treated.

Other authors speak of plants as cultivated, weedy or wild. The most commonly cultivated are **domesticates**, plants that have undergone a genetic change that alters their appearance. At least some populations of these species are land races which are dependent on humans for their survival. **Weeds** sprout in areas disturbed by people or by natural causes. There are often considered undesirable when they invade agricultural lands, but are also used as natural fertilizer, food or medicine in many areas. **Wild plants**, which comprise the great majority of species, grow outside of cultivated and other extensively disturbed sites.

These sets of terms are not entirely adequate to describe the practices used by local people to manage plants in the tropics. These techniques may change from one region, ethnic group or climatic zone to another. Even within one region, the local people may let a cultivated species slip back into a wild state or they may begin to experiment with growing plants once found only in the wild.

There is no consensus among ethnobotanists on the terminology that should be used to characterize different practices of human management of plants. Yet all the terms form a continuum along which human attention, intervention and expense of energy increase from wild plants to domesticated species.

Cultivated plants correspond to those species intentionally grown in agricultural plots, home gardens, orchards and other areas tended by people. These plants are often **domesticates** which have become genetically and morphologically altered in the course of selection, making them dependent on humans for survival. Most domesticates are **stable** and cannot revert to their wild state, though they are sometimes cross-pollinated by wild relatives growing near agricultural fields. Other domesticates may retain their capacity to survive in the wild. These plants are called **semi-domesticates**. Those undergoing genetic and morphological changes which will eventually make them dependent on humans for survival are said to be in a state of a **incipient** domestication. Some cultivated plants have not yet undergone any change in genetic composition or appearance – they are **non-domesticated**.

The growth of **managed** plants is stimulated by a broad range of techniques by which they are sheltered from deleterious human actions, freed from competition by other plants or shielded from predators. **Transplanted** species are removed from where they grow naturally to an area which is accessible to humans and favorable to the development of the plant. These include plants which are placed in home gardens and those moved to pathsides and nearby secondary vegetation. **Encouraged** plants are left where they are found, but their growth is aided by pruning, fertilizing or other horticultural practices. Some plants are not directly manipulated, but are **protected** from grazing animals and encroaching vegetation. The least managed species are simply **tolerated**, left standing when other vegetation is cleared. Regardless of the particular techniques employed, managed plants require less input of human labor than cultivated species. The management practices sometimes lead to changes in the species composition of the natural vegetation or to genetic modifications in the plants.

When local plants are neither cultivated nor managed, they are considered to be **wild**. Many of these species, gathered by local people, are important resources in rural communities because they provide medicines, building materials, firewood and some foods. Plants not gathered do not go totally unnoticed by local people. In folk botanical classification we find many plants that are **classified** but not used. There are also plants which are recognized by local people, but have not yet been given distinct names. Yet even among indigenous groups that have a vast botanical knowledge, there are some species of no cultural significance and limited distribution that are completely **unknown**.

In every inventory we will find some plants which are not produced locally, but are **imported**. These are usually cultivated plants, but some are managed or wild species. We can further distinguish between imported plants that are **domestic** – produced in the country where we are working – and those that are **foreign** – purchased in another country and resold in another.

Agronomists and botanists seek to discover where plants were originally domesticated and along which routes they spread to other regions of the world. Plants cultivated in the region in which they were originally domesticated are considered to be **native crops**, whereas those which were domesticated elsewhere are referred to as **exotic** or **introduced crops**. In southern Mexico, for example, tomatoes are native, because they were domesticated in that part of Mesoamerica. Peanuts are exotic, as they were domesticated in South America and spread to Mexico before the arrival of the Spanish. All Old World domesticated plants grown in Mexico are thus exotics by definition.

Agronomists and other researchers try to identify the wild relatives of crop plants and to discover which are the ancestor-species – those that gave rise to the domesticated plants. Although the source of some crop plants is still in doubt, there are standard references that list which plants are from the Old World and which are from the New World. These references often give a detailed discussion of the taxonomy and current distribution of crops plants as well as their centers of origin and diversity.

This range of plant management techniques is particularly evident among traditional agriculturalists. Janis Alcorn (1981b, 1984b), an American ethnobotanist, has documented a series of agricultural practices employed by the Huastec indians of San Luis Potosí and Veracruz, Mexico. The rich lexicon of terms is a first indication of the sophistication of their methods of plant resource management (figure 4–3).

kwathaal	«slashed»
aalk'ith wa'ats	«neglected»
hilath	«spared»
ak'ith	«weeded around»
beletnath	«protected»
tsabt'ayath	«transplanted»
t'ayath	«planted»

Figure 4–3. Some Huastec terms for plant management recorded by Janis Alcorn in San Luis Potosi and Veracruz, Mexico.

Human management of plants is a dynamic, cumulative process. Unknown plants come to be recognized and classified by local people. If they are discovered to be useful, they are gathered. In time, populations of the species may begin to be managed using a variety of techniques. Plants that attain a high cultural significance are cultivated, which in time leads to their domestication. In most cases, this process can also be reversed. As the local culture and economy changes, less attention is given to some culturally significant species and they may be eventually abandoned and forgotten by local people.

Plant use categories

There is no universally accepted set of categories that characterize how plants are utilized. In comparing ethnobotanical databases or ethnographic works on plant utilization, we find a broad range of overlapping use categories. The «dye plant» referred to in one is the «plant used in craft production» in another. One author will speak globally of «medicinal herbs», whereas another will characterize medicinals by stating the ailment they treat and yet another will categorize the plants according to the body part affected. The disagreement between these characterizations makes it difficult to compare the use of plants across cultures. In addition, it complicates the linking of localized databases into regional or global ones.

If ethnobotanists reach a consensus on a standardized system of use categories, then comparative ethnobotany will become an easier task. Three aspects of plant utilization need to be systematized – the category of use, the plant part employed and the accessibility of the species.

Several researchers are defining global use categories in the process of building databases that incorporate ethnoecological information from a number of ethnic groups, regions or countries. For example, Victor Toledo and his colleagues (1992) are compiling data from more than 30 studies of the use of plants by indigenous people in the tropical moist forests of Mexico. They have found that use categories employed in the various studies are approximately equivalent. In this database, they are employing several major categories of use, including medicine, food, ornament, wood and resin, among others.

Toledo and other researchers have emphasized the importance of distinguishing between single and multiple–use plants. **Single–use** species have one specific use for which a single plant part is gathered, often during one season of the year. Other plants are **multiple–use** – yielding various plant organs which are harvested at various times of the year, each for one or more distinctive purposes.

The utilization in Latin America of *Agave* species which provide a good illustration of multiple–use plants. The more than 300 species of *Agave* native to the New World serve as excellent examples of plants used and managed in multiple ways. The genus contains a number of domesticates, including the ornamental century plant (*A. americana* L.), fiber-producing species such as sisal (*A. sisalana* (Engelm.) J.R. Drumm. & Prain) and henequen (*A. fourcroydes* Lemaire), and those used in the production of distilled alcoholic beverages, principally the tequila maguey (*A. tequilana*). Managed and wild species are also a source of alcohol, fiber and ornament, but the list of uses does not end there. *Agave* flowers and buds are edible and the tough leaf membrane is used as the outer wrapping of *mixiotes*, a traditional meat and vegetable dish popular in central Mexico. The sap of large, fleshy species (such as *A. atrovirens*) is fermented to produce *pulque*, a nutritious beverage purported to be of medicinal value in treating stomach ulcers and gastritis. The fleshy leaves and bases that remain after tapping are fed to animals or are left to dry for later use as fuel. If the stumps are particularly large and well-formed, they may be fashioned into beehives. When planted on the edge of fields and gardens, the magueys serve as windbreaks, living fences and retainers for terrace banks.

For most species, we can define which is the primary use and which are secondary uses. For example, the primary use of *Bougainvillea*, a genus of lianas native to Central and South America, is as an ornamental which is trained to grow over houses and walls in many tropical and subtropical countries. In Mexico, the bracts of the red-colored variety of bougainvillea are used as a remedy for coughs, a secondary use of the species.

Frances Cook (1995) has devised a three level system of plant use descriptors for economic botany databases. The system begins with thirteen general use categories - called level 1 states, listed in table 4-5. Some of these use classes —

Food
Food Additives
Animal Food
Bee plants
Invertebrate Food
Materials
Fuels
Social Uses
Vertebrate Poisons
Invertebrate Poisons
Medicines
Environmental uses
Gene Sources

Table 4–5. Thirteen top level use categories proposed by Frances Cook.

food, medicine, fuels and **materials** — are the major intuitive divisions that many ethnoecologists employ. Others, such as **food additives, vertebrate poisons** and **non-vertebrate poisons, bee plants** and **animal food**, are used by some but not all researchers. **Social uses** include plants used as ritual, religious and magical objects as well as drugs and birth control agents. **Invertebrate food** includes host plants which harbor useful organisms, such as insects which are edible or which produce something of benefit to humans (silk, cochineal dye and so on). Other plants host harmful organisms, including crop pests. Species which have **environmental uses** serve as ornamentals, living fences, natural soil fertilizers or as purifiers of air and water. Finally, **gene sources** are wild relatives of major crops which serve as potential sources of genes for improving the disease resistance, yield, salt tolerance and other desirable features of domesticated species.

These level 1 states are broken down into 107 level 2 states, which further characterize the specific use of the plant according to the medical condition treated, the part of the plant which is eaten, the type of material produced and other features. Finally, level 3 descriptors give further details on the level 2 specific uses.

Cook has also systematized the reporting of the plant parts used. Working from initial lists prepared by Eduoard Adjanohoun and his colleagues (1989), she has

Live plant *in situ*
Entire plant *ex situ*
unspecifies aerial parts (including aquatics)
Seedlings/germinated seeds
Galls
Stems
Bark
Leaves
Inflorescences
Infructescences
Seeds
'Roots'
Exudates

Table 4-6. Master list of plant parts from Cook (1995).

created an taxonomy of plant anatomy. The various plant parts, listed in table 4-6, are subdivided into specific categories. For example, **exudates**, or liquids contained in the plant, are further broken down into sap, latex, leaf juice, gum, resin and nectar. Although this system has not been adopted universally, other researchers use similar ways of characterizing plant use.

After characterizing plant uses and parts, it is relatively simple by comparison to judge the **accessibility** or ease of finding a plant resource. Accessibility can be measured in two ways – the variation in abundance throughout the year, called **seasonal availability**, or across space, referred to as **geographical distribution**.

When defining when a plant is used, most researchers refer to the four seasons (winter, spring, summer, autumn), to the calendar year (January through December) or to climatic periods (cold season/dry season, or wet period/dry period). Availability also depends on the change in vegetation over time – some plants are found in cultivated fields, others colonize fallows and others emerge as the fields revert to shrubland or woods.

The study of distribution of plants in space, which is called **phytogeography**, offers various perspectives on where a plant can be found. Botanists note the geographical range of a species and patterns of occurrence within that range. They record the other plants that are commonly associated with the species. In an area divided into **quadrats**, a quantitative study discerns exactly how individuals are grouped (such as dispersed, clumped, evenly spaced) and allows a measure of their **frequency**, the total number of plots in which the species occurs, and **density**, the average number of individuals of the species across the area (Dallmeier 1992).

Local classifications of accessibility, anatomy and use of plants

As we seek to find a universal system for classifying plant utilization, we should keep in mind that many rural inhabitants have a rich vocabulary for describing plant accessibility, anatomy and use. As with other aspects of botanical knowledge, much care should be taken in recording the local way of classifying plant uses, parts and seasonality.

All people have a way of splitting time into seasons, periods of a calendar year, or other units. In addition to the standard 12–month calendar which is now used in many parts of the world, there may also be traditional ritual or agricultural calendars in some communities. In many cases, local people have concepts which coincide with our notion of the four seasons and which integrate elements of climatic seasons or agricultural cycles. For example, the Mixe have a general name for season, ***aats***. What we call winter, they call ***xox'aats*** «cold season», alluding to the chilly days of this time of the year. Spring is ***yo'aats*** «hunger season», a period when the supplies of staple foods are running low, new crops have not yet yielded produce and the vegetation suffers from the onset of the short dry season. Summertime, referred to as ***to'aats*** «rain season», brings heavy rains which ensure an ample crop. Autumn, which is referred to as ***tsik'aats*** or «harvest season», is the time for picking corn, beans and other agricultural produce that must carry the population through the wintertime.

Complex vocabularies of plant anatomy are found in many languages. In their book on Tzeltal botanical knowledge, Brent Berlin and his colleagues (1974) dedicate an entire chapter to describing how plant parts are classified in this dialect of Maya. There are terms for different types for major organs such as fruits, flowers, roots and leaves as well as for minor plant parts such as leaf bracts and pubescence.

As mentioned above, the Chinantec have terms for «medicinal herb», «firewood», «edible greens» and many other major categories of plant use. Each of these terms may be further subdivided. For example, the Chinantec have types of medicinal herbs used for treating a wide range of medical conditions, some of which are shown in table 4–7. In many Mexican communities, we discover plants used to treat folk illnesses, such as *susto* or «magical fright» and *aire* or «evil winds», which are not typically recognized by Western physicians.

Chinantec name	English gloss
'oo^{L} *dsee*^{LH}	infection medicinal–herb
'oo^{L} *dsú*^{H}	malaria medicinal–herb
'oo^{L} *fɨ*$^{'LM}$	*susto* medicinal–herb
'oo^{L} *gi*^{L}	*aire* medicinal–herb
'oo^{L} *g*^{w}*ɨ*$^{'LM}$	scarring medicinal–herb
'oo^{L} *ku*$^{'L}$ *maja*^{LH}	toothache medicinal–herb

Table 4–7. Chinantec names for some medicinal herbs.

These various ways of characterizing scientific and folk representation of plants – including classification, naming, anatomy, availability and use – are reflected in the descriptions of Mixe and Chinantec botanical categories in the following chapters.

5. Ethnobotanical inventory methods

As Brent Berlin states in his recent book on ethnobiological classification (1992), there is no single reference on the methods for documenting folk knowledge about plants, animals and other aspects of the environment. Descriptions of the techniques that we employ are dispersed in many different publications, and we often find ourselves improvising new ways – or reinventing old methods – of recording ethnobotanical data.

The following account sets out some of the methodological approaches and perspectives that I have been employing in the Sierra Norte. I provide more detail on these and other techniques in *Ethnobotany, a Methods Manual* which I have prepared for the People and Plants Initiative of the World Wide Fund for Nature (WWF), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Royal Botanic Gardens, Kew (Martin 1994b).

In the first part of this chapter, I discuss the general ethnobotanical inventory that I carried out in Totontepec and Comaltepec. In addition, I present some of the special techniques I employed to gauge the extent to which folk botanical knowledge in Totontepec is widespread and variable. In the second part, I address various questions and controversies concerning the collection and analysis of data.

Carrying out an ethnobotanical inventory

More than ten years ago, I set out to document the useful plants of the Sierra Norte of Oaxaca. After making general floristic and ethnobotanical collections in various communities, I decided to concentrate on conducting an inventory of all folk botanical categories in Totontepec and Santiago Comaltepec.

I began my study of plant knowledge by making an extensive collection of plants with the help of the local collectors listed in table 5–1. Each of these collectors was provided with standard equipment for collecting and drying plants – presses, newspapers, dryers, and so on.

Collector name	Year of birth	Gen der	Ethnic group	Community	Approximate number of specimens
José García García	1940	♂	Chinantec	San Juan Quiotepec	150
Leonardo Hernández García	1964	♂	Chinantec	Santiago Comaltepec	350
Saul Hernández Hernández	1962	♂	Chinantec	La Chuparrosa	225
Eusebio López Hernández	1964	♂	Chinantec	Puerto Eligio	150
Laura López López	1954	♀	Chinantec	Santiago Comaltepec	400
Ricardo López Luna	1948	♂	Chinantec	La Esperanza	600
José Rivera Reyes	1930	♂	Mixe	Totontepec	1800
Eloy Vargas Ruíz	1958	♂	Mixe	Chinantequilla	350
Esaú Velasco López	1957	♂	Mixe	Tepitongo	300
Tiburcio Vargas Ruíz	1958	♂	Mixe	Mixistlán	50

Table 5–1. Date of birth, gender and approximate number of collections of local collectors from Chinantec and Mixe communities who participated in the ethnobotanical inventory.

Ethnobotanical information was recorded in a preprinted notebook. An English translation of one page from the Mixe notebook is shown in figure 5–1. I trained each collector separately, ensuring that he or she was able to make good quality herbarium specimens, and that each understood how to record the appropriate ethnobotanical data. I encouraged all collectors to record information both in Spanish and in their own language. In practice, most assistants recorded indigenous names for the plants, soil types, geographical localities and vegetation type. The rest of the information – including the uses and preparation, and a botanical description – was recorded in Spanish, which facilitated making the collection labels.

The collectors sampled a wide range of specimens from different localities.

They concentrated on documenting useful plants, but also collected plants not named or used in the community. The quality of some early collections was rather poor, but most of the collectors quickly learned to prepare specimens with flowers and fruit, and to press and dry them with care.

Ethnobotanical Collections of Totontepec

Community ________ Specific Locality ________

Vegetation Type: Climate: Soil:

herb bush tree grass vine

Other, specify ________________________

If tree, bush, or vine, Height ___ Diameter _____

Color of the flower _______ of the fruit _______

Other notes on the plant's appearance __________

Flowering season _________ Fruiting season _____

Collector ____________ no. ___ Date ________

Mixe Name ____________________________

Translation ___________________________

Use _________________________________

Preparation ___________________________

Use _________________________________

Preparation ___________________________

Other notes on the use and preparation __________

Who gave the information ________________

Figure 5-1. English translation of one page from a preprinted Mixe plant collection notebook.

In Totontepec, I worked with older, male collectors who possess a broad knowledge of plants, but have difficulties in writing and translating their native language. They dictated ethnobotanical information to younger female assistants who entered the data in the preprinted notebook. These secretaries were mostly students in the community's secondary school who, although fluent in both Spanish and Mixe, were unfamiliar with the names and uses of many of the plants in the community.

José Rivera Reyes, a resident of Totontepec and the most productive of all collectors, began working with me in 1985. He went on to train collectors from other villages within the municipality of Totontepec. José has amassed some 2400 collections, while the other collectors each made between 150 and 500 specimens in their own communities. In all, we have some 3000 botanical collections that correspond to over 400 folk botanical generics in the municipality of Totontepec.

In Comaltepec, I trained a total of six collectors, each living in a different climatic and vegetational zone of the municipality. Saul Hernández Hernández worked in Chuparrosa, a ranch in the hot dry zone where his family raises cattle and cultivates agricultural plots. Eusebio López García, from Puerto Eligio, collected plants in the hot, humid zone below 1000 meters above sea level. Ricardo López Luna, a resident of La Esperanza, combed the cloud forests for useful plants, and ventured into lowland forests and abandoned ranches on the humid side of the Sierra.

In Comaltepec itself, several other collectors concentrated on documenting the useful plants of the pine–oak and tropical deciduous forests around the community. In particular, Leonardo Hernández García, then in secondary school, spent afternoons and weekends working alongside his father, Roberto Hernández López, one of the community's *curanderos*. Leonardo learned the names and uses of medicinal herbs in Chinantec, and made a collection of over 350 plants.

In general, only men were available for this work, which required long solitary walks in the forest, something that would have been inappropriate for women. The single female collector, Laura López López, pressed plants brought to her by local curers, or by friends living in other parts of the municipality, such as Chuparrosa ranch. She also collected plants growing in home gardens as well as in fallow fields and forests near the community. On occasion, accompanied by her oldest children, she would venture further into the countryside. She collected over

500 specimens during a four year period.

All collectors in Comaltepec were literate and able to record ethnobotanical information in the preprinted notebooks by themselves. In all, they have collected a total of over 2000 botanical specimens.

A question that we must resolve in all ethnobotanical studies is how to compensate our local collaborators. Communities of the Sierra Norte are fully inserted into a cash economy, and many villagers migrate to urban areas of Mexico or the United States to earn money. Perhaps more importantly, the governmental and non-governmental agencies offer paid positions as school teachers, cultural promoters, health and nutrition assistants and many other similar posts. Under these conditions, it is appropriate to compensate the plant collectors and other assistants in a similar way.

All assistants earned a salary that corresponded to the high end of the pay scale for a daily worker. It was important to compensate the collectors for the time and knowledge they dedicated to the project, but at the same time I was cautious to pay wages that were reasonable within the local economy. The salary was calculated on a monthly basis, and each collector agreed to make a certain number of collections per month.

From 1985 until 1988, I travelled regularly to these communities to visit the collectors and oversee their work. Since 1988, I have returned to Oaxaca once or twice a year to continue this supervision. Rafael García Soriano, a botanist from Aguascalientes state, has been coordinating the ethnobotanical project since February 1993. On each visit to the communities, we review the specimens with each collector, ensuring that the information is complete and the collected plants are fertile. We then transport the plants to Oaxaca City, where the specimens are dried for an additional night to remove any additional humidity that the specimens absorbed when stored in the humid villages. We leave the specimens under dry and sterile conditions in Oaxaca until we prepare labels and ship the specimens to herbaria or prepare them for use as a reference collection in the communities.

We identify the specimens to the best of our ability, often to genus or family. Most of the final determinations to species are made by specialists of various taxonomic groups who I list in the acknowledgements at the beginning of this dissertation. Primary sets of the plant collections from both municipalities have been deposited in the herbaria of the University of California at Berkeley (UC) and the Universidad Nacional Autónoma de México (MEXU). Many duplicates have been sent to the Missouri Botanical Garden (MO) and the New York Botanical Garden (NY). An additional set will be deposited in another international herbaria and a representative set is being incorporated into the reference herbarium of the Sociedad para el Estudio de los Recursos Bióticos de Oaxaca.

I gave special attention to ensuring that each indigenous plant name and other terms were accurately transcribed. I tape recorded the names of hundreds of collections by each collector. The tape of Comaltepec names was transcribed by JudiLynn Anderson, who has worked on this dialect of Chinantec for more than twenty years, and has recently published a analysis of Comaltepec Chinantec syntax (1989). In Totontepec, several intensive transcription sessions were held with José Rivera Reyes and a linguist, Alvin Schoenhals, who has worked on Mixe for over thirty years and has co-authored a Spanish-Mixe dictionary for the municipality (Schoenhals and Schoenhals, 1964).

After this introduction to Chinantec and Mixe transcription, I attempted to write the various indigenous terms myself, and I often consulted the above mentioned linguists as well as local people who had experience in writing their own language. I never attained conversational ability in either of the languages, although this would have greatly enriched the fieldwork.

I worked extensively with local people on the meanings of each plant name, and on the structure of the folk botanical classification. The collectors gave their own Spanish translation of each name, morpheme by morpheme. Upon reviewing the collections, I discussed the derivation of each name with the collectors. I later prepared a computerized database containing all of the ethnobotanical collections, and I was able to compare plant names in which the same morpheme was used, thus finding clues to the patterns of usage.

After these initial analyses, I discussed my conclusions with several people from each village and I sent a summary of the conclusions to the linguists who had helped me on the transcriptions. The meaning of almost all of the morphemes used in Chinantec and Mixe plant nomenclature have been elucidated, although the sense of a few terms remains unclear. The etymology of each plant name is given as part of the description of each folk botanical category in chapter 6 and 7.

The inventory was enriched by consulting ethnobotanical and linguistic references on the Sierra Norte. In particular, the unpublished doctoral thesis of Richard Evans Schultes (n.d.) provided a wealth of information on how plants were being used and classified in the Sierra some 50 years before my own field work. The etymological dictionary of proto-Chinantec by Calvin Rensch provided a wealth of cognate terms from other dialects of Chinantec, as well as reconstructions of many proto-Chinantec plant names. Published reconstructions of proto-Mixe and proto-Mixe-Zoque terms are fewer, but the works of Kaufman (1963), Brown and Witkowski (1979), Wichmann (n.d.) and Witkoswki and Brown (1978, 1981) provide useful information. These works and various articles on Sierra Norte ethnobotany broadened the historical and geographical perspective I was able to gain on folk classification in the Sierra.

Retreating from the field is often recommended as a way of gaining a new perspective on how data should be analyzed. This I did in 1988, leaving Oaxaca after a fairly continuous residence of more than 3 ½ years. I brought my database of the ethnobotanical collections to Morocco, where the distance from Mexico provided the ideal conditions to work out the correspondence between the folk categories and scientific species. Over a period of six months, I worked to define the structure of Chinantec and Mixe plant classification, attempting to distinguish between true plant names and mere descriptive phrases, to understand to which ethnobiological rank each name corresponds, and to understand the lexemic structure of each.

I treated my descriptions of each folk botanical category as hypotheses which I could test in further collections and discussions in the communities. As a way of summarizing my proposed classifications, I created a database in which the records – each corresponding to a different folk category – contain an accurate transcription of the plant name, what type of lexeme it constitutes, and an indication of the rank of the folk category. As I have returned to the communities and consulted bibliographic sources over the past several years, I have reviewed my ideas on classification with the collectors and several other members of each community. In addition, I sent the list of Mixe categories to a local Mixe agronomist, Juan Arelí Bernal Alcantara, who discussed it with several elderly members of Totontepec.

Local collaborators were asked if they could confirm the existence of the categories that I had recorded and if they could suggest any plant names that had been omitted. I proceeded on a rank by rank basis – for each generic category, I asked if there were additional specifics or varietals, and for each life–form I asked if the person knew of any additional generic classes that had not yet been collected. I further checked the life–form affiliation of each generic term, asking a number of different people to which broader category the generic belonged. This allowed me to ensure that the list of life–form terms was complete and that I understood the overall structure of the botanical classification.

Over the course of these interviews, we made additions and deletions to the ethnobotanical inventory, but in general the results that I drew from the botanical collections were confirmed, indicating that collaboration with local collectors is an effective way of documenting local plant categories.

Free listing of plant names and interviewing

After the inventory was well advanced, I began to wonder if the knowledge we were recording was widespread in the municipalities. Were the plant names and uses given to us by the various collectors widely known in the community?

It is time–consuming to answer this question, because it requires us to talk with a broad sample of local people about a large number of plants. I chose to look in greater detail at the breadth of ethnobotanical knowledge in Totontepec, where the task of recording hundreds of ethnobotanical names was easier because the local people can write their language quite well.

Such an approach was impractical in Comaltepec, where many plant names sound similar to outsiders and – because of the complex system of tones – cannot yet be accurately transcribed by local people. Although a free list could be carried out in Comaltepec, each name would have to be tape-recorded and transcribed, a laborious process. In addition, the villagers of Totontepec tend to be more cooperative in such endeavors than those of Comaltepec, where intra-community rivalries and tensions are quite strong.

In order to begin to measure the breadth of ethnobotanical knowledge in Totontepec, I enlisted the help of six local, bilingual women who carried out extensive discussions with an adult member of 150 different households. A local agronomist, Juan Arelí Bernal Alcantara supervised the entire process. The interviews, which took an average of two afternoons per household, were composed of three parts. The participants were first asked to provide sociological data on the members of his or her household. They were then asked to list the first 25 plant names that came to their mind. Finally, detailed information on the ecology, classification and use of each plant was recorded.

In this interview, we were hoping to elicit a list of native categories that included most of the basic plant names indicated in our ethnobotanical inventory. At the same time, we were hoping that the majority of the native categories would be mentioned by many different local collaborators. In this way, we could judge the relative salience of each plant name and measure the variation in people's perception of its ecological distribution and use.

This exercise is a variation on the free list technique described by Romney and Weller (1988:9–20), an approach which is most successful when the domain has a relatively small number of members. When working with domains that contain many categories – such as most plant classifications – it becomes very time-consuming to ask many people to give a complete listing. For example, Brent Berlin and his colleagues elicited complete inventories from 13 Tzeltal-speaking participants during the course of several years of research in Chiapas, Mexico. The resulting lists contained from 187 to 565 names and the average number of names per person was 398. It would be difficult to collect and analyze similar data from a large number of local collaborators. Even with 30 respondents, there would be some 12,000 responses to transcribe and analyze.

An alternative technique for inventorying large domains is to ask for a discrete number of responses from a relatively large sample of local people. In Totontepec, by asking 150 adults to provide us with lists of 25 names each, we ensured that we would have a total of 3750 responses. This number of participants and queries provides a good deal of information, but is still practical to record. As we can see in figure 5–2, the number of new generics detected nears zero as we reach the final interviewees, indicating that 150 local participants are sufficient for this technique.

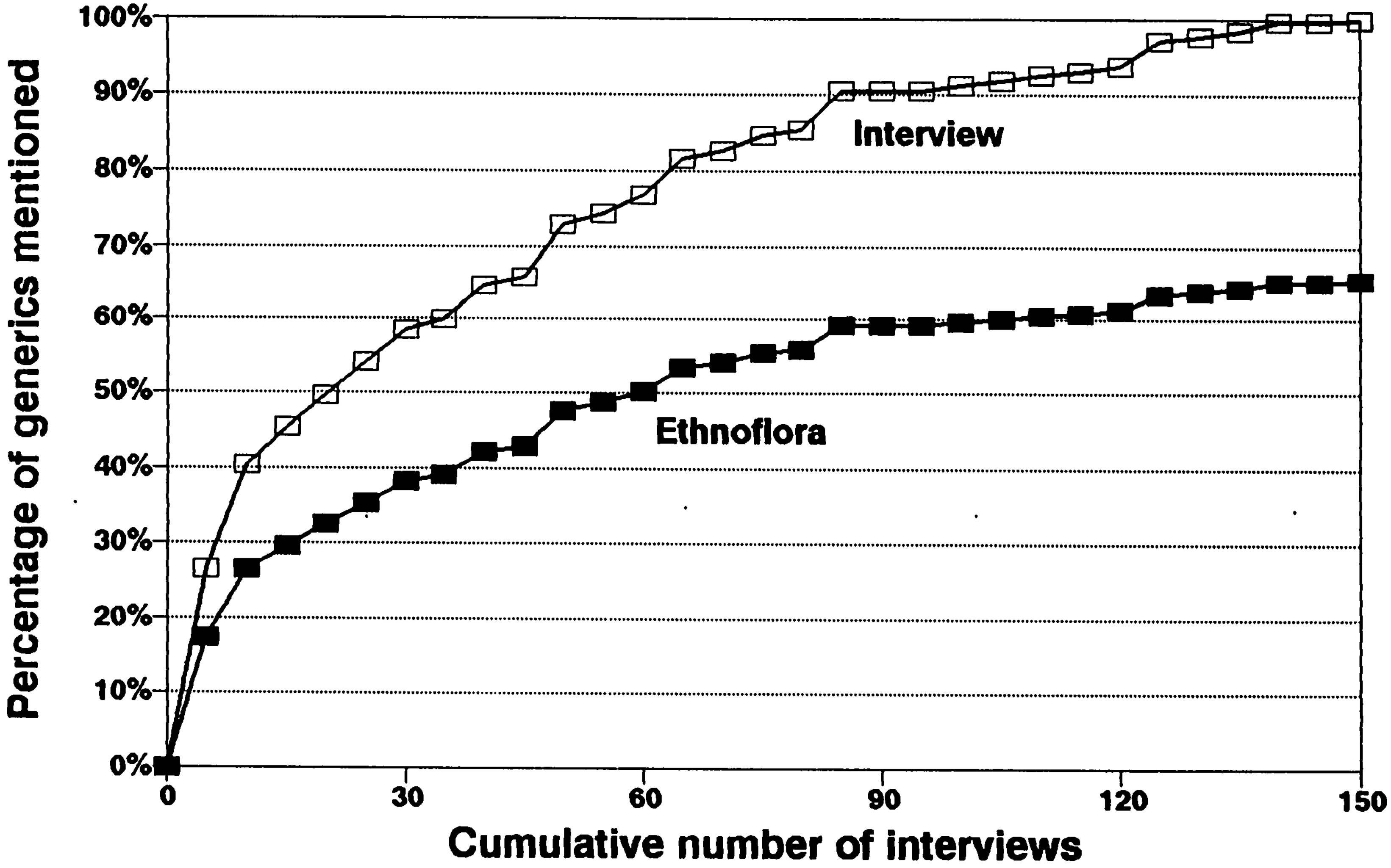


Figure 5–2. The increase in the proportion of folk generics mentioned in the Totontepec community ethnobotanical survey, given as a percentage of all generics elicited in the survey and in the ethnofloristic inventory.

Out of a total of 356 households in Totontepec, the interviewers visited 150. A summary of the sociological and demographic characteristics of these households and the subsample of interviewees is presented in tables 5-2, 5-3 and 5-4.

	All adults	Males	Females
Number of adult inhabitants	379	166	213
Mean and standard deviation of age (years)	41.6 ± 18.1	40.9 ± 18.0	42.1 ± 18.1
Age range (years)	16 - 99	16 - 86	16 -99
Mean and standard deviation of schooling (years)	3.8 ± 2.9	4.2 ± 2.9	3.5 ± 2.9
Schooling range (years)	0 - 12	0 - 12	0 - 12
Mean and standard deviation of age at marriage (years)	22.1 ± 5.6	24.9 ± 5.8	20.1 ± 4.5
Age at marriage range (years)	12 - 55	15 - 55	12 - 45
Literacy rate (percent)	75.5	83.1	69.5
Migration rate (percent)	12.7	10.8	14.1

Table 5-2. Characteristics of the adult participants (16 years old and older) of 150 households in Totontepec selected for inclusion in the community ethnobotanical survey.

The age of the participants ranged from 18 to 99 years; household size ranged from single inhabitants to extended families of 10

	All	Males	Females
Number of inhabitants	150	16	134
Mean and standard deviation of age (years)	49.4 ± 16.0	49.3 ±17.8	49.4 ± 15.9
Age range (years)	16 - 99	20 - 86	16 - 99
Mean and standard deviation of schooling (years)	2.7 ± 2.6	4.3 ± 3.6	2.5 ± 2.4
Schooling range (years)	0 - 12	0 - 12	0 - 6
Mean and standard deviation of age at marriage (years)	20.6 ± 5.6	27.3 ± 9.3	19.8 ± 4.5
Age at marriage range (years)	12 - 45	18 - 45	12 - 45
Literacy rate (percent)	62.0%	81.3%	59.7%
Migration rate (percent)	13.3%	12.5%	13.4%

Table 5-3. Sociological characteristics of 150 adults who participated in the free listing and interview in Totontepec.

members; educational levels ranged from no formal schooling to more than 12 years of primary, secondary and preparatory studies. The subsample included people who had spent many years outside of the village as well as those who had always lived in the community. Since the interviewers found that women were generally more available than men, the subsample is lopsided for gender – 133 women were interviewed, versus 17 men.

The total number of inhabitants in these households is 660, more than 37% of the community's population. Of the young (non-adult) population, there were 81 infants and 168 school age children; among the adults there were 151 *campesinos* (all men), 219 housewives (all women), 5 carpenters, 5 teachers (3 men, 2 women), 2 secretaries, 2 seamstresses, 2 merchants, 2 truck drivers/ chauffeurs, 1 unspecified worker in Mexico, 1 office worker in Mexico, 1 tailor, 1 domestic employee (Oaxaca), 1 government roadworks employee, 1 agronomist and 1 bricklayer. 50 had migrated and 605 had not.

	Interview	Community	% sampled
Households	150	356	42%
Inhabitants	665	1745	38%
Number of inhabitants per household	4.4	4.3	n/a
Range in number of inhabitants per household	1 – 10	1–10?	n/a
Plant generics mentioned	298	418	>71%

Table 5–4. Summary data on households, inhabitants and plant generics sampled in Totontepec ethnobotanical survey.

624 were born in Totontepec, 10 in Mexico City, 9 in Amatepec, 4 in Ayutla, 4 in Oaxaca, 2 in Chinantequilla and 1 in various local communities (Candelaria, Jayacastepec, Ocotepec and Tepitongo) or other states of Mexico (Nayarit, Veracruz, Zacatecas).

The preliminary results reveal that local people know and use a wide variety of plants. 298 generic categories were mentioned by interviewees, representing nearly 3/4 of the basic categories in Totontepec Mixe botanical classification. Some generics were mentioned by more than 123 people, while others were mentioned just once. These data give us an initial ranking of the most important plants in the community. Among the most mentioned plants there is a mixture of condiments, firewoods, edible plants, and medicinal plants.

The community survey revealed some plant categories that we had not yet detected in the plant inventory, particularly those corresponding to species grown in home gardens, which are tended primarily by women. There were an even larger number of generics documented in our collections, particularly forest trees, that had not been mentioned in the survey. These results highlight the importance of using various complementary methods to collect data on local ethnobotanical knowledge (figure 5-3).

Are the results from this exercise meaningful? Weller and Romney (1988:15) discuss how to evaluate the results of a free list, stating that,

> "The final tabulated list of items can sometimes be diagnostic of whether or not the researcher asked a meaningful question. If items are arranged in order of their frequency of mention, with the most frequently mentioned items at the top of the list, the top item probably will have been mentioned by a majority of the sample (say 75%). Frequencies should then descend slowly, dribbling down to the lowest frequency ..."

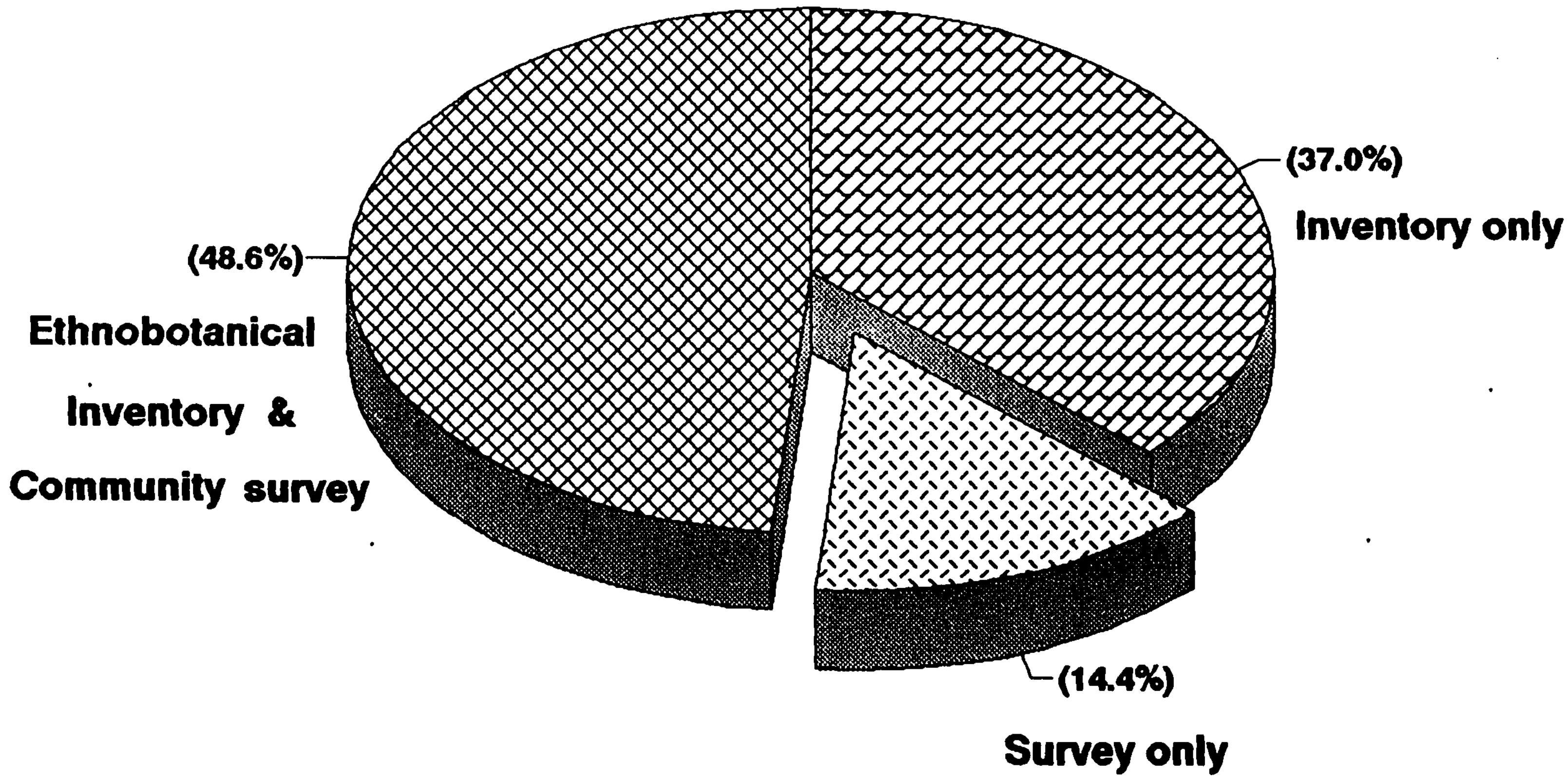


Figure 5–3. The percentage of folk generics documented in the Totontepec ethnobotanical inventory, the community interview and both the inventory and the interview.

In the results from the Totontepec free list, shown in figure 5-4, we see that the frequencies descend gradually, but only a few of the names were mentioned by a majority of respondents. The Totontepec graph is particularly long-tailed because there is a great diversity of plant generics that come to the minds of Mixe speakers.

Weller and Romney (1988:10-11) provide an additional test for the free listing technique which is based on the saliency of each item. As they write,

> "First, some items are more "salient," "better known," "important," or "familiar" than other items, and such items occur earlier or higher up on an individual's list than those that lack such characteristics. Second, there is usually a great range in the number of people that mentioned each item. Thus we can think of two different indices of "saliency". The first is the position of an item on a list and the second is the proportion of lists on which the item appears. These two indices tend to be highly correlated".

In other words, items mentioned by a large number of people tend also to be among those first mentioned on each list. Less salient objects are mentioned by a smaller number of respondents and when they do appear, they tend to be further down on the list.

I tested for this correlation in our free list by comparing the frequency of mention with the average position that the categories occupied on the lists. The raw data are shown in table 5.5, and a scatterplot of the results is given in figure 5-5.

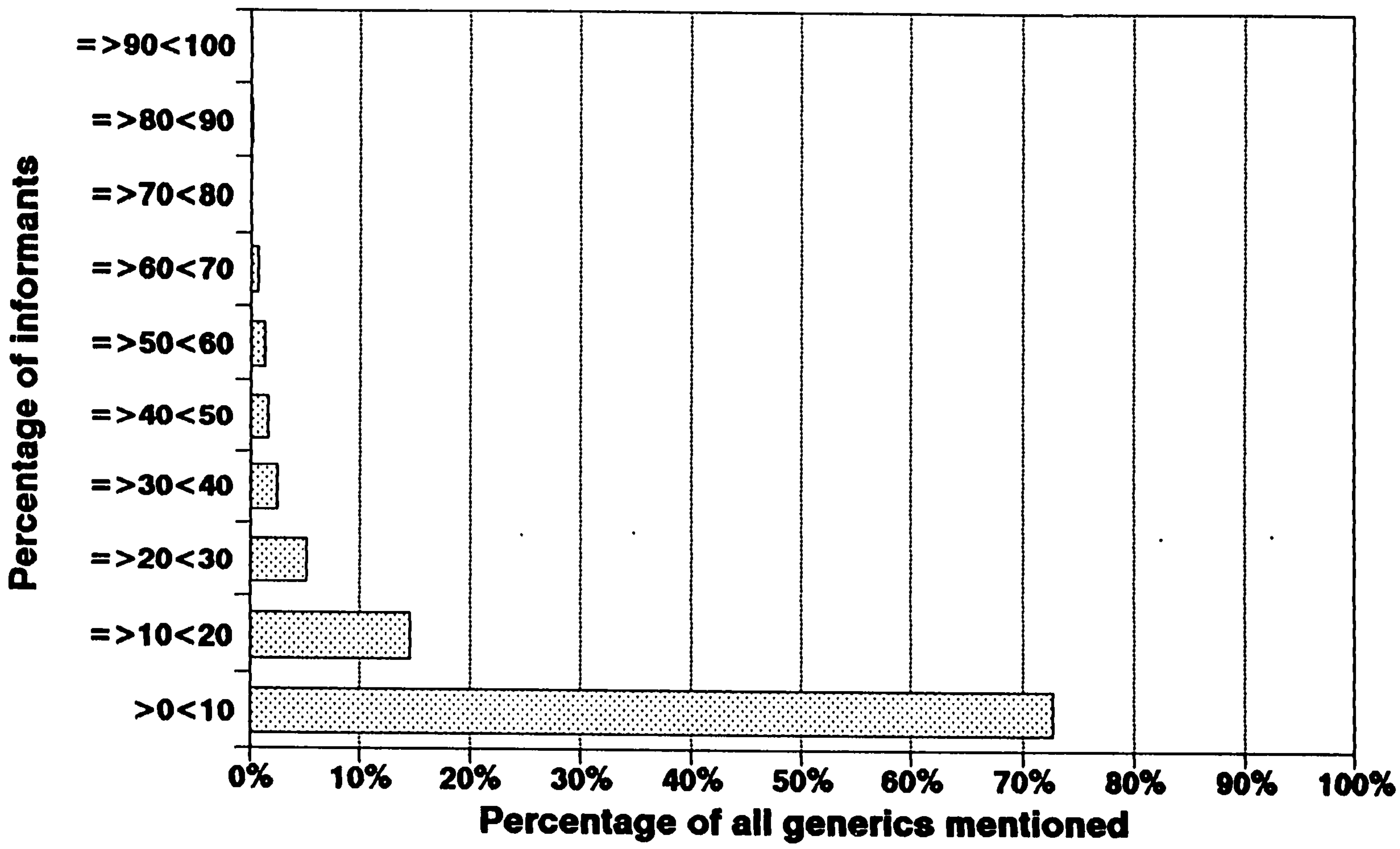


Figure 5–4. The percentage of folk generics mentioned by different proportions of local participants in the Totontepec ethnobotanical interview.

Frequency of mention	Number of generics	Average Position	Frequency of mention	Number of generics	Average position
1	66	13.1	34	1	12.4
2	41	14.8	35	1	15.2
3	18	14.8	36	1	11.3
4	16	12.3	37	3	15.1
5	15	14.3	38	1	13.4
6	15	14.5	41	1	14.2
7	11	13.6	42	1	15.3
8	5	14.9	43	1	14.8
9	6	15.1	45	1	11.3
10	5	11.9	46	1	14.8
11	4	13.6	50	1	13.7
12	6	15.6	52	1	13.3
13	3	15.1	54	2	11.7
14	5	14.2	56	1	9.7
15	4	12.7	57	2	13.9
16	8	13.3	57	2	13.9
17	6	12.8	60	1	11.4
18	5	14.6	62	1	9.2
19	3	13.5	63	1	8.4
20	2	11.3	65	1	13.1
21	1	11.9	69	1	11.6
22	3	13.6	78	1	10.7
23	6	16.2	79	1	10.1
24	2	13.5	84	1	11.1
25	1	15.0	88	1	12.5
27	1	14.1	94	1	11.2
29	1	13.3	103	1	11.7
32	4	11.3	123	1	10.7
33	1	16.4			

Table 5.5. Frequency of mention and average position of 298 generic categories in the free lists of 150 informants.

There is a correlation of 0.53 between the two indices of saliency, not quite the 'high correlation' predicted by Weller and Romney. I believe that a relatively low correlation is to be expected for the exceptionally diverse domain of all folk plant generics. In domains with many salient members, there are a large number of candidates that have an equal probability of coming to people's mind when they are asked to provide a list. In ethnobotanical research, free lists that are more strictly delimited - such as all edible plants or all vines - are more likely to fulfill Weller and Romney's predictions.

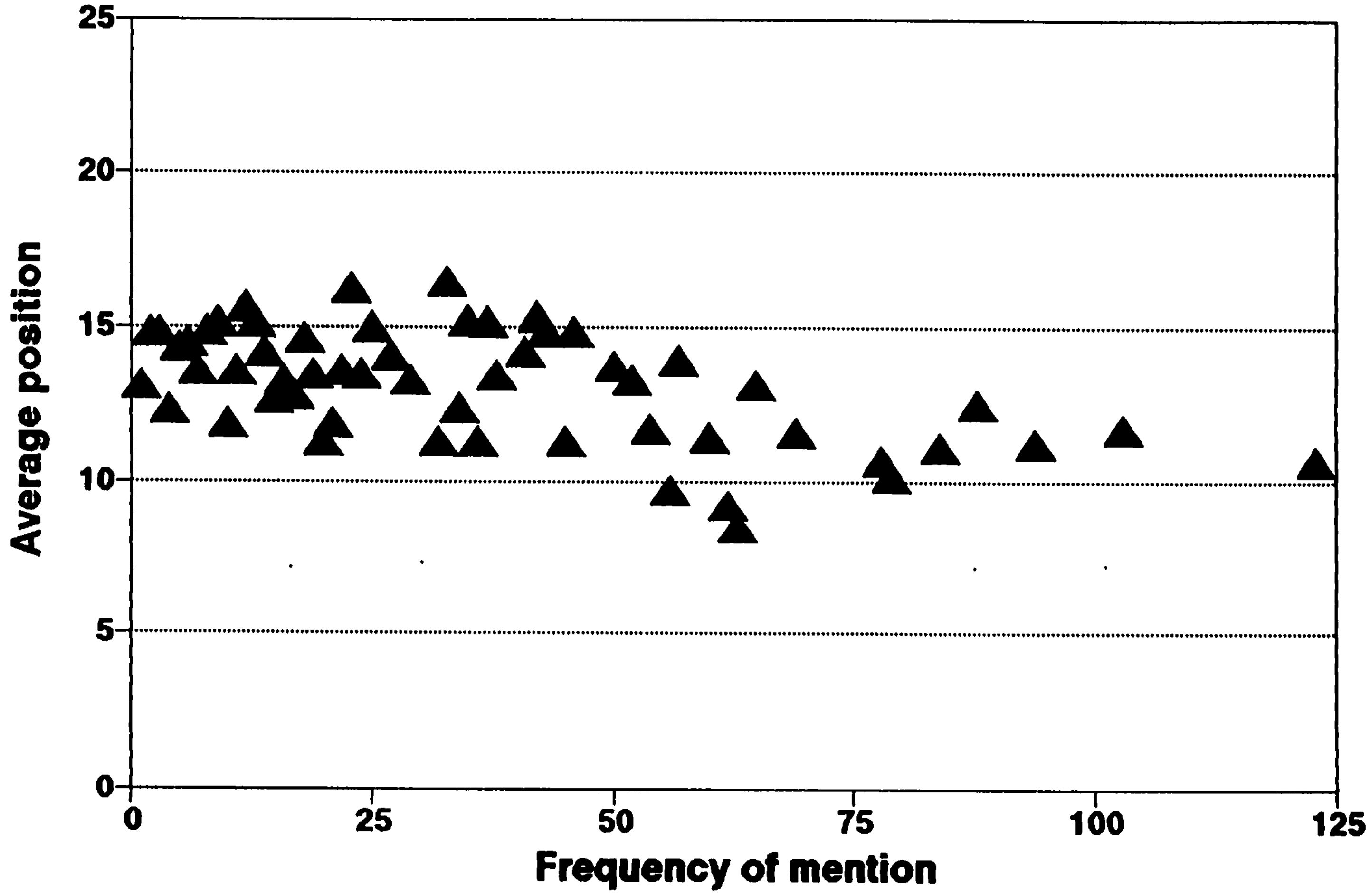


Figure 5–5. A scatterplot showing the relationship between frequency of mention and average position of plant generics on 150 free lists.

Identification tasks with selected plants

Although the community survey demonstrated the breadth of ethnobotanical knowledge in the community, we needed a different approach to assess patterns of expertise. Were some medicinal plants only known by the few herbal curers in the community or were they recognized by everybody? Did only men know the forest trees used in house construction or could women identify them also? Was it true, as many people claim, that older people know the names and uses of plants, but that the younger generation was no longer learning botanical folklore? We needed to show the same set of plants to the same group of local people in order to gauge how ethnobotanical knowledge is distributed among the members of the community.

From the households that were visited during the community survey, we chose individuals who represented the range of sociological characteristics revealed in our earlier census. Table 5.6 summarizes one group of 88 participants. This sample was more evenly balanced for gender than the group of people who participated in the community survey: 37 of the participants were male and 51 were women.

	All	Males	Females
Number of inhabitants	88	37	51
Mean and standard deviation of age (years)	45.9 ± 18.7	44.4 ± 19.4	46.9 ± 18.4
Age range (years)	11 - 84	11 - 84	11 - 76
Mean and standard deviation of schooling (years)	3.3 ± 2.5	3.4 ± 2.4	3.13 ± 2.6
Scolarity range (years)	0 - 9	0 - 9	0 - 9
Mean and standard deviation of age at marriage (years)	21.4 ± 4.2	23.3 ± 3.4	20.0 ± 4.2
Age at marriage range (years)	14 - 35	15 - 33	14 - 35
Literacy rate (percent)	75.0%	83.8%	68.6%
Migration rate (percent)	11.4%	13.5%	9.8%

Table 5.6. Sociological characteristics of 88 individuals who participated in the plant identification task.

We then chose 35 species that represented a range of uses, life-forms, ecological zones and other features. For example, we included 14 woody plants, 12 herbs, 4 vines, 1 grass, 1 large-leaf herb, 1 fern, 1 agave and 1 palm – roughly the proportions of life-forms that we found in the ethnobotanical inventory (figure 5-6). The set contained plants used as medicine and as food, in crafts and construction and for firewood and ornament.

The specimens, selected from the collections made during the ethnobotanical inventory, were mounted on half sheets of standard-sized herbarium paper, and were then inserted into protective plastic sleeves. The plants were sorted using a random numbers table and were then bound between cardboard covers, forming an easy-to-carry portfolio of specimens.

Name	Age	Gender	Community	Number of tests
Arelí Bernal Alcantara		Male	Totontepec	Supervisor
Braulia Reyes Gómez		Female	Totontepec	88
Aurora Gómez Hernández		Female	Totontepec	100

Table 5.7. Community members who participated as supervisor and interviewers in the plant identification task.

Two female assistants from Totontepec (table 5.7), bilingual in Mixe and Spanish, showed the plants one by one to the interviewee, asking them the Mixe name, life-form and use of each specimen. The identification task was conducted with one individual at a time in his or her home. The participants were requested to answer to the best of their ability, without consulting other members of their family.

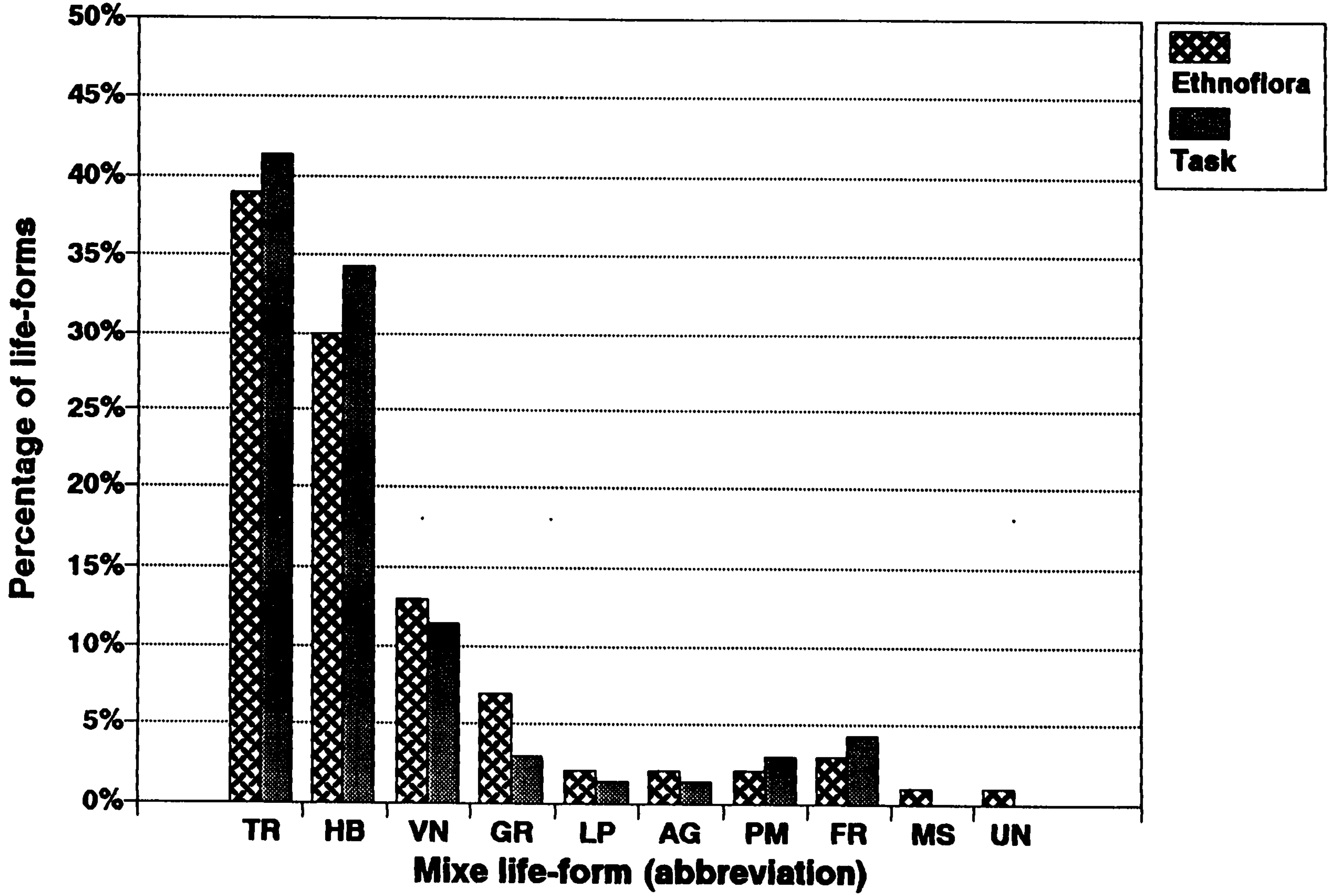


Figure 5–6. The relative proportion of life–forms in the Mixe ethnoflora and in the set of 35 plants used in the identification task. [Life–form abbreviations: TR = «tree»; HB = «herb»; VN = «vine»; GR = «grass»; LP = «large–leaved herbs»; AG = «agave»; PM = «palm»; FR = «fern»; MS = «mushroom»; UN = unaffiliated.]

The cumulative responses form a rich data set that can be analyzed with a variety of statistics, from a number of different perspectives. The resulting data have been organized into matrices suitable for measuring the extent of agreement between people on the name, use and ecological distribution and other parameters of plants. I have begun looking for patterns of variation in the data that correspond to differences in villagers' gender, age, education, occupation and ecological zone of residence. Correlating the ethnobotanical data with these sociological factors reveals how folk knowledge is distributed among community members and gives an initial idea about how botanical folklore is transmitted from generation to generation. In addition, this analysis is useful in discerning clusters of local people who classify and use plants in similar ways and aids in discovering the socio-economic factors that best explain the patterns of agreement between community members.

Judging the completeness of an ethnofloristic inventory

As scientists document local plant and animal categories, they increasingly collaborate with local people. At first, ethnobotanists were reluctant to entrust native assistants with the collection of data and voucher specimens. Lipp voices a familiar caution, "Informants should never be sent alone to collect, since they have a tendency to collect fragmentary or only usable parts, which will preclude positive identification (ibid:140). Other researchers began to challenge this idea, and ethnobotanical work is now routinely carried out in part by local assistants. Since ethnobiological studies began in the late 1950s, indigenous people have been called upon to collect voucher specimens and to record data in both the *lingua franca* of their country and in their indigenous language. In several projects, indigenous plant collectors are making valuable sets of voucher specimens in various ecological zones and in different seasons.

Brent Berlin, reflecting upon his extensive experience with Maya assistants in Mexico and with Aguaruna collaborators in Peru, described the role that indigenous people can play in regional floristic and ethnobotanical projects:

> "Not only can native assistants be taught to collect plant specimens, thus greatly increasingly the botanical coverage for a particular region, but they can also be encouraged to produce the kinds of valuable information on native knowledge of the plant world and of the application of this knowledge in daily life ... The benefits of widening the scope of routine botanizing in the American tropics to include these kinds of ethnobotanical data is underscored by the rapid and often deleterious social and ecological transformation of the neotropics... If extensive ethnobotanical data are to be collected in the American tropics before the turn of the century, the work in large part must be coordinated by modern botanists who accept the challenge of including native botanists as an integral part of their ongoing research programs." (Berlin 1984:33).

Are these collectors capable of providing a complete inventory of folk botanical categories and of the local flora? In the course of my research, I often asked myself how much was enough. Did we need to go on collecting? Would there be – in an additional set of collections – a species, name or plant use that we had not yet recorded? These questions are of general importance when making folk biological inventories in any part of the world.

When gauging the completeness of an ethnbotanical inventory, we must demonstrate that a broad sample of plants has been collected. No study can be exhaustive, because this would require that we ask each person about every plant or animal in the community, a task that is difficult in temperate zones and nearly impossible in tropical areas. Yet we must show how well our collection of plants represents the local flora and the range of native categories within a delimited area.

When studying classifications that are hierarchical, it is useful to judge the comprehensiveness of coverage for each folk or scientific rank in three dimensions: breadth, depth and replication. I define breadth as the proportion of categories which have been collected at any given rank; depth as the proportion of subordinate categories sampled; and replication as the average number of collections per category. In table 5.8, I demonstrate how these concepts can be employed at the family rank of the scientific system of botanical classification, an example that can be extended to other scientific and folk botanical ranks. Although these measurements can be laborious to calculate for an entire flora or even for a given subset of local plants, they are useful guides to the completeness of an inventory which allow researchers to save time and resources over the long term.

Breadth	Depth	Replication
Number of families collected divided by total number of families in the region.	Number of genera collected in family divided by total number of genera in that family; summation and division by total number of families gives a cumulative measure.	Total number of collections for each family; summation and division by total number of families gives a cumulative measure.

Table 5.8. The measurement of breadth, depth and replication of botanical collections at the rank of botanical family.

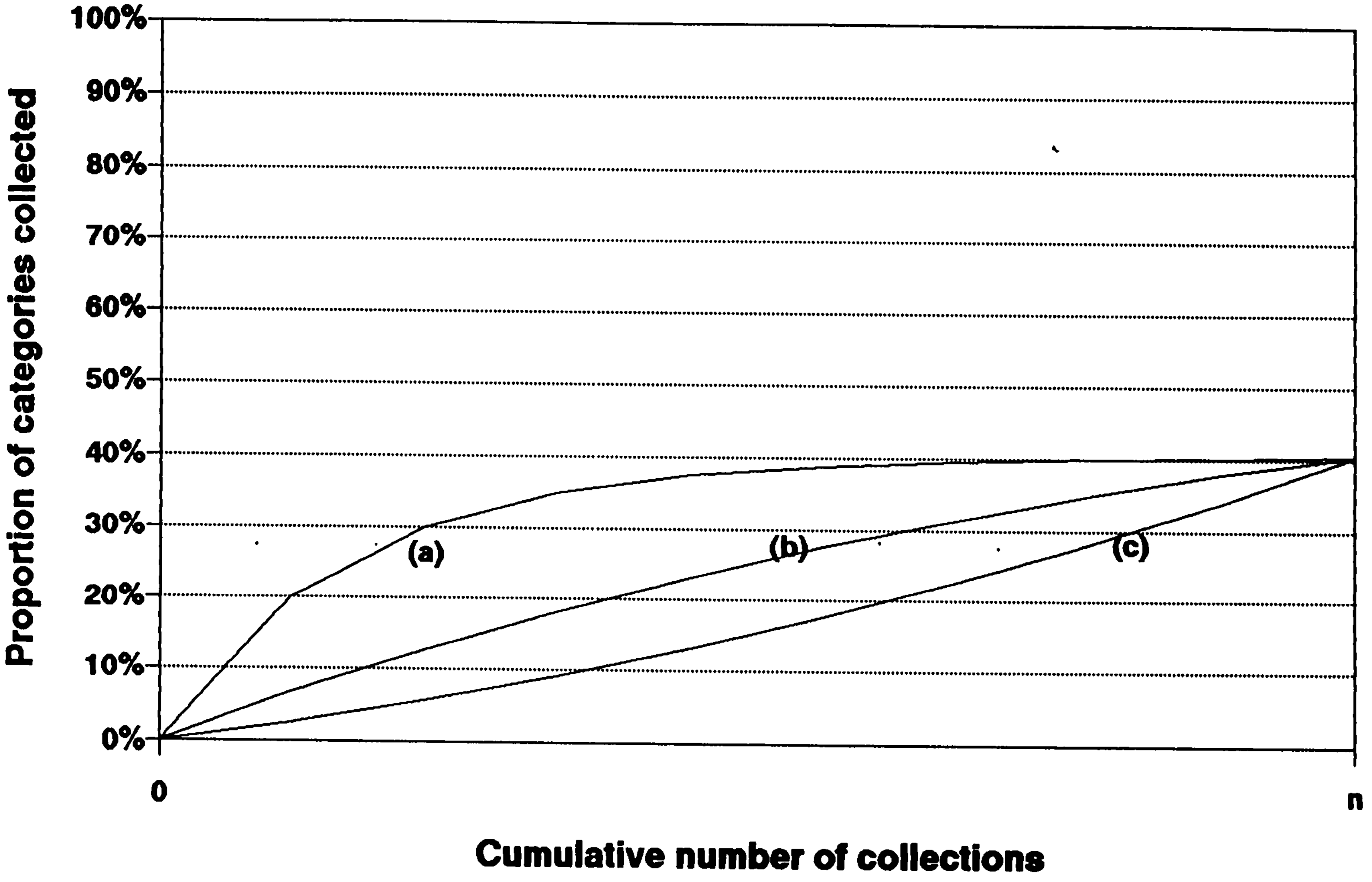


Figure 5–7. An idealized graph showing the proportional increase of categories documented at any given rank as a function of the cumulative number of collections.

We can take both a static and dynamic perspective when measuring the completeness of our data. The static approach is equivalent to taking a snapshot of the results at a certain point in the study, by calculating the proportion of folk or scientific categories that have been collected up to that point. The results are presented in a table comparing the extent to which the categories at each rank have been sampled. Another technique is needed if we are to measure the efficiency of our collecting, that is, the rate at which new categories are detected as more and more plants are collected. This perspective is gained by judging how the proportion of total categories sampled increases as a function of the cumulative number of collections made. The data are plotted onto an xy graph, and the resulting curve shows the rate at which new information is being added.

Figure 5–7 shows curves which are: (a) leveling off, indicating that new collections will add few additional categories to the inventory; (b) increasing at an ever slower rate, indicating that new categories are still being added to the inventory, but in decreasing numbers; and (c) increasing at an ever faster rate, indicating that new categories are being added in increasing numbers. These results can help us to decide if our current collecting strategy is efficient. Result (a) would suggest that enough collections have been made, while (b) and (c) would spur us on to continue collecting. In the following discussion - and in related explanations in chapter 8 - I give both a static and a dynamic perspective of the completeness of the Sierra Norte ethnobotanical inventory.

Breadth

The extent to which out ethnobotanical collections represent the regional flora is discussed in detail in Chapter 8, under my commentary on Berlin's first generalization on ethnobiological categorization.

Here I would like to consider briefly how well they represent the ethnofloras. The majority of these categories have been documented by voucher specimens, as shown in table 5-9. Considering that a broad program of botanical collecting was the primary method of documenting local categories, it is not surprising that most generic, specific and varietal categories appear to have been documented by voucher specimens. Additional interviews, review of historical and linguistic works, community surveys and interaction with Chinantec and Mixe speakers from other communities may reveal additional categories that we have not yet collected. Conversely, the number and percentage of documented folk categories will rise as local ethnobotanists continue their to collect plants in their community, guided by the supervisor of the project.

Ethno-biological rank	Chinantec		Mixe	
	Collected	% of total	Collected	% of total
Kingdom	n/a	n/a	n/a	n/a
Life-form	11	100%	10	100%
Intermediate	n/a	n/a	n/a	n/a
Generic	360	92.8%	378	90.9%
Specific	263	85.9%	323	82.0%
Varietal	6	100%	12	60%

Table 5.9. The number and percentage of Chinantec and Mixe folk categories at various ethnobiological ranks which have been documented by voucher specimens.

By stopping to estimate the breadth of collections in terms of both scientific and folk categories, I have been able to orient the work of the local collectors, encouraging them to visit certain ecological zones that are undersampled and directing them to look for specific folk categories for which we do not yet have voucher collections. Similarly, as collaborating botanists have expressed interest in obtaining additional material of certain taxa, I have been able to ask the collectors to recollect the folk categories to which they would most likely correspond.

After taking these "snapshots" of the proportion of scientific and folk categories that have been documented, I was interested in looking at the rate of increase in detection of new categories. In order to make these calculations, I took the first one thousand collections of José Rivera Reyes, excluding those numbers which had not been identified at least to genus and those which had no indigenous name. From among the Chinantec collections, I selected the first 100 - 300 numbers that met the above criteria from each of 5 collectors (Eusebio López García, Laura López López, Leonardo Hernández Hernández, Ricardo López Luna, Saul Hernández López), which together gave a sum of 1000 collections.

Because the folk and scientific identifications of these plants had been entered into a database, it was relatively simple to register when each category was collected for the first time. For example, I sorted the database alphabetically according to family, and marked at which collection number each family appeared the first time. I considered the collections by José Rivera in numerical order, starting with the first collection he made in December of 1985. I counted the Chinantec collections in sequence - the first collection by each collector, then the second collection by each, and so on until I reached 1000 total collections.

Counting the first time that scientific taxa appear is straightforward, but calculating the same for folk categories is more complex. We must define which indigenous plant names correspond to true folk taxa, and which are merely synonyms or descriptive phrases. This is particularly time–consuming for categories at the specific and varietal ranks. After each collection has been attributed accurately to a given folk category, counting the first time each generic and specific appears may proceed as described for scientific taxa.

On the following pages, I show the results of this endeavor. The y–axis of the graphs are calibrated as percentages in order to facilitate comparison between the various figures. For scientific taxa (families and genera), I give the results as a proportion of not only the entire Sierra Norte flora, but also the taxa represented in the ethnofloras. For folk categories, the results are given as a percentage of the total number of categories at that rank in the folk classification.

Figures 5–8 and 5–9 show the increase in new families detected over the cumulative collections. Referring once again to figure 5–7, we can observe that the curves are of type (a): after 1000 collections, the rate of discovery of new families is beginning to level off.

In figures 5–10 and 5–11, we see that the increase in new genera detected gives rise to type (b) curves: discovery is increasing at an ever slower rate. Turning to folk generics, we observe in figures 5–12 and 5–13 that the increase in categories detected is represented by type (b) curves.

It is curious to note that in the above examples, the general tendencies for rates of increase in families, genera, and folk generics is similar between the Chinantec and Mixe collections. This may reflect a general pattern in ethnobotanical collecting, something that should be verified in other ethnofloristic projects.

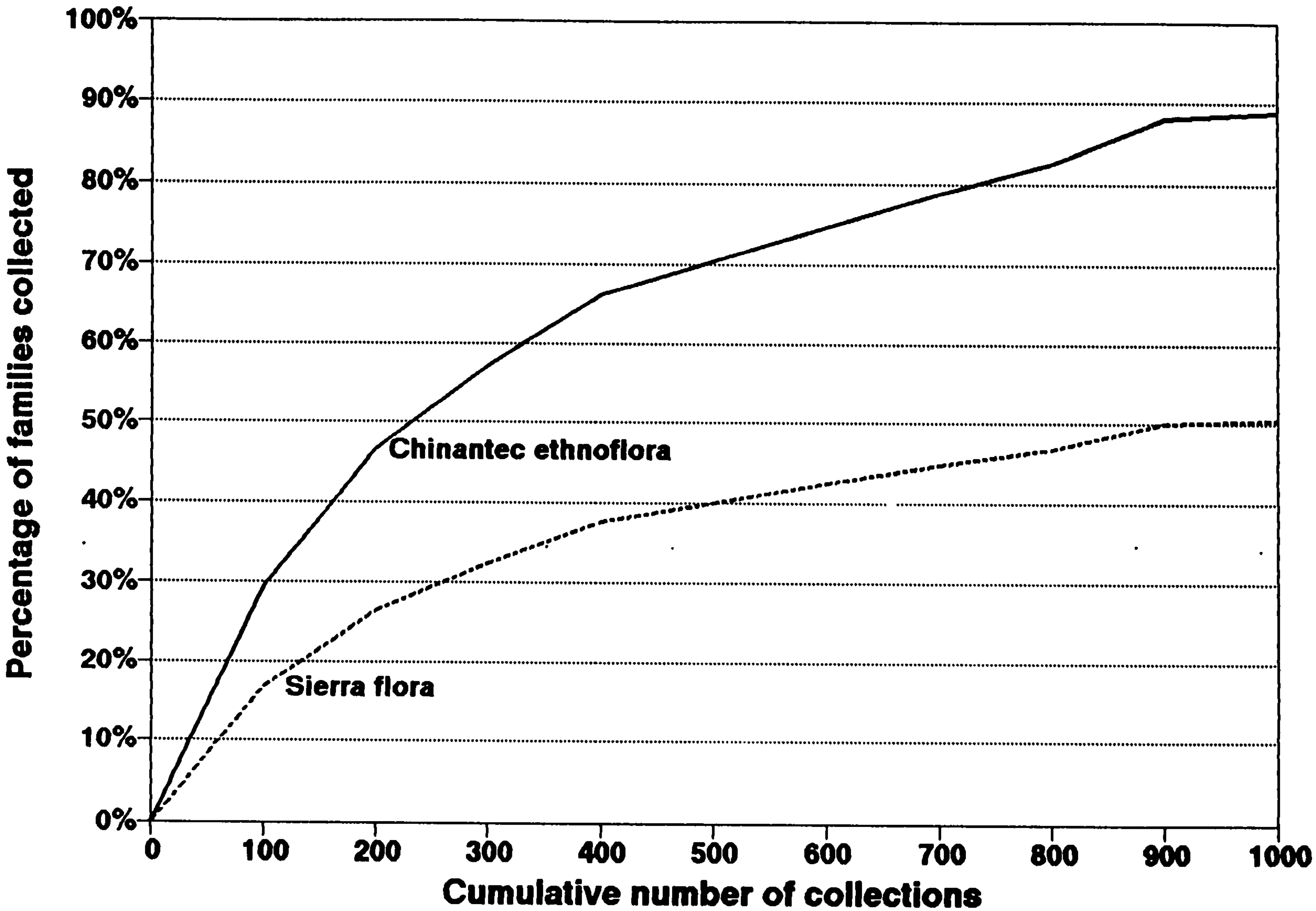


Figure 5–8. The increase in the proportion of botanical families sampled over 1000 collections by Chinantec collectors, expressed as a percentage of all families in the Comaltepec ethnoflora and the Sierra flora.

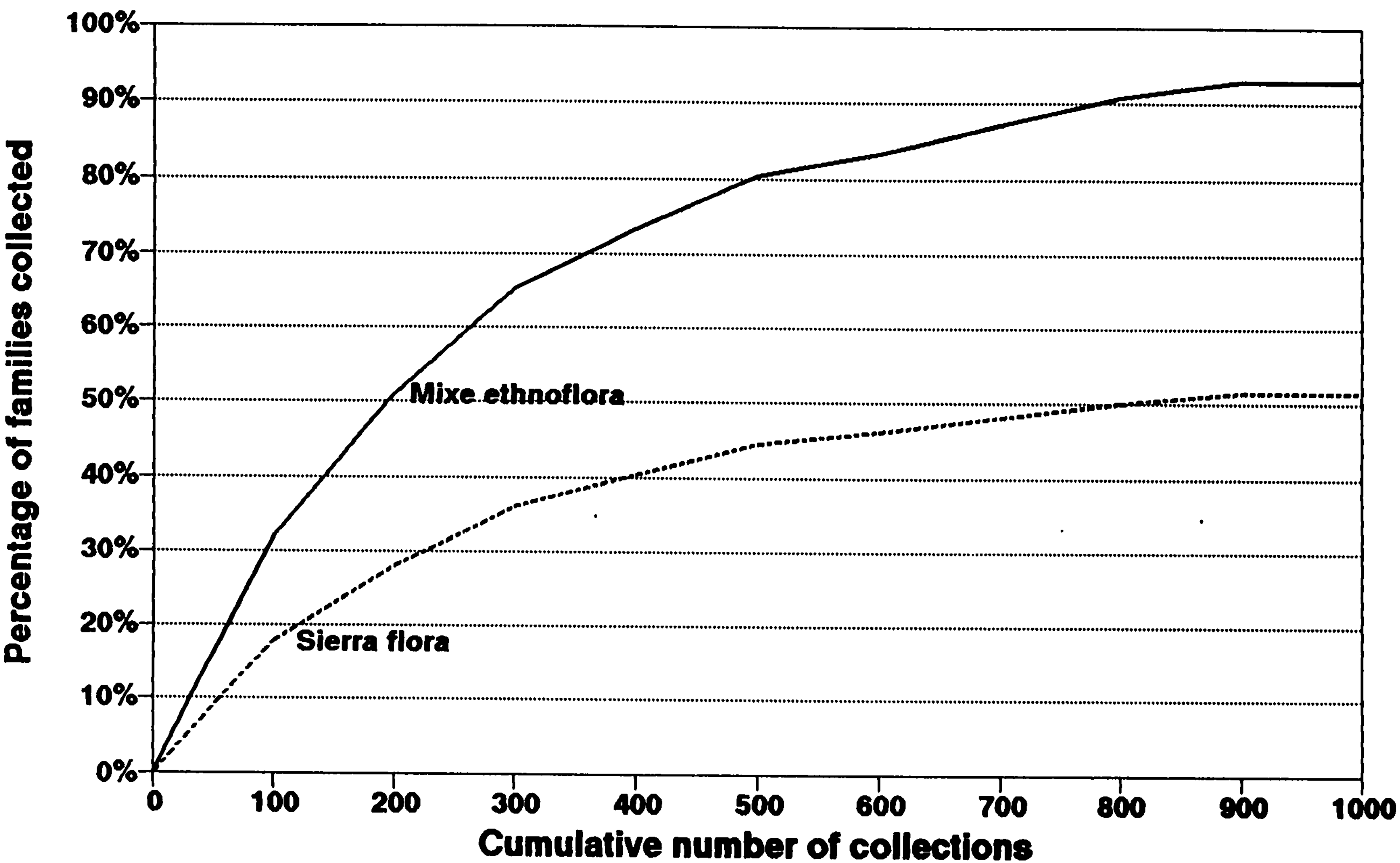


Figure 5–9. The increase in the proportion of botanical families sampled over 1000 collections by José Rivera Reyes, expressed as the percentage of all families found in the Totontepec ethnoflora and the Sierra flora.

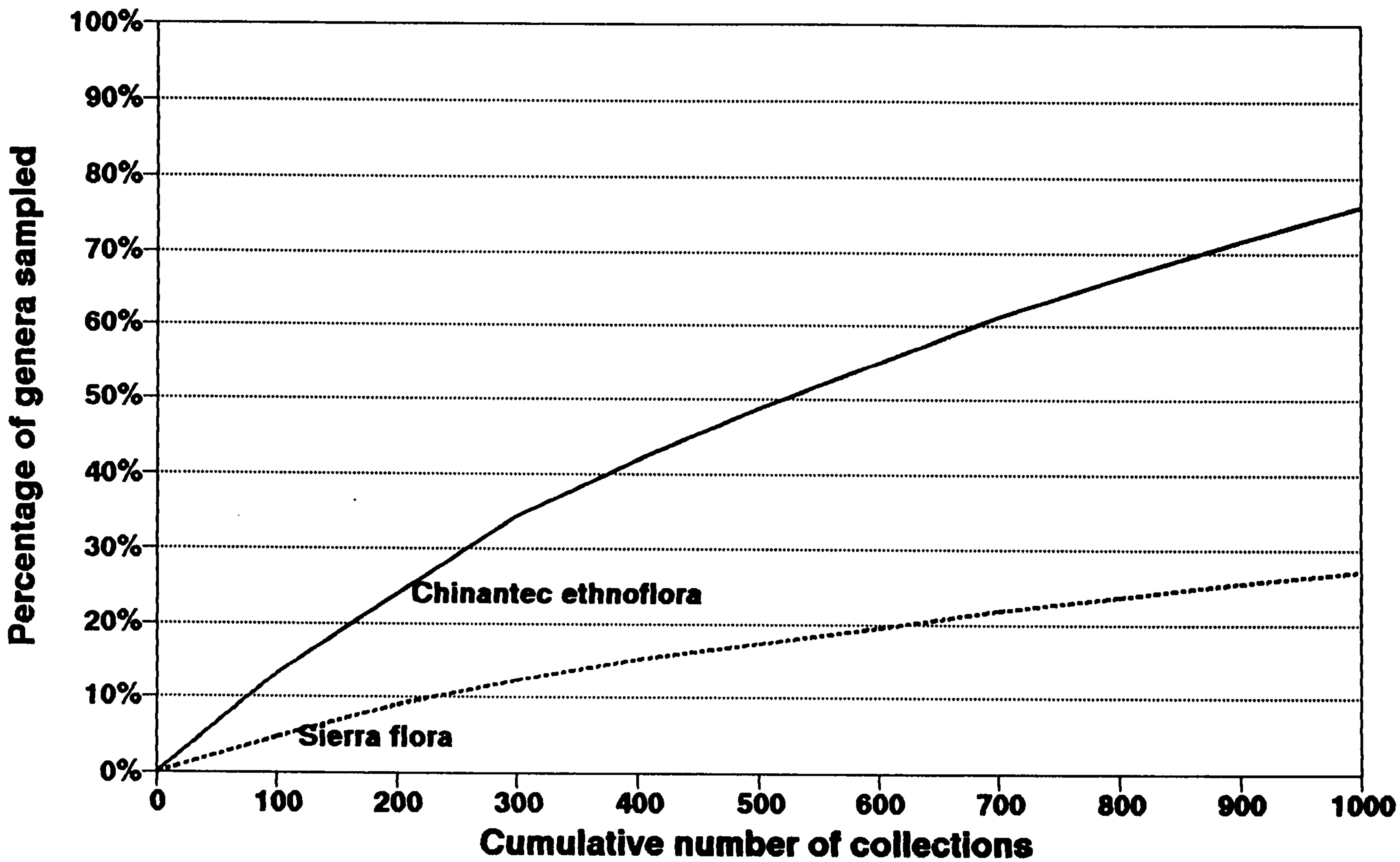


Figure 5–10. The increase in the proportion of botanical genera sampled over 1000 collections by Chinantec collectors, expressed as a percentage of all genera in the Comaltepec ethnoflora and the Sierra flora.

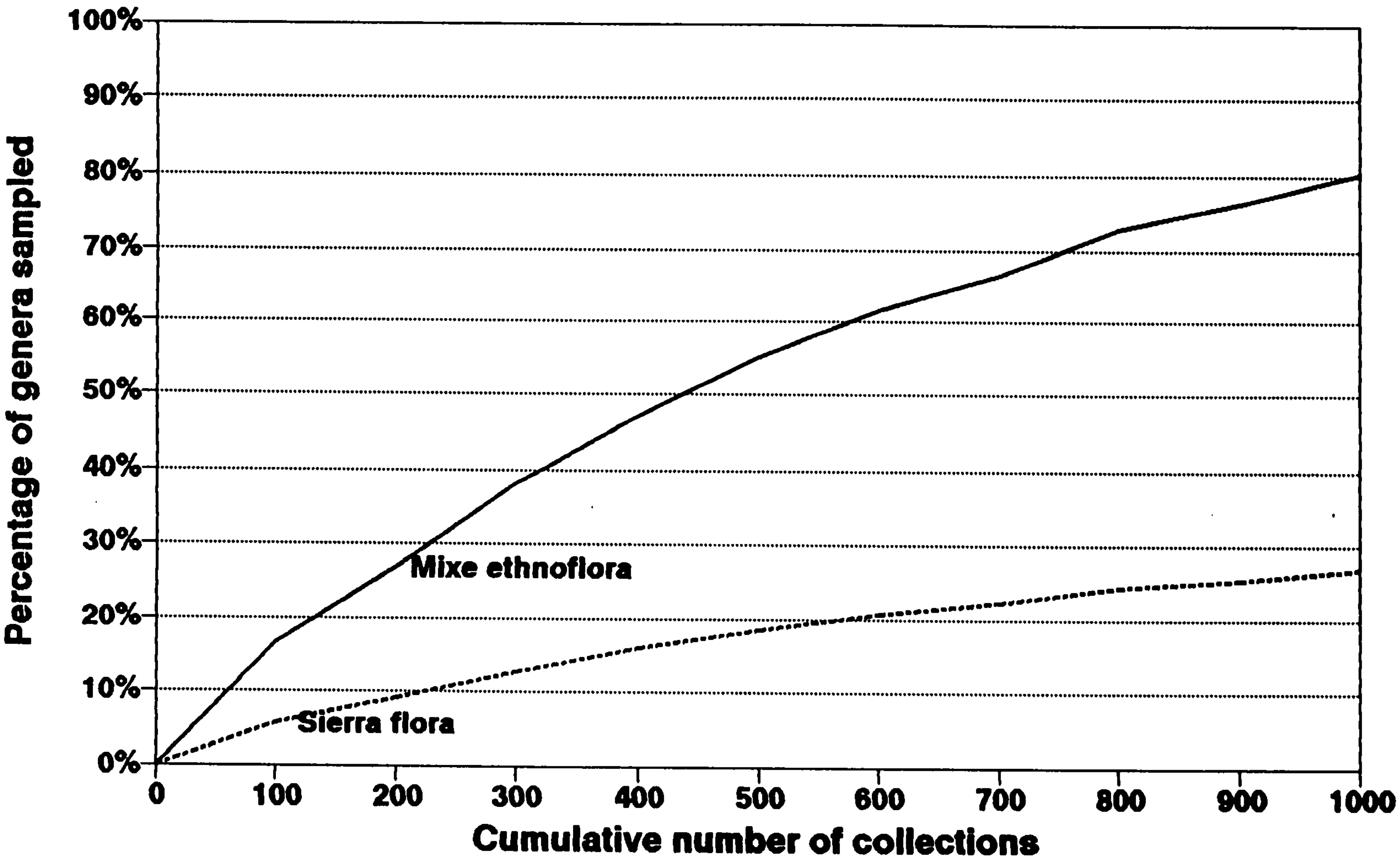


Figure 5-11. The increase in the proportion of botanical genera sampled over 1000 collections by José Rivera Reyes, expressed as the percentage of all genera in the Totontepec ethnoflora and the Sierra flora.

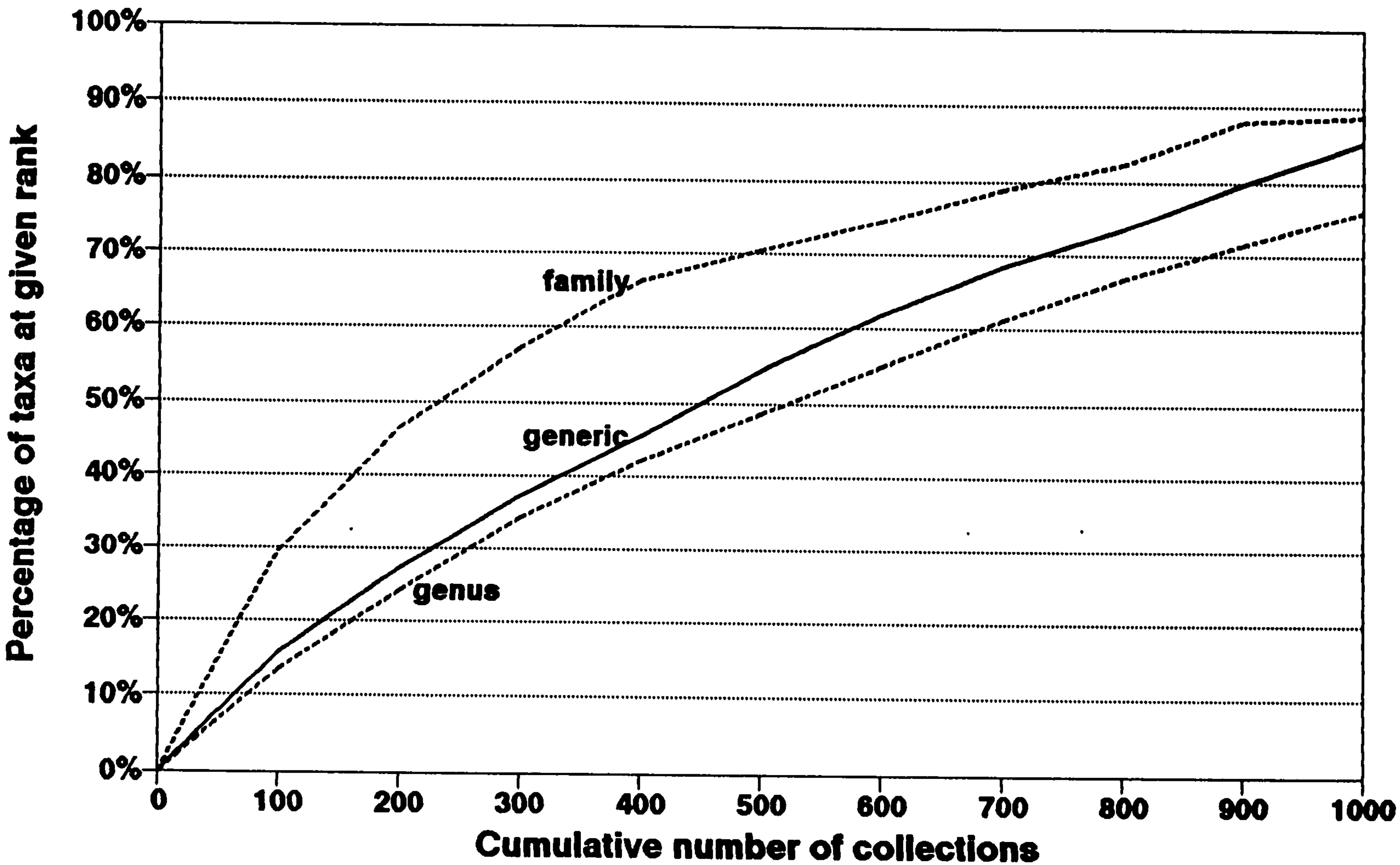


Figure 5–12. The increase in the proportion of folk generics sampled over 1000 Chinantec collections, expressed as a percentage of all folk generics in the Comaltepec ethnoflora, and compared to the increase in categories at the genus and family rank.

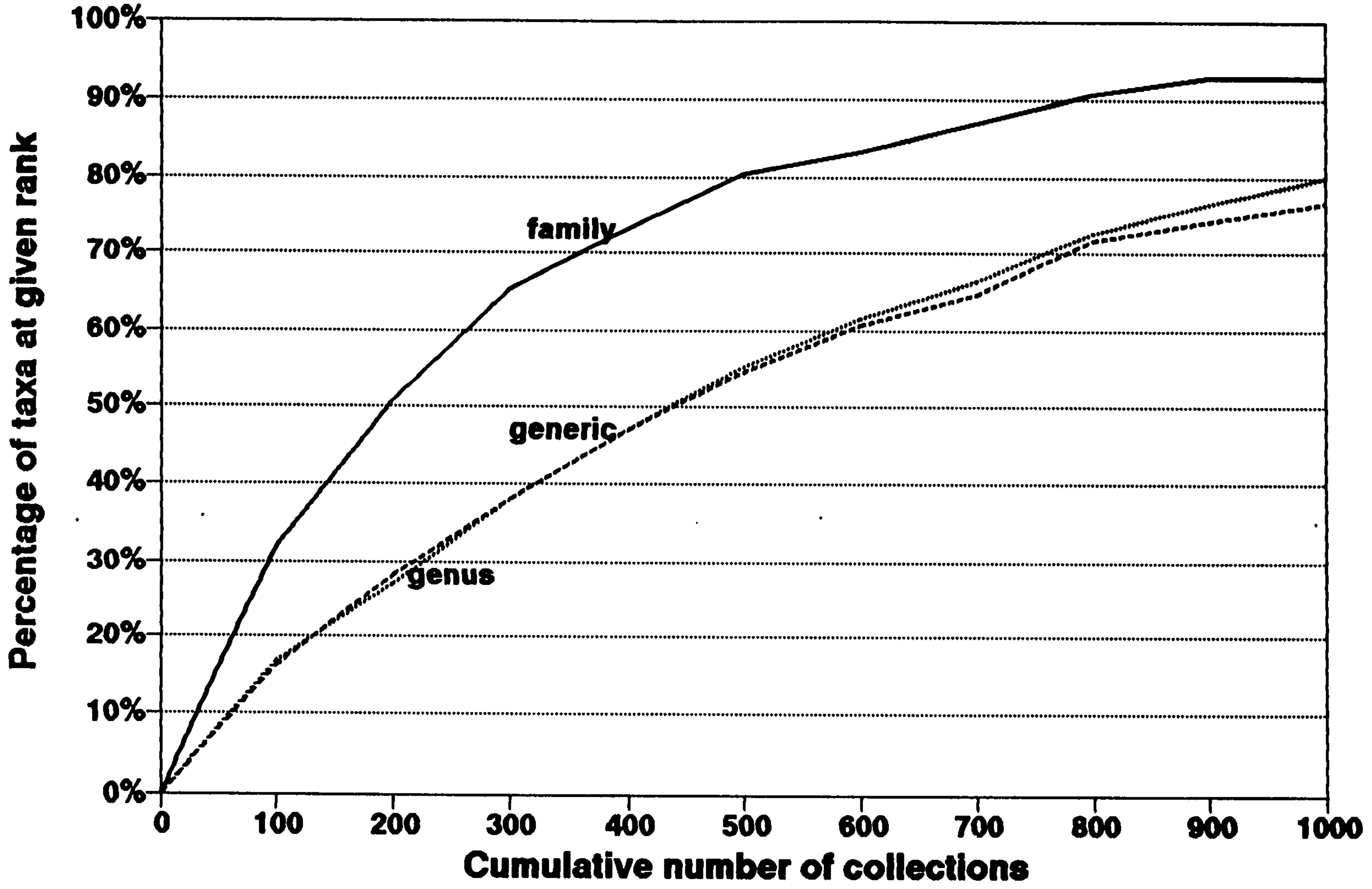


Figure 5–13. The increase in the proportion of folk generics and subgenerics in 1000 Mixe collections, expressed as a percentage of these categories in the Totontepec ethnoflora, and compared to the increase in categories as the genus and family rank.

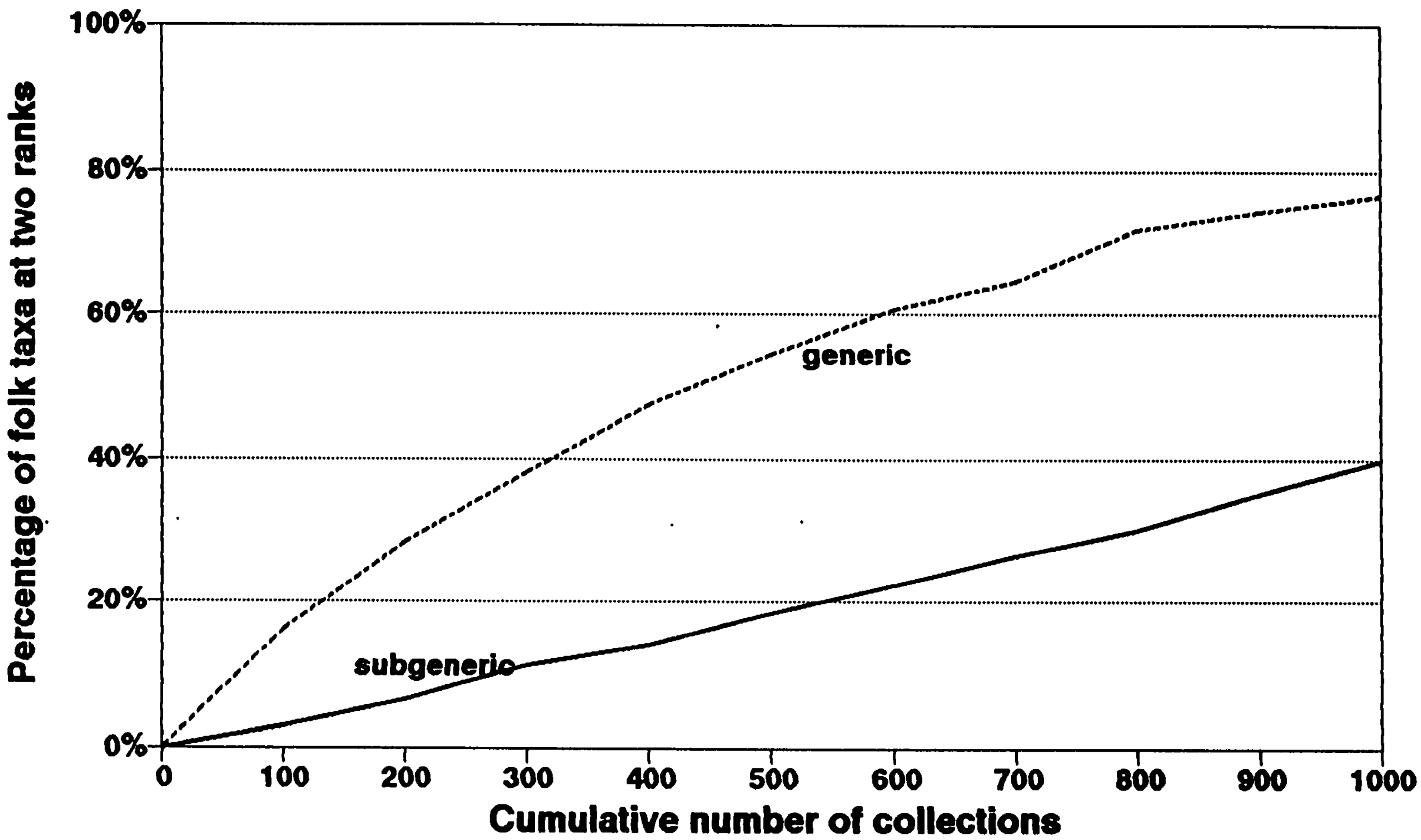


Figure 5–14. The increase in the proportion of folk subgenerics (specifics and varietals) over 1000 collections made by José Rivera Reyes, expressed as the percentage of all folk subgenerics in the Totontepec ethnoflora, and compared to the increase categories at the generic rank.

I calculated the rate of increase of folk subgeneric categories only in the collections of José Rivera because the Chinantec collectors were less systematic than José in reporting specific and varietal categories. Figure 5–14 shows a type (c) curve, indicating that the addition of new subgeneric categories was increasing at an ever faster rate over the first 1000 collections. To anyone who has carried out an ethnobotanical survey, this result should make intuitive sense. José started by collecting as many generics as he could, and as time went by he began to pay increasing attention to subgeneric categories. As he completes the task of collecting every specific and varietal category that he knows, this curve will eventually flatten out, becoming S–shaped.

Depth

Because depth is time–consuming to calculate, I give a single example – the depth of family coverage in terms of the proportion of generics sampled in each family, as outlined in table 5.8. A similar approach could be used for other folk and scientific ranks.

Because the Sierra Norte checklist is relatively complete for families and genera, I am able measure the percentage of genera sampled within each family. These results are somewhat skewed because our checklist, even at the generic level, is complete for many small and medium–sized families (such as *Actinidiaceae*, *Polemoniaceae*, *Melastomataceae*) but less so for larger families (*Poaceae*, *Asteraceae*). This will make it appear that small and medium sized families are generally better sampled than large families.

In table 5–10, I show the proportion of genera sampled per family in the entire set of Mixe and Chinantec collections for the 252 families represented in at least one of the sets of collections. For example, the *Actinidiaceae* includes the single genus *Saurauia* in the Sierra Norte. Both Chinantec and Mixe collections contain at least one collection of *Saurauia*, which translates into 100% coverage for both. Of the 113 genera of *Asteraceae* in the floristic checklist of the Sierra. 64 have been collected by Chinantec collectors and 56 by Mixe collaborators, giving 56.6% and 49.5% coverage, respectively.

The cumulative measure of depth is obtained by summing all the proportions greater than zero and dividing by the corresponding number of families. Families in which no genera have been collected are excluded in this measure, simply because there is a chance that the family is not encountered in the municipal flora, as contrasted with the regional flora. The cumulative depth for the Chinantec collections is 7763.69 (the sum of all percentages for all families) / 130 (families) = 59.7 and 7799.5 (the sum of all percentages for all families) / 130 (families) = 60.0 for the Mixe collections.

Replication

Science is based upon the ability to repeat each experimental step, and observe if the result is always the same. In ethnobotany, we confirm our results not by repeating experiments, but by replicating collections – preparing voucher specimens of the same folk or scientific taxon on several different occasions. Given that there are thousands of taxa to sample, replication is always a matter of degree. Many categories are documented by one or few collections, and only a few categories are represented by many collections.

Family	Chinantec %	Mixe %	Family	Chinantec %	Mixe %	Family	Chinantec %	Mixe %
ACA	21.1	15.9	DSC	100.0	100.0	PAS	100.0	100.0
ACT	100.0	100.0	EBN	100.0	100.0	PDC	100.0	100.0
ADI	44.4	33.0	EQU	100.0	100.0	PGL	66.7	66.7
AGA	23.1	30.1	ERI	69.2	53.8	PHT	16.7	33.3
AMA	60.0	80.0	EUP	40.0	35.0	PIN	50.0	50.0
ANA	45.5	36.4	FAB	32.9	32.9	PIP	66.7	66.7
ANN	16.7	16.7	FAG	100.0	100.0	PLB	100.0	0.0
API	35.0	30.0	FLC	12.5	12.5	PLG	40.0	40.0
APO	10.0	10.0	GAR	100.0	0.0	PLM	50.0	0.0
ARA	85.7	85.7	GEN	0.0	14.3	PLT	0.0	100.0
ARE	27.3	27.3	GER	100.0	100.0	POA	18.3	20.4
ARL	0.0	20.0	GSN	25.0	37.5	POR	50.0	50.0
ASC	16.7	0.0	HAM	100.0	100.0	PRM	100.0	50.0
AST	56.6	49.5	HCS	100.0	100.0	PRT	50.0	0.0
BEG	100.0	100.0	HDR	100.0	100.0	PTG	100.0	100.0
BET	66.7	66.0	HLC	100.0	100.0	PUN	100.0	100.0
BIG	17.4	4.0	HPX	0.0	100.0	PYR	50.0	0.0
BIX	100.0	50.0	HYD	25.0	0.0	RAN	80.0	40.0
BLS	0.0	100.0	IRI	66.7	66.7	RHM	20.0	10.0
BML	50.0	40.0	JUG	50.0	50.0	ROS	75.0	62.5
BNL	100.0	0.0	JUN	50.0	50.0	RUB	27.5	27.5
BOR	14.3	7.1	LAM	68.8	62.5	RUT	66.7	66.7
BRA	50.0	37.5	LAU	50.0	37.5	SAL	50.0	0.0
BRS	50.0	50.0	LIL	36.4	36.4	SAP	28.6	42.9
CAC	13.6	9.1	LOA	50.0	0.0	SAX	100.0	0.0
CAM	40.0	60.0	LOG	25.0	50.0	SCR	50.0	27.3
CAS	0.0	100.0	LOR	40.0	20.0	SEL	100.0	100.0
CHN	100.0	100.0	LYC	100.0	100.0	SML	100.0	100.0
CIS	100.0	50.0	LYT	16.7	16.7	SMR	0.0	100.0
CLE	100.0	100.0	MAG	0.0	50.0	SOL	60.0	55.0
CLR	100.0	100.0	MEL	40.0	40.0	SPT	75.0	75.0
CLU	57.1	57.1	MLP	16.7	16.7	STR	11.1	11.1
CMM	7.1	14.3	MLS	50.0	35.7	STY	100.0	100.0
CNA	100.0	100.0	MLV	35.0	40.0	TEA	20.0	20.0
CNV	100.0	100.0	MNM	100.0	100.0	THY	0.0	100.0
COT	100.0	0.0	MNS	50.0	0.0	TIC	100.0	100.0
CPP	25.0	25.0	MOR	45.5	54.5	TIL	37.5	25.0
CPR	50.0	50.0	MRS	50.0	33.3	TOV	100.0	100.0
CRC	100.0	100.0	MRT	71.4	57.1	TRP	0.0	100.0
CRS	33.3	66.7	MTT	50.0	50.0	TXO	0.0	100.0
CRY	50.0	50.0	MUS	100.0	100.0	ULM	42.9	42.9
CTH	33.3	33.3	MYR	100.0	100.0	URT	0.0	25.0
CUC	25.0	20.0	NYC	22.2	22.2	VAL	100.0	100.0
CUN	100.0	100.0	OCH	0.0	50.0	VIO	33.3	33.3
CUP	100.0	100.0	ONA	88.3	66.7	VIT	100.0	50.0
CYC	0.0	50.0	ORC	13.9	30.6	VRB	17.6	17.6
CYP	33.3	44.4	OXL	100.0	100.0	ZAM	33.3	33.3
DLL	33.3	0.0	PAP	50.0	50.0	ZIN	66.7	33.3

Table 5.10. The depth of coverage of 144 families in the Chinantec and Mixe collections, expressed as the percentage of genera sampled per family.

If we prepare a graph that shows how many specimens have been collected for each category at a given rank, we discover a characteristic long–tailed curve. In a long–term collecting program in which assistants are instructed to make general floristic collections, we find that this curve maintains its shape, but that the average number of collections per taxon increases over time. If we instruct the collectors to concentrate on the categories which have been least collected over the course of the project, we find that the slope of the curve gradually decreases.

Charting the degree of replication in a set of collections helps us to assess how much confidence we can have in our data. The more times that we collect the plants that correspond to a folk category, the more certain we are that we understand how the taxon is delimited. Similarly, the more specimens that we have of a botanical family, genus or species, the more sure we are of how the local people classify these taxa.

On the following pages, I present a series of graphs that demonstrate the degree of replication in the Sierra Norte ethnobotanical collections. Figure 5–15 shows replication in the families most frequently collected by the Mixe and Chinantec collectors. The same families show up in similar proportions in the two sets of collections, indicating that the assistants were consistently sampling the plant families that they found in the environment around them. Although the Chinantec occupy a broader range of ecological zones that the Mixe, I assume that the general frequency of botanical families is similar in the two municipalities.

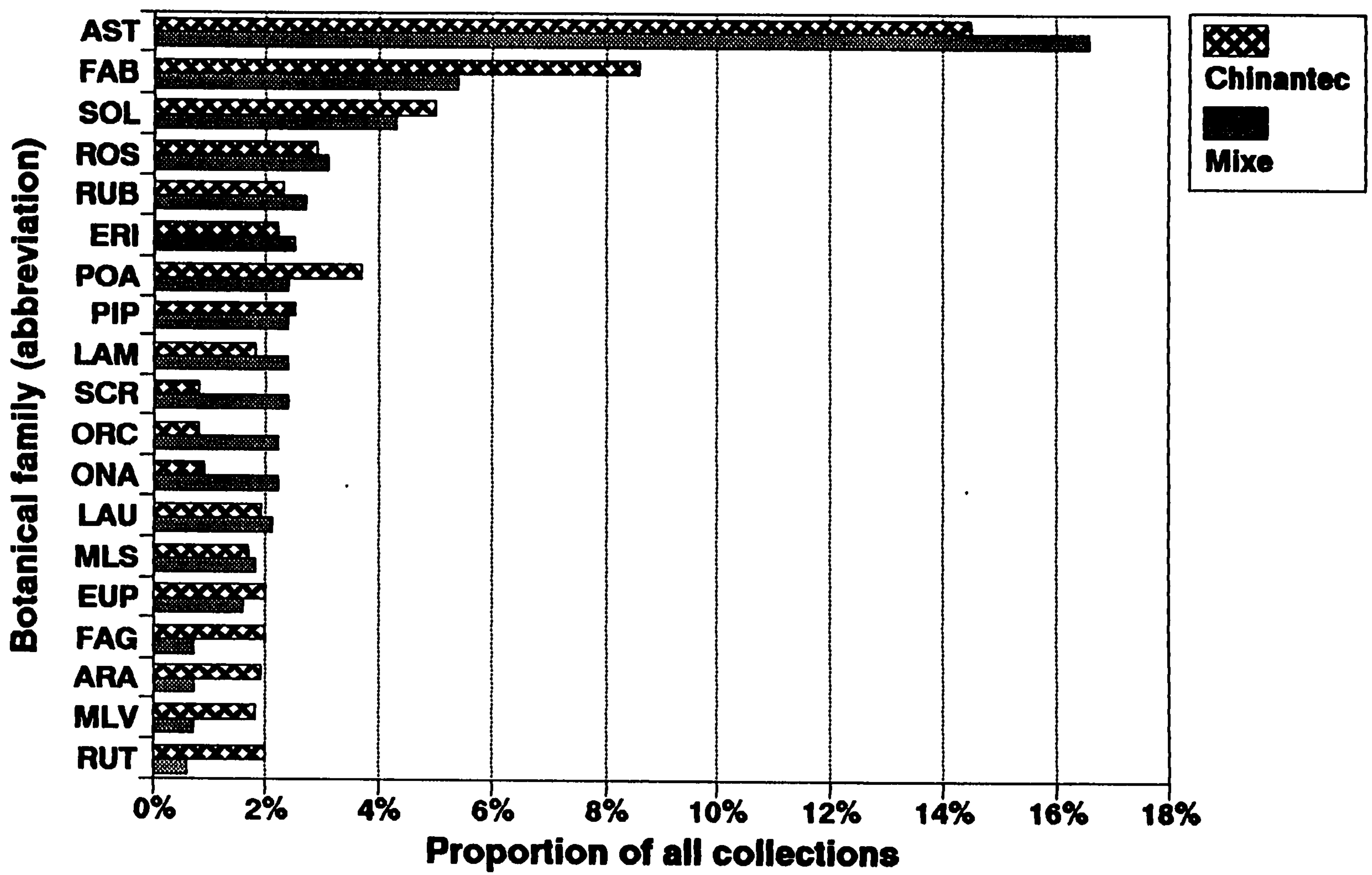


Figure 5-15. The degree of replication in the 19 most frequently collected families, expressed as the proportion of the first 1000 Chinantec and Mixe collections.

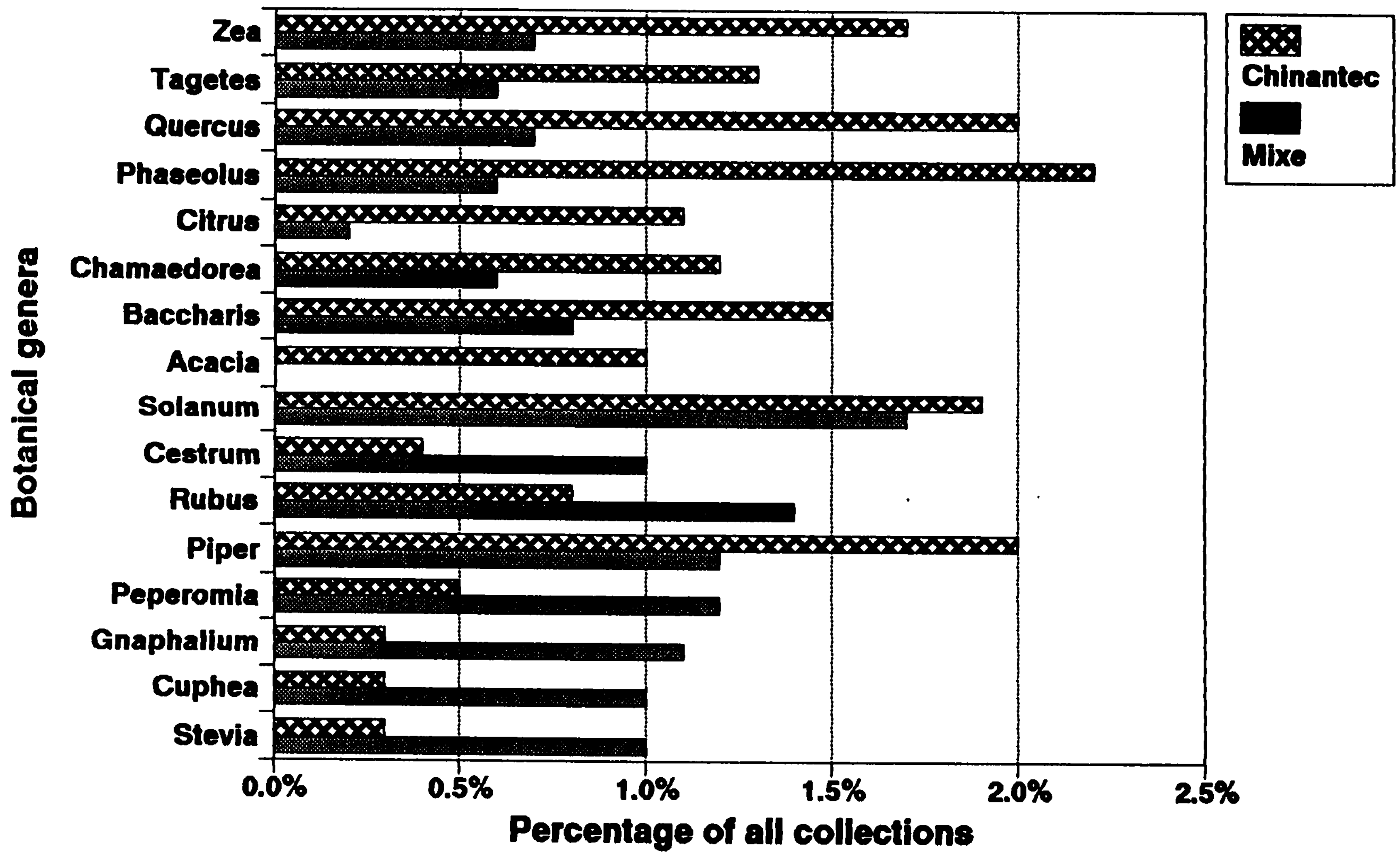


Figure 5–16. The degree of replication in the 16 most frequently collected genera, expressed as the proportion of the first 1000 Chinantec and Mixe collections.

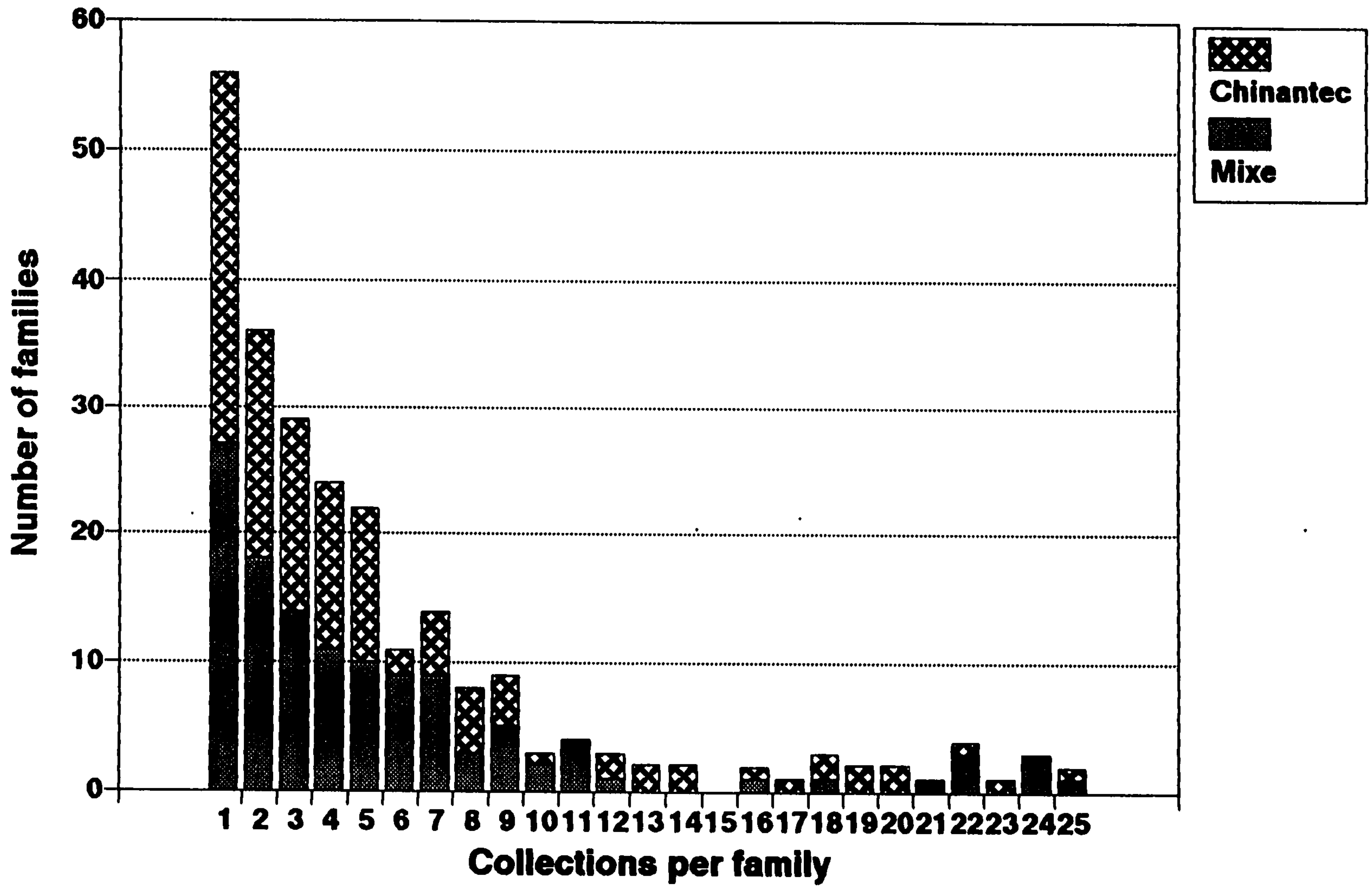


Figure 5–17. The degree of replication in families collected 25 times or less, expressed as the proportion of the first 1000 Chinantec and Mixe collections.

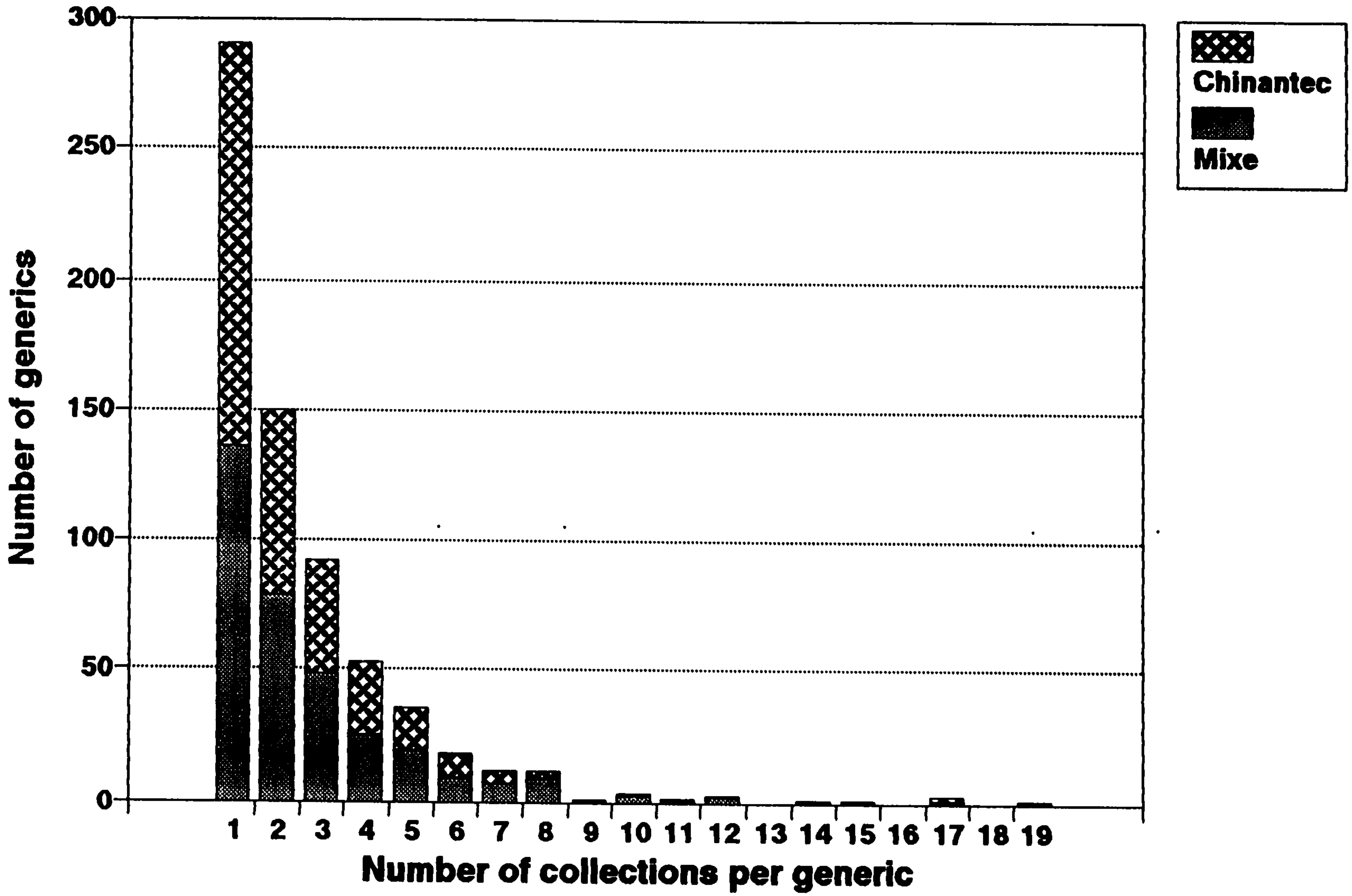


Figure 5–18. The degree of replication in genera collected less than 20 times, expressed as the proportion of the first 1000 Chinantec and Mixe collections.

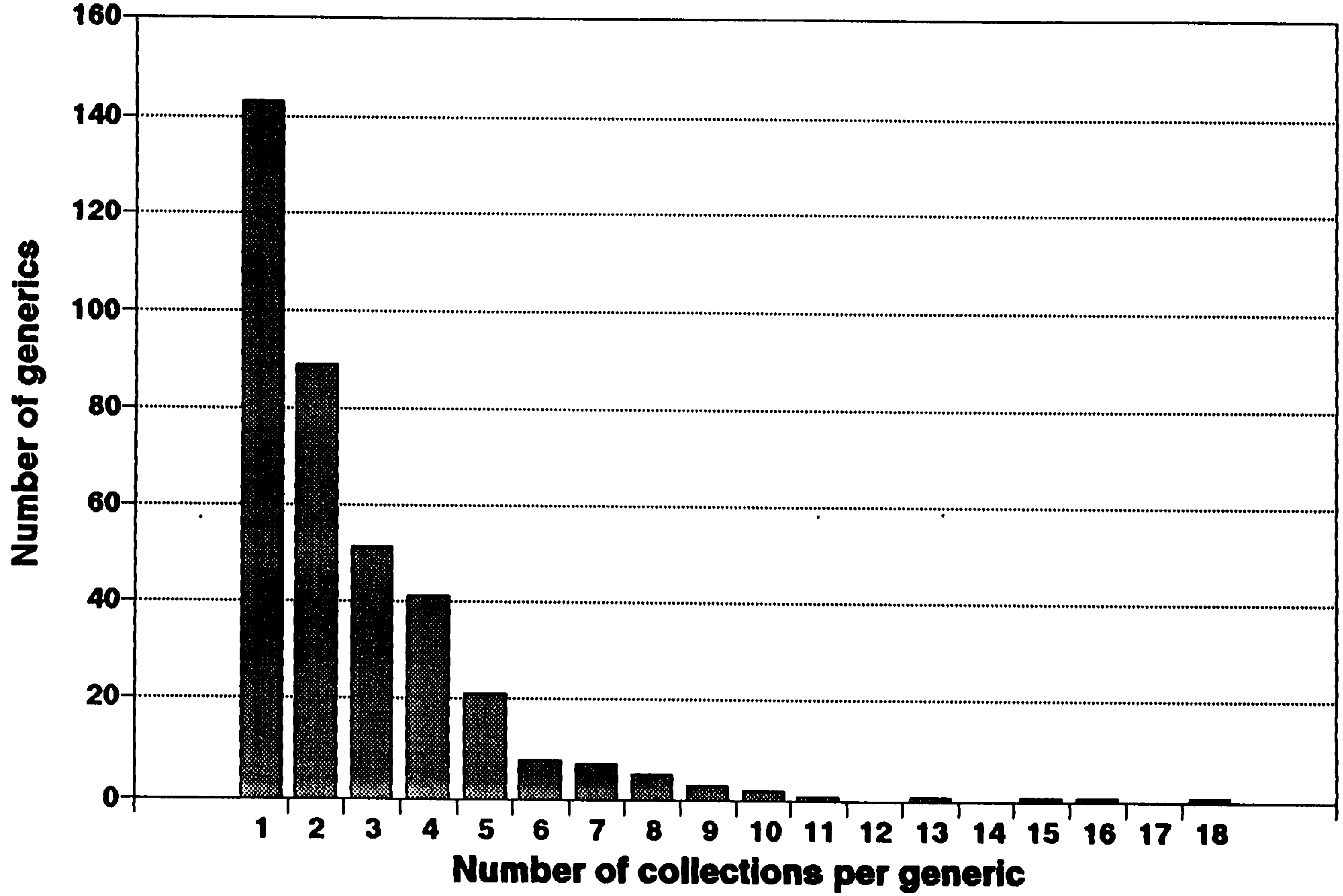


Figure 5–19. The distribution of the number of collections per folk generic in the set of plant collections made by José Rivera Reyes.

The conclusion that the assistants were sampling a wide range of local plants is confirmed by looking at replications of genera (figure 5–16). Even the exceptions strengthen the general tendency. *Acacia*, a genus commonly associated with dry, warm climatic zones, is absent from the Mixe collections, but is rather abundant among the Chinantec specimens, mirroring the access to this ecological zone by these two indigenous groups. There are some cultural differences in the levels at which different genera were collected. Because *Cuphea* and *Stevia* are medicinal herbs commonly used among the Mixe, but less so among the Chinantec, we find that these genera are most abundant in the Mixe collections. Other differences in the degree of replication between the two sets of collections are simply random.

Of the more than 150 families in the ethnobotanical collections, relatively few are represented by more than 25 collections. Figure 5–17, which shows the distribution of collections among the families less frequently collected, demonstrates the typical long-tailed curve that we expect to find when measuring replication in floristic or ethnobotanical collections. We discover the same result in the graph of genera that have been collected less than 20 times (figure 5–18). Both of these graphs justify my decision to continue collecting in Totontepec and Comaltepec – I have increasing confidence in my data and my understanding of the folk botanical classifications when each taxon is sampled at least 3, 4 or 5 times.

The general tendency in replication of scientific taxa is repeated for folk categories. For example, we find that the Mixe folk generics are typically documented by one or a few collections (figure 5–19).

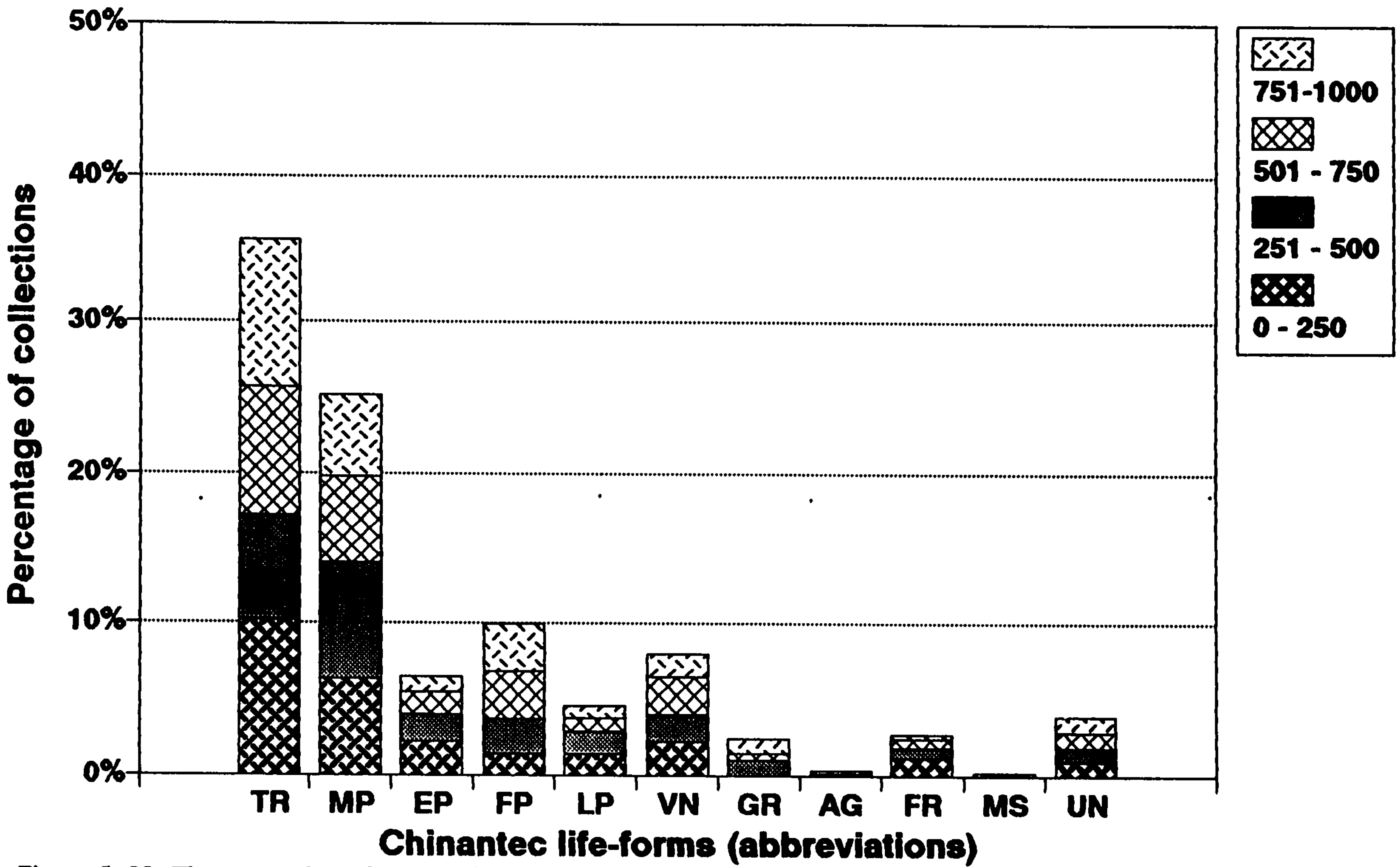


Figure 5–20. The proportion of various life-forms, expressed as a percentage of the first 1000 collections by five Chinantec collectors. [Life-form abbreviations: TR = «tree»; MP = «medicinal plant»; EP = «edible plant»; FP = «flowering plant»; LP = «large-leaved herbs»; VN = «vine»; GR = «grass»; AG = «agave»; FR = «fern»; MS = «mushroom»; UN = unaffiliated].

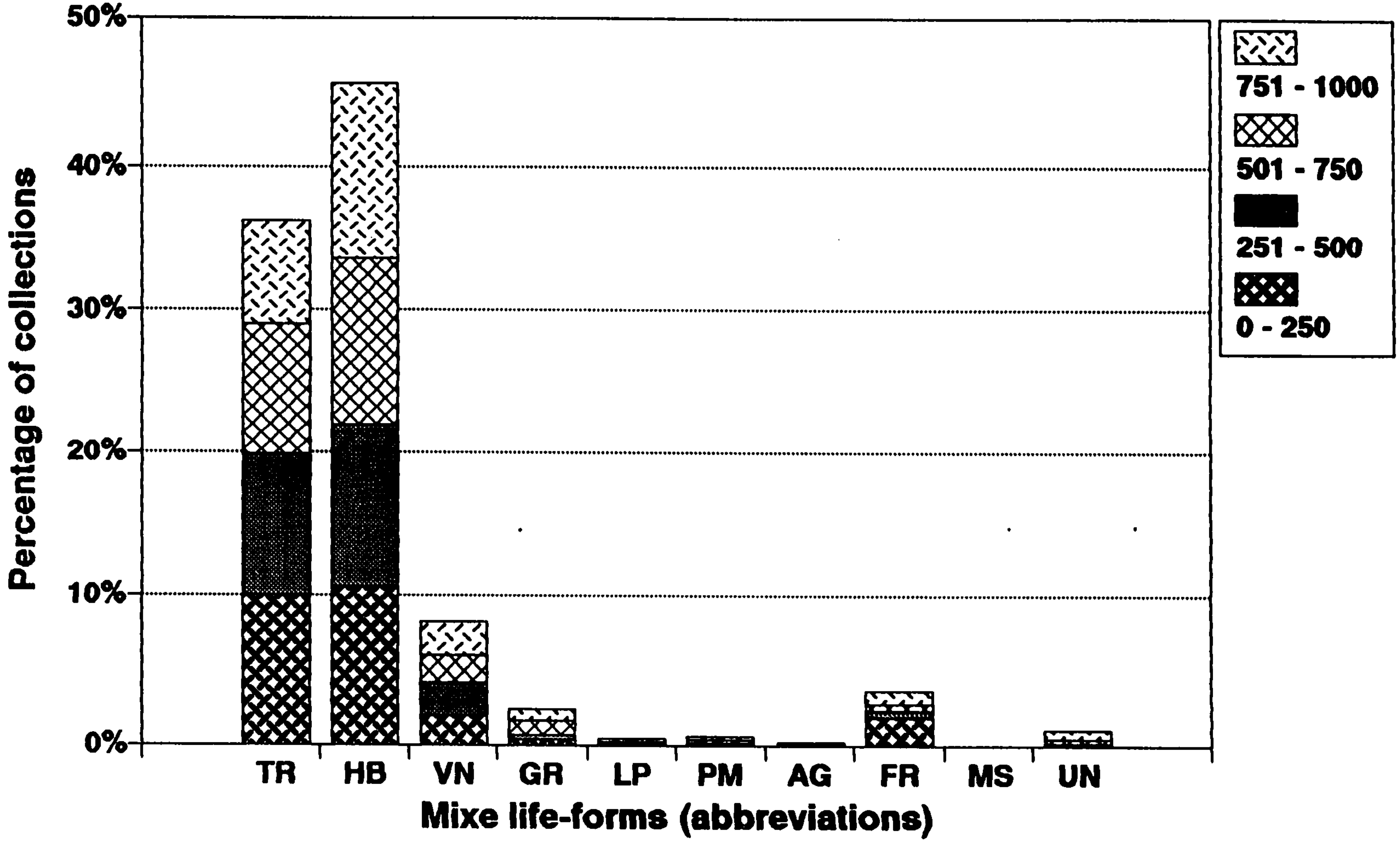


Figure 5–21. The proportion of various life–forms, expressed as a percentage of the first 1000 collections by José Rivera Reyes. [Life–form abbreviations: TR = «tree»; HB = «herb»; VN = «vine»; GR = «grass»; LP = «large–leaved herbs»; PM = «palm»; AG = «agave»; FR = «fern»; MS = «mushroom»; UN = unaffiliated].

Assessing the increase in life-forms over the first 1000 collections requires a different approach. Life-forms are few in number, and showing the degree of replication is best seen by dividing the collections into four sets - the first 250 numbers, the second 250 and so on. By charting on a stacked-bar graph the number of collections pertaining to the various life-forms in each set, we can observe if they are evenly represented over the entire set of collections. Figure 5-20, showing the results for the Chinantec specimens and figure 5-21, showing results for the Mixe set, both give similar profiles. A diversity of life-forms were collected in each set of 250 specimens. In other words, the collectors did not collect all trees first, then all herbs, and so on. They sampled widely much as they were advised. The proportion of each life-form represented in each set of 250 plants - and over the entire set of 1000 - approximates the overall proportion of each life-form in the folk classification.

A similar graph could be set up to measure the occurrence of different use categories (medicinals, foods, construction materials, etc.) over the course of the collecting. The calculation would be tedious, particularly because many plants have multiple uses, but I predict that the results would be quite similar to the bar graphs of life-forms.

In sum, how many collections are necessary?

The measurements illustrated above give us a great deal of information about a set of ethnobotanical vouchers which has been systematically collected. In the end, all of the measurements allow us to assess just how much collecting we need to do before feeling confident that we have sampled the local flora and documented folk categories to an adequate degree. Table 5-11 indicates the range of collections necessary for the Sierra Norte, given local ethnic and floristic diversity. These could be modified for other regions of the world, increasing or decreasing the amounts according to the local conditions.

Number of Collections	Type of Analysis	Level of Documentation
> 750	Outline	All life-forms; many vouchers of generics, specifics and varietals.
> 1,500	Sketch	All life-forms and generics; additional vouchers of specifics and varietals.
> 2,500	Detailed Study	Prototypical species of folk botanical categories of all ethnobiological ranks.
> 5,000	Definitive study	Prototypical species and extended ranges of all folk categories.
> 10,000	Complete Analysis	Documentation of all local plant species, including ones not classified or used by indigenous people.

Table 5.11. The number of general collections required for various levels of documentation of local knowledge of the Sierra Norte flora.

Unicate, sterile and repetitive collections

A major point of contention between plant taxonomists and ethnobotanists is the collection of sterile specimens. Although all researchers prefer to gather plants with flowers or fruit, ethnobotanists are sometimes constrained to collections sterile material because it is all they can find when they are collecting with a particular local person. A sterile collection that can be identified to the level of botanical family is better than no collection at all.

Another point of disagreement is over the repetitious collections of common species. An ethnobotanist might want to discover how 50 local people in one community classify plants in dooryard gardens. The plants encountered are likely to be well-known species, but in order to document intraspecific variation each plant may be collected on many different occasions.

Sterile collections are a burden to taxonomists, because they are often difficult to identify. Repetitive collections contribute little to taxonomic studies, and rapidly fill up herbarium cabinets. It costs as much to curate a poor specimen as a good one, and because most herbaria work with limited resources, they must make a selection of the most valuable material to mount and deposit in the permanent collections.

When sterile collections must be made, every attempt should be made to be rediscover the species in flower or fruit at a later date. By comparing all the different collections given the same local name we can often identify the sterile specimens of plants which have been recollected later in fertile condition. In a well-advanced collecting project, local collaborators can give special attention to recollecting good specimens of plants previously found sterile.

This way of re-evaluating sterile specimens is illustrated by two examples taken from the ethnofloristic inventory of the Sierra Norte. *Ticodendron incognitum*, a cloud forest tree that was named as new to science in 1989, is the only species in a new genus and family named in 1990 (Gómez-Laurito

Collection number	Condition	Date	Locality
JRR440	sterile	12 April 1987	Totontepec
RLL049	sterile	30 September 1987	La Esperanza
JRR721	sterile	11 March 1990	Totontepec
RLL656	fruiting	8 July 1990	La Esperanza
RLL694	old fruits under tree	29 April 1991	La Esperanza

Table 5.12. Collections of fertile and sterile specimens of *Ticodendron incognitum* in the Sierra Norte of Oaxaca (JRR = José Rivera Reyes; RLL = Ricardo López Luna).

and Gómez P. 1989, 1991; Hammel and Burger 1991). Previous to 1989, local collectors had found it in sterile condition in La Esperanza and Totontepec. Collectors were encouraged to search for it in fertile condition and some of their subsequent collections had fruit (table 5.12), enabling us to verify the tentative identification and to provide more data on the little Mexican populations of this species (Martin and Madrid 1993).

Salmea scandens is a cloud forest vine with cream-colored flowers. Mixe indians call it ***ni'iv aa'ts*** «chile vine», because they say that it is spicy like hot chile peppers. When first collected in 1985, I tentatively identified the specimen as *Asteraceae* or *Scrophulariaceae*. Subsequently, José Rivera Reyes was able to find fertile material during the same season for three successive years, allowing us to identify the plant to species (table 5.13).

Collection number	Condition	Date	Place
JRR0010	sterile	26 November 1985	Totontepec
JRR1324	fertile	15 December 1989	Totontepec
JRR1335	fertile	10 January 1990	Totontepec
JRR1725	fertile	8 February 1991	Totontepec

Table 5.13. Sterile and fertile collection of *Salmea scandens*, a cloud forest vine in Oaxaca.

Taxonomists and ethnobotanists are in agreement on another practice in ethnobotanical collecting – making single specimens (unicates) which increase the scope of an ethnobotanical or floristic inventory without having a negative impact on rare plant populations. The local collectors in the Sierra Norte ethnobotanical inventory agreed to collect 6 duplicates of each specimen. These multiple collections ensure that the identity of the specimens can be confirmed by specialists at various institutions and that they will not be lost if a particular herbarium ceases to exist.

After reviewing the first several hundred collections, I was surprised to find that some plants collected in one community had not shown up in the specimens from the other community. For example, an important source of emergency food for the Mixe is the vegetative base of a shrubby fern, *Marattia weinmannifolia*. Several collections had been made in the cloud forests of Totontepec, but none in the cloud forest of Comaltepec. When reviewing ferns with Ricardo López Luna, a collector from Comaltepec, I discovered that he had not collected the *Marattia* because it was very scarce in the forests around La Esperanza where he was collecting. I asked him to make a unicate collection, and his number RLL643 collected on April 25 1990 documents that the fern is also used by the Chinantec.

Defining the existence, rank and inclusion of folk categories and names

Despite continuing debate on how to describe the structure of ethnobiological classifications, there is general agreement that the basic building blocks are folk categories at various ranks. The consensus on how to define and describe these taxa covers three points that were initially controversial. Do folk categories really exist? Are there different ranks and degrees of inclusiveness. How should each different type be labelled?

Beginning in the late 1950s, anthropologists from various countries and theoretical orientations have verified the existence of folk biological taxa. Roy Ellen, although critical of many aspects of the ethnobiological model proposed by Brent Berlin and his colleagues, explicitly embraces the reality of folk biological taxa, noting that "... the careful delineation of selected semantic fields is a basic ingredient of any research strategy" (Ellen 1979:16). All researchers interested in ethnobotany follow this strategy by asking for the local names of biological organisms, seeking to discover all of the plant or animal categories in a language and attempting to define the characteristics of each category.

There is general agreement on the existence of different levels of inclusiveness in folk classifications. Although not everyone has adopted Berlin's notion of rank, no ethnobiologist doubts the existence of several types of categories: some broadly inclusive and others more narrowly defined. Even Ellen accepts hierarchical models in some social contexts. Speaking of the structural complexity of folk classification, he cites as important variables "the number of levels in taxonomies, the number of categories at each level of class inclusion and other quantifiable characteristics" (Ellen 1979:15).

Ethnobiologists retain some differences of opinion on how to label these different levels of inclusiveness. Within the United States, there is general acceptance of the set of terms that Brent Berlin improvised to label ethnobiological ranks: kingdom, life-form, intermediate, generic, specific and varietal. Alternate terms are usually true synonyms - different names for the same concept. For instance, Claudine Friedberg (1986) prefers to call life-forms, "global categories". Among other synonyms of generics (Berlin 1992:64-78), Ralph Bulmer and M.J. Tyler (Bulmer and Tyler 1968) employed "speciemes", Darrell Posey (1979) proposed "basic level objects" and Conklin (1954) used "specific plant types". All of these terms show tacit approval of the existence of folk categories and the concept of inclusiveness.

Although there is agreement on these general aspects of folk classification, deciding what constitutes a folk category is not only simply a matter of empirical observation, but also of interpretation. At each rank we find a continuum of categories, ranging from those that are highly salient for all members of the community to those that are recognized by only a few people.

The highly salient categories are evidence that clearly-circumscribed folk taxa are important elements in local cultures. At the rank of life-form, there are often well-delimited concepts of «tree», «herb», «vine» and others. Hundreds of generics are there for the asking, and many specifics and varietals are similarly easy to elicit. Our efforts at deciphering what are real categories is simplified when a majority of local people recognize and agree how to delimit them.

Yet there are always many classes that inspire less unanimity and require us to make a call on whether or not to include them in the final monograph of folk biological classification. How far do we go in accepting these minority opinions? In resolving this question, we consider if the category name is a habitually-used label, or rather a descriptive phrase applied idiosyncratically by one or a few people. Because there are often no linguistic clues that allow us to differentiate between true and improvised names, we are left to make a judgement based on subjective factors.

Once we have accepted a category, we must define its boundaries and inquire whether or not it is included in a higher order taxon. Although a category may include a number of different types of plants, one kind is often considered the most distinctive in appearance, the most abundant near the community or the one preferred for a particular use. These characteristic members, commonly referred to as prototypes, are relatively easy to identify. Yet categories are usually fuzzy at their edges, which means that they include a number of plants which are less characteristic than the prototype. The plants form what is often called the extended range of the category. The plants in this extended range may be assigned to more than one category by different local people, which gives the impression that some folk taxa are partially overlapping. Because there is sometimes variation in the way local people circumscribe a category, we must decide whose advice to follow when making our final analysis of the system.

A parallel problem is inherent in defining the rank of each category. We can elicit the indigenous names of plants from local people and we can accompany them in the field to discover which plant corresponds to which category. These are emic concepts – perspectives from derived from local culture – that emerge from participant observation, identification tasks and other anthropological methods. Yet no fieldworker would ask if a certain category is a generic, specific or life–form. Ethnobiological rank is an etic concept – that of an outside observer – which we attempt to apply universally in order to compare different systems of folk classification.

In practice, we consider each category and name one by one, attempting to follow the same criteria throughout the folk classification. Although many categories and much of the overall classification appear spontaneously in the course of fieldwork, some decisions are arbitrary. There is a good deal of circular logic in the entire process, because researchers are variably guided by patterns in naming, use and correspondence to biological taxa.

Consider an example from my own pondering about Chinantec and Mixe categories – the status of coriander and its substitutes. *Coriandrum sativum*, an European herb, is the focal member of the Chinantec category ***'oo^L tii^L*** «thin herb» and the Mixe category ***cilaantro*** «Sp. *cilantro*», a name borrowed from Spanish). *Eryngium foetidum*, a cosmopolitan weed that has much the same taste and flavor as coriander, is called in Mixe ***habanero cilantro*** («*havanero cilantro*», a name apparently borrowed from Spanish) and ***'oo^L tii^L kiá' lee^L*** «carnaval thin herb» in Chinantec. Wild types, found in both communities, and are called ***yuk cilantro*** «wild cilantro» in Mixe and ***oo^L tii^L mó'^{L}*** «mountain thin herb» in Chinantec. They correspond either to other species of *Apiaceae* or to a coriander-scented species of *Peperomia* that is used as condiment in the temperate humid zone.

Is each of these «coriander» categories well delimited? Are the names consistently used, or are they descriptive? Should the categories be considered as a contrast set of three specifics included in the same generic or as three distinct generics? Although much evidence can be gathered during fieldwork, the final answer to each of these questions is subjective. I have concluded that each of the categories is widely recognized in the communities, that the names are habitual and that the various folk taxa should be considered as folk specifics, united under a generic categories which corresponds to coriander-like herbs.

Some similar decisions lead to ironic results. The Mixe have a single name for oak, ***xoj***, and they name at least nine different types. Following standard practice, I consider each to be a specific, all forming a contrast set in the «oak» generic. The Chinantec have no single term for oak, but they have more than ten different names that correspond to *Quercus*. Again following standard practice, I consider each a generic term. This leads to a paradox when comparing the two systems of plant classification. Speakers of the two languages split up the oak genus into a number of similar categories, but these count as many generics for the Chinantec but as a single generic for the Mixe.

Roles - as splitters and lumpers - are reversed in classification of the Laurel family. The Mixe have a number of distinct generics that correspond to the different genera and species of the *Lauraceae* and I was unable to discover any covert category into which they were grouped. The Chinantec have a general term - ***'ma***^{L} ***g***^{w}***ɨɨ***^{HL} - which includes most *Lauraceae* and several other cloud forest trees as well. I have concluded that some of these names refer to specifics whereas others refer to generics. Although I have consistent explanations for my decisions, I accept that they are ultimately arbitrary.

Another complication is the existence of wild relatives of culturally important plants. Should the useful and wild relatives be treated as specifics of one generic or as separate generics? The answer depends very much on the specific case. I treat the Mixe categories of avocado (***xijts***) and wild avocado (***yukxijts***) as distinct generics. They correspond to distinct species of *Lauraceae*, one a semi-cultivated tree that yields edible fruits and the other a forest tree that provides durable wood for construction. Yet, I treat the categories ***tsoo'jn*** and ***yuktsoo'jn***, both corresponding to *Weinmannia pinnatifolia*, as forms of the same generic because the Mixe tell me that the only difference between the trees is that one is found more deeply in the virgin forest than the other.

Additional difficulties arise when generic categories are extended to include introduced or newly encountered plants, a common process in folk classification. The Chinantec classification of trees which bear sour fruits provides a good example. In many parts of the Chinantla, the generic name for oranges, guavas and other fruits is polysemic, meaning also «sour» in general (Rensch 1989:81). It is probable that the generic name originally applied to guavas and was extended to citrus fruits after the arrival of the Spanish. In addition, there are some native woody plants with aromatic foliage and sour fruits that are considered to be wild counterparts of the cultivated fruit trees. Should «sour fruits» be considered an extended generic category or a named intermediate? Should citrus, guavas and wild sour fruits be considered as separate generics or as specifics of a polytypic generic? In this particular case of Comaltepec Chinantec botanical classification, I resolved this dilemma by recognizing one unmarked citrus generic with a number of specifics, one monotypic wild sour fruit generic, and three guava generics, one of which is further subdivided into three specifics. The solution is arbitrary, and is based on my intuitive feeling for what constitutes a salient plant category in Chinantec. I faced the same problem in Totontepec, in which the introduced citrus fruit trees are lumped with native zapotes in a single category under the name ***tsook***.

In the end, the process of deciding what is a generic is a relatively subjective venture. Researchers are guided by local people's appraisals of the relative dissimilarity between categories and by the differences observed in the morphology, use and ecological distribution of the plants. The designation of each generic must be considered as a hypothesis to be confirmed by further experimental techniques and observations.

My analysis is often based on the range of biological species that correspond to a given category. This makes evident the circularity of logic that ethnobotanists employ. We suggest that there is a correspondence between folk and scientific categories and we use this as a criterion in defining the rank and boundaries of folk categories. To what extent is this correspondence an empirical observation and to what degree is it an artefact of our method?

There is room for differences of opinion and this is why ethnobotanists may reach different conclusions about how people classify. Even when working with the same data, there is no guarantee that two ethnobotanists would come up with similar estimates of the number of generics, specifics and varietals in the same ethnobiological classification. Given the amount of disagreements between ethnobiologists over the status of life-forms, there is no guarantee of consensus on these inclusive categories.

In biological systematics, we speak of 'lumpers', who tend to group a set of similar, yet morphologically-variable plants into a single category, and of 'splitters', who consider even slight morphological differences as the basis for new species or genera. The same tendencies are apparent in ethnobiology. Some workers are liberal in their approach, tending to maximize the number of generic categories that they detect in any language. In my work, I have tried to be conservative, excluding a number of categories that may turn out to be valid generics upon further inspection. The figures reported in this dissertation should thus be considered as the minimum numbers of categories at the various ethnobiological ranks.

After deciding on which categories we are going to consider generics, we must ascertain to which life-form they are affiliated, if any. In Comaltepec Chinantec, this is a straightforward process, because almost all generic and specific names include a classifier which indicates the life-form. If affiliation is ambiguous, people use different classifiers. If the generic is unaffiliated, no life-form classifier is used. This appears to be common phenomenon in all Chinantec languages and is widespread in general in the Otomanguean language family.

In Mixe, as in most other languages studied thus far, there is no obligatory use of a classifier or other linguistic element that indicates life-form. In these languages, we must rely on what local people tell us about how generics are affiliated. In Totontepec, the collectors indicated the life-form of each collections and this gave me an initial understanding of how generics were grouped. After I had prepared an initial list of generics, a group of elderly community members was asked to go through the list name-by-name, identifying the life-form of each. Subsequently, we asked the life-form affiliation of each category mentioned in the community survey and identification task. Together, these data demonstrate that life-form affiliation can be unequivocally established for the majority of folk categories. There are a number of categories which are ambiguous, being characterized in different ways by different people and there are some which are clearly unaffiliated to any life-form.

In chapters 6 and 7, I give my account of Chinantec and Mixe plant categories as I currently understand them. As the local people review what I have written and as other dialects of these languages are studied, I expect some categories to be redefined, others rejected and yet others added. This sort of revision, commonplace in biological systematics, has not yet been carried out even for the few folk botanical systems that have been systematically described. Although details may change, I am confident that the elucidation of the general structure of Chinantec and Mixe botanical classification that I present in subsequent chapters will hold up under further scrutiny.

Statistical Measures used in Ethnobiology

Local people are able to recognize by sight hundreds of different plants. Two processes have been postulated to explain this ability. One is referred to as *gestalt* identification, meaning that the plant is distinguished as a whole, without paying attention to any particular character. According to this point of view, local people recognize a plant because it matches a prototype, or best example, of the category. In the other process, a plant is identified by examining one or more of its salient features – the color of the stem, the taste of the fruit, the appearance of the bark – that differentiate it from other similar plants.

Some ethnobotanists have suggested that plants are identified to kingdom, life–form and generic by recognizing the overall form of the plant and are assigned to subgeneric categories after careful observation of specific morphological features. Other researchers believe that the two processes are combined – a general impression is gained from looking at the whole plant in its habitat and is confirmed looking for certain key features.

Analysis of how folk categories are delimited must take into account this debate on perception. Because higher–order ranks are not "defined by reference to verbalizable feature contrasts" (Hunn 1975), they stand in opposition to specific and varietal categories which can often be identified by a number of discrete characteristics (Boster 1980:82–83). The features used to distinguish between these lower–order ranks can be measured – yielding ordinal or interval variables. Even when life–form and generic categories can be distinguished by discrete characteristics, these are qualitative, giving a set of nominal variables.

For a numerical analysis of folk categories, nominal factors present major limitations. They are the weakest kind of variable and are not amenable to analysis by some of the most common statistics such as means, medians, variance and standard deviation (Bernard 1984:357–359). Despite these limitations, we still have recourse to descriptive statistical methods that yield quantitative answers to some of the most commonly posed questions about the structure of a folk classification. Simple frequency distributions allow us to show how many generics in a life-form are used medicinally, ritually or as food. Similarly, we can demonstrate what percentage of plants represented in the «tree» life form are actually erect, woody plants and which percentage are vining, herbaceous or of another habit. In addition, these measures are the basis of the description and cross-comparison of folk classifications in terms of polytypy versus monotypy, correspondence of folk to scientific categories, relative importance of life forms and other indicators. Univariate statistics give a feel for the tendencies of the data set, providing initial hypotheses on the correspondence of folk categories to morphological, utilitarian and ecological dimensions.

It is desirable to test these initial impressions by bivariate or multivariate methods. Statements based on simple frequency measures are only circumstantial, making it necessary to demonstrate that associations in the data are statistically significant. In the ethnobiological literature, qualitative assessments of how categories are defined are common. Take the following examples:

Berlin (1974:329) states, "I am confident that the covert taxa discovered in Tzeltal are formed exclusively on the basis of the recognition of gross, visually recognized, morphological similarities and do not represent classes formed on functional considerations".

Randall and Hunn (1984:335) say that the Sinama term ***bahan*** "is approximately equivalent to English «vine» but that 'real' ***bahan*** is more accurately glossed as «lashing plant»".

Morris (1984:51) suggests that "edibility is the defining character" of the Chichewa mushroom category ***bowa***.

Is there a way to test these hypotheses, given that we are dealing with purely nominal variables and categorical data?

Nominal data can often be further tested by a common bivariate statistic, the chi-square test for independence, which permits consideration of the null hypothesis that there is no relationship between two variables. Starting from the assumption that two variables are independent, we calculate the expected frequencies in a contingency table. If by comparing the expected frequencies with observed frequencies, we discover that the discrepancy in values in not likely due to chance alone, we can reject the null hypothesis (Reynolds 1988:15). For example, we can observe if there is a statistically significant difference between various Tzeltal generics, if edibility is a statistically significant criterion of ***bowa*** mushrooms versus other classes of mushroom, and so on.

There are several conditions that limit the applicability of the chi-square test to ethnobiological data. The sample must be random, the expected frequencies in each cell must be larger than 5 and observations must be placed in one and only one cell of the contingency table (Reynolds 1988:19).

These conditions present some problems for analysis of folk botanical classification. Even with large random samples, some contingency tables that compare multistate characters may contain unsuitably low expected frequencies. For example, in a comparison of Chinantec life forms with botanical habit, we find low expected frequencies for the cells corresponding to vines/ferns, and vines/edible greens. This is due to the low observed frequency of vines, vining ferns and of vines which are used as edible greens in the domain of plants named by the Chinantec. A more serious problem is that some observations may have to be placed in more than one cell. This is because categories are often fuzzy (Boster 1980) or overlapping (Ellen 1986). If we were to construct a contingency table comparing life form categories with uses, for instance, we might find some multiple-use plants (e.g. medicinal and edible) and some which correspond to more than one life-form (the case with some Chinantec generics that carry two obligatory life form classifiers).

This difficulty may be artificially resolved by ascertaining which is the primary use or life form or, perhaps more satisfactorily, by excluding such complex cases, considering them as intermediates that – if they were amenable to statistical analysis – would support the results of the chi-square test of simple cases. Yet these manipulations of the data would affect the randomness of the sample and the fidelity of the original information.

These difficulties rule out some multivariate analysis based on nominal variables that would provide a more sophisticated approach to understanding the relationship between folk botanical taxa and their corresponding dimensions.

More sophisticated statistics, using ordinal measures, have been used. One such multivariate approach, borrowed from numerical taxonomy, uses similarity measures between collected specimens or folk generics (referred to as 'operational taxonomic units' or 'OTUs') to carry out hierarchical scaling and multidimensional scaling of folk generics. Although Hunn correctly asserts that these techniques are not suited to measuring the correspondence between folk and scientific taxa, they may have a role in assessing the similarity of higher-order folk taxa in reference to local perception, knowledge and management of plants. In order to understand the application of these techniques to ethnobiological classifications, it is necessary to review briefly the practice and principles of building classification systems using numerical taxonomy.

The construction of classification models has been a subject of debate in the biological literature from the 16th century to the present day. Many of the arguments considered in this long history have resurfaced in the ethnobiological literature, indicating the appeal of scientific classification as a compelling metaphor for understanding the organization of folk categories.

In Sneath and Sokal's historical review of taxonomic principles (1973:16–67), three associated properties are considered to form the basis of classifications – naturalness, ease of manipulation and information retrieval. Although there is no consensus among biologists about the relative desirability of these properties, they serve to elucidate the purpose of classification, which is give the members of a heterogenous society access to a broad array of knowledge about empirically recognizable groups of organisms.

The principal property of classifications is naturalness, a concept which has its philosophical origin in the idea that categories should reflect nature – what we observe in our environment – and not some imposed or artificial criteria. Biologists, searching for an empirical basis of naturalness, came to define it as a "maximum correlation of features" (Sneath & Sokal 1973:19). At first, this was taken to mean that biological categories were characterized by a unique set of features that every member organism must possess. Such categories are known as 'monothetic groups'. Later, given the failure to find common diagnostic characters for many groups considered natural, categories came to be conceived of as 'polythetic groups' encompassing organisms that share a large number of features, but that do not necessarily possess any single character in common (Needham 1975).

Polythetic groups have become the categories of choice among systematists and ethnobiologists. Since they are based on diverse features, these groups have a high information content and can be used for many purposes, unlike artificial or monothetic groups. New organisms can easily be incorporated, since the polythetic categories are broad and not delimited by any single characteristic, making them useful and consistent in many different contexts. As Sneath and Sokal write, "An important, if somewhat poorly defined, criterion is concordance between a classification and other facts about the organisms ... an important test of a classification is whether it agrees with another classification of the organisms based on additional data, or in other words, exhibits stability upon addition of new information" (1973:66).

The naturalness of a classification affects how easily people can use it to retrieve information about organisms. Ironically, polythetic categories do not always make for simplicity in a classification. These categories may overlap because they are not defined by a finite and requisite set of characters, making it difficult to discriminate between two categories that have some members in common. This 'fuzziness' creates problems in constructing hierarchical classifications of organisms, because it violates the principle that categories must be mutually exclusive. On the other hand, broad ranges of biological diversity may be summarized in relatively few polythetic groups, simplifying the memorization and manipulation of a classification. This aids in the retrieval of information, since a wealth of characters can be accessed in a single category.

Sneath and Sokal (1973:5) state the sequence of operations in a numerical study aimed towards obtaining a polythetic classification: "organisms and characters are chosen and recorded; the resemblances between organisms are calculated; taxa are based upon these resemblances; and last, generalizations are made about the taxa". They further advise "... that generalizations about the taxa cannot be made before one has recognized the taxa; that taxa cannot be recognized before resemblances between organisms are known; and that these resemblances cannot be estimated before organisms and their characters have been examined".

In ethnobiology we are presented with the inverse of this situation. During interviews and plant collecting with native people, we first encounter taxa and generalizations about taxa. That is, we are told about taxa of life form, generic, specific or varietal ranks. We hear how these taxa contrast morphologically, how they are used and where they are found in the local environment. We then proceed to elucidate the resemblances between the organisms included in any one taxon as a way to discover the characters that can explain the structure of the classification. In biology we work from chosen characters and organisms to construct taxa and the classifications that associate them; in ethnobiology we work from given categories to discover the characters and organisms which delimit the folk categories. The end result of both processes is the clarification of the relationship between organisms, their perceptual dimensions and the categories in which they are placed. Once we have a set of characters that ostensibly separate folk generics and life forms, we can proceed to use numerical taxonomic procedures to analyze the folk classification.

Bivariate approaches based on correlation and regression and multivariate tests ranging from analysis of variance to multiple regression will ultimately be of limited use in analyzing the general structure of ethnobiological classifications. These techniques can be used in other sorts of ethnobiological studies – to measure, for instance, community variation in plant knowledge or the perceived saliency of an organism – but they are not appropriate for discerning how life form and generic categories are delimited.

Concluding remarks: putting the parts into a whole.

Within anthropology, ethnobiology has been criticized as a discipline which imposes a Western scientific view onto the interpretation of local peoples' knowledge. Even practitioners of ethnobiology have questioned themselves about the verity of folk taxonomies, wondering if they are not reified models of classification. It is necessary to distinguish between two processes in ethnobiological research – gathering the empirical bits of information in the field and interpreting how all these pieces fit together into an overall picture of how local people classify the natural world.

Collecting field data is an empirical task and what we discover is already known to the local people, such as the name or use attributed to a certain plant, the relationship between categories or the similarity between two organisms. The more direct the question, the more obvious is the answer to local collaborators and the more acceptable is the method to many of our colleagues. If we ask if the name of a plant – or whether it is considered as a kind of tree, vine or herb – we obtain results which could easily be replicated by other ethnobotanists.

As we interpret these responses, we begin to discover information that local people cannot tell us directly. This is the moment when we have cause to wonder if our imagination or our methods have led us astray. Local people could tell us the names of all trees they know, but we do not expect them to concur when we tell them there are 185 generics in the life–form that corresponds to «tree». In a village, someone could elucidate the meaning of one plant name word by word, while suggesting that another name cannot be explained, saying, "it's just the name". We do not except them to declare that a high percentage of domesticated plants are labeled by simple, literal lexemes.

We receive the pieces and we choose to put together the puzzle. Going even further, we could say that we have decided that a puzzle exists. When we are satisfied that we understand local patterns of categorization and nomenclature, we construct a system of classification which states the relationships between the categories that local people have described to us. We often have the opportunity to share this interpretation with local people, and we make modifications according to their input. Yet in most cases, local people are content to view the pieces as an assemblage of things known about plants and animals, without worrying if they constitute a system of classification.

In my opinion, the folk systems of classification that we create are by definition reified. They are abstract concepts that we have rendered material by putting them onto paper, a step rarely taken by the local people. There is a qualitative difference between knowledge which is communicated by oral tradition and that which is written (Goody 1977). Academic representations of folk classification – be they in the form of hierarchical tree diagrams, intertwining circles or written descriptions – inevitably alter ideas which have been passed along by word of mouth for centuries.

In our methods and our models, we should remember to stick close to the source.

6. Comaltepec Chinantec plant classification

As a general description of Chinantec plant classification, this chapter gives a skeletal outline of plant categories known in Santiago Comaltepec. The data presented here – and analyzed in chapter 8 – are being updated as new identifications for botanical collections become available and as Chinantec speakers and other collaborators review the cultural and linguistic information that corresponds to each category. Although specific details may change in this process of revision, I believe that the overall picture of Chinantec botanical classification that emerges from these data is an accurate one.

I focus on describing categories at life-form and generic ranks. For the life-forms, designated by roman numerals, I provide the etymology of each name and a general explanation of the morphological, ecological and utilitarian aspects of each category. The number of generics and subgeneric categories included in the life-form is summarized in a table and discussed.

After each life-form description there is a numbered series of affiliated generic categories. The explanation of each generic includes the name of the category and its etymology, a list of pertinent collections and a general description of botanical correspondence, morphological characteristics, uses and local distribution. Polytypic generics are followed by a listing of sub-generic categories and their botanical correspondence, when available.

I refer to botanical family names by a three-letter mnemonic devised by Weber (1982). The botanical collections are indicated by the initials of the collectors followed by the collection number. The codes for the collectors in Comaltepec are as follows: EL = Eusebio López Hernández, LH = Leonardo López Hernández, LM = Laura López López, RL = Ricardo López Luna and SH = Saul Hernández Hernández.

As throughout the dissertation, the gloss of any indigenous term is given between double parentheses, (« »). Proto-Chinantec and other reconstructed terms are preceded by a superscript asterisk, (*).

I. *'ma^L* «tree»

Etymology: /*'ma^L*/ = «Chinantec life-form name for tree». This is a cognate of the proto-Chinantec term **'ma^L* and is related terms are found in all of the Chinantec languages (Rensch 1989:102). The term is polysemous with «wood» and «pole». There does not appear to be any generic name that is polysemous with the Chinantec term for tree. Rensch suggests that the term for manioc might be related to the term for tree, but this opinion is based on a cognate set on five languages from three of the Chinantec subregions and is not borne out by my data from Comaltepec Chinantec.

Description: A large and diverse life from that corresponds to primarily subshrubs, shrubs and trees; many domesticated agricultural herbaceous plants are also included. Erect plants, usually woody and of relatively large stature (commonly greater than 1 meter tall). Utilized in diverse ways, material (wood/construction & fuel), edible (fruits/raw & cooked), occasionally medicinal (leaves, bark/various conditions), and when *lí^H 'ma^L*, ornamental (flowers/adornment). Common in all ecological zones of the community, ranging from predominant in the humid temperate and tropical zones to sparse in the dry tropical zone.

Trees often overlap with another life-form. If showy, ornamental flowers are present then the plants are cross-classified as ***lí^{H} 'ma^{L}***; when the tree bears fleshy, particularly edible, fruits then the plants are cross-classified as ***'ma^{L} mi$\underline{í}$'^{H}***; trees that have foliage considered medicinal are often called ***'ma^{L} má'^{H}***; erect, cultivated plants with edible tubers are referred to as ***'ma^{L} jii^{L}***.

I recognize 137 generics in the tree category, making it the most diverse of all Chinantec life-forms (table 6.1.). 96 generics are monotypic (70.1% of the total); 41 generics (29.9%) are further subdivided into 150 specifics and 4 varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	96	20	9	2	1	4	2	0	1	0	1	1
Totals: 137 generics, 150 specifics, 4 varietals												

Table 6.1. Distribution of specifics in the life-form ***'ma^{L}*** «tree».

1. *'ma^{L} baruu^{L}*

Collections: LH0222, LM0353, SH0120a

Etymology: /***'ma^{L}***/ + /***baruu^{L}***/ = «tree» + «adhere, or perhaps discolored». The name apparently refers to the adhering, hispid pubescence of the foliage, or perhaps the evanescent flowers, which quickly fade from yellow to black.

Description: A monotypic generic that corresponds to LOA *Mentzelia arborescens*. Shrubs of 1 – 2 meters; leaves roughly pubescent; flowers large, yellow, quickly fading to brown-black. Leaves taken in tea for convulsions (*ataque*); flowers said to be used as an adornment for the church, but some people believe that bringing the flowers into the house will cause death of a family member (apparently related to the fact that the flowers fade quickly and turn black). Common in temperate and tropical dry zones. [cross-classified by LM as ***lí***^{H}, used for ornament in church but not home]. The Loasaceae includes two genera and three species in the Sierra Norte; in addition to *Mentzelia arborescens* there are *M. hispida* and *Eucnide grandiflora*, both apparently restricted to tropical dry areas and not reaching Comaltepec.

2. *'ma*^{L} ***ka***^{L}***hué***^{LH}

Collections: LH0164, LM0040, RL0180, RL0210, RL0562

Etymology: /***'ma***^{L}/ + /***kahué***^{LH}/ = «tree» + «Spanish proper name for coffee». The Chinantec name is derived from the Spanish name for coffee by extending the final vowel and adding a rising tone; it is assigned life-form status as a tree. Coffee is sometimes pronounced in a way which more resembles Spanish ***'ma***^{L} ***ca***^{L}***fée***^{LH}

Description: A polytypic generic that corresponds to RUB *Coffea arabica* and some wild RUB. Shrubs of 1 – 2 meters; leaves deep green, glossy, opposite; flowers white, grouped in the axils of the leaves; fruits berry-like; red at maturity; seeds large, greenish-white. Seeds, harvested in winter and early spring, roasted and ground to prepare *café*, a beverage consumed daily with meals all year; wood of wild form used for house construction. Cultivated extensively in humid zones; grown rarely in home gardens and humid ravines of temperate dry zone; wild forms found occasionally in temperate humid forest. The category is extended to several native species of Rubiaceae that resemble coffee bushes.

Specifics:

(A) ***'ma***^{L} ***ka***^{L}***hué***^{LH} (unmodified) «coffee tree» [RUB *Coffea arabica*]

(B) ***'ma***^{L} ***ka***^{L}***hué***^{LH} ***nuu***^{L} «wild coffee tree» [various RUB]

3. *'ma^{L} má'^{H} coco*

Collections: none

Etymology: */'ma^{L}/* + */má'^{H}/* + */coco/* = «tree» + «small-leaf» + «Spanish proper name for coconut». It appears that the Spanish *coco* is the most commonly used name for coconuts in Comaltepec, but some of the people dwelling in lowland ranches use a Chinantec name borrowed from Santiago Progreso, a ranch that belongs to the municipality of Ozumacin. It appears that a general name for palms in Ozumacin is ***'ma sų***; the specific name for *coyol* palms is probably ***'ma sų ñi***, the coconut palm is probably referred to as ***'ma sų joo***. These are cognates of proto-Chinantec reconstructed terms: Rensch gives ****háą^{H}*** for coconut, listing variants from two subregions of the Chinantla (1989:78:#476); and ****sų́^{LH}*** as the proto-Chinantec term for *coyol* and coconut palms, listing variants from all subregions of the Chinantla (1989:74:#416).

Description: A monotypic generic that corresponds to ARE *Cocos nucifera*. Trees of 5 – 10 meters; leaves very large, compound, divided into linear leaflets; flowers regular, yellowish-white; fruit a hollow nut covered by a fibrous husk. Not widely used in Comaltepec, but the local people know that the fruits are edible and that the leaves may be used as thatch. Semi-cultivated in tropical humid forest, especially in Soyalapam.

4. *'ma^{L} crúu^{H}*

Collections: EL0059, LH0220, LM0096, RL0004, RL0036, RL0094, RL0248, RL0267, RL0271, RL0324, RL0325, RL0342, RL0430, RL0431, RL0433, RL0459, RL0524, SH0068a

Etymology: */'ma^L/* + */crúu^H/* = «tree» + «SN for cross». The leaves of these plants are opposite, with successive leaf pairs set at right angles, giving the appearance of a cross. *palo de cruz* is a common Spanish name used widely in Latin America for tree and shrubs that have branches that grow at right angles. The trunk and branches of these species are sometimes thought to have religious or magical power because of their resemblance to Christian crosses.

Description: A polytypic generic that corresponds to CLR *Hedyosmum mexicanum*, RUB *Cephaelis, Palicourea berteriana, P. leucantha, P. podifolia, Psychotria panamensis* subsp. *ixtlanesis* and other RUB. Shrubs of 1 – 2 meters; leaves opposite in pairs that alternate at right angles along the stem, forming «crosses»; flowers various, from greenish–white to yellow and red; fruits various. Flowers used for adornment; leaves occasionally used for colds, placed with lemon and chamizo leaves on the soles of the feet; wood rarely used as fuel; fruits eaten by birds and squirrels. As ***'ma^L ka^{LH}***, ***'ma^L crúu^H*** shows an interesting distribution floristically and ethnobotanically – it is a common element in the temperate humid forest, but is found only in humid, cool ravines on the dry side of the Sierra. Accordingly, its name is well known by inhabitants of La Esperanza and Puerto Eligio, but is poorly known by residents of Comaltepec. Members that correspond to RUB commonly cross–classified as ***li^H 'ma^L crúu^H***. *Hedyosmum mexicanum*, a dioecious shrub, is divided into a male and female form by at least some Chinantec. Forty genera of Rubiaceae are found in the Sierra, of which the majority are cloud forest shrubs that could correspond to ***li^H 'ma^L crúu^H***. Chloranthaceae is represented only by *Hedyosmum mexicanum*, a distinctive and common element of humid areas. There may be a connection between this generic and *el día de la cruz*, a Catholic holy day.

Specifics:

(A) ***'ma***^{L} ***crúu***^{H} (unmodified) «cross tree» [CLR *Hedyosmum mexicanum*]; the male and female individuals of this monocieous shrub are recognized and named: ***'ma***^{L} ***crúu***^{H} ***'iee***^{LH} «female cross tree», and ***'ma***^{L} ***crúu***^{H} ***ñʉ***$^{'L}$ «male cross tree»

(B) ***'ma***^{L} ***crúu***^{H} ***mó***$^{'L}$ «montane cross tree» [RUB *Palicourea berteriana*]

(C) ***'ma***^{L} ***crúu***^{H} ***née***^{M} «yellow cross tree» [RUB]

(D) ***'ma***^{L} ***crúu***^{H} ***tee***^{L} «white cross tree» [RUB]

(E) ***'ma***^{L} ***crúu***^{H} ***tii***^{L} «thin cross tree» [RUB *P. leucantha*, *P. podifolia*, *Psychotria panamensis* subsp. *ixtlanesis*]

(F) ***'ma***^{L} ***crúu***^{H} ***yʉ́ʉ***^{M} «red cross tree» [RUB *Cephaelis*]

5. ***'ma***^{L} ***dsíi***^{LM}

Collections: LH0283, LH0294, LM0386, SH0046a, SH0046b?

Etymology: */'ma*^{L}*/* + */dsíi*^{LM}*/* = «tree» + «heart». The name refers to the wood of this tree which is very resistant, lasting well after the bark rots off.

Description: A monotypic generic that corresponds to COR *Cornus*, probably including both Sierra Norte species, *C. disciflora* and *C. excelsa*. Shrubs of 1 – 2 meters; leaves ovate, conspicuously veined, with a slightly pinkish cast, arranged oppositely along stem; flowers white, arranged in dense terminal clusters, fruits brown, dry. Wood used for bridges and other construction, considered very strong and durable. Common in temperate dry areas.

6. ***'ma***^{L} ***eucalipto***

Collections: none

Etymology: */'ma^L/* + */eucalipto/* = «tree» + «Spanish proper name for eucalyptus».

Description: A monotypic generic that corresponds to MRT *Eucalyptus* spp. A monotypic generic that corresponds to MRT *Eucalyptus* spp., an Australian tree which is widely cultivated in Mexico and is used medicinally, primarily for respiratory problems. Trees of 10 – 20 meters with light brown bark that peels off in large pieces; leaves light green, lanceolate, and strongly aromatic; flowers white, containing numerous filamentous stamens on a dark green receptacle; fruit a resinous, greenish-white capsule. Leaves taken in tea for colds? Occasionally cultivated in villages of the temperate zone.

7. ***'ma^L '$\underline{e}^{MH}$***

Collections: LH0137, LH0270, LM0080, LM0387, SH0065a, SH0130b

Etymology: */'ma^L/* + */'$\underline{e}^{MH}$/* = «tree» + «Chinantec proper name for *Ternstroemia*».

Description: A polytypic generic that corresponds to *Ternstroemia sphaerocarpa* and may be extended to *Ternstroemia seemanni*; both yield brown capsules that are sold in Oaxaca markets and throughout Mexico to treat nervous conditions. Shrubs of up to two meters; leaves smooth, slightly thickened; flowers white and large (1 – 2 cm.); fruit a dark brown capsule. Fruits, taken in tea, are used year–round for empacho and, mixed with *Arctostaphylos* leaves, for nervous conditions; wood is used in construction and for fuel. Some villagers are aware that the fruits are sold in local markets for nervousness and insomnia, and that the fruits are collected and sold by itinerant herb vendors of San Juan Quiotepec. Scarce in tropical and temperate dry areas along the western edge of Comaltepec; also found in the temperate, humid forests of La Esperanza. The category may be extended to four additional local genera in the Theaceae (*Cleyera*, *Freziera*, *Gordonia* and *Symplocarpon*) which grow in humid forests.

Specifics:

(A) *'ma^L 'e̱^{MH}* (unmodified) «*Ternstroemia* tree» [TEA *Ternstroemia sphaerocarpa*]

(B) *'ma^L 'e̱^{MH} tee^L* «white *Ternstroemia* tree» [TEA ?]

8. *'ma^L fali^{MH}*

Collections: EL0005, EL0018, EL0083, RL0423

Etymology: */'ma^L/* + */fali^{MH}/* = «tree» + «ashen». This is derived from Comaltepec Chinantec *fá^{MH}*, which is cognate with the reconstructed proto-Chinantec term for ash, **hwa^L*, for which Rensch lists variants from all subregions of the Chinantla (1989:122:#927).

Description: A polytypic generic that corresponds to various MLS with a powdery substance under the leaves, including *Clidemia octoma*, *Miconia dodecandra* and *M. serrulata*. Shrubs of 1 - 2 meters; leaves with pronounced lateral venation and a powdery grayish-white color under the leaves; flowers white; and fruits purple. Wood sometimes used for construction and fuel. Common in the humid tropical zone. This generic could include various species of Melastomataceae, a family represented by 14 genera and some 70 species in the Sierra.

Specifics:

(A) *'ma^L fali^{MH}* (unmodified) «ashen tree» [MLS *Miconia dodecandra*]

(B) *'ma^L fali^{MH} bǿǿ'^{LH}* «short ashen tree» [MLS *Clidemia octona*]

(C) *'ma^L fali^{MH} 'ú^L* «wide(leaved) ashen tree» [MLS *Miconia*

9. *'ma^L fi^H*

Collections: LH0103, LM0070, LM0115?, SH0010b, SH0037b

Etymology: /*'ma*^{L}/ + /*fi*^{H}/ = «tree» + «animal-horn». The name is cognate with the reconstructed proto-Chinantec term for «horn of an animal», **hwi*^{H}; Rensch lists variants from all subregions of the Chinantla (1989:121:#916). The name probably refers to the strength and durability of this wood, resembling deer antler and other animal horns in hardness.

Description: A monotypic generic that corresponds to SAP *Dodonaea viscosa*, the most distinctive and abundant member of the Sapindaceae, represented by 6 additional genera in the Sierra. Shrubs of 1 - 2 meters; leaves lanceolate, glossy; flowers pinkish to greenish-white, inconspicuous; fruits light brown, winged. Leaves applied as compress to the back for post-partum; leaves, mixed with alcohol and lard or oil, applied as compress to heal broken bones. Abundant in secondary vegetation of the tropical dry zone, occasionally cultivated in home gardens of the temperate dry zone.

10. *'ma*^{L} *fii*^{L}

Collections: RL0125, RL0171, RL0365, RL0419, SH0063b

Etymology: /*'ma*^{L}/ + /*fii*^{L}/ = «tree» + «flexible». The name probably refers to the wood, which flexes easily without splintering. It may be derived from a term that is cognate with proto-Chinantec **hwiin̄*^{HL}, which Rensch glosses as «tough» (1989:121:#920).

Description: A polytypic generic that corresponds to trees with flexible wood? such as BET *Carpinus caroliniana*?, ROS *Prunus brachybotrya* and ULM *Ulmus mexicanus*. Trees of 4 - 15 meters; leaves ovate, often serrate, arranged alternately along stem; variable in size; flowers white or greenish–white and inconspicuous. Wood used as fuel; fruits are eaten by badgers. Occasional in temperate zones. Ocassionally pronounced as ***'ma***^{L} ***fiing***^{L}.

Specifics:

(A) ***'ma***^{L} ***fii***^{L} (unmodified) «flexible tree» [BET *Carpinus caroliniana*]

(B) ***'ma***^{L} ***fii***^{L} ***tee***^{L} «white flexible tree» [ROS *Prunus brachybotra*]

11. ***'ma***^{L} ***foo***^{M}

Collections:

Etymology: */'ma*^{L}*/* + */foo*^{ML}*/* = «tree» + «Chinantec proper name for some amaranths». This is close to, but apparently distinct from, the Comaltepec Chinantec word for trout *foo*^{L}, which is a cognate of the proto–Chinantec term ****hwaa***^{H}, for which Rensch lists variants throughout the Chinantla (1989:122:#929).

Description: A polytypic generic that corresponds to AMA *Amaranthus cruentus.* Herbs of 30 – 50 cms. with often reddish–green foliage; leaves alternate, ovate and simple; flowers minute, greenish–white, clustered into dense terminal inflorescences. Seeds may be prepared in atole; whole plant used as a garden ornamental. Semi–cultivated in home gardens of the temperate dry zone. I have seen the seeds for sale in a village store.

(A) ***'ma***^{L} ***foo***^{M} ***tee***^{L} «white amaranth tree»

(B) ***'ma***^{L} ***foo***^{M} ***'ui***$^{'M}$ «black amaranth tree»

12. ***'ma***^{L} ***gia***$^{'LM}$

Collections: LH0290

Etymology: */'ma*^{L}*/* + */gia*$^{'LM}$*/* = «tree» + «Chinantec proper name for cacao and anteaters». This is cognate with the proto-Chinantec term for cacao **ziá*; the cognate set given by Rensch includes terms from all the subregions of the Chinantla (1989:64:#323).

Description: A monotypic generic that corresponds to STR *Theobroma cacao* and other woody plants with fruits or seeds that are similar to cacao in color or shape [FAG *Quercus* and EUP *Jatropha*]. Trees or shrubs; leaves large & variously shaped; flowers various; fruit a large rounded pod with many seeds, fragrant and sweet-tasting; seeds about 2 cms. long, flattened, tan to brown. Seeds roasted and ground to make a hot beverage [*Theobroma*]; seeds roasted and eaten [*Jatropha*]; wood used for fuel [*Quercus*]. *Theobroma* was formerly widely grown in the tropical humid Chinantla, but at present it is not cultivated in Comaltepec, it is imported from the Oaxaca Valley; other types rare in temperate zones. Often cross-classified as ***mɨ́'H 'maL gia'LM***.

13. *'maL giée'LH*

Collections: EL0048, LH0135, LH0292, RL0021, RL0022, RL0048, RL0438, RL0461, SH0069b

Etymology: */'maL/* + */giée'LH/* = «tree» + «Chinantec proper name for *Inga*». This is a cognate of the proto-Chinantec term **ziaa'H*; related terms are widespread in the Chinantla (Rensch, 1989:64:#322).

Description: A polytypic generic that corresponds to the FAB *Inga* and is extended to *Lonchocarpus* and *Senna multijuga* var. *doylei*. Trees of 4 to 15 meters; leaves large, compound, the leaflets large and broad; flowers white, a group of fine filaments; fruit a green, long, flattened pod; seeds often with a sweet-tasting, cottony covering. Whole plant used for shading coffee plantations; leaves recognized as green fertilizer; wood used as fuel; seed covering occasionally eaten in autumn; fruits eaten by wild animals and birds. Common in tropical and humid temperate zones.

Specifics:

(A) ***'ma^L giée'^{LH}*** (unmodified) «*Inga* tree» [FAB *Inga*]

(B) ***'ma^L giée'^{LH} jñu^L má'^{H}*** «pubescent-leaved *Inga* tree» [FAB *Inga*]

(C) ***'ma^L giée'^{LH} nuu^L*** «wild *Inga* tree» [FAB *Senna multijuga* var. *doylei*]

(D) ***'ma^L giée'^{LH} rø'^{L}*** «green *Inga* tree» [FAB *Inga jinicuil*]

(E) ***'ma^L giée'^{LH} tii^L*** «thin *Inga* tree» [FAB *Inga schiedeana*]

(F) ***'ma^L giée'^{LH} tii^L moo^L*** «narrow-leaved *Inga* tree» [FAB *Lonchocarpus*]

(G) ***'ma^L giée'^{LH} yúu^M*** «red *Inga* tree» [FAB *Inga sapinoides*]

14. *'ma^L granaa^L*

Collections: LM0171, LM0339

Etymology: /***'ma^L***/ + /***granaa^L***/ = «tree» + «Spanish proper name for pomegranate».

Description: A monotypic generic that corresponds to PUN *Punica granatum*, a Eurasian trees that is widely cultivated throughout the tropics and subtropics for its edible fruits. Small trees of 1 – 3 meters; leaves oblong, simple, alternate and entire; flowers red, having a persistent red calyx; fruit globose, containing numerous red, juicy seeds. Seeds eaten raw. Semi-cultivated in home gardens of the temperate dry zone.

15 – 23. The ***'ma^L gwɨɨ^{HL}*** complex

The following 9 generics form part of the complex, marked intermediate category ***'ma^L gwɨɨ^{HL}*** «avocado tree». This is a polytypic category that corresponds to edible-fruited LAU Persea (particularly *P. americana* and *P. schiedeana*), to MOR *Ficus carica* and to hardwood tree species of various genera of LAU and some FLC, HCS, MEL and MRT. Trees of 6 - 20 meters; leaves variously-shaped, often pleasantly scented; flowers usually inconspicuous, yellowish-green rarely bright-red; fruits commonly large, green with yellowish-green, edible flesh. Fruits eaten raw as a common accompaniment to meals; leaves used as condiment in a variety of cooked dishes; leaves, boiled as tea, used for post-partum bath; fruits eaten by wild birds; used wood used for fuel and construction. *Persea americana* is commonly cultivated or protected in dry zones; *P. schiedeana* is occasionally cultivated or protected in the temperate humid zone; hardwood species occasional in primary forests of humid zones.

15. ***'ma^{L} gwɨɨ^{HL}*** (unmodified)

Collections: LH0042, LH0048, LM0021, LM0372, RL0023, SH0038, SH0054

Etymology: /***'ma^{L}***/ + /***gwɨɨ^{HL}***/ = «tree» + «Chinantec proper name for avocado». This should be cognate with a term that would reconstruct in proto-Chinantec as ****gwɨɨ^{L}*** and it should be possible to find variants in all Chinantec languages; Rensch glosses this reconstruction as haya tree (a name used in Mexico for any broad-leaved tree), and lists only two variants (1989:66). I believe that his data and interpretation are deficient in this case.

Description: A polytypic generic that corresponds to LAU *Persea americana*. Trees of 5 - 15 meters; leaves alternate and simple, ovate and entire, glossy and dark green; flowers small and yellowish-green; fruit is a large green drupe with yellow-green flesh and a large brown seed. The fruit is eaten raw. Cultivated and protected in the temperate zone.

Specifics:

(A) *'ma^L gwɨɨ^{HL} bɵɵ^{LH}* «rounded avocado tree» [LAU *P. americana*]

(B) *'ma^L gwɨɨ^{HL} gia'^{LM}* «cacao avocado tree» [LAU *P. americana*]

(C) *'ma^L gwɨɨ^{HL} jí̱i̱'^{LH}* «sweet avocado tree» [LAU *P. americana*]. This name is cognate with the reconstructed proto-Chinantec term **hɨ̱ɪ'*; Rensch lists variants from three of the five subregions of the Chinantla (1989:81:#507). It is probable that this is a medium to high elevation cultivar.

(D) *'ma^L gwɨɨ^{HL} tee^L* «white avocado tree» [LAU *P. americana*]

(E) *'ma^L gwɨɨ^{HL} 'u'^{LM}* «owl avocado tree» [LAU *P. americana*]

(F) *'ma^L gwɨɨ^{HL} 'uí'^{M}* «black avocado tree» [LAU *P. americana*]. A synonym for this specific appears to be *'ma^L g^{w}ɨɨ^{HL} le'^{L}* which also translates as «black avocado tree».

16. ***'ma^L gwɨɨ^{HL} jlúu^{LM}***

Collections: none

Etymology: */'ma^L/ + /gwɨɨ^{HL}/ + /jlúu^{LM}/* = «tree» + «Chinantec proper name for avocado» + «resistant»; this is a secondary lexeme.

Description: A monotypic generic that corresponds to LAU. Does not have edible fruits but is used as construction wood.

17. ***'ma^L gwɨɨ^{HL} née^M***

Collections: RL0155, RL0181, RL0290, RL0291, RL0305

Etymology: */'ma^L/ + /gwɨɨ^{HL}/ + /née^M/* = «tree» + «Chinantec proper name for avocado» + «yellow»; this is a secondary lexeme. The name apparently refers to the yellowish-white heartwood of this tree.

Description: A polytypic generic that corresponds to LAU. The wood is very hard, and is used for hatchet handles.

Specifics:

(A) *'ma^{L} gwɨɨ^{HL} née^{M} jñu^{L} má'^{H}* «pubescent-leaved yellow avocado tree» [LAU]

(B) *'ma^{L} gwɨɨ^{HL} née^{M} joo^{L} má'^{H}* «cottony-leaved yellow avocado tree» [LAU]

(C) *'ma^{L} gwɨɨ^{HL} née^{M} huɨ'^{L} má'^{H}* «glabrous-leaved yellow avocado tree» [LAU]

18. *'ma^{L} gwɨɨ^{HL} 'níi^{L}*

Collections: none

Etymology: */'ma^{L}/* + */gwɨɨ^{HL}/* + */'níi^{L}/* = «tree» + «Chinantec proper name for avocado» + «Chinantec proper name for a specific type of avocado»; this is a secondary lexeme. This is a cognate of proto-Chinantec **'nii*, which Rensch reconstructs from variants from Quiotepec and San Pedro Sochiapan (1989:104). The name apparently refers to an avocado that is only found in the highland Chinantla.

Description: A monotypic generic that corresponds to LAU *Persea americana* subsp. *drymifolia*? Trees of 10 – 15 meters; leaves alternate, simple, entire, rather shiny and anise-scented leaves; flowers small and greenish yellowish, grouped in axillary clusters; fruit a small, egg-shaped, dark-green drupe, with an anise-like scent and taste. Fruits eaten raw; leaves used whole or ground to flavor food. Semi-cultivated in home gardens and shrub vegetation of the cold and temperate zones.

19. *'ma^{L} gwɨɨ^{HL} nuu^{L}*

Collections: EL0022, EL0130, RL0046, RL0126?, RL0450, SH0047]

Etymology: */'ma^{L}/* + */gwɨɨ^{HL}/* + */nuu^{L}/* = «tree» + «Chinantec proper name for avocado» + «wild»; this is a secondary lexeme. This name refers to wild relatives of cultivated avocados.

Description: A monotypic generic that corresponds to LAU. This may also be called ***'ma^{L} gwɨɨ^{HL} mó$^{'L}$*** «wild avocado tree» [SH0047]

20. *'ma^{L} gwɨɨ^{HL} ñí$^{'H}$*

Collections: LH0264

Etymology: */'ma^{L}/* + */gwɨɨ^{HL}/* + */ñí$^{'H}$/* = «tree» + «Chinantec proper name for avocado» + «Spanish»; this is a secondary lexeme. Description: A monotypic generic that corresponds to MOR *Ficus carica*, the fig, a native of SW Asia anciently cultivated in the Mediterranean region, from where it was brought over to the New World after the Spanish conquest. Shrubs of 2 – 3 meters with white latex; leaves alternate, simple and deeply-lobed; fruit a pear-shaped, sweet and fleshy berry that contains many small seeds. Fruits eaten raw, or more commonly boiled in sugar syrup. Semi-cultivated in the shrub vegetation and home gardens of dry zones.

21. *'ma^{L} gwɨɨ^{HL} tóo$^{'LH}$*

Collections: RL0090

Etymology: */'ma^{L}/* + */gwɨɨ^{HL}/* + */tóo$^{'LH}$/* «tree» + «Chinantec proper name for avocado» + «strong,durable»; this is a secondary lexeme.

Description: A monotypic generic that corresponds to LAU.

22. *'ma^{L} gwɨɨ^{HL} t<u>óo</u>$^{'L}$*

Collections:

Etymology: */'ma^{L}/* + */gwɨɨ^{HL}/* + */t<u>óo</u>$^{'L}$/* = «tree» + «Chinantec proper name for avocado» + «Chinantec proper name for a specific type of avocado»; this is a secondary lexeme. The name is cognate with proto-Chinantec ***gw** and ***tą́ą́**^{HLH}; the cognate set given by Rensch implies that ***tą́ą́**^{HLH} is a free-standing generic in lowland Chinantec languages, not overtly classified as a type of avocado.

Description: A monotypic generic that corresponds to LAU *Persea americana*. Trees of 15 – 20 meters with aromatic foliage; leaves alternate, simple and glossy; flowers regular, greenish-yellow, clustered in loose, axillary inflorescences; fruit a blackish-green, pear-shaped drupe. Cultivated in home gardens and cultivated fields of the temperate zones.

23. *'ma*^{L} *gwɨɨ*^{HL} *yee*^{L}

Collections: none

Etymology: /*'ma*^{L}/ + /*gwɨɨ*^{HL}/ + /*yee*^{L}/ = «tree» + «Chinantec proper name for avocado» + «Chinantec proper name for a fatty avocado called aguacate chupon or aguacate chinene in local Spanish»; this is a secondary lexeme. This is cognate with the proto-Chinantec reconstructed term ***yaa**^{L}; the variants that Rensch lists from all subregions of the Chinantla overtly classify this fruit as a type of avocado (1989:98).

Description: A monotypic generic that corresponds to LAU *Persea scheideana*, a avocado that is planted in humid forests of the Sierra Norte. Trees of 15 – 20 meters; leaves alternate, simple, entire, large and obovate, yellow-green; flowers inconspicuous, greenish-white; fruit a large crook-neck drupe that has whitish-green flesh containing fibrous strings. Fruit eaten raw; trees used to shade coffee groves? Cultivated in secondary forest of the temperate and hot zones.

24. *'ma*^{L} *gwo'*^{L}

Collections: none

Etymology: */'ma^L/ + /gwo$^{'L}$/* = «tree» + «seed» + «Chinantec proper name for some species of *Chenopodium*?».

Description: A monotypic generic that corresponds to CHN *Chenopodium berlandieri* subsp. *nuttalli*, a domesticated herb that is called by the Nahutal name huazontle in Mexico, and is grown and marketed for its edible leaves and flowers? Erect herbs of 30 – 50 cms.; leaves alternate, simple and lobed; flowers greenish-white, densely packed in elongate terminal inflorescences; seed small, shiny and black. Apparently formerly cultivated in the temperate dry zone; many Chinantec know the plant from their travels to Oaxaca City and especially central Mexico, where it is more commonly eaten than in the Chinantla. Often referred to as *'ma^L mí$^{'H}$ gwo$^{'L}$* «*Chenopodium* seed tree».

25. ***'ma^L gwoo^{LH}***

Collections: LH0056, LM0101?, SH0026a

Etymology: */'ma^L/ + /gwoo^{LH}/* = «tree» + «Chinantec proper name for a shrub with compound leaves».

Description: A monotypic generic that corresponds to RUT *Zanthoxylum*, possibly including some three species of the Sierra Norte. Shrubs of 2 – 3 meters with aromatic foliage; leaves compound, often punctate with resin-dots; flowers regular, white. Branchlets used as «spiritual cleansing»for evil eye; leaves prepared in bath for internal heat. Rare in dry areas.

This may also correspond to ANA *Rhus*. Small shrubs of 1 meter; leaves small and thickened. Flowers reddish-pink. Leaves, prepared in boiled tea, are used to wash skin wounds. Occasional in tropical dry zone.

26. *'ma^{L} gwóo$^{'LH}$*

Collections: EL0146, LM0384, SH0036b

Etymology: /*'ma^{L}*/ + /*gwóo$^{'LH}$*/ = «tree» + «soil». This is a cognate of the proto-Chinantec term for earth or soil ***gwaa$^{'H}$***; variants are found in all subregions of the Chinantla (Rensch 1989:68) but there is no indication that the term is used as a tree name in other Chinantec languages.

Description: A monotypic generic that corresponds to CLE *Clethra*, probably includes all 6 Sierra Norte species of *Clethra*. Trees of 4 – 15 meters, leaves alternate, simple and entire; flowers regular, cream-white; fruit a dark brown capsule. Wood used in house and furniture construction combined with other plants. Found in forests and shrub vegetation in cold and temperate zones.

27. *'ma^{L} 'iée^{H}*

Collections: LH0023, LM0093, LM0111, LM0213

Etymology: /*'ma^{L}*/ + /*'iée^{H}*/ = «tree» + «Chinantec proper name for custard apple». This is cognate with the reconstructed proto-Chinantec term for custard apple ****'yáá^{H}***; Rensch lists variants from all subregions of the Chinantla (1989:112).

Description: A polytypic generic that corresponds to ANN *Anona cherimola*, and probably includes other species of *Anona* available in Oaxaca markets and may be extended to wild Annonaceae species representing some five genera in the Sierra Norte. Trees of 2 – 4 meters; leaves broadly ovate, with strong venation; flowers yellow-white, pleasantly-scented; fruits green with a white, very sweet flesh inside; seeds large, black. Fruits, available in winter, eaten raw; leaves, prepared with castor oil and ointment?, placed as compress on mumps; young leaves, prepared with almond oil, placed on skin infections, and over the lungs for asthma. Commonly cultivated or protected in the temperate dry zone. Is there a wild form?

Specifics:

(A) ***'ma^{L} 'iée^{H} k^{w}óo$^{'LH}$*** «uneven(toothless) custard–apple tree» [ANN *Anona*]. This form gives a small edible fruit which has some parts which are dry, some which are pulpy.

(B) ***'ma^{L} 'iée^{H} rɸ$^{'L}$*** «green custard–apple tree» [ANN *Anona*]

(C) ***'ma^{L} 'iée^{H} tee^{L}*** «white custard–apple tree» [ANN *Anona*]

28. ***'ma^{L} 'iée^{H} too^{M}***

Collections: SH0007a

Etymology: */'ma^{L}/* + */'iée^{H}/* + */too^{M}/* = «tree» + «Chinantec proper name for custard–apple» + «Chinantec proper name for some trees in the Boraginaceae». Some Chinantec suggest that ***too^{M}*** refers to a one–eyed or blind person; this may be derived from ***tiuuñ1***, which is a cognate of the proto–Chinantec ****tuu^{H}***, which means blind (Rensch, 1989:38). This foliage of this oak may resemble custard–apple leaves.

Description: A monotypic generic that corresponds to FAG *Quercus magnolifolia*. Trees of 2 – 5 meters; leaves simple, alternate, thickened; flowers inconspicuous; fruit a rounded, hard–shelled nut. Wood used as fuel. Found in tropical and temperate dry zone around Chuparrosa. This category might include other species of *Quercus*.

29. ***'ma^{L} 'ɨ$^{'H}$***

Collections: LH0191, LM0068, SH0022a LM0066

Etymology: */'ma^{L}/* + */'ɨ$^{'H}$/* = «tree» + «Chinantec proper name for *Arbutus*».

Description: A monotypic generic that corresponds to ERI *Arbutus xalapensis*. Shrubs and trees of 2 – 5 meters; leaves simple, serrate, alternate, dark green, somewhat glossy; flowers urn– shaped, small, white, growing in dense clusters; fruits a red drupe. Bark, available year–round, is boiled and taken as a tea for kidneys problems and post–partum recovery; flowers are used for adornment around Christmas time; fruits are eaten by birds and may also be consumed by humans. Common in temperate to cold dry areas near Comaltepec. Sometimes cross–classified as ***lí'*** $^{'H}$ ***'ma*** ^{L} ***'ɨ́*** $^{'H}$. This category might be extended to *A. glandulosa*.

30. ***'ma*** ^{L} ***je*** ^{LH}

Collections: EL0046, RL0007, RL0194

Etymology: /***'ma*** ^{L}/ + /***je*** ^{LH}/ = «tree» + «Chinantec proper name for a common tree called jonote in local Spanish». This is cognate with the reconstructed proto–Chinantec term for balsa ****he*** ^{H}; Rensch lists variants from four of the five subregions of the Chinantla (1989:76).

Description: A monotypic generic that corresponds to TIL *Heliocarpus*; probably restricted to some six species of *Heliocarpus*, though may include other tree genera of Tiliaceae such as *Apeiba* and *Belotia*, each with a single species in the Sierra. Trees of 5 – 15 meters, fast–growing; wood rather light; leaves large, rounded, with prominent, veins; flowers & fruits not commonly observed. Tender leaf shoots eaten as cooked green; wood used for construction; bark used for binding?. Common in primary and especially secondary forest of humid zones. Which specific is used for Chinantec ladders?

Specifics:

(A) *'ma^{L} je^{LH} mó$^{'L}$* «montane balsa tree» [TIL *Heliocarpus*]

(B) *'ma^{L} je^{LH} tee^{L}* «white balsa tree» [TIL *Heliocarpus*]

(C) *'ma^{L} je^{LH} yúu^{M}* «red balsa tree» [TIL *Heliocarpus*]

31. *'ma^{L} ji^{L}*

Etymology: /*'ma^{L}*/ + /*ji^{L}*/ = «tree» + «paper». The name is cognate wit the proto–Chinantec term **hyi^{L}*, which Rensch reconstructs from variants representing all subregions of the Chinantla. Although it is not clear whether this term forms part of botanical names other parts of the Chinantla, the Comaltepec name may refer to the former use of the bark of this tree as a raw material for paper–making.

Collections: SH0001b, SH0138b

Description: A monotypic generic that corresponds to MOR *Ficus* spp., including several species of native figs. Small shrubs to trees with copious white latex; leaves simple, alternate and thickened; flowers pinkish white. Apparently without use, although the Chinantec name would appear to refer to a paper–making, a common use of *Ficus* in Veracruz. Occasional in oak and thorn scrub forests of tropical dry zones.

32. *'ma^{L} jii^{L} bøø^{HL}*

Collections: none

Etymology: /*'ma^{L}*/ + /*jii^{L}*/ + /*bøø^{HL}*/ = «tree» + «root» + «ball, rounded». The name is a description of the rounded tubers of potatoes. Rensch reconstructs a proto–Chinantec term for a «kind of tuber» **bø*, from Palantla Chinantec *bɨw^{L}* and Comaltepec Chinantec *hii bøø*. These forms are derived from words meaning «ball»or «short»(e.g. Comaltepec *bøø$^{'L}$*) which are cognate with the reconstructed proto–Chinantec term *$b\phi\phi^{'H}$ (1989:59).

Description: A monotypic generic that corresponds to SOL *Solanum* (potatoes). Herbs of 2 – 4 dms.; roots white and fleshy, rounded; leaves deeply divided into several segments; flowers purple, star–shaped. Roots, boiled in water, eaten as a vegetable. Rarely cultivated in the cold zone; commonly sold in village stores of Comaltepec, brought from the Oaxaca Valley. Apparently restricted to several species of *Solanum* that correspond to potatoes.

33. *'ma^L jii^L 'má^H*

Collections: EL0014

Etymology: /*'ma^L*/ + /*jii^L*/ + /*'má^H*/ = «tree» + «root» + «Chinantec proper name for yuca». Rensch reconstructs the proto–Chinantec term as *'*ma^L*, which is equal to the reconstruction for proto–Chinantec «tree» (1989:102). However, Rensch's cognate list is limited to three of the five Chinantec subregions, and it is likely that a more complete study would reveal differences between the «tree»and «manioc»terms.

Description: A monotypic generic that corresponds to EUP *Manihot esculentus*. Erect herbs of 2 – 3 meters; leaves deeply divided into numerous finger–like segments; root large and starchy; flowers white. Roots, boiled with sugar or salt, eaten as a vegetable or as a sweet dessert. Occasionally cultivated in the tropical humid zone, where it is said to also grow wild. Apparently restricted to *Manihot edulis*, and perhaps a few wild species of the same genus.

34. *'ma^L $j\underline{i}^{'L}$* (unmodified)

Collections: LH0054, LH0074, LH0082, LM0097, LM0170, LM0180, LM0181, RL0130, RL0139, RL0220, SH0058a

Etymology: */'ma^L/* + */ji̱'^L/* = «tree» + «Chinantec proper name for sour fruits». Rensch indicates that the reconstructed proto–Chinantec term ***hií'^L*** may be glossed as «sour», «orange» and «guava», and he suggests that the three cognate sets may be related; the terms for orange and guava may also be reconstructed with a ^HL tone (1989:81:#504, 505, 506). I think that the reconstructed proto–Chinantec term should have a short vowel, and that it refers to «sour fruits» in general (usually citrus and guavas; a variant from Lalana apparently refers to «custard apple»).

This is a probable case of the extension of a generic name to include introduced plants. *'ma^L ji̱'^L* perhaps originally referred to guavas, native fruits of Mesoamerica. With the arrival of the Spanish, the term was likely extended to citrus fruits. As used at present in Comaltepec, the unmarked generic refers to sweet and sour oranges and other citrus fruits, whereas common guavas are marked by a descriptor which means «real» and other guavas are marked by terms which connate «raspberry» and «pineapple» (see below).

Rensch also gives a reconstructed proto–Chinantec term for lemon ***hlɨɨ^L***, which he derives from variants from two lowland Chinantec subregions (1989:123:#939). This does not appear to be cognate with any Comaltepec Chinantec term for citrus or other fruits.

Description: A polytypic generic that corresponds to RUT *Citrus*, including all citrus fruit trees cultivated in the Sierra Norte. Trees of 2 – 10 meters; leaves ovate, smooth and sometimes glossy, pleasantly–scented; flowers white, strongly and pleasantly scented; fruits round, juicy, sweet to sour–tasting, various in size and color, from orange to yellow to green. Fruits of many specific eaten raw; juice of fruits used as condiment; leaves, boiled (at times with *manzanilla*), taken in tea for treating fever, headache, jaundice and colds. Alternately called ***'ma^L ji$^{'HL}$***. Cultivated or protected in temperate and tropical zones, varying by specific.

Specifics:

(A) ***'ma^L ji$^{'L}$ lima*** «lime sour-fruit tree» [RUT *Citrus aurantifolia*] Rensch lists numerous variants of a name what he considers «lima, a type of citrus fruit», reconstructed as proto-Chinantec ****tu^H*** (1989:35:22). There may be an equivalent term in Comaltepec; Quiotepec Chinantec has ***hįh$^{'H}$ tu^L***. Some members of the community recognize two varieties – **(a)** ***'ma^L ji$^{'L}$ lima*** (unmodified) «lime sour-fruit tree» [RUT *Citrus aurantifolia*], which is found in temperate regions, and **(b)** ***'ma^L ji$^{'L}$ lima real*** «royal lime sour-fruit tree» [RUT *Citrus* ?], which is cultivated in tropical regions.

(B) ***'ma^L ji$^{'L}$ limón*** «lemon sour-fruit tree» [RUT *Citrus* spp.]. Some members of the community consider that there are two varieties – **(a)** ***'ma^L ji$^{'L}$ limón dúu^H*** «sweet lemon sour-fruit tree» [RUT *Citrus* spp.] and **(b)** ***'ma^L ji$^{'L}$ limón tí$^{'L}$*** «sour lemon sour-fruit tree» [RUT *Citrus* spp.].

(C) ***'ma^L ji$^{'L}$ mandarii^L*** «mandarine sour-fruit tree» [RUT *Citrus reticulata*]

(D) ***'ma^L ji$^{'L}$ pomé^H*** «pomelo sour-fruit tree» [RUT *Citrus maxima*, possibly extended to RUT *Citrus paradisi*]

(E) ***'ma^L ji$^{'L}$ róo^M*** «sweet sour-fruit tree» [RUT *Citrus sinensis*]

(F) ***'ma^L ji$^{'L}$ rúu^L gui^{LH}*** «hair wash sour-fruit tree» [RUT *Citrus aurantinum* subsp. *bergamia*, noted by Mabberly to be used as a scent for hair oil].

35. ***'ma^L ji$^{'L}$ dsee^L***

Collections: LH0002, RL0072, SH0019b,

Etymology: */'ma^L/* + */ji̲$^{'L}$/* + */dsee^L/* = «tree» + «sour-fruit» + «true». See discussion under citrus fruits above. Rensch reconstructs the proto-Chinantec term ***há*** from guava names from Chiltepec and Sochiapan (1989:82:#519). I believe that this relates to the proto-Chinantec name for edible-green ***hę́'*** (see Rensch 1989:82:#520). The Comaltepec Chinantec variant is used a descriptor to indicate the sweetest or most prized variety of some fruits (see ***'ma 'u$^{'H}$ jmɨɨ^L ja̲$^{'L}$***, for example).

Description: A polytypic generic that corresponds to MRT *Psidium guajava*. Shrubs of 1 - 4 meters; leaves lanceolate; flowers cream-white to yellow; fruits yellow to orange, pleasantly-scented, sweet to sour in taste. Fruits commonly eaten raw; vegetative shoots, ground or chewed, is placed on canker sores, vegetative shoots, combined with *estafiate*, taken in tea for diarrhea; wood of wild types used for fuel. Commonly cultivated to protected in tropical dry and temperate zones. Found in Comaltepec and La Esperanza.

Specifics:

(A) ***'ma^L ji̲$^{'L}$ dsee^L née^M*** «yellow real sour-fruit tree» [MRT *P. guajava*]

(B) ***'ma^L ji̲$^{'L}$ dsee^L tee^L*** «white real sour-fruit tree» [MRT *P. guajava*]

(C) ***'ma^L ji̲$^{'L}$ dsee^L yú̲u̲^{M}*** «red real sour-fruit tree» [MRT *P. guajava*]

36. ***'ma^L ji̲$^{'L}$ fi$^{'L}$***

Collections: LH0128, LM0114, LM0285, LM0290?, RL0013, RL0474, SH0032b

Etymology: */'ma^L/* + */ji̲$^{'L}$/* + */fi$^{'L}$/* = «tree» + «Chinantec proper name for sour fruits» + «Chinantec proper name for raspberry». See discussion under citrus fruits above; the fruits of this bush have a tartness and taste which is comparable to that of raspberries.

Description: A monotypic generic that corresponds to MRT *Psidium guineense*, a native Mesoamerican shrub which is known as *guayapiña* in local Spanish. Shrubs of 1 – 2 meters; leaves simple, opposite and lanceolate; flowers cream–white to yellow; fruit a rounded, yellow berry which is pleasantly–scented, and sweet to sour in taste. Fruits eaten raw. Protected in shrub vegetation of the temperate and the tropical dry zones.

37. ***'ma^{L} j$\underline{i}$$^{'L}$ jú$^{'H}$***

Collections: none

Etymology: /*'ma^{L}*/ + /*j$\underline{i}$$^{'L}$*/ + /*jú$^{'H}$*/ = «tree» + «Chinantec proper name for sour fruits» + «Chinantec proper name for pineapple». See discussion under citrus fruits above; the fruits of this bush have a taste which is said to be reminiscent of pineapple.

Description: A monotypic generic that corresponds to MRT *Psidium friedrichthalianum*?, the Costa Rican guava. Trees of 5 – 10 meters; leaves simple, opposite and oblong; flowers regular, cream–white, with numerous stamens; fruits a oval, yellow berry that contains numerous hard seeds. Protected in the secondary forest of the tropical humid zone.

38. ***'ma^{L} j$\underline{i}$$^{'L}$ nuu^{L}***

Collections: RL0179, RL0307, RL0353, RL0490, RL0565,

Etymology: /*'ma^{L}*/ + /*j$\underline{i}$$^{'L}$*/ + /*nuu^{L}*/ = «tree» + «Chinantec proper name for sour fruits» + «wild».

Description: A monotypic generic that corresponds to MNM *Mollinedia*. The leaves look and smell like orange leaves; used for firewood.

39. ***'ma^L ji̲'^{L} róo^M kiá^M dsea^L nuu^L***

Collections: RL0156, RL0232

Etymology: /***'ma^L***/ + /***ji̲'^{L}***/ + /***róo^M***/ + /***kiá^M***/ + /***dsea^L***/ + /***nuu^L***/ = «tree» + «Chinantec proper name for sour fruits» + «sweet» + «for» + «people» + «wild». ***dseanuu^L*** is the Chinantec name for foreigners, and this name indicates the exotic origin of the rose apple. This name is perhaps a descriptive phrase used by only some Chinantec speakers. Others know it by a variation on its Spanish name *poma rosa*.

Description: A monotypic generic that corresponds to MRT *Syzygium jambos*. Tree of 2 – 4 meters; leaves broadly lanceolate; flowers large, white, falling to ground underneath tree; fruit pale yellow, pleasantly-scented, sweet-tasting. Fruit eaten raw. Occasional in secondary forest of the humid zones.

40. ***'ma^L jlaa^L***

Collections: EL0116, RL0259?, RL0264

Etymology: /***'ma^L***/ + /***jlaa^L***/ = «tree» + «broad». The name apparently refers to the broad leaves of this tree.

Description: A monotypic generic that corresponds to BNL *Brunellia mexicana*. Trees of 2 – 15 meters; leaves very large, compound, the leaflets large; flowers greenish-white, small and inconspicuous, loosely grouped in a diffuse inflorescence. Wood used in house construction (fencing and roofing). Common in primary and secondary forest of the humid zone. The category is possibly extended to *Brunellia* *comocladifolia*, the only other species of Brunelliaceae found in the Sierra. A synonym is ***'ma***^{L} ***kwee***^{L} ***moo***^{L} «long-leaved tree». ***'ma***^{L} ***gwɨɨ***^{HL} ***kwee***^{L} ***moo***^{L} «long-leaved avocado tree» may correspond to PRT *Roupala montana*, a large tree of temperate humid forests that is sometimes used as a shade for coffee.

41. *'ma*^{L} ***jlɨ***^{HL}

Collections: LH0296, LM0064; RL0184, RL0193, RL0227, RL0348, RL0454, RL0491, RL0523, RL0551, RL0563

Etymology: /***'ma***^{L}/ + /***jlɨ***^{HL}/ = «tree» + «to split». The name refers to the fact that the wood which splinters easily, which facilitates preparing firewood. The name is a cognate of the proto-Chinantec reconstructed term meaning «split» ****hlɨ*** for which Rensch presents variants from two subregions of the Chinantla; there is no indication that the term is used in botanical names in these areas (1989:123:#935).

Description: A polytypic generic that corresponds to shrubs with resin-dotted leaves? such as MRS *Parathesis*, *Rapanea*, *Zunila*, MRT *Eugenia*, and MYR *Myrica* [SH0024a]?; FAB *Desmodium*?. Shrubs of 2 - 3 meters; leaves usually lanceolate, punctate with numerous resin dots, sometimes fragrant when broken; flowers inconspicuous, often small and closely attached to the stem; fruits various. Wood used for fuel and for utensils (hook for cleaning weeds from coffee plantations); leaves used for «people that think too much», placed on right arm?; leaves used for cattle forage. Occasional in the temperate humid zone, and along humid stream banks in the temperate dry zone. Possibly includes at least 18 species of 6 genera of Myrsinaceae in the Sierra, plus 2 species of Myricaceae and numerous species of *Eugenia*, a taxonomically complex genus of Myrtaceae.

Specifics:

(A) ***'ma***^{L} ***jlɨ***^{HL} (unmodified) «splitting tree» [MRS *Rapanea*, MRT *Eugenia*]

(B) ***'ma***^{L} ***jlɨ***^{HL} ***mó***$^{\prime L}$ «montane splitting tree» [MRS *Zunila alba*]. This may also be called ***'ma***^{L} ***jlɨ***^{HL} ***nuu***^{L} «wild splitting tree».

(C) ***'ma***^{L} ***jlɨ***^{HL} ***pí***$^{\prime H}$ «small splitting tree» [MRS *Parathesis*]

42. ***'ma***^{L} ***jmɨ***^{LH}

Collections: EL0047, EL0092, RL0228

Etymology: /***'ma***^{L}/ + /***jmɨ***^{H}/ = «tree» + «blood». This is a cognate of the reconstructed proto-Chinantec term for «blood» ****hmɨ***^{L}; Rensch lists variants in all subregions of the Chinantla (1989:113:#846). It is possible that the blood-red sap of these trees, called *llorasangre* in Spanish, inspires a pan-Chinantec generic category.

Description: A monotypic generic that corresponds to EUP *Croton draco*. Small trees of 2 - 4 meters; sap deep red, turning white and opaque when rubbed on the skin; leaves large, heart-shaped; flowers inconspicuous, whitish, borne on a long, spike-like inflorescence. Whole plant used to shade coffee plantations; wood used as fuel and for construction (*troja*). Abundant in secondary vegetation of the humid zone.

43. ***'ma***^{L} ***jmɨ***$^{\prime LM}$

Collections: none

Etymology: /***'ma***^{L}/ + /***jmɨ***$^{\prime LM}$/ = «tree» + «Chinantec proper name for tomato». This is a cognate of the proto-Chinantec term for tomato ****hmį́***$^{\prime LH}$; variants are found in all subregions of the Chinantla (Rensch, 1989:113:#851).

Description: A polytypic generic that corresponds to SOL *Lycopersicon esculentum* vars. *esculentum* and *leptophyllum*. Erect herbs of 20 – 50 cms.; leaves various; flowers yellow, star or cup-shaped ; fruit always berry-like, sometimes enclosed in a husk, strong-tasting, often slightly sweet to sour. Fruits eaten raw or cooked on a daily basis, often used as base for sauces; whole plant of Physalis prepared in a bath or as a compress, used for *derisepela*. Cultivated throughout temperate and tropical zones; wild forms common throughout the community, often protected and growing in association with corn. See also ***ja̲'ᴸᴹ jmɨ'ᴸᴹ*** for other species of Solanaceae.

Specifics:

(A) ***'maᴸ jmɨ'ᴸᴹ dséeᴴ*** «true tomato tree» [SOL *L. esculentum*]. This specific corresponds to a large and prized tomato.

(B) ***'maL jmɨ'ᴸᴹ jí̲'ᴴ*** «sour tomato tree» [SOL *L. esculentum*]

(C) ***'maᴸ jmɨ'ᴸᴹ jminiᴹᴴ kʷeaᴸᴴ*** «horse-eye tomato tree» [SOL *L. esculentum*]. This term may also be used for the large SOL *Physalis* sold in markets.

(D) ***'maᴸ jmɨ'ᴸᴹ kʷó'ᴸ*** «guaje-gourd tomato tree» [SOL *Lycopersicon esculentum*]. This specific, which is called tomate guajillo in local Spanish, is a store bought tomato considered to be of low quality.

(E) ***'maᴸ mɨ́'ᴴ jmɨ'ᴸᴹ nuuᴸ*** «wild rounded-fruit tomato tree» [SOL *Lycopersicon esculentum* var. *leptophyllum*]

(F) ***'maᴸ jmɨ'ᴸᴹ tiiᴸ*** «thin tomato tree» [SOL *L. esculentum*]

(G) ***'maᴸ jmɨ'ᴸᴹ yʉ̲́ʉ̲ᴸ*** «red tomato tree» [SOL *L. esculentum*]

44. *'maᴸ jmɨ'ᴸᴹ 'nʉ́ᴴ*

Collections: LM0193, RL0105

Etymology: */'maᴸ/ + /jmɨ'ᴸᴹ/ + /'nʉ́ᴴ/* = «tree» + «Chinantec proper name for tomato» + «Chinantec proper name for *Physalis*».

Description: A monotypic generic that corresponds to SOL *Physalis* spp.

45. *'ma^{L} jmɨ$^{'LM}$ mó$^{'L}$*

Collections: LH0153

Etymology: */'ma^{L}/* + */jmɨ$^{'LM}$/* + */mó$^{'L}$/* = «tree» + «tomato» + «montane»

Description: A monotypic generic that corresponds to SOL *Lycianthes geminiflorum*. Check synonymy with peaches & chilies. Might also be classified as a *ja̱$^{'L}$*.

46. *'ma^{L} jmo$^{'H}$*

Collections: EL0042, RL0075, RL0315

Etymology: */'ma^{L}/* + */jmo$^{'H}$/* = «tree» + «Chinantec proper name for a fast-growing tree with light wood». This is cognate with a proto-Chinantec tree name ***hmáá$^{'H}$**, which Rensch reconstructs from variants representing three subregions of the Chinantla (1989:115:#870). The tree is called *guarumbo* or *chancarro blanco* in local Spanish.

Description: A polytypic generic that corresponds to MOR *Cecropia*, apparently restricted to two Sierra Norte species. Trees of 2 - 20 meters, fast growing; branches divided into segments like *carrizo* (POA *Arundo donax*), brittle and easily broken; wood very light; leaves very large, deeply divided into 5 - 10 rounded lobes; flowers borne along spike-like clusters, the spikes in groups of 5 - 10. Vegetative shoots, boiled in tea, is used for diabetes; fruits eaten by wild animals. Common in secondary vegetation of the humid zones.

Specifics:

(A) *'ma^{L} jmo$^{'H}$ tee^{L}* «white *Cecropia* tree» [MOR *Cecropia*]

(B) ***'ma^L jmo'^{H} y<u>uu</u>^{L}*** «red *Cecropia* tree» [MOR *Cecropia*]

47. *'ma^L joo^L*

Collections: RL0422

Etymology: */'ma^L/* + */joo^L/* = «tree» + «Chinantec proper name for cotton». This is a cognate of the reconstructed proto-Chinantec term ****haa^L***; Rensch lists variants from all the subregions of the Chinantla (1989:78:#470).

Description: A monotypic generic that corresponds to MLV *Gossypium*, The category is extended to CCH *Cochlospermum*.

48. *'ma^L joo^{LH}*

Collections: LH0005, LH0011, LM0088, RL0135, RL0299, RL0464, SH0028a

Etymology: */'ma^L/* + */joo^{LH}/* = «tree» + «Chinantec proper name for elderberry». *joo^{LH}* may be derived from the Chinantec name for cotton since the inflorescences of *Sambucus* are formed by clusters of white flowers that may seem to resemble cotton (see discussion of cotton above).

Description: A monotypic generic that corresponds to CPR *Sambucus*, of which two species are represented in the Sierra, *S. canadensis* and *S. mexicana*. Shrubs of 2 –3 meters; stems thin (1 – 2 cms.); leaves large, compound, divided into 7 – 9? ovate leaflets; flowers small, white, densely grouped into large, flat– topped terminal inflorescences; fruits small, purple–black, berry–like. Leaves used fresh as «spiritual sweeping» for evil eye; leaves boiled as bath for physical exhaustion; leaves, boiled in tea, used for chapped lips; flowers, heated with honey, bougainvillea flowers, *Gnaphalium* flowers, cinnamon bark and combined with lemon juice, taken for coughs; roots used to stop drinking. Common in humid streambanks of dry zones;

occasional in temperate humid forest. The use seems to reflect distribution – the plant is well known and widely used in Comaltepec, but its properties are apparently not well know in the coffee-growing ranches like La Esperanza.

49. ***'ma**^{L} **jo̱**$^{'H}$*

Collections: LH0229, LM0222, SH0021a, SH0031b, SH0033b

Etymology: /*'ma*^{L}/ + /*jo̱*$^{'H}$/ = «tree» + «Chinantec proper name for willows».

Description: A polytypic generic that corresponds to SAL *Salix*, probably includes all 4 species of *Salix* that grow in the Sierra, and possibly the other local genus of Salicaceae, *Populus*. Shrubs of 2 – 3 meters; branches thin and very flexible; leaves narrowly to broadly lanceolate; flowers yellow, arranged in a spike-like cluster; fruits brown, dry, containing cottony seeds. Branchlets ornamental, used to make crown of the apostles in Easter week. Common along humid riverbanks of the temperate zones.

Specifics:

(A) *'ma*^{L} *jo̱*$^{'H}$ ***rø***$^{'L}$ «green willow tree» [SAL *Salix bonplandiana*]. This specific may also be referred to as *'ma*^{L} *jo̱*$^{'H}$ (unmodified) «willow tree».

(B) *'ma*^{L} *jo̱*$^{'H}$ ***tiiL*** «thin willow tree» [SAL *Salix taxifolia*?]

50. *'ma*^{L} *j*^{w}*óo*^{L}

Collections: LH0013, LH0025, LM0042, LM0155, SH0004b, SH0043b

Etymology: /*'ma*^{L}/ + /*j*^{w}*óo*^{L}/ = «tree» + «Chinantec proper name for castor- bean». This term may be related to the proto-Chinantec term for «pus, rotten» ****h**^{w}**aa***$^{'L}$; the cognate set listed by Rensch includes variants from all subregions of the Chinantla (1989:122). The name referred to the medicinal use of the castor bean leaves.

Description: A polytypic generic that corresponds to EUP *Ricinus communis*. Shrubs of 1 – 2 meters; leaves large and deeply lobed, dark green to dark red; flowers yellowish–green or purple, borne at top of plant in terminal cluster; fruits spiny, turning brown at maturity; seeds shiny, oily. Leaves – prepared with various combinations of alcohol, oil, lard, almond oil and ash – are applied as compress to abdomen for stomach problems (*empacho*); seeds sometimes sold in Oaxaca, used to express oil burned in churches; oil rarely prepared in Comaltepec, seeds are ground, strained, and the oil is cooked until ready. Commonly cultivated or protected in home gardens and disturbed areas in Comaltepec and ranches of dry zones. Sometimes cross–classified as ***mí'ᴴ 'maᴸ jʷóoᴸ***.

Specifics:

(A) ***'maᴸ jʷóoᴸ teeᴸ*** «white castor–bean tree» [EUP *Ricinus communis*] medicinal

(B) ***'maᴸ jʷóoᴸ yúuᴸ*** «red castor–bean tree» [EUP *Ricinus communis*]

51. ***'maᴸ jʷóoᴸ kiá'ᴹ ñí'ᴹ***

Collections: LH0076, SH0123a

Etymology: */'maᴸ/* + */jʷóoᴸ/* + */ñí'ᴹ/* = «tree» + «Chinantec proper name for castor–bean» + «Spanish». Although native to Mexico, it may be that this weedy plant became more common in recent years and is thus considered a foreign plant.

Description: A monotypic generic that corresponds to SOL *Datura*. Shrubs of 1 – 2 meters; leaves large and lobed; flowers lavender to purple, borne in terminal cluster; fruits spiny, turning brown at maturity; seeds black, shiny. Leaves, prepared with almond oil, applied as compress for skin infections. Common in disturbed areas of Comaltepec and ranches of dry zones. Also called by the local Spanish name *toloache*, which is derived from Nahuatl.

52. ***'ma^L ka^{LH}***

Collections: EL0008, LH0226, LH0293, LH0299, RL0033, RL0095, RL0192, RL0532

Etymology: /***'ma^L***/ + /***ka^{LH}***/ = «tree» + «Chinantec proper name for *Saurauia*». Rensch (1989) gives no cognate reconstructed proto-Chinantec term, but I expect this to be a widespread name for *Saurauia* in the Chinantla.

Description: A polytypic generic that corresponds to ACT *Saurauia*, probably including all 13 local species of *Saurauia*, the only genus of Actinidiaceae found in the Sierra. Shrubs to small trees of 2 – 4 meters; leaves large, broadly lanceolate, whorled; flowers white, showy; fruits green, mucilaginous inside, somewhat sweet. Fruits occasionally eaten raw in autumn, also eaten by wild animals such as badgers; wood used as fuel and for house construction. Occasionally cross-classified as ***li^H 'ma^L ka^{LH}***. May occasionally be confused with the folk generic for *Clethra*, ***'ma^L g^{w}óo$^{'LH}$*** (i.e. RL0532 is called ***'ma^L g^{w}óo$^{'LH}$ nuu^L***, «wild *Clethra* tree»).

Specifics:

(A) ***'ma^L ka^{LH}*** (unmodified) «*Saurauia* tree» [focal member = *S. scabrida*]

(B) ***'ma^L ka^{LH} tii^L*** «thin *Saurauia* tree» [focal member = *S. serrata*]

53. ***'ma^L kɨɨ́^{HL}*** (unmodified)

Collections: LH0099, LM0083, SH0019a

Etymology: /***'ma^L***/ + /***kɨɨ́^{HL}***/ = «tree» + «Chinantec proper name for pines». This is a cognate of the reconstructed proto-Chinantec term for pines ****kɨɨ^{HL}***; variants are found in all subregions of the Chinantla (Rensch 1989:42).

Description: A polytypic generic that corresponds to PIN *Pinus*, including most of the 16 species found in the Sierra. Trees of 4 – 30 meters; «leaves» are thin needles, green, short (in CUP) to long (in PIN), fragrant; flowers absent; fruit a small to large cone. Wood used for kindling, fuel and for construction; leaves, prepared as tea, for esponjado?; sap used to treat skin wounds; branchlets and fruits used for ornament, especially around Christmas. Abundant in temperate dry and cold zones, occasionally cultivated in home gardens [CUP]; occasional in temperate humid areas; rare in tropical zones.

Specifics:

(A) *'ma^{L} kɨɨ́^{HL} bɸɸ$^{'LH}$* «short pine tree» [PIN *Pinus*] apparently the pine tree that grows on Cerro Humo Chico and Cerro Pelon, 3000+ meter peaks that divide the dry and humid zones of Comaltepec.

(B) *'ma^{L} kɨɨ́^{HL} kuu^{LH}* «stone? pine tree» [PIN *Pinus chiapensis*] This is the pine of Puerto Eligio.

(C) *'ma^{L} kɨɨ́^{HL} jaang^{LH}* «jointed pine tree» [PIN *Pinus*] These are pine trees that have many branches sprouting from each node, making it difficult to split the wood into long pieces.

(D) *'ma^{L} kɨɨ́^{HL} tii^{L} má$^{'H}$* «thin-leaf pine tree» [PIN *Pinus*]. This is apparently a short-needled pine tree.

(E) *'ma^{L} kɨɨ́^{HL} yʉ$^{'LM}$* «pitch pine tree» [PIN *Pinus* (pitch pines)]. These are pines of hot country.

54. ***'ma^{L} kɨɨ́^{HL} gia$^{'LM}$***

Collections: RL0260

Etymology: */'ma^L/* + */kɨɨ́^HL/* + */gia'^LM/* = «tree» + «Chinantec proper name for pine» + «Chinantec proper name for cocoa».

Description: A monotypic generic that corresponds to PIN *Abies*?

55. *'ma^L kɨɨ́^HL ñí'^M*

Collections: LM0076, LM0138, LM0145, LM0186b, LM0355?

Etymology: */'ma^L/* + */kɨɨ́^HL/* + */ñí'^M/* = «tree» + «Chinantec proper name for pine» + «Spanish».

Description: A monotypic generic that corresponds to CUP *Cupressus*/ PIN *Pinus ayacahuite*.

56. *'ma^L kɨng'^LM tu^L*

Collections: LM0260, LH0192, LH0291

Etymology: */'ma^L/* + */kɨng'^LM/* + */tu^L/* = «tree» + «knock-down,kill» + «chicken». The plant is apparently poisonous for chickens.

Description: A monotypic generic that corresponds to ERI *Lyonia squamulosa*. Small shrubs of less than 1 meter; leaves small, covered with gold-brown scales; flowers white. Flowers used for adornment; whole plant said to be poisonous for chickens and turkeys. Common in pine-oak forest of temperate to cold dry zones. Also called ***má'^H 'ma^L kɨng'^LM tu'mɨɨ^M tu^L***, «small-leaf tree knock-over chicken hole?». This may also be called ***má'^H 'ma^L too^L***.

57. *'ma^L kúu^LM jɨ́ɨ'^LH*

Collections: none

Etymology: */'ma^L/* + */kúu^LM/* + */jɨ́ɨ'^LH/* = «tree» + «testicles» + «horse». The bilocular fruits of this tree are said to resemble horse's testicles in size and shape.

Description: A monotypic generic that corresponds to a large tropical tree with large, rounded fruits apparently reminiscent of horse testicles. Apparently without use. Occasional in the tropical humid forest.

58. *'ma^L k^{w}á̲^{H}*

Collections: LH0297, LH0298, LH0347, LM0210, LM0216, LM0244, LM0258, RL0358, SH0016a

Etymology: */'ma^L/* + */k^{w}á̲^{H}/* = «tree» + «Chinantec proper name for some Mimosoids with long, exserted stamens».

Description: A polytypic generic that corresponds to FAB *Acacia angustissima*, *Calliandra grandiflora* and *C. hirsuta*, *Zapoteca* sp. and other Mimosoidae. Herbs or small shrubs; leaves large, compound and finely divided; flowers white, in ball-shaped inflorescence, or a group of red or white long stamens; fruit a long flattened pod. Wood of typical form used to speed the fermentation of the slightly alcoholic beverages, *tepache* (from sugar cane) or *pulque* (from *Agave atrovirens*); leaves, prepared in bath, applied externally for *espinilla*; flowers used as ornamental; leaves eaten by horses; bark of wild form, placed in mescal, used as veterinary medicine for cows. Common in tropical dry zones; occasional in temperate dry and humid zones. Often alternately classified as ***'oo^L k^{w}á̲^{H}***. See also ***'ma^L tó̲o̲$^{'LM}$***. This category is synonymous with ***'ma^L dsii^L 'mɨ^{MH}*** «dog-tick tree» (also called ***'oo^L dsii^L 'mɨ^{MH}*** «dog-tick medicinal herb») and may be extended to include many mimosoid Fabaceae, including species *Acacia*, *Calliandra*, *Mimosa*, *Zapoteca*, but excluding *Leucaena* species.

Specifics:

(A) ***'ma***^{L} ***k***^{w}$\underline{\acute{a}}^{H}$ (unmodified) «mimisoid tree» [FAB *Acacia angustissima*]

(B) ***'ma***^{L} ***k***^{w}$\underline{\acute{a}}^{H}$ ***tii***^{L} «thin mimisoid tree» [FAB *C. grandiflora*, *C. hirsuta*] This may also be called ***'ma***^{L} ***k***^{w}$\underline{\acute{a}}^{H}$ ***nuu***^{L} «wild mimisoid tree» synonym ***'ma***^{L} ***dsi'mɨɨ***^{H}

59. ***'ma***^{L} ***k***^{w}***ée***$^{'MH}$

Collections: LH0209, LM0072, LM0383, SH0045b

Etymology: /***'ma***^{L}/ + /***k***^{w}***ée***$^{'MH}$/ = «tree» + «gourd bowl (Sp. *jicarilla*)». The acorns of this oak are said to resemble small gourds. The name appears to be related to the proto–Chinantec term for gourd dipper ****k***^{w}***ee***$^{'H}$; similar terms are found in all subregions of the Chinantla (Rensch 1989:50:#159). However, the name appears to be cognate with a proto–Chinantec term for «bark, peeling» ****k***^{w}***éé***$^{'H}$, which has variants in all of the lowland Chinantec languages (ibid 1989:50:#160). The Comaltepec Chinantec name applies to an oak (perhaps because of a perceived similarity between the acorns and gourds), but it is possible that in other areas the name corresponds to *Crescentia* trees. Another possibility is that the name may refer to the peeling bark of this tree.

Description: A monotypic generic that corresponds to FAB *Quercus urbanii*. Trees of 4 – 8 meters?; leaves large, recurved; flowers inconspicuous; fruits brown, 2 cm., shell tough, nutty inside. Wood commonly used for fuel; bark medicinal for ?, taken as tea; fruit, available in fall and winter, recognized as edible, but never used. Restricted to temperate and cold dry areas above Comaltepec. This category may be extended to other oaks with large, recurved leaves.

60. ***'ma***^{L} ***k***^{w}***ɨjii***^{H}

Collections: EL0079, LH0156, LH0315, LM0120, SH0059a

Etymology: */'ma*^{L}/ + /*k*^{w}*ɨ*^{LM}/ + /*jii*^{H}/ = «tree» + «Chinantec proper name for maize» + «bee». ***k***^{w}***ɨjii***^{H} is the PN for bumblebee, perhaps so-called because its shape and coloration resemble that of a grain of corn. The name for bee is cognate with the proto-Chinantec term ****hii***^{H}, for which Rensch lists variants from all the Chinantec subregions (1989:76:#445). In Comaltepec Chinantec, this botanical name refers to urticaceous plants, which apparently have an irritant effect similar to a bee sting.

Description: A polytypic generic that corresponds to HYD *Wigandia*, ULM *Lozanella enatiophylla*. Shrubs of 1 - 2 meters, covered with stinging or irritant hairs; leaves large and variously shaped; flowers purple, or whitish-green and inconspicuous. Leaves used as compress for rheumatism, and for pregnant women when they suffer from morning sickness. Seven shoots of the plant are used for spiritual cleansings or *limpias*), since the small spines of the plant are thought to pull evil spirits from the body. The plant is considered to be hot. Common in temperate dry and cold zones. This category may be extend to other stinging, shrubby plants used for rheumatism. It may be cross-classified as ***'moo***^{L} ***k***^{w}***ɨjii***^{H} («bumblebee large-leaf»).

Specifics:

(A) ***'ma***^{L} ***k***^{w}***ɨjii***^{H} (unmodified) «bumblebee tree» [HYD *Wigandia*]

(B) ***'ma***^{L} ***k***^{w}***ɨjii***^{H} ***mó***$^{'L}$ «montane bumblebee tree» [ULM *Lozanella enantiophylla*]. This may also be called ***'ma***^{L} ***k***^{w}***ɨjii***^{H} ***nuu***^{L} «wild bumblebee tree».

61. ***'ma***^{L} ***k***^{w}***ɨsʉ***$^{'LM}$

Collections: LH0284

Etymology: */'ma*^{L}/ + /*k*^{w}*ɨ*^{LM}/ + /*sʉ*$^{'LM}$/ = «tree» + «Chinantec proper name for maize» + «itching, burning sensation». The term for itching is cognate with the reconstructed proto-Chinantec term **siuu*^{iL}; variants of term are widespread in the Chinantla (Rensch 1989:71:#397). In Comaltepec Chinantec, this botanical name refers to urticaceous plants.

Description: A polytypic generic that corresponds to EUP *Cnidoscolus*, and may be extended to CAR *Carica cnidosculoides*. This category is considered to be the male counterpart of EUP *Jatropha* (the female). This category may be cross-classified as ***moo***^{L} ***k***^{w}***ɨsu***^{iLM} «itch-maize large-herb».

62. *'ma*^{L} ***k***^{w}***i̠***^{iLM}

Collections: LH0012, LM0146, LM0378

Etymology: /*'ma*^{L}/ + /*k*^{w}*i̠*^{iLM}/ = «tree» + «Chinantec proper name for *Leucaena*, called *guaje* in local Spanish)». *k*^{w}*i̠*^{iLM} is polysemous for the *guaje* tree and the city/valley of Oaxaca. It is cognate with the reconstructed proto-Chinantec term for Oaxaca City **k*^{w}*i̠'*; variants are found throughout the Chinantla (Rensch 1989:50:#166). The name «Oaxaca» is apparently derived from the fact that the valley was once forested by large groves of *Leucaena*.

Description: A polytypic generic that corresponds to FAB *Leucaena*, probably including all seven species of *Leucaena* found in the Sierra. Trees of 2 to 20 meters; leaves compound with many, fine divisions; flowers white, arranged in a ball-shaped inflorescence; fruits a long, flat pod; seeds green, peppery-tasting *(Leucaena)*. Leucaena seeds eaten raw or cooked in soup as summertime food, and as medicine for intestinal parasites; tender young leaves and leaf buds eaten cooked, also effective against parasites; young leaves given as forage to goats. *Leucaena* is a common, managed tree of dry zones.

Specifics:

(A) *'ma^L k^{w}i̱$^{'LM}$ tee^L* «white *Leucaena* tree» [FAB *Leucaena*]

(B) *'ma^L k^{w}i̱$^{'LM}$ yúu̱^{M}* «red *Leucaena* tree» [FAB *Leucaena*]

63. ***'ma^L k^{w}i̱$^{'LM}$ nuu^L***

Collections: EL0009, EL0145, LM0163, LM0208, LM0217, RL0076, RL0350

Etymology: */'ma^L/ + /k^{w}i̱$^{'LM}$/ + /nuu^L/* = «tree» + «Chinantec proper name for *Leucaena*, called *guaje* in local Spanish» + «wild». See explanation of guaje above.

Description: A monotypic generic that corresponds to FAB *Acacia angustissima*, *Chamaecrista* aff. *glandulosa*, *Senna multijuga* subsp. *doylei*, *Zapoteca tetragona*. Trees of 15 to 20 meters; leaves compound with many, fine divisions; flowers yellow, in open flower clusters; fruit a long, flat pod; seeds green. Wood used as fuel and for house construction; whole plant used as shade in coffee plantations. Found in secondary forest of the humid zones. An alternate name is *'ma^L k^{w}i̱$^{'LM}$ tii^L* «thin *Leucaena* tree»; this refers to FAB *Zapoteca*.

64. ***'ma^L k^{w}óo$^{'L}$ kwidsii^{MH}***

Collections: RL0089

Etymology: */'ma^L/ + /k^{w}óo$^{'L}$/ + /k^{w}idsii^{MH}/* = «tree» + «Chinantec proper name for large-gourd-bowl, called jicara in local Spanish» + «Chinantec proper name?». *k^{w}óo$^{'L}$* is a cognate of the reconstructed proto-Chinantec term **k^{w}aa$^{'L}$*, which Rensch glosses as «gourd for carrying water»; he lists variants from Lalana and Comaltepec (1989:50:#162). The term is close to *k^{w}ée$^{'MH}$* (see above), which is also a type of gourd. I believe that in Comaltepec *k^{w}ée$^{'MH}$* refers to *Lagenaria*, while *k^{w}óo$^{'L}$* is the name for *Crescentia*.

Description: A polytypic generic that corresponds to BIG *Crescentia* spp. and *Amphitecna*. Trees of 5 to 20 meters; leaves large and sometimes very long; flowers white?; fruit a large, rounded and hollow with a woody shell. Fruit used as container and household utensil; fruits edible? dried and sliced? Occasional in the tropical humid zone.

Specifics:

(A) *'ma*^{L} *k*^{w}*o*$^{\prime L}$ *k*^{w}*idsii*^{MH} (unmodified) «gourd tree» [BIG *Crescentia alata*]

(B) *'ma*^{L} *k*^{w}*o*$^{\prime L}$ *k*^{w}*idsii*^{MH} *nuu*^{L} «wild gourd tree» [BIG *Amphitecna*]

65. *'ma*^{L} $k^{w}\underline{oo}^{LH}$

Collections: EL0105, RL0202, RL0233

Etymology: /*'ma*^{L}/ + /$k^{w}\underline{oo}^{LH}$/ = «tree» + «Chinantec proper name for *Bunchosia*». A reconstructed proto-Chinantec term should be ***k*^{w}*ǫǫ***, and I expect variants of this to be the common botanical name for some fruit trees in many Chinantec subregions. The closest term listed by Rensch is ***k*^{w}*aa***, meaning «Petlapa, a Chinantec village» (1989:51:172). It may be that Petlapa is so-named because *Bunchosia* or similar fruit trees are abundant there.

Description: A polytypic generic that corresponds to MLP *Bunchosia*, represented by at least 5 species in the Sierra. Tree of 4 – 10 ? meters; leaves lanceolate to ovate; flowers yellow to yellow-orange; fruits round, yellow-orange, sweet-tasting. Fruits are eaten by birds; young leaves eaten as an edible-green. Occasional in primary and secondary forests of the humid zones. Often called *'ma*^{L} *mɨ*$^{\prime H}$ $k^{w}\underline{oo}^{LH}$ «*Bunchosia* fruit tree».

Specifics:

(A) ***'ma^L k^w<u>oo</u>^{LH}*** (unmodified) «*Bunchosia* tree» [MLP *Bunchosia*]

(B) ***'ma^L k^w<u>oo</u>^{LH} nuu^L*** «wild *Bunchosia* tree» [?; a tree that does not have *Bunchosia*-like fruits]

66. ***'ma^L lea^{LH}***

Collections: EL0027, RL0027, RL0414, RL0467

Etymology: /***'ma^L***/ + /***lea^{LH}***/ = «tree» + «Chinantec proper name for sweet gum». I expect there to be related terms in many Chinantec languages.

Description: A monotypic generic that corresponds to HAM *Liquidambar styraciflua*. Trees of 4 – 15 meters; leaves reddish-green, divided into 5 sharply-pointed lobes; flowers yellow-green, inconspicuous, grouped into a ball-like cluster; fruits a dark brown ball with rounded points. Essence of leaves crushed in alcohol applied externally for rheumatism, fractures and skin abrasions; wood used as fuel. Common in primary and particularly secondary forests of the temperate humid zone. Often called ***má'^{H} 'ma^L lea^{LH}*** «small-leaf liquidambar tree».

67. ***'ma^L lï^H jɨ^L***

Collections: LM0053, LM0067, LM0143, RL0477, SH0111a

Etymology: /***'ma^L***/ + /***lï^H***/ + /***jɨ^L***/ = «tree» + «flower» + «fire». This is cognate with the proto-Chinantec terms for «fire» and «light» ****hyɨ^L***, which Rensch reconstructs from variants representing all subregions of the Chinantla (1989:124:#949). A related proto-Chinantec term is ***hyɨɨ'***, which Rensch glosses as «brilliant» (1989:#950). This name may refer to the brightly colored flowers, or to the fact that this shrub sprouts up in burned pine-oak forest. It is unclear whether these terms are related to the proto-Chinantec term meaning to «clear land» ***h**ɨɨ*^{LH} (Rensch, 1989:75:#433) [i.e. to clear land with fire?].

Description: A monotypic generic that corresponds to ERI *Befaria laevis*. or shrubs of 1 meter; leaves lanceolate and glossy; flowers pinkish white, 5 cms. long. Flowering branches used as ornament in churches, especially around Christmas time; flowering branchlets formerly used to dye fabric. Occasional in temperate dry and cold zones. Some Chinantec recognize two specific forms of this generic – *'ma*^{L} *lí*^{H} *jɨ*^{L} *pí'*^{H} «small fire flower tree» and *'ma*^{L} *lí*^{H} *jɨ*^{L} *rø'*^{L} «green fire flower tree».

68. *'ma*^{L} *lí'*^{H} *nʉ'*^{L}

Collections: SH0013b

Etymology: /*'ma*^{L}/ + /*lí*^{H}/ + /*nʉ'*^{L}/ = «tree» + «flower» + «purple». The name is descriptive of this attractive tree.

Description: A monotypic generic that primarily corresponds to APO *Plumeria* and is probably extended to other purple-flowered shrubs and trees.

69. *'ma*^{L} *lí'*^{H} *yʉ́ʉ*^{L}

Collections: LH0512, RL0044, RL0364, SH0129

Etymology: /*'ma*^{L}/ + /*lí*^{H}/ + /*yʉ́ʉ*^{L}/ = «tree» + «flower» + «red». The name is descriptive of the pinkish-red flowers of this common shrub.

Description: A monotypic generic that corresponds to ONA *Fuchsia paniculata* and is perhaps extended to other red-flowered shrubs and trees.

70. *'ma*^{L} *lɨ'*^{H}

Collections: SH0094a, LM0328

Etymology: */'ma^L/* + */lɨ́'^H/* = «tree» + «Chinantec proper name for Mexican sunflowers». This name may be related to the reconstructed proto–Chinantec term for spindle **lɨ'^H* (Rensch, 1989:83:#646), or the term for round **líí'* (ibid, 1989:94:651), perhaps referring to the spindly stems or rounded inflorescences of these plants.

Description: A monotypic generic that corresponds to AST *Tithonia*. Large herbs of 1 meter; leaves rough to the touch; flowers large, yellow. Apparently without use. Occasional weed growing in cornfields in the temperate dry zone. Focal member is *Tithonia tubaeformis*, but possibly extended to other large yellow–flowered 'sunflower'–like AST. This category is usually referred to as *lí^H 'ma^L lɨ́'^H* «flower Mexican–sunflower tree».

71. *'ma^L li^LH*

Collections: EL0136; RL0322

Etymology: */'ma^L/* + */li^LH/* = «tree» + «Chinantec proper name for tepejilote–palm». This name is cognate with the proto–Chinantec term for «edible palmetto shoot» **li^H*; Rensch lists variants for all subregions of the Chinantla (1989:94:#653).

Description: A polytypic generic that corresponds to ARE *Chamaedorea tepejilote*. Palms of 1 – meters; leaves very large, deeply dissected; flowers emerging from dark green spike–like bud that emerges from the base of the plant, mature flower–cluster branched and bearing numerous inconspicuous flowers; fruits glossy, dark–green, densely packed on fruiting stalk. Immature flower stalk, available in spring, eaten cooked; seeds, available in summer, eaten roasted. Commonly cultivated or protected in secondary forest of the temperate humid zone.

Specifics:

(A) *'ma^{L} li^{LH} dsee^{L}* «true tepejilote–palm tree» [ARE *Chamaedorea tepejilote*]

(B) *'ma^{L} li^{LH} jmɨɨ^{L}* «water tepejilote–palm tree» [ARE *Chamaedorea*]

(C) *'ma^{L} li^{LH} kuu^{LH}* «thin-peel tepejilote–palm tree» [ARE *Chamaedorea*]

(D) *'ma^{L} li^{LH} nikɨɨ^{H}* «chicken-toe tepejilote–palm tree» [ARE *Chamaedorea*]

72. *'ma^{L} lóo$^{'LH}$*

Collections: SH0024b

Etymology: /*'ma^{L}*/ + /*lóo$^{'LH}$*/ = «tree» + «Chinantec proper name for a tree that bears edible fruits». Some Chinantec suggest that the name may refer to the mucilage of these fruits, and might be related to the following generic – prickly pear cactus.

Description: A monotypic generic that corresponds to *Parmentiera aculeata*, a Mesoamerican tree which is semi-cultivated for its edible fruit. Trees of 4 – 10 meters; flowers large, white, emerging from the tree trunk; fruit a long, round pod with a wrinkled texture. Pods, roasted in coals, contain edible pulp and seeds – available in autumn. Occasional in tropical dry zone.

73. *'ma^{L} lóo^{LH}*

Collections: none

Etymology: /*'ma^{L}*/ + /*lóo^{LH}*/ = «tree» + «Chinantec proper name for prickly-pear cactus». This name is cognate with the reconstructed proto-Chinantec term for prickly pear cactus ****láá^{LH}***, for which Rensch lists variants from four subregions of the Chinantla. Some Chinantec suggest that ***lóo^{LH}*** may be derived from a word for «mucilage».

Description: A polytypic generic that corresponds to CAC *Opuntia*, probably includes some 5 species of *Opuntia* found in the Sierra. Shrubs of 1 – 3 meters; sap mucilaginous; modified stems succulent, spiny, very thick and broad; flowers large, showy, yellow or red; fruit spiny, green-yellow, often sweet-tasting; seeds numerous, hard. Fruits eaten raw after removing spines; modified stems eaten boiled after removing spines, reputed as cure for diabetes. Occasional in the tropical dry zone; protected in temperate zone around Comaltepec. See also ***huɨɨ^{L} lí^{H} lóo^{LH}*** (CAC *Epiphyllum*). Some Chinantec also classify this as a thorn shrub, ***'ma^{L} tóo^{LM} lóo^{LH}***.

Specifics:

(A) ***'ma^{L} lóo^{LH} bea^{LM}*** «cylindrical prickly-pear tree» [CAC *Opuntia*] apparently found near the Rio Grande, and also called by the descriptive name ***'ma^{L} lóo^{LH} sea^{L} gua^{L} jmɨɨ^{L}*** see «prickly-pear tree of the Rio Grande»

(B) ***'ma^{L} lóo^{LH} g^{w}íí^{LM}*** «fox prickly-pear tree» [CAC *Opuntia*]

(C) ***'ma^{L} lóo^{LH} 'mɨ'^{LH}*** «? prickly-pear tree» [CAC *Opuntia*]

(D) ***'ma^{L} lóo^{LH} ñí'^{M}*** «Spanish prickly-pear tree» [CAC *Opuntia*]

(E) ***'ma^{L} lóo^{LH} tee^{L}*** «white prickly-pear tree» [CAC *Opuntia*]

(F) ***'ma^{L} lóo^{LH} tii^{L}*** «thin prickly-pear tree» [CAC *Opuntia*]

74. ***'ma^{L} loo^{L}***

Collections: LH0219

Etymology: /***'ma^{L}***/ + /***loo^{L}***/ = «tree» + «skin, leather». This name is cognate with the proto-Chinantec term for «skin» or «leather», ****laa^{L}***, which Rensch derives from variants from all subregions of the Chinantla (1989:95:#664). There is no indication that the term is used in plant names in all these areas, but it is possible that the Comaltepec name has its origin in the use of the bark of these trees as a tanning agent.

Description: A monotypic generic that corresponds to FAB *Lysiloma*, probably includes the three species of *Lysiloma* found in the Sierra, as well as other FAB. Tree of ? meters; leaves compound, divided into many, small leaflets; flowers yellow; fruit a reddish, flattened pod. Leaves; boiled as tea, used to treat canker sores; wood used for construction. Occasional in the tropical dry zone.

75. *'ma^{L} lúu^{LM}*

Collections: RL0030

Etymology: */'ma^{L}/* + */lúu^{LM}/* = «tree» + «clarinet, music». The name is cognate with the reconstructed proto-Chinantec term ****lúú^{LH}***, which Rensch derives from variants from four subregions of the Chinantla (1989:94:#658). There is no indication that the term is used in plant names in all these areas, but the Comaltepec name is apparently descriptive of the hollow stems of these plants, which may have been formerly used to make musical instruments.

Description: A monotypic generic that corresponds to AST ?. Shrubs; stem rigid and hollow; flowers purple. Stem used as a tube for water in springs. Common in the tropical humid zone. The category is probably extended to other AST that have hollow stems.

76. *'ma^{L} 'luu^{M}*

Collections: EL0013, EL0132, LH0223, LH0155, RL0020, RL0195, RL0399, SH0070

Etymology: */'ma^{L}/* + */'luu^{M}/* = «tree» + «Chinantec proper name for trees with fibrous bark».

Description: A monotypic generic that corresponds to ULM *Trema micrantha*, FLC

Pleuranthodendron lindenii and other trees that have diffuse inflorescences with small, rounded flower buds or fruits. Trees of 2 – 10 meters; leaves variously shaped; flower buds small, round; flowers inconspicuous, sparsely placed in a diffuse inflorescence; fruits, when present, small and round. Bark used as rope for tying (RL1095); leaves cooked as vegetable to accompany beans (RL0020)?; other members without apparent use. Common in temperate and tropical areas. This large, broadly inclusive categories appears to apparently includes other ULM (e.g. *Lozanella enantiophyllla*) and perhaps some EUP; FLC *Pleuranthodendron lindenii* may also be called *'ma^L gwɨɨ^{HL} tii^L moo^L*.

77. *'ma^L máang^{LH}*

Collections: SH0021b

Etymology: */'ma^L/* + */máang^{LH}/* = «tree» + «Chinantec-modified Spanish proper name for mango».

Description: A monotypic generic that corresponds to ANA *Mangifera indica*. Trees of 4 – 10 meters; leaves lanceolate; flowers yellowish-green, inconspicuous; fruits large, yellow to greenish-red, juicy, sweet-tasting; seed large, flattened, bone-white. Occasional in the hot tropical zone; occasionally imported from the Cañada through the Oaxaca Valley.

78. *'ma^L mansanaa^L*

Collections: LM0166

Etymology: */'ma^L/* + */mansa̱^{H}/* = «tree» + «Chinantec-modified Spanish proper name for apple (*manzana*)».

Description: A monotypic generic that corresponds to apples, ROS *'Malus* *domestica'*. Small trees of 2 - 4 meters; leaves ovate; flowers white; fruits large (8 cm.), red to yellow, fleshy, sweet. Fruits, available in summer, eaten raw or cooked. Occasionally cultivated in temperate dry zones near Comaltepec; often purchased from itinerant zapotec vendors from Jaltianguis.

79. *'ma^{L} mansaní'^{H}*

Collections: LH0262, LM0237, RL0479

Etymology: */'ma^{L}/* + */mansaní'^{H}/* = «tree» + «Chinantec-modified Spanish proper name for Mexican hawthorn *manzanilla*)».

Description: A monotypic generic that corresponds to ROS *Crataegus pubescens*. Small trees of 2 meters; leaves ovate; flowers white; fruits small (1 - 2 cm.), yellow-orange, somewhat sour. Fruits, available in summer, eaten raw or cooked; fruits boiled in sugar water, used to treat cough. Rarely cultivated in temperate dry zones near Comaltepec; occasionally purchased from itinerant zapotec vendors from Jaltianguis. *Tejocotes*, a common name for *C. pubescens* derived from Nahuatl, are a Mesoamerican domesticate that were probably known in the Chinantla before the arrival of apples. The much more common use of apples, and the morphological similarity between apples and hawthorn fruits, explains the Spanish-derived given the tree in Comaltepec. ROS *Photinia mexicana* is considered as a wild type of hawthorn by some Chinantec speakers.

80. *'ma^{L} mee^{LH}*

Collections: LH0198, SH0059b, LM0223

Etymology: */'ma^{L}/* + */mee^{LH}/* = «tree» + «dove». The name may refer to the white plumed fruits of this which are apparently reminiscent of the white feathers of a dove.

Description: A monotypic generic that corresponds to ROS *Cercocarpus macrophylla*, a distinctive tree of pine–oak forests. Trees of 2 – 8 meters; leaves ovate, strongly veined; flowers small, white, clustered in the axils of the leaves; seeds covered with soft, cottony hairs. Wood used for utensils (tops). Occasional in temperate and cold dry zones. Some Chinantec suggest that ***'ma***^{L} ***joo***^{L} «cotton tree» may be a synonym for this tree.

81. ***'ma***^{L} ***minuu***^{H}

Collections: LH0184, SH0006a

Etymology: /***'ma***^{L}/ + /***minuu***^{H}/ = «tree» + «corncob».

Description: A monotypic generic that corresponds to ARL and VRB *Lippia* trees. Trees of 2 – 8 meters; stems brittle; leaves large, diverse in shape; flowers whitish–green, often in long, spike–like clusters; fruits various. Leaves applied as a compress for rheumatism [LH0184]. Found in dry zones.

82. ***'ma***^{L} ***mɨja̱***$^{'LM}$

Collections: RL0096, RL0116

Etymology: /***'ma***^{L}/ + /***mɨ́***^{H}/ + /***ja̱***$^{'LM}$/ = «tree» + «rounded–fruit» + «edible–green». ***mɨja̱***$^{'LM}$ refers to the flowers of *Phaseolus coccineus*, scarlet red just as the flowers of the Mexican horse chestnut.

Description: A monotypic generic that corresponds to HPC *Billia hippocastanum*. Trees of 5 – 20 meters; leaves compound, composed of three ovate leaflets; flowers flame red, apparent at tree–tops. Wood used as fuel. Occasional in the temperate humid forest. A synonym is ***'ma***^{L} ***gwɨɨ***^{HL} ***'nɨ***^{LM} ***má***$^{'H}$ «three–leaved avocado tree», which refers to the trifoliate leaves of this tree. Another synonym is ***'ma^L^ mɨ^H^ lɨ^H^*** «rounded-fruit flower tree».

83. *'ma^L^ mɨ'^H^ 'ó^L^*

Collections: RL0295

Etymology: */'ma^L^/* + */mɨ'^H^/* + */'ó^L^/* = «tree» + «rounded-fruit» + «rosary». The name refers to the use of the fruits of this palm as rosary beads.

Description: A monotypic generic that corresponds to ARE *Chamaedorea*?

84. *'ma^L^ mɨnoo^H^*

Collections: RL0108, RL0115, RL0328

Etymology: */'ma^L^/* + */mɨnoo^H^/* = «tree» + «fern». The specific names refer to cottony pubescence or thorns which cover this tree fern.

Description: A monotypic generic that corresponds to *Alsophila firma* and *Sphaeropteris horrida*. Used for firewood?; part of stem transplanted to cultivate as garden ornamental. This category is sometimes classified as a tree ***mɨnoo^H^ tóo^LM^*** «spiny fern».

Specifics:

(A) ***'ma^L^ mɨnoo^H^ tóo^LM^*** «spiny tree fern» [CTH *Alsophila firma*]

(B) ***'ma^L^ mɨnoo^H^ joo^L^*** «cotton tree fern» [CTH *Sphaeropteris horrida*]

85. *'ma^L^ 'moo^L^*

Collections: EL0043, LH0285, RL0028, RL0274

Etymology: */'ma^L^/* + */'moo^L^/* = «tree» + «ice». ***'moo^L^*** is cognate with the proto-Chinantec term for ice ****'maa^L^***, which Rensch suggests also may be related to widely distributed Chinantec terms for dew and drizzle (Rensch 1989:102). In this plant name the term apparently refers to the terminal clusters of white flowers.

Description: A monotypic generic that corresponds to AST *Vernonia*. Shrubs up to 1 meter; leaves simple, opposite, coriaceous; flowers white, densely packed in terminal, compound inflorescences. Juice of the leaves used to treat skin wounds year-round (LH0285, RL0028). Occasional in temperate and tropical areas. This category probably includes other white-flowered Asteraceae.

86. *'ma^{L} nee^{LH}*

Collections: LH0037, LH0337, LM0019, SH0041b, RL0574, RL0578

Etymology: */'ma^{L}/* + */nee^{LH}/* = «tree» + «Chinantec proper name for *Erythrina*». I expect that this generic term is widespread in the Chinantla. The proto-Chinantec should be ***niaa*; Rensch reconstructs a possible cognate from variants from two subregions of the Chinantla and gives the meaning for this term as «be snagged» (1989:88:#597), a possible reference to the spiny nature of some species of this genus.

Description: A polytypic generic that corresponds to FAB *Erythrina*, including most 9 species of Erythrina that grow in the Sierra. Trees of 4 – 10 meters; leaves compound, the leaflets broadly ovate; flowers scarlet red, tubular; fruit a long, rounded pod; seeds scarlet red. Young vegetative shoots eaten as a cooked green; flowers eaten as a boiled vegetable, often scrambled with eggs; branchlets used as forage for cattle; branchlets, combined with aguardiente or alcohol, used for «spiritual cleansing» to cure evil eye; flowers made into whistles, mostly by children. Common and protected in dry zones; rare in secondary forest of the temperate humid zone.

Specifics:

(A) ***'ma**^{L} **nee**^{LH}* (unmodified) «*Erythrina* tree» [FAB *Erythrina americana*]

(B) ***'ma**^{L} **nee**^{LH} **nuu**^{L}* «wild *Erythrina* tree» [FAB *Erythrina* – orange–flowered, shrubby species]

(C) ***'ma**^{L} **nee**^{LH} **tóo**^{LM}* «thorny *Erythrina* tree» [FAB *Erythrina horrida*?]

87. *'ma*^{L} *née*^{M}

Collections: EL0016, RL0005, RL0283, RL0481, RL0545

Etymology: /*'ma*^{L}/ + /*née*^{M}/ = «tree» + «yellow». The name apparently refers to the orange–yellow sap of this tree. Rensch reconstructs *niá^{L} as the proto–Chinantec term for yellow; it appears to be universal in the Chinantla (1989:88:#588). However, there is no indication that the term is used in plant names in other Chinantec languages.

Description: A monotypic generic that corresponds to CLU *Vismia mexicana*. Small trees of 2 – 4 meters; sap yellow–orange; leaves ovate–lanceolate; flowers cream–white; fruit a brown capsule with yellow–orange sap. Wood used for construction and fuel. Common in secondary forest of the temperate humid zone.

88. *'ma*^{L} *née*$^{'LH}$

Collections: LH0268, SH0062b

Etymology: /*'ma*^{L}/ + /*née*$^{'LH}$/ = «tree» + «Chinantec proper name for Mexican basswood».

Description: A monotypic generic that corresponds to TIL *Tilia mexicana*. Tree of 5 – 15 meters; leaves broadly heart–shaped; flowers white, fragrant, grouped into small, pendant clusters; fruits brown, round, hard, pendant from a leaf–like bract.

Leaves recognized as good forage for cattle; wood used for construction and fuel?. Rare in the temperate dry zone.

89. ***'ma^L ni^{LH}***

Collections: LH0100, LM0116?, RL0165, SH0109a, LM0385

Etymology: */'ma^L/* + */ni^{LH}/* = «tree» + «Chinantec proper name for Alnus». I expect that this generic term is found in other highland Chinantec languages.

Description: A monotypic generic that corresponds to BET *Alnus acuminata* and perhaps *A. jorulensis*. Trees of 2 - 4 meters; leaves broadly ovate, strongly veined, serrate; flower of two types - a rounded cone, or a long catkin; fruits a dark brown, rounded, cone-like. Wood used as fuel; leaves, sometimes prepared with *Physalis* fruits and lard, applied as a compress for «magical fright». Common in humid areas of the temperate zones.

90. ***'ma^L níspero***

Collections: LH0145, LM0142

Etymology: */'ma^L/* + */níspero/* = «tree» + «Spanish proper name for loquats».

Description: A monotypic generic that corresponds to ROS *Eriobotrya japonica*. Trees of 2 - 5 meters; leaves long, oblanceolate, strongly-veined; flowers white; fruits orange, sweet-tasting. Fruits, available in summer, eaten raw or cooked. Commonly cultivated or protected in the temperate dry zone. Cross-classified as ***lí'^{H} níspero***.

91. ***'ma^L nóo^{LM}***

Collections: LH0251

Etymology: */'ma^L/* + */nóo^{LM}/* = «tree» + «mouse». This is a cognate of the proto-

Chinantec term for rat **náá^{LH}*, which Rensch reconstructs from variants from all the Chinantla subregions (1989:87:#578). There is no indication that the term is used in plant names in other Chinantec languages.

Description: A monotypic generic that corresponds to ROS *Cotoneaster denticulata*. Shrubs of 1 – 2 meters; leaves ovate, serrate; flowers small, white; fruits small, red. Fruits, available in December, occasionally eaten raw. Occasional in dry zones.

92. ***'ma^L ñi^L***

Collections: LH0228, SH0012b

Etymology: /***'ma^L***/ + /***ñi^L***/ = «tree» + «Chinantec proper name for a tree of the tropical dry zone». Some Chinantec say that the name is derived from ***kodiañi^L*** which means arm's length, a unit of measure. Rensch reconstructs a proto-Chinantec term for arm's length as ****ñi^L*** and lists variants from four Chinantla subregions (1989:89:#608).

Description: A monotypic generic that corresponds to ANA *Pistacia mexicana*. Shrubs of up to 2 meters; leaves compound; flowers greenish-white, inconspicuous; fruits red. Branches used for spiritual cleansing (*limpia*); wood used for fuel. Occasional in secondary forests of the tropical dry zone.

93. ***'ma^L ñii'^{LH}***

Collections: RL0236

Etymology: /***'ma^L***/ + /***ñii'^{LH}***/ = «tree» + «Chinantec proper name for Mexican mahogany». This is cognate with the reconstructed proto-Chinantec term ****ñii'^{H}***, for which Rensch lists variants from all subregions of the Chinantla (1989:90:#613).

Description: A monotypic generic that corresponds to MEL *Cedrela* and *Swietenia*.

Trees of 5 – 25 meters; leaves large, compound, composed of broadly lanceolate leaflets; flowers white, grouped loosely into large clusters; fruit red. Wood used for construction and fuel. Occasional in primary forests of the temperate humid zone. Potentially includes some 5 species of *Cedrela* and *Swietenia* found in the Sierra.

Specifics:

(A) ***'ma^L ñíi'^{LH} tee^L*** «white Mexican–mahogany tree» [MEL]

(B) ***'ma^L ñíi'^{LH} yúu^M*** «red Mexican–mahogany tree» [MEL]

94. *'ma^L ñɨɨ'^{LH}*

Collections: LH0231

Etymology: /***'ma^L***/ + /***ñɨɨ'^{LH}***/ = «tree» + «Chinantec proper name for some oaks».

Description: A monotypic generic that corresponds to some species of FAG *Quercus*. Trees of 2 – 4 meters; leaves broad; flowers inconspicuous; fruit a hard–shelled nut. Wood used as fuel. Occasional in the tropical dry zone.

95. *'ma^L 'ñi^L*

Collections: RL0371

Etymology: /***'ma^L***/ + /***'ñi^L***/ = «tree» + «Chinantec proper name for *Weinmannia*».

Description: A monotypic generic that corresponds to CUN *Weinmannia*. Large trees of up to 20 meters; leaves small and ornately dissected; flowers inconspicuous, borne on a small (4 cm.) spike–like inflorescence; fruiting stalk dark brown, dry, falling around the base of the tree at maturity. Wood, available all year, used for house construction. Occasional in primary forests of the temperate humid zone. Restricted to perhaps four species of *Weinmannia*, the sole genus of Cunoniaceae found in the Sierra.

96. ***'ma^L 'omó$^{'L}$***

Collections: EL0054, EL0111, LH0185, LM0296, RL0008, RL0056, RL0335

Etymology: ***/'ma^L/*** + ***/'omó$^{'L}$/*** = «tree» + «Chinantec proper name for some shrubs in the Asteraceae». ***'omó$^{'L}$*** may be further analyzed as ***/'oo^L/*** + ***/mó$^{'L}$/*** = «CNC medicinal-herb» + «montane».

Description: A polytypic generic that corresponds to AST *Melanthera*, *Shistocarpa bicolor*, *Trigonospermum* and other AST genera. Herbs and shrubs of 1 - 2 meters; flowers white, yellow or purple, clustered in terminal, compound inflorescences. Juice of the leaves used as a dressing for skin wounds [EL0111]; leaves used as forage [EL0054, LH0185, RL0008]; flowers used as adornment [RL0056]. Common in humid and temperate dry zones.

Specifics:

(A) ***'ma^L 'omó$^{'L}$ née^M*** «yellow montane-herb tree» [AST]

(B) ***'ma^L 'omó$^{'L}$ nʉ$^{'L}$*** «purple montane-herb tree» [AST]

(C) ***'ma^L 'omó$^{'L}$ sii^M*** «striped montane-herb tree» [AST *Melanthera*]

(D) ***'ma^L 'omó$^{'L}$ tee^L*** «white montane-herb tree» [AST]

97. ***'ma^L 'oo^M***

Collections: EL0133

Etymology: ***/'ma^L/*** + ***/'oo^M/*** = «tree» + «PN for papaya». Rensch suggests that this is a cognate with the proto-Chinantec term for papaya ****'ąą$^{'H}$***, although he notes that the Comaltepec and Quiotepec names lack the expected nasalization and final glottal stop (1989:59). Related terms for papaya are found in all five subregions of the Chinantla. It is possible that the highland names are related to the proto-Chinantec term for hollow *'*aa*^{L} (Rensch 1989:55), since the fruits of this tree are hollow.

Description: A polytypic generic that corresponds to CAR *Carica*; the family and genus are represented by one domesticated species, *C. papaya*, and two wild species, *C. caulifora* and *C. cnidosculoides*. Trees of 2 – 4 meters; leaves alternate large, deeply–lobed; flowers yellow; fruits fleshy, yellow to orange inside, insipid to sweet–tasting, pleasantly scented; seeds round, black, covered with a gelatinous, sweet–tasting coating. Fruits eaten raw; wild fruits available in May. Cultivated papaya rarely cultivated in home gardens in tropical humid zones, fruits occasionally sold in the village, imported from the Oaxaca Valley or the Gulf Coast; wild types occasional in tropical humid forests.

Specifics:

(A) *'ma*^{L} *'oo*^{M} (unmodified) «papaya tree» [CAR *C. papaya*]

(B) *'ma*^{L} *'oo*^{M} *nuu*^{L} «wild papaya tree» [CAR *C. cnidoscoloides*, *C. cauliflora*]

98. *'ma*^{L} *se*$'^L$

Collections: EL0066

Etymology: /*'ma*^{L}/ + /*se*$'^L$/ = «tree» + «Chinantec proper name for rubber tree». This is cognate with the reconstructed proto–Chinantec term **siaa*$'^L$ Rensch lists variants from four Chinantla subregions, including Comaltepec [*sée*$'^{LM}$] (1989:73:#407). It is probable that the term is used as descriptor in plant names in all Chinantec languages.

Description: A monotypic generic that corresponds to EUP *Hevea brasiliensis* and MOR *Castilla elastica*. Trees of 15 – 20 meters; sap milky white, sticky; leaves compound, composed of 3? ovate leaflets; flowers inconspicuous; fruits three–parted;

seeds shiny, spotted [description pertains to *Hevea*]. Sap is recognized as source of rubber. Cultivated in the tropical humid zone north of municipality limits in Valle Nacional. The Chinantec say that although there is one Chinantec name, there are two types of rubber tree, possibly referring to *Hevea* and *Castilla*.

99. *'ma*^{L} *sóo*$^{'MH}$

Collections: RL0331, SH0074, LM0389

Etymology: /*'ma*^{L}/ + /*sóo*$^{'MH}$/ = «tree» + «Chinantec proper name for oaks». This could be cognate with the proto-Chinantec term **sáá*$^{'L}$, which Rensch reconstructs from variants from four Chinantec subregions (not including the highlands), and glosses as «dirt» or «algae» (Rensch 1989:71:#394).

Description: A monotypic generic that corresponds to FAG *Quercus seemanii* and related species. Trees of 5 – 15 meters; leaves broad; flowers inconspicuous; fruit a thin-shelled nut. Wood used for construction. Occasional in temperate zones.

100. *'ma*^{L} *soo*^{LH}

Collections: LH0139

Etymology: /*'ma*^{L}/ + /*soo*^{LH}/ = «tree» + «Chinantec proper name for a tree known as lignum-nephriticum or kidney wood». The cognate proto-Chinantec term would be reconstructed as **sǫǫ*; Rensch lists two possibilities – **sǫǫ*^{H} «grass» and **sǫǫ* «be pleasing» (1989:74:#420 & #421).

Description: A monotypic generic that corresponds to FAB *Eysenhardtia polystachya*, a distinctive shrub that is the source of a resin formerly much commercialized. Shrubs of 1 – 2 meters; leaves compound, divided into many small leaflets; flowers white, grouped into a small spike-like cluster; fruit a small, brown pod. Bark boiled in tea for kidney ailments. Common in the tropical dry zone.

101. *'ma^{L} sʉ^{L}*

Collections: LH0133

Etymology: /*'ma^{L}*/ + /*sʉ^{L}*/ = «tree» + «Chinantec proper name for copal trees and incense». This is cognate with a proto-Chinantec term for incense **siʉ^{L}*, which Rensch reconstructs from variants from all subregions of the Chinantla (1989:74:#423).

Description: A monotypic generic that corresponds to BRS *Bursera*. Shrubs or small trees of 2 – 4 meters, aromatic; sap resinous, clear to amber-colored; leaves compound, divided into numerous small segments; flowers yellow-green, inconspicuous; fruit a resinous, aromatic berry. Resin, burned as an incense to 'smoke' the body, used to treat *susto*. Common in the tropical dry zone. Could include up to 10 species of *Bursera* and possibly 2 species of *Protium*, the two genera of Burseraceae found in the Sierra. Sometimes considered to be *'oo^{L} sʉ^{L}*, probably in reference to its use as a medicinal incense.

102. *'ma^{L} sʉ́ʉ^{LM}*

Collections: LH0325, LM0073, LM0390

Etymology: /*'ma^{L}*/ + /*sʉ́ʉ^{LM}*/ = «tree» + «Chinantec proper name for oaks».

Description: A monotypic generic that corresponds to some species of FAG *Quercus*, including *Q. elliptica*. Trees of 5 – 10 meters; leaves?; flowers inconspicuous; fruits a thin, leathery shelled nut crowned with a corky cap. Wood used as fuel; bark used to cure leather; bark, crushed in water, used to strengthen teeth. Occasional in the temperate dry zone.

103. to 108. The extended category *'ma^{L} ta$^{'LM}$*, sometimes unmarked

Collections: LH0147

Etymology: /*'ma^{L}*/ + /*ta$^{'LM}$*/ = «tree» + «Chinantec proper name for sweet fruit». This is cognate with the reconstructed proto-Chinantec term **tá$^{'LH}$*, which Rensch glosses as «a kind of fruit, perhaps zapote»; he lists variants from four Chinantla subregions, including the highlands. The variants from Lalana and Lealao are glossed as «orange» – interesting because these villages border on the Mixe region, where oranges are commonly classified in the extended zapote category (1989:38:#38). As illustrated by the following generics, the term is used for different types of sweet fruits in Comaltepec, many of which are commonly called zapotes in Spanish.

Description: A polytypic category that corresponds to *RUT Casimoroa*, EBN *Diospyros*, SPT *Pouteria*, ROS *Cydonia oblangata*, CLU *Rheedia* and FAG *Quercus grahami*. Trees or seldomly vines of 2 – 10 meters; leaves ovate; flowers white; fruits large (10 – 12 cm.), variously colored, sweet to sour. Fruits, available in summer, are eaten raw or cooked; fruits [*Casimiroa*] have reputation of causing sleepiness; fruits used to relieve constipation [*Cydonia*]; leaves, prepared as tea, used for kidney ailments [*Quercus*]; wood used for construction [RL0074]. Occasionally cultivated in temperate and tropical zones; purchased from itinerant zapotec vendors from Jaltianguis and imported from Oaxaca Valley; wild forms occasional in temperate zones.

103. *'ma^{L} ta$^{'LM}$ gwɨɨ^{LH}*

Collections: SH0009a, SH0025b

Etymology: /*'ma^{L}*/ + /*ta$^{'LM}$*/ + /*gwɨɨ^{LH}*/ = «tree» + «Chinantec proper name for sweet fruits» + «sleepy–person». The latter descriptor is cognate with the proto–Chinantec term for «sleep» ***gwɨɨñ**, for which Rensch lists cognates from throughout the Chinantla (1989:66:#345).

Description: A monotypic generic that corresponds to RUT *Casimoroa edulis*. Found in Chuparrosa.

104. *'ma^L ta$^{'LM}$ já$^{'M}$*

Collections: none

Etymology: */'ma^L/* + */ta$^{'LM}$/* + */já$^{'M}$/* = «tree» + «Chinantec proper name for honey and sweet fruits» + «Chinantec proper name for mammee sapote». The latter descriptor is cognate with the reconstructed proto–Chinantec term ***ha'**, which Rensch glosses as «mamey, a fruit of the zapote family»; he lists variants from all subregions of the Chinantla (1989:78:#469).

Description: A monotypic generic that corresponds to SPT *Pouteria mammosa*. Found in La Esperanza, Puerto Eligio. There is a myth that nobody plants mameys (and chinene avocados) because they take one lifetime to become fertile – that is, when they bear fruit the sower's life is over.

105. *'ma^L ta$^{'LM}$ membríi^H*

Collections: LH0120, SH0051b

Etymology: */'ma^L/* + */ta$^{'LM}$/* + */membríi^H/* = «tree» + «Chinantec proper name for honey and sweet fruits» + «Chinantec–modified Spanish proper name for quince».

Description: A monotypic generic that corresponds to ROS *Cydonia oblongata*.

106. *'ma^L ta$^{'LM}$ mɨ$^{'H}$*

Collections: none

Etymology: */'ma^L/* + */ta'^{LM}/* + */mɨ'^{H}/* = «tree» + «Chinantec proper name for honey and sweet fruits» + «rounded–fruit».

Description: A monotypic generic that corresponds to EBN *Diospyros digyna*. This appears to be the focal species.

107. *'ma^L ta'^{LM} mó'^{L}*

Collections: SH0049b

Etymology: */'ma^L/* + */ta'^{LM}/* + */mó'^{L}/* = «tree» + «Chinantec proper name for sweet fruits» + «montane, wild».

Description: A monotypic generic that corresponds to MRS *Ardisia*?

108. *'ma^L ta'^{LM} 'ngø^{LH}*

Collections: RL0074

Etymology: */'ma^L/* + */ta'^{LM}/* + */'ngø^{LH}/* = «tree» + «proper name for sweet fruits» + «virgin forest, or tepezquintle, a badger–like animal». The latter descriptor is cognate with the reconstructed term ***'nga^H***, for which Rensch lists variants from all subregions of the Chinantla, and which he glosses as «tepezcuintle, a wild rodent» and as «forest» (1989:105:#768 & #769). I think that the term may in general apply to things from the virgin forest; this generic name could be glossed as «virgin–forest sweet–fruit» or as «tepezcuintles' sweet–fruit».

Description: A monotypic generic that corresponds to CLU *Rheedia macrophylla*? Fruits are edible and the wood used as firewood. Found in La Esperanza.

109. *'ma^L tee^M limón*

Collections: RL0002, RL0457, RL0476

Etymology: */'ma^L/* + */tee^M/* + */limón/* = «tree» + «Chinantec modified SN for tea, or

Chinantec proper name for aromatic plants» + «Spanish proper name for lemon». The name refers to lemon grass, the leaves of this tree smell like lemon.

Description: A monotypic generic that corresponds to MRT *Calyptranthes chytraculia* var. *americana*. Trees of 4 – 10 meters; leaves compound, divided into two ovate, glossy leaflets; flowers white, composed of a group of white filaments (stamens); fruit a purple-black berry. Leaves, taken as tea to relieve hangover; wood used as fuel. Occasional in temperate humid forest.

110. ***'ma^{L} tɨ^{MH}***

Collections: LH0034, LH0196, LM0075, LM0286, LM0322, RL0041, RL0352

Etymology: */'ma^{L}/* + */tɨ^{MH}/* = «tree» + «music».

Description: A polytypic generic that corresponds to AST *Baccharis conferta* and *B. heterophylla*. Shrubs of 1 – 2 meters; leaves small, resinous, lobed; flowers white, grouped in terminal inflorescences. Leaves, burned and ground, formerly used to make fireworks (*cohetes*); young vegetative shoots, prepared with alcohol and combined with AST *Heterotheca inuloides*, placed in ear for deafness; branchlets used for «spiritual cleansing»; branchlets boiled as bath as cure for skin infections; branchlets, prepared with alcohol and ash, placed on soles of the feet to treat physical exhaustion; wood used as fuel. Abundant in secondary vegetation in temperate and cold zones. Often cross-classified as ***má$^{'H}$ 'ma^{L} tɨ^{MH}***.

Specifics:

(A) ***'ma^{L} tɨ^{MH}*** (unmodified) «music tree» [AST *Baccharis conferta*]

(B) ***'ma^{L} tɨ^{MH} bɸɸ$^{'LH}$*** «short music tree» [AST *Baccharis conferta*]

(C) ***'ma^{L} tɨ^{MH} tii^{L}*** «thin music tree» [AST *Baccharis conferta*]

111. ***'ma^L too^L***

Collections: none

Etymology: /*'ma^L*/ + /*too^L*/ = «tree» + «Chinantec proper name for bananas». This nmae is cognate with the proto-Chinantec term ****taa^L***, which Rensch reconstructs from variants from all subregions of the Chinantla (1989:37:#43). A similar proto-Chinantec term is ****taa^H***, which Rensch glosses as «posole leaf» or «tender banana leaf» (1989:37:#42); this may refer to banana leaves, or it may be a generic is the «large-leaf» life-form. Bananas were introduced by the Spanish, so it is probable that the Chinantec name for them is an extension of the generic term for a similar looking plant; see also the Comaltepec name ***moo^L tée^{LH}***, cognate with the proto-Chinantec term for «tender banana leaf used for patting out tortillas», ****tiaa*** (Rensch 1989:39:#63).

Description: A polytypic generic that corresponds to MUS *Musa*, cultivated bananas. Shrublike herbs of 2 – 6 meters; stalks easily sliced with a machete, full of water; leaves very large, smooth, thin and easily tearing; flowers yellowish-green, grouped in terminal, pendant clusters; fruit a banana, peel yellow to red at maturity, flesh white to orangish, sweet. Fruits eaten raw and cooked; leaves used to prepare tortillas and other foods. Abundantly cultivated in the tropical humid zone, sometimes in association with cornfields; occasionally grown in temperate and tropical dry zones. Often referred to as ***too^L***, without a life form modifier.

Specifics: (Most Chinantec banana varieties correspond closely to Mexican Spanish varieties, given in parenthesis):

(A) ***'ma^L too^L giée^M***, «Chinantec proper name banana tree» (= Spanish proper name *platano macho*) [MUS *Musa x paradisiaca*]

(B) ***'ma^{L} too^{L} hüng^{H},*** «India banana tree» (= Spanish proper name *plantano de la India*) [MUS *Musa acuminata*]

(C) ***'ma^{L} too^{L} le$^{'L}$,*** «black banana tree» (= Spanish proper name *platano guineo*)[MUS *Musa acuminata*]

(D) ***'ma^{L} too^{L} mansá^{H},*** «apple–tree banana tree» (= Spanish proper name *platano manzano, platano de seda*) [MUS *Musa acuminata*]

(E) ***'ma^{L} too^{L} mosii^{M},*** «? banana tree» (= Spanish proper name *platano dominico*) [MUS *Musa acuminata*]

(F) ***'ma^{L} too^{L} ñi$^{'H}$,*** «Spanish banana tree» (= Spanish proper name *platano de castilla*) [MUS *Musa acuminata*]

(G) ***'ma^{L} too^{L} perón,*** «pear–tree banana tree» (= Spanish proper name *platano perón*) [MUS *Musa acuminata*]

(H) ***'ma^{L} too^{L} rotán,*** «Spanish proper name banana tree» (= Spanish proper name *platano rotán*) [MUS *Musa acuminata*]

(I) ***'ma^{L} too^{L} yúu^{M}***, «red banana tree» (= Spanish proper name *platano morado*) [MUS *Musa acuminata*]

(J) ***'ma^{L} too^{L} [yúu^{M}] rǿ$^{'L}$***, «green [red] banana tree» (= Spanish proper name *platano morado verde*) [MUS *Musa acuminata*]

(K) ***'ma^{L} too^{L} 'u$^{'L}$,*** «short banana tree» (= Spanish proper name ?) [MUS *Musa acuminata*]

112. ***'ma^{L} too^{M}***

Collections: EL0023, EL0086, RL0154, RL0257, RL0333, LH0272

Etymology: */'ma^L/* + */too^M/* = «tree» + «Chinantec proper name for *Cordia* or perhaps blind».

Description: A polytypic generic that corresponds to BOR *Cordia* trees and ULM *Ulmus*. Trees of 4 – 20 meters; leaves serrate, ovate; flowers small, white to greenish–white, turning brown upon drying. Wood used for construction and fuel. Occasional in humid zones. Alternately called ***huɨ̲ɨ̲^{L} too^M*** [BOR *Cordia spinescens*] or cross–classified as ***lí^H huɨ̲ɨ̲^{L} too^M*** [BOR *Cordia*]. The category may be extended to include several species of BOR *Cordia* as well as other hardwood trees.

113. ***'ma^L tóo^M***

Collections: LH0291

Etymology: */'ma^L/* + */tóo^M/* = «tree» + «Chinantec proper name for *Gaultheria*?».

Description: A monotypic generic that corresponds to ERI (most likely *Gaultheria*, but perhaps *Xolisma squamulosa*). Shrubs, leaves small and lanceolate; flowers white and shaped like a closed bell; fruit a purple berry. Leaves, prepared in tea, taken for vaginal bleeding. Occasional in the temperate dry zone. Often cross–classified as ***má'^{H} 'ma^L tóo^M***. This plant is the shrubby (***'ma^L***) counterpart to ***lí'^{H} tóo^L***, (ERI *Gaultheria acuminata*), perhaps because of their similar flowers. This category may be extended to many of the approximately eight species of *Gaultheria* found in the Sierra.

114. ***'ma^L too'^{L}***

Collections: none

Etymology: */'ma^L/* + */too'^{L}/* = «tree» + «Chinantec proper name for a bamboo–like plant; shrimp; charcoal». The name is cognate with the reconstructed proto–

Chinantec term **taa* $^{'L}$, which Rensch glosses as charcoal (1989:38:#49), as well as «shrimp» and «bamboo» (1989:38:#50).

Description: A monotypic generic that corresponds to POA?, a bamboo-like plant that is used in house construction.

115. *'ma^L toj̲i̲i̲$^{'MH}$*

Collections: EL0129, RL0043, RL0196

Etymology: /*'ma^L*/ + /*toj̲i̲i̲$^{'MH}$*/ = «tree» + «Chinantec proper name for a wild fruit-bearing tree». It is possible that the name is derived from /*ta̲^{L}*/ + /*j̲i̲i̲$^{'MH}$*/ = «bird» + «sour-fruit», indicating that this the fruit is eaten by wild birds.

Description: A monotypic generic that corresponds to MOR *Pseudalmedia oxyphyllaria*. Trees of 5 - 20 meters; leaves large, pointed at the tip, dark green and somewhat shiny; flowers white, fruits red. Fruits occasionally eaten raw; fruits eaten by pheasants and other wild birds; wood used as fuel. Occasional in humid zones. This category is apparently restricted to *Pseudalmedia oxyphyllaria*.

116. to 123. The extended category *'ma^L tóo̲^{LM}* (sometimes unmodified) «thorn tree»

Collections: EL0076, LH0186, LH0207, RL0221, SH0124

Etymology: /*'ma^L*/ + /*tóo̲^{LM}*/ = «tree» + «thorn». This is cognate with the proto-Chinantec term for thorn **tóǫ́^{LH}*; Rensch lists variants from all subregions of the Chinantla (1989:41:#76).

Description: A polytypic category that corresponds to thorny ARE *Bactris*, AST *Cirsium*, FAB *Mimosa*, *Acacia*, ROS *Rubus* and SOL *Solanum*. Herbs and shrubs of 1 - 4 meters; stem always armed with thorns; additional description below each group of specifics. Potentially includes any thorny shrub, especially Fabaceae and

Solanaceae.

116. *'ma*^{L} *tóo*^{LM} *fí*^{H}

Collections: RL0351,

Etymology: /*'ma*^{L}/ + /*tóo*^{LM}/ + /*fí*^{H}/ = «tree» + «thorn» + «horn». The name is cognate with the reconstructed proto–Chinantec term for «horn of an animal», **hwí*^{H}; Rensch lists variants from all subregions of the Chinantla (1989:121:#916).

Description: A monotypic generic that corresponds to FAB *Acacia.* Shrubs; leaves compound, divided into small leaflets; flowers yellow or white, grouped into ball–shaped clusters; fruit a long, round, bean–like pod. Wood used as fuel. Common in the temperate humid zone.

117. *'ma*^{L} *tóo*^{LM} *le*$^{'L}$

Collections: EL0040

Etymology: /*'ma*^{L}/ + /*tóo*^{LM}/ + /*le*$^{'L}$/ = «tree» + «thorn» + «black».

Description: A monotypic generic that corresponds to ARE *Bactris mexicana.* Vining shrubs, covered with long, black, sharp spines; leaves large, oblong; flower inconspicuous; fruit red?. Stem used for basket–making. Occasional in the tropical humid zone. See also ***huɨɨ***^{L} ***tóo***^{LM} ***le***$^{'L}$ for *Desmoncus chinantlensis*, another palm used for weaving baskets.

118. *'ma*^{L} *tóo*^{LM} *'mɨɨ́*^{H}

Collections: LH0148, LM0049

Etymology: /*'ma*^{L}/ + /*tóo*^{LM}/ + /*'mɨɨ́*^{H}/ = «tree» + «thorn» + «new». The latter descriptor is cognate with the proto–Chinantec term for new **'mɨɨñ*; Rensch lists variants from throughout the Chinantla (1989:101:#719). There is no indication that the term is used in plant names in other Chinantec languages than Comaltepec.

Description: A monotypic generic that corresponds to FAB *Acacia*. Shrubs; leaves compound, divided into small leaflets; flowers yellow or white, grouped into ball-shaped clusters; fruit a long, round, bean-like pod. Wood used as fuel. Common in the tropical dry zone. This generic name is close to ***'ma^{L} t<u>óo</u>^{LM} mɨ$^{'L}$*** «eagle thorn tree», and it appears that some Chinantec call some thorny shrubs by this synonym, probably because of the symbolic relation between thorns and eagle's talons.

119. *'ma^{L} t<u>óo</u>^{LM} ná$^{'H}$*

Collections: EL0033, LH0157, SH0017a, SH0034a, RL0157, RL0529

Etymology: */'ma^{L}/* + */t<u>óo</u>^{LM}/* + */ná$^{'H}$/* = «tree» + «thorn» + «today, now». This is a cognate of the proto-Chinantec term ****nǿ^{HL}***, which Rensch reconstructs from variants from all subregions of the Chinantla (1989:86:#561).

Description: A monotypic generic that corresponds to SOL *Solanum chrysotrichum*, *S. erianthum*, *S. rudepannum*. Shrubs, somewhat pubescent; leaves entire, somewhat lobed; flowers white, fruit a yellow berry. Branchlets occasionally used to prepare a bath for reducing fever. Occasional throughout the community.

120. *'ma^{L} t<u>óo</u>^{LM} nó$^{'H}$*

Collections: none

Etymology: */'ma^{L}/* + */t<u>óo</u>^{LM}/* + */nó$^{'H}$/* = «tree» + «thorn» + «lard». This is a cognate of the proto-Chinantec term ****nee^{HLH}***, which Rensch reconstructs from variants from all subregions of the Chinantla (1989:86:#561).

Description: A monotypic generic that corresponds to ? Pubescent leaves used to clean dishes.

121. ***'ma^{L} t<u>óo</u>^{LM} 'óo^{M} 'iúu$^{'LH}$***

Collections: none

Etymology: /*'ma^{L}*/ + /*t<u>óo</u>^{LM}*/ + /*'óo^{M}*/ + /*'iúu$^{'LH}$*/ = «tree» + «thorn» + «mouth» + «hummingbird». The term for mouth is cognate with the proto-Chinantec term for mouth **'aa^{H}*, reconstructed from variants found throughout the Chinantla (Rensch 1989:55:220). This may refer to a shrub with thorns that are hollow or are shaped like hummingbird beaks.

Description: A monotypic generic that corresponds to FAB?. Used for leña, found in Puerto Eligio.

122. ***'ma^{L} t<u>óo</u>^{LM} rǿǿ$^{'LH}$***

Collections: LH0215

Etymology: /*'ma^{L}*/ + /*t<u>óo</u>^{LM}*/ + /*rǿǿ$^{'LH}$*/ = «tree» + «thorn» + «greenish?». This is derived from the proto-Chinantec term for green **rǿǿ$^{'L}$*, which Rensch reconstructs from variants from throughout the Chinantla (1989:99:#704).

Description: A monotypic generic that corresponds to FAB *Acacia farnesiana*. Shrubs; leaves compound, divided into small leaflets; flowers yellow or white, grouped into ball-shaped clusters; fruit a long, round, bean-like pod. Wood used as fuel; young fruits ground and used as a mouth rinse to strengthen teeth [*A. farnesiana*]. Common in the tropical dry zone.

123. ***'ma^{L} t<u>óo</u>^{LM} 'ue$^{'L}$***

Collections: SH0081a

Etymology: /*'ma^{L}*/ + /*t<u>óo</u>^{LM}*/ + /*'ue$^{'L}$*/ = «tree» + «thorn» + «broad».

Description: A monotypic generic that corresponds to [FAB *Acacia pinnatula*].

Shrubs; leaves compound, divided into small leaflets; flowers yellow or white, grouped into ball-shaped clusters; fruit a long, round, bean-like pod. Wood used as fuel; Common in the tropical dry zone.

124. *'ma^{L} túʉ^{LM} tʉpá$^{'H}$*

Collections: EL0053, EL0131, LH0138, LH0200, LM0025, LM0249, RL0067, RL0077, SH0002b

Etymology: */'ma^{L}/* + */túʉ^{LM}/* + */tʉpá$^{'H}$/* = «tree» + «tube» + «thunder». ***túʉ^{LM} tʉpá$^{'H}$*** is the name for rifle; it is derived in part from terms for «tube» or «blow gun» [proto-Chinantec **tuu^{L}:* (Rensch 1989:35:#26)] or «gun» ***tú^{L}*** [proto-Chinantec **tiú^{LH}* (Rensch 1989:38:#54)].

Description: A polytypic generic that corresponds to AST *Verbesina*, BOR *Cordia*, MNM *Siparuna* and PAP *Bocconia*. Shrubs; stems hollow or with easily removable pith; leaves deeply lobed, fragrant; flowers white. Stem used in construction of toy houses?, formerly used to make *cohetes*; leaves, prepared as tea, used to wash skin wounds and infections; leaves, fresh or prepared in tea, rubbed on the feet for rheumatism; young vegetative shoots used to treat skin wounds of animals; flowers used for adornment; branchlets used for 'spiritual cleansing' to treat evil eye. Also called ***'ma^{L} tʉpá$^{'H}$***, tree thunder. Common in temperate and tropical zones. The category may be extended to include any hollow-stemmed shrub.

Specifics:

(A) ***'ma^{L} tʉpá$^{'H}$*** (unmodified) «rifle tree» [AST *Verbesina*]

(B) ***'ma^{L} tʉpá$^{'H}$ jme$^{'L}$*** «fragrant rifle tree» [MNM *Siparuna*] a shrub that may also be called ***'ma^{L} tʉpá$^{'H}$ huɨ$^{'L}$*** «smooth rifle tree» or ***'ma^{L} tʉpá$^{'H}$ mó$^{'L}$*** «montane rifle tree». Shrubs; leaves entire, fragrant; flowers red; fruits red. Branchlets used in preparing a bath for skin rashes and other illness. Occasional in tropical humid forest.

125. *'ma^L 'ú^L moo^L*

Collections: LH0266

Etymology: /*'ma^L*/ + /*'ú^L*/ + /*moo^L*/ = «tree» + «wide» + «large-leaf». The term for «wide» is cognate with the proto-Chinantec term **'ú^L*; related terms are found in Chinantec languages of all five subregions (Rensch 1989:55:#211).

Description: A monotypic generic that corresponds to *Quercus*, and perhaps generally to wide-leaved trees. Trees; leaves variously-shaped but always relatively large and wide; flowers inconspicuous. Wood, available all year, used as fuel [LH0266]. Found in moist areas of the temperate zones. This name may be used descriptively for other wide-leaved trees such as [RL0129], an unidentified species used in house construction.

126. *'ma^L 'u$'^H$* (unmodified)

Collections: LH0150, LM0169, LM0352

Etymology: /*'ma^L*/ + /*'u$'^H$*/ = «tree» + «Chinantec proper name for peaches and other fleshy fruits». Rensch suggests this is a cognate of a proto-Chinantec term for peach **'úú$'^L$*, although his cognate set is limited to two subregions of the Chinantla (1989:55).

Description: A polytypic generic that corresponds to ROS *Prunus persica*, true peaches. Trees of 2 – 8 meters; leaves various, often ovate and sometimes with strong lateral venation; flowers small, white or pinkish-white; fruit a fleshy, large (8 cm.) drupe that is yellowish–green to yellowish white, edible & usually sweet. Fruits, available in late spring to early summer, are eaten raw or cooked. Commonly cultivated in temperate dry zones.

Specifics:

(A) *'ma^L 'u$^{'H}$ bó^M* «hollow peach tree» [ROS *Prunus persica*]

(B) *'ma^L 'u$^{'H}$ dsíi^{LM}* «heart,inside peach tree» [ROS *Prunus persica*]

(C) *'ma^L 'u$^{'H}$ ji$^{'L}$* «sour peach tree» [ROS *Prunus persica*]

(D) *'ma^L 'u$^{'H}$ jii^M* «poor–quality peach tree» [ROS *Prunus persica*]

(E) *'ma^L 'u$^{'H}$ lí^H* «flower peach tree» [ROS *Prunus persica*]

(F) *'ma^L 'u$^{'H}$ née^M* «yellow peach tree» [ROS *Prunus persica*]

(G) *'ma^L 'u$^{'H}$ róo^M* «sweet peach tree» [ROS *Prunus persica*]

(H) *'ma^L 'u$^{'H}$ tee^L* «white peach tree» [ROS *Prunus persica*]

(I) *'ma^L 'u$^{'H}$ 'uɨng$^{'LM}$* «peeling–off peach tree» [ROS *Prunus persica*] (Sp. *durazno prisco*)

127. ***'ma^L 'u$^{'H}$ g^{w}iiL^H***

Collections: RL0049

Etymology: /*'ma^L*/ + /*'u$^{'H}$*/ + /*g^{w}ii^{LH}*/ = «tree» + «Chinantec proper name for peaches and other fleshy fruits» + «squirrel». The name is apparently derived form the observation that the fruits of these trees are a favorite food of squirrels. The name for squirrel is cognate with proto–Chinantec **gwii^{HLH}*; Rensch lists related terms in all subregions of the Chinantla (1989:67).

Description: A monotypic generic that corresponds to TIC *Ticodendron incognitum*. Trees of 20 to 30 meters; Common in the temperate humid zone.

128. ***'ma^{L} 'u$^{'H}$ jmíi^{LM}***

Collections: EL0097, LH0257, LM0131, LM0368, LM0393, RL0088, RL0128, RL0140, RL0229, RL0245, RL0286, RL0471, RL0472, SH0058b

Etymology: */'ma^{L}/* + */'u$^{'H}$/* + */jmíi^{LM}/* = «tree» + «PN for peaches and other fleshy fruits» + «Chinantec people or language». The term for Chinantec is cognate with proto-Chinantec ***hmíi^{LH}**, and Rensch cognate list includes variants from all subregions of the Chinantla (Rensch 1989:115). It is probable that the original term for black cherry tree was *'ma^{L} 'u$^{'H}$*, and that the name was extended to peaches after the arrival of the Spanish leaving black cherries marked as «Chinantec peaches».

Description: A polytypic generic that corresponds to *Prunus serotina* subspp. *capuli* and *serotina*; and several MLS including *Conostegia xalapensis*, *Miconia costaricencis* and *M. glaberrima*. Trees of 2 - 8 meters; leaves ovate and sometimes with strong lateral venation; flowers small, white or pinkish-white; fruits fleshy, small (1 - 2 cm.), reddish, dark purple, usually edible and sweet. Fruits, available in late spring to early summer, are eaten raw or cooked; seeds are occasionally eaten toasted; leaves used to make bath for 'internal heat'; wood occasionally used as fuel or for house construction; trees used as shade for coffee bushes in tropical humid zone [MLS]. Semi-cultivated in the dry zones; abundant in humid and temperate dry zones. Probably includes other berry-fruited MLS and well as other plants with fleshy fruits eaten by human or birds.

Specifics:

(A) *'ma^{L} 'u$^{'H}$ jmíi^{LM}* (unmodified) «Chinantec peach tree» [ROS *Prunus persica* subsp. *capuli*]. The best fruits come from large-fruited trees near the head village which are called *'ma^{L} 'u$^{'H}$ jmíi^{LM} jmini^{MH} k^{w}ea^{LH}* «horse-eye Chinantec peach tree» or *'ma^{L} 'u$^{'H}$ jmíi^{LM} ja$^{'LM}$* «edible-green Chinantec peach tree».

(B) ***'ma^{L} 'u$^{'H}$ jmíi^{LM} nuu^{L}*** «Wild Chinantec peach tree» [ROS *Prunus persica* subsp. *serotina*].

(C) ***'ma^{L} 'u$^{'H}$ jmíi^{LM} tee^{L}*** «white Chinantec peach tree» [MLS] The melastomataceous members of this folk generic are called by other specific names as well, including *'ma^{L} 'u$^{'H}$ jmíi^{LM} joo^{L} má$^{'H}$* «cottony leaved Chinantec peach tree» and *'ma^{L} 'u$^{'H}$ jmíi^{LM} pí$^{'H}$ má$^{'H}$* «small leaved Chinantec peach tree».

129. ***'ma^{L} 'uɨ$^{'L}$***

Collections: RL0085, RL0185

Etymology: */'ma^{L}/* + */'uɨ$^{'L}$/* = «tree» + «Chinantec proper name for the hog-plum». This is cognate with the proto-Chinantec term **wɨɨ$^{'LH}$*, which Rensch mistakenly glosses as «peach», «orange» or «plum» (1989:107:#781); the term appears to quite widespread in the Chinantla.

Description: A polytypic generic that corresponds to ANA *Spondias* (and perhaps *Cyrtocarpus*). Trees. Fruits are edible raw; wood used for house construction and fuel. Occasional in secondary forests of the temperate humid zone. Found in Chuparrosa, Soyalapam, Puerto Eligio.

Specifics:

(A) ***'ma^{L} 'uɨ$^{'L}$*** (unmodified) «hog-plum tree» [ANA *Spondias*]

(B) ***'ma^{L} 'uɨ$^{'L}$ ja$^{'LM}$*** «edible-green hog-plum tree» [ANA *Spondias*]

(C) ***'ma^{L} 'uɨ$^{'L}$ nuu^{L}*** «wild hog-plum tree» [ANA ?] (used for firewood, house beams)

130. ***'ma^L 'uɨng$^{'LM}$ ló^L***

Collections: RL0183, RL0329

Etymology: */'ma^L/* + */'uɨng$^{'LM}$/* + */ló^L/* = «tree» + «peel» + «bark». The word for «peel» is cognate with the proto-Chinantec term **'wɨ'*, which Rensch reconstructs from variants from all subregions of the Chinantla (1989:106:#779). The name for bark may be derived from the Comaltepec Chinantec word for «skin, or leather» *loo^L*. The name refers to the peeling bark by which the Chinantec identify this tree from a distance.

Description: A polytypic generic that corresponds to JUG *Oreomunnea (Englehardtia) mexicana*. Large trees of up to 20 meters; bark dark grey, peeling in large shreds that can be seen from a distance; leaves large & compound; flowers inconspicuous: fruits winged, with gold-brown hairs. Wood used for house and furniture construction. Common in higher elevation (ca. 1800 meters) primary forests of the temperate humid zone. This category is restricted to *Oreomunnea mexicana*; three other Juglandaceae genera (*Alfaroa*, *Carya* and *Juglans*), are apparently placed in separate generics.

(A) ***'ma^L 'uɨng$^{'LM}$ ló^L tee^L*** «white peeling-bark tree» [JUG *Oreomunnea mexicana*]

(B) ***'ma^L 'uɨng$^{'LM}$ ló^L yʉ́ʉ^M*** «red peeling-bark tree» [JUG *Oreomunnea mexicana*]

131. ***'ma^L 'uɸ$^{'L}$***

Collections: RL0172, RL0360]

Etymology: */'ma^L/* + */'uɸ$^{'L}$/* = «tree» + «Chinantec proper name for *Clusia*». Rensch lists no cognate proto-Chinantec reconstructed term, but the Chinantec suggest that it is a proper name.

Description: A polytypic generic that includes two specifics and corresponds to CLU *Clusia*, including perhaps three species of the Sierra Norte. Shrubs of 1 – 2 meters, sometimes epiphytic; leaves thick, glossy, broadly obovate; flowers cream-white, attached to a spike-like inflorescence; fruits green, fleshy. The fruit may be eaten. Common in secondary forests of the temperate humid zone.

Specifics:

(A) *'ma^{L} 'uɸ$^{'L}$* (unmodified) «*Clusia* tree» [CLU *Clusia*?]

(B) *'ma^{L} 'uɸ$^{'L}$ nuu^{L}* «wild *Clusia* tree» (red, nonedible fruit) [?]

132. *'ma^{L} 'úu^{L}*

Collections: EL0026, LH0166, LM0135, LM0050

Etymology: /*'ma^{L}*/ + /*'úu^{L}*/ = «tree» + «Chinantec proper name for chile». This is a cognate of the proto-Chinantec term for chile **ɥɥ^{HL}*; variants are found in all Chinantec languages (Rensch 1989:58).

Description: A polytypic generic that includes 9 specifics and corresponds to SOL *Capsicum annuum* and *C. pubescens*. Sparse to bushy herbs of up to 1 meter; leaves small, smooth or hairy; flowers white or purple; fruits variously-shaped, green, yellow or red, very spicy. Fruits, available all year (grown or purchased), used as a condiment, consumed daily raw or cooked, an essential ingredient in many traditional recipes. Cultivated in home gardens or in cornfields in all temperate and tropical zones of the Sierra; frequently purchased in community stores, imported from Sierra zapotec villages, the Oaxaca valley or the Gulf Coastal plain. This category is probably extends to all local varieties of *Capsicum*, including those available in the markets of Oaxaca.

Specifics:

(A) ***'ma^L 'úu^L 'úu$^{'LH}$*** «fat chile tree» [SOL *Capsicum annuum* var. *annuum*] (= Spanish proper name *chile gordo*). The descriptor for «fat» is a cognate of the proto-Chinantec term ***'yy$^{'H}$** (Rensch 1989:58:#248).

(B) ***'ma^L 'úu^L canaa^M*** «canary chile tree» [SOL *Capsicum pubescens*] (= Spanish proper name *chile canario*).

(C) ***'ma^L 'úu^L gilii^H*** «Yalina [a zapotec town] chile tree» [SOL *Capsicum annuum* var. *annuum*] (= Spanish proper name *chile de onza*?) This chile is also known by the hispanicized name ***'ma^L 'úu^L yalii^H*** «Yalina [a zapotec town] chile tree».

(D) ***'ma^L 'úu^L kuu^{LH}*** «?stone chile tree» [SOL *Capsicum annuum* var. *annuum*]

(E) ***'ma^L 'úu^L mɨ$^{'H}$*** «rounded-fruit chile tree» [SOL *Capsicum annuum* var. *glabrisculum*] (= Spanish proper name *chile piquín*)

(F) ***'ma^L 'úu^L ñitɨɨ^L*** «Yagalina [a zapotec town] chile tree» [SOL *Capsicum annuum* var. *annuum*] (= Spanish proper name *chile de onza*?)

(G) ***'ma^L 'úu^L nóo^{LM}*** «mouse chile tree» [SOL *Capsicum annuum*] (= Spanish proper name ?)

(H) ***'ma^L 'úu^L nuu^L*** «wild chile tree» [SOL *Capsicum annuum*] (= Spanish proper name *chile ?*)

(I) ***'ma^L 'úu^L pí$^{'H}$*** «small chile tree» [SOL *Capsicum annuum* var. *glabrisculum*] (= Spanish proper name *chile piquín*).

(J) ***'ma^L 'úu^L rø^L*** «green chile tree» [SOL *Capsicum annuum* var. *annuum*] (= Spanish proper name *chile verde*).

(K) ***'ma^L 'úu^L tii^L*** «thin chile tree» [SOL *Capsicum annuum* var. *annuum*] (= Spanish proper name *chile chiltepec*)

Note: Rensch (1989:46:#123) gives ***kiá:*** as a proto-Chinantec term for *chile hancho*, a commonly sold chile used in making stuffed peppers and cooked sauces. His cognate list includes variants forms from the Eastern Chinantla, and it is unclear whether the term is found in other subregions of the Chinantla. If found among any speakers of Comaltepec, we would expect a variant such as ***'ma^L 'úu2 kióo***.

133. *'ma^L 'úu^H dsea^L [adjective]*

Collections: LH0031, LM0132

Etymology: */'ma^L/* + */'úu^H/* + */dsea^L/* = «tree» + «Chinantec proper name for chile» + «people» + [adjective]. A variation on this name is ***'ma^L 'u'^{H} dsea^L*** [adjective] = «tree» + «Chinantec proper name for peach» + «people» + [adjective]. The names designate plants that have peach or chile-like fruits, but which are not considered edible. Two descriptive terms are commonly used: ***dsea^L nikiá^H*** «supernatural people» and ***dsea^L jgiáa^{LM}*** «cliff people». The names indicate that the fruits resemble «peaches(cherries)» or «chilies» are not considered edible for humans

Description: A monotypic generic that corresponds to SOL *Lycianthes*. Shrubs and herbs of 1 – 1.5 meters with strongly-scented foliage; leaves alternate, entire, often lobed; flowers bell-shaped, cream-white to yellowish-green; fruit a round, purple-black berry.

134. *'ma^L mɨ'^{H} 'úu^L ta^{LM}*

Collections: LH0265, LM0062, SH0036a, SH0049a, SH0113a

Etymology: */'ma^L/* + */mɨ'^{H}/* + */'úu^L/* + */ta^{LM}/* = «tree» + «rounded-fruit» + «Chinantec proper name for chile» + «bird». A variant on this name is ***'ma^L mɨ'^{H}***

'u'^{H} ta^{LM} «tree» + «rounded-fruit» + «peach» + «bird». Both names refer to the observation that birds favor the fruits of these plants.

Description: A monotypic generic that corresponds to ERI *Comarostaphylos*, including perhaps five species; also BRA *Lepidium lasicarpum* and *L. virginicum*. Shrubs of up to 1 meter; leaves small and lanceolate; flowers small, white, bell-shaped, grouped in a terminal, loose cluster; fruit small, round, purple-black. Apparently without use. Occasional in temperate dry and cold zones. Some people include these plants in the folk generic for «peach trees».

135. *'ma^L yúu'^{M}*

Collections: LH0146, LH0249, LH0250, LM0077, LM0082, SH0001a, SH0004a

Etymology: /*'ma^L*/ + /*yúu'^{M}*/ = «tree» + «Chinantec proper name for *Quercus*».

Description: A polytypic generic that corresponds to some species of FAG *Quercus*, including *Q. glabrescens*, *Q. glaucoides* and *Q. polymorpha*. Trees of 4 – 15 meters; leaves with pointed lobes, leathery, dark green, smooth; flowers greenish-yellow, small; fruit a pliable-shelled nut with a corky cap. Bark, boiled in tea, to strengthen gums and teeth; bark, combined with mescal and strapped to the back, used to treat backache in men?; bark?, prepared in tea with a little mescal, taken by those lacking physical strength; branchlets used for 'spiritual cleansing' to treat evil eye; branchlets used for adornment. Common in dry zones.

Specifics:

(A) *'ma^L yúu'^{M} tee^L* «white *Quercus* tree» [FAG *Quercus*]

(B) *'ma^L yúu'^{M} tii^L* «thin *Quercus* tree» [FAG *Quercus*]

(C) *'ma^L yúu'^{M} too^M* «blind *Quercus* tree» [FAG *Quercus*]

II. *'oo*^{L} «medicinal-herb»

A large life-form that corresponds to herbaceous plants used medicinally (or in some other way). Erect plants, herbaceous and of relatively small stature (typically less than 1 meter tall). Flowers present, if showy then cross-classified as *'oo*^{L} *li*^{H}. Primarily medicinal (whole plant, leaves, roots/various conditions). Common in all ecological zones of the community.

I recognize 62 generics in the medinical-herb category, making it the most diverse of the Chinantec life-forms that correspond to «herbs» (table 6.2.). 50 generics are monotypic (81% of the total); 12 generics (19%) are further subdivided into 31 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	50	7	3	2	0	0	0	0	0	0	0	0
Totals: 62 generics, 31 specifics, 0 varietals												

Table 6.2. Distribution of specifics in the life-form *'oo*^{L} «medicinal-herb».

1. *'oo*^{L} *chemis*

Collections: LH0105, LH0118, LM0086, LM0225, RL0011, RL0363, SH0017b

Etymology: /*'oo*^{L}/ + /*chemis*/ = «medicinal-herb» + «Spanish proper name for *Baccharis salicifolia*».

Description: A polytypic generic that corresponds to AST *Aster* and *Baccharis salicifolia*. Shrubs of 1 – 2 meters or small herbs; leaves lanceolate, slightly toothed; flowers white. Branchlets, rubbed on body, used to treat *calor interno*; juice of branchlets taken for stomach ache and diarrhea; branchlets, blended to make a fresh drink, taken daily for varicose veins; juice of branchlets, combined with mescal, taken three times a week for physical exhaustion; juice of the leaves, smoked over pitch-pine fire, taken to treat digestive tract irritation. The plant is considered to be cold. Abundant in temperate zones. Probably restricted to several species of *Aster* and to *Baccharis salicifolia*.

Specifics:

(A) *'oo^{L} chemis jmɨɨ^{L}* «water *chamizo* medicinal-herb» [AST *Aster*?] flowers white like *pericón*.

(B) *'oo^{L} chemis rø'^{L}* «green *chamizo* medicinal-herb» [AST *Baccharis salicifolia*]

(C) *'oo^{L} chemis tee^{L}* «white *chamizo* medicinal-herb» [AST *Baccharis salicifolia*]

2. *'oo^{L} chepii^{M}*

Collections: LM0227, LM0253, LM0273, SH0072

Etymology: */lí'^{H}/* + */chepii^{M}/* = «medicinal-herb» + «Chinantec-modified Spanish proper name for *Crotalaria* (Sp. *chepil*)».

Description: A polytypic generic that corresponds to FAB *Crotalaria* and PLG *Polygala paniculata*. Herbs of 1 – 2 dms.; leaves narrow, often compound and divided into three leaflets; flowers yellow or occasionally pinkish-white; fruit usually a round pod containing numerous seeds. Vegetative shoots, combined with corn *masa*, used to make *tamales* [*Crotalaria*]; flowering branchlets used for ornament [*Crotalaria*, *Polygala*]. Occasional in the dry zones. Could include all of the approximately 10 species of *Crotalaria*. This category is often classified as a flower (*lí'^{H} chepii^{M}*) or an edible-green (*ja'^{LM} chepii^{M}*).

Specifics:

(A) *'oo^{L} chepii^{M}* (unmodified) «*Crotalaria* medicinal-herb» [FAB *Crotalaria*]

(B) ***'oo^L chepii^M nuu^L*** «wild *Crotalaria* medicinal-herb» [FAB *Crotalaria*, PGL *Polygala*]

3. *'oo^L [sɨɨ^M kiá'^{M}] cuete*

Collections: LH0182, LM0117, RL0039

Etymology: */'oo^L/* + */sɨɨ^M/* + */kiá'^{M}/* + */cuete/* = «medicinal-herb» + «stem» + «for» + «SN for firework (Sp. cohete)

Description: A monotypic generic that corresponds to AST *Baccharis serraefolia*. Shrubs of 1 – 2 meters; leaves lanceolate; flowers yellow. Branchlets, prepared as a bath, used for *calor interno*; leaves, combined with ***'oo^L chemis*** and alcohol, placed on temples to treat headache and fever; stems formerly used to make *cohetes*, noisemakers used during the village fiestas. The plant is considered to be hot. Occasional in temperate zones of the community.

4. *'oo^L [kiá'^{M} sɨɨ3] dsea^L mɨ^L*

Collections: EL0125

Etymology: */'oo^L/* + */kiá'^{M}/* + */dsea^L/* + */mɨ^L/* = «medicinal-herb» + «for» + «people» + «female». This plant is said to have leaf morphology resembling female genitalia.

Description: A monotypic generic that corresponds to MLS *Clidemia setosa* herbs of 1 dms., pubescent; leaves 1 – 2 dms. long, notably veined, with a curious, setose, swollen base; flowers small, pinkish; fruit a purple berry. Juice of the branchlets or whole plants taken during conception and pregnancy to induce female gender in the fetus. The plant is considered to be hot. Scarce in humid zones.

5. *'oo^L [kiá'^{M} sɨɨ3] dsea^L ñu'^{L}*

Collections: RL0415

Etymology: */'oo^L/* + */kiá'^{M}/* + */dsea^L/* + */ñu'^{L}/* = «medicinal-herb» + «for» + «people» + «male». This plant is said to have leaf and fruit morphology resembling male genitalia.

Description: A monotypic generic that corresponds to ORC *Pleurothallis cardiothallis*. Epiphytic herbs; leaves leathery and deep green; flower white? on a stem that emerges from the leaf base; fruit pendant, elongate. Juice of the branchlets or whole plants taken during conception and pregnancy to induce male gender in the fetus. The plant is considered to be hot. Scarce in humid zones.

6. ***'oo^L [kiá'^{M}] dsee^{LH}***

Collections: LH0040, LM0274, RL0188, SH0039b

Etymology: */'oo^L/* + */kiá'^{M}/* + */dsee^{LH}/* = «medicinal-herb» + «for» + «infection». This plant is used for skin infections.

Description: A monotypic generic that corresponds to CLU *Hypericum*, PRM *Anagallis arvensis*, and VRB *Lippia*. Erect herbs of 1 dm. or less, sometimes aromatic; leaves less than 2 cms. long; flowers yellow, orange or white. Juice of the whole plant placed on skin to treat *derisepela* (a skin disease in which red splotches appear) [*Anagallis*, *Lippia*]; branchlets, crushed and boiled in water, used to bathe *derisepela roja*. The plant is considered to be cold. Occasional in temperate zones. *Lippia* is alternately classified as ***jóo^M kiá'^{M} dsee^{LH}***. This category is considered to be close to ***'oo^L ngɨ^{LM} sí'^{L}***.

7. ***'oo^L dsii^L moo^{MH}***

Collections: LH0009, LM0056, RL0160, RL0218, RL0268, RL0374

Etymology: */'oo^L/* + */dsii^L/* + */moo^MH/* = «medicinal–herb» + «dog» + «flea».

Description: A polytypic generic that corresponds to CHN *Chenopodium ambrosioides*, a highly salient strongly–scented herb much used in cooking and medicine. Herbs of 2 – 3 dms, strongly aromatic; leaves lobed; flowers minute, greenish–white, bunched into terminal, dense clusters; seeds black. Branchlets used as condiment in beans or meat stews; branchlets, eaten whole or taken in tea, used to rid the body of intestinal parasites and to treat stomach aches. The plant is considered to be hot. Commonly protected in home gardens and open areas in all inhabited zones.

Specifics:

(A) ***'oo^L dsii^L moo^MH*** (unmodified) «flea herb» [CHN *Chenopodium ambrosioides*]

(B) ***'oo^L dsii^L moo^MH tøø^M*** «false flea herb» [?] A pubescent herb that is similar to *Chenopodium ambrosioides*.

8. *'oo^L [kiá'^M] dsii^L ngøøng^L*

Collections: LH0101, LM0241, SH0027b

Etymology: */'oo^L/* + */kiá'^M/* + */dsii^L/* + */ngøøng^L/* = «medicinal–herb» + «for» «dog» + «rabid».

Description: A monotypic generic that corresponds to SOL *Solanum* and PLG *Polygonum*. Two types: herbs of up to one meter, often spiny; leaves lobed, alternate, often densely pubescent; flowers blue to purple, star–shaped; or herbs of 1 – 2 dms., growing in moist habitats; leaves lanceolate, alternate, clasping the stem; flowers pinkish–white, in terminal spikes. Branchlets rubbed on skin to treat rabid–dog bites [*Polygonum*]; leaves rubbed on skin, and juice of leaves – sometimes mixed with a little gunpowder, taken to treat dog bites [*Solanum*]. The plants are considered cold. Occasional in dry zones.

9. ***'oo***^{L} ***fi***$^{'L}$

Collections: LH0045, SH0009b

Etymology: */'oo*^{L}*/* + */fi*$^{'L}$*/* = «medicinal-herb» + «milk». The name refers to the milky sap of this herb.

Description: A monotypic generic that corresponds to CAM *Lobelia laxiflora*. Herbs with milky sap; flowers red. Whole plant boiled and used to bathe skin rashes [?]; branchlets used for a *limpia* to treat *mal ojo*; sap placed in skin wounds to prevent infection and promote healing. Available all year? Occasional in temperate dry zone. Often cross-classified as ***má***$^{'H}$ ***'ma***^{L} ***fi***$^{'L}$ or ***moo***^{L} ***fi***$^{'L}$. Is there an *'oo*^{L} *ji*$^{'L}$?

10. ***'oo***^{L} ***[kiá***$^{'M}$***]*** ***fɸ***$^{'LM}$

Collections: LH0033, LH0035, LH0038, LH0129, LH0130, RL0340

Etymology: */'oo*^{L}*/* + */kiá*$^{'M}$*/* + */fɸ*$^{'LM}$*/* = «medicinal-herb» + «for» + «magical-fright». These plants are in the treatment of *susto* or magical fright, a folk illness common in many parts of Mesoamerica.

Description: A polytypic generic that corresponds to CRY *Arenaria lanuginosa*, PLM *Loeselia*; SCR *Lindernia*, *Mecardonia procumbens* and *Mimulus*. Scandent herbs of 0.5 to 5 dms.; leaves small, lanceolate, sometimes lobed; flowers less than 1 cm. long, yellow, white or purple; fruit a small, brown capsule. Juice of branchlets, branchlets crushed in mescal, or tea of several *susto* herbs taken to cure *susto* and associated symptoms like *calor interno*; branchlets placed in mescal, which is later blown (*soplado*) over patient sick with *susto*. These plants are considered to be temperate. Occasional in temperate zones. Apparently restricted to a few scandent herbs used to treat *susto* - perhaps 3 species of *Arenaria*, 1 species of *Loeselia*, and several genera and species of Scrophulariaceae. Combined with *pernecida* for cold *susto*.

Specifics:

(A) ***'oo^L fɸ'^{LM} kiá'^{M} dsea^L 'iing^{LM}*** «magical-fright medicinal-herb for drunks» [CRY *Arenaria lanuginosa*]

(B) ***'oo^L [kiá'^{M}] fɸ'^{LM} jmɨɨ^L*** «daytime magical-fright medicinal-herb» [SCR *Mimulus*, *Mecardonia procumbens*]

(C) ***'oo^L [kiá'^{M}] fɸ'^{LM} 'uɸɸ^L*** «nighttime magical-fright medicinal-herb» [SCR *Lindernia*]

11 - 24. The extended, polytypic category ***'oo^L gí^L*** *«aire* medicinal-herb»

Description: A complex polytypic generic that corresponds to medicinal herbs used in the treatment of ***gí^L***, «*aire*», a folk illness. Descriptions and collections follow each generic name.

11. ***'oo^L gí^L [kiá'^{M}] dsúu^H***

Collections: RL0247 [RL0461]

Etymology: ***/'oo^L/ + /gí^L/ + /kiá'^{M}/ + /dsúu^H/*** = «medicinal-herb» + «for» + «malaria». Plants in this folk category are used in the treatment of malaria.

Description: A monotypic generic that corresponds to AST *Neurolaena*. Shrubs of 1 - 2 meters; leaves thin; flowers yellow. Juice of the branchlets taken to treat malaria. Apparently considered to be hot. Occasional in the temperate humid zone.

12. ***'oo^L gí^L iée^M***

Collections: EL0115, LH0018, LH0197, RL0375

Etymology: */'oo^L/* + */gɨ^L/* + */iée^M/* = «medicinal–herb» + «wind» + «hot».

Description: A specific that corresponds to AST *Pluchea odorata*, ERI *Vaccinium confertum* and PIP *Piper*. Herbs of up to 1 meter, often aromatic; leaves oblanceolate, covered with a rust–colored pubescence; flowers white to pinkish red. Vegetative shoots taken in tea for neuralgic pains; branchlets, prepared as tea combined with coffee, taken to treat stomach ache [AST *Pluchea*]; branchlets taken in tea to treat cold diarrhea [ERI *Vaccinium*]; branchlets taken as tea to warm the body [PIP *Piper*]. These plants are considered to be hot. Occasional in all zones. Ricardo López Luna called *Pluchea odorata* ***'oo^L gɨ^L sea^L g^wa^L mɨ'^L***, «Snake river air medicinal–herb», apparently indicating that the plant is more known and common in the tropical dry country around *Rio Culebra*. Apart from *Pluchea odorata*, a medicinal plant widely used in Mesoamerica, and *Vaccinium confertum*, probably includes numerous species of *Piper*, a complex genus containing more than 25 species in the Sierra.

13. ***'oo^L gɨ^L jiíng^M***

Collections: LH0032, LM0026, LM0123, LM0158, LM0212, SH090a

Etymology: */'oo^L/* + */gɨ^L/* + */jiíng^M/* = «medicinal–herb» + «wind» + «Chinantec proper name for *Heterotheca*».

Description: A specific that corresponds to AST *Heterotheca inuloides*. Herbs of 1 – 2 dms.; leaves oblanceolate, softly pubescent, bitter–tasting; flowers yellow, grouped into a margarita–like cluster. Whole plant taken in tea for stomach and muscle aches, or applied as a compress for rheumatism or insect bites; whole plant, extracted in alcohol, rubbed on bodyaches to increase the circulation of the blood. Considered to be a hot plant. Abundant in open fields and roadsides of the dry zones and the cold zone. Apparently restricted to *Heterotheca inuloides*, a medicinal plant widely used in southern Mexico, and sold in Oaxacan markets under the name *arnica de flor*. Sometimes pronounced as *'oo*^{L} *gɨ*^{L} *jii*^{M}.

14. *'oo*^{L} *gɨ*^{L} *jmɨɨ*^{L}

Collections: LH0144, LM0122, RL0026, RL0270, RL0413

Etymology: */'oo*^{L}*/* + */gɨ*^{L}*/* + */jmɨɨ*^{L}*/* = «medicinal-herb» + «wind» + «water».

Description: A specific that corresponds to AST *Baccharis*, PLG *Polygonum*, PLT *Plantago*. Herbs, often growing in water or humid soil; leaves lanceolate; flowers pink or greenish-white, often grouped into a spike-like cluster. Leaves, crushed with alcohol, placed on the body to treat rheumatism; juice of the leaves, combined with mescal, taken to treat stomach ache; leaves, prepared in bath, used to treat *calor interno* [all PLT] ; leaves, prepared in tea with ruda and *'oo*^{L} *gɨ*^{L} *'ua*^{LH}, taken for stomach and muscle aches [AST]; leaves, prepared in tea, used to treat body aches and snake bite. Considered to be cold plant. Occasional in temperate zones. *Plantago* is sometimes referred to as *'oo*^{L} *jmɨɨ*^{L}, *Baccharis* as *'oo*^{L} *kiá'*^{M} *jmɨɨ*^{L}. Apparently restricted to the 5 species of *Plantago*, and probably one species of Eupatoriae. *Polygonum* is not used medicinally, but its 3 – 4 species are included because of their spike-like inflorescence and aquatic habit.

15. *'oo*^{L} *gɨ*^{L} *joo*^{L}

Collections: LH0057, LM0173

Etymology: */'oo*^{L}*/* + */gɨ*^{L}*/* + */joo*^{L}*/* = «medicinal-herb» + «wind» + «cotton».

Description: A specific that corresponds to AST *Gnaphalium*. Erect herbs, bitter–tasting; leaves lanceolate, densely covered with cottony hairs; flowers white, turning golden–brown when in fruit. Leaves taken as tea for all types of *aire*, stomach ache and biliary disease. Considered to be a temperate herb. Occasional in the temperate dry zone. Alternately classified as *'oo^{L} gɨ^{L} tee^{L}*. Could refer to all of the approximately 12 species of *Gnaphalium* of the Sierra.

16. ***'oo^{L} gɨ^{L} kiu̱^{LM}***

Collections: LH0142, LM0121

Etymology: */'oo^{L}/* + */gɨ^{L}/* + */kiu̱^{LM}/* = «medicinal–herb» + «wind» + «fourteen». The name appear to be derived for the Spanish name *catorce potencias* (or vice versa).

Description: A specific that corresponds to ?. Herb; leaves; flowers red or white. Branchlets, grouped into a handful of 7, used for *limpias*; branchlets taken in tea for stomach ache, inflammation and *aire*. Considered to be temperate. Occasional in disturbed areas of Comaltepec, in the temperate dry zone.

17. ***'oo^{L} gɨ^{L} kóo má$^{'H}$***

Collections: RL0411

Etymology: */'oo^{L}/* + */gɨ^{L}/* + */kóo/* + */má$^{'H}$/* = «medicinal–herb» + «wind» + «large» + «small–leaf».

Description: A residual specific that corresponds to ?. Shrub of 1 meter; leaves ?; flowers white, grouped into a spike–like cluster. Apparently without use. Apparently also called *'oo^{L} gɨ^{L} jaang^{LH}*.

18. ***'oo^{L} gɨ^{L} lɨ$^{'LM}$ má$^{'H}$***

Collections: RL0087

Etymology: */'oo*^{L}*/ + /gi*^{L}*/ + /lɨ*$^{'LM}$*/ + /má*$^{'H}$*/* = «medicinal-herb» + «wind» + «round» + «small-leaf».

Description: A specific that corresponds to PIP *Piper*. Shrub of 1 – 2 meters, aromatic; leave broadly lanceolate; flowers white, grouped into a rat tail-like cluster. Leaves taken as tea for snake bite. Occasional in the temperate humid zone. Could apply to several species of *Piper*, a very complex genus.

19. ***'oo*^{L} *gi*^{L} *'lo*$^{'H}$**

Collections: LH0051, SH0077a

Etymology: */'oo*^{L}*/ + /gi*^{L}*/ + /'lo*$^{'H}$*/* = «medicinal-herb» + «air» + «hook». The leaves of this herb are said to have a hooked tip.

Description: A specific that corresponds to AST *Archibaccharis schiedeana*. Twining herbs of 1 meter; leaves ovate, clearly three-nerved; flowers white. Leaves, prepared in compress, to treat *calor interno* and *derisepela*. This plant is considered to be temperate. Occasional in temperate dry and cold zones. Probably restricted to *Arcibaccharis schiedeana* but could include *A. asperifolia* and other species.

20. ***'oo*^{L} *gi*^{L} *má*$^{'H}$ *j<u>óo</u>*^{LM}**

Collections: LH0092, SH0131b

Etymology: */'oo*^{L}*/ + /gi*^{L}*/ + /má*$^{'H}$*/ + /j<u>óo</u>*^{LM}*/* = «medicinal-herb» + «wind» + «small-leaf» + «Chinantec proper name for *Piper sanctum*».

Description: A specific that corresponds to PIP *Piper* aff. *jacquemontianum*. Shrubs of 1 meter, aromatic; leaves lanceolate, alternate; flowers white, grouped into rat tail-like clusters, emerging from the axils of the leaves. Leaves taken as tea for post-partum recovery; leaves, prepared as a vapor bath, used to calm internal aches and to treat *calor interno*. Considered to a temperate herb. Occasional near rivers in the temperate dry zone. Probably applies to a few species of *Piper*, a complex genus that includes more than 25 species in the Sierra.

21. *'oo^L gi^L née^M*

Collections: EL0017, RL0341, SH0015b

Etymology: /*'oo^L*/ + /*gi^L*/ + /*née^M*/ = «medicinal–herb» + «wind» + «yellow».

Description: A specific that corresponds to PIP *Piper*. Shrubs of 1 – 2 meters, aromatic; leaves lanceolate, alternate; flowers white, grouped into rat tail–like cluster that emerge from the axils of the leaves. Leaves taken in tea or heated and placed on body for snake–bite. Considered to be hot. Common in secondary vegetation of tropical and temperate humid zones. Probably applies to a few species of *Piper*, a complex genus that includes more than 25 species in the Sierra.

22. *'oo^L gi^L rø'^{L}*

Collections: LH0019, RL0012

Etymology: /*'oo^L*/ + /*gi^L*/ + /*rø'^{L}*/ = «medicinal–herb» + «wind» + «green».

Description: A specific that corresponds to AST ? and PIP *Piper*. Herbs of up to 1 meter; leaves deep green, alternate; flowers white. Leaves, heated over a wood fire, placed on snake bite [PIP]; leaves, boiled in water, taken for *mal de ojo* and *aire*. Considered to be caliente. Occasional in temperate zones.

23. *'oo^L gi^L tii^L*

Collections: LH0093, RL0057, RL0068, RL0396, SH0069a

Etymology: /*'oo^L*/ + /*gi^L*/ + /*tii^L*/ = «medicinal–herb» + «wind» + «thin».

Description: A specific that corresponds to PIP *Piper amalago*. Bushy herbs of up to

1 meter; leaves ovate, alternate, light green; flowers white, grouped into a spike-like cluster. Branchlets, boiled in water, taken for post-partum recovery; leaves, boiled in water, taken to treat stomach ache; juice of the leaves, combined with cane liquor, taken to treat stomach ache. Considered to be temperate. Common in temperate and tropical zones of the community. Sometimes considered as a tree form of wind herb – ***'ma***^{L} ***'oo***^{L} ***gɨ***^{L} ***tii***^{L}, tree herb air[folk illness] thin. Apparently restricted to *Piper amalago*, a medicinal plant widely used in Mesoamerica, but may include other species of *Piper*.

24. *'oo*^{L} *gɨ*^{L} *'ua*^{LH}

Collections: LH0006, LM0127, RL0084, RL0200, RL0250, RL0272, RL0273, SH0014b

Etymology: /*'oo*^{L}/ + /*gɨ*^{L}/ + /*'ua*^{LH}/ = «medicinal-herb» + «air» + «soft».

Description: A polytypic specific that corresponds to AST Eupatoriae and LAM. Erect herbs, bitter-tasting; leaves toothed; flowers white. Leaves, added to coffee or prepared in tea sometimes combined with ground corn or mescal, used to treat stomach and headache; juice taken for *malestar* or as protection during nighttime walks. This plant is considered to be temperate. Common in temperate to tropical dry zones near Comaltepec and Chuparrosa, and in the temperate humid zone near La Esperanza. Includes several species of AST and LAM, difficult to identify because they are almost always in a vegetative state. It may correspond to a medicinal plant which is called ***hoja de angel*** in local Spanish. A synonym for this category is ***'oo***^{L} ***[kiá***$^{'M}$***] dsea***^{L} ***láang***^{L} «witch's herb».

Specifics:

The «purple» and «white» specifics are used alike, whereas the «green» and «wild» types are not used medicinally.

(A) ***'oo^{L} gɨ^{L} 'ua^{LH} nuu^{L}*** «wild soft wind medicinal–herb» [AST or LAM]

(B) ***'oo^{L} gɨ^{L} 'ua^{LH} nʉ^{M}*** «purple soft wind medicinal–herb» [AST] Considered by some to be the «male» form.

(C) ***'oo^{L} gɨ^{L} 'ua^{LH} rø'^{L},*** «green soft wind medicinal–herb» [AST]

(D) ***'oo^{L} gɨ^{L} 'ua^{LH} tee^{L}*** «white soft wind medicinal–herb» [AST] Considered by some to be the «female» form.

25. ***'oo^{L} g^{w}a^{L}***

Collections: EL0042, EL0148, LH0010, LH0110, LM0151, RL0024, RL0178, SH0056a, SH0066a

Etymology: /*'oo^{L}*/ + /*g^{w}a^{L}*/ = «medicinal–herb» + «river».

Description: A monotypic generic that corresponds to MLV *Sida rhombifolia* and other *Sida* species. Erect herbs, sometimes woody at base, with mucilaginous sap; stems multiple; leaves ovate, lobed; flowers less than 1 cm. wide, yellow; fruit a small, round group of light brown seeds. Branchlets, crushed with «naranja agria» used to wash hair as treatment for dandruff; branchlets, grouped into a handful of 7, used for a *limpia* to treat *mal de ojo*; whole plant, prepared in bath, used to treat general illness, or to recover strength after being ill. The plant is considered to be cold. Abundant in disturbed areas in temperate and tropical zones. Some Chinantec distinguish the followings specifics, while others suggest that the plant changes appearance depending on the soil fertility: **(A)** ***'oo^{L} g^{w}a^{L} jñʉ^{L} má'^{H}*** «hairy–leaf river medicinal–herb» [MLV *Sida*]; **(B)** ***'oo^{L} g^{w}a^{L} tiɨ^{L}*** «thin river medicinal–herb» [MLV

Sida].

26. ***'oo^L g^{w}í'^{L}***

Collections: EL0007, EL0012, EL0024, EL0039, EL0067, EL0080, EL0081, EL0104, EL0106, LH0236, LH0237, LH0308, LM0154, RL0032, RL0045, RL0078, RL0080, RL0081, RL0176, RL0234, RL0284, RL0343, RL0402, SH0132b

Etymology: /*'oo^L*/ + /*g^{w}í'^{L}*/ = «medicinal–herb» + «cold, fresh».

Description: A variable monotypic generic that corresponds to ACA *Aphelandra aurantiaca*, *Blechnum brownei*, BEG *Begonia*, CMM, COT *Costus ruber*, CRS, HAE *Xiphidium carulea*, ORC, MLS *Arthrostema ciliatum*, *Miconia lonchophylla*, *Miconia oinocchrophylla*, *Topobaea laevigata*, PIP *Peperomia donaguina* and other *Peperomia*, RUB *Sommera*. Herbs of diverse habit – erect, scandent, epiphytic, terrestrial – that grow in shady, moist habitats; leaves thickened to succulent, green but often tinged with red; flowers and fruits diversely shaped and colored. Juice of the leaves taken to stop uterine hemorrhaging [MLS *Arthrostema ciliatum*, *Miconia oinochrophylla*]; leaves, crushed and prepared as a compress to treat «calor interno» [PIP *Peperomia*]; leaves, chewed fresh, used to treat canker sores [CRS]; leaves given as food to chicken that do not lay eggs [PIP *Peperomia*]; leaves, crushed and applied as compress, used to treat skin infections such as *sarna*; leaves chewed to treat canker sores [BEG *Begonia*]; juice of the leaves taken to treat dysentery [PIP *Peperomia donaguina*]; juice of the leaves taken to relieve thirst [MLS]. Considered to be cold. Common in all zones. Sometimes cross–classified as ***lí^H 'oo^L g^{w}í'^{L}***. *Begonia* is alternately classified as ***'oo^L j<u>í</u>'^{H} l+'^{LM} má'^{H}***, «medicinal–herb sour round small–leaf». Focal members are apparently the species used for *calor interno* – herbs with thickened leaves that grow in shady, moist areas like ACA *Aphelandra aurantiaca*, BEG *Begonia*, GSN *Columnea schiedeana*, MLS *Miconia oinochrophylla* and PIP *Peperomia*. *'oo^L g^{w}í'^{L}*, as a residual category, is extended to include succulent herbs in general, a criterion that could apply to many species in the Sierra. Specific classification of *'oo^L g^{w}í'^{L}* is not systematic or habitual, many specific names appear improvised and are not commonly used. The names include: **(A)** *'oo^L g^{w}í'^{L} j<u>ii</u>'^{MH}* «sour fresh medicinal–herb» [MLS *Arthrostema ciliatum*]; **(B)** *'oo^L g^{w}í'^{L} pí'^{H}* «small fresh medicinal–herb» [BEG *Begonia*]; **(C)** *'oo^L g^{w}í'^{L} kiá'^{M} tu^L* «chicken fresh medicinal–herb» [PIP *Peperomia*]; **(D)** *'oo^L g^{w}í'^{L} sea^L dse'^{L} 'ma^L* «fresh medicinal–herb found on trees» [epiphytic *Peperomia*]; **(E)** *'oo^L gwí'^{L} sea^L dse'^{L} k<u>uu</u>^{LH}* «fresh medicinal–herb found on rocks» [epiphytic *Peperomia*].

27. *'oo^L gwɨ'^{LM}*

Collections: LH0049, LM0032, LM0201

Etymology: /*'oo^L*/ + /*gwɨ'^{LM}*/ = «medicinal–herb» + «scar–forming». These herbs are used to treat skin wounds.

Description: A monotypic generic that corresponds to AST ?, CIS *Helianthemum glomeratum*, MLV. Erect herbs; leaves small; flowers yellow to pink. Leaves, boiled in water and then cooled, used to wash skin burns and wounds. Considered to be cold. Found in temperate dry and cold areas near Comaltepec. Could apply to several species of Malvaceae and Asteraceae.

28. *'oo^L 'ia^{LM}*

Collections: LH0326

Etymology: /*'oo^L*/ + /*'ia^{LM}*/ = «medicinal–herb» + «Chinantec proper name for ?».

Description: A monotypic generic that corresponds to AST. Herb; flowers purple. Leaves, warmed and prepared with almond oil, applied to skin abscesses. The herb is considered temperate. Found in the cold zone near Comaltepec.

29. ***'oo^L 'iée^L***

Collections: LH0014, LM0060, LM0112, RL0254, SH0008b

Etymology: /*'oo^L*/ + /*'iée^L*/ = «medicinal-herb» + « Chinantec proper name for Baccharis, or tender».

Description: A polytypic generic that corresponds to *Baccharis salicifolia* and *Senecio salignus*. Shrubs to 2 meters; leaves lanceolate; flowers, small, white or yellow, uncommon. Juice of the leaves (sometimes combined with mescal or with ***'oo^L chemis***, a similar looking plant), taken for post-partum recovery, body aches and tiredness; leaves, prepared in bath, used for post-partum recovery. The juice is considered to be temperate to hot. Abundant in temperate zones. Occasionally cross-classified as ***'ma^L***. Apparently includes all lanceolate-leaved *Baccharis* species (e.g. *B. caloneara*); excludes *Baccharis* with coriaceous, resinous leaves (e.g. *B. conferta*, *B. trinervis*).

Some Chinantec also include the following specific that corresponds to a small form of the plant ***'oo^L 'iée^L bóó'^{LH}*** «short *Baccharis* medicinal-herb» [AST *Baccharis*]. The following two specifics are widely recognized.

Specifics:

(A) ***'oo^L 'iée^L nu^M*** «purple *Baccharis* medicinal-herb» [AST *Baccharis salignus*] Considered to be the male form, it is combined with ***'ooL chemis*** to treat physical exhaustion.

(B) ***'ooL 'iée^L tee^L*** «white Baccharis medicinal-herb» [AST *Baccharis salignus*] Considered to be the female form it is used to treat *calor interno* «internal heat», swelling, post-partum recovery and exhaustion.

30. *'oo^L jii^LH gwɨ^M 'uí'^M*

Collections: LM0102, LH0081, LM0156, LM0232

Etymology: /***'oo^L***/ + /***jii^LH***/ + /***gwɨ^M***/ + /***'uí'^M***/ = «medicinal-herb» + «root» + «spider» + «black».

Description: A monotypic generic that corresponds to RAN *Ranunculus petiolaris*. Root, or leaves extracted in alcohol, applied to treat toothache. The root is said to be *picoso*, or hot and spicy like chile pepper. Apparently considered to be cold, since most roots are cold. Common in the temperate dry zone around Comaltepec. Alternately classified as ***lï^H née^M*** «yellow flower».

31. *'oo^L jii^LH jmɨ^M*

Collections: LH0134, LM0226

Etymology: /***'oo^L***/ + /***jii^LH***/ + /***jmɨ^M***/ = «medicinal-herb» + «root» + «Chinantec proper name for *Indigofera*?».

Description: A monotypic generic that corresponds to FAB *Indigofera*. Scandent herbs; root woody, extending deeply in soil; leaves compound, divided into numerous small leaflets; flowers orange-red; fruit a small bean-like pod. Root, extracted in mescal, taken three times a day to treat *calor*; root, crushed and boiled in water, taken to treat physical exhaustion, post-partum recovery, and kidney ailments. The root is considered to be cold. Occasional in dry areas near Comaltepec. Called *golondrina raizada* by some Chinantec.

32. *'oo*^{L} *jii*^{L} *mogi*^{LH} *k*^{w}*ɨ*$^{'LM}$

Collections: LH0088, LM0069, SH0086a

Etymology: /*'oo*^{L}/ + /*jii*^{L}/ + /*mogi*^{LH}/ + /*k*^{w}*ɨ*$^{'LM}$/ = «medicinal–herb» + «root» + «head» + «lizard».

Description: A monotypic generic that corresponds to AST *Iostephane trilobata*. Herbs of less than 1 dm.; taproot woody, growing deeply in soil; leaves lobed, elongate, growing in a whorl around the base of the plant; flowers yellow. Roots, blended in mescal, taken for 2 weeks to 1 month to remove *manchas* from the face; juice of the roots taken to treat physical exhaustion and for kidney ailments. Considered to be cold. Occasional in fallow fields of the temperate dry zone. Occasionally referred to as ***mogui*^{LH} *k*^{w}*ɨ*$^{'LM}$**, without a life–form classifier.

33. *'oo*^{L} *jmearóo*^{L}

Collections: LM0206, SH0048b, SH0075a

Etymology: /*'oo*^{L}/ + /*jmearóo*^{L}/ = «medicinal–herb» + «Chinantec proper name for *Porophyllum*, leaves–taste».

Description: A monotypic generic that corresponds to AST *Porophyllum*. Herbs of 2 – 3 dms, strongly scented; leaves narrowly linear; flowers lilac–white, borne in a terminal cluster enclosed in dark purple bracts. Branchlets eaten as fresh condiment with beans or less commonly as a cooked vegetable. Scarce in temperate and tropical dry zones; rarely cultivated in home gardens of the temperate humid zone. The plant is considered to be hot. Probably includes 3 species of *Porophyllum* found in the Sierra as well as *P. macrocephala* (*papaloquelite*), which is sold in markets of Oaxaca City. (Roberto López Hernández, a local curer, suggests that this must have been used medicinally at one time, since it is considered *'oo*^{L}).

Specifics:

(A) ***'oo*^{L} *jmearóo*^{L}** (unmodified) «tasty medicinal-herb» [AST *Porophyllum*]

(B) ***'oo*^{L} *jmearóo*^{L} *kiá*$^{'M}$?** «bumblebee? tasty medicinal-herb» [AST *Porophyllum* ?] edible, found in tierra caliente.

34. *'oo*^{L} *jmɨɨ*^{L}

Collections: LM0030, RL0226

Etymology: /*'oo*^{L}/ + /*jmɨɨ*^{L}/ = «medicinal-herb» + «water».

Description: A polytypic generic that corresponds to CRS and CIS *Helianthemum glomeratum*. Erect herbs; leaves whitish-green; flowers yellow. Branchlets, grouped into a handful of seven, used for a *limpia* to treat laziness. Occasional in temperate zones. See also ***'oo*^{L} *guí*^{L} *jmɨɨ*^{L}**. Some Chinantec differentiate a typical form and a reduced form (***'oo*^{L} *jmɨɨ*^{L} *tií*^{L}** «thin water medicinal-herb») of this generic.

35. *'oo*^{L} *jóo*^{LM}

Collections: LM0109, LM0194, LM0254, RL0214, SH0080a

Etymology: /*'oo*^{L}/ + /*jóo*^{LM}/ = «medicinal-herb» + «Chinantec proper name for *Lippia* and *Lantana*».

Description: A polytypic, unaffiliated generic that corresponds to VRB *Lantana* and *Lippia*. Scandent or erect herbs, aromatic; leaves ovate, dentate, opposite; flowers purple to white, grouped in dense clusters that emerge from the axils of the leaves. Branchlets, boiled in water, taken at onset of labor to speed delivery; juice of the branchlets, toasted and crushed, taken to treat uterine hemorrhaging; branchlets, crushed or ground, given to dogs to treat hemorrhage. Considered to be hot. Scarce;

cultivated in home gardens of the tropical dry and temperate humid zone. Could apply to several herbaceous species of *Lippia* and *Lantana*. Also called ***jóo̲***^{LM}, without life–form classifier. A descriptive synonym is ***'oo***^{L} ***jóo̲***^{LM} ***kiá***$^{'M}$ ***dsii***^{L} «*Lippia/Lantana* medicinal–herb for dog».

36. ***'oo***^{L} ***kóo***$^{'LH}$ ***ñi***^{H}

Collections: LH0281, LM0247, SH0115

Etymology: /*'oo*^{L}/ + /*cóo*$^{'LH}$/ + /*ñi*^{H}/ = «medicinal–herb» + «iron» + «Spanish». ***kóo***$^{'LH}$ ***ñi***^{H} is the name for machete, a cutting tool introduced by the Spanish.

Description: A monotypic generic that corresponds to RUB *Galium*. Twining herbs, often climbing on other herbs and shrubs; stem and leaves covered with stiff, cutting hairs; leaves small, lanceolate, arranged in a whorl; flowers minute, white; fruit a pair of rough, hard seeds. Leaves taken in tea for kidney problems, and for post–partum recovery. The plant is considered to be hot. Common in temperate zones. *Galium mexicanum* is the focal member, but 4 other *Galium* species are probably included.

37. ***'oo***^{L} ***[kiá***$^{'M}$***]*** ***k***^{w}***a***^{LH}

Collections: LH0183, LM0130, RL0029, RL0203

Etymology: /*'oo*^{L}/ + /*k*^{w}*a*^{LH}/ = «herb» + «Chinantec proper name for some composites used to treat skin wounds».

Description: A monotypic generic that corresponds to AST *Alloispermum integrifolium*, *Lagascea helianthaefolia* and other composites. Robust herbs of 0.5 – 1.5 meters; leaves large, scabrid; flowers cream–white or yellow, borne in terminal composite inflorescences. Juice used as a dressing for skin wounds, leaves used as forage in times of drought. Common in temperate dry zone around Comaltepec. Alternately classified as ***li'^{H} 'oo^{L} k^{w}a^{LH}*** or ***'ma^{L} k^{w}a^{LH}***. This category may be extended to other large herbaceous AST.

38. *'oo^{L} k^{w}ée'^{LH} lɨ'^{H}*

Collections: LM0092, RL0189

Etymology: */'oo^{L}/* + */k^{w}ée'^{LH}/* + */lɨ́'^{H}/* = «medicinal-herb» + «gourd bowl» + «round». The name apparently refers to the cup-shaped peltate leaves of this herb.

Description: A monotypic generic that corresponds to API *Hydrocotyle*. Herbs of less than 5 cms.; leaves glossy, rounded and usually peltate; flowers minute, yellowish-green, rarely observed, grouped in a round cluster. Leaves, moistened with mescal, are placed on the temples to relieve headache or nosebleed. Whole plant used as food for chickens. The plant is considered to be cold. Occasional in water in the temperate zones. Also may be referred to as ***'oo^{L} lɨ́'^{H} má'^{H}***, herb round small-leaf. The focal member is *Hydrocotyle mexicana*, which has peltate, round leaves; *H. ranunculoides* and *H. umbellata*, which have round leaves, are probably included; *Hydrocotyle verticillata*, which does not have round leaves, is probably excluded.

39. *'oo^{L} lí^{H} mɨ'^{H} k^{w}ɨ́ɨ^{H}*

Collections: LM0002, LH0086

Etymology: */'oo^{L}/* + */lí^{H}/* + */mɨ́'^{H}/* + */k^{w}ɨ́ɨ^{H}/* = «medicinal-herb» + «rounded-fruit» + «Chinantec proper name for maize». The golden flowering heads of chamomile are said to resemble grains of corn.

Description: A monotypic generic that corresponds to AST *Chamomila recutita*.

Herbs of up to 1 dm., sweetly scented; leaves divided into numerous very fine segments; flowers grouped into compact heads composed of white ray and yellow disk flowers. Flowering branchlets prepared in tea to treat head colds and dehydration. Considered to be hot. Commonly cultivated in home gardens of Comaltepec in the temperate dry zone. Apparently restricted to *Chamomila recutita*, a medicinal plant abundantly cultivated in San Juan Quiotepec and widely used in Mesoamerica.

40. ***'oo*^{L} *lí*^{H} *mɨ́'*^{H} *kʷɨ́ɨ*^{H} *kiʉ̲ʉ̲*^{L}**

Collections: LH0194, LM0079, LM0262, SH0038b

Etymology: /*'oo*^{L}/ + /*lí*^{H}/ + /*mɨ́'*^{H}/ + /*kʷɨ́ɨ*^{H}/ + /*kiʉ̲ʉ̲*^{L}/ = «medicinal–herb» + «flower» + «rounded–fruit» + «Chinantec proper name for maize» + «dry». The fruits of Mexican bearberry are said to resemble dried grains of corn.

Description: A monotypic generic that corresponds to ERI *Arctostaphylos pungens*. Shrubs of 1 – 2 meters; branches multiple; leaves whitish–green, ovate, smooth and leathery in texture; flowers white, shaped like small, closed bells; fruits round, with a mealy pulp, turning brown at maturity. Leaves and fruits, dried and prepared in tea, taken daily to relieve kidney problems; leaves, combined with *'ma*^{L} *'e̲*^{MH} in tea, used to treat nervous conditions; flowers used for ornament; fruits eaten raw. Considered to be a temperate plant. Common in dry and cold zones near Comaltepec. Could also include *Arctostaphylos polifolia*, a species common in the piedmont above the Oaxaca Valley.

41. ***'oo*^{L} *lí*^{H} *'nɨ*^{LM}**

Collections: LH0324, LM0196

Etymology: */'oo*^{L}*/* + */lí*^{H}*/* + */'nɨ*^{LM}*/* = «medicinal–herb» + «flower» + «three».

Description: A monotypic generic that corresponds to LAM *Hyptis*. Herbs of 1 – 2 dms.; leaves opposite, softly pubescent; flowers lilac. Leaves, crushed and extracted in alcohol, rubbed on body for rheumatism; leaves, prepared in tea, taken to treat stomach ache. Occasional in cornfields of the cold and temperate zone around Comaltepec. Could include several of the 14 *Hyptis* species found in the Sierra.

42. ***'oo*^{L} *lí*^{H} *tṳ́*^{M}**

Collections: LH0008, RL0025, SH0118

Etymology: */'oo*^{L}*/* + */lí*^{H}*/* + */tṳ́*^{M}*/* = «medicinal–herb» + «flower» + «buttons». The flowering heads of this plant are round and flattened, apparently bringing to mind buttons.

Description: A monotypic generic that corresponds to AST *Erigeron karwinskianus*. Herbs of 1 dm.; leaves whorled around the base of the plant; flowers grouped into a compact head composed of pinkish–white ray and yellow disk flowers. Flowering branchlets, combined with other plants in tea, used to treat coughs. Considered to be a temperate plant. Occasional in temperate zones. The focal member is *Erigeron karwinskianus*, a medicinal plant widely used in the Sierra. Sometimes extended to certain species of AST *Gnaphalium*, herbs of 1 – 2 dms; leaves lanceolate, densely covered with white hairs; flowers white, turning golden when dry. No use recorded. Found in the cold zone above Comaltepec. Occasionally referred to as *'oo*^{L} *tṳ́*^{M} «button medicinal–herb».

43. ***'oo*^{L} *lí*^{H} *'uøø*^{L}**

Collections: EL0128, LM0001, LH0055

Etymology: /*'oo*^{L}/ + /*lí*^{H}/ + /*'uɵɵ*^{L}/ = «medicinal–herb» + «flower» + «night».

Description: A monotypic generic that corresponds to AST *Tanacetum parthenium*, *Neurolaena*. Herbs of 2 – 3 dms., strongly scented, bitter tasting; leaves deeply lobed; flowers grouped into terminal clusters composed of white ray and yellow disk flowers. Branchlets, prepared in tea with rue, used to treat stomach ache; branchlets or flowers prepared as tea to speed labor; leaves prepared in tea to treat biliary disease [*Tanacetum*]; juice of leaves given to calm children who cry frequently [*Neurolaena*]. Considered to be hot. Commonly protected in open areas of Comaltepec; occasional in secondary vegetation in the tropical humid zone [*Neurolaena*]. Apparently restricted to *Tanacetum parthenium* and *Neurolaena*, but could extend to other Asteraceae.

44. *'oo*^{L} *lɨgí*^{H}

Collections: EL0094, LH0068, LM00269, SH0079a

Etymology: /*'oo*^{L}/ + /*lɨgí*^{H}/ = «medicinal–herb» + «bitter». The leaves of this herb are extremely bitter.

Description: A polytypic generic that corresponds to AST *Neurolaena*, *Pinaropappus* and *Conyza gnaphalioides*. Erect herbs of up to 1 dm. or larger and bushy [*Neurolaena*], bitter tasting; leaves forming a whorl around the base of the plant [*Pinaropappus*] or alternate along stem and densely hairy [*Conyza*]; flower white, yellow or pink. Considered to be a temperate plant. Branchlets, taken in tea or rubbed on the body, used to cleanse the blood and intestines, to relieve stomach and muscle aches, and as eyewash; leaves taken as tea to treat *empacho* [all *Conyza*]; leaves prepared in tea to cleanse the throat [*Neurolaena*]. Common in abandoned fields the temperate dry zone around Comaltepec; scarce in the tropical dry zone [*Pinaropappus*] and the tropical humid zone [*Neurolaena*] Could include other medicinal, bitter herbs belonging to the Asteraceae. Both *Conyza* (*simonillo*) and *Pinaropappus* (*ixpule*) are sold in markets of the Oaxaca Valley and are widely used as medicinals.

Specifics:

(A) *'oo^L lɨgí^H* (unmodified) «bitter medicinal-herb» [AST *Neurolaena, Pinaropappus*]

(B) *'oo^L lɨgí^H tee^L* «white bitter medicinal-herb» [*Conyza gnaphalioides*]

45. *'oo^L lóo^H tu^L*

Collections: LH0020, LM0059, LM0098

Etymology: /*'oo^L*/ + /*lóo^H*/ + /*tu^L*/ = «medicinal-herb» + «mustache» + «chicken».

Description: A monotypic generic that corresponds to AST *Verbena caroliniana*. Herbs of 2 - 5 dms.; stem square; leaves with round teeth, opposite; flowers lavender to white, grouped in a spike-like cluster. Branchlets prepared in tea to treat stomach ache; branchlets used for *limpia* to treat *mal de ojo* and *comezón*; branchlets used as food for chickens. Considered to be a hot plant. Commonly protected in home gardens and open areas of Comaltepec, in the temperate dry zone. Could include others of the more than ten species of *Verbena* in the Sierra.

46. *'oo^L 'loo^{LH}*

Collections: LH0007, LH0039, LM0137, RL0216

Etymology: /*'oo^L*/ + /*'loo^{LH}* / = «medicinal-herb» + «large-stone».

Description: A polytypic generic that corresponds to ONA *Oenothera*. Herbs; leaves alternate; flowers pink or yellow; fruit long, 4–angled. Branchlets, taken in tea, refregado or taken fresh with mescal , used to treat vaginal hemorrhaging and *calor interno*; branchlets, prepared in a bath, used to treat *calor*; juice of plant, combined with cane alcohol, taken to treat vaginal hemorrhaging; branchlets, cooked with beans, eaten as a vegetable. The plant is considered to be cold. Common in temperate zones. Sometimes classified as ***lí***^{H} ***'loo***^{LH}. Probably includes all 4 species of *Oenothera* found in the Sierra; may be extended to *Epilobium* and *Ludwigia* species as well. See also ***ja***$^{'LM}$ ***'loo***^{LH}.

Specifics:

(A) *'oo*^{L} *'loo*^{LH} (unmodified) «large–stone medicinal–herb» [ONA *Oenothera*, with large yellow flowers]

(B) *'oo*^{L} *'loo*^{LH} *tii*^{L} «thin large–stone medicinal–herb» [ONA *Oenothera rosea*]

47. *'oo*^{L} *mɨ*$^{'L}$

Collections: EL0021, LH0060, LM0129

Etymology: /*'oo*^{L}/ + /*mɨ*$^{'L}$/ = «medicinal–herb» + «snake».

Description: A monotypic generic that corresponds to EUP *Acalypha*. Herb of 1 – 2 dms, bitter–tasting; leaves ovate, with round teeth; flowers reddish–green, grouped into a rat tail–like cluster, or yellowish–green and subtended by a leafy bract, both emerging from the axil of the leaf. Branchlets prepared in tea to treat dysentery; juice of branchlets taken alone or with cane liquor to treat dysentery. Common in temperate and tropical zones. Alternately classified as ***'oo***^{L} ***kiá***$^{'M}$ ***dsea***^{L} ***túu***^{L} ***ku***$^{'L}$, a descriptive phrase that means «herb for people who defecate with pain». Could apply to the more than 12 species of *Acalypha*.

Some Chinantec refer to FAB *Crotalaria* as ***'oo^L [kiá$^{'M}$] mɨ^L*** «snake herb or herb for snakes» (e.g. LH0095). These are herbs of 1 – 2 dms.; leaves compound, divided into three lanceolate segments; flowers yellow, fruit a pea-like pod. Branchlets, boiled in water, used to wash snake bites. Considered to be hot. Occasional in the dry zones. Could include several of the ten species of *Crotalaria* used in the Sierra. Some Chinantec recognize two specifics: (A) ***'oo^L kiá$^{'M}$ mɨ^L*** (unmodified) «medicinal-herb for snakebite» [FAB *Crotalaria*] and (B) ***'oo^L [kiá$^{'M}$] mɨ^L rø$^{'L}$*** «green medicinal-herb for snakebite» [FAB *Crotalaria*].

48. *'oo^L mɨbɨɨ^H*

Collections: EL0050, EL0102, LH0050, LH0072, LH0087, LH0107, LM0034, LM0062, LM0126, RL0104, SH0055a

Etymology: */'oo^L/ + /mɨbɨɨ^H/* = «medicinal-herb» + «temper tantrum».

Description: A monotypic generic that corresponds to AMA *Iresine diffusa*, BRA *Lepidium virginicum*, CIS *Lechea skinneri*, LAM *Salvia amarissima* and URT. Scandent herbs of up to 1 meter; leaves ovate; flowers white, minute, grouped into small clusters that emerge from the leaf axils. Branchlets, prepared in a bath, used to treat temper tantrums in children, often when caused by *susto* [*Iresine, Salvia*]; branchlets, boiled in water, used to treat biliary disease [*Salvia*]; branchlets, prepared in a bath, used for post-partum recovery [*Salvia*]; branchlets, prepared as a bath, used to treat measles [*Iresine*]. Considered to be hot. Common in secondary vegetation in temperate and tropical zones.

49. *'oo^L ngɨ^{LM} sí$^{'L}$*

Collections: SH100a, LH0065, LH0112

Etymology: */'oo^L/* + */ngɨ^{LM}/* + */sí'^{L}/* = «medicinal-herb» + «skin infection (Sp. *erispela*)» + «tender».

Description: A monotypic generic that corresponds to AST *Piqueria* and SCR *Calceolaria* (focal), VAL *Valeriana*. Herbs of 1 – 3 dms., often growing in moist areas; leaves lanceolate, lobed to deeply divided; flowers white or yellow. Branchlets, boiled in water, used as a wash or compress to treat *derisepela* [*Piqueria*, *Valeriana*]; branchlets, prepared as a bath, used to treat *calor interno* [*Calceolaria*]. Considered to be cold. Occasional in fallow fields and secondary vegetation of the temperate dry zone. Sometimes referred to as *'oo^L sí'^{L}*.

50. ***'oo^L níing^M 'iee^L***

Collections: EL0149, LH0067, LM0188

Etymology: */'oo^L/* + */níing^M/* + */'iee^L/* = «medicinal-herb» + «faces» + «sun».

Description: A monotypic generic that corresponds to MLV *Malva* and LYT *Cuphea*. Erect herbs; leaves rounded and cordate, or lanceolate; flowers lilac to purple; fruit dry, containing many seeds. Branchlets, boiled in water, used as a bath to treat «*calor interno*» [*Cuphea*, *Malva*]; branchlets used as food for pigs [*Malva*]. Considered to be a temperate plant. Common in the temperate dry zone; occasional in the tropical humid zone. The focal member appears to be *Malva parviflora*, but it also applied to purple-flowered species of *Cuphea*, of which there are several in the Sierra. Both *Malva* (*malva*) and *Cuphea* (*hierba de cancer*) are sold as medicinal plants in the markets of the Oaxaca Valley.

51. ***'oo^L kiá'^{M} riñon***

Collections: RL0339

Etymology: */'oo^{L}/* + */kiá$^{'M}$/* + */riñon/* = «medicinal-herb» + «for» + «SN for kidney (Sp. *riñon*)».

Description: A monotypic generic that corresponds to RUB *Borreria*. Scandent herbs of 1 – 2 dms.; leaves narrowly ovate, notably veined, opposite; flowers white, grouped into a dense terminal cluster. Juice of the branchlets taken to treat kidney disorders. Could include several species of *Borreria*, *Crusea*, *Houstonia* and associated genera of Rubiaceae.

52. ***'oo^{L} roo^{LH} ngúu^{LM}***

Collections: LH0001, LH0204, LM0100, SH0042b

Etymology: */'oo^{L}/* + */roo^{LH}/* + */ngúu^{LM}/* = «medicinal-herb» + «scar-forming» + «flesh».

Description: A polytypic generic that corresponds to SOL *Cestrum fasciculatum* and *C. lanatum*. Shrubs of 2 – 3 meters, strongly scented; leaves ovate, alternate, softly pubescent; flowers cream-white or red, tubular, similar to tobacco flowers; fruit a many-seeded brown capsule. Branchlets, boiled in water, used to wash infected wounds; branchlets, boiled in water with *fresno*, *ruda* and *laurel*, used as a bath for contusions and post-partum recovery; juice of the leaves used to treat skin wounds. Considered to be a hot plant. Common in temperate dry and cold zones. Apparently restricted to *Cestrum* species, excluding *Cestrum nocturnum*, which is classified as ***ja̠$^{'LM}$ dsí$^{'H}$***.

Specifics: (the varieties are differentiated by flower color, but are used in the same way).

(A) ***'oo^{L} roo^{LH} ngúu^{LM} tee^{L}*** «white scar-forming medicinal-herb» [SOL *Cestrum* *lanatum*]

(B) ***'oo^{L} roo^{LH} ngúu^{LM} yʉʉ^{M}*** «red scar-forming medicinal-herb» [SOL *Cestrum fasciculatum*]

53. ***'oo^{L} san juan***

Collections: LH0195, SH0127a?

Etymology: */'oo^{L}/* + */juanasana/* = «medicinal-herb» + «Spanish name which refers to *Brickellia* spp. in Comaltepec». An alternate name is ***'oo^{L} juanasana*** «*juanasana* medicinal-herb», derived from the local Spanish names of the plant, *juanasana* or *cuanasana*.

Description: A monotypic generic that corresponds to AST *Brickellia* or maybe *Calea*. Shrubs of up to 1 meter, strongly aromatic; leaves opposite, slightly hairy; flowers yellow, purple. Apparently without use. Considered to be a hot plant. Occasional in the temperate and tropical dry zones. Could include 7 species of *Brickellia* and 4 species of *Calea* found in the Sierra. *Brickellia* is widely sold in markets of the Oaxaca valley as a treatment for stomach ache and internal parasites.

54. ***'oo^{L} sé^{H} k^{w}ɨɨ^{L}***

Collections: LH0243, SH0008a

Etymology: */'oo^{L}/* + */sé^{H}/* + */k^{w}ɨɨ^{L}/* = «medicinal-herb» + «mother» + «corn-field». The plant has milky sap, which is perhaps symbolically related to mother's milk.

Description: A monotypic generic that corresponds to ASC *Asclepias*. Herbs of 2 – 3 dms.; sap white, thick; leaves broadly ovate, opposite; flowers cream-white, grouped into ball-like clusters that emerge from the axils of the leaves; fruit a green pod containing numerous seeds; seeds dark brown, flat, borne aloft in the wind by a cottony appendage. The sap is used to treat skin wounds and infections. Common in fallow and cultivated fields of dry zones. Probably includes all *Asclepias* except *A. curassavica* which is classified as ***li**^{H} **ta**^{L}*.

55. *'oo^{L} sɨɨ^{M} 'iúu'^{LH}*

Collections: LH0070

Etymology: /*'oo^{L}*/ + /*sɨɨ^{M}*/ + /*'iúu'^{LH}*/ = «medicinal-herb» + «nest» + «hummingbird».

Description: A monotypic unaffiliated generic that corresponds to SEL *Selaginella pallescens*. Herb shaped like a bird's nest, up to 10 cms., growing on rocks; fronds curled in dry season, uncurling during rains; flowers and fruits absent. Whole plant, prepared as tea, taken for post-partum recovery. Considered to temperate. Scarce in dry zones.

56. *'oo^{L} sɨɨ^{M} nóo^{LM}*

Collections: LH0066

Etymology: /*'oo^{L}*/ + /*sɨɨ^{M}*/ + /*nóo^{LM}*/ = «medicinal-herb» + «nest» + «rat».

Description: A monotypic generic that corresponds to ?. Herb. Branchlets, boiled in water, used to wash the body as a treatment for measles, *derisepela*, infection in general, post-partum recovery. Considered to cold. Found in Comaltepec, in the temperate dry zone.

57. *'oo^{L} té^{M}*

Collections: EL0025, EL0091, EL0143, LH0177, LH0342, RL0149, RL0222

Etymology: /*'oo^{L}*/ + /*té^{M}*/ = «medicinal-herb» + «sticky».

Description: A polytypic generic that corresponds to FAB *Aeschyomene americana* and *Desmodium adscendens*, TIL *Triumfetta* and MLV *Pavonia*. Erect herbs and shrubs from 3 dms. to 1 meter; leaves compound or deeply lobed; flowers diverse in shape and color; fruits diverse in shape, but all easily adhering to fur and clothing. Apparently without use, but much notice is taken of the sticky fruits and seeds. Common in temperate and tropical zones. Ambiguously classified as ***'ma^L té3***. Could include all plants with adhering fruits and seeds – a notable exception being Bidens, which is classified as ***lí^H 'u̱'^{L}***, flower barb. Some Chinantec speakers recognize specific forms, such as ***'oo^L té^M 'ui'^{M}*** «black sticky medicinal-herb».

58. *'oo^L tee^L*

Collections: LM0087a, LM0107, LM0110

Etymology: /*'oo^L*/ + /*tee^L*/ = «medicinal-herb» + «white».

Description: A polytypic generic that corresponds to AST. Herbs; leaves whitish-green; flowers rarely seen. Leaves, prepared as tea, taken for stomach ache and ulcer – especially effective for older, unmarried women [AST]; branchlets, prepared with lard and oil, placed over the abdomen to treat fever [AST]; leaves, combined with anona leaves and prepared with oil, placed over chest for children's lungs or on the swellings caused by mumps [?]. Occasional in open areas of Comaltepec, in the temperate dry zone. Could include diverse species of several genera of Asteraceae. There appears to be a ***moo^L tee^L*** also, perhaps more salient than ***'oo^L tee^L***. The specific categories are not universally recognized in Comaltepec.

Specifics:

(A) ***'oo^L tee^L gíi^M*** «bitter? white medicinal-herb»

(B) ***'oo^L tee^L rø'^{L}*** «green white medicinal-herb»

(C) *'oo^{L} tee^{L} s̱eng$^{'LM}$* «? white medicinal-herb»

59. ***'oo^{L} tii$^{'L}$***

Collections: LH0116, LM0057, LM0136, RL0215, RL0242, RL0262, RL0361, SH0027a

Etymology: /*'oo^{L}*/ + /*tii$^{'L}$*/ = «medicinal-herb» + «thin».

Description: A polytypic generic that corresponds to API *Coriandrum sativum*, *Eryngium foetidum*, *Sanicula liberta* and PIP *Peperomia*. Herbs of less than 1 dm., strongly and distinctively aromatic of 3 types: 1) leaves deeply lobed, emerging from the base of the plant; flowers white, grouped into a flattened cluster; seeds round, light brown, aromatic [*Coriandrum*, *Sanicula*]; leaves oblong, slightly toothed; flowers apparently never seen [*Eryngium*]; epiphytes with ovate, thickened leaves; flowers cream-white, grouped into rattail-like clusters. Seed, boiled in water, used to facilitate labor [*Coriandrum*]; leaves used as cooked or raw condiment [*Coriandrum*, *Eryngium*, *Peperomia*]. Considered to be a hot plant. Commonly cultivated in home gardens in temperate zones; wild types occasional in temperate humid zone. Potentially includes any plant that looks or smells like *cilantro*, a widely-used medicinal and condiment plant.

Specifics:

(A) ***'oo^{L} tii$^{'L}$*** (unmodified) «thin medicinal-herb» [API *Coriandrum sativum*]

(B) ***'oo^{L} tii$^{'L}$ kiá$^{'M}$ lee?*** «thin medicinal-herb for carnival» [API *Eryngium foetidum*]

(C) ***'oo^{L} tii$^{'L}$ mó$^{'L}$*** «montane thin medicinal-herb» [PIP *Peperomia* sp.]

(D) ***'oo^{L} tii$^{'L}$ nuu^{L}*** «wild thin medicinal-herb» [API *Sanicula liberta*]

60. ***'oo^{L} tɨɨ^{M} 'ie$^{'L}$***

Collections: LH0026, LH0118

Etymology: */'oo*^{L}*/* + */tɨɨ*^{M}*/* + */'ie*$^{'L}$*/* = «medicinal–herb» + «foot» + «lion».

Description: A monotypic generic that corresponds to GER *Geranium*. Herbs of up to 1 dms.; leaves rounded and deeply lobed; flowers solitary, whitish–pink. Branchlets, boiled in water, taken to treat drooling. Considered to be a cold plant. Occasional in the dry zones. Could apply to the more than six species of *Geranium* found in the Sierra.

61. ***'oo***^{L} ***tóo***^{LM} ***gwɨ'ǿ***^{H}

Collections: none

Etymology: */'oo*^{L}*/* + */'ma*^{L}*/* + */tóo*^{LM}*/* + */gwɨ'ǿ*^{H}*/* = «medicinal–herb» + «tree» + «thorn» + «tamal».

Description: A monotypic generic that corresponds to [AST *Cirsium*]. Herbs, often covered with whitish hairs; leaves entire, lobed and spiny, flowers white to purple, grouped into a spiny, cup–shaped cluster. Root used in tea as a treatment for diabetes; flowers prepared in bath for reducing fever. Occasional in temperate dry and cold zones. Sometimes called ***'ma***^{L} ***tóo***^{LM} ***gwɨ'ǿ***^{H} «tamal thorn tree» or ***'oo***^{L} ***tóo***^{LM} ***gwɨ 'ǿ***^{H} «tamal thorn medicinal–herb».

62. ***'oo***^{L} ***tóo***^{LM} ***ku***$^{'LM}$

Collections: EL0055, LH0046, LM0074, LM0257, RL0225, RL0357

Etymology: */'oo*^{L}*/* + */tóo*^{LM}*/* + */ku*$^{'LM}$*/* = «medicinal–herb» + «thorn» + «close».

Description: A monotypic generic that corresponds to FAB *Mimosa albida*. Shrubs of 1 – 2 dms., armed with thorns; leaves compound, divided into a few ovate segments, closing at night; flowers pinkish–white, grouped into a ball–like cluster.

Juice of the leaves taken for body and stomach ache and for kidney problems; leaves rubbed on body for *calor*; root, boiled in water or prepared in tea, taken to treat dysentery; leaves, blended with mescal or cane liquor, taken to treat physical exhaustion. The leaves are considered to be hot, while the root is considered to be cold. Abundant in temperate and tropical zones of the community. Apparently restricted to *Mimosa albida* (*vergonsoza*), a widespread and commonly used medicinal plant.

A large number of herbaceous plants are classified in a diverse folk category referred to as ***'oo^L nuu^L*** «wild medicinal-herb». Although not considered a distinct generic, this category is described below.

Collections: EL0036, EL0090, EL0138, RL0187, RL0288, RL0362, RL0386, RL0389, RL0390, RL0391, RL0393, RL0395, RL0397, RL0410, RL0420

Description: A polytypic generic that corresponds to herbaceous plants of little morphological or practical interest; refers to a great diversity of plant families, genera and species. Plants herbaceous or sometimes shrubby, of small stature (less than 1 meter), leaves variously shaped; flowers present but not showy; fruits various. Not used, but the plants have some agroecological significance since they are often considered to be weeds or potential green manure. Found in all ecological zones, but most common in cultivated and disturbed areas. These plants are often referred to as ***nuu^L*** [adjective] (without the life-form classifier ***'oo^L***), implying that ***nuu^L*** could be analyzed as a polygeneric life-form that would correspond to «useless, weedy plants». The category refers to weedy vegetation, and could include a vast array of herbaceous plants that lack morphological, ecological or practical importance.

Many specific categories are recognized, but their botanical range is variable. The specifics include: *'oo^L nuu^L 'ia^L fi$^{'L}$* «milk (white latex) -producing wild medicinal-herb» [EUP]; ***'oo^L nuu^L 'ua^L*** «soft wild medicinal-herb» [MLS]; ***'oo^L nuu^L gwí$^{'L}$*** «fresh wild medicinal-herb» [AST *Vernonia*, PIP *Peperomia*, HAE *Xiphidium caeruleum* and RUB *Borreria*]; ***'oo^L nuu^L 'nɨ^{LM} má$^{'H}$*** «three-leaved medicinal-herb» [?]; ***'oo^L nuu^L joo^L má$^{'H}$*** «cotton-leaved wild medicinal-herb»; ***'oo^L nuu^L nu$^{'L}$ má$^{'H}$*** «purple small-leaf wild medicinal-herb»; ***'oo^L nuu^L pí$^{'H}$ má$^{'H}$*** «small-leaved wild medicinal-herb»; ***'oo^L nuu^L tii^L*** «thin wild medicinal-herb»; ***'oo^L nuu^L tóo^{LM}*** «thorny wild medicinal-herb» [FAB *Mimosa*, CPP *Cleome spinosa*].

III. *li$^{'H}$* «flowers or showy flowering plants»

A medium-sized life-form that corresponds to plants that have showy flowers used for ornament. Plants of diverse stature and habit, primarily herbs but also including trees, shrubs and vines. Flowers profuse, colorful or both. Ornamental (flowers used various for ritual occasions and everyday decoration in various localities and seasons). Found throughout the community, but most common in cultivated or disturbed areas close to human habitation. Combines with all other life-form classifiers – ***'ma^L, 'moo^L, 'oo^L, huɨɨ^L, ja$^{'LM}$, má$^{'H}$*** – depending on habit and use of the plant.

I recognize 34 generics in the flowering plant category (table 6.3.). 24 generics are monotypic (70.6% of the total); 10 generics (29.4%) are further subdivided into 26 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	24	7	1	1	1	0	0	0	0	0	0	0
Totals: 34 generics, 26 specifics, 0 varietals												

Table 6.3. Distribution of specifics in the life-form *li'^H* «flowers or showy flowering plants».

1. *li'^H cartú^LH*

Collections: LH0162, RL0219

Etymology: */li'^H/* + */cartú^LH/* = «flower» + «Chinantec-modified Spanish name for calla lily (Sp. *cartucho*)».

Description: A monotypic generic that corresponds to ARA *Zantedeschia aethiopica*. Erect herbs of 2 - 4 dms., sap irritating to skin, leaves, green, glossy, heart-shaped, emerging from base of plant; flowers yellow, minute, grouped into a spike- like cluster (spadix) enclosed in an open, white bract (spathe). Flowering stalks used as ornament. Commonly planted in moist areas of the temperate zones. Restricted to the Calla Lily, *Zantedeschia aethiopica*, a widely grown ornamental native to Africa.

2. *li'^H cer*

Collections: LM0187

Etymology: */li'^H/* + */cer/* = «flower» + «Chinantec-modified SN for wax (Sp. *cera*)».

Description: A monotypic generic that corresponds to AST *Zinnia*. Herbs of 1 - 2 dms; leaves opposite, each pair attached at successive right angles; flowers minute, grouped into a composite cluster composed of yellow disk flowers and red-purple ray flowers. Flowering branchlets used for ornament. Scarce, planted in home gardens of the temperate dry zone. Apparently restricted to non-native, horticulturally modified *Zinnia* species.

3. *lí'^{H} clavel*

Collections: LM0148

Etymology: */lí'^{H}/* + */clavel/* = «flower» + «Spanish proper name for pinks (Sp. *clavel*)».

Description: A monotypic generic that corresponds to CRY *Dianthus*. Erect herbs of 1 – 2 dms; leaves narrow, opposite; flowers red, the petals fringed. Flowering branchlets used for ornament. Occasionally planted in home gardens of the temperate dry zone. Apparently restricted to *Dianthus*.

4. *lí'^{H} dsea^L giúu^M*

Collections: LH0303, [RL0487]

Etymology: */lí'^{H}/* + */dsea^L/* + */giúu^M/* = «flower» + «people» + «goblins».

Description: A monotypic generic that corresponds to ORC *Sobralia*. Epiphytic herbs; leaves broadly ovate, conspicuously parallel-veined, alternate; flowers very showy, 8 – 10 cms. long, rose-purple. Flowering stalks used for ornament. Scarce in the cold zone above Comaltepec. Apparently restricted to *Sobralia decora*, one of the showiest orchids of the Sierra.

5. *lí'^{H} dsiuung^M*

Collections: LM0190

Etymology: */lí'^{H}/* + */dsiuung^M/* = «flower» + «wilting». ***lí'^{H} dsiuung^M*** is the Chinantec propoer name for four-o'clocks, morning glorys and other plants that have evanescent flowers (cf. ***huɨɨ^L lí'^{H} dsiuung^M*** (unmodified) «wilting flower vine» [CNV *Ipomoaea*]).

Description: A polytypic generic that corresponds to NYC *Mirabilis*. Erect herbs of 2 - 4 dms.; leaves ovate, wilting easily in times of drought; flowers purple–red, trumpet–shaped, 3 - 4 cms. long. Flowering branchlets used for ornament. Commonly protected in Comaltepec, in the temperate dry zone. Probably includes three species of *Mirabilis* that are found in the Sierra. Some Chinantec speakers distinguish the specific ***lí'^{H} dsiuung^M nʉ'^{L}*** «purple wilting flower» [NYC *Mirabilis*].

6. *lí'^{H} fɨ^H*

Collections: LH0062, LM0003, LM0029, LM0263, RL0069, RL0117, RL0265

Etymology: */lí'^{H}/* + */fɨ^H/* = «flower» + «Chinantec proper name for Mexican marigold».

Description: A polytypic generic that corresponds to AST *Gymnolaena*, *Tagetes* and perhaps VIO *Viola*. Erect herbs of 1 - 3 dms., strongly scented; leaves deeply divided into many segments; flowers yellow–orange to red, grouped into terminal, composite heads. Flowering branches used for ornament, especially during All Saint's Day (*día de muertos*); branchlets, prepared in bath, used to treat skin abscesses and boils; branchlets, boiled in water with *laurel*, taken to treat heart pain; flowers, prepared in alcohol, placed in ear to treat earache. Commonly planted in home gardens of the temperate zones. Apparently restricted to several *Tagetes* species, the assignation of the violet probably a mistake. Although AST *Tagetes erecta* is usually referred to as ***lí'^{H} fɨ^H*** (unmodified) «Mexican–marigold flower», the following specifics are recognized by some speakers for this cultivated species and wild relatives.

Specifics:

(A) ***lí'H fɨH kondseá'M*** «? Mexican-marigold flower» [AST *Tagetes*]

(B) ***lí'H fɨH kʷóo'LH*** «? Mexican-marigold flower» [AST *Tagetes*]

(C) ***lí'H fɨH ñuH*** «? Mexican-marigold flower» [AST *Tagetes*]

(D) ***lí'H fɨH tiiL*** «thin Mexican-marigold flower» [AST *Tagetes spp.*, VIO *Viola*?]

(E) ***lí'H fɨH yuuM*** «red Mexican-marigold flower» [AST *Tagetes*]

7. *lí'H gie'L*

Collections: LH0305, LM0159, LM0215, LM0219 [RL0469]

Etymology: */líH/* + */gie'L/* = «flower» + «lace».

Description: A monotypic generic that corresponds to LIL *Smilacina*, ONA *Lopezia*, RAN *Thalictrum*. Erect herbs; leaves diverse; flowers white to pinkish-white, minute, grouped in terminal clusters. Flowering branches used as ornament. Occasional in temperate dry and cold zones. The focal member is *Smilacina*, but the category can apparently be extended to other small-flowered herbs.

8. *líH gʷɨɨL*

Collections: LH0004, LH0044, LH0104, LH0252, LM0022, LM0195, SH0089a

Etymology: */líH/* + */gʷɨɨL/* = «flower» + «Chinantec proper name for avocado». The anise-scent of this herb is reminiscent of the aroma of small Mexican avocados.

Description: A monotypic generic that corresponds to AST *Tagetes lucida* and LAU *Litsea glaucescens*. Erect herbs of 2 – 3 dms., anise-scented; leaves lanceolate, finely toothed, opposite; flowers yellow, grouped into terminal, showy head composed of several minute flowers. Branchlets, prepared as a bath or in tea, used to treat stomach, body and headache, to purify the blood, and to calm nerves; flowers, prepared in tea, taken to treat diarrhea; flowering branches used as ornament.

Common in the dry zones. Occasionally cross-classified as *'oo*^{L} *lí*^{H} *g*^{w}*ɨɨ*^{L}. Apparently restricted to *Tagetes lucida*, both of which have a characteristic odor reminiscent of avocado leaves.

9. *lí*^{H} *g*^{w}*ɨɨ*^{L} *dsúi*^{LM}

Collections: none

Etymology: */lí*^{H}*/* + */g*^{w}*ɨɨ*^{L}*/* + */dsúi*^{LM}*/* = «flower» + «Chinantec proper name for avocados» + «heart».

Description: A monotypic generic that corresponds to LAU *Litsea glaucescens*. Shrubs of 2 – 3 meters, aromatic; leaves ovate, deep green, glossy; flowers small, transparent white, grouped into axillary clusters. Branchlets, boiled in water, taken to treat stomach ache and *enfriamiento*. Occasional in the cold zone and dry zones.

10. *lí*^{H} *horteeng*

Collections: RL0300

Etymology: */lí*^{H}*/* + */horteeng/* = «flower» + «Chinantec-modified Spanish proper name for hortensia».

Description: A monotypic generic that corresponds to HYD *Hydrangea macrophylla*. Shrubs of 1 – 2 meters; leaves large, ovate, toothed; flowers bluish-white. Planted as garden ornamentals; flowering branches used in churches as adornment. Occasionally planted in home gardens of the temperate humid zone. Apparently restricted to the introduced ornamental HYD *Hydrangea*.

11. *lí'*^{H} *'ia*^{L} *fi'*^{L}

Collections: LH0276, RL0099, RL0191

Etymology: */lí'*^{H}*/* + */'ia*^{L}*/* + */fi'*^{L}*/* = «flower» + «exudes» + «milk».

Description: A monotypic generic that corresponds to CAM *Centropogon* and ASC *Asclepias curassavica*. Erect herbs with milky sap; leaves alternate, rounded to lanceolate; flowers yellow-orange or red, grouped in terminal clusters or emerging from the leaf axils. Apparently without use. Occasional in temperate zones. Sometimes alternately classified as *'oo*^{L} *'ia*^{L} *fi'*^{L}. Could include other plants that have showy flowers and milky sap.

12. ***lii*^{H} *jii*^{L} *k*^{w}*oo*^{HL}**

Collections: EL0112, EL0139, LH0238, RL0091, SH0060b

Etymology: /*lii*^{H}/ + /*jii*^{L}/ + /*k*^{w}*oo*^{HL}/ = «flower» + «root» + «Chinantec proper name for pseudobulbous orchids».

Description: A monotypic generic that corresponds to ORC. Terrestrial and epiphytic herbs; base of the plant fleshy and water-filled; leaves leathery, shiny, diversely-shaped; flowers of many different colors, often showy; fruit a green capsule containing numerous small seeds. The 'root' (actually a pseudobulb) eaten raw to quench thirst. Sometimes cross-classified as *jii*^{L} *k*^{w}*oo*^{HL} «spongy tuber». Occasional in dry and cold zones, common to abundant in humid zones. This generic may be extended to all orchids that have a large, succulent pseudobulb.

13. ***lii*^{H} *jɨ*^{L}**

Collections: EL0074, LH0179, LH0246, LH0333, LM0053, LM0067, LM0143, LM0272, SH0111a

Etymology: /*lii*^{H}/ + /*jɨ*^{L}/ = «flower» + «fire». Compare with *'ma*^{L} *lii*^{H} *jɨ*^{L} «fire flower tree».

Description: A monotypic generic that corresponds to SCR *Castilleja arvensis* and

Lamourouxia. Herbs of 1 – 4 dms.; leaves linear to lanceolate; flowers red to orange-red. Flowering branchlets occasionally used to adorn the church altar [*Castilleja*, *Lamourouxia*]. Occasional in all zones [*Castilleja*, *Lamourouxia*]. Probably includes more than 5 species of *Castilleja*, and more than 10 species of *Lamourouxia* found in the Sierra. Some speakers recognize a wild form of this generic: ***lí^H jɨ^L mó'^{L}*** «montane fire flower» [SCR *Castilleja* sp].

14. *lí^H jnʉʉ^L kiee^M*

Collections:

Etymology: */lí^H/* + */jnʉʉ^L/* + */kiee^M/* = «flower» + «Chinantec proper name for beans» + «buzzard».

Description: A monotypic generic that corresponds to FAB *Crotalaria* and *Lupinus*. May also be called ***huɨɨ^L jnʉʉ^L kiʉʉ^{LM}***, especially for some vining species with similar flowers.

15. *lí^H joo^L*

Collections: EL0093, [RL0397, RL0488], SH0030b

Etymology: */lí^H/* + */joo^L/* = «flower» + «Chinantec proper name for cotton».

Description: A monotypic generic that corresponds to AST *Erectites hieracifolia*. Herbs of 1 – 2 dms.; leaves lobed, spiny on edge; flowers white; seeds tufted with cottony hairs. Recognized as a cornfield weed. Occasional in disturbed areas of the tropical zones. May be called ***'oo^L joo^L*** «cotton medicinal herb» or ***nuu^L joo^L má'^{H}*** «cotton leaf weed».

16. *lí^H jú^H*

Collections: EL0045, EL0137, RL0059, RL0279

Etymology: */lí^H/* + */jú^H/* = «flower» + «mosquito».

Description: A monotypic generic that corresponds to ARA *Spathiphyllum*. Erect herbs of 1 dm.; leaves long-stemmed with glossy, ovate leaf blades; flowers yellow, grouped into a spike-like cluster (spadix) surrounded by a large, white or greenish bract (spathe). Flower cluster, roasted or boiled with beans, eaten as a vegetable, sometimes mixed with edible greens. Commonly protected in coffee plantations of the humid zones. Occasionally referred to as ***má'^H lí^H jú^H***. Apparently restricted to a few (2?) species of *Spathiphyllum* that are found in the tropical piedmont of the Sierra.

17. *lí'^H karɨɨ^M*

Collections: LM0052, LM0183, LM0185, RL0132

Etymology: */lí'^H/* + */karɨɨ^M/* = «flower» + «Chinantec-modified Spanish name for daisy (Sp. *margarita*)».

Description: A monotypic generic that corresponds to AST *Leucanthemum*. Erect herbs of 1 – 2 dms.; leaves oblong, finely toothed; flowers grouped into a flattened cluster composed of yellow disk flowers and white ray flowers. Flowering branches used for ornament, especially for Christmas. Protected in home gardens of Comaltepec, in the temperate dry zone. Apparently restricted to non-native species of Chrysanthemum. Often called by the synonym ***lí'^H margarí'^H*** «*margarita* flower».

18. *lí'^H k^wee^L tɨɨ^M*

Collections: LH0079, LM0184, SH0029b

Etymology: */lí'^H/* + */k^wee^L/* + */tɨɨ^M/* = «flower» + «long» + «foot».

Description: A polytypic generic that corresponds to GER *Pelargonium*. Erect herbs of 2 – 3 dms, distinctively scented; leafs heart– shaped, lobed; flowers red to pinkish–white, composed of several petals. Flowering branchlets used as ornament for the church and for *limpias* to treat *mal ojo*. Commonly planted in home gardens of the dry zones. Apparently restricted to *Pelargonium*, a non–native ornamental often sold in markets of the Oaxaca Valley and used together with other herbs for *limpias*.

Specifics:

(A) ***lí'^{H} kʷee^{L} tɨɨ^{M} tee^{L}*** «white long foot flower» [GER *Pelargonium*]

(B) ***lí'^{H} kʷee^{L} tɨɨ^{M} yúu^{M}*** «red long foot flower» [GER *Pelargonium*]

19. *lí'^{H} 'lɨɨ^{LH}*

Collections: EL0029, LH0143, LM0041, LM0209, LM240, RL0092, RL0097, RL0403, RL0404, SH0107

Etymology: */lí'^{H}/* + */'lɨɨ^{LH}/* = «flower» + «dead».

Description: A polytypic generic that corresponds to ACA *Odontonema cuspidatum*, LAM *Hyptis mutabilis*, *Salvia inconspicua*, *S. purpurea*, *S. sapinea*, RUB *Borreria*. Herbs or shrubs of 1 – 10 dms.; leaves opposite, lanceolate to broadly ovate; flowers purple or red, grouped in terminal clusters. Flowering branchlets ornamental placed on altars in homes, cemeteries and churches, especially around All Saint's Day (*Día de los Muertos*) [*Odontonem, Salvia*]; juice of branchlets taken to treat epilepsy [RL0403]; seven flowering branchlets placed under the pillow at night to treat someone 'who thinks too much' [*Borreria*]. Abundant in temperate and tropical zones. Rarely cross–classified as ***'oo^{L} lí^{H} 'lɨɨ^{LH}***. Could include several purple–flowered species of *Salvia*, as well as other *Odontonmea*.

Specifics:

(A) ***lí***$^{'H}$ ***'lɨɨ***^{LH} (unmodified) «dead flower» [LAM *Salvia purpurea*, ACA *Odontonema cuspidatum*]

(B) ***lí***$^{'H}$ ***'lɨɨ***^{LH} ***mó***$^{'L}$ «montane dead flower» or ***lí***$^{'H}$ ***'lɨɨ***^{LH} ***nuu***^{L} «wild dead flower» [LAM *Hyptis mutabilis*, *Salvia inconspicua*, *Salvia sapinea*]

20. *lí*^{H} ***moo***^{L}

Collections: LM0084, RL0100, RL0111, RL0123, RL0224, RL0230, RL0239, RL0240, RL0277, RL0308, RL0309, RL0354, SH0052a

Etymology: /*lí*^{H}/ + /*moo*^{L}/ = «flower» + «large–leaf».

Description: A polytypic generic that corresponds to ERI *Cavendishia*, *Vaccinium leucanthum*, GSN *Columnea*, LAM *Coleus blumei*, ORC, PIP *Peperomia*, SEL *Selaginella galeottii*. Herbs, usually epiphytic or occasionally shrubs; leaves often large, usually tinged with red, especially when young; flowers and fruits diverse in shape and color. Vegetative and flowering branches used as ornament. Abundant in the temperate humid zone, scarce in other areas of the community. Sometimes referred to as ***moo***^{L} ***lí***^{H}; also called ***lí***^{H} ***moo***^{L} ***yʉ́ʉ***^{M} «red large–leaf flower». Potentially includes other plants that are epiphytes, have reddish leaves, or both.

Specifics:

(A) ***lí***^{H} ***moo***^{L} (unmodified) «large–leaf flower» [ERI *Cavendishia*, *Macleania*]

(B) ***lí***^{H} ***moo***^{L} ***tii***^{L} «thin large–leaf flower» [ERI *Vaccinium*, GSN *Columnea*, ORC, RUB]

21. *lí*^{H} ***nochebuena***

Collections: LH0165

Etymology: ***/lí^H/*** + ***/nochebuena/*** = «flower» + «Spanish proper name for poinsettia (Sp. *nochebuena*)».

Description: A monotypic generic that refers to EUP *Euphorbia pulcherrima*. Erect herbs of 2 – 3 meters; sap milky; leaves with 5 – 7 pointed lobes; flowers greenish–yellow, subtended by large scarlet–red bracts. Whole plants used as a garden ornamental; flowering branches used as adornment. Commonly planted in home gardens of the temperate dry zone. Apparently restricted to *Euphorbia pulcherrima*, an ornamental widely used in Oaxaca as a Christmas and Easter ornamental.

22. *lí^H nu^L*

Collections: LH0059

Etymology: ***/lí^H/*** + ***/nu^L/*** = «flower» + «purple». The name may be used for other purple–flowered species, but typically refers to *Bougainvillea*.

Description: A monotypic generic that corresponds to NYC *Bougainvillea*. Woody vines of 4 – 6 meters, twining along houses and walls; leaves ovate, alternate; flowers yellowish–white, grouped in clusters that are enclosed in three brightly colored bracts which can be white, red, orange purple or lilac. Red–bracted flower clusters, boiled in water and combined with lemon juice, honey, *gordolobo* flowers, *Sambucus* flowers, cinnamon and raw sugar, used for coughs. Occasionally cultivated in home gardens of Comaltepec, in the temperate dry zone. Increasingly called ***lí^H vugambilia*** «*Bougainvillea* (Sp. *bugambilia*) flower», or *vugambilia*, without an accompanying life–form classifier. Apparently restricted to several introduced species of *Bougainvillea*, an ornamental vine native to Brazil.

23. *lí^{H} romee^{M}*

Collections: LH0075, LM0054, SH0053b

Etymology: */lí^{H}/* + */romee^{M}/* = «flower» + «Spanish proper name for rosemary (Sp. *romero*)».

Description: A monotypic generic that corresponds to LAM *Rosmarinus officinalis*. Shrubs of 2 – 5 dms., strongly aromatic; leaves needle-like, leathery, grayish-green; flowers light blue. Branchlets, prepared in tea, used for *agruras*. Occasionally planted in home gardens of the dry zones. Apparently restricted to *Rosmarinus officinalis*, an introduced culinary and medicinal herb.

24. *lí^{H} ros*

Collections: LH0141, LH0163, LH0190, LM0128, LM0179, LM0230, RL0213

Etymology: */lí^{H}/* + */ros/* = «flower» + «Chinantec-modified Spanish proper name for rose».

Description: A polytypic generic that corresponds to ROS *Rosa* (and RUB *Bouvardia*). Herbs of 1 – 2 meters, the stems armed with thorns; leaves deeply divided into several ovate lobes; flowers composed of many soft petals, pink, red, white or yellow, fruits a red berry. Planted as a garden ornamental; flowering branches used for adornment; petals placed on the soles of the feet for *trastorno de la cabeza* in babies; flower buds, boiled in water, placed in eye to treat infection; flowers, combined with cinnamon and boiled in water, taken to treat coughs; flower petals, boiled in water with antibiotic, taken for diarrhea. Commonly cultivated in home gardens of the temperate zones. Apparently restricted to the genus *Rosa*; the inclusion of *Bouvardia* here is anomalous and is perhaps a mistake or a descriptive phrase «pink flower».

Specifics:

(A) ***lí^{H} ros guinda*** «dark-red rose flower» [ROS *Rosa*]

(B) ***lí^{H} ros mɨɨng^{LM}*** «medicinal rose flower» [ROS *Rosa*]

(C) ***lí^{H} ros tee^{L}*** «white rose flower» [ROS *Rosa*]

(D) ***lí^{H} ros yúu^{M}*** «red rose flower» [ROS *Rosa*]

25. *lí^{H} sanjosé*

Collections: none

Etymology: */lí^{H}/* + */sanjosé/* = «flower» + «Spanish name San José, a Catholic saint».

Description: A monotypic generic that corresponds to HYD *Philadelphus mexicana*. Shrubs of 2 – 3 meters; leaves green, opposite and marked with several veins; flowers white, sweet-scented. Flowers used for ornament in the church and house. Found in forests of the temperate zone.

26. *lí^{H} sée^{M}*

Collections: LH0078, LM0108, LM0182, RL0065, RL0298

Etymology: */lí^{H}/* + */sée^{M}/* = «flower» + «Chinantec proper name for *Brugmansia*». The name is probably derived from the Chinantec word for «sleep».

Description: A monotypic generic that corresponds to SOL *Brugmansia*. Shrubs of 2 – 3 meters; leaves broadly lanceolate, alternate; flowers yellow-white to pink, trumpet-shaped, fragrant. Flowers, prepared with almond oil, placed on swollen glands as treatment for mumps; flowers, prepared with almond oil and lard, placed on skin wounds (especially on the feet); leaves, boiled in water, taken to treat fever.

Commonly planted in home gardens of the temperate zones. When leaves are used, cross-classified as ***má'***^{H} ***lí***^{H} ***sée***^{M}. Apparently restricted to two species of *Brugmansia* that have been introduced from Peru. The double-flowered form is the one considered to be medicinal.

Specifics:

(A) ***lí***^{H} ***sée***^{M} ***tee***^{L} «white sleep flower» [SOL *Brugmansia*]

(B) ***lí***^{H} ***sée***^{M} ***yúu***^{M} «red sleep flower» [SOL *Brugmansia*]

27. *lí*^{H} *ta*^{L}

Collections: EL0030, LM0265, RL0151, SH0053a

Etymology: /***lí***^{H}/ + /***ta***^{L}/ = «flower» + «Chinantec proper name for cane (*Arundo donax*)». The leaves of these flowering herbs are said to resemble cane leaves.

Description: A polytypic generic that corresponds to IRI *Gladiolus* is focal; the category is extended to ASC *Asclepias curassavica*, IRI *Rigidella orthantha* and *Sysirinchium*. Erect herbs of 1 – 2 dms.; leaves grass-like or lanceolate, reminiscent of *carrizo* leaves; flowers orange-red to red or yellow, borne in few-flowered, terminal clusters. Apparently without use. Occasional throughout the community. Could include other genera of Iridaceae.

Specifics:

(A) ***lí***^{H} ***ta***^{L} (unmodified) «cane flower» [AML *Gladiolus*, ASC *Asclepias*]

(B) ***lí***^{H} ***ta***^{L} ***nuu***^{L} «wild cane flower» [IRI *Tigridia*]

(C) ***lí***^{H} ***ta***^{L} ***tii***^{L} «thin cane flower» [IRI?]

28. *lí*^{H} *teg*^{w}*a*^{MH}

Collections: LM0139, LM0245

Etymology: /*lí*^{H}/ + /*teg*^{w}*a*^{MH}/ = «flower» + «earring».

Description: A polytypic generic that corresponds to ONA *Fuchsia*. Shrubs of 1 – 2 meters; leaves opposite, ovate; flowers pink to purple; fruits a reddish–purple berry. Whole plant used as a garden ornamental; flowering branchlets used as adornment. Typical form occasionally planted in home gardens of the temperate dry zone, wild type scarce in the cold zone. Apparently restricted to several wild and cultivated species of *Fuchsia*; but may also extend to other plants with long–tubular flowers like NYC *Mirabilis*.

Specifics:

(A) ***lí*^{H} *teg*^{w}*a*^{M}*H*** (unmodified) «earring flower» [ONA *Fuchsia*]

(B) ***lí*^{H} *teg*^{w}*a*^{M}*H tii*^{L}** «thin earring flower» [ONA *Fuchsia encliandra*]

29. *lí*^{H} *tóo*^{L}

Collections: RL0070, RL0131, RL0417

Etymology: /*lí*^{H}/ + /*tóo*^{L}/ = «flower» + «Chinantec proper name for *Gaultheria acuminata*».

Description: A monotypic generic that corresponds to ERI *Gaultheria acuminata*. Small shrubs of 1 meter or less; leave pale green, aromatic, leathery, ovate and arranged alternately along branches; flowers white, shaped like a closed bell, less than 1 cm. long; fruit a purple–black berry, slightly sweet. Flowering branchlets used as ornament for church and home altars, especially during Easter week; leaves, boiled in water, taken for stomach ache. Occasional in secondary vegetation in the temperate humid forest. Restricted to *Gaultheria acuminata*, a wintergreen scented shrub used in many parts of the Sierra and the Oaxaca Valley during Easter week.

30. ***lí^{H} tulipán***

Collections: LM0153, RL0263

Etymology: */lí^{H}/* + */tulipán/* = «flower» + «Spanish proper name for hollyhocks (Sp. *tulipán*)».

Description: A monotypic generic that corresponds to MLV. Shrubs of 2 – 3 meters; leaves several-lobed; flowers pink to purple, up to 10 cms. long. Flowering branchlets used for adornment. Occasionally cultivated in home gardens of the temperate zones. Apparently restricted to MLV, an introduced ornamental.

31. ***lí^{H} tɨ́ɨ^{LM}***

Collections: none

Etymology: */lí^{H}/* + */tɨ́ɨ^{LM}/* = «flower» + «tube, rifle».

Description: Not collected.

31. ***lí'^{H} 'u̲'^{H}***

Collections: EL0028, EL0150, LM0198, LM0233, LM0278, RL0206

Etymology: */lí'^{H}/* + */'u̲'^{H}/* = «flower» + «Chinantec proper name for Bidens».

Description: A polytypic generic that corresponds to AST *Aldama dentata*, *Bidens pilosa*, *Melampodium*. Erect herbs of 2 – 4 dms.; leaves deeply lobed, opposite; flowers cream-white to yellow, grouped into composite clusters composed of ray and disk flowers; seed often barbed and sticking, easily becoming entangled in fur and clothing. Recognized as a weed or forage for cattle [*Aldama*, *Bidens*, *Melampodium*]; branchlets ground into *masa* and toasted to make a liniment placed on body to treat aches [*Melampodium*]. Common in temperate and tropical zones, usually found in open areas and cultivated fields. The focal member is the genus *Bidens*, including some 7 species; several other genera of Asteraceae may be included. This category is often considered to be unaffiliated.

Specifics:

(A) ***lí'ᴴ 'u̲'ᴴ*** (unmodified) «*Bidens* flower» [AST *Bidens*]

(B) ***lí'ᴴ 'u̲'ᴴ bɸɸ'ᴸᴴ*** «short *Bidens* flower» [AST *Bidens*]

32. *lí^{H} 'uɨ$^{'L}$*

Collections: EL0060, RL0066, SH0010a

Etymology: /***lí^{H}***/ + /***'uɨ$^{'L}$***/ = «flower» + «Chinantec proper name for Mexican-plum». The yellow flowers of these shrubs are said to resemble Mexican-plum flowers.

Description: A polytypic generic that corresponds to FAB *Chamaecrista*, *Senna cobanensis* and *S. pendula*. Shrubs of 1 - 2 meters; leaves compound, divided into several ovate leaflets; flowers yellow, composed of several petals, reminiscent of the flowers of Spondias; fruits a round pod containing several round seeds. Flowering branchlets occasionally used as adornment for church altars. Occasional in both temperate and tropical zones. Cross-classified as ***'oo^{L} lí^{H} 'uɨ$^{'L}$***, or alternately classified as ***lí^{H} taloo^{L}*** in the tropical dry zone. Could include over 25 species of *Senna* and some 9 species of *Chamaecrista*.

Specifics:

(A) ***lí^{H} 'uɨ$^{'L}$*** (unmodified) «Mexican-plum flower» [FAB *Senna*, *Chamaecrista*]

(B) ***lí^{H} 'uɨ$^{'L}$ tii^{L}*** «thin Mexican-plum flower» [FAB *Senna*, *Chamaecrista*]

33. *lí^{H} violeta*

Collections: LH0029, LM0242, SH0040b

Etymology: */lí^H/* + */violeta/* = «flower» + «Spanish proper name for violets (Sp. *violetas*)».

Description: A monotypic generic that corresponds to MLV *Anoda cristata*. Herbs of 2 - 3 dms.; leaves deeply lobed, green often marked with purple; flowers violet, 2 - 3 cms. Juice of the whole plant used to as a hair wash to treat baldness; branchlets, left in warm water or squeezed to extract juice, taken to treat uterine hemorrhaging. Common in disturbed areas of cold and dry zones. Occasionally called *violeta* without the accompanying life-form modifier. Apparently restricted to *Anoda cristata*, used as an edible green in the Oaxaca Valley, where it is also called *violeta*.

34. *lí^H yúu^M*

Collections: EL0103, RL0098, RL0148, RL0332

Etymology: */lí^H/* + */yúu^M/* = «flower» + «red».

Description: A monotypic residual generic that corresponds to ACA *Hanstenia gracilis*, MLS and RUB. Herbs and shrubs; leaves opposite and distinctively veined; flowers red. Flowering branches used for ornament [*Hanstenia*]. These collections are from the humid zone, but the plants could be found throughout the community. Could include any plant with distinctive red flowers.

IV. *ja'^{LM}* «edible-greens»

A small life-form that corresponds to herbaceous plants that can be eaten as cooked greens. Erect herbs of relatively small stature, typically less than 1 meter. When applied to «trees» and «vines», the life-form term *ja'^{LM}* is usually combined with the life-form term of these categories. Flowers present, but usually not showy (if showy then usually cross-classified as ***lí^H·ja'^{LM}***). Primarily edible (whole plant, leaves/cooked), occasionally medicinal (leaves/various conditions). Common in cultivated and disturbed areas of the tropical and temperate zones of the community; rare in cold areas.

I recognize 22 generics in the edible green category (table 6.3.). 14 generics are monotypic (63.6% of the total); 10 generics (36.4%) are further subdivided into a total of 23 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	14	4	2	1	1	0	0	0	0	0	0	0
	Totals: 22 generics, 23 specifics, 0 varietals											

Table 6.4. Distribution of specifics in the life-form *ja̱*$^{\prime LM}$ «edible-greens»

Cognate terms are found throughout the Chinantla. Rensch lists variants from all five subregions of the Chinantla, and reconstructs the proto-Chinantec form as ****h***$^{\prime LH}$ (1989:82). Rensch mistakenly glosses this term as «onion», probably because «onion greens» exists as a common generic term in some lowland Chinantec languages. Rensch lists separately other terms for onion, which he considers to be cognate with the Chinantec term for skunk (1989:114). I believe that the correct interpretation is that the proto-Chinantec form for «quelite» is ****hą́***^{LH} and that the proto-Chinantec term for onions should be ****hmi̤***^{H}, ****hmi̤***^{L} or ****hmí***^{H}, as Rensch suggests on (1989:114). The generic term for onions can apparently be unaffiliated or affiliated with one of three life-form classifiers – quelite, root or rounded seed/fruit.

	#856 «skunks and onions»	#520 «onions and greens»
Ojitlan	***yi***^{1} ***hmi***^{1} ***ka***$^{\prime 1}$	***yi***^{1} ***hmi***^{1} ***hǫ***$^{\prime 3}$
Usila	***u̧***^{4}***dᵞa***^{1} ***hu̧***^{2}	***u̧***^{4}***dᵞa***^{1} ***hǫ***$^{\prime 43}$

Tepetotutla	***si¹hme²***	***hą'³²*** [glossed as «wild greens»]
Tlacoatzintepec	–	***hǫ́'⁴*** [glossed as «wild greens»]
Palantla	***ci¹hme² hą³²***	***ci¹hme hą'³²***
Valle Nacional	***į hmi hąǫ'***	***i hmi hąǫ'***
Ozumacin	***yu hme***	
Lalana	***mɨ³¹i³ ko·'²***	***me²hǫ'¹*** [glossed as «wild green»]
Latani	***hi hmi***	
Quiotepec	***ų hmi²⁴***	***hǫ'³*** [glossed as «wild green»]
Comaltepec	***hi²hmí¹²***	***hą'²***
Sochiapan	–	***si kwu hǫ'***
Quetzalapa	–	***ci ku hąų'³²***

1. ***ja̠'ᴸᴹ col***

Collections: LM0037b, LM0167, LM0192, RL0162

Etymology: /*ja̠'ᴸᴹ*/ + /*col*/ = «edible-green» + «Spanish proper name for cabbage (Sp. *col*)». This is an introduced European plant that is commonly called *col* in local Spanish; the term has been borrowed as a name for cabbage in other indigenous languages, including Mixe and Maya.

Description: A monotypic generic that corresponds to BRA *Brassica oleracea*. Erect herbs of up to 1 meter, strongly-scented; leaves lobed, whitish-green, simple and alternate; flowers cream-white or yellow, grouped in a terminal cluster; fruit a slender, green capsule. Young leaves boiled, eaten in beef stew or as a vegetable; considered to be hot food. Commonly planted in home gardens in the temperate zones. The yellow flowered plants may sometimes be referred to as ***ja̠'ᴸᴹ col née***ᴹ «yellow cabbage edible–green».

2. ***ja̲*$^{'LM}$ *dsí*$^{'H}$**

Collections: EL0011, LM0023, LM0162, RL0001, RL0051, RL0159

Etymology: /*ja̲*$^{'LM}$/ + /***dsí***$^{'H}$/ = «edible–green» + «bitter, Chinantec proper name for an edible species of *Cestrum*». Rensch reconstructs a proto–Chinantec term **zɨɨ*' which he glosses as «gall» and as «wild herb» (1989:60:#274 & #275). He suggests that the term is related to **zɨɨ*$^{'LH}$ or **zɨɨ*$^{'HL}$, which he glosses as bitter (1989:60:#276). His cognate terms for «wild herb» come from Palantla and Lalana, and both contain the noun classifier for edible green. I think that these names are cognate with this Comaltepec generic, and are probably derived from a term meaning «bitter or gall edible–green» – a good description of this *Cestrum*. This pattern is illustrated for languages of three distinct subregions of the Chinantla in the following table.

	«edible green»	«bitter»	«gall»	«*C. nocturnum*»
Comaltepec	*hą*$^{'2}$	*gí*$^{'12}$	*di*$^{'1}$	*hą*$^{'2}$ *dsí*$^{'1}$
Lalana	*hǫ*$^{'2}$	*ǰi*$^{'23}$	*zɨ́ɨ́*$^{'31}$	*hǫ*$^{'2}$ *zɨ́ɨ́*$^{'31}$
Palantla	*hą*$^{'32}$	*zi*$^{'3}$	*zɨ*$^{'31}$	*hą*$^{'32}$ *zɨ*$^{'31}$

Description: A polytypic generic that corresponds to SOL *Cestrum nocturnum* and *Solanum aphyodendron*. Shrubs of 1 – 2 meters, strongly and distinctively scented; leaves ovate to lanceolate, often with a series of small holes; flowers cream–white, often emitting a strongly perfume at night–time, grouped into an open, terminal cluster; fruit a white or dark purple berry. Branchlets used for *limpias* to cleanse the body and to treat *mal de ojo* [*Solanum*]; branchlets prepared in a bath to [RL0001]; branchlets, grilled or boiled then fried with chile, eaten as a vegetable [*Cestrum nocturnum*]; branchlets used to treat foot skin infection [*Cestrum*]; this is considered to be a cold plant. Commonly protected in temperate zones [*Cestrum*]; occasional in temperate zones [*Solanum*].

Specifics:

(A) ***ja̱***$^{'LM}$ ***dsí***$^{'H}$ (unmodified) «bitter edible-green» [SOL *Cestrum nocturnum*]. This is an edible plant that is not used for medicine.

(B) ***ja̱***$^{'LM}$ ***dsí***$^{'H}$ ***nuu***^{L} «wild bitter edible-green» [SOL *Cestrum*]. This is a medicinal plant that is not considered to be edible.

(C) ***ja̱***$^{'LM}$ ***dsí***$^{'H}$ ***tǿǿ***^{M} «second-class or false bitter edible-green» [SOL *Solanum aphyodendron*]. This is a medicinal plant, but is not considered edible.

3. ***ja̱***$^{'LM}$ ***fó***^{L}

Collections: EL0034, LH0047, SH0074a

Etymology: /*ja̱*$^{'LM}$/ + /*fó*^{L}/ = «edible-green» + «Chinantec proper name for amaranth». Rensch gives no reconstructed proto-Chinantec form, but it is likely that cognate terms are widespread throughout the Chinantla.

Description: A polytypic generic that corresponds to AMA *Amaranthus hybridus*. Erect herbs of less than 2 dms; leaves deep green, simple, and alternate; flowers minute, grouped in terminal greenish-white clusters; seeds shiny and black. Branchlets, boiled with salt, garlic and onion then fried in oil, eaten as a vegetable. This is considered to be a cold food. Occasional in disturbed areas and cultivated fields of the temperate and tropical zones; commonly protected or managed in home gardens. See also ***'ma*** ^{L} ***foo*** ^{M}, and ***'ma*** ^{L} ***mɨ*** ^{H} ***kʷoo*** ^{L}.

Specifics:

(A) *ja̱* $^{\prime LM}$ ***fó*** ^{L} ***tee*** ^{L} «white amaranth edible-green» [AMA *Amaranthus* sp.]. This has whitish seeds that are used in making *alegrias*.

(B) *ja̱* $^{\prime LM}$ ***fó*** ^{L} ***yṳ́ṳ*** ^{M} «red amaranth edible-green» [AMA *Amaranthus* sp.]. This has black seeds; they are not used in making *alegrias*.

4. ***ja̱*** $^{\prime LM}$ ***ja̱*** ^{L}***H kʷea*** ^{LH}

Collections: LH0115, LM0016?, SH0063a

Etymology: /*ja̱* $^{\prime LM}$/ + /*ja̱* ^{LH}/ + /*kʷea* ^{LH}/ = «edible-green» + «offspring» + «horse». The derivation of this name is unclear.

Description: A monotypic generic that corresponds to AST *Sonchus oleracea*. Erect and spiny herbs with milky sap; leaves simple, alternate, toothed; flowers minute, yellow, grouped into a composite terminal cluster composed of many flowerlets; seeds attached to a cottony tuft of hairs. Branchlets, cooked with beans, eaten as a vegetable and said also to strengthen the intestines; this is considered to be a hot food. Occasional in open areas and cultivated fields of the dry zones. This is probably also called by the synonym ***ja̱*** $^{\prime LM}$ ***má*** $^{\prime H}$ ***tóo̱*** ^{LM} «spiny leaved quelite», which refers to the spines that grow along the edges of the leaves.

5. ***ja̱*** $^{\prime LM}$ ***jløø*** $^{\prime LH}$

Collections: EL0089, RL0235

Etymology: /*ja̱* $^{\prime LM}$/ + /*jløø* $^{\prime LH}$/ = «edible-green» + «blisters, measles». The name apparently refers to the small pustules which form on the leaf blades, but this may also be used medicinally for measles in some areas of the Chinantla. It is cognate with the proto–Chinantec term ***hlɨɨ*** $^{\prime H}$, for which Rensch lists cognates in languages of all subregions of the Chinantla (1989:123:#941).

Description: A monotypic generic that corresponds to EUP *Acalypha macrostachya*. Shrubs of less than 5 dms., coarsely pubescent; leaves broadly ovate, toothed, greenish–white; flowers grouped into axillary inflorescences of two types, a red rat tail–like spike or an inconspicuous cluster of yellowish–green flowers subtended by a leafy bract. Young leaves, boiled and then fried, eaten as a vegetable; apparently considered to be a hot food. Occasional in the humid zones. Apparently restricted to a single species of *Acalypha*, a genus of over 10 species in the Sierra which is better known as medicinal used to treat dysentery.

6. *ja̱* $^{\prime LM}$ ***jmɨ*** $^{\prime LM}$

Collections: EL0019, EL0051, LH0017, LH0036, LH0122, LH0278, LM0018, LM0166, LM0279, RL0031, RL0367, RL0387, RL0401

Etymology: */ja̱* $^{\prime LM}$*/* + */jmɨ* $^{\prime LM}$*/* = «edible–green» + «Chinantec proper name for tomato». This is a cognate of the pCh term for tomato ***hmí̱*** $^{\prime LH}$; variants are found in all subregions of the Chinantla (Rensch 1989:113:#851).

Description: A polytypic generic that corresponds to SOL *Solanum americanum*, *S. nigrescens*; and for some speakers *Jaltomata procumbens*, *Lycianthes*, *Nicandra physaloides*. Herbs of 1 – 5 dms., strongly and distinctively scented; leaves deep green, glabrous, alternate, often pierced by many small holes; flowers diverse, usually white to yellow, star or bell shaped, grouped in small clusters that emerge from the leaf axils; fruit a dark purple, round berry containing many seeds. Branchlets with flowers and fruits, boiled in water and sometimes fried in oil or mixed with beans, eaten as a vegetable [*Jaltomata*, *Solanum*]; juice of the fruit applied to skin as treatment for *derisepela* [*Jaltomata*, *Nicandra*, *Solanum*]; leaves blended with water to make a beverage to treat diabetes [*Solanum nigrescens*]; branchlets, cut and allowed to decompose, used as a fertilizer; considered to be a cold food and medicine. Abundant in disturbed areas and cultivated fields of all inhabited zones.

Specifics:

(A) ***ja̲'LM jmɨ 'LM ná'H*** «today tomato edible–green» [SOL *Jaltomata procumbens*, *Nicandra physaloides*]. An edible green, considered to be hot

(B) ***ja̲'LM jmɨ 'LM nuuL*** «wild tomato edible–green» [SOL *Lycianthes*]. Not edible, but used medicinally.

(C) ***ja̲'LM jmɨ 'LM nʉ'L*** «purple tomato edible–green» [SOL *Solanum americana*, *S. nigrescens*]. An edible green.

(D) ***ja̲'LM jmɨ 'LM rø'L*** «green tomato edible–green» [SOL *Solanum* ?]. This is medicinal, ground and mixed with a bit of mescal to treat bilis.

7. ***ja̲'LM líiLH***

Collections: LH0030, RL0018, RL0052, RL0159

Etymology: /*ja̲'LM*/ + /*líiLH*/ = «edible–green» + «NP for an edible–green». There is some resemblence between this name and the Chinantec words for *tepejilote* and «flower».

Description: A polytypic generic that corresponds to AMA *Gomphrena*. Scandent herbs; leaves ovate; flowers minute, grouped into white, compact clusters that emerge from the leaf axils. Branchlets, boiled in water with salt, garlic and onion, eaten as a vegetable; branchlets eaten by small deer [wild type]. Occasional in temperate zones of the Sierra.

Specifics:

(A) ***ja̱'ᴸᴹ líi̱ᴸᴴ nuuᴸ*** «wild Chinantec proper name edible-green» [?]

(B) ***ja̱'ᴸᴹ líi̱ᴸᴴ teeᴸ*** «white Chinantec proper name edible-green» [AMA *Gomphrena*]

This is the edible one, considered cold

(C) ***ja̱'ᴸᴹ líi̱ᴸᴴ yúu̱ᴹ*** «red Chinantec proper name edible-green» [AMA *Gomphrena*]

8. ***ja̱'ᴸᴹ lóoᴸᴴ***

Collections: none

Etymology: /*ja̱'ᴸᴹ*/ + /*lóoᴸᴴ*/ = «edible-green» + «Chinantec proper name for prickly-pear cactus and other mucilaginous plants». This name is cognate with the reconstructed proto-Chinantec term for prickly pear cactus ***láa̱ᴸᴴ*, for which Rensch lists variants from four subregions of the Chinantla (1989:96:#675). Some Chinantec suggest that ***lóoᴸᴴ*** may be derived from a word for «mucilage».

Description: A monotypic generic that corresponds to POR *Portulaca oleracea*. Eaten as a potherb; considered to be a cold food. Found in the temperate dry zone in cornfields.

9. ***ja̱'ᴸᴹ 'looᴸᴴ***

Collections: SH0014a, SH0050a

Etymology: /*ja̱'ᴸᴹ*/ + /*'looᴸᴴ*/ = «edible-green» + «large-stone». The name is cognate with the proto-Chinantec reconstructed term ****'laaᴸ***, which Rensch glosses as «rock, cliff» (1989:109:806). It is not clear to what the term refers in this botanical name.

Description: A monotypic generic that corresponds to ONA *Gaura drummondii*. Herbs of 1 – 2 dms.; leaves deeply lobed; flowers purple–red?; fruit elongate, quadrangular. Branchlets, boiled in water, eaten as a vegetable. It is considered to be a cold food. Scarce in the tropical dry zone. Apparently restricted to *Gaura drummondii*, the only species of *Gaura* in the Sierra. This is considered to be the edible counterpart of *'oo*^{L} *'loo*^{LH} (*Oenothera rosea* and other *Oenothera* spp.)

10. ***ja̱'*^{LM} *'ma*^{LH}**

Collections: RL0015, RL0016, RL0017, RL0146, RL0289

Etymology: */ja̱'*^{LM}/ + /*'ma*^{LH}/ = «edible–herb» + «Chinantec proper name for an edible–green». The derivation of the name is unclear.

Description: A polytypic generic that corresponds to SOL *Jaltomata procumbens*, *Lycianthes*, *Nicandra physaloides*. Herbs of 1 – 5 dms., strongly and distinctively scented; leaves deep green, glabrous, alternate, often pierced by many small holes; flowers diverse, usually white to yellow, star or bell shaped, grouped in small clusters that emerge from the leaf axils; fruit a dark purple, round berry containing many seeds. Branchlets with flowers and fruits, boiled in water and sometimes fried in oil or mixed with beans, eaten as a vegetable [*Jaltomata*, *Solanum*].

Specifics:

(A) ***ja̱'*^{LM} *'ma*^{LH} *nuu*^{L}** «wild Chinantec proper name edible–green» [SOL ?]

(B) ***ja̱'*^{LM} *'ma*^{LH} *nu'*^{L}** «purple Chinantec proper name edible–green» [SOL]

(C) ***ja̱'*^{LM} *'ma*^{LH} *rø'L*** «green Chinantec proper name edible–green» [SOL] Large leaved form.

(D) ***ja̱'*^{LM} *'ma*^{LH} *tee*^{L}** «white Chinantec proper name edible–green» [SOL].

(E) ***ja̲'**^{LM}* ***'ma**^{LH}* ***túu**^{LM}* «tubular Chinantec proper name edible-green» [SOL *Jaltomata procumbens*].

11. ***ja̲'**^{LM}* ***mɨjúu**^{M}*

Collections: LH0061, LM0178, LM0256, RL0038, SH0092a

Etymology: /***ja'**^{LM}*/ + /***mɨ**^{H}*/ + /***júu**^{M}*/ = «edible-green» + «rounded-fruit» + «Chinantec proper name, possum». The Chinantec I have talked to consider this an unanalyzable proper name. However, I think that it may be related to the Comaltepec Chinantec word for possum, ***júu**^{H}*. The reconstructed proto-Chinantec term for «possum» is ****húú**^{H}*; Rensch lists variants from all subregions of the Chinantla (1989:77:#463). The term is synonymous with the proto-Chinantec reconstructed term for «word» (1989:77:#462).

Description: A polytypic generic that corresponds to AST *Galinsoga*, *Jaegeria hirta* (and *Melampodium*?). Herbs of less than 1 dm.; leaves small, opposite?; flowers yellow, minute, grouped into tight heads composed of numerous flowerlets. Flowering branchlets, boiled in water and combined with corn *masa*, eaten as a vegetable stew; considered to be a hot food. Common in temperate zones, often growing in cultivated fields and open areas; branchlets, eaten raw, used as to treat internal parasites.

Specifics:

(A) ***ja̲'**^{LM}* ***mɨjúu**^{M}* ***nee**^{M}* «yellow possum fruit edible-green» [AST *Jaegeria*]. This type is not edible.

(B) ***ja̲'**^{LM}* ***mɨjúu**^{M}* ***tee**^{L}* «white possum fruit edible-green» [AST *Galinsoga*?]. This type is edible.

12. ***ja̲'ᴸᴹ mɨkɨɨᴹ***

Collections: LH0178, LH0255

Etymology: */ja̲'ᴸᴹ/* + */mɨᴴ/* + */kɨɨᴹ/* = «edible–green» + «rounded–fruit» + «Chinantec proper name for *Daucus*?». The name may be related to the Comaltepec Chinantec name for «pine tree», perhaps relating to the foliage of this herb.

Description: A monotypic generic that corresponds to API *Daucus montana*. Herbs; taproot extending deeply in soil?; flowers white. Branchlets eaten cooked as fresh vegetable; considered to be a hot food. Found in the temperate dry zone, often in cornfields. May also be called ***'ooᴸ má'ᴴ kɨɨᴸᴹ***. Herbs of less than 1 dm., strongly scented and bitter tasting; leaves deeply divided into many fine segments, arranged in a whorl at the base of the plant; flowers white, grouped in a rounded, terminal cluster on an erect stalk.

13. ***ja̲'ᴸᴹ mɨlóᴴ***

Collections: EL0077, LH0102, LM0224, RL0010, RL0101, SH0054

Etymology: */ja̲'ᴸᴹ/* + */mɨᴴ/* + */lóᴴ/* = «edible–green» + «rounded–fruit» + «Chinantec proper name for an edible–green». The Chinantec consider that this is a proper name that cannot be further analyzed. I wonder it is related to the proto–Chinantec term for «roasting ear» [corn–on–the–cob], ****láᴸᴴ***, which Rensch reconstructs from cognates from throughout the Chinantla (1989:95:662). The inflorescence of this plant resembles a corn–cob, and that may have been the original inspiration for the name.

Description: A polytypic generic that corresponds to PHT *Phytolacca purpurascens*. Herbs of 1 dm.; leaves purplish–green; flowers pinkish–white, grouped in a loose cluster; fruit a purple-black berry containing many small seeds. Young vegetative shoots, boiled in water and fried in oil, eaten as a vegetable; fruits formerly used as soap to wash clothes; considered to be a cold food. Common in all inhabited zones. Could include up to five species of *Phytolacca*, a genus commonly eaten in Oaxaca. The local Spanish name is *perla china*.

Specifics:

(A) ***ja̱'ᴸᴹ mɨlóᴴ*** (unmodified) «corn-cob rounded-fruit edible-green» [PHT *Phytolacca icosandra*]

(B) ***ja̱'ᴸᴹ mɨlóᴴ teeᴸ*** «white corn-cob rounded-fruit edible-green [PHT *Phytolacca*]

13. *ja̱'ᴸᴹ mɨñʉʉᴴᴸ*

Collections: LH0123, LM0090

Etymology: /*ja̱'ᴸᴹ*/ + /*mɨñʉʉᴴᴸ*/ = «edible-green» + «puddle, ducks?». The name is perhaps derived from the observation that this plant grows in humid soils.

Description: A polytypic generic that corresponds to BRA *Rorripa nasturtium-aquaticum*. Erect herbs, always growing in standing or flowing water, strongly and distinctively scented; leaves deeply dissected; flowers white, grouped into terminal clusters. Branchlets, boiled in water, eaten in a vegetable stew and thus used to treat diabetes; branchlets used as food for chickens; considered to be a hot food. Commonly protected in streams and other moist areas in the temperate dry zone. Apparently restricted to water-cress, *Rorripa nasturtium-aquaticum*, which is a commonly cultivated or protected green, sold in markets in the Oaxaca Valley, and widely consumed in Oaxaca.

Specifics:

(A) ***ja̲***$^{'LM}$ ***mɨñuu***^{HL} «puddle edible-green» [BRA *Rorripa nasturtium-aquaticum*]

(B) ***ja̲***$^{'LM}$ ***mɨñuu***^{HL} ***nuu***^{L} «wild puddle edible-green» [?]

15. ***ja̲***$^{'LM}$ ***'moo***^{LH}

Collections: none

Etymology: */ja̲*$^{'LM}$/ + /***'moo***^{LH}/ = «edible-green» + «to extend, or precipitation?». Several Chinantec speakers indicated that the name means «to extend», and refers to the twining nature of this vine. The name appears to be related to several proto-Chinantec terms for precipitation, **'maa*** (Rensch 1989:102:#739, #740, #741).

Description: A monotypic generic that corresponds to ?. An edible vine found in Soyalapam.

16. ***ja̲***$^{'LM}$ ***mostáa***^{H}

Collections: LM0176, LM0268, RL0198, RL0251, SH0073b

Etymology: */ja̲*$^{'LM}$/ + */mostáa*^{H}/ = «edible-green» + «Spanish proper name for mustard (Sp. *mostaza*)». The Spanish name *mostaza* is commonly used to refer to mustard greens in Oaxaca, and has been borrowed into other indigenous languages such as Mixe.

Description: A monotypic generic that corresponds to BRA *Brassica rapa* subsp. *campestris*? Herbs of 1 – 2 dms., strongly and distinctively scented; leaves greenish-white, lobed; flowers yellow; fruit a long, round pod containing a few round seeds. Branchlets, boiled in water, eaten as a vegetable; considered to be a hot food. Commonly protected in home gardens and cultivated fields of temperate zones. Could include several species of *Brassica* that grow in the Sierra. Called *mostaza negra* in Spanish.

17. ***ja̱***$^{'LM}$ ***ná***$^{'H}$

Collections: LH0122, LH0278

Etymology: */ja̱*$^{'LM}$*/* + */ná*$^{'H}$*/* = «edible-herb» + «Zapotec». The proto-Chinantec term for Zapotec is ****naaL***; Rensch list cognates from all Chinantec subregions (1989:87:#575). The edible green is more often consumed in the Zapotec and Mixe regions than in the Chinantec zones. It is sold in Zapotec and Mixe markets, and it may be that the Zapotec introduced the use of the plant to the Chinantec.

Description: A monotypic generic that corresponds to CPP *Cleome magnifica*?. Strongly scented herb of 0.5 - 2 meters; leaves alternate and palmately-compound, the leaflets oblanceolate; flowers irregular, cream-white in terminal, racemose inflorescences; fruit a long, narrow capsule. Branchlets, boiled in water, eaten as a vegetable; probably considered to be a hot food. Rather scarce in the temperate forests.

18. ***ja̱***$^{'LM}$ ***nisɨɨ***$^{'MH}$ ***gwita***^{H}

Collections: LH0028, LM0089

Etymology: */ja̱*$^{'LM}$*/* + */nisɨɨ*$^{'MH}$*/* + */gwita*^{H}*/* = «edible-green» + «tongue» + «cow». The name may be a translation of the local Spanish name *lengua de vaca*. Tongue may be analyzed as */ni*^{L}*/* + */sɨɨ*$^{'MH}$*/* = «face» + «tongue». Other Chinantec languages do not include the classifier for face in the name for tongue.

Description: A monotypic generic that corresponds to PLG *Rumex*. Herbs of 2 - 4 dms.; taproot reaching deep into soil; leaves large, broadly lanceolate; flowers greenish-white, grouped in dense, terminal clusters; seeds enclosed in winglike bracts. Leaves, boiled in water with *nopales*, eaten as a vegetable; considered to be a cold food. Occasional in the temperate dry zone. Alternately classified as ***ja***$'^{LM}$ ***nisɨ́ɨ***$'^{MH}$ ***vaca***, «cow–tongue edible–green».

19. ***ja***$'^{LM}$ ***'ɵ́ɵ***^{M} ***luu***^{LH}

Collections: LH0071

Etymology: /***ja***$'^{LM}$/ + /***'ɵ́ɵ***^{M}/ + /***luu***^{LH}/ = «edible–green» + «scarce,rickety» + «thin, neck». Rensch reconstructs a proto–Chinantec term for scarce from cognates from Palantla, Lalana and Comaltepec, ****ɵɵñ***^{HL} (1989:53). Several Chinantec gloss the final morpheme of this name as «neck»; it appears to be related to a proto–Chinantec term for thin ****luu*** (1989:94:657). Both modifiers apparently refer to the scarcity and small size of this edible green.

Description: A monotypic generic that corresponds to PRM *Anagallis arvensis*. Scandent herbs of 5 – 10 cms.; leaves ovate, opposite, less than 1 cm. long; flowers orange, solitary in the leaf axils. Branchlets, often combined with *piojito*, boiled and eaten as a vegetable. It is considered to be a temperate food. Occasional in open, disturbed sites of Comaltepec, in the temperate dry zone.

20. ***ja***$'^{LM}$ ***tee***^{L}

Collections: none

Etymology: /***ja***$'^{LM}$/ + /***tee***^{L}/ = «edible–green» + «white». The names apparently refers to the whitish leaves and white flowers of this mustard.

Description: A monotypic generic that corresponds to BRA *Brassica oleracea*?. *Mostaza blanca*, found in La Esperanza and considered to be a hot food.

21. ***ja***$'^{LM}$ ***tóo***^{LM}

Collections: none

Etymology: */lí^H/* + */ja̲^{'LM}/* + */má^{'H}/* + */tóo̲^{LM}/* = flower» + «edible-green» + «CNC small-leaf» + «thorn».

Description: A monotypic generic that corresponds to SOL?. Found in La Esperanza, considered to be a cold food. This may be the same as *cuernos del diablo.*

22. ***ja̲^{'LM} yé^H***

Collections: LM0094, LH0124

Etymology: */ja̲^{'LM}/* + */yé^H/* = «edible-green» + «Miguel?». Several Chinantec indicated that this is the Comaltepec translation of the proper first name «Miguel».

Description: A monotypic generic that corresponds to API *Berula erecta*. Erect herbs of 1 dm., usually growing in moist areas; leaves deeply divided into numerous lobes; flowers white. Vegetative shoots, raw or boiled in water, eaten as a vegetable and to improve eyesight; vegetative shoots given as food to laying chickens when it is hot; considered to be a hot food. Occasional in the temperate dry zone.

V. ***huɨ̲ɨ̲^L*** «vines»

19 generics, 30 specifics, 2 varietals. A moderately-sized life-form that corresponds to vines and lianas. Twining plants, herbaceous or woody, of medium to large stature (1 - 20+ meters), flowers present, if showy then cross-classified as ***lí^H huɨ̲ɨ̲^L***. Found throughout the ecological zones, but most common in the temperate and tropical humid areas, where they form dense patches of secondary vegetation called ***'mɨ́ɨ^{'LH} huɨ̲ɨ̲^L***, and are present with trees and other plants in primary vegetation called ***mó^{'L} 'gaang^L*** secondary vegetation called ***nu^{'LM} tí^L***. Used in diverse ways, material (bark, stem/basketry, construction), food (fruits, raw/cooked), medicine.

I recognize 27 generics in the vine category (table 6.4.). 19 generics are monotypic (70.4% of the total); 8 generics (29.6%) are further subdivided into a total of 24 specifics. There are 2 varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	19	3	2	3	0	0	0	0	0	0	0	0
Totals: 27 generics, 24 specifics, 2 varietals												

Table 6.5. Distribution of specifics in the life-form ***huɨɨ***^{L} «vines».

1. *huɨɨ*^{L} *barbasco*

Collections: LH0317, RL0054, RL0204

Etymology: */huɨɨ^{L}/* + */barbasco/* = «vine» + «Spanish proper name for some *Dioscorea*».

Description: A monotypic generic that corresponds to DSC *Dioscorea*. Herbaceous vines; rootstock large; leaves heart-shaped with distinct, parallel veins; flowers small, greenish-yellow; fruit a dry capsule. Rootstock – grated, dried and mixed with water – used to wash clothes; roots formerly gathered to sell to buyers representing pharmaceutical companies that made birth control pills from *barbasco*. Sparse in temperate, tropical dry and cold areas, occasional in the tropical humid zone. Probably includes some of the 12 non-edible species of *Dioscorea* found in the Sierra.

2. *huɨɨL dsiko*$^{'L}$

Collections: EL0084, EL0144, LH0208, LM0017, RL0199, SH0028b, SH0061b

Etymology: */huɨɨ^{L}/* + */dsiko$^{'L}$/* = «vine» + «to stick?, Chinantec proper name for mistletoes».

Description: A polytypic generic that corresponds to LOR *Phoradendron*, *Psitticanthus* and *Struthanthus*. Vines of 10 - 50 dms., brittle and easily broken, parasitic, growing out of the trunks and branches of trees; leaves absent to medium-sized, oblong to lanceolate, dark green to golden yellow; flowers often inconspicuous, occasionally orange-yellow and showy; fruit a sticky berry or dry capsule that contains sticky seeds. Juice of the leaves taken fresh to treat uterine hemorrhaging; leaves taken in tea to provoke and speed birth; leaves taken in tea to treat constipation; fruits used to prepare birdlime, a sticky substance used, mostly by small boys, to trap small birds; fruits eaten by wild birds that carry the seed from tree to tree. Occasional in all ecological zones of the community. When used medicinally, these plants may be called ***'oo***^{L} ***huɨ̱ɨ̱***^{L} ***dsiko***$^{'L}$ «mistletoe vine medicinal-herb». Probably corresponds to all Loranthaceae of the Sierra Norte, including 5 genera and more than 12 species.

Specifics:

(A) ***huɨ̱ɨ̱***^{L} ***dsiko***$^{'L}$ (unmodified) «mistletoe vine» [LOR]

(B) ***huɨ̱ɨ̱***^{L} ***dsiko***$^{'L}$ ***née***^{M} «yellow mistletoe vine» [LOR]

(C) ***huɨ̱ɨ̱***^{L} ***dsiko***$^{'L}$ ***nuu***^{L} «wild mistletoe vine» [LOR] not used

(D) ***huɨ̱ɨ̱***^{L} ***dsiko***$^{'L}$ ***yṳ́ṳ***^{M} «red mistletoe vine» [LOR] the most medicinal one

3. *huɨ̱ɨ̱*^{L} *gɨɨ*^{L}

Collections: none

Etymology: /***huɨ̱ɨ̱***^{L}/ + /***gɨɨ***^{L}/ = «vine» + «four, Chinantec proper name for a Smilax».

Description: A monotypic generic that corresponds to SML *Smilax*. Found below La

Esperanza. Used to make baskets.

4. *huɨɨ*^{L} *g*^{w}*oo*^{L}

Collections: RL0053

Etymology: */huɨɨ*^{L}*/* + */g*^{w}*oo*^{L}*/* = «vine» + «hand». The name may come from the palmately lobed leaves of this morning glory.

Description: A monotypic generic that corresponds to CNV *Ipomoaea*. Occasional in the temperate humid zone. This category corresponds to a common lowland species of *Ipomoaea* which is distinguished from ***huɨɨ***^{L} ***lí***$^{'H}$ ***dsiuung***^{M} «wilting flower vine», apparently because of its large leaves and flowers.

5. *huɨɨ*^{L} *jii*^{LH} *ñíi*$^{'MH}$

Collections: LH0109, LH0309, LH0339, LM0004, RL0121

Etymology: */huɨɨ*^{L}*/* + */jii*^{LH}*/* + */ñíi*$^{'MH}$*/* = «vine» + «root» + «salty».

Description: A monotypic generic that corresponds to CUC *Hanburnia* and *Microsechium*. Herbaceous vines of 1 - 4 meters long; leaves heart-shaped and dentate, often covered with stiff hairs, wilting quickly when cut; flowers cream-white, 1 - 3 cms. broad; fruits green, diverse in shape, often a group of spiny round berries, occasionally a spiny, pear-shaped fruit that resemble *chayotes*. Roots, crushed in water, used to wash clothes; roots, crushed or cooked in water, used as a disinfectant bath; leaves used as fodder for cows. Occasional in temperate zones. Rarely classified as ***'oo***^{L} ***jii***^{LH} ***ñíi***$^{'MH}$; *Hanburnia mexicana* sometimes alternately classified as ***má***$^{'H}$ ***ngɨ***^{L} ***nuu***^{L}, wild «chayote». Probably extended to a number of wild Cucurbitaceae.

6. *huɨɨ*^{L} *jii*^{L} *róo*^{M}

Collections: none

Etymology: */huɨ̲ɨ̲*^{L}*/* + */jii*^{L}*/* + */róo*^{M}*/* = «vine» + «root» + «sweet».

Description: A polytypic generic that corresponds to CNV *Ipomoea batatas*. Scandent herbaceous vines of 1 – 2 meters; root a large, fleshy tuber, white, purple or yellow; leaves lobed, alternate along stem; flowers trumpet-shaped, bluish-purple. Roots, boiled in water, eaten as a sweet vegetable. Common in disturbed areas of the tropical humid zone. Apparently restricted to sweet potato, *Ipomoea batatas*.

Specifics:

(A) ***huɨ̲ɨ̲*^{L} *jii*^{L} *róo*^{M}** (unmodified) «sweet root vine» [CNV *Ipomoea batatas*] always purple.

(B) ***huɨ̲ɨ̲*^{L} *jii*^{L} *róo*^{M} *tee*^{L}** «white sweet root vine» [CNV *Ipomoea batatas*]

7. *huɨ̲ɨ̲*^{L} *jii*^{L} *teé*$^{'LH}$

Collections: none

Etymology: */huɨ̲ɨ̲*^{L}*/* + */jii*^{L}*/* + */teé*$^{'LH}$*/* = «vine» + «root» + «Chinantec proper name for an edible, semi-cultivated *Dioscorea*; may also mean subterranean».

Description: A monotypic generic that corresponds to DIO *Dioscorea*. Roots, boiled in water, eaten as a cooked vegetable; the roots are placed in water with lime. The root is said to be similar to the *jicama*. Occasionally cultivated in Soyalapan, in the tropical humid zone.

8. *huɨ̲ɨ̲*^{L} *jii*^{L} *tu*$^{'LM}$

Collections: none

Etymology: */huɨ̲ɨ̲*^{L}*/* + */jii*^{L}*/* + */tu*$^{'LM}$*/* = «vine» + «root» + «Chinantec proper name for an edible *Dioscorea*?».

Description: A monotypic generic that corresponds to DIO *Dioscorea*. Roots, boiled in water, eaten as a cooked vegetable. Occasionally cultivated in home gardens in temperate and tropical zones, most often in Soyalapam.

9. *huɨ̱ɨ̱^{L} jnʉʉ^{L} jme^{L}*

Collections: none

Etymology: */huɨ̱ɨ̱^{L}/* + */jnʉʉ^{L}/* + */jme'^{L}/* = «vine» + «Chinantec proper name for beans» + «fragrant, perfumed».

Description: A monotypic descriptive generic that corresponds to ORC *Vanilla planifolia*. Formerly used to perfume clothes in ranches such as Loma Hormiga and Ladera de Frutas. Now commonly called by the Spanish name *vainilla* and considered unclassified.

10. *huɨ̱ɨ̱^{L} kiú̱^{L}*

Collections: none

Etymology: */huɨ̱ɨ̱^{L}/* + */kiú̱^{L}/* = «vine» + «Chinantec proper name for a vine used in weaving».

Description: A monotypic generic that corresponds to ?. Found in forests of the humid temperate, for example in Soyalapam. Cultivated in the Chinantec municipality of San Felipe Usila.

11. *huɨ̱ɨ̱^{L} lí'^{H} dsiuung^{M}*

Collections: LH0069, RL0055, RL0142, RL0355

Etymology: */huɨ̱ɨ̱^{L}/* + */lí'^{H}/* + */dsiuung^{M}/* = «vine» + «flower» + «wilting». The name refers to the flowers, which wilt quickly after opening.

Description: A polytypic generic that corresponds to CNV *Ipomoaea* and AST

Hidalgoa. Herbaceous vines, 1 – 3 meters long; leaves heart–shaped, occasionally divided and serrate; flowers shaped like an open bell, showy, diversely colored from blue to pink to red; fruit a dry capsule containing black seeds. Leaves, prepared in tea, taken for *aire*; flowers often visited by butterflies, leaves eaten by small deer and other animals. Occasional in temperate and tropical zones. Occasionally cross–classified as ***'oo***^{L} ***lí'***^{H} ***dsiuung***^{M}. Probably includes most of the Convolvulaceae, excluding *Cuscuta*, *Ipomoaea batatas* (and some other distinctive *Ipomoaea*) and *Turbina corymbosa*.

Specifics:

(A) ***huɨ̱ɨ̱***^{L} ***lí'***^{H} ***dsiuung***^{M} ***tii***^{L} «thin wilting flower vine» [CNV *Ipomoaea*]

(B) ***huɨ̱ɨ̱***^{L} ***lí'***^{H} ***dsiuung***^{M} ***yʉ̱́ʉ̱***^{L} «red wilting flower vine» [AST *Hidalgoa*]

12. *huɨ̱ɨ̱*^{L} ***lí'***^{H} ***lóo***^{LH}

Collections: LH0271, RL0292

Etymology: */huɨ̱ɨ̱*^{L}*/* + */lí'*^{H}*/* + */lóo*^{LH}*/* = «vine» + «flower» + «Chinantec proper name for prickly–pear cacti».

Description: A polytypic generic that corresponds to CAC *Epiphyllum*. Herbaceous, epiphytic vines; stems flattened and fleshy; leaves absent; flowers red and showy; fruit ?. Stems eaten cooked, combined with black beans. Scarce in temperate zones. Probably restricted to the more than 5 species of *Epiphyllum* found in the Sierra.

Specifics:

(A) ***huɨ̱ɨ̱***^{L} ***lí'***^{H} ***lóo***^{LH} ***tee***^{L} «white prickly–pear flower vine» [CAC *Epiphyllum*]

(B) ***huɨ̱ɨ̱***^{L} ***lí'***^{H} ***lóo***^{LH} ***tii***^{L} «thin prickly–pear flower vine» [CAC *Epiphyllum*]

(C) ***huɨ̱ɨ̱***^{L} ***lí'***^{H} ***lóo***^{LH} ***yʉ̱́ʉ̱***^{M} «red prickly–pear flower vine» [CAC *Epiphyllum*]

13. ***huɨ̲ɨ̲ᴸ lɨᴴ sɨᴸ***

Collections: LH0097

Etymology: */huɨ̲ɨ̲ᴸ/* + */lɨᴴ/* + */sɨᴸ/* = «vine» + «flower» + «moon».

Description: A monotypic generic that corresponds to CNV *Cuscuta*. Herbaceous parasitic vines; stems bright yellow-orange, densely climbing and clinging on host herbs and shrubs; leaves lacking; flowers white, small, grouped in clusters along the vine. Stems, boiled and prepared in a bath, used to reduce fever. Common in cold and dry zones. Probably restricted to the three species of *Cuscuta* that occur in the Sierra.

14. ***huɨ̲ɨ̲ᴸ má'ᴴ tóo̲ᴸᴹ le'ᴹ***

Collections: none

Etymology: */huɨ̲ɨ̲ᴸ/* + */má'ᴴ/* + */tóo̲ᴸᴹ/* + */le'ᴹ/* = «vine» + «small-leaf» + «thorn» + «black».

Description: A monotypic generic that corresponds to ARE *Desmoncus chinantlensis*. Used for basket making. Called *junco* in Chinantec Spanish.

15. ***huɨ̲ɨ̲ᴸ má'ᴴ tóo̲ᴸᴹ sɨᴴ***

Collections: none

Etymology: */huɨ̲ɨ̲ᴸ/* + */má'ᴴ/* + */tóo̲ᴸᴹ/* + */sɨᴴ/* = «vine» + «small-leaf» + «thorn» + «crest, rasps».

Description: A monotypic generic that corresponds to ? No use; found in Puerto Eligio and Metates.

16. ***huɨ̲ɨ̲ᴸ má'ᴴ tóo̲ᴸᴹ 'u'ᴸᴹ mí'ᴴ***

Collections: none

Etymology: */hu$\underline{\text{ɨɨ}}$^{L}/ + /má$^{'H}$/ + /t$\underline{\text{óo}}$^{LM}/ + /'u$^{'LM}$/ + /'mí$^{'H}$/* = «vine» + «small-leaf» + «thorn» + «talon» + «eagle».

Description: A monotypic generic that corresponds to ? A vine, apparently without use, which is found in forests of lowland ranches.

17. *hu$\underline{\text{ɨɨ}}$^{L} mí$^{'H}$ jmimi$^{'MH}$ k^{w}ea^{LH}*

Collections: none

Etymology: */hu$\underline{\text{ɨɨ}}$^{L}/ + /mí$^{'H}$/ + /jmimi$^{'MH}$/ + /k^{w}ea^{LH}/* = «vine» + «rounded–fruit» + «eye» + «horse».

Description: A monotypic generic that corresponds to FAB *Mucuna*. Might also be called ***hu$\underline{\text{ɨɨ}}$^{L} mí$^{'H}$ ju?*** (lustrous rounded–fruit vine).

18. *hu$\underline{\text{ɨɨ}}$^{L} mí$^{'H}$ 'ó^L kiá$^{'M}$ sée^M*

Collections: none

Etymology: */hu$\underline{\text{ɨɨ}}$^{L}/ + /mí$^{'H}$/ + /'ó^L / + /kiá$^{'M}$/ + /sée^M/* = «vine» + «seed» + «medicine» + «for» + «dream».

Description: A monotypic generic that corresponds to CNV *Turbina corymbosa*. Herbaceous vines, 2 – 4 meters long, often climbing in trees; leaves heart–shaped, deep green, smooth; flowers pinkish–white, trumpet–shaped; fruit a dry capsule; seeds triangular, black. Seeds, ingested raw, formerly used for divination and to speed childbirth. Scarce along humid river beds in the tropical dry zone. Apparently restricted to CNV *Turbina corymbosa*, a vine with seeds that cause hallucinations.

19. *hu$\underline{\text{ɨɨ}}$^{L} mɨ$^{'L}$*

Collections: LH0304, LH0319, RL0083, RL0113, RL0138, RL0150, RL0372

Etymology: */hu$\underline{\text{ɨɨ}}$^{L}/ + /mɨ$^{'L}$/* = «vine» + «snake».

Description: A variably-named monotypic generic that corresponds to SML *Smilax*. Herbaceous vines; leaves ovate or heart-shaped with distinct parallel veins; flowers cream-white, often grouped in axillary clusters; fruit often a yellow to orange berry. Leaves prepared in tea to treat kidney problems; stem used to make baskets. Scarce in the temperate humid zone; occasional in the humid zones. It appears that there is no generic name or concept for *Smilax*, a salient genus that nonetheless shows a fair amount of morphological variation – small to large stature, spiny to spineless, inconspicuous to large, yellow fruits. No name was given for the collections from the temperate dry zone, where the plant is occasionally used medicinally; many different names (including descriptive labels such as ***huɨ̱ɨ̱***^{L} ***jaang***^{L} «sectioned vine», ***huɨ̱ɨ̱***^{L} ***yú̱u̱***^{M} «red vine» and ***huɨ̱ɨ̱***^{L} ***mí'***^{H} ***née***^{M} «yellow rounded-fruit vine» were given by the same collector in the temperate humid zone. Probably restricted to the some of the 6 species of *Smilax* in the Sierra.

20. *huɨ̱ɨ̱*^{L} ***ngɨ́***^{L}

Collections: LM0164, LM0276, RL0037, RL0153

Etymology: */huɨ̱ɨ̱*^{L}/ + */ngɨ́*^{L}/ = «vine» + «Chinantec proper name for chayote».

Description: A polytypic generic that corresponds to CUC *Sechium edule* and *Hanburnia mexicana*. Herbaceous vines, 2 – 6 meters long, often climbing profusely on tree branches; roots large, buried deep in the earth; leaves lobed, often sparsely covered with stiff hairs; flowers greenish-white, small, grouped in axillary clusters; fruits pear-shaped to egg-shaped, whitish-green to dark green, smooth or spiny, hard; seed large, enclosed in a fibrous covering. Roots, vegetative shoots, fruits and seeds eaten cooked. Abundant, cultivated and protected in temperate zones.

Cross–classification suggests that this could be considered an ambiguously–affiliated generic. There is general consensus that ***hu<u>ɨɨ</u>^{L} ngɨ́^{L}*** is the correct name for the whole plant. Other names are used in context, when referring to a particular use of the plant. Among the most common names are: ***hu<u>ɨɨ</u>^{L} má'^{H} ngɨ́^{L}*** «chayote leaf vine»; ***j<u>a</u>'^{LM} má'^{H} ngɨ́^{L}*** «edible–green leaf chayote» [referring to edible vegetative shoots] ***má'^{H} ngɨ́^{L}*** «chayote leaf»; ***jii^{L} ngɨ́^{L}*** «chayote root» [referring to edible root]; ***ngɨ́^{L}*** «chayote» [referring to edible fruit]. Restricted to *Sechium edule*.

Specifics:

(A) ***hu<u>ɨɨ</u>^{L} ngɨ́^{L} huɨ'^{L} lá'^{H}*** «smooth peeled chayote vine» [CUC *Sechium edule*]

(B) ***hu<u>ɨɨ</u>^{L} ngɨ́^{L} huóo^{L}*** «castor–bean chayote vine» [CUC *Sechium edule*]

(C) ***hu<u>ɨɨ</u>^{L} ngɨ́^{L} jløø'^{LH}*** «thin–peeled? chayote vine» [CUC *Sechium edule*]

(D) ***hu<u>ɨɨ</u>^{L} ngɨ́^{L} t<u>óo</u>^{LM}*** «spiny chayote vine» [CUC *Sechium edule*] including two varietals: **a)** ***hu<u>ɨɨ</u>^{L} ngɨ́^{L} t<u>óo</u>^{LM} rø'^{L}*** «green spiny chayote vine» [CUC *Sechium edule*]; **b)** ***hu<u>ɨɨ</u>^{L} ngɨ́^{L} t<u>óo</u>^{LM} tee^{L}*** «white spiny chayote vine» [CUC *Sechium edule*].

21. ***hu<u>ɨɨ</u>^{L} ngɨ́^{L} nuu^{L}***

Collections: none

Etymology: /***hu<u>ɨɨ</u>^{L}***/ + /***ngɨ́^{L}***/ + /***nuu^{L}***/ = «vine» + «Chinantec proper name for chayote» + «wild».

Description: A monotypic generic that corresponds to CUC *Hanburnia mexicana* and wild chayotes. Flowers white, 3 cms. broad; fruit pear–shaped, densely covered with spines. Roots, grated and mixed with water, used to wash clothes. Common in the temperate humid zone. Includes another wild species of Cucurbitaceae which has been collected between La Esperanza and Vista Hermosa.

22. *huɨ̲ɨ̲^{L} njǿ$^{'H}$*

Collections: LH0176, LH0267, LM0134, RL0035, SH0061a, SH0117a

Etymology: */huɨ̲ɨ̲^{L}/* + */njǿ$^{'H}$/* = «vine» + «Chinantec proper name for grapes».

Description: A polytypic generic that corresponds to RAN *Clematis* and VIT *Vitis*. Descriptions follow specifics. The typical form includes vines, woody at base; leaves heart-shaped, toothed; flowers yellow-green, inconspicuous, grouped in loose clusters; fruit a round berry, green to purple, sour to sweet-tasting, grouped in clusters. Fruits eaten raw; fruits fermented to make wine used medicinally; wine most often imported from Jaltianguis. Occasional in temperate and cold zones. Occasionally cross-classified as ***mɨ́$^{'H}$ huɨ̲ɨ̲^{L} njǿ$^{'H}$***. The «white» specific includes herbaceous vines; leaves compound, divided into three dentate leaflets; flowers inconspicuous; fruits covered with cottony hairs. Branches with fruits used as adornment. Occasional in dry zones. Probably includes 4 species of *Clematis*; as well as some 5 species of *Vitis* and perhaps some 4 species of *Cissus*, the two genera of Vitaceae represented in the Sierra.

Specifics:

(A) ***huɨ̲ɨ̲^{L} njǿ$^{'H}$*** (unmodified) «grape vine» [VIT *Vitis*]

(B) ***huɨ̲ɨ̲^{L} njǿ$^{'H}$ tee^L*** «white grape vine» [RAN *Clematis*]

23. *huɨ̲ɨ̲^{L} 'oo^L jii^{LH} [kiá3] jmɨ́^{M}*

Collections: RL0079, RL0492

Etymology: */huɨ̲ɨ̲^{L}/* + */'oo^L/* + */jii^{LH}/* + */kiá^M/* + */jmɨ́^{M}/* = «vine» + «medicinal-herb» + «root» + «for» + «worms».

Description: A monotypic generic that corresponds to MNS *Cissampelos pareira*.

Herbaceous vines, 1 – 3 meters long; leaves with three lobes?, bitter–tasting; flowers cream–white; fruit a bluish berry?. Juice of the leaves or root taken to treat dysentery and stomach ache. Occasional in the temperate humid zone. Probably restricted to *Cissampelos pareira*, a commonly–used medicinal plant commonly–used in many parts of Latin America; possibly extended to *Abuta* and other *Cissampelos*, the two genera of Menispermaceae found in the Sierra. This may also be called ***'oo***^{L} ***jii***^{LH} ***[kiá3] jmɨ***^{M} «tuberous medicinal–herb for worms».

24. *huɨ̱ɨ̱*^{L} ***polee***^{L}

Collections: LH0058, LH0096, RL0003, SH0034b

Etymology: ***/huɨ̱ɨ̱***^{L}***/*** + ***/polee***^{L}***/*** = «vine» + «Chinantec proper name for passion flower».

Description: A polytypic generic that corresponds to PAS *Passiflora*. Herbaceous vines, 2 – 15 meters long; leaves smooth, heart–shaped; flowers white to lavender, subtended by a number of green, leafy bracts; fruit egg–shaped, yellow at maturity; seeds numerous, covered with a slimy, sweet to sour tasting pulp. Fruits eaten raw; young leaves, prepared with almond oil, applied externally for skin infection, *derisepela*, and for swollen glands associated with mumps and tonsillitis. Commonly cultivated and protected in temperate zones of the Sierra; wild types occasional in temperate zones. Probably includes some 12 species of wild and cultivated passion flowers of the Sierra.

Specifics:

(A) ***huɨ̱ɨ̱***^{L} ***polee***^{L} (unmodified) «passion flower vine» [PAS *Passiflora*, cultivated]

(B) ***huɨ̱ɨ̱***^{L} ***polee***^{L} ***nuu***^{L} «wild passion flower vine» [PAS *Passiflora*] Includes several wild species of passion flower.

(C) ***hu**ɨ̲ɨ̲*^{L} ***polee***^{L} ***kiá***$^{'M}$ ***nóo***^{LM} «mouse passion flower vine» [PAS *Passiflora*] A wild species found in Puerto Eligio and Soyalapam.

25. *huɨ̲ɨ̲*^{L} *su*$^{'LM}$**

Collections: RL0042, RL0143, RL0144, RL0145, RL0249, RL0381

Etymology: /***hu**ɨ̲ɨ̲*^{L}/ + /***su***$^{'LM}$/ = «vine» + «Chinantec proper name for *Philodendron*».

Description: A polytypic generic that corresponds to ARA *Monstera deliciosa* and *Philodendron* spp. Herbaceous, epiphytic vines, 2 – 6 meters long, often starting from the ground and growing along tree trunks; leaves variously shaped; flowers whitish–green, consisting of a bract (spathe) that curls around a central spike (spadix). Whole plant, cultivated in pots, used for adornment; stems, peeled and dried, used to make baskets and hats [RL0042]. Common in humid zones. Sometimes alternately classified as ***moo***^{L} ***su***$^{'LM}$, then [ARA *Anthurium* and *Monstera* only?]. Probably includes the three or more species of *Philodendron* found in the Sierra. Might also include the many species of *Anthurium* found in the Sierra.

Specifics:

(A) ***hu**ɨ̲ɨ̲*^{L} ***su***$^{'LM}$ (unmodified) «Philodendron vine» [ARA *Monstera deliciosa*, *Philodendron*]

3 specifics may be differentiated by the shape of the leaf:

(B) ***hu**ɨ̲ɨ̲*^{L} ***su***$^{'LM}$ ***kóo***$^{'LH}$ ***má***$^{'H}$ «large–leaved *Philodendron* vine» [ARA *Philodendron*]

(C) ***hu**ɨ̲ɨ̲*^{L} ***su***$^{'LM}$ ***lɨ***$^{'LM}$ ***má***$^{'H}$ «round–leaved *Philodendron* vine» [ARA *Philodendron*]

(D) ***huɨɨ*** ^{L} ***su*** $^{'LM}$ ***[má*** $^{'H}$ ***] tiı*** ^{L} «thin[-leaved] *Philodendron* vine» [ARA *Philodendron*]

26. *huɨɨ* ^{L} ***tu*** ^{L}

Collections: none

Etymology: */huɨɨ* ^{L}*/* + */tu* ^{L}*/* = «vine» + «chicken».

Description: A monotypic generic that corresponds to ?. Apical meristem consumed as a potherb. Found in Puerto Eligio and Soyalapam.

27. *huɨɨ* ^{L} ***uu?***

Collections: none

Etymology: */huɨɨ* ^{L}*/* + */uu/* = «vine» + «Chinantec proper name for a vining palm».

Description: A monotypic generic that corresponds to ARE *Chamaedorea*? Called mimbre in Spanish. Used to make baskets and chairs.

In addition to the 27 generics described above, there are a number of descriptive residual categories in the «vine» life-form. One of the most common is ***lí*** $^{'H}$ ***huɨɨ*** ^{L} «flowering vine». The following collections were considered to belong to this general category by Ricardo López Luna: RL0150, RL0169, RL0174, RL0190, RL0238, RL0281, RL0302. It is a polytypic category that corresponds to AST Eupatoriae & *Lascianthes*, LIL *Bomarea*, ORC, SOL, SML *Smilax*, VAL *Valeriana*, and other vines with showy flowers. Herbaceous vines, 1 - 2 meters long; leaves diverse in shape; flowers various in color, usually showy; fruits various. Leaves, crushed and formed into a compress, applied to swollen glands of people suffering from mumps [VAL]. Occasional in the temperate humid zone. As in most residual categories, many residents of the community would say that included collections do not have a name in Chinantec. It is alternately called ***lí*** $^{'H}$ ***huɨɨ*** ^{L} «flower vine».

Probably can be applied to the majority of flowering vines that do not receive a proper name. Specific categories include ***lí'***^{H} ***huɨ̲ɨ̲***^{L} ***jñu***^{L} «smooth[-leaved] flowering vine» [AST Eupatoriae]; ***lí'***^{H} ***huɨ̲ɨ̲***^{L} ***née***^{M} «yellow flowering vine» [AST *Lascianthes*]; ***huɨ̲ɨ̲***^{L} ***lí'***^{H} ***tee***^{L} «white flowering vine» [VAL *Valeriana*, SOL].

Another commonly cited descriptive category is ***huɨ̲ɨ̲***^{L} ***tó̲o̲***^{LM} «thorny vine». Collections pertaining to this category include RL0113, RL0347. It is a residual, polytypic category that includes MLV *Hibiscus uncinellus*, SML *Smilax* and other thorny vines. Herbaceous vines; stems thorny; leaves, flowers and fruits variable. Apparently without use. Occasional throughout the community, but most frequent in the humid zones. Could include all thorny vines that lack other salient morphological features, useful properties, and do not receive a proper name. Among other specific categories is ***huɨ̲ɨ̲***^{L} ***tó̲o̲***^{LM} ***joo***^{L} «cotton thorny vine».

A third descriptive category is ***huɨ̲ɨ̲***^{L} ***mí'***^{H} «berry vine» represented by collections such as RL0138, RL0314. It includes taxa such as some genera of Fabacaeae and SML *Smilax*. Herbaceous vines; leaves and flowers various; fruits round and often berry-like. Apparently without use. The category could include all round-fruited vines not receiving a proper name.

VI. *ñii*^{L} «grass»

A small life from that corresponds to grasses, rushes, horsetails and other plants with a similar habit, primarily including species of the Poacaeae, Cyperaceae and Equisitaceae). Erect plants, herbaceous, of small stature (typically less than 0.5 meter), flowers usually present but inconspicuous. Use primarily agricultural (whole plant used as fodder), occasionally material (whole plant used for thatch). Found in all ecological zones, most common in disturbed fields and swampy areas.

I recognize 15 generics in the grass category (table 6.6). 11 generics are monotypic (73.3% of the total); 4 generics (26.6%) are further subdivided into a total of 10 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	11	3	0	1	0	0	0	0	0	0	0	0
	Totals: 15 generics, 10 specifics, 0 varietals											

Table 6.6. Distribution of specifics in the life-form ***ñii^L*** «grass».

1. *ñii^L camalao*

Collections: none

Etymology: ***/ñii^L/*** + ***/camalao/*** = «grass» + «Spanish proper name *camalote*, of uncertain origin».

Description: A monotypic generic that corresponds to POA, a broad-leaved large grass. Found in Soyalapam and Metates where it is considered good fodder for animals.

2. *ñii^L 'ia$^{'LM}$*

Collections: LH0083, LH0113, RL0330, EL0140, EL0142

Etymology: ***/ñii^L/*** + ***/'ia$^{'LM}$/*** = «grass» + «good, attractive».

Description: A polytypic generic that corresponds to POA *Muhlenberghia* and some FAB *Desmodium*. Herbaceous plants from 1 – 2 meters; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in dense clusters; seeds small, hard, inconspicuous. Flowering plants may be used as brooms; juice of the stem placed in eye to treat infections. Frequent in the dry and cold zones, common in humid zones.

Desmodium is included in this category because its branches are used to make brooms, similar to *Muhlenberghia* and other robust grasses. Although plants in this generic are typically referred to as ***ñii***^{L} ***'ia***$^{'LM}$ (unmodified) «good, attractive grass», the following specifics are recognized by some speakers.

Specifics:

(A) ***ñii***^{L} ***'ia***$^{'LM}$ ***jɵ́ɵ́ng***^{L} «segmented good, attractive grass» [POA]

(B) ***ñii***^{L} ***'ia***$^{'LM}$ ***nikú̲u̲***^{LM} ***k***^{w}***ea***^{LH} «horse-tail good, attractive grass» [POA *Muhlenberghia*? cream-colored inflorescence]

3. *ñii*^{L} ***jaang***^{LH}

Collections: EL0141, RL0112

Etymology: */ñii*^{L}*/* + */jaang*^{LH}*/* = «grass» + «segmented». The stem is segmented by knobby nodes and smooth internodes.

Description: A monotypic generic that corresponds to POA. Herbaceous plants from 1 - 2 meters; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Whole plant used as forage for cattle. Found in the humid zones.

4. *ñii*^{L} ***jɨ̲ɨ̲***^{L}

Collections: RL0320

Etymology: */ñii*^{L}*/* + */jɨ̲ɨ̲*^{L}*/* = «grass» + «small-knife». The name refers to the razor sharp margins of this grass.

Description: A monotypic generic that corresponds to POA. Herbaceous plants from 1 - 10 dms.; leaves narrow and linear, sharp and cutting on the leaf margin, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Apparently without use, but recognized because its leaves are razor sharp like knives and leaves small cuts on passing animals and people.

5. *ñii^{L} jɨ́ɨ$^{\prime LH}$*

Collections: RL0237

Etymology: */ñii^{L}/* + */jɨ́ɨ$^{\prime LH}$/* = «grass» + «sterile, lacking fertilizer». The name derives from the observation that this grass grows in infertile soil.

Description: A monotypic generic that corresponds to POA. Herbaceous plants from 1 – 10 dms.; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Apparently without use, but known as an indicator of poor soil. Found in the temperate humid zone.

6. *ñii^{L} kiá^{M} gii^{L}*

Collections: none

Etymology: */ñii^{L}/* + */kiá^{M}/* + */gii^{L}/* = «grass» + «for» + «raincover». The stems of this rush were formerly used to weave mats used as protection from the rain.

Description: A polytypic generic that corresponds to JUN *Juncus effusus* and CYP *Eleocharis*. Often called ***gii^{L}***, without life form classifier. Elderly Chinantec speakers from Comaltepec remember that the stems of *Juncus* were formerly woven into mats that were held over the head as protection from the rain. Plastic *impermeables* have apparently replaced this traditional plant use. Although *Eleocharis* stems are widely used in Latin America to weave baskets and other objects, no one in Comaltepec suggested that the plants have been used locally. Found in wet soils, but particularly common in temperate zones.

Specifics:

(A) *ñii^L kiá^M gii^L* «raincover grass» [JUN *Juncus*]

(B) *ñii^L kiá^M gii^L bɨɨ^{LH}* «rounded raincover grass» [CYP *Eleocharis*]

7. *ñii^L k^{w}ɨ^{LM}*

Collections: RL0379

Etymology: */ñii^L/* + */k^{w}ɨ^{LM}/* = «grass» + «Chinantec proper name for maize».

Description: A monotypic generic that corresponds to POA. Herbaceous plants from 1 – 2 meters; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Whole plant used as forage for horses. Found in the temperate humid zone.

8. *ñii^L 'me'^{H}*

Collections: LM0204

Etymology: */ñii^L/* + */'me'^{H}/* = «grass» + «mole or molehill».

Description: A monotypic generic that corresponds to some species of IRI, including yellow-flowered *Sisyrinchium*. Herbaceous plants from 1 – 5 dms.; leaves narrow and rounded to triangular, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Leaves, taken in tea, used for uterine bleeding. Collected in the temperate dry zone.

9. *ñii^L mé^M*

Collections: none

Etymology: */ñii^L/* + */'mé^M/* = «grass» + «?».

Description: A monotypic generic that corresponds to POA. Herbaceous plants from 1 – 2 meters; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Use and ecological zone uncertain.

10. ***ñii*^{L} *mɨ*$^{'L}$**

Collections: RL0378, RL0380, SH0082a

Etymology: /*ñii*^{L}/ + /*mɨ*$^{'L}$/ = «grass» + «spike-flower».

Description: A polytypic generic that corresponds to POA. Herbaceous plants from 1 – 10 dms.; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in a dense spike; seeds small, hard, inconspicuous. Whole plant used as forage. Found in temperate and tropical zones. Although typically referred to simply as ***ñii*^{L} *mɨ*$^{'L}$** (unmodified) «spike grass», the following specifics are recognized by some people.

Specifics:

(A) ***ñii*^{L} *mɨ*$^{'L}$ *jñu*^{L}** «glabrous spike grass» [POA]

(B) ***ñii*^{L} *'nɨ*^{LM} *mɨ*$^{'L}$** «three spike grass» [POA]

(C) ***ñii*^{L} *mɨ*$^{'L}$ *rɵ*$^{'L}$** «green spike grass» [POA]

(D) ***ñii*^{L} *mɨ*$^{'L}$ *tee*^{L}** «white spike grass» [POA]

11. ***ñii*^{L} *seá*$^{'LH}$**

Collections: RL0327, RL0383

Etymology: /*ñii*^{L}/ + /*seá*$^{'LH}$/ = «grass» + «clump».

Description: A monotypic generic that corresponds to CYP *Carex*, *Cyperus* and *Rhynchospora*. Herbaceous plants from 1 – 5 dms.; leaves narrow and rounded to triangular, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Whole plant is recognized forage. Found in temperate zones. Over 6 species of *Rhynchospora*, 12 species of *Carex* and 20 species of *Cyperus* grow in the Sierra; 5 additional genera of Cyperaceae may be included; *Eleocharis* is classified with *Juncus* in the generic ***ñii***^{L} ***gii***^{L}, perhaps because of their distinctive use.

12. *ñii*^{L} *ta*^{L}

Collections: RL0063, RL0064, RL0338, SH0066b

Etymology: /***ñii***^{L}/ + /***ta***^{L}/ = «grass» + «Chinantec proper name for reeds (*Arundo donax*)». These grasses are apparently similar in appearance to *Arundo donax*, which is classified under the unaffiliated generic ***ta***^{L}.

Description: A polytypic generic that corresponds to POA. Herbaceous plants from 1 – 2 meters; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in diversely–shaped clusters; seeds small, hard, inconspicuous. Vegetative shoots recognized as forage eaten by horses. Cited collections are from the temperate humid zone, but included plants may be found throughout the community. Although typically referred to as ***ñii***^{L} ***ta***^{L} (unmodified) «cane grass», the following specifics are recognized by some people.

Specifics:

(A) ***ñii***^{L} ***ta***^{L} ***rø***$^{'L}$ «green cane grass» [POA]

(B) ***ñii***^{L} ***ta***^{L} ***tii***^{L} «thin cane grass» [POA]

13. *ñii*^{L} *té*^{L} *limón*

Collections: RL0276

Etymology: /***ñii***^{L}/ + /***té***^{L}/ + /***limón***/ = «grass» + «Spanish name for tea (Sp. *té*)» + «Spanish proper name for lemon (Sp. *limón*)». *té limón* is the common Spanish name for this introduced grass throughout Mexico.

Description: A monotypic generic that corresponds to POA *Cymbopogon citratus*, an introduced species widely used in the tropics to make beverages and medicinal teas. Herbaceous plants to 0.5 meters; leaves narrow and linear, clasping the stalk at base, this foliage lemon-scented; apparently without flower and fruit. Vegetative shoots, prepared in tea, taken for hangover. Cultivated in home gardens in many parts of the community.

14. *ñii^{L} tii^{L}*

Collections: RL0201, RL0377

Etymology: */ñii^{L}/* + */tii^{L}/* = «grass» + «thin».

Description: A monotypic generic that corresponds to POA. Herbaceous plants from 1 - 10 dms.; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Whole plant considered as forage for horses. Collections from the temperate, humid zone; may be found throughout the community. Some people consider this a synonym of ***ñii^{L} jaang^{LH}***.

15. *ñii^{L} tuu^{M}*

Collections: LH0261

Etymology: */ñii^{L}/* + */tuu^{M}/* = «grass» + «Chinantec proper name for *Equisetum*».

Description: A monotypic generic that corresponds to EQU *Equisetum*. Herbaceous plants from 5 - 10 dms.; stems green, rigid and rounded; flowers and fruits absent. Stems, prepared as a bath, used to treat skins infections. Collected in humid areas of the temperate, dry zone but found in moist soils throughout the community.

The category ***ñii***^{L} is also used without any modifiers to refer to any species of grass or sedge that is not placed in a particular generic category. A number of collections (e.g. EL0056, EL0087, LH0224, LH0230, LH0244, LH0263, LM0172, LM0189, LM0238, LM0266, RL0062, RL0306, SH0071a) were considered to pertain to this undifferentiated class. They correspond to diverse species of POA and to some CYP *Carex*. Herbaceous plants from 1 – 10 dms.; leaves narrow and linear, clasping the stalk at base; flowers small, grouped in diversely-shaped clusters; seeds small, hard, inconspicuous. Whole plant considered as weed, forage, as medicine for dogs; flower clusters used to make brooms, used for adornment; often without apparent use. Abundant in secondary vegetation throughout the community. Over 90 genera and more than 275 species of Poaceae grow in the Sierra Norte; the correspondence of folk to scientific taxa is not yet analyzed. Sometimes called by descriptive names which refer to the general use of grasses and sedges as forage: ***ñii***^{L} ***kiá***^{M} ***k***^{w}***ea***^{L} «grass for horses»; ***ñiiL kiá***^{M} ***g***^{w}***ita***^{H} «grass for cattle»; ***ñii***^{L} ***kiá***^{M} ***loo***? «grass for rabbits». For wheat, corn and sugar cane (cultivated, domesticated species of Poaceae) see ***k***^{w}***ɨ***^{LM}, an unaffiliated generic, for reeds (or «bamboo» as it is called in some ethnographies of the Chinantla) see ***ta***^{L}, another unaffiliated generic.

VII. *moo*^{L} & *má*$^{'H}$ «leaf or large-leaved herbs»

A medium-sized life from that corresponds to large-leaved, robust herbs. ***má***$^{'H}$ refers specifically to large herbaceous herbs having leaves that are placed in compresses on the body for various medicinal purposes. ***má***$^{'H}$ may be used in combination with ***huɨɨ***^{L}, ***ja***$^{'LM}$, ***'ma***^{L}, ***mɨnoo***^{LH} and ***moo***^{L} to indicate «useful leaves» of plants in these life-forms. Large herbs (typically 1–2 meters) or epiphytes.

Flowers usually present. Material (leaves/food preparation); often medicinal (leaves/various conditions); seldom edible (leaves/condiment). Found in all ecological zones, but most common in humid temperate and tropical areas.

I recognize 23 generics in the large-leaved herb category (table 6.7). 14 generics are monotypic (60.9% of the total); 9 generics (39.1%) are further subdivided into a total of 21 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	14	7	1	1	0	0	0	0	0	0	0	0
Totals: 23 generics, 21 specifics, 0 varietals												

Table 6.7. Distribution of specifics in the life-form ***moo***^{L} & ***má***$^{\prime H}$ «large-leaved herbs».

1. *moo*^{L} ***dsi***^{LH} ***too***^{L}

Collections: RL0034

Etymology: /***moo***^{L}/ + /***dsi***^{LH}/ + /***too***^{L}/ = «large-leaved herbs» + «to have» + «hole».

Description: A monotypic generic that corresponds to SOL?. Shrub of ?; leaves large; flowers white; fruits white. Leaves, prepared with alcohol, used as a compress to treat *aire*. Found in the temperate humid zone.

2. *moo*^{L} ***f*****$\underline{ɨɨ}$**^{H}

Collections: EL0037, LH0094, RL0058, LM0055, SH0018b

Etymology: /***moo***^{L}/ + /***f*****$\underline{ɨɨ}$**^{H}/ = «large-leaved herbs» + «Chinantec proper name for *Xanthosoma robustum*».

Description: A polytypic generic that corresponds to ARE *Xanthosoma robustum* and *X. violaceum*. Herb of 1 - 4 meters; sap copious and caustic; leaves extremely large, equaling a person in size; flowers grouped into a central green spike (spadix) enclosed in a cream-white bract (spathe). Lamina of young leaves eaten in combination with corn *masa*, chile, squash seeds and mint; sap of the stalk placed on skin to treat infections (*sarna*); sap applied to snake-bites in dogs and other animals; leaves, in combination with *chile piquín* used to treat *mal ojo*; seven leaves used for *limpia* to cleanse body. Commonly protected in temperate and tropical zones. Sometimes cross-classified as ***jii***^{LH} or ***má***$^{'H}$ ***moo***^{L} ***fɨ̱ɨ̱***^{H}.

Specifics:

(A) ***moo***^{L} ***fɨ̱ɨ̱***^{H} (unmodified) «*Xanthosma* large-leaf» [ARA *X. robustum*]

(B) ***moo***^{L} ***fɨ̱ɨ̱***^{H} ***nʉ***$^{'L}$ «purple *Xanthosoma* large-leaf» [ARA *X. violaceum*]. Also called ***moo***^{L} ***fɨ̱ɨ̱***^{H} ***jii***^{L} «*Xanthosoma* large-leaf root»

3. *moo*^{L} ***gii***^{M} ***[kiá***$^{'M}$***] 'me***$^{'H}$

Collections: EL0122, RL0319

Etymology: */moo*^{L}*/* + */gii*^{M}*/* + */kiá*$^{'M}$*/* + */'me*$^{'H}$*/* = «large-leaved herb» + «poison» + «for» + «moles».

Description: A monospecific generic that corresponds to ARA. Vine of 1 meter; sap irritating when applied to skin; leaves broadly oblong; flowers and fruit? Leaves used to kill moles, placed in moleholes. Scarce in secondary vegetation of the tropical humid zone. This is considered by some people to be a type of *'oo*^{L}, which indicates that poisons may be thought of as types of «medicinal-herb».

4. *má*$^{'H}$ ***g***^{w}***oo***^{L} ***ie***$^{'L}$

Collections: LH0201, LH0273, LM0099, LM0221, RL0073?, RL0168

Etymology: */má*$^{'H}$*/* + */g*^{w}*oo*^{L}*/* + */ie*$^{'L}$*/* = «small-leaf» + «hand» + «lion».

Description: A monotypic generic that corresponds to AST *Senecio*, *Podachaenium*.

Shrubs of 1 – 2 meters; leaves medium to large, always deeply–indented with often 3 – 5 lobes; flowers white or yellow, often showy. Juice of the leaves mixed with alcohol and applied to skin infections; leaves, prepared with pitch–pine smoke and *mescal*, alcohol or *aguardiente*, applied as compress for rheumatism. The plant is considered to be hot. Common in temperate zones. Cross–classified as ***lɨ^{H} g^{w}oo^{L} ie$^{'L}$*** and ***má$^{'H}$ g^{w}oo^{L} ie$^{'L}$***; rarely referred to as ***g^{w}oo^{L} ie$^{'L}$*** (i.e. lacking a life form classifier). The category may be extended to other plants that have deeply lobed leaves such as MOR *Artocarpus incisa* and probably other AST.

5. *moo^{L} jlɨ^{HL}*

Collections: EL0085, RL0061, RL0086; RL0285

Etymology: */moo^{L}/* + */jlɨ^{HL}/* = «large–leaf» + «to split». The name refers to the large–leaved palms that have stems that are easily split into strips. See ***'ma^{L} má$^{'H}$ jlɨ^{HL}*** for additional discussion.

Description: A polytypic generic that corresponds to ARE *Chamaedorea* and some 'palm–like' plants such as ZAM *Ceratozamia*. Shrubs of 1 – 2 meters, leaves very large, highly–dissected; flowers inconspicuous, tightly grouped into clusters that emerge from the base of the plant; fruits containing numerous hard seeds. Leaves used for adornment; whole plant, cultivated in home gardens, used for adornment; leaves sometimes sought out by travelling buyers form Veracruz who export them, often to the United States, for adornment; stems occasionally used for basket–making or construction material? Common in primary forests of humid zones. Sometimes cross–classified as ***'ma^{L} 'ma^{L} jlɨ^{HL}*** «leafy splitting tree» and ***huɨ̲ɨ̲^{L} má$^{'H}$ jlɨ^{HL}*** «leafy splitting vine» for vining types. This category probably includes several of the

8 - 10 *Chamaedorea* species, (excluding *Chamaedorea tepejilote*), and several genera of Zamiaceae. See also ***moo****^{L}* ***kiee****^{M}*, ***moo****^{L}* ***palma tóo****^{LM}* (*Ceratozamia*), ***moo****^{L}* ***palma nicúu****^{LM}* ***'ñú****^{L}*.

Specifics:

(A) ***moo****^{L}* ***jlɨ****^{HL}* (unmodified) «splitting large-leaf» [ARE *Chamaedorea*]

(B) ***moo****^{L}* ***jlɨ****^{HL}* ***nuu****^{L}* «wild splitting large-leaf» [ZAM *Ceratozamia*]

(C) ***moo****^{L}* ***jlɨ****^{HL}* ***tii****^{L}* «small splitting large-leaf» [ARE *Chamaedorea*]

6. ***moo****^{L}* ***jmee****^{LH}*

Collections: EL0038, EL0068, RL0109, RL0110

Etymology: */moo^{L}/* + */jmee^{LH}/* = «large-leaved herbs» + «aroma». The leaves and fruits of *Renealmia* have a pleasant ginger-like scent.

Description: A polytypic generic that corresponds to ZIN *Renealmia*. Large, aromatic herbs of 2 - 3 meters; stalks multiple; leaves large, broadly lanceolate to oblong; flowers pinkish-white, emerging in an open cluster from the base of the plant; fruit red, turning purple-black upon maturity; seeds black, surrounded by yellowish, slimy pulp. Leaves used to make *tamales*; pulp, combined with corn *masa*, and chile, used as a base for *amarillo* or stew. Occasionally protected in humid zones; wild type occasional in humid zones. Apparently restricted to the 2 or 3 *Renealmia* species found in the Sierra. *Zingiber officinale*, occasionally sold in the markets of the Oaxaca Valley as a condiment, is apparently unknown and unclassified in the community.

Specifics:

(A) ***moo****^{L}* ***jmee****^{LH}* (unmodified) «aromatic large-leaf» [ZIN *Renealmia*]

(B) ***moo^{L} jmee^{LH} nuu^{L}*** «wild aromatic large–leaf» [ZIN *Renealmia*]

7. *má'^{H} jóo^{LM}*

Collections: EL0020, LH0015, LM0058, RL0014, RL0398, SH0020b

Etymology: */má'^{H}/* + */jóo^{LM}/* = «small–leaved large herbs» + «Chinantec proper name for *Piper auritum*».

Description: A monotypic generic that corresponds to PIP *Piper auritum*. Large, aromatic herb of 1 – 2 meters; stalks multiple; leaves broadly heart–shaped, dark green; flowers grouped into cream–white, smooth spikes. Leaves used as condiment in many cooked foods; leaves, heated with lard, rubbed on abdomen to treat stomach ache, and to facilitate birth for women in labor. Commonly cultivated in home gardens of all inhabited zones.

8. *moo^{L} jú'^{H}*

Collections: none

Etymology: */moo^{L}/* + */jú'^{H}/* = «large–leaf» + «mosquito».

Description: A monotypic generic that corresponds to CYC *Asplundia*? A sugar–cane like grass that is used for thatch. Found from Metates to Soyalapam.

9. *moo^{L} kiee^{M}*

Collections: EL0070, EL0073, RL0231

Etymology: */moo^{L}/* + */kiee^{M}/* = «large–leaved herbs» + «Chinantec proper name for *Chamaedorea*».

Description: A polytypic generic that corresponds to ARE *Chamaedorea*. Palms of 1 – 3 meters; leaves large, deeply divided into many narrow segments; flowers small, cream–white, grouped into a spike–like cluster that emerges from the base of the plant. Leaves used to thatch houses; whole plant recognized as ornamental. Occasional in primary forest of humid zones; wild type found in secondary forest. Probably includes several of the *Chamaedorea* species with leaves divided into narrow segments. A palm with whitish leaves, that are rather thick.

Specifics:

(A) ***moo^L kiee^M*** (unmodified) «Chamaedor–palm large–leaf» [ARE *Chamaedorea*]

(B) ***moo^L kiee^M tii^L*** «thin Chamaedor–palm large–leaf [ARE *Chamaedorea*]

10. *moo^L kɨɨ^M*

Collections: none

Etymology: */moo^L/* + */kɨɨ^M/* = «large–leaved herbs» + «Chinantec proper name?»

Description: A monotypic generic that corresponds to ? Found near the cascade in cloud–forested zone, used to thatch houses.

11. *moo^L kiʉ^{MH}*

Collections: EL0041, LH0085, LM0149, RL0134, RL0158, RL0349

Etymology: */moo^L/* + */kiʉ^{MH}/* = «large–leaved herbs» + «Chinantec proper name for *Canna*».

Description: A polytypic generic that corresponds to CNA *Canna* and ZIN *Hedychium coronarium*. Large herbs of 1 – 3 meters; stalks multiple; leaves large, broadly ovate to oblong, glabrous; flowers large and showy, red to yellow; fruit a green capsule; seeds black. Leaves used to wrap *tamales*; leaves, prepared with almond oil, placed on abdomen to treat diarrhea. Commonly cultivated in home gardens in tropical and temperate zones. Apparently restricted to *Canna edulis* and *C. glauca*, the two species of Cannaceae found in the Sierra, and to *Hedychium* *coronarium.*

Specifics:

(A) ***moo**^{L} **kiʉ**^{MH} **huɨ**$^{'L}$* «smooth *Canna* large-leaf» [CNA *Canna*]

(B) ***moo**^{L} **kiʉ**^{MH} **jó**$^{'L}$* «animal Canna large-leaf» [ZIN *Hedychium coronarium*] May also be called *'**moo**^{L} **kiʉ**^{MH} **nuu**^{L}* «wild *Canna* large-leaf».

(C) ***moo**^{L} **kiʉ**^{MH} lí^{H}* «flowery *Canna* large-leaf» [CNA *Canna*] The name apparently refers to the multi-colored (purple-green) leaved variety or species of *Canna*.

(D) ***moo**^{L} **kiʉ**^{MH} 'lɵ́$^{'L}$* «powdery?(aspero) *Canna* large-leaf» [CNA *Canna*]

12. *má*$^{'H}$ *lí*^{H} *tóo*$^{'LH}$

Collections: LH0131, LH0132, LM0065, SH0023a, SH0083a, SH0093a

Etymology: */má$^{'H}$/* + */lí^{H}/* + */tóo$^{'LH}$/* = «small- leaved large herbs» + «flower» + «sand».

Description: A polytypic generic that corresponds to AST *Eupatorium* and *Stevia lucida*. Small herbs of 1 - 2 dms.; stalks multiple; leaves lobed, resinous, 2 - 5 cms. long; flowers pinkish-white to cream-white, grouped into terminal, dense clusters. Leaves used as a compress for post-partum recovery; leaves, prepared with lard and warmed with pitch-pine smoke, placed on abdomen to treat diarrhea; leaves, blended with water, taken internally for physical exhaustion. Common in open areas and near human settlements in the dry zones.

Specifics:

(A) ***má**$^{'H}$ **lí**^{H} **tóo**$^{'LH}$ **dsee**^{L}* «large sand flower small-leaf» [AST *Stevia lucida*]

(B) ***má**$^{'H}$ **lí**^{H} **tóo**$^{'LH}$ **jgiáa**^{LM}* «cliff sand flower small-leaf» [AST *Eupatorium*]

13. *moo*^{L} *nicúu*^{LM} *'ñʉ́*^{L}

Collections: none?

Etymology: */moo^L/* + */nicúu^LM/* + */'ñú^L/* = «large–leaf» + «tail» + «tail».

Description: A monotypic generic that corresponds to ARE *Chamaedorea*. Not used for thatch, apparently without use.

14. *moo^L nisɨɨ'^MH gwita^H*

Collections: LM0081, RL0312, RL0337, RL0392

Etymology: */moo^L/* + */nisɨɨ'^MH/* + */gwita^H/* = «large–leaved herbs» + «tongue» + «cow».

Description: A monotypic generic that corresponds to epiphytic ferns such as *Elaphoglossum sartorii* and *Niphidium crassifolium*. Epiphytic herbaceous ferns; fronds large, not divided into segments; flowers and fruits absent; sporing bodies brown to golden–yellow; often forming round spots on the bottom surface of the frond. Whole plant, crushed with mescal, used to treat aire in cows; often without apparent use. Common in the temperate humid zone. Alternative names given for these epiphytic ferns are ***moo^L sea^L dse'^L kuu^LH*** [*Pleopeltis angusta*] and ***moo^L kʷee^L má'^H*** [*Elaphoglossum sartorii*]. May also be called ***má'^H nisiɨ'^MH gʷita^H*** «cow's tongue small–leaf» or without life–form classifier, ***nisɨɨ'^MH gʷita^H*** «cow's tongue».

15. *má'^H 'nɨɨ^LM*

Collections: LH0233, LM0071, RL0019

Etymology: */má'^H/* + */'nɨɨ^LM/* = «small–leaved large herbs» + «corn–cob». The spike–like inflorescences of this *Piper* are said to resemble corn–cobs.

Description: A monotypic generic that corresponds to PIP *Piper umbellatum*. Large, aromatic herb of 1 – 2 meters; stalks multiple; leaves very broadly heart–shaped, light green; flowers grouped into cream–white, smooth spikes. Leaves, prepared with ?, placed on abdomen to reduce internal inflammation, diarrhea and *empacho*; juice of crushed leaves used to treat infected insect bites. Occasional, a protected plant in temperate zones. Sometimes cross–classified as ***má'^{H} lɨ́^{H} 'nɨ́ɨ^{LM}***. Apparently restricted to *Piper umbellatum*.

16. *moo^{L} palmí*

Collections: RL0060, RL0258, RL0294, RL0312

Etymology: */**moo^{L}**/* + */**palma**/* = «large–leaved herbs» + «Spanish proper name for palm (Sp. *palma*).

Description: A polytypic generic that corresponds to some ARE *Chamaedorea* and ZAM *Ceratozamia*. Shrubs of 1 – 3 meters; leaves large, deeply divided into many segments; flowers small, grouped into a dense cluster that emerges from the base of the plant; seeds large. Occasional in the temperate humid zone. The *rabo de pescado* used for thatch on houses in lowland Chinantec villages may correspond to this generic. Probably includes several of the more than 8 species of *Chamaedorea* and 7 species of Zamiaceae that grow in the Sierra; could also include species of the other nine palm genera found in the Sierra. This category is sometimes classified as a tree, ***'ma^{L} palmí***. A dark–green, thin–leaved palm.

Specifics:

(A) ***moo^{L} palmí*** (unmodified) «palm large–leaf» [ARE *Chamaedorea*?]

(B) ***moo^{L} palmí tóo^{LM}*** «thorn palm large–leaf» [ZAM *Ceratozamia*]

17. *má'^{H} ró^{L}*

Collections: LH0022, LH0119

Etymology: */má*$^{'H}$*/* + */ró*^{L}*/* = «small-leaved large herbs» + «Chinantec proper name for tobacco».

Description: A polytypic generic that corresponds to SOL *Nicotiana tabacum*. Large herb of up to 1 meter; stalk single; leaves softly pubescent, resinous and strongly-scented; flowers cream-white to pinkish-red; fruit a dry capsule containing numerous seeds. Leaves, prepared with mescal and pitch-pine smoke, placed on joints for rheumatism. Commonly cultivated in home gardens of the temperate dry zone. Apparently restricted to *Nicotiana tabacum*, but potentially includes *Nicotiana glauca* as a wild type [SH0003b].

Specifics:

(A) ***má***$^{'H}$ ***ró***^{L} (unmodified) «tobacco small-leaf» [SOL *Nicotiana tabacum*]

(B) ***má***$^{'H}$ ***ró***^{L} ***tøø***^{M} «second-class or false tobacco small-leaf» [SOL *Nicotiana*?]

18. ***moo***^{L} ***sii***^{M}

Collections: EL0052, EL0123, RL0082, RL0278

Etymology: */moo*^{L}*/* + */sii*^{M}*/* = «large-leaved herbs» + «Chinantec proper name for *Heliconia* and striped».

Description: A polytypic generic that corresponds to HEL *Heliconia*. Large herbs of 2 – 4 meters; leaf stalks multiple; leaves large, broadly oblong, glabrous; flowering stalks emerging from base of plant, reaching 1 –2 meters; flowers yellow, subtended by scarlet red cupped bracts. Young leaves used to wrap *tamales*. Common in the humid zones of the Sierra. Apparently restricted to the 2 – 3 species of *Heliconia* found in the Sierra. Also called ***lí***^{H} ***moo***^{L} ***sii***^{M} «striped large-leaf flower».

Specifics:

(A) ***moo^L sii^M*** (unmodified) «striped large-leaf» [HEL *Heliconia*] a reddish variety.

(B) ***moo^L sii^M tee^L*** «white striped large-leaf» [HEL *Heliconia*]

19. *moo^L su$^{'LM}$*

Collections: RL0042, RL0143, RL0144, RL0145, RL0249, RL0381

Etymology: */huɨɨ^L/* + */su$^{'LM}$/* = «vine» + «Chinantec proper name for aroids».

Description: A monotypic generic that corresponds to ARA *Monstera deliciosa* and *Anthurium* spp. Herbs, 2 – 6 meters long, leaves variously shaped; flowers whitish-green, consisting of a bract (spathe) that curls around a central spike (spadix). Whole plant, cultivated in pots, used for adornment; stems, peeled and dried, used to make baskets and hats [RL0042]. Common in humid zones. Sometimes alternately classified as ***moo^L su$^{'LM}$***, then [ARA *Anthurium*?]. Probably includes the three or more species of *Philodendron* found in the Sierra. Might also include the many specie of *Anthurium* found in the Sierra. *Monstera* is sometimes called ***huɨɨ^L su$^{'LM}$***, together with *Philodendron*.

20. *moo^L 'ú^L*

Collections: RL0186, RL0373

Etymology: */moo^L/* + */'ú^L/* = «large-leaved herbs» + «wide».

Description: A monotypic generic that corresponds to ARA *Anthurium*. Herbs, often epiphytic; leaves broad, thick, usually glossy and heart-shaped; flowers grouped into a dense greenish spike (spadix) subtended by a single leaf-like bract (spathe). Whole plant used as ornamental. Common in the humid zones, rare along riverbanks in the temperate dry zone. Variations of the name are ***moo^L 'ú^L má$^{'H}$*** (large-leaf wide small-leaf), and ***moo^L 'ú^L sea^L dse$^{'L}$ 'ma^L*** (large-leaf wide where there-is tree). The species of *Anthurium* that reaches into the temperate dry region apparently goes unnamed, although it is considered ornamental [LH0242]. Probably includes the more than 12 species of *Anthurium* found in the Sierra Norte. This may be synonymous with ***moo^{L} su$^{'LM}$***.

21. *moo^{L} taloo^{L}*

Collections: EL0031

Etymology: */moo^{L}/* + */taloo^{L}/* = «large-leaved herbs» + «hollow-bag».

Description: A monotypic generic that corresponds to AST *Critonia quadrangulare*. Herbs of 1 - 2 meters; stems hollow; leaves broad, glabrous; flowers and fruits not commonly seen. Leaves used as compress to treat rheumatism. Common in secondary vegetation of humid zones.

22. *moo^{L} tufa*

Collections: none

Etymology: */moo^{L}/* + */tufa/* = «large-leaved herbs» + «?».

Description: A monotypic generic that corresponds to Zingiberales; this may be MRN *Calathea lutea*. *hoja de platano ceniza*.Used for thatch and for tamales, found in Soyalapam.

23. *moo^{L} 'ueá$^{'H}$ k$\underline{i}$$^{'LM}$*

Collections: none

Etymology: */moo^{L}/* + */'ueá$^{'H}$/* + */k$\underline{i}$$^{'LM}$/* = «large-leaved herbs» + «?» + «?».

Description: A monotypic generic that corresponds to ZAM. Leaves used as ornament, especially as 'palms' for the Christian holidays of Palm Sunday and Easter. Chinantec from some communities in the dry tropical zone collect the leaves for sale in Oaxaca Valley markets.

In addition to the generic categories described above, there are a number of descriptive categories which pertain to the life-form ***moo***^{L} or ***má***$^{'H}$. The following collections were said to correspond to this large, undifferentiated class: RL0009, RL0047, RL0122, RL0127, RL0170, RL0197, RL0274, RL0287, RL0311, RL0385, RL0399, SH0005a. Best considered as a residual polytypic generic, it corresponds to plants such as AST *Rumfordia* and *Vernonia*, LOG *Buddleia*, MLS, and SOL *Cestrum* and *Solanum schlechtendalianum*. Shrubs of 1 – 3 meters; leaves broad, variable in texture; flowers and fruits variable in color and size. Apparently without use, although may be occasionally used for fuel, medicine or ornament. Collections primarily from the temperate humid zone, but potentially found throughout the community. Many of the names take the form /***moo***^{L}/ + /***[adjective]***/ + /***má***$^{'H}$/ = «large-leaved herbs» + «[adjective]» + «leaf». Alternately classified as ***má***$^{'H}$ ***moo***^{L} [adjective]y. Potentially includes other large-leaved herbs and shrubs that do not receive a proper name. Specific categories include ***moo***^{L} ***'ua***^{LH} ***má***$^{'H}$ «soft large-leaved herb»; ***moo***^{L} ***cuee***^{L} ***má***$^{'H}$ «long[-leaved] large-leaved herb»; ***moo***^{L} ***hu***ɨ$^{'L}$ ***má***$^{'H}$ «smooth large-leaved herb»; ***moo***^{L} ***jñu***^{L} ***má***$^{'H}$ «glabrous large-leaved herb» ***moo***^{L} ***joo***^{L} ***má***$^{'H}$ «cottony large-leaved herb»; ***moo***^{L} ***nu***$^{'L}$ ***má***$^{'H}$ «purple large-leaved herb»; ***moo***^{L} ***rø***$^{'L}$ ***má***$^{'H}$ «green large-leaved herb»; ***moo***^{L} ***tee***^{L} ***má***$^{'H}$ «white large-leaved herb»; ***moo***^{L} ***tii***^{L} ***má***$^{'H}$ «thin large-leaved herb».

VIII. *móo*^{LM} «agaves»

A life from that corresponds to pineapple, *Ananas comosus*, the genus *Agave*, possibly extended to other members of the Agavaceae, and to some terrestrial bromeliads, most notably the genus *Hechtia*. Plants formed by a basal rosette of fleshy, usually thorny leaves. Edible (raw/cooked), Material (utensil). Restricted to tropical areas and the temperate zone around Comaltepec.

I recognize 11 generics in the agave category (table 6.8). All generics are monotypic (100% of the total). There are no specific or varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	11	0	0	0	0	0	0	0	0	0	0	0
Totals: 11 generics, 0 specifics, 0 varietals												

Table 6.8. Distribution of specifics in the life-form ***móo***^{LM} «agaves».

Although several collections (EL0072, EL0124, LH0253, LH0254, LH0286) have been made of different types of ***móo***^{LM}, many additional species of agaves and terrestrial bromeliads need to be made before clarifying the correspondence of folk to scientific categories. The Comaltepec Chinantec botanical name ***móo***^{LM} is related to the proto-Chinantec term ****máá***^{LH}, which Rensch reconstructs from cognate terms from the dry mountainous zones of the Chinantla (1989:553).

I consider it a polytypic life-form that includes at least 11 generics. Terrestrial plants; leaves spiny, fleshy or coriaceous, forming a basal rosette; flowers white to greenish-white; fruits a small green capsule, or a large fleshy sweet 'pineapple'. Leaf bases used to prepare a cold beverage; flowers eaten as a cooked vegetable [***móo***^{LM} ***'o̱***$^{'H}$]; pulp from inside of leaf eaten; leaves used to prepare *ixtle* fiber [***móo***^{LM} ***kṵṵ***^{LH}]; fruit eaten raw [*Ananas*]. Common in the tropical dry zone [*Agave*]; occasionally cultivated [*Ananas*] or occasional and protected [*Aechmea*] in the tropical humid zone. Probably includes the genus *Agave*, including some 11 species, and possibly the genera *Dasylirion* and *Nolina* (all Agavaceae) as well as terrestrial bromeliads. The following generics will be described in greater detail as more collections become available.

1. *móo*^{LM} *jú*$^{'H}$

Collections: none

Etymology: */móo*^{LM}*/* + */jú*$^{'H}$*/* = «agave–like plants» + «Chinantec proper name for pineapple».

Description: A monotypic generic that corresponds to BML *Ananas comosus*. Fruits, eaten, considered to be a cold food. Cultivated in the humid tropical zone.

2. *móo*^{LM} *jú*$^{'H}$ *nuu*^{L}

Collections: none

Etymology: */móo*^{LM}*/* + */jú*$^{'H}$*/* + */nuu*^{L}*/* = «agave–like plants» + «Chinantec proper name for pineapple» + «wild».

Description: A monotypic generic that corresponds to BML *Aechmea magdalense* and other wild or semi–cultivated species. This category could include wild types of pineapple. Fruits eaten, considered to be a cold food.

3. *móo*^{LM} *kiu̲u̲*^{L}

Collections: none

Etymology: */móo*^{LM}*/* + */kiu̲u̲*^{L}*/* = «agave–like plants».

Description: A monotypic generic that corresponds to AGA *Agave*? Fibers removed to make rope. Found in the hot tropical zone.

4. *móo*^{LM} *ku̲u̲*^{LH}

Collections: none

Etymology: */móo^{LM}/* + */k̲u̲u̲^{LH}/* = «agave-like plants» + «stone». These terrestrial bromeliads grow on rocks and cliff sides.

Description: A monotypic generic that corresponds to BML *Hechtia*. Only used for making *ixtle* and lassos.

5. *móo^{LM} ñí$^{'H}$*

Collections: none

Etymology: */móo^{LM}/* + */ñí$^{'H}$/* = «agave-like plants» + «Spanish». The aloe plant has the from of an agave, and was introduced by the Spanish.

Description: A monotypic generic that corresponds to ALO *Aloe saponaria*. The sap, considered to be cold, is used medicinally.

6. *móo^{LM} ñii3*

Collections: none

Etymology: */móo^{LM}/* + */ñii3/* = «agave-like plants» + «cooking pot (Sp. *olla*)».

Description: A monotypic generic that corresponds to AGA *Agave*. Sap, fermented and distilled, used to make mescal. Found in the dry tropical zone.

7. *móo^{LM} 'o̲$^{'H}$*

Collections: none

Etymology: */móo^{LM}/* + */'o̲$^{'H}$/* = «agave-like plants» + «?».

Description: A monotypic generic that corresponds to AGA *Agave* sp. Considered to be a cold food or beverage.

8. *móo^{LM} rǿ$^{'L}$*

Collections: none

Etymology: */móo^{LM}/* + */rǿ$^{'L}$/* = «agave-like plants» + «green».

Description: A monotypic generic that corresponds to AGA *Agave atrovirens*. Sap fermented to make a drink called *pulque*, which is considered to be cold. Semi–cultivated inside the village limits.

9. *móo*^{LM} *sú̲*$^{'H}$

Collections: none

Etymology: */móo*^{LM}*/* + */sú̲*$^{'H}$*/* = «agave–like plants» + «?».

Description: A monotypic generic that corresponds to AGA *Agave*. Flowers and pulp of the leaves eaten, often in a hot sauce called *amarillo*. Growing wild in the dry tropical zone.

10. *móo*^{LM} *tee*^{L}

Collections: none

Etymology: */móo*^{LM}*/* + */tee*^{L}*/* = «agave–like plants» + «white».

Description: A monotypic generic that corresponds to AGA *Agave*. The sap is considered of the best quality to prepare the fermented drink called *pulque*. Considered to be a cold drink. This species is apparently semi–cultivated around the village.

11. *móo*^{LM} *tii*^{L}

Collections: none

Etymology: */móo*^{LM}*/* + */tii*^{L}*/* = «agave–like plants» + «thin». This is a thin–leaved agave–like plant.

Description: A monotypic generic that may corresponds to BML *Greigia oaxacana*. Found in Soyalapam, in the humid tropical zone.

Some notes about *Agave* species that might be included in this life–form. The semi-domesticated *Agave atrovirens*, planted between fields and around houses, is the source of *pulque*, a fermented beverage prepared in Chuparosa and Comaltepec year-round. *A. potatum*, *A. mescalensis* and other species are recognized as the source of *mescal*, a distilled liquor formerly produced in the Chinantla and now imported from the Oaxaca central valley by travelling Zapotec salesmen. The leaves, flowers and flower stalk are eaten, typically soon after the rainy season, but are not commonly consumed. They are considered to be a cold food. Small leaves (*A. potatum*) are used by the Chinantecs of Quiotepec as receptacles for collecting *copal*, an incense resin tapped from *Bursera* trees, apparently no longer collected in Comaltepec. The plants are restricted to hot or temperate dry zones.

The «wild» form of pineapple, *Aechmea magdalense*, grows in mixed secondary vegetation of tropical evergreen forest. The typical pineapple is cultivated around Loma Bonita in the Gulf coastal plain and brought to market in Valle Nacional or Tuxtepec, where Chinantecs from Comaltepec acquire it. Fruits from both the «wild» and typical form are eaten raw, and considered a cold food. Villagers are aware that *tepache*, a fermented beverage, can be made from the fruit but this is rarely done. Pineapple is cultivated only in the humid tropical zone but its village stores.

IX. *mɨnoo*^{H} «fern»

A moderately large morphologically-defined life form that corresponds to ferns and ferns allies. Plants herbaceous, of small to medium stature (up to 2 meters) flowers absent, leaves moderately to much dissected. Occasionally agricultural (whole plant/fertility indicator), medicinal (root/various conditions). Found in all ecological zones, particularly common in humid areas.

I recognize 14 generics in the fern category (table 6.9). All generics are monotypic (100% of the total). There are no specific or varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	14	0	0	0	0	0	0	0	0	0	0	0
Totals: 14 generics, 0 specifics, 0 varietals												

Table 6.9. Distribution of specifics in the life-form ***mɨnoo***^{H} «fern».

s/n. *mɨnoo*^{H} (unmodified) «fern»

The life-form term ***mɨnoo***^{H} is often used unmodified in order to refer to a wide range of ferns, particularly ones which have no particular morphological aspects or cultural uses to distinguish. A number of collections were attributed to this undifferentiated class, including EL0001, EL0002, EL0003, EL0004, LH0053, LH0125, LH0136, LH0203, LH0260, LM0063, RL0246, SH0032a, SH0108a. All of these collections pertain to ferns, helping to confirm the delimitation of this life-form.

This unmodified name is probably used to refer to: (a) the category that corresponds to one of the most common and salient ferns *Pteridium aquilinum* var. *feei* and (b) an undifferentiated class that includes, among other ferns, *Megalastrum subincisum*, *Dennstaedtia bipinnata*, *Diplazium striatum*, *Pellaea sagittata*, *Polypodium pseudoaureum*, *Thelypteris torresiana* and *Woodsia mollis*. Whole plant indicator of fertile soil [*Megalastrum subincisum*], of fertile soil appropriate for sowing beans [*Thelypteris torresiana*], of poor soil [*Dennstaedtia bipinnata*], of poor soil that is beginning to recuperate [*Diplazium striatum*]; roots, boiled in water, used to treat infected skin wound [*Woodsia mollis*]; root, boiled in water and combined with *cabeza de chintete*, *golondrina*, *vergonsoza* and *chamiso*, used to treat physical exhaustion and kidney problems; whole plant used for ornament [*Pteridium aquilinum* var. *feei*, ?]; leaves, prepared with lard, placed on skin to treat infections [*Pellaea sagittata*]. Occasional in all zones of the community. Because most ferns appear to lack proper names and are referred to the life form class only, this category could include several hundred fern species. The residual members of this category may be referred to as ***mɨnoo^{H} mó$^{'L}$***. Many descriptive names are used. For example, ***mɨnoo^{H} sea^{L} dse$^{'L}$ 'ma^{L}*** «epiphytic fern, lit. tree which grows on trees» (represented by collection RL0114) corresponds to *Blechnum ensiforme*, a fern found in the temperate humid zone. This descriptive category could be extended to any epiphytic fern.

1. *mɨnoo^{H} fiscáa^{H}*

Collections: EL0015, LH0027, LH0052, LM0152, SH0011b, SH0033a

Etymology: */mɨnoo^{H}/* + */fiscáa^{H}/* = «fern» + «Spanish name for churchworker (Sp. *fiscal*)».

Description: A monotypic generic that corresponds to *Adiantum poiretii*, *Odontosoria schlechtendalii* and *Pityrogramma tartarea* and RAN *Thalictrum*. Root, boiled in water, taken for post-partum recovery, especially to expel the placenta and afterbirth [*Adiantum poiretii*, *Odontosoria schlechtendalii*]; roots, boiled in water, taken to treat uterine hemorrhaging [*Adiantum poiretii*]; no use reported [*Thalictrum*]. Common in dry zones [*Adiantum poiretii*]; occasional in humid zones [*Odontosoria*]. *Adiantum poiretii* is the focal member of the generic, but other ferns with black, shiny stems and finely divided leaves may be included. The included collection of *Thalictrum* is sterile, and may be incorrectly attributed to this generic. May be called ***'oo^L mɨnoo^H fiscáa^H*** «*fiscal* fern medicinal–herb».

2. *mɨnoo^H 'ie$^{'L}$*

Collections: LM0078

Etymology: */mɨnoo^H/* + */'ie$^{'L}$/* = «fern» + «lion».

Description: A monotypic generic that corresponds to *Blechnum occidentale*. Roots, combined with avocado leaves in mescal, taken for post–partum recovery. Found in the temperate dry zone.

3. *mɨnoo^H jii^L*

Collections: none

Etymology: */mɨnoo^H/* + */jii^L/* = «fern» + «root».

Description: A monotypic generic that corresponds to MTT *Marratia weinmannifolia*. The leaf bases are used to make tortillas. Scarce around La Esperanza.

4. *mɨnoo^H jɨɨ$^{'LH}$*

Collections: RL0102

Etymology: */mɨnoo^H/* + */jɨɨ$^{'LH}$/* = «fern» + «leached, lacking fertilizer».

Description: A monotypic generic that corresponds to *Sticherus brevipubis*. Whole plant indicator of soil fertility. Occasional in the temperate humid zone. Small ferns that indicate poor soil.

5. *mɨnoo^H jmɨɨ^L*

Collections: LH0301

Etymology: */mɨnoo^H/* + */jmɨɨ^{L}/* = «fern» + «water».

Description: A monotypic generic that corresponds to ?. Fronds potentially used as ornamental. Found in the cold zone.

6. mɨnoo^H jñʉ^{L}

Collections: LM0150, RL0328

Etymology: */mɨnoo^H/* + */jñʉ^{L}/* = «fern» + «pubescent».

Description: A monotypic generic that corresponds to *Cheilanthes decomposita*, *Sphaeropteris horrida*. Whole plant used for ornament. Occasional in the cold zone and the temperate humid zone. This rather descriptive category also goes by the name of ***mɨnoo^H joo^L***.

7. mɨnoo^H k^{w}ee^L moo^L

Collections: RL0280

Etymology: */mɨnoo^H/* + */k^{w}ee^L/* + */moo^L/* = «fern» + «long» + «large-leaf».

Description: A monotypic generic that corresponds to *Polypodium pseudoaureum*. Whole plant potentially used as home garden or house ornamental. This may also be used as a synonym for some tree ferns.

8. mɨnoo^H k^w$\underline{o}$'^{L}

Collections: RL0106

Etymology: */mɨnoo^H/* + */k^w$\underline{o}$'^{L}/* = «fern» + «sterile, and in infertile soil».

Description: A monotypic generic that corresponds to *Thelypteris dentata*. Whole plant potentially used as home garden or house ornamental. Found in the temperate humid zone. A small fern that grows in infertile soils of hillsides; it is used as an indicator of soil fertility, showing placing where only cassava may be grown.

9. *mɨnoo^H 'o'^{H}*

Collections: RL0147

Etymology: */mɨnoo^H/ + /'o'^{H}/* = «fern» + «fertilizer».

Description: A monotypic generic that corresponds to *Pteridium arachnoideum*. Fronds used as thatch (*tapesco*) for tree nursery. Found in the temperate humid zone.

10. *mɨnoo^H rɵ'^{L}*

Collections: RL0107

Etymology: */mɨnoo^H/ + /rɵ'^{L}/* = «fern» + «green».

Description: A monotypic generic that corresponds to *Thelypteris linkiana*. Potentially used as a home garden ornamental. Found in the temperate humid zone. A fern that is found as a weed in coffee plantations.

11. *mɨnoo^H sɨɨ^L*

Collections: RL0103

Etymology: */mɨnoo^H/ + /sɨɨ^L/* = «fern» + «landslide».

Description: A monotypic generic that corresponds to *Pityrogramma tartarea*. Found in the temperate humid zone. Apparently a colonizer of disturbed sites, especially where there have been landslides.

12. *mɨnoo^H tee^L*

Collections: LH0149

Etymology: */mɨnoo^H/ + /tee^L/* = «fern» + «white».

Description: A monotypic generic that corresponds to *Polypodium sanctae-rosae*. Roots, boiled in water, used to treat kidney problems. Occasional in the cold zone. Sometimes referred to as ***mɨnoo^H tee^L nú'^{M} má'^{H}*** «? small-leaf white fern».

13. *mɨnoo^H tii^L*

Collections: EL0006, EL0010, LH0258, LH0314, RL0297, RL0394, RL0405

Etymology: */mɨnoo^H/* + */tii^L/* = «fern» + «thin».

Description: A monotypic generic that corresponds to *Diplazium franconis*, *Nephrolepis multiflora*, *Polypodium triseriata*, *Selaginella oaxacana*. Root, prepared as tea, used for post–partum recovery [LH0258]; whole plant potentially used as a home garden ornamental [*Diplazium franconis*]; fronds used as house ornamental [LH0314]. Occasional in temperate and tropiçal zones. There is a lithophytic variety that is referred to as ***mɨnoo^H tii^L sea^L dse'^{L} k$\underline{uu}$^{LH}*** «lithophytic thin fern» = [*Nephrolepis multiflora*]

14. *mɨnoo^H 'uí'^{M}*

Collections: RL0040

Etymology: */mɨnoo^H/* + */'uí'^{M}/* = «fern» + «black».

Description: A monotypic generic that corresponds to *Blechnum schiedeanum*. Whole plant potentially used as home garden or house ornamental. Found in the temperate humid zone. Found around Puerto Eligio.

X. *ñi'^{LM}* «mosses»

A small morphologically–defined life form that corresponds to true mosses and some plants of similar habit such as lycopods and spanish moss. Scandent, pendant or low–growing [caespitose] herbaceous plants that grow on soil, rocks or trees; leaves reduced; flowers inconspicuous or absent. Ornamental (whole plant/adornment). Found in all ecological zones; common in wet or seasonally humid areas.

I recognize 2 generics in the moss category (table 6.10). All generics are monotypic (100% of the total). There are no specific or varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	2	0	0	0	0	0	0	0	0	0	0	0
Totals: 2 generics, 0 specifics, 0 varietals												

Table 6.10. Distribution of specifics in the life-form ***ñi***$^{\prime LM}$ «mosses».

s/n. *ñi*$^{\prime LM}$ (unmodified) «mosses»

The term ***ñi***$^{\prime LM}$ is often used unmodified to refer to any moss or moss-like plant. For example, collections EL0119 and LH0202 correspond to LYC *Huperzia linifolia* and *Huperzia* sp. The whole plant used for adornment. Scarce in temperate and tropical zones. This undifferentiated class probably includes several species of *Huperzia* as well as some species of moss.

1. *ñi*$^{\prime LM}$ ***rɸ***$^{\prime L}$

Collections: LH0331

Etymology: /***ñi***$^{\prime LM}$/ + /***rɸ***$^{\prime L}$/ = «moss» + «green».

Description: A monotypic generic that corresponds to LYC *Lycopodium*? Whole plant used for adornment. Scarce in the cold zone.

2. *ñi*$^{\prime LM}$ ***tee***^{L}

Collections: LH0216, LM0033, LM0061

Etymology: /***ñi***$^{\prime LM}$/ + /***tee***^{L}/ = «moss» + «white».

Description: A monotypic generic that corresponds to BML *Tillandsia usneoides*. Epiphytic plants, up to 0.5 meters long, pendant from branches of trees; stems and leaves grayish-silver; flowers and fruits small, inconspicuous. Whole plant commonly used at Christmas time for ornament. Common to abundant in dry zones of the Sierra. Some Chinantec may call this by the name ***ñi'^{LM} te'^{L}*** «sticky moss» but this is considered to be a mistake by more knowledgeable informants. Apparently restricted to *Tillandsia usneoides*.

XI. Unaffiliated and ambiguously affiliated generics

I recognize 29 generics which are unaffiliated or ambiguously affiliated (table 6.11). 20 generics are monotypic (69.0% of the total); 9 generics (31.0%) are further subdivided into a total of 30 specifics. 3 specifics are subdivided into a total of 7 varietals.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	20	3	4	0	0	2	0	0	0	0	0	0
Totals: 29 generics, 30 specifics, 7 varietals												

Table 6.11. Distribution of specifics among unaffiliated generics.

Corn, beans and squash, unaffiliated generics often considered as types of *mí'^{H}*, «small, round fruit, seed or root»

mí'^{H} is a classifying term that cuts across the other life-forms. It typically forms one component, in combination with life-form classifiers such as ***'ma^{L}*** or ***hu$\underline{ɨɨ}$^{L}***, of the name of plants having small, rounded fruits and seeds, often useful or morphologically salient. It is the only classifying noun that is consistently used with the monogenerics ***k^{w}ɨɨ^{H}*** (corn), ***jnʉʉ^{L}*** (beans), and ***mó'^{L}*** (squash), which are described here.

1. - 4. Generics in the ***jnʉʉ^{L}*** «bean» complex.

1. ***jnʉʉ^{L}*** (unmodified) «Chinantec proper name for *Phaseolus*)»

Collections: EL0065, LH0077, LH0111, LH0168, LH0169, LH0170, LH0174, LH0175, LH0225, LM0008, LM0009, LM0010, LM0011, LM0012, LM0013, LM0014, LM0015, LM0031, LM0035, LM0036, LM0051, LM0104, LM0105, LM0177, LM0275, RL0356, RL0382

A polytypic generic that corresponds to FAB *Crotalaria*, *Lupinus*, *Phaseolus*, *Pisum* and *Vicia*. Erect herbs or climbing herbaceous vines of 3 – 10 dms.; leaves compound, usually divided into 3 or more broad leaflets; flowers white, blue, yellow, red or pink, composed of several curled petals, grouped into open axillary clusters; fruit a bean, a round to flattened pod that contains several large lustrous seeds may be tan, white, black or purplish. Seeds, boiled in water and prepared in many different ways, eaten as a basic grain; whole pod, boiled in water, eaten as a basic grain; seed, boiled in water, eaten to treat kidney problems [*Phaseolus coccineus* var. *formosus*]; seeds, dried and ground, combined with sugar to make sweets [*Vicia*]; seeds, prepared in *amarillo*, eaten as a basic grain [*Vicia*]; branchlets, boiled in water, eaten as a cooked vegetable [*Phaseolus*, *Pisum*, *Vicia*]; flowering branchlets used as ornament, especially around Christmas time; branchlets used as forage for cattle in the dry season [*Lupinus*, FAB].

The cultivated legumes have the following distribution:

Tropical dry zone: *jnʉʉ*^{L} *tii*^{L} *'ma*^{L}, *jnʉʉ*^{L} *tii*^{L} *'uí*$^{'M}$, *jnʉʉ*^{L} *tii*^{L} *tu*^{L}

Temperate dry zone: *jnʉʉ*^{L} *'mɨɨ*^{L}, *jnʉʉ*^{L} *'ua*^{L}, *jnʉʉ*^{L} *no*$^{'L}$

Cold zone: *jnʉʉ*^{L} *ñi*$^{'H}$, *jnʉʉ*^{L} *no*$^{'L}$, *jnʉʉ*^{L} *nuu*^{L}, *jnʉʉ*^{L} *tee*^{L}

Temperate humid zone: *jnʉʉ*^{L} *huɨ̠ɨ̠*^{L}, *jnʉʉ*^{L} *rɨ́*$^{'H}$

Tropical humid zone: *jnʉʉ*^{L} *huɨ̠ɨ̠*^{L}.

Uncultivated legumes [*Crotalaria*, *Lupinus*, *Phaseolus coccineus* var. *formosus*] are found in the temperate zones. Beans are often referred to as ***jnuu***^{L}, without a life-form modifier, as ***ja̲***$^{'LM}$ ***jnuu***^{L}, or as ***hu̲ɨ̲ɨ̲***^{L}. Applied to many plants in the Fabaceae.

Specifics and Varietals:

(A) ***jnuu***^{L} ***hu̲ɨ̲ɨ̲***^{L} «vine bean» [FAB *Phaseolus vulgaris*, vining type] (Sp. ?)

(B) ***jnuu***^{L} ***'mɨɨ***^{L} «excrement bean» [FAB *Phaseolus vulgaris*] (Sp. ?) plus varietals:

(a) ***jnuu***^{L} ***'mɨɨ***^{L} (unmodified) «excrement bean» [FAB *Phaseolus vulgaris*]

(b) ***jnuu***^{L} ***'mɨɨ***^{L} ***tee***^{L} «white excrement bean» [FAB *Phaseolus vulgaris*]

(C) ***jnuu***^{L} ***no***$^{'L}$ «tasty bean» [FAB *Phaseolus vulgaris*] (Sp. *ejotes*?) plus varietals:

(a) ***jnuu***^{L} ***no***$^{'L}$ ***'uí***$^{'M}$ «black tasty bean» [FAB *Phaseolus vulgaris*]

(b) ***jnuu***^{L} ***no***$^{'L}$ ***tee***^{L} ***née***^{M} «yellow white tasty bean» [FAB *Phaseolus vulgaris*]

(D) ***jnuu***^{L} ***rɨ***$^{'H}$ «? bean» [FAB *Phaseolus vulgaris*] (Sp. ?)

(E) ***jnuu***^{L} ***tii***^{L} «thin bean» [FAB *Phaseolus vulgaris*] (Sp. *frijol delgado*) plus varietals:

(a) ***jnuu***^{L} ***tii***^{L} ***'uí***$^{'M}$ «black thin bean» [FAB *Phaseolus vulgaris*]

(b) ***jnuu***^{L} ***tii***^{L} ***'ma***^{L} «bush black thin bean» [FAB *Phaseolus vulgaris*]

(c) ***jnuu***^{L} ***tii***^{L} ***tu***^{L} «chicken thin bean» [FAB *Phaseolus vulgaris*]

(F) ***jnuu***^{L} ***'ua***^{L} «forty-day bean» [FAB *Phaseolus vulgaris*, bush bean] (Sp. *frijol cuarenteno*)

2. ***jnuu***^{L} ***nuu***^{L}

Collections: none

Etymology: /***jnuu***^{L}/ + /***nuu***^{L}/ = «Chinantec proper name for beans» + «wild».

Description: A monotypic generic that corresponds to *Phaseolus coccineus* subsp. *formosus*.

3. ***jnʉʉ***^{L} ***ñi'***^{H}

Collections: none

Etymology: /*jnʉʉ*^{L}/ + /*ñi'*^{H}/ = «Chinantec proper name for beans» + «Spanish».

Description: A monotypic generic that corresponds to FAB *Vicia faba*.

4. ***jnʉʉ***^{L} ***tee***^{L}

Collections: none

Etymology: /*jnʉʉ*^{L}/ + /*tee*^{L}/ = «Chinantec proper name for beans» + «white»

Description: A monotypic generic that corresponds to FAB *Pisum sativum*.

5. – 8. Generics in the *kʷɨ*^{LM} «maize» complex

5. ***kʷɨ***^{LM} «Chinantec proper name for *Zea mays*)»

Collections: EL0061, EL0062, EL0063, EL0064, LH0167, LH0171, LH0172, LH0173, LM0006, LM0007, LM0037, LM0045, LM0046, LM0047, LM0048, RL0093, RL0211, RL0212

A polytypic generic that corresponds to POA *Zea mays*. Grasses, 1 – 3 meters tall; stalks erect and rigid; leaves linear, broad and long; male flowers borne in "tassles" that emerge from the top of the plant; female flowers in "corn cobs" that arise in axils of leaves. Seeds ground and eaten in a variety of ways as a cooked grain; seeds, ground and prepared in *masa*, taken to treat *susto* [black–seeded maize]. Abundantly cultivated in all zones of the communities, but different varieties suited to different climates – black–seeded in temperate humid and cold zones, fire–red and yellow–seeded in the tropical zones, white–seeded in all zones, pinto in temperate and tropical zones. Although this generic is restricted to maize, it has been basis for the creation (through extension) of three additional generics that correspond to introduced species (wheat and sugar cane) plus a wild species said to resemble sugar cane.

Specifics:

(A) ***kʷɨ****ᴸᴹ* ***jɨ****ᴸ* «fire maize» [POA *Zea mays*]

(B) ***kʷɨ****ᴸᴹ* ***née****ᴹ* «yellow maize» [POA *Zea mays*]

(C) ***kʷɨ****ᴸᴹ* ***rosa*** «pinkish maize» [POA *Zea mays*]

(D) ***kʷɨ****ᴸᴹ* ***tee****ᴸ* «white maize» [POA *Zea mays*]

(E) ***kʷɨ****ᴸᴹ* ***'uí'****ᴹ* «black maize» [POA *Zea mays*]

(F) ***kʷɨ****ᴸᴹ* ***'uɸ'****ᴸ* «pinto maize» [POA *Zea mays*]

6. kʷɨᴸᴹ **'iee**ᴸ

Collections: none

Etymology: /***kʷɨ****ᴸᴹ*/ + /***'iee****ᴸ*/ = «Chinantec proper name for maize» + «tender».

Description: A monotypic generic that corresponds to POA *Triticum aestivum*. Grasses, 1 – 3 meters tall; stalks erect and rigid; leaves linear, broad and long; flowers borne in compact terminal spikes. Seeds, ground and kneaded into a dough, used for bread-making. Commonly cultivated in the tropical dry zone.

7. kʷɨᴸᴹ **ñi'**ᴴ (unmodified)

Collections: none

Etymology: /***kʷɨ****ᴸᴹ*/ + /***ñi'****ᴴ*/ = «Chinantec proper name for maize» + «Spanish».

Description: A monotypic generic that corresponds to POA *Saccharum officinale*. Grasses of 3–4 meters, stalks erect and rigid; leaves linear, broad and long; flowers borne in terminal, open inflorescences. Juice of stalks used to make raw sugar, fermented and distilled alcoholic beverages; commonly cultivated in tropical zones. This category may be considered as a large-leaf herb (***moo***^{L} ***kʷɨ***^{LM} ***ñi'***^{H}) or as a tree (***'ma***^{L} ***kʷɨ***^{LM} ***ñi'***^{H}) by some people in Comaltepec.

8. *kʷɨ*^{LM} ***ñi'***^{H} ***nuu***^{L}

Collections: none

Etymology: /*kʷɨ*^{LM}/ + /*ñi'*^{H}/ + /*nuu*^{L}/ = «Chinantec proper name for maize» + «Spanish» + «wild». The genus *Costus*, which contains several wild species, is likened to sugar cane because of its thick, juicy stem.

Description: A monotypic generic that corresponds to COS *Costus ruber*. Erect, twisting herbs of 1–2 meters; stalks rather succulent; leaves ovate; flowers red, borne in terminal compact reddish spikes. Stems, boiled in water, taken to treat dysentery [*Costus*]. Found in the tropical humid zone. This category is considered as a large-leaf herb (***moo***^{L} ***kʷɨ***^{LM} ***ñi'***^{H} ***nuu***^{L}) or as a tree (***'ma***^{L} ***kʷɨ***^{LM} ***ñi'***^{H} ***nuu***^{L}) by some people.

9. – 12. Generics in the ***mó'***^{L} «squashes and gourds» complex

s/n. *mó'*^{L} «squashes and gourds».

Collections: LM0039, LM0043, LM0044

4 generics, 3 specifics. A category that corresponds to CUC *Cucurbita* and *Lagenaria*?. Scandent herbaceous vines, often covered with bristly hairs; leaves lobed, alternate; flowers yellow, up to 10 cms. long; fruits large and fleshy, containing numerous flat seeds that are cream–white or black. Fruits, boiled in sugar water, eaten as a sweet dessert; seeds eaten, roasted with salt peeled and cooked with

sugar; vegetative shoots are boiled and eaten as a *quelite*. Commonly cultivated in dry areas – ***mó'^{L} k^{w}eá^{L}*** is especially suited to cold zones, the three varieties of ***mó'^{L} jii^{LH}*** to the temperate dry zone, and ***mó'^{L} tóo^{LM}*** to the tropical dry zone. Apparently restricted to cultivated squashes, of which there are four species in the Sierra. All of these categories may be considered as belonging to the life-form ***má'^{H}*** (small-leaf) by some informants.

9. *mó'^{L} jii^{LH}*

Collections: none

Etymology: */mó'^{L}/* + */jii^{LH}/* = «Chinantec proper name for squash» + «root?»

Description: A polytypic generic that corresponds to CUC *Cucurbita* ?

Specifics:

(A) ***mó'^{L} jii^{LH} jlɨɨ'^{LH}*** «thin-shelled tuberous squash» [CUC *Cucurbita*] eaten with the skin and all.

(B) ***mó'^{L} jii^{LH} síi^{H}*** «striped tuberous squash» [CUC *Cucurbita*]

(C) ***mó'^{L} jii^{LH} 'ue'^{L}*** «thick-shelled tuberous squash» [CUC *Cucurbita*]

10. *mó'^{L} k^{w}eá^{L}*

Collections: none

Etymology: */mó'^{L}/* + */k^{w}eá^{L}/* = «Chinantec proper name for squash» + «horse».

Description: A monotypic generic that corresponds to CUC *Cucurbita ficifolia*.

11. *mó'^{L} kuma'*

Collections: none

Etymology: */mó'^{L}/* + */kuma'/* = «Chinantec proper name for squash» + «Chinantec proper name for *Lagenaria* gourd?».

Description: A monotypic generic that corresponds to CUC *Lagenaria*?

12. ***mó***$^{'L}$ ***tóo̱***^{LM}

Collections: none

Etymology: /*mó*$^{'L}$/ + /*tóo̱*^{LM}/ = «Chinantec proper name for squash» + «thorn».

Description: A monotypic generic that corresponds to CUC *Cucurbita* ?

Unaffiliated generics included in the ***jii***^{L} **«root, tuber» category**

jii^{L} «root, tuber» is a classifying term that cuts across the other life–forms. It typically forms one component, in combination with life–form classifiers such as *'oo*^{L} or ***huɨ̱ɨ̱***^{L}, of the name of plants with large or useful tubers. Plants herbaceous, of small to medium stature (up to 2 meters), flowers present but not particularly showy, rootstock usually large. Edible (roots/cooked), medicinal (roots/various conditions), material (roots/hygiene). Found in all ecological zones, edibles in cultivated zones, medicinals most common in dry tropical and temperate areas. Although *jii*^{L} is usually used in combination with a life–form term, the following polytypic generic is unaffiliated.

13. ***jii***^{L} ***jmé***$^{'L}$

Collections: LM0205, LM0243, RL0209

Etymology: /*jii*^{L}/ + /*jmé*$^{'L}$/ = «root» + «odor».

Description: A polytypic generic that corresponds to LIL *Allium* ?. Erect herbs, strongly–scented; «root» (corm) white, succulent; leaves green, tubular, grass–like; flowers white, 1 cm. wide. Occasionally cultivated in dry zones, commonly sold in village stores, brought from the Oaxaca Valley or the Gulf Lowlands, occasionally growing wild in temperate zones. «Roots», roasted over a fire, eaten as a vegetable and given to children to treat colic; «roots» used as a fresh or cooked condiment in many dishes; leaves eaten raw to accompany beans. Sometimes cross-classified as ***lí'^H jiı̈^L jmé'^L***. Restricted to garlic and onions.

Specifics:

(A) ***jiı̈^L jmé'^L*** (unmodified) «odor root» [LIL *Allium* (native spp.?]

(B) ***jiı̈^L jmé'^L ajo*** «garlic odor root» [LIL *Allium sativum*]

(C) ***jiı̈^L jmé'^L ñiı̈^L*** «grass odor root» [LIL *Allium cepa*?]

Unaffiliated Generics with Chinantec Names

14. *bǿǿ^LH tó̲o̲^LM*

Collections: none

Etymology: */bǿǿ^LH/* + */tó̲o̲^LM/* = «ball» + «spine».

Description: A monotypic generic that corresponds to CAC *Mammilaria*.

15. *melée^MH*

Collections: LH0217, LH0279, LM0085

Etymology: */lı̈^H/* + */melée^MH/* = «flower» + «Chinantec proper name for bromeliads».

Description: A polytypic generic that refers to BML *Tillandsia*. Epiphytic, agave-like plants; leaves leathery, maguey or grass-like, arranged spirally in a basal rosette; flowers of diverse colors, subtended by brightly colored red to red-orange bracts, the entire flower cluster borne on a stem that emerges from the center of the plants; fruit a dry brown capsule. Whole plant used for adornment of church and home altars. Occasional in all zones. Probably includes all epiphytic bromeliads, especially the more than ten species of *Tillandsia* that grow in the Sierra. Often referred to as ***lı̈^H melée^MH*** «bromeliad flower».

Specifics:

(A) ***melée***^{M}***H*** «(unmodified) bromeliad» [BML *Tillandsia*]

(B) ***melée***$^{MH\ niL}$ «thin bromeliad» [BML *Tillandsia*]

(C) ***melée***^{MH} ***tóo***^{LM} «thorny bromeliad» [BML *Tillandsia*]

16. *see*^{L}

Collections: EL0075, EL0134, RL0207, RL0370

Etymology: /*see*^{L}/ = «Chinantec proper name for CMM».

Description: A polytypic generic that corresponds to Commelinaceae. Scandent herbs of 3 – 4 dms.; leaves ovate, fleshy, the leaf base clasping the stem; flowers white to purple, composed of three quickly wilting petals. Medicinal, has cooling effect, used for calor interno and for urinary tract problems. Common in primary and secondary vegetation of the humid zones. Commonly classified as ***see***^{L}, without an accompanying life form classifier. Apparently restricted to Commelinaceae, a family that contains more than 12 genera and some 30 species in the Sierra. ***see***^{L} ***lí***^{H} is the medicinal type; similar to ***'oo***^{L} ***g***^{w}***í***^{L} «fresh herb». Often referred to as ***lí***^{H} ***see***^{L} «CMM flower».

Specifics:

(A) ***see***^{L} (unmodified) «CMM» [CMM]

(B) ***see***^{L} ***moo***^{L} «large-leaved CMM» [CMM]

17. *seeL*

Collections: LH0117, LM0020, LM0106, LM0165

Etymology: /*see*^{L}/ = «Chinantec proper name for mints and oregano».

Description: A polytypic generic that corresponds to LAM *Mentha*, *Origanum* and other genera. Erect herbs, aromatic; leaves deep green, opposite; flowers apparently lacking. Branchlets, prepared in tea, used to treat stomach ache and empacho; branchlets used as condiment in cooking [both *Mentha*]. Considered to be a hot plant. Commonly cultivated in home gardens of Comaltepec, in the temperate dry zone. Usually referred to as ***see***^{L}, with the life form classifier ***'oo***^{L} being optional. The focal member is *Mentha* sp., cultivated spearmint, but the category extends to other aromatic, medicinal Lamiaceae that are also often used for condiment.

Specifics:

(A) ***see***^{L} ***kiá***$^{'M}$ ***ngúu***^{LM} «condiment for meat» [LAM *Mentha* sp.] (= Spanish proper name *hierba buena*»

(B) ***see***^{L} ***kiá***$^{'M}$ ***tu***^{L}***yʉ***^{LH} «condiment for chicken» [LAM *Origanum*]

(C) ***see***^{L} ***'ma***^{L} ***oregano*** «oregano condiment tree» [probably oregano-scented LAM *Solenostemon* sp.] used to flavor chicken, *tamales*, cultivated in Soyalapam. The qualifier ***'ma***^{L} «tree» is probably used metaphorically to indicate that *Solenostemon* is a larger, more robust plant than *Origanum*.

18. *ta*^{L}

Collections: LH0064, RL0177, SH0023b

Etymology: ***/taL/*** = «Chinantec proper name for cane (*Arundo donax*)».

Description: A monotypic generic that corresponds to POA *Arundo donax*. Erect grasses, 2 – 4 meters; stems 4– 5 cm wide and rigid; leaves long and narrow; flowers and fruits apparently absent. Stems used in house construction and basket-making; vegetative shoots, boiled in water, used as a post-partum bath. Commonly protected in temperate and tropical zones.

19. *tee*^{M}

Collections: LH0199, SH0064b, SH0116a

Etymology: */'ma^{L}/* + */tee^{M}/* = «tree» + «Chinantec proper name for *Satureja*».

Description: A monotypic generic that corresponds to LAM *Satureja*. Shrubs of 1 – 3 meters; much branched, stems slender; leaves small, lanceolate, strongly scented; flowers red. Leaves taken in tea to relieve stomach ache, hangover. Occasional in temperate and cold dry zones.

20. *tóo*^{LM} *fɨ*$^{'L}$

Collections: LH0186, LH0280, LM0027, LM0028, LM0115, LM0191, RL0164

Etymology: */tóo^{LM}/* + */fɨ$^{'L}$/* = «thorn» + «Chinantec proper name for rasberries and blackberies»

Description: A polytypic generic that corresponds to ROS *Rubus*, blackberries and rasberries. Subshrubs of 1 – 2 meter canes, sparsely to densely covered with sharp spines; leaves often serrate and deeply lobed; flowers white; fruits, red to purple–black, sour to sweet, composed of numerous small lobes each containing a seed. Fruits, available in spring and summer, eaten raw, or made into beverage with water; juice of the leaves used rinse mouth to relieve canker sores; leaves, boiled in tea, applied to skin abscesses. Common in secondary vegetation of the dry temperate zone, often cultivated in home gardens. Sometimes called *'ma*^{L} *fɨ*$^{'L}$, «blackberry tree» or cross–classified as *'ma*^{L} *tóo*^{LM}. The category is apparently extended to include all Sierra Norte *Rubus*, including approximately 6 native species and several introduced cultivars. Most blackberries are referred to as *tóo*^{LM} *fɨ*$^{'L}$ (unmodified) «blackberry thorn», but two salient varieties are recognized.

Specifics:

(A) ***tóo***^{LM} ***fɨ́'***^{L} ***kʷóo'***^{LH} «uneven (toothless) blackberry thorn» [ROS *Rubus*]; this specific refers to blackberry species having fruits in which some drupes are dried out, and some are fleshy.

(B) ***tóo***^{LM} ***fɨ́'***^{L} ***'úu***^{LM} «rounded-dish blackberry thorn»; [ROS *Rubus*] this specific refers to blackberries having particularly rounded fruits.

21. *'uø'*^{LM}

Collections: LH0274

Etymology: */'uø'*^{LM}/ = «vine» + «Chinantec proper name for poison ivy».

Description: A monotypic generic that corresponds to ANA *Toxicodendron radicans*. Herbaceous vines of 0.5 – 1 meter, often climbing on rocks; leaves compound, divided into three serrate leaflet, resinous, green but often tinged with red; flowers small, yellowish-white, grouped into loose axillary clusters; fruit a cream-white berry. Whole plant recognized as causing a rash in allergic people. Frequent in dry zones. Although this is a vine it is always referred to as *'uø'*^{LM}, without an accompanying life form classifier.

Unaffiliated Generics with Spanish Names

22. *anís*

Collections: LH0098, RL0006

Etymology: */anís/* = «Spanish proper name for anise (Sp. *anís*)».

Description: A monotypic generic that corresponds to AST *Tagetes micrantha*. Erect herbs of 1 – 2 dms., anise-scented; leaves divided into numerous fine segments; flowers white, grouped into dense, composite heads. Branchlets, prepared in tea and often sweetened with sugar, used for stomach ache. Common in temperate zones. Sometimes classified as ***anís nuu***^{L}, which might indicate that this is a polytypic generic composed of cultivated anise [API] and weedy anise-scented *Tagetes*. Apparently restricted to a few anise-scented species of *Tagetes*, but excluding *Tagetes lucida*.

23. *celedonia*

Collections: LH0073, LM0144

Etymology: ***/celedonia/*** = «Spanish proper name for calendula (Sp. *celedonia*)».

Description: A monotypic generic that corresponds to *Calendula officinalis*. Erect herbs; leaves oblong, forming a basal rosette; flowers yellow–orange, grouped into dense composite heads that emerge from the center of the plant. Juice of the plant placed on skin wounds to prevent infection and promote healing. Commonly cultivated in home gardens of the temperate dry zone. When used as an altar ornamental, classified as ***lí***^{H} ***'iée***^{L}. Apparently restricted to *Calendula officinalis*, a medicinal plant commonly sold in Oaxaca Valley markets.

24. *estafiate*

Collections: LH0021

Etymology: ***/estafiate/*** = «Spanish proper name for *Artemisia mexicana* (Sp. *estafiate*)».

Description: A monotypic generic that corresponds to AST *Artemisia mexicana*? Erect herbs of 2 – 3 dms.; leaves grayish–green; flowers ?. Branchlets, prepared as tea in combination with guava, taken to treat diarrhea, vomiting and intestinal parasites. Occasionally cultivated in home gardens of the temperate dry zone.

Apparently restricted to *Artemisia mexicana*, a medicinal herb commonly sold in markets of the Oaxaca Valley.

25. ***fresa***

Collections: none

Etymology: */fresa/* = «Spanish proper name for strawberry (Sp. *fresa*)».

Description: A polytypic generic that corresponds to ROS *Fragaria*. An herb of 10 cms. with trifoliate leaves, white flowers and red fruits. Fruits eaten raw; sometimes found in markets of Oaxaca valley. Cultivated in temperate zones.

Specifics:

(A) ***fresa*** (unmodified) «strawberry» [ROS *Fragaria* sp. (cultivated)]

(B) ***fresa nuu***^{L} «wild strawberry» [ROS *Fragaria* sp.?]

26. ***golondrina***

Collections: LH0041

Etymology: */golondrina/* = «Spanish proper name for some herbaceous spurges (Sp. *golondrina*).

Description: A monotypic generic that corresponds to EUP *Euphorbia*. Erect herbs of 1 – 2 dms.; sap milky; leaves minute; flowers minute, greenish–white. Sap placed on skin to treat abscesses. Occasional in tropical dry zone. Apparently restricted to several small species of *Euphorbia* and *Chamaesyce*.

27. ***gordolobo***

Collections: LH0084

Etymology: */gordolobo/* = «Spanish proper name for some *Gnaphalium* (Sp. *gordolobo*).

Description: A monotypic generic that corresponds to AST *Gnaphalium*. Erect herbs of 2 – 3 dms.; leave lanceolate, covered with cottony hairs; flowers cream white, grouped in dense terminal composite heads. Branchlets, prepared in tea with lemon juice, *Bougainvillea* flowers, Sambucus flowers, raw sugar, cinnamon and honey, taken for coughs. Occasional in the tropical dry zone. Restricted to several species of *Gnaphalium*.

28. ***pernecida***

Collections: none

Etymology: /*pernecida*/ = «Spanish proper name for ?»

Description: not collected, apparently medicinal.

29. ***ruda***

Collections: LH0016, LM0024, LM0124, LM0125, RL0161, RL0261

Etymology: /*ruda*/ = «Spanish proper name for rue (Sp. ***ruda***)».

Description: A monotypic unaffiliated generic that corresponds to RUT *Ruta chalapensis*. Erect herbs, strongly aromatic; leaves deeply divided into numerous narrow segments, alternate; flowers composed of 5 yellow, curled petals. Branchlets, boiled in water, taken for muscle aches, intestinal pain and general debility; juice of the branchlets taken for stomach ache; branchlets, crushed and mixed with cane alcohol, rubbed on the arms to improve blood circulation. Abundantly cultivated in home gardens of tropical and temperate zones. Apparently restricted to *Ruta chalapensis*, an introduced medicinal herb.

XII. ***ñɨɨ***^{LM} «mushrooms»

A small life–form that corresponds to mushrooms. Erect fleshy–bodied plants that emerge from decaying trees or from the soil; leaves and flowers absent. Sometimes edible (whole plant/cooked). Found in all ecological zones, most abundant in humid zones.

I recognize 14 generics in the mushroom category (table 6.12). 8 generics are monotypic (57.1% of the total); 6 generics (42.9%) are further subdivided into a total of 13 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	8	5	1	0	0	0	0	0	0	0	0	0

Totals: 14 generics, 13 specifics, 0 varietals

Table 6.12. Distribution of specifics in the life-form *ñɨɨ*^{LM} «mushrooms».

No collections were made of mushrooms during this phase of the research, but the following names were detected in free-listing exercises with Chinantec speakers from Comaltepec:

1. ***nɨ́ɨ*^{LM} *dsea*^{L} *jiuung*^{LH}** «God-people mushroom»

2. ***nɨ́ɨ*^{LM} *dsi*$^{'H}$ *g*^{w}*ii*^{LH}** «squirrel ? mushroom»

3. ***nɨ́ɨ*^{LM} *dsii*$^{'LH}$** «? mushroom», possibly including 2 specifics

    (A) ***nɨ́ɨ*^{LM} *dsii*$^{'LH}$** (unmodified) «? mushroom»

    (B) ***nɨ́ɨ*^{LM} *dsii*$^{'LH}$ *gíi*$^{'M}$** «poisonous ? mushroom»

4. ***nɨ́ɨ*^{LM} *jníi*$^{'LM}$** «cloud mushroom»

5. ***nɨ́ɨ*^{LM} *jnʉʉ*^{LH}** «? mushroom», possibly including 2 specifics

    (A) ***nɨ́ɨ*^{LM} *jnʉʉ*^{LH}** (unmodified) «? mushroom»

    (B) ***nɨ́ɨ*^{LM} *jnʉʉ*^{LH} *gíi*$^{'M}$** «poisonous ? mushroom»

6. ***nɨ́ɨ*^{LM} *k*^{w}*eá*$^{'H}$** «animal mushroom», possibly including 3 specifics

(A) ***nɨ́ɨ***^{LM} ***k***^{w}***eá***$^{'H}$ $^{gíi M}$ «poisonous animal mushroom»

(B) ***nɨ́ɨ***^{LM} ***k***^{w}***eá***$^{'H}$ ***née***^{M} «yellow animal mushroom»

(C) ***nɨ́ɨ***^{LM} ***k***^{w}***eá***$^{'H}$ ***yúu***^{M} «red animal mushroom»

7. ***nɨ́ɨ***^{LM} ***log***^{w}***a***^{LH} ***dsearɨ***$^{'H}$ «river?–*duende* mushroom»

8. ***nɨ́ɨ***^{LM} ***'maje***^{LH} «*Heliocarpus*–tree mushroom»

9. ***nɨ́ɨ***^{LM} ***née***^{LH} «net mushroom», possibly including 2 specifics

(A) ***nɨ́ɨ***^{LM} ***née***^{LH} (unmodified) «net mushroom»

(B) ***nɨ́ɨ***^{LM} ***née***^{LH} ***gíi***^{M} «poisonous net mushroom»

10. ***nɨ́ɨ***^{LM} ***sea***^{L} ***dse***$^{'L}$ ***'ma***^{L} «epiphytic mushroom», probably a descriptive residual category.

11. ***nɨ́ɨ***^{LM} ***sɨ́ɨ***^{LH} «? mushroom», possibly including 2 specifics

(A) ***nɨ́ɨ***^{LM} ***sɨ́ɨ***^{LH} (unmodified) «? mushroom»

(B) ***nɨ́ɨ***^{LM} ***sɨ́ɨ***^{LH} ***gíi***^{M} «poisonous ? mushroom»

12. ***nɨ́ɨ***^{LM} ***tɨ́ɨ***^{M} ***ta***^{LM} «bird foot mushroom»

13. ***nɨ́ɨ***^{LM} ***tú***^{H} «chicken mushroom»

14. ***nɨ́ɨ***^{LM} ***'úu***^{L} «chile mushroom», possibly including 2 specifics

(A) ***nɨ́ɨ***^{LM} ***'úu***^{L} (unmodified) «chile mushroom»

(B) ***nɨ́ɨ***^{LM} ***'úu***^{L} ***gíi***^{M} «poisonous chile mushroom»

7. Totontepec Mixe plant classification

I. *kup* «tree»

A large and diverse life from that primarily corresponds to shrubs and trees, but also includes some herbaceous and succulent plants. Erect plants, usually woody, and of relatively large stature, usually greater than 2 meters tall. Utilized in diverse ways – the wood is commonly used for construction and fuel; the bark is used as a rope-like fiber; the fruits are eaten raw or cooked; leaves and bark occasionally medicinal; whole plant used as a 'living' fence. Common in all ecological zones of the community, ranging from predominant in the humid temperate and tropical zones to sparse in the dry tropical zone.

I recognize 159 generics in the tree category (table 7.1). 76 generics are monotypic (47.8% of the total); 83 generics (52.2%) are further subdivided into 205 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	76	57	20	4	0	1	0	0	1	0	0	0
Totals: 159 generics, 205 specifics, 0 varietals												

Table 7.1. Distribution of specifics in the life-form *kup* «tree».

1. *aaydum*

Collections: ES0021, ES0269, EV0052, JR0149, JR0267, WR0006

Etymology: */aaydum/* = «Mixe proper name for anonas». The suffix «*dum*» is found in other names of fruits (*jaamdum*, *kooydum*) and flowers (*maaydum*) that are round in shape; it may be derived from a term meaning «rounded object». This name is a cognate of the reconstructed protoMixe-Zoque term for annona is **(y)a·ti(n)*

(Kaufmann and Campbell 1967:87).

Description: A polytypic generic that corresponds to ANN *Annona cherimola* and other species of this genus of tropical trees that are widely cultivated for their edible fruits. Trees of 10 – 20 meters; leaves broadly ovate, entire, alternate; flowers aromatic, cream–white and axillary; fruits green, containing a sweet, white pulp and numerous black, shiny seeds. The fruit is eaten raw; the leaves are prepared with cebo lard and placed on the chest and throat for coughs and laryngitis; the peel of the fruit is prepared in tea for throat problems. Cultivated in home gardens of the communities, in temperate or hot climates. Called ***xeenk*** in the dialects of Amatepec, Tepitongo and Chinantequilla. Wild species of Annonaceae are classified under *yukaaydum*.

Specifics:

(A) ***aaydum*** (unmodified) «annona» [ANN *Annona cherimola*]. This form is found in the temperate zone, the fruit is smooth.

(B) ***tsa aaydum*** «stone annona» [ANN *Annona* sp.]. The form is found in the hot zone, the fruit is rather bumpy.

2. *achoot*

Collections: none

Etymology: */achoot/* = «Mixe–modified Spanish proper name for *Bixa orellana*».

Description: A monotypic generic that corresponds to BIX *Bixa orellana*, a tropical American shrub that is often use as a living fence or as a source for red dye. Shrubs of 2 – 3 meters; leaves simple, entire, cordate and palmately–veined; flowers regular, showy, white and grouped in terminal paniculate inflorescences; fruits dark red, rather prickly, containing numerous seeds, each covered by a bright red testa. The testa was formerly used to color food, especially the thick chile sauce known by the Spanish name amarillo. Formerly cultivated in some lowland parts of Totontepec; now brought from the nearby town of Comaltepec, where it is found in disturbed areas and secondary forests of the hot zone.

3. *aj*

Collections: none

Etymology: */aj/* = «Mixe proper name for Mexican mahogany and hardwood cedars».

Description: A polytypic generic that corresponds to MEL *Cedrela* and *Swietenia*, and perhaps *Guarea* and *Trichilia*. Trees of 20 - 30 meters; leaves alternate, large and pinnately-compound; flowers regular and cream-white, borne in axillary cymose inflorescences; fruit a capsule?. The wood is used for house and furniture construction, and is sold on a small scale in the lowland ranches. The trees are felled in a specific way – the roots are uncovered and cut, and the bark is removed from the still-standing tree to prevent sprouting; after one year of drying the tree is cut down, but always during a full? moon, said to decrease the future insect damage to the wood. Found in the primary forests of the temperate and hot zones. The difference between male and female individuals of these dioecious trees is recognized by Mixe speakers, but fruit-bearing trees are considered to be male.

Specifics:

(A) ***poo'p aj*** «white cedar» [MEL *Cedrela* sp.?]. This form is found in the hot zone.

(B) ***tsa aj*** «stone cedar» [MEL *Swietenia* sp.?]. This form is found in temperate zones, is used as cross beams in house construction, and is also known by the Spanish name *caoba*.

(C) ***tsapts aj*** «red cedar» [MEL *Cedrela* sp.?]. This form is found in hot zone.

4. *aja'apuj*

Collections: JR0348, JR0830

Etymology: */aja'a/* + */puj/* = «Mixe proper name for *Plumeria*» + «flower».

Description: A polytypic generic that corresponds to APO *Plumeria*, a genus of shrubs native to Mexico and Central America that is used ritually and ornamentally in tropical areas throughout the world. Shrubs and small trees of 2 – 4 meters that contain a copious amount of white latex; stems thickened; leaves elliptical and entire, arranged spirally around stems; flowers regular, fragrant, yellow, white or pink; stems and leaves exuding a sticky, white latex when cut. The stems, split and heated, are placed on joints to relieve rheumatism; the latex is placed on skin wounds; flowers used as adornment. Found in mature forests of the temperate and hot zone.

Specifics:

(A) ***poo'p aja'apuj*** «white *Plumeria* flower» [APO *Plumeria*]

(B) ***yak aja'apuj*** «black *Plumeria* flower» [APO *Plumeria*]

5. *akaa'y*

Collections: JR0247b, JR0270, JR0780

Etymology: */akaa'y/* = «Mixe proper name for some *Befaria* and *Weinmannia* species». The name may be derived from the method of drying or preparing the wood of this shrub.

Description: A polytypic generic that corresponds to CUN *Weinmannia tuerckheimii* and ERI *Befaria* sp. Glabrous, resinous shrubs of 1 – 2 meters with reddish bark or trees of 10 – 15 meters; leaves evergreen and lanceolate; flowers showy, white, grouped in terminal inflorescences; fruits green and capsular. Wood of the white form, burned in underground ovens to make charcoal; wood of the black form used for house cornerposts; wood of both used as fuel; flowers of the white form used ornamentally. Frequent in the shrub vegetation of the cold and temperate zone. The specifics are apparently distinguished by the color of the bark; the white form has reddish bark, while the black form has dark grey bark.

Specifics:

(A) ***po̲o̲'p akaa'y*** «white ***akaa'y***» [ERI *Befaria* sp.]

(B) ***ya̲k akaa'y*** «black ***akaa'y***» [CUN *Weinmannia tuerkheimii*]

6. ***alcanfor ku̲p***

Collections: none

Etymology: */alcanfor/* + */ku̲p/* = «camphor tree». *Alcanfor* is a Spanish word for camphor, a general term used for strongly scented trees and herbs of diverse parts of the world, particularly LAU *Cinnamomum camphora*, an Asian tree whose wood is used for cabinet making, and from which camphor, a moth repellent, was formerly distilled (Mabberly 1987:126–127).

Description: A monotypic generic that corresponds to MRT *Eucalyptus* spp., an Australian tree which is widely cultivated in Mexico and is used medicinally, primarily for respiratory problems. Trees of 10 – 20 meters with light brown bark that peels off in large pieces; leaves light green, lanceolate, and strongly aromatic; flowers white, containing numerous filamentous stamens on a dark green receptacle;

fruit a resinous, greenish–white capsule. Leaves taken in tea for colds? Occasionally cultivated in villages of the temperate zone.

7. *alivia kup*

Collections: JR0443, JR0729

Etymology: ***/alivia/*** + ***/kup/*** = «Spanish name for alleviate» + «tree». The name apparently referring to the medicinal properties of this tree.

Description: A monotypic generic that corresponds to WIN *Drimys granadensis* var. *mexicana*, a common tree of the Mesoamerican cloud forest that is used widely as a medicine. Trees of 10 – 20 meters, somewhat aromatic; leaves arranged spirally around stem, lanceolate and leathery, dark green above and whitish beneath; flowers white, regular, grouped into terminal cymose inflorescences; fruit a green berry. Bark, placed in aguardiente for fifteen days (for adults) or boiled with coffee (for children), taken to treat stomach ache. A tree of primary forests in the cold zone.

8. *almendras kup*

Collections: JR0440, JR0721

Etymology: ***/almendras/*** + ***/kup/*** = «Spanish proper name for almonds» + «tree». *Almendras* is the Spanish name for almonds, and usually refers to the nut–like seeds of ROS *Prunus dulcis*; in Mexico the name often refers to the fruits of CMB *Terminalia cattapa*, a Malaysian tree naturalized in many humid tropical zones. The fruits of this cloud forest tree are drupaceous, and resemble tropical Mexican almendras.

Description: A polytypic generic that corresponds to TIC *Ticodendron incognitum*, a recently described family and genus of cloud forest trees. Trees of 20 – 30 meters;

leaves alternate, ovate and entire; flowers inconspicuous, cream–white; fruit a greenish, mucilaginous drupe. The wood is used as beams in house construction, and also used as fuel, said to burn as well as oakwood. The tree is native to primary cloud forests in cold country.

Specifics:

(A) ***poo'p almendras kup*** «white almond tree» [TIC *Ticodendron incognitum*], a specifics with whitish–gray bark and somewhat glaucous leaves.

(B) ***yak almendras kup*** «black almond tree» [TIC *Ticodendron incognitum*], a specific with blackish–gray bark and green leaves.

9. ***apyajpuk***

Collections: JR0290, JR0441, JR0616, WR0090

Etymology: */aajy/* + */pajpuk/* = «leaf» + «juniper». */pajpuk/* is the name for *Juniperus* spp., and the name for this generic probably refers to the fact that the wood of these trees resembles juniper timber.

Description: A polytypic generic that corresponds to THE *Cleyera*?. Evergreen trees of 10 – 15 meters; leaves alternate, simple, smooth leaves; flowers regular, white, clustered along the stem; fruit green. The wood is used in house construction. Found in primary forests of the cold zone.

Specifics:

(A) ***poo'p apyajpuk*** «white juniper–leaf» [THE *Cleyera*?]

(B) ***yak apyajpuk*** «black juniper–leaf» [THE *Cleyera*?]

10. ***apya'ajk***

Collections: ES0002, ES0118, ES0134, JR0014, JR0187, JR0213, JR0875, JR1169, WR0039, WR0063

Etymology: */aajy/* + */pa'ajk/* = «leaf» + «sweet». ***pa'ajk***, the Mixe term for brown sugar, is used generally as an adjective to denote sweet flavor or smell. This generic corresponds to a plant with resinous, rather sweet-smelling foliage.

Description: A polytypic generic that has as its focal member a shrubby, resinous species of AST *Stevia*; the category is extended to other Compositae such as *Desmanthodium tomentosum*, and perhaps some *Verbesina*. Shrubs of 0.5 - 2 meters with aromatic and resinous stems; leaves opposite, simple, elliptic, serrate; flowers grouped into dense terminal clusters, cream-white to purple. Leaves, prepared in tea, used for coughs and abdominal cramps; heated over a fire and placed on the waist and lower back to ease childbirth, or to relieve backache; combined with other plants and moistened with *aguardiente*, placed on the soles of the feet to reduce fever or tied around head to relieve headache; flowers, dried and prepared in tea, used to stimulate appetite. Abundant in the shrub vegetation in the temperate and cold zone.

Specifics:

(A) ***poo'p apya'ajk*** «white sweet-leaf» [AST *Stevia*, *Verbesina*, *Desmanthodium tomentosum*]. This form is used medicinally.

(B) ***tsapts apya'ajk*** «red sweet-leaf» [AST *Stevia*]. This form is not considered useful.

11. ***apyok***

Collections: JR0438

Etymology: */aajy/* + */pok/* = «leaf» + «*Lageneria*-gourd». The name probably refers to the large, rigid and cup-shaped leaves.

Description: A polytypic generic that corresponds to BIG. Trees of 20 – 30 meters; leaves smooth, greenish above and cream–white below. The tree is planted or left to shade coffee plantations; the wood, which is said to decay rapidly, is apparently not used. A primary forest tree of all climatic cold zones.

Specifics:

(A) ***poo'p apyok*** «white gourd–leaf» [BIG ?]

(B) ***yak apyok*** «black gourd–leaf» [BIG ?]

12. ***atsits***

Collections: ES0038, ES0127, JR0054, JR0061, JR0460, JR0884, JR0909

Etymology: ***/atsits/*** = «Mixe proper name for some blueberries». In Schoenhals & Schoenhals dictionary, there are two possible cognates: ***/atsii'ts/*** = «plug, top» or ***/atsi'it/*** = «button» (used as both a verb and noun). There may be a link between the rounded fruits and buttons or plugs.

Description: A polytypic generic that corresponds to ERI *Gaultheria acuminata*, and perhaps dome of the other species that bear non–pubescent fruit. Shrubs of one meter; leaves alternate, leathery, greenish–white above and glaucous below, sometimes with a slight wintergreen smell; flowers white, urn–shaped; fruit a dark–purple, glabrous berry. The fruits are eaten raw; and the wood of bushes cleared from cultivated fields is used as fuel. A common shrub found in secondary vegetation of the temperate and cold zone.

Specifics:

(A) ***poo'p atsits*** «white ***atsits***» [ERI *Gaultheria*]

(B) ***tsapts atsits*** «red ***atsits***» [ERI *Gaultheria*]

13. ***atya'ajts***

Collections: ES0286, EV0040, JR0495, JR0499, JR0583, JR0600, WR0024

Etymology: */aajy/* + */ta'ajts/* + */kup/* = «leaf» + «dry,thin» + «tree». The name probably refers to the shape or thickness of leaves.

Description: A polytypic generic that corresponds to timber trees that have glossy leaves, possibly including JUG *Oreomunnea*, ROS *Prunus* and various Lauraceae. Trees of 20 – 30 meters with rough bark; leaves green leaves, simple or compound; flowers cream-white; fruits green. The wood in used in furniture making and in house construction, particularly as crossbeams. Found in primary forests of temperate and cold zones.

Specifics:

(A) ***poo'p atya'ats*** «white dry-leaf [LAU]

(B) ***tsapts atya'ajts*** «red dry-leaf» [JUG *Oreomunnea*, ROS *Prunus* ?]

(C) ***yak atya'ajts*** «black dry-leaf» [LAU *Persea*]

14. ***atyu'kx***

Collections: JR0175, JR0258, JR0463, JR0676, JR0812, JR0868, JR1056, JR1165, JR1248, JR1259

Etymology: */aajy/* + */tu'kx/* = «leaf» + «smooth,watery». The name refers to the glabrous leaves of the flowering shrubs included in this generic. Schoenhals & Schoenhals also define */tu'kx/* as «to give birth» (1965:110) but this apparently does not relate to the name of this generic.

Description: A polytypic generic that corresponds to showy flowering shrubs including ACA *Odontonema callistachyum*, ONA *Fuchsia paniculata*, RUB

Palicourea macrantha, *P. padifolia*, and a red-flowered SOL *Cestrum*. Shrubs or small trees; leaves glabrous, simple and entire; flowers in terminal showy inflorescences, purple, red or yellow; fruits usually a purple drupe or berry. Wood used as fuel; considered to be of good quality [RUB]; flowers used ornamentally on the *día de muertos*. Found in secondary shrubby vegetation and primary forests in the cold, temperate or hot zone.

Specifics:

(A) ***poo'p atyu'kx*** «white smooth-leaf» [ONA *Fuchsia paniculata*, RUB *Palicourea macrantha*]

(B) ***yak atyu'kx*** «black smooth-leaf» [ONA *Fuchsia paniculata*]

(C) ***yukatyu'kx*** «wild smooth-leaf» [SOL *Cestrum*]

15. *avacha'am*

Collections: ES0088, JR0591

Etymology: ***/avacha'am/*** = «Mixe proper name for some blueberries». The name may be derived from ***/aaj/*** + ***/vaajy/*** + ***/tsa'am/*** = «mouth» + «hair» + «ripe(fruit)», apparently referring to the pubescent edible fruits of this shrub.

Description: A polytypic generic that corresponds to ERI *Gaultheria trichocalycina*. Shrubs of 1 meter; leaves leathery, alternate and pubescent; flowers pinkish-red, the corolla covered with glandular hairs; fruit a purple-black, pubescent berry . Fruits eaten raw; fruits also observed to be consumed by birds. Common in secondary shrub growth of the cold zone.

Specifics:

(A) ***poo'p avacha'am*** «white beard-berry» [ERI *Gaultheria trichocalycina*]

(B) ***tsapts avacha'am*** «red beard-berry» [ERI *Gaultheria trichocalycina*]

16. ***axyeen***

Collections: ES0012, EV0071, EV0146, EV0239, JR0146, JR0764, WR0071

Etymology: */aajy/* + */xeen/* = «leaf twins». It is unclear what of the leaf morphology suggests twins.

Description: A polytypic generic that corresponds to EUP *Ricinus communis*, an old world shrub that is cultivated and naturalized in many parts of the tropics. Shrubs of 2 – 4 meters; leaves alternate palmately-lobed, reddish-green; flowers yellow; fruit a rounded, spiny capsule that yields oily seeds. The leaves of the white form are prepared with lard, oil or aguardiente and used to lower fevers, the leaves are applied to the body or wrapped around feet, often to hold a mixture of herbs, combined with SOL *Cestrum nocturnum* and placed on back, or placed on chest; the oil of the seeds of the red form was formerly extracted and burned in the church. Semi-cultivated in and around human settlements in the temperate and hot zones of the municipality.

Specifics:

(A) ***poo'p axyeen*** «white twin-leaf» [EUP *Ricinus communis*]

(B) ***tsapts axyeen*** «red twin-leaf» [EUP *Ricinus communis*]

17. ***ákux***

Collections: JR0349, JR1220

Etymology: */ákux/* = «Mixe proper name for some forest hardwood trees».

Description: A polytypic generic that corresponds to one genus of LAU, as yet unidentified. Trees of 20 – 30 meters; leaves simple, evergreen, resembling the foliage of certain avocados and ***yukatya'ats***; flowers white and fruits green, both appearing in autumn. Wood used for construction especially for house posts, considered to be of very high quality. Found in the temperate and hot country forests.

Specifics:

(A) ***poo'p ákux*** «white ***ákux***» [LAU]. This form is found in temperate zones; it does not have heartwood and is said to last for only 3 years; it may be used as house cornerposts, but it is not preferred.

(B) ***tsapts ákux*** «red ***ákux***» [LAU]. This form is found in hot zones; it is said to last for 8 – 10 years and is prized as house or fence posts.

18. *axta'achtek puj*

Collections: JR0285, JR1105

Etymology: */ax/* + */ta'ach/* + */tek/* + */puj/* = «reflexive-pronoun» + «urinate» + «foot» + «flower». The name apparently refer to the flowering stems which, when cut, spill water onto the base of the plant.

Description: A polytypic generic that corresponds to AST *Cosmos* and *Dahlia*. Erect, bushy herbs of 1 – 1.5 meters; stems rigid, purple-green; leaves opposite, deeply-divided; flowers composed of multiple purple ray flowers and numerous yellow disk flowers. Leaves, combined with other herbs, placed on the soles of the feet to reduce fever; juice taken for urinary tract infections; flowers used for adornment; hollowed-out stems used to make flutes. Found in shrub vegetation of the cold and temperate zones.

Specifics:

(A) ***tsoxk axta'ach tek puj*** «green urinating-foot flower» [AST *Cosmos* and *Dahlia*?]

(B) ***yak axta'ach tek puj*** «black urinating–foot flower» [AST *Cosmos* and *Dahlia*?]

19. ***café kup***

Collections: ES0283, EV0117, EV0199, EV0233, EV0319, WR0005, WR0141

Etymology: */café/* + */kup/* = «Spanish proper name» + «tree». *Café* is the Spanish name for coffee.

Description: A monotypic generic that corresponds to RUB *Coffea arabica*, the most widely cultivated of the coffee species. Shrubs of 2 – 3 meters; leaves opposite and entire, glossy, dark green; flowers fragrant, white, grouped into terminal inflorescences; fruit red. The seeds (coffee beans) are roasted and prepared as coffee, which is consumed daily and is occasionally combined with medicinal herbs (see ***alivia kup***). Coffee is the most important cash crop grown in the Mixe region and is widely cultivated in temperate and hot zones. Some Mixe divide coffee into two varieties: ***po'ts café*** «yellow coffee» and ***tsapts café*** «red coffee». There is apparently no «wild coffee» category.

20. ***canela kup***

Collections: none

Etymology: */canela/* + */kup/* = «Spanish proper name for cinnamon» + «tree». *Canela* is the Spanish name for cinnamon.

Description: A monotypic generic that corresponds to LAU *Cinnamommum verum* or possibly *C. aromaticum*. Tree with aromatic foliage and bark. Cinnamon is used as a spice in Totontepec. The tree is not traditionally cultivated in the region, but there are reports that some Mixe speakers of Moctum have attempted to plant a few trees.

21. ***chamizo***

Collections: JR1038, JR1047

Etymology: */chamizo/* = «chamizo, a Spanish proper name» that is commonly used in southern Mexico to denote several shrubby compositae such as *Baccharis* spp. and *Senecio salignus*.

Description: A monotypic generic that corresponds to AST *Senecio salignus*, a widespread shrub that is a much used medicinal plant in Mesoamerica. Robust shrubs of 2 – 3 meters; leaves, alternate, narrowly lanceolate, slightly toothed; flowers clustered into dense composite heads, bright yellow. Leaves, chopped with other plants and sprayed with aguardiente, placed on chest for colds. Found in secondary forest of cold zones. Some people recognize a typical ***chamizo*** (unmodified) and a «wild» ***yukchamizo*** «wild ***chamizo***». Both categories correspond to AST *Senecio salignus* and *Baccharis*.

22. *chicozapote*

Collections: none

Etymology: */chicozapote/* = «Spanish proper name for sapodilla».

Description: A monotypic generic that corresponds to SPT *Manilkara zapota*, a fruit tree native to southern Mexico and Central America, and the source for chicle, the original component of chewing gum. Tree of 2 –4 meters, containing copious milky latex; leaves opposite, simple, entire and ovate; flowers white, grouped in the leaf axils; the fruit a round, brown berry that contains a sticky, very sweet pulp and several black, shiny seeds. Fruits eaten raw. Cultivated in the hot zone.

23. *ciruela kup*

Collections: none

Etymology: */ciruela/* + */kup/* = «Spanish proper name that corresponds to prune» + «tree». In Mexico, it is used to describe two distinct types of fruit, those of ROS *Prunus domestica* and those of ANA *Spondias* spp.

Description: A monotypic generic that corresponds to ROS *Prunus domestica*, the common plum, a fruit tree species probably native to Asia but now cultivated in many temperate zones throughout the world. Trees of 5 – 10 meters; leaves simple, serrate and alternate; flowers regular, white; fruits yellow to purple, sweet, containing a hard stone. Fruits eaten raw. Occasionally cultivated in home gardens of the temperate zone of Totontepec, but much more common in neighboring Mixe villages of the pine–oak forest. Apricot trees, ROS *Prunus armenaica*, are occasionally cultivated in Totontepec, where they are called by the Spanish name *chabacano*.

24. ***cohete kup***

Collections: JR0314, JR1002

Etymology: */cohete/* + */kup/* = Spanish name + «tree». *Cohete* is Spanish for firecracker or noisemaker; the Mixe name refers to the use of *Archibaccharis* stems in the preparation of homemade fireworks.

Description: A monotypic generic that corresponds to AST *Archibaccharis*. Shrubs of 1 meter; flower white, grouped into composite heads. Stems used as a substitute for *carrizo* stalks (POA *Arundo donax*) in the production of *cohetes* – homemade fireworks. Found in secondary vegetation of the temperate and cold zones.

25. ***fumarosa***

Collections: EV0219, EV0301, JR0507, JR0619, JR0843,

Etymology: */fuma/* + */rosa/* = «smoke» + «Spanish proper name for rose». The common Spanish name for the rose apple is *poma rosa*; this has been corrupted in Mixe to ***fumarosa***. Various other corruptions of the Spanish name, such as ***cimarrosa*** are also employed.

Description: A monotypic generic that is apparently restricted to the rose apple, MRT *Syzigium jambos*, a naturalized tree native to southeast Asia. Small evergreen trees; leaves opposite, lanceolate and entire; flowers cup–shaped, rimmed with numerous white, exserted stamens; the fruit is a yellowish–pink, fleshy berry that is cloyingly sweet and fragrant. Fruit occasionally eaten raw. Frequent around abandoned home sites in secondary forest and scrub vegetation in temperate and hot zones.

26. *guaje*

Collections: JR0374, JR0577

Etymology: ***/guaje/*** = «Spanish proper name». *Guaje*, a Mexican Spanish name derived from Nahautl, refers to trees and the edible fruits of FAB *Leucaena* spp.

Description: A polytypic generic that corresponds to FAB *Leucaena* spp., and as «wild» species, *Chamaecrista glandulosa*, and *C. nictitans*. The «wild» species are shrubs of 1 – 2 meters; leaves alternate, compound; flowers yellow; fruits a slender, dark brown legume. Seeds are eaten raw as food and to expel intestinal parasites [*Leucaena*] the Chamaecristas are apparently without use. *Leucaena* is known primarily as a plant of the Zapotec zone which does not grow in Totontepec; the *Chamaecrista* species are found in secondary shrubby vegetation of the temperate zone.

Specifics:

(A) ***guaje*** (unmodified) «Spanish proper name (*guaje*)» [FAB *Leucaena* ?]

Named varieties are considered collectively as ***yukguaje***:

(B) ***poo'p guaje*** «white *guaje*» [FAB ?]

(C) ***tsapts guaje*** «red *guaje*» [FAB *Chamaecrista glandulosa*, *C. nictitans*] also called ***po'ts guaje*** «yellow *guaje*, or ***tsay guaje*** «thin *guaje*».

27. *higo*

Collections: none

Etymology: */higo/* = «Spanish proper name for figs».

Description: A monotypic generic that corresponds to MOR *Ficus carica*, the fig, a native of SW Asia anciently cultivated in the Mediterranean region, from where it was brought over to the New World after the Spanish conquest. Shrubs of 2 – 3 meters with white latex; leaves alternate, simple and deeply–lobed; fruit a pear–shaped, sweet and fleshy berry that contains many small seeds. Fruits eaten raw, or more commonly boiled in sugar syrup. Semi–cultivated in the shrub vegetation and home gardens of cold and temperate zones. It appears that some people might classify figs as ***tsapxijts*** «foreign avocados».

28. *hule*

Collections: none

Etymology: */hule/* = «Spanish proper name» referring to rubber and rubber trees. The protoMixe–Zoque term for *chicle* and rubber is ****na'a***, and it may be that the original Mixe for rubber tree was a cognate.

Description: A monotypic generic that corresponds to EUP *Hevea brasiliensis* and MOR *Castilla mexicana*. The cultivated Hevea are trees of 20 – 30 meters with abundant white latex; leaves palmately compound leaves, alternate; flowers ?; fruit ?. The Mixe remember that the latex was formerly collected and used to make rubber balls, but this custom has apparently disappeared. The trees are apparently still cultivated in lowland ranches of Totontepec. These were apparently introduced by government workers in the early 1930's.

29. ***iitsum tsi'ix***

Collections: ES0044, ES0205, EV0043, EV0348, JR0264, JR0621

Etymology: */iitsum/* + */tsi'ix/* = «wild-boar» + «fart». The name refers to the strongly but agreeably-scented fruits of *Siparuna*, which appear to be reminiscent of the musky odor of wild-boars.

Description: A polytypic generic that corresponds to MNM *Siparuna andina*. Shrubs of 2 - 3 meters; leaves alternate, entire, somewhat thickened and glossy; flowers cream-colored; fruits red and fragrant. The leaves, bound to the soles of the feet, used to lower fever; the leaves, heated in a wood fire, are placed on the body to relieve fevers and aches, and to aid in post-partum recovery; the leaves are boiled with coffee and taken to warm the body; the fruits are used to prepare tea for stomach aches. Frequent in primary and secondary forests of the temperate zone.

Specifics:

(A) ***poo'p iitsum tsi'ix*** «white wild-boar fart» [MNM *Siparuna andina*]

(B) ***po'ts iitsum tsi'ix*** «yellow wild-boar fart» [MNM *Siparuna andina*]

30. ***ii'k***

Collections: EV0024, EV0074, EV0290, EV0316, EV0354, JR0585, JR0962, JR1208, WR0019, WR0045

Etymology: */ii'k/* = «Mixe proper name» which refers to *Inga* trees.

Description: A polytypic generic that corresponds to FAB *Inga* aff. *oerstediana* and *I. latibracteata*. Trees of 15 - 20 meters; leaves alternate, large and pinnately compound; flowers whitish, composed of head-like clusters of filaments; fruit a long green to orangish-brown legume. The trees are often used as shade for coffee groves, its leaves are considered to be a natural fertilizer; the wood is used to make house beams; the fruits yield an edible aril, but the seeds are not consumed. Found in primary and secondary forests of the temperate and hot zone.

Specifics:

(A) ***poo'p ii'k*** «white *ii'k*» [FAB *Inga* aff. *oerstediana*], bark is whitish grey, leaves are green.

(B) ***tsapts ii'k*** «red *ii'k*» [FAB *Inga latibracteata*], the bark is brown, the leaves are green above and reddish-brown below.

31. ***jaach ke'ev***

Collections: EV0012, EV0201, EV0222, EV0259, EV0314, JR0325, JR0366, JR0493, JR0539, JR0817, JR1132, JR1242

Etymology: */jaach/* + */ke'ev/* = «burro» + «stinging». Some Mixe suggest that the name may originally have applied to a stinging plant used as a switch to urge animals along.

Description: A polytypic generic that corresponds to EUP *Acalypha subviscida* and other species of this large tropical genus. Monoecious or dioecious herbs and small shrubs; leaves reddish-green, alternate, simple and serrate; female flowers in reduced axillary clusters, male flowers arranged in reddish-green spikes. Leaves, especially of the red form, crushed in water, taken to treat dysentery; leaves of the white form, heated over fire, applied on joints for rheumatic pains. Found in the shrub vegetation of the all climate zones. For classification of other salient *Acalypha* species, see ***nanik***.

Specifics:

(A) ***poo'p jaach ke'ev*** «white burro sting» [EUP *Acalypha* spp.]

(B) ***tsapts jaach ke'ev*** «red burro sting» [EUP *Acalypha subviscida* & spp.] This is sometimes simply referred to as ***tsapts ojts*** «red herb» in Chinantequilla, and goes by the synonyms ***tsay jaach ke'ev*** «thin burro sting» and ***tso'ojmk jaach ke'ev*** «purple burro sting». Alternately, it may also be included in the extended range of other folk generics and be called by names such as ***tsapts jon kaaky*** «red bird tortilla», ***yuktsamun*** «wild-amaranth» and ***yuknatsoo'k*** «wild-water-zapote». This specific corresponds to reddish-green herbs that have relatively small leaves.

32. ***jaamdum***

Collections: ES0173, JR0051, JR0410

Etymology: */jaamdum/* = «Mixe proper name for raspberries and other fruits». It appears that ***jaamdum*** was originally used exclusively for some native blackberries and that ***tsapjaamdum*** referred to mulberries (MOR *Morus alba* and possibly *M. nigra*) introduced by the Spanish in the 17th century. At present, ***tsapjaamdum*** «sky raspberry» is also used to refer to introduced varieties of *Rubus* that have a glaucous stem, whitish-green leaves, and produce a large, sweet fruit.

Description: A monotypic generic that corresponds to ROS *Rubus* spp. Spiny canes of 1 – 2 meters; leaves compound, composed of usually 3 serrate leaflets that are green above and whitish-green below; flowers regular and white; fruit purple, an aggregation of drupes. Fruits are eaten raw. Common in secondary shrub vegetation of the cold and temperate zones. Other raspberries and blackberries are classified as ***tsa'am ju'u*** and ***naxtum ónuk*** as well as by some descriptive «thornbush» names - ***miistu xaa'k ápit, ápit aajy, ápit tam, tsa ke'emajka ápit***. The category appears to overlap with ***tsa'am ju'u***, and some Mixe say that ***poo'p jaamdum*** is a synonym of ***poo'p tsa'am ju'u***.

33. *jampoj*

Collections: ES0014, EV0001, EV0034, EV0070, EV0140, EV0294, EV0347, JR0045, JR0379, JR1101, JR1080, JR1117, JR1138, WR0048

Etymology: */jaajm/* + */poj/* = «ash, ashen» + «wind». The name refers in part to the glaucous or pubescent under-surface of the leaves; the reference to wind is unclear, since the plant is apparently not used to treat the folk illness aire (see ***poj ojts***).

Description: A polytypic generic that corresponds to LOG *Buddleia cordata* and other species of this widespread genus. Trees and shrubs; leaves opposite, lanceolate to ovate, often covered with pubescence or a whitish powder; flowers greenish to yellowish-white, clustered in terminal cymes; fruit a small brown capsule. Wood of the black form used as house posts and as fuel; leaves of the white form, boiled in water, used as a bath water to treat chicken pox; combined with other herbs and lard, placed on the soles of the feet or on the stomach to lower fevers; placed on the chest to reduce inflammation. Common in secondary scrub vegetation in all climate zones.

Specifics:

(A) ***poo'p jampoj*** «white ash-wind» [LOG *Buddleia*]. This corresponds to a small tree that has a whitish stem and no heart wood.

(B) ***tsapts jampoj*** «red ash–wind» [LOG ***Buddleia cordata***]. Also called ***tsay jampoj*** «thin ash wind». This is a shrub, apparently not used.

(C) ***yak jampoj*** «black ash–wind» [LOG ***Buddleia***]. This is a rather large tree that has a blackish stem and dark heartwood.

34. ***jaank***

Collections: ES0052, ES0096, EV0019, EV0041, JR0005, JR0186, JR0214, JR0426, JR1079

Etymology: */jaank/* = «Mixe proper name» that refers to *Clethra* spp.

Description: A polytypic generic that corresponds to six or more species of CLE *Clethra*, the sole genus of Clethraceae. Trees of 4 – 15 meters, leaves alternate, simple and entire; flowers regular, cream–white; fruit a dark brown capsule. Wood used in house construction and to make cross–beams and roofing slats; leaves, combined with other plants, placed on the soles of the feet to lower fever [especially the red form]. Found in secondary forests and shrub vegetation in cold and temperate zones.

Specifics:

(A) ***poo'p jaank*** «white PN» [CLE *Clethra*]

(B) ***tsapts jaank*** «red PN» [CLE *Clethra*]

(C) ***xijts aajy jaank*** «avocado leaf PN» [CLE *Clethra*]

35. ***jaat***

Collections: JR0330

Etymology: */jaat/* = «Mixe proper name for ***Cecropia***». */jaatp/* means «pregnant», and some Mixe consider that it also means «inside», perhaps referring to the hollow interior of the stems of these trees.

Description: A monotypic generic that corresponds to several species CEC *Cecropia*, a large genus of fast-growing tropical America trees sometimes used for pulp and ornament. Dioecious trees of 20 – 30 meters; twigs hollow and septate; leaves arranged spirally, simple and large, palmately-lobed, green above and white below; inflorescence a group of catkins; fruit a nutlet. The hollowed out stems are sometimes used as a tube to tap water in springs and rivulets. Common in secondary forest of the temperate and hot zone.

36. ***jan xuu'k***

Collections: JR0023, JR0063, JR0065, JR0112, JR0138, JR0605, JR0874, JR1152, JR1178

Etymology: */jan/* + */xuu'k/* = «fever, fire» + «aroma, stink». The name refers to the plants' property as a febrifuge, and the strong scent of the foliage or flowers.

Description: A polytypic generic that corresponds to AST Eupitoriae and RUB *Deppea*, *Hoffmannia culminicola*. Shrubs of 2 – 4 meters; leaves often aromatic, opposite and simple; flowers yellow, purple or rose-colored; fruit may be a bluish berry. Wood used as fuel; leaves, often combined with other herbs, placed on the soles of the feet to lower body temperature; flowers used ornamentally on the *día de muertos*. Common in primary forests and shrub vegetation of the cold zone.

Specifics:

(A) ***poo'p jan xuu'k*** «white fever aroma» [RUB *Deppea*, *Hoffmannia culminicola*] The stems are white, and the flowers may be white to yellowish-white.

(B) ***yak jan xuu'k*** «black fever aroma» [AST Eupitoreae] The stems are blackish, and the flowers purple.

37. ***joo'v***

Collections: none

Etymology: */joo'v/* = «Mixe proper name for yellow sapotes».

Description: A monotypic generic that corresponds to SPT *Pouteria campechiana* and other species of this moderately-large tropical genus of timber and fruit trees. Trees of 15 – 20 meters; branches stout, containing a white latex; leaves spirally arranged, simple and entire; flowers cream-white to yellowish; fruit large, fleshy and yellow, containing a solitary shiny seed. Fruits are eaten, but are not highly prized. Occasional around abandoned home sites in the temperate and hot zones. This category may be extended to include the white sapote, RUT *Casimoroa edulis*, but this tree is not well known in the humid Mixe zone.

38. ***jon kaaky***

Collections: ES0086, ES0187, EV0042, EV0101, EV0194, EV0195, EV0257, JR0049, JR0064, JR0127, JR0130, JR0134, JR0239, JR0323, JR0541, JR0672, JR0696, JR0905, JR1031, JR1059, JR1066, JR1067, JR1146, JR1147, JR1157, JR1252, JR1272

Etymology: */jon/* + */kaaky/* = «bird» + «*tortilla*». The name is apparently derived from the observation that birds eat the fruits of *Miconia* spp. – they are the «*tortillas* of the birds».

Description: A polytypic generic that corresponds to MLS *Conostegia icosandra*, *Miconia hemenostigma* and other *Miconia* spp., PGL *Monina xalapensis*, and other berry-fruited melastomes. EUP *Acalypha* is occasionally included in the extended range of the red form. Shrubs and small trees; leaves opposite, distinctively cross-veined, often reddish, or yellow-green; flowers usually small, white to yellowish; fruit a purple-black, often sweet berry. Fruits are eaten raw; fruits are observed to be a favorite food of doves and other birds; leaves, boiled in water, occasionally taken for *aire* in the stomach; wood of the larger species is used as fuel. Abundant in primary and especially in secondary vegetation of all climate zones. Other melastomes are grouped into the following folk generics: ***axkujp puj***, ***maaxun tajk***, ***pericón ojts***, ***naach***, ***pu'ujts ujts***, ***kox ojts***, ***nataats ojts***, and ***peetun ojts***.

Specifics: The following specifics are distinguished by a combination of characters including the color of the stems, leaves and fruits.

(A) ***poo'p jon kaaky*** «white bird tortilla» [MLS *Miconia hemenostigma*, *Miconia* sp.]. The stem is whitish, and the leaves are whitish underneath.

(B) ***po'ts jon kaaky*** «yellow bird tortilla» [MLS *Miconia* aff. *glaberrima*]

(C) ***tsapts jon kaaky*** «red bird tortilla» [MLS *Conostegia icosandra*, *Miconia glaberrima*, *M. hemenostigma*, and other *Miconia* spp.]

(D) ***tsay jon kaaky*** «thin bird tortilla» [MLS *Miconia*]

(E) ***tso'ojmk jon kaaky*** «purple bird tortilla» [MLS *Miconia glaberrima*]

(F) ***tsoxk jon kaaky*** «green bird tortilla» [MLS *Miconia globulifera*]

39. *ju'uk*

Collections: ES0241, EV0068, EV0237, EV0289, JR0587

Etymology: */ju'uk/* = «Mixe proper name for tobacco». It is also means «to smoke, and cigarette». Campbell and Kaufmann list ****hu·kV*** as the reconstructed protoMixe–

Zoque term for cigarette (1967:88). The name is polysemous for the plant, cigarettes made from the leaves, and the act of smoking.

Description: A polytypic generic apparently restricted to the 5 – 6 wild and cultivated species of tobacco, including SOL *Nicotiana tabacum* and *N. rustica*. It is probable that the wild form corresponds to SOL *Nicotiana glauca*. Herbs and small shrubs of 0.5 – 2 meters; leaves simple and entire, alternate, resinous and often pubescent; flowers tubular, yellow, white or light blue to pinkish red, borne in terminal clusters; fruit a brown capsule with numerous small seeds. Leaves of the red form formerly dried and then crumbled to be rolled into cigarettes; leaves of the turkey form said to kill external parasites on turkeys; stems of wild form used to build lofts. An herb cultivated or sprouting alone in home gardens of the temperate and hot zones, the wild forms found in secondary vegetation of the temperate zones. A Spanish-derived synonym used in Tepitongo is ***tabacu ujts***.

Specifics:

(A) ***tootk ju'uk*** «turkey tobacco» [SOL *Nicotiana tabacum*] This form has cream-white flowers.

(B) ***tsapts ju'uk*** «red tobacco» [SOL *Nicotiana tabacum*]

(C) ***yuk ju'uk*** «wild tobacco» [SOL *Nicotiana glauca*?]

40. *kaaj taatsk*

Collections: ES0062, ES0288, JR0368, JR0809

Etymology: ***/kaaj/*** + ***/taatsk/*** = «animal» + «ear». The leaves of *Clusia* are considered to look like cattle ears.

Description: A polytypic generic that corresponds to several species of CLU *Clusia*, a large genus of tropical American trees and shrubs that are sometimes epiphytic. Trees and shrubs of 1 – 5 meters, occasionally epiphytic, with rather resinous sap; leaves opposite, obovate, and entire, rather rigid and shiny; flowers yellowish, sticky, clustered in axillary cymes; fruit a yellow to red berry, containing seeds covered by a gelatinous aril. Squirrels and other animals observed to eat the fruit, and it is said to be also edible for humans. Frequent in forests of the cold and temperate zones. Also called ***tsik pojts*?** «badger sucker» in Tepitongo.

Specifics:

(A) ***poo'p kaaj taatsk*** «white cattle ear» [CLU *Clusia*]. This is said to have a fruit like a small avocado.

(B) ***tsapts kaaj taatsk*** «red cattle ear» [CLU *Clusia*]. This is said to have a hawthorn-like fruit.

41. ***kaku kup***

Collections: none

Etymology: */kaku/* + */kup/* = «Mixe proper name for cocoa» + «tree». Campbell and Kaufmann give ****kakawa*** as protoMixe–Zoque for cocoa (1967:84); the name has been widely borrowed into other Mesoamerican indigenous languages, and was passed from Nahuatl into Spanish and then into other European languages.

Description: A monotypic generic that corresponds to STR *Theobroma cacao*, a widely cultivated tree that is the source of chocolate. The category may be extended to other species, such as *T. bicolor*, of this tropical American genus. Trees of 15 – 20 meters; leaves alternate and palmately-lobed; flowers regular and white, and emerge from the trunk; fruits are large and woody fruits, containing numerous seeds.

Cocoa beans are consumed as a beverage and base for cooked sauces in Totontepec, but the cacao tree is apparently not cultivated in the region.

42. *kapy tanejya*

Collections: EV0078, EV0134, JR0358, JR0527, JR1276

Etymology: ***/kapy/*** + ***/tanejya/*** = «Mixe proper name for reedy grasses» + «Mixe proper name?». ***tanejya*** may be derived from ***teñiva*** which means «erect».

Description: A monotypic generic that corresponds to AST *Verbesina turbacensis* and other species of this large American genus. Herbs of 1 – 2 meters with rigid, pithy stems with swollen nodes; leaves deeply lobed, and hispid; flowers composite, cream–white, dense in terminal clusters. Leaves, toasted and ground, placed on skin wounds [*V. turbacensis*]; the stems are used in building lofts. The other species of *Verbesina*, referred to as ***paa'yi tsim*** «pathside ***tsim***» or ***paa'yi kapy tanejya*** in Chinantequilla, are considered as fodder for goats, and their stems are burned as fuel. This category is sometimes placed in the life–form ***ojts***. Found in shrub vegetation of the temperate zone.

43. *kávux ma'aj*

Collections: JR0199, JR0842

Etymology: ***/kávux/*** + ***/ma'aj/*** = «*guacamaya* (Spanish proper name for a bird)» + «sleep». The relationship between a guacamaya's sleep and buckthorn is unclear.

Description: A monotypic generic that corresponds to one tree species of RHM *Rhamnus*, a large genus of trees and shrubs. Trees of 10 – 15 meters; leaves opposite and simple; flowers inconspicuous, yellowish, borne in axillary cymes; fruit a red, fleshy drupe. The yellowish wood is used in furniture–making, and as fuel. Found in the primary and secondary forests of the cold and temperate zones. See ***yuktem*** for classification of other *Rhamnus* spp.

44. *kaa'kx*

Collections: JR0191, JR0447, WR0120

Etymology: ***/kaa'kx/*** = «Mixe proper name for magnolia species».

Description: A polytypic generic that corresponds to MAG *Magnolia mexicana* and other species of this large, cosmopolitan genus known for its showy blossoms. Trees of 5 – 20 meters; leaves alternate and simple, large and obovate to ovate leaves; flowers large, showy and fragrant, regular and cream–white; fruit composed of many dry, dehiscent or indehiscent carpels, the seeds often covered by an aril. Flowers used for adornment, especially at Eastertime; flowers, toasted on a comal and then boiled in water with sugar, used to treat vomiting and diarrhea; whitish wood of wild type used for construction and fuel. Found in the primary forest of cold and temperate zones.

Specifics:

(A) ***kaa'kx*** (unmodified) «***kaa'kx***» [MAG T*alauma mexicana*]. This corresponds to a shrub or small tree.

(B) ***yukkaa'kx*** «montane ***kaa'kx***» [MAG *Magnolia*]. This corresponds to a large forest tree.

45. *kávun*

Collections: ES0140, JR0848?, JR1075

Etymology: ***/kávun/*** = «Mixe proper name». Some Mixe explain the name as ***/ka'a/*** + ***/ku'uv/*** = «hand» + «to cook». The name may be in part derived from the palmate (hand–shaped) leaves of the shrub.

Description: A polytypic generic that corresponds to AST *Koanophyllon albicaulis* and *Senecio* sp. Shrubs of 1 – 2 meters; leaves alternate and palmately–lobed; flowers composite, white. Branchlets, grouped in bunches of 13 and combined with 13 pitch–pine pieces, moved in a circular motion around the body 13 times to cure susto; leaves, ground with aguardiente, placed on back to treat chest colds. Found in secondary vegetation of the temperate zones; also cultivated in home gardens.

Specifics:

(A) ***maaxu̲n kávu̲n*** «small ***kávu̲n*** » [AST *Senecio*]

(B) ***po̲o̲'p kávu̲n*** «white ***kávu̲n***» [AST *Koanophyllon albicaulis*]

(C) ***yukkávu̲n*** «wild ***kávu̲n***» [AST?]

46. ***kets joo'v***

Collections: JR0354, WR0092

Etymology: */kets/* + */joo'v/* = «break/hard Mixe proper name»

Description: A monotypic generic that corresponds to ROS *Photinia* aff. *mexicana* or SAB *Meliosma*. Trees of 5 – 20 meters; leaves opposite (alternate?) and simple, glossy, broadly–lanceolate; flowers white; fruit is fleshy. The whitish wood is used to make axe handles, sugar cane mills, and house beams, and is also burned as fuel; this is the wild form of ***joo'v*** and does not have edible fruit. Found in the primary forest of cold zones.

47. ***ke̲'e̲majka***

Collections: ES0006, ES0081, JR0027, JR0117, JR0209, JR0230, JR0266, JR0427, JR0651, JR0658, JR0687, JR0939, JR1084, JR1148, JR1160, WR0030, WR0118

Etymology: ***/ke'emajka/*** = «Mixe proper name for alders». Although some Mixe analyze the name as ***/keem/*** + ***/majk/*** = «pig» + «ten», this does not appear to be a logical derivation of the name.

Description: A polytypic generic that corresponds to BET *Alnus acuminata* and *Carpinus carolinianus*, northern temperate species known as good sources of timber. Deciduous monoecious trees and shrubs of 2 – 4 meters; leaves ovate, simple and alternate; male flowers grouped in elongate cylindrical catkins, female flowers aggregated in erect dark-brown, cone-like inflorescences; fruit is small, hard nut. The red and white forms are considered to enrich the soil; wood of the red form is used as fuel; leaves, combined with aguardiente and other plants, placed on soles to lower fever; wood of the thin form used for posts and house construction; wood of the white form used in house construction (*morillos*). Found in primary and secondary forests of the cold and temperate zones. Apparently restricted to the few genera of Betulaceae found in the Sierra Norte – *Alnus*, *Carpinus* and perhaps *Ostrya*.

Specifics:

(A) ***poo'p ke'emajka*** «white ***ke'emajka***» [BET *Alnus acuminata*] This is considered to be the male form.

(B) ***tsapts ke'emajka*** «red ***ke'emajka***» [BET *Alnus acuminata*]. This is considered to be the female form.

(C) ***tsay ke'emajka*** «thin ***ke'emajka***» [BET *Carpinus carolinanus*]

48. ***koo'tski***

Collections: ES0042, ES0128, JR0165, JR0178, JR0420, JR0663, JR1005, JR1174, WR0080

Etymology: */koo'tski/* = «Mixe proper name for *Phyllonoma laticuspis*».

Description: A polytypic generic that is restricted to GRS *Phyllonoma laticuspis*, a common shrub in the Sierra that is widely used to treat measles and chicken pox. Shrubs of 1 – 3 meters; leaves alternate and simple, serrate, and rather glossy; flowers inconspicuous, yellow–green, emerging from the tips of the leaves; the fruit a rounded white berry. Berries ground with aguardiente and placed on the boils caused by chicken pox; leaves, boiled in water, used as bath for measles, the tea may be taken internally for the same purpose; branchlets, boiled in water, used as a bath to lower fever; combined to make brooms; woody stems of the white form used as fence posts for home gardens. Abundant in the secondary shrub vegetation of the cold and temperate zone.

Specifics:

(A) ***poo'p koo'tski*** «white Mixe proper name» [GRS *Phyllonoma laticuspis*]. This form is a small tree.

(B) ***tsapts koo'tski*** «red Mixe proper name» [GRS *Phyllonoma laticuspis*]. This form is a low bush.

49. ***kooxk***

Collections: ES0246, EV0308, JR0947, WR0107

Etymology: */kooxk/* = «Mixe proper name for an ornamental shrub».

Description: A monotypic generic that corresponds to AGA *Yucca*, a North American genus of some 40 species that are most common in warm, dry zones and are often cultivated as an ornamental. Semi–succulent shrubs of 1 – 3 meters; leaves stiff, relatively fleshy, narrow and liner, spineless, and grouped spirally around the stem; inflorescence a raceme borne on a central fleshy spike; flowers regular, cream-white, composed of six petaloid parts; fruit a capsule. Flowers are boiled in water and eaten with chile and tortillas; flowers also used as adornment for the church. Leaves used to heal broken bones; the leaves are roasted in the open fire for approximately thirty seconds, and then are placed as a splint around the fracture. Found in along paths and in home gardens of villages in the temperate and cold zones. Some Mixe classify this as a ***palma*** «palm» or a ***tsaats***, «agave».

50. *kooydum*

Collections: ES0192, EV0058

Etymology: ***/kooydum/*** = «Mixe proper name for large-fruited avocados». This name is a cognate of protoMixe-Zoque **'owi'*.

Description: A polytypic generic that corresponds to LAU *Persea americana*. Trees of 5 – 15 meters; leaves alternate and simple, ovate and entire, glossy and dark green; flowers small and yellowish-green; fruit is a large green drupe with yellow-green flesh and a large brown seed. The fruit is eaten raw. Cultivated and protected in the temperate zone. This generic is apparently restricted to large-fruited varieties of *Persea americana*. For small fruited varieties see ***xijts***; for *P. schiedeana* see ***tsiijn***. In addition to the specifics listed below, there are numerous descriptive names that indicate the shape or texture of the fruit of particular avocado trees: ***atsii'n? kooydum*** «? ***kooydum***», ***najaach kooydum*** «water-burro ***kooydum***» (name used in Tepitongo); ***yaajnit kooydum*** «long ***kooydum***».

Specifics:

(A) ***kooydum*** (unmodified) «***kooydum***» [LAU *Persea americana*]

(B) ***pa'ajk kooydum*** «sugary ***kooydum***» [LAU *Persea americana*]

51. ***kújunts***

Collections: JR0536, JR0824, JR1288, WR0029

Etymology: ***/kújunts/*** = «Mixe proper name for some pines with white, relatively non-resinous wood».

Description: A polytypic generic that corresponds to PIN *Pinus patula*? and *P*. spp. and CAS *Casuarina*. Trees of 20 – 30 meters; needles long and flexible, pendant; cones small and rounded. Wood sawed into boards for use in house and furniture construction. Found in the primary forest of the hot, dry zone near Tiltepec.

Specifics:

(A) ***poo'p kújunts*** «white ***kújunts***» [PIN *Pinus*]. This form is found in the cold zone in high mountains.

(B) ***yak kújunts*** «black ***kújunts***» [PIN *Pinus*]. This form is found in the temperate zone.

52. ***kupix***

Collections: JR1096

Etymology: ***/kupix/*** = «Mixe proper name for cassava». This name is a cognate of protoMixe–Zoque for cassava ****pisi*** (Campbell and Kaufmann, 1967:84).

Description: A polytypic generic that corresponds to EUP *Manihot esculenta*, a tropical American species much cultivated for its edible tubers; the category may be extended to some wild species of *Manihot*. Shrubby tree of 2 – 3 meters that emerges from large tuberous roots; leaves large, palmately–lobed; flowers white;

fruit a brownish schizocarp?. Roots, peeled and boiled in water, are eaten. Cultivated in temperate and hot zones.

Specifics:

(A) ***poo'p kupix*** «white cassava» [EUP *Manihot esculenta*]

(B) ***tsapts kupix*** «red cassava» [EUP *Manihot esculenta*]

53. ***ku'ujk jampajk***

Collections: ES0011, ES0085, JR0011, JR0038, JR0190, JR0630, WR0112

Etymology: */ku'ujk/* + */jampajk/* = «Mixe proper name» + «ash bone/hot-coal». The meaning of the name is unclear.

Description: A polytypic generic that corresponds to LAU *Litsea glaucescens*, a widespread shrub that is locally marketed for ornament, medicine and condiment under the Spanish name laurel. Shrubs of 2 - 3 meters; leaves fragrant, alternate, simple and entire, rather glossy, whitish beneath; flowers inconspicuous, yellowish-white; fruits a purple-black drupe. Leaves, boiled in water, taken as tea for diarrhea, and for coughs combined with fever. Frequent in secondary forest and shrub vegetation in the cold zone. Called ***kets pejxk*** («hard peach») in Tepitongo.

Specifics:

(A) ***tsoxk ku'ujk jampajk*** «green ash-bone/hot-coal» [LAU *Litsea glaucescens*]. This form is said to have greenish stems.

(B) ***yak ku'ujk jampajk*** «black ash-bone/hot-coal» [LAU *Litsea glaucescens*]. This form is said to have blackish stems.

54. ***kup_ka'ajk***

Collections: none

Etymology: */ka'ajk/* = «Mixe proper name for mammee zapote and similar fruits». This name is cognate with protoMixe-Zoque for «zapote» ***ka'wak** (Campbell and Kaufmann, 1967:84).

Description: A monotypic generic that is restricted to SPT *Pouteria sapota*, a Central American tree that is cultivated for its fruit, especially in the Caribbean region. Tree of 15 - 20 meters that contains a whitish latex; leaves are simple and entire, alternate to spirally whorled; flowers inconspicuous and cream-white; fruit is a dense, sweet berry with a corky peel, orangish flesh and a shiny large seed. Fruit is eaten raw. Cultivated and protected in temperate and hot zones.

55. *kup_ko'on*

Collections: none.

Etymology: */kup/* + */ko'on/* = «tree» + «Mixe proper name for tomato».

Description: A monotypic generic that corresponds to SOL *Cyphomandra betacea*, a tropical tree that has long been cultivated for its tomato-like, rather sour fruit. Trees of 3 - 5 meters; leave alternate, simple and entire, broadly ovate; flowers white, bell-shaped; fruit is a red, oval berry. Fruits, toasted on a *comal*, are ground to make hot sauces. Semi-cultivated in home gardens of the temperate zone, especially in Tepitongo indicating the tree produces best at elevations of 1500 meters and lower.

56. *kup_tsu'up*

Collections: JR0316, JR0804

Etymology: */kup/* + */tsu'up/* = «tree» + «edible-green». See ***kup puj*** for explanation of «***kup***» in this generic name.

Description: A monotypic generic that corresponds to SOL or FAB? Small trees;

leaves compound? Tender branches and leaves, boiled in salted water, eaten as a potherb. Found in primary and secondary forests of the temperate and hot zones.

57. *lanté xajk*

Collections: ES0226, JR0333, JR0508, JR1217

Etymology: ***/lanté/*** + ***/xajk/*** = «Mixe form of the Spanish proper name for lentils» + «Mixe proper name for beans». ***/lanté/*** is a corruption of *lenteja*, the Spanish name for *Lens culinaris*, common lentils, which may be purchased in Oaxaca city but are rarely prepared in Totontepec.

Description: A monotypic generic that corresponds to FAB *Cajanus cajan*, the pigeon pea, a South Asian cultigen which is widely cultivated in the tropics for its edible seeds. Shrubs of 1 –2 meters, whole plant slightly pubescent; leaves alternate and pinnately compound; flowers yellow; fruit a green pod containing numerous black seeds. Cultivated in home gardens of the hot zone ranches. Seeds edible; they are boiled in water and eaten as beans. Pronounced in various ways, including ***landa xajk*** in Tepitongo; ***lanté ojts*** is a synonym for some species of FAB *Crotalaria*.

58. *lima*

Collections: JR0109, JR0111, JR1283, WR0032

Etymology: ***/lima/*** = «Spanish proper name for limes».

Description: A polytypic generic that corresponds to RUT *Citrus aurantiifolia*, the lime tree, a widely cultivated SE Asian tree which yields fruits that are widely used for juice and in cooking. This category includes other citrus trees, probably including the limelo, a cross between lemon and lime (*C. aurantiifolia* x *C. limon*?). Trees of 2 – 4 meters with thorny branches; leaves ovate, alternate and simple; flowers regular, white and fragrant; fruit round, green to yellowish-green, sour to somewhat insipid. The juice of the fruit is used as a condiment and to make limeade.

Specifics:

(A) ***lima agria*** «sour lime» [RUT *C. aurantiifolia*]. This form is also called ***tsi'tsk lima*** «breast lime»

(B) ***lima limón*** «lemon lime» [RUT *C. aurantiifolia* x *C. limon*?]. This form is also called ***limón dulce*** «sweet lemon».

59. *limones kup*

Collections: EV0110, EV0212, JR0537, JR0582, WR0123

Etymology: */limones/* + */kup/* = «Spanish proper name for lemons» + «tree». The name apparently refers to the morphological similarity between this and some citrus trees, especially in the lemony-smell of the foliage.

Description: A monotypic generic that corresponds to a wild species of RUT, possibly including *Amyris*, *Esenbeckia*, and most likely *Zanthoxylum*. Trees of 20 – 30 meters with whitish-gray and bark thorny branches; leaves compound?; flowers apparently cream-colored to pinkish-white, but the Mixe say that they have rarely seen the flowers and fruit. The wood is considered to be of excellent quality for furniture-making since it can easily be sawn into boards. Found in primary and secondary forest in the temperate and hot zone.

60. *maaydum*

Collections: ES0089, EV0026, EV0102, JR0096, JR0253, JR1209, JR1271

Etymology: */maaydum/* = «Mixe proper name for a widespread mimosa». The name could be analyzed as */maay/* + */dum/* = «divinate, much, adundant» + «rounded–

object», perhaps referring to the abundant round flowers clusters that the shrub produces. The name is derived in part from protoMixe–Zoque **may*, which means «to count, to divine»; the term is found as a loan word in many Mesoamerican language families (Campbell and Kaufmann, 1967:??).

Description: A polytypic generic that corresponds to FAB *Mimosa albida*, a weedy shrub that is much used medicinally in the Sierra Norte and other parts of Mexico. Thorny shrubs of 1 – 2 meters; leaves compound, composed of 4 – 6 broad leaflets; flowers pink, clustered in ball–like inflorescences; fruit a dark brown legume. Branchlets, placed under children's pillows in the nighttime, believed to encourage sleep; root, prepared in tea, taken to induce menstruation. Abundant in secondary shrub vegetation of all temperate and hot zones.

Specifics:

(A) ***poo'p maaydum*** «white ***maaydum***» [FAB *Mimosa albida*]

(B) ***tsapts maaydum*** «red ***maaydum***» [FAB *Mimosa albida*]

61. ***madook tay***

Collections: ES0001, ES0129, EV0086, JR0075, JR0872, JR0913, JR1137, JR1227, JR1250, WR0083

Etymology: */**madook**/* + */**tay**/* + «yesterday, four–days–ago» + «scar», the name perhaps referring to the medicine use of the plant as a treatment for skin wounds and burns.

Description: A polytypic generic that corresponds to species of GSN *Moussonia*, a small Central American genus of showy herbs. Erect herbs of 0.5 to 1 meter with reddish–green stems and foliage; leaves broadly lanceolate, entire and simple, softly pubescent; flowers tubular, yellow to orange–red; fruit a brown capsule . Leaves, heated over an open fire on a clay platter, are later ground and placed on the abdomen; ground on a *metate* and mixed with water, placed on skin wounds; sprigs, made into tea, used to wash skin eruptions. Found in abandoned fields, shrub vegetation and forests of the cold and temperate zones. Synonyms include ***nuu'pun ujts*** from Tepitongo and ***pixtun ujts*** from Chinantequilla. (***madook tay*** is apparently used in Tepitongo as a synonym for AST *Sonchus* sp., which is more commonly called ***tuk axmots***.

Specifics:

(A) ***poo'p madook tay*** «white yesterday scar» [GSN *Moussonia*]. This probably refers to the yellowish–flowered species that tends to have less red pigmentation in the leaves and stems.

(B) ***tsapts madook tay*** «red yesterday scar» [GSN *Moussonia*]. This refers to the species with orangish–red flowers and red–pigmented foliage and stems.

62. ***majk ak***

Collections: EV0019?

Etymology: */majk/* + */ak/* + */nak/* = «ten» + «bark» + «paper?».

Description: A monotypic generic that corresponds to ULM? A tree of 10 – 15 meters with fibrous, stringy bark and a twisted trunk; leaves alternate, simple and serrate; flowers greenish–white and inconspicuous; fruit?. The bark is a construction material source; it is used to bind together the poles of a *jacal* and other buildings. Found in the forests of temperate and hot zones.

63. ***mandarina kup***

Collections: none

Etymology: */mandarina/* + */kup/* = «Spanish proper name for mandarin orange» + «tree».

Description: A monotypic generic that corresponds to RUT *Citrus reticulata*, a Southeast Asian tree much cultivated in sub–tropical and tropical areas for its edible fruit. Trees of 5 – 10 meters with thorny branches; leaves simple, alternate and ovate; flowers regular, fragrant and white; fruit orangish–green and juicy with a coarse–textured peel. Fruit eaten raw. Occasionally cultivated in the hot zone.

64. ***mangu***

Collections: none

Etymology: */mangu/* = «Mixe form of the Spanish proper name for mango».

Description: A polytypic generic that corresponds to ANA *Mangifera indica*, an Indomalaysian tree that is much cultivated in the tropics for its edible fruit. Trees of 10 – 20 meters with resinous foliage and fruits; leaves alternate, simple and entire, lanceolate; flowers small and inconspicuous, yellowish–green; fruit a juicy, sweet yellowish to orange drupe. Fruit eaten raw. Cultivated in the temperate and hot zones of the community, occasionally sold in the Totontepec market by Zapotec vendors.

Specifics:

(A) ***mangu manil*** «Manila mango» [ANA *Mangifera indica*]. This form is called *manila* in local Spanish, and is widely produced and sold in the markets of Oaxaca.

(B) ***poo'p mangu*** «white mango» [ANA *Mangifera indica*]. This is a large–fruited variety that is name as *mago criollo* in local Spanish.

65. ***manzana***

Collections: none

Etymology: */manzana/* = «Spanish proper name for apple».

Description: A monotypic generic that corresponds to ROS *Malus domestica*, the scientific name applied to most of the cultivated varieties of apple. Trees of 5 - 10 meters; leaves alternate , simple, ovate and serrate; flowers regular and white; fruits fleshy and sweet, yellow to red in color. Fruits eaten raw. Rarely cultivated in the cooler and drier zones of municipality; more commonly purchased from the Mixe of Tlahuitoltepec and other communities of the pine-oak forest, and from Zapotec vendors.

66. *mook tsa'a kup*

Collections: ES0229?, ES0084, WR0117

Etymology: */mook/* + */tsa'a/* + */kup/* = «Mixe proper name for corn + «grilled» + «tree». The name appears to be a reference to the darkened fruits of this tree.

Description: A monotypic generic that may correspond to PRT *Grevillea* or *Roupala montana*, two trees that are used to shade coffee plantations. Trees of 15 - 25 meters; leaves compound, green above and whitish-green below; flowers yellow to white; fruits red. Wood used as fuel; the tree may also be used to shade coffee plantations. Found in shrub vegetation of the cold and temperate zones, but apparently not found in the communal lands of the cabecera of Totontepec. Schoenhals and Schoenhals report that this category corresponds to gredilla in local Spanish (1965:341).

67. *mook yee'k kup*

Collections: none

Etymology: */mook/* + */yee'k/* + */kup/* = «Mixe proper name for maize» + «grown, swollen» + «tree».

Description: A monotypic generic that corresponds to a tree with yellow, pulpy fruits; most likely a MLP. Trees of 5 – 10 meters. Fruits are eaten raw. Semi-cultivated or protected in temperate zones. The wild counterpart of this tree (*yukmokyee'k kup*) is a MLP *Bunchosia*.

68. ***mo'tski***

Collections: JR0678, JR1154, WR098

Etymology: */mo'tski/* = «Mixe proper name for a widespread shrub».

Description: A polytypic generic that corresponds to CLR *Hedyosmum mexicanum*, a common shrub of the humid forests of Mesoamerica and the only representative of the Chloranthaceae in the Sierra Norte. Shrubs of 2 – 3 meters; leaves opposite, broadly-lanceolate and serrate; female flowers grouped into a capitate, fleshy inflorescence, male flowers aggregated in catkins; fruit a fleshy aggregate of drupes. The stems, dried, split in half and cut to size, are used to build lofts or fences. The two specifics are differentiated by stem color, but both are used as construction materials. Frequent in primary and secondary forests of the cold and temperate zones.

Specifics:

(A) ***poo'p mo'tski*** white PN [CLR *Hedyosmum mexicanum*]

(B) ***yak mo'tski*** black PN [CLR *Hedyosmum mexicanum*]

69. ***mutap***

Collections: ES0034, ES0274, EV0030, EV0031, EV0050, EV0158, EV0181, EV0226, EV0306, JR0091, JR0094, JR0222, JR0414, JR0564, WR0002

Etymology: */mutap/* = «Mixe proper name for an ornamental and edible *Cestrum*».

Description: A polytypic generic that corresponds to SOL *Cestrum nocturnum*, a native of the West Indies that is widely cultivated in Mexico; the category is extended to *C. lanatum*, a species native to Mesoamerica. Shrubs of 1 – 2 meters with bitter–smelling and tasting foliage; leaves lanceolate, alternate, simple and entire; flowers fragrant, tubular and cream–colored; fruit a purple–black berry. Leaves edible either raw or roasted on the *comal*; ground in water, they are taken to lower fevers. Semi–cultivated in shrub vegetation or home gardens of the all zones. See also *yukmutap*; other *Cestrum* are classified as ***tu̲'nu̲k***, ***tsejst***, ***yukyukte̲m*** and ***yukatu̲'kx***.

Specifics:

(A) ***mutap*** (unmodified) «***mutap***» [SOL *Cestrum nocturnum*]

(B) ***xuumutap*** «powdery ***mutap***» [SOL *Cestrum lanatum*]. This name is apparently only used in Chinantequilla and Tepitongo.

70. *naach ku̲p*

Collections: EV0313, JR0173, JR0340, JR0581, JR0822, WR0119

Etymology: */naach/* + */ku̲p/* = «Mixe proper name for a tropical American fruit tree»; the name has been borrowed into many Mesoamerican languages, and is the origin of the local Spanish name for the fruit *nanche*.

Description: A polytypic generic whose focal member is MLP *Byrsonima*; the category also includes some shrub that have edible berries such as MLS *Conostegia icosandra* and other melastome genera and species. The focal member is a tree of 15 – 25 meters; leaves are simple, opposite, and ovate with entire margins; flowers are cream-colored and borne in racemes; fruit is a yellowish, fleshy drupe. The extended range includes shrubs of 2 - 4 meters; leaves are opposite, simple and entire, smooth or softly-pubescent; flowers are pinkish to yellowish-white, grouped in terminal racemes; fruit is purple, sweet berry. Fruits eaten raw; said to purify the blood; made into tea and taken internally or used for baths to treat boils, *sarna* and to purify the blood. In shrub vegetation of the cold and temperate zones; the focal member is protected in temperate and hot zone. The purple-berried shrub forms are sometimes called ***naach ojts***, perhaps to distinguish them from true *nanches*.

Specifics:

(A) ***poo'p naach*** «white ***naach***» [MLS *Conostegia isocandra* and other genera and species]. These shrubs produce fruit which is said to never be attacked by insects.

(B) ***tsapts naach*** «red ***naach***» [MLP *Byrsonima*].

(C) ***yak naach*** «black ***naach***» [?]. This is said to be a tree species which apparently does not produce fruit, and while known to cause a burning sensation on the skin, is said to be a cure for poison ivy rashes.

71. ***naap kup***

Collections: EV0028, EV0293, EV0339, EV0352, JR0584, JR0679, JR0758, WR0015

Etymology: ***/naap/*** + ***/kup/*** = «Zapotec» + «tree». It is unclear why this tree is associated with the Zapotecs.

Description: A monotypic generic that corresponds to CLU *Vismia mexicana*. Shrubs of 2 - 5 meters with orangish-yellow sap; leaves simple, entire, opposite and ovate; flowers cream-white, found in the axils of the leaves; fruit a brown capsule. Wood used for fuel; juice of the berries used to treat skin wounds and boils. Found in secondary vegetation of the temperate and hot zone.

72. *naak*

Collections: ES0063, EV0191, JR0355

Etymology: ***/naak/*** = «Mixe proper name for a walnut relative».

Description: A monotypic generic that corresponds to JUG *Oreomunnea mexicana* (or SMB?). Trees of 15 - 30 meters; leaves large and compound, alternate; flowers inconspicuous, greenish-yellow; fruit is a brown, winged nut. Wood sawed into planks for use in furniture-making and construction. Found in primary and secondary forest of the temperate zone.

73. *nanik*

Collections: ES0143, ES0277, JR0148, JR1284, WR0078

Etymology: ***/na/*** + ***/nik/*** = «water» + «humid». The name possibly refers to the humid habitat where the plant grows.

Description: A monotypic generic that corresponds to EUP *Acalypha*. Small shrubs and herbs of up to 1 meter; leaves heart-shaped, alternate and serrate; flowers whitish to reddish-green, clustered in long, pendant inflorescences. The juice of the plant is taken internally for four days to treat dysentery; leaves, heated over fire, placed on back to treat backache. Some people consider that there are at least two specifics - ***poo'p nanik*** «white ***nanik***» and ***tso'ojmk nanik*** «purple ***nanik***».

74. *nataats kup*

Collections: JR0603

Etymology: ***/na/*** + ***/taats/*** + ***/kup/*** = «water» + «tooth» + «tree». Some Mixe have suggested that */nataats/* means «angled,square», apparently referring to angled stems; however, this plants has rounded stems.

Description: A monotypic generic that corresponds to *Solanum* aff. *aligerum*. Shrubs of 1 – 2 meters; leaves simple, alternate and entire; flowers star–shaped and yellowish–white; fruit a green berry. Wood used as posts in house and fence construction. Found in secondary forests of the temperate zone.

75. *natsamun kup*

Collections: JR0273, JR1025

Etymology: */na/* + */tsamun/* + */kup/* = «water» + «Mixe proper name for amaranth» + «tree».

Description: A monotypic generic that corresponds to MRS *Zunila alba*. Shrubs of 2 – 3 meters with yellowish stems; obovate, toothed leaves; open inflorescences of (white–) purple flowers, and hard fruits. Wood used as fuel; the stems are not used as posts since they are full of sap and tend to sprout. Found in shrub vegetation of the temperate zone.

76. *niispero*

Collections: ES0078, EV0051, JR0335, WR0008

Etymology: */niispero/* = «Mixe form of the Spanish proper name (*nispero*) for loquats».

Description: A monotypic generic that corresponds to ROS *Eriobotrya japonica*, a shrub native to China and Japan that is now widely cultivated in subtropical areas as an ornamental and fruit tree. Trees of 2 – 4 meters; leaves evergreen and deeply veined, spirally arranged, simple and serrate; flowers white, clustered into terminal racemes; fruit is an orange-yellow sweet, berry that containing 1 - several large seeds. Fruits eaten raw. Semi-cultivated near human settlements or escaped in abandoned ranches of the temperate and hot zones.

77. *niiv kųp*

Collections: JR0505

Etymology: */niiv/* + */kųp/* = «Mixe proper name for chile» + «tree». The name is apparently inspired by the fruits of this shrub, which are said to resemble green chilies.

Description: A monotypic generic that corresponds to LAU *Nectandra*?. Evergreen shrubs of 2 - 4 meters; leaves alternate, simple and entire; flowers yellowish-white and inconspicuous; fruits green, shaped like small chile peppers. The wood is used in house construction, but is not seen as fit material for roofs. Found in secondary vegetation in the temperate zone.

78. *nókum*

Collections: JR0041, JR0691, JR1001, JR1274

Etymology: */nókum/* = «Mixe proper name for some species of *Rapanea*».

Description: A monotypic generic that corresponds to species of MRS *Rapanea*, a large genus of tropical shrubs. Trees of 5 - 10 meters; leaves simple, entire and lanceolate, punctate with minute resin dots; flowers inconspicuous, greenish-white, borne in fascicles in the leaf axils; fruit a small drupe. Wood used in house construction, fence-making, and for fuel; birds are observed to eat the fruits in springtime. The wood is said to last only about six months when in contact with the soil; it is preferred for use in the upper part of the house. Found in shrub vegetation of the cold zone. See ***yuk tsoo'k*** for classification of broad-leaved species of *Rapanea*.

79. *no'op kup*

Collections: ES0142, EV0147, EV0184, EV0253, EV0268, JR0167, JR0497, JR0580, JR0617, JR0636, JR0930, JR0944, WR0021

Etymology: */no'op/* + */kup/* = «vulture» + «tree». Some Mixe say that the name is inspired by the observation that vultures often perch in these trees.

Description: A polytypic generic that corresponds to ARL *Dendropanax arboreus*. Trees of 20 – 30 meters with brittle stems; leaves alternate and palmately compound; flowers yellow greenish-white, in terminal clusters that form a compound umbel; the fruit is a drupe. The tree is an indicator of soil fertility, and may be used as firewood. Frequent in primary forest of the cold and temperate zones.

Specifics:

(A) ***poo'p no'op kup*** «white vulture tree» [ARL *Dendropanax arboreus*]

(B) ***yak no'op kup*** «black vulture tree» [ARL ?]

80. *nueces kup*

Collections: ES

Etymology: */nueces/* + */kup/* = «Spanish proper name for walnuts» + «tree».

Description: A monotypic generic that corresponds to JUG *Juglans regia*, the European walnut much cultivated in Oaxaca, and *J. pyramidatus*, a native walnut found in warm, humid parts of the Sierra. Trees of 10 – 30 meters; leaves large, alternate and compound, flowers greenish-yellow and inconspicuous; fruit a hard-shelled nut covered by an acrid green husk. Fruit eaten raw. The European species is cultivated in the drier areas of the municipality or more commonly purchased from villages in the pine–oak forest or from Zapotec market vendors. The wild species is found in the temperate zones lower than 1500 meters above sea level; it is relatively common in Tepitongo, but apparently absent in the communal lands of the cabecera of Totontepec.

81. ***nuu'pun kup***

Collections: ES0209, JR0538

Etymology: */nuu'pun/* + */kup/* = «blood» + «tree». The sap of this tree is apparently reminiscent of blood.

Description: A monotypic generic that corresponds to EUP *Croton draco*, a fast-growing tree that is a pioneer species in secondary formations of the tropical evergreen forest. Trees of 5 – 10 meters with reddish–orange latex; leaves heart-shaped, alternate; flowers grouped in pendant spikes; fruit a brown capsule. The sap is used to cure skin wounds. Common in the secondary vegetation of the hot zone.

82. ***ok ak***

Collections: ES0198, EV0174, EV0325, JR0381, JR0674, WR0138

Etymology: */ok/* + */ak/* = «dog» + «bark, leather–hide». The derivation of the name is not evident.

Description: A monotypic generic for which the focal member is ULM *Trema micrantha*, but the category may be extended to *Lozanella* and other Ulmaceae. Trees of 15 – 20 meters with very straight trunks; leaves heart–shaped, alternate,simple and serrate; flowers inconspicuous, greenish–white, grouped in cymose inflorescences; fruit a small purple–black drupe. Bark used to tie together poles in houses. Common in secondary vegetation of the temperate zone.

83. ***oo'xats***

Collections: ES0188, JR0053, JR0240, JR0628, JR1145, WR0028, WR0129

Etymology: */oo'xats/* = «Mixe proper name for some blueberries». ***xats*** means soap, but this is apparently unrelated to the derivation of this name.

Description: A polytypic generic that corresponds to ERI *Vaccinium leucanthemum*, other species of *Vaccinium*, a large cosmopolitan genus of shrubs that yield edible berries. Shrubs of 1 – 1.5 meters; leaves alternate, ovate and entire; flowers white and urn–shaped; fruit a purple–black berry. Berries of both forms eaten raw, but the white form is larger and more prized; the wood of the red form may be used for fence posts; leaves may be used for fever. Common in the shrub vegetation of cold and temperate zones. Called ***jonvin*** «bird's eye» or ***jonvin kaaky*** «bird's eye tortilla» in Tepitongo and Amatepec, a name derived from the shape and edibility of the fruit.

Specifics:

(A) ***poo'p oo'xáts*** «white *oo'xats*» [ERI *Vaccinium leucanthemum*]

(B) ***tsapts oo'xats*** «red *oo'xats*» [ERI *Vaccinium*]

84. ***pajpuk***

Collections: ES0172, JR0197, JR0883, JR0924, JR1207, WR0009, WR0148

Etymology: */pajpuk/* = «Mixe proper name for cedars (conifers)».

Description: A polytypic generic that corresponds to CUP *Cupressus benthamii* or JUN *Juniperus*, frequent elements of montane conifer forests in the Sierra Norte. Trees of 15 – 30 meters; needles short and sharply–pointed; cones or fruits small and rounded. Wood used in house construction and furniture; branches used to make the crown for king's day (January 6). Found in primary and secondary forests of the cold zone.

Specifics:

(A) ***poo'p pajpuk*** «white cedar» [JUN *Juniperus*]. This form has little dark heartwood.

(B) ***tsapts pajpuk*** «red cedar» [JUN *Juniperus*]. The trunks of this form are especially prized as house posts, since the heartwood is said to be very durable.

(C) ***yak pajpuk*** «black cedar» [JUN *Juniperus*]. This form has a dark heartwood, but the wood is said to be not very durable.

85. ***pak tsik***

Collections: ES0087, JR0418, JR0637, JR0656, JR0746, JR0870, JR1051

Etymology: ***/pak/*** + ***/tsik/*** + ***/kup/*** = «dove» + «harvest» + «tree». The name may be explained by the fact that doves and other birds eat the fruits of the madroño.

Description: A polytypic generic that corresponds to ERI *Arbutus xalapensis*, a tree that is common in montane forests of Mexico and Central America, and SAP *Dodonaea angustifolia*, a weedy New Zealand native that is found throughout temperate zones of the tropics. The white form is a trees of 10 – 20 meters; leaves simple, alternate, ovate and rather glossy; flowers showy, white and urn-shaped; fruit is a purple drupe. The red form is a shrub of 2 – 4 meters; leaves simple, alternate, lanceolate and glossy; flowers greenish-white and inconspicuous; fruit is an alate capsule. Wood of the white form used as house posts, and for fuel; branches of the red form used to make brooms and planting sticks; fruits of the white form observed to be eaten by doves and other birds. Found in the forests and shrub vegetation of the cold and temperate zone.

Specifics:

(A) ***poo'p pak tsik*** «white dove harvest» [ERI *Arbutus xalapensis*]

(B) ***tsapts pak tsik*** «red dove harvest» [SAP *Dodonaea viscosa*]

86. ***pak tukva'ajts***

Collections: ES0058, ES0176, ES0202, EV0189, JR0002, JR0480, JR629, JR0724, JR0906, WR0079

Etymology: */pak/* + */tukva'ajts/* = «paloma» + «empty». The derivation of the name is unclear, but it may refer in part to the hollow stems of these shrubs.

Description: A monotypic generic that corresponds to AST Eupatoriae. Shrubs of 1 – 2 meters; leaves opposite, roughly pubescent, rather fragrant; flowers grouped in composite heads, white to pinkish–red. Branchlets, boiled in water, used to clean wounds; leaves, boiled in water, taken as tea for ten days to prevent conception. Found in secondary forest and shrub vegetation in the cold and temperate zone.

87. ***pak vaj***

Collections: none

Etymology: */pak/* + */vaj/* = «dove» + «horn,antler». The derivation of this name is not evident, but it may be in part related to the observation that birds eats the pulpy fruits.

Description: A monotypic generic that corresponds to ROS *Crataegus pubescens*. Trees of 3 – 4 meters; leaves ovate, alternate, simple and serrate; flowers regular and white, clustered in the leaf axils; fruit a yellow–orange fleshy pome. The tree is apparently not cultivated in Totontepec, but villagers say that there are many trees in the Chinantla and the drier Mixe villages such as Tlahuitoltepec.

88. ***papaya***

Collections: none

Etymology: */papaya/* = «Spanish proper name for papaya fruits». The Copinalá Zoque term for papaya is found as a loan word in Xinca, Nahua and perhaps Ixcatlán (Campbell and Kaufmann 1967:81); it is possible that the original Totontepec Mixe name is cognate with the Zoque term.

Description: A polytypic generic that corresponds to CAR *Carica papaya*, a tropical American fruit tree that is cultivated throughout the tropics for its edible fruit; the category also includes some native wild species of *Carica*. Sparsely branched trees of 2 – 15 meters; leaves spirally arranged, large, deeply palmately-lobed; flowers regular, tubular and somewhat twisted; fruit is a large, orangish-yellow berry, the seeds are covered with a gelatinous substance. Fruits of both the wild and cultivated forms may be eaten, but the fruit is not commonly consumed in Totontepec. Cultivated in home gardens or wild in the forests of the temperate and hot zones.

Specifics:

(A) ***papaya*** (unmodified) «***papaya***» [CAR *Carica papaya*]

(B) ***yuk papaya*** «wild ***papaya***» [CAR *Carica* spp.]

89. ***pavo̱o̱n***

Collections: EV0066, EV0106, EV0113, JR0047, JR0059, JR0576, JR0596, JR0908, WR0084

Etymology: */pavo̱o̱n/* = «Mixe proper name for Mexican sunflowers» and also «secondary-vegetation». The polysemy is perhaps derived from the fact that this plant is a common element of early ecological succession.

Description: A polytypic generic whose focal members are AST *Tithonia*, *Vigueria excelsa*, but is also extended to other hispid shrubby composites such as AST *Lagascea helianthifolia*. Shrubs and large herbs with hispid pubescence; leaves broad, alternate and simple; flowers grouped in composite heads, yellow to white. The straight stems are used as a building material to make lofts. Found in shrub vegetation in cold and temperate zones; the red form is found in the temperate and hot zone.

Specifics:

(A) ***pavoon*** (unmodified) «***pavoon***» [AST *Tithonia*, *Vigueria excelsa*].

(B) ***tsapts pavoon*** «red ***pavoon***» [AST *Lagascea helianthifolia*], also called an ***it pavoon***, «hot country ***pavoon***».

90. ***pax_tee'n***

Collections: none

Etymology: /***pax***/ + /***tee'n***/ = «stem, longish» + «ladder, stairway». The notched stems of the columnar cacti are apparently reminiscent of the notched–log ladders commonly used in the Sierra. The reconstructed proto–Mixe–Zoque term for ladder is ****te'n***, indicating that ladders may have been a part of Mixe material culture for several thousand years.

Description: A monotypic generic that corresponds to columnar cacti. Shrubby, succulent plants; stems roughly cylindrinal, armed with numerous spines; leaves absent; flowers regular, solitary and sessile, composed of numerous, spirally arranged petaloid parts that are usually yellow to white; the fruit is a spiny or scaly berry, containing green to red flesh and numerous black or white seeds. Some of these fruits, which are called *pitahayas* in local Spanish, may be edible. Found in dry and hot zones near the Oaxaca valley; probably not present in Totontepec. This cactus is not well known in Totontepec; it is possible that other Mixe would consider it a non-affiliated generic.

91. ***pa̲'a̲jnt***

Collections: EV????

Etymology: ***/pa̲'a̲jnt/*** = «Mixe proper name for sycamore». The name may be derived from the word ***pa̲'a̲jntk*** «smooth», possibly because of the soft pubescence of sycamore leaves.

Description: A monotypic generic that is restricted to PLT *Platanus mexicanus*, a tree that is endemic to montane humid forests of Mesoamerica. Trees of 15 - 25 meters with scaly whitish-gray bark; leaves palmately-lobed, simple, and alternate; flowers are clusters in globose head that hang from the branches; fruit is a globose head of bristly seeds. The wood is apparently sawn into planks and used for construction. Frequent in temperate zones of the community, especially along rivers.

92. ***pa̲'a̲jntk ku̲p***

Collections: JR0500, JR720, JR851, JR1164, JR1187

Etymology: ***/pa̲'a̲jntk/*** + ***/ku̲p/*** = «soft, silky» + «tree». The name refers to the softly pubescent or glabrous leaves of the trees that comprise this generic.

Description: A monotypic generic that corresponds to RUB *Rondeletia liebmanni* and others species of this large tropical family; the category may be extended to some LAU. Shrubs of 2 - 4 meters; leaves opposite, ovate, and softly-publescent;

flowers tubular, greenish–white, yellow or burgundy red flowers; fruit a green capsule. Wood used for roofing slats in houses thatched with grass; flowers may used as adornment for the *«día de muertos»*. Frequent in primary and secondary forests of the cold zone.

93. ***pákum***

Collections: EV0144, JR0028, JR0228, JR0479, JR1068, JR1118, JR1285

Etymology: */pákum/* = «Mixe proper name for some thorny robust species of *Solanum*». The name may be derived from */pak/* which means witchcraft in Totontepec Mixe.

Description: A polytypic generic that corresponds to thorny, bushy species of SOL *Solanum*. Thorny shrubs of 1 – 2 meters; leaves alternate, lobed, and densely pubescent; flowers star–shaped, white to bluish–purple; ruit a round, greenish–purple berry. The leaves of the purple and red forms, boiled in water, prepared as a bath and as tea (taken in small amounts) to lower body temperature. Common in secondary shrub vegetation of all climatic zones, but especially common in the cold zone.

Specifics:

(A) ***poo'p pa'kum*** «white ***pákum***» [SOL *Solanum*]. This form is apparently not used.

(B) ***tsapts pa'kum*** «red ***pákum***» [SOL *Solanum*]

(C) ***tso'ojmk pákum*** «purple ***pákum***» [SOL *Solanum*]. This form may be synonomous with the red form.

94. ***pera***

Collections: none

Etymology: */pera/* = «Spanish proper name for pear».

Description: A monotypic generic that is restricted to pear varieties derived from ROS *Pyrus communis*, a tree of Eurasian origin much cultivated in temperate zones for its edible fruits, which was brought to the New World shortly after the Spanish conquest. Trees of 2 – 3 meters; leaves simple, alternate, broadly lanceolate, and serrate; flowers white, clustered in the leaf axils; fruit is a hard, sweet pome. Fruits eaten raw. Not cultivated in the municipality but people from Totontepec purchase the fruits from Mixe villages in the pine–oak forest and from Zapotec vendors.

95. ***pęjkx***

Collections: ES0174, EV0035, EV0249, JR0196, JR0210, WR0010, WR0147

Etymology: */pęjkx/* = «Mixe proper name for peach». It is possible that this name originally referred to native black cherries, and was expanded to include peaches that were brought by the Spaniards. Peaches are now the focal members, and native black cherries are called by a modified name (see following generic).

Description: A polytypic generic that corresponds to ROS *Prunus persica*, a tree of Chinese origin which is now widely cultivated in temperate areas for its edible fruit, and was probably introduced early in the colonial period by the Spanish. Trees of 3 – 4 meters; leaves simple, alternate, broadly–lanceolate, and serrate; flowers regular, white to pinkish–white, clustered in the leaf axils; fruit is a round, fleshy yellow–green drupe. Fruit eaten raw, and cooked in sugar syrup; leaves, crushed with aguardiente, rubbed on body or placed on the soles of the feet to break a fever; same preparation placed on jaw to relieve toothache, and placed on temples to treat headache. Cultivated in home gardens and orchards in the cold zone. chabacano, the apricot (*Prunus armeniaca*) is also cultivated in the community, and may be considered as a separate folk generic.

Specifics:

(A) ***poo'p pęjkx*** «white peach» [ROS *Prunus persica*]

(B) ***prisco pęjkx*** «prisco peach» [ROS *Prunus persica*]. This form corresponds to a freestone peach called «*durazno prisco*» in local Spanish.

96. ***pęjkx muu'k***

Collections: ES0053, ES0257, EV0255, JR0194, JR0198, JR0935, WR0149

Etymology: */pęjkx/* + */muu'k/* = «Mixe proper name for peach» + «suck». The name is perhaps derived from the way of eating this fruit – sucking the pulp off of the hard stone. This name is not cognate with the reconstructed protoMixe–Zoque term for chokecherry suggested by Campbell and Kaufmann (1967:87) ****nuhpe(n)***, a word that appears related to the Totontepec Mixe word for blood, ***nuu'pun***.

Description: A polytypic generic that corresponds to ROS *Prunus serotina* subspp. *capuli* and *serotina*. Trees of 5 – 10 meters; leaves broadly lanceolate, alternate and simple; flowers white, hanging in clusters from the leaf axils; fruit a reddish–black drupe, some sweet, some sour or astringent. Sweet fruit eaten raw in limited quantities; sour fruit sometimes eaten by children, observed to be eaten by foxes and other animals. Sweet variety semi–cultivated within village limits in the cold and temperate zones; the sour variety found in secondary shrub vegetation in the cold zone. See ***tsij ee'm*** for another native cherry species *Prunus brachybotrya*.

Specifics:

(A) ***pęjkx muu'k*** (unmodified) «sucking peach» [ROS *Prunus serotina* subsp. *capuli*]

(B) ***vaax pejkx muu'k*** «fox sucking peach» [ROS *Prunus serotina* subsp. *serotina*]

97. ***pe'tski***

Collections: ES0106, EV0045, JR0519, JR0528, JR0825, JR0833, JR1195, JR1264, WR0143

Etymology: ***/pe'tski/*** = «Mixe proper name for some leguminaceous bushes». ***/pe'ts/*** means to «drink in great quantity» and ***/ki/*** is used as a suffix for several plant names, but these clues don't clarify the origin of the name.

Description: A polytypic generic which has as its focal member FAB *Calliandra grandiflora*; the yellow form (and synonyms) correspond to FAB *Chamaecrista glandulosa*, *C. rufa* var. *rufa* and other related plants; the wild form is an unidentified leguminaceous tree. Shrubs of 1 – 2 meters; leaves alternate, compound and finely-divided leaves; flowers with many red exserted stamens, or yellow and irregular; fruit is a brown legume. The wood is highly prized as fuel, and it is said to be like oakwood. Common in shrub vegetation of the cold and temperate zones.

Specifics:

(A) ***poop pe'tski*** «white ***pe'tski***» [FAB *Calliandra grandiflora*]

(B) ***po'ts pe'tski*** «yellow ***pe'tski***» [FAB *Chamaecrista glandusoa*, *C. rufa* var. *rufa*]. This category may also be called ***tsay pe'tski*** «thin ***pe'tski***» or ***tsapts pe'tski*** «red ***pe'tski***»; these *Chamaecrista* species are also sometimes classified as specifics of *guaje*. There may also be a ***tsoxk pe'tski*** in this group.

(C) ***yuk pe'tski*** «wild ***pe'tski***» [FAB]

98. ***pipe***

Collections: EV0220, JR0332

Etymology: */pipe/* = «Mixe form of a Zapotec proper name for soapberry».

Description: A monotypic generic that corresponds to SAP *Sapindus saponaria*, a tropical American tree that yields berries that are high in saponin content, and are widely used as soap. Tree of 5 – 10 meters; leaves alternate and compound, the leaflets ovate; flowers cream–white flowers; fruit a green berry. Fruits infrequently used as a soap substitute in the ranches, where it is called *jojoba* in Spanish. Semi-cultivated in shrub vegetation of the hot zone.

99. ***pivayoon***

Collections: JR0800

Etymology: */pivayoon/* = «Mixe form of *pipian*, the local Spanish name of a cooked sauce». The roasted seeds of *Jatropha* were formerly used to make a cooked sauce.

Description: A monotypic generic that corresponds to one species EUP *Jatropha*, a large genus found in warm and tropical areas of North America. Shrubs of 2 – 3 meters; leaves alternate, simple, entire and broadly cordate; flowers white; fruit is a green capsule which yields a white, oily seed. Seeds, roasted and peeled, are eaten out of hand, or ground to make a cooked sauce. Semicultivated in fields and home gardens of the hot zone.

100. ***pojxun kup***

Collections: JR0132, JR0273, JR1025

Etymology: */pojxun/* + */kup/* = «iron/hatchet» + «tree». The name may refer to the particularly hard wood of these shrubs. Campbell and Kaufmann (1967:85) report that the reconstructed protoMixe–Zoque term for «hatchet» is ****pusan***.

Description: A polytypic generic that corresponds to RUB *Psychotria galeottiana* and, as the wild type, perhaps a species in the MRS. Shrubs of 2 – 3 meters; leaves elliptical, opposite and simple; flowers yellow, grouped in dense terminal panicles; fruit a purple drupe. The stems are used as construction poles. The typical form is found in forests of the temperate zone, while the wild form is of the cold zone.

Specifics:

(A) ***pojxun kup*** (unmodified) «iron/hatchet tree» [RUB]

(B) ***yuk pojxun kup*** «wild iron/hatchet tree» [MRS *Ardisia*?]

101. ***poom kup***

Collections: (JR 1989 collection)

Etymology: */poom/* + */kup/* = «incense» + «tree». The name is cognate with the reconstructed protoMixe–Zoque term for incense, **po·mV* (Campbell and Kaufmann 1967:85).

Description: A monotypic generic that corresponds to BRS *Bursera*, a tropical American genus of aromatic trees and shrubs; the category may also be extended to *Protium*, a genus of trees representd by two species in the Sierra Norte. Trees and shrubs of 2 – 10 meters, containing copious, fragrant resin; leaves spirally arranged and compound; flowers small, inconspicuous and yellow–white; fruit a very resinous and fragrant drupe. The tree is the source of an incense resin called copal in local Spanish; the resin is burned for ritual and medicinal purposes, such as to calm a woman who has had a miscarriage. Frequent in the drier, warmer areas of the municipality, especially near Tiltepec.

102. ***poo'p kaa'ch***

Collections: JR0283, JR0503, JR0727

Etymology: */poo'p/* + */kaa'ch/* = «white» + «scrape,scratch».

Description: A monotypic generic that corresponds to FAB or ROS. Tree of 20 - 30 meters with grayish-white trunk and thorny branches; leaves glabrous; flowers pink to white. Wood used in house construction as roof beams. Found in primary forests of the cold zone.

103. ***poo'p kup***

Collections: none

Etymology: */poo'p/* + */kup/* = «white» + «tree».

Description: A monotypic generic that corresponds to ?. Trees of 15 - 25 meters; flowers pinkish-white. The wood is said to be very fine, and to plane off easily in very thin strips - these listones may be used for decorative purposes; the wood is also sawed into planks for used in furniture-making and construction. Found in forests of the temperate zone.

104. ***poo'p xuu'k***

Collections: ES0108, EV0288, JR0152, JR0280, JR0951, JR1039, JR1082, JR1110, JR1136, WR0034

Etymology: */poo'p/* + */xuu'k/* = «white» + «aroma». The name refers to the white flowers that are become very fragrant in the nighttime.

Description: A polytypic generic that corresponds to SOL *Brugmansia* x *candida* and *B. suaveolans*, South American species that are cultivated as ornamentals throughout Mexico. Much branched shrubs of 2 - 3 meters; leaves alternate, large, soft-pubescent; flowers trumpet-shaped, pendant, white to pinkish-white, very fragrant at night. Whole plant used as a living fence; flowers used to adorn the altar of the church; crushed and placed on the cheeks to treat mumps and toothache; prepared with lard, placed on the soles of the feet to break a fever; leaves, ground together with corn dough, used as turkey feed. Protected in the shrub vegetation and home gardens of the community. The two varieties are differentiated by the color of the flower.

Specifics:

(A) ***po̲o̲'p po̲o̲'p xuu'k*** «white white-aroma» [SOL *Brugmansia*]

(B) ***tsapts po̲o̲'p xuu'k*** «red white-aroma» [SOL *Brugmansia*]

105. ***po̲x***

Collections: ES0009, EV0020, EV0060, EV0112, EV0132, EV0229, EV0232, EV0248, EV0303, EV0357, JR0081, JR0093, JR0200, JR0254, JR0757, JR1041, WR0033

Etymology: */po̲x/* = «Mixe proper name for guavas». The category is extended to oranges by Mixe speakers. Campbell and Kaufmann (1967:87) report that the reconstructed protoMixe-Zoque term for guava is ****po'os***.

Description: A polytypic generic that corresponds to MRT *Psidium guajava*, *P. guineense*, and probably *P. friedrichsthalianum* – tropical American species of guava – and may in some tree species belonging to the Myrtaceae; the category is also extended by some speakers to RUT *Citrus sinensis* and *C. aurantium*. Trees and shrubs of 1 – 15 meters; leaves simple, leathery, opposite, containing resin dots; flowers white and often fragrant; fruit is a rounded, yellowish, tartly sweet berry. Fruits eaten raw; or taken as tea to treat dysentary; leaves, ground and mixed with water, taken for dysentary. Cultivated or semicultivated in temperate and hot zones;

«stone» form found in forests of the cold zone.

Specifics:

(A) ***poo'p pox*** «white guava» [MRT *Psidium guajava, P. guineense?, P. friedrichsthalianum*]. This form yields the commonly eaten guavas.

(B) ***tsa pox*** «stone guava» [MRT *Psidium?*]. This is a tree species that is said not to bear edible fruit; it is found in the cold zone. A synonym may be ***ketspox*** «rock guava», a name used for guava used in Chinantequilla and Amatepec. ***pox*** is also extended to oranges in these communities; it is interesting to note that Chinantequilla borders on the Chinantla, where guavas and oranges are also classified together.

106. ***pox na'av puj***

Collections: ES0103, JR0356, JR0535, JR0847

Etymology: ***/pox/*** + ***/na'av/*** + ***/puj/*** = «Mixe proper name for guava» + «old» + «flower». It is possible that the overall morphology of this shrub is reminiscent of guava bushes, especially the evergreen foliage.

Description: A monotypic generic that corresponds to ERI *Befaria*, a small genus of showy shrubs that resemble rhododendrons. Pubescent shrubs of 1 - 1.5 meters; leaves evergreen and leathery, simple and entire; flowers showy, pinkish-white, grouped in terminal clusters; fruit is a green capusule. Flowers used as adornement for the church. Frequent in the secondary forests of the tempreate zone. Another species of *Befaria* is classified as ***poo'p akaa'y***.

107. ***pujk***

Collections: ES0102, ES0165, EV0053, EV0183, EV0209, JR0309, JR0498, JR0653

Etymology: ***/pujk/*** = «Mixe proper name for some soft-wooded trees».

Description: A polytypic generic that corresponds to TIL *Heliocarpus*, a small genus of tropical American trees much used as a source of fiber. Trees of 10 – 20 meters; leaves alternate, simple and heart-shaped; flowers small, clustered in reddish to yellowish inflorescences; fruit a hairy achene. Whole tree used to enrich the soil and provide shade for coffe plantations; trunks used to make benches and ladders; wood sawed while still green to make boards for house doors; bark, dried and peeled into strips, used to make rope to tie horses and other animals. Found in primary and secondary forests of temperate and hot areas.

Specifics:

(A) ***poo'p pujk*** «white ***pujk***» [TIL *Heliocarpus*]

(B) ***tsapts pujk*** «red ***pujk***» [TIL *Heliocarpus*]

108. ***sabiin kup***

Collections: ES

Etymology: ***/sabiin/*** + ***/kup/*** = «Mixe pronunciation of the Spanish proper name (*sabino*) for Mexican cypress» + «tree».

Description: A monotypic generic that is restricted to TXO *Taxodium mucronatum*, the Mexican cypress, a tree of the central and southern Mexican highlands. Coniferous trees of 20 – 30 meters; needles short and crowded along twigs in two opposite rows; cones small and rounded. The wood is considered to be very durable, and the trunk is used as a housepost, and as a crossbeam for lofts and doors. Found in humid forests of the cold zones, particularly along stream and rivers.

109. ***ta'am pax***

Collections: ES0188, JR0177, JR0310, JR0853, JR1198, JR1219

Etymology: */ta'am/* + */pax/* = «bitter» + «woody-stem». Apparently refers to the stout stem and bitter foliage of these plants.

Description: A polytypic generic which has AST *Verbesina hypoglauca* as a focal member; the category is extended to AST *Stevia* aff. *microchaeta*, and perhaps MRS and VRB *Lippia*. Shrubs and large herbs of 1 - 2 meters with few branches; leaves crenate to deeply-lobed simple and opposite; flowers grouped in composite heads, yellow and white or purple; fruit is one-seeded and indehiscent. Leaves of the white form, prepared as tea, taken for stomachache and heartburn; flowers of the black form used to adorn the church. The white form is common in the secondary forest of the temperate and hot zones; the black form is found in secondry vegetation of the cold zone.

Specifics:

(A) ***poo'p ta'am pax*** «white bitter woody-stem» [AST *Verbesina hypoglauca*]

(B) ***yak ta'am pax*** «black bitter woody-stem» [AST *Verbesina*; *Stevia microchaeta*]

110. *taatsk tay kup*

Collections: JR0620, JR1131

Etymology: */taatsk/* + */tay/* + */kup/* = «ear» + «hanging» + «tree». The name refers to the idea that the pendant flowers or fruits that hang like earrings.

Description: A monotypic generic that corresponds to LAU. Trees of 5 - 10 meters with blackish bark; flowers inconspicuous, yellowish-white flowers; fruit a green drupe. Wood used for roofing slats and fuel. Found in secondary forests of the temperate and hot zones. This category is is related to ***niiv kup***, which is said to have a whitish trunk.

111. ***ta'chki***

Collections: EV0171, EV0214, JR0506

Etymoloy: ***/ta'tyki/*** = «Mixe proper name for an *Inga* with large, edible fruits and seeds».

Description: A polytypic generic that corresponds to FAB *Inga jinicuil*; the wild form corresponds to Indigofera sp. Trees of 20 – 30 meters; leaves large and compound, alternate, the leaflets elliptical; flowers small and white, grouped in ball-like inflorescences; fruit a long, somewhat flattened legume that contain a sweet, cottony aril surrounding large, green seeds. The white aril is often eaten raw; the beans are boiled and combined with corn dough to make memelas, a type of thick corn bread. Found in secondary forests of temperate and hot zones, often near abandoned or present human settlements. Called ***nata'chki*** in Chinantequilla, perhaps sometimes called ***ta'tyki*** in Totontepec.

Specifics:

(A) ***ta'chki*** (unmodified) «***ta'chki***» [FAB *Inga jinicuil*]

(B) ***cimmarón ta'chki*** «wild ***ta'chki***» [FAB *Indigofera* sp.]

112. ***tampok***

Collections: JR0113, JR0114, JR0269, JR1155, WR0041

Etymology: ***/tampok/*** = «Mixe proper name for a medicinal shrub».

Description: A polytypic generic that corresponds to TEA *Ternstroemia sphaerocarpa*, a shrub that yields fruits widely sold in markets as a treatment for anxiety; the category is extended to RHM *Rhamnus serrata*? The red and white forms are small evergreen trees; leaves elliptical, opposite, simple and entire; flowers solitary in the leaf axils, regular and cream–white; fruit is a brown, spherical capsule. The black form is a tree of 10 – 15 meters; leaves ovate, simple, alternate and entire; flowers inconspicuous, greenish–white; fruit is a red drupe. Wood used as fuel and also for construction; trunk of the black form is considered very durable, and is used for cornerposts and other parts of the house. All forms are found in forests of the cold zone.

Specifics:

(A) ***poo'p tampok*** «white ***tampok***» [TEA *Ternstroemia*]

(B) ***tsapts tampok*** «red ***tampok***» [TEA *Ternstroemia*]

(C) ***yak tampok*** «black ***tampok***» [RHM *Rhamnus serrata*]

113. ***tijki***

Collections: EV0037, EV0180, JR0122, JR0422, JR1003, WR0042

Etymology: /***tijki***/ = «Mixe proper name for wax myrtle».

Description: A polytypic generic that corresponds to MYR *Myrica cerifera*, a shrub that ranges from the eastern United States to Mexico, and is the source of a wax that may be used in candle and soap–making. Shrubs of 1 – 2 meters; leaves obovate, toothed, arranged spirally around the stem; flowers greenish–white clustered in dense axillary spikes; fruit is a waxy drupe. Wood used for fuel; fruits observed to be eaten by birds in the springtime. Found in the primary and secondary forest of the temperate and hot zone. A synonym from Chinantequilla is ***tuux ujts***, «bat herb».

Specifics:

(A) ***poo'p tijki*** «white ***tijki***» [MYR *Myrica cerifera*]

(B) ***tsapts tijki*** «red ***tijki***» [MYR *Myrica cerifera*]

114. ***toxy ee'm***

Collections: JR0461, JR0618

Etymology: */toy/* + */xee'm/* = «burned» + «calmed,cooled». The derivation of the name is not evident.

Description: A monotypic generic that corresponds to AST?. Shrubs of 2 – 4 meters; stems square and whitish; leaves ovate; flowers greenish–white to yellow. Wood is used as fuel. Found in the secondary forest and shrub vegetation of the cold zone.

115. ***tsaa'k***

Collections: ES0067, ES0157, EV0176, JR0116, JR0614, JR0797, JR0815, JR0845, JR1262, WR0017

Etymology: */tsaa'k/* = «Mixe proper name for dogwood».

Description: A polytypic generic which has as its focal members COR *Cornus disciflora* and MNM *Mollinedia viridifolia*; there is a morphological similarity in the capitate inflorescences and frutescences of both shrubs. Trees of 5 – 15 meters; leaves opposite, broadly ovate, sometimes glossy green or reddish–green; flowers white in dense capitate clusters; fruit a purple drupe. Wood used for as roofing materials in house construction and for fuel. Common in the primary and secondary forests of the cold zone.

Specifics:

(A) ***poo'p tsaa'k*** «white ***tsaa'k***» [COR *Cornus disciflora*, MNM *Mollinedia viridifolia*]

(B) ***yak tsaa'k*** «black ***tsaa'k***» [COR *Cornus*]

116. ***tsapjaamdum***

Collections: none

Etymology: */tsap/* + */jaamdum/* = «prefix that usually indicates objects that are foreign to Mixe culture» + «Mixe proper name for raspberries». It appears that ***jaamdum*** was originally used exclusively for some native blackberries and that ***tsapjaamdum*** referred to mulberries (MOR *Morus alba* and possibly *M. nigra*) introduced by the Spanish in the 17th century. At present, ***tsapjaamdum*** is also used to refer to some introduced varieties of *Rubus*.

Description: A monotypic generic that corresponds to MOR *Morus alba* and possibly *M. nigra*, a natives of China that is naturalized in Europe and North America, and is the basis of Mexico silk industry. Trees of 5 – 10 meters; leaves simple, alternate, serrate and often lobed, rather glossy; male flowers grouped into catkins, female flowers aggregated into a pseudospike; fruit an aggregation of fleshy drupes, white to purple. The fruits may be eaten. Naturalized in warm, dry areas of the municipality.

117. ***tsaptsi'iv***

Collections: JR0322

Etymology: */tsap/* + */tsi'iv/* = «prefix that usually indicates objects that are foreign to Mixe culture» + «PN(squash)». The name apparently refers to the origin of the tree and the large size of the fruit.

Description: A monotypic generic that corresponds to RUT *Citrus medica*, called *sidra* in local Spanish, a native of India which spread to the Mediterranean and from there to the New World. Trees of 4 – 8 meters; leaves simple, entire, alternate and ovate; flowers regular, white, and fragrant; fruit a very large, greenish-yellow and sour hesperidium. Apparently without use? Cultivated in hot zones.

118. ***tsaptsoo'k***

Collections: MI00SN

Etymology: ***/tsap/*** + ***/tsoo'k/*** = «prefix that usually indicates objects that are foreign to Mixe culture» + «Mixe proper name for zapote».

Description: A polytypic generic that corresponds to RUT *Citrus aurantium* and *C. sinensis*, sweet and sour oranges, Asian trees that are widely cultivated in tropical and subtropical for their edible fruit. Trees of 5 – 10 meters with thorny branches; leaves glossy, ovate, alternate and simple; flowers regular, fragrant and white; fruit a juicy, round, yellowish orange that may be sweet or sour. Fruit eaten raw. Cultivated in the hot zones of lowland ranches, in which it is more commonly called ***pox*** (guava).

Specifics:

(A) ***pa'ajk tsaptsoo'k*** «sweet sky zapote» [RUT *Citrus sinensis*?] A descriptive synonym for a subtype is ***tsap tsoo'k juu' ka'a pajk_xup*** «sky sapote which no seed»

(B) ***xónun tsaptsoo'k*** «sour sky zapote» [RUT *C. aurantium* ?]

119. ***tsapxijts***

Collections: none

Etymology: ***/tsap/*** + ***/xijts/*** = «prefix that usually indicates objects that are foreign to Mixe culture» + «Mixe proper name for some avocados».

Description: A polytypic generic that corresponds to LAU *Persea americana*. Trees of 15 – 25 meters; leaves alternate, simple, entire; flowers inconspicuous, yellowish–white; fruit a blackish–green drupe. Fruits eaten raw; leaves of this variety are not used as condiment. Cultivated in fields and homegardens of the community. It appears that some people might consider that ***tsap xijts*** corresponds to the common fig, MOR *Ficus carica*; this shrub is more commonly called by its local Spanish name, ***higo***.

Specifics:

(A) ***tsapts tsapxijts*** «red foreign–avocado» [LAU *Persea americana*]

(B) ***yak tsapxijts*** «black foreigh–avocado» [LAU *Persea americana*]

120. ***tsapxoj***

Collections: none

Etymology: */tsap/* + */xoj/* = «prefix that usually indicates objects that are foreign to Mixe culture» + «Mixe proper name for oak». The leaves of the membrillo are apparently reminiscent of oak foliage.

Description: A monotypic generic that corresponds to ROS *Cydonia oblonga*, the quince tree, a native of Europe that was brought to the New World after the Spanish conquest, and is now cultivated widely in temperate climates. Trees of 3 – 6 meters; leaves alternate, simple and entire; flowers white, regular; fruit a sour green pome. Fruit, dusted with bicarbonate of soda to reduce sourness, may be eaten raw. Occasionally cultivated in home gardens of the community, especially in cold zones.

121. ***tsapyaav***

Collections: EV0029, EV0286, EV0340

Etymology: */tsap/* + */yaav/* = «prefix that usually indicates objects that are foreign to Mixe culture» + «*elote* (corn–on–the–cob)». The name is perhaps due to the observation that pomegranite seeds are fresh corn kernels.

Description: A monotypic generic that corresponds to PUN *Punica granatum*, a Eurasian trees that is widely cultivated throughout the tropics and subtropics for its edible fruits. Small trees of 1 – 3 meters; leaves oblong, simple, alternate and entire; flowers red, having a persistent red calyx; fruit globose, containing numerous red, juicy seeds. Seeds eaten raw. Apparently not cultivated in the cabecera of Totontepec, but it may be known from the ranches.

122. ***tsatyóguk***

Collections: ES0013, ES0079, JR0120, JR0121, JR0423, JR0548, JR0601, JR0855, JR0856, JR0911, JR1189, WR0061

Etymology: */tsa/* + */tyóguk/* = «stone» + «Mixe proper name for viburnum». ***tyóguk*** is translated as «precious» or «tortoise-shell» by some Mixe.

Description: A polytypic generic whose focal member is CPR *Viburnum acutifolium*, while the wild type is a Rubiaceae. Small trees or shrubs of 2 – 4 meters; leaves opposite, ovate, simple and entire; flowers white, clustered into dense rounded terminal inflorescences; fruit a greenish to purplish drupe. Wood of all forms used as fuel, and as fence posts for home gardens; wood of white and black forms used to make kitchen utensils (stirring rod for stews and sauces); flowers used for ornament on the All Saint's Day. Common in the primary and secondary forests of the cold zone.

Specifics:

(A) ***poo'p tsatyóguk*** «white stone–viburnum» [CPR *Viburnum acutifolium*]

(B) ***yak tsatyóguk*** «black stone–viburnum» [CPR *Viburnum*]

(C) ***yuk tsatyóguk*** «wild stone–viburnum» [RUB *Rondeletia amoena*]

123. ***tsejst***

Collections: ES0036, EV0072, EV0312, JR0296, JR0297, JR1059

Etymology: */tsejst/* = «Mixe proper name for coral trees».

Description: A polytypic generic that corresponds to FAB *Erythrina americana*, and other species of this tree genus found in warm areas, and planted around the world for for shade and ornament. Trees of 4 – 10 meters; leaves alternate and compound, consisting of three broadly-ovate leaves; flowers scarlet-red, tubular, grouped in dense terminal inflorescences; fruit a legume with orange-red seeds. Some mixe report that the flowers and tender leaf shoots of the white form are edible, boiled in water; the leaves of the red type are taken in tea three days a day to stop excessive menstrual bleeding; the stems are planted as a living fence since they sprout readily. Occasional in the secondary forest of the cold and temperate zones.

Specifics:

(A) ***poo'p tsejst*** «white *tsejst*» [FAB *Erythrina*]

(B) ***tsapts tsetst*** «red *tsejst*» [FAB *Erythrina*]

124. ***tsiijn***

Collections: ES0090, JR0931, JR0937, JR1129

Etymology: */tsiijn/* = «Mixe proper name for resinous pines».The term also means «torches or candles»; the polysemy is due to the former use of pitch-pine kindling as torches.

Description: A polytypic generic that corresponds to PIN *Pinus* spp. Trees of 10 – 25 meters with very resinous wood; needles long, green, rather erect; cones rounded and grayish-brown. Wood, split into broad splinters, used to start fires, formerly used as torches; branchlets used as adornment for King's day (January 6). Frequent in primary and secondary forests; the white form is found in cold country, the red form in hot zones, and the black form in temperate areas.

Specifics:

(A) ***poo'p tsiijn*** «white pitchpine» [PIN *Pinus*]

(B) ***tsapts tsiijn*** «red pitchpine» [PIN *Pinus*] A common synonym for this form is ***uk tsiijn*** «dog pitchpine». This form may be used in the production of a local type of combustible resin (said to be similar to kerosene).

(C) ***yak tsiijn*** «black pitchpine» [PIN *Pinus*]. This is considered to be a synonym of ***yak kújunts***, meaning that the two generics are partially overlapping.

125. *tsii'kpa kup*

Collections: ES0046, EV0136, EV0175, JR0008, JR0204, JR0227, JR0718, JR0748, JR0912, JR1040, JR1047

Etymology: ***/tsii'kpa/*** + ***/kup/*** = «stick-to» + «tree». The plants in this generic have sticky, resinous leaves.

Description: A polytypic generic that corresponds to AST *Baccharis conferta*, one of the most common shrubs in secondary vegetation of the Sierra Norte. Much-branched shrubs of 1 – 2 meters; leaves waxy, obovate, alternate and lobed; flowers white, grouped in composite heads that emerge from the leaf axils. Leaf tips, combined with many different herbs and moistened with aguardiente, placed on the soles of the feet to lower fever; branchlets used to make brooms, said to repel fleas; wood used for fuel, said to burn as well as oakwood. Abundant in shrub vegetation of all climatic zones. The specifics are differentiated by a white, black or red cast on the twigs and foliage. Sometimes classified as an herb, ***tsii'kpa ojts*** «stick-to herb», or sometimes called ***ku'u taatsk***, «squirrel ear» in Chinantequilla.

Specifics:

(A) ***poo'p tsii'kpa kup*** «white stick-to tree» [AST *Baccharis conferta*]

(B) ***yak tsii'kpa kup*** «black stick-to tree» [AST *Baccharis conferta*]

126. ***tsii'n***

Collections: ES0054, EV0061

Etymology: /***tsii'n***/ = «Mixe proper name for a white-fleshed, oily, rather sweet avocado. This name is probably cognate with the reconstructed protoMixe-Zoque term ****ćiinu***, which means «honey» (Campbell and Kaufmann 1967:87). This avocado goes by two names in local Spanish – *aguacate chinene* or *aguacate chupon*.

Description: A polytypic generic that corresponds to LAU *Persea schiedeana*, a avocado that is planted in humid forests of the Sierra Norte. Trees of 15 – 20 meters; leaves alternate, simple, entire, large and obovate, yellow-green; flowers inconspicuous, greenish-white; fruit a large crook-neck drupe that has whitish-green flesh containing fibrous strings. Fruit eaten raw; trees used to shade coffee groves? Cultivated in secondary forest of the tempreate and hot zones.

Specifics:

(A) ***poo'p tsii'n*** «white ***tsii'n***» [LAU *Persea schiedeana*]

(B) ***xa'k tsii'n*** «agave-fiber ***tsii'n***» [LAU *Persea schiedeana*]

(C) ***yaajnit tsii'n*** «long ***tsii'n***» [LAU *Persea schiedeana*]

127. ***tsij ee'm***

Collections: JR0115, JR0261, JR0961

Etymology: */tsij/* + */ee'm/* = «Mixe proper name for a bird» + «vein, hard». The bird, according to Schoenhals and Schoenhals (1965:330) is *Basileuterus belli* belli, called *verdin de toca amarilla* in Spanish.

Description: A monotypic generic that corresponds to ROS *Prunus brachybotrya*, a native cherry tree found in humid montane forests of teh Sierra Norte. Trees of 15 – 20 meters; leaves simple, ovate, alternate and entire; flowers white, grouped in pendant axillary clusters, fruit a reddish–black drupe. Wood used as fuel, and posts. Found in primary forest of temperate and cold zones. The similarity between this species and *P. serotina* subsp. *serotina* is recognized by the Mixe, who say that the two are «brothers». Some Mixe recognize a white and a red form of this tree, but the two specifics do not appear to be very salient.

128. ***tsim kup***

Collections: none

Etymology: */tsim/* + */kup/* = «gourd dipper» + «tree». This name is cognate with the reconstructed protoMixe–Zoque term for gourd, ***ċima**, which has been borrowed into many Mayan languages (Campbell and Kaufmann 1967:84).

Description: A monotypic generic that corresponds to BOR *Crescentia cujete*, the cabash–tree, a widely cultivated native of tropical America that yields fruits which are made into a wide variety of utensils. Trees of 10 – 15 meters; leaves opposite, large, compound; flowers white, solitary, rather showy, emerging directly from the trunk and branches; fruit woody and rounded, contain numerous seeds in a mucilaginous pulp. The woody pericarps of the fruits are used as containers. Occasionally cultivated in the hot zone. Some Mixe recognize specifcs based on the shape and size of the fruit.

129. ***tsi'ntsun***

Collections: JR0188, JR0464, JR0469, JR0483, JR0625, JR0936, JR0965, JR1013, JR1030, JR1032

Etymology: ***/tsi'ntsun/*** = «Mixe proper name, possibly derived from paint or dye». Some younger people now call this shrub ***tinta kup*** «ink tree».

Description: A polytypic generic that corresponds to some herbs such as ONA *Fuchsia*, and some shrubs such as ACA, PLG *Monnina xalapensis*, RUB *Deppea scotii*. The shrubs grow to 2 - 4 meters; leaves opposite, simple, entire and glabrous; flowers purple, red or yellow, often clustered in showy terminal inflorescences; fruit a red to purple berry or drupe. Fruits of the typical form reported to have been formerly crushed and strained through a cloth to make ink and a detergent for washing clothes. Common in shrub vegetation in the cold zone. Sometimes classified as ***tsi'ntsun ojts***; or called ***jon kaaky*** in Tepitongo.

Specifics:

(A) ***tsi'ntsun*** (unmodified) «***tsi'ntsun***» [PLG *Monnina xalapensis*]. There is apparently an herb form that thas red flowers and green fruits, and that is may also be used as a detergent.

(B) ***po'ts tsi'ntsun*** «yellow ***tsi'ntsun***» [ACA]. This form is a shrub.

(C) ***tsapts tsi'ntsun*** «red ***tsi'ntsun***» [ONA *Fuchsia*]. This form is an herb.

(D) ***yuk tsi'ntsun*** «wild ***tsi'ntsun***» [RUB *Deppea scotii*]. This form is apparently not used in any way.

130. ***tsoo'k***

Collections: JR0553

Etymology: */tsoo'k/* = «Mixe proper name for black zapote».

Description: A monotypic generic that corresponds to SPT *Diosporys digyna*, the black zapote, a tree native to Mexico and Central America, now naturalized in parts of Asia. Trees of 15 – 30 meters; leaves alternate, simple, entire, and rather glossy; flowers greenish–yellow, regular, solitary in the leaf axils; fruits a large green, rounded berry, containing a sweet, black pulp and several shiny seeds. Fruits eaten raw. Cultivated in the temperate and hot zones.

131. ***tso'ojn***

Collections: ES0051, JR0034, JR0502, JR0504, JR1159, WR0043

Etymology: */tso'ojn/* = «Mixe proper name for a cloud forest tree».

Description: A polytypic generic that corresponds to CUN *Weinmannia pinnata*, a cloud forest species of a large genus of trees that are often used for timber, tanning and medicine in various parts of the world. Trees of 20 – 30 meters; leaves opposite, ornate, pinnately–compound; flowers inconsicuous, cream–white, grouped in pendant, spike–like inflorescences; fruit a brown capsule that remains adhered to the flowering stalk. Wood used in house construction; said to be used as a roofing material, it rots too easily in the ground to be used as houseposts. Common in the primary forests of cold zones. The specifics are distinguished by their bark and wood color.

Specifics:

(A) ***poo'p tso'ojn*** «white ***tso'ojn***» [CUN *Weinmannia pinnata*]

(B) ***tsapts tso'ojn*** «red ***tso'ojn***» [CUN *Weinmannia pinnata*]

132. ***tsujxk***

Collections: EV0038?, EV0055?, EV0120, EV0275, EV0309, JR0164, JR0370, JR0509, JR0798

Etymology: */tsujxk/* = «Mixe proper name for some leguminaceous shrubs».

Description: A polytypic generic that corresponds to FAB *Dyphysa* and *Indigofera thibaudiana*. Trees and shrubs of 2 – 10 meters; leaves alternate, compound, composed of numerous small leaflets; flowers yellowish-white, grouped in pendant racemes; fruit a whitish-green flattened legume. Wood used for houseposts and sugarcane presses; leaves, made into tea or placed on body, used to relieve rheumatism. Found in secondary forest and shrub vegetation of the temperate and hot zones.

Specifics:

(A) ***poo'p tsujxk*** «white *tsujxk*» [FAB *Indigofera*]. This form is said to have no colored heartwood.

(B) ***tsapts tsujxk*** «red *tsujxk*» [FAB *Dyphysa*]. This form is said to have a red heart.

133. ***tsuuj***

Collections: ES0050, EV0044, EV0124, EV0256, EV0337, JR0185, JR0257, JR0425, JR0885, JR0907, JR1270, WR0018

Etymology: */tsuuj/* = «Mixe proper name for sweet gum».

Description: A polytypic generic that corresponds to HAM *Liquidambar styraciflua*, the sweet gum, a species with a disjunct distribution in the eastern United States and Mesoamerica, often used for woodworking and as medicine for skin diseases. Trees of 10 – 20 meters with white wood; leaves simple, alternate, palmately-lobed, and often reddish-green; flowers greenish-white, aggregated in globose heads; fruit aggregated in a woody, globose sphere. Wood used as cross–beams in house construction; branchlets of the white used as wisk to cleanse the body in a temascal bath; resin, called ***tsuuj taats***, used to cure skin wounds. Abundant in primary and secondary forest of all climate zones.

Specifics:

(A) ***poo'p tsuuj*** «white liquidambar» [HAM *Liquidambar styraciflua*]

(B) ***tsapts tsuuj*** «red liquidambar» [HAM *Liquidambar styraciflua*]

134. *tukxooxun kup*

Collections: JR0702, JR0967

Etymology: ***/tuk/*** + ***/xooxun/*** + ***/kup/*** = «prefix infers something cut, or something hold something with the fingers» + «whistle» + «tree». The name refers to the use of the stems to make flutes.

Description: A polytypic generic that corresponds to AST *Barlettina sordida*, and perhaps other shrubs with pithy stems that may be hollowed out to form tubes. Shrubs of 2 – 3 meters; stems blackish, rigid, pithy; leaves ?; flowers purple, grouped into composite heads. Stems were formerly used to fashion homemade whistles that were used in traditional Mixe music. Found in secondary forests; the white form in the cold zone, and the black form in the temperate zone. Also called ***corneta kup*** and ***clarín kup***, both names of Spanish origin that refer to musical instruments.

Specifics:

(A) ***poo'p tukxooxun kup*** «white whistle tree» [AST *Eupatoriae*]

(B) ***yak tukxooxun kup*** «black whistle tree» [AST *Eupatoriae*]

135. ***tuu'n***

Collections: JR0589

Description: A monotypic generic that corresponds to MOR *Pseudolmedia oxyphyllaria*, a small genus of trees found in the tropics of Latin America. Trees of 20 – 30 meters, cotaining white latex; leaves broadly–lanceolate, alternate and simple, somewhat leathery; flowers inconspicuous and whitish–green, grouped in dense heads; fruit fleshy?. Wood used in house construction. Found in primary forests of the temperate zones.

136. ***tu̲'nu̲k***

Collections: JR0029a, JR0351, JR0389, JR0555, JR0565, JR0826, JR0881, JR1263

Etymology: */tu̲'nu̲k/* = «Mixe proper name for a diverse group of trees». Curiously, the reconstructed PZo term for turkey is ****tu'nuk***, which is rather different thatn the PMi reonstructed term ****tuutuk***, has been borrowed into many other Mesoamerican languages. It is possible that the name of this generic is a cognate of the PZo term for turkey.

Description: A polytypic generic that corresponds to BOR *Cordia*, FAB *Ateleia*, and SOL *Cestrum*. The white form is a tree of 15 – 25 meters; leaves compound; fruit a legume. The other forms are shrubs of 3 – 5 meters; leaves alternate, simple, often dark green and glossy; flowers tubular yellow to purple; fruits a berry? Wood of black form used for houseposts; wood of the red and wild forms used as fuel and for homegarden fenceposts; white form reputed to be medicinal. White form is found in and around the village; black form found in ranches; wild and red form found in forests of cold country.

Specifics:

(A) ***poo'p tu'nuk*** «white ***tu'nuk***» [SOL *Cestrum*]

(B) ***tsapts tu'nuk*** «red ***tu'nuk***» [SOL *Cestrum*]

(C) ***yak tu'nuk*** «black ***tu'nuk***» [FAB *Ateleia*]

(D) ***yuk tu'nuk*** «wild ***tu'nuk***» [BOR *Cordia*?, SOL *Cestrum*]

137. ***ujxpun***

Collections: ES0268, JR0060, JR0419, JR0928

Etymology: ***/ujxpun/*** = «Mixe proper name for a common shrub».

Description: A polytypic generic that corresponds to ERI *Lyonia squamulosa*, a common shrub of rocky soils and disturbed sites in montane areas of Mexico. Shrubs of 1 – 1.5 meters; leaces small, ovate, alternate and simple, covered with reddish–brown scales; flowers white and urn–shaped; fruit a dry, brown capsule. Branchlets used to make brooms; wood used as fuel; stems employed as fenceposts for home gardens. Common in shrub vegetation of the cold and temperate zones.

Specifics:

(A) ***poo'p ujxpun*** «white ***ujxpun***» [ERI *Lyonia squamulosa*]

(B) ***tsapts ujxpun*** «red ***ujxpun***» [ERI *Lyonia squamulosa*]

138. ***vimpo'k***

Collections: EV0133, JR0357, JR0496, JR0588, JR0664

Etymology: ***/vimpo'k/*** = «Mixe proper name for a cloud forest tree». Some Mixe analyze the name as ***/viijn/*** + ***/po'k/*** = «eye» + «dense», perhaps referring to the solidity of the wood.

Description: A polytypic generic that corresponds to tree species of LAU. Trees of

15 – 25 meters; leaves alternate, simple, entire, slightly pubescent; flowers white, inconspicuous; fruit a green drupe said to be reminiscent of earrings. Wood used as houseposts, or sawed into boards for furniture construction. Frequent in forests of the cold zone. The varieties are distinguished by the color of the wood.

Specifics:

(A) ***poo'p vimpo'k*** «white ***vimpo'k***» [LAU]

(B) ***tsapts vimpo'k*** «red ***vimpo'k***» [LAU]

(C) ***yak vimpo'k*** «black ***vimpo'k***» [LAU]

139. ***vintoo'y kup***

Collections: ES0230, EV0135, EV0150, JR0031, JR0453

Etymology: */viijn/* + */too'y/* + */ojts/* = «eye» + «burned» + «herb». */vintoo'y/* means «spot on the face»; the name refers to use the use this plant in treating facial marks.

Description: A monotypic generic that corresponds to PAP *Bocconia arborea* and *B. frutescens*, tree–celandine, a tropical American shrub naturalized in parts of Asia and used as a dye and treatment for skin growths. Shrubs of 2 – 3 meters with reddish–orange latex and whitish–gray stems; leaves large, toothed, spirally arranged; flowers yellowish–green, apetalous, grouped in a terminal raceme; fruit a capsule. Juice said to used to treat facial skin blemishes caused by excess pigmentation. Found in shrub vegetation of the cold zone. This category overlaps or is synonymous with ***tsii'k ujts*** «cockroach herb», a name used in Tepitongo and Chinantequilla for *Bocconia*.

140. ***vintso'ox ápit***

Collections: JR0781

Etymology: */viijn/* + */tso'ox/* + */ápit/* = «eye» + «difficult» + «thorn».

Description: A monotypic generic that corresponds to ROS? Shrubs of 2 – 3 meters with whitish–gray, thorny stems; leaves simple, alternate, greensih–white; flowers white and regular; fruit green. Apparently without use, but noted because the thorns cause itching and swelling when they prick; people avoid walking in or clearing land covered by this shrub. Found in the shrub vegetation in the hot zone.

141. ***xiikx***

Collections: ES0016, ES0123, EV0003, EV0228, EV0317, JR0084, JR0852, JR1048, JR1078, JR1135, JR1200, WR0062

Etymology: /*xiikx*/ = «Mixe proper name for elderberry».

Description: A polytypic generic that corresponds to CPR *Sambucus* and SMB *Picramnia*. Trees and shrubs of 2 – 5 meters; leaves opposite, large, compound, composed of numrous ovate and serrate leaflets; flowers small, white, clustered into dense terminal inflorescences; fruit a red to purple berry. Flowers of the typical form, boiled in water with sugar, taken to treat coughs; leaves, mixed with other herbs and moistened with *aguardiente* or oil, placed on the body (especially the soles of the feet) to reduce fever; heated over a fire, applied externally used to treat rheumatism and skin wounds; boiled in water, used as a soak for aching feet; young leaves, ground with *aguardiente*, placed at the back of the head to stop noseblood; flowers of typical and wild forms used as ornmanent on the All Saints Day. Found in the secondary and shrub vegetation of the cold and temperate zone.

Specifics:

(A) ***xiikx*** (unmodified) «*xiikx*» [CPR *Sambucus*]. This is also commonly referred to as ***poo'p xiikx*** «white ***xiikx***»

(B) ***yuk xiikx*** «wild ***xiikx***» [SMB *Picramnia*]

142. ***xii'ts***

Collections: ES0055, ES0068, EV0324, JR0129, JR0289, JR0291, JR0458, JR0834, JR1111, JR1161, JR1177, WR0023

Etymology: */xii'ts/* = «Mixe proper name for *Saurauia*».

Description: A polytypic generic that corresponds to ACT *Saurauia conzattii*, *S. scabrida* and other species of this large tropical genus known for its edible if insipid fruits. Small trees and shrubs of 2 - 4 meters; leaves simple, spirally arranged, usually toothed; flowers white, regular, grouped in rather showy terminal clusters; fruit a berry containing gelatinous, somewhat insipid pulp and numerous small seeds. Fruits eaten raw, especially by children; leaves used as fodder for cattle and goats; taken as tea, used for fevers and for chicken pox. Found in the primary and secondary vegetation of all zones.

Specifics:

(A) ***poo'p xii'ts*** «white ***xii'ts***» [ACT *Saurauia scabrida*]. This is the most prized form.

(B) ***maaxun xii'ts*** «small ***xii'ts***» [ACT *Saurauia conzatti*]. This form, which may also be called ***po'ts maaxun xii'ts*** «yellow small ***xii'ts***», has little pulp.

(C) ***tsapts xii'ts*** «red ***xii'ts***» [ACT *Saurauia*]

143. ***xijts***

Collections: ES0137, JR0181, JR0287, JR0459, JR0554, WR0012, WR0096

Etymology: */xijts/* = «Mixe proper name for some avocado trees».

Description: A polytypic generic that corresponds to LAU *Persea americana* var.

drymifolia. Trees of 10 - 15 meters; leaves alternate, simple, entire, rather shiny and anise-scented leaves; flowers small and greenish yellowish, grouped in axillary clusters; fruit a small, egg-shaped, dark-green drupe, with an anise-like scent and taste. Fruits eaten raw; leaves, made in tea, taken by women in labor to speed childbirth; leaves used whole or ground to flavor food. Semi-cultivated in home gardens and shrub vegetation of the cold and temperate zones.

Specifics:

(A) ***naap xijts*** «Zapotec *xijts*» [LAU *Persea americana* var. *drymifolia*]. The fruit of this form is elongate.

(B) ***poo'p xijts*** «white *xijts*» [LAU *Persea americana* var. *drymifolia*]

(C) ***tsapts xijts*** «red *xijts*» [LAU *Persea americana* var. *drymifolia*]

(D) ***yak xijts*** «black *xijts*» [LAU *Persea americana* var. *drymifolia*]

144. ***xijts aam***

Collections: JR0189

Etymology: */xijts/* + */aam/* = «Mixe proper name for some avocado trees» + «mute, or closed as a flower bud». The name apparently refers to the small, avocado-like fruits of this lauraceous shrub. The reconstructed protoMixe-Zoque term for deaf-mute is ****ʉma*** (Campbell and Kaufmann, 1967:86); this may be extended in meaning to include flowers and fruits that are small or closed.

Description: A monotypic generic that corresponds to LAU *Nectandra salicifolia*. Small trees of 2 - 4 meters; leaves alternate, simple, entire, rather glossy-green; flowers cream-white, rather inconspicuous; fruit a small, green drupe. Wood used as fuel. Found in shrub vegetation of the cold zone.

145. ***xoj***

Collections: ES0153, EV0039, EV0105, EV0227, EV0318, JR0331, JR0350, JR0391, JR0428, JR0445, JR0510, JR0917, WR0031, WR0047, WR0130.

Etymology: */xoj/* = «Mixe proper name for oak».

Description: A polytypic generic that corresponds to FAG *Quercus candicans*, *Q. lancifolia*, *Q. laurina*, *Q. persiifolia* and many other species of this large and complex genus of tropical montane and temperate zones. Trees of 10 – 25 meters; leaves alternate, simple, usually leathery, of variable shape and pubescence; male flowers grouped in catkins, female flowers inconspicuous, clustered in the leaf axils, fruit an acorn. Wood used for house cornerposts and for fuel, for plow and sugar cane mill; bark?, taken as tea?, used for vomiting and diarrhea. Abundant in primary and secondary forest in all climate zones; the various specifics may be restricted to one or more climate zones.

Specifics:

(A) ***ji'nun xoj*** «hard oak» [FAG *Quercus lancifolia*]. This form, which is made into cornerposts said to last for more than forty years, may be further classified into white, red and black varietals; it is found in the cold zone.

(B) ***naak xoj*** «***naak*** oak» [FAG *Q. candicans*]. This form is found in hot country.

(C) ***poo'p xoj*** «white oak» [*Quercus candicans*]. This form has two unnamed varietals, one in the cold zone and the other in the hot country.

(D) ***tsapts xoj*** «red oak» [FAG *Q.* aff. *laurina*, *Q. persiifolia*]. This form is prefered as a source of wood for making carbon; it is found in temperate and hot zones.

(E) ***tsaxoj*** «stone–oak» [FAG *Quercus*]. This is a shrubby form found in hot country;

the wood is used to make sugar–cane presses.

(F) ***tsaxyoj*** «thin–oak» [FAG *Quercus*]. This narrow–leaved form is found in the cold zone, and may be differentiated into three varietals, white, red and black.

(G) ***vaa'y xoj*** «? oak» [FAG *Quercus*]. This form is found in hot country.

(H) ***xijts axyoj*** «avocado leaf–oak» [FAG *Quercus scytophylla*]. This form is restricted to hot country.

(I) ***yak xoj*** «black oak» [FAG *Quercus*]. This form may de differentiated into two unnamed varietals, one found in hot country, the other in the cold zone.

146. ***xókum***

Collections: ES0200, JR0442, JR0723, JR0929?

Etymology: */xókum/* = «Mixe proper name for a coniferous tree».

Description: A polytypic generic that corresponds to POD *Podocarpus*. Trees of 10 - 20 meters; needles broadly linear leaves, leathery, glossy–green; male cones whitish–green, spike–like; fruit a small cone. Wood used for construction, sawed into boards crossbeams and cornerposts; foliage used as adornment on King's Day (January 6th). Found in primary forests of the cold zone.

Specifics:

(A) ***poo'p xókum*** «white ***xókum***» [POD *Podocarpus*]. The wood of this form is used in the upper part of the house, since it does not resist contact with the soil.

(B) ***tsapts xókum*** «red ***xókum***» [POD *Podocarpus*]. The wood of this form is used for cornerposts; it is considered very durable in the soil.

147. ***xoo'tski***

Collections: ES0156, JR0076, JR0313, JR0783, JR1210

Etimology: */xoo'tski/* = «Mixe proper name for some woody species of *Lantana* and *Lippia*».

Description: A monotypic generic that inlcudes woody species of VRB *Lantana* and *Lippia*, large tropical genera that are often used medicinally or as condiment. Aromatic shrubs of 1 – 1.5 meters; leaves opposite, simple, lobed, and usually rough-pubescent; flowers white, grouped in dense axillary heads; fruit a purple drupe or a brown capsule. Apparently without use. Occasional in shrub vegetation in all climate zone. Often classified an herb, ***ojts***. Some Mixe speakers may split this category into a white and a red form.

148. ***yoo'vun***

Collections: EV0015, EV0276, JR0133, JR0139, JR0140, JR0143, JR0517, JR0579, JR0964, JR0966, JR1022, JR1024

Etymology: */yoo'vun/* = «Mixe proper name for many species of *Piper*».

Description: A polytypic generic that corresponds to PIP *Piper*, a very large genus of tropical, often aromatic plants. Shrubs of 2 – 3 meters; leaves alternate, simple and entire, variable in shape and pubescence but usually broadly lanceolate and glabrous; flowers minute, whitish-green, clustered in a cream-white axillary spike. Whole plant observed to be a favorite food of jabalis and pigs; the woody stems used for firewood or as posts for homegarden fences. Found in primary and secondary forests of all climatic zones, but most common in the cold and temperate areas. Some of the plants in this generic are considered to be herbs ***ojts***, and others are shrubs, ***peji kup***.

Specifics:

Specifics:

(A) ***poo'p yoo'vun*** «white *yoo'vun*» [PIP *Piper*]

(B) ***tsapts yoo'vun*** «red *yoo'vun*» [PIP *Piper*]

(C) ***tsoxk yoo'vun*** «green *yoo'vun*» [PIP *Piper lapathifolium*, etc.]

(D) ***tsay yoo'vun*** «thin *yoo'vun*» [PIP *Piper*]. This form, unlike the previous three, is an herb; it is epiphytic on rocks.

149. ***yukaaydum***

Collections: EV0151, JR0741

Etymology: */yuk/* + */aaydum/* = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «Mixe proper name for anonas». See ***aaydum*** for further discussion.

Description: A monotypic generic that corresponds to wild species of Annonaceae, perhaps including genera such as *Cymbopetalum*, *Guatteria*, *Rollinia*, *Sapranthus* and *Xylopia*. Trees of 20 to 30 meters; leaves simple, entire, alternate, forming two ranks along the twig, greenish-white or slightly glossy; flowers regular, yellowish-white, and fragrant; fruit an aggregate of berries?, green. The wood, which is said to be whitish, is used in building wall and roofs of houses. Found in mature forests of the cold climatic zone.

150. ***yukkooydum***

Collections: ES0061, JR0125, JR0615

Etymology: */yuk/* + */kooydum/* = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «Mixe proper name for some avocados». See ***kooydum*** for further explanation.

Trees of 20 - 30 meters; leaves alterante, simple, entire, glossy and green; flowers inconspicuous, yellow-green; fruit a green fleshy drupe. Wood sawed into boards to be used in furniture constrcution. Found in primary forest of the cold and temperate zones. This category overlaps or perhaps is synonymous with ***yukatya'ajts*** «wild dry-leaf».

151. ***yukmanzana***

Collections: none

Etymology: ***/yuk/*** + ***/manzana/*** = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «Spanish proper name for apple». This is apparently a wild relative of the cultivated apple.

Description: A monotypic generic that corresponds to a wild species of ROS, perhaps *Photinia mexicana*. Trees of 10 -15 meters; leaves simple, alternate, serrate; flowers regular, white, grouped in small axillary clusters; fruit a small, reddish pome. The fruit is not considered eedible, but the wiood may be used as fuel.

152. ***yukmokyee'k***

Collections: JR0192, JR0501, JR1035

Etymology: ***/yuk/*** + ***/moo_k/*** + ***/yee'k/*** = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «Mixe proper name for maize» + «swollen, fattened». The name apparently refers to the golden-yellow fruits of *Bunchosia*, which are reminiscient of large corn kernels.

Description: A monotypic generic that corresponds to MLP *Bunchosia* and ?FLC *Olmediella betscheriana*. Trees of 15 - 20 meters; leaves simple, entire, opposite leaves; flowers yellow, regular, borne in racemes; fruit an orange-yellow, drupe.

Fruits said to be edible; wood used in upper parts of houses. Occasional in primary and secondary forests of the cold and temperate zones.

153. ***yukmutap***

Collections: ES0184, ES0231, EV0006, EV0356, JR0224, JR0271, JR0288, JR1186, JR1199, JR1244

Etymology: */yuk/* + */mutap/* = «a prefix that indicates objects that are wild, non–domesticated, from the forest or high montane area» + «Mixe proper name for a widely cultivated *Cestrum*».

Description: A monotypic generic that corresponds to a woody species of SOL *Solanum*. Shrubs of 2 – 4 meters with a distinctive bitter scent; leaves alternate, simple, entire and glabrous; flowers white, star–shaped; fruit a purple berry. Leaves, ground with other herbs, tied to head to relieve headache; wood used as fuel. Common in secondary forest and shrub vegetation of the all climate zones. Some Mixe speakers recognize a white, red and wild form of this generic. The white form grows in the village, and is the medicinal form; the other forms are used firewood.

154. ***yuknạk***

Collections: JR0439, JR0730

Etymology: */yuk/* + */nạk/* = «a prefix that indicates objects that are wild, non–domesticated, from the forest or high montane area» + «paper». The name is cognate with the reconstructed PMi term for paper, ***nokE*; the PZo term is ***toto* (Campbell and Kaufmann, 1967:86).

Description: A monotypic generic that corresponds to THY *Daphnopsis*, a large and taxonomically difficult Latin American genus of shrubs that are used for rope making.. Shrubs of 1 – 2 meters; leaves simple, entire, and alternate; flowers regular, yellow, tubular; fruit a green berry? Bark used to make rope. Occasional in the primary forest of the cold zone.

155. ***yuktẹm***

Collections: JR0243, JR0390, JR0424, JR0604, JR1268, WR0059, WR0122

Etymology: ***/yuk/*** + ***/tẹm/*** = «a prefix that indicates objects that are wild, non–domesticated, from the forest or high montane area» + «Mixe proper name for a firewood tree».

Description: A polytypic generic that corresponds to RHM *Rhamnus serrata* and perhaps other unidentified tree species of this large genus of trees and shrubs widely distributed throughout temperate and cool tropical zones of the world. Trees of 5 – 10 meters; leaves opposite, simple, entire and soft–pubescent; flowers white; fruit a red drupes. The wood is noted to be particularly hard and durable, and is one of the most prized firewoods; wood of wild type used in construction of houses and homegarden fences; branchlets made into brooms. Found in primary and secondary forest and shrub vegetation of the temperate and cold zone. A synonym used is Amatepec is ***tsakụp*** «stone–tree».

Specifics:

(A) ***yuktẹm*** (unmodified) «wild–***tẹm***» [RHM *Rhamnus*]. This is a shrubby species used for firewood.

(B) ***yukyuktẹm*** «wild wild–***tẹm***» [RHM *Rhamnus*]. This form corresponds to a large tree species made into cross beams and planks for construction.

156. ***yuktsoo'k***

Collections: ES0070, ES0232, JR0123, JR0124, JR0421

Etymology: */yuk/* + */tsoo'k/* = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «Mixe proper name for zapote».

Description: A monotypic generic that corresponds to MRS *Ardisia* or *Parathesis*, large geneera of shrubs and trees found in subtropical and tropical regions. Shrubs of 2 – 3 meters; leaves alternate, rather leathery, broadly ovate, punctate with resin dots; flowers inconspicuous, cream-white; fruit a small purple drupe. Wood used in house construction as roof beams. Found in primary and secondary forests of the cold zone.

157. ***yukxaa'k***

Collections: JR0701, JR0808, WR0127

Etymology: */yuk/* + */xaa'k/* = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «Mixe proper name for a mint shrub».

Description: A polytypic generic that has as a focal member LAM *Satureia macrostemma*; it may be extended to ONA *Fuchsia*, and AST ?, which are considered as wild types. Very aromatic shrubs of 2 – 4 meters; leaves opposite, lanceolate, simple and entire; flowers singular in the leaf axils, red-orange, tubular and irregular; fruit is composed of four indehiscnet nutlets enclosed by the persistent calyx. Leaves used as a condiment to flavor beans; taken in tea for stomach ache. Semi-cultivated within the confines of the community; found in secondary forests of the cold and temperate zones.

Specifics:

(A) ***yukxaa'k*** (unmodified) «wild-***xaa'k***» [LAM *Satureja macrostemma*]

(B) ***yukyukxaa'k*** «wild wild-***xaa'k***» [AST ?, ONA *Fuchsia*] A synonym is ***yukxaa'k ojts*** «wild-***xaa'k*** herb».

158. ***yukxats***

Collections: ES0239, JR0119, JR0136, JR0444, JR0731, JR1153

Etymology: */yuk/* + */xats/* + */kup/* = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «soap».

Description: A monotypic generic that corresponds to HPC *Billia hippocastanum*, a tropical American genus of two species related to the horse chestnut. Evergreen trees of 30 - 40 meters; leaves opposite, compound, with three elliptical leaflets; flowers irregular, scarlet-red, clustered in showy, terminal racemes; fruits a leathery capsule with a single, large and shiny seed. Fruits, boiled in water and then ground, used as soap. Wood, dried and then cut into boards, used for construction; wood also used as fuel. Frequent in primary forest of the cold zone. Sometimes called tsapts ***yukxats*** «red wild soap». The category may be extended (perhaps in error) to TOV *Tovaria diffusa*, a shrub with trifoliate leaves, white flowers and green, aromatic fruits, which is apparently not used.

159. ***yukxijts***

Collections: none

Etymology: */yuk/* + */xijts/* = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «Mixe proper name for some avocado trees».

Description: A monotypic generic that corresponds to a wild tree species of LAU. Trees of 20 – 30 meters; leaves simple, entire, alternate; flowers greenish–yellow, inconspicuous; fruit a rounded drupe. Wood sawed into planks and used furniture–making.

II. *ojts* «herbs»

I recognize 121 generics in the herb category (table 7.2.). 76 generics are monotypic (62.8% of the total); 45 generics (37.2%) are further subdivided into 139 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	76	22	12	2	1	4	0	1	2	1	0	0
Totals: 121 generics, 153 specifics, 0 varietals												

Table 7.2. Distribution of specifics in the life–form *ojts* «herbs».

1. *aceelgas*

Collections: none

Etymology: */aceelgas/* = «Mixe modified Spanish proper name for swiss chard».

Description: A monotypic generic that corresponds to CHN *Beta vulgaris* subsp. *cicla*, a Mediterranean potherb that is cultivated in temperate climates. Erect herbs of 20 – 40 cms. emerging from a large taproot; leaves, simple, deep green with a white stem; flowers greenish–white, inconspicuous; fruit dry, corky and spherical. Leaves, boiled in salted water, are eaten as a green or prepared in stews. Cultivated in home gardens of the cold and temperate zone.

2. *ajenjo*

Collections: JR0286

Etymology: */ajenjo/* = «Spanish proper name for absinthe».

Description: A monotypic generic that corresponds to AST *Artemisia absinthium*?, a European herb used for medicine and for flavoring alcohol. Aromatic herbs of 10 – 20 cms.; leaves finely dissected leaves, grayish–green; flowers composite, white. Leaves, made into tea, taken for colds, coughs and *latido*. Semi–cultivated in home gardens of the cold zone.

3. ***alcanfor ojts***

Collections: JR0040b, JR0406, JR0482, JR0888, JR1238

Etymology: */alcanfor/* + */ojts/* = «camphor» + «herb». See explanation of camphor under ***alcanfor kup***.

Description: A polytypic generic that corresponds to several species of VAL *Valeriana*, a genus of medicinal herbs that are sold in markets and used to treat nervous problems. Strongly scented herbs of 10 – 20 cms. arising from a thick tuber; leaves deeply–lobed and opposite; flowers small, tubular, white to pink, grouped into dense cymes; fruit is small, dry and indehiscent. Leaves and perhaps rootstock, boiled with coffee, taken for stomachache; only men use it because said to render women infertile [JR0406]. Found in secondary forests and shrub vegetation of the cold zone.

Specifics:

(A) ***poo'p alcanfor ojts*** «white camphor herb» [VAL *Valeriana*]

(B) ***tsapts alcanfor ojts*** «red camphor herb» [VAL *Valeriana*]

4. ***amaa'ts***

Collections: ES0003, ES0144, EV0149, EV0277, EV0338, JR0010, JR0659, JR0972, JR1008, WR0137

Etymology: */amaats/* = «Mixe proper name for some composites». It may be derived from */a/* + */maa'ts/* = «verb-prefix» + «cut». The meaning of */maa'ts/* is rather specific, referring to plant-gathering. Schoenhals & Schoenhals (1965:49) give the following meanings: "gather with the hands, pull off the tips of grasses or small herbs (e.g. with the hands), take (e.g. many tips of a plant)".

Description: A polytypic generic that corresponds to AST *Alloispermum integrifolium*, the only Sierra Norte species of the genus, which ranges from Mexico the South America. Herbs of 20 - 30 cms. with blackish-green stems; leaves simple, opposite, elliptical, roughly-pubescent; flowers composite, white to yellow flowers. Juice of the leaves, extracted in water, used to wash skin wounds and to coagulate blood. Common in abandoned fields and shrub vegetation of cold zones. The specifics are differentiated by the color of the stems. Pronounced ***amyaa'ch*** in Tepitongo and Chinantequilla.

Specifics:

(A) ***poo'p amaa'ts*** «white ***amaa'ts***» [AST *Alloispermum integrifolium*]

(B) ***yak amaa'ts*** «black ***amaa'ts***» [AST *Alloispermum integrifolium*]

5. ***amyajpxyun ojts***

Collections: JR0337, JR0346, JR0449, JR0549, JR0613, JR1088

Etymology: */aajy/* + */majpxyun/* + */ojts/* = leaf» + «thick» + «herb». The name is derived from the leaves of these plants, which are typically thickened and succulent.

Description: A polytypic, ambiguously-affiliated generic that corresponds to PIP *Peperomia*, a complex and poorly studied genus with over twenty species in the

Sierra Norte. Identified collections include PIP *Peperomia donaguina* and other species. Herbs, usually epiphytic, from 5 - 20 cms.; leaves simple, alternate, entire, rather succulent and glabrous; flowers minute, greenish-white, grouped axillary spikes. Apparently without use. Common in primary and secondary forests in all climate zones. Synonyms include ***amyajpxyun aa'ts*** «thick-leaf vine», ***amyajpxyun puj*** «thick-leaf flower», ***amyajpxyun kaaky*** «thick-leaf tortilla». Other *Peperomia*, including ones that are medicinal or resemble edible plants, are classified as ***tsapuj*** «stone flower», ***tsa'aga ojts*** «susto herb», ***yee'k vet ojts*** «fat termite herb», and ***yuk cilantro*** «wild coriander». Although most people refer to these plants as ***amyajpxyun ojts*** (unmodified) «thick-leaf herb», the following specifics are recognized by some.

Specifics:

(A) ***mújit amyajpxyun ojts*** «large thick-leaf herb» [PIP *Peperomia*]

(B) ***tsay amyajpxyun ojts*** «thin thick-leaf herb» [PIP *Peperomia*]

(C) ***yuk amyajpxyun ojts*** «wild thick-leaf herb» [PIP *Peperomia donaguina*]

6. ***anís***

Collections: none

Etymology: */anís/* = «Spanish proper name for anise-scented herb». *anís* originally referred to *Pimpinella anisum* a Mediterranean and north African herb that is apparently not cultivated in Oaxaca, but may be sold in markets.

Description: A polytypic generic that corresponds to ?. Small herbs. The foliage is used to flavor coffee. A weedy plant found growing in abandoned fields and grasslands in the cold and temperate zones.

Specifics:

(A) ***poo'p anís*** «white anise» [?]

(B) ***tsapts anís*** «red anise» [?]

7. ***azucena puj***

Collections: ES0181, ES0263, EV0002, EV0271, JR0736, JR0767, JR0828, WR0007

Etymology: ***/azucena/*** + ***/ojts/*** + ***/puj/*** = «Spanish proper name for various lilies and amaryllids» + «flower».

Description: A polytypic generic that corresponds to native and introduced lilies, including LIL *Hemerocallis fulva*, a native of Asia which became naturalized in Europe, and then in the United States and Mexico. Herbs of 10 – 50 cms. that arise from a thickened tuber; leaves semi–succulent, long linear leaves that form a basal rosette; flowers showy, trumpet–shaped, yellow to white or red; fruit is a brown capsule. Flowers used to adorn the church. Cultivated or protected in home gardens, or wild in shrub vegetation of all climatic zones.

Specifics:

(A) ***poo'p azucena*** «white lily» [LIL]. This is a cultivated flower.

(B) ***po'ts azucena*** «yellow lily» [LIL *Hemerocallis fulva*]. There are said to be cultivated and wild varieties of this form.

(C) ***tsapts azucena*** «red lily» [LIL]. This is a wild form.

8. ***botones puj***

Collections: ES0167, JR0231, JR0327, JR1028, JR1097, JR1158, JR1214

Etymology: ***/botones/*** + ***/puj/*** = «SN for buttons» + «flower». The name is apparently derived from the rounded «button–like» flowers these plants.

Description: A polytypic generic whose focal member is AST *Erigeron longipes*, and is extended to include AST *Melanthera nivea*, *Microspermum debile* and LAM? Herbs of 10 - 20 cms.; leaves simple, forming a basal rosette; flowers grouped in composite heads, white to pinkish-white; fruit a small and indehiscent. Leaves of the focal member, prepared in tea, used to treat susto; the others without use. Common in the shrub vegetation of the temperate and cold zone. The specifics are differentiated by the stems color, which varies from the typical green to white. The plants are alternately called ***botones ojts*** «button herb». See also ***té ojts***, with which this category partially overlaps.

Specifics:

(A) ***botones puj*** (unmodified) «button flower» [AST *Erigeron*, *Microspermum*]

(B) ***poo'p botones puj*** «white button flower» [AST *Melanthera*, LAM ?]

9. ***cartuch puj***

Collections: ES0037, ES0111, JR0673, JR0733, JR0738, WR0106

Etymology: */cartuch/* + */puj/* = «Mixe form of a Spanish proper name for *Calla* lilies» + «flower».

Description: A polytypic generic that corresponds to ARA *Zantedeschia aethiopica*, a South African plant that is much cultivated in Mexico for its showy flowers, and species of *Spathiphyllum*, natives of tropical America. Herbs of 0.5 - 1 meter growing from thickened rhizomes; leaves erect, formed by a long stem and a glossy, green elliptical to sagitate blade, inflorescence consisting of a large white to greenish-white bract (spathe) and a white to yellow spike (spadix); fruiting head green. Flowers used for adornment. The typical form is grown in home gardens of the cold and temperate zones. The wild type is frequent in forests, shrub vegetation and coffee groves of the hot zone, where it is protected. A former Mixe synonym for *Spathiphyllum* is ***tsaa'y apyuj***, discussed under the generic ***tsaa'y aajy***.

Specifics:

(A) ***cartuch puj*** «*cartucho* flower» [ARA *Zantedeschia aethiopica*]

(B) ***yuk cartuch*** «wild *cartucho* flower» [ARA *Spathiphyllum*]

10. ***cebolla***

Collections: ES0280, JR0805

Etymology: /***cebolla***/ = «Spanish proper name for onion».

Description: A polytypic generic that corresponds to wild and introduced species of onions, including LIL *Allium cepa*, a European cultigen introduced by the Spanish; the category is extended to other plants that resemble onions. Herbs of 10 – 20 cms growing from a pungent, purple–red or white bulb; leaves cylindrical, deep green; flowers white, star–shaped, born in clusters at the end of erect stalks. Bulbs, eaten raw or cooked, used to flavor food; bulbs of red form, ground and mixed with water, taken as a cure for snake bites. The typical form is occasionally cultivated in home gardens of the temperate zone, but is more commonly purchased in stores and the marketplace; it is widely available in the Oaxaca valley where it is cultivated on a large scale. The red form is apparently a wild species of onion which produces several bulbs from the same plant; it is found in temperate forests and is sold in Mixe markets in Tlahuitoltepec and Ayutla. An alternate name is *cebollina* which means little onions.

Specifics:

(A) ***cebolla*** «onion» [LIL *Allium cepa*]

(B) ***naax cebolla*** «earth onion» [LIL *Allium*]. A wild species?

(C) ***tsapts cebolla*** «red onion» [LIL *Allium*]

11. ***cilantro***

Collections: ES0152, JR0142, JR0318, JR0450, JR0547, JR0560, JR0710, JR0750, JR0901

Etymology: /*cilantro*/ = «Spanish proper name for coriander and other plants that have the taste or smell of coriander».

Description: A polytypic generic which has as a focal member API *Coriandrum sativum*, and is extended to API *Ciclospermum leptophyllum*, *Daucus montanus*, *Eryngium foetidum* and PIP *Peperomia* sp. The focal member is a strongly-scented herb of 10 - 40 cms.; leaves simple, alternate, coarsely to finely divided; flowers small, white to pinkish-white, grouped into dense umbels; fruit dry and indehiscent. Leaves and seeds, fresh or cooked, used as a condiment; wild forms usually without use. Typical and *Havana* forms semi-cultivated in home gardens of temperate and hot zones. Wild forms, often epiphytic, found in primary and secondary forests of cold and temperate zones.

Specifics:

(A) ***cilantro*** (unmodified) «coriander» [API *Coriandrum sativum*]

(B) ***habanero cilantro*** «Havana coriander» [API *Eryngium foetidum*]

(C) ***yuk cilantro*** «wild coriander» [API *Ciclospermum leptophyllum*, *Daucus montanus*, PIP *Peperomia* aff. *quadrifolia* and other Peperomia spp.].

12. ***colis***

Collections: ES0102, ES0177, ES0244, ES0249, JR0179, JR0255, JR0282, JR0782, JR1043

Etymology: */colis/* = «Mixe form of a Spanish proper name (*coles*) for some mustards».

Description: A monotypic generic whose focal member belongs to the acephala group (kales, collards) of BRA *Brassica oleracea*, a morphologically diverse European cultigen. Pungent herbs of 20 – 60 cms.; leaves simple, alternate, whitish–green, lobed; flowers white to yellow; fruit a slender, green capsule. Leaves boiled and consumed as potherb. Semi–cultivated in abandoned fields of temperate zones. See also ***tsap tsu̲'up*** for other edible species of mustard. There is a reduced form of this generic, referred to as ***tsay colis*** «thin mustards» [BRA *Brassica oleracea*, acephala group], which could be considered a specific.

13. ***colis ojts***

Collections: none

Etymology: */colis/* + */ojts/* = «Mixe form of a Spanish proper name (*coles*) for some mustards» + «herb». This generic is formed by an extension of the preceding category ***colis***.

Description: A monotypic generic that corresponds to SOL *Nicotiana*, and some other herbs such as PTG *Plantago*. The typical form is an herb of 1 – 1.5 meters; leaves opposite, entire, broadly ovate, glossy–green; flowers bell–shaped?, blue?, grouped in small axillary inflorescences; fruit a brown capsule. Leaves of the typical form, taken as tea, used for treating susto and stomach ache; leaves of the wild form, chopped with other herbs and moistened with aguardiente, placed on head for dizziness, placed on feet for reducing fever. Frequent in primary and secondary forests of the temperate zone. There is a wild form of this generic, called ***yuk colis ojts*** «wild mustard herb» [PTG *Plantago major*], which could be considered a generic by extension.

14. *encaje pųj*

Collections: JR0787

Etymology: */encaje/* + */pųj/* = «SN for lace» + «flower». The name refers to the lace-like flowers of this relative of Queen-Anne's-lace.

Description: A monotypic generic that corresponds to API. Herbs of 10 - 30 cms.; leaves, alternate, simple but very finely divided; flowers white, minute grouped in terminal umbels; fruit dry and indehiscent. The plant is a garden ornamental, sometimes escaped in abandoned fields of the cold zone.

15. *enemigo xąjk*

Collections: JR0232, JR0372, JR0681, JR0816, JR0844, JR1133

Etymology: */enemigo/* + */xąjk/* = «SN for enemy» + «Mixe proper name for bean». The name may be linked to the observation that the overall morphology of these plants resemble beans, but the seeds not edible and perhaps poisonous. This category is formed by extension of the ***xąjk*** or «bean» category.

Description: A monotypic generic that corresponds to FAB *Senna septentrionalis*. Herbs of 20 - 50 cms.; leaves alternate, pinnately compound, the leaflets ovate; flowers yellow; fruits green, turning brown and opening on maturation. Apparently without use. Found in abandoned fields and shrub vegetation of the cold and temperate zones. The category may be extended to other members of the bean family that are considered to be noxious weeds, such as yellow-flowered *Lupinus* spp.

16. ***estafiate***

Collections: JR0770

Etymology: */estafiate/* = «Spanish proper name for a widely-used medicinal plant».

Description: A monotypic generic that corresponds to AST *Artemisia mexicana*, a medicinal herb that is widely cultivated in home gardens and sold in Oaxacan markets. Strongly scented herbs of 10 – 30 cms.; leaves simple, alternate, deeply divided; flowers grouped in greenish–yellow composite heads; fruit indehiscent and dry. Leaves, prepared as tea, used to treat stomachache. Semi–cultivated in home gardens in the cold zone.

17. ***geranio puj***

Collections: JR0155, JR0574, JR0640, JR0734, JR0772

Etymology: */geranio/* + */puj/* = «Spanish proper name for geraniums» + «flower».

Description: A monotypic generic whose focal member is GER *Pelargonium* x *hortorum*; wild types include *Geranium mexicanum* and MLV *Anoda cristata* and *Malva cristata*. Erect to scandent herbs of 10 – 50 cms.; leaves simple, rounded and lobed; flowers regular purple to pink flowers, grouped in terminal cymes; fruit a green, narrow schizocarp. Leaves of the wild *Geranium*, combined with ***tu'nuk***, and moistened with *aguardiente*, used to reduce fever; branchlets of the Malva, prepared in tea, taken by women to treat irregular menstruation, three branchlets per morning for three days; flowers of the typical form used to adorn the church. The typical form is cultivated in home gardens of the cold and temperate zone; wild types found in secondary forests of the cold zone or in abandoned fields and shrub vegetation in temperate zone. The wild types, variously called ***geranio ojts*** «geranium herb» [MLV

Anoda cristata, *Malva cristata*] and ***geranio silvestre*** «wild geranium» [GER *Geranium mexicanum*], could be considered generics by extension.

18. *gladiola puj*

Collections: ES0242, JR0737

Etymology: */gladiola/* = «Spanish proper name for gladiolas».

Description: A monotypic generic that corresponds to IRI *Gladiolus* x *hortulanus*, Old Worlds herbs that have been much altered horticulturally; widely grown as a garden ornamental and for cut flowers. Herbs of 30 – 50 cms. growing from a tuberous rhizome; leaves flat, linear and broad; flowers irregular, showy, pink to purple, borne on an erect central stalk. Flowers used to adorn the church. Cultivated in home gardens of the cold and temperate zones.

19. *jaachpup*

Collections: none

Etymology: */jaach/* + */pup/* = «animal» + «Mixe proper name for some edible greens». */pup/* may be derived from */puu'p/* = «tender–plant–shoot», but the phonological change would be abnormal.

Description: A monotypic generic that corresponds to a species of CPP *Cleome*, a large genus of plants that grow in warm and tropical areas, some of which are used medicinally, ornamentally and as potherbs; the wild type is a species of EUP with palmately lobed leaves and white flowers, perhaps a wild *Manihot*. Strongly scented, glabrous herbs of 50 – 80 cms.; leaves alternate, palmately compound; flowers cream–white, grouped in terminal racemes; fruit a long, green capsule. Sprigs, boiled in water and left to mature for 1 – 2 days, eaten as a potherb; the wild type is not considered edible. Found in abandoned fields and shrub vegetation of the ranches, in temperate to hot country; the wild type is found in shrub vegetation of the temperate zone. There appears to be a covert category which links this folk generic with others that correspond to CPP *Cleome* spp.: ***popotsu'up***, ***poo'p ojts*** and ***tsupup***. All are prepared and eaten in the same way, and all are said to have the same odor and taste. They differ in morphology and in distribution in the various ecological zones. There is a wild form of this generic called ***yukjaachpup*** «wild animal ***pup***» [EUP] which could be considered a generic by extension.

20. *jan ojts*

Collections: ES0010, ES0043, ES0131, JR0001, JR0059, JR0382, JR0455, JR0607, JR0745, JR0940, JR0987, JR1045, JR1085, JR1102, JR1116, JR1149, JR1168, JR1211, JR1225, JR1254

Etymology: */jan/* + */ojts/* = «fever, fire» + «herb». The name is perhaps derived from the use of these plants as febrifuges, or perhaps to the red blossoms.

Description: A polytypic generic that has as its focal member LYT *Cuphea* sp., an abundant red–flowered herb; the category may be extended to other herbs used in curing fevers such as CIS *Helianthemum glomeratum* and SCR *Russelia sarmentosa*. Erect, branched herbs of 10 – 30 cms.; leaves simple, alternate and elliptical; flowers scarlet–red, tubular, emerging from the leaf axils; fruit a green capsule. Leaves and flowers, prepared as tea, taken to lower fever; branchlets, mixed with other herbs, lard and aguardiente, placed on soles of feet to lower fever. A synonym is ***jan tsoojy*** «fever medicine».

Specifics:

(A) ***poo'p jan ojts*** «white fever herb» [LYT *Cuphea*] apparently not medicinal.

(B) ***tsapts jan ojts*** «red fever herb» [LYT *Cuphea*, SCR *Russelia sarmentosa*].

(C) ***tso'ojmk jan ojts*** «purple fever herb» [LYT *Cuphea*]

(D) ***yak jan ojts*** «black fever herb» [CIS *Helianthemum glomeratum*, LYT *Cuphea*]

(E) ***yaa'tyajk jan ojts*** «man fever herb» [LYT *Cuphea*]

21. ***juanasana***

Collections: ES0158, JR0174, JR0532, JR1235, WR0135

Etymology: */juanasana/* = «Spanish proper name for some medicinal composites».

Description: A polytypic generic that corresponds to AST *Calea integrifolia* and bitter-tasting composites. Erect herbs of 20 – 60 cms.; leaves opposite, simple, reddish-green, and roughly pubescent; flowers white grouped into terminal clusters of composite heads. Leaves, crushed and placed in water, taken every four hours for *latido*. Frequent in shrub vegetation of temperate to hot zone. Although the focal species is simply called ***juanasana*** (unmodified) «*juanasana*» [AST *Calea integrifolia*], the following specifics are recognized by some Mixe.

Specifics:

(A) ***poo'p juanasana*** «white *juanasana*» [AST]

(B) ***tsay juanasana*** «thin *juanasana*» [AST]

22. ***kaaj aaxk***

Collections: ES0057, ES0101, ES0119, EV0079, JR0305, JR0437, JR0610

Etymology: ***/kaaj/*** + ***/aaxk/*** = «animal» + «tick». The name refers to the fruits, which stick to animal fur. ***/kaaj/*** refers generally to wild cats (panthers, puma, bobcats, etc.) and to cattle.

Description: A monotypic generic that corresponds to TIL *Triumfetta columnaris* and other species of this large tropical genus. Herbs to small shrubs of 0.5 – 1 meter; leaves alternate, simple, elliptical, and serrate; flowers yellow to cream-white, grouped in cymes that emerge from the leaf axils; fruits brown, indehiscent and very spiny. Apparently without use. Common in shrub vegetation of the temperate zone.

23. ***kaaj kapo'ot***

Collections: ES0199, ES0264, JR0226, JR0533

Etymology: ***/kaaj/*** + ***/kapo'ot/*** = «animal» + «towel». This is metaphorically considered a hand towel for wild cats.

Description: A monotypic generic that corresponds to SEL *Selaginella galeottii* and *S. martensii*, two Oaxacan species of this very large genus of fern allies. Scandent herbaceous plants of 10 – 30 cms.; foliage deep green, fernlike; lacking flowers and fruits. Apparently without use. Found in stony soil of secondary forests and shrub vegetation in all climate zones. Although classified as an herb, some Mixe remark that is looks like a fern.

24. ***kaat***

Collections: JR0376, JR0880

Etymology: ***/kaat/*** = «Mixe proper name for some edible greens».

Description: A monotypic generic that corresponds to CHN *Chenopodium berlandieri*?, a weedy species that is often used as a potherb in southern Mexico. Herbs of 30 – 40 cms., covered with a grayish powdery indumentum; leaves alternate, simple, greenish-white; flowers greenish-white in dense terminal clusters; seeds black and shiny. Whole plant, boiled in salted water, eaten as a potherb. Found in cultivated and abandoned fields of the cold and temperate zone.

25. *kax ojts*

Collections: ES0189, JR0215, JR0277, JR0399

Etymology: */kax/* + */ojts/* = «craving» + «herb». The name is perhaps derived from the use of the herb to restore the appetite.

Description: A polytypic generic that corresponds to VRB *Verbena caroliniana* and other species of this large, primarily New World genus of herbs; the category also includes FAB *Melilotus alba*. Erect herbs of 20 – 60 cms.; leaves opposite, simple, elliptical, and shallowly lobed; flowers small, lavender to pink, grouped in dense terminal spikes; fruit a small brown capsule. Leaves, taken as tea or ground and mixed with corn dough to make tortillas to restore the appetite; leaves, crushed in water, taken for stomach ache, and to restore appetite [*Verbena*].

Specifics:

(A) ***kax ojts*** (unmodified) «craving herb» [VRB *Verbena*]

(B) ***poo'p kax ojts*** «white craving herb» [FAB *Melilotus alba*] Also called *zorilla*, apparently without use.

26. *ko'on*

Collections: JR0711

Etymology: */ko'on/* = «Mixe proper name for tomato». This is a cognate of the reconstructed protoMixe term for «tomato», ****koya*** (Campbell and Kaufmann 1967:84).

Description: A polytypic generic that corresponds to SOL *Lycopersicon esculentum* var. *esculentum*, the cultivated tomato thought to have been domesticated in

Mesoamerica, and *L. esculentum* var. *leptophyllum*, the cherry tomato, thought to be close to the wild ancestor of cultivated tomato. Strong-scented, branched herbs of 20 - 50 cms.; leaves alternate, deeply-divided; flowers yellow, star-shaped grouped in axillary cymes; fruit a rounded, orange-red berry. Fruits eaten raw in salad and hot sauces, and added to a variety of cooked dishes. Cultivated or semi-cultivated in fields of the cold and temperate zones.

Specifics:

(A) ***ko'ovyiijn*** «eye tomato» [SOL *Lycopersicon esculentum* var. *leptophyllum*]

(B) ***mújit ko'on*** «large tomato» [SOL *Lycopersicon esculentum* var. *esculentum*]

(C) ***píguk ko'on*** «round tomato» [SOL *Lycopersicon esculentum* var. *esculentum*]

(D) ***tsii'n ko'on*** «chinene-avocado tomato» [SOL *Lycopersicon esculentum* var. *esculentum*]. This form is called *tomate guajillo* in local Spanish.

(E) ***tu'kx ko'on*** «smooth, juicy tomato» [SOL *Lycopersicon esculentum* var. *esculentum*]

(F) ***xe'en ko'on*** «twin tomato» [SOL *Lycopersicon esculentum* var. *esculentum*]. This form is called *tomate de gajo* is local Spanish.

27. ***kox ojts***

Collections: ES0022, ES0130, EV0007, EV0075, EV0152, EV0185, EV0267, EV0281, JR0299, JR0695, JR0703, JR0862, JR0955, JR1014, JR1077, JR1109, JR1126, JR1166, JR1170, JR1204, JR1243

Etymology: */kox/* + */ojts/* = «knee» + «herb». The name refers to the knobby stem nodes that characterize these plants.

Description: A polytypic generic that corresponds to diverse group of plants including ACA *Ruellia*, AMA *Iresine diffusa*, BLS *Impatiens*, LAM *Salvia*, MLS *Heterocentron*, PLG *Polygonum*. The focal species is AMA *Iresine diffusa*, a scandent herb of 20 - 60 cms with long stems and swollen nodes; leaves simple, opposite, entire; flowers minute, white, grouped in and small white flowers in open terminal inflorescences. Specifics are differentiated by the stem color; *Iresine* is perceived as being variable, with green, reddish or whitish stems. Whole plant considered a good forage plant; leaves, crushed in alcohol, placed in ear to cure deafness [MLS *Heterocnetron*]; leaves prepared in tea, given to children who are incontinent [LAM *Salvia*]; branchlets and flowers, prepared in tea, taken for *latido*; flowers used to adorn church [BLS *Impatiens*]; whole plant an indicator of good soil for planting corn. Found in abandoned fields and shrub vegetation of cold and temperate zones. The unmodified form of the name, ***kox ojts*** «knee herb», is used to refer to the focal member [AMA *Iresine diffusa*] and also to some species in the extended range [LAM *Salvia*, MLS *Heterocentron*, PLG *Polygonum*].

Specifics:

(A) ***poo'p kox ojts*** «white knee herb» [AMA *Iresine diffusa*]

(B) ***tsapts kox ojts*** «red knee herb» [AMA *Iresine diffusa*, MLS *Heterocentron*, PLG *Polygonum*]

(C) ***tso'ojmk kox ojts*** «purple knee herb» [AMA *Iresine diffusa*]

(D) ***tsoxk kox ojts*** «green knee herb» [?]

(E) ***yak kox ojts*** «black knee herb» [ACA *Ruellia*]

(F) ***yuk kox ojts*** «wild knee herb» [PIP *Piper*]

28. ***kujapk***

Collections: JR0359, JR0544, JR0668, JR1292

Etymology: ***/kujapk/*** = «Mixe proper name for an edible green». The origin of the name is obscure. It may be analyzed as ***/ku/*** + ***/japk/*** = «prefix often denoting head» + «corncob», perhaps related to the observation that the flower cluster of this plant resembles a small corncob.

Description: A monotypic generic that corresponds to AMA *Gomphrena*, a large genus of herbs, including some Old World species that are grown as ornamentals in Oaxaca. Scandent herbs of 10 – 50 cms.; leaves opposite, simple, ovate and entire; flowers minute, white, grouped in dense terminal heads. Tender sprigs, boiled in salted water and later fried in oil, eaten as a potherb. Frequent in shrub vegetation and abandoned fields of the temperate zone.

29. ***kumokx puj***

Collections: ES0121, JR0877, JR0878, WR0054

Etymology: ***/kumokx/*** + ***/puj/*** = «Mixe proper name for some marigolds» + «flower».

Description: A polytypic generic that corresponds to AST *Tagetes erecta*, a widely naturalized Mesoamerican plant that has been cultivated in Mexico as an ornamental since prehispanic times; the extended range of this category probably includes other species of *Tagetes*. Strongly-scented herbs of 0.5 – 1 meter; leaves opposite and deeply-divided; flowers grouped in showy composite heads, yellow-orange. Flowers used as adornment for the *día de muertos*. Grown in home gardens and escaped in fields of the cold and temperate zones.

Specifics:

(A) ***atyu'kma kumokx*** «? marigold» [AST *Tagetes erecta*]

(B) ***oy kumokx*** «good marigold» [AST *Tagetes erecta*]

30. ***kumyo'o ojts***

Collections: ES0004, EV0009, JR0435, JR0573, JR0863, JR0957, JR0970, JR0986?, JR1144, JR1163, JR1196, WR0113

Etymology: */kumyo'o/* + */ojts/* = «bumblebee» + «herb». The name is derived from the observation that these small herbs are frequently visited by bumblebees.

Description: A monotypic generic that corresponds to LYT *Cuphea aequipetala* as a focal species and is extended to VIO *Viola*. Erect, branched herbs of 20 – 40 cms.; leaves, small, simple and ovate, reminiscent of some chile pepper leaves; flowers cup-shaped, rose-purple, singular; fruit a brown capsule. Leaves, taken in tea with sugar, as a cure for dysentery; whole plant may be used as a broom. Found in abandoned fields and grasslands of all climate zones. Synonyms include ***kumyo'o vuu'n ojts*** «bumblebee pulled herb». VIO *Viola* is also known by several synonyms – ***tsaviin aa'tspa ojts*** «stone-eye vining herb», ***kumyo'o aa'ts*** «bumblebee vine» and ***yuktsapts aa'ts*** «wild red vine». It is has white to purple flowers, is apparently not used, and is found in forests and shrub vegetation of the temperate and cold zone.

31. ***kupak ojts***

Collections: JR0153, JR1021

Etymology: */kupak/* + */ojts/* = «Mixe proper name for a mustard herb» + «herb». The derivation of the name is unclear. It may be analyzed as */ku/* + */pak/* = «prefix often denoting head» + «dove»; but ***kupak*** appears to be used as an adjective meaning «vacant» (i.e. ***kupak tajk*** is an old, uninhabited house).

Description: A monotypic generic that corresponds to BRA *Rorripa mexicana*. Strongly-scented herbs of 10 - 20 cms.; leaves alternate, deeply-dissected; flowers small, yellow, grouped in terminal clusters; fruit a narrow, green capsule. Sprigs, toasted on a comal or fresh, are ground into a paste used to treat skin eruptions. Frequent in abandoned fields of the cold zone.

32. *kupo'o ónuk*

Collections: JR0160, JR0744, JR1000

Etymology: ***/kupo'o/*** + ***/ónuk/*** = «Mixe proper name for some edible herbs» + «child». The origin of the name is obscure. The first part of the name could be analyzed as */ku/* + */po'o/* = «prefix often denoting head» + «break or sand», perhaps referring to plants that grow in sandy soil. This and the following two generics form a family: ***tee*** (father), ***taak*** (mother) and ***ónuk*** (offspring). It is said that the male form stands erect, while the female form is scandent. The child - watercress - is perhaps considered offspring because it is an introduced plant and thus more recent than the other, native plants that pertain to the following two generics.

Description: A monotypic generic that corresponds to BRA *Rorripa nasturtium-aquaticum*, a European salad green which is naturalized in the Sierra Norte, and to a wild species of EUP. Strong-smelling herbs of 10 - 20 cms.; leaves deep-green, alternate, deeply-lobed; flowers small, white, grouped in terminal clusters; fruit a narrow, green capsule. Sprigs, eaten raw or cooked as a salad or potherb, said to relieve liver and kidney problems, especially when caused by excessive drinking. Found in stream beds and wet fields of the cold zone. The wild type, a herb with milky sap, is not used; it is found in shrub vegetation and abandoned fields of the temperate zone. This wild form, called ***cimarrón kupo'o ónuk*** «wild ***kupo'o*** offspring» [EUP *Euphorbia*], could be considered a generic in its own right.

33. ***kupo'o taak***

Collections: JR0220, JR0490, JR0642

Etymology: */kupo'o/* + */taak/* = «Mixe proper name for some edible greens» + «mother, female».See further discussion under ***kupo'o ónuk***.

Description: A monotypic generic that corresponds to SCR *Calceolaria mexicana*. Scandent herbs of 20 - 40 cms that often grow in humid soil; leaves alternate and deeply-lobed; flowers yellow, pocket-shaped, grouped in open terminal clusters; fruit a small, green capsules. Tender branchlets, boiled in salted water, said to be eaten as a potherb. Found in moist areas of the cold and temperate zone. There is a small form of this generic which is referred to as ***tsay kupo'o taak*** «thin ***kupo'o*** mother» [SCR *Calceolaria mexicana*].

34. ***kupo'o tee'***

Collections: JR0161, JR0221

Etymology: */kupo'o/* + */tee'/* = «Mixe proper name for some edible greens» + «father, male». See further discussion under ***kupo'o ónuk***.

Description: A monotypic generic that corresponds to SCR *Mimulus glabratus*. Erect herbs of 10 - 30 cms.; leaves deep green, opposite, simple; flowers yellow, broadly tubular; fruit a small green capsule that emerges from the persistent calyx. Tender branchlets, boiled in salted water, said to be eaten as a potherb. Found in moist areas of the cold and temperate zone.

35. *kuti'mun ojts*

Collections: JR0388, JR0432, JR0838, JR1036

Etymology: ***/kuti'mun/*** + ***/ojts/*** = «Mixe proper name for some scandent herbs» + «herb». The name may be partially analyzed as ***/ku/*** + ***/mun/*** = «prefix often denoting head» + «tuber»; some Mixe suggest that it is derived from the word for *bolillo* (little ball, also used in local Spanish to denote a white bread roll), which may refer to the dense, rounded flowering heads of these herbs.

Description: A polytypic generic that corresponds to LAM *Prunella*, RUB *Borreria*, *Crusea*. Scandent herbs of 10 – 30 cms.; leaves opposite, ovate, simple and entire; flowers tubular, white to purple, grouped in dense terminal heads. Sprigs prepared in tea, used to bathe skin wounds and eruptions [RUB *Crusea*]. Found in shrub vegetation and abandoned fields of the cold and temperate zone. This category overlaps or is synonymous with ***tik ka'aj*** «lizard's hand».

Specifics:

(A) ***poo'p kutimun ojts*** «white ***kutimun*** herb» [RUB *Borreria*, *Crusea*]

(B) ***tso'ojmk kuti'mun ojts*** «purple ***kutimun*** herb» [LAM *Prunella*, RUB *Borreria*]

36. *kup_puj*

Collections: ES0240, JR0168, JR0361, JR0485, JR0512, JR0529, JR0552, JR0722, JR0810, JR0819, JR0919, JR1023, JR1062

Etymology: ***/kup/*** + ***/puj/*** + «tree» + «flower». In this and other generics preceded by ***kup***, «tree» refers not to life form status but rather to habitat – all the plants are epiphytes on trees.

Description: A monotypic generic that corresponds to CAC *Epiphyllum*, ERI

Cavendishia, *Maclaenia*, ORC *Dichaea glauca* and PIP *Peperomia*. Erect or twining epiphytic herbs of 10 - 50 cms.; leaves usually fleshy, alternate, diverse in shape; flowers often showy, solitary, white to scarlet-red or orange. Flowers used to adorn the church [CAC *Epiphyllum*, ERI *Cavendishia* and *Macleania* and ORC]. Whole plant, crushed and added to 1/2 cup of water, taken for dysentery [PIP *Peperomia*]. Found in primary and secondary forests of all climatic zones. Also called ***kup azucena*** «tree lily» or ***yuk azucena*** «wild lily», categories which focus on CAC *Epiphyllum*; see explanation of ***azucena*** under ***azucena ojts***). This category may be extended to many epiphytes with showy flowers, including orchids and cacti; it may also be classified in the life form ***tsoots*** «grass», especially when it refers to ORC *Dichaea glauca*.

37. *maaxun kaaky ojts*

Collections: ES0071, ES0238, JR0118, JR0682, JR0728, JR0960, JR1258

Etymology: ***/maaxun/*** + ***/kaaky/*** + ***/ojts/*** = «small» + «tortilla» + «herb».

Description: A polytypic generic that corresponds to LIL *Smilacina* and ERI *Maclaenia*, ORC *Arpophyllum*. This category, which overlaps with the preceding, refers most often to LIL *Smilacina*, which is an erect herb of 20 - 40 cms. with smooth, ovate leaves, white flowers and a red berry. Apparently without use, but perhaps occasionally used as adornment. Found in forests of the cold and temperate zones. It is sometimes referred to by the descriptive phrase ***yuk puj*** «wild flower» in Tepitongo.

Specifics:

(A) ***maaxun kaaky ojts*** (unmodified) «stone small tortilla herb» [LIL *Smilacina*]

(B) ***tsamaaxun kaaky ojts*** «stone small tortilla herb» [ORC *Arpophyllum*]

38. ***maaxun kaaky puj***

Collections: ES0099, ES0110, JR0135, JR0339, JR0341, JR0345, JR0347, JR0511, JR0524, JR0542, JR0774, JR0775, JR0777, JR0854, JR1064, JR1065, JR1216, JR1230

Etymology: */maaxun/* + */kaaky/* + */puj/* = «small» + «tortilla» + «flower».

Description: A polytypic generic that corresponds to ORC *Encyclia cochleata*, *E.* sp., *Epidendrum*, *Lemboglossum maculatum*, *Pleurothallis*, and ERI *Maclaenia*. Epiphytic herbs of 10 – 80 cms., often emerging from a thickened bulb-like base; leaves leathery, glossy leaves, variable in shape but often linear; flowers usually showy, of many different colors, usually in axillary or terminal clusters; fruit a many-seeded capsule. Apparently without use, but the flowers may be used for adornment in the church. Common in primary and secondary forest in all climate zones. The specifics are differentiated by leaf or inflorescence size, and stem and flower color. This category overlaps partially with ***tsapuj*** and ***kup_puj***. Epiphytic orchids – including *Encyclia cochleata*, *E. sp.*, *Lemboglossum maculatum*, *Pleurothallis* and others – are often referred to as ***maaxun kaaky*** without an added modifier.

Specifics:

(A) ***po'ts maaxun kaaky*** «yellow small tortilla» [ORC *Epidendrum*, +]

(B) ***poo'p maaxun kaaky*** «white small tortilla» [ORC *Encyclia*, *Habernaria*]

(C) ***tsa maaxun kaaky*** «stone small tortilla» [ORC *Arpophyllum*]

(D) ***tsapts maaxun kaaky*** «red small tortilla» [ORC *Epidendrum*]

(E) ***tsay maaxun kaaky*** «thin small tortilla» [ORC] (resembles ***kup tsoots***]

(F) ***tso'ojmk maaxun kaaky*** «purple small tortilla» [ORC *Epidendrum*]

(G) ***tsoxk maaxun kaaky*** «green small tortilla» [ORC]

(H) ***yaajnit maaxun kaaky*** «long small tortilla» [ORC *Epidendrum*]

(I) ***yak maaxun kaaky*** «black small tortilla» [ORC]

39. ***maaxun tajk***

Collections: JR0018, JR0078, JR1071

Etymology: */maaxun/* + */tajk/* = «small» + «walking-cane» + «herb». The name apparently refers to the stout stems of this plant.

Description: A monotypic generic that corresponds to MLS *Heterocentron*. Erect herbs of 20 - 50 cms. with reddish, square stems; leaves opposite, simple and entire; flowers regular, white; fruit a brown capsule. Whole plant including roots ground in water and taken three times daily for urinary tract infections, especially when there is blood or pus in the urine. Common in abandoned fields of the cold zone.

40. ***malva***

Collections: JR0080

Etymology: */malva/* = «Spanish proper name for certain plants of the Malva family».

Description: A monotypic generic that corresponds to MLV *Modiola caroliniana*. Herbs of 30 - 50 cms. with lobed leaves and blue flowers. Apparently without use. This name may be applied to many weedy species of Malvaceae. Found in abandoned fields of the cold zone.

41. ***manzanilla***

Collections: ES0245, EV0251, JR0082, JR0229, JR0755, JR0926, WR0056, WR0124, WR0145

Etymology: */manzanilla/* = «Spanish proper name for chamomile».

Description: A monotypic generic that corresponds to AST *Matricaria recutita*, a European medicinal herb widely cultivated and used in Oaxaca. Sweet-scented herbs of 20 - 40 cms; leaves finely-divided; inflorescence a dense composite heads of yellow disk and white ray flowers. Leaves ground with the seed of sapote mamey, taken in tea, considered medicinal; flowers used for adornment on the 6th of January; flowers and leaves taken in tea for colics; leaves, ground in water, taken for *latido*. Semi-cultivated in home gardens, or protected in abandoned fields of the cold and temperate zone. One form of this generic is referred to as ***poo'p manzanilla*** «white chamomile» [AST *Matricaria recutita*] and may be considered a specific category.

42. ***margarita puj***

Collections: ES0026, EV0025, EV0048, EV0069, EV0073, EV0127, JR0735, JR0784, WR0055, WR0097

Etymology: */margarita/* + */puj/* = «Spanish proper name for daisy» + «flower».

Description: A monotypic generic that corresponds to AST *Leucanthemum vulgare*, one of the most widely used ornamental flowers in Oaxaca, commonly grown in the many parts of the Sierra and sold in peasant markets. Erect herbs of 20 - 40 cms.; leaves alternate, deeply divided; inflorescence a composite head composed of yellow disk and white ray flowers. Flowers used to adorn the church. Semi-cultivated in home gardens, and escaped in shrub vegetation and abandoned fields of all climate zones. Also called ***teresa puj*** «Theresa flower» in Chinantequilla.

43. ***ma'k tsam'ijtpa***

Collections: ES0027, ES0122, EV0004, EV0130, EV0325, EV00328, EV0351, JR0404, JR0598, JR0599, JR0693, JR0980, JR1273, WR0057

Etymology: */ma'k/* + */tsama/* + */ijtp/* = «dew» + «humid» + «place». The name is derived from the dew that settles onto the leaves of this cornfield weed.

Description: A polytypic generic that corresponds to ONA *Lopezia miniata*, & *L. racemosa*. Herbs of 20 – 30 cms.; leaves alternate, simple, ovate; flowers white to deep pink flowers; fruit a round capsule. Branchlets, heated over charcoal or on a comal, placed on pustules and infected skin wounds, especially on the feet; whole plant used for brooms, and considered as good fodder for pigs and other animals. Abundant in cultivated and abandoned fields of all climate zones.

Specifics:

(A) ***poo'p ma'k tsam'ijtpa*** «white dew humid–place» [ONA *Lopezia*]

(B) ***tsapts ma'k tsam'ijtpa*** «red dew humid–place» [ONA *Lopezia*]

44. ***mejtsvay ojts***

Collections: JR0259, JR0304, JR0386, JR0992, JR1053, JR1098

Etymology: */mejts/* + */vaajy/* + */ojts/* = «arrive» + «(fine) hair» + «herb». */mejtsvay/* is an illness, called espinilla in local Spanish, which is said to cause fine hairs to grow on the body; it is apparently a skin disease associated with lack of appetite or a nutritional deficiency.

Description: A monotypic generic that corresponds to OCH *Suavegesia erecta*, ONA *Ludwigia octovalvis* and perhaps SCR *Russellia*. Herbs of 10 – 30 cms.; leaves small, alternate simple, toothed or entire; flowers yellow to white, often solitary; fruit an oblong or rounded capsule. Leaves, ground into corn dough and then made into tortillas, are eaten to relieve espinilla [OCH *Suavagesia*, ONA *Ludwigia*]; leaves, ground and placed on the soles of the feet, used to treat susto. Found in moist soils of abandoned fields and shrub vegetation of the cold and temperate zones.

45. *mirto*

Collections: JR0217, JR0249, JR0393

Etymology: */mirto/* = «Spanish proper name for some salvias».

Description: A monotypic generic that corresponds to LAM *Mentha rotundifolia*. Erect herbs of 10 – 30 cms, covered with a white, wooly pubescence; leaves opposite, simple and ovate; flowers purple, in dense terminal clusters, rarely seen. Sprigs, made into tea, taken to treat vomiting and diarrhea; ground with *aguardiente*, placed in ear to treat deafness due to ear infection; taken as tea, used to treat coughs. Found in shrub vegetation and abandoned fields of the cold and temperate zones. A synonym is *borraje*, a Spanish name usually reserved for BOR *Borago officinalis*, an herb that is also widely used in Mexico for coughs and throat problems; both *Borago* and *Mentha rotundifolia* are covered with a whitish pubescence.

46. *mọọk kast*

Collections: ES0018, JR0048, JR0371, JR0465, JR0829, JR1188

Etymology: */mọọk/* + */kast/* = «Mixe proper name for maíz» + «pinto». The name may refer to the mixed (white and yellow) flowers of these composites.

Description: A polytypic generic that corresponds to AST *Smallanthus maculata* and *Trigonospermum melampodioides*. Herbs of 10 – 15 cms. with purple-green stems; leaves opposite, pubescent; inflorescence a composite head of yellow flowers. Whole plant considered to be good forage for cows and other animals. Found in shrub vegetation, cultivated and abandoned fields, in the cold and temperate zone.

Specifics:

(A) ***mook kast*** (unmodified) «maize pinto» [AST *Trigonosperum melampodioides*]

(B) ***tsapts mook kast*** «red maize pinto» [AST *Smallanthus maculata*], this generic is also referred to as ***yuk mook kast*** «wild maize pinto» [AST *Smallanthus*]

47. ***mo'ots naxo'ojk***

Collections: ES0191, JR0263, JR0360, JR0451, JR0790, JR0954, JR1054

Etymology: */mo'ots/* + */na/* + */xo'ojk/* + */ojts/* = «mud» + «water» + «savory» + «herb». The name may be due to the moist habitat and agreeable scent of spearmint.

Description: A polytypic generic that corresponds to LAM *Mentha* x *piperita*? Aromatic herbs of 10 – 20 cms. with square stems; leaves opposite and simple, dark green; flowers small, white, grouped in axillary heads, rarely seen. Leaves used as condiment, ground with corn dough, chile and salt to make memelas, thickened corn breads; sprigs made into tea, taken to treat dysentery. Semi-cultivated in home gardens and abandoned fields. The category is extended to SCR *Leucocarpus perfoliatus* and *Russelia*, herbs of 0.5 to 1 meter, with square stems, opposite leaves and yellow or red flowers in axillary clusters. These are not apparently used; they are found in abandoned fields, shrub vegetation and grasslands of the cold and temperate zones.

Specifics:

(A) ***mo'ots na xo'ojk*** (unmodified) «mud savory» [LAM *Mentha*]

(B) ***tsapts na mo'ots xo'ojk ojts*** «red mud savory» [SCR *Russelia*]

(C) ***yuk mo'ots na xo'ojk*** «wild mud savory» [SCR *Leucocarpus perfoliatus*]

48. ***mook pat ma'k***

Collections: EV0224, JR0162, JR0276, JR0708, JR0801

Etymology: */mook/* + */pat/* + */ma'k/* = «maize» + «underneath» + «dew». These are apparently cornfield weeds that collect dew drops underneath the corn plants, perhaps aiding in preservation of soil humidity.

Description: A monotypic generic that corresponds to CRY *Stellaria*. Scandent herbs of 20 – 30 cms.; leaves rounded, opposite and simple, white solitary flowers and green capsular fruits. Whole plant, boiled in salted water, eaten as a potherb. Found in cultivated and abandoned fields of all zones. The category is sometimes extended to include OXL *Oxalis*, which is usually classified as ***pixk xo'na***; may also be extended to PRM *Anagallis arvensis*.

49. ***muu'k ojts***

Collections: ES0019, ES0125, ES0136, JR0073, JR0079, JR0128, JR0233, JR0315, JR0475, JR0476, JR0639, JR1172, WR0058

Etymology: */muu'k/* + */ojts/* = «suckle» + «herb». The name apparently refers to the insects and hummingbirds that come to suck the nectar of salvias and other mints.

Description: A polytypic generic that corresponds to LAM *Lepechinia schiedeana*, *Salvia cinnabarina* and SCR *Lamourouxia*. Aromatic herbs of 0.5 to 1 meter with square stems; leaves opposite, simple and serrate; often green above and whitish-green below; flowers tubular, red, white or purple, in axillary or terminal dense clusters, red, white or purple. Whole plant recognized as an indicator of fertile soil, and considered good forage and as a natural «green» manure; leaves, mixed with other plants and moistened with aguardiente, placed on feet to lower fever; branchlets used to make wiskbroom [LAM *Salvia cinnabarina* and spp.]. Found in forests, shrub vegetation and abandoned fields in all climate zones. Several descriptive synonyms apply to Salvia – ***tsay tso'ojmk puj*** «narrow purple flower»; ***tso'ojmk pajpa ojts*** «purple flowering herb» and ***ju'ukpa ojts*** «smoking or cigarette flower».

Specifics:

(A) ***muu'k ojts*** (unmodified) «suckle herb» [LAM *Salvia cinnabarina*]. A reduced form of this species is referred to as ***tsay muu'k ojts*** «thin suckle herb».

(B) ***mújit muu'k ojts*** «large suckle herb» [LAM *Salvia*, SCR *Lamourouxia*]

(C) ***poo'p muu'k ojts*** «white suckle herb» [LAM *Lepechina schiedeana*]

50. ***naax akax ojts***

Collections: ES0035, JR0563, JR0950, JR1009, WR0087

Etymology: /***naax***/ + /***akax***/ + /***ojts***/ = «earth» + «craving» + «herb».

Description: A monotypic generic that corresponds to PLG *Rumex*. Herbs of 30 – 50 cms.; leaves oblong, often reddish-green, forming a basal rosette; flowers small, green, clustered in a dense inflorescence on a central flower stalk with reduced leaves; fruit a papery capsule. Considered as excellent fodder for cattle. Found in shrub vegetation and abandoned fields of the cold and temperate zones. Also called ***kaaj toots*** «cow's tongue» – probably a translation of the local Spanish name lengua de vaca; in Tepitongo and Chinantequilla, called ***chivu ujts*** «goat herb» referring to its use as fodder.

51. ***naax kaku***

Collections: JR0484, JR0743, JR1245

Etymology: /***naax***/ + /***caco***/ = «earth» + «Mixe proper name for cacao». /***naax***/ is used for soil or earth; and is used as an adjective for plants that grow in or close to the ground, especially in comparison to taller or more erect relatives. The association with cocoa is perhaps due to the shape of the tuber.

Description: A polytypic generic that corresponds to SOL *Solanum tuberosum*, the potato, a cultigen introduced to Mexico from South America, and *Solanum* sp. (a wild potato?). Herbs of 20 – 40 cms. with white tubers; leaves alternate, deeply-divided; flowers star-shaped, purple, in terminal few-flowered clusters, fruit a green berry. Tubers, boiled in water, eaten in stews and chile sauces; leaves, boiled in salted water, eaten as a potherb. The typical form is cultivated in abandoned fields of the cold zone; the wild type, apparently not used, is occasional in abandoned fields of the cold zone.

Specifics:

(A) ***naax kaku*** (unmodified) «earth cacao» [SOL *Solanum tuberosum*]

(B) ***cimarrón naax kaku*** «wild earth cacao» [SOL *Solanum* sp.]

52. ***naax kapy***

Collections: ES0206, EV0196, EV0278, JR0324, JR0338, JR0486, JR0494, JR0665, JR0670, JR0839, JR1106, JR1201, JR1202, JR1239, WR0102

Etymology: /***naax***/ + /***kapy***/ = «earth» + «Mixe proper name for some large, reedy grasses». See ***naax kaku*** for discussion of /***naax***/.

Description: A polytypic generic that corresponds to CMM *Tinantia erecta* and other genera and species of this family. Semi-succulent, scandent herbs of 10 – 30 cms.; leaves ovate, clasping at base, and alternate; flowers three-parted, white, pink or purple flowers, in axillary or terminal cymes. Whole plant masticated to treat sores in the mouth; considered as good forage; crushed in water or aguardiente, taken to treat uterine hemorrhaging and nosebleeds; wild type is considered an indicator of good soils. Found in shrub vegetation, abandoned fields of the temperate and hot zones. Some CMM species are also called ***motukx*** or ***poo'p tsoots***. Although most species of Commelinaceae are called ***naax kapy*** (unmodified) «earth ***kapy***» [CMM], the following specifics are recognized by some speakers

Specifics:

(A) ***poo'p naax kapy*** «white earth ***kapy***» [CMM *Tinantia erecta* +]

(B) ***tso'ojmk naax kapy*** «purple earth ***kapy***» [CMM]

(C) ***yuk naax kapy*** «wild earth ***kapy***» [CMM]

53. *naax vaa'kxy*

Collections: JR0448, JR0471

Etymology: ***/naax/*** + ***/va'kxy/*** = «earth» + «Mixe proper name for some orchids and lilies». ***/va'kxy/*** means «parted, sliced, separated». The name may refer to the leaves of these plants, which are pleated.

Description: A polytypic generic that corresponds to IRI *Tigridia* and ORC *Govenia*. Herbs of 10 – 40 cms. with large tubers; leaves emerging pleated, ovate to broadly lanceolate leaves; flowers showy, white or red flowers. Apparently without use. This category is related to ***toj puj***, which is also considered a type of ***vaa'kxy***. Found in shrub vegetation, pastures and abandoned fields of the cold zone.

Specifics:

(A) ***tsapts naax vaa'kxy*** «red earth sliced» [IRI *Tigridia*]

(B) ***poo'p naax vaa'kxy*** «white earth sliced» [ORC *Govenia*]

54. ***na'pxyk***

Collections: ES0160, ES0180, JR0344, JR0487, JR0704, JR1012, JR1183

Etymology: «***na'pxyk***» = «Mixe proper name for some herbs». The name is derived from */**na'pxy**/*, a Mixe word for sticky – the fruits, resinous foliage or rasping stems make these plants «sticky».

Description: A monotypic generic that corresponds to AST *Elephantopus spicatus*, *Sigesbeckia*, FAB *Desmodium*, MLV *Pavonia schiedeana* and RUB *Galium mexicanum.* Herbs of 20 – 50 cms.; leaves variable, from trifoliate to linear or whorled; flowers variable, purple, white or yellow. Considered as forage plants, but without other use. Found in shrub vegetation and abandoned fields of cold and temperate zones. *Galium* is alternately classified as ***tsa'aga ojts***.

55. ***natyu'un toojnjuva ojts***

Collections: ES0083, JR0201, JR0278, JR0593, JR0949, JR0969, JR1103, JR1142

Etymology: */**nay**/* + */**tu'un**/* + */**toojnjuva**/* + */**ojts**/* = «prefix for reflexive action?» + «excrement» + «he–touches» + «herb». The derivation of the name is obscure.

Description: A monotypic generic that corresponds to AST *Heliopsis bupthalmoides* and *Sclerocarpus* as focal species and is extended to AST *Ageratina rivalis*, *Bartlettina oresbioides*, *Eupatorium macrophyllum*. Herbs of 10 – 60 cms; leaves heart–shaped; inflorescence a yellow composite heads. Leaves, crushed with other herbs, placed on back of head to relieve dizziness; leaves, moistened in aguardiente, are placed in mouth for same purpose [AST *Heliopsis* and *Sclerocarpus*]; whole plant considered as good forage for grazing animals [AST]. Found in abandoned fields of the cold zone.

56. *naxyju ojts*

Collections: JR0713

Etymology: */naxyju/* + */ojts/* = «dysentery» + «herb».

Description: A monotypic generic that corresponds to ONA *Oenothera rosea*. Erect herbs of 10 – 20 cms.; leaves alternate, lanceolate and simple; flowers rose-pink, axillary; fruit a narrow, green capsule. Sprigs, taken as tea sweetened with raw sugar, used to treat dysentery. Found in grasslands of the cold zone.

57. *napa'ajntk ojts*

Collections: ES0017, ES0183, ES0272, EV0064, EV0085, EV0087, EV0106, EV0137, EV0170, EV0178, EV0187, EV0215, EV0230, EV0270, EV0282, EV0311, JR0251, JR0312, JR0405, JR0626, JR0690, JR0685, JR0705, JR0707, JR0716, JR0766, JR0823, JR0869, JR0948, JR0968, JR0971, JR0984, JR0991, JR0995, JR1057, JR1212, JR1240, WR0115.

Etymology: */na/* + */pa'ajntk/* + */ojts/* = «water» + «soft, silky» + «herb». The herbs in this generic have soft-pubescent foliage.

Description: A monotypic generic that corresponds to AST *Ageratina bustamenta*, *A. rivalis*, *A. vernalis*, *Lagascea* sp., *Melampodium perfoliatum*, *Schistocarpa bicolor*, *S. seleri*, *Trigonospermum* sp., BOR, PTG *Plantago*, RAN *Ranunculus petiolaris*, and SCR *Castilleja*. Small shrubs and herbs with soft-pubescent to hispid foliage; leaves variable in shape but often triangular to ovate; flowers color variable, often group in composite heads. Forage plants for pigs, cattle and other animals; considered to be «green manure» for agricultural fields; AST *Lagaseca* has rigid stems which, peeled and cut to size, used as supports for grass roofs. Abundant in shrub vegetation, pastures and abandoned fields of the cold and temperate zone. Some Mixe further divide the category into a red, white and other specific forms, but these do not appear to be widely recognized. Since this a variable and broad category, it overlaps with other categories and synonymous terms abound (i.e. ***kaaj ka'aj*** «animal foot»; ***natsaampk*** «water carry», ***nauu'kxk puj kup*** «water stiff-pubescence flower tree»; ***nakaay ojts***, «carry-water herb»; ***najaamk ojts***, «water soft-pubescence herb».

58. *napiitun ojts*

Collections: JR0941, JR0974, JR1018, JR1020

Etymology: */napiitun/* + */ojts/* = «eddy» + «herb». The typical form is a semi-aquatic plant, and this may explain the name. The named specifics are apparently included because they resemble the typical form in leaf shape and lobing.

Description: A polytypic generic that corresponds to API *Hydrocotyle mexicana*. Herbs of 5 - 10 cms.; leaves rounded, lobed; flowers greenish-white, clustered in rounded umbels. The generic is extended to other herbs with crenately-lobed leaves such as GER *Geranium*, ROS *Alchemilla*, and a small herb in the Scrophulariaceae. Whole plant, crushed in water, is taken for susto of rivers and streams [API *Hydrocotyle*]. Whole plant considered as forage for grazing animals [ROS *Alchemilla*], other apparently without use. Found in moist soils of shrub vegetation and abandoned fields in the cold and temperate zones.

Specifics:

(A) *napi'itun ojts* (unmodified) «eddy herb» [API *Hydrocotyle*]

(B) *tsapts napi'itun ojts* «red eddy herb» [GER *Geranium*]

(C) *xuum napi'itun ojts* «net eddy herb» [SCR]

(D) ***yuk napi'itun ojts*** «wild eddy herb» [ROS *Alchemilla*]

59. *nataats ojts*

Collections: EV0047, EV0125, EV0322, JR0262, JR0751, JR0788, JR1119, JR1232, JR1265

Etymology: ***/na/*** + ***/taats/*** + ***/ojts/*** = «water» + «tooth» + «herb». Some Mixe have suggested that ***/nataats/*** means «angled, square», apparently referring to the 4-angled stem of these plants.

Description: A polytypic generic that corresponds to MLS *Heterocentron* and LAM or RUB. Herbs of 20 - 40 cms. with square often reddish stems; leaves opposite and ovate; flower color variable. Leaves, crushed with *aguardiente*, placed on forehead to relieve dizziness; juice of stems used to relieve sores in the mouth by masticating the plant [MLS *Heterocentron*]. Found in forests and shrub vegetation of all climate zones. Called ***pu'ujts ojts*** «blister herb» in Chinantequilla. Although this category is typically referred to as ***nataats ojts*** «water tooth herb» [MLS, RUB], the following specifics are recognized by some community members.

Specifics:

(A) ***tsapts nataats ojts*** «red water tooth herb» [MLS *Heterocentron*]

(B) ***yuk nataats ojts*** «wild water tooth herb» [LAM]

60. *natsoo'k*

Collections: ES0024, EV0010, EV0225, EV0233, JR0325, JR0415, JR0611, JR1114, JR1298, WR0014, WR0140

Etymology: ***/na/*** + ***/tsoo'k/*** + ***/ojts/*** = «water» + «Mixe proper name (black zapote)» + «herb». The name is perhaps explained by the fact that the fruits are round and purple–black; they may be thought to be miniature versions of the black zapote.

Description: A polytypic generic that corresponds to SOL *Solanum americanum* and *S. nigrum*. Herbs of 10 – 30 cms. with purplish–green stems and foliage; leaves alternate, broadly elliptical, and entire; flowers white and star–shaped, grouped in small axillary clusters; fruit a purple–black berry. Whole plant, boiled in salted water, eaten as a potherb; fruits, ground and placed on skin burns. Common in shrub vegetation and abandoned fields and cultivated fields of all zones. Although commonly referred to by the unmodified name, ***natsoo'k*** (unmodified) «water zapote» [SOL *Solanum nigrescens*, *S. nigrum*], the following two specifics are sometimes cited by local people.

Specifics:

(A) ***poo'p natsoo'k*** «white water zapote» [SOL *Solanum nigrum*]

(B) ***yuk natsoo'k*** «wild water zapote» [SOL *Solanum*] also called ***cimarrón natsoo'k***.

61. *navaajy ojts*

Collections: EV0163, JR1246

Etymology: */na/* + */vaajy/* + */ojts/* = «water» + «pubescence» + «herb». The name refers to the soft pubescence of these herbs.

Description: A monotypic generic that corresponds to CPP *Cleome* sp. Herbs of 0.5 – 1 meter, soft–pubescent; stem blackish–green; leaves alternate, palmately–compound; flowers large, white, grouped in a terminal raceme; fruit a long, green capsule. Leaves, boiled in water and left to mature for 1 – 2 days, are eaten as a potherb. In secondary forests and shrub vegetation of cold and temperate zones. This category is most related to ***jaachpup***.

62. *niiv*

Collections: none

Etymology: */niiv/* = «Mixe proper name for chile pepper». This is a cognate of the reconstructed protoMixe–Zoque term for chile ***ni'wi*** (Campbell and Kaufmann 1967:87).

Description: A polytypic generic that corresponds to SOL *Capsicum annuum*, a chile pepper that was domesticated in Mesoamerica, and *C. pubescens*, a Peruvian chile that is much cultivated in mountain villages of mexico. Herbs of 40 – 60 cms.; leaves, alternate, ovate, simple and entire; flowers star–shaped, white or purple; fruit a very spicy chile pepper that is green, yellow or red. The fruit is much used as a condiment used to make hot sauces *(niivjip)* and many dishes such as *enchiladas* (***ninnqjaa'xy***). Specifics A, F, and G are cultivated in home gardens in fields (***niivkam***) or intercropped with corn, beans and squash. The other specifics are purchased from Mixe and Zapotec traders. In addition to the following specifics, there is a category called ***tq'qts niiv*** «dry chile» [SOL *Capsicum annuum*], which may refers to any chile which is used dried.

Specifics:

(A) ***canario niiv*** «canary chile» [SOL *Capsicum pubescens*]. In local Spanish, this form is called *chile canario*.

(B) ***kaa'jk niiv*** «*pixtle*? chile» [SOL *Capsicum annuum*]. This form appear to be a low quality type of *chile pasilla*.

(C) ***kq'qn niiv*** «tomate chile» [SOL *Capsicum annuum*]. In local Spanish, this form is called *chile hancho*.

(D) ***kuñiiv*** «? chile» [SOL *Capsicum annuum*]. In local Spanish, this form is called *chile de onza*.

(E) ***maj niiv*** «large chile» [SOL *Capsicum annuum*]. In local Spanish, this form is called *chile pasilla*

(F) ***píguk niiv*** «round chile» [SOL *Capsicum annuum*]

(G) ***pii'ch niiv*** «bird? chile» [SOL *Capsicum annuum*]. In local Spanish, this form is called *chile piquín*

(H) ***po'op niiv*** «white chile» [SOL *Capsicum annuum*]

(I) ***tsap japu niiv*** «foreign ? chile» [SOL *Capsicum annuum*] In local Spanish, this form is called *chile mirasol*, according to Schoenhals & Schoenhals)

(J) ***tsoxk niiv*** «green chile» [SOL *Capsicum annuum*]. This form is called *chile verde* in local Spanish.

63. ***oo'va***

Collections: EV0304, JR0378

Etymology: */oo'va/* = «Mixe proper name for a large commelinaceous herb».

Description: A monotypic generic that corresponds to a large-leafed species of CMM, probably *Tradescantia spathacea* (formerly called *Rhoeo discolor*), an ornamental plant native to Central America and the West Indies. Semi-succulent herbs of 20 - 30 cms.; leaves reddish-green, simple, entire, lanceolate, forming a rosette leaves; flowers blue, grouped in loose terminal clusters. Whole plant crushed with aguardiente to treat hemorrhages. Cultivated in home gardens of temperate zones as an ornamental.

64. ***orégano***

Collections: JR0085, JR0363, JR0641, JR0975, JR1037, JR1120, JR1233, WR0095

Etymology: */oregano/* = «Spanish proper name for the culinary herb oregano».

Description: A monotypic generic that has as a focal member LAM *Origanum vulgare* and *O. marjorum*?, culinary herbs of European origin that are much cultivated in Mexico; the category is extended to weedy herbs that are thought to superficially resemble oregano such as GEN *Centaurium*, RUB *Borreria laevis* and *Richardia scabra*, and URT. The focal species is a very fragrant herb of 10 – 20 cms.; leaves greenish-white, opposite, simple and rounded; flowers white, grouped in dense capitate inflorescences. Leaves of the typical form used as a condiment in many cooked dishes; taken three times daily in tea, used for stomach ache; wild types apparently not used. Cultivated in home gardens of the temperate zone; wild types found in abandoned fields and grasslands of all climate zones. Wild forms of this species are called ***yuk orégano*** «wild oregano». These plants also may be referred to as ***oregano ojts*** and ***oregano montés*** [GEN *Centaurium*, RUB *Borreria laevis*, *Richardia scabra*, URT]. This category could be considered a separate generic.

65. ***orquilla pu̲j***

Collections: JR0739, JR0754, JR0864

Etymology: */orquilla/* + */pu̲j/* = «Mixe form of a Spanish proper name?» + «flower». This name is probably a corruption of a Spanish name for this introduced ornamental.

Description: A monotypic generic that corresponds to AST *Dendranthema*. Herbs of 10 – 30 cms.; leaves alternate, toothed and linear; inflorescence a composite head of white ray and yellow disk flowers. Flowers used to adorn the church, and used for All Saint's Day. Cultivated in home gardens in the cold and temperate zones.

66. *paajvuk*

Collections: ES0132, EV0167, JR0015, JR0058, JR0067, JR0170, JR0180, JR0203, JR0364, JR0385, JR0572, JR0627, JR0914, JR0983, JR0988, JR1044, JR1213

Etymology: */paajvuk/* = «Mixe proper name for a common medicinal herb».

Description: A polytypic generic that corresponds to AST *Gnaphalium canescens* and other species of this large cosmopolitan genus; the category is extended to SCR *Castilleja*. Sweet-smelling herbs of 10 - 30 cms. covered with white cottony pubescence; leaves opposite, simple, entire and elliptical; flowers grouped into a composite head, cream-white to pinkish-white; calyx persistent and straw-colored. Sprigs, boiled in water, used to wash skin wounds; combined with *yaa'tyajk poj ojts*, prepared as tea for *susto*; prepared as tea, taken for coughs; leaves, mixed with other herbs and moistened with aguardiente, placed on soles of the feet to treat fever; branchlets used as wisk broom. Found in shrub vegetation and abandoned fields of the cold and temperate zones. Also called *pixtun ujts* «cotton herb», *poo'p pajpa ojts* «white flowering herb» or *jam ujts* «ash herb». The category is extended to SCR *Castilleja* and perhaps other weedy, pubescent herbs but these are not considered useful.

Specifics:

(A) *poo'p paajvuk* «white *paajvuk*» [AST *Gnaphalium*]

(B) *tsapts paajvuk* «red *paajvuk*» [AST *Gnaphalium*, SCR *Castilleja*]

(C) *tsay paajvuk* «thin *paajvuk*» [?]

67. paa'ts to'xta ojts

Collections: JR0329, JR0760

Etymology: ***/paa'ts/*** + ***/to'xta/*** + ***/ojts/*** = «skunk» + «tail» + «herb».

Description: A monotypic generic that corresponds to ACA *Justicia breviflora*. Herbs of 10 – 20 cms.; leaves opposite, simple, and entire; flowers tubular, yellow, grouped in dense terminal clusters; fruit a brown capsule. Whole plant, prepared as tea, taken for susto. Found in the shrub vegetation of the temperate zone. Also called ***poo to'xta ojts*** «opossum tail herb».

68. paktéguk

Collections: ES0190, JR0219, JR0452, JR0650, JR0956

Etymology: ***/paktéguk/*** = «Mixe proper name for a potherb». Some Mixe suggest the following analysis ***/pak/*** + ***/téguk/*** = «dove» + «on–its–side»; the derivation is unclear.

Description: A monotypic generic that corresponds to SOL *Solanum nigrescens* and *S. nigrum*, weedy herbs that are a popular edible green in Mexico, where they are commonly called *hierba mora*. Herbs of 10 – 30 cms., often with purplish–green stems and foliage; leaves entire, alternate and simple; flowers white, star–shaped; fruits a purple–green berry. Whole plant, cooked in salted water, eaten as a potherb; the wild form is not edible. Common in shrub vegetation and abandoned fields of the cold zone. The specifics are differentiated by the color of the stem and foliage. This category is related to and may overlap with ***natsoo'k***. Some members of the community mentioned specifics such as ***poo'p paktéguk*** «white ***paktéguk***» [SOL *Solanum*] and ***yukpaktéguk*** «wild ***paktéguk***» [SOL *Solanum*], but these appear to be minor variations on the same botanical species.

69. ***payo̱'yva ojts***

Collections: ES0273?, EV0264, JR0036, JR0522, JR0684, JR0827

Etymology: */payo̱'yva/* + */ojts/* = «shepherd» + «herb». The name may refer to the habitat of this herb – it shows up in pastures and abandoned fields where animals are pastured, and where shepherds may use it as a field remedy for skin wounds.

Description: A polytypic generic that corresponds to LAM *Hyptis*, VRB *Lantana*. Strongly-scented herbs with square stems and cottony white pubescence; leaves simple, lobed and opposite; flowers tubular, purple or yellow-white, grouped in dense axillary capitate clusters. Juice of leaves placed on skin wounds and sores. Found in shrub vegetation and abandoned fields of the cold zone. *Lantana* is also called ***tsaa'n payo̱'yva ojts*** «snake shepherd herb» and perhaps ***yaktsuutsa̱mp*** «nighttime carrier?».

Specifics:

(A) ***po̱o̱'p payo̱'yva ojts*** «white pastor herb» [VRB *Lantana*]

(B) ***tso'ojmk payo̱'yva ojts*** «purple pastor herb» [LAM *Hyptis*]

70. ***pericón ojts***

Collections: JR0009, JR0562, JR0871, JR1073, JR1127

Etymology: */pericón/* + */ojts/* = «Spanish proper name for an anise scented species of marigold» + «herb». pericón usually applies to AST *Tagetes lucida*, a widely used medicinal plant of Mexico and Guatemala that usually grows in abandoned fields and roadsides in dry montane areas; it is not common in cloud forests, and is apparently little known in Totontepec.

Description: A monotypic generic that corresponds to MLS *Miconia pulchrum* and *Heterocentron*. Herbs of 0.5 to 1 meter; leaves pubescent opposite, simple and entire; flowers regular, purple; fruit a brown capsules. Leaves, crushed with other herbs and moistened with aguardiente and lard, placed on the soles of the feet to reduce fever [*Miconia*]. Found in shrub vegetation an abandoned fields of the cold zones. This generic may be further divided into specifics, including ***po'ts pericón ojts*** «yellow ***pericón*** herb» [MLS *Miconia*?].

71. *peetun ojts*

Collections: ES0147, JR0003, JR0700, JR0745, JR0850, JR1139

Etymology: */peetun/* + */ojts/* = «broom» + «herb». The name refers to low-growing, stiff and bushy herbs and sub-shrubs that may be used to make brooms.

Description: A polytypic generic whose focal member CIS *Helianthemum glomeratum*; the category is extended to other erect, weedy plants such as LAM *Salvia*, and MLS *Tibouchina scabriuscula*. The focal member is an herb of 10 - 20 cms. with whitish-green foliage and stems; leaves linear, alternate and simple; flowers yellow, regular, grouped in terminal clusters. Sprigs of the focal member, crushed with other herbs and moistened with aguardiente, placed on the soles of the feet to reduce fever; whole plant gathered to make whisk brooms; sprigs, made into tea, used to regulate menstruation [MLS]. Found in shrub vegetation, abandoned fields and pathsides in cold and temperate zones. This category may overlap or be synonymous with ***too'teñiva ojts***.

Specifics:

(A) ***poo'p peetun ojts*** «white broom herb» [MLS *Tibouchina scabriuscula*, LAM

Salvia?].

(B) ***po'ts peetun ojts*** «yellow broom herb» [CIS *Helianthemum glomeratum*] also called ***tsay pu'ts ojts*** «thin yellow flower».

72. *pii'x*

Collections: ES0026, ES0093, ES0094, ES0162, ES0112, ES0279, EV0005, EV0021, EV0077, EV0089, EV0100, EV0154, EV0186, EV0202, JR0004, JR0006, JR0039, JR0207, JR0260, JR0307, JR0326, JR0433, JR0467, JR0521, JR0559, JR0749, JR0910, JR1004, JR1017, JR1026, JR1083, JR1104, JR1140, JR1143, JR1179, JR1275, WR0139, WR0146

Etymology: */pii'x/* + */ojts/* = «Mixe proper name for plants of the Compositae, especially those with adhering fruits» + «herb».

Description: A polytypic generic in which the tribe Heliantheae is probably focal and that includes AST *Acmella*, *Aldama dentata*, *Bidens aurea*, *B. pilosa*, *B. reptans*, *Cosmos diversifolius*, *Melampodium microcephalum*, *M. divaricatum*, *Perymenium gracile*, *Piqueria trinerva*, *Tanacetum parthenium*. Herbs of 20 – 80 cms. with strongly-scented foliage; leaves deeply-divided; inflorescence a composite head of yellow, orange or white flowers. Leaves, crushed in water and mixed with a raw egg, taken for *latido* [*Tanacetum*]; leaves, crushed in water, taken for stomach ache; same preparation used to control excessive menstruation [*Tanacetum*]; plants considered as good forage for grazing animals [*Bidens*, and many others]; leaves, combined with other herbs and moistened with *aguardiente*, placed on the soles of the feet to lower fever [*Tanacetum*, *Perymenium*, *Piqueria*]; flowers occasionally used for adornment. *Tanacetum parthenium* is cultivated in home gardens the cold and temperate zones, and it often escapes to disturbed areas around the village. The other species grow in abandoned fields, grasslands and secondary forest of all zones. Sometimes called ***oo'pk pajpa ojts*** «dead-person flowering herb» or ***xu'u puj*** «mist flower» or ***ee'm puj*** «vein flower».

Specifics:

(A) ***pii'x*** (unmodified) «*pii'x*» [The focal member is AST *Tanacetum parthenium* which is also known as ***poo'p pii'x***, but this category can also apply to *Bidens*, *Cosmos*, *Melampodium divaricatum*, *Perymenium*. The species may be differentiated from the focal member by an adjective, i.e. *Melampodium* is sometimes called ***kam_tajk pii'x*** «abandoned-field pii'x» to differentiate it from the cultivated *Tanacetum*.

(B) ***poo'p pii'x*** «white *pii'x*» [AST *Tanacetum parthenium*]

(C) ***po'ts pii'x*** «yellow *pii'x*» [AST *Aldama*]

(D) ***tsapts pii'x*** «red *pii'x*» [AST *Acmella*]

(E) ***tsay pii'x*** «thin *pii'x*» [AST *Melampodium microcephalum*]

(F) ***tso'ojmk pii'x*** «purple *pii'x*» [*Cosmos diversifolius*]

(G) ***tsoxk pii'x*** «green *pii'x*» [*Aldama dentata*, *Bidens reptans*]

(H) ***yak pii'x*** «black *pii'x*» [AST *Bidens*, *Perymenium gracile*, *Piqueria trinerva*]

73. *píxtun tsaaj*

Collections: EV0177, JR0606

Etymology: */píxtun/* + */tsaaj/* = «Mixe proper name for cotton» + «stone». This name applies to a member of the botanical family that includes cotton. ***píxtun***, the Mixe proper name for MLV *Gossypium* sp., could be considered a generic in the *ojts* life-form. It is not cultivated in Totontepec, where no weaving is done at the present time. This is not a cognate of the protoZoque reconstructed term for cotton ***ɸha*.

Description: A monotypic generic that corresponds to MLV *Hibiscus uncinellus*. A twining herb of 1 – 3 meters, stems and foliage covered with hispid pubescence; leaves simple, palmately-lobed and alternate; flowers twisted before opening, trumpet shaped, scarlet red; fruit a divided brownish capsule. Foliage considered to be good forage for grazing animals. Found in shrub vegetation of temperate and hot zones. Called ***poo'p vii'tsa*** «white twist», probably a descriptive phrase, in Chinantequilla. Sometimes considered to be a vine.

74. ***pixk xo'na***

Collections: ES0282, JR0400, JR1121, WR0111

Etymology: */pixk/* + */xo'na/* = «flea» + «Mixe proper name for begonias». The name denotes this as a small relative of begonia, perhaps because both plants have an acidic taste.

Description: A monotypic generic that corresponds to OXL *Oxalis*. Acid-tasting herbs of 15 – 20 cms. emerging from a rounded tuber; leaves trifoliate, forming a basal rosette, often reddish-green; flowers regular, yellow or pink; fruit is brown capsule. Leaves, masticated but not swallowed, used to treat mouth canker sores. Sometimes extended to MLS *Heterocentron*, also an acidic herb. Found in abandoned fields of cold and temperate zones. Also called ***xu'na ujts***.

75. ***popotsu'up***

Collections: ES0025, ES0248, ES0252, JR0088, JR0089, JR0352, JR0377, JR0395, JR0398, JR0545, JR0714, JR1033

Etymology: ***/popo/*** + ***/tsu'up/*** = «Mixe proper name, possibly meaning white» + «edible-green». ***/popo/*** but is more likely a cognate of a reconstructed protoMixe-Zoque term for «white».

Description: A polytypic generic that corresponds to CPP *Cleome magnifica*. Strongly scented herb of 0.5 – 2 meters; leaves alternate and palmately-compound, the leaflets oblanceolate; flowers irregular, cream-white in terminal, racemose inflorescences; fruit a long, narrow capsule. Leaves, boiled in water and left to mature for 1 – 2 days, eaten as a potherb. Cultivated in home gardens and found in forests of the cold zones. The wild types corresponds to FAB *Lupinus*, herbs that have palmately compound leaves, and purple-blue flowers in racemose inflorescences; it is found in meadows of the cold zone. See ***jaachpup*** for additional explanation. In addition to the following two specifics, there is a wild type of this category referred to as ***popotsu'up ojts*** «popo-edible-green herb» [FAB *Lupinus*] which could be considered a generic created by extension of the ***Cleome***.

Specifics:

(A) ***poo'p popotsu'up*** «white popo-edible-green» [CPP *Cleome*]. This form is said to be glabrous.

(B) ***tsapts popotsu'up*** «red popo-edible-green» [CPP *Cleome*]. This form is said to be pubescent.

76. ***po'ojts tsoojy***

Collections: JR0849, JR1087

Etymology: ***/po'ojts/*** + ***/tsoojy/*** = «pimple, boil, rotten» + «medicine». The name describes the medicinal use of this plant.

Description: A monotypic generic that corresponds to AST *Eupatorieae*. Herbs of 10 - 30 cms with softly-pubescent foliage and stems; leaves simple, entire and opposite?; flowers purple, grouped in composite heads. Sprigs, boiled in water, used to wash skin infections. Found in abandoned fields of the cold zone. May also be called by the descriptive names ***tso'ojmk pajpa ojts*** «purple flowering herb».

77. ***poo'p ojts***

Etymology: */poo'p/* + */ojts/* = «white + herb». Perhaps refers to the whitish-green foliage or flowers of the plants.

Collections: JR0879, WR0026

Description: A monotypic generic that corresponds to a species of CPP *Cleome*. Strongly-scented, pubescent herbs of 0.5 - 1 meter; leaves alternate and palmately-compound, the leaflets oblanceolate; flowers irregular, cream-white in terminal, racemose inflorescences; fruit a long, narrow capsule. Leaves, boiled in water and left to mature for 1 - 2 days, eaten as a potherb. Found in meadows and shrubs vegetation in the ranches, in temperate and hot zones. See ***jaachpup*** for additional explanation.

78. ***poj ojts***

Collections: ES0117, JR0016b, JR0068, JR0170, JR0182, JR0383, JR0556, JR0557, JR0558, JR0594, JR0595, JR0597, JR0654, JR0683, JR0887, JR0899, JR0916, JR0978, JR0981, JR0993, JR1046, JR1107, JR1141, JR1223, JR1234

Etymology: */poj/* + */ojts/* = «wind» + «herb». The name refers to the medicinal use of these plants; they are used to treat the folk illness *aire*, which is seen as the ultimate cause of many health symptoms.

Description: A polytypic generic that corresponds to AST *Ageratum albidum*, *Archibaccharis asperifolia*, *Eupatorium oreithales*, *Fleischmannia pratensis*, *Piqueria trinervia*, *Stevia rhombifolia*. Small shrubs and herbs, often strongly-scented; leaves simple, alternate or opposite, lanceolate to heart-shaped; flowers purple to white, grouped into composite heads. Leaves, combined with other plants and moistened with aguardiente, placed on soles of the feet to reduce fever; taken in tea combined with *Gnaphalium canescens* for susto; sprigs, crushed in water, placed on forehead to relieve headaches; whole plants crushed and warmed over a comal, placed on body for treatment of colds; flowers used as adornment for All Saint's Day [*Stevia*]. Found in forests, shrub vegetation and abandoned fields of all climatic zones. The specifics are differentiated in part by stem color and habit. This category is often referred to by a the unmodified name ***pqj ojts*** «wind herb» [AST *Ageratum albidum*, *Piqueria trinervia*, *Stevia rhombifolia*], but the following specifics are recognized by some people.

Specifics:

(A) ***najaamk pqj ojts*** «pubescent wind herb» [AST *Archibaccharis asperifolia*]

(B) ***pqq'p pqj ojts*** «white wind herb» [AST *Eupatorium oreithales*, *Piqueria*, *Stevia rhombifolia*]

(C) ***taax tajk ojts*** «woman wind herb» [AST *Piqueria*, *Stevia*]

(D) ***tsay yak pqj ojts*** «thin black wind herb» [AST]

(E) ***tso'ojmk pqj ojts*** «purple wind herb» [AST *Piqueria trinervia*, *Stevia*]

(F) ***tsoxk pqj ojts*** «green wind herb» [AST]

(G) ***yak pqj ojts*** «black wind herb» [AST *Archibaccharis asperifolia*, *Fleischmannia* *pratensis*, *Stevia*]

(H) ***yaa'tyajk poj ojts*** «man wind herb» [AST Eupatoriae]

(I) ***yuk poj ojts*** «wild wind herb» [AST]

79. ***po'o ojts***

Collections: JR0680, JR1100, JR1287

Etymology: */po'o/* + */ojts/* = «month, moon, tanned-leather-hide, skin, cane, thong» + «herb». It is unclear which meaning of ***po'o*** applies here.

Description: A monotypic generic that corresponds to a species of EUP *Croton*, a large and morphologically diverse genus of warm and tropical zones. Herbs of 50 – 60 cms.; leaves alternate, simple, cordate, and serrate; male and female flowers separate, inconspicuous and white, grouped into terminal, spike-like inflorescences of a few white flowers; fruit a brown, trilocular capsule. Foliage esteemed as forage for cattle. Found in shrub vegetation of cold and temperate zones.

80. ***putet***

Collections: ES0133, ES0151, EV0166, EV0326, JR0158, JR0295, JR0430, WR0068

Etymology: */putet/* = «Mixe proper name for epazote».

Description: A polytypic generic that corresponds to CHN *Chenopodium ambrosioides*, a New World herb that is widely naturalized in other parts of the world, and often used as a medicine for intestinal worms, or as a condiment for many fresh and cooked dishes. Strongly-scented herbs of 20 – 60 cms.; leaves alternate, simple and lobed; flowers inconspicuous, greenish-white, grouped in dense terminal inflorescences; seeds black and shiny. Leaves used as condiment to flavor many dishes; root, taken as tea every four hours, to treat intestinal worms; ground in water and combined with ground chile and onion, taken in the morning hours to treat malaria. Semi-cultivated or protected in home gardens, abandoned fields and shrub vegetation of the cold and temperate zones.

Specifics:

(A) ***poo'p putet*** «white putet» [CHN *Chenopodium ambrosioides*]

(B) ***po'ts putet*** «yellow putet» [CHN *Chenopodium ambrosioides*]

(C) ***tsapts putet*** «red putet» [CHN *Chenopodium ambrosioides*]

81. *rábano silvestre*

Collections: JR0793

Etymology: */rábano/* + */silvestre/* = «Spanish proper name for radish» + «Spanish word for wild.

Description: A monotypic generic that corresponds to BRA *Brassica* or an escaped, weedy species of *Raphanus*. Strongly-scented herbs of 10 - 20 cms. with a whitish, fleshy root; leaves hispid, simple, and lobed, forming a basal rosette; flowers white, borne on a central flowering stalk; fruit a green capsule. Leaves, boiled in salted water, eaten as a potherb. Found in shrub vegetation and abandoned fields of the cold zone. Also called ***yuk rábano*** «wild radish».

82. *romero*

Collections: none

Etymology: */romero/* = «Spanish proper name for the culinary herb rosemary».

Description: A monotypic generic that corresponds to LAM *Rosmarinus officinalis*, a Mediterranean herb that is much cultivated in Mexico as condiment, ornament and medicine. Aromatic shrubs of 0.5 - 1 meter; leaves opposite, simple and linear;

flowers bluish-white, irregular. Whole plant used as a garden ornamental; sprigs used as a condiment and medicine? Cultivated in home gardens of the temperate zone.

83. ***romero extranjero***

Collections: JR0074, JR0174, JR0159, JR0328, JR0394

Etymology: ***/romero/ /extranjero/*** = «Spanish proper name for the culinary herb rosemary» + «Spanish name for foreign». The focal species of the category has a rosemary-like scent.

Description: A monotypic generic that corresponds to AST *Achillea millefolium.* Herbs of 10 - 30 cms., scented like rosemary; leaves with much divided, forming a basal rosette; flowers white, borne on erect stems in dense composite heads. Leaves, prepared in tea, taken to treat stomach vomiting and diarrhea. The category is extended to include PLG Polygala paniculata, and SCR *Lamourouxia*, and perhaps other weedy species. Found in shrub vegetation, abandoned fields and grasslands of cold and temperate zones. Also called ***romero ojts*** «rosemary herb» and ***romero silvestre*** «wild rosemary».

84. ***taatsk tąy ojts***

Collections: EV0296, JR0206, JR0236, JR0274, JR0472, JR0831, JR0832, JR0997, JR1167, JR1192, JR1255

Etymology: ***/taatsk/*** + ***/tąy/*** + ***/ojts/*** = «ear» + «hanging» + «herb». ***/taatsk tąy/*** means earring, and this generic name refers to the flowers of this plant are which are showy, pendant and perhaps reminiscent (or formerly used as?) earrings.

Description: A polytypic generic that corresponds to CAM *Centropogon cordifolia,* GSN *Achimenes*, ONA *Fuchsia splendens*, *Oenothera*, SCR *Lamourouxia*. Herbs of 10 - 50 cms.; leaves simple and entire; flowers showy, purple or yellow, regular or irregular; fruit an elongate or rounded capsular fruits. Sprigs, prepared in tea, taken for susto [ONA *Oenothera*]; other may be considered as ornamentals. Found in forest, shrubland and abandoned fields of the cold zone. May also be called taatsk ***tąy puj*** «earring flower» or ***taatsk tąy aa'ts*** «earring vine».

Specifics:

(A) ***taatsk tąy ojts*** (unmodified) «earring herb» [CAM *Centropogon cordifolia*, ONA *Fuchsia splendens*, *Oenothera*, SCR *Lamourouxia*].

(B) ***tso'ojmk taatsk tąy ojts*** «purple earring herb» [GSN *Achimenes*]

(C) ***yuk taatsk tąy ojts*** «wild earring herb» [ACA]

85. ***tañja'vin ojts***

Collections: EV0285, JR0156, JR0263, JR0799

Etymology: */tañ/* + */ja'vin/* + */ojts/* = «remaining, staying spirit» + «herb». The name refers to the medicinal use of the plant - it is used to cure susto, a disease that is caused by the soul leaving the body and staying in some place - usually a crossroads in a path or in a river.

Description: A monotypic generic that corresponds to SCR *Russellia*. Shrubs or herbs of 0.5 - 1 meter; leaves opposite, simple and ovate; flowers tubular, scarlet-red, grouped in axillary inflorescences; fruit a green capsule. Leaves, placed in *aguardiente*, are placed on the body part that aches, or on the feet, to relive body aches caused by susto. Found in shrub vegetation of temperate and hot climates. *Russelia* is also called ***mejtsk aajy*** «two leaves» a descriptive name that refers to the opposite, paired leaves, or ***tsapts naxo'ojk ojts*** «red flavorful herb» (a generic that typically refers to peppermint).

86. *taaxt ke'ev*

Collections: JR0759

Etymology: */taaxt/* + */ke'ev/* = «hail» + «stinging». The name refers in part to the stinging hairs of these plants.

Description: A monotypic generic that corresponds to EUP *Cnidosculus*. Herbs of 1 – 2 meters covered with stinging hairs; leaves alternate and deeply lobed; flowers white, regular, grouped in dense terminal inflorescences; fruit a tri–locular, brown capsule. Leaves placed on body part affected by rheumatism. Found in secondary forest of the temperate zone.

87. *tajkts ke'ev*

Collections: JR0154

Etymology: */tajkts/* + */ke'ev/* = «mouse» + «stinging». The name is derived in part from the abundant stinging hairs that cover the plants; the adjective «mouse» may refer to the diminutive habit of the plant.

Description: A monotypic generic that corresponds to URT *Urtica*, a widespread genus of herbs. Herbs of 10 – 20 cms., covered with stinging hairs; leaves opposite, simple and serrate; flowers inconspicuous, greenish–white in axillary inflorescences. Leaves used for cramps, placed on body part that is affected; ground and mixed with lard and aguardiente, placed on cheeks of those suffering from mumps or a similar swelling that prevents them from speaking. Found in abandoned fields of the cold zone.

88. ***tekpo̲'o̲***

Collections: ES0255, JR0897

Etymology: ***/tek/*** + ***/po̲'o̲/*** = «foot» + «moon, month, leather, animal-hide, cane, leather-strip». This bean may be harvested in a month (30 - 40 days) and is thus called «month bean»; ***tek*** describes erect plants with rigid stems (e.g. the stem of corn is called ***mo̲ktek***), in this case implying a bush bean variety that contrasts with vining beans.

Description: A monotypic generic that corresponds to early-yielding bush bean varieties of FAB *Phaseolus vulgaris*. Erect herbs of 0.5 meters; leaves alternate and trifoliate, the leaflets ovate; flowers white to lilac; seeds white. The immature pods are boiled and eaten as «green beans». Cultivated as a monoculture in ranches of the hot zone. This may also be called ***tekpo̲'o̲ xa̲jk*** «foot-month bean», but the «bean» label is optional; the local Spanish name is *frijol cuarenteno*. Some Mixe recognize a white form of this bean ***po̲o̲'p tek po̲'o̲*** «white foot month» [FAB *Phaseolus vulgaris*], that could be considered a specific category.

89. ***té ojts***

Collections: JR0022, JR0072, JR0251, JR0649, JR0707, JR1015

Etymology: ***/té/*** + ***/ojts/*** = «Spanish name for tea» + «herb». The name may be derived from the use of this plant as a medicinal tea.

Description: A polytypic generic that corresponds to AST *Erigeron karwinskianus*, a Mesoamerican species which has become naturalized in Europe. Herbs of 10 - 30 cms.; leaves small, simple and lobed, forming a basal rosette; central flowering stalk bearing composite heads of yellow disk and pink-white ray flowers. Leaves and sprigs prepared in tea for susto, taken three times daily; placed on bottom of feet for fever. Found in shrub vegetation and abandoned fields of the cold zone. The category is extended to PTG *Plantago* (the leaves of which are placed on soles of feet for fever), and SCR *Castilleia*.

Specifics:

(A) ***té ojts*** (unmodified) «tea herb» [AST *Erigeron karwinskianus*]

(B) ***yak té ojts*** «black tea herb» [SCR *Castilleia*]

(C) ***najaamp té ojts*** «soft–pubescent tea herb» [PTG *Plantago*]

90. *tik ka'aj*

Collections: ES0146, JR0248?, JR0275, JR0298, JR0342, JR0590

Etymology: ***/tik/*** + ***/ka'aj/*** = «lizard» + «hand». It is unclear how these plants are related to lizards» feet.

Description: A polytypic generic that corresponds to LAM *Prunella vulgaris*, RUB *Borreria* and *Crusea coccinea*. Herbs of 10 – 30 cms.; leaves opposite, ovate and simple; flowers tubular, white to red or purple, grouped into dense terminal heads; seeds held inside the persistent calyx. Whole plant is considered good forage for pigs, goats, rabbits and other animals. Found in shrub vegetation and abandoned fields of the cold and temperate zone. This category overlaps or is synonymous with *kutimun ojts*. Although many herbaceous Rubiaceae may be called by the unmodified name ***tik ka'aj*** (unmodified) «lizard hand», the following specifics are recognized by some Mixe.

Specifics:

(A) ***poo'p tik ka'aj*** «white lizard hand» [RUB *Borreria*]

(B) ***tso'ojmk tik ka̲'aj*** «purple lizard hand» [LAM *Prunella vulgaris*]

91. ***toj pu̲j***

Collections: ES0285, JR0245, JR0375, JR0837

Etymology: */toj/* + */pu̲j/* = «rain» + «flower». The name may refer to the seasonality of the flowers – they come out with the heavy summer rains and thunderstorms.

Description: A monotypic generic that has a focal member ORC *Sobralia macrantha*; the category may be extended to IRI *Tigridia*, which also has very showy flowers. Herbs of 30 – 50 cms.; leaves lanceolate, parallel venation very marked, giving the foliage a pleated look; flowers very showy, grouped into terminal inflorescences; fruit a green capsule. Flowers used as adornment for churches. *Sobralia macrantha*, the focal species, is called ***añu pu̲j*** «lightning flower» in Tepitongo – this apparently has the same derivation as the Totontepec name.

92. ***too'kaa'ch***

Collections: EV0014, EV0080, EV0221, EV0315, EV0333, JR0942, JR1277

Etymology: */too'/* + */kaa'ch/* = «prefix denoting pathside» + «scratch the earth». The name may be a reference to the scandent habit of these pathside weeds.

Description: A monotypic generic that corresponds to MLV *Sida rhombifolia* and other species of this widespread genus. Herbs of 20 – 30 cms.; leaves alternate, simple and serrate; flowers regular, solitary, evanescent, yellow; fruit a rather . Leaves, boiled in water, used to washed eyes for irritation and infection; leaves, crushed in water, taken by the spoonful for dysentery; whole plant considered good forage for grazing animals. Found in shrub vegetation and abandoned fields of cold and temerate zones. Some Mixe recognize a black form, ***ya̲k too'kaa'ch*** «black path scratch-the-earth» [MLV *Sida*].

93. ***too'téñiva peetun***

Collections: ES0145, EV0057, JR0435, JR0841, JR0989

Etymology: */too'/* + */téñiva/* + */peetun/* = «prefix denoting pathside» + «erect» + «herb». The name refers to the fact that the herbs in this generic stand erect along the side of the path, and the branchlets are used to make whisk brooms.

Description: A monotypic generic that corresponds to CLU *Hypericum uliginosum*. Herbs of 20 - 30 cms. with multiple rigid stems; leaves opposite, simple and entire, punctate with small resin dots; flowers regular, yellow, in small terminal clusters. Whole plant gathered and tied together to make brooms. Found in the secondary forest and shrub vegetation of the cold and temperate zone. Sometimes called ***too'téñiva ojts*** «pathside erect herb»; some specifics are recognized, such as ***tsapts too'teñiva*** «red pathside erect».

94. ***too'xijts***

Collections: ES0048, JR0013, JR0403, JR1176

Etymology: */too'/* + */xijts/* = «prefix denoting pathside» + «Mixe proper name for some avocados». This is a pathside weed that has the anise-like scent of some Mesoamerican avocados.

Description: A monotypic generic that corresponds to AST *Tagetes filifolia*. Anise-scented herbs of 10 - 15 cms.; leaves opposite, finely-divided; flowers cream-white, grouped in composite heads. Sprigs, prepared as tea, used to treat stomach ache and vomiting. Found in the abandoned fields and grasslands of the cold and temperate zone.

95. ***tok***

Collections: ES0247, JR0032, JR0234, JR1055

Etymology: */tok/* = «Mixe proper name for some umbels» + «herb».

Description: A monotypic generic that corresponds to API *Arracacia bracteata*. Strongly-scented herbs of 1 - 2 meters; leaves alternate, much-divided, and clasping at base; flowers whitish-green, clustered into terminal umbels; fruit dry, greenish-brown. Leaves, boiled in water, taken as tea and as a bath for edema. Found in moist soils of shrub vegetation of the cold and temperate zones.

96. ***toojvuk***

Collections: ES0109, JR0543, JR0773, JR0776, JR1058, JR1090, JR1091, JR1092, JR1228, JR1256, WR0108

Etymology: */toojvuk/* = «Mixe proper name for most epiphytic bromeliads».

Description: A polytypic generic that corresponds to BML *Tillandsia*. Epiphytic herbs of 10 - 50 cms; leaves rigid, elliptical to oblong, forming in a basal rosette; flowering stalk bearing red, yellow purple or green bracts that subtend tubular, often yellow flowers; fruit a brown capsules. Whole plant used as adornment. Common in trees of the primary and secondary forest of all climate zones. Also called ***tsap'ax puj*** «upside-down flower».

Specifics:

(A) ***poo'p toojvuk*** «white bromeliad» [BML *Tillandsia*]

(B) ***po'ts toojvuk*** «yellow bromeliad» [BML *Tillandsia*]

(C) ***tsapts toojvuk*** «red bromeliad» [BML *Tillandsia*]

(D) ***tsay toojvuk*** «thin bromeliad» [BML *Tillandsia*]

(E) ***tsoots toojvuk*** «grass bromeliad» [BML *Tillandsia*]

(F) ***tsoxk toojvuk*** «green bromeliad» [BML *Tillandsia*]

97. ***tótuk xuu'k puj***

Collections: JR0867

Etymology: ***/tótuk/*** + ***/xuu'k/*** + ***/puj/*** = «butterfly» + «scent» + «flower». The name is derived from the fragrant flowers which attract butterflies.

Description: A monotypic generic that corresponds to LIL *Echeandia* or *Zygadenus*? or maybe an introduced *Lilium*. Semi-succulent herbs; leaves elongate, forming a basal rosette; flowering stalk bearing numerous white, fragrant, trumpet-shaped flowers; fruit a green capsule. Tuber, ground and boiled in water, taken 4 times a day as a purgative. Cultivated in home gardens of the cold zone.

98. ***tsaa'n xi'tsun***

Collections: ES0100, ES0197, JR0319, JR0531, JR0661, JR0990, JR1190

Etymology: ***/tsaa'n/*** + ***/xi'tsun/*** = «snake» + «rattle». The name probably refers to the dry fruit, which makes a rattling sound apparently reminiscent of a rattlesnake.

Description: A monotypic generic that corresponds to FAB *Crotolaria bupleurifolia* var. *bupleurifolia*, *C. rotundifolia*, *C. schiedeana*, and *C. vulgaris*. Erect herbs of 20 - 50 cms.; leaves alternate, simple or trifoliate leaves; flowers yellow, irregular, grouped in terminal racemes; the fruit a green, rounded legume, turning brown on maturity, the numerous seeds becoming loose and making sound like a rattle. Seeds, green or dry, given to children to treat incontinence. Found in shrub vegetation and abandoned fields of all climate zones.

99. ***tsamun***

Collections: ES0253, ES0258, ES0262, EV0307, JR0087, JR0272, JR0791, JR0846, JR0866, JR1112

Etymology: */tsamun/* = «Mixe proper name for some amaranths».

Description: A polytypic generic that corresponds to AMA *Amaranthus hybridus* and other species of this genus. Herbs of 20 – 30 cms. with often reddish-green foliage; leaves alternate, ovate and simple; flowers minute, greenish-white, clustered into dense terminal inflorescences. Plants, boiled in salted water and fried in oil, eaten as a potherb; seeds may be prepared in atole; flowers cut for All Saint's Day. Found in abandoned and cultivated fields and grasslands of all zones. Perhaps because of the superficial similarity in habit, Impatiens is sometimes called ***natsamun puj*** (JR0865). Many people refer to these plants by the unmodified name ***tsamun*** (unmodified) «amaranth» [AMA *Amaranthus*].

Specifics:

(A) ***poo'p tsamun*** «white amaranth» [AMA *Amaranthus*]

(B) ***tsapts tsamun*** «red amaranth» [AMA *Amaranthus*]

(c) ***tso'ojmk tsamun*** «purple amaranth» [AMA *Amaranthus*]

100. ***tsapko'on***

Collections: JR0353, JR0392, JR570

Etymology: */tsap/* + */ko'on/* = «prefix which commonly denotes objects that have been introduced to the Mixe» + «Mixe proper name for tomato».

Description: A monotypic generic that corresponds to SOL *Physalis*. Herbs of 10 – 30 cms.; leaves simple, slightly lobed, and alternate; flowers yellow, bell-shaped; fruit is a yellow-green berry enveloped in a papery husk. Fruits are toasted on a comal and ground to be added to hot sauces and various cooked dishes. Semi-cultivated or protected in fields and shrub vegetation of all climate zones. The species protected in cultivated fields is called ***tsapko'on***, while those found in abandoned fields are referred to as ***aa'tspa ko'on***. Various name are recognized by local people, including ***aa'tspa ko'on*** «vining tomato» [SOL *Physalis* – wild spp.?]; ***tsapko'on*** «foreign tomato» [SOL *Physalis* – cultivated spp. ?], and ***tsay tsapko'on*** «thin foreign tomato» [SOL *Physalis* – cultivated spp. ?].

101. ***tsaptsu'up***

Collections: ES0032, JR0090, JR0412

Etymology: */tsap/* + */tsu'up/* = «prefix which commonly denotes objects that have been introduced to the Mixe» + «edible-green».

Description: A monotypic generic that corresponds to BRA *Brassica campestris*. Strongly-scented herbs of 10 – 30 cms., leaves alternate, simple, deeply-lobed; central flowering stem with numerous yellow flowers grouped in a raceme; fruit an elongate, green capsule containing numerous reddish-brown seeds. Leaves, boiled in salted water, eaten as a potherb. Found in shrub vegetation, cultivated and abandoned fields in all climate zones.

102. ***tsapuj***

Collections: JR0131, JR0144, JR0622, JR1205

Etymology: */tsa/* + */puj/* = «stone» + «flower». The name refers to the habit of these plants – they often grow on rocks or in rocky soil.

Description: A monotypic generic that corresponds to CRS *Echeveria chiapensis*. Succulent herbs of 10 – 15 cms.; leaves thickened, ovate leaves, forming a basal rosette; flowering stalks bearing numerous yellow to red, regular flowers; fruit a brown capsule. Leaves, ground, are taken for rheumatism. The category is extended to PIP *Peperomia nigropunctata* (referred to as ***tsay tsa puj*** «thin stone flower») and other *Piper* spp., which are succulent herbs usually called ***amyajpxun ojts***. The leaves of these herbs are crushed and the juice is placed on skin boils. Found growing on rocks or in rocky soil in forests of the cold zone.

103. ***tsapxajk***

Collections: JR0413

Etymology: */tsap/* + */xajk/* = «prefix which commonly denotes objects that have been introduced to the Mixe» + «Mixe proper name for bean».

Description: A monotypic generic that corresponds to FAB *Vicia faba*, the fava or broad bean, a Eurasian cultivar introduced by the Spanish and now widely cultivated in montane regions of Mexico. Erect herbs of 20 – 30 cms. with square stems; leaves pinnately compound, the leaflets broadly ovate; flowers white with black marking near the base of the petals; fruit a glabrous green pod that contains several broad, flattened seeds which turn tannish-brown upon maturing. The seeds are boiled in water to be eaten in stews or alone as a substitute for beans; leafy shoots eaten as potherbs? Cultivated and escaped in fields of the cold zone. Synonyms include ***peji xajk*** «bush bean», and ***kaaj yu'u xajk*** «animal plowed-field bean». The name ***yuk tsap xajk*** «wild Spanish bean» [FAB *Vicia faba*] is sometimes used for some escaped or 'volunteer' populations of fava bean.

104. ***tsay kapy***

Collections: JR0373, JR0492

Etymology: */tsay/* + */kapy/* = «thin» + «Mixe proper name for tall, reedy grasses».

Description: A monotypic generic that corresponds to API, especially robust herbs of this family. Herbs of 0.5 – 1 meter; leaves alternate, much-divided, clasping at base; flowers white, grouped into broad umbels; fruit dry, flattened and brown. Found in abandoned fields of temperate zone. Apparently without use. RAN *Thalictrum* is sometimes called ***tsay kapy ojts***, perhaps because of its superficial resemblance to plants in the Apiaceae.

105. ***tsa̱'a̱ga ojts***

Collections: ES0228?, ES0255, JR0021, JR0025, JR0056, JR0156, JR0202, JR0454, JR0489, JR0568, JR0634, JR0717, JR0740, JR0762, JR0818, JR0886, JR0973, JR0976, JR1072, JR1134

Etymology: */tsa̱'a̱ga/* + */ojts/* = «magical-fright» + «herb». The name is derived from the use of these plants in the curing of susto, a common folk illness.

Description: A polytypic generic that corresponds to AMA *Alternanthera*, AST, CRY *Arenaria lanuginosa*, LYC *Huperzia taxifolia*, PIP *Peperomia*, PRM *Anagallis arvensis*, RUB *Crusea coccinea breviloba*, *Didymaea alsinoides*, *Galium* sp., and SCR *Castilleia*. Herbs, often scandent or twining, but otherwise very diverse morphologically. Branchlets, boiled in water, taken as tea or as a bath to cure *susto*; the treatment may last for up to 15 days, and the tea may be taken up to three times a day. Found in all climates zones and vegetation types. In addition to the unmodified name ***tsa̱'a̱ga ojts*** «magical-fright herb» [PRM *Anagallis arvensis*, RUB *Didymaea alsinoides*, SCR *Castilleia*], the following specifics are recognized by some members of the community and in particular curers. Some species of PIP

Peperomia used for *susto* are referred to as ***amyajpxyun tsa'aga ojts*** «thick-leaf magical-fright herb», a category which overlaps which the generic ***amyajpxyun ojts*** «thick-leaf herb».

Specifics:

(A) ***kax tsa'aga ojts*** «high magical-fright herb» [LYC *Huperzia myrsinites*, *H. pithyoides*, *H. taxifolia*, RUB *Didymaea alsinoides*]. Alternately known as ***kax tsa'aga aa'ts*** «high magical-fright vine» and ***kax tsa'aga tsimi*** «high magical-fright fern».

(B) ***maaxun ónuk tsa'aga ojts*** «small offspring magical-fright herb» [AMA *Alternanthera*, CRY *Arenaria lanuginosa*, RUB *Galium* and *Crusea*, SCR *Castilleia*] used for babies that have *susto*

(C) ***po'ts tsa'aga ojts*** «yellow magical-fright herb» [SCR *Castilleia*]

(D) ***ta'ax tajk tsa'aga ojts*** «female magical-fright herb» [CRS *Sedum oaxacanum*]

(E) ***tsay tsa'aga ojts aa'ts*** «thin magical-fright herb vine» [CRY *Arenaria*]

(F) ***yaa'tyajk tsa'aga ojts aa'ts*** «male magical-fright herb vine» [RUB *Didymaea alsinoides*]

106. ***tsiik ojts***

Collections: ES0230, EV0150, EV0261, EV0211

Etymology: */tsiik/* + */ojts/* = «cockroach» + «herb». The name comes from the plant's reputation as an insecticide that kills cockroaches and other pests. The name may well have been introduced in its widespread Spanish form *hierba de cucaracha*, and then translated into Mixe.

Description: A monotypic generic that corresponds to APO *Haplophyton cimicidium* in Totontepec and PAP *Bocconia frutescens* in Tepitongo and *Chinantequilla*. *Haplophyton* is an herb of 10 – 20 cms with milky latex, lanceolate leaves and terminal clusters of cream-white flowers. It is reputed to be used as an insecticide plant in the Zapotec region. It grows in dry areas outside of the municipality, especially in the Zapotec village of Yalalag, with whom the Mixes have had a long relationship of trade. *Bocconia* is a shrub of 1 – 2 meters with reddish latex, reddish-green leaves, and terminal inflorescences of greenish-yellow flowers. It is said to have formerly been used as a dye plant. Found in shrub vegetation of all climatic zones.

107. ***tsik ay'ápit***

Collections: ES0175, JR0044

Etymology: */tsik/* + */aajy/* + */ápit/* = «badger» + «leaf» + «thorn».

Description: A monotypic generic that corresponds to AST *Cirsium*. Herbs of 1 – 1.5 meters with spiny stems and foliage; leaves alternate, simple and deeply-lobed; flowers pink to purple, clustered in composite heads enclosed in a spiny calyx. Medicinal for rheumatism? Found in shrub vegetation and abandoned fields of the cold zone. Also called ***poo'p ápit*** «white thorn» in Tepitongo.

108. ***tsim puj***

Collections: ES0029, ES0124, JR0035, JR0401, JR0523

Etymology: */tsim/* + */puj/* = «gourd (Crescentia-fruit)» + «flower». The name may refer to the gourd-shaped, rounded receptacle.

Description: A monotypic generic that corresponds to AST Tagetes lunulata; the category may be extended composites such as *Smallanthus oaxacanus*. Strongly scented herbs of 10 – 40 cms.; leaves glabrous, alternate and deeply-divided; flowers showy, yellow, clustered in composite heads. Whole plant used to treat *susto* by burning 13 sprigs together with 13 sticks of pitchpine; leaves, heated over a comal, placed on body to treat colds and fainting spells. Found in shrub vegetation of temperate zones often near human settlements.

109. ***tsípun tsoojy***

Collections: JR0530

Etymology: */tsípun/* + */tsoojy/* = «wart» + «medicine». The name describes the use of this plant.

Description: A monotypic generic that corresponds to RUB *Coccocypselum*, a small genus of tropical American herbs. Scandent herbs of 30 – 40 cms. with purplish-green stems and foliage; leaves simple, opposite, entire and pubescent; flowers purple, grouped in axillary clusters; fruit a purple-red berry. Juice placed on warts and other skin blemishes? Found in secondary vegetation of the temperate and hot zones.

110. ***tsupup***

Collections: none

Etymology: */tsu/* + */pup/* = «prefix used in several plants names, but meaning is unclear» + «Mixe proper name for some edible greens». */pup/* may be derived from */puu'p/* = «tender-plant-shoot», but the phonological change would be abnormal.

Description: A monotypic generic that corresponds to CPP *Cleome speciosa*. Strongly scented, glabrous herbs of 40 – 60 cms.; leaves alternate and palmately-compound, the leaflets oblanceolate; flowers irregular, purple in terminal, racemose inflorescences; fruit a long, narrow capsule. Leaves, boiled in water and left to mature for 1 – 2 days, eaten as a potherb. Found in abandoned fields and shrub vegetation of the temperate zone; gathered in fairly large quantities in the large meadow below Totontepec. See *jaachpup* for additional explanation.

111. ***tukaxmots ojts***

Collections: ES0020, ES0113, JR0792

Etymology: */tuk/* + */axmots/* + */ojts/* = «old» + «underwear» + «herb». The derivation of this name is unclear.

Description: A monotypic generic that corresponds to AST *Sonchus*. Herbs of 10 – 30 cms. with milky sap; leaves simple, alternate, lobed and spiny; flowers yellow in terminal composite heads; seeds with cottony hairs. Whole plant, boiled in salted water, eaten as a potherb, especially recommended for children since it is said to strengthen their teeth. Found in grasslands and abandoned fields of hot zones.

112. ***vainilla***

Collections: none

Etymology: */vainilla/* = «Spanish proper name for vanilla».

Description: A monotypic generic that corresponds to ORC *Vainilla planifolia*. Vining, epiphytic herbs of 2 – 4 meters; leaves simple, elliptical, and alternate; flowers fragrant, yellow–white; fruit a long, fleshy, sweet–smelling pod. Apparently is not grown in the municipality, but the fruit is known to be used as a flavoring.

113. ***vinjot***

Collections: EV0008, EV0056, JR0311, JR0411, JR0667, JR1241

Etymology: */viijn/* + */jot/* = «eye» + «hole». The name may refer to the numerous small holes that appear in the foliage of this plant.

Description: A polytypic generic that corresponds to SOL *Jaltomata procumbens*. Herbs of 30 – 40 cms.; leaves glabrous, alternate simple and lobed; flowers bell-shaped, greenish-white; fruit a purple-black berry subtended by a persistent green calyx. Leaves, boiled in salted water, eaten as a potherb; berries may also be eaten. Frequent in abandoned and cultivated fields of cold and temperate zones.

Specifics:

(A) ***poo'p vinjot*** «white eye-hole» [SOL *Jaltomata procumbens*]

(B) ***yak vinjot*** «black eye-hole» [SOL *Jaltomata procumbens*]

114. ***xookx tsi'tsk***

Collections: ES0082, ES0104, ES0164, JR0037, JR0163, JR0638, JR0943, JR1229

Etymology: */xookx/* + */tsi'tsk/* = «hummingbird» + «chest». The name may refer to the fact the this flower is observed to be visited by hummingbirds, and it may also be related to the milky sap the plant contains.

Description: A monotypic generic that corresponds to CAM *Centropogon*, *Lobelia laxiflora*. Erect herbs with milky sap; leaves long, narrow, arranged in whorls; flowers yellow to red, tubular; fruit a purple-black berry. The leaves or tender tips of the plant are taken before every meal for four days by mothers who have difficulty breast feeding. Found in shrub vegetation, grasslands and abandoned fields of the cold and temperate zone. Called ***kampuj ojts*** in Ocotepec. The category is extended to SCR *Lamourouxia*, which has tubular red flowers.

115. ***xoo'kpa ojts***

Collections: JR0151, JR0756, JR1074, WR0053

Etymology: */xoo'kpa/* + */ojts/* = «smell» + «herb».

Description: A monotypic generic that corresponds to RUT *Ruta chalapensis*. Strong-smelling herbs of 20 - 30 cms.; leaves alternate, deeply-divided, grayish-green; flowers terminal, regular, yellow; fruit a green capsule. Leaves, ground with mamey sapote seed and dissolved in water, taken for *latido*; mixed with manzanilla for other medicinal uses; leaves, mixed with other herbs, aguardiente and lard, placed on soles of feet for fever. Cultivated in home gardens of all zones.

116. ***xo'na***

Collections: ES0049, ES0204, ES0282, JR0057, JR0141, JR0145, JR0172, JR0436, JR0648, JR0671, JR0859, JR1113, JR1162

Etymology: */xo'na/* = «Mixe proper name for begonias». The name was perhaps originally derived from */xonun/* which means sour.

Description: A polytypic generic that corresponds to BEG *Begonia*. Succulent herbs of 10 - 50 cms. with greenish-red stems; leaves alternate, simple, often lobed and reddish-green; flowers whitish to deep pink; fruit a winged capsule. Leaves masticated (but not swallowed) to relieve canker sores; stems, peeled and cooked in an *olla*, are ground with chilies to make hot sauce. Found in the forests and shrub vegetation of climate zones.

Specifics:

(A) ***poo'p xo'na*** «white begonia» [BEG *Begonia*]

(B) ***tsa xo'na*** «stone begonia» [BEG *Begonia*]. This form grows on rocks.

(C) ***tsapts xo'na*** «red begonia» [BEG *Begonia*]

(D) ***tsoxk xo'na*** «green begonia» [BEG *Begonia*]

117. ***yaktex_po'ova ojts***

Collections: ES0276, EV0011, JR0301, JR0369, JR0407, JR0820, JR0840

Etymology: */yak/* + */tex/* + */po'ova/* + */ojts/* = «verb–prefix (to do)» + «plate» + «break» + «herb». The name appears to be a translation of the local Spanish name, *quiebra platos*, for morning glories.

Description: A monotypic generic that corresponds to AST *Dahlia coccinea* and LIL *Bomarea acutifolia*. Vining or erect herbs of 0.5 – 1 meter; leaves deeply–lobed or broadly lanceolate; flowers orange–red, grouped in dense terminal clusters or composite heads. Flowers used for adornment. Found in shrub vegetation and abandoned fields of all climate zones. A synonym is ***taza po'ova ojts*** «cup break herb». The *Bomarea* is sometimes classified as a vine, ***yaktex_po'ova aa'ts***.

118. *yee'k vet*

Collections: JR0137

Etymology: */yee'k/* + */vets/* = «grow–fat» + «termite». The name apparently refers to the size, shape and thickness of the leaves.

Description: A polytypic generic that corresponds to POR *Portulaca oleracea* and is extended to PIP *Peperomia* sp. Scandent succulent herbs of 10 – 20 cms.; leaves alternate, simple and entire; flowers regular, yellow, inconspicuous, axillary; fruit a brown capsule. Whole plant, boiled in salted water and then fried in oil with onions and chile, eaten as a potherb. Occasional in abandoned fields and grasslands of cold and temperate zones. The wild type is found in forests of the cold zone, and is not eaten.

Specifics:

(A) ***yee'k vet*** (unmodified) «grow–fat termite» [POR *Portulaca oleraea*]

(B) ***yuk yee'k vet silvestre*** «wild grow–fat termite» [PIP *Peperomia* sp.]

119. ***yukcebolla***

Collections: JR0302, JR1010

Etymology: ***/yuk/*** + ***/cebolla/*** = «a prefix that indicates objects that are wild, non–domesticated, from the forest or high montane area» + «Spanish proper name for onions».

Description: A monotypic generic that corresponds to HPX *Hypoxis*?. Herbs of 10 cms.; leaves linear, elongate, forming a basal rosette; flowers yellow or pink, terminal on a central flowering stalk. Apparently without use. A wild crocus that grows in abandoned fields of cold zone. This generic, also referred to as ***tsapts cebolla puj***, is an extension of the generic category ***cebolla puj*** «onion flower» which corresponds to onions.

120. ***yukputet***

Collections: ES0148, JR0157, JR0252, JR0836, JR0985, JR1007, JR1173, JR1280

Etymology: ***/yuk/*** + ***/putet/*** = «a prefix that indicates objects that are wild, non–domesticated, from the forest or high montane area» + «Mixe proper name for a culinary and medicinal herb».

Description: A monotypic generic that corresponds to AST *Conyza*, *Erectites*, and Hieracium. Herbs of 10 – 20 cms. with milk sap; leaves simple, alternate, entire and lobed, forming a basal rosette; flowers borne on a central stalk, grouped in a composite head, yellow, white to purple; seeds bearing a white cottony pubescence. Sprigs, ground in water, taken before each meal; or ground and mixed with *aguardiente* to be placed on wrists and inside elbows to treat dysentery; plants, crushed and combined with other plants moistened with aguardiente, placed on feet to reduce fever. The category is extended to SCR *Castilleia* and CAM *Diastatea*, and other herbs which are considered to have a superficial resemblance to CHN *Chenopodium ambrosioides*. Found in shrub vegetation and abandoned fields of the cold and temperate zones. Also called ***putet ojts*** «***putet*** herb».

121. ***zanahoria***

Collections: none

Etymology: /***zanahoria***/ = «Spanish proper name for carrots».

Description: A monotypic generic that corresponds to API *Daucus carota*, a Eurasian cultigen that is cultivated as a root crop in areas of temperate climate. Herbs of 10 - 20 cms., arising from a large, orange taproot; leaves all emerging from the taproot, finely divided; flowers white, grouped in umbels. Root eaten fresh and cooked. Occasionally cultivated in home gardens of the community; more commonly purchased from market vendors.

III. ***aa'ts*** «vines»

I recognize 51 generics in the vine category (table 7.3). 36 generics are monotypic (70.6% of the total); 12 generics (29.4%) are further subdivided into 40 specifics. There are 4 varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	36	9	3	2	1	0	0	0	0	0	0	0
Totals: 51 generics, 40 specifics, 4 varietals												

Table 7.3. Distribution of specifics in the life-form ***aa'ts*** «vines».

1. ***aa'ts xajk***

Collections: ES0227

Etymology: */aa'ts/* + */xajk/* = «vine» + «Mixe proper name for bean». The name describes the vining habit of these beans.

Description: A polytypic generic that corresponds to vining types of FAB *Phaseolus vulgaris*, a species that was domesticated in Mesoamerica some 5000 – 6000 years ago, and is now widely cultivated throughout the world. Vines of 1 – 3 meters; stems twining on surrounding vegetation, scandent on ground, or intertwined; leaves trifoliate, the leaflets ovate; flowers pink to cream-white; fruit a green pod containing several kidney-shaped seeds that are reddish-brown to black and rather lustrous. Seeds are edible; they are boiled in water and are eaten plain, made into tamales or prepared in stews. Cultivated in polycultures with maize and squash, particularly in the cold and temperate zones. Although often referred to simply as ***aa'ts xajk*** (unmodified) «vine bean» [FAB *Phaseolus vulgaris]*, the following specifics are widely recognized in the community.

Specifics:

(A) ***naap aa'ts xajk*** «Zapotec vine bean» [FAB *Phaseolus vulgaris*]

(B) ***tsapts aa'ts xajk*** «red vine bean» [FAB *Phaseolus vulgaris*]

(C) ***yak aa'ts xajk*** «black vine bean» [FAB *Phaseolus vulgaris*]

2. ***aa'tspa puj***

Collections: EV0164, JR0367, JR0488, JR0861

Etymology: */aa'tspa/* + */puj/* = «vining» + «flower». The name describes the morphology of these plants – they are showy flowering vines.

Description: A polytypic generic that corresponds to CNV *Ipomoea*, a very large genus of climbing plants that grow primarily in tropical warm temperate zones; the wild form is SCR *Lophospermum antirhinifolia*, a flowering vine sometimes cultivated as a garden ornamental. The focal member comprises herbaceous vines of 2 – 4 meters often arising from a thick tuber; stems twining in surrounding vegetation or sprawling on ground; leaves alternate and heart-shaped; flowers regular and bisexual, axillary and funnelform, purple to red; fruit a brown, often dehiscent capsule containing several dark seeds. The wild form is an herbaceous vines of 3 – 5 meters; stems climbing on surrounding vegetation; leaves alternate and heart-shaped; flowers purplish-black and tubular, subtended by a persistent green calyx. The Ipomoea is considered to be a good forage for grazing animals. The wild form is occasionally cultivated as a garden ornamental trained to climb over houses and fences. The focal member is common in secondary forests and shrub vegetation of all climatic zones. The wild form is found in secondary forests of the temperate and hot zones, and is semi-cultivated in home gardens of the temperate zone. The *Ipomoea* species is also called ***campanilla aa'ts*** «small bell vine» and ***tsapts aajy aa'ts*** «red leaf vine».

Specifics:

(A) ***aa'tspa puj*** (unmodified) «vining flower» [CNV *Ipomoea* spp.]

(B) ***yuk aa'tspa puj*** «wild vining flower» [SCR *Lophospermum antirhinifolia*]

3. ***ap_puj***

Collections: ES0069, EV0084, JR0046, JR0166, JR0525, JR0550, JR0578, JR0592, JR0612, JR0873, JR1180, JR1267, WR0073

Etymology: */ap/* + */puj/* = «grandfather, grandson» + «flower». */ap/* is the term for maternally or paternally descended grandfathers or grandsons that are consanguineous, or blood-related (Schoenhals & Schoenhals 1965:320, 322–323). The name is related to the use of these flowers as an ornamental for the cemetery and All Saint's Day (the day of the dead), paying homage to the «grandfathers» who have passed on.

Description: A polytypic generic that corresponds to AST *Archibaccharis* (the black form), *Bidens* (the typical form), *Liabum discolor* and *Mikania cordifolia* (the red and wild form). Herbaceous vines and scandent herbs of 0.5 – 5 meters; leaves alternate or opposite, often lobed or divided but sometimes entire; flowers yellow, white or purple clustered in composite heads that often contain both disk and ray florets; fruit one-seeded and indehiscent, tipped with barbs or long white hairs. Flowers used as adornment for the All Saint's Day. Found in the primary and secondary vegetation of all climate zones. The specifics are distinguished by the color of the leaves, stems or pubescence. Sometimes considered as a type of *ojts*, or perhaps better thought of as an ambiguously affiliated generic.

Specifics:

(A) ***ap_puj*** (unmodified) «grandfather flower» [AST *Bidens*]. This form grows close by the community, in contrast to the remaining forms, which are found in the wild.

(B) ***poo'p ap_puj*** «white grandfather flower» [AST *Liabum discolor*]. A synonym is poo'p aa'ts ojts «white vine herb».

(C) ***yak ap_puj*** «black grandfather flower» [AST *Archibaccharis*].

(D) ***yuk ap_puj*** «wild grandfather flower» [AST *Mikania cordifolia]*

4. ***arroz xajk***

Collections: JR0934

Etymology: */arroz/* + */xajk/* = «Spanish proper name for rice» + «Mixe proper name for bean». This is a Mixe adaptation of the Spanish name for rice bean frijol arroz.

Description: A monotypic generic that corresponds to FAB *Vigna umbellata*, the rice bean, a native of South Asia that is occasionally cultivated in Oaxaca, Veracruz and other tropical regions of Mexico. Vines of 0.5 to 1 meter; stem twining on vegetation or scandent on ground; leaves pinnately compound, the leaflets ?; flowers yellow; pods green, containing several red-brown rice-sized seeds. Seeds are boiled, mashed and refried to be consumed as a staple food. Cultivated in ranches of temperate and hot zones.

5. ***aya'ax aa'ts***

Collections: ES0078, JR0802

Etymology: */aya'ax/* + */aa'ts/* + */aajy/* = «cry-baby» + «vine». There are various ideas of why the plant is called «cry-baby» i.e. because it weeps water from its cut stem or because of a crying-sound that the leaves make) but none is definitive.

Description: A monotypic generic that corresponds to ARA *Monstera deliciosa*, the *piñanona*, a widely cultivated ornamental and food plant which is native to humid forests of the Sierra Norte; the category probably also includes some *Philodendron*, a large tropical American genus of vines. Climbing, epiphytic herbaceous vines of 2 - 20 meters; stems stout, containing a copious amount of watery sap; leaves simple, alternate and ovate, developing large holes and pinnate lobes; flowers composed of a greenish-white bract (spathe) which envelops a central spike (spadix) of numerous small flowers; fruit an aggregate of berries? Aerial roots used to make baskets and hats; the immature inflorescence sometimes eaten raw? Found in primary and secondary forests of the all zones. Some large-leaved representatives of this generic are considered to belong also to the «leaf» life-form ***aajy***.

6. *barbasco aa'ts*

Collections: JR0526, JR0706, JR1130, JR1281

Etymology: ***/barbasco/*** + ***/aa'ts/*** = «Spanish proper name for some vines with large tubers» + «vine». *barbasco* is the Spanish name commonly used in Mexico for *Dioscorea* species, especially ones used as fish poisoning. Although this is a native plant, it is not surprising that it receives a Spanish name - *barbasco* was the basis of a large collecting initiative by European and later Mexican pharmaceutical companies that were using the tubers to make birth control pills.

Description: A polytypic generic that corresponds to DIO *Dioscorea*, a large genus of vines that grow in warm and tropical zones around the world. Climbing herbaceous vines of 2 - 8 meters; stems, arising from large tubers, twining over supporting vegetation; leaves alternate and cordate, marked by deep parallel veins; flowers regular, small and inconspicuous, greenish to yellowish-white; fruit a dry capsule bearing numerous winged seeds. Tubers used to treat rheumatism; they are ground, mixed with 1/2 cup of alcohol and then tied over the body part which aches. Found in forests and shrub vegetation of all zones. Although not completely analyzed, it appears that the «red» form is the focal, useful member of the category and that other *Dioscorea* species are considered «wild».

Specifics:

(A) *tsapts barbasco* «red *barbasco*» [DIO *Dioscorea*]. This may also be called by the Spanish synonym *barbasco rojo*, which similarly means «red *barbasco*»

(B) *yuk barbasco* «wild *barbasco*» [DIO *Dioscorea*].

7. *bugambilia*

Collections: JR1081

Etymology: */bugambilia/* = «Spanish proper name, which is derived form the generic name *Bougainvillea*».

Description: A monotypic generic that corresponds to cultivars of NYC *Bougainvillea* spp., ornamental South American vines that are widely cultivated in Mexico. Woody climbing vines; stems stout and usually thorny; leaves deciduous, alternate and elliptic to ovate; inflorescence subtended by three brightly colored bracts, flowers regular and tubular; fruit an indehiscent achene. Red and pink-bracted inflorescences are used to relieve coughs; they are prepared in honey-sweetened tea which is taken three times a day. Semi-cultivated in home gardens of the cold and temperate zone.

8. *campana aa'ts puj*

Collections: JR0752, JR0860

Etymology: */campana/* + ***/aa'ts/*** + ***/puj/*** = «Spanish name for bell» + «vine» + «flower». The name apparently evokes the bell-shaped flowers of this vine. It is interesting to note that the first extended contact between the Mixe of Totontepec and a Spanish-speaker occurred when a Sr. Alcantara came to the village in the late 1700's to make a bell for the church. Since he was an inquisitive and knowledgeable person that taught many skills to the people of Totontepec, it is probable that many of the Spanish plant names come from him and his descendants, some of whom settled in the village.

Description: A monotypic generic that corresponds to SOL *Solandra*, a small genus of tropical American vines, some of which are used as hallucinogens and ornamentals. Woody, climbing vines; stems stout and greenish-white; leaves alternate, oval and entire, thickened and glossy; flowers solitary in the leaf axils, subtended by large green bract, the corolla golden yellow and bell-shaped; fruit is a brown capsule. Flowers are used as adornment for the church. Occasional in the primary forest of the cold zone. Sometimes referred to simply as ***campana puj***, «bell flower».

9. ***ee'm puj aa'ts***

Collections: JR0212, JR0279

Etymology: */ee'm/* + */puj/* + */aa'ts/* = «cord,vein or hard» + «flower» + «vine». The name apparently refers to the long, fibrous branches or the deeply-veined leaves of this mock orange shrub.

Description: A monotypic generic that corresponds to HDR *Philadelphus mexicanus*, a Mesoamerican shrub whose flowers were used in pre-Columbian Mexico to scent drinking water (Mabberly 1987:447), presently much cultivated in Oaxaca and sold in markets as an ornamental. Shrubs of 2 - 10 meters with pendant or vining branches; leaves simple, entire, opposite and ovate; flowers white, fragrant, regular, the four petals with pronounced veins, grouped in terminal or axillary racemes; fruit a brown capsule. Leaves and leafy shoots, ground and moistened with alcohol, placed on joints to treat rheumatism. Found in primary forests of the cold zone. Sometimes considered a herb and simply referred to as ***ee'm puj***.

10. *ee'm xats*

Collections: none

Etymology: */ee'm/* + */xats/* = «vein, cord» + «soap». The name is derived from the former use of these fibrous tubers as a detergent for clothes washing.

Description: A monotypic generic that corresponds to CUC ?. Vine of 2 – 4 meters; leaves simple, alternate and entire; flowers yellow–white; fruit ?. Found in primary and secondary forests of the cold zone.

11. *eex taats*

Collections: JR0813

Etymology: */eex/* + */taats/* = «Mixe proper name for crab» + «teeth». The name is derived from the spiny stems of this vine, which are likened to the pincers of crabs. The reconstructed protoMixe–Zoque term for crab is **'eesi*, indicating that crabs are an old element of Mixe zoology.

Description: A monotypic generic that corresponds to FAB *Machaerium cobanense*. Woody, climbing vines of 10 – 15 meters; stems covered with recurved spines; leaves compound, alternate; flowers in a pendulous raceme?, irregular, cream–white; the fruit is a brown legume. Apparently without use. Found in secondary vegetation of the temperate zone.

12. *ejkx*

Collections: JR0416

Etymology: */ejkx/* = «Mixe proper name for a vine in the squash family».

Description: A polytypic generic that corresponds to CUC *Sechium edule*, the cultivated chayote squash that appears to have been domesticated in southern Mexico and is now widely cultivated in tropical and subtropical areas of the world. Annual herbaceous vines of 4 - 10 meters that emerge from a well-developed tuber; stems rather succulent and often hirsute; leaves alternate and palmately lobed; flowers in axillary racemes, regular and yellowish-white; fruits are ovoid, rugose squashes that are one-seeded and indehiscent, spiny to glabrous and yellowish-white to deep green. The fruits and tubers are commonly eaten; they are boiled in salted water, and may be served in chile stews, though the fruits are usually eaten out-of-hand; the leafy shoots, boiled in salted water, are eaten as a potherb. Semi-cultivated in home gardens and pathsides of all climate zones, though most abundant in cold and temperate areas. Several synonyms - such as ***ejkx aajy*** «chayote leaf», or ***ejkx mun*** «chayote tuber» - emphasize the useful parts of the plant; the tender shoots, when eaten as a green vegetable are called ***vip_tsu'up*** «tendril edible-green», which is perhaps the most familiar of all names for the vine. I expect there to be in the lowland areas a wild chayote (perhaps called ***yukejkx***) with bitter fruits, which may correspond to a wild ancestor or a naturalized population of *chayote*. The specific categories are differentiated by texture, spininess and color of the fruits.

Specifics:

(A) ***maj_ejkx*** «large *chayote*» [CUC *Sechium edule*]

(B) ***poo'p ejkx*** «white *chayote*» [CUC *Sechium edule*]

(C) ***ta'ajts ejkx*** «dry *chayote*» [CUC *Sechium edule*]

(D) ***ya'atspa ejkx*** «spiny *chayote*» [CUC *Sechium edule*]

13. ***fiscal ápit aa'ts***

Collections: none

Etymology: */fiscal/* + */ápit/* + */aa'ts/* = «Spanish name for a member of the religious hierarchy» + «thorn» + «vine». The name is apparently inspired by the black stems or spines of these plants, considered to be reminiscent of the black cane which a fiscal traditionally carried in church.

Description: A monotypic generic that corresponds to probably ARE ***Desmoncus chinantlensis*** (a palm of the Lepidocaryoid line of spiny, climbing plants). Woody climbing palms, stems flexible and covered with long, black spines; leaves elliptical, often subtended by a spine; flowers are regular, greenish-white, rather small and inconspicuous; fruit is a one-seeded purple berry. The bark is used to make baskets. Found in primary and secondary forests of the temperate and hot zones.

14. ***granadita***

Collections: JR0284, JR0742, WR0069

Etymology: */granadita/* = «Spanish proper name which in Mexico refers to pomegranates and passion fruits».

Description: A polytypic generic that corresponds to PAS *Passiflora ligularis*, a vine native to Brazil and much cultivated in Mexico for its edible fruit; the category is extended to as many as 12 native species, including *P. hahnii*. Herbaceous climbing vines; stems deep green, supported by axillary coiled tendrils; leaves alternate, palmately lobed, glabrous to glossy; flowers solitary, often showy, purple-white; fruit a yellow-orange, indehiscent berry; the numerous seeds covered by a mucilaginous, sweet aril. The fruit, which is harvested in fall and winter, contains seeds that are eaten raw; the leaves, covered with cebo lard and heated over the fire, are placed on the cheek to relieve swelling caused by toothaches. Semi-cultivated in home gardens of the temperate region. The wild forms, which are not considered useful, are found in forests and shrub vegetation of the cold and temperate zones.

Specifics:

(A) ***granadita*** (unmodified) «*granadita*» [PAS *Passiflora ligularis* and other edible species].

(B) ***yuk granadita*** «wild *granadita*» [PAS *Passiflora hahnii* and other, inedible wild species].

15. ***jatyaju***

Collections: EV0156?

Etymology: */jayu/* + */taj/* = «person» + «dig, scratch». The name is apparently derived from the skin rash provoked by poison ivy.

Description: A monotypic generic that corresponds to ANA *Toxicodendron radicans*, poison ivy, a vine which ranges the Eastern United States to Mexico and Central America. Woody vines of 2 – 6 meters; stems weekly climbing over rocks and trees or sprawling over the ground; leaves trifoliate, alternate, the leaflets ovate and serrate; flowers regular, greenish-white and inconspicuous; fruit a cream-white drupe. The plant is not used, but the Mixe are aware that it causes a skin rash. Found in secondary forests and shrub vegetation of the temperate and hot zones.

16. ***kaaj tsiiv***

Collections: JR0397, JR0882, JR1059

Etymology: */kaaj/* + */tsi'iv/* = «animal» + «Mixe proper name for squashes». The Totontepec name for squash is a cognate of the reconstructed protoMixe name, ****¢i'wa***

(Campbell and Kaufmann 1967:84).

Description: A polytypic generic that corresponds to CUC *Cucurbita ficifolia*. Annual herbaceous vines of 4 – 10 meters; stems rather succulent and often hirsute; leaves alternate and palmately lobed; flowers in axillary racemes, regular and yellow, bell-shaped; fruits green to greenish-white, large and hard-shelled berries containing many black seeds. The fruits are edible; they are cut into pieces and boiled in sugared water and eaten as a dessert or blended with sugar water and taken as a fresh drink. Cultivated in cornfields in the cold and temperate zones. The varietals, which are recognized by only some Mixe speakers, are distinguished by the color and striping patterns of the fruits.

Specifics:

(A) ***poo'p kaaj tsi'iv*** «white animal squash» [CUC *Cucurbita ficifolia*]

Varietals:

(1) ***poo'p vaa'x kaaj tsi'iv*** «white striped animal «squash» [CUC *Cucurbita ficifolia*]

(2) ***poo'p xakaa kaaj tsi'iv*** «white spotted animal squash». The descriptive term is derived from a spotted mountain cat. [CUC *Cucurbita ficifolia*]

(B) ***tsoxk kaaj tsi'iv*** «green animal squash» [CUC *Cucurbita ficifolia*]

Varietals:

(1) ***tsoxk vaa'x kaaj tsi'iv*** «green striped animal squash» [CUC *Cucurbita ficifolia*]

(2) ***tsoxk xakaa kaaj tsi'iv*** «green spotted animal squash» [CUC *Cucurbita ficifolia*]

17. ***kach aa'ts aajy***

Collections: JR0806

Etymology: ***/kach/*** + ***/aa'ts/*** + ***/aajy/*** = «basket» + «vine» + «leaf».

Description: A monotypic generic that corresponds to ARE *Chamaedorea elatior*?. Vining palms of 2 – 5 meters; stems flexible, intertwining with associated vegetation; leaves divided into numerous long, broadly lanceolate pinnae; flowers regular, inconspicuous, grouped into a branched inflorescence that emerges from the base of the plant; fruit a green, one-seeded berry. Stem used for basket-making; the vine is cut, peeled and halved and these splints are used to weave baskets and other utensils. Some Mixe have observed that the Chinantec eat the tender sprouts of this palm, but they are not eaten in Totontepec. Found in primary forest of cold and temperate zones.

18. ***ketsmu̱n***

Collections: ES0210

Etymology: */kets/* + */mu̱n/* = «break, hard» + «tuber». The name apparently describes the fibrous tubers of this vine. */ket/* is defined by Schoenhals & Schoenhals as, "limp (temporarily), break (e.g. a grinding-stone)" (1965:90). See also ***ketsjoo'v***, a tree that has very hard and resistant wood.

Description: A monotypic generic that apparently corresponds to a species of DIO *Dioscorea*. Climbing herbaceous vines of 2 – 8 meters; stems, arising from large tubers, twining over supporting vegetation; leaves alternate and cordate, marked by deep parallel veins; flowers regular, small and inconspicuous, greenish to yellowish-white; fruit a dry capsule bearing numerous winged seeds. The tuberous roots are edible; they are boiled in water, and are eaten salted. Found in rich, black soils of the secondary forest and shrub vegetation of the hot zone.

19. ***ko̱x toot***

Collections: ES0115, JR0237, JR0643, WR0075?

Etymology: */ko̲x/* + */toot/* = «knee» + «woody-vine». The name refers to the knobby stem nodes of these woody vines.

Description: A monotypic generic that corresponds to woody species of SML *Smilax*. Woody vines of 5 – 15 meters, arising from a well-developed tuber; stems stout and squarish, climbing by means of coiled tendrils; leaves alternate and orbicular, rather glossy and leathery; flowers yellowish-white, arranged in axillary umbels; fruit is a green berry that contains several seeds. The leafy shoots are edible; they are boiled in salted water and eaten as a potherb. The stems are used for basket-making; they are split into two halves, smoothed free of leaves and tendrils, and then woven or used as a binding material in house construction. The leaves may be used to as a wrapping for tamales. Found in secondary forest and shrub vegetation of all climate zones. Some Mixe call this ***ko̲x tootk*** «knee turkey» and in Tepitongo it is known as ***tootk aa'ts*** «turkey vine»; it may be that these are corruptions of the term ***toot***.

20. ***ku'u pii't***

Collections: JR0225, JR0946, JR1253, WR0144

Etymology: */ku'u/* + */pii't/* = «squirrel» + «thread». The stems of this vine are threadlike, but the connection with squirrel's is unclear.

Description: A monotypic generic that corresponds to CNV *Cuscuta jalapensis* and other species of this parasitic vine which abundantly covers roadside vegetation with bright orange-yellow stems. Parasitic herbaceous vines; stems orange-yellow, climbing over and attaching to surrounding vegetation; leaves absent; flowers white and rather waxy; grouped in few-flowered clusters along the stems; fruit a brown capsule. Apparently without use. Common in shrub vegetation and abandoned fields of the cold and temperate zones.

21. ***maaxun ka'ajk***

Collections: none

Etymology: */maaxun/* + */ka'ajk/* = «small» + «Mixe proper name for some zapote fruits. See ***kup_ka'ajk*** for further explanation.

Description: A monotypic generic that corresponds to a vining species CLU, perhaps in a genus such as *Tovomita* or *Tovomitopsis*. Woody vines of 2 – 4 meters; leaves opposite, simple and entire; flowers regular; fruit a round, brownish berry. Fruits eaten raw. Found in forests of the hot zone.

22. *maj_xajk*

Collections: ES0220, ES0221, ES0222, ES0223, ES0275, JR0417, JR0470, WR0036

Etymology: */maj/* + */xajk/* = «large» + «Mixe proper name for bean».

Description: A polytypic generic that corresponds to FAB *Phaseolus coccineus* subsp. *coccineus* and *Phaseolus coccineus* subsp. *formosus*, wild and domesticated varieties of the scarlet runner bean, a native of Mesoamerica that is represented in archaeological collections from the Oaxaca from 5000 – 6000 years ago. Vines of 1 – 3 meters; stems twining on surrounding vegetation, scandent on ground, or intertwined; leaves trifoliate, the leaflets triangular; flowers scarlet red; fruit a reddish-green pod containing several oval-shaped seeds that are purple or mottled with black, red, purple brown, and gray. Flowers and seeds eaten; the flowers are boiled in water and are consumed as a potherb; the seeds are boiled in water and eaten as is or made into tamales or eaten in stews. Cultivated or wild in fields of all climate zones; the cultivated varieties planted in plowed fields as well as swidden sites. Since the flowers and leaves are edible parts of the plants, the following names are often used: ***maj_xajk aajy*** «large bean leaf», ***maj_xajk puj*** «large bean flower». Also called by the Spanish name satope in Totontepec.

Specifics:

(A) ***poo'p maj_xajk*** «white large bean» [FAB *Phaseolus coccineus* subsp. *coccineus*]

(B) ***tigre maj_xajk*** «tiger large bean» [FAB *Phaseolus coccineus* subsp. *coccineus*]

(C) ***tsapts maj_xajk*** «red large bean» [FAB *Phaseolus coccineus* subsp. *coccineus*]

(D) ***yak maj_xajk*** «black large bean» [FAB *Phaseolus coccineus* subsp. *coccineus*]

(E) ***yuk maj_xajk*** «wild large bean» [FAB *Phaseolus coccineus* subsp. *formosus*]

23. ***mootsk xajk***

Collections: JR0898, JR1193

Etymology: ***/mootsk/*** + ***/xajk/*** = «narrow» + «bean».

Description: A polytypic generic that corresponds to FAB *Phaseolus vulgaris*, a species that was domesticated in Mesoamerica some 5000 – 6000 years ago and is now widely cultivated throughout the world. The category extended to include some wild bean vines. Vines of 1 – 3 meters; stems twining on surrounding vegetation, scandent on ground, or intertwined; leaves trifoliate, the leaflets ovate; flowers lilac to cream–white; fruit a green pod containing several kidney–shaped seeds that are black and rather lustrous. Seeds are edible; they are boiled in water and eaten as is or are made into tamales or eaten in stews. Cultivated in monocultures in ranches of the hot zone; wild form in shrub vegetation of all zones. Called by the Spanish names *frijol delgado* or *frijol negro* in Totontepec.

Specifics:

(A) ***(yak) mootsk xajk*** «(black) narrow bean» [FAB *Phaseolus vulgaris*]. This form is mostly cultivated in the ranches.

(B) ***yuk mootsk xajk*** «wild narrow bean» [FAB wild *Phaseolus*?]

24. ***mun tsi'iv***

Collections: JR0334, JR0803, JR0958, JR0959

Etymology: */mun/* + */tsi'iv/* = «tuber» + «Mixe proper name for squashes».

Description: A polytypic generic that corresponds to CUC *Cucurbita moschata* and *C. pepo*. Annual herbaceous vines of 4 – 10 meters arising from a thick tuber; stems rather succulent and often hirsute; leaves alternate and palmately lobed; flowers in axillary racemes, regular and yellow, bell-shaped; fruits yellow to orange-brown, large and hard-shelled berries containing many white seeds. The fruits, seeds and leafy shoots are edible; the fruits are harvested while still immature and are boiled in water and prepared in soups and stew; the mature seeds are eaten roasted or prepared in sauces; the shoots are boiled in salted water and eaten as a potherb. Cultivated in cornfields in the cold and temperate zones. ***tsi'iv ónuk*** «squash offspring» is the name given to the zucchini form of *C. pepo*, which is brought to Totontepec from the Oaxaca Valley. ***kapy tsi'iv*** «reed squash» is another cultivated squash of the Mixe zone, but it is only found in drier areas such as the municipality of Tlahuitoltepec.

Specifics:

(A) ***píguk mun tsi'iv*** «round tuber-squash» [CUC *Cucurbita moschata* and *C. pepo*]

(B) ***yan mun tsi'iv*** «long tuber-squash» [CUC *Cucurbita moschata* and *C. pepo*]

25. muu'x aa'ts

Collections: ES0019, EV0217, JR0042, JR0308, JR1052

Etymology: */muu'x/* + */aa'ts/* = «quail» + «vine». The name apparently refers to the observation that quail and other birds on these wild grapes.

Description: A monotypic generic that corresponds to VIT *Vitis mesoamericana* and other wild species of this genus of north temperate vines. Woody perennial vines; stems rather weak and sprawling over surrounding vegetation or climbing by means of tendrils; leaves alternate, serrate, broadly cordate and softly pubescent underneath; flowers very small and regular, yellowish-white, grouped into axillary clusters; fruit a purple berry. Juice of the stem is placed directly in the eyes to relieve soreness and infection; stems, cleaned of leaves and tendrils, but with the bark intact, are used to bind poles used in house construction. Found in the shrub vegetation of all climatic zones.

26. ***náguk xajk***

Collections: JR0896, JR1181

Etymology: */náguk/* + */xajk/* = «flattened» + «Mixe proper name for bean». The name refers to the shape of the beans, which are flattened, a characteristic trait of tepary beans.

Description: A polytypic generic that corresponds to vining types of FAB *Phaseolus vulgaris*, the common bean that was domesticated in Mesoamerica some 5000 – 6000 years ago, and is cultivated in many parts of the world; the category is extended to include some wild bean vines. Vines of 1 – 3 meters; stems twining on surrounding vegetation, scandent on ground, or intertwined; leaves trifoliate, the leaflets ovate;

flowers lilac to cream–white or yellow; fruit a green pod containing several flattened seeds that are black and rather lustrous. Seeds are edible; they are boiled in water and eaten as is or made into tamales or eaten in stews; wild form apparently not used. Cultivated in monocultures in ranches of the hot zone; wild (yellow) form in shrub vegetation of all zones. The Spanish name *«frijol de Orizaba»* is used in Totontepec and the Mixe say that the bean was brought from Veracruz.

Specifics:

(A) ***náguk xajk*** (unmodified) «flat bean» [FAB *Phaseolus vulgaris*]

(B) ***po'ts náguk xajk*** «yellow flat bean» [FAB *Canavalia villosa*]

27. *na ejkx xats*

Collections: EV0234, JR0043, JR0320, JR0491, JR1222

Etymology: */na/* + */ejkx/* + */xats/* = «water» + «Mixe proper name for chayote squash» + «soap». The name is apparently derived in part from the similarity this vine and the chayote squash vine, both members of the Cucurbit family, and in part because the tubers were formerly used as a detergent to wash clothes.

Description: A monotypic generic that corresponds to CUC *Microsechium*. Perennial herbaceous vines of 4 – 6 meters that arise from a large tuber; stems green, weakly climbing on surrounding vegetation; leaves alternate and palmately lobed; flowers in axillary racemes, regular, cream–white; fruits are round, spiny and fleshy capsules. The roots are used to make a detergent and shampoo; they are ground and mixed in water to make a sudsy liquid with which to wash clothes and hair; considered as a remedy for dandruff. Found in shrub vegetation of cold and temperate zone. (EV0234 is reported as a cure for vomiting). A synonym, or perhaps a related but distinct generic is ***poo'p maaxun ejkx*** «white small chayote».

28. *na mun aa'ts*

Collections: ES0138, JR1293

Etymology: ***/na/*** + ***/mun/*** + ***/aa'ts/*** = «water» + «tuber» + «vine».

Description: A monotypic generic that corresponds to CNV *Ipomoea*. Herbaceous vines of 2 – 4 meters arising from a thick tuber; stems weakly intertwining in surrounding vegetation; leaves cordate and alternate, softly pubescent; flowers purple–red, funnelform, singular or clustered in the leaf axils; fruit a brown capsule with triangular blacks seeds. May be planted along homegarden fences as a bindweed. Found in secondary forest and shrub vegetation of all climate zones. Some Mixe speakers recognize a wild form of this generic, ***yuk na mun aa'ts*** «wild water tuber–vine» [CNV *Ipomoea*].

29. *naxtum'ónuk*

Collections: ES0116, JR0052, JR0688, JR0996

Etymology: ***/naax/*** + ***/tum/*** + ***/ónuk/*** = «earth» + «pure or your» + «offspring, tender». The derivation of this name is unclear, but it may be interpreted as the «earth's offspring». Some Mixe define ***/tum/*** as «pure, only», others as the second person singular possessive pronoun «your» (Spanish «tu»). Schoenhals and Schoenhals define ***naxtum'ónuk*** as a «form of tuber in the shape of monkeys» (1965:61); these are perhaps similar to the stone idols found in the Mixe region, and may be considered «children of the earth». This may be an old use of the name which is no longer applied; the raspberry described below does not have unusually shaped roots.

Description: A monotypic generic that corresponds to ROS *Rubus*. Shrubs of 2 – 4 meters with a vining habit; stems rigid and covered with spines; leaves palmately compound or trifoliate, often thorny, greenish-white below and green above; flowers regular, composed of five white petals, five green sepals and numerous stamens; fruit a composite of drupes, red-purple to purple-black, small and sweet-tasting. The fruits are eaten raw in springtime. Common in shrub vegetation and abandoned fields of cold and temperate zones.

30. ***no'ojntk***

Collections: JR0857

Etymology: */no'ojntk/* = «Mixe proper name for some beans».

Description: A monotypic generic that corresponds to vining types of FAB *Phaseolus vulgaris*, a species that was domesticated in Mesoamerica some 5000 – 6000 years ago, and is now widely cultivated throughout the world; the category is extended to include some wild bean vines. Vines of 1 – 3 meters; stems twining on surrounding vegetation, scandent on ground, or intertwined; leaves trifoliate, the leaflets ovate; flowers lilac to cream-white or yellow; fruit a green pod containing several kidney-shaped seeds that are white and rather large. Seeds are edible; they are boiled in water and are eaten in stews; the whole immature pod is eaten as a «green bean». Cultivated in swidden plots of the cold zone. The Spanish names *frijol blanco gordo* or *frijol celaya* are used in Totontepec.

31. ***oo'tsun aa'ts***

Collections: ES0030, ES0256, JR0343, JR0534, JR0952, JR1269

Etymology: */oo'tsun/* + */aa'ts/* = «sticky, glue» + «vine». The names refers to the gelatinous, sticky seeds of these parasitic vines.

Description: A monotypic generic that corresponds to LOR *Psitticanthus calyculatus* and other mistletoes. Shrubby, parasitic vines; stems green to orange–yellow, emerging directly from tree trunks; leaves opposite, linear to elliptical, usually rather leathery and evergreen; flowers regular, often inconspicuous though sometimes showy and red–orange; fruit a drupe, or a berry containing numerous viscid seeds. The flowering shoots, taken in tea three times a day, are used to stimulate menstruation and to relieve menstrual pains. Flowering shoots, boiled in water, are placed on soles of the feet to relieve fever. Found in forests of all climate zones.

32. ***ok pe̲'e̲n***

Collections: ES0041, EV0016, EV0081, EV0121, JR0030, JR0380, JR0927, JR0938, WR0131

Etymology: */ok/* + */pe̲'e̲n/* = «dog» + «nest». Some Mixe say that these plants are considered as a comfortable bedding for dogs, but the name may be imaginative.

Description: A monotypic generic that corresponds to LYC *Lycopodium clavatum*, a species of north temperate zone which has medicinal properties and was formerly employed in the manufacture of fireworks. Scandent, vining herbs; microphylls thickened and needlelike; spores in terminal often branched, yellow–green heads. Leafy stems are used as adornment on Christmas and King's Day (January 6). Said to be used as a bedding for dogs, though this may be an assumption based on the folk name. Common in rocky soil of shrub vegetation in the temperate and cold zones.

33. ***pa'ajk mu̲n***

Collections: JR0238, JR0540, JR1099

Etymology: */pa'ajk/* + */mun/* = «sweet» + «tuber». The name refers to the tubers of sweet potato. This name is cognate with a reconstructed protoMixe–Zoque term for *mɨnE, which Campbell and Kaufmann consider as «sweet potato» (1967:84). It is more likely a term that encompasses many plants with useful tubers (see ***ketsmun***, ***mun tsi'iv***, ***ejkx mun*** and others).

Description: A monotypic generic that corresponds to CNV *Ipomoea batatas*, a Mesoamerican domesticate that is widely cultivated in tropical and subtropical regions of the world. Scandent, herbaceous vines that arise from purple, white or orange tubers; stems sprawling over ground, often in dense masses; leaves alternate and cordate, glabrous; flowers funnelform, purple–red; fruit a brown capsule. The tubers are edible they are boiled in water, peeled and eaten sweet (with honey) or salted. Cultivated in temperate and hot zones, and often escaped in the hot tropical zones. The escaped populations of sweet potato may be called ***yuk pa'ajk mun*** «wild sugary tuber»; this category may also include MLV *Anoda cristata*, which has palmately lobed leaves and purple, bell–shaped flowers.

34. *píguk xajk*

Collections: ES0224

Etymology: */píguk/* + */xajk/* = «round» + «Mixe proper name for bean». */píguk xajk/* is the proper name for green peas.

Description: A monotypic generic that corresponds to FAB *Pisum sativum* var. *sativum*, garden peas, a Mediterranean and Middle Eastern cultigen that was introduced to Mexico by the Spanish and is now widely cultivated in montane regions. Vines of 0.5 – 1 meter, intertwining and scandent on ground; leaves pinnately compound, leaflets ovate; flowers white; seeds greenish–yellow. Seeds are eaten fresh or dried; they are boiled in water and are eaten in stews; leafy shoots used as potherb? Cultivated in monocultures in plowed fields of the cold zone. The Spanish names *chícharo* or *alverja* are used in Totontepec.

35. *rosa*

Collections: ES0023, JR0293, JR0294, JR1034

Etymology: */rosa/* = «Spanish proper name for roses».

Description: A polytypic generic that corresponds to ROS *Rosa* spp., north temperate plants widely cultivated as ornamental plants. Climbing or trailing shrubs; stems multiple from each plant, green and spiny; leaves alternate, pinnately–compound, the leaflets ovate and serrate; flowers composed of five white to pinkish–red petals, 5 green sepals, and many stamens; fruit a red–orange hip containing numerous black seeds. Juice squeezed from the petals is used to soothe eye irritation and infection, the treatment may be taken three times a day; the flowers are used for adornment; the whole plant is considered a garden ornamental. Cultivated in home gardens and escaped in shrub vegetation and abandoned fields in the cold and temperate zone.

Specifics:

(A) ***rosa china*** «china rose» [ROS *Rosa* spp.] This form has small leaves and flowers.

(B) ***rosa de castilla*** «Spanish rose» [ROS *Rosa* spp.] This form has large leaves and flowers.

36. *sarsa aa'ts*

Collections: JR0765

Etymology: */sarsa/* + */aa'ts/* = «abbreviation of a Spanish proper name (*sarsaparilla*), for some medicinal vines» + «vine».

Description: A monotypic generic that corresponds to SML *Smilax*? Woody vines of 5 – 15 meters, arising from a well-developed tuber; stems stout and squarish, climbing by means of coiling tendrils; leaves alternate and orbicular, rather glossy and leathery; flowers yellowish-white, arranged in axillary umbels; fruit is a green berry that contains several seeds. The tuber is used to purify the blood; roots are dug fresh, ground and then placed in boiling water; the decoction is taken every morning for a week. Found in secondary forest of the temperate zone.

37. ***suelda***

Collections: JR0569

Etymology: */suelda/* = «Spanish verb for «to mend», and also an abbreviation of the Spanish proper name *suelda consuelda*, a widely-used medicinal tuber».

Description: A monotypic generic that corresponds to AST *Psacalium*?. Perennial herbaceous vines arising from well-developed tuber; stems weakly sprawling over surrounding vegetation; leaves thickened and yellowish-green; flowers yellow. Tuber medicinal. Found in shrub vegetation of the temperate zone. ***na'xpa aaxk*** «Mixe proper name tuber» is apparently the traditional Mixe name for this plant, but the name is apparently not recognized at the present time in Totontepec.

38. ***sumaje***

Collections: ES0015, ES0287, JR0183, JR0785

Etymology: */sumaje/* = «Spanish proper name that generally refers to shrubby species of *Rhus* (sumacs)».

Description: A monotypic generic that corresponds to ANA *Rhus*. Woody vines or vining shrubs; stems green and soft pubescent; leaves alternate and pinnately compound; flowers regular and pinkish to yellowish-white, small and inconspicuous; fruit is a drupe. The category is extended to FAB *Desmodium*, which has showy yellow, irregular flowers and pubescent legumes. Sprigs, boiled in water, used to bathe the people suffering from to sarna and other skin diseases; several spoonfuls of the decoction may also be taken internally. Found in shrub vegetation of temperate zones. Called ***ketstoot*** «hard vine» in Tepitongo.

39. *tootk pak ak*

Collections: JR0384, JR0609, JR0644

Etymology: */tootk/* + */pak/* + */ak/* = «turkey» + «dove» + «leather-hide». The derivation of the name is unclear.

Description: A monotypic generic that corresponds to AST *Archibaccharis* cf. *androgyna* and *Baccharis trinerva*. Shrubs of 2 - 3 meters; stems greenish-white; leaves alternate and elliptical, grayish-green; flowers small and regular, white, grouped into terminal clusters of composite heads. Apparently without use. Found in shrub vegetation of the cold zone.

40. *tsa'am ju'u*

Collections: ES0114, ES0278, JR0029b?, JR0055, JR0195, JR0218, JR0292, JR0408, JR0429, JR0786, JR0999, WR0109, WR0121

Etymology: */tsa'am/* + */ju'u/* = «ripe, also the Mixe proper name for banana» + «charcoal». It is likely that the */tsa'am/* originally referred to ripe, sweet fruit; its focal member is now bananas, but it is extended to other distinct fruits like these blackberries.

Description: A polytypic generic that corresponds to RUB *Rubus fagifolia* and other species of this large genus. Shrubs of 2 – 4 meters; stems rigid and covered with spines; leaves palmately compound or trifoliate, often thorny, greenish–white below and green above; flowers regular, composed of five white petals, five green sepals and numerous stamens; fruit a composite of drupes, red–purple to purple–black, small and sweet–tasting. The fruits are eaten raw; ground and mixed with sugar, they are taken for ?. Common in shrub vegetation and abandoned fields of cold and temperate zones. Descriptive names for other Rubus species refer to the spiny stem and leaves: ***ápit aajy*** «thorn leaf», ***ápit tam***? «thorn fence?» and ***miistu xaa'k ápit*** «cat–claw thorn».

Specifics:

(A) ***poo'p tsa'am ju'u*** «white banana/ripe charcoal» [RUB *Rubus fagifolius*]

(B) ***tsapts tsa'am ju'u*** «red banana/ripe charcoal» [RUB *Rubus*]

(C) ***tsoxk tsa'am ju'u*** «green banana/ripe charcoal» [RUB *Rubus*]

41. ***tsaaydum***

Collections: JR0169

Etymology: ***/tsaaydum/*** = «Mixe proper name for grapes».

Description: A monotypic generic that corresponds to glabrous species of VIT *Vitis* that have large, edible fruits. Woody perennial vines; stems rather weak and sprawling over surrounding vegetation or climbing by means of tendrils; leaves alternate, serrate, broadly cordate and glabrous; flowers very small and regular, yellowish-white, grouped into axillary clusters; fruit a purple berry. The fruit is eaten raw. Found in secondary of the temperate zone.

42. ***tsach ápit***

Collections: JR0216, JR0265, JR0977, JR1049, JR1218

Etymology: ***/tsach/*** + ***/ápit/*** = «fly» + «thorn». The name may refer to the diminutive size of this vine, or the observation that flies are attracted to the scent of the flowers.

Description: A monotypic generic that corresponds to SML *Smilax glabra*?. Herbaceous vines of 20 to 50 cms.; stems weak and scandent, climbing by means of coiling tendrils; leaves alternate and ovate, whitish-green; flowers yellowish-white, arranged in axillary umbels; fruit is a green berry that contains several seeds. Leafy shoots, boiled in water to prepare a bath, are used to lower a fever. Common in shrub vegetation and abandoned fields of the cold and temperate zones.

43. ***tsay aa'pk***

Collections: ES0005, ES0185, JR0062, JR0070, JR0457, JR0660, JR0876, JR0900, JR1006, JR1069

Etymology: ***/tsay/*** + ***/aa'pk/*** = «thin, cord-like, vining» + «foam». The name refers to the former use of the root, as a detergent. Campbell and Kaufmann note that the reconstructed protoMixe-Zoque term ****¢ay*** means «cord or vine», indicating objects that are thin or intertwining.

Description: A polytypic generic that corresponds tò *Polygala floribunda*, an abundant vine with showy flowers. Herbaceous vines of 2 - 5 meters; stems twining and climbing in shrub vegetation; leaves simple, entire and alternate, rather glossy and leathery; flowers irregular, pink to purple, clustered in large, showy terminal racemes; fruit a brown capsule. The tuber is used to prepare detergent used for washing clothes and shampoo for killing head lice; the tuber is ground into a fine masa then dissolved with water in a large tub until suds appear. Flowers used as adornment for All Saint's Day. Abundant in the shrub vegetation of cold and temperate zones. The purple variety corresponds to FAB *Desmodium*, a vining shrub with compound leaves, purple–pink flowers that is apparently not used.

Specifics:

(A) ***poo'p tsay aa'pk*** «white thin suds» [PGL *Polygala floribunda*]

(B) ***tsapts tsay aa'pk*** «red thin suds» [PGL *Polygala floribunda*]

(C) ***tso'ojmk tsay aa'pk*** «purple thin suds» [FAB *Desmodium trifolium*]

44. ***tuktajktso'mun aa'ts***

Collections: ES0179, JR0184, JR0624

Etymology: */tuk/* + */tajk/* + */tso'mun/* + */aa'ts/* = «prefix that denotes with–something» + «house» + «bind» + «vine». The name is descriptive of the use – it is a vine with which to bind together the cornerposts and beams of a house.

Description: A monotypic generic that corresponds to LOG *Gelsemium sempervirens*, a native of tropical America that is a much cultivated ornamental and medicinal vine. Woody vines of 2 – 3 meters; stems black and wiry; leaves opposite and elliptical; flowers are regular, campanulate and bright yellow, clustered in the axils of the leaves. Stems are used for house construction; they are cut to size, stripped of leaves and flowers, and used to bind together the posts and beams used in house construction. Common in the shrub vegetation of the cold and temperate zones. Called ***naax aa'ts*** «earth vine» in Tepitongo.

45. *tuktsapkojtsun aa'ts*

Collections: JR0561

Etymology: ***/tuk/*** + ***/tsap/*** + ***/kojtsun/*** + ***/aa'ts/*** = «prefix that denotes with–something» + «sky» + «talk, word» + «vine»; literally «a vine with which to talk to heaven». The name relates to the shape of the fruits, which are said to look like crucifixes. ***/tsap/*** is a polysemous prefix, and in this case it appears to mean heaven (i.e. ***/tsapkats/*** means «prayer').

Description: A monotypic generic that corresponds to DIO *Dioscorea*?. Perennial climbing herbaceous vines of 2 – 8 meters; stems, arising from large tubers, twining over supporting vegetation; leaves alternate and cordate, marked by deep parallel veins; flowers regular, small and inconspicuous, greenish to yellowish–white; fruit a dry capsule bearing numerous winged seeds. Apparently without use, but the cruciform fruits may have some symbolic value. Found in shrub vegetation and abandoned fields of the temperate zones.

46. *túputs xajk*

Collections: JR0520, JR0933

Etymology: ***/túputs/*** + ***/xajk/*** = «mole» + «Mixe proper name for bean». The name may be partially explained by the fact that this plant is in the bean family; animal modifiers like «mole» are often used to denote an non–useful, wild or poor quality relative of a useful plant.

Description: A monotypic generic that corresponds to FAB *Mucuna pruriens*, a tropical Asian vine widely naturalized in the tropics. Vines of 1 – 3 meters; stems twining on surrounding vegetation, scandent on ground, or intertwined; leaves compound, the leaflets ?; flowers cream-white or yellow; fruit a green pod containing several kidney-shaped seeds that are white and rather large.

47. *xut*

Collections: JR0322

Etymology: */xut/* = «Mixe proper name for bottle gourd». This is cognate with the reconstructed protoMixe-Zoque term; this apparently has been lent to the Otomanguean language Ixcatec (Campbell and Kaufmann 1967:84). There is another gourd used for carrying water that is called ***po̱k***; this is cognate with a reconstructed protoMixe-Zoque term ****pok(A)*** (Campbell & Kaufmann 1967:87,88). It is unclear how this is related to the other gourd-like fruits ***xut*** and ***tsim***.

Description: A polytypic generic that corresponds to CUC *Lagenaria siceraria*, the calabash or bottle gourd, apparently domesticated independently in the Old and New World, the fruit widely used as a container. Annual herbaceous vines of 4 - 10 meters; stems rather succulent and often hirsute; leaves alternate and palmately lobed; flowers in axillary racemes, regular and white; fruits yellow, large and very hard-shelled berries containing many white seeds. The mature fruits are cut in cross-section, the seeds are removed and the remaining hard shell used to hold water, food or agricultural seeds; some fruit with special uses are designated ***ju̱ts_xut*** «corn-dough carrier» or ***aniivip_xut***? «seed-carrier».Cultivated in hot zones.

Specifics:

(A) ***tsum_xut*** «to-tie ***xut***» [CUC *Lagenaria siceraria*]. It is said that this is a sprawling vine that has fruits that «have a waistline» - they are shaped liked an hourglass, making it easy to tie a rope with which to hold the container. The fruits are used for holding liquids.

(B) ***tsaxut*** «stone ***xut***» [CUC *Lagenaria siceraria*]. It is said that this is a climbing vine with particularly hard and broad fruits especially appropriate for holding tortillas.

48. ***xuum aa'ts ojts***

Collections: JR0998

Etymology: */xuum/* + */aa'ts/* + */ojts/* = «net» + «vine» + «herb». The name may be derived from the much-branched inflorescence of these scandent herbs.

Description: A monotypic generic that corresponds to VAL *Valeriana scandens*. Strongly-scented vining herbs of 0.5 - 1 meter; stems weakly scandent, arising from a thick tuber; leaves palmately lobed and alternate; flowers small and white, clustered in open terminal panicles. Apparently without use. Found in shrub vegetation of cold zone.

49. *yak mix*

Collections: JR0235

Etymology: */yak/* + */mix/* = «black» + «boy». The derivation of this name is obscure.

Description: A monotypic generic that corresponds to SML *Smilax*. Woody vines of 5 - 15 meters, arising from a well-developed tuber; stems stout and squarish, climbing by means of coiling tendrils; leaves alternate and orbicular, rather glossy and leathery; flowers yellowish-white, arranged in axillary umbels; fruit is a green berry that contains several seeds. The leafy shoots, prepared in a bath, are used to lower a fever. Found in shrub vegetation of the cold and temperate zones. May also be referred to as ***aatspa ápit*** «vining thorn».

50. ***yukaa'ts tsi'iv***

Collections: none

Etymology: */yuk/* + */aa'ts/* + */tsi'iv/* = «wild» + «vine» + «Mixe proper name for squash)». See ***kaaj tsi'iv*** for more detail about the derivation of the squash term.

Description: A monotypic generic that corresponds to CUC *Cucurbita okeechobensis*. Perennial herbaceous vines of 4 – 10 meters that emerge from a well-developed tuber; stems rather succulent and often hirsute; leaves alternate and palmately lobed; flowers in axillary racemes, regular and yellowish-white; fruits are round, green and white-striped berries that contain extremely bitter pulp and many white seeds. Apparently without use. Occasional in secondary forests of hot zone.

51. *yukpíguk xajk aa'ts*

Collections: ES0097, EV0159, EV0252, JR0551, JR0608, JR0796, JR1182, JR1278, JR1296, JR1297

Etymology: */yuk/* + */píguk/* + */xajk/* + */aa'ts/* = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «round» + «Mixe proper name for beans» + «vine». ***píguk xajk*** is the proper name for garden peas, and this generic comprises vines that have a similar floral or leaf morphology.

Description: A monotypic generic that corresponds to FAB *Canavalia villosa*, *Centrosema galeotti*, *Clitoria* sp., *Desmodium macrostachyum* and other *Desmodium* species. Vines of 1 – 3 meters; stems twining on surrounding vegetation, scandent on ground, or intertwined; leaves trifoliate, the leaflets ovate; flowers white, lilac, blue or pink; fruit a green pod containing several. Foliage used as fodder for grazing animals. Found in forests, shrub vegetation and abandoned fields of all climate zones. The category is extended to include many wild beans that have rounded seeds, rounded flowers or a pea-like habit; these plants are called by many synonyms – ***cimarrón píguk xajk*** «wild round bean», ***píguk xajk aa'ts*** «round bean vine», ***xajk aa'ts*** «bean vine», ***yukpíguk xajk*** «wild round bean»; they are also sometimes referred to by descriptive names such as ***po'ts aa'ts*** «yellow vine», ***tseev aa'ts puj*** «chicken vine flower» and ***yak aa'ts*** «black vine».

IV. *tsoots* «grass»

I recognize 26 generics in the grass category (table 7.4). 25 generics are monotypic (96.1% of the total); 1 generic (3.9%) is further subdivided into 3 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	25	0	1	0	0	0	0	0	0	0	0	0
Totals: 26 generics, 3 specifics, 0 varietals												

Table 7.4. Distribution of specifics in the life-form *tsoots* «grass».

s/n. *tsoots* (unmodified)

Collections: ES0170, EV0123, EV0280, EV0292, JR0244, JR1122, JR1197, WR0076, WR0101

Etymology: */tsoots/* = «Mixe proper name for grass».

Description: An unmarked life-form category that includes many non-descript genera and species of POA, including *Dichanthelium* sp., *Setaria geniculata* and *Zeugites*. Erect herbs of 10 – 50 cms.; stems cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins;

flowers very reduced, greenish–white to greenish–yellow; fruit hard and seed–like (a caryopsis). Considered to be good fodder for grazing animals. Abundant in shrub vegetation, grasslands and abandoned fields of all climate zones. This category may be divided into categories on the basis of stem color, habit or habitat: ***poo'p tsoots*** (a name is used in Chinantequilla for some CMM), ***tsapts tsoots***, ***tsay tsoots***, ***yuk tsoots***. It is doubtful that these represent stable generics.

1. ***camelote***

Collections: ES0154

Etymology: ***/camelote/*** = «Spanish proper name for *Carludovica* species».

Description: A monotypic generic that corresponds to CYC *Asplundia liebmannii* or *Carludovica labela*, tropical american plants that are widely used for basketry and weaving. Erect herbs of 0.5 – 1 meter, arising from underground rhizomes; leaves palm–like, with two large lobes; inflorescence spike–like (a spadix) borne at the end of a separate stem, flowers small and inconspicuous; fruit a composite berry. Apparently without use. Found in shrub vegetation of the temperate zone. This may be a Spanish synonym of ***paay***.

2. ***kup_tsoots***

Collections: JR0778, JR1063, JR1089, JR1294

Etymology: ***/kup/*** + ***/tsoots/*** = «tree» + «grass». The name refers to the habit and habitat of this plant; it is a orchid with grass–like leaves that grows on trees.

Description: A monotypic generic that corresponds to ORC *Isochilus* aff. *linearis*, a poorly understood species complex. Epiphytic herbs of 10 – 20 cms.; stems thin and erect, multiple per plant; leaves small and linear, glabrous; flowers rose–purple, densely grouped in terminal clusters. Apparently without use. Found in primary and secondary forests of the cold and temperate zones. A synonym is ***tsay kup puj*** «thin tree flower». This generic is sometimes classified as an «herb».

3. *maajntkun tsoots*

Collections: JR0575

Etymology: */maajntkun/* + */tsoots/* = «bed» + «grass». The name is presumably derived from the former use of this grass as bedding material.

Description: A monotypic generic that corresponds to POA *Panicum glandulosum*. Erect herbs of 40 – 60 cms.; stems cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, greenish–yellow; fruit hard and seed–like (a caryopsis). Formerly used as bedding material in ranches? Found in shrub vegetation of temperate zone.

4. *maaxun mook aajy*

Collections: JR0779

Etymology: */maaxun/* + */mook/* + */aajy/* = «small» + «maize» + «leaf». The names refers to the corn–like leaves of this grass.

Description: A monotypic generic that corresponds to an unidentified species of POA. Erect herbs of 40 – 60 cms.; stems cylindrical; leaves borne alternately in two rows, reminiscent of corn; the base sheathing the stem, the blade long and lanceolate with parallel veins; flowers very reduced, reddish–green; fruit hard and seed–like (a caryopsis). Apparently without use. Found in forests of the cold zone.

5. *maajy*

Collections: ES0171, EV0111, JR0712

Etymology: */maajy/* = «Mixe proper name for some grasses».

Description: A monotypic generic that corresponds to POA *Muhlenberghia*?, *Paspalum*?. Erect herbs of 0.5 – 1 meter; stems cylindrical, thin and glabrous; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, greenish–yellow; fruit hard and seed–like (a caryopsis). Whole plant used as a roofing material for house construction; the plants are pulled up by the roots, tied into bundles of 100, and then lashed onto roof poles as a thatch. Found in oak forests and shrub vegetation of hot zones. Schoenhals and Schoenhals reports that this category is called *zacate de agua* in local Spanish, and that it is a wide–leaved grass (1965:341). Some Mixe speakers recognize a form of this grass called ***poo'p maajy*** «white ***maajy***» [POA *Muhlenberghia*, *Paspalum*]

6. *náguk tsoots*

Collections: ES0236, JR0566, JR635, JR0709, JR0747, JR0982

Etymology: */náguk/* + */tsoots/* = «flattened» + «grass». The name refers to the flattened base of this plant.

Description: A monotypic generic that corresponds to IRI *Sysyrinchium*. Erect perennial herbs, arising from a rhizome; leaves narrow and linear, doubled and clasping at base, arranged in two ranks that give the plants a fan–like appearance; flowers white to purple, star–shaped, grouped into a terminal cymose inflorescence; fruit a small, rounded capsule, reminiscent of coriander fruits to some Mixe. Apparently without use, but observed to be a good forage for grazing animals. Found in shrub vegetation, abandoned and cultivated fields of the cold and temperate zones. Sometimes referred to as ***tuxnáguk tsoots*** «buttocks flattened grass»; also called by the descriptive name ***tuu'tsoots*** «path grass» in Tepitongo.

7. na̲'akapy

Collections: none

Etymology: */**na̲'a̲**/* + */**kapy**/* = «water» + «Mixe proper name for a large reed». The name may refer to the observation that these large grasses prefer moist soils.

Description: A monotypic generic that corresponds to the tropical American bamboos POA *Arthrostylidum racemiflorum* or *Arundinaria longifolia*, according to Schoenhals and Schoenhals who report that the local Spanish name is *otate* (1965:342). Erect or somewhat scandent herbs of 0.5 – 1 meter; stems cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and lanceolate with parallel veins; flowers very reduced, greenish-yellow; fruit hard and seed-like (a caryopsis). Considered to be good fodder for grazing animals. Found in open forests and shrub vegetation of the temperate zone.

8. *nee*

Collections: ES0159

Etymology: */nee/* = «Mixe proper name for sedges and perhaps grasses that have sharp-edged leaves»

Description: A monotypic generic that corresponds to CYP *Carex*. Erect herbs; stems usually triangular, arising from a creeping underground rhizome; leaves very long and linear, often sharp-edged; flowers small and inconspicuous, arranged in clusters of terminal spikelets; fruit is an achene. Considered to be a good fodder. Found in abandoned fields of the hot zone. Schoenhals and Schoenhals suggest that this category may be extended to other plants with sharp, linear leaves such as AGA

Nolina; they report that these plants are known as *navajilla* «small knife» or *cortador* «cutter» in local Spanish. (1965:342).

9. ***pajki***

Collections: ES0161, EV0103?, JR1266

Etymology: */pajki/* = «Mixe proper name for some grasses».

Description: A monotypic generic that corresponds to POA *Euclasta*. Erect herbs of 10 – 40 cms.; stems cylindrical and pubescent; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, reddish-green to greenish-white; fruit hard and seed-like (a caryopsis). Considered to be good fodder for grazing animals. Found in shrub vegetation of the temperate zone. May also be called ***jaach tsu'up*** «animal's edible green».

10. ***papi'ip***

Collections: ES0139, JR0662, JR0795, JR0953, JR1261, JR1291?

Etymology: */papi'ip/* = «Mixe proper name for some grasses».

Description: A polytypic generic that corresponds to POA *Euclasta*, *Lasciacis procerrima*, *Pennisetum bambusiforme*. Scandent herbs of 0.5 – 1 meter; stems green to light brown, cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, greenish-white; fruit hard and seed-like (a caryopsis). Considered to be good fodder for animals; gathered, dried and given to burros, horses and cows. Found in open forest, shrub vegetation and abandoned fields of all climate zones. Schoenhals and Schoenhals consider this to be POA *Melinis minutiflora*, a widely introduced forage grass native to tropical Africa; it is said to be called *zacate gordura* in local Spanish. (1965:343).

Specifics:

(A) ***poo'p papi'ip*** «white ***papi'ip***» [POA *Lasiacis procerrima*]

(B) ***tsapts papi'ip*** «red ***papi'ip***» [POA]

(C) ***yak papi'ip*** «black ***papi'ip***» [POA *Euclasta* ?]

11. ***pa'a peetun***

Collections: JR0644, JR1295

Etymology: */pa'a/* + */peetun/* = «pathside» + «broom». The name refers to the use and habitat of these grasses – the inflorescences are used to make brooms, and the plant is common along pathsides and in abandoned fields.

Description: A monotypic generic that corresponds to POA *Muhlenberghia*. Erect herbs of 0.5 – 1.5 meters; stems cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, greenish-white, grouped into large, feathery terminal inflorescences; fruit hard and seed-like (a caryopsis). The flowering stems are tied together to make dusting brooms. Found in open forests of hot zone. Some Mixe speakers recognize a form of this grass called ***poo'p pa'a peetun*** «white path-broom» [POA *Muhlenberghia*].

12. ***paa'y***

Collections: JR0677, JR1095

Etymology: */paa'y/* = «Mixe proper name for some grasses».

Description: A monotypic generic that corresponds to POA *Ichnanthus* sp., *Lasiacis* *procerrima*, broad-leaved grasses that are primarily distributed in tropical America. Erect herbs of 0.5 – 1 meter; stems cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and lanceolate with parallel veins; flowers very reduced, greenish-yellow; fruit hard and seed-like (a caryopsis). Considered to be good fodder for grazing animals. Found in open forests and shrub vegetation of the temperate zone. Schoenhals and Schoenhals consider this to be POA *Oplismenus holciformis*, and to be a synonym of *camelote*, also called *zacate camelote* (1965:343). Some Mixe speakers recognize a form of this grass called ***poo'p paa'y*** «white ***paa'y***» [POA *Ichnanthus* sp., *Lasciasis procerrima*]. In Tepitongo, ***tsay kapy*** «thin reed» (collections: ES0141, ES0166) refers to POA *Lasiacis procerrima* and *Pennisetum*. Considered to be good forage for grazing animals. Found in shrub vegetation and abandoned fields of the temperate and hot zones. In Totontepec the name refers to a certain plants of the Apiaceae.

13. ***seda tsoots***

Collections: JR0821

Etymology: ***/seda/*** + ***/tsoots/*** = «Spanish name for silk» + «grass». The name is probably derived from the silky, cottony texture of the inflorescence.

Description: A monotypic generic that corresponds to POA *Andropogon bicornis* and *A. glomeratus*. Erect herbs of 0.5 – 1 meter; stems cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, greenish-white, grouped in long feathery racemes; fruit hard and seed-like (a caryopsis). The stems are tied together to make dusting brooms which are used in village houses and stores. Found in open forests of hot zone. This may be a synonym of ***pa'a peetun***.

14. *tajkts tsoojy*

Collections: JR0431, JR0473

Etymology: */tajkts/* + */tsoojy/* = «mouse» + «medicine». The meaning of the name is unclear; animal modifiers often indicate plants that are not useful to humans, or are of second quality compared to a cultivated species.

Description: A monotypic generic that corresponds to IRI *Sisyrinchium arizonicum* a relatively broad-leaved species in this genus of primarily American herbs. Erect perennial herbs, arising from a rhizome; leaves, dark green relatively broad and linear, doubled and clasping at base, arranged in two ranks that give the plants a fan-like appearance; flowers regular, yellow and star-shaped, grouped into a terminal cymose inflorescence; fruit a small, triangular capsule. Apparently without use. Found in moist soils of shrub vegetation, grasslands and abandoned fields of the cold zone.

15. *ta'ak tsoots*

Collections: JR1094

Etymology: */ta'ak/* + */tsoots/* = «straw-mat» + «grass». The reconstructed protoMixe term for woven mat (Sp. *petate*) is ****to'kE***.

Description: A monotypic generic that corresponds to a species of POA *Panicum*, a large genus of grasses that grow in tropical and warm climates. Erect herbs of 20 – 40 cms.; stems cylindrical and pubescent; leaves softly pubescent, borne alternately in two rows, the base sheathing the stem, the blade long and lanceolate, with parallel veins; flowers very reduced, greenish-white; fruit hard and seed-like (a caryopsis).

Considered to be good fodder for grazing animals. Found in open forests of temperate zone.

16. ***té limón***

Collections: EV0059, EV0128, EV0342, JR0515, WR0037

Etymology: */té/* + */limón/* = «Spanish name for tea» + Spanish proper name for «lemon». The name is an unmodified form of the Spanish name for lemon grass.

Description: A monotypic generic that corresponds to POA *Cymbopogon citratus*, a native of South India and Sri Lanka that is widely cultivated in subtropical and tropical zones, where it is used for condiment and tea. Lemon-scented erect herbs of 20 - 30 cms.; stems cylindrical; leaves greenish-white, borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; apparently never flowering in the Sierra. Leaves, prepared as tea, are taken as a remedy for stomachache. Semi-cultivated in abandoned fields and home gardens of all zones.

17. ***trigo tsoots***

Collections: JR0769

Etymology: */trigo/* + */tsoots/* = «Spanish proper name for wheat» + «grass». The name apparently refers to the overall morphological similarity between this grass and wheat.

Description: A monotypic generic that corresponds to POA *Bromus*. Erect herbs of 20 - 40 cms.; stems cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, greenish-white; fruit hard and seed-like (a caryopsis). Apparently without use. Found in shrub vegetation of the cold zone.

18. ***tsaa'n xooxun***

Collections: JR0176

Etymology: */tsaa'n/* + */xooxun/* = «snake, intestine» + «whistle». The derivation of the name is unclear, but it may refer to the hollow stems of the plant, and perhaps to it former use as a whistle, or the sound it makes blowing in the wind.

Description: A monotypic generic that corresponds to EQU *Equisetum myriochaetum*. Erect herbs of 0.5 – 1 meter with jointed, ridged stems; microphylls emerging in horizontal whorls form the nodes; sporing heads terminal, greenish-black. Sprigs, boiled in water, taken as tea and used as a bath for fever, and skin eruptions such as sarna. Found in humid areas of shrub vegetation in the hot zone. A synonym is ***to'xta caballo*** «horsetail», a partial translation of the local Spanish name and ***tsaa'n viicun*** «snake switch», if derived from ***vi'tsun***.

19. ***tsavinkeexk***

Collections: JR0223, JR0477

Etymology: */tsa/* + */viijn/* + */keexk/* = «stone» + «eye» + «Mixe proper name for some terrestrial bromeliads?». The name may be roughly interpreted as referring to the observation that this bromeliad grows on large rocks.

Description: A monotypic generic that corresponds to BML *Pitcairnia heterophylla*. Terrestrial bromeliads; leaves spiny and leathery, rather grass-like, spirally arranged into a tough and semi-succulent, rounded base; flowers elongate and yellow, subtended by several lilac-colored bracts; fruit a brown capsule. The leaf bases may be eaten raw, but it is not often used. Found on rocks in shrub vegetation of the cold zone.

20. ***tsaakts***

Collections: JR0631

Etymology: */tsaakts/* = «Mixe proper name for a grass».

Description: A monotypic generic that corresponds to a species of POA *Panicum*. Erect herbs of 40 – 60 cms.; stems green and cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, greenish-white; fruit hard and seed-like (a caryopsis). Apparently without use. Found in open forests of the cold zone.

21. ***tsijst***

Collections: ES0073, JR0126, JR0669, JR1050, JR1151

Etymology: */tsijst/* = Mixe proper name for some grasses.

Description: A monotypic generic that corresponds to POA *Isachne arundinacea*, *Lasciasis*, *Rhypidocladum*. Erect herbs of 0.5 – 1 meter; stems cylindrical, green and scandent; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, green to greenish-white; fruit hard and seed-like (a caryopsis). Considered to be a good fodder for grazing animals. Found in open forests, shrub vegetation and abandoned fields of temperate and predominately cold zones. Schoenhals and Schoenhals consider this to be a species of *Arundinaria*, a grass that is said to grow in cold zones. Some Mixe speakers differentiate between ***tsijst*** (unmodified) «***tsijst***» [POA *Isachne arundinacea*] and ***poo'p tsijst*** «white ***tsijst***» [POA *Lasciasis*, *Rhypidocladum*].

22. ***tsoxk tsoots***

Collections: ES0149, JR1123, JR1125

Etymology: */tsoxk/* + */tsoots/* = «green» + «grass».

Description: A monotypic generic that corresponds to CYP *Carex* and *Cyperus*? Erect herbs; stems usually triangular, arising from a creeping underground rhizome; leaves very long and linear, often sharp-edged; flowers small and inconspicuous, arranged in clusters of terminal spikelets; fruit is an achene. Also called ***namo'ots tsoots*** «mud grass». Apparently without use, but may be eaten by grazing animals. Found in abandoned fields of cold and temperate zones. This may be a synonym of the following generic. Some speakers recognize a from of this generic referred to as ***tsay tsoxk tsoots*** «thin green grass» [CYP *Carex*, *Cyperus*?]

23. ***tsoxk xaa'ch***

Collections: JR0456, JR0692, JR0904, JR0923

Etymology: */tsoxk/* + */xaa'ch/* = «green» + «Mixe proper name for sedges». Some Mixe interpret xaa'ch as meaning «doubled over», apparently referring to the creased and folded leaves. Schoenhals and Schoenhals define the word as «large-grass, roll» (1965:135) perhaps referring to the general aspect of the plant and its preparation into bundles for thatched roofs.

Description: A monotypic generic that corresponds to CYP *Carex* and *Rhynchospera*. Erect herbs; stems usually triangular, arising from a creeping underground rhizome; leaves very long and linear, often sharp-edged; flowers small and inconspicuous, arranged in clusters of greenish-yellow terminal spikelets; fruit is a brown achene. The leaves are used to thatch houses and shacks; the leaf stems are cut to size, tied into bundles and lashed onto roof poles. Found in open forests and shrub vegetation of the cold zone.

24. ***tsookun tsoots***

Collections: ES0169, JR0026, JR0902

Etymology: ***/tsookun/*** + ***/tsoots/*** = «rain-cover» + «grass». The name refers to the use of these rushes as rain covers, a custom which is dying out with the introduction of plastic sheets.

Description: A monotypic generic that corresponds to several species of rushes including JUN *Juncus effusus*, a widespread species that is often as a material for woven mats in Japan, Mexico and perhaps other areas. Perennial erect herbs; stems bright green, cylindrical and hollow, arising from thickened rhizomes; flowers regular, greenish-white and inconspicuous, grouped in clusters that emerge from the side of the stem; the fruit is a dry capsule. The stems are used to make mats formerly used as raincovers; the stems are cut to size, dried in the sun and then sewn together one by one. Common in moist black soil of forest and shrub vegetation of the cold zone.

25. ***túputs to'xta***

Collections: JR0633

Etymology: ***/túputs/*** + ***/to'xta/*** = «mole» + «tail».

Description: A monotypic generic that corresponds to an unidentified species of POA. Erect herbs of 0.5 - 1.0 meter; stems cylindrical; leaves borne alternately in two rows, the base sheathing the stem, the blade long and narrow with parallel veins; flowers very reduced, greenish-white; fruit hard and seed-like (a caryopsis). The leaves are used to thatch houses and shacks; the leafy stems are cut to size, tied into bundles and lashed onto roof poles. Found in open forests and shrub vegetation of the cold and temperate zone. A synonym is ***tsik tu'xta*** «badger tail».

26. *veek*

Collections: JR0306, JR0402, JR0903

Etymology: */veek/* = «Mixe proper name for spike rushes».

Description: A monotypic generic that corresponds to CYP *Eleocharis* aff. *elegans*. Perennial erect herbs; stems bright green, cylindrical and hollow, arising from thickened rhizomes; flowers regular, greenish-white and inconspicuous, grouped in terminal, dark-brown clusters; the fruit is a dry capsule. Apparently without use. Found in open forests and grasslands of cold zone.

V. ***aajy*** «large leaf»

I recognize 10 generics in the large leaf category (table 7.5). 8 generics are monotypic (80.0% of the total); 2 generics (20.0%) are further subdivided into 4 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	8	2	0	0	0	0	0	0	0	0	0	0
Totals: 10 generics, 4 specifics, 0 varietals												

Table 7.5. Distribution of specifics in the life-form ***aajy*** «large leaf».

These are large-leaved herbs, even when large they are said to have a non-woody stem (*tallo aguado*). The name for leaf, ***aajy***, is often reduced to ay in compound plant names (see ***apya'ajk***, ***apyok***, ***apyajpuk***, ***atya'ats***, ***atyu'kx***, ***axyeen***); for further notes on this vowel reduction, see appendix on linguistic processes. The included generics correspond to broad-leaved, often shrubby plants that generally have abundant latex or sap and well-developed tubers or rhizomes. All of the plants belong to the Liliopsida, with the exception of ***tukvit_poj na'ay*** and ***voo'v aajy***, which are members of the Magnoliophyta.

This life-form may be tentatively divided into two intermediate categories: ***aajy*** (unmodified) which has watery sap and no useful tubers, and ***na'ay*** which has milky sap and often useful, large tubers. The name of the latter intermediate category y be derived from a contraction between the archaic word for rubber (reconstructed for proto-Mixe-Zoque as ****na'a*** + ***aajy*** = «old» + «leaf», giving the idea of large leaves that contain a milky or watery latex. ***na'a*** is used in current Totontepec Mixe as a prefix in the proper names for rooster (***na'atseev***) and male turkey (***na'atootk***), perhaps referring to the rubbery crest and beak appendages of these domesticated birds. May be extended in meaning to things that are flat or elongate like a leaf, a sheet of paper, for example.

1. ***aajy*** (unmodified)

Collections: none

Etymology: /*aajy*/ = «a polysemous Mixe proper name for leaf, large-leafed herbs in general, and a specific generic».

Description: A monotypic generic that corresponds to CNN *Canna*. Erect herbs of 1 - 3 meters that emerge from a well-developed tuber; stems bright green and glabrous; leaves broadly obovate to oblong, glossy, the bases forming a sheath around the stem; flowers irregular, yellow-orange, enclosed in green bracts which together form a spike-like inflorescence; fruit a warty capsule. Leaves used as wrappers for *tamales*. Semi-cultivated in home gardens and waste areas of villages of all climatic zones.

2. pix na'ay

Collections: EV0283, JR0193

Etymology: */pix/* + */na'ay/* = «Mixe proper name for manioc» + «large-leaf». This name is probably an extension of the name for manioc; both plants have large, edible tubers; manioc is putatively native to Mesoamerica and this plant was introduced from the West Indies after the Spanish conquest.

Description: A monotypic generic that corresponds to ARA *Xanthosoma violaceum*, a plant native to the West Indies that is widely cultivated in the tropics for its edible tubers and leaves. Erect herbs of 40 - 60 cms. with abundant milky sap; leaves simple and sagitate, emerging from a well-developed purplish-red tuber; inflorescence consisting of a large greenish-white bract (spathe) which envelops a central flowering spike (spadix); fruit is a berry. The leaves and tubers are edible; they are boiled in salted water, the leaves eaten as a potherb, and the tubers as potatoes. Cultivated in home gardens of all climatic zones, but most abundant in the hot zone.

3. *poo'p aajy*

Collections: none

Etymology: */poo'p/* + */aajy/* = «white» + «leaf, large-leaved herb». The name refers to the glaucous leaves of this plant.

Description: A monotypic generic that may correspond to MRN *Calathea lutea*, a plant native to the West Indies that is used is in basketry, or perhaps *C. ovadensis*, a native of Mexico that is sometimes cultivated as an ornamental. Erect herbs of 0.5 -

1 meter; stems bright green and slightly pubescent, emerging from a well-developed tuber; leaves broadly obovate to oblong, rather glaucous, the bases forming a sheath around the stem; flowers irregular, yellow, enclosed in green bracts which together form a spike-like inflorescence. Leafs used as wrappers for tamales and as a material for thatched roofs. Semi-cultivated in the hot zone.

4. *tsaa'y aajy*

Collections: JR1203

Etymology: ***/tsaa'y/*** + ***/aajy/*** = «monkey» + «leaf». The name may be symbolic or may refer to the habit of some of these plants. The reconstructed protoMixe-Zoque term for monkey is ****¢awi***, and it is an important animal in Mixe mythology (and calendar?).

Description: A monotypic generic that corresponds to ARA *Anthurium* and large-leaved *Philodendron*, large American genera that are often grown as ornamental plants. Herbaceous vines, epiphytes or erect terrestrial herbs of 0.5 – 10+ meters; stems often with thickened rhizomes; leaves usually cordate, glossy; inflorescence composed of a small green to greenish-white bract (spathe) which subtends and often encloses the greenish-white central flowering spike (spadix); the fruit is a green berry. The leaves of some particularly large species may be used as a thatching material. Found in forests of all zones but some especially common in the cold zone.

5. *tsookun na'ay*

Collections: JR0150, JR0396

Etymology: ***/tsookun/*** + ***/na'ay/*** = «rain-cover» + «large-leaf».

Description: A monotypic generic that corresponds to ARA *Xanthosoma robustum*.

Erect herbs of 2 – 4 meters with abundant milky sap; leaves simple and sagitate, emerging from a well-developed tuber; inflorescence consisting of a large greenish-white bract (spathe) which envelops a central flowering spike (spadix); fruit is a berry. Leaves were formerly used as rain covers; both the leaves and the tubers are considered poisonous by some Mixe, but others say that the leaf may be eaten; the veins are removed, the remaining leaf lamina is cooked in water, and later prepared in amarillo, a ground corn and chile sauce. The root is said to be used to treat people who are choking; it is sliced and mixed with *rosa de castilla* and lard and then placed on the throat. Semi-cultivated in moist soils of shrub vegetation near households in the temperate and hot zones.

6. ***tukvit_poj na'ay***

Collections: ES0040, EV0323, JR0268, JR0409, JR0623, JR0945, JR1011, JR1070, JR1257

Etymology: */tuk/* + */vit/* + */poj/* + */na'ay/* = «object-prefix ('with-something')» + «cloth» + «wash» + «large-leaf»; meaning «a large-leaved plant with which to wash clothes». The name realtes to the use of the roots and berries as a detergent for washing clothes.

Description: A polytypic generic that corresponds to PHT *Phytolacca icosandra* and other species of this pantropical genus which is widely recognized to be as a source of dyes and edible greens. Erect shrubby herbs of 1 – 1.5 meters, arising from a well-developed tuber, stems glabrous, turning purplish-green; leaves ovate and slightly thickened; flowers pinkish to purplish-white, borne in terminal or axillary racemes; the fruit is a fleshy, purple berry. Leaves of both forms are considered edible; they are occasionally gathered while tender and green (before turning purple) and are boiled in water to be eaten as potherbs; the roots and especially the fruits of both forms are ground and mixed with water to make a detergent used to wash clothes; fruits and older, purple foliage recognized as toxic. Common in shrub vegetation and abandoned fields of the cold and temperate zones. Called ***na'ay xats*** «large-leaf soap» in Tepitongo.

Specifics:

(A) ***tsapts tukvit_poj na'ay*** «red cloth wash herb» This form is said to have a reddish-purple stems and leaves, and pinkish-white flowers [PHT *Phytolacca*].

(B) ***poo'p tukvit_poj na'ay*** «white cloth wash herb». This form is said to have white flowers and green fruit [PHT *Phytolacca*].

7. ***vaa'y aajy***

Collections: ES0259, JR0666, WR0049

Etymology: */vaa'y/* + */aajy/* = «Mixe proper name for some monocots» + «leaf». *vaa'y* may be derived from */vaa'x/* = «to line, to stripe (as with a pencil)», perhaps referring to the linear, parallel venation of the leaves.

Description: A monotypic generic that corresponds to a glaucous species of CNN *Canna*?. Erect herbs of 1 – 3 meters that emerge from a well-developed tuber; stems bright green and very glaucous and waxy; leaves broadly obovate to oblong, glaucous, the bases forming a sheath around the stem; flowers irregular, yellow-orange, enclosed in green bracts which together form a spike-like inflorescence; fruit a warty capsule. Leaves are not used to wrap corn tamales, because they are covered with a whitish powder; they may be used as improvised lids for cooking pots. Often cultivated in homes gardens or escaped in shrub vegetation of all zones, but especially common in the temperate zone.

8. ***vaa'kx aajy***

Collections: JR0807, JR0814

Etymology: */vaa'kxy/* + */aajy/* = «Mixe proper name for some monocots» + «leaf». The name may refer to the horizontal slits that are common in *Heliconia* leaves. */vaa'kxy/* may be derived from */vaa'y/* + */aa'kxy/* = «to split, split into strips, to break (in two)» + «squeak (like the sound of pieces of wood rubbing together)»; perhaps to the pinnate splits in the leaves and to the sound that the leaves make in the wind or when rubbed together?.

Description: A monotypic generic that corresponds to HEL *Heliconia*, a large genus of tropical American and Southwest Pacific plants that are occasionally cultivated as ornamentals. Erect herbs of 1– 3 meters; multiple stems arising from a well-developed tuber or from fleshy rhizomes; stems green and glabrous, formed by sheathing leaf bases; leaves broadly oblong or lanceolate, parallel-veined, arranged in two ranks along the stem; inflorescence borne on separate stems from the leaves, the irregular flowers subtended by a large, tough green bract; fruit a green capsule. Apparently without use. Found in the shrub vegetation of temperate and hot zones. ***pijk aajy*** «*moyocuil* leaf» is a synonym for *Heliconia* reported by Schoenhals and Schoenhals (1965:84).

9. ***vaax mole***

Collections: none

Etymology: */vaax mole/* = «fox» + «Spanish proper name for a thick stew». The name may be related to the semi-cultivated status of these plants; animal modifiers are often used to indicate the wild counterpart of a cultivated plant or domestic object, and a *mole* prepared from a non-cultivated plant.

Description: A monotypic generic that corresponds to ZIN ***Renealmia***, a large genus of tropical American and African aromatic herbs that are used for ornament, food and medicine. Aromatic herbs of 2 - 4 meters; numerous rigid stems emerging from the tuberous, branched roots; leaves broadly lanceolate, alternate, arranged in two ranks along the stem; flowers irregular, pinkish-white, borne on short (10 - 20 cm.) stalks that arise from the base of the plant; fruit a dark purple fleshy capsule that contains many blacks seeds enveloped in a yellow, aromatic aril. The aril was formerly used to prepare *mole amarillo*, an aromatic stew that also contains corn dough, chile and many other ingredients. Semi-cultivated in the hot zone.

10. ***voo'v aajy***

Collections: EV0054, EV0065, EV0143, EV0326, JR0139, JR0145, JR0362, JR0768, WR0003, WR0100

Etymology: */voo'v/* + */aajy/* = «Mixe proper name for a culinary and medicinal herb» + «leaf». The name may be derived from */voo'tsp/* = «extend»; or */voo'mp/* = «stretch; very long and thick». The thick rhizomes of this plant extend along in the soil, forming large patches.

Description: A polytypic generic that corresponds to PIP ***Piper auritum*** and ***P. umbellata***. Pleasantly-scented herbs of 1 - 2 meters; leaves alternate, heart-shaped, entire and clasping at base; flowers minute, white, grouped in dense axillary spikes. Leaves used to flavor food; taken in tea to treat diarrhea; ground with a small amount of salt, placed on skin wounds. The wild form is observed to be eaten by wild boars, and the rigid stems are used as fence posts. The typical form is semi-cultivated in home gardens and in shrub vegetation in all climate zones; the wild form found in secondary forest of temperate zone. A synonym appears to be ***tóṯuḵ ojts aajy*** «butterfly herb leaf». See also ***yoo̲'vu̲n***, which appears to overlap with the wild form of this generic.

Specifics:

(A) ***vo̲o̲'v aajy*** «wild *vo̲o̲'v* leaf» [PIP *P. auritum*]

(B) ***yuk vo̲o̲'v aajy*** «wild *vo̲o̲'v* leaf» [PIP *P. umbellata*]. This form is also called ***cimarrón vo̲o̲'v aajy*** in Chinantequilla.

VI. ***tsaats*** «agave»

I recognize 7 generics in the agave category (table 7.6). 6 generics are monotypic (85.7% of the total); 1 generic (14.3%) is further subdivided into 2 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	6	1	0	0	0	0	0	0	0	0	0	0
Totals: 7 generics, 2 specifics, 0 varietals												

Table 7.6. Distribution of specifics in the life-form ***tsaats*** «agave».

Etymology: ***/tsaats/*** = «Mixe proper name for agaves and century plants».

Description: A prototypic, unmarked generic that corresponds to AGA *Agave*, a large genus of xerophytic plants that range from the Southwest United States to South America. Semi-succulent, usually stemless, spiny plants; leaves stiff, relatively fleshy, narrow and liner, spiny along margin, and grouped into a basal rosette;

inflorescence a raceme borne on a central fleshy spike; flowers regular, cream–white, composed of six petaloid parts; fruit a capsule. Agaves from the Oaxaca Valley are recognized as the source of mezcal, a distilled alcohol consumed in the municipality, but apparently never fabricated locally; other agaves are considered to be without use. Agaves are not common in Totontepec, but they are abundant in dry and hot zones on the road to Oaxaca.

1. ***mó̱tu̱kx tsaats***

Collections: JR0963

Etymology: */mó̱tu̱kx/* + */tsaats/* = «Mixe proper name for a terrestrial bromeliad» + «Mixe proper name for agave».

Description: A monotypic generic that corresponds to BML *Hechtia*?, a Mesoamerican genus of bromeliads that have an agave–like habit. Semi–succulent, stemless, spiny plants of 0.5 to 1 meter; leaves stiff and fibrous, relatively fleshy, narrow and liner, spiny along margin, and grouped into a basal rosette; inflorescence a raceme borne on a central fleshy spike; flowers regular, cream–white, composed of six petaloid parts; fruit a capsule. Leaves are a source of ixtle, a fiber used in weaving; the leaves are baked in an oven, and are then beaten against rocks and soaked in water to extract the fiber. Found in ranches of the temperate zones, especially in greenish soil. A common synonym is ***xa'k tsaats*** «*ixtle* agave» (*ixtle* is agave fiber).

2. ***pa'ajktsaats***

Collections: none

Etymology: */pa'ajk/* + */tsaats/* = «sweet» + «Mixe proper name for agaves».

Description: A polytypic generic that corresponds to BML *Ananas comosus*, pineapple, a seedless bromeliad that was probably derived from a South American species; and was widely distributed in the New World tropics in prehispanic times. Semi–succulent, stemless, spiny plants of 0.5 to 1 meter; leaves stiff and fibrous, relatively fleshy, broad and long, spiny along margin, and grouped into a basal rosette; inflorescence a central fleshy spike; fruit a fleshy, yellow–orange syncarp – an aggregate of many berry–like fruits placed along a fleshy axis. Fruit eaten raw. Cultivated in ranches of the hot zone, but not often brought to Totontepec.

Specifics:

(A) ***ápit pa'ajktsaats*** «thorny sugary agave» [BML *Ananas comosus*]

(B) ***esmeralda pa'ajktsaats*** «emerald sugary agave» [BML *Ananas comsosus*]. This is considered to the a superior form of pineapple

3. ***paa'tsaats***

Collections: JR0317, JR1150

Etymology: ***/paa'v/*** + ***/tsaats/*** = «pathside» + «Mixe proper name for agave–like plants». The name may refer to the fact that this terrestrial bromeliad is found most commonly along paths. It is more likely that the prefix ***paa'*** indicates wild relatives of cultivated plants; in this case a relative of the pineapple, ***pa'ajktsaats***.

Description: A monotypic generic that corresponds to BML *Greigia oaxacana*, an Oaxacan endemic species of this small tropical American genus. Semi–succulent, stemless, spiny plants of 0.5 to 1 meter; leaves greenish–white, stiff and fibrous, relatively fleshy, narrow and long, spiny along margin, and grouped into a basal rosette; inflorescence a rounded, fleshy head; fruit a capitate aggregate of many berry-like fruits. Fruit eaten raw. Sometimes referred to as ***tsoxk paa'tsaats*** «green pathside agave».

4. *poo'p tsaats*

Collections: none

Etymology: */poo'p/* + */tsaats/* = «white» + «Mixe proper name for agaves and century plants». The name apparently refers to the glaucous, grayish-green aspect of this large agave.

Description: A monotypic generic that corresponds to AGA *Agave atrovirens*. Semi-succulent, usually stemless, spiny plants that may grow to a diameter and height of more than two meters; leaves stiff, relatively fleshy, narrow and liner, spiny along margin, and grouped into a basal rosette; inflorescence a raceme borne on a central fleshy spike; flowers regular, cream-white, composed of six petaloid parts; fruit a capsule. Sap fermented to make pulque, a slightly alcoholic beverage. Apparently semi-cultivated in shrubland of the cold zone.

5. *tsapmótukx*

Collections: JR0567

Etymology: */tsap/* + */mótukx/* = «prefix which commonly denotes objects that have been introduced to the Mixe» + «Mixe proper name for a terrestrial bromeliad».

Description: A monotypic generic that corresponds to ALO *Aloe* aff. *saponaria*, a South African species that is used in treatment of skin diseases. Stemless herbs of 20 – 30 cms. that contain copious mucilaginous sap; leaves long and narrow, glabrous but slightly spine along the margin, oval in cross-section, grouped into basal rosettes; apparently without flowers and fruits in the Sierra Norte. Used medicinally for skin irritations or rheumatism?. Semi-cultivated in home gardens of the cold and temperate zones.

6. ***yukpa'ajktsaats***

Collections: none

Etymology: ***/yuk/*** + ***/pa'ajk/*** + ***/tsaats/*** = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «sweet» + Mixe proper name for agave-like plants.

Description: A monotypic generic that corresponds to BML *Aechmea magdalense* or perhaps *Bromelia pinguin*. Semi-succulent, stemless, spiny plants of 0.5 to 1 meter; leaves greenish-white, stiff and fibrous, relatively fleshy, narrow and long, spiny along margin, and grouped into a basal rosette; inflorescence a rounded, fleshy spike; - a composite of many berry-like fruits placed along a fleshy axis and topped by stiff, green bracts. Fruit may eaten be raw. This may also correspond to BML *Greigia oaxacana*, especially in Tepitongo. Found in the shrub vegetation of hot zones.

7. ***yuktsaats***

Collections: JR1191

Etymology: ***/yuk/*** + ***/tsaats/*** = «a prefix that indicates objects that are wild, non-domesticated, from the forest or high montane area» + «Mixe proper name for agave».

Description: A monotypic generic that corresponds to AGA *Agave* spp., non-cultivated agaves. Semi-succulent, usually stemless, spiny plants; leaves stiff, relatively fleshy, narrow and liner, spiny along margin, and grouped into a basal rosette; inflorescence a raceme borne on a central fleshy spike; flowers regular, cream–white, composed of six petaloid parts; fruit a capsule. The leaves are apparently used as a thatching material. Found in forest openings of the hot zone.

VII. *palma* «palm»

I recognize 7 generics in the palm category (table 7.7). 6 generics are monotypic (85.7% of the total); 1 generic (14.3%) is further subdivided into 4 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	6	0	0	1	0	0	0	0	0	0	0	0
	Totals: 7 generics, 4 specifics, 0 varietals											

Table 7.7. Distribution of specifics in the life–form ***palma*** «palm».

Tree–like, shrubby, or vining plants; stems unbranched; leaves large and compound, folded into a v–shaped or fan–like form, leaflets lanceolate or shaped like fish–tails; inflorescences are branched panicles typically emerging from stiff green bracts; flowers regular, small, greenish–white; fruits are mostly one–seeded berries. The category refers to members of the palm and cycad families; it was probably covert before the Spanish term came into use.

kach aa'ts aajy «basket vine leaf» and ***fiscal ápit aa'ts*** «church–member thorn vine» are palms that are usually classified as vines; the unmarked generic palm is excluded.

1. *ajkx to'xta*

Collections: none

Etymology: */ajkx/* + */to'xta/* = «fish» + «tail». The name refers to fan–like leaves of this palm, which are considered to look like fish tails.

Description: A monotypic generic that probably corresponds to ARE *Bactris mexicana*, *Geonoma mexicana* or *G. bionervia*, or *Sabal mexicana*?. Shrubby palms of 1 - 2 meters; leaves emerging from plant base, large and compound, folded into a fan-like form, leaflets resembling fish-tails; inflorescences are branched panicles typically emerging from stiff green bracts; flowers regular, small, greenish-white; fruits a single-seeded berry. The leaves may be used to fan a cooking fire (an alternate name ***ajkx to'txa ye̱'mu̱n*** «fish tail fan» refers to this use). Apparently found in forests of the temperate and hot zones.

2. *ko̱m*

Collections: none

Etymology: */ko̱m/* = «Mixe proper name for certain palms that yield edible fruits». The reconstructed protoMixe-Zoque term for this palm is ****kuma*** (Campbell and Kaufmann 1976:87).

Description: A monotypic generic that corresponds to ARE *Acrocomia mexicana*, the coyoli palm, a Mesoamerican species that is widely cultivated in tropical Mexico for its edible fruits. Tree-like palms; stems unbranched; leaves forming a tuft at the top of the trunk, large and compound, folded into a v-shaped form, leaflets lanceolate; inflorescences are branched panicles typically emerging from stiff green bracts; flowers regular, small, greenish-white; fruits are mostly one-seeded drupe. Fruits roasted on a comal, are peeled and eaten as is. Semi-cultivated in the lowland ranches from where it is brought to Totontepec, and sometimes sold in the Sunday market.

3. *kupivejtun*

Collections: JR0462, JR0657

Etymology: */kupivejtun/* = «Mixe proper name for Chamaedor–palm». Some Mixe have suggested that this name means «cut leafy–shoot»; it may be derived from morphemes such as */kupuu'p/* = «to sprout, a leafy–shoot or sprout» and */vejp/* = «germinate», referring to the way that the palm resprouts after being cut.

Description: A monotypic generic that corresponds to ARE *Chamaedorea affinis*. Shrubby palms; stems unbranched and cane–like; leaves large and compound, folded into a v–shaped, leaflets lanceolate and long; inflorescences are branched panicles typically emerging from stiff green bracts; flowers regular, small, greenish–white; fruits are mostly one–seeded berries. The leaves may be used as adornment. Found in the forest understory of cold and temperate zones.

4. *noojn*

Collections: ES0066, JR0655, JR0675, JR0925, JR1249

Etymology: */noojn/* = «Mixe proper name for chamaedor palms».

Description: A polytypic generic that corresponds to ARE *Chamaedorea tepejilote*, *C. sartorii* and other *Chamaedorea* spp. Shrubby palms; stems unbranched and cane–like; leaves large and compound, folded into a v–shaped, leaflets lanceolate and long; inflorescences are branched panicles typically emerging from stiff green bracts; flowers regular, small, greenish–white; fruits are green, one–seeded berries. Immature inflorescence a major source of food in the springtime; the bract–enclosed inflorescence is roasted in coals, the bracts are removed and the whitish–green, slightly bitter flowering spike is eaten alone or in chile stews or scrambled with eggs; leaves as adornment of some species used as adornment, especially around Christmas time. Found in the forest understory of all climate zones.

Specifics:

(A) ***añu noojn*** «thunder *tepejilote*-palm» [ARE *Chamaedorea*] This is a broad-leaved species that is found in forests of the hot zone; the inflorescence is eaten, and the leaves used for adornment.

(B) ***na'anoojn*** «water *tepejilote*-palm» [ARE *Chamaedorea*]. This is a small species that grows along riverbanks in the hot zone; the inflorescence may be eaten, but it is generally very small.

(C) ***poo'p noojn*** «white *tepejilote*-palm» [ARE *Chamaedorea tepejilote*]. This is a semi-cultivated species, and the one that has the most harvested fruits.

(D) ***yuk noojn*** «wild *tepejilote*-palm» [ARE *Chamaedorea elegans*?]. This is used only for adornment, and is found in forests of the cold zone; it is said to be a «brother» of ***kupivejtun***.

5. ***pit***

Collections: none

Etymology: */pit/* = «Mixe proper name for some palms used in weaving». The reconstructed proto-Mixe-Zoque term *__pit__ = «to spin thread», a weaving term that may have been extended to this palm, a source of leaves used in basket and mat making.

Description: A monotypic generic that corresponds to ARE *Brahea dulcis*, the most common species of a small genus of palms that grow on limestone formations of Mesoamerica. Tree-like palms; stems unbranched; leaves large, palmately lobed, and folded into sections that form a broad fan–like lamina; inflorescences are whitish–green, branched panicles emerging from stiff green bracts; flowers regular and small; fruits are one–seeded berries?. Although the Mixe of Totontepec do not weave with the leaves of this palm, they recognize it as the source of petates (sleeping mats) and tenates (baskets) that are produced in drier zones of Oaxaca state and are widely used in the Sierra Norte. This palm is relatively abundant in some Zapotec and Mixe communities to the south of Totontepec; it does not appear to grow within the municipality and the name is not recognized by many people.

6. ***tsapkom***

Collections: none

Etymology: */tsap/* + */kom/* = «prefix which commonly denotes objects that have been introduced to the Mixe» + «Mixe proper name for the *coyol* palm».

Description: A monotypic generic that corresponds to ARE *Cocos nucifera*, the coconut palm, a cosmopolitan and widely cultivated palm that yields edible fruits and oil, leaves for thatch and weaving, timber for construction; probably introduced into the Americas around the end of the 15th century (Mabberly 1987:134). Tree–like palms; stems unbranched; leaves forming a tuft at the top of the trunk, large and compound, folded into a v–shaped form, leaflets lanceolate; inflorescences are branched panicles typically emerging from stiff green bracts; flowers regular, small, greenish–white; fruits are filled with a sweet liquid, the hard shell is lined with a white, sweet and hard to rubbery pulp. Fruits are eaten raw?. This palm may occur in the lowland ranches of Totontepec, but is not widely consumed in Totontepec. A common synonym is the Spanish name *coco* or *cocotero*.

7. *tsik_tsajx*

Collections: ES0060, JR0246, JR0920, WR0046

Etymology: */tsik/* + */tsajx/* = «badger» + «tree–nest?». It is not clear why this plant is linked to a badger's nest. The reconstructed protoMixe–Zoque term for badger or coati is ***ʼ¢iku***.

Description: A monotypic generic that corresponds to ZAM *Ceratozamia*?. Palm–like shrubby plants of 1 – 1.5 meters; leaves emerging from a scaly base, pinnately compound, leathery and rather glossy, greenish–yellow; inflorescence an elongate cone; fructescence cone–shaped, containing numerous hard seeds. Leaves used as thatch for ranch houses (*matyajk, jacal* in Spanish); used as adornment, especially around Christmas time. Found in the forest understory of the cold and temperate zones.

VIII. *Unaffiliated generics*

I recognize 5 unaffiliated generics (table 7.8). 2 generics are monotypic (40.0% of the total); 3 generics (60%) are further subdivided into 25 specifics and 16 varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	2	0	1	0	0	0	0	0	0	1	0	1
	Totals: 5 generics, 25 specifics, 16 varietals											

Table 7.8. Distribution of specifics among unaffiliated generics.

1. *kapy*

Collections: none

Etymology: */kapy/* = «Mixe proper name for large cane»; Schoenhals and

Schoenhals (1965:18) also list the following meanings: "carry (something long, e.g. a pole), take (e.g. poles), carry (e.g. a thin pole over the shoulder).

Description: A monotypic generic that corresponds to POA *Arundo donax*, a Mediterranean grass that is widely naturalized in tropical and subtropical zones. Erect grasses of 2 – 3 meters with cylindrical cane-like to woody stems that have hollow internodes; leaves broadly lanceolate, long and parallel veined, the base sheathing the stems; apparently without flowers and fruit in the Sierra. Although not affiliated with grasses, this generic is the base for grass generics such as *na̲'akapy* and *tsay kapy*. The long, rigid stems are used for a number of purposes – house construction, fences, as carrying poles. Semi-cultivated in all zones of the municipality, and widely distributed throughout the Sierra Norte.

2. ***mo̲o̲k***

Etymology: */mo̲o̲k/* = «Mixe proper name for maize». The protoMixe-Zoque reconstructed term is ***mook**, a term that does not appear to be cognate with names for maize in other Mesoamerican languages (Campbell and Kaufman 1967:85).

Collections: ES0212, ES0214, ES0218, JR0889, JR0890, JR0891, JR0892, JR0893, JR0894, JR0895

Description: A polytypic generic that corresponds to many varieties of POA *Zea mays*, maize, a plant that was cultivated in Mesoamerica some 5000 years ago. Erect grasses of 1.5 meters; stems pithy and rigid, though sometimes partially scandent (lodging), green to purplish-red; leaves broadly linear, long, reddish-purple to green, sometimes pubescent; male flowers reduced, grouped in terminal inflorescences (tassles); female inflorescences borne on a central spike (cob) from which many long style (the silk) emerge.

It is difficult to summarize the uses, cultivation and importance of maize. The seeds are a basic food of the Mixe; when young they may be eaten «on the cob»; when more mature but still tender they are ground to make *tamales* and *tortillas*; when dry, they are soaked in water with lime, and are later ground to make masa, a corn dough that is used to prepare tortillas and tamales and is an ingredient in many cooked chile sauces. The seeds are also used in the treatment of susto, and in fortune-telling (Gonzalez V. 1989:110). The dried leaves and stems are given to cattle as fodder, and are left in plowed fields, where they serve as a green manure and to control erosion. The corn silk may be used in medicine. Maize is considered to be in a class of its own, and is an unaffiliated generic of great importance. Its cultivation and role in the local culture has given rise to a specialized vocabulary of botanical and other terms. *taak? mook* «dry-season maize» is another possible specific category form Tepitongo.

Specifics:

(A) *na'av mook* «old corn» [This may be a reference to the antiquity of the cultivar - may be the original corn of the Mixes?].

Varietals:

(1) *maj na'av mook* «large old maize» [POA *Zea mays*] Tepitongo

(2) *poo'p kast na'av mook* «white pinto old maize» [POA *Zea mays*] hot zone

(3) *poo'p na'av mook* «white old maize» [POA *Zea mays*] cold zone

(4) *po'ts kast na'av mook* «yellow pinto old maize» [POA *Zea mays*] hot zone

(5) *po'ts na'av mook* «yellow old maize» [POA *Zea mays*]

(6) ***tsapts na'av mook*** «red old maize» [POA *Zea mays*] hot zone

(7) ***yak na'av mook*** «black old maize» [POA *Zea mays*] hot zone

Specifics classified by habit:

(B) ***ka'ach mook*** «scandent maize» [POA *Zea mays*] (The unmodified name refers to a «scandent maize» with mixed white and black kernels)

(1) ***poo'p ka'ach mook*** «white scandent maize» [POA *Zea mays*] swidden (mostly white kernels)

(2) ***yak ka'ach mook*** «black scandent maize» [POA *Zea mays*] swidden (mostly black kernels)

(C) ***peji pu'ts mook*** «bushy yellow maize» [POA *Zea mays*] Tepitongo

Specifics classified by color:

(D) ***po'ts mook*** «yellow maize»

(1) ***aa'tspa po'ts mook*** «bejucoso yellow maize» [POA *Zea mays*] swidden

(2) ***andon po'ts mook*** «Antonio yellow maize» [POA *Zea mays*] permanent field

(3) ***po'ts ja'ats poo'p mook*** «yellow spotted white maize» [POA *Zea mays*] Rancho

(4) ***maj po'ts mook*** «large yellow maize» [POA *Zea mays*] permanent field

(E) ***poo'p mook*** «white maize»

(1) ***maj poo'p mook*** «large white maize» [POA *Zea mays*] permanent field

(2) ***tsa poo'p mook*** «stone white maize» [POA *Zea mays*] permanent field

(3) ***tsejkx tsapoo'p mook*** «pinched stone white maize» [POA *Zea mays*] swidden – Tepitongo

(F) ***tsapts mook*** «red maize» [POA *Zea mays*] swidden

(G) ***yak mook*** «black maize» swidden

Specifics classified by origin:

(H) ***naap mo̲o̲k*** «Zapotec maize» [POA *Zea mays*] Rancho, hot zone, Tepitongo

(I) ***toojk joyumit mo̲o̲k*** «Ayutla maize» [POA *Zea mays*] permanent field

Unanalyzed Specifics:

(J) ***chuux mo̲o̲k*** ? «maize» [POA *Zea mays*] swidden – cold areas [initial ch unusual – does it comes from chuuxnaban?]

(K) ***kets mo̲o̲k*** «rock maize» [POA *Zea mays*] Rancho

(L) ***na'j mo̲o̲k*** ? «maize» [POA *Zea mays*] Rancho

3. ***taat***

Collections: none

Etymology: */taat/* = «Mixe proper name for prickly pear cacti».

Description: A monotypic generic that corresponds to CAC *Opuntia* spp. Arborescent plants of 1 – 4 meters; stems flattened into succulent pads (Sp. *pencas*) that are covered with a waxy cuticle and scattered spines; leaves absent; flowers solitary and stemless, borne on a fleshy receptacle that matures into a greenish-yellow to red berry that contain numerous hard seeds. Fruit and fleshy stems edible; spines are removed from both, the fruit is eaten raw, the stems are boiled in water and are often eaten with beans or eggs. Found only in drier parts of the temperate and hot zones of the municipality, but many Mixe know *nopales* (the Spanish name for both the cactus the diced and cooked pads that are eaten in salads and stews) from travels to Oaxaca and Mexico City, where they are frequently consumed.

4. ***tsa'am***

Collections: JR0763

Etymology: ***/tsa'am/*** = «Mixe proper name for banana», but the term also means «ripe». The name is apparently derived from protoMixe–Zoque ****¢aam**, which is translated as «ripe, good». Some blackberries are called ***tsa'am ju'u*** «ripe coal», it is possible that the term meant sweet fruit in general and was extended to include bananas after their introduction by the Spanish. Many of the specific names are derived the common Mexican Spanish names for banana varieties. The reconstructed protoMixe–Zoque term for plantain is ****sapani***, which does not appear to be a cognate of any plant name currently used in Totontepec.

Description: A polytypic generic that corresponds to MUS *Musa* x *paradisiaca*, and triploid forms of *Musa acuminata*, plantain and common bananas, cultivars of Indomalaysian origin which are widely cultivated in the tropics for their carbohydrate–rich fruit. Large, erect herbs of 2 – 4 meter with abundant watery to milky sap; stems formed by the succulent leaf bases; multiple shoots arising from a large rhizome; leaves very large, oblong to oval, sheathing and spirally arranged around stem; inflorescences terminal, the yellow irregular flowers subtended and enclosed by deciduous purplish–red bracts, fruits are oblong, seedless berries that are grouped into bunches. Fruit is eaten raw or roasted in the open fire; leaves are used for thatch and or shade, to flatten tortillas and to wrap tamales. Cultivated in cornfields, in home gardens, along riverbanks and in other moist areas of the temperate and especially the hot zone.

Specifics:

(A) ***india tsa'am*** «India banana» [MUS *Musa acuminata* form]

(B) ***manzana tsa'am*** «apple banana» [MUS *Musa acuminata* form]

(C) ***morado tsa'am*** «purple banana» [MUS *Musa acuminata* form]

(D) ***pa'a tsa'am*** «pathside banana» [MUS *Musa acuminata* form]

(E) ***pi'k tsa'am*** «small banana» [MUS *Musa acuminata* form]

(F) ***poo'p tsa'am*** «white banana» [MUS *Musa acuminata* form]

(G) ***seeda tsa'am*** «silk banana» [MUS *Musa acuminata* form]

(H) ***tsapts tsa'am*** «red banana» [MUS *Musa acuminata* form]

(I) ***vaja_tsa'am*** «horn banana» [MUS *Musa* x *paradisiaca*]

(J) ***yak tsa'am*** «black banana» [MUS *Musa acuminat*a form]

5. *vaaxk*

Collections: none

Etymology: */vaaxk/* = «Mixe proper name for sugar cane».

Description: A polytypic generic that corresponds to POA *Saccharum officinarum*, a native of Southeast Asia that is widely cultivated in tropical areas as a source of sugar and related products. Erect grasses of 2 – 3 meters with cylindrical, rigid, purple–red stems that contain copious amounts of sugary sap; leaves broadly lanceolate, long and parallel veined, the base sheathing the stems; flowers very reduced, grouped into large feathery terminal inflorescences. Sap is taken as beverage, and is fermented to make tepache, a mildly alcoholic drink, which in turn may be distilled to make cane alcohol. That sap is extracted by placing the stems in a cane press, often made from a variety of tropical hardwoods. Cultivated in fields (***vaaxkam***) of temperate and hot zones.

Specifics:

(A) ***java? vaaxk*** «Java ***vaaxk***» [POA *Saccharum officinarum*]

(B) ***poo'p vaaxk*** «white ***vaaxk***» [POA *Saccharum officinarum*]

(C) ***vaa'xk vaaxk*** «striped ***vaaxk***» [POA *Saccharum officinarum*]

IX. ***tsimi*** «fern»

I recognize 12 generics in the fern category (table 7.9). 11 generics are monotypic (91.7% of the total); 1 generic (8.3%) is further subdivided into 2 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	11	1	0	0	0	0	0	0	0	0	0	0
	Totals: 12 generics, 2 specifics, 0 varietals											

Table 7.9. Distribution of specifics in the life-form ***tsimi*** «fern».

s/n. ***tsimi*** (unmodified)

Collections: ES0077, ES0168, ES0193, EV0013, EV0017, EV0131, EV0200, EV0210, EV0250, EV0272, EV0273, EV0330, JR0033, JR0979, WR0081

Etymology: */tsimi/* = «Mixe proper name for fern».

Description: An undifferentiated generic category that focuses on *Pteridium aquilinum* and *P. arachnoideum*, but may be extended to include any fern including *Plagiogyra*, PLP *Polypodium loriceum*, THL *Thelypteris resinifera* and *T. rudis*. *Pteridium* is sometimes used as bedding for chickens and dogs. Found in shrub vegetation and grasslands of all climatic zones. Also may be called by a variety of descriptive names, including ***tsimi tse'xuk'am tsov*** «Amatepec brave fern?»; ***tseev pe'en tsimi*** «chicken nest fern»; and tsapts tsimi «red fern».

1. ***jantsimi***

Collections: ES0065, EV0122, JR0250, WR0074

Etymology: */ja̲n/* + */tsimi/* = «fire, fever» + «fern». This name apparently refers to the stinging or burning sensation that this fern causes when it comes in contact with the skin.

Description: A monotypic generic that corresponds to GLC ***Sticherus bifidus*** and ***S. palmatus***. Used as ornament for feast day celebrations. Found in shrub vegetation of the temperate and cold zones. May also be called ***pax_tsimi*** «stem fern».

2. *kaatsimi*

Collections: ES0047, JR0012, WR0093

Etymology: */kaaj/* + */tsimi/* = «animal» + «fern». The name could be related to its use as fodder, or the fact that it is a large fern, the modifier ***kaaj*** often being used to indicate the coarsest member of a group (see ***kaaj tsi'iv***).

Description: A monotypic generic that corresponds to TPT *Culcita coniifolia* and LPH *Lophosoria quadripinnata*. Small tree ferns. *Culcita* fronds are used for sore throat; they are blended and the juice is taken internally. *Lophosoria* root is used to purify the kidneys; it is taken internally as tea. Found in stony soil of abandoned fields in the temperate and cold zones.

3. *ku̲pyuktsum*

Collections: JR0719, JR794, JR0835, JR1060

Etymology: */ku̲p/* + */yuk/* + */tsum/* = «prefix for growing or living in tree, or tree-sized» + «prefix for wild» + «tie».

Description: A monotypic generic that corresponds to PLP *Niphidium crassifolium*, and is extended to ASL *Elaphoglossum vestitum* and other *Elaphoglossum* species. Epiphytic ferns. Apparently without use. Found in forests of all zones.

4. *maj_vintsimi*

Collections: ES0195, EV0118, JR0719, JR0922 .

Etymology: ***/maj/*** + ***/viijn/*** + ***/tsimi/*** = «large» + «eye» + «fern». ***/maj_viijn/*** = «wide, ample». These are epiphytic ferns with wide, entire fronds.

Description: A monotypic generic that corresponds to FRN *Elaphoglossum sartorii* and *E.* spp. Occasionally used as adornment on January 6th. Also called ***yaajnit tsimi*** «long fern» in Totontepec, ***tasaju ujts*** «Spanish for beef jerky» + «herb» in Tepitongo and ***uk toots*** «dog tongue» in Chinantequilla. These all may be synonymous with ***kup tsum***.

5. *moktsimi*

Collections: JR0069, JR0726

Etymology: ***/mook/*** + ***/tsimi/*** = «Mixe proper name for *maíz*)» + «fern». The base of the fern is used as substitute for corn.

Description: A monotypic generic that corresponds to MTT *Marratia weinmannifolia*. Shrubby fern. The base of the fern is cut into square pieces, cooked like corn, and ground to make tortillas; it may be combined with corn *masa* for the same purpose. Found in secondary forest and shrub vegetation of the cold zone. Sometimes called ***yukmoktsimi*** «wild maize fern».

6. *naaydum tsimi*

Collections: JR0303, JR0645, JR0915, JR0994, JR1115

Etymology: ***/naaydum/*** + ***/tsimi/*** = «single-person».+ «fern», apparently so-called because the plants are solitary in contrast to the many ferns that grow in bunches.

Description: A monotypic generic that corresponds to OSM *Osmunda regalis*. Stipes yellow-green. The fronds are taken in tea for 'magical fright' or *susto*. Found in secondary forest and shrub vegetation of the all zones. Also may be called ***natsimi*** or *tso'ojmk tsimi*.

7. ***okanokts tsimi***

Collections: JR0241, JR0647, WR0089

Etymology: A possible derivation that involves several phonological changes is */ok/* + */aaj/* + */nokuts/* + */tsimi/* = «dog» + «mouth» + «saliva» + «fern». Some ferns [like *Plagiogyra*] produce mucilage on the young leaves, or have mature leaves which become mucilaginous when ground, and this may be reminiscent of dog saliva.

Description: A monotypic generic that corresponds to FRN *Blechnum falsiforme* and *B. schiedeanum*. Found in shrub vegetation of the cold zone. Pubescent and saw-toothed ferns? The root is combined with other plants to make a tea used for treating *susto*; the fronds are given to chickens to calm them and make them sleep.

8. ***poo'p tsimi***

Collections: JR0017, JR0211, JR0466, JR1042

Etymology: */poo'p/* + */tsimi/* = «white» + «fern».

Description: A monotypic generic that corresponds to FRN *Pityrogramma ebenea* [formerly called *P. tartarea*]; some species of this genus are used in basketry but not in Totontepec. Fern with black stems and white waxy powder on abaxial surface of fronds. The fronds are used to prepare a tea to treat *susto*, taken three times a day. Found in the shrub vegetation of cold zones.

9. ***tsa tsimi***

Collections: ES0007, EV0114, JR0007, JR0019, JR0066, JR0256, JR0921

Etymology: */tsa/* + */tsimi/* = «stone» + «fern».

Description: A monotypic generic that corresponds to DRY *Elaphoglossum petiolatum* and *Tectaria mexicana* and PLP *Polypodium pseudoaureum*. *Polypodium* root are prepared in tea to treats coughs and *susto*; *Elaphoglossum* sometimes used as an ornamental. Sometimes called ***naaydum poo'p tsimi***. Found in forests, shrub vegetation and abandoned fields of the cold and temperate zone, often growing on rocks.

10. ***tsapkom***

Collections: EV0036?, EV0160?, JR0514, JR1279

Etymology: */tsap/* + */kom/* = «prefix for foreign» + «Mixe proper name for certain tree ferns». The name is in part cognate with the reconstructed protoMixe–Zoque word ****kom***, which is glossed as house posts; the tree fern trunks are used as houseposts in Totontepec. The fact that the name is modified by the prefix ***tsap*** might indicate that there is a plant category ***kom***, perhaps a tree species also used for house posts.

Description: A polytypic generic that corresponds to CTH *Alsophila firma*. Also called kup tsimi «tree fern». The trunks are cut to size and used for house posts. Found in forests of the temperate and hot zones.

Specifics:

(A) ***tsapkom*** (unmodified) «***tsapkom***» [CTH *Alsophila*]. This form is said to have a yellowish pubescence.

(B) ***ápitax tsapkom*** «thorny ***tsapkom***» [CTH *Alsophila*]. This form is said to be thorny.

11. ***tsay tsimi***

Collections: JR0024, JR0208, JR1016

Etymology: */tsay/* + */tsimi/* = «thin» + «fern». This is a general category that refers to ferns of thin, fragile stems and leaves.

Description: A monotypic generic that corresponds to ADI *Adiantum andicola*, ASL *Cystopteris fragilis*, and DST *Odontosoria schlectendalii*. Black stems and soft green fronds. The fronds? prepared in tea to treat susto. May also be called ***pi'k tsimi***, or in Tepitongo, ***seeda ujts***. Found in abandoned fields of the cold and temperate zone.

12. ***tsa'aga tsimi***

Collections: JR0242, JR0387, JR0725, WR0110

Etymology: */tsa'aga/* + */tsimi/* = «magical-fright» + «fern».

Description: A polytypic generic that corresponds to ADI *Llavea cordifolia*, OSM *Osmunda cinnamonea*, and VTT *Vittaria graminifolia*. Sporing fronds sometimes appearing as inflorescences [*Llavea*]. *Llavea* and *Osmunda* roots, and *Vittaria* fronds used to prepare a tea for treating *susto*. Found in secondary forest and shrub vegetation of the cold zone. The unmodified name ***tsa'aga tsimi*** «magical-fright fern» refers to *Llavea cordifolia* and *Vittaria graminifolia*, whereas the form called ***yaajnit tsa'aga tsimi*** «long magical-fright fern» refers to *Osmunda cinnamonea*.

X. ***tse'ek*** «moss»

I recognize 3 generics in the palm category (table 7.10), all of which are monotypic (100% of the total).

Greenish to yellow scandent plants; leaves and microphylls small; flowers, when present, small and white. Usually found in rather moist habitats. The life refers mainly to bryophytes, but also includes some small moss-like flowering plants. There are three generics, but only one includes flowering plants; all are monotypic. *tse'ek* itself may be employed as an unmodified generic term for indescript mosses.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	3	0	0	0	0	0	0	0	0	0	0	0
Totals: 3 generics, 0 specifics, 0 varietals												

Table 7.10. Distribution of specifics in the life-form *tse'ek* «moss».

1. ***poo'p tse'ek***

Collections: none

Etymology: */poo'p/* + */tse'ek/* = «white» + Mixe proper name for moss».

Description: A monotypic generic that corresponds to whitish-green mosses.

2. ***po'ts tse'ek***

Collections: none

Etymology: */po'ts/* + */tse'ek/* = «yellow» + «Mixe proper name for moss».

Description: A monotypic generic that corresponds to yellowish mosses.

3. ***tsa tse'ek***

Collections: JR0020, JR0071

Etymology: */tsa/* + */tse'ek/* = «stone» + «Mixe proper name for moss». The name refers to the habitat of these moss-like plants that grow on rocks.

Description: A monotypic generic that corresponds to CRS *Sedum* and perhaps some mosses that grow on rocks. Succulent herbs of 5 – 10 cms.; leaves fleshy and entire, ± cylindrical in cross-section, arranged spirally around the stem; flowers regular, whitish-pink; fruit is a group of follicles. Apparently without use. Found on rocks in shrubby vegetation of the cold zone.

XI. ***mox*** «mushroom»

I recognize 13 generics in the mushroom category (table 7.11). 9 generics are monotypic (69.2% of the total); 4 generics (30.8%) are further subdivided into 9 specifics. There are no varietal categories.

	Number of specifics											
	mono	2	3	4	5	6	7	8	9	10	11	12
Number of generics	9	3	1	0	0	0	0	0	0	0	0	0
	Totals: 13 generics, 9 specifics, 0 varietals											

Table 7.11. Distribution of specifics in the life-form ***mox*** «mushroom».

s/n. ***mox*** (unmodified)

Collections: none

Etymology: */mox/* = «Mixe proper name for mushrooms».

Description: A monotypic generic that corresponds to corresponds to both edible and poisonous mushrooms. At the life-form rank, this category appears to be restricted to fungi, although it may include some parasitic species of morphologically unusual plant families such as Mitrastemonaceae.

1. ***chaax***

Collections: none

Etymology: */chaax/* = «Mixe proper name for an edible mushroom». Some Mixe suggest that the name may be derived from «eyelash», and refers to the aspect of this edible mushroom.

Description: A monotypic generic that corresponds to an edible mushroom that grows on trees. Schoenhals and Schoenhals (1965:33) suggest that it is an edible mushroom that is particularly abundant on the trunks of mango, sweet gum and *Inga* trees.

2. *clavos mox*

Collections: none

Etymology: */clavos/* + */mox/* = «Spanish word for nails or cloves» + «Mixe proper name for mushrooms». The name may refer to the distinctive shape or smell of these mushrooms.

Description: A monotypic generic that corresponds to an edible mushroom.

3. *exmokax mox*

Collections: none

Etymology: */exmokax mox/* = «?(some Mixe perhaps has something to do with having a «*nahua*, an animal spirit)» + «Mixe proper name for mushroom»

Description: A monotypic generic that corresponds to a mushroom that grows in soil; found in all zones.

4. *jaach tuun mox*

Collections: none

Etymology: */jaach/* + */tuun/* + */mox/* = «animal, cattle» + «excrement» + «Mixe proper name for mushroom». The name describes the habitat of these mushrooms – they grow on cattle manure.

Description: A monotypic generic that corresponds to *Psilocybin* spp. Apparently not used at the present time in Totontepec. Found in forests shrub vegetation of the temperate and hot zones. It does not appear that this hallucinogenic mushroom is widely used for divination in Totontepec and its hamlets. There are reports of individuals taking these mushrooms, and reporting on events that will occur in the future. It is said that an 18-year-old (A.N) who died in 1987 has taken the mushrooms at least once. A descriptive synonym given by Schoenhals and Schoenhals is ***mox juu' juu' jaty tuk'ixp***, which may be analyzed as follows ***/mox/*** + ***/juu'/*** + ***/juu'/*** + ***/jaty/*** + ***/tuk'ixpet/*** = «Mixe proper name for mushroom» + «which» + «which» + «people» + «see something which is in front of one»; ***/tuk'ix/*** means «to teach, to show».

5. *ku'u avaajy*

Collections: none

Etymology: ***/ku'u/*** + ***/avaajy/*** = «squirrel» + «hair, mustache». The name may be an apocryphal reference to the appearance of this mushroom.

Description: A polytypic generic that corresponds to an edible, terrestrial mushroom that grows under pitch-pines. Schoenhals and Schoenhals reports that it is brownish.

Specifics:

(A) ***po'ts ku'u avaajy*** «yellow squirrel mustache»

(B) ***poo'p ku'u avaajy*** «white squirrel mustache»

6. *mokjachijtuk*

Collections: none

Etymology: ***/mook/*** + ***/jaach/*** + ***/ijtuk/*** = «Mixe proper name for corn» + «Mixe proper name for animal, cattle» + «placed in the middle of?». The name refers in part to the fact that this mushroom grows on corn.

Description: A monotypic generic that corresponds to *Usitlago maydis*, corn smut, a fungus that grows on corn and was formerly eaten in the community.

7. *nejk*

Collections: none

Etymology: */nejk/* = «Mixe proper name for an edible mushroom».

Description: A polytypic generic that corresponds to an edible mushroom that grows on the trunks of soft-wooded trees such as TIL *Heliocarpus*. It is said to be a very tasty edible mushroom; however the variety that grows on oak trees is said to be poisonous.

Specifics:

(A) ***ajktits nejk*** «corn-cob ***nejk***»

(B) ***poo'p nejk*** «white ***nejk***»

(C) ***xoj nejk*** «oak ***nejk***». A poisonous variety that grows on oak trees.

8. *taatsk ak*

Collections: none

Etymology: */taatsk/* + */ak/* = «ear» + «leather-hide, bark». The name probably refers to leathery ear-shaped mushrooms that grow on tree trunks.

Description: A monotypic generic that corresponds to an edible mushroom that grows on fallen tree trunks or at the base of coffee bushes; said to be found in all climatic zones.

9. *too'puu'ts*

Collections: none

Etymology: */too'/* + */puu'ts/* = «prefix that denotes pathside» + «Mixe proper name for some poisonous mushrooms». ***puu'ts*** is perhaps derived from the morpheme

/pu'uts/ = «to rot,rotten,fermented» or ***/pu'ut/*** = «dirty», perhaps referring to the foul smell or aspect of these mushrooms.

Description: A polytypic generic that corresponds to ?. Found in soil especially in oak forests and also in pine forests of the cold and temperate zones. Schoenhals and Schoenhals (1965:345) report that this category corresponds to *Amanita muscaris*, a poisonous mushroom.

Specifics:

(A) ***po'ts too'puu'ts*** «yellow ***too'puu'ts***»

(B) ***yak too'puu'ts*** «black ***too'puu'ts***»

10. ***tsapts tsaxoj mox***

Collections: none

Etymology: ***/tsapts/*** + ***/tsa/*** + ***/xoj/*** + ***/mox/***. The name refers to the habitat of this mushroom – it grows on a certain type of red oak trees.

Description: A monotypic generic that corresponds to a poisonous mushroom that grow on oak trees in the cold zone.

11. ***tsiijn mox***

Collections: none

Etymology: ***/tsiijn/*** + ***/mox/*** = «Mixe proper name for pitch–pine» + «Mixe proper name for mushroom». This is a mushroom which grows under or on pitch–pines.

Description: A monotypic generic that corresponds to a mushroom which is found in the ranches of the hot zone.

12. ***tso'x tek***

Collections: none

Etymology: */tso'x/* + */tek/* = «Mixe proper name for certain birds» + «foot, stem». The name could be glossed as «bird's foot mushroom»; there is a mushroom marketed in the Oaxaca Valley under the name of *pata de pájaro*. Schoenhals and Schoenhals suggest that */tso'x/* is called tarenga or *totchil* in local Spanish, a bird which belongs to the genus *Pipilo*.

Description: A monotypic generic that corresponds to some mushrooms that grow in the soil; Schoenhals and Schoenhals suggest that some may be edible and some poisonous mushrooms, and that they may be red, yellow or white (the first two edible, the last one poisonous). This is apparently synonymous with ***paa'ookun***, which may be analyzed as */paa'/* + */ookun/* = «prefix for edge, pathside» + «bone?» (*ookun acap* means «clavicle»).

13. *xoy*

Collections: none

Etymology: */xoy/* = «Mixe proper name for some mushrooms that grow on oak trees». The name may be derived from */xoj/* + */oy/* = «Mixe proper name for oak» + «good, tasty».

Description: A polytypic generic that corresponds to edible mushrooms that grow in soil in oak forest of the cold zone.

Specifics:

(A) *po'ts xoy* «yellow ***xoy***»

(B) *yak xoy* «black ***xoy***»

8. Comparative analysis of Chinantec and Mixe plant classification

Over the last three decades, many authors have focused on analyzing systems of ethnobiological classification. Conklin (1954, 1962), one of the originators of the trend, carried out fieldwork in the Philippines that elucidated how the Hanunóo perceive the local environment. Much analytical thinking was inspired by the seminal papers written by Berlin (1972, 1973, 1974, 1976, 1978) and his colleagues (Berlin et al. 1966, 1968, 1973) on universal principles of folk biological classification as well as by their subsequent monograph on Tzeltal ethnobotany, which described the botanical knowledge of a Mexican indigenous group (Berlin et al. 1974). Independently, Bulmer arrived to similar generalizations about folk biological classification based on his work in New Guinea (Bulmer 1967, 1970, 1974, 1979). Other ethnobotanists have described and compared systems of folk classification from many other parts of the world (Alcorn 1984b; Atran 1983, 1985, 1990; Berlin 1976; Brown 1974, 1977, 1984, 1985, 1986; Ellen 1975, 1979, 1986; Ellen and Reason 1979; Felger & Moser 1985; Friedberg 1979, 1986; Hays 1974, 1976, 1979, 1982, 1983; Headland 1983; Hunn 1977; Hunn and French 1984; Morris 1976, 1979, 1984; Posey 1984; Taylor 1984, 1987; Waddy 1982, 1988).

An essential part of characterizing Chinantec and Mixe botanical classifications is to show how they conform with or differ from other systems of folk biological classification. Taking on this task could be intimidating were it not for the recent appearance of Berlin's (1992) Ethnobiological Classification: Principles of Categorization of Plants and Animals in Traditional Societies. After a review of the original principles that he and colleagues presented in 1973, Berlin provides an updated view which responds to the criticism of his early model of folk classification. In the revision, he makes a distinction between principles of categorization, which govern peoples' perception of biological organisms, and principles of nomenclature, which guide the naming of plants and animals.

In the original manuscript of the book, there is an appendix which presents analytical sketches of three systems of ethnobiological classification. By way of introduction to this section, Berlin (n.d.:388–389) states,

> "[t]he goal was to work carefully through every complete, partial and fragmentary ethnobotanical and ethnozoological system I could find, organize each in light of the foregoing theoretical framework, discuss where the framework appeared to apply and when it did not, evaluate as candidly as possible the apparent underlying reasons as best as I could determine them... Having passed through three systems, it became obvious to me that my original plan was simply not workable given the time available to me. ... I still believe that a complete inventory of such sketches such as the three presented here would be worthwhile and will continue to work on its production".

Although this comment and the analysis of the three systems were left out of the published book, Berlin's quest to summon all available data for a cross-cultural analysis of folk classification remains an inspiration to ethnobiologists. In this chapter, I intend to contribute to this analysis by discussing Chinantec and Mixe classification according to Berlin's (1992:23–43) revised outline of principles. I take the liberty to expand on or minimize some issues according to their relevance to my study of plant classification in the northern Sierra of Oaxaca.

Berlin presents 7 principles of categorization and 5 principles of nomenclature. He makes clear that each principle is a "general or natural tendency or quality" (ibid:20), not a hard and fast rule. He suggests they be considered as scientific hypotheses which can be tested by empirical studies. This is an important distinction, because acceptance of his ideas is contingent on taking them as general guidelines for understanding indigenous botanical knowledge which can be further refined and tested. As rules of thumb, they provide a basis for comparing ethnobiological classifications worldwide and are useful to researchers in various fields of study. At the beginning of each of the following sections, I provide a verbatim quote of each principle as stated in the summary presented by Berlin (ibid:31–35). I comment on the statement and then give evidence from Chinantec and Mixe plant classification that argues for or against the principle.

Part 1. Categorization

For Berlin, categorization is "the conceptual organization of plants and animals into a coherent cognitive structure" (ibid:26). The seven principles he presents do not address all issues in folk biological categorization, leaving aside important considerations such as variation among local people in the way they categorize the natural world and the persistence of folk categories over time. Yet the principles serve as a useful guide to providing a broad outline of how Chinantec and Mixe people categorize plants. In order to illustrate and critique each principle, I provide examples from the ethnobotanical inventories carried out in Comaltepec and Totontepec. Additional information on the internal structure and correspondence to scientific taxa of each folk category is given in chapters 6 and 7.

General principles of ethnobiological categorization

> 1) "In ethnobiological systems of classification, conceptual recognition will be given to a subset of the existing flora and fauna. This subset will be comprised of the biologically most distinctive (hence, salient) species of the local habitat." (ibid:31).

It is important to realize that only a subset of the local biota is explicitly recognized by local people. This is a position that belies earlier extreme suggestions that local people lack a sophisticated classification of the natural world or that, on the contrary, they know every plant and animal intimately. There is now general agreement that only a sub-set of the local biota is explicitly classified by local people. This is borne out in the Mixe and Chinantec cases.

In order to calculate the extent to which the local flora is included in a folk classification, we need first to estimate local botanical diversity, measured in terms of the number of families, genera and species which are present. In addition, we need to gauge the numbers of folk categories in the local classification, particularly at the ranks of life-form, generic and specific. Following standard practice, I refer to the assemblage of scientific categories as the flora and the universe of folk categories as the ethnoflora.

Several colleagues and I have been working over the last ten years on a floristic inventory for the Sierra Norte of Oaxaca, delimited as described in Chapter 1. At present we have documented 252 families, 1262 genera and 3548 species as shown in appendices 1, 2 and 3. We estimate that this checklist is complete for families, 90% complete for genera and 75% complete for species, as indicated in table 8–1.

	Families	Genera	Species
Current	252	1262	3548
Projected	252	1400	5000
% in checklist	100%	90%	71%

Table 8–1. Current number of families, genera and species in the Sierra Norte floristic checklist and projected number in flora.

My estimate of the size of the ethnoflora is based on the categories detected in the various approaches used in this study – the inventory itself, structured and informal interviews and review of other ethnobotanical and linguistic studies of the Sierra Norte. I estimate that there are over 700 Chinantec botanical categories and over 800 Mixe botanical categories, distributed among the various ranks as indicated in table 8–2. This estimate of the categories is conservative. Specific individuals with specialist knowledge, such as José Rivera Reyes in Totontepec, recognize a larger number of categories (particularly at the specific rank) than other people in the community. Whereas Chapters 6 and 7 give a detailed account of all plant categories I discovered in Comaltepec and Totontepec, the analyses in this chapter are based on a more limited set of categories recognized widely in the community. In particular, this is reflected in a smaller number of specific categories used for analysis of the Totontepec and Comaltepec data. The greater number of Mixe generics and specifics when compared to Chinantec

Rank	Chinantec	Mixe
Kingdom	unitary	unitary
Life-form	11	10
Intermediate	numerous	numerous
Generic	388	417
Specific	307	394
Varietal	6	20
Totals	712	841

Table 8–2. The distribution of Chinantec and Mixe botanical categories, including «mosses» and «mushrooms», among the ranks of folk biological classification.

categories may have resulted from the detection of many folk categories in the community survey and identification tasks carried out in Totontepec. A similar approach in Comaltepec may increase the estimate of the total number of Chinantec categories.

Although incomplete, we can use the floristic checklist of the Sierra Norte and the ethnobotanical inventories to demonstrate the extent to which Totontepec Mixe and Comaltepec Chinantec classify the plants in their immediate environment. Among the Chinantec collections, 141 botanical families are represented (56% of all Sierra Norte families) as well as 451 genera (32% of total) and some 800 species (16% of total). The numbers are slightly lower for the set of Mixe specimens, probably because of the more limited floristic diversity of Totontepec. The collections correspond to 133 families (53% of all Sierra Norte families), 423 genera (30% of total) and some 750 species (15% of total).

These figures probably do not represent the total number of botanical taxa included in the ethnofloras, but primarily the focal species, genera and families. Many other scientific taxa would be included in the extended range of each folk category, allowing an estimate of the upper limits of the breadth of each folk classification. For example, the Mixe and Chinantec categories that pertain to the genus *Saurauia* are documented by collections of three species. It is probable that the Mixe and Chinantec would include in their respective categories an additional ten species of *Saurauia* found in the Sierra Norte but not yet been collected by community ethnobotanists. A careful estimate of this extended range for all folk categories would include additional families and genera as well as 2 – 3 times more species than are evident in our current collections. The conservative and liberal ways of measuring floristic diversity give the minimum and maximum estimates of the breadth of Chinantec and Mixe botanical classification, as indicated in tables 8-3 and 8-4.

	Families	Genera	Species
Current	141	451	800
Percentage of Sierra Norte total flora	56%	32%	16%
Extended range	160	600	1200-1800
Percentage of Sierra Norte total flora	64%	43%	24%-36%

Table 8-3. The estimated minimum and maximum number of families, genera and species included in the Comaltepec Chinantec ethnoflora and the extent to which they represent the regional flora.

	Families	Genera	Species
Current	133	423	750
Percentage of Sierra Norte total flora	52%	30%	15%
Extended range	160	550	1100-1650
Percentage of Sierra Norte total flora	64%	39%	22%-33%

Table 8-4. The estimated minimum and maximum number of families, genera and species represented in Totontepec Mixe ethnoflora and their corresponding percentages of the total Sierra Norte flora.

Even if the extended ranges are taken into consideration, it is apparent that the ethnofloras do not include all plants found in the Sierra Norte. Why do the Chinantec and Mixe appear to classify only a relatively small portion of the regional flora? I can offer several possible explanations, each one accounting for a segment of the plant world missing from the ethnobotanical collections.

First, the absent plants may yet be found among our collections which remain unidentified. Table 8-5 indicates the degree to which the ethnobotanical specimens have been identified to family, genus and species. New taxa will undoubtedly emerge as these collections continue to be studied by specialists. Second, there may be some

5 – 10% of folk categories which are not yet documented in our ethnobotanical collections. These correspond to species found in vegetational zones not sufficiently surveyed – low elevational forest remnants in Totontepec, mountaintops in Comaltepec and other areas. Third, there is likely to be a large number of geographically-restricted species which are found someplace in the Sierra, but not in the municipalities of Comaltepec and Totontepec. It should be remembered that the figures of the total flora that I cite are derived from an area of over 10,000 km^2. The combined lands of the two municipalities measure some 500 km^2. While it is true that some villagers have had opportunities to observe other species in their travels around the region, it is unlikely the plants would be included in the local plant classifications.

Rank	Chinantec	Mixe
Family	95%	98%
Genus	84%	82%
Species	48%	42%

Table 8–5. The extent of identification of the ethnobotanical collections.

Even if we corrected for these causes – by basing our calculations on the municipal floras, collecting in under-represented areas and identifying all collections – there would be a large number of plants that are simply not salient enough to be classified by the local people, including some aquatics, non-descript herbs, ferns, seldom observed epiphytes and rare plants in general. Although they are often ignored in ethnobotanical inventories, French (1981:2326) underlined the importance of documenting this group of species, noting that,

"[i]n the first place, it provides an indication of the universe, in the statistical sense, within which the utilized plants are to be found. Furthermore, the plants in question may be utilized by other peoples, but not by the ones being studied, and this can contribute to an understanding of the human ecology of the area. Finally, there may be interesting characteristics which differentiate the plants not used from the others... Similar questions are involved in plants which were once used as foods or medicines by a given group yet were later abandoned."

For a rigorous analysis of the extent to which the local flora is classified, it is necessary to have collectors concentrate on gathering not only useful plants, but also those which have no local name or use. These general collections – which I have strived to attain in my study of Chinantec and Mixe classification – allow us to assess if the portion of the flora classified by local people is comprised solely of the biologically most distinctive species of the local habitat, as Berlin implies, or also includes a majority of the plants which are useful or easily accessible. These issues are further discussed below.

2) "Ethnobiological systems of classification are based primarily on the affinities that humans observe among the taxa themselves, quite independent of the actual or potential cultural significance of the taxa." (Berlin 1992:31).

In the second principle, Berlin takes up in earnest what he only implies in the first. He asserts that ethnobiological classifications are primarily ordered along a single dimension, biological similarity. He rejects the possibility that cultural utility, role in the local ecosystem, symbolic importance and other factors are basic elements of the salience of local plant categories. Evidence from Chinantec and Mixe argues against assigning primary importance *a priori* to any one dimension, such as the morphological affinities between taxa. Preliminary data from the Sierra Norte indicate that ethnobiological classification is a multidimensional phenomenon.

It is important to place this debate in an historical perspective. In the early stages of the formalization of a discipline, there is a tendency to attach primary importance to a single dimension, simply because it is difficult to understand the interplay of several dimensions at once. With time, the interaction between various dimensions can be observed and possibly measured by using multidimensional statistics and other tools.

As biological science developed over the last century, there was a split between a holistic view that appreciated the complex interaction between various aspects of a phenomenon – such as that posited by the naturalist Alexander von Humboldt – and a reductionistic approach based on the isolation of a single rule or dimension that was seen to govern all others. While physiologists and physicists sought to explain natural phenomena by positing definite laws and single dynamic causes, biologists were discovering that ecological processes were governed by multiple causes. As McIntosh (1985:25) noted, "concern with single variables at a time rather than with multiple variables in the full context of their interactions with nature was not satisfying to many 19th–century biologists, although some pursued "single–factor ecology".

A similar evolution has taken place in plant systematics. Linnaeus and other botanists of his era proposed classifications based on a single factor, such as the number of stamens per flower. These artificial systems were gradually replaced by natural classifications based on multiple dimensions which reflect the phylogenetic relationships between plants.

A parallel historical process is evident in anthropology. After an early fascination with single-factor explanations of social evolution and cultural behavior, anthropologists began to look at the interaction of multiple aspects of culture. In the case of human or cultural ecology, for example, there has been an attempt to explain cultural behavior by analyzing the limits set by the natural environment. Steward (1955) suggested that similar cultures arise in response to sets of environmental constraints. Researchers who followed this theoretical approach - particularly in the Amazon basin - at first concentrated on single factors which could explain cultural diversity and adaptation to the natural environment (Chicchon 1992). Meggers (1954) suggested that soil quality, which limits agricultural productivity in the Amazon, influenced the demographic patterns in the region, explaining the tendency towards small settlements and migrating populations. Carneiro (1961), Roosevelt (1989) and others contested this hypothesis, pointing out cases in the present and the past which demonstrate that relatively large settlements and complex social organizations have arisen in parts of the Amazon. These settlements were possible because people based their subsistence on cultivation of high-calorie plants such as manioc or on modification of soils and forests to produce adequate supplies of food.

After the theory of soil limitation was questioned, researchers turned their attention to the availability of protein from wild animals (Gross 1975). Yet once again, this single-factor theory was put in doubt. Beckerman (1979) and others demonstrated that Amazonian people have access to a wide range of protein sources, including fish, insects and certain fruits. Although additional single-factor explanations have been advanced, the current tendency is to abandon reductionistic hypotheses in order to focus on analyses which integrate cultural patterns, economic behavior and environmental conditions (Descola 1987, 1992, 1994).

It is ironic that ethnobiologists – who have long recognized the value of natural over artificial classification – first sought to use single variables to explore how local people categorize plants and animals. Because there is wide recognition that folk biological classifications are natural systems, there is now an evolution towards proposing explanations based on multiple variables.

The logic of multiple dimensions of folk classification is evident when talking about plant resources with local people in any part of the world. The conversation initially revolves around a few themes – what is the name of the plant?, how is it used?, how is it recognized?, where is it found?, to which other plants is it similar? These basic questions bring out the most salient dimensions of plant classification, giving an initial indication that folk botanical nomenclature and categorization are based on the morphology, utility, ecology and other aspects of plants.

Since the onset of ethnoscientific studies in the early 1950s, these and other dimensions of human perception have been considered as the possible motivating factors of folk biological classification. An integral part of the early lexicographic approach was its openness to considering a variety of ways of eliciting native categories. As Frake (1962:38) remarks, "this methodology ... insists that any eliciting conditions not themselves part of the cultural-ecological system being investigated cannot be used to define categories purporting to be those of the people under study. It is those elements of our informants experience, which they heed in selecting appropriate actions and utterances, that this methodology seeks to discover."

Despite this common methodology, there has been disagreement among anthropologists about the criteria that local people employ to distinguish between different folk categories. In an article on the pragmatics of folk classification, Brian Morris (1984:45) refers to the rise of a methodological approach in ethnobiology which has come to be known as the intellectualist or cognitive perspective. He distinguishes the two schools of the intellectualist perspective, one led by French structuralists (Levi–Strauss 1966) and the other by American ethnoscientists such as Brent Berlin. He states that the two traditions demonstrate distinct ways of looking at human perception of the natural environment: "For Levi–Strauss, pre–literate people are concerned with a mode of thinking that unifies through symbolic logic diverse aspects of their culture; for Berlin and his associates ... subjects are proto–botanists concerned with ordering the natural world through criteria based on morphology and structure." Common to both perspectives in an interest is demonstrating that humans universally seek to recognize the innate structure of the natural environment without reference to the utility of plants and animals.

The bulk of Berlin's ethnobiological analysis has been dedicated to demonstrating that folk biological classification reflects human perception of the natural discontinuities. His defense of the empirical nature of covert categories could stand for categories of all levels of inclusiveness. They are, he states (Berlin 1974:329), "formed exclusively on the basis of the recognition of gross, visually recognized, morphological similarities and do not represent classes formed on functional considerations."

On both a theoretical and a practical level, Berlin et al.'s model has achieved wide acceptance. It has succeeded in demonstrating the sophistication of folk classification by reference to a single dimension – perception of morphological discontinuities in nature – that explains many of the distinctions between folk biological categories. However, there has not been complete accord with this tenet. Other anthropologists have sought to show that the morphological basis of folk classification is at times correlated or subordinated to other empirical dimensions such as ecology and utility.

Several decades after it fell into disfavor among anthropologists in general, the functionalist perspective is making a comeback in ethnobiological theory. It is most commonly referred to as the pragmatic or utilitarian approach to folk classification, perhaps in an attempt to extricate itself from Malinowski's legacy – and his infamous quote (1948:44) "The road from the wilderness to the savage's belly and consequently to his mind is very short, and for him the world is an indiscriminate background against which there stand out the useful, primarily the edible, species of animals and plants". Among ethnobiologists, Eugene Hunn has been one of the most persistent in considering the practical utility of folk classifications. While he accepts the reality that humans perceive natural discontinuities, he asks rhetorically why some organisms are named and others not. Hunn (1982:835) concludes that "[f]olk generic classification is highly selective, and the practical significance of the organisms classified is important to the selection process."

Hunn suggests that practical utility is a necessary discriminant of every folk taxonomic distinction and that we must always be able to understand differences between contrasting categories in terms of differences in the cultural significance of the included organisms: "Our task, then, is to describe the practical context of folk biological knowledge in detail sufficient to discriminate each taxon from every other. Each taxon should be definable in terms of a unique activity signature" (ibid:841). In this perspective he implicitly rejects the idea of the distinguishing two taxa along purely morphological or ecological dimensions.

This position is again evident in Randall and Hunn (1984), who assert that some life–forms are defined solely on the basis of utility. For example, after discussing evidence for considering the Sinama vine term ***bahan*** from both a morphological and utilitarian perspective, they (1984:339) conclude: "...the range of ***bahan*** is approximately equivalent to English vine but that "real" ***bahan*** is more accurately glossed «lashing plant»".

Morris (1984:49) takes a more conciliatory view when he appeals for a new look at the pragmatic side of folk classification. He proposes to look at biological classification "not only in terms of morphology but also in terms of utility" and finds the delimitation of some folk categories of fungi, animals and higher plants is often inherently linked to functional criteria.

Hays (1982:91–92) recognizes the validity of the utilitarian perspective, but he cautions that the concept of utility must be defined in a rigorous and culturally significant fashion. He argues that a stated contrast in use must be verified by observation – that there must an empirical difference in the behavior towards two distinct folk classes if we are to say that they contrast along the utilitarian dimension. Berlin (1985) takes this criticism to a further degree, suggesting that at present the utilitarian argument permits an ad-hoc, open-ended definition of what constitutes a useful organism.

The late Ralph Bulmer (1974:11), in an article on New Guinean ethnobiology, provides an eloquent argument for considering ecological data in analyses of folk classification. He states that,

> "...a vast amount of apparently accurate knowledge is possessed about aspects of the integration of the plant and animal communities - of the topographic, soil and climatic conditions required by wild as well as cultivated plants, of the kinds of plants and their parts which provide food or refuge for different kinds of animals, of which animals prey upon which other animals, and of the role of birds and mammals in the propagation and dispersal of certain plants."

He points out, as has Berlin in the first principle of categorization, that human populations live within certain ecological and geographical limits and they come into contact with a finite number and diversity of organisms. Moreover, he recognizes the importance of the distribution of these organisms within a physical environment, noting that humans are aware of which plants and animals are found in particular ecological zones.

He also emphasizes the dual importance of ecological niches in folk classification - they maintain biological diversity while providing natural, environmental discontinuities with which humans associate specific plants and animals. He (1974:11-12) concludes that,

> "... the ecological grid both objectively ensures a high degree of discontinuity between the forms present of animals and plants, and because man's own

survival depends in part on the notice he takes of his ecology, provides one very significant dimension for his classification of these same forms."

Randall and Hunn (1984:346) also implicitly recognize the ecological dimension when they ask, "Why, in a world that encompasses desert oases, coral atolls, arctic tundras, high mountain forests, and other diverse realms, as well as an enormous range of technical and social organizations, would one expect people everywhere to categorize the more abstract features of their biological experience similarly?". Their conclusion is that ecological and social diversity are linked to the emergence of diverse folk biological categories, some universal and some restricted to specific regions.

Atran underlines the importance of the ecological dimension in folk classification. He suggests that human biological classification is affected by a culture's perception of the 'economy of nature', a term that he borrows from Darwin. Speaking of life-forms, Atran (1985:308) states,

> "It is not size alone that is important, but place in human ecology; that is, the life-form divisions seem to be made on the basis of those habits of life that determine the place of each being in the economy of nature that pertains to everyday life. The ecological importance of life-forms is attested to by the fact that modern botany retains them only in ecological contexts."

These various perspectives create a convincing argument for the development of a multidimensional model of folk biological classification. Citing his data from New Guinea, Bulmer (1974:12-13) suggests combining the morphological, utilitarian and ecological dimensions of folk classification. He concludes that a holistic perspective allows humans to recognize basic categories that reflect "discontinuities in nature ... multidimensionally, systematically relating morphological discontinuities with discontinuities in behavior, as well as in direct cultural significance." Descola (1988:118), in his empirical and symbolic analysis of the relationship of the Achuar to their natural environment, conveys a similar sentiment, "Taxonomic knowledge is as much an instrument of pure knowledge that allows people to order the [natural] world as it is a practical instrument that allows people to act effectively within it [i.e. the natural environment]."

Multidimensional models of folk classification are gaining acceptance among ethnobiologists. Turner (1988) has proposed a model which unites cultural, ecological and morphological features. The model implicitly recognizes that each dimension has its own degree of saliency for each plant or animal. That is, some living things may be strongly distinguished by their use, others by their distinctive morphology and still others by their position in the local environment. According to Turner, it is the sum of these elements that determine the cultural significance of an organism.

Because a given plant or animal blends morphological, cultural and ecological dimensions into a single stimulus, any classificatory model that considers only one of these dimensions is artificial and cannot account for the categories and structure of the entire folk classification. From a perspective that accepts human perception of biological organisms as a multidimensional phenomenon, it becomes clear why we cannot completely separate or completely unite the morphological, ecological and utilitarian features of folk biological categories. These features are co-related and this correlation can vary over the vast landscape of biological, ecological and cultural diversity that we find summarized in folk biological classification.

If we look at just one of these dimensions, the other dimensions can apparently hide from view. Since the morphological dimension can explain a great percentage of a given folk classificatory scheme, we find that we can ignore ecological and cultural dimensions and still arrive at a more-or-less satisfactory explanation of the arrangement of folk categories. When we focus on a single dimension, we find some persistent problems - variously referred to in the literature as cross-cutting classifications, overlapping categories or multiple hierarchies - which Berlin's model has not been able to accommodate.

In an analysis based on multiple dimensions, we can postulate and discover portions of the indigenous classification that can be explained to a greater or lesser degree by utilitarian, morphological or ecological features. We should not expect that all categories will be clearly differentiated or explained by only one dimension. Most often, we will discover that utility, morphology and ecology coincide in defining the categories of a particular ethnobiological classification. Although scarcely documented at present, we can imagine that some useful plants acquire increased morphological salience through human selection (Boster 1986) and become more accessible through a variety of horticultural techniques (Alcorn 1981a, 1981b; Anderson and Posey 1989; Posey 1985, 1988). In addition, it may be that morphological saliency is a determining factor in which plants are selected for use (that is, species with a characteristic or aberrant appearance may be those that people tend to experiment with and whose use persists over time). If these observations and speculations are borne out by future research, we could argue that the convergence of the morphological, utilitarian, ecological and symbolic dimensions in ethnobiological classifications is a dynamic process that is consciously or inadvertently encouraged by people.

If we take the example of the classification of vines in the Sierra Norte, we find interesting and significant patterns of correlation along all three dimensions. Vines are rather abundant in the hot and temperate humid regions (lowland evergreen and cloud forest), fairly common than in temperate dry regions (pine–oak forest) and fairly rare in the dry tropical region (tropical deciduous forest). This can be empirically verified not only by referring to floristic treatments of the Sierra but also by counting the number of categories for vine that the Mixes and Chinantecs have in these various zones. Vines are also distinctive morphologically, being given a distinct life–form designation generally in folk classifications and specifically in Mixe and Chinantec systems, in which they are referred to as ***aa'ts*** and ***huɨ̲ɨ̲***^{L}, respectively. Vines can be assigned some typical uses. They are often used as binding material in house construction, in the manufacture of baskets and for other applications that take advantage of their long, flexible and strong stems.

In general, we should expect greater variation among use, because vines also provide fruit, medicine and edible greens. There is less variation along the ecological dimension, because vines are most abundant in humid habitats but do occur in drier vegetation types. The least amount of variation is along the morphological dimension, because the life–form can be defined principally by its non–erect, vining stem habit. Thus, vine can be described by utilitarian, ecological and morphological features. The most salient of these dimensions is the morphological one, simply because it is the least variable of the three.

A life-form such as edible green (*ja*^{L} in Chinantec) however, presents us with a rather different case. It should show the greatest amount of variation along the ecological dimension, because edible greens are found in cultivated and abandoned fields throughout the ecological zones of the Sierra, lesser variation along the morphological dimension, because most but not all greens are herbaceous plants and the least variation along the utilitarian dimension, because edible greens are typically harvested, prepared and consumed in a similar way.

A multidimensional perspective on local classification of the plants is complex, because morphology, utility and ecology are themselves multidimensional phenomena. For example, the ecological dimension could be split into various aspects of succession, climate, soils and vegetation types such as those described in the first chapters of this thesis. Each of these aspects is in turn classified according to multiple criteria by local people (Martin 1993).

My own intuitive feeling for the data would suggest that the morphological dimension can explain the greatest portion of the covariation, while utility and ecology will be important in descending order. This enables us to award primary status to the morphological dimension in deciphering folk biological classification scheme. This also suggests that hierarchic representations of folk categories based on the morphological dimension will generate the most successful keys to identifying the relationship between folk categories. But we should not confuse this primary status with precedence in any sort of a evolutionary or temporal process, nor should we link the appearance of life-forms defined principally by morphological features to any scheme of cultural evolution along subsistence lines such as that proposed by Brown (1985). This would again artificially separate the morphological dimension from the ecological, utilitarian and other dimensions that are inextricably intertwined in human perception of biological organisms.

This perspective can obviate some of the controversy in the literature concerning what motivates folk classification. Interpretation along morphological lines and then subsequent re-interpretation along utilitarian lines or vice versa can both be substantiated and accommodated if we concur that folk categories can be defined along multiple dimensions.

A prime advantage of viewing ethnobiological classification simultaneously along several dimensions is that it allows us to perceive folk knowledge of the natural environment in a broad cultural context. As Morris concludes, "we should be concerned with systematically exploring the relationship between folk classifications and other aspects of cultural life. To view folk taxonomies ... abstracted from utilitarian, ecological and cultural concerns, limits our understanding of how human groups relate to the natural world" (1984:58).

Ellen echos this sentiment, following the lead of Harris (1968) and Vayda and Rappaport (1968). He argues that classifications are integrated into the general culture and that any classificatory model must explain how categories can "provide information to know how to perform in a culturally acceptable manner" (Ellen 1986:86), which was one of the early goals of ethnoscience.

Friedberg also believes that ethnoscientific research must address larger anthropological questions. Regarding the Berlin et al. proposals on folk biological taxonomy, she (1986:27) demurs,

"Rather curiously, up to the last quarter of this century, these investigations were made without concern to understanding how these classifications are integrated into the general functioning of the society and the universalists limited themselves only to establishing very vague parallels between classification and the subsistence modes purported to correspond to a more or less grand cultural 'complexity'".

However, after 1975, one sees appear some articles that are directed at proving a theory that was apparently new but was in some ways a throwback to "behavioralism": namely, that classification plays a role in the adaptation of human societies to their environment."

A definition of category-membership that follows morphological, ecological and utilitarian factors can make explicit the evolutionary advantage of human perception and classification of the natural environment (Hunn 1982:834; Posey 1984:123). A model that centers on human perception of plant morphology does not explain how classification has been involved in human evolution, adaptation to the natural environment or current management of natural resources. As Hays (1982:89) concludes, "the environment is ... a setting in which people must satisfy their physical needs, i.e. they must adapt. Folk biological classification [is] ... a way by which people systematically organize, store and retrieve environmental information which will enable them to accomplish this adaptation".

Once a multidimensional approach is accepted, a method of measuring the various dimensions must be proposed. Boster (1980) has shown how to carry out a multidimensional study for a single, complex folk generic – the Aguaruna category for manioc – but no multidimensional statistical technique has been developed to measure ecological, utilitarian and morphological dimensions across an entire system of folk classification. This is a challenge for future ethnobiological studies.

> 3) "Ethnobiological systems of classification are organized conceptually into a shallow hierarchic structure." (Berlin 1992:31).

Although there are other organizing principles at work in the folk classification of plants (Hunn and French 1984), the recognition that most systems are hierarchical has become a tenet of ethnobiological research. Two basic claims have been made for hierarchy – that it is a good way of presenting data on folk classification and that it represents the way in which people actually perceive and think about the world.

At its simplest, the principle of hierarchy means there are sets of categories that show differing degrees of inclusiveness – some categories are very broad and they include sets of categories that have an increasingly restricted range. This modest proposal is implicitly accepted by all researchers who take an empirical approach to the analysis of folk classification.

Hunn (1976:522) summarizes the skepticism that often greets contentions of the psychological reality of hierarchical cognitive models, "Though no doubt taxonomic–like forms will continue to be useful for representing observed data patterns, these forms may now be seen to represent the end product of a clearly non–taxonomic cognitive process". He asserts that not all folk categories are directly related by the taxonomic principles of class inclusion and set contrast.

Several anthropologists echo Hunn's reservation that folk biological classification is too complex to be summarized in a hierarchical model of mutually exclusive categories. Ellen (1986:86) observes, "It would appear then that taxonomies have to be extracted from a much more complex classificatory web of which they are part, and in the process even constructed in the interests of neat presentation. The evidence for the inadequacy of taxonomy has come to light partly through the so-called "special problems" which many have seen as simply the artifacts of method. Examples of these include multiple and inter-locking hierarchies, the employment of radically different principles at different levels, and extra-hierarchic relations...The evidence for conflicting arrangements, cross-cutting ties, and so on, is now so overwhelming that it cannot be ignored in any general theory".

Claims to the psychological significance of this model, given importance in the early days of cognitive anthropology, have been virtually abandoned in the current formulation. Berlin, in a footnote, asserts that the "... restatement of principles treats matters of psychological salience in a more discursive fashion, since our measures of psychological salience of ethnobiological taxa are, at best, hardly adequate." (Berlin 1992:22).

Both Chinantec and Mixe plant classification demonstrate hierarchical organization, if this is defined as a ranked series of ever more inclusive categories. These ranks are further described in the following sections.

That local people demonstrate different levels of generalization when they talk about plants gives an intuitive impression of the importance of hierarchy in folk classification. I can remember numerous conversations that follow the general pattern of ascending or descending the hierarchy, of going from general to specific or vice versa, in order to identify a plant and understand its position in the folk classification.

In the following improvised example, we see that, during the course of the conversation, botanical categories of different degrees of inclusiveness are mentioned.

> "Where did you find these fruits?"
> "They are from a **tree** that grows in cold country."
> "What kind of a **tree** is it?"
> "It's a **black cherry** [tree]?"
> "Is it the **sweet kind** or the **sour kind**?"
> "It's the **sweet one**, the kind that we eat."

When I speak of folk botanical classification being hierarchical, this is the common-sense notion that I have in mind. I imply no claims about the cognitive processes associated with this classification.

> 4) "Recognized taxa will be distributed among four to six mutually exclusive ethnobiological ranks, with taxa of each rank sharing similar degrees of internal variation and separated from each other by comparably sized perceptual gaps. The six universal ranks are the kingdom, life-form, intermediate, generic, specific and varietal. There is some evidence that foraging societies have poorly developed, or lacked entirely, taxa of specific rank. No foraging society will exhibit taxa of varietal rank." (Berlin 1992:31,33).

This statement elaborates on principle 3 and is a prelude to principle 5, in which the content and internal variation of each rank is further defined. Most ethnobiologists have accepted the six-rank, hierarchical model as a useful heuristic device for describing systems of folk biological classification. The labels (kingdom to varietal) proposed by Berlin and his colleagues are now widely used in the ethnobiological literature. The system works particularly well for peasant societies such as the Tzeltal-speaking community which first inspired the model. I have found it to be a useful framework for describing Mixe and Chinantec botanical classification, as demonstrated in chapters 6 and 7.

Other aspects of this principle have created considerable debate. In what ways are "ethnobiological ranks comparable in content to the ranks of Western zoology and botany?" In a general sense, the two sorts of ranks have some characteristics in common. They are both arranged in tiers of ever-decreasing breadth and there is often a correspondence between the content of the two - a folk generic may contain a single biological species or a life-form may correspond approximately to a group of related botanical families. For example, the Chinantec life-form ***ñii***^{L} and the Mixe life-form ***tsoots*** typically include species of *Poaceae* or *Cyperaceae*; the Chinantec generic ***ta***^{L} and the Mixe generic ***kapy*** correspond to a single species, *Arundo donax*.

In a stricter sense, folk and scientific ranks show several differences in definition and content. This principle assumes that both biological and folk ranks are based on perception of morphological similarity, but this has been called into question by numerous researchers, as discussed above. In biology, ranks are explicitly defined, but in folk systems ranks are implicit. Biologists make a conscious effort to delimit taxa and standardize nomenclature within each rank, but local people set no such conventions for folk taxa. This means that scientific systems are by definition composed of discrete units, whereas folk systems contain some taxa which are discrete and some which are overlapping.

In anthropology, there has been a tradition of borrowing concepts from the natural sciences. In some cases, a model persists among social scientists long after it has been abandoned by biologists. In Berlin's assertions about the internal variation of taxa and the gaps between them, we find such an anachronism. Biologists strive to have some degree of equality between taxa of each rank and have developed empirical approaches to deciding the extent to which one group of organisms is different from another. Even so, it is commonly acknowledged that at each rank there are taxa of dissimilar proportions. The continual process of taxonomic revision is an attempt to rectify these anomalies, but many botanists accept that some categories are more internally variable or are separated by larger gaps than others.

Do the categories at each rank of ethnobiological classification, "... share similar degrees of internal variation as well as being separated from each other by comparably sized gaps", as asserted by Berlin? We have no adequate empirical method for measuring these parameters, but even a qualitative appraisal reveals folk taxa that differ in size, that overlap or that are so unusual that they are considered to be in a class of their own, much separated from other categories.

> 5) "Across systems of ethnobiological classification, taxa of each rank show marked similarities as to their relative numbers and biological ranges." (Berlin 1992:33)

This is a statement that has stood the test of time. When a universal system was first proposed by Berlin and his colleagues in the 1970's, there was room for doubt because so few folk biological classifications had been studied. Chinantec and Mixe plant classification augment the growing body of evidence that bears out Berlin's prediction. The approximate number of categories at each rank, shown in table 8-2, fits within the upper and lower limits set by Berlin. The biological content of categories at these various ranks, detailed in chapters 6 and 7, conforms to the general case he presents.

5a) "Taxa of generic rank are the most numerous in every system, with rare exceptions number no more than five hundred classes in each kingdom, are largely monotypic (roughly 80 percent in typical systems), and, with notable exceptions are included in taxa of life-form rank." (Berlin 1992:33).

Generics are widely accepted as the most evident and abundant categories in folk biological classifications. Berlin's generalizations on number of generics, polytypy and affiliation to life-form categories have been borne out by a large number of studies in peasant societies. Do Chinantec and Mixe fit the general pattern?

Despite the inherent subjectivity involved in defining what constitutes a generic (see chapter 5), it is interesting to note that my analysis of the two folk systems of botanical classifications agrees rather well with Berlin's general estimates. I recognize 417 generics in Mixe and 388 in Chinantec. 98.8% of the Mixe generics are included in a life-form category, versus 91% of the Chinantec generics. The unaffiliated generics correspond to plants that are economically important, morphologically aberrant or that have been introduced to the communities relatively recently. At least 67% of the Mixe generics are monotypic versus 73% of the Chinantec categories. These results are compared with Berlin's estimates in table 8-6.

	Number of generics	Proportion of monotypic generics	Number of unaffiliated generics
Berlin's estimate	< 600	appox. 80%	small number
Chinantec	388	73%	35 (9%)
Mixe	417	67%	5 (1.2%)

Table 8-6. The conformity of Chinantec and Mixe botanical categories at the generic rank to Berlin's estimates for typical folk systems of botanical classification.

There is an indication of the saliency of generic categories in the results of the community survey and the identification task carried out in Totontepec. The vast majority of responses corresponded to generics, whereas a small minority were categories at the specific or life–form ranks. This suggests that taxa at the generic level are those that come first to people's mind in a free–listing and other types of structured interviews. They are also the categories that are most frequently mentioned in general conversation. These findings support the contention that generics are the most salient folk biological categories.

> 5b) "Taxa of life–form rank are few in number, probably no more than ten or fifteen, are broadly polytypic and include among them the majority of taxa of lesser rank. Substantively, life–form taxa designate a small number of morphotypes of plants and animals that share obvious gross patterns of stem habit and bodily form." (Berlin 1992:33).

When ethnobiologists refer to a small number of life–forms, they are considering primarily those that correspond to «tree», «herb», «vine» and «grass». These are the putative universal categories that Brown took into consideration when he carried out his survey of life–forms in many different languages. I postulate that they are 11 life–forms in Chinantec and 10 in Mixe. These categories are polytypic and, as discussed above, incorporate the majority of subordinate taxa. Why are there so many life–forms in Mixe and Chinantec, whereas most folk botanical classifications studied thus far are postulated to have four or fewer?

Let's begin with the four universal life–forms. Mixe has broad categories that correspond to «tree», «herb», «vine» and «grass» and that include over 86% of the Totontepec generic categories considered here. In Chinantec, we find counterparts of «tree», «grass» and «vine». Although there is no single term for «herb», we find that most herbaceous plants are included in one of three broad categories – «medicinal plants», «flowers» or «edible greens». Together, these six life-forms account for 74.5% of the Comaltepec botanical generics.

There are two other broad, polygeneric categories that correspond to flowering plants and that occur in both languages. One category includes «agave-like plants» – succulent, often spiny plants that have an erect, central flowering stalk and leaves which form a basal rosette. The other class of plants «large-leaved herbs», typically monocotyledons, have large, often succulent leaves. In addition, the Mixe have a category that corresponds to «palms», a concept that was probably introduced by the Spanish. Although not always considered life-forms, «agaves», «palms» and «large-leaved herbs» are prominent in many folk botanical classifications in Mesoamerica and perhaps in other regions of the world.

I include three additional categories which are found in most languages, but are not always included in ethnobotanical inventories – «ferns», «mosses» and «mushrooms». There is no simple, empirical test to decide whether or not these form part of the Chinantec or Mixe conception of the plant kingdom. I believe that most speakers of these languages would consider mosses and ferns as «plants» and would exclude mushrooms. I consider all three as life-forms and include them in this study, in order to make a complete inventory of organisms which grow rooted in the earth or are found as epiphytes or parasites on trees.

As I carried out the ethnobotanical inventories, surveys and identification tasks, I came across a number of other possible candidates for botanical life-forms which I have excluded in the present study. The existence of a noun classifier in

Chinantec, discussed further in the following section on nomenclature, is a clue to other broad botanical categories. There are terms for plant parts — such as «root», «seed» and «thorn» — which are used in a similar way as life-form classifiers. For example, unaffiliated generics such as corn, beans, squash and onions are included in the «seed» category. Potatoes, sweet potatoes and other edible and medicinal tubers are classified as «roots». Thorny plants, be they trees (acacias), herbs (thistles) or vining canes (raspberries) are thought to go together as «thorns». The Chinantec also have a classifier - ***oo***^{L}***nuu***^{L} - which I consider to be the equivalent of «weedy plant».

Although lacking noun classifiers, Mixe has a number of broad, functional categories which some ethnobotanists would admit as life-forms. Chinantec has similar broad functional categories. For example, the Chinantec have words for «fruit» (***'o***^{L}***huɨɨ***^{L}) and for «firewood» (***kuɨɨ***^{LH}), whereas the Mixe have terms for «edible greens» (***tsu'up***) and for «medicinal plants» (***tsoojy***). These named categories are delimited primarily by their use and they group a number of diverse folk generics. The decision to exclude these various Mixe and Chinantec categories, to consider them as cross-cutting classes, is an arbitrary one. In my analysis I have taken the middle road, describing not only the putative universal life-forms, but also some other broad, inclusive categories.

> 5c) "Taxa of intermediate rank generally group small numbers of generic taxa on the basis of their perceived affinities in overall morphology (and behavior). Intermediate taxa are included in taxa of life-form rank." (Berlin 1992:33)

Of all the types of ethnobiological categories described by Berlin, intermediates have been met with the most skepticism. Admitting their existence has opened a Pandora's box of plant classes, some of them based on ecological or utilitarian dimensions, which do not always fit nicely into his theoretical framework.

Because they are typically unnamed, intermediates have been most commonly detected through several techniques associated with cognitive anthropology, such as sorts, triads and identification tasks. It is difficult to confirm their existence or their features in open interviews with informants and it is difficult to judge if they are recognized by a large sector of the community. Much further work will be necessary before this rank can be established to the satisfaction of most ethnobiologists. As Berlin admits, we are even lacking the data necessary to establish how many intermediates are to be expected in a typical ethnobiological classification.

The identification task carried out in Totontepec revealed some groupings of plants that I tentatively recognize as intermediates. Hays (1974, 1976), who carried out a similar sorting task among the Ndumba, suggested that covert categories could be detected in the patterns of correct and incorrect answers given by informants.

In Totontepec, when I presented a specimen of *Xanthosoma robustum*, a species in the *Araceae*, only 27 informants (30.7% of the sample) identified it by its conventional name in the community ***tsookun na'ay***. The specimen was of rather poor quality, so the low level of accuracy is not surprising. Yet all answers that differed from this typical name pertained to aroids: 23 people (26.1%) replied ***pix na'ay*** (*Xanthosoma purpureum*); 24 (27.3%) ***tsaa'y aajy*** (*Philodendron* spp.); 1 (1.1%) ***ayaa'x aa'ts*** (*Monstera deliciosa*); and 13 (14.8%) said that they did not recognize the plant. I believe that these results show that the various folk generics go together in an unnamed intermediate category that corresponds to the *Araceae*.

Sorting and identification tasks emphasize the morphological aspect of plants, giving us the impression that covert categories are based on the recognition of perceptual similarities between organisms. Other intermediates are based upon utilitarian features. Berlin recognizes this himself in his analysis of 50 intermediate categories reported for Huambisa botanical classification that are distinguished by features which are morphological, utilitarian or both (Berlin 1992:154–159).

I made no systematic attempt to record intermediate classes in Totontepec and Comaltepec, but I have discovered a number of categories, named or unnamed, that group diverse folk generics. My initial impression, uncorroborated by systematic analysis, is that these groupings would best be explained by a combination of morphological, utilitarian, ecological and historical considerations.

We can take as an example the Mixe classification of *Cleome* spp. There are five folk generics which correspond to *Cleome*. Although the Mixe indicate that these are related, there is no general term which refers to the ensemble. Each generic can be distinguished by a set of morphological, ecological and utilitarian criteria, but the entire group is held together by common features such as morphological similarity, status as managed edible greens, similarity in taste and preparation and so on.

Some intermediates arise in the historical process of the expansion of generic categories as indigenous people migrate or come into contact with other cultures (Brown and Witkowski 1983). A good example is the Chinantec classification of «sour fruits». As discussed in chapter 6, the generic name *'ma*^{L} *j$\underline{i}$*^{tL} originally applied to guavas and it was extended to apply to introduced fruit trees having acidic fruit. At present, there are many «sour fruit» categories at the generic and subgeneric rank. It is reasonable to consider *'ma*^{L} *ji̲*$^{'L}$ as an intermediate category, which has as focal members different species and varieties of *Citrus* and *Psidium*. Similar cases of generic expansion are found in the Chinantec classification of «avocados» and medicinal «air herbs», as well as in the Mixe classification of «beans».

> 5d) "Specific taxa subdivide generic taxa but are fewer in absolute number. Folk varietals are rare; when they occur, they subdivide folk species. Unlike taxa of superordinate rank, a major portion of subgeneric taxa in ethnobotanical systems of classification is recognized primarily as a result of cultural considerations, in that such taxa represent domesticated or otherwise economically important species." (Berlin 1992:34)

Berlin suggests several rules-of-thumb concerning the division of generic categories. Most generics are monotypic, usually equivalent to 80% of the total. And when they are subdivided, the resulting contrasts sets usually contain two to three members (ibid:122–133).

Do we find in Chinantec and Mixe botanical classification the characteristic distribution pattern of folk specifics described by Berlin?

Both specifics and varietals exist in the plant classifications of Comaltepec and Totontepec and they partition generics into two or more categories. As can be seen in table 8–7 and 8–8, these subgeneric taxa are fewer in number than generics in both Mixe and Chinantec botanical classification.

Table 8–9 is a summary of the Chinantec data, broken down by life-form category. We can see that the majority of generics are monotypic (284; 73% of the total), followed in frequency by generics having two members (61; 16%) and three members (21; 5.4%).

The Mixe data, presented in table 8–10, paint much the same picture: 280

generics (67.2% of the total) are monotypic, 85 (20.4%) contain two specifics and 32 (7.7%) are divided into three specifics. Thus, 366 Chinantec generics (94.3% of the total) and 397 Mixe generics (95.2%) have less than three members, ranges that are very much in agreement with Berlin's predictions.

Life-form	Number of generics	Number of specifics	Number of varietals
Tree	157	190	0
Herb	125	124	0
Vine	53	33	4
Grass	24	3	0
Agave	7	2	0
Large-leaf	10	4	0
Palm	7	4	0
Unaffiliated	5	25	16
Fern	12	0	0
Moss	3	0	0
Mushroom	14	9	0
Total	417	394	20

Table 8-7. The number of subordinate categories in Mixe life-forms.

Life-form	Number of generics	Number of specifics	Number of varietals
Tree	136	131	4
Medicinal herb	60	31	0
Flower	30	22	0
Edible green	22	21	0
Vine	27	26	0
Grass	15	10	0
Large-leaf	22	21	0
Agave	11	2	0
Unaffiliated	35	29	2
Fern	14	0	0
Moss	2	0	0
Mushroom	14	14	0
Total	388	307	6

Table 8-8. The number of subordinate categories in Chinantec life-forms.

As with categories at other ranks, the number of sub-specific taxa recognized varies from informant to informant. Some specifics - such as the red and white forms of the castor bean or the numerous types of corn and beans - were widely recognized in the community. Others are known only by specialists. For example, Roberto Hernández López, a knowledgeable curer in Comaltepec, recognizes at least three varieties of «susto herb», whereas the general populace considers it a monotypic category. José Rivera Reyes, who has a detailed knowledge of forest trees, recognizes numerous specific «tree» categories that are unknown to most Mixe speakers. In general, my characterization of subgeneric categories reflects the knowledge of specialists or very knowledgeable local collaborators, which might explain the relatively high degree of polytypy in the two classification systems.

		Number of specifics per polytypic generic											
Life-form	0	2	3	4	5	6	7	8	9	10	11	12	Sum
Tree	100	17	8	2	3	3	0	0	1	0	1	1	36
Medicinal herb	47	9	3	1	0	0	0	0	0	0	0	0	13
Flower	22	5	1	1	1	0	0	0	0	0	0	0	8
Edible green	15	3	2	1	1	0	0	0	0	0	0	0	7
Vine	18	3	4	2	0	0	0	0	0	0	0	0	9
Grass	11	3	0	1	0	0	0	0	0	0	0	0	4
Large-leaf herb	13	8	0	0	1	0	0	0	0	0	0	0	9
Agave	10	1	0	0	0	0	0	0	0	0	0	0	1
Unaffiliated	24	7	3	0	0	1	0	0	0	0	0	0	11
Fern	14	0	0	0	0	0	0	0	0	0	0	0	0
Moss	2	0	0	0	0	0	0	0	0	0	0	0	0
Mushroom	8	5	0	1	0	0	0	0	0	0	0	0	6
Sum	284	61	21	9	6	4	0	0	1	0	1	1	104

Table 8-9. The distribution of monotypic and polytypic generics in the various Chinantec life-forms.

Berlin (1992:122-133) has asserted that both scientific and folk systems of biological classification show similar patterns of polytypy. He cites the conclusions of Willis (1940), who observed that the majority of categories recognized by biological systematists are monotypic, most polytypics have just 2 or 3 members and the number of categories with higher levels of polytypy falls rapidly. When plotted, these figures give a characteristic long-tailed curve. As shown in figure 8-1, this general pattern is found in both Chinantec and Mixe botanical classification.

Berlin, following an hypothesis first formulated by Brown (1985), suggests that mode of production is associated with the tendency to subdivide generic categories. The few studies made among hunter–gatherers show that they tend not to have sub–generic categories. In contrast, peasant societies are splitters – they have a great number of specifics. Chinantec and Mixe have been living as peasants for a long time and, perhaps not coincidentally, fit the general case proposed by Berlin.

Attempts to explain this difference in classification between the two types of societies has not been particularly successful. Berlin suggests that the hunter–gatherer societies studied thus far have been in advanced stages of acculturation and have perhaps lost their knowledge of the finer points of folk classification. Further studies among isolated nomadic groups will be needed if we are to test this idea.

		Number of specifics per polytypic generic											
Life–form	0	2	3	4	5	6	7	8	9	10	11	12	Sum
Tree	79	56	17	3	0	1	0	0	1	0	0	0	78
Herb	90	17	8	2	1	3	1	0	2	1	0	0	35
Vine	41	6	4	1	1	0	0	0	0	0	0	0	12
Grass	23	0	1	0	0	0	0	0	0	0	0	0	1
Agave	6	1	0	0	0	0	0	0	0	0	0	0	1
Large–leaf herb	8	2	0	0	0	0	0	0	0	0	0	0	2
Palm	6	0	0	1	0	0	0	0	0	0	0	0	1
Unaffiliated	2	0	1	0	0	0	0	0	0	1	0	1	3
Fern	12	0	0	0	0	0	0	0	0	0	0	0	0
Moss	3	0	0	0	0	0	0	0	0	0	0	0	0
Mushroom	10	3	1	0	0	0	0	0	0	0	0	0	4
Sum	280	85	32	7	2	4	1	0	3	2	0	1	137

Table 8–10. The distribution of monotypic and polytypic generics in the various Mixe life–forms.

Other researchers have suggested that subgeneric classification is promoted by a settled lifestyle and agricultural practices. One argument could be that peasants come into sustained contact with the same plants much more than hunter–gatherers who are constantly on the move. Subgeneric classification is certainly affected by the number of opportunities that people have to observe plants.

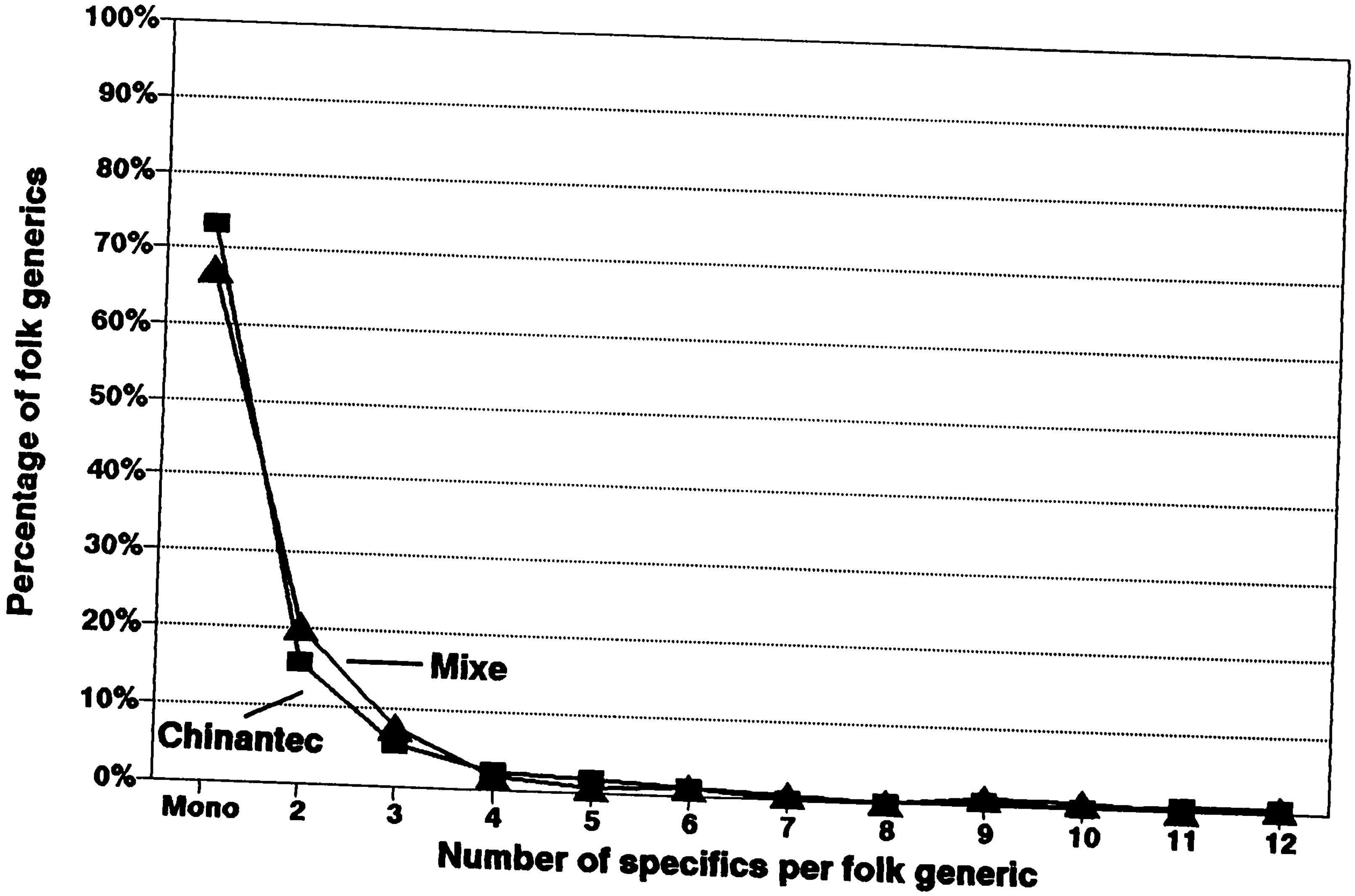


Figure 8–1. Frequency distribution of specifics in Chinantec and Mixe generic taxa in terms of numbers of specifics included in sets with 1 (monotypic) to 12 members.

An additional explanation is that peasants create a great number of plant varieties through horticultural manipulation and these are recognized in the local language. A related claim is that peasants must pay a great deal of attention to plants to ensure a sustainable subsistence production throughout the year and this close observation leads to the recognition of differences between organisms grouped in the same generic.

Interpretations such as these are *ad hoc* – they have been neither analyzed carefully nor corroborated by systematic cross-cultural studies. Counter-arguments abound. While it is true that hunter-gatherers travel about, they do so within a restricted area. They repeatedly come into contact with populations of the same species of plants and they often deliberately search out stands of useful species that they have harvested on previous treks. Posey and Balée (1989) as well as other ethnobiologists have demonstrated that nomadic groups manage plant populations and may select certain populations for intensive use, eventually leading to the morphological differentiation of some varieties. Hunter-gatherers closely observe the different plants that they find around them and can indicate which populations are the best for medicine, yield the greatest number of fruits and have other characteristics that affect human subsistence activities.

I believe that Berlin is taking the right approach by proposing that a major proportion of folk specifics pertain to domesticated plants and animals. Within each folk biological classification, we must compare the set of monotypic and polytypic generics and try to understand what criteria can be used to separate one from the other.

A good way to start is by assessing how polytypy is distributed by life-form. I mentioned above that certain life-forms, such as «tree», have large numbers of specifics when compared to other life-forms. Is there a systematic pattern in how polytypic generics are spread among life-forms? Referring to tables 8-11 and 8-12 we can see that most major life-forms have roughly similar levels of polytypy. Mixe «tree» is anomalous, but the level of polytypy may be inflated by José Rivera's detailed knowledge of forest trees. Ferns and mosses are not differentiated into specifics classes in either Mixe or Chinantec. Before reaching a definitive conclusion, more systematic work will have to be done on measuring how widely specifics are recognized by the general population in Totontepec and Comaltepec. The preliminary data indicate that polytypy is randomly associated with life-form affiliation.

Life-form	% polytypic
Tree	26.5
Medicinal herb	21.7
Flower	26.6
Edible green	31.8
Vine	33.3
Grass	26.6
Agave	9.1
Large-leaf herb	40.9
Unaffiliated	31.4
Fern	0.0
Moss	0.0
Mushroom	42.9

Table 8-11. The percentage of polytypic generics in the various life-forms of Chinantec botanical classification.

Life-form	% polytypic
Tree	49.7
Herb	28.0
Vine	22.6
Grass	4.2
Agave	14.3
Large-leaf herb	20.0
Palm	14.3
Unaffiliated	60.0
Fern	0.0
Moss	0.0
Mushroom	28.6

Table 8-12. The percentage of polytypic generics in the various life-forms of Mixe botanical classification.

Is polytypy correlated with horticultural manipulation of plants, as suggested by Berlin? In the Chinantec and Mixe botanical classification, the highest levels of polytypy are found in generics that correspond to domesticated plants - beans, chilies, corn, squash, peaches and so on. Yet we also find polytypy among plants that correspond to wild plants and those that are managed or cultivated, but not domesticated. Perhaps the most logical explanation for polytypy is that is reflects the variability in morphology, use and ecological distribution of the plants within a given generic. Generics which correspond to species showing relative uniformity along these dimensions would tend to be monotypic whereas generics that are variable along one or more dimensions would likely be polytypic.

> 5e) "The taxon marking the rank of kingdom in ethnobotanical as well as ethnozoological systems of classification is comprised of a single member." (Ibid:34).

Do indigenous people have a concept that corresponds to our notion of the plant kingdom? This is the most difficult empirical question that faces us when analyzing an ethnobiological categories.

As I explain in the section on nomenclature, there is no Chinantec or Mixe label that is equivalent to our plant or plant kingdom. Yet there are indirect lines of linguistic evidence that an unnamed category of «plant kingdom» exists, such as the existence of Mixe verbs that are used only to describe action taken on plants and noun classifiers in Chinantec that are applied almost exclusively to botanical categories.

In the course of my research, I had many indications that the Mixe, Chinantec and I agree on what constitutes a plant. With general instructions (in Spanish and repeated in their own language) to collect all the plants they knew, the Mixe and Chinantec collectors made more than 5000 collections, all corresponding to vascular plants. The collectors even had to be encouraged to collect mushrooms, which they considered to fall outside of the limits of the plant class. In the Totontepec botanical survey, 150 informants gave a total of 3750 names of «plants». In this list I found only one non-plant – an informant had answered «pig's foot», apparently because she had gotten carried away in listing edible plants and named one food derived from an animal. The Mixe coordinator and interviewees characterized this as a mistake.

Although some ethnobotanists will continue to argue against recognizing unnamed categories (be they unique beginners or intermediates), most colleagues will accept these types of indirect evidence of their existence.

> 6) "Ethnobotanical taxa of generic and specific rank exhibit an internal structure in which some members are thought of as prototypical of the taxon while others are seen as less typical of the category." (Berlin 1992:34).

I found that prototypicality was a common element of folk botanical classification among Chinantec and Mixe speakers and, as suggested by Berlin (ibid:24), is related to a number of factors, including "taxonomic distinctiveness ..., frequency of occurrence and cultural importance". For many generic and subgeneric categories, informants are able to indicate which is the «true», the «real» or the «most typical» member. For example, ***lí***$^{'H}$ ***'lɨɨ***^{LH} «dead flower» – the Chinantec category of ornamental flowers used for All Saint's Day (and in general as adornment in the cemetery) – has two focal members. In the humid zone the most typical species is *Odontonema cuspidatum* whereas in the dry zone it is *Salvia purpurea*. Both species are locally abundant and have very showy flowers. This generic category has a broad extended range, including other species of *Acanthaceae* and *Lamiaceae* (such as *Hyptis mutabilis*, *Salvia inconspicua* and *Salvia sapinea*) that have showy flowers. These less typical species are often referred to as ***lí***$^{'H}$ ***'lɨɨ***^{LH} ***mó***$^{'L}$ «montane dead flower» or ***lí***$^{'H}$ ***'lɨɨ***^{LH} ***nuu***^{L} «wild dead flower».

Prototypicality can be directly elicited by asking informants to indicate which is the best example of a category. Indirect evidence can be obtained from sorting or identification tasks. For example, Mixe speakers concur that *Chamaedorea tepejilote* is the most typical member of a Mixe generic that includes several species of *Chamaedorea*. *C. tepejilote*, semi-cultivated in lowland ranches, bears large inflorescences which are eaten when still immature. The other, wild species yield edible inflorescences which are smaller than those of *C. tepejilote*. On the basis of the identification task carried out in Totontepec, I postulate that there is an intermediate category that groups the edible species of *Chamaedorea* with other species of *Chamaedorea* and similar palm-like plants, used for ornament or basketry, which are assigned to distinct generics. When presented with a specimen of *C. affinis*, an ornamental species, the most common name given was ***noojn***, the generic term which refers to *C. tepejilote*. Fewer respondents identified the plant as a non-cultivated, edible specific type of ***noojn***, as ***tsik_tsajx*** (a cycad used for ornament), as ***kach aa'ts*** (a palm used for basket-making), or by its conventional name ***kupivejtun***. I believe that these results indicate that *C. tepejilote* is the focal species not only of the folk generic ***noojn***, but also of the unnamed intermediate category that refers to Chamaedor-like plants.

Can the Chinantec and Mixe point out the «most typical» member of life-form categories? This is certainly the case for minor life-forms such as «fern» and «large-leaf herbs». The Chinantec suggest that the widespread weedy fern *Pteridium aquilinum* is the most representative of the pteridophytes and the Mixe consider the genus *Canna* to be prototypical member of the «large-leaf» life-form. I could detect no single generic which could be considered as prototypical for major life-forms such as «tree» and «vine».

> 7) "A substantial majority of ethnobiological taxa will correspond closely in content with taxa recognized independently by Western botany and zoology, with the highest degree of correspondence occurring with taxa of generic rank. Taxa of intermediate rank often correspond to portions of recognized biological families. Taxa of life-form and subgeneric rank exhibit the lowest correspondence with recognized biological taxa." (Berlin 1992:34)

As described in chapter 4, the simplest way is to express the content of folk categories is to show how they correspond to scientific categories – how folk categories map onto scientific taxa. Generics, the most salient folk category, often show a one-to-one correspondence with scientific species. For example, the Mixe generic for dogwood corresponds to *Cornus disciflora*, the only species of this genus that grows in Totontepec. Species of great cultural significance are overdifferentiated – they are divided into many distinct categories by indigenous peasants. The avocado, *Persea americana*, is partitioned into two generics and several specifics by the Mixe. ***kooydum*** pertains to large-fruited avocados similar to the ones sold in supermarkets, whereas ***xijts*** corresponds to trees with small, thin-skinned fruits that have an anise-like taste and smell. Species that are less important or less distinctive in appearance are usually underdifferentiated – they are lumped into polythetic folk taxa. Several species of *Inga*, all used for firewood and known to have an edible pulp inside the fruit pod, are included in the Mixe generic ***ii'k***. Two species of *Inga* with particularly large fruits containing edible pulp are placed in the folk generic ***ta'chki*** (figure 8-2).

When speaking of correspondence, it is essential to define which folk and

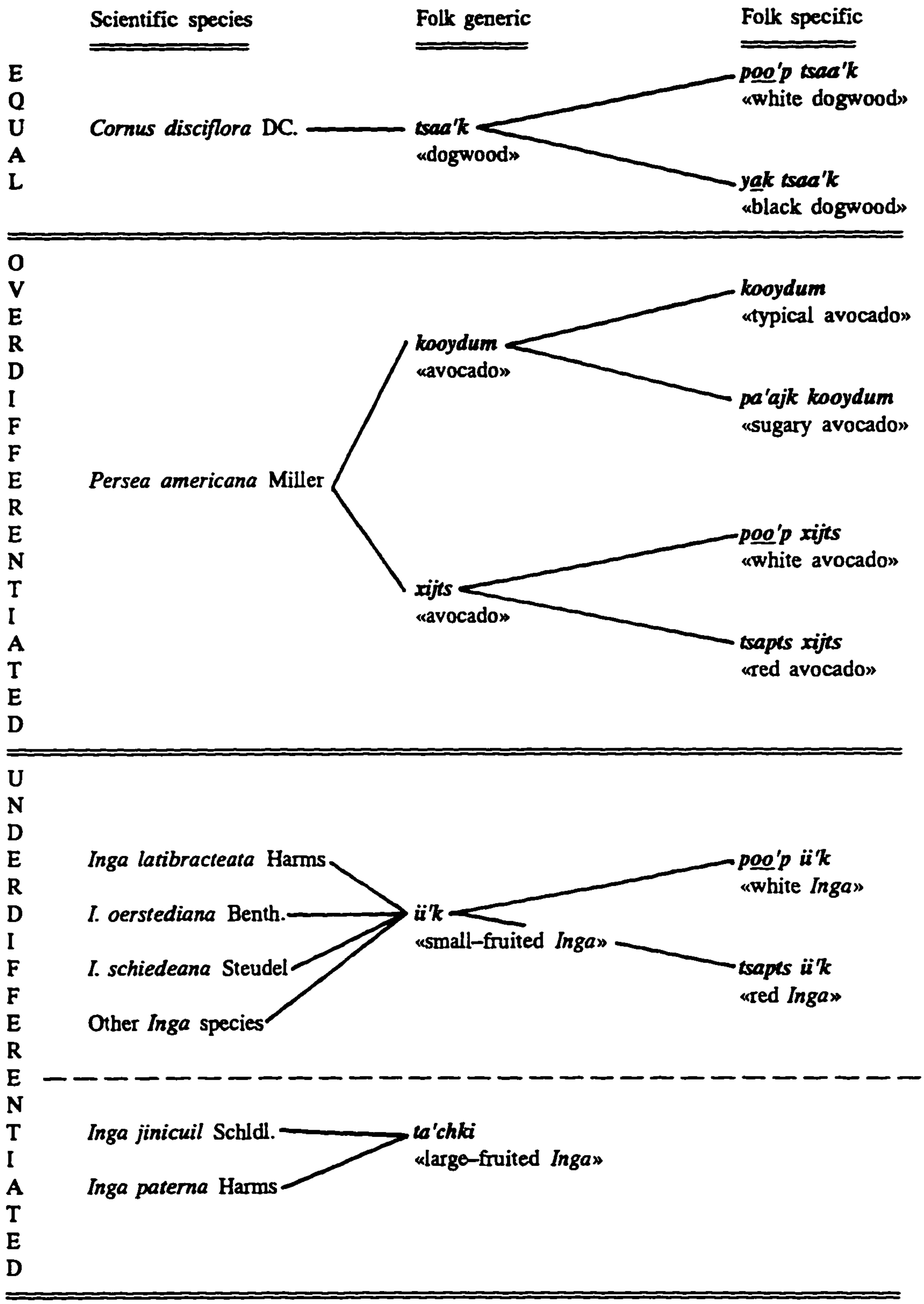


Figure 8.2. Mixe examples of the mapping of scientific species to folk generics and specifics, showing cases of one-to-one (equal) correspondence, overdifferentiation and underdifferentiation at the generic rank.

scientific categories are being compared. Although most comparisons are between folk generics and botanical species, it is possible to compare any folk rank with a scientific rank. As shown in figure 8-2, we can say that the Mixe overdifferentiate *Inga* at the level of folk generics - they divide it into two distinct classes. And while *Cornus* has a one-to-one relationship with the Mixe generic ***tsaa'k***, it is overdifferentiated by the Mixe at the specific rank, because it is partitioned into two classes.

Part 2. Nomenclature

For Berlin, "principles of ethnobiological nomenclature focus on those patterns that underlie the naming of plants and animals in systems of ethnobiological classification" (Berlin 1992:26). He states that in each folk classification, there is a system of naming "that reveals much about the way people conceptualize the living things in their environment" (ibid:26). I have found Chinantec and Mixe botanical nomenclature to be a rich source of information on how plants are perceived and used as well as a guide to how these indigenous peoples classify the botanical world. The following discussion, structured as a critique and illustration of Berlin's 5 nomenclatural principles, serves to elucidate the patterns of plant naming in Comaltepec and Totontepec. Many examples, additional to those given below, may be found in the etymological analyses that accompany the description of the botanical generics presented in chapters 6 and 7.

An issue that Berlin does not address in his principles, but which has great importance in folk classification in Mesoamerica and other regions, is the influence that cultural contact and hegemony have on the naming and content of indigenous biological categories (Brown and Witkowski 1983; Crosby 1986; Thomason and Kaufman 1988). If we take a simple list of folk botanical categories from Mexico and the scientific species to which they correspond, we will typically find local names borrowed from Spanish (or indigenous languages) and exotic plants introduced from many part of the world. Although these cultural loans do not change the underlying patterns in the way that folk categories are formed or named, it is useful to distinguish indigenous plants and names from those that have been adopted from elsewhere. We find, among other things, that introduced plants are often marked by a foreign word or by a modifier which means «foreign» or «Spanish».

In this thesis, I make a distinction between Spanish-based and indigenous names. I use the term Spanish-based because the original loan word is often altered in the process of linguistic borrowing (e.g. Spanish *granada* «pomegranate» becomes ***granaa***^{L} in Chinantec). I employ a strict definition in characterizing borrowed names — if any part of the name contains a Spanish-derived morpheme, I consider it to be Spanish-based, such as Chinantec ***'ma***^{L} ***granaa***^{L} «pomegranate tree» and ***'ma***^{L} ***too***^{L} ***hiing***^{H} «India banana tree», or Mixe ***sabiin kup*** «*sabino* [Mexican cypress] tree». Mixe shows a much higher incidence of borrowed plant terms that does Chinantec. Mixe names at the rank of generic, subgeneric and even life-form show borrowing, whereas most Spanish-based names in Chinantec botanical nomenclature are found at the subgeneric ranks.

General principles of ethnobiological nomenclature

> 1) "Taxa at the ranks of kingdom and intermediate are generally not named. When such taxa are labeled, they often show polysemous relations with taxa of subordinate rank" (Ibid:34).

In most cultures, we find names that mean «plants in general». Often the term translates as «weeds» or «weedy vegetation». In other cases, it is a compound term composed of two life-forms. Although the unitary taxon at the rank of plant kingdom is typically unnamed in folk biological classifications, we have to ascertain whether or not the label for «plants in general» is a gloss for «the plant world».

The Mixe use the expression ***ojts aajy*** to refer to plants in general. This is a compound term composed of the labels for the «herb» and the «large-leaf» life-forms. According to several Mixe informants in Totontepec, ***ojts aajy*** excludes unaffiliated generics such as «corn», «sugar cane» and «reeds». We partially confirmed this perspective during the useful plants survey in Totontepec. Respondents were asked to name 25 types of ***ojts aajy*** that came to mind. Although «corn» and other unaffiliated generics are highly salient, they were not mentioned very frequently. According to Juan Arelí Bernal Alcantara, the Mixe agronomist who supervised the interview, this is because people tended not to mention plants which fell outside of their conception of ***ojts aajy***. The way we phrased the question encouraged responses that correspond primarily to generics affiliated to life-forms. Indirectly, it confirmed that «herb large-leaf» is not a true label for «plant kingdom» in Mixe, but only refers to selected generics which are affiliated to life-forms.

The Chinantec use the term ***'oo^{L} nuu^{L}*** to refer to plants in general and a superficial translation may make it appear as a suitable label for «plant kingdom» The name literally means «wild medicinal-herb» but is interpreted variously as «plant which have no use», «pathside vegetation» or «plants in general». I consider it the equivalent of weedy plants and do not believe it is a Chinantec label for «plant kingdom». If we simply ask how to say plants, we will be told *'oo^L nuu^L*. Yet if we pose the question, "Is the black cherry (or any other useful plant) a type of *'oo^L nuu^L*?", the answer is no.

Of the possible intermediate categories in the Chinantec and Mixe botanical classifications, the majority appear to be unnamed, but those I assume have arisen from a historical process which extended the range of a generic are labeled with primary names.

I can only speculate on the existence of unnamed life-forms in Mixe and Chinantec. The best candidate would be the category that pertains to palms. In Chinantec, the palms are divided among the major life-forms «tree», «vine» and «large-leaf». Although informants understand the concept of *palma* in Spanish and can name prototypical generics by their Chinantec name, there does not appear to be any equivalent intermediate or life-form category that includes all palms in the Chinantec spoken in Comaltepec.

The Mixe borrowed the Spanish name for their «palm» life-form, but did they borrow the concept, too? I could find no evidence of an equivalent indigenous term in Totontepec Mixe and to my knowledge no such term has been reconstructed for protoMixe or protoMixe-Zoque. It may be that an unnamed «palm» life-form existed even in the prehispanic era and the Spanish term was adopted subsequently. There is no empirical way to test this hypothesis, but it would be informative to look at how palms are classified in other dialects of Mixe and Zoque.

> 2) "Names for plants and animals exhibit a lexical structure of one of two universal lexical types that can be called primary and secondary plant and animal names. These types can be recognized by recourse to linguistic,

semantic and taxonomic criteria. Primary names are of three subtypes: simple (e.g. *fish*), productive (e.g., *catfish*) and unproductive (e.g., *silversfish*). Secondary names (e.g., *red maple, silver maple*), with generally specifiable exceptions, occur only in contrast sets whose members share a constituent that refers to the taxon that immediately includes them (e.g., *maple*)." (Berlin 1992:34).

Despite some ambiguities and anticipated exceptions to the rule, botanical names from Totontepec and Comaltepec can be characterized as primary and secondary names. Chinantec and Mixe botanical nomenclature fits into Berlin's general framework, but each language adds its own flavor to the process of naming plants.

In practice, primary names can be distinguished from secondary names in a variety of ways. As noted in chapter 4, some primary names can be recognized because they are composed of a single constituent. But it is can be more difficult to tell apart compound primary and secondary names. Although there is no *a priori* linguistic distinction between these types of names, the distinction often becomes apparent when we hear how the names are used in everyday speech and as we ask about folk categories in diverse social contexts.

An example from Totontepec will show how this is done in practice. In Mixe, there are many plants that begin with the prefix ***yuk***, which means «wild». Some of these are primary names and some are secondary. For example, there is a tree (*Billia hippocastanum*) in Totontepec called ***yukxats*** «wild–soap», a primary name, and there is another tree (*Weinmannia pinnata*) which is sometimes referred to as ***yuktso'ojn*** «wild–*Weinmannia*», a secondary name. In the first case ***yuk*** is an integral part of the name, whereas in the second it is an optional modifier. We can hear a difference in the ways these names are used – sometimes people will say ***tsapts yukxats*** «red wild–soap» or they will call the ***Weinmannia*** simply ***tso'ojn***. But we will never find the «wild–soap tree» referred to as simply ***xats*** «soap», nor will we hear an additional modifier added on to ***yuktso'ojn***. This allows us to confirm their status as primary and secondary names.

Occasionally, we can hear unusual–sounding names in which the prefix is repeated, such as ***yukyukxaa'k*** «wild–wild–*Satureja*». ***yukxaa'k*** is a primary name that labels a shrub (*Satureja macrostemma*) in the mint family, whereas ***yukyukxaa'k*** is a secondary name that refers to its wild counterparts (species of Asteraceae and perhaps a *Fuchsia*). This prefix–doubling can be seen in other Mixe names, as well. *Brugmansia* shrubs, introduced into Mexico from Peru centuries ago, are called ***poo'p xuu'k*** «white aroma», a generic which include two named specifics, ***poo'p poo'p xuu'k*** «white white aroma» and ***tsapts poo'p xuu'k*** «red white aroma». The use of these modified forms of the name helps us to conclude that ***poo'p xuu'k*** is a primary rather than a secondary name.

> 3) "A specifiable relationship can be observed between the names of taxa and their rank. Life–form and generic taxa are labeled by primary names; subgeneric taxa are labeled, in general, with secondary names." (Berlin 1992:34)

I found that the Mixe and Chinantec generic names could be characterized as one of the three types of primary names described by Berlin, through a process which requires systematic linguistic analysis of the entire lexicon of plant names in each language. *Pouteria sapota*, the mammee zapote, is called ***kup_ka'ajk*** «tree–zapote» by the Mixe. Which type of primary name is it? Certainly not a simple one, because it is analyzable and divisible into two units ***kup*** «tree» and ***ka'ajk*** «zapote». Although it may appear to be a productive primary name, it is not – the «tree» term ***kup***, when used as a prefix, is an adjective meaning «borne on a tree», as numerous other examples make clear (e.g. ***kup_puj*** «tree-flower» refers to several species epiphytic orchids and *Ericaceae*). Through this process of elimination and analysis, I have decided that ***kup_ka'ajk*** is an unproductive primary name. The mammee zapote is the prototypical member of the ***ka'ajk*** class and it is unusual that a highly salient, native plant should be labeled by an unproductive primary name rather than a simple name. Again, an historical process of range extension is at play – at present that the primary simple name ***ka'ajk*** refers to an intermediate category which includes various types of zapote-like fruit.

In most indigenous languages, we find numerous examples of each type of primary name. In table 8-13, I give examples, taken from Mixe botanical nomenclature, of all three types. Chinantec and other Otomanguean languages have a great majority of productive primary names, almost to the exclusion of simple and unproductive primary names. This is because most plant and animal names begin with an obligatory noun classier, further discussed below, which

	Type of primary name		
Life-form	Simple	Productive	Unproductive
kup «tree»	***xijts*** «avocado»	***alivia kup*** «relief tree»	***iitsum tsi'ik*** «peccary musk»
ojts «herb»	***ko'on*** «tomato»	***jan ojts*** «fever herb»	***kaaj aaxk*** «animal tick»
aa'ts «vine»	***ejkx*** «chayote»	***aya'ax aa'ts*** «cry-baby vine»	***eex taats*** «crab teeth»
tsoots «grass»	***veek*** «spikerush»	***tsookun tsoots*** «rain-cover grass»	***pa'a peetun*** «pathside broom»

Table 8-13. Examples of the three types of primary names taken from four Mixe botanical life-forms.

indicates the life-form to which the category belongs.

Mixe follows the relationship that Berlin posits between the names of taxa and their rank. In general, life-forms are labeled by primary simple names, as are the named intermediates that I propose. Generic names correspond variously to all three types of primary names and specifics and varietals are labeled by secondary names. Some exceptions are noted below.

Totontepec Mixe life-forms are always labeled by simple primary names. These are all names that can be traced to protoMixe-Zoque forms, or at least to protoMixe forms. Most, like ***ku̲p*** «tree», are proper nouns (i.e. names that are not derived from another word or form of speech). Others are verbal nouns (i.e. names derived from the extension or modification of a verb). For instance, ***pu̲j*** «flower» is derived from a term cognate with the protoMixe-Zoque verb ****pe̲h***, which means 'to bloom, burst or get fat' (Kaufman 1963:142). Life-forms names may be polysemous. ***ku̲p***, for instance, means «wood, pole and tree».

In Chinantec, all life-forms are designated by simple primary names, whereas all intermediate categories and affiliated generics are labeled by productive complex primary names. The names of unaffiliated generics are either simple primary or unproductive primary names.

In table 8-14, I show how the various types of primary names are divided among Mixe life-forms (and unaffiliated generics) for names that are entirely Mixe. I give the same data for Spanish-based Mixe names in table 8-15. Although the names types are widely distributed throughout the life-forms, several trends are apparent: 1) Spanish-based names tend to label categories in the «tree», «herb», «vine» and «grass» life-forms, accounting for 97.3% of all Spanish-based names; 2) the «tree» life-form contains a high percentage (57.9%) of Mixe simple primary names, whereas «tree» generics account for only 37.7% of the Mixe botanical classification; 3) generics affiliated to small life-forms such as «agave», «large-leaf», «fern», «moss» and «mushroom» are often labeled by Mixe productive complex primary names («palm» is an exception, probably because it was formerly an unnamed covert category, that is, there was no

	Simple		Complex, type 1		Complex, type 2	
Life-form	Number	%	Number	%	Number	%
Tree	55	35.0	19	12.1	56	35.7
Herb	13	10.4	32	25.6	48	38.4
Vine	7	13.2	8	15.1	29	54.7
Grass	8	33.3	6	25.0	7	28.0
Agave	0	0.0	6	85.7	1	14.3
Large-leaf	1	10.0	8	80.0	0	0.0
Palm	3	42.9	0	0.0	4	57.0
Unaffiliated	5	100.0	0	0.0	0	0.0
Fern	0	0.0	9	75.0	3	25.0
Moss	0	0.0	3	100.0	0	0.0
Mushroom	3	23.1	4	30.8	5	38.5
Total	95	22.8	95	22.8	153	36.7

Table 8-14. The number and percentage of generics labeled by Mixe primary names within each life-form of Mixe botanical classification.

	Simple		Complex, type 1		Complex, type 2	
Life-form	Number	%	Number	%	Number	%
Tree	15	9.6	11	7.0	2	1.3
Herb	18	14.4	6	4.8	8	6.4
Vine	5	9.4	3	2.4	1	1.9
Grass	1	4.2	1	4.2	1	4.2
Agave	0	0.0	0	0.0	0	0.0
Large-leaf	0	0.0	0	0.0	1	10.0
Palm	0	0.0	0	0.0	0	0.0
Unaffiliated	0	0.0	0	0.0	0	0.0
Fern	0	0.0	0	0.0	0	0.0
Moss	0	0.0	0	0.0	0	0.0
Mushroom	0	0.0	1	7.1	0	0.0
Total	39	9.3	22	5.3	13	3.1

Table 8-15. The number and percentage of generics labeled by Spanish-derived primary names within each life-form of Mixe botanical classification.

life-form term with which to construct a productive primary name); and 4) unaffiliated generics, which are highly salient, are labeled by Mixe simple primary names.

Similar tables for Comaltepec plant names would confirm the overwhelming predominance of productive complex primary names in Chinantec botanical nomenclature and show that very few Spanish-based names are employed in the labeling of generic categories. This demonstrates the differences between Chinantec and Mixe botanical naming, patterns that I believe will be confirmed for the Otomanguean family and the Mixe-Zoque family in general as more ethnobotanical inventories are carried out for these languages.

> 4) "There are two well-understood conditions under which subgeneric taxa may be labeled by primary names, although these two conditions do not account for all of the empirically observed data. The first condition (4a) occurs when the name of the prototypical subgeneric is polysemous with its superordinate generic. Disambiguation of polysemy is accomplished by the optional occurrence of modifier glossed as 'genuine' or 'ideal type'. The second condition (4b) occurs when nonprototypical subgenerics refer to subgeneric taxa of great cultural importance". (Ibid:34)

As Berlin implies, it is at first hard to distinguish between secondary names and complex primary names. These difficulties, and how to resolve some of them, can be observed in the Mixe classification of beans and the Chinantec classification of avocados.

Not surprisingly, the folk classification of beans in many Mesoamerican languages is complicated. There are many types of beans, some native and some exotic, some edible and some poisonous. They variously grow on bushes, vines and herbaceous plants. In the case of the Mixe of Totontepec, I consider that the general

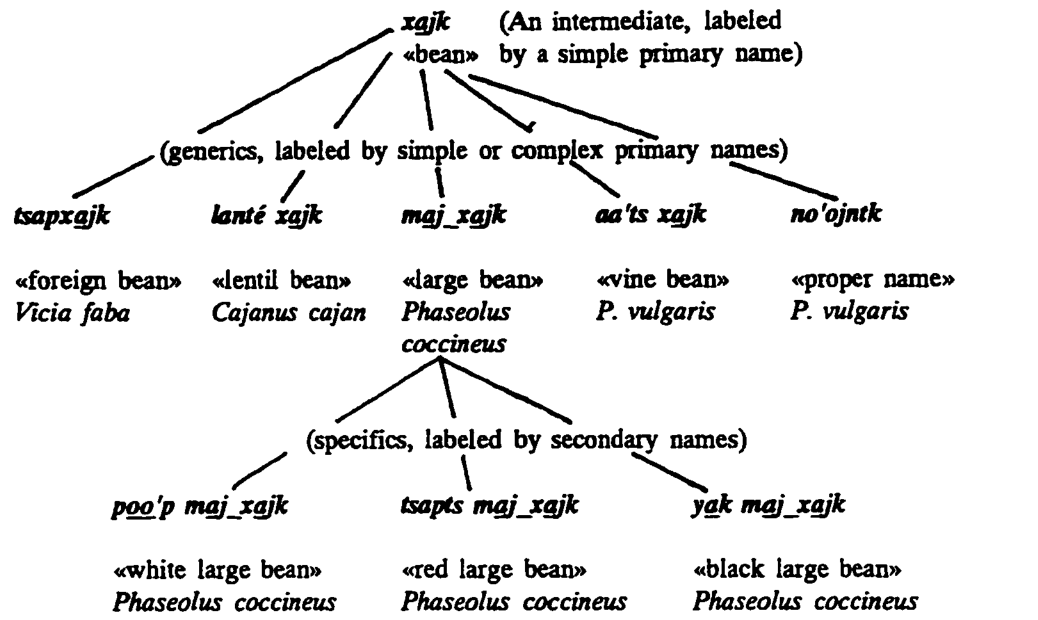


Figure 8-3. A portion of the Mixe classification of beans, showing taxa labeled by primary names at generic and intermediate ranks and by secondary names at the specific rank.

name ***xajk*** «bean», which is applied to many species of the Fabaceae, corresponds to an intermediate category that cross-cuts several life-forms. Among the various «bean» generics, there are ones that refer to native beans such as *Phaseolus coccineus* and *P. vulgaris* and exotic beans such as *Vicia faba* and *Cajanus cajan*, as shown in figure 8-3. Some of the generics that includes species of *Phaseolus* are partitioned into numerous folk specifics, such as those which pertain to *P. coccineus*, as shown in the diagram.

Note that most taxa at the generic rank and all taxa at the specific rank have names containing a modifier that tells something about the origin, size, habit, color or other characteristic of the plant. But it is only the specific categories which are labeled by secondary names which: 1) obligatorily include the superordinate category (e.g. ***maj_xajk***); and 2) form a contrast set with the names of other members of the category. Many of the names of generic categories contain ***xajk***, but this is not obligatory in names such as ***no'ojntk***.

In some generics, which have been extended to include newly discovered and exotic species, the difference between primary and secondary names is arbitrary and decided on taxonomic rather than linguistic criteria. This is the case for the Chinantec category ***'ma***^{L} ***gwɨɨ***^{LH}, which corresponds to a diverse range of tree species. The focal member is *Persea americana*, the common avocado, of which there are many named forms. The extended range of ***'ma***^{L} ***gwɨɨ***^{LH} includes: 1) other edible avocados, such as *P. schiedeana*; 2) other fruit bearing trees, such as the common fig, called «Spanish avocado»; and 3) many trees, primarily cloud forest species of the *Lauraceae*, which yield valuable woods for construction and woodworking. I speculate that ***'ma***^{L} ***gwɨɨ***^{LH} was originally a generic category that pertained to edible avocados and that it was extended to include other trees introduced by the Spanish or discovered as the uninhabited cloud forests were explored.

This historical process has culminated in a modern-day classification that is logical in itself, yet anomalous in Berlin's model. From a taxonomic perspective, we discover a set of categories that are best described as generics and specifics within the broad category ***'ma***^{L} ***gwɨɨ***^{LH}, which I consider as a named intermediate (the alternative is to designate a floristically-diverse mega-generic with at least 9 specifics and 9 varietals). From a nomenclatural perspective, we find generic categories labeled in a way which fulfills all of the conditions of secondary names; they occur in a contrast set "whose members all share a constituent that labels the taxon that immediately includes them". In this case and others similar to it, I have made the arbitrary decision of designating the names of these generic categories as productive complex primary names. I justify this by the general rule that all generics are labeled by primary names and that the «avocado» generic names are thus by definition primary complex rather than secondary names. The circular logic involved in this argument is evident.

Among the Comaltepec Chinantec subgeneric categories, there are some which are labeled by productive primary names. In Totontepec Mixe, some subgeneric categories are labeled by productive primary names and others by unproductive primary names. In no cases is a subgeneric labeled by a simple primary name, or with a name "linguistically distinct from the label of its superordinate".

All of the cases of subgenerics labeled by primary names in both languages agree with Berlin's exception (4b) — they are polysemous with the name of the generic category to which they belong. This happens most frequently in the generics which I define as consisting of a prototypical member and a «wild» counterpart. For example, the Mixe generic ***kaa'kx*** contains two specifics, both of which pertain to species in the *Magnoliaceae*: (a) ***kaa'kx***, which refers to *Talauma mexicana* and (b) ***yukkaa'kx***, which corresponds to one or more species of *Magnolia*. Specific (a) is a highly-salient small tree, found relatively close to the village and which bears large flowers used as adornment at Easter time and also as a remedy for heart conditions. Specific (b) is a large forest tree whose wood is occasionally used for construction and fuel. In cases like this, I consider that the name of the prototypical specific is polysemous with the generic name.

Do the Chinantec and Mixe use a modifier that distinguishes these prototypical, unlabeled specifics from the marked ones, an adjective that translates, in Berlin's words, as «genuine», «real», «original» or «ideal-type»?. There is a candidate that the Chinantec use at the generic rank to distinguish native plants from exotics. As I have noted previously, both oranges and guavas belong to the same category, ***'ma***^{L} ***ji̲***$^{'L}$ «sour-fruit tree». The common guava, *Psidium guajava*, is called ***'ma***^{L} ***ji̲***$^{'L}$ ***dsee***^{L} «real sour-fruit tree». The modifier ***dsee***^{L} is used in two other plant names and may be used in conversation to indicate the prototypical member of other generics. The modifier «Chinantec» is used in a similar way to distinguish native black cherries (***'ma***^{L} ***'u***$^{'H}$ ***jmíi***^{LM} «Chinantec peach tree») from introduced peaches (***'ma***^{L} ***'u***$^{'H}$ «peach tree»). I am not aware of equivalent terms in Mixe, used either as a part of a plant name or in conversation.

If prototypical specifics are not recognized by an adjective which translates as «real», it is perhaps because their «nongenuine» counterparts are labeled by modifiers which mean «false», «wild», «second-quality» or «Spanish». Use of such modifiers abound in Mixe and Chinantec. *Cestrum nocturnum*, a common edible green in both communities, is called ***ja̱***^{L} ***dsí***$^{'H}$ «*C. nocturnum* edible-green» in Comaltepec and ***mutap*** «*C. nocturnum*» in Totontepec. Less salient counterparts are clearly labeled: *Solanum aphyodendron* is called ***ja̱***^{L} ***dsí***$^{'H}$ ***tøø***^{M} «false *C. nocturnum* edible-green» in Chinantec, whereas some other *Cestrum* species are referred to as ***yukmutap*** «wild *C. nocturnum*» in Totontepec.

5) "Ethnobiological nomenclature is semantically active in that the linguistic constituents of plant and animal names often metaphorically allude to morphological, behavioral or ecological features that are nonarbitrarily

associated with their biological referents". (Ibid:35)

After describing folk plant names in terms of names, rank and other features, it is satisfying to finally ask the question, "but what do they all mean?" In Totontepec and Comaltepec, I spent hours working out the correct interpretation of each name, working morpheme by morpheme, category by category. I reviewed the denotation and connotation of each with the local collectors and other members of the communities and I discussed our conclusions with linguists specialized in each of the languages. I believe that we have been able to work out the significance of most terms, though some doubts remain.

In this process, I was struck by a basic dichotomy of the constituents, or morphemes, used to construct plant names. Some are names and only names. For example, ***mutap*** is a morpheme that refers exclusively to *Cestrum nocturnum* and means nothing else. Other constituents are used descriptively in plant names – ***no'op*** means «vulture» and is used in the Mixe name ***no'op kup*** «vulture tree»; ***tii***^{L} means «thin» and is used the Chinantec name for coriander ***'oo***^{L} ***tii***^{L} «thin herb».

Balée and Moore (1991) have written a perceptive article in which they analyzed the difference between these two types of names, which they call literal and metaphorical/descriptive. They assert (1991:231),

> "... it is necessary to distinguish 'literal' plant words from 'metaphorical/descriptive' (henceforth called simply metaphorical) plant words, a distinction which proves to be of crucial analytical importance. In our usage, 'literal' plant words are those which contain a literal plant morpheme; they may contain other morphemes as well. Literal plant morphemes are here defined as

those which have as their sole referent a specific plant, excluding thereby general life–form morphemes such as 'tree' or 'herb'... In our usage, 'metaphorical names' are those which do not contain a literal plant morpheme, or if they do contain a literal plant morpheme, it is being used metaphorically (i.e. the class of plants designated by the whole metaphorical term is not a subset of the class designated by the literal morpheme".

Metaphorical names refer to some quality of morphology, utility, ecology or behavior, as Berlin contends. Literal names are "proper names" – they only serve to identify the plant and do not give any descriptive information about it. Literal names usually refer to the most salient plants in the community and these names can usually be reconstructed using the methods of historical linguistics. For example, __*kaku*__, the Totontepec Mixe term for «cocoa» can be reconstructed as *__*kakawa*__ in protoMixe–Zoque. Descriptive constituents can also be reconstructed, but it is more difficult to determine if they formed part of a plant name in the protolanguage. __*tee*__^{L} reconstructs as *__*tiaa*__^{L} and __*'oo*__^{L} as *__*'a:*__^{L} in protoChinantec (Rensch 1989:37,56), but we do not know if there was a protoChinantec plant name *__*'a:*__^{L} *__*tiaa*__^{L} which is equivalent to __*'oo*__^{L} __*tee*__^{L} «thin herb», the Comaltepec Chinantec name for coriander and related herbs.

Balée and Moore's conception of literal and metaphorical names is of great utility in analyzing folk botanical nomenclature, but their definitions must be restated to make explicit the relationship with two other elements of ethnobiological analysis: rank and name type.

A given constituent may or may not be literal according to the rank at which it is used. Words for «tree», «herb» and «vine» are certainly literal at the life-form rank, but not at the generic rank, where they serve a metaphorical or descriptive function, according to Balée and Moore's definition.

At the generic rank, I contend that simple primary names are always literal. In a few cases they are polysemous, yet the additional meanings are derived from or related to the proper name of the plant. For example, the Mixe name for «tobacco», ***ju'uk***, is also used as a verb meaning «to smoke» and as a noun meaning «cigarette», but these are related to the plant name. Literal names at the life-form rank are often polysemous in this way – terms for «tree» may often be glossed also as «wood». I would further argue that productive primary names are literal when they consist exclusively of a life-form term plus a literal constituent; otherwise they are metaphorical. Logically, it follows that unproductive complex primary names and secondary names are always metaphorical, because by definition they never contain exclusively a life-form term and a literal constituent. The general relationship between name type, and literal and metaphorical names is shown in table 8-16.

	Literal	Metaphorical
Simple primary	yes	no
Productive primary	yes	yes
Unproductive primary	no	yes
Secondary	no	yes

Table 8-16. The distribution of literal and metaphorical names according to name type in folk botanical nomenclature.

The less strict definition provided by Balée and Moore, devoid of reference to rank and name type, is appropriate for the sort of study they present: a comparison of cognate names in related languages, not all of which have been thoroughly analyzed from an ethnobiological perspective. When working with partial inventories, we can learn much by assuming that two names are cognate if they both refer to the same biological species and have a literal constituent in common, regardless of the other constituents in the names, the rank of the categories, or the type of label.

	Literal Total (Chinantec/Spanish)	Metaphorical Total (Chinantec/Spanish)
Simple primary	17 (8/9)	0 (0/0)
Productive primary	106 (85/21)	246 (237/9)
Unproductive primary	0 (0/0)	19 (19/0)

Table 8-17. The distribution of literal and metaphorical names according to name type for generic names in Chinantec botanical nomenclature (respective totals for Chinantec and Spanish-based names given in parentheses).

	Literal Total (Mixe/Spanish)	Metaphorical Total (Mixe/Spanish)
Simple primary	133 (97/36)	0 (0/0)
Productive primary	14 (8/6)	103 (87/16)
Unproductive primary	2 (1/1)	165 (153/12)

Table 8-18. The distribution of literal and metaphorical names according to name type for generic names in Mixe botanical nomenclature (respective totals for Mixe and Spanish-based names given in parentheses).

The stricter definition I provide is appropriate when we are working with a single ethnobiological classification which is thoroughly analyzed, or with a group of languages sufficiently well studied so as to allow reconstruction of protolinguistic forms. When restated in this way, the concept of literal and metaphoric names elucidates Chinantec and Mixe naming of plants; it allows us to differentiate between literal and metaphoric generic names which correspond to productive complex primary names. This is of particular importance in Chinantec botanical nomenclature, in which all literal plant names are opaque, because they are hidden in productive primary names. Using the strict definition, I consider that 123 generic names (31.7%) in Chinantec are literal. In Mixe botanical nomenclature, 149 generic names (35.7% of the total) are literal. The distribution of literal and metaphorical names according to name type for Chinantec and Mixe generics are given in tables 8–17 and 8–18.

Only in Mixe do we find exceptions to the expected pattern shown in table 8–16: there are two literal names found among the unproductive primary names, ***orquilla puj*** «orchid? flower» and ***aja'a puj*** «*Plumeria* flower». There are several possible explanations which may be verified in future research: 1) ***puj***, as noted above, could be considered a life-form, in which case these would be considered productive primary names; 2) ***orquilla*** may be used as single name, with ***puj*** added optionally (e.g. ***gladiola*** is sometimes called ***gladiola puj***), thus becoming a simple primary name; 3) ***aja'a*** may be ultimately analyzable (***aj*** is often a contraction of ***aajy*** when combined with another constituent).

Modifier and gloss	Number of mentions
tee^{L} «white»	35
yúu^{M} «red»	26
nuu^{L}/***mó***^{iL} «wild»	25
tii^{L} «thin»	25
rø^{iL} «green»	12
née^{M} «yellow»	8
'uí$^{iMLM'}$*L* «black»	8
tóo^{LM} «thorny»	6

Table 8–19. The frequency of occurrence of the most commonly used modifiers in Chinantec secondary names.

Modifier and gloss	Number of mentions
poo'p «white»	109
tsapts «red»	70
yak «black»	48
yuk «wild»	27
po'ts «yellow»	21
tsoxk «green»	16
tso'ojmk «purple»	14
tsay «thin»	11

Table 8–20. The frequency of occurrence of the most commonly used modifiers in Mixe secondary names.

Folk names, as some scientific names, often reveal information about the appearance, utility or distribution of the plant. This is particularly true for the names of specific and varietal categories, which typically contain a modifier that alludes to the color, origin or other property of the plant. Mentioning these features probably helps people to remember which names goes with which plant, but the full cognitive impact of nomenclatural patterns has not yet been fully studied. As shown in table

8–19, there are 8 modifiers used more than 6 times in Chinantec subgeneric categories labeled by secondary names; they account for the modifiers used in 145 names.

In Mixe there are 8 modifiers, shown in table 8–20, that are used more than 10 times in subgeneric categories labeled by secondary names; together they account for the modifiers used in 316 secondary names. As in the Chinantec case, most of the modifiers refer to color, with «white», «red» and «black» topping the list.

Future directions for research

The vast landscapes of local botanical classifications present many possibilities for further detailed research. Just as Berlin had wished to append an analysis of each ethnobiological system studied thus far to his book on ethnobiological classification, I would have liked to take the opportunity to delve further into various aspects of Chinantec and Mixe classification.

Wichmann's (1995) book on the relationship among the Mixe–Zoquean languages of Mexico, which appeared after I had carried out my research and written most of this dissertation, provides extensive data for a comparative study of Mixe plant nomenclature. In particular, comparison of his reconstructions of Mixe–Zoque terms with the Totontepec Mixe data could provide insights into the stability of the names for the most salient plants over time. A parallel study of Chinantec, based on Rensch's (1989) etymological dictionary of the Chinantec languages, would have the potential of revealing trends in persistence of plant names in Comaltepec Chinantec, perhaps leading to an understanding of general trends in cultural and linguistic continuity in the Sierra Norte of Oaxaca.

The appearance of Balée's (1994) Footprints of the Forest on the historical ecology of plant utilization of the Ka'apor in the Brazilian Amazon, provides a methodological and theoretical framework for linking studies of local plant classification with systems for managing botanical resources. A historical perspective on both linguistic and ecological aspects of local plant knowledge would provide important insights into the sustainability of resource use in the Sierra.

This historical view can be enriched by reaching back to earlier studies of plant use in the Sierra Norte. In particular, a systematic comparison of the plant names and uses recorded by Richard Evans Schultes in the late 1930s with the data we collected principally in the 1980s would give some indications of how plant knowledge and use has changed or been maintained over a short but turbulent historical period.

Apart from these broad approaches to further analysis of the general systems of plant classification and management, my attention is drawn to specific plant resources that play an important role in local patterns of subsistence and commerce. As communities seek to maintain a diversified production, there will be increased emphasis on what can be harvested from their forested lands, and what new markets are emerging for forest products. I hope the data presented in this dissertation give incentive for further study of these valuable species, by and for these communities.

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Appendix 1. Botanical families of the Sierra Norte of Oaxaca, Mexico.

The following list, drawn from the floristic checklist of Martin et al (n.d.), gives the names of botanical families that have been reported from the Sierra Norte. The names are abbreviated according to the mnemomic system developed by Weber (1982:74–88). The notes in brackets indicate if the family is represented in the Chinantec collections, Mixe collections, both or neither.

ACA Acanthaceae [both]
ACE Aceraceae [neither]
ACH Achatocarpaceae [neither]
ACT Actinidiaceae [both]
ADI Adiantaceae [both]
AGA Agavaceae [both]
AIZ Aizoaceae [neither]
ALI Alismataceae [neither]
ALO Aloaceae [Mixe]
AMA Amaranthaceae [both]
AML Amaryllidaceae [both]
ANA Anacardiaceae [both]
ANN Annonaceae [both]
API Apiaceae [both]
APO Apocynaceae [both]
AQF Aquifoliaceae [neither]
ARA Araceae [both]
ARE Arecaceae [both]
ARL Araliaceae [both]
ARS Aristolochiaceae [neither]
ARU Araucaricaceae [neither]
ASC Asclepiadaceae [Chinantec]
ASD Aspidiaceae [neither]
ASL Aspleniaceae [neither]
AST Asteraceae [both]
AZL Azollaceae [neither]
BAS Basellaceae [neither]
BAT Bataceae [neither]
BEG Begoniaceae [both]
BER Berberidaceae [neither]
BET Betulaceae [both]
BIG Bignoniaceae [both]
BIX Bixaceae [both]
BLE Blechnaceae [neither]
BLS Balsaminaceae [both]
BML Bromeliaceae [both]
BMN Burmanniaceae [neither]
BNL Brunelliaceae [both]
BNP Balanophoraceae [neither]
BOM Bombacaceae [neither]
BOR Boraginaceae [both]
BRA Brassicaceae [both]
BRS Burseraceae [both]
BUX Buxaceae [neither]
CAC Cactaceae [both]
CAM Campanulaceae [both]
CAS Casuarinaceae [Mixe]
CCH Cochlospermaceae [both]
CEL Celastraceae [neither]
CHB Chrysobalanaceae [neither]
CHN Chenopodiaceae [both]
CIS Cistaceae [both]
CLE Clethraceae [both]
CLL Callitrichaceae [neither]
CLR Chloranthaceae [both]
CLU Clusiaceae [both]
CMB Combretaceae [neither]
CMM Commelinaceae [both]
CNA Cannaceae [both]
CNN Connaraceae [neither]
CNV Convolvulaceae [both]
COR Cornaceae [both]
COT Costaceae [Chinantec]
CPP Capparaceae [both]
CPR Caprifoliaceae [both]
CRC Caricaceae [both]
CRR Coriariaceae [neither]
CRS Crassulaceae [both]
CRY Caryophyllaceae [both]
CTH Cyatheaceae [both]
CTP Ceratophyllaceae [neither]
CUC Cucurbitaceae [both]
CUN Cunoniaceae [both]
CUP Cupressaceae [both]

CYC Cyclanthaceae [both]
CYP Cyperaceae [both]
DAV Davalliaceae [neither]
DCH Dichapetalaceae [neither]
DCK Dicksoniaceae [neither]
DLL Dilleniaceae [Chinantec]
DRS Droseraceae [neither]
DRY Dryopteridaceae [neither]
DSC Dioscoreaceae [both]
DST Dennstaedtiaceae [neither]
EBN Ebenaceae [Chinantec]
ELC Elaeocarpaceae [neither]
EPH Ephredaceae [neither]
EQU Equisetaceae [both]
ERI Ericaceae [both]
ERO Eriocaulaceae [neither]
ERX Erythroxylaceae [neither]
EUP Euphorbiaceae [both]
FAB Fabaceae [both]
FAG Fagaceae [both]
FLC Flacourtiaceae [both]
FNK Frankeniaceae [neither]
FOQ Foquieriaceae [neither]
GAR Garryaceae [Chinantec]
GEN Gentianaceae [both]
GER Geraniaceae [both]
GLC Gleicheniaceae [neither]
GMM Grammitidaceae [neither]
GRS Grossulariaceae [both]
GSN Gesneriaceae [both]
HAE Haemadoraceae [neither]
HAL Haloragaceae [neither]
HAM Hamamelidaceae [both]
HCS Hippocastanaceae [both]
HDC Hydrocharitaceae [neither]
HDR Hydrangeaceae [both]
HLC Heliconiaceae [both]
HMP Hymenophyllaceae [neither]
HPC Hippocrateaceae [neither]
HPX Hypoxidaceae [Mixe]
HRN Hernandiaceae [neither]
HYD Hydrophyllaceae [Chinantec]
ICC Icacinaceae [neither]
IRI Iridaceae [both]
JUG Juglandaceae [both]
JUL Julianaceae [neither]
JUN Juncaceae [both]
KRM Krameriaceae [neither]
LAM Lamiaceae [both]
LAU Lauraceae [both]
LCS Lacistemaceae [neither]
LCY Lecythidaceae [neither]
LIL Liliaceae [both]
LIM Limnocharitaceae [neither]
LIN Linaceae [neither]
LMN Lemnaceae [neither]
LNN Lennoaceae [neither]
LNT Lentibulariaceae [neither]
LOA Loasaceae [Chinantec]
LOG Loganiaceae [both]
LOR Loranthaceae [both]
LPH Lophosoriaceae [both]
LYC Lycopodiaceae [both]
LYG Lygodiaceae [neither]
LYT Lythraceae [both]
MAG Magnoliaceae [Mixe]
MAR Martyniaceae [neither]
MAY Mayacaceae [neither]
MEL Meliaceae [both]
MLP Malpighiaceae [both]
MLS Melastomataceae [both]
MLV Malvaceae [both]
MND Mendonciaceae [neither]
MNM Monimiaceae [both]
MNS Menispermaceae [Chinantec]
MNT Monotropaceae [neither]
MOR Moraceae [both]
MRC Marcgraviaceae [neither]
MRG Moringaceae [neither]
MRN Marantaceae [neither]
MRS Myrsinaceae [both]
MRT Myrtaceae [both]
MTR Mitrastemonaceae [neither]
MTT Marattiaceae [neither]
MUS Musaceae [both]
MYR Myricaceae [both]
MYS Myristicaceae [neither]
NAJ Najadaceae [neither]
NYC Nyctaginaceae [both]
NYM Nymphaceae [neither]

OCH Ochnaceae [Mixe]
OLC Olacaceae [neither]
OLE Oleaceae [neither]
ONA Onagraceae [both]
OPH Ophioglossaceae [neither]
ORC Orchidaceae [both]
ORO Orobanchaceae [neither]
OSM Osmundiaceae [both]
OXL Oxalidaceae [both]
PAP Papaveraceae [both]
PAS Passifloraceae [both]
PDC Podocarpaceae [both]
PDS Podostemaceae [neither]
PED Pedaliaceae [neither]
PGL Polygalaceae [both]
PGY Plagiogyriaceae [neither]
PHT Phytolaccaceae [both]
PIN Pinaceae [both]
PIP Piperaceae [both]
PLB Plumbaginaceae [Chinantec]
PLG Polygonaceae [both]
PLM Polemoniaceae [Chinantec]
PLP Polypodiaceae [neither]
PLT Platanaceae [Mixe]
POA Poaceae [both]
PON Pontederiaceae [neither]
POR Portulacaceae [both]
POT Potamogetonaceae [neither]
PRM Primulaceae [both]
PRT Proteaceae [both]
PTG Plantaginaceae [both]
PTS Pterostemonaceae [neither]
PUN Punicaceae [both]
PYR Pyrolacaeae [Chinantec]
RAF Rafflesiaceae [neither]
RAN Ranunculaceae [both]
RHM Rhamnaceae [both]
RHZ Rhizophoraceae [neither]
ROS Rosaceae [both]
RSD Resedaceae [neither]
RUB Rubiaceae [both]
RUT Rutaceae [both]
SAB Sabiaceae [neither]
SAL Salicaceae [both]
SAP Sapindaceae [both]
SAX Saxifragaceae [Chinantec]
SCR Scrophulariaceae [both]
SCZ Schizaeaceae [neither]
SEL Selaginellaceae [both]
SIN Sinopteridaceae [neither]
SML Smilacaceae [both]
SMR Simaroubaceae [both]
SOL Solanaceae [both]
SPT Sapotaceae [both]
STP Staphyleaceae [neither]
STR Sterculiaceae [both]
STY Styracaceae [Chinantec]
SVN Salviniaceae [neither]
SYM Symplocaceae [neither]
TAC Taccaceae [neither]
TAX Taxaceae [neither]
TEA Theaceae [both]
TEO Theophrastaceae [neither]
THL Thelypteridaceae [neither]
THY Thymeliaceae [Mixe]
TIC Ticondendraceae [both]
TIL Tiliaceae [Chinantec]
TNR Turneraceae [neither]
TOV Tovariaceae [both]
TRG Trigoniaceae [neither]
TRI Triuridaceae [neither]
TRP Tropaeolaceae [both]
TXO Taxodiaceae [Mixe]
TYP Typhaceae [neither]
ULM Ulmaceae [both]
URT Urticaceae [both]
VAL Valerianaceae [both]
VIO Violaceae [both]
VIT Vitaceae [both]
VOC Vochysiaceae [neither]
VRB Verbenaceae [both]
VTT Vittariaceae [neither]
WIN Winteraceae [neither]
XYR Xyridaceae [Chinantec]
ZAM Zamiaceae [both]
ZAN Zanichelliaceae [neither]
ZIN Zingiberaceae [both]
ZYG Zygophyllaceae [neither]

Appendix 2. Botanical genera of the Sierra Norte of Oaxaca, Mexico.

The following list, drawn from the floristic checklist of Martin et al (n.d.), gives the names of genera that have been reported from the Sierra Norte. Family names are abbreviated according to the mnemomic system developed by Weber (1982:74–88). The notes in brackets indicate if the genus is represented in the Chinantec collections, Mixe collections, both or neither.

ACA Anisacanthus [neither]
ACA Aphelandra [Chinantec]
ACA Barleria [neither]
ACA Blechum [neither]
ACA Carlowrightia [neither]
ACA Chileranthemum [neither]
ACA Dicliptera [neither]
ACA Dyschoriste [neither]
ACA Elytraria [neither]
ACA Habracanthus [neither]
ACA Hansteinia [Chinantec]
ACA Henrya [neither]
ACA Justicia [both]
ACA Louteridium [neither]
ACA Odontonema [both]
ACA Pseuderanthemum [neither]
ACA Ruellia [Mixe]
ACA Siphonoglossa [neither]
ACA Tetramerium [neither]
ACE Acer [neither]
ACT Saurauia [both]
ADI Adiantopsis [neither]
ADI Adiantum [both]
ADI Cheilanthes [Chinantec]
ADI Cheiloplecton [neither]
ADI Llavea [Mixe]
ADI Mildella [neither]
ADI Pellaea [Chinantec]
ADI Pityrograma [both]
ADI Pteris [neither]
AGA Agave [both]
AGA Beschorneria [neither]
AGA Bomarea [both]
AGA Dasylirion [neither]
AGA Dracaena [neither]
AGA Fucraea [neither]
AGA Hemerocallis [both]
AGA Manfreda [neither]
AGA Nolina [neither]
AGA Sanseviera [neither]
AGA Sprekelia [neither]
AGA Yucca [Mixe]
AGA Zephyrantes [neither]
AHT Achatocarpus [neither]
AIZ Trianthema [neither]
ALI Echinodorus [neither]
ALI Sagittaria [neither]
AMA Alternanthera [Mixe]
AMA Amaranthus [both]
AMA Gomphrena [both]
AMA Guilleminia [neither]
AMA Iresine [both]
ANA Actinocheita [neither]
ANA Cyrtocarpa [neither]
ANA Mangifera [both]
ANA Metopium [neither]
ANA Pachycornus [neither]
ANA Pistacia [Chinantec]
ANA Pseudosmodingium [neither]
ANA Rhus [both]
ANA Schinus [neither]
ANA Spondias [both]
ANA Toxicodendron [both]
ANN Annona [both]
ANN Cymbopetalum [neither]
ANN Guatteria [neither]
ANN Rollinia [neither]
ANN Sapranthus [neither]
ANN Xylopia [neither]
API Ammi [neither]
API Arracacia [Mixe]
API Berula [Chinantec]
API Ciclospermum [Mixe]
API Coaxana [neither]

API Coriandrum [both]
API Daucus [both]
API Donnellsmithia [neither]
API Eryngium [both]
API Foeniculum [Chinantec]
API Hydrocotyle [both]
API Micropleura [neither]
API Neogoezia [neither]
API Osmorhiza [neither]
API Ottoa [neither]
API Pimpinella [neither]
API Prionosciadium [neither]
API Rhodosciadium [neither]
API Sanicula [Chinantec]
API Tauschia [neither]
APO Allamanda [neither]
APO Aspidosperma [neither]
APO Mandevilla [neither]
APO Plumeria [both]
APO Prestonia [neither]
APO Stemmadenia [neither]
APO Tabernaemontana [neither]
APO Thenardia [neither]
APO Thevetia [neither]
APO Vallesia [neither]
AQF Ilex [neither]
ARA Anthurium [both]
ARA Monstera [both]
ARA Philodendron [both]
ARA Spathiphyllum [both]
ARA Syngonium [neither]
ARA Xanthosoma [both]
ARA Zantedeschia [both]
ARE Acrocomia [neither]
ARE Astrocaryum [neither]
ARE Bactris [Chinantec]
ARE Brahea [Mixe]
ARE Chamaedorea [both]
ARE Desmoncus [both]
ARE Geonoma [neither]
ARE Hexopetion [neither]
ARE Reinhardtia [neither]
ARE Sabal [neither]
ARE Scheelea [neither]
ARL Aralia [neither]
ARL Dendropanax [Mixe]
ARL Didymopanax [neither]
ARL Hedera [neither]
ARL Oreopanax [neither]
ARS Aristolochia [neither]
ARU Araucacia [neither]
ASC Asclepias [Chinantec]
ASC Cynanchum [neither]
ASC Gonolobus [neither]
ASC Marsdenis [neither]
ASC Matelea [neither]
ASC Metastelma [neither]
ASL Asplenium [Chinantec]
ASL Cystopteris [Mixe]
ASL Woodsia [Chinantec]
AST Achillea [both]
AST Acmella [both]
AST Acourtia [neither]
AST Adenophyllum [neither]
AST Ageratina [Mixe]
AST Ageratum [both]
AST Aldama [both]
AST Alloispermum [both]
AST Ambrosia [both]
AST Archibaccharis [both]
AST Artemisia [both]
AST Aster [Chinantec]
AST Axiniphyllum [neither]
AST Baccharis [both]
AST Bartlettina [Mixe]
AST Bidens [both]
AST Bigelowia [neither]
AST Brickellia [both]
AST Calea [Mixe]
AST Calendula [Chinantec]
AST Calyptocarpus [neither]
AST Chaptalia [Chinantec]
AST Cirsium [both]
AST Clibadium [both]
AST Conyza [both]
AST Coreopsis [neither]
AST Cosmos [Mixe]
AST Critonia [Chinantec]
AST Dahlia [both]
AST Dalilea [neither]

AST Dendranthema [Chinantec]
AST Desmanthodium [both]
AST Digitacalia [neither]
AST Dyssodia [both]
AST Electra [neither]
AST Elepantopus [Mixe]
AST Epaltes [neither]
AST Erechtites [both]
AST Erigeron [both]
AST Flaveria [neither]
AST Fleischmannia [Mixe]
AST Florestina [neither]
AST Galinsoga [neither]
AST Gnaphalium [both]
AST Grindelia [Chinantec]
AST Gymnolaena [Chinantec]
AST Gymnosperma [neither]
AST Haplopappus [neither]
AST Heliopsis [Mixe]
AST Heterosperma [Chinantec]
AST Heterotheca [Chinantec]
AST Hidalgoa [Chinantec]
AST Hieracium [Mixe]
AST Iostephane [Chinantec]
AST Jaegeria [Chinantec]
AST Koanophyllon [Mixe]
AST Lactuca [Mixe]
AST Lagascea [both]
AST Lasianthes [Chinantec]
AST Leibnitzia [Chinantec]
AST Leptosyne [neither]
AST Leucanthemum [both]
AST Liabum [both]
AST Matricaria [both]
AST Melampodium [both]
AST Melanthera [both]
AST Microspermum [both]
AST Mikania [both]
AST Montanoa [neither]
AST Neurolaena [Chinantec]
AST Oaxacania [neither]
AST Oxylobus [neither]
AST Parthenium [neither]
AST Pectis [neither]
AST Perymeniopsis [neither]
AST Perymenium [both]
AST Pinaropappus [Chinantec]
AST Piptocarpha [Chinantec]
AST Piptothrix [neither]
AST Piqueria [both]
AST Pluchea [Chinantec]
AST Podochaenium [Chinantec]
AST Porophyllum [Chinantec]
AST Psacalium [neither]
AST Rumfordia [Chinantec]
AST Sabazia [neither]
AST Salmea [Mixe]
AST Sanvitalia [neither]
AST Schistocarpha [both]
AST Schkuhria [Chinantec]
AST Sclerocarpus [Mixe]
AST Senecio [both]
AST Sigesbeckia [Mixe]
AST Simsia [neither]
AST Smallanthus [Mixe]
AST Sonchus [both]
AST Stevia [both]
AST Syndrela [Chinantec]
AST Tagetes [both]
AST Tanacetum [both]
AST Tetrachyron [Mixe]
AST Tithonia [both]
AST Tridax [neither]
AST Trigonospermum [both]
AST Trixis [neither]
AST Verbesina [both]
AST Vernonia [both]
AST Viguiera [Mixe]
AST Wedelia [neither]
AST Xanthium [neither]
AST Zaluzania [neither]
AST Zexmenia [neither]
AST Zinnia [Chinantec]
AZL Azolla [neither]
BEG Begonia [both]
BER Mahonia [neither]
BET Alnus [both]
BET Carpinus [both]
BET Ostrya [neither]
BIG Adenocalymma [neither]

BIG Amphilophium [neither]
BIG Amphitecna [Chinantec]
BIG Anemopaegma [neither]
BIG Arrabidaea [neither]
BIG Astianthus [neither]
BIG Crescentia [both]
BIG Cydista [neither]
BIG Distictis [neither]
BIG Godmania [neither]
BIG Jacaranda [neither]
BIG Lundia [neither]
BIG Macfadyena [neither]
BIG Melloa [neither]
BIG Paragonia [neither]
BIG Parmentiera [Chinantec]
BIG Pithecoctenium [neither]
BIG Pyrostegia [neither]
BIG Saritaes [neither]
BIG Spathoidea [neither]
BIG Tabebuia [neither]
BIG Tecoma [Chinantec]
BIG Xylophragma [neither]
BIX Bixa [both]
BIX Cochlospermum [Chinantec]
BLE Blechnum [both]
BLE Woodwardia [neither]
BLS Impatiens [both]
BML Aechmea [Chinantec]
BML Ananas [both]
BML Catopsis [neither]
BML Greigia [both]
BML Guzmania [neither]
BML Hechtia [Chinantec]
BML Lindmannia [neither]
BML Pitcairnia [Mixe]
BML Tillandsia [both]
BML Vriesia [neither]
BMN Apteria [neither]
BMN Dictyostega [neither]
BMN Gymnosiphon [neither]
BNL Brunellia [Chinantec]
BNP Helosis [neither]
BOM Bombax [neither]
BOM Ceiba [neither]
BOM Ochroma [neither]
BOM Quararibea [neither]
BOR Antiphytum [neither]
BOR Borago [neither]
BOR Cordia [both]
BOR Cryptantha [neither]
BOR Cynoglossum [neither]
BOR Echinospermum [neither]
BOR Ehretia [neither]
BOR Hackelia [neither]
BOR Heliotropium [neither]
BOR Lasiarrhenum [neither]
BOR Lithospermum [neither]
BOR Macromeria [neither]
BOR Rochefortia [neither]
BOR Tournefortia [Chinantec]
BRA Brassica [both]
BRA Cardamine [neither]
BRA Eruca [neither]
BRA Lepidium [Chinantec]
BRA Pennellia [neither]
BRA Raphanus [both]
BRA Romanschulzia [neither]
BRA Rorripa [both]
BRS Bursera [both]
BRS Protium [neither]
CAC Acanthocereus [neither]
CAC Aporocactus [neither]
CAC Cephatocereus [neither]
CAC Coryphantha [neither]
CAC Disocactus [neither]
CAC Echinocereus [neither]
CAC Epiphyllum [both]
CAC Escontria [neither]
CAC Ferrocactus [neither]
CAC Heliocereus [neither]
CAC Hylocereus [neither]
CAC Lemaireocereus [neither]
CAC Mammillaria [Chinantec]
CAC Neobuxbaumia [neither]
CAC Nopalea [neither]
CAC Nopalxochia [neither]
CAC Nyctocereus [neither]
CAC Opuntia [both]
CAC Pachycereus [neither]
CAC Pereskia [neither]

CAC Rhipsalis [neither]
CAC Stenocereus [neither]
CAM Centropogon [both]
CAM Diastatea [Mixe]
CAM Glockeria [neither]
CAM Lobelia [both]
CAM Triodanis [neither]
CAS Casuarina [Mixe]
CEL Celastrus [neither]
CEL Euonymus [neither]
CEL Maytenus [neither]
CEL Microtropis [neither]
CEL Perrottetia [neither]
CEL Wimmeria [neither]
CHB Hirtella [neither]
CHB Licania [neither]
CHN Chenopodium [both]
CIS Helianthemum [both]
CIS Lechea [Chinantec]
CLE Clethra [both]
CLL Callitricha [neither]
CLR Hedyosmum [both]
CLU Ascyrum [neither]
CLU Calophyllum [neither]
CLU Clusia [both]
CLU Hypericum [both]
CLU Rheedia [Chinantec]
CLU Tovomita [Mixe]
CLU Vismia [both]
CMB Combretum [neither]
CMB Terminalia [neither]
CMM Aneilema [neither]
CMM Callisia [neither]
CMM Commelina [both]
CMM Cymbispatha [neither]
CMM Gibasis [neither]
CMM Leptorhoeo [neither]
CMM Matudanthus [neither]
CMM Murdannia [neither]
CMM Thyrsanthemum [neither]
CMM Tinantia [Mixe]
CMM Tradescantia [neither]
CMM Tripogandra [neither]
CMM Weldenia [neither]
CMM Zebrina [neither]
CNA Canna [both]
CNN Cnestidium [neither]
CNN Connarus [neither]
CNN Rourea [neither]
CNV Cuscuta [both]
CNV Dichondra [neither]
CNV Evolvulus [neither]
CNV Ipomoea [both]
CNV Jacquemontia [neither]
CNV Merremia [neither]
CNV Operculina [neither]
CNV Turbina [Chinantec]
COR Cornus [both]
COS Costus [Chinantec]
CPP Capparis [neither]
CPP Cleome [both]
CPP Crataeva [neither]
CPP Polanisia [neither]
CPR Abelia [neither]
CPR Lonicera [neither]
CPR Sambucus [both]
CPR Viburnum [both]
CRC Carica [both]
CRS Echeveria [Mixe]
CRS Sedum [both]
CRS Villadia [neither]
CRY Arenaria [both]
CRY Cerastium [neither]
CRY Dianthus [Chinantec]
CRY Drymaria [Mixe]
CRY Gypsophila [neither]
CRY Stellaria [both]
CTH Alsophila [both]
CTH Cnemidaria [neither]
CTH Cyathea [neither]
CTH Hemitelia [neither]
CTH Sphaeropteris [both]
CTH Trichipteris [neither]
CTP Ceratophyllum [neither]
CUC Anguria [neither]
CUC Apodanthera [neither]
CUC Cayaponia [neither]
CUC Citrullus [neither]
CUC Cucumis [neither]
CUC Cucurbita [both]

CUC Cyclanthera [neither]
CUC Echinopepon [neither]
CUC Hanburia [Chinantec]
CUC Lagenaria [both]
CUC Luffa [neither]
CUC Melothria [neither]
CUC Microsechium [both]
CUC Momordia [neither]
CUC Psiguria [neither]
CUC Rytidostylis [neither]
CUC Schizocarpum [neither]
CUC Sechium [both]
CUC Sicydium [neither]
CUC Sicyos [neither]
CUN Weinmannia [both]
CUP Cupressus [both]
CUP Juniperus [both]
CYC Asplundia [neither]
CYC Carludovica [Mixe]
CYP Bulbostylis [neither]
CYP Carex [both]
CYP Cyperus [both]
CYP Dichromena [neither]
CYP Eleocharis [both]
CYP Fimbristylis [neither]
CYP Kyllinga [neither]
CYP Rhynchospora [Mixe]
CYP Scleria [neither]
DAV Nephrolepis [Chinantec]
DCH Dichapetalum [neither]
DCK Culcita [Mixe]
DCK Dicksonia [neither]
DLL Curatella [neither]
DLL Davilla [Chinantec]
DLL Tetracera [neither]
DRS Drosera [neither]
DRY Arachniodes [neither]
DRY Bolbitis [neither]
DRY Diplazium [Chinantec]
DRY Elaphoglossum [both]
DRY Megalastrum [Chinantec]
DRY Tectaria [Mixe]
DSC Dioscorea [both]
DST Dennstaedtia [Chinantec]
DST Hypolepis [neither]
DST Lindsaea [neither]
DST Lonchitis [neither]
DST Odontosoria [both]
DST Pteridium [both]
DST Saccoloma [neither]
EBN Diospyros [both]
ELC Muntingia [neither]
ELC Sloanea [neither]
EQU Equisetum [both]
ERI Arbutus [both]
ERI Arctostaphylos [Chinantec]
ERI Befaria [both]
ERI Cavendishia [both]
ERI Comarostaphylis [Chinantec]
ERI Empedoclesia [neither]
ERI Gaultheria [both]
ERI Leucothoe [neither]
ERI Lyonia [both]
ERI Macleania [both]
ERI Pernettya [neither]
ERI Sphyrospermum [neither]
ERI Vaccinium [both]
ERX Erythroxylon [neither]
EUP Acalypha [both]
EUP Adelia [neither]
EUP Alchornea [neither]
EUP Argythamnia [neither]
EUP Bernardia [neither]
EUP Caperonia [neither]
EUP Chamaesyce [Chinantec]
EUP Cnidoscolus [both]
EUP Croton [both]
EUP Dalechampia [neither]
EUP Euphorbia [both]
EUP Jatropha [both]
EUP Manihot [both]
EUP Pedilanthus [neither]
EUP Phyllanthus [neither]
EUP Plukenetia [neither]
EUP Ricinus [both]
EUP Sapium [neither]
EUP Stillingia [neither]
EUP Tragia [neither]
FAB Acacia [both]
FAB Acosmium [neither]

FAB Aeschynomene [Chinantec]
FAB Albizia [neither]
FAB Amicia [neither]
FAB Andira [neither]
FAB Arachis [both]
FAB Astragalus [neither]
FAB Ateleia [Mixe]
FAB Bauhinia [neither]
FAB Brongniartia [neither]
FAB Caesalpinia [neither]
FAB Cajanus [Mixe]
FAB Calliandra [both]
FAB Calopogonium [neither]
FAB Canavalia [Mixe]
FAB Centrosema [Mixe]
FAB Cercidium [neither]
FAB Chamaecrista [both]
FAB Clitoria [both]
FAB Cologania [neither]
FAB Coursetia [neither]
FAB Crotalaria [both]
FAB Dalbergia [neither]
FAB Dalea [Chinantec]
FAB Desmanthus [neither]
FAB Desmodium [both]
FAB Dialium [neither]
FAB Diphysa [Mixe]
FAB Dussia [neither]
FAB Entada [neither]
FAB Entadopsis [neither]
FAB Enterolobium [neither]
FAB Eriosema [neither]
FAB Erythrina [both]
FAB Eysenhardtia [Chinantec]
FAB Galactia [neither]
FAB Gliricidia [neither]
FAB Indigofera [both]
FAB Inga [both]
FAB Lablab [neither]
FAB Leucaena [both]
FAB Lonchocarpus [Chinantec]
FAB Lotus [neither]
FAB Lupinus [both]
FAB Lysiloma [Chinantec]
FAB Machaerium [both]
FAB Macroptilium [neither]
FAB Marina [neither]
FAB Medicago [neither]
FAB Melilotus [Mixe]
FAB Mimosa [both]
FAB Mucuna [both]
FAB Myroxylon [neither]
FAB Nissolia [neither]
FAB Ormosia [neither]
FAB Pachyrrhizus [neither]
FAB Phaseolus [both]
FAB Piscidia [neither]
FAB Pisum [both]
FAB Pithecellobium [neither]
FAB Platymiscium [neither]
FAB Prosopis [neither]
FAB Pterocarpus [neither]
FAB Rhynchosia [neither]
FAB Schizolobium [neither]
FAB Senna [both]
FAB Stizolobium [neither]
FAB Stylosanthes [neither]
FAB Sweetia [neither]
FAB Tamarindus [neither]
FAB Tephrosia [neither]
FAB Teramnus [neither]
FAB Trifolium [Chinantec]
FAB Vatairea [neither]
FAB Vicia [both]
FAB Vigna [Mixe]
FAB Zapoteca [Chinantec]
FAB Zornia [neither]
FAG Quercus [both]
FLC Casaeria [neither]
FLC Lunania [neither]
FLC Olmediella [Mixe]
FLC Pleuranthodendron [Chinantec]
FLC Prockia [neither]
FLC Trimeria [neither]
FLC Xylosma [neither]
FLC Zuelania [neither]
FOQ Fouquieria [neither]
GAR Garrya [Chinantec]
GEN Centaurium [Mixe]
GEN Chelonanthus [neither]

GEN Eustoma [neither]
GEN Gentiana [neither]
GEN Halenia [neither]
GEN Lisianthus [neither]
GEN Voyria [neither]
GER Geranium [both]
GER Pelargonium [both]
GLC Dicranopteris [neither]
GLC Diplopterygium [neither]
GLC Sticherus [both]
GMM Cochlidium [neither]
GMM Grammitis [neither]
GRS Ribes [neither]
GSN Achimenes [Mixe]
GSN Alloplectus [neither]
GSN Besleria [neither]
GSN Columnea [both]
GSN Drymonia [neither]
GSN Hippodamia [neither]
GSN Moussonia [both]
GSN Pterostemon [neither]
HAE Xiphidium [Chinantec]
HAM Liquidambar [both]
HDR Hydrangea [both]
HDR Philadelphus [both]
HDR Phyllonoma [both]
HLC Heliconia [both]
HMP Athrium [neither]
HMP Hymenophyllum [neither]
HMP Trichomanes [neither]
HPC Billia [both]
HPP Hippocratea [neither]
HPX Hypoxis [Mixe]
HRN Gyrocarpus [neither]
HYD Hydrolea [neither]
HYD Nama [neither]
HYD Phacelia [neither]
HYD Wigandia [Chinantec]
ICC Calatola [neither]
IRI Crocosmia [Mixe]
IRI Gladiolus [both]
IRI Orthrosanthus [neither]
IRI Rigidella [Chinantec]
IRI Sisyrinchium [both]
IRI Tigridia [both]
JUG Alfaroa [neither]
JUG Carya [neither]
JUG Juglans [both]
JUG Oreomunnea [both]
JUL Amphipterygium [neither]
JUN Juncus [both]
JUN Luzula [neither]
KRM Krameria [neither]
LAM Asterohyptis [neither]
LAM Coleus [Chinantec]
LAM Hyptis [both]
LAM Lepechinia [both]
LAM Marrubium [neither]
LAM Marsypianthes [neither]
LAM Mentha [both]
LAM Ocimum [both]
LAM Origanum [both]
LAM Prunella [both]
LAM Rosmarinus [both]
LAM Salvia [both]
LAM Satureja [both]
LAM Scutellaria [neither]
LAM Stachys [both]
LAM Teucrium [neither]
LAU Aniba [neither]
LAU Beilscmedia [neither]
LAU Licaria [neither]
LAU Litsea [both]
LAU Nectandra [both]
LAU Ocotea [Chinantec]
LAU Persea [both]
LAU Phoebe [neither]
LCS Lacistema [neither]
LIL Allium [both]
LIL Aloe [both]
LIL Calochortus [neither]
LIL Echeandia [Mixe]
LIL Hymenocallis [Chinantec]
LIL Milla [neither]
LIL Nothoscordum [neither]
LIL Polianthes [neither]
LIL Schoenocaulon [neither]
LIL Smilacina [both]
LIL Zygadenus [neither]
LIN Linum [neither]

LMC Limnocharis [neither]
LMN Lemna [neither]
LMN Wollfia [neither]
LNN Lennoa [neither]
LNT Pinguicula [neither]
LNT Utricularia [neither]
LOA Eucnide [neither]
LOA Mentzelia [Chinantec]
LOG Buddleia [both]
LOG Gelsemium [Mixe]
LOG Polypremum [neither]
LOG Spigelia [neither]
LOR Arceuthobium [neither]
LOR Loranthus [neither]
LOR Phoradendron [neither]
LOR Psittacanthus [both]
LOR Struthanthus [Chinantec]
LPH Lophpsoria [Mixe]
LYC Huperzia [both]
LYC Lycopodium [both]
LYG Lygodium [neither]
LYT Ammania [neither]
LYT Cuphea [both]
LYT Ginoria [neither]
LYT Heimia [neither]
LYT Lagerstroemia [neither]
LYT Lythrum [neither]
MAG Magnolia [neither]
MAG Talauma [Mixe]
MAR Martynia [neither]
MAR Proboscidea [neither]
MEL Cedrela [both]
MEL Guarea [neither]
MEL Melia [neither]
MEL Swietenia [both]
MEL Trichilia [neither]
MLP Aspicarpa [neither]
MLP Banisteria [neither]
MLP Bunchosia [both]
MLP Byrsonima [both]
MLP Echinopterys [neither]
MLP Galphimia [neither]
MLP Heteropteris [neither]
MLP Lasiocarpus [neither]
MLP Malpighia [neither]
MLP Mascagnia [neither]
MLP Stigmatophyllon [neither]
MLP Tetrapteris [neither]
MLS Adelobotrya [neither]
MLS Arthrostema [Chinantec]
MLS Centradenia [neither]
MLS Clidemia [Chinantec]
MLS Conostegia [both]
MLS Heterocentron [Mixe]
MLS Leandra [neither]
MLS Miconia [both]
MLS Monochaetum [both]
MLS Mourira [neither]
MLS Ossaea [neither]
MLS Tibouchina [both]
MLS Topobea [Chinantec]
MLS Triolena [neither]
MLV Abelmoschus [neither]
MLV Abutilon [neither]
MLV Alcea [Chinantec]
MLV Allowissadula [neither]
MLV Anoda [both]
MLV Bakeridesia [neither]
MLV Gossypium [both]
MLV Hampea [neither]
MLV Hibiscus [both]
MLV Lavatera [neither]
MLV Lopimia [neither]
MLV Malachra [neither]
MLV Malva [both]
MLV Malvastrum [neither]
MLV Malvaviscus [Mixe]
MLV Modiola [Mixe]
MLV Pavonia [both]
MLV Phymosia [neither]
MLV Robinsonella [neither]
MLV Sida [both]
MND Mendoncia [neither]
MNM Mollinedia [both]
MNM Siparuna [both]
MNS Abuta [neither]
MNS Cissampelos [Chinantec]
MNT Monotropa [neither]
MOR Artocarpus [both]
MOR Brosimum [neither]

MOR Castilla [neither]
MOR Cecropia [both]
MOR Dorstenia [neither]
MOR Ficus [both]
MOR Hevea [both]
MOR Maclura [neither]
MOR Prosimum [neither]
MOR Pseudolmedia [both]
MOR Trophis [Mixe]
MRC Marcgravia [neither]
MRC Souroubea [neither]
MRG Moringa [neither]
MRN Calathea [neither]
MRN Maranta [neither]
MRS Ardisia [neither]
MRS Heberdenia [neither]
MRS Parathesis [Chinantec]
MRS Rapanea [both]
MRS Stylogyne [neither]
MRS Zunila [both]
MRT Calyptranthes [Chinantec]
MRT Eucalyptus [both]
MRT Eugenia [both]
MRT Pimenta [neither]
MRT Psidium [both]
MRT Syzygium [both]
MRT Ugni [neither]
MTR Mitrastemma [neither]
MTT Danaea [neither]
MTT Marattia [Mixe]
MUS Musa [both]
MYR Myrica [both]
MYS Compsoneura [neither]
NAJ Najas [neither]
NYC Allionia [neither]
NYC Boerhavia [neither]
NYC Bougainvillea [both]
NYC Commicarpus [neither]
NYC Mirabilis [both]
NYC Neea [neither]
NYC Pisonia [neither]
NYC Pisoniella [neither]
NYC Salpianthus [neither]
NYM Nymphaea [neither]
NYS Nyssa [neither]
OCH Ouratea [neither]
OCH Sauvagesia [Mixe]
OLE Fraxinus [neither]
ONA Epilobium [neither]
ONA Fuchsia [both]
ONA Gaura [Chinantec]
ONA Lopezia [both]
ONA Ludwigia [both]
ONA Oenothera [both]
OPH Ophioglossum [neither]
ORC Alamania [neither]
ORC Arpophyllum [Mixe]
ORC Artorima [neither]
ORC Barkeria [neither]
ORC Bletia [neither]
ORC Calanthe [neither]
ORC Corallorhiza [neither]
ORC Cranichis [neither]
ORC Cymbiglossum [neither]
ORC Dichaea [Mixe]
ORC Distictis [neither]
ORC Elleanthus [neither]
ORC Encyclia [Mixe]
ORC Epidendrum [both]
ORC Goodyera [neither]
ORC Govenia [both]
ORC Habernaria [Mixe]
ORC Isochilus [Mixe]
ORC Jacquiniellla [neither]
ORC Laelia [neither]
ORC Lemboglossum [Mixe]
ORC Lepanthes [neither]
ORC Liparis [neither]
ORC Malaxis [neither]
ORC Maxillaria [neither]
ORC Nidema [neither]
ORC Norylia [neither]
ORC Oncidium [neither]
ORC Platystele [neither]
ORC Pleurothallis [both]
ORC Sequanthes [neither]
ORC Sobralia [both]
ORC Spiranthes [neither]
ORC Stelis [neither]
ORC Triphora [neither]

ORC Vanilla [both]
ORO Conopholis [neither]
OSM Osmunda [Mixe]
OXL Oxalis [both]
PAP Argemone [neither]
PAP Bocconia [both]
PAS Passiflora [both]
PDC Podocarpus [both]
PDS Marathrum [neither]
PDS Podostemum [neither]
PDS Tristicha [neither]
PED Sesamum [neither]
PGL Monnina [both]
PGL Polygala [both]
PGL Securidaca [neither]
PGY Plagiogyria [Mixe]
PHT Agdestis [neither]
PHT Petiveria [Mixe]
PHT Phytolacca [both]
PHT Rivina [neither]
PHT Stegnosperma [neither]
PHT Trichostigma [neither]
PIN Abies [neither]
PIN Pinus [both]
PIP Peperomia [both]
PIP Piper [both]
PIP Pothomorphe [neither]
PLB Plumbago [Chinantec]
PLG Antigonon [neither]
PLG Muehlenbeckia [neither]
PLG Podopterus [neither]
PLG Polygonum [both]
PLG Rumex [both]
PLM Cobaea [neither]
PLM Loeselia [Chinantec]
PLP Camphyloneurum [neither]
PLP Cochlidium [neither]
PLP Niphidium [both]
PLP Notholaena [neither]
PLP Phlebodium [neither]
PLP Pleopeltis [Chinantec]
PLP Polypodium [both]
PLP Polyporus [neither]
PLT Platanus [Mixe]
POA Aegopogon [neither]
POA Agrostis [neither]
POA Andropogon [Chinantec]
POA Anthephora [neither]
POA Aristida [neither]
POA Arundinaria [neither]
POA Arundinella [Chinantec]
POA Arundo [both]
POA Aulonemia [neither]
POA Bothriochloa [Chinantec]
POA Bouteloua [neither]
POA Bracchizria [neither]
POA Brachiaria [neither]
POA Briza [neither]
POA Bromus [Mixe]
POA Calamagrostis [neither]
POA Cathestecum [neither]
POA Cenchrus [neither]
POA Chloris [neither]
POA Chusquea [neither]
POA Cinna [neither]
POA Cottea [neither]
POA Ctenium [neither]
POA Cymbopogon [both]
POA Cynodon [neither]
POA Dactyloctenium [neither]
POA Dichanthelium [Mixe]
POA Digitaria [Chinantec]
POA Echinochloa [neither]
POA Eleusine [neither]
POA Enneapogon [neither]
POA Eragrostis [neither]
POA Eriochloa [neither]
POA Eriochrysis [neither]
POA Euclasta [Mixe]
POA Gouinia [neither]
POA Guadua [neither]
POA Gynerium [neither]
POA Heteropogon [neither]
POA Hierochloe [neither]
POA Hilaria [neither]
POA Homolepsis [neither]
POA Hymenachne [neither]
POA Hyparrhenia [neither]
POA Ichnanthus [Mixe]
POA Imperata [neither]

POA Isachne [both]
POA Lasciasis [both]
POA Leersia [neither]
POA Leptochloa [neither]
POA Mesosetum [neither]
POA Microchloa [neither]
POA Muhlenbergia [both]
POA Olyra [neither]
POA Opizia [neither]
POA Oplismenus [neither]
POA Orthoclada [neither]
POA Oryza [neither]
POA Panicum [both]
POA Pappophorum [neither]
POA Paspalum [both]
POA Pennisetum [Mixe]
POA Pereilema [neither]
POA Peyritschia [neither]
POA Pharus [neither]
POA Piptochaetium [neither]
POA Poa [neither]
POA Polypogon [neither]
POA Pringleochloa [neither]
POA Pseudochinolaena [neither]
POA Rhipidocladum [Mixe]
POA Rhychelytrum [Chinantec]
POA Saccharum [both]
POA Schizachyrium [neither]
POA Setaria [Mixe]
POA Setariopsis [neither]
POA Sorghastrum [neither]
POA Sorghum [both]
POA Sphenopholis [neither]
POA Sporobolus [neither]
POA Stipa [neither]
POA Streptochaeta [neither]
POA Trachypogon [Chinantec]
POA Tragus [neither]
POA Trichloris [neither]
POA Triniochloa [neither]
POA Trintachya [neither]
POA Tripsacum [neither]
POA Trisetum [neither]
POA Triticum [both]
POA Vulpia [neither]
POA Zea [both]
POA Zeugites [Mixe]
PON Eichornia [neither]
PON Heteranthera [neither]
PON Pontederia [neither]
POR Portulaca [both]
POR Talinum [neither]
POT Potamogeton [neither]
PRM Anagallis [both]
PRM Samolus [Chinantec]
PRT Grevillea [neither]
PRT Roupala [Chinantec]
PTG Plantago [both]
PUN Punica [both]
PYR Chimaphila [Chinantec]
PYR Pyrola [neither]
RAN Anemone [neither]
RAN Clematis [Chinantec]
RAN Delphinium [Chinantec]
RAN Ranunculus [both]
RAN Thalictrum [both]
RHM Adolphia [neither]
RHM Ceanothus [Chinantec]
RHM Colubrina [neither]
RHM Condalia [neither]
RHM Gouania [neither]
RHM Karwinskia [neither]
RHM Muhlenbeckia [Chinantec]
RHM Rhamnus [Mixe]
RHM Sageretia [neither]
RHM Ziziphus [neither]
ROS Alchemilla [Mixe]
ROS Cercocarpus [both]
ROS Cotoneaster [Chinantec]
ROS Crateagus [both]
ROS Cydonia [both]
ROS Eriobotrya [both]
ROS Fragaria [Chinantec]
ROS Guamatela [Chinantec]
ROS Holodiscus [neither]
ROS Lindleyella [neither]
ROS Malus [both]
ROS Photinia [both]
ROS Potentilla [neither]
ROS Prunus [both]

ROS Rosa [both]
ROS Rubus [both]
RUB Alibertia [neither]
RUB Borreria [both]
RUB Bouvardia [Chinantec]
RUB Cephaelis [Chinantec]
RUB Chiococca [neither]
RUB Chomelia [neither]
RUB Coccocypselum [both]
RUB Coffea [both]
RUB Crusea [both]
RUB Deppea [Mixe]
RUB Didymaea [Mixe]
RUB Diodia [neither]
RUB Faramea [neither]
RUB Galium [both]
RUB Gonzalagunia [neither]
RUB Guettarda [neither]
RUB Habroneuron [neither]
RUB Hamelia [neither]
RUB Hemidiodia [neither]
RUB Hillia [neither]
RUB Hintonia [neither]
RUB Hoffmannia [Chinantec]
RUB Houstonia [neither]
RUB Lindenia [neither]
RUB Machaonia [neither]
RUB Manettia [neither]
RUB Mitracarpus [neither]
RUB Nertera [neither]
RUB Oldenlandia [neither]
RUB Palicourea [both]
RUB Posqueria [neither]
RUB Psychotria [both]
RUB Randia [neither]
RUB Richardia [Mixe]
RUB Rondeletia [Mixe]
RUB Rudgea [neither]
RUB Sabicea [neither]
RUB Sickingia [neither]
RUB Sommera [Chinantec]
RUB Spermacoce [neither]
RUT Casimiroa [both]
RUT Citrus [both]
RUT Esenbeckia [neither]
RUT Ptelea [neither]
RUT Ruta [both]
RUT Zanthoxylum [both]
SAB Meliosma [Mixe]
SAL Populus [neither]
SAL Salix [Chinantec]
SAP Carisdospermum [neither]
SAP Cupania [both]
SAP Dodonaea [both]
SAP Matayba [neither]
SAP Paullinia [neither]
SAP Sapindus [Mixe]
SAP Serjania [neither]
SAX Heuchera [Chinantec]
SCR Agalinis [neither]
SCR Bacopa [neither]
SCR Buchnera [Chinantec]
SCR Calceolaria [both]
SCR Castilleja [both]
SCR Escobedia [neither]
SCR Hemichaena [Chinantec]
SCR Lamourouxia [both]
SCR Leucocarpus [both]
SCR Lindernia [Chinantec]
SCR Lophospermum [neither]
SCR Maurandya [neither]
SCR Mecardonia [Chinantec]
SCR Mimulus [both]
SCR Pedicularis [neither]
SCR Penstemon [neither]
SCR Russelia [both]
SCR Scoparia [Chinantec]
SCR Seymeria [neither]
SCR Sibthorpia [neither]
SCR Stemodia [neither]
SCR Uroskinnera [neither]
SCZ Schizea [neither]
SEL Selaginella [both]
SML Smilax [both]
SMR Picramnia [Mixe]
SOL Athenaea [Chinantec]
SOL Brachistus [neither]
SOL Browallia [neither]
SOL Brugmansia [both]
SOL Capsium [both]

SOL Cestrum [both]
SOL Cyphomandra [Mixe]
SOL Datura [both]
SOL Jaltomata [both]
SOL Juanulloa [neither]
SOL Lycianthes [Chinantec]
SOL Lycopersicon [both]
SOL Magaranthus [neither]
SOL Nectouxia [neither]
SOL Nicandra [Chinantec]
SOL Nicotiana [both]
SOL Physalis [both]
SOL Solandra [Mixe]
SOL Solanum [both]
SOL Witheringia [neither]
SPT Bumelia [Chinantec]
SPT Chrsyophyllum [Mixe]
SPT Manilkara [both]
SPT Pouteria [both]
STP Turpinia [neither]
STR Ayenia [neither]
STR Byttneria [neither]
STR Guazuma [neither]
STR Helicteres [neither]
STR Hermannia [neither]
STR Melochia [neither]
STR Sterculia [neither]
STR Theobroma [both]
STR Waltheria [neither]
STY Styrax [both]
SYM Symplocos [neither]
TAX Taxus [neither]
TEA Cleyera [neither]
TEA Freziera [neither]
TEA Gordonia [neither]
TEA Symplococarpon [neither]
TEA Ternstroemia [both]
TEO Jacquinia [neither]
THL Thelypteris [both]
THY Daphnopsis [Mixe]
TIC Ticodendron [both]
TIL Apeiba [neither]
TIL Belotia [neither]
TIL Corchorus [neither]
TIL Heliocarpus [both]
TIL Luehea [neither]
TIL Tilia [Chinantec]
TIL Trichospermum [neither]
TIL Triumfetta [both]
TNR Eriblichia [neither]
TNR Piriqueta [neither]
TNR Turnera [neither]
TOV Tovaria [both]
TRG Trigonia [neither]
TRP Tropaeolum [Mixe]
TXO Taxodium [Mixe]
TYP Typha [Mixe]
ULM Ampelocera [neither]
ULM Aphananthe [neither]
ULM Celtis [neither]
ULM Lozanella [both]
ULM Mirandaceltis [neither]
ULM Trema [both]
ULM Ulmus [both]
URT Boehmeria [neither]
URT Myriocarpa [neither]
URT Parietaria [neither]
URT Phenax [neither]
URT Pilea [neither]
URT Pouzolzia [neither]
URT Urera [Mixe]
URT Urtica [Mixe]
VAL Valeriana [both]
VIO Hybanthus [neither]
VIO Rinorea [neither]
VIO Viola [both]
VIT Cissus [Chinantec]
VIT Vitis [both]
VOC Vochysia [neither]
VRB Aegiphila [neither]
VRB Aloysia [neither]
VRB Bouchea [neither]
VRB Callicarpa [neither]
VRB Citharexylum [neither]
VRB Clerodendrum [neither]
VRB Cornutia [neither]
VRB Duranta [neither]
VRB Ghinia [neither]
VRB Lantana [both]
VRB Lippia [both]

VRB Petrea [neither]
VRB Phyla [neither]
VRB Priva [neither]
VRB Stachytarpheta [neither]
VRB Tamonea [neither]
VRB Verbena [both]
VTT Vittaria [both]
WIN Drimys [neither]
XYR Xyris [neither]
ZAM Ceratozamia [both]
ZAM Dioon [neither]
ZAM Zamia [neither]
ZAN Zannichellia [neither]
ZIN Hedychium [Chinantec]
ZIN Renealmia [both]
ZIN Zingiber [neither]
ZYG Kallstroemia [neither]
ZYG Tribulus [neither]

Appendix 3. Botanical species of the Sierra Norte of Oaxaca, Mexico.

The following list, drawn from the floristic checklist of Martin et al (n.d.), gives the complete species names of plants that have been reported from the Sierra Norte, including all the species cited in this dissertation. Family names are abbreviated according to the mnemomic system developed by Weber (1982:74–88).

ACA Anisacanthus gonzalezii Greenman
ACA Anisacanthus quadrifidus (Vahl) Standley
ACA Anisacanthus sp.
ACA Aphelandra aurantiaca (Scheidw.) Lindley var. aurantiaca
ACA Aphelandra scabra (Vahl) Smith
ACA Aphelandra schiedeana Schldl. & Cham.
ACA Aphelandra sp.
ACA Barleria micans Nees
ACA Blechum brownei Juss.
ACA Carlowrightia neesiana (Nees) T. Daniel
ACA Carlowrightia pringlei Robinson Greenmann
ACA Chileranthemum trifidum Oersted
ACA Dicliptera hankaena Nees
ACA Dicliptera peduncularis Nees
ACA Dicliptera sexangularis (L.) Juss.
ACA Dicliptera sp.
ACA Dicliptera thlaspioides Nees
ACA Dicliptera unguiculata Nees
ACA Dyschoriste capitata (Oersted) Kuntze
ACA Dyschoriste hirsutissima (Nees) Kuntze
ACA Dyschoriste quadrangularis (Oersted) Kuntze
ACA Elytraria imbricata (Vahl) Pers.
ACA Habracanthus silvaticus Nees
ACA Hansteinia gracilis (Nees) Lindou
ACA Hansteinia monolopha (J. Smith) D. Gibson
ACA Henrya insularis Benth.
ACA Justicia aurea Schldl.
ACA Justicia breviflora (Nees) Rusby
ACA Justicia candicans (Nees) L. Benson
ACA Justicia caudata A. Gray
ACA Justicia comata L.
ACA Justicia pringlei Robinson
ACA Justicia spicigera Schldl.
ACA Louteridium conzattii Standley
ACA Odontonema callistachyum (Schldl. & Cham.) Kuntze
ACA Odontonema cuspidatum (Nees) Kuntze
ACA Odontonema tubiforme (Bertol.) Kuntze
ACA Pseuderanthemum praecox (Benth.) Leonard

ACA Ruellia abbreviata D. Gibson
ACA Ruellia geminiflora Kunth
ACA Ruellia harveyana Stapf
ACA Ruellia hookeriana (Nees) Hemsley
ACA Ruellia inundata Kunth
ACA Ruellia jusseuoides Schldl.
ACA Ruellia lactea Cav.
ACA Ruellia longituba D. GIbson
ACA Ruellia nudiflora (Engelm. & A. Gray) Urban
ACA Ruellia pereducta Standley
ACA Ruellia pulcherrima Hemsley
ACA Ruellia rosea (Nees) Hemsley
ACA Ruellia sp.
ACA Ruellia speciosa (Nees) Linden
ACA Ruellia stemonacanthoides (Oersted) Hemsley
ACA Siphonoglossa ramosa Oerst.
ACA Tetramerium glandulosum Oerst.
ACA Tetramerium nervosum Nees
ACE Acer negundo L. subsp. mexicanum (DC.) Wesmael.
ACT Saurauia angustifolia Turcz.
ACT Saurauia aspera Turcz.
ACT Saurauia cana Keller & Breedlove
ACT Saurauia conzattii Buscalioni
ACT Saurauia leucocarpa Schldl.
ACT Saurauia oreophila Hemsley
ACT Saurauia pedunculata Hook.
ACT Saurauia pringlei Rose
ACT Saurauia scabrida Hemsley
ACT Saurauia serrata DC.
ACT Saurauia subalpina J.D. Smith
ACT Saurauia villosa DC.
ACT Saurauia yasicae Loes.
ADI Adiantopsis radiata (L.) Fée
ADI Adiantum andicola author?
ADI Adiantum braunii Kuhn
ADI Adiantum petiolatum Desv.
ADI Adiantum poiretii Wikstrom
ADI Adiantum pulverulentum L.
ADI Cheilanthes bonariensis (Willd.) Proctor
ADI Cheilanthes cucullans Fée
ADI Cheilanthes cuneata Link
ADI Cheilanthes farinosa (Forss.) Kaulf.
ADI Cheilanthes marginata Kunth
ADI Cheilanthes membranacea (Davenp.) Maxon
ADI Cheilanthes myriophylla Desv.

ADI Cheilanthes notholaenoides (Desv.) Weath.
ADI Cheiloplecton rigidum (Sw.) Fée
ADI Llavea cordifolia Lagasca
ADI Mildella intramarginalis Lind. Trev. St. Leon
ADI Pellaea cordata J. Sm. f. sagittata
ADI Pellaea ovata (Desv.) Weath.
ADI Pellaea sagittata (Cav.) Link
ADI Pityrograma tartarea (Cav.) Maxon
ADI Pteris altissima Poiret
ADI Pteris cretica L.
ADI Pteris grandifolia L.
ADI Pteris sp.
AGA Agave americana L.
AGA Agave angustiarum
AGA Agave angustifolia Haw.
AGA Agave angustifolia Haw. var. rubescens
AGA Agave atrovirens Salm-Myck
AGA Agave karwinskii Zucc.
AGA Agave kerchovei author
AGA Agave marmorata author
AGA Agave potatorum Zucc.
AGA Agave salmiana author
AGA Agave seemanii author
AGA Beschorneria albiflora Matuda
AGA Dasylirion serratifolium (Schultes) Zucc.
AGA Dracaena
AGA Fucraea
AGA Manfreda pringlei Rose
AGA Manfreda pubescens (Regel & Ortega) Verhoek
AGA Manfreda sp.
AGA Nolina
AGA Sansevieria trifasciata Prain
AGA Yucca elephantipes Regel
AHT Achatocarpus nigricans Triana
AIZ Trianthema portulacastrum L.
ALI Echinodorus andrieuxii (Hook. & Arn.) Small
ALI Sagittaria guyanensis Kunth subsp. guyanensis
ALI Sagittaria lancifolia L.
ALI Sagittaria longiloba Torrey
AMA Alternanthera microcephala (Moq.) Schinz.
AMA Alternanthera repens (L.) Kuntze
AMA Amaranthus caudatus L.
AMA Amaranthus cruentus L.
AMA Amaranthus dubius C. Martius
AMA Amaranthus hybridus L.

AMA Amaranthus x powellii S. Watson
AMA Gomphrena decumbens Jacq.
AMA Gomphrena pilosa Moq.
AMA Guilleminia densa (Willd.) Moq.
AMA Iresine calea (Ibañez) Standley
AMA Iresine celosia L.
AMA Iresine diffusa Willd.
AMA Iresine discolor Greenman
AMA Iresine pringlei S. Watson
AMA Iresine sp.
AML Bomarea acutifolia (Link & Otto) Herbert
AML Bomarea edulis (Tassac) Herbert
AML Sprekelia formosissima (L.) Herbert
AML Zephyrantes carinata Herbert
AML Zephyrantes sp.
ANA Actinocheita filicina (DC.) Barkley
ANA Astronium graveolens Jacq.
ANA Cyrtocarpa procera Kunth
ANA Mangifera indica L.
ANA Metopium brownei (Jacq.) Urban
ANA Pachycornus discolor (Benth.) Cav. var. veatchiana (Kell) Gentry
ANA Pistacia mexicana Kunth
ANA Pseudosmodingium multifolium Rose
ANA Rhus rubifolia Turcz
ANA Rhus standleyi F. Barkley
ANA Rhus virens A. Gray subsp. purpusii Young
ANA Schinus molle L.
ANA Spondias mombin L.
ANA Spondias purpurea L.
ANA Toxicodendron radicans (L.) Kuntze
ANN Annona cherimola Miller
ANN Annona globiflora Schldl.
ANN Annona muricata L.
ANN Annona scleroderma Safford
ANN Annona squamosa L.
ANN Cymbopetalum penduliflorum (Dunal) Baillon
ANN Guatteria amplifolia Triana & Planchon
ANN Guatteria galeottiana Baillon
ANN Rollinia rensoniana Standley
ANN Sapranthus violaceus (Dunal) G.E. Schatz
ANN Xylopia frutescens Aublet
API Ammi majus L.
API Ammi visnaga (L.) Lam.
API Apium graveolans L.
API Arracacia aegopodioides (Kunth) Coulter & Rose

API Arracacia bracteata J. Coulter & Rose
API Arracacia longipedunculata J. Coulter & Rose
API Arracacia molseedii Mathias & Constance
API Arracacia nelsonii J. Coulter & Rose
API Arracacia pringlei J. Coulter & Rose
API Arracacia ravenii Constance & Affolter ined.
API Berula erecta (Hudson) Coville
API Ciclospermum leptophyllum (Pers.) Sprague
API Coaxana purpurea J. Coulter & Rose
API Coriandrum sativum L.
API Daucus carota L.
API Daucus montanus Sprengel
API Donnellsmithia cordata (J. Coulter & Rose) Mathias & Constance
API Donnellsmithia guatemalensis J. Coulter & Rose
API Donnellsmithia juncea (Sprengel) Mathias & Constance
API Donnellsmithia serrata (J. Coulter & Rose) Mathias & Constance
API Donnellsmithia tuberosa (J. Coulter & Rose) Mathias & Constance
API Eryngium alternatum Coulter & Rose
API Eryngium foetidum L.
API Eryngium galeottii Hemsley
API Eryngium ghiesbreghtii Decne.
API Eryngium heterophyllum Engelm.
API Eryngium involucratum J. Coulter & Rose
API Eryngium longirameum Turcz.
API Eryngium nasturtiifolium Delar. f.
API Eryngium purpusii Hemsley & Rose
API Eryngium scaposum Turcz.
API Eryngium sp.
API Eryngium tzeltal Constance
API Foeniculum vulgare Miller
API Hydrocotyle mexicana Cham. & Schldl.
API Hydrocotyle ranunculoides L.f.
API Hydrocotyle umbellata Cham. & Schldl.
API Hydrocotyle verticillata Thunb.
API Micropleura renifolia Lagasca
API Neogoezia minor Hemsley
API Osmorhiza mexicana Griseb.
API Ottoa oenanthoides Kunth
API Petroselinium crispum (Miller) A.W. Hill
API Pimpinella anisum L.
API Prionosciadium megacarpum J. Coulter & Rose
API Rhodosciadium dissectum J. Coulter & Rose
API Rhodosciadium glaucum J. Coulter & Rose var. glaucum
API Rhodosciadium nudicaule (J. Coulter & Rose) Drude
API Sanicula liberta Cham. & Schldl.

API Tauschia ehrenbergii (Wolff) Mathias
API Tauschia filiformis (J. Coulter & Rose) J. Coulter & Rose
API Tauschia nudicaulis Schlecht.
API Tauschia vaginata (J. Coulter & Rose) J. Coulter & Rose
APO Allamanda cathartica L.
APO Aspidosperma megalocarpon Muell. Arg.
APO Mandevilla oaxacana (A. DC.) Hemsley
APO Plumeria rubra L.
APO Prestonia guatemalensis Woodson
APO Stemmadenia donnell-smithii (Rose) Woodson
APO Stemmadenia galeottiana (A. Rich.) Miers
APO Tabernaemontana alba Miller
APO Tabernaemontana arborea Rose ex J. D. Smith
APO Tabernaemontana citrifolia L.
APO Thenardia galeottiana Baill
APO Thevetia ovata (Cav.) A. DC.
APO Thevetia peruviana (Pers.) Schumann
APO Thevetia thevetiodes (Kunth.) Schumann
APO Vallesia glabra (Cav.) Link.
APO Vallesia mexicana Muell. Arg.
AQF Ilex pringlei Standley
AQF Ilex sp.
ARA Anthurium andicola Liebm.
ARA Anthurium cerropelonense Matuda
ARA Anthurium longipeltatum Matuda
ARA Anthurium lucens Yancker
ARA Anthurium machetioides Matuda
ARA Anthurium microspadix Schott
ARA Anthurium pentaphyllum (Aublet) Do var. bombacifolium (Schott) Madison
ARA Anthurium scandens (Aublet) Engl. var. scandens
ARA Anthurium schlechtendalii Kunth
ARA Anthurium sp.
ARA Anthurium subovatum Matuda
ARA Anthurium umbrosum Liebm.
ARA Anthurium yetlense Matuda
ARA Dieffenbachia sequina (L.) Schott
ARA Monstera deliciosa Liebm.
ARA Philodendron guatemalense Engl.
ARA Philodendron radiatum Schott
ARA Philodendron sagittifolium Liebm.
ARA Philodendron sp.
ARA Spathiphyllum cochlearispathum (Liebm.) Engl.
ARA Syngonium podophyllum Schott
ARA Xanthosoma robustum Schldl.
ARA Xanthosoma violaceum Schott

ARA Zantedeschia aethiopica (L.) Sprengel
ARE Acrocomia mexicana C. Martius
ARE Astrocaryum mexicanum Liebm.
ARE Bactris mexicana author
ARE Brahea dulcis (Kunth) C. Martius
ARE Chamaedorea affinis Liebm.
ARE Chamaedorea elatior C. Martius
ARE Chamaedorea elegans C. Martius
ARE Chamaedorea lehmannii Burret vel. aff.
ARE Chamaedorea lindeniana Wendl. vel. aff.
ARE Chamaedorea nubium Standley & Steyerm. vel. aff.
ARE Chamaedorea rojasiana Standley & Steyerm. vel aff.
ARE Chamaedorea sartorii Liebm.
ARE Chamaedorea sp.
ARE Chamaedorea tepejilote Liebm.
ARE Desmoncus chinantlensis Liebm.
ARE Geonoma binervis Oersted
ARE Hexopetion mexicanum Liebm.
ARE Reinhardtia elegans Liebm.
ARE Sabal mexicana Martens
ARE Scheelea liebmannii Becc.
ARL Aralia humilis Cav.
ARL Dendropanax arboreus (L.) Decne. & Planchon
ARL Dendropanax populifolius (Marchal) A.C. Smith
ARL Didymopanax morototonii (Aublet) Decne. & Planchon
ARL Hedera helix L.
ARL Oreopanax capitatus (Jacq.) Decne. & Planchon
ARL Oreopanax echinops (Schldl. & Cham.) Decne. & Planchon
ARL Oreopanax flaccidus Marchal
ARL Oreopanax liebmanii Marchal
ARL Oreopanax peltatus Regel
ARL Oreopanax xalapensis (Kunth) Decne. & Planchon
ARS Aristolochia grandiflora Sw.
ARS Aristolochia ovalifolia author
ARS Aristolochia tricaudata Lemaire
ARU Araucaria heterophylla (Salisb.) Franco
ASC Asclepias curassavica L.
ASC Asclepias elata Benth.
ASC Asclepias glaucescens Kunth
ASC Asclepias laxiflora (Benth.) Decne
ASC Asclepias linaria Cav.
ASC Asclepias notha W. D. Stevens
ASC Asclepias oenotheroides Cham. & Schldl.
ASC Asclepias ovata Martens & Galeotti
ASC Asclepias sp.

ASC Cynanchum barbigerum (Scheele) Schinners
ASC Cynanchum sp.
ASC Gonolobus nemorosus Decne.
ASC Gonolobus sororius A. Gray
ASC Marsdenia mexicana Decne.
ASC Matelea caudata (A. Gray) Woodson
ASC Matelea ceratopetalas (J. D. Smith) Woodson
ASC Matelea chrysantha (Greenman) Woodson
ASC Matelea dictyantha Woodson
ASC Matelea gonoloboides (Robinson & Greenman) Woodson
ASC Matelea quirosii (Standley) Woodson
ASC Metastelma angustifolium Turcz.
ASC Metastelma macropoda Greenman
ASC Metastelma schlechtendalii Decne.
ASC Metastelma sp.
ASC Tassadia obovata Decne.
ASL Achrodyne deflexum author
ASL Asplenium cirrhatum Willd.
ASL Asplenium commutatum Kuhn
ASL Asplenium cuspidatum Lam.
ASL Asplenium delitescens (Maxon) L.D. Gomez
ASL Asplenium exiguum Beddome
ASL Asplenium formosum Willd.
ASL Asplenium hallbergii Mickel
ASL Asplenium lacerum Schlecht. & Cham.
ASL Asplenium miradorense Liebm.
ASL Asplenium monanthes L.
ASL Asplenium myriophyllum (Sw.) Presl.
ASL Asplenium palmeri Maxon
ASL Asplenium polyphyllum L.
ASL Asplenium pumilum Sw.
ASL Asplenium repandulum Kunze
ASL Asplenium salicifolium L.
ASL Asplenium serra Langsd. & Fisch.
ASL Asplenium sphaerosporum A.R. Smith
ASL Asplenium tuerckheimii Maxon
ASL Asplenium uniseriale Raddi
AST Achillea millefolium L.
AST Acmella oppositifolia (Lam.) R. Jansen
AST Acourtia nudicaulis (A. Gray) B. Turner
AST Adenophyllum glandulosum (Cav.) Strother
AST Adenophyllum porophyllum (Cav.) Hemsley
AST Ageratina aschenborniana (Schauer) R. King & H. Robinson
AST Ageratina bartlettina (Less.) R. King & H. Robinson
AST Ageratina bellidifolia (Benth.) R. King & H. Robinson

AST Ageratina bustamenta (DC.) R. King & H. Robinson
AST Ageratina collodes (Robinson & Greenman) R. King & H. Robinson
AST Ageratina espinosarum (A. Gray) R. King & H. Robinson
AST Ageratina glabrata (Kunth) R. King & H. Robinson
AST Ageratina glauca (Klatt) R. King & H. Robinson
AST Ageratina liebmannii (Klatt) R. King & H. Robinson
AST Ageratina ligustrina (DC.) R. King & H. Robinson
AST Ageratina loeseneri (Robinson) R. King & H. Robinson
AST Ageratina muelleri (Klatt) R. King & H. Robinson
AST Ageratina pazcuarensis (Kunth) R. King & H. Robinson
AST Ageratina petiolaris (DC.) R. King & H. Robinson
AST Ageratina pringlei (Robinson & Greenman) R. King & H. Robinson
AST Ageratina prunellaefolia (Kunth) R. King & H. Robinson
AST Ageratina rivalis (Greenman) R. King & H. Robinson
AST Ageratina rupicola (Robinson & Greenman) R. King & H. Robinson
AST Ageratina tomentella (Schrader) R. King & H. Robinson
AST Ageratina vernalis (Vatke & Kurtz) R. King & H. Robinson
AST Ageratina vernicosa (Griseb.) R. King & H. Robinson
AST Ageratum albidum (DC.) Hemsley
AST Ageratum corymbosum Pers.
AST Ageratum houstonianum Miller
AST Ageratum microcephalum Hemsley
AST Ageratum paleaceum (DC.) Hemsley
AST Ageratum rugosum J. Coulter
AST Aldama dentata Llave & Lex.
AST Alloispermum integrifolium (DC.) H. Robinson
AST Ambrosia cumanensis Kunth
AST Archibaccharis androgyna (Brandagee) Blake
AST Archibaccharis asperifolia (Benth.) S.F. Blake
AST Archibaccharis schiedeana (Benth.) J.D. Jackson
AST Artemisia mexicana Sprengel
AST Aster moranensis Kunth
AST Aster subulatus Michaux
AST Aster subulatus Michaux var. parviflorus
AST Asterohyptis stellulata
AST Axiniphyllum tomentosum Benth.
AST Baccharis caloneara S.F. Blake
AST Baccharis conferta Kunth
AST Baccharis elegans Kunth
AST Baccharis glutinosa Pers.
AST Baccharis heterophylla Kunth
AST Baccharis mexicana author?
AST Baccharis oaxacana Greenman
AST Baccharis pyramidata (Robinson & Greenman) Rzed.
AST Baccharis salicifolia (Ruíz & Pavón) Pers.

AST Baccharis serraefolia autor?
AST Baccharis sordescens DC.
AST Baccharis trinervis Pers.
AST Barlettina platyphylla (Robinson) R. King & H. Robinson
AST Barlettina tuerkheimii (Klatt) R. King & H. Robinson
AST Bartlettina karvinskiana (DC.) R. King & H. Robinson
AST Bartlettina sordida (Less.) R. King & H. Robinson
AST Bartlettina sordida (Less.) R. Kong & H. Robinson
AST Bidens alba Willd. var. radiata (Schulty-Bip.) Ballard
AST Bidens aurea (Aiton) Sherff
AST Bidens bicolor Greenman
AST Bidens chiapensis Brandegeee
AST Bidens odorata Cav.
AST Bidens pilosa L.
AST Bidens reptans (L.) G. Don
AST Bidens serrulata (Poiret) Desf.
AST Bidens squarrosa Kunth
AST Bidens triplinervia Kunth var. macrantha (Wedd.) Scherff
AST Bigelowia pyramidata Robinson & Greenman
AST Brickellia diffusa (Vahl) A. Gray
AST Brickellia hymenochlaena A. Gray
AST Brickellia lancifolia Robinson & Greenman
AST Brickellia nutans Robinson & Greenman
AST Brickellia pacayensis autor
AST Brickellia paniculata (Miller) Robinson
AST Brickellia secundiflora (Lag.) Gray
AST Brickellia squarrosa (Cav.) Robins.
AST Calea hypoleuca Robinson & Greenman
AST Calea ternifolia Kunth var. hypoleuca (Robinson & Greenman) B. Turner
AST Calea ternifolia Kunth var. ternifolia
AST Calea urticifolia (Miller) DC.
AST Calendula cf. arvensis L.
AST Calendula officinalis L.
AST Calyptocarpus vialis Less.
AST Chaptalia sp.
AST Cirsium horridum Michaux
AST Cirsium mexicanum author
AST Cirsium pinetorum author
AST Cirsium subcoriaceum (Less.) Sch.-Bip.
AST Cirsium subcoriaceus (Hemsley) S.F. Blake
AST Clibadium
AST Conyza apurensis Kunth
AST Conyza canadensis (L.) Cronq.
AST Conyza confusa Cronq.
AST Conyza gnaphalioides (Kunth) Cass.

AST Conyza sophiifolia Kunth
AST Coreopsis mutica DC.
AST Coreopsis pinnatisecta S.F. Blake
AST Cosmos bipinnatus Cav.
AST Cosmos crithmifolius Kunth
AST Cosmos diversifolius Otto
AST Cosmos sulphureus Cav.
AST Critonia eriocarpa (Robinson & Greenman) R. King & H. Robinson
AST Critonia quadrangularis (DC.) R. King & H. Robinson
AST Dahlia ?biflora (L.) Kuntze
AST Dahlia australis (Scherff) Sorensen
AST Dahlia coccinea Cav.
AST Dahlia imperialis Ortgies
AST Dahlia pinnata Cav.
AST Desmanthodium ovatum Benth.
AST Desmanthodium tomentosum Brandagee
AST Digitacalia napeifolia (DC.) Pippen
AST Dyssodia decipiens (Bartling) M. Johnston
AST Electra galeottii A. Gray
AST Elephantopus spicatus Aublet
AST Epaltes mexicana Less.
AST Erechtites hieracifolia (L.) Raf.
AST Erigeron galeottii (Hemsley) Greene
AST Erigeron karwinskianus DC.
AST Erigeron longipes DC.
AST Erigeron scaposus DC.
AST Eupatorium sp.
AST Flaveria trinervia (Sprengel) C. Mohr
AST Fleischmannia pycnocephaloides (Robinson) R. King & H. Robinson
AST Fleiscmannia pratensis (Klatt) R. King & H. Robinson
AST Florestina platyphylla (Robinson & Greenman) Robinson & Greenman
AST Galinsoga quadriradiata Ruíz et Pav6n
AST Galinsoga urticaefolia (Kunth) Benth.
AST Gnaphalium americanum Miller
AST Gnaphalium attenuatum DC.
AST Gnaphalium attenuatum DC. var. attenuatum
AST Gnaphalium brachypterum DC.
AST Gnaphalium canescens DC.
AST Gnaphalium chartaceum Greenman
AST Gnaphalium concinnum A. Gray
AST Gnaphalium greenmanii S.F. Blake
AST Gnaphalium pannosum A. Gray
AST Gnaphalium purpureum L.
AST Gnaphalium roseum Kunth
AST Gnaphalium salicifolium (Bertol.) Schulty-Bip

AST Gnaphalium schraderi DC.
AST Gnaphalium viscosum Kunth
AST Grindelia squarrosa Dunal var. hirtella Robinson & Greenman
AST Gymnolaena serratifolia (DC.) Rybd.
AST Gymnosperma glutinosa (Sprengel) Less.
AST Haplopappus pyramidatus (Robinson & Greenman) S.F. Blake
AST Hebeclinium macrophyllum (L.) DC.
AST Helenium mexicanum Kunth
AST Heliopsis buphtalmoides (Jacq.) Dunal
AST Heterosperma pinnatum Cav.
AST Heterotheca inuloides Cass.
AST Hidalgoa ternata Llave & Lex.
AST Hieracium abscissum Less.
AST Hieracium mexicanum Less.
AST Hieracium schultzii Fries
AST Iostephane trilobata Hemsley
AST Jaegeria hirta (Lagasca) Less.
AST Koanophyllon albicaulis (Schultz-Bip.) R. King & H. Robinson
AST Lagascea helianthifolia Kunth
AST Lagascea rigida (Cav.) Stuessy
AST Lasianthea fruticosa (L.) K. Becker
AST Leibnitzia
AST Leptosyne pringlei Robinson & Greenman
AST Leucanthemum vulgare L.
AST Liabum caducifolium autor?
AST Liabum discolor (H & A) Benth. & Hook.
AST Liabum klattii Robinson & Greenman
AST Matricaria recutita L.
AST Melampodium divaricatum (Rich.) DC.
AST Melampodium glabribracteatum Stuessy
AST Melampodium microcephalum Less.
AST Melampodium montanum Benth.
AST Melampodium perfoliatum (Cav.) Kunth
AST Melampodium sericeum Lagasca
AST Melanthera nivea (L.) Small
AST Microspermum debile Benth.
AST Mikania aromatica Oersted
AST Mikania cordifolia (Lf.) Willd
AST Mikania eriophora Schultz-Bip.
AST Mikania micrantha Kunth
AST Mikania punctata Klatt
AST Mikania tonduzii Robinson
AST Montanoa leucantha (Lagasca) S.F. Blake subsp. arborescens (DC.) V. Funk
AST Montanoa macrolepis Robinson & Greenmann
AST Montanoa microcephala Schultz-Bip.

AST Montanoa tomentosa Cerv.
AST Montanoa uncinata Schultz-Bip.
AST Neurolaena lobata (L.) Cass.
AST Neurolaena macrocephala Hemsley
AST Oaxacania malvifolia Robinson & Greenman
AST Oxylobus arbutifolius (Kunth) A. Gray
AST Oxylobus glanduliferous (Schultz-Bip.) A. Gray
AST Oxylobus oaxacanus S.F. Blake
AST Parthenium hysterophorus L.
AST Parthenium tomentosum DC.
AST Pectis prostrata Cav.
AST Pectis saturejoides (Miller) Schultz-Bip.
AST Perymeniopsis ovalifolia (A. Gray) H. Robinson
AST Perymenium discolor Shrader
AST Perymenium gracile Hemsley
AST Perymenium mendezii DC. var. mendezii
AST Pinaropappus roseus (Less.) Less,
AST Piptocarpha
AST Piptothrix areolaris (DC.) R. King & H. Robinson
AST Piqueria serrata A. Gray var. angustifolia Robinson & Greenman
AST Piqueria trinervia Cav.
AST Pluchea odorata (L.) Cass.
AST Podochaenium eminens (Less.) Schultz-Bip.
AST Porophyllum lineare (Cav.) DC.
AST Porophyllum ruderale (Jacq.) Cass.
AST Porophyllum tagetoides (Kunth) DC.
AST Psacalium amplifolium (DC.) H. Robinson
AST Psacalium beamannii H. Robinson
AST Psacalium peltatum (Kunth) Cass.
AST Rumfordia floribunda DC.
AST S. chenopodioides
AST Sabazia liebmannii Klatt var. liebmannii
AST Salmea scandens
AST Sanvitalia angustifolia Engelm.
AST Sanvitalia procumbens Lam.
AST Schistocarpha bicolor Less.
AST Schistocarpha oppositifolia (Kuntze) Rydb.
AST Schistocarpha seleri = S. bicolor
AST Schkuhria pinnata (Lam.) Thell.
AST Senecio andrieuxii DC.
AST Senecio angulifolia DC.
AST Senecio arborescens Steetz
AST Senecio barba-johannis DC.
AST Senecio bellidifolius Kunth
AST Senecio bracteatus Klatt

AST Senecio callosus Schultz-Bip.
AST Senecio conzattii Greenmann
AST Senecio deppeanus
AST Senecio eximius Godm. & Salv.
AST Senecio grandifolius Less.
AST Senecio liebmanni Buchinger
AST Senecio petasioides Greenman
AST Senecio picrides Schauer
AST Senecio praecox (Cav.) DC.
AST Senecio runcinatus Less.
AST Senecio salignus DC.
AST Senecio sanguisorbae DC.
AST Senecio sinuatus Kunth
AST Senecio toluccanus DC.
AST Senecio uspantanensis (J. Coulter) Greenman
AST Sigesbeckia jorullensis Kunth
AST Sigesbeckia repens Robinson & Greenman
AST Simsia lagascaeformis DC.
AST Simsia sanguinea A. Gray.
AST Sinclairia
AST Smallanthus maculata (Cav.) H. Robinson
AST Smallanthus oaxacanus (Klatt) H. Robinson
AST Sonchus oleraceus L.
AST Stevia attenuatum author
AST Stevia elatior Kunth
AST Stevia glutinosa Kunth var. oaxacana DC.
AST Stevia hirsuta DC.
AST Stevia incognita Grashoff.
AST Stevia jorullensis Kunth
AST Stevia lehmannii Hieron.
AST Stevia lucida Lagasca
AST Stevia microchaeta Schultz-Bip.
AST Stevia ovata Willd.
AST Stevia polycephala Bertol.
AST Stevia rhombifolia Kunth
AST Stevia seemanii Schultz-Bip.
AST Stevia serrata Cav.
AST Stevia suaveolens Lagasca
AST Stevia subpubescens Lagasca
AST Stevia subpubescens Lagasca var. subpubescens
AST Stevia triflora DC.
AST Syndrella nodiflora author
AST Tagetes erecta L.
AST Tagetes filifolia Lagasca
AST Tagetes lucida Cav.

AST Tagetes lunulata autor?
AST Tagetes remotiflora Kunze
AST Tagetes tenuiflora author
AST Tanacetum parthenium (L.) Schultz-Bip.
AST Taraxacum officinalis Wigg.
AST Tetrachyron manicatum Schldl.
AST Tithonia calva autor? var. lancifolia autor
AST Tithonia diversifolia (Hemsl.) A. Gray
AST Tithonia longiradiata (Bertoloni) S.F. Blake
AST Tithonia tubaeformis (Jacq.) Cass.
AST Tridax coronopifolia (Kunth) Hemsley
AST Trigonospermum melampodioides DC.
AST Trixis oligantha Robinson & Greenman
AST Verbesina abscondita Klatt
AST Verbesina enceliodes (Cav.) autor?
AST Verbesina hypoglauca Klatt
AST Verbesina lanatum Robinson & Greenman
AST Verbesina nelsonii Robinson & Greenman
AST Verbesina perymenioides Klatt
AST Verbesina resinosa Klatt
AST Verbesina sericea Kunth & Bouché
AST Verbesina trilobata Robinson & Greenman
AST Verbesina turbacensis Kunth
AST Verbesina virgata Cav.
AST Vernonia alamanii DC.
AST Vernonia deppeana Less.
AST Vernonia karwinskiana DC.
AST Vernonia leiocarpa DC.
AST Vernonia paniculata DC.
AST Vernonia patens Kunth
AST Vernonia tortuosa (L.) S.F. Blake
AST Viguiera cordata (Hook. & Arn.) D'Arcy
AST Viguiera dentata (Cav.) Sprengel
AST Viguiera eriophora Humb. & Bonpl.
AST Viguiera excelsa (Willd.) Humb. & Bonpl.
AST Viguiera grammatoglossa DC.
AST Viguiera hemsleyana S.F. Blake
AST Viguiera ovata (A. Gray) S.F. Blake
AST Viguiera rhombifolia (Robinson & Greenman) S.F. Blake
AST Viguiera tenuis A. Gray
AST Wedelia hispida Kunth var. ramosissima Greenman
AST Xanthium strumarium L.
AST Zaluzania asperrima Schultz-Bip
AST Zexmenia elegans Schultz-Bip.
AST Zinnia peruviana (L.) L.

AZL Azolla
BEG Begonia biserrata Lindley
BEG Begonia crenatiflora A. DC.
BEG Begonia fimbriata author
BEG Begonia franconis Liebm.
BEG Begonia glabra Aublet
BEG Begonia gracilis Kunth
BEG Begonia heracleifolia Schldl. & Cham.
BEG Begonia oaxacana
BEG Begonia pedata
BEG Begonia plebeja
BEG Begonia sartori
BER Mahonia lanceolata (Benth.) Fedde
BER Mahonia pallida (Benth.) Fedde
BET Alnus acuminata Kunth
BET Alnus acuminata Kunth subsp. arguta (Schldl.) Furlow
BET Alnus acuminata Kunth subsp. glabrata (Fern) Furlow
BET Alnus jorullensis Kunth
BET Alnus jorullensis Kunti lutea Furlow
BET Carpinus caroliniana Walt.
BET Ostrya virginiana (Miller) K. Koch
BIG Adenocalymma inundatum DC.
BIG Amphilophium paniculatum (L.) Kunth var. molle (Schldl. & Cham.) Standley
BIG Amphilophium paniculatum (L.) Kunth var. paniculatum
BIG Amphitecna macrophylla (Seemann) Baillon
BIG Anemopaegma chrysanthum Dugand
BIG Anemopaegma chrysoleucum (Kunth) Sadwinth
BIG Anemopaegma puberulum (Seibert) Miranda
BIG Arrabidaea corallina (Jacq.) Sandwith
BIG Arrabidaea patelliferß (Schldl.) Sandw.
BIG Astianthus viminalis (Kunth) Baillon
BIG Crescentia alata Kunth
BIG Crescentia cujete L.
BIG Cydista aequinoctialis (L.) Miers var. aequinoctialis
BIG Cydista aequinoctialis (L.) Miers var. hirtella (Benth.) Gentry
BIG Cydista heterophylla Seibert
BIG Distictis laxiflora (DC.) Greenman
BIG Godmania aesculifolia (Kunth) Standley
BIG Jacaranda mimosifolia D. Don
BIG Lundia puberula Pittier
BIG Macfadyena unguiscati (L.) A. Gentry
BIG Melloa quadrivalvis (Jacq.) A. Gentry
BIG Paragonia pyramidata (Rich.) Bureau
BIG Parmentiera aculeata (Kunth) Seemann
BIG Pithecoctenium crucigerum (L.) A. Gentry

BIG Pyrostegia venusta (Ker.) Miers
BIG Saritaes magnifics (van Steenis) Dugand
BIG Spathoidea campanulata Beauv.
BIG Tabebuia rosea (Bertol.) DC.
BIG Tecoma stans (L.) Kunth var. stans
BIG Tecoma stans (L.) Kunth var. velutina DC.
BIG Xylophragma seemannianum (Kuntze) Sandwith
BIX Bixa orellana L.
BLE Blechnum ensiforme (Liebm.) C. Chr.
BLE Blechnum fraxineum Willd.
BLE Blechnum occidentale L.
BLE Blechnum schiedeanum (Presl) Hieron.
BLE Woodwardia spinulosa Martens & Galeotti
BLS Impatiens balsamina L.
BML Aechmea bracteata (Sw.) Griseb.
BML Aechmea magdalenae (Andre) Baker
BML Aechmea mexicana Baker
BML Ananas comosus (L.) Merrill
BML Catopsis floribunda (Brogn.) L.B. Sm.
BML Catopsis nutans (Sw.) Baker
BML Catopsis paniculata E. Morren
BML Catopsis sabulata L. B. Sm.
BML Guzmania nicarguensia Mez & C. F. Baker
BML Hechtia podantha Mez
BML Hechtia stenopetala Klotsch
BML Lindmannia micrantha (Lindley) L. B. Sm.
BML Pitcairnia heterophylla Beer
BML Pitcairnia ringens Link
BML Tillandsia bourgaei Baker
BML Tillandsia carlos-hankii Matuda
BML Tillandsia gymnobotria Baker
BML Tillandsia macdougallii L. B. Sm.
BML Tillandsia mexicana L. B. Sm.
BML Tillandsia ponderosa L. B. Sm.
BML Tillandsia seleriana Mez
BML Tillandsia sierrajuarezensis Matuda
BML Tillandsia tricolos Schldl. & Cham.
BML Tillandsia usneoides (L.) L.
BML Tillandsia violacea Baker
BML Tillandsia viridiflora (Beer) Baker
BML Vriesia malzinei E. Morren vas. malzinei
BML Vriesia vanhymingii L. B. Sm.
BMN Apteria aphylla (Nutt.) Small
BMN Dictyostega orobanchoides (Hook.) Miers v. orobanchoides
BMN Gymnosiphon divaricatus (Benth.) Benth. & Hook.

BNL Brunellia comocladifolia Humb. & Bonpl.
BNL Brunellia mexicana Standley
BNP Helosis mexicana Liebm.
BOM Bombax ellipticum Kunth
BOM Ceiba aescultifolia (Kunth) Britton & Baker
BOM Ceiba parviflora Rose
BOM Ceiba pentandra (L.) Gaertn.
BOM Ochroma lagopus (Sw.)
BOM Quararibea funebris (Llave) Vischer
BOR Antiphytum heliotropiodes A. DC.
BOR Borago officinalis L.
BOR Brassica campestris L.
BOR Cordia alliodora (Ruíz López & Pavón) Oken
BOR Cordia ambigua Schldl. & Cham.
BOR Cordia curasavica (Jacq.) Roemes & Schultes
BOR Cordia diversiflora A. DC.
BOR Cordia dodecandra A. DC.
BOR Cordia foliosa Martens & Galeotti
BOR Cordia inermis (Miller) I.M. Johnston
BOR Cordia limicola Brandagee
BOR Cordia linnaei Stearn
BOR Cordia oaxacana A. DC.
BOR Cordia paranensis Rilez
BOR Cordia pringlei B.L. Robinson
BOR Cordia spinescens L.
BOR Cordia stellifera I.M. Johnston
BOR Cryptantha albida (Kunth) I.M. Johnston
BOR Cynoglossum amabile Stapμ & J.R. Drumm
BOR Echinospermum mexicanum Hemsley
BOR Ehretia latifolia A. DC.
BOR Ehretia tinifolia L.
BOR Hackelia mexicana (Schldl. & Cham.) I.M. Johnston
BOR Hackelia stricta I.M. Johnston
BOR Heliotropium aff. mexicanum Greenman
BOR Heliotropium curassavicum L. vas curassavicum L. var. curassavicum
BOR Heliotropium filiforme Lehm.
BOR Heliotropium foliosissimum J.F. Macbr.
BOR Heliotropium fruticosum L.
BOR Heliotropium indicum L.
BOR Heliotropium inundatum Sw.
BOR Heliotropium lagoense (Warming) Gorke
BOR Heliotropium limbatum Benth.
BOR Heliotropium mexicanum Greenman
BOR Heliotropium procumbens Miller
BOR Heliotropium rufipilum (Benth.) I.M. Johnston

BOR Heliotropium ternatum Vahl
BOR Lasiarrhenum strigosum (Kunth) I.M. Johnston
BOR Lithospermum calcicola Robinson
BOR Lithospermum calycosum (MacBride) I.M. Johnston
BOR Lithospermum distichum Ortega
BOR Macromeria exserta D. Don
BOR Macromeria pringlei Greemamn
BOR Rochefortia lundellii Camp
BOR Tournefortia acutiflora Martens & Galeotti
BOR Tournefortia bicolor Swartz
BOR Tournefortia calycosa (J.D. Sm.) D. Nash
BOR Tournefortia densiflora Martens & Galeotti
BOR Tournefortia glabra L.
BOR Tournefortia hartwegiana Steudel
BOR Tournefortia hirsutissima L.
BOR Tournefortia maculata Jacq.
BOR Tournefortia trichocalycina author
BOR Tournefortia volubilis L.
BRA Brassica campestris L.
BRA Brassica nigra (L.) Koch
BRA Brassica oleracea
BRA Cardamine flaccida Cham & Schldl.
BRA Cardamine fulcrata E. Greene
BRA Eruca sativa Milles subsp. sativa
BRA Lepidium lasiocarpum L.
BRA Lepidium virginicum L.
BRA Pennellia patens (O. Schultz) Rollins
BRA Raphanus sativus L.
BRA Romanschulzia turritoides (Loes.) O.E. Schul·
BRA Rorripa mexicana (Mociño & Sessé) Standley & Steyerm.
BRA Rorripa nasturtium-aquaticum (L.) Hayek
BRS Bursera bipinnata (Sessé & Mociño) Engl.
BRS Bursera galeottiana Engl.
BRS Bursera glabrifolia (Kunth) Engl.
BRS Bursera grandifolia (Schldl.) Engl.
BRS Bursera jorullensis (Kunth) Engl.
BRS Bursera morelensis Ramirez
BRS Bursera penicillata (DC.) Engl.
BRS Bursera schlechtendalii Engl.
BRS Bursera simaruba (L.) Sarg.
BRS Protium copal (Schldl. & Cham.) Engl.
BRS Protium pittieri (Rose) Engl. cf.
CAC Acanthocereus
CAC Aporocactus conzattii Britton & Rose
CAC Cephatocereus

CAC Coryphantha retusa (Pfeiμfer) Britton & Rose
CAC Disocactus
CAC Echinocactus
CAC Echinocereus
CAC Epiphyllum anguliger (Lemaire) Don
CAC Epiphyllum caudatum Britton & Rose
CAC Epiphyllum crenatum (Lindley) Don
CAC Epiphyllum oxypetalum (DC.) Haw.
CAC Epiphyllum strictum (Lemaire) Britton & Rose
CAC Escontria chiotilla (A. Weber) Rose
CAC Ferrocactus nobilis (L.) Britton & Rose
CAC Heliocereus
CAC Hylocereus undatus (Haworth) Britton & Rose
CAC Lemaireocereus chichipe (Goss.) Britton & Rose
CAC Lemaireocereus stellatus (Pfeiffer) Britton & Rose
CAC Mammillaria rekoi (Britton & Rose) Vaupel
CAC Neobuxbaumia tetetzo (Weber) Backbg.
CAC Nopalea auberi (Pfeiffer) Salm-Dyck
CAC Nopalea lutea Rose
CAC Nopalxochia conzattiana MacDougall
CAC Nyctocereus oaxacensis Britton & Rose
CAC Opuntia guatemalensis Britton & Rose
CAC Opuntia pilifera Weber
CAC Opuntia tomentosa Salm-Dyck
CAC Pachycereus marginatus (DC.) Britton & Rose
CAC Pereskia lychnidiflora (DC.) autor
CAC Rhipsalis baccifera (Mill.) Stearn.
CAC Stenocereus pruinosus (Otto) F. Buxb.
CAC Stenocereus treleasei (Vaupel) Britton & Rose
CAM Centropogon Benth.
CAM Centropogon affine Martens & Galeotti
CAM Centropogon grandidentatus (Schldl.) A. Zahlbr.
CAM Diastatea expansa McVaugh
CAM Diastatea micrantha (Kunth) McVaugh
CAM Diastatea tenera (A. Gray) McVaugh
CAM Glockeria haematodes Oersted
CAM Lobelia cliffortiana L. var. xalapensis A. Gray
CAM Lobelia laxiflora Kunth
CAM Lobelia nelsonii Fern.
CAM Lobelia sartorii Vatke
CAM Triodanis biflora (Fisches & Meyer) E. Greene
CAS Casuarina cunninghamiana Miq.
CAS Casuarina equisetifolia L.
CCH Cochlospermum vitifolium Sprengel
CEL Celastrus pringlei Rose

CEL Euonymus corymbosus Sprague & Bullock
CEL Maytenus trichotomus Turcz.
CEL Microtropis guatemalensis Sprague
CEL Perrottetia longistylis Rose
CEL Perrottetia ovata Hemsley
CEL Wimmeria persicifolia Radlk.
CHB Hirtella racemosa Lam. var. hexandra (R. & S.) Prance
CHB Licania platypus (Hemsley) Fritsh
CHN Chenopodium ambrosioides L.
CHN Chenopodium berlandieri Moq.
CHN Chenopodium murale L.
CIS Helianthemum glomeratum DC.
CIS Lechea skinneri (Benth.) Britton
CLE Clethra alcoceri Greenman
CLE Clethra macrophylla Martens & Galeotti
CLE Clethra mexicana DC.
CLE Clethra pachecoana Standley & Steyerm.
CLE Clethra pringlei S. Watson
CLE Clethra suaveolens Turcz.
CLL Callitricha heterophylla Pursh
CLR Hedyosmum mexicanum Cordemoy
CLU Ascyrum hypericoides L.
CLU Calophyllum brasiliense Camb.
CLU Clusia parvicapsula Vasque·
CLU Clusia salvinii Donn.
CLU Clusia utilis Blake
CLU Hypericum denticulatum Kunth
CLU Hypericum fastigiatum Kunth
CLU Hypericum formosum Kunth
CLU Hypericum silenoides Juss.
CLU Hypericum uliginosum Kunth
CLU Rheedia macrophylla author
CLU Vismia mexicana Schldl.
CMB Combretum farinosum Humb. & Bonpl.
CMB Combretum mexicanum Kunth
CMB Terminalia amazonia (J. Gmelin) Exell
CMB Terminalia catappa L.
CMM Aneilema holosericea (Kunth) Woodson
CMM Callisia campeliazanonia (L.) Kunth
CMM Commelina alpestris Standley & Steyerm.
CMM Commelina coelestis Willd. var. bourgaeri (Clarke) C.B.
CMM Commelina diffusa Burm. f.
CMM Commelina pallida Willd.
CMM Commelina tuberosa L.
CMM Cymbispatha commelinoides (Schulte) F.) Pichon

CMM Gibasis consobrina D.R. Hunt
CMM Gibasis oaxacana D. R. Hunt.
CMM Leptorhoeo
CMM Matudanthus nahus (Martens & Galeotti) D. Hunt.
CMM Murdannia
CMM Thyrsanthemum floribumdum (Martens & Galeotti) Pichon
CMM Thyrsanthemum holosericea (Kunth) Woodson
CMM Tinantia erecta (Jacq.) Schldl.
CMM Tinantia leiocalyx C.B. Clarke
CMM Tradescantia crassifolia Cav.
CMM Tradescantia pulchella Kunth
CMM Tripogandra serrulata (Vahl) Handlos
CMM Weldenia candida Schultes F.
CMM Zebriaa pendula Schunitzl.
CNA Canna edulis Ker
CNA Canna glauca L.
CNN Cnestidium rufescens Planchon
CNN Connarus schultesii Standley
CNN Rourea glabra Kunth
CNV Cuscuta jalapensis Schldl.
CNV Cuscuta mitraeformis
CNV Cuscuta tinctoria Martius
CNV Dichondra argentea Willd.
CNV Evolvulus alsinoides L.
CNV Evolvulus ovatus Fern.
CNV Evolvulus sericeus Sw.
CNV Evolvulus sericeus Sw. var. discolos (Benth.) Gray
CNV Ipomoea aculeata autor?
CNV Ipomoea anisomeres Robinson & Bartlett
CNV Ipomoea batatas (L.) Lam.
CNV Ipomoea bracteata Cav.
CNV Ipomoea capillacea (Kunth) G. Don
CNV Ipomoea cholulensis Kunth
CNV Ipomoea conzattii Greenman
CNV Ipomoea elongata Choisy
CNV Ipomoea hastigera Kunth
CNV Ipomoea hederifolia L.
CNV Ipomoea mairetii Choisy
CNV Ipomoea microsepala Benth
CNV Ipomoea murucoidea Roemes & Schultes
CNV Ipomoea nil (L.) Roth
CNV Ipomoea pauciflora Martens & Galeotti
CNV Ipomoea purga (Wender.) Hayne
CNV Ipomoea purpurea (L.) Roth
CNV Ipomoea purpusii House

CNV Ipomoea santillani O'Donell V
CNV Ipomoea setosa autor?
CNV Ipomoea stans Cav.
CNV Ipomoea suffulta (Kunth) G. Don
CNV Ipomoea tentaculifera Greenman
CNV Ipomoea tricolor Cav.
CNV Ipomoea trifida complex autor?
CNV Ipomoea tuxtlensis House
CNV Jacquemontia hirtiflora (Martens & Galeotti) O'Donell
CNV Jacquemontia oaxacana (Meissner) Hallier f.
CNV Jacquemontia smithii Robinson & Greenman
CNV Merremia quinquefolia (L.) H. Hallier
CNV Merremia tuberosa (L.) Rendle
CNV Merremia umbellata G.F.W. Meyer
CNV Operculina pinnatifida (Kunth) O'Donell
CNV Turbina corymbosa (L.) Raf.
COR Cornus disciflora DC.
COR Cornus excelsa Kunth
COS Costus ruber Griseb.
CPP Capparis breynia L.
CPP Capparis incana Kunth
CPP Cleome magnifica Briq.
CPP Cleome speciosa Raf.
CPP Crataeva tapia L.
CPP Polanisia dodecandra (L.) DC.
CPR Abelia floribunda Decne.
CPR Lonicera mexicana (Kunth) Rehder
CPR Sambucus canadensis L.
CPR Sambucus mexicana A. DC.
CPR Viburnum acutifolium Benth. subsp. acutifolium
✓ CPR Viburnum disjunctum Morton
CPR Viburnum hartwegii Benth.
CRC Carica cauliflora Jacq.
CRC Carica cnidosculoides Lorence & Torres
CRC Carica papaya L.
CRS Echeveria chiapensis
CRS Echeveria goldmani Rose
CRS Echeveria montada Rose
CRS Echeveria pulvinata Rose
CRS Sedum bourgaei Hemsley
CRS Sedum cupressoides Hemsley
CRS Sedum dendroideum Moc. & Sessé
CRS Sedum oaxacana Rose
CRS Sedum oxypetalum Kunth
CRS Sedum praealtum A. C.

CRS Sedum pulvinatum Clausen
CRS Sedum quevae? Hamet
CRS Villadia albiflora author
CRS Villadia guatemalensis Rose
CRS Villadia minutiflora Rose
CRS Villadia ramosissima Rose
CRY Arenaria alsinoides Willd. var. ensifolia Rohrb
CRY Arenaria lanuginosa (Michaux) Rohrb.
CRY Arenaria lycopodioides Willd.
CRY Arenaria oresbia Greenman
CRY Arenaria reptans Hemsley var. pringlei Williams
CRY Cerastium nutans Raf.
CRY Drymaria
CRY Gypsophila elegans M. Bieb.
CRY Stellaria cuspidata Schldl.
CRY Stellaria ovata Schldl.
CRY Stellaria prostrata Elliott
CTH Alsophila salvinii Hook.
CTH Cnemidaria apiculata (Hook.) Stolze
CTH Cnemidaria decurrens (Liebm.) Tryon
CTH Cyathea divergens var tuerckheimii
CTH Cyathea fulva (Martens & Galeotti) Fée
CTH Cyathea schiedeana (Presl) Domin
CTH Hemitelia lucida (Fée) Maxon
CTH Sphaeropteris horrida (Liebm.) Tryon
CTH Sphaeropteris myosuroides (Liebm.) Tryon
CTH Trichipteris bicrenata (Liebm.) Tryon
CTH Trichipteris scabriuscula (Maxon) Tryon
CTH Trichipteris schiedeana (Presl) Tryon
CTP Ceratophyllum demersum L.
CUC Anguria narseewiezii Hooker
CUC Apodanthera aspera Cogn.
CUC Cayaponia attenuata Hook. & Arn.
CUC Cayaponia racemosa (Miller) Cogn.
CUC Citrullus lanatus (Tunb.) Matsumura & Nakai
CUC Cucumis melo L.
CUC Cucurbita argyrosperma C. Huber ssp. argyrosperma
CUC Cucurbita argyrosperma C. Huber ssp. sororia author
CUC Cucurbita ficifolia Bouché
CUC Cucurbita galeottii Cogn.
CUC Cucurbita moschata (Duchesne) Poiret
CUC Cucurbita okeechobensis (Small) Bailey
CUC Cucurbita pepo L.
CUC Cyclanthera dissecta (Torrey & A. Gray) Arn. subsp. dissecta
CUC Cyclanthera langaei Cogn.

CUC Echinopepon coulteri (Gray) Rose
CUC Echinopepon floribundus (Cogn.) Rose
CUC Echinopepon milleflorus Naud.
CUC Echinopepon pubescens (Cogn.) Rose
CUC Echinopepon torquatus (DC.) Rose
CUC Hanburia mexicana Seeman
CUC Hanburnia parviflora author
CUC Lagenaria siceraria (Molina) Standley
CUC Luffa cylindrica (L.) M. Roemer
CUC Luffa fricatoria Sessé & Mociño
CUC Melothria pendula L.
CUC Microsechium helleri (Peyr.) Cogn. C.
CUC Momordia charantia L.
CUC Psiguria triphylla (Miq.) C. Jeffrey
CUC Rytidostylis gracilis Hook. & Arn.
CUC Schizocarpum filiforme Schrader
CUC Sechium edule (Jacq.) Sw.
CUC Sicydium tuerckheimii J.D. Sm.
CUC Sicyos galeottii Cogn.
CUC Sicyos microphylla Kunth
CUN Weinmannia glabra L.f.
CUN Weinmannia intermedia Schldl. & Cham. T
CUN Weinmannia pinnata L.
CUN Weinmannia tuerckheimii Engl.
CUP Cupressus benthamii Endl.
CUP Cupressus benthamii Endl. var. benthamii
CUP Cupressus benthamii Endl. var. lindleyi (Klotzsch) M.T. Masters
CUP Juniperus flaccida Schldl.
CYC Asplundia liebmanni Harl
CYC Carludovica labela Schultes
CYP Bulbostylis capillaris (L.) Carke
CYP Bulbostylis spadicea (Kunth) Ku^H
CYP Carex anisostachys Liebmann
CYP Carex austromexicana Reznicek
CYP Carex chiapensis F.J. Hermann
CYP Carex complanata Torrey & Hook.
CYP Carex densa L. Bailey
CYP Carex flexirostris
CYP Carex jamesoni Boott
CYP Carex longicaulis Boeckeler
CYP Carex oaxacana L. Bailey
CYP Carex polystachya Wahlenb.
CYP Carex spissa Bailey var. seatoniana (L. Bailey) Ku^H
CYP Carex straminea Schk. var. australis Bailey
CYP Cyperrs virens Michaux

CYP Cyperus botteri Boeckler
CYP Cyperus bourgaei Lundell
CYP Cyperus densicaespitosus Mattf. & Kukenthel
CYP Cyperus diffusus Vahl
CYP Cyperus flavus (Vahl) Nees
CYP Cyperus hermaphroditus (Jacq.) Standley
CYP Cyperus ischnos Schldl.
CYP Cyperus lanceolatus Poiret
CYP Cyperus luzulae (L.) Retz.
CYP Cyperus mutissi (Kunth.) Grisb.
CYP Cyperus niger Ruíz & Pav6n
CYP Cyperus ochraceus Vahl
CYP Cyperus odoratus L.
CYP Cyperus piceus Liebm.
CYP Cyperus pseudovegetetus Steudel var. megalanthus Ku^H
CYP Cyperus seslerioides Kunth
CYP Cyperus suranamensis Rottbol
CYP Cyperus tenuis Sw.
CYP Dichromena ciliata Vahl
CYP Eleocharis elegans (Kunth) Roem. & Schultes
CYP Eleocharis filiculmis Kunth
CYP Eleocharis montana (Kunth) Roemer & Schultes
CYP Eleocharis montevidensis Kunth
CYP Fimbristylis diphylla (Retz.) Vahl.
CYP Kyllinga pumila Michaux
CYP Rhynchospora aristata Boeckeler
CYP Rhynchospora cephalotes (L.) Vahl
CYP Rhynchospora globosa (Kunth) Roemes & Schultes
CYP Rhynchospora marisculus Nees
CYP Rhynchospora schiedeana Liebm.
CYP Rhynchospora tuerckheimii L.B. Clarke
CYP Scleria bracteata Cav.
DAV Nephrolepis multiflora
DAV Nephrolepis pectinata (Willd.) Schott
DCH Dichapetalua donnel∞-smithii Engler var. donnell-smithii
DCK Culcita coniiflia (Hook.) Maxon
DCK Dicksonia gigantea Karst.
DCK Lophosoria quadripinnata author
DLL Curatella americana L.
DLL Davilla kunthii St. Hil.
DLL Tetracera volubilis L.
DRS Drosera capillaris Poiret
DRY Arachniodes denticulata (Sw.) Ching
DRY Bolbitis portoricensis (Spreng.) Hennipman
DRY Cystopteris fragilis (L.) Bernhardi

DRY Diplazium franconis Liebm.
DRY Dryopteris rosea (Fournier) Mickel & Beitel
DRY Dryopteris wallichiana author
DRY Elaphoglossum acutissium Christ
DRY Elaphoglossum alan-smithii Mickel
DRY Elaphoglossum erinaceum (Fée) Moore
DRY Elaphoglossum glaucum Moore
DRY Elaphoglossum guatemalense (Klotzsch) Moore
DRY Elaphoglossum lanceum Mickel
DRY Elaphoglossum latifolium (Sw.) J. Sm.
DRY Elaphoglossum muscosum (Sw.) Moore
DRY Elaphoglossum paleaceum (Hook. & Grev.) Sledge
DRY Elaphoglossum peltata (Sw.) Urban
DRY Elaphoglossum revolutum (Liebm.) Moore
DRY Elaphoglossum squamipes (Hook.) Moore
DRY Elaphoglossum tenuifolium (Liebm.) Moore
DRY Tectaria incisa Cav.
DRY Tectaria mexicana (Fée) Morton
DSC Dioscorea composita Hemsley
DSC Dioscorea convolvulaceae Cham. & Schldl.
DSC Dioscorea conzattii autor
DSC Dioscorea densiflora Hemsley
DSC Dioscorea dugesii Robinson
DSC Dioscorea galeottiana Kunth
DSC Dioscorea liebmannii Uline
DSC Dioscorea mexicana Scheidw.
DSC Dioscorea polygonoides Willd.
DSC Dioscorea urceolata Uline
DSC Dioscroea remotiflora Kunth
DST 0dontosoria schlechtendalii (Presl) C. Chr.
DST Dennstaedtia bipinnata (Cav.) Maxon
DST Dennstaedtia distenta (Kunze) Moore
DST Hypolepis bogatensis Karst.
DST Hypolepis nigrescens Hook.
DST Hypolepis repens (L.) Presl
DST Lindsaea arcuata Kunze
DST Lindsaea lancea (L.) Beddome
DST Lindsaea quadrangularis author
DST Lindsaea stricta (Sw.) Dryandes
DST Lonchitis hirsuta L.
DST Pteridium aquilinum (L.) Kuhn var. arachnoideum (Kauflass) Maxon
DST Pteridium aquilinum (L.) Kuhn var. feei (Fee) Yunker
DST Saccoloma inaequale (Kunze) Mett.
EBN Diospyros conzatti Standley
EBN Diospyros digyna Jacq.

EBN Diospyros oaxacana Standley
EBN Diospyros riojae Gomey–Pompa
EBN Diospyros verae–crucis (Standley) Standley
ELC Muntingia calabura L.
ELC Sloanea tuerckheimii J.D. Sm.
EQU Equisetum giganteum L.
EQU Equisetum hymenale
EQU Equisetum myriochaetum Schldl. & Cham.
ERI Agarista mexicana (Hemsl.) Judd
ERI Arbutus gladulosa Martens & Galeotti
ERI Arbutus xalapensis Kunth
ERI Arctostaphylos pungens Kunth
ERI Arctostaphylos pungens Kunth var. mexicana Knight
ERI Befaria aestuans L.
ERI Befaria discolor Benth.
ERI Befaria laevis Benth.
ERI Befaria mexicana Benth
ERI Cavendishia bracteata (Ruíz, López & Pavónz) J. St. Hil.
ERI Comarostaphylis discolor (Hook.) Diggs
ERI Comarostaphylis glaucescens Klotzsch
ERI Comarostaphylis lucida Small
ERI Comarostaphylis polifolia (Kunth) Klotzsch
ERI Comarostaphylis spinulosa (Martens & Galeotti) Diggs subsp. spinulosa
ERI Empedoclesia brachysiphon Sleumer
ERI Gaultheria acuminata Schldl. & Cham.
ERI Gaultheria cordata Martens & Galeotti subsp. lancifolia (Small)
Corcoran & Breckon
ERI Gaultheria esculenta Corcoran & Breckon
ERI Gaultheria hirtiflora author
ERI Gaultheria odorata Willd.
ERI Gaultheria parvifolia Small
ERI Gaultheria schultesii R. Schultes
ERI Gaultheria trichocalycina DC.
ERI Gaultheria trichocalycina X Gaultheria parvifolia ?
ERI Leucothoe mexicana (Hemsley) Small
ERI Lyonia squamulosa Martens & Galeotti
ERI Macleania insignis Martens & Galeotti
ERI Pernettya prostrata (Cav.) DC.
ERI Satyria panurensis
ERI Sphyrospermum majus Griseb.
ERI Vaccinium confertum Kunth
ERI Vaccinium consaguinum Klotzsch
ERI Vaccinium leucanthum Cham. & Schldl.
ERX Erythroxylon compactum Rose
ERX Erythroxylon tabascense Britton

EUP Acalypha diversifolia Jacq.
EUP Acalypha glandulifera Robinson & Greenman
EUP Acalypha haploclada Pax & K. Hoffm.
EUP Acalypha langiana Muell. & Arg.
EUP Acalypha macrostachya Jacq.
EUP Acalypha monostachya Cav.
EUP Acalypha phleoides Cav.
EUP Acalypha purpurascens Kunth var. purpurescens
EUP Acalypha schlechtendaliana Muell. Arg.
EUP Acalypha subviscida S. Watson
EUP Acalypha synoica S. Wats.
EUP Acalypha trachyloba Muell. Arg.
EUP Acalypha unibracteata Muell. Arg.
EUP Acalypha vagans Cav.
EUP Adelia
EUP Alchornea latifolia Sw.
EUP Argythamnia
EUP Bernardia interrupta (Schldl.) Muell.
EUP Caperonia castaneifolia (L.) A. St. Hil.
EUP Caperonia palustris (L.) author
EUP Chamaesyce cumbrae (Boiss.) Millsp.
EUP Chamaesyce hirta (L.) Millsp. var. procumbems (DC.) E. Br.
EUP Chamaesyce hyssopifolia (L.) Small
EUP Chamaesyce indivisa (Engelm.) Millsp.
EUP Chamaesyce lasiocarpa (Klotzsch) Arthur
EUP Chamaesyce nutans (Lagasca) Small
EUP Chamaesyce puberula
EUP Chamaesyce stictospora (Engelm) Small
EUP Chamaesyce thymifolia (L.) Millsp.
EUP Chamesyce serpens (Kunth) Small
EUP Cnidoscolus jurgensenii (Briq.) Lundell
EUP Cnidoscolus multilobus (Pax) I. M. Johnston)
EUP Cnidoscolus urens (L.) Arthur subsp. urens
EUP Croton billbergianus Muell. Arg.
EUP Croton cilatoglanduliferus Ortega
EUP Croton draco Schldl.
EUP Croton glabellas L.
EUP Croton lobatus L.
EUP Croton panamensis (Klotzsch) Muell. Arg.
EUP Croton reflexifolius Kunth
EUP Croton repens Schldl.
EUP Croton soliman Cham. & Schldl.
EUP Dalechampia heteromorpha Pax & K. Hoffm.
EUP Dalechampia scandens L.
EUP Dalechampia triphylla Lam.

EUP Euphorbia ariensis
EUP Euphorbia cotinifolia L.
EUP Euphorbia dentata Michaux
EUP Euphorbia graminea Jacq.
EUP Euphorbia heterophylla L.
EUP Euphorbia ixtlana Huft
EUP Euphorbia luciismithii Robinson & Greenman
EUP Euphorbia macropodoides Robinson & Greenman
EUP Euphorbia macropus (Klotzsch & Garcke) Boiss
EUP Euphorbia oaxaca Robinson & Greenman
EUP Euphorbia puberula
EUP Euphorbia radians Benth.
EUP Euphorbia subcaerulea Robinson & Greenman
EUP Euphorbia xilopoda Greenman
EUP Hevea brasiliensis (A. Juss.) Muell. Arg.
EUP Jatropha dioica Cerv.
EUP Manihot esculenta Crantz
EUP Manihot esculenta Crantz
EUP Manihot olfersiana Pax
EUP Pedilanthus tithymaloides (L.) Poiter
EUP Pedilanthus tomentellus Robinson & Greenman
EUP Phyllanthus brasiliensis (Aublet) Poiret
EUP Phyllanthus lathroides Kunth
EUP Phyllanthus niruri (Kunth) Webster
EUP Phyllanthus nirurioides L.
EUP Plukenetia penninervia Muell. Arg.
EUP Ricinus communis L.
EUP Sapium appendiculatum (Muell. Arg.) Pax & K. Haffm.
EUP Sapium pedicellatum Huber
EUP Stillingia sanguinolenta Muell. Arg.
EUP Tragia mexicana Muell. Arg.
FAB Acacia acatlensis Benth.
FAB Acacia angustissima (Miller) Kuntze var. angustissima
FAB Acacia angustissima (Miller) Kuntze var. smithii (Britton & Rose) L. Rico
FAB Acacia angustissima (Miller) Kuntze var. texana (Torrey & Gray) Isley
FAB Acacia angustissima (Milller_ Kuntze
FAB Acacia baileyana F. Meull.
FAB Acacia chiapensis Safford
FAB Acacia cochliacantha Willd.
FAB Acacia compacta Rose
FAB Acacia cornigera (L.) Willd.
FAB Acacia coulteri Benth.
FAB Acacia farnesiana (L.) Willd.
FAB Acacia farnesiana (L.) Willd.
FAB Acacia glomerosa Benth.

FAB Acacia hayesii Benth.
FAB Acacia macracantha Willd.
FAB Acacia mayana Lundell
FAB Acacia oaxacana (Britton & Rose) L. Rico
FAB Acacia penicillata Standley
FAB Acacia pennatula (Schldl. & Cham.) Benth.
FAB Acacia picachensis T.S. Brandagee
FAB Acacia pringlei Rose
FAB Acacia purpusii T.S. Brandagee
FAB Acacia riparioides (Britton & Rose) Standley
FAB Acacia salicina Lindley
FAB Acacia schaffneri (S. Watson) Hermann
FAB Acacia subangulata Rose
FAB Acosmium
FAB Aeschynomene americana L.
FAB Aeschynomene villosa
FAB Albizia purpusi author
FAB Amicia
FAB Andira galeottiana Standley
FAB Arachis hypogaea L. subsp. fastigiata Wald.
FAB Arachis hypogaea L. subsp. hypogaea
FAB Astragalus oaxacana Rose
FAB Astragalus strigulosus Kunth
FAB Bauhinia dipetala Hemsley
FAB Bauhinia divaricata L.
FAB Brongniartia mollis Kunth
FAB Brongniartia oxyphylla Hemsley
FAB Brongniartia viciodes Martens & Galeotti
FAB Caesalpinia
FAB Cajanus cajan (L.) Millsp.
FAB Calliandra grandiflora (L'Her.) Benth.
FAB Calliandra hirsuta (G. Don) Benth.
FAB Calliandra houstoniana (Miller) Standley
FAB Calopogonium mucunoides Desv.
FAB Canavalia hirsutissima Sauer
FAB Canavalia villosa Benth.
FAB Centrosema galeotti
FAB Centrosema plumieri (Pers.) Benth.
FAB Centrosema virginianum (L.) Benth.
FAB Cercidium praecox (Ruíz & Pavón) Harms
FAB Chamaecrista flexuosa (L.) Greene
FAB Chamaecrista glandulosa (L.) Greene var. flavicoma (Kunth) Irwin & Barneby
FAB Chamaecrista kunthiana (Schldl. & Cham.) Irwin & Barneby
FAB Chamaecrista nictitans (L.) Moench
FAB Chamaecrista nictitans (L.) Moench subsp. disadeana (Steudel) Irwin &

Barneby
FAB Chamaecrista nictitans L. subsp. patellaria (Colladon) Irwin & Barneby
FAB Chamaecrista rotundifolia (Pers.) Greene
FAB Chamaecrista rufa (Martens & Galeotti) Britton & Rose
FAB Chamaecrista serpens (L.) Greene
FAB Clitoria falcata Lam.
FAB Clitoria guianensis (Aublet) Benth.
FAB Clitoria mexicana Link.
FAB Clitoria polystachya Benth.
FAB Cologania angustifolia Kunth var. angustifolia
FAB Cologania biloba (Lindl.) Nicholson
FAB Cologania broussonetii (Balb.) DC.
FAB Cologania hirta (Martens & Galeotti) Rose
FAB Cologania ovalifolia Kunth
FAB Cologania procumbens Kunth
FAB Coursetia caribea (Jacq.) Lavin
FAB Coursetia mollis Robinson & Greenman
FAB Crotalaria acapulcensis Humb. & Bonpl.
FAB Crotalaria bupleurifolia Schldl. & Cham.
FAB Crotalaria cajanifolia Kunth
FAB Crotalaria incana L.
FAB Crotalaria longirostrata Hookes & Arnott
FAB Crotalaria micans Link
FAB Crotalaria mollicula Kunth
FAB Crotalaria nayaritensis Windler
FAB Crotalaria pumila Ortega
FAB Crotalaria rotundifolia (Walt.) Gmelin var. vulgaris Windler
FAB Crotalaria sagittalis L.
FAB Crotalaria schiedeana
FAB Dalbergia
FAB Dalea aff. bicolos Willd.
FAB Dalea aff. reclinata (Cav.) Willd.
FAB Dalea bicolos Willd. var. naviculifolia (Hemsley) Barneby
FAB Dalea carthagenensis (Jacq.) Macbride var. capitulata (Rybderg) Barneby
FAB Dalea cliffortiana Willd.
FAB Dalea dorycnioides DC.
FAB Dalea elata Hookes & Arnott
FAB Dalea filiciformis Robinson & Greenman
FAB Dalea foliolosa (Aiton) Barneby var. citrina (Rydberg) Barneby
FAB Dalea foliolosa (Aiton) Barneby var. foliolosa
FAB Dalea gregii A. Gray
FAB Dalea hegewischiana Steudel
FAB Dalea humilis G. Don
FAB Dalea insignis Hemsley
FAB Dalea leporina (Aiton) Bullock

FAB Dalea leucosericea (Rydberg) Standley & Steyermark
FAB Dalea melantha Schaues var. cinercea Barneby
FAB Dalea obovatifolia Ortega
FAB Dalea obovatifolia Ortega var. obovatifolia
FAB Dalea obovatifolia Ortega var. uncifera (Schldl. & Cham.) Barneby
FAB Dalea reclinata (Cav.) Willd.
FAB Dalea scandens (Miller) R.T. Clausen var. paucifolia (Coulter) Barneby
FAB Dalea sericea Lagasca
FAB Dalea sericea Lagasca var. humstrata Barneby
FAB Dalea tolteca Barneby
FAB Dalea trifoliata Zucc
FAB Dalea versicolos Zucc. var. versicolor
FAB Dalea virgata Lagasca
FAB Dalea zimapanica Schuaer
FAB Desmanthus virgatus (L.) Willd.
FAB Desmodium adscendens Kuntze
FAB Desmodium angustifolium (Kunth) DC.
FAB Desmodium conzattii Greenman
FAB Desmodium distortum (Aublet) Macbr.
FAB Desmodium ghiesbreghtii
FAB Desmodium grahamii Gray
FAB Desmodium hartwegianum Hemsley
FAB Desmodium hartwegianum Hemsley var. amans (Watson) Schubert
FAB Desmodium helleri
FAB Desmodium intortum (Miller) Urban
FAB Desmodium macrostachym Hemsley
FAB Desmodium molliculum (Kunth) DC.
FAB Desmodium orbiculare Schldl.
FAB Desmodium plicatum Schldl. & Cham.
FAB Desmodium procumbens (Miller) Hitchc.
FAB Desmodium sericophyllum Schldl.
FAB Desmodium trifolium
FAB Dialium
FAB Diphysa
FAB Dussia mexicana Standley Harms
FAB Entada monostachya DC.
FAB Entadopsis polystachya (L.) Britton
FAB Enterolobium cyclocarpum (Jacq.) Griseb.
FAB Eriosema pulchellum (Kunth) G. Don
FAB Erythrina americana Miller
FAB Erythrina bertoroana Urban
FAB Erythrina florenciae Krukofy & Barneby
FAB Erythrina folkersii Krukoff & Mold.
FAB Erythrina herbacea L. subsp. nigrorosea Krukofk & Barneby
FAB Erythrina horrida DC.

FAB Erythrina mexicana Krukoff
FAB Erythrina sp.
FAB Erythrina tuxtlana Krukoff & Barneby
FAB Eysenhardtia polystachya (Ortega) Sarg.
FAB Galactia multiflora (Jacq.) Urban
FAB Gliricidia sepium (Jacq.) Steudel
FAB Indigofera densiflora Martens & Galeotti
FAB Indigofera hartwegii
FAB Indigofera miniata Gomey-Ortega
FAB Indigofera suffruticosa Miller
FAB Inga jinicuil Schldl.
FAB Inga latibracteata Harms
FAB Inga micheliana Harms ?
FAB Inga oerstediana Seem.
FAB Inga paterna
FAB Inga punctata Willd.
FAB Inga sapinoides Willd.
FAB Inga schiedeana Steudel
FAB Inga thibaudiana DC.
FAB Inga vera Willd. subsp. spuria (Willd.) J. Leon
FAB Inga xalapensis Benth.
FAB Lablab purpurea (L.) Sweet
FAB Leucaena cuspidata Standley
FAB Leucaena cuspidata Standley subsp. compactiflora S. Zarate
FAB Leucaena diversifolia (Schldl.) Benth.
FAB Leucaena diversifolia (Schldl.) Benth. subsp. stenocarpa (Urban) S. Zárate
FAB Leucaena esculenta (Mociño & Sessé) Benth.
FAB Leucaena leucocephala (Lam.) de Wit var. glabrata (Rose) S. Zárate
FAB Leucaena leucocephala (Lam.) de Wit var. paniculata (Britton & Rose) S. Zárate
FAB Leucaena pulverulenta (Schldl.) Benth. var. pulverulenta
FAB Leucaena stenocarpa Urban
FAB Lonchocarpus caudatus Pittier
FAB Lonchocarpus cruentus Lundell
FAB Lonchocarpus guatemalensis Benth.
FAB Lonchocarpus orizabensis Lundell
FAB Lonchocarpus purpusii Brandegee
FAB Lonchocarpus unifoliatus Benth.
FAB Lotus angustifolius (G. Don) Smith & Schubert
FAB Lupinus campestris Schldl. & Cham.
FAB Lupinus elegans Kunth
FAB Lupinus glabellus Martens & Galeotti
FAB Lupinus montanus Kunth
FAB Lysiloma acapulcense (Kunth) Benth.
FAB Lysiloma divarivatum (Jacq.) Macbr.

FAB Lysiloma microphylla Benth.
FAB Machaerium cobanense J.D. Smith
FAB Machaerium setulosum Pittier
FAB Macroptilium atropurpureum (DC.) Urban
FAB Macroptilium gibbosifolium (Gomey–Ortega) A. Delgado
FAB Marina gracilis Liebmann
FAB Marina greenmaniana (Rose) Barneby var. greenmaniana
FAB Marina neglecta (B.L. Robinson) Barneby var. neglecta
FAB Marina procumbens (DC.) Barneby
FAB Marina scopa Barneby
FAB Medicago polymorpha L.
FAB Melilotus alba Desv.
FAB Melilotus indica (L.) All.
FAB Mimosa adenantheroides (Martens & Galeotti) Benth.
FAB Mimosa albida Willd.
FAB Mimosa biuncifera Benth.
FAB Mimosa deamii Robinson
FAB Mimosa polyantha Benth.
FAB Mimosa watsonii Robinson
FAB Mucuna sp.
FAB Myroxylon balsamum (L.) Harms
FAB Nissolia fruticosa Jacq.
FAB Nissolia multiflora Rose
FAB Nissolia nelsoni Rose
FAB Ormosia isthmensis Standley
FAB Pachyrrhizus erosus (L.) Urban
FAB Phaseolus coccineus L. subsp. coccineus
FAB Phaseolus coccineus L. subsp. darwinianus Hernandey X. & Miranda C.
FAB Phaseolus coccineus L. subsp. formosus (Kunth) Mare¼ Masch. & Stain
FAB Phaseolus leptostachyus Benth.
FAB Phaseolus vulgaris L.
FAB Piscidia communis (Blake) I.M. Johnston
FAB Pisum sativum L.
FAB Pithecellobium arboreum (L.) Urban
FAB Pithecellobium dulce (Roxb.) Benth.
FAB Platymiscium
FAB Prosopis laevigata (Willd.) Johnston
FAB Pterocarpus hayesii Hemsley
FAB Rhynchosia discolos Martens & Galeotti
FAB Rhynchosia edulis Griseb.
FAB Rhynchosia longeracemosa Martens & Galeotti
FAB Rhynchosia minima (L.) DC.
FAB Rhynchosia pringlei Rose
FAB Rhynchosia pyramidalis (Lamark) Urban
FAB Schizolobium parahybum (Vell. Conc.) Blake

FAB Senna alata (L.) Roxburgh
FAB Senna andrieuxii (Benth.) Irwin & Barneby
FAB Senna argenta (Kunth) Irwin & Barneby
FAB Senna atomaria (L.) Irwin & Barneby
FAB Senna bicapsularis (L.) Roxburgh var. bicapsularis
FAB Senna cobanensis (Britton & Rose) Irwin & Barneby
FAB Senna fruticosa (Miller) Irwin & Barneby
FAB Senna hayesiana (Britton & Rose) Irwin & Barneby
FAB Senna hirsuta (L.) Irwin & Barneby var. hirta Irwin & Barneby
FAB Senna holwayana (Rose) Irwin & Barneby var. holwayana
FAB Senna multiglandulosa (Jacq.) Irwin & Barneby
FAB Senna multijuga (L.C. Richard) subsp. doylei (Britton & Rose) Irwin & Barneby
FAB Senna obtusifolia (L.) Irwin & Barneby
FAB Senna occidentalis (L.) Link
FAB Senna pallida (Vahl) Irwin & Barneby
FAB Senna papillosa (Britton & Rose) Irwin & Barneby
FAB Senna pendula (Willd.) Irwin & Barneby var. advena (Vogel) Irwin & Barneby
FAB Senna pilifera (Vogel) var. subglabra (S. Moore) Irwin & Barneby
FAB Senna polyantha (Colladon) Irwin & Barneby
FAB Senna racemosa (P. Miller) Irwin & Barneby
FAB Senna reticulata (Willd.) Irwin & Barneby
FAB Senna septemtrionalis (Viviani) Irwin & Barneby
FAB Senna sophora (L.) Roxburgh
FAB Senna spectabilis (DC.) Irwin & Barneby var. spectabilis
FAB Senna uniflora (P. Miller) Irwin & Barneby
FAB Senna villosa (P. Miller) Irwin & Barneby
FAB Senna wislizeni (A. Gray) Irwin & Barneby var. pringlei (Rose) Irwin & Barneby
FAB Stizolobium pruriens (L.) Medikus
FAB Stylosanthes humilis Kunth
FAB Sweetia panamensis Benth.
FAB Tamarindus indicus
FAB Tephrosia belizensis Lundell
FAB Tephrosia multifolia Rose
FAB Tephrosia pringlei (Rose) Macbride
FAB Teramnus
FAB Trifolium amabile Kunth
FAB Vatairea lundellii (Standley) Killip
FAB Vicia faba L.
FAB Vicia pulchella Kunth
FAB Vigna adenantha (G.F.W. Meyer) Mare¼ Masch. & Stain
FAB Vigna linearis (Kunth) Mare¼ Masch. & Stain
FAB Vigna speciosa (Kunth) Verdcourt
FAB Vigna umbellata (Thunb.) Ohwi & Ohashi

FAB Zapoteca alinae H. Hernandez
FAB Zapoteca formosa (Kunth) H. Hernandey subsp. formosa
FAB Zapoteca formosa (Kunth) H. Hernandey subsp. mollicula (Martens & Galeotti) H. Hernandez
FAB Zapoteca formosa (Kunth) H. Hernandey subsp. rosei (Wiggins) H. Hernandez
FAB Zapoteca formosa (Kunth) H. Hernandez
FAB Zapoteca tetragona (Willd.) Benth.
FAB Zornia thymifolia Kunth
FAG Quercus acutifolia Née
FAG Quercus affinis Schiede
FAG Quercus aristata Hook. & Arn.
FAG Quercus candicans Née
FAG Quercus castanea Née
FAG Quercus cf. obstusata Humb. & Bonpl.
FAG Quercus chartacea Trel.
FAG Quercus chinantlensis Liebm.
FAG Quercus conspersa Benth.
FAG Quercus conzatti Trel.
FAG Quercus crassifolia Humb. & Bonpl.
FAG Quercus dysophylls Benth.
FAG Quercus elliptica Née
FAG Quercus glabrescens Benth.
FAG Quercus glaucescens Humb. & Bonpl.
FAG Quercus glaucoides Martens & Galeotti
FAG Quercus grandis Liebm.
FAG Quercus jurgensenii Liebm.
FAG Quercus laurina Humb. & Bonpl.
FAG Quercus macdougallii
FAG Quercus magnolifolia Née
FAG Quercus nectandraefolia Liebm.
FAG Quercus nitens Martens & Galeotti
FAG Quercus oaxaca Liebm.
FAG Quercus obtusata Humb. & Bonpl.
FAG Quercus oleoides Cham. & Schldl.
FAG Quercus rugosa Née
FAG Quercus sartorii Liebm.
FAG Quercus sororia Liebm.
FAG Quercus urbanii Trel.
FLC Casaeria arguta Kunth
FLC Casaeria corymbosa Kunth
FLC Casaeria guianensis (Aubl.) Urban
FLC Casaeria nitida (L.) Jacq.
FLC Casaeria obovata Schldl.
FLC Casearia sylvestris Sw.
FLC Lunania mexicana T.S. Brandagee

FLC Pleuranthodendron lindenii (Turcz.) Sleumes
FLC Prockia crucis L.
FLC Trimeria
FLC Xylosma chloranthum J.D. Sm.
FLC Xylosma flexuosum (Kunth) Hemsley
FLC Xylosma hemsleyana Standley
FLC Zuelania guidonia (Sw.) Britton & Millsp.
FOQ Fouquieria formosa Kunth
GAR Garrya laurifolia Benth.
GEN Centaurium brachycalyx Standley & Williams
GEN Centaurium quitense (Kunth) Robinson
GEN Centaurium strictum (Schiede) Druce
GEN Chelonanthus alatus (Aublet) Standley
GEN Eustoma exalatum (L.) Salisb.
GEN Gentiana adsurgens Griseb.
GEN Gentiana ovatiloba Kusnezow
GEN Gentiana spathacea Kunth
GEN Halenia brevicornis (Kunth) G. Don f.
GEN Halenia decumbens Benth.
GEN Halenia longicornus Martens & Galeotti
GEN Halenia plantaginea Griseb.
GEN Lisianthus nigrescens Cham. & Schldl.
GEN Voyria aphylla (Jacq.) Pers.
GEN Voyria tenellus
GER Geranium aff. seemanni Peyr.
GER Geranium alpicola Loes.
GER Geranium hastatum Rose
GER Geranium mexicanum Kunth
GER Geranium monanthum Small
GER Geranium repens H. Moore
GER Geranium schiedeanum Schldl.
GER Geranium seemanni Peyr.
GLC Dicranopteris flexuosa (Schrader) Underw.
GLC Dicranopteris pectinata (Willd.) Underw.
GLC Diplopterygium bancroftii (Hook.) A. R. Smith
GLC Sticherus bifidus (Willd.) Ching
GLC Sticherus palmatus (Underw.) Copel.
GLC Sticherus underwoodianus (Maxon⌐ Nakai
GMM Cochlidium rostratum (Hook.) C. Chr.
GMM Cochlidium serrulatum (Sw.) L.E. Bishop
GMM Grammitis cultrata (Willd.) Proctor
GMM Grammitis delicatula (Martens & Galeotti) Proctor
GMM Grammitis moniliformis (Sw.) Proctor
GMM Grammitis parietina (Klotsch) Fée
GMM Grammitis pilosissima (Martens & Galeotti) Morton

GMM Grammitis semihirsuta (Klotzsch) Morton
GMM Grammitis xiphopteroides (Liebm.) A.R. Smith
GRS Ribes ciliatum Roemes & Schultes
GSN Achimenes erecta (Lamb.) H.P. Fuchs
GSN Achimenes grandiflora (Schiede) DC.
GSN Achimenes pedunculata Benth.
GSN Alloplectus
GSN Besleria glabra (Oersted) Hanst.
GSN Columnea schiedeana Schldl.
GSN Drymonia aff. oinochrophylla (J.D. Sm.) D. Gibson
GSN Drymonia strigosus (Oersted) D. Gibson
GSN Hippodamia insignis (Martens & Galeotti) Decaisne
GSN Moussonia elegans Decne.
GSN Pterostemon mexicanus Schauer
HAE Xiphidium caeruleum Aublet
HAM Liquidambas styraciflua L.
HDR Philadelphus mexicanus Schldl.
HDR Phyllonoma laticuspis (Turcz.) Engl.
HMP Athrium filix-femina (L.) Roth
HMP Hymenophyllum brevistipes Liebm.
HMP Hymenophyllum fendlerianum Sturm
HMP Hymenophyllum fragile (Hedwig f.) Morton
HMP Hymenophyllum fucoides (Sw.)
HMP Hymenophyllum hirsutum (L.) Sw.
HMP Hymenophyllum lanatum Fée
HMP Hymenophyllum microcarpum Desv.
HMP Hymenophyllum polyanthos (Sw.) Sw.
HMP Hymenophyllum trapezoidale Liebm.
HMP Hymenophyllum tunbridgense (L.) J. E. Sm.
HMP Trichomanes capillaceum L.
HMP Trichomanes crispum L.
HMP Trichomanes galeotti Fourn.
HMP Trichomanes krausii Humb. & Grev.
HMP Trichomanes ludovicium Rosenst.?
HMP Trichomanes pinnatum Hedwing f.
HMP Trichomanes radicans Sw.
HMP Trichomanes rigidum Sw.
HPC Billia hippocastanum Peyr.
HPP Hippocratea celastroides Kunth
HPP Hippocratea voluvilis L.
HPX Hypoxis decumbens L.
HRN Gyrocarpus jatrophifolius Domin
HYD Hydrolea ovata Nutt.
HYD Hydrolea spinosa L.
HYD Nama chasmogamum (Brand) Bacon

HYD Nama jamaicense L.
HYD Nama pueblense Robinson & Greenman
HYD Nama undulatum Kunth
HYD Phacelia platycarpa (Cav.) Sprengel
HYD Wigandia caracasana Kunth
HYD Wigandia kunthii Choisy
HYD Wigandia macrophylla Schldl. & Cham.
ICC Calatola laevigata Standley
IRI Orthrosanthus chimboracensis (Kunth) Bakes var. centroamericanus Steyerm.
IRI Rigidella immaculata Herbert
IRI Rigidella orthantha Lemaire
IRI Sisyrinchium angustifolium Miller
IRI Sisyrinchium angustissimum (Robinson & Greenman) Greenman & Thompson
IRI Sisyrinchium convolutum Nocca
IRI Sisyrinchium laterale Bake≥ ?
IRI Sisyrinchium micranthum Cav.
IRI Sisyrinchium polycladom Robinson & Greenman
IRI Sisyrinchium tenuifolium Willd.
IRI Tigridia galanthoides Molseed
IRI Tigridia hallbergii Molseed
IRI Tigridia molseediana Ravenna
IRI Tigridia pavonia (L.f.) DC.
IRI Tigridia seleriana (Loes.) Ravenna
JUG Alfaroa mexicana Stone
JUG Carya illinoensis (Wahgenh.) K. Koch
JUG Juglans pyriformis Liebm.
JUG Juglans regia L.
JUG Oreomunnea mexicana (Standley) Leroy subsp. mexicana
JUL Amphipterygium adstringens (Schldl.) Standley
JUN Juncus effusus L.
JUN Juncus microcephalus Kunth
JUN Luzula caricina E. Meyer
JUN Luzula denticulata Liebm.
KRM Krameria revoluta Berg
LAM Asterohyptis mociniana (Benth.) Epling
LAM Asterohyptis stellulata (Benth.) Epling
LAM Coleus blumei Benth.
LAM Hyptis americana (Aublet) Urban
LAM Hyptis atrorubens Poit.
LAM Hyptis capitata Jacq.
LAM Hyptis conferta Pohl
LAM Hyptis mixta Epling
LAM Hyptis mutabilis (Rich.) Briq.
LAM Hyptis pectinata (L.) Poit.
LAM Hyptis rugosa L.

LAM Hyptis savannarum Briq.
LAM Hyptis spicata Poit.
LAM Hyptis spicigera Lam.
LAM Hyptis tomentosa Poit.
LAM Hyptis urticoides Kunth
LAM Hyptis verticillata Jacq.
LAM Lepechinia caulescens (Ortega) Epling
LAM Lepechinia schiedeana (Schldl.) Vatke
LAM Marrubium vulgare L.
LAM Marsypianthes chamaedrys (Vahl) Kuntze
LAM Marsypianthes hyptoides Martens
LAM Mentha hybrid
LAM Mentha rotundifolia Hundson
LAM Ocimum basilicum L.
LAM Ocimum micranthum Willd.
LAM Ocimum selloi Benth.
LAM Origanum vulgare L.
LAM Rosmarinus officinalis L.
LAM Salvia adenophora Fern.
LAM Salvia amarissima Ortega
LAM Salvia atropaenulata Epling
LAM Salvia axillaris Mociño & Sessé
LAM Salvia cinnabarina Martens & Galeotti
LAM Salvia divinorum Epling & Jativa
LAM Salvia elegans Vahl
LAM Salvia fruticulosa Benth.
LAM Salvia glabra Martens & Galeotti
LAM Salvia glechomaefolia Kunth
LAM Salvia gracilis Benth.
LAM Salvia helianthemifolia Benth.
LAM Salvia hispanica L.
LAM Salvia hyptoides Martens & Galeotti
LAM Salvia inconspicua Benth.
LAM Salvia involucrata Cav.
LAM Salvia lasiantha Benth.
LAM Salvia lasiocephala Hook. & Arnott
LAM Salvia lavanduloides Kunth
LAM Salvia leucantha Cav.
LAM Salvia longistyla Benth.
LAM Salvia mellissodora Lag.
LAM Salvia mendax Epling
LAM Salvia mexicana L.
LAM Salvia misella Kunth
LAM Salvia nervata Martens & Galeotti
LAM Salvia oaxacana Fernald

LAM Salvia oblongifolia Martens & Galeotti
LAM Salvia occidentalis Sw.
LAM Salvia polystachya Ortega
LAM Salvia prunelloides Kunth
LAM Salvia purpurea Cav.
LAM Salvia pusilla Fern.
LAM Salvia recurva Benth.
LAM Salvia sapinea Epling
LAM Salvia semiatrata Zucc.
LAM Salvia sessei Benth.
LAM Salvia stolonifera Benth.
LAM Salvia tricuspidata Martens & Galeotti
LAM Salvia umbraticola Epling
LAM Salvia vitifolia Benth.
LAM Satureja macrostema (Benth.) Briq. var. laevigata (Standley) McVaugh & Schmid
LAM Satureja mexicana (Benth.) Briq.
LAM Satureja oaxacana Fernald
LAM Scutellaria caerulea Mociño & Sessé
LAM Scutellaria formosa Leonard H
LAM Scutellaria seleriana Loes.
LAM Scutellaria splendens Link
LAM Stachys agraria Schldl. & Cham.
LAM Stachys boraginoides Schldl. & Cham.
LAM Stachys coccinea Jacq.
LAM Stachys flaccida Fernald
LAM Stachys guatemalensis Epling
LAM Stachys keerlii Benth.
LAM Stachys lindenii Benth. var. aristulata Epling
LAM Stachys pilosissima Martens & Galeotti
LAM Teucrium vesicarium Miller
LAU Aniba mexicana Kostermans
LAU Beilschmiedia mexicana (Mez)_Kosterm.
LAU Beilscmedia mexicana (Blake) Kosterm.
LAU Licaria capitata (Cham. & Schldl.) Kosterm.
LAU Licaria cervantesii (Kunth) Kostermans
LAU Licaria peckii (I. M. Johnston) Kosterm.
LAU Litsea glaucescens Kunth
LAU Nectandra ambigens (Blake) C.K. Allen
LAU Nectandra glabrescens Benth.
LAU Nectandra globosa
LAU Nectandra perdubia Lundell
LAU Nectandra reticulata (Ruíz & Pav6n) Mez
LAU Nectandra rubiflora (Mez) D.H. Allen
LAU Ocotea effusa (Meissner) Hemsley

LAU Ocotea helicterifolia (Meissner) Hemsley
LAU Persea americana Miller
LAU Persea flavifolia Lundell
LAU Persea floccosa Mez
LAU Persea podadena Blake
LAU Persea schiedeana Nees
LAU Phoebe acuminatissima Lundell
LAU Phoebe bourgeauviana Mez
LAU Phoebe chinantecorum R. Schultes
LAU Phoebe helicterifolia (Meissner) Mez
LAU Phoebe mexicana Meissner
LAU Phoebe neurophylla Mez
LAU Phoebe psychotrioides (Kunth) Mez
LAU Phoebe tampicensis (Meissner) Mez
LCS Lacistema aggregatum (Berg) Rusby
LIL Allium cepa L.
LIL Allium sativum L.
LIL Allium sp. (nativo)
LIL Aloe sp.
LIL Calochortus barbatus (HBK) Painter
LIL Echeandia ciliata (Kunth) Cruden
LIL Echeandia eleutherandra C. Koch
LIL Echeandia macrocarpa Greenman
LIL Echeandia vestita (Baker) Cruden
LIL Milla biflora Cav.
LIL Nothoscordum bivalve (L.) Britton
LIL Schoenocaulon calcicola Greenman
LIL Schoenocaulon conzatti Brinker
LIL Schoenocaulon tenuifolium (Martens & Galeotti⌐ Robinson & Greenman
LIL Smilacina amoena Wedl.
LIL Smilacina paniculata Martens & Galeotti
LIL Smilacina thyrsoidea Hense.
LIL Smilacins scilloidea (Martens & Galeotti) Pringle
LIL Zygadenus mexicanus Hemsley
LIN Linum mexicanum Kunth
LIN Linum orizabae Planchon
LIN Linum rupestre (A. Gray) Engelm.
LIN Linum scabrellum Planchon
LIN Linum schiedeanum Schldl. & Cham.
LMC Limnocharis laforestii Griseb.
LMN Lemna aequinoctialis Welwitsch
LMN Lemna gibba L.
LMN Wollfia brasiliensis Weddell
LMN Wollfia columbiana Karsten
LNN Lennoa madreporoides Llave & Lex.

LNT Pinguicula heterophylla Benth.
LNT Pinguicula moranensis Kunth
LNT Pinguicula oblongiloba A. DC.
LNT Pinguicula sp. nov.
LNT Utricularia
LOA Eucnide grandiflora (Groenl.) Rose
LOA Mentzelia arborescens Urban & Gilg
LOA Mentzelia hispida Willd.
LOG Buddelia parviflora Kunth
LOG Buddleia americana L.
LOG Buddleia cordata Kunth
LOG Buddleia crotonoides A. Gray subsp. crotonoides
LOG Buddleia sessiflora Kunth
LOG Buddleia skutchii Morton
LOG Gelsemium sempervirens (L.) Saint-Hilaire
LOG Polypremum procumbens L.
LOG Spigelia palmeri Rose
LOG Spigelia speciosa Kunth
LOR Arceuthobium gilli Hawksw. & Wiens
LOR Arceuthobium globosum Hawksw. & Wiens
LOR Loranthus spirostylis DC.
LOR Phoradendron brachystac*yum (DC.) Nutt.
LOR Phoradendron carneum Urban
LOR Phoradendron forestierae Robinson & Greenman
LOR Phoradendron sp.
LOR Phoradendron tomentosum (DC.) Oliver
LOR Psittacanthus calyculatus (DC.) G. Don
LOR Psittacanthus schiedeanus (Schldl. & Cham.) Schultes
LOR Struthanthus alni Bartlett
LOR Struthanthus quericola (Schldl. & Cham.) G. Don
LYC Lycopodium cernuum L.
LYC Lycopodium clavatum L.
LYC Lycopodium dichotomum Jacq.
LYC Lycopodium linifolium L.
LYC Lycopodium pringlei Underw.
LYC Lycopodium reflexum Lam.
LYC Lycopodium reflexum Lam.
LYC Lycopodium thyoides Willd.
LYG Lygodium heterodoxum Kunze
LYG Lygodium mexicanum Presl.
LYT Ammania coccinea Rothb.
LYT Cuphea aequipetala Cav.
LYT Cuphea angustifolia Koehne
LYT Cuphea carthaginensis (Jacq.) Macbride
LYT Cuphea cyanea DC.

LYT Cuphea decandra Aiton
LYT Cuphea hookeriana Walp.
LYT Cuphea hyssopifolia Kunth
LYT Cuphea lutea Rose
LYT Cuphea micropetala Kunth
LYT Cuphea palustris Koehne
LYT Cuphea pinetorum Benth.
LYT Cuphea racemosa (L.f.) Spreng.
LYT Cuphea salicifolia Cham. & Schldl.
LYT Cuphea wrightii A. Gray var. wrightii
LYT Ginoria nodiflora (Hemsley) Koehne
LYT Heimia salicifolia (Kunth) Link
LYT Lagerstroemia indica L.
LYT Lythrum acinifolium (DC.) Koehne
MAG Magnolia dealbata Zucc.
MAG Magnolia grandiflora L.
MAG Magnolia schiedeana Schldl.
MAG Talauma mexicana (DC.) G. Don
MAR Martynia annua L.
MAR Proboscidea triloba (Schldl. & Cham.) Decne.
MEL Cedrela oaxacensis (C. DC.) & Rose
MEL Cedrela odorata L.
MEL Cedrela saxatilis Rose
MEL Guarea hispida Benth.
MEL Melia azedarach L.
MEL Swietenia macrophylla G. King
MEL Trichilia colimana C. DC.
MEL Trichilia minutiflora Standley
MLP Aspicarpa hirtella Rich.
MLP Banisteria sp.
MLP Bunchosia biocellata Schldl.
MLP Bunchosia guatemalensis Niedenzu
MLP Bunchosia lanceolata Turcz.
MLP Bunchosia montana A. Juss.
MLP Byrsonima crassifolia (L.) Kunth
MLP Echinopterys eglandulosa (Juss.) Small
MLP Galphimia burchiana B. MacBryde
MLP Galphimia glauca Cav.
MLP Galphimia multicaulis A. Juss.
MLP Galphimia sessilifolia Rose
MLP Heteropteris beechyana Juss.
MLP Heteropteris laurifolia (L.) Juss.
MLP Lasiocarpus salicifolius Liebm.
MLP Malpighia emarginata DC.
MLP Malpighia galeottiana A. Juss.

MLP Malpighia glabra L.
MLP Malpighia guadalajarensis (S. Watson) Rose
MLP Malpighia mexicana Juss.
MLP Malpighia obovata Kunth
MLP Malpighia punicifolia L.
MLP Mascagnia seleriana Loes
MLP Stigmatophyllon humboldtianum (DC.) A. Juss
MLP Stigmatophyllon lindenianum Juss.
MLP Tetrapteris schiedeana Cham. & Schldl.
MLS Adelobotrya adscendens (Sw.)
MLS Arthrosema sp. nov. Almeda
MLS Arthrostema ciliatum D. Don
MLS Centradenia inaequilateralis (Schldl. & Cham.)
MLS Clidemia capitellata (Bonpl.) D. Don
MLS Clidemia dentata D. Don
MLS Clidemia fulva Gleason
MLS Clidemia gracilipes Gleason
MLS Clidemia hirta (L.) D. Don
MLS Clidemia matudae L. Williams
MLS Clidemia octona (Bonpl._ L. Williams
MLS Clidemia petiolaris (Schldl. & Cham.) Triana
MLS Clidemia sericea D. Don.
MLS Clidemia setosa (Triana) Gleason
MLS Conostegia caelestis Standley
MLS Conostegia icosandra (Sw.) Urban
MLS Conostegia superba Naudin
MLS Conostegia xalapensis (Bonpl.) D. Don
MLS Heterocentron alatum Rose & Standley var. alatum
MLS Heterocentron macrostachyum Naudin
MLS Heterocentron subtriplinervium (Link & Otto) A. Brown & Bouché
MLS Leandra mexicana (Naudin) Cogn.
MLS Leandra subseriata (Naudin) Cogn
MLS Miconia affinis DC.
MLS Miconia albicans (Sw.) Triana
MLS Miconia anisotricha (Schldl.) Triana
MLS Miconia argentea (Sw.) DC.
MLS Miconia chrysoneura Triana
MLS Miconia chrysophylla (L.C. Rich.) Urban
MLS Miconia costaricensis Cogn.
MLS Miconia dodecandra (Desr.) Cogn.
MLS Miconia echinoidea Standley & Steyerm.
MLS Miconia glaberrima (Schldl.) Naudin
MLS Miconia globulifera (Schldl.) Naudin
MLS Miconia guatemalensis Cogn.
MLS Miconia hemenostigma Naudin

MLS Miconia hyperprasina Naudin
MLS Miconia ibaguensis (Bonpl.) Triana
MLS Miconia impetiolaris (Sw.) D. Don
MLS Miconia lacera (Bonpl.) Naudin
MLS Miconia laevigata (L.) D. Don
MLS Miconia lauriformis Naudin
MLS Miconia liebmannii Cogn.
MLS Miconia lonchophylla Naudin
MLS Miconia matthaei Naudin
MLS Miconia mexicana (Humb. & Bonpl.) Naudin
MLS Miconia minutiflora (Bonpl.) DC.
MLS Miconia oinochrophylla J.D. Sm.
MLS Miconia oligotricha (DC.) Naudin
MLS Miconia phaeotricha Naudin
MLS Miconia prasina (Sw.) DC.
MLS Miconia purulensis J.D. Smith
MLS Miconia schlechtendallii Cogn.
MLS Miconia serrulata (DC.) Naudin
MLS Miconia stenostachya DC.
MLS Miconia tomentosa (Rich.) DC.
MLS Miconia trinervia (Sw.) Loud.
MLS Miconia tuerckheimii Cogn.
MLS Monochaetum alpestre Naudin
MLS Monochaetum floribundum (Schldl.) Naudin
MLS Monochaetum pulchrum Decne.
MLS Mourira myrtilloides (Sw.) Poiret subsp. parvifolia (Benth.) Morley
MLS Ossaea micrantha (Sw.) Cogn.
MLS Tibouchina longifolia (Vahl) Cogn.
MLS Tibouchina naudiana (Decne.) Cogn.
MLS Tibouchina scabriuscula (Schldl.) Cogn.
MLS Topobea calycularis Naudin
MLS Topobea laevigata (D. Don) Naudin
MLS Triolena scorpioides Naudin
MLV Abelmoschus moschatus Medikus
MLV Abutilon reventum S. Watson
MLV Allowissa*** inglei (Rose) Bates
MLV Anoda cristata (L.) Schldl.
MLV Bakeridesia bakerianum (Rose) Bates
MLV Bakeridesia subcordata (Hochr.) Bates
MLV Gossypium hirsutum L.
MLV Hampea
MLV Hibiscus costatus A. Rich.
MLV Hibiscus rosa-sinensis L.
MLV Hibiscus uncinellus DC.
MLV Lavatera assurgentiflora Kellogg

MLV Lopimia malacophylla (Link & Otto) Martius
MLV Malachra fasciata Jacq.
MLV Malva parviflora L.
MLV Malvastrum bicuspidatum (S. Watson) Rose
MLV Malvastrum coromandelianum (L.) Garcke
MLV Malvastrum spicatum (L.) A. Gray
MLV Malvaviscus arboreus Cav.
MLV Pavonia paniculata Cav.
MLV Phymosia floribunda (Schldl.) Fryxell
MLV Robinsonella cordata Rose & Baker
MLV Robinsonella mirandae Gomez-Pompa
MLV Sida abutifolia Miller
MLV Sida rhombifolia L.
MND Mendoncia sp.
MNM Mollinedia sp.
MNM Siparuna andina (Tul.) A. DC.
MNM Siparuna scandens Lorence
MNS Abuta sp.
MNS Cissampelos pareira L.
MNS Cissampelos tropaeolifolia DC.
MNT Monotropa coccinea Zucc.
MNT Monotropa hypopithys L.
MOR Brosimum alicastrum Swartz
MOR Brosimum terrabahum Pittier
MOR Castilla elastica Cerv.
MOR Cecropia mexicana Hemsley T
MOR Cecropia obtusifolia Bertol.
MOR Dorstenia contrajerva L.
MOR Dorstenia drakena L.
MOR Ficus tecolutensis (Liebm.) Miquel
MOR Maclura tinctoria (L.) Doε
MOR Prosimum terrabanum Pittier
MOR Pseudolmedia oxyphyllaria J.D. Sm.
MOR Trophis racemosa (L.) Urban
MRC Marcgravia stonei Utley
MRC Souroubea exauriculata Delp.
MRG Moringa oleifera Lam.
MRN Calathea lutea (Aublet) G. Meyer
MRN Maranta arundinacea L.
MRS Ardisia carlsonae Steyerm.
MRS Ardisia nigrescens Oersted
MRS Ardisia rekoi Schultes
MRS Ardisia serrulata Sw.
MRS Heberdenia penduliflora (A. DC.) Mez
MRS Parathesis donnell-smithii Mez

MRS Parathesis ixtlanensis Lundell
MRS Parathesis melanosticta Schldl. (Hemsley)
MRS Parathesis oerstediana Mez
MRS Parathesis psychotrioides Lundell
MRS Parathesis schultesii Lundell
MRS Parathesis serrulata Sw.
MRS Parathesis tenuis Standley
MRS Rapanea juergensenii Mez
MRS Rapanea myricoides (Schldl.) Lundell
MRS Stylogyne oaxacana Lundell
MRT Calyptranthes chytraculia L. vas. americans McVaugh
MRT Calyptranthes pallens (Lundell) McVaugh
MRT Calyptranthes schiedeana Berg
MRT Eucalyptus tereticornis Smith
MRT Eugenia acapulcensis Steudel
MRT Eugenia choapamensis Standley
MRT Eugenia conzattii Standley
MRT Eugenia jambos L.
MRT Eugenia oerstediana Berg.
MRT Myrica splendens (Swartz) DC.
MRT Pimenta dioica (L.) Merril
MRT Psidium friedrichsthalianum (Berg) Niedenzu
MRT Psidium guajava L.
MRT Psidium guineense Swartz
MRT Ugni myricoides (Kunth) Berg var. longipes (Berg) McVaugh
MTR Mitrastemma matudai Yamamoto
MTT Danaea cuspidata Liebm.
MTT Danaea nodosa (L.) J. E. Sm.
MUS Musa sp. S
MYR Myrica cerifera L.
MYS Compsoneura sprucei (A. DC.) Warb.
NAJ Najas guadalupensis (Sprengel) Magnus var. guadalupensis
NYC Allionia incarnata L.
NYC Boerhavia coccinea Milles
NYC Boerhavia diffusa L.
NYC Boerhavia erecta L.
NYC Bougainvillea
NYC Commicarpus scandens (L.) Standley
NYC Mirabilis jalapa L.
NYC Mirabilis longiflora L.
NYC Mirabilis viscosa Cav.
NYC Neea psychotrioides J.D. Sm.
NYC Neea tenuis Standley
NYC Pisonia aculeata L. var. aculeata
NYC Pisonia aculeata L. var. macrathocarpa J.D. Sm.

NYC Pisoniella arborescens (Lag. & Rod.) Standle)
NYC Salpianthus purpurascens (Cav.) Hook. & Arn.
NYM Nymphaea ampla (Salisb.) DC.
NYM Nymphaea gracilis Zucc.
NYS Nyssa sylvatica Marshal∞
OCH Ouratea mexicana (Humb. & Bonpl.) Engl.
OCH Sauvagesia erecta L.
OLE Fraxinus uhdei (Wenzig) Linglesheim.
ONA Epilobium mexicanum DC.
ONA Fuchsia arborescens Sims
ONA Fuchsia bacillaris Lindley
ONA Fuchsia microphylla Kunth
ONA Fuchsia paniculata Lindley
ONA Fuchsia steinbuchiana Schultes
ONA Fuchsiß thymifoliß Kunth
ONA Gaura drummondii (Spach) Torrey & Gray
ONA Lopezia racemosa Cav.
ONA Ludwigia octovalvis (Jacq.) Raven
ONA Ludwigia repens Forst.
ONA Oenothera pubescens Sprengel
ONA Oenothera cuprea Schldl.
ONA Oenothera laciniata Hill
ONA Oenothera rosea L'Hes ex Ait
OPH Ophioglossum reticulatum L.
ORC Alamania puniceae Llave & Lex.
ORC Arpophyllum giganteum Hartw.
ORC Arpophyllum spicatum Llave & Lex.
ORC Artorima erubescens (Lindley) Dressles & Pollard
ORC Barbosella cucullata (Lindl.) Schltr.
ORC Barkeria halbingeri Thien
ORC Barkeria lindleyana Batem. ssp. vanneriana (Rchb. f.) Thien
ORC Barkeria lindleyana Bateman
ORC Barkeria melanocaulon A. Rich. & Galeotti
ORC Beloglottis costaricensis (Rchb. f.) Schltr.
ORC Beloglottis laxispica Catling
ORC Bletia campanulata Llave & Lex.
ORC Bletia lilacina A. Rich. & Gal.
ORC Bletia nelsonii Ames
ORC Bletia parkinsonii Hook.
ORC Bletia punctata Llave & Lex.
ORC Bletia purpurata (Lam.) DC
ORC Bletia purpurea (Lam.) DC.
ORC Bletia reflexa Lindl.
ORC Bletia roezlii Rchb. f.
ORC Bletia sp.

ORC Brachystele polyantha (Rchb. f.) Balogh
ORC Brassia caudata (L.) Lindl.
ORC Brassia verrucosa Lindl.
ORC Calanthe calanthoides (A. Rich. & Gal.) Hamer & Garay
ORC Calanthe calanthoides (A. Rich. & Galeotti) Hames & Garay
ORC Calanthe mexicana Reichb. f.
ORC Campylocentrum micranthum (Lindl.) Rolfe
ORC Campylocentrum schiedei (Rchb. f.) Hemsl.
ORC Catasetum integerrimum Hook.
ORC Cattleya aurantiaca (Lindl.) P.N. Don
ORC Chysis laevis Lindl.
ORC Coelia macrostachya Lindl.
ORC Coelia triptera (Sm.) Steudel
ORC Comparettia falcata Poepp. & Endl.
ORC Corallorhiza aff. fimbriata Schtlr.
ORC Corallorhiza enherenbergii Reichb.
ORC Corallorhiza maculata Raf.
ORC Corallorrhiza macrantha Schltr.
ORC Corallorrhiza maculata (Raf.) Raf.
ORC Corallorrhiza odontorrhiza (Willd.) Nuttall
ORC Coryanthes picturata Rchb. f.
ORC Cranichis ciliata (Kunth) Kunth
ORC Cranichis mexicana (A. Rich. & Galeotti) Schltr.
ORC Cranichis schaffneri Rchb. f.
ORC Cranichis subumbellata A. Rich. & Gal.
ORC Cranichis thysanochila Robinson & Greenman
ORC Cyclopogon cf. elatus (Sw.) Schltr.
ORC Cycnoches ventricossum Batem.
ORC Cymbiglossum bictoniense (Bateman) F. Halbinger
ORC Cymbiglossum cervantesii (Lex.) F. Halbinger
ORC Cymbiglossum cervantesii (Lex.) F. Halbinges var. roseum Hort
ORC Cymbiglossum cordatum (Lindley) F. Halbinger
ORC Cymbiglossum maculatum (Lex.) F. Halbinger
ORC Cypripedium irapeanum Llave & Lex.
ORC Cyrtopodium punctatum (L.) Lindl.
ORC Deiregyne pyramidalis (Lindl.) Burns-Balogh
ORC Deiregyne rhombilabia Garay
ORC Dichaea glauca (Sw.) Lindl.
ORC Dichaea graminoides (Sw.) Lindl.
ORC Dichaea intermedia Ames & Correll
ORC Dichaea muricata (Sw.) Lindley
ORC Dichaea muricatoides Hamer & Garay
ORC Dichaea panamensis Lindley
ORC Dichaea squarrosa Lindley
ORC Dichromanthus cinnabarinus (Llave & Lex.) Garay

ORC Dimerandra emarginata (G.F.W. Meyer) Hoehne
ORC Distictis laxiflora Greenman
ORC Domingoa kienastii (Rchb. f.) Dressler
ORC Elleanthus capitatus (Poeppit & Endl.) Reichb. f.
ORC Elleanthus cynarocephalus (Rchb. f.) Rchb. f.
ORC Encyclia atrorubens (Rolfe) Schltr.
ORC Encyclia baculus (Rchb. f.) Dressler & Pollard
ORC Encyclia belizensis (Rchb. f.) Schltr. ssp. parviflora (Regel) Dressler & Pollard
ORC Encyclia bractescens (Lindl.) Hoehne
ORC Encyclia brassavolae (Rchb. f.) Dressler
ORC Encyclia candollei (Lindley) Schltr.
ORC Encyclia cochleata (L.) Lemee
ORC Encyclia concolos (Llave & Lex.) Schltr.
ORC Encyclia cretacea Dressler & Pollard
ORC Encyclia diota (Lindley) Schltr.
ORC Encyclia ghiesbreghtiana Dressler & Pollard
ORC Encyclia ghisbreghtiana (A. Rich. & Galeotti) Dressler
ORC Encyclia glauca (Knowles & Westc.) Dressler
ORC Encyclia gravida (Lindl.) Schltr.
ORC Encyclia guatemalensis (Kl.) Dressler & Pollard
ORC Encyclia hanburyi (Lindl.) Schltr.
ORC Encyclia linkiana (Klotzsch) Schltr.
ORC Encyclia livida (Lindl.) Dressler
ORC Encyclia meliosma (Rchb. f.) Schltr.
ORC Encyclia michuacana (Llave & Lex.) Schltr.
ORC Encyclia microbulbon (Hook.) Schltr.
ORC Encyclia obpiribulbon Hagsater
ORC Encyclia ochracea (Lindl.) Dressler
ORC Encyclia polybulbon (Sw.) Dressler
ORC Encyclia pterocarpa (Lindley) Dressler
ORC Encyclia pygmaea (Hook.) Dressler
ORC Encyclia radiata (Lindl.) Dressler
ORC Encyclia rhinchophora (A. Rich. & Galeotti) Dressler
ORC Encyclia semiaperta Hagsater
ORC Encyclia subulatifolia (A. Rich. & Gal.) Dressler
ORC Encyclia tenuissima (A.H.S.) Dressler
ORC Encyclia varicosa (Lindley) Schltr.
ORC Epidendrum anceps Jacq.
ORC Epidendrum anisatum Llave & Lex.
ORC Epidendrum ciliare L.
ORC Epidendrum costatum A. Rich. & Gal.
ORC Epidendrum difforme Jacq.
ORC Epidendrum diffusum Sw.
ORC Epidendrum falcatum Lindl.
ORC Epidendrum gasteriferum Scheeren

ORC Epidendrum ibaguense Kunth
ORC Epidendrum imatophllum Lindley
ORC Epidendrum isomerum Schltr.
ORC Epidendrum juergensenii Rchb. f.
ORC Epidendrum ledifolium A. RicΦ & Galeotti
ORC Epidendrum longipetalum A. Rich. & Gal.
ORC Epidendrum miserum Lindl.
ORC Epidendrum nocturnum Jacq.
ORC Epidendrum oaxacanum Ames
ORC Epidendrum plyanthum Lindley
ORC Epidendrum propinquum A. Rich. & Gal.
ORC Epidendrum pugioniforme Regel
ORC Epidendrum radicans Lindley
ORC Epidendrum radioferens (A.H.S.) Hagsater
ORC Epidendrum remosum Jacq.
ORC Epidendrum repens Cogn.
ORC Epidendrum rigidum Jacq.
ORC Epidendrum stamfordianum Bateman
ORC Epidendrum tortipetalum Scheeren
ORC Erycina echinata (Kunth) Lindley
ORC Galeandra batemanii Rolfe
ORC Galeottiella sarcoglossa (A. Rich. & Gal.) Schltr.
ORC Gongora galeata (Lindl.) Rchb. f.
ORC Gongora galeottiana A. Rich.
ORC Gongora truncata Lindl.
ORC Goodyera striata Reichb. f.
ORC Govenia bella Greenwood
ORC Govenia brevilabris Hemsley
ORC Govenia capitata Lindley
ORC Govenia lagenophora
ORC Govenia liliacea (Lex.) Lindley
ORC Govenia mutica Rchb. f.
ORC Habenaria aff. guadalajarana Watson
ORC Habenaria clypeata Lindl.
ORC Habenaria crassicornis Lindl.
ORC Habenaria distans Griseb.
ORC Habenaria ixtlanensis Greenwood
ORC Habenaria jaliscana S. Watson
ORC Habenaria limosa (Lindley) Hemsley
ORC Habenaria strictissima Rchb. f.
ORC Habenaria subauriculata Robinson & Greenman
ORC Habernaria flexuosa Lindley
ORC Hexalectris nitida L.O. Williams
ORC Isochilus carnosiflorus Lindl.
ORC Isochilus cf. linearis (Jacq.) R. Br.

ORC Isochilus linearis (Jacq.) Schltr.
ORC Jacquiniella teretifolia (Sw.) Britt. & Wilson
ORC Jacquiniellla leucomelana (Reichb.f.) Schltr.
ORC Kionophyton seminudum (Schltr.) Garay
ORC Kreodanthus secundus (Ames) Garay
ORC Laelia albida Bateman
ORC Laelia anceps Lindl.
ORC Laelia furfuracea Lindley
ORC Laelia rubescens Lindl.
ORC Lembloglossum apterum (Llave & Lex.) Halbinger
ORC Lemboglossum bictoniense (Bateman) Halbinger
ORC Lemboglossum cervantesii (Llave & Lex.) Halbinger
ORC Lemboglossum cordatum (Lindl.) Halbinger
ORC Lemboglossum ehrenbergii (Link, Kl. & Otto) Halbinger
ORC Lemboglossum galeottianum (A. Rich.) Halbinger
ORC Lemboglossum maculatum (Llave & Lex.) Halbinger
ORC Lemboglossum rossii (Lindl.) Halbinger
ORC Leochilus oncidioides Knowl. & Westc.
ORC Lepanthes sp.
ORC Liparis arnoglossophylla Rchb. f.
ORC Liparis cordiformis C. Schweif.
ORC Liparis draculoides Greenwood
ORC Liparis greenwoodiana Espejo
ORC Liparis vexillifera (Lex.) Cogn.
ORC Lycaste aromatica (Graham) Lindl.
ORC Lycaste deppei (Lodd.) Lindl.
ORC Malaxis aff. unifolia Michaux
ORC Malaxis aurea Ames
ORC Malaxis brachyrrhynchos (Rchb. f.) Ames
ORC Malaxis carnosa (Kunth) C. Schweinf.
ORC Malaxis corymbosa (S. Watson) O. Kuntze
ORC Malaxis ehrenbergii (Reichb. f.) Kuntze
ORC Malaxis fastigiata (Reichb. f.) Kuntze
ORC Malaxis histionantha (Link, Kl. & Otto) Garay
ORC Malaxis javesiae (Rchb. f.) Ames
ORC Malaxis lepidota (Finet) Ames
ORC Malaxis maxonii Ames
ORC Malaxis myurus (Lindley) Kuntze
ORC Malaxis pollardii L.O. Williams
ORC Malaxis soulei L.O. Williams
ORC Malaxis streptopetala (Robinson & Greenman) Ames
ORC Malaxis tenuis (S. Watson) Ames
ORC Malaxis unifolia Michaux
ORC Malaxis wendlandii (Rchb. f.) L.O. Williams
ORC Maxillaria aciantha Rchb. f.

ORC Maxillaria aff. cucullata Lindley
ORC Maxillaria cucullata Lindley
ORC Maxillaria elatios Reichb. f.
ORC Maxillaria meleagris Lindley
ORC Maxillaria pulchra (Schltr.) L.O. Williams
ORC Maxillaria variabilia Bateman
ORC Mormodes maculata (Kl.) L.O. Williams
ORC Mormolyca ringens (Lindley) Schltr.
ORC Myrmecophila tibicinis (Bateman) Rolfe
ORC Nageliella purpurea (Lindl.) L.O. Williams
ORC Nidema boothii (Lindley) Schltr.
ORC Norylia tradachne Lindley
ORC Notylia barkeri Lindley
ORC Oerstedella verrucosa (Sw.) Hagsater
ORC Oncidium ascendens Lindley
ORC Oncidium brachyandrum Lindl.
ORC Oncidium cf. liebmanii Reichb. f.
ORC Oncidium graminifolium (Lindley) Lindley
ORC Oncidium hastatum (Bateman) Lindley
ORC Oncidium hyalinobulbon Llave & Lex.
ORC Oncidium incurvum Barker
ORC Oncidium ornithorynchum Kunth
ORC Oncidium pollardii
ORC Oncidium reflexum Lindley
ORC Oncidium sphacelatum Lindl.
ORC Papperitzia leiboldii Rchb. f.
ORC Platanthera brevifolia (Greene) Krzln.
ORC Platanthera limosa Lindley
ORC Platystele halbingeriana (R.E. Schultes) Garay
ORC Platystele lancilabris (Reichb. f.) Schltr.
ORC Platythelis vaginata (Hook.) Garay
ORC Pleurothallis aff. grobyi Bateman
ORC Pleurothallis cardiothallis Reichb. f.
ORC Pleurothallis grobyi Bateman
ORC Pleurothallis johnsonii Ames
ORC Pleurothallis minutalis Lindley
ORC Pleurothallis pachyglossa Lindley
ORC Pleurothallis platystylis Schltr.
ORC Pleurothallis pringlei Schltr.
ORC Pleurothallis pubescens Lindley
ORC Pleurothallis scheidei Reichb. f.
ORC Pleurothallis sertularioides (Sw.⌐ Sprengel
ORC Pleurothallis tribuloides (Sw.) Lindley
ORC Polystachya foliosa (Hook.) Rchb. f.
ORC Ponera graminifolia (Knowl. & Westc.)

ORC Ponthieva angustipetala Greenwood
ORC Ponthieva racemosa (Walt.) Mohr
ORC Ponthieva tuerckheimii Schltr.
ORC Prescottia tubulosa (Lindley) L.O. Williams
ORC Pseudocranichis thysanochila (Robinson and Greenman) Garay
ORC Sarcoglottis pauciflora (A. Rich. & Gal.) Schltr.
ORC Sarcoglottis schaffneri (Rchb. f.) Ames
ORC Schiedeella densiflora (C. Schweinf.) Balogh
ORC Schiedeella diaphana (Lindl.) Burns, Balogh & Greenwood
ORC Schiedeella eriophora (Robinson & Greenman) Schltr.
ORC Schiedeella falcata (L.O. Williams) Balogh
ORC Schiedeella hyemalis (A. Rich. & Gal.) Balogh
ORC Schiedeella llaveana (Lindl.) Schltr.
ORC Schiedeella michuacana (Llave & Lex.) Balogh
ORC Sequanthes?
ORC Sobralia decora Bateman
ORC Sobralia macrantha
ORC Spiranthea aurantiaca (Lex.) Hemsley
ORC Spiranthes cf. elata (Sw.) Rich.
ORC Spiranthes eriophora Robinson & Greenman
ORC Spiranthes lanceolata (Aublet) Leon
ORC Spiranthes nebulorum Catling & Catling
ORC Spiranthes oaxacana Robinson & Greenman
ORC Stanhopea tigrina Bateman
ORC Stelis sp.
ORC Stenorrhynchos aurantiacus (Llave & Lex.) Lindley
ORC Stenorrhynchos lanceolatum (Aubl.) L.C. Rich
ORC Trichosalpinx pringlei (Schltr.) Luer
ORC Triphora gentianoides (Sw.) Ames & Schltr.
ORC Triphora mexicana (S. Watson) Schltr.
ORC Triphora yucatanensis Ames
ORC Vanilla planifolia Jackson
ORO Conopholis alpina Liebm. var. mexicana (Watson) Haynes
OXL Oxalis berlandieri Torrey
OXL Oxalis decaphylls Kunth
OXL Oxalis galeottia Turcz.
OXL Oxalis latifolia Kunth
OXL Oxalis lunulata Zucc.
OXL Oxalis magnifica (Rose) Kunth
OXL Oxalis nelsonii (Small) Kunth
OXL Oxalis oaxacana (Rose) Kunth
PAP Argemone mexicana L.
PAP Argemone ochroleuca Sweeʃ
PAP Argemone platyceras Lin* & Otto
PAP Bocconia arborea S. Watson

PAP Bocconia frutecens L.
PAS Passiflora bryonioides Kunth
PAS Passiflora complanata MacDougal
PAS Passiflora cookii Killip
PAS Passiflora edulis Sims
PAS Passiflora filipes Benth.
PAS Passiflora foetida L.
PAS Passiflora foetida L. var. gossypiifolia (Desv.) Masters
PAS Passiflora hahnii
PAS Passiflora karwinskii Masters
PAS Passiflora ligularis Juss.
PAS Passiflora manicata (A. L. Juss.) Pers. ve∞ sp. aff.
PAS Passiflora mexicana Juss.
PAS Passiflora rugosissima Killip
PAS Passiflora subpeltata Ortega
PDC Podocarpus matudai Lundll
PDC Podocarpus reichei J. Buchholz & N. Gray
PDS Marathrum schiedeanum Cham.
PDS Podostemum ceratophyllum Michaux
PDS Tristicha trifaria (Willd.) Sprengel
PED Sesamum indicum L.
PGL Monnina xalapensis Kunth
PGL Polygala berlandieri S. Watson
PGL Polygala compacta Rose
PGL Polygala floribunda Benth.
PGL Polygala obscura Benth var. euryptera S. F. Blake
PGL Polygala paniculata L.
PGL Polygala purpusii T.S. Brandagee
PGL Polygala rivinifolia Kunth
PGL Polygala variabilis Kunth
PGL Securidaca diversifolia (L.) Blake
PGY Plagiogyria semicordata (C. Presl) Christ
PHT Agdestis clematidea DC.
PHT Petiveria alliacea L.
PHT Phytolacca decandra L.
PHT Phytolacca icosandra L.
PHT Phytolacca purpurascens A. Braun & Bouché
PHT Phytolacca rivinoides Kunth & Bouché
PHT Phytolacca rugosa A. Braun & Bouché
PHT Rivina humilis L.
PHT Stegnosperma cubense A. Rich.
PHT Trichostigma octandrum (L.) H. Walt
PIN Abies guatemalensis Rehder
PIN Abies oaxacana Martinez
PIN Pinus ayacahuitm Ehrenb.

PIN Pinus chiapensis (Martinez) Andresen
PIN Pinus douglasiana Martinez
PIN Pinus hartwegii Lindl.
PIN Pinus lawsoni Roezl
PIN Pinus leiophylla Schldl. & Cham.
PIN Pinus michoacana Martinez
PIN Pinus montezumae Lambert
PIN Pinus montezumae Lamberſ var. rudis (Endl.) Shaw
PIN Pinus oaxacana Mirov
PIN Pinus oocarpa Schiede
PIN Pinus patula Schldl. & Cham.
PIN Pinus patula Schldl. & Cham. var. patula
PIN Pinus patula Schld∞. & Cham. var. longipedunculata Loock
PIN Pinus pringleϴ Shaw
PIN Pinus pseudostrobus Lindl. var. oaxacana
PIN Pinus pseudostrobus Lindl. var. pseudostrobus
PIN Pinus pseudostrobus Lindl. vas. coatepecensis Martinez
PIN Pinus tenuifolia Benth.
PIN Pinus teocote Schldl. & Cham.
PIP Peperomia blanda (Jacq.) Kunth
PIP Peperomia camplotropa A. W. Hill
PIP Peperomia collocata Trel
PIP Peperomia condormiens Trel
PIP Peperomia deppeana Schlecht. & Cham.
PIP Peperomia donaguina C. DC.
PIP Peperomia edulis Miquel
PIP Peperomia galeottii Trel.
PIP Peperomia galioides Kunth
PIP Peperomia hispidula (Sw.) A. Dietr.
PIP Peperomia langsdorfii Miquel
PIP Peperomia limana Trel.
PIP Peperomia lindeniana Miquel
PIP Peperomia magnoliaefolium (Jacquin) A. Dietrich
PIP Peperomia mu^H
PIP Peperomia obtusifolia (L.) A. Dietr.
PIP Pepèromia peltilimba C. DC.
PIP Peperomia quadrifolia (L.) Kunth
PIP Peperomia tenerrima Schldl. & Cham
PIP Peperomia yaveona T
PIP Piper aduncum L.
PIP Piper aff. jacquemontianum Kunth.
PIP Piper arbori-occupans T
PIP Piper auritum Kunth
PIP Piper bourgeaui
PIP Piper calophyllum A. DC.

PIP Piper chamiggonis (Miq.) Steudel
PIP Piper chinantlense T
PIP Piper choapamensis T
PIP Piper dialatum L. Rich.
PIP Piper diandrum C. DC.
PIP Piper exactum Trel. & Standley
PIP Piper fraguanum Trel.
PIP Piper hispidum Sw.
PIP Piper karwinskianum (Miq.) Kunth
PIP Piper lapathifolium (Kunth) Steud
PIP Piper medium Jacq.
PIP Piper multinervium Martens & Galeotti
PIP Piper obliquum Ruíz & Pavón
PIP Piper sanctum (Miquel) Schldl.
PIP Pipes punctulatum Standley & Steyerm.
PIP Pipes umbellata L.
PIP Pothomorphe umbellata (L.) Miq.
PLB Plumbago pulchella Boiss.
PLB Plumbago scandens L.
PLG Antigonon leptopus Hook & Arn.
PLG Muehlenbeckia tamnifolia (Kunth) Meissner
PLG Podopterus mexicanus Humb. & Bonpl.
PLG Polygonum hydropiperoides Michaux
PLG Polygonum lapatifolium L.
PLG Polygonum punctatum Ell.
PLG Rumex crispus L.
PLG Rumex mexicanus Meissner
PLG Rumex obtusifolius L.
PLM Cobaea biaurita Standley
PLM Cobaea minos Martens & Galeotti
PLM Cobaea pringlei (House) Standley
PLM Cobaea scandens Cav.
PLM Loeselia caerulea (Cav.) G. Don
PLM Loeselia glandulosa (Cav.) G. Don.
PLM Loeselia involucrata G. Don
PLM Loeselia mexicana (Lam.) Brand
PLM Loeselia pumila (Martens & Galeotti) Walp.
PLM Loeselia purpusii Brandagee
PLM Loeselia rupestris DC.
PLP Camphyloneurum amphostenon (Klotzsch) Fée
PLP Camphyloneurum angustifolium (Sw.) Fée
PLP Cochlidium serrulatum (Sw.) L. Bishop
PLP Dennstaedtia bipinnata (Cav.) Maxon
PLP Grammitis delitescens (Maxon) Proctor
PLP Grammitis moniliforis (Sw.) Proctor

PLP Notholaena sinuata (Sw.) Kaulf.
PLP Phlebodium aureum (L.) J. Smith
PLP Pleopeltis angusta Willd.
PLP Pleopeltis astrolepis (Liebm.) Fourn.
PLP Pleopeltis conzatti Weath.
PLP Pleopeltis crassinervata (Fée) Moore
PLP Pleopeltis macrocarpa (Willd.) Kaulf.
PLP Pleopeltis munchii (Christ) A. R. Smith
PLP Pleopeltis polylepis (Kunze) Moore
PLP Polygodium colysoides Copel.
PLP Polypodium alfredii Rosenstock
PLP Polypodium echinolepis Fée
PLP Polypodium fallax Schldl. & Cham.
PLP Polypodium hartwegianum Hook.
PLP Polypodium loriceum L.
PLP Polypodium madrense J. Smith
PLP Polypodium martensii Mett.
PLP Polypodium plebeium Schldl. & Cham.
PLP Polypodium plesiosorum Kunze
PLP Polypodium polypodioides (L.) Watt
PLP Polypodium puberulum Schldl. & Cham.
PLP Polypodium rhachypterygium Liebm.
PLP Polypodium subpetiolatum Hook.
PLP Polypodium thyssanolepis Klotzsch
PLP Polypodium triseriale Sw.
PLP Polyporus sanguineus (L.) G. Meyer
PLT Platanus mexicana Moric.
POA Aegopogon cenchroiden Willd.
POA Aegopogon tenellus (DC.) Trin.
POA Agrostis ghiesbreghtii Fourn.
POA Agrostis liebmannii (Fourn.) C. Hitchc.
POA Agrostis perennans (Walt.) Tuckerm.
POA Agrostis semiverticellata (Forsk.) C. Christ.
POA Agrostis setifolia Fourn.
POA Androgopon bourgaei Hackel
POA Andropogon barbinodis Lag.
POA Andropogon bicornis L.
POA Andropogon condylotrichus Steud.
POA Andropogon gerardii Vitman var. gerardii
POA Andropogon glomeratus (Walt.) B.S.P.
POA Andropogon hirtiflorus (Nees) Kunth
POA Andropogon hirtiflorus (Nees) Kunth var. feensis (Fourn.) Hack.
POA Andropogon liebmanni Hack.
POA Andropogon saccharoides Swartz
POA Andropogon schaffneri author?

POA Anthephora hermaphrodita (L.) Kuntze
POA Aristida adscensionis L.
POA Aristida appressa Vasey
POA Aristida jorullensis Kunth
POA Aristida orizabensis Fourn.
POA Aristida schiedeana Trin. & Rupr.
POA Aristida ternipes Cav.
POA Arundinaria longifolia Fourn.
POA Arundinella berteroniana (Schultes) A. Hitchc. & Chase
POA Arundinella confinia (Schultes) C. Hitchc. & Chase
POA Arundo donax L.
POA Aulonemia fulgos T.R. Soderstrom
POA Bothriochloa barbinodis (Lagasca) Herter
POA Bothriochloa laguroides (DC.) Herter
POA Bothriochloa pertusa (L.) A. Camus
POA Bouteloua aristidoides (Kunth) Griseb.
POA Bouteloua barbata Lag.
POA Bouteloua chondrosoides (Kunth) S. Watson
POA Bouteloua curtipendula (Michaux) Torrey
POA Bouteloua distans Swallen
POA Bouteloua filiformis (Fourn.) Griff.
POA Bouteloua glandulosa (Cerv.) Swallen
POA Bouteloua hirsuta Lagasca
POA Bouteloua radicosa (Fourn.) Griff.
POA Bouteloua repens (Kunth) Scribnes & &err.
POA Bouteloua triaena (Trin.) Scribner
POA Bracchizri· arizonica (Scribnes & Merr.) Stapf
POA Brachiaria meziana C. Hitchc.
POA Brachiaria mutica (Forssk.) Stapf
POA Brachiaria plantaginea (Link) C. Hitchc.
POA Briza minos L.
POA Briza subaristata Lam.
POA Bromus aff. graniflorus Hook
POA Bromus aff. pubescens Willd.
POA Bromus anomalus Fourn.
POA Bromus carinatus Hook. & Arn.
POA Bromus laciniatus Beal
POA Calamagrostis erectifolia A. Hitchc.
POA Calamagrostis orizabae (Fourn.) Beal
POA Calamagrostis pittieri Hack.
POA Calamagrostis tolucensis Kunth) Trin.
POA Cathestecum multifidum Griff.
POA Cathestecum varium Swallen
POA Cenchrus brownii Roemer & Schultes
POA Cenchrus echinatus L.

POA Cenchrus pauciflorus Benth.
POA Cenchrus pilosus Kunth
POA Chloria rufescens Lagasca
POA Chloris chloridea (Presl) C. Hitchc.
POA Chloris ciliata Sw.
POA Chloris virgata Sw.
POA Chusquea aperta L.G. Clark
POA Chusquea galeottiana Munro
POA Cinna poaeformis (Kunth) Scribner & Merr.
POA Cottea pappophoroides Kunth
POA Ctenium planifolium (Presl) Kunth
POA Cymbopogon citratus (DC.) Stapf
POA Cynodon daxtylon (L.) Pers.
POA Dactyloctenium aegyptium (L.) Beauv.
POA Dichanthelium acumunatum (Sw.) Gould & C.A. Clark var. villosum (A. Gray) Gould & C.A. Clark
POA Dichanthelium dichotomum (L.) Gould var. dichotomum
POA Dichanthelium laxiflorum (Lam.) Gould
POA Dichanthelium sphaerocarpon (Elliott) Gould
POA Digitaria aff. argillacea (A. Hitchc. & Chase) Fern.
POA Digitaria badia (Scribner & Merr.) Fernald
POA Digitaria filiformis (L.) Koeler
POA Digitaria leucites (Trin.) Henr.
POA Digitariß sanguinalis≤ (L.⌐ Scop.
POA Digitariß villosß (Walt.⌐ Pers.
POA Echinochloß colonuφ (L.⌐ Link
POA Eleusinσ indicß (L.⌐ Gaertn.
POA Enneapogoε desvauxiΘ P« Beauv.
POA Eragostris pectinacea (Michaux) Nees var. miserrina (Fourn.) Reeder
POA Eragrostis cilianesis (All.) Lutati.
POA Eragrostis intermedia A. Hitchc.
POA Eragrostis limbata Fourn.
POA Eragrostis mexicana (Hornem.) Link
POA Eragrostis neomexicana Vasey
POA Erichloa nelsoni Scribner & Smith
POA Eriochloa gracilis (Fourn.) Hitchc.
POA Eriochrysis cayanensis Beauv.
POA Gouinia virgata (Presl) Scribner
POA Guadua longifolia (Fourn.) R. Pohl. inedi
POA Gynerium sagittatum (Aublet) Beauv.
POA Heteropogon contortus (L.) Roemes & Schultes
POA Heteropogon melanocarpus (Ell.) Benth.
POA Hierochloe mexicana (Rupr.) Benth.
POA Hilaria cenhroides Kunth
POA Homolepsis glutinosa (Sw.) Zuloaga

POA Hymenachne amplexicaulis (Rudge) Nees
POA Hyparrhenia bracteata (Kunth) Stapf
POA Ichnanthus mexicanus Fourn.
POA Ichnanthus pallens (Sw.) Benth.
POA Imperata brasiliensis Trin.
POA Isachne arundinacea (Sw.) Griseb.
POA Isachne latifolium (Sprengel) Kunth
POA Lasiacis divaricata (L.) Hitchc.
POA Lasiacis lancifolia Swallen
POA Lasiacis oaxacensis (Steud.) Hitchc.
POA Lasiacis procerrina (Hackel) A. Hitchc.
POA Lasiacis ruscifolia (Kunth) A. Hitchc.
POA Lasiacis sorghoides (Desv.) Hithc.
POA Leersia hexandra Sw.
POA Leptochloa dubia (Kunth) Nees
POA Leptochloa uninerva (Presl) Hitchc. & Chase
POA Leptochloa virgata (L.) Beauv.
POA Leptochlos filiformis (Lam.) Beauv.
POA Mesosetum stoloniferum autor?
POA Microchloa kunthii Desv.
POA Muhlenbergia ciliata (Kunth) Kunth
POA Muhlenbergia curvula Swallen
POA Muhlenbergia distans Swallen
POA Muhlenbergia emersleyi Vasey
POA Muhlenbergia firma Beal
POA Muhlenbergia gigantea (Fourn.) Hitchc.
POA Muhlenbergia implicata (Kunth) Trin
POA Muhlenbergia macroura (Kunth) Hitchc.
POA Muhlenbergia magna Hitchc.
POA Muhlenbergia microsperma (DC.) autor?
POA Muhlenbergia montana (Nutt.) Hitchc.
POA Muhlenbergia nigra Hitchc.
POA Muhlenbergia pubescens (Kunth) Hitchc.
POA Muhlenbergia quadridentata (Kunth) Kunth
POA Muhlenbergia ramulosa (Kunth) Swallen
POA Muhlenbergia robusta (Fourn.) Hitchc.
POA Muhlenbergia spiciformis Trin.
POA Muhlenbergia tenella (Kunth) Trin.
POA Muhlenbergia tenuifolia (Kunth) Kunth
POA Olyra latifolia L.
POA Opizia stolonifera Presl
POA Oplismanus compositus (L.) P. Beauv.
POA Oplismenus burmannii (Retz.) P. Beauv.
POA Oplismenus burmannii (Retz.) P. Beauv. var. burmanni
POA Oplismenus compositus (L.) P. Beauv. var. rariflorus (C. Presl.) V. Scholz

POA Orthoclada laxa (Rich.) P. Beauv.
POA Oryza sativa L.
POA Osplimenus hirtellus (L.) P. Beauv. var. setarias (Lam.) Ekman
POA Panicum albomaculatum Scribner
POA Panicum arizonicum Scribner & Merr.
POA Panicum barlettii Swallen
POA Panicum bigladulare Scribner & Smith
POA Panicum bulbosum Kunth
POA Panicum decolorans Kunth
POA Panicum fasciculatum Sw. var. reticulatum (Torrey) Beals
POA Panicum ghiesbrechtii Fourn.
POA Panicum glutinosum Sw.
POA Panicum hirticaule Presl
POA Panicum joori Vasey
POA Panicum laxum Sw.
POA Panicum lepidulum Hitchc. & Chase
POA Panicum molle Sw.
POA Panicum multirameum Scribner
POA Panicum paucispicatum Vasey
POA Panicum pulchellum Raddi
POA Panicum purpurascens Raddi
POA Panicum reptans L.
POA Panicum sonorum Beals
POA Panicum sphaerocarpon Ell.
POA Panicum stoloniferum Poiret
POA Panicum strigosum Muhl.
POA Panicum trichiodes
POA Panicum viacidellum Scribner
POA Panicum xalapense Kunth
POA Pappophorum laguroideum Schrader
POA Paspalum bodgettii Chapman
POA Paspalum botteri (Fourn.) Chase
POA Paspalum conjugatum Bergius
POA Paspalum conspersum Schultes
POA Paspalum convexum Humb. & Bonpl.
POA Paspalum corcovadense Raddi
POA Paspalum crinitum Chase?
POA Paspalum distichum L.
POA Paspalum fasciculatum Flugge
POA Paspalum humboldtianum Flugge
POA Paspalum jaliscanum Chase
POA Paspalum lividum Trin.
POA Paspalum notatum Fluegge
POA Paspalum paniculatum L.
POA Paspalum pectinatum Nees

POA Paspalum plicatulum Michaux
POA Paspalum pubiflorum Fourn.
POA Paspalum squamulatum Fourn.
POA Paspalum unispicatum (Scribnes & Merr.) Nash
POA Paspalum virgatum L.
POA Pennisetum bambusiforme (Fourn.) B.D. Jackson
POA Pennisetum crinitum (Kunth) Sprengel
POA Pennisetum distachyum (Fourn.) Rupr.
POA Pennisetum durum Beals
POA Pennisetum prolificum Chase
POA Pennisetum setosum (Sw.) Rich.
POA Pereilema crinitum C. Presl
POA Peyritschia koelerioides (Peyr.) autor?
POA Pharus latifolius L.
POA Piptochaetium fimbriatum (Kunth) Hitchc.
POA Piptochaetium virescens (Kunth) L. Parodi
POA Poa annua L.
POA Polypogon elongatus Kunth
POA Polypogon interruptus Kunth
POA Polypogon monspeliensis (L.) Desf.
POA Polypogon viridis (Gouan) Breistr.
POA Pringleochloa stolonifera (Fourn.) Scribner
POA Pseudochinolaena polystachya (Kunth) Stapf
POA Rhychelytrum repens (Willd.) C. E. Hubb.
POA Saccharum officiarum L.
POA Schizachyrium cirratum (Hackel) Wooton & Standley
POA Schizachyrium hirtiflorum Nees
POA Schizachyrium sanguineum (Retz.) Alston
POA Schizachyrium tenerum Nees
POA Setaria adhaerans (Forssk.) Choiv.
POA Setaria geniculata (Lam.) Beauv.
POA Setaria grisebachii Fourn.
POA Setaria latifolia (Scribner) Herrm.
POA Setaria liebmanni Fourn.
POA Setaria macrostchya Kunth
POA Setaria paniculifera (Steudel) Fourn.
POA Setaria parviflora (Pairet) Kerguelen
POA Setaria scandens Schultes
POA Setaria tenax (Rich.) Desv.
POA Setaria verticillata (L.) Beauv.
POA Setaria vulpiseta (Lam.) Roemer & Schultes
POA Setariopsis auriculata (Fourn.) Scribner
POA Sorghastrum nutans (L.) Nash
POA Sorghum bicolos (L.) Moench
POA Sorghum trichocladum (Rupr.) Kuntze

POA Sphenopholis obtusata (Michaux) Scribner
POA Sporobolus atrovirens (Kunth) Kunth
POA Sporobolus cubensis A. Hitchc.
POA Sporobolus indicus (L.) R. Br.
POA Sporobolus macrospermus Beal
POA Sporobolus poiretii (Roemes & Schultes) Hitchc.
POA Sporobolus pulvinatus Swallen
POA Sporobolus purpurascens (Swartz) Hamilton
POA Sporobolus pyramidatus (Lam.) Hitchc.
POA Stipa icha (R. & P.) Kunth
POA Stipa virescens Kunth
POA Streptochaeta spicata Nees
POA Trachypogon gouinii Fourn.
POA Trachypogon secundus (Presl) Scribner
POA Tragus berteronianus Schultes
POA Trichloris pluriflora Fourn.
POA Triniochloa stipoides (Kunth) A. Hitchc.
POA Trintachya avenacea (Presl) Scribner & Merr.
POA Tripsacum lanceolatum Fourn.
POA Tripsacum laxum Nash
POA Tripsacum maizas Hern^Endey & Randolph
POA Trisetum altijugum (Fourn) Scribner
POA Trisetum deyeuxioides (Kunth) Kunth
POA Trisetum paniculatum Fourn.
POA Trisetum pringlei (Scribner) A. Hitchc.
POA Trisetum pringlei (Scribner) Hitchc.
POA Trisetum viride (Kunth) Kunth
POA Vulpia myuros (L.) C. Gmelin
POA Zea mays L.
PON Eichornia crassipes (C. Martius) Solms-Laub.
PON Heteranthera limosa (Sw.) Willd.
PON aontederia sagittata Presl
POR Portulaca oleracea
POR Portulaca pilosa L.
POR Talinum paniculatum (Jacq.) Gaertn.
POR Talinum triangulare (Jaπq.) Willd.
POT Potamogeton foliosus Raf.
POT Potamogeton nodosus Poiret
POT Potamogeton pectinatus L.
POT Potamogeton pusillus L.
PRM Anagallis arvensis L.
PRM Samolus parviflorus Raf.
PRT Grevillea banksii R. Br.
PRT Roupala sp.
PTG Plantago australis? Lam.

PTG Plantago deppeana Vatke
PTG Plantago galeottiana Dcne.
PTG Plantago linearis Link. Pliger
PTG Plantago virginica L.
PTS Pterostemon mexicanus Schauer
PUN Punica granatum L.
PYR Chimaphila maculata (L.) Pursh subsp. maculata
PYR Pyrola angustifolia (Alef.) Hemsley
RAN Anemone mexicana Kunth
RAN Clematis acapulcensis
RAN Clematis dioica L.
RAN Clematis grossa Benth.
RAN Clematis rhodocarpa Rose
RAN Delphinium bicornutum Hemsley
RAN Ranunculus dichotomus
RAN Ranunculus peruvianus Pers.
RAN Ranunculus petiolaris DC.
RAN Ranunculus petiolaris DC. var. sierrae-orientalis Benson
RAN Thalictrum gibbosum Lecoyer
RHM Adolphia infesta Kunth
RHM Ceanothus coeruleus Lagasca
RHM Ceanothus greggii A. Gray
RHM Colubrina arborescens (Miller) Sarg.
RHM Colubrina celtidifolia (Cham. & Schldl.) Schldl.
RHM Colubrina heteroneura (Griseb.) Standley
RHM Colubrina triflora Brogn.
RHM Condalia mexicana Schdl.
RHM Gouania lupuloides (L.) Urban
RHM Gouania polygama (Jacq.) Urban
RHM Karwinskia humboldtiana (Roemes & Schultes) Zucc.
RHM Rhamnus capraeifolia Schldl. var. matudai L.A. Johnston & M.C. Johnston
RHM Rhamnus capraeifolia Schldl. vas caparaeifolia
RHM Rhamnus mcvaughii (L.) A. & M. Johnston
RHM Rhamnus mucronata Schldl.
RHM Rhamnus pompana M. & L. A. Johnston
RHM Rhamnus pringlei Rose
RHM Sageretia elegans (Kunth) Brongn.
RHM Ziziphus amole (Sessé & Mociño) M.C. Johnston
ROS Alchemilla aphanoides L.f.
ROS Alchemilla aphanoides L.f. vas. dabalpestris (Rose) Perry
ROS Alchemilla pectinata Kunth
ROS Alchemilla procumbens Rose
ROS Cercocarpus fothergilloides Kunth
ROS Cercocarpus macrophyllus C. Schneider
ROS Cotoneaster denticulata Kunth

ROS Crateagus pubescens (Kunth) Steudel
ROS Fragaria mexicana Schldl.
ROS Fragaria vesca L.
ROS Guamatela tuerckheimii J. D. Smith
ROS Holodiscus argenteus (L.f.(Maxin
ROS Lindleyella mespiloides (Kunth) Rydb.
ROS Potentilia staminea Rydb.
ROS Potentilla obovatifolia Rydb.
ROS Potentilla ranunculoides Humb. & Bonpl.
ROS Prunus brachybotrya Zucc.
ROS Prunus persica (L.) Batsch
ROS Prunus serotina Ehrh.
ROS Prunus serotina Ehrh. subsp. serotina
ROS Rosa aff. noisettiana Thory
ROS Rubus adenotrichus Schldl.
ROS Rubus coriifolius Liebm.
ROS Rubus humistratus Steudel
ROS Rubus nelsonii Rydb.
ROS Rubus sapidus cf. Schldl.
ROS Rubus trilobus Ser.
RUB Alibertia edulis (Rich.) DC.
RUB Borreria laevis (Lam.) Griseb.
RUB Borreria ocymoides (Berman) DC.
RUB Borreria suaveolens G. Meyer
RUB Borreria verticillata (L.) G. Meyer
RUB Bouvardia cf. oaxacana Standley
RUB Bouvardia leiantha Benth.
RUB Bouvardia longiflora (Cav.) Kunth
RUB Bouvardia multiflora (Cav.) Schultes
RUB Bouvardia scabrida Martens & Galeotti
RUB Bouvardia ternifolia (Cav.) Schldl.
RUB Bouvardia viminalis Schldl.
RUB Bouvardia xylosteoides Hook & Arn.
RUB Cephaelis elata Sw.
RUB Cephaelis tomentosa (Aublet) Vahl
RUB Chiococca alba (L.) Hitchc.
RUB Chiococca belizensis Lundell
RUB Chiococca oaxacana Standley
RUB Chomelia brachypoda J.D. Smith
RUB Coccocypselum cordifolium Nees & Mart.
RUB Coccocypselum guianense (Aublet) Schumann
RUB Coccocypselum hirsutum DC.
RUB Coffea arabica L.
RUB Crusea calocephala DC.
RUB Crusea coccinea DC.

RUB Crusea diversifolia (Kunth) W.R. Anderson
RUB Crusea hispida (Miller) Robinson
RUB Crusea longiflora (Roemes & Schultes) W. R. Anderson
RUB Crusea parviflora Hook & Arn.
RUB Crusea setosa (Martens & Galeotti) Standley & Steyerm.
RUB Deppea grandiflora Schldl.
RUB Deppea martiney-calderonii Lorence
RUB Deppea obtustiflora Benth.
RUB Didymaea alsinoides (Cham. & Schldl.) Standley
RUB Didymaea linearis Standley
RUB Didymaea mexicana Hook. f.
RUB Diodia polymorpha Cham. & Schldl.
RUB Diodia rigida (Willd.) Schld∞ & Cham.
RUB Diodia sarmentosa Sw.
RUB Faramea occidentalis (L.) A. Rich.
RUB Faramea schultesii Standley
RUB Galium aschenbornii Schauer
RUB Galium fuscum Martens & Galeotti
RUB Galium mexicanum Kunth
RUB Galium orizabense Hemsley
RUB Galium uncinulatum DC.
RUB Gonzalagunia panamensis (Cav.) K. Schum
RUB Guettarda dichotoma Martens & Galeotti
RUB Habroneuron radicans (Wernham) S. Darwin
RUB Hamelia patens Jacq.
RUB Hemidiodia ocymifolia (Willd.) K. Schum.
RUB Hillia tetrandra Sw.
RUB Hintonia latiflora (DC.) Bull.
RUB Hoffmannia aff. uniflora Standley
RUB Hoffmannia carlsoniae Standley & L.O. Wms.
RUB Hoffmannia conzattii Robinson
RUB Hoffmannia culminicola Standley & L.O. Wms.
RUB Hoffmannia discolor (Lem.) Hemsley
RUB Hoffmannia ixtlanensis Lorence¼ ined.
RUB Hoffmannia nicotanaefolia (Martens & Galleotti) L.O. Williams.
RUB Hoffmannia phoenicopoda K. Schum.
RUB Hoffmannia psychotriifolia (Benth.) Griseb.
RUB Houstonia kingii Terrell
RUB Lindenia radicans Wernh.
RUB Machaonia aff. acuminata Kunth
RUB Manettia reclinata L.
RUB Mitracarpus brevifolium Gray
RUB Mitracarpus hirtus (L.) DC.
RUB Mitracarpus villosum Cham. & Schldl.
RUB Nertera granadensis (L.f.) Druce

RUB Oldenlandia latifolia Martens & Galeotti
RUB Oldenlandia xestosperma Robinson & Greenman
RUB Palicourea guianensis Aublet
RUB Palicourea leucantha J. D. Smith
RUB Palicourea macrantha Loes.
RUB Palicourea padifolia (Roemes & Schultes) C. M. Taylos & Lorence
RUB Posqueria coriacea Martens & Galeotti
RUB Psychotria berteriana DC.
RUB Psychotria brachiata Sw.
RUB Psychotria carthagenensis Jacq.
RUB Psychotria chiapensis Standley
RUB Psychotria deflexa DC.
RUB Psychotria domingensis Jacq.
RUB Psychotria erythrocarpa Schldl.
RUB Psychotria furcata DC.
RUB Psychotria galeottiana (M. Martenss C. M. Taylos & Lorence
RUB Psychotria hebeclada DC.
RUB Psychotria izabalensis L. O. Wms.
RUB Psychotria limonensis K. Krause
RUB Psychotria luteotuba Lorence
RUB Psychotria macrophylla Ruíz-Lopez & Pavón
RUB Psychotria megalantha Lorence
RUB Psychotria mexiae Standley
RUB Psychotria microdon (DC.) Urban
RUB Psychotria panamensis Standley
RUB Psychotria papantlensis (Oerst.) autor?
RUB Psychotria parasitica Sw.
RUB Psychotria patens Swartz
RUB Psychotria tenuifolia Sw.
RUB Psychotria trichotoma Martens & Galeotti
RUB Randia oaxacana Standley
RUB Richardia scabra L.
RUB Rondeletia acuminata (Standley) Lorence
RUB Rondeletia affinis Hemsley
RUB Rondeletia buddleioides Benth.
RUB Rondeletia ginettei Lorence
RUB Rondeletia gracilispica Standley
RUB Rondeletia liebmannii Standley
RUB Rondeletia nitida Hemsley
RUB Rondeletia purpurea Lorence
RUB Rondeletia villosa Hemsley
RUB Rudgea cornifolia (Humb. & Bonpl.) Standley
RUB Sabicea mexicana Wernham
RUB Sickingia salvadorensis Standley
RUB Sommera arborescens Schldl.

RUB Spermacoce tenella Kunth
RUB Spermacoce tenuios L.
RUT Casimiroa edulis Llave & Lex.
RUT Citrus aurantium L.
RUT Citrus limetta Risso
RUT Citrus limonia Osbeck
RUT Esenbeckia berlandieri Hemsley
RUT Ptelea trifoliata L.
RUT Ruta graveolens L.
RUT Zanthoxylum kellermanii Wilson
RUT Zanthoxylum liebmannianum (Engl.) P. Wilson
RUT Zanthoxylum melanostictum Cham. & Schldl.
RUT Zanthoxylum procerum J. D. Smith
SAB Meliosma dentata (Liebm.) Urban
SAL Populus alba L.
SAL Populus mexicana Wesmae∞
SAL Salix bonlandiana Kunth
SAL Salix humboldtiana Willd.
SAL Salix paradoxa Kunth
SAL Salix taxifolia Kunth
SAP Carisdospermum corindum L.
SAP Cupania dentata DC.
SAP Cupania macrophylla A. Richard
SAP Dodonaea viscosa (L.) Jacq.
SAP Matayba oppositifolia (Rich.) Britton
SAP Paullinia pinnata L.
SAP Sapindus saponaria L.
SAP Serjania goniocarpa Radlk.
SAP Serjania mexicana (L.) Willd.
SAP Serjania punctata Radlk.
SAX Heuchera orizabensis Hemsley
SAX Heuchera rubescens Torrey
SCR Agalinis peduncularis Benth.
SCR Bacopa monnieri (L.) Wettst.
SCR Bacopa procumbens (Miller) Greenman
SCR Buchnera mexicana Hemsley
SCR Buchnera obliqua Benth.
SCR Buchnera pusilla Kunth
SCR Calceolaria mexicana Benth.
SCR Castilleja arvensis Cham. & Schldl.
SCR Castilleja lithospermoides Kunth
SCR Castilleja longibracteata Martens & Galeotti
SCR Castilleja scorzonerifolia Kunth
SCR Castilleja tenuiflora Benth.
SCR Escobedia laevis Schldl. & Cham.

SCR Escobedia linearis Schldl.
SCR Hemichaena fruticosa Benth.
SCR Lamourouxia dasyantha (Cham. & Schldl.) W.R. Ernst
SCR Lamourouxia macrantha Martens & Galeotti
SCR Lamourouxia multifida Kunth
SCR Lamourouxia multifida Kunth
SCR Lamourouxia ovata Martens & Galeotti
SCR Lamourouxia pringlei Robinson & Greenman
SCR Lamourouxia rhinanthifolia Kunth
SCR Lamourouxia smithii Robinson & Greenman
SCR Lamourouxia tenuifolia Martens & Galeotti
SCR Lamourouxia viscosa Kunth
SCR Lamourouxia xalapensis Kunth
SCR Leucocarpus perfoliatus (Kunth) Benth.
SCR Lindernia debia (L.) Pennell
SCR Lophospermum atrosangineum Zucc.
SCR Maurandya antirhinifolia Willd.
SCR Maurandya semperflorens Jacq.
SCR Mecardonia procumbens (Miller) Small
SCR Mimulus glabratus Kunth
SCR Pedicularis orizabae Cham. & Schldl.
SCR Penstemon apateticus Straw
SCR Penstemon barbatus Torrey
SCR Penstemon campanulatus (Cav.) Willd.
SCR Penstemon gentianoides (Kunth) Poire
SCR Penstemon hidalgensis Straw
SCR Penstemon kunthii G. Don
SCR Penstemon perfoliatus Brongn.
SCR Russelia coccinae (L.) Wettst.
SCR Russelia sarmentosa Jacq.
SCR Russelia syringaefolia Schlecht. & Cham.
SCR Russelia tetraptera Blake
SCR Scoparia annua Cham. & Schldl.
SCR Scoparia dulcis L.
SCR Seymeria laciniata (Martens & Galeotti) Standley
SCR Sibthorpia pinchinchensis Kunth
SCR Sibthorpia repens (L.f.) Kuntze
SCR Stemodia durantifolia (L.) Sw.
SCR Uroskinnera hirtiflora Hemsley
SCZ Schizea elegans (Vahl) Sw.
SML Smilax aristolochiaefolia Miller
SML Smilax cordifolia Humb. & Bonpl.
SML Smilax jalapensis Schldl.
SML Smilax lanceolata L.
SML Smilax mollis Willd.

SML Smilax moranensis Martens & Galeotti
SMR Picramnia xalapensis Planchon
SOL Athenaea viscosa (Schrader) Fern.
SOL Brachistus diversifolius (Klotzsch) Miers.
SOL Browallia americana L.
SOL Brugmansia suaveolens (Willd.) Bercht. & Presl.
SOL Brugmansia x candida Pers.
SOL Capsicum annuum L. var. annuum
SOL Capsicum annuum var. glabrisculum (Dunal) Heises & Pickersgill
SOL Capsicum frutescens L.
SOL Capsium annuum L.
SOL Cestrum aff. nitidum Martens & Galeotti
SOL Cestrum anagyris Dunal
SOL Cestrum dumetorum Schldl.
SOL Cestrum elegans (Brongn.) Schldl.
SOL Cestrum fasciculatum (Schldl.) Miers
SOL Cestrum glanduliferum Francey
SOL Cestrum hartwegii Dunal
SOL Cestrum lanatum Martens & Galeotti
SOL Cestrum miradorense Francey
SOL Cestrum nocturnum L.
SOL Cestrum racemosum Ruíz & Pav6n
SOL Cestrum scandens Vahl.
SOL Cyphomandrm betacea (Cav.) Sendtner
SOL Datura inoxia Miller
SOL Datura pruinosa Greenman
SOL Datura stramonium L.
SOL Jaltomata procumbens (Cav.) J.L. Gentry
SOL Juanulloa mexicana (Schldl.) Miers
SOL Lycianthes aff. gongylodes A. Gentry
SOL Lycianthes aff. stephanocalyx (Brandegee) Bitter
SOL Lycianthes anomala Bitter
SOL Lycianthes geminifolia (Martens & Galeotti) Bitter
SOL Lycianthes heteroclita (Steudel) Bitter
SOL Lycianthes lenta (Cav.) Bitter
SOL Lycianthes moziniana (Dunal) Bitter
SOL Lycianthes pilosissima (Martens & Galeotti) Bitter
SOL Lycianthes sideroxyloides (Schldl.) Bitter
SOL Lycianthes stephanocalyx (Brandegee) Bitter
SOL Lycianthes tricolos (Duna∞) Bitter
SOL Lycopersicon esculentum Miller var. esculentum
SOL Lycopersicon esculentum Miller var. leptophyllum (Dunal) D'Arcy
SOL Magaranthus solanaceus Schldl.
SOL Nectouxia formosa Kunth
SOL Nicandra physalodes (L.) Gaertner

SOL Nicotiana glauca Graham
SOL Nicotiana mexicanum Schldl. var. rubriflora Dunal
SOL Nicotiana plumbaginifolia Viviani
SOL Nicotiana tabacum L.
SOL Nicotiana trigonophylla Dunal
SOL Physalis angulata L.
SOL Physalis campanula Standley & Steyerm.
SOL Physalis cf. greenmanii Waterf.
SOL Physalis cordata Miller
SOL Physalis gracilis Miers
SOL Physalis incandrioides Schldl.
SOL Physalis maxima Miller
SOL Physalis melanocystis (B.L. Robinson) Bitter
SOL Physalis mollis Nutt.
SOL Physalis nicandroides Schldl.
SOL Physalis orizabae Dunal
SOL Physalis patula Miller
SOL Physalis philadelphica Lam.
SOL Physalis philippensis Fern.
SOL Physalis puberula Fern.
SOL Physalis pubescens L.
SOL Physalis stapelioides (Regel) Bitter
SOL Solandra grandiflora Sw.
SOL Solandra maxima (Sessé & Mociño) P.S. Green
SOL Solandra nitida Zucc.
SOL Solanum aff. (nigrum)
SOL Solanum aff. mexicana Robinson
SOL Solanum aff. nyctaginoides Dunal
SOL Solanum aligerum Schldl.
SOL Solanum amazonium Ker
SOL Solanum americanum Miller
SOL Solanum appendiculatum Dunal
SOL Solanum brachystachys Martens & Galeotti
SOL Solanum cervantesii Lagasca
SOL Solanum deflexum Greenman
SOL Solanum diversifolium Schldl.
SOL Solanum erianthum D. Don
SOL Solanum hartwegii Benth.
SOL Solanum hartwegii Benth. var. lanatum Dunal
SOL Solanum hispidium Pers.
SOL Solanum lanceolatum Cav.
SOL Solanum laurifolium L. f.
SOL Solanum mitlense Dunal
SOL Solanum nigrescens Martens & Galeotti
SOL Solanum nigricans Martens & Galeotti

SOL Solanum nigrum L.
SOL Solanum nigrum L. var. dillenii Gray
SOL Solanum nudum Kunth
SOL Solanum ochraceo-ferrugineum (Dunal) Fern.
SOL Solanum polyadenium Greenman
SOL Solanum pubigerum Dunal
SOL Solanum rostratum Dunal
SOL Solanum salviifolium Lamb.
SOL Solanum schlechtendalianum Walp
SOL Solanum torvum Sw.
SOL Solanum umbellatum Miller
SOL Solanum wendlandii Hook. f.
SOL Witheringia cuneata (Standley) Hunz.
SOL Witheringia solanacea L'Her
SOL Witheringia stramonifolia Kunth
SOL solanum callicarpaefolium Kunth & Bouché
SPT Bumelia eloxochitlensis R. Schultes & Conzatti
SPT Bumelia laetevirens Hemsley
SPT Bumelia persimilis Hemsley
SPT Chrsyophyllum mexicanum Standley
SPT Manilkara zapota (Miller) Fosberg
SPT Pouteria campechiana (Kunth) Baehni
SPT Pouteria mammosa (L.) Cronq.
SPT Pouteria sapota (Jacq.) H. Moore & Stearn
STP Turpinia occidentalis (Sw.) G. Don
STR Ayenia fruticosa Rose
STR Byttneria aculeata (Jacq.) Jacq.
STR Byttneria catalpaefolia Jacq. subsp. catalpaefolia
STR Guazuma ulmifolia Lam.
STR Helicteres guazumaefolia Kunth
STR Hermannia inflata Link & Otto
STR Melochia dubium Hemsley
STR Melochia interrupta autor?
STR Melochia pyramidata L.
STR Melochia tomentosa L.
STR Sterculia apetala (Jacq.) Karst.
STR Theobroma bicolos Humb. & Bonpl.
STR Theobroma cacao L.
STR Waltheria americana L.
STR Waltheria brevipes Turcz.
STR Waltheria glomerata Presl
STY Styrax argenteus Presl. var. ramirezzi (Greenman) Gonsoulin
STY Styrax glabrescens Benth.
STY Styrax pilosus (Perkins) Standley
SYM Symplocos aff. pycnantha

SYM Symplocos austro-mexicana Almeda
SYM Symplocos coccinea Humb. & Bonpl.
SYM Symplocos johnsonii Standley
SYM Symplocos jurgensenii Hemsley
SYM Symplocos limoncillo Humb. & Bonpl.
SYM Symplocos speciosa Hemsley
TAX Taxus globosa Schldl.
TEA Cleyera cernua (Tul.) Kobuski
TEA Cleyera integrifolia (Benth.) Choisy
TEA Cleyera theoides (Sw.) Choisey
TEA Freziera guatemalensis (J.D. Smith) Kobuski
TEA Freziera macrophylla Tul.
TEA Gordonia brandegeei Keng
TEA Symplococarpon purpusii (Brandagee) Kobuski
TEA Ternstroemia seemannii Triana & Planchon
TEA Ternstroemia sphaerocarpa (Rose) Melchior
TEO Jacquinia sp.
THL Thelypteris cheilanthoides (Kunze) Proctor
THL Thelypteris cinerea (Sod.) A.R. Smith
THL Thelypteris concinna (Willd.) Ching
THL Thelypteris deflexa (Presl.) Tryon
THL Thelypteris falcata (Liebm.) Tryon
THL Thelypteris meniscioides (Liebm.) Reed
THL Thelypteris oaxacana A. R. Smith
THL Thelypteris pilosohispida (Hook.) Alston
THL Thelypteris pilosula (Mett.) Tryon
THL Thelypteris puberula (Baker) Morton
THL Thelypteris resinfera (Desv.) Proctor
THL Thelypteris reticulata (L.) Proctor
THL Thelypteris rudis (Kunze) Proctor
THL Thelypteris scalaris (Christ) Alston
THY Daphnopsis americana (Mill.) Johnst.
THY Daphnopsis brevifolia autor?
TIL Apeiba tibourboJ Aublet
TIL Belotia mexicana (DC.) Schum.
TIL Corchorus siliquosus L.
TIL Heliocarpus appendiculatus Turcz.
TIL Heliocarpus donnel∞-smithii Rose
TIL Heliocarpus glabrescens Hochr.
TIL Heliocarpus terebinthinaceous (DC.) Hochr.
TIL Heliocarpus tomentosus Turcz.
TIL Luehea speciosa Willd.
TIL Tilia mexicana Schldl.
TIL Trichospermum galeottii (Turcz) Kosterm.
TIL Triumfetta coriacea Hochr.

TIL Triumfetta galeottiana Turcz
TIL Triumfetta grandiflora Vahl
TIL Triumfetta semitriloba Jacq.
TNR Eriblichia odorata Seem.
TNR Piriqueta cistoides (L.) Steudel
TNR Turnera diffusa Schultes
TNR Turnera ulmifolia L.
TOV Tovaria diffusa (Macfad.) Fawcett & Rendle
TRG Trigonia
TRP Tropaeolum majus L.
TXO Taxodium mucronatum Ten.
TYP Typha domingensis Pers.
TYP Typha latifolia L.
ULM Ampelocera hottlei (Standley) Standley
ULM Aphananthe monoica (Hemsley) Leroy
ULM Celtis caudata Planchon
ULM Celtis iguanea (Jacq.) Sarg.
ULM Celtis pallida Torrey
ULM Lozanella enantiophylla (J.D. Sm.) Killip & Morton
ULM Mirandaceltis monoica (Hemsley) Sharp
ULM Trema micrantha (L.) Blume
ULM Ulmus mexicana (Liebm.) Planchon
URT Boehmeria caudata Sw.
URT Myriocarpa bifurca Liebm.
URT Myriocarpa longipes Liebm.
URT Myriocarpa obovata J.D. Sm.
URT Parietaria debilis Forster
URT Phenax hirtus (Sw.) Wedd.
URT Phenax mexicanus Wedd.
URT Pilea irrorata J. D. Sm.
URT Pilea mexicana Wedd.
URT Pilea microphylla (L.) Liebm.
URT Pilea pubescens Liebm.
URT Pilea vulcanica Liebm.
URT Pouzolzia pringlei Greenman
URT Urera baccifera (L.) Gaud.
URT Urera caracasana (Jacq.) Griseb.
URT Urtica dioica L.
URT Urtica mexicana Liebm.
URT Urtica spiralis Blume var. ligulata Wedd.
URT aoehmeria ramiflora Jacq.
VAL Valeriana affinis Martens & Galeotti
VAL Valeriana clematidis Kunth
VAL Valeriana densiflora Benth.
VAL Valeriana palmeri A. Gray

VAL Valeriana scandens L.
VAL Valeriana sorbifolia Kunth
VAL Valeriana tolucana DC.
VAL Valeriana urticaefolia Kunth
VAL Valeriana zapotecana Barrie
VIO Hybanthus attenuatus (Humb. & Bonpl.) Schulze
VIO Rinorea guatemalensis (S. Watson) Bartlett
VIO Viola nannei Polatschek
VIO Viola reptans Robinson
VIO Viola scandens Roemer & Schultes
VIT Cissus erosa L. Rich
VIT Cissus martiniana Woodson & Seibert
VIT Cissus rhombifolia Vahl
VIT Cissus sicyoides L.
VIT Vitis acapulcensis Kunth
VIT Vitis latifolia Humb. & Bonpl.
VIT Vitis mesoamericana Rogers
VIT Vitis rotundifolia Michaux
VIT Vitis tiliifolia Roemer & Schultes
VOC Vochysia guatemalensis J.D. Sm.
VOC Vochysia hondurensis Sprague
VRB Aegiphila deppeana Steudel
VRB Aegiphila elata Swarty
VRB Aloysia triphylla (L.'Her.) Britton
VRB Bouchea nelsonii Grenzebach H
VRB Bouchea prismatica (Jacq.) Kuntze var. brevirostra Grenzebach
VRB Bouchea prismatica (L.) Kuntze
VRB Callicarpa acuminata Kunth
VRB Citharexylum affine D. Don
VRB Citharexylum berlandieri Robinson
VRB Citharexylum caudatum L.
VRB Citharexylum hexangualre Greenman
VRB Citharexylum kerberi Greenman
VRB Citharexylum mocinnii D. Don
VRB Clerodendrum bungei Steudel
VRB Clerodendrum japonicum (Thumb.) Sweet
VRB Clerodendrum ligustrinum (Jacq.) R. Br.
VRB Clerodendrum philippinum Schaues
VRB Clerodendrum thomsoniae Balf.f.
VRB Cornutia grandiflora (Schldl. & Cham.) Schaues
VRB Duranta repens L.
VRB Ghinia curassivica (Jacq.) Kuntze
VRB Lantana achyranthifolia Desf.
VRB Lantana camara L.
VRB Lantana canescens Kunth

VRB Lantana hirta R. Graham
VRB Lantana hispida Kunth
VRB Lantana trifolia L.
VRB Lippia alba (Miller) N.E. Britton
VRB Lippia bracteosa (Martens & Galeotti) Mold.
VRB Lippia graveolens Kunth
VRB Lippia myriocephala Schldl. & Cham.
VRB Lippia oaxacana Robinson & Greenman
VRB Lippia pringlei Briq.
VRB Lippia strigulosa Martens & Galeotti
VRB Lippia umbellata Cav.
VRB Petrea volubilis L.
VRB Phyla nodiflora (L.) Michaux
VRB Phyla scaberrima (A.L. Juss.) Mold.
VRB Priva aspera Kunth
VRB Priva lapulaceae (L.) Pers. H
VRB Priva mexicana (L.) Pers.
VRB Stachytarpheta acuminata DC.
VRB Stachytarpheta cayennensis (L. Rich.) Vahl
VRB Stachytarpheta incana Mold.
VRB Stachytarpheta jamaicensis (L.) Vahl
VRB Stachytarpheta mutabilis (Jacq.) Vahl
VRB Stachytarpheta purpurea Greenman
VRB Tamonea curassavica (L.) Pers.
VRB Verbena bipinatifida Nutt.
VRB Verbena canescens Kunth
VRB Verbena carolina L.
VRB Verbena delticola Small
VRB Verbena ehrenbergiana Schaues
VRB Verbena elegans Kunth
VRB Verbena litoralis Kunth
VRB Verbena longifolia Martens & Galeotti
VRB Verbena menthaefolia Benth.
VRB Verbena recta Kunth
VRB Verbena rigida Sprengel
VRB Verbena teucriifolia Martens & Galeotti
VTT Vittaria graminifolia Kaulf.
WIN Drimys granadensis L.f.
XYR Xyris sp.
ZAM Ceratozamia robusta Miq.
ZAM Dioon califanoi De Luca & Sabato
ZAM Dioon purpusii Rose
ZAM Dioon rzedowskii D. Luca Moretti Sabato & Vasquez Torres
ZAM Dioon spinulosum Dyer
ZAM Zamia loddigesii Miq.

ZAM Zamia purpurea Vovoides, Rees & Vasquez Torres
ZAN Zannichellia palustris L.
ZIN Renealmia aromatica (Aublet) Griseb.
ZIN Renealmia occidentalis (Sw.) Sweet
ZIN Zingiber officinale Roscoe
ZYG Kallstroemia rosei Ryberg
ZYG Tribulus cistoides L.