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Devoted to the Sheltered Garden

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Views expressed in this magazine are not necessarily those of the Editors, the Society or its officers.

FROM THE EDITOR

This issue is devoted primarily to tuberous begonias. You who live in the regions where the summer climate is cool and moist are indeed fortunate for you can grow these beauties outdoors for a magnificent display of large, colorful blooms all summer long. The rest of us must make special provisions or be satisfied with less than perfection. I find in my part of Southern California that I can grow the multiflora type in hanging baskets — in the shade with frequent watering — but the magnificent upright doubles are virtually impossible.

In the late 1930's and early 1940's there was considerable development work with the tuberous begonias. I have found some of these articles very interesting. An article from *The Begonian*, 1940, is republished for the benefit of new members who do not have access to back issues. This article, "Methods of Inducing a Permanent Fragrance in Tuberous Begonias" is complemented by a more modern article, "Chromosome Numbers in *Begonia*." In addition to the articles republished here, I refer you to articles by Antonelli in August and October of 1949 and by Reinelt in November and December of 1950.

The letter to the editor from Leslie Woodruff is a report on fascinating new begonia hybrids by a man

who has been developing such hybrids with tuberous begonias for at least 35 years. The photographs referred to in Mr. Woodruff's letter are in beautiful color. Unfortunately the contrast is not good enough to make black and white reproductions in the magazine. The letter has been included without the pictures because the work reported is so interesting.

Photographs to be included with articles should be black and white, they should show the plant or feature being illustrated in good contrast, and the background should be plain, either dark or light depending on the color value of the feature being illustrated. Color pictures for use on the cover can be either slides or prints. They must be composed so that the plant shown fits a square format with no intruding leaves or blossoms that are not a part of the illustration. Entire plants are preferred but blossoms and/or leaves are sometimes used. The exposure must be such that the color values are not "muddy" and the contrast is good

Ed Bates, Co-Editor

COVER PICTURE

Prof. J. Doorenbos submitted this picture of "... female flowers of a *Symbegonia*, probably *S. sanguinea* Warb., imported by Mr. Patrick Woods from New Guinea and distributed by the Botanic Garden at Edinburgh."

AIMS AND PURPOSES OF THE AMERICAN BEGONIA SOCIETY, INC.

The purpose of this Society shall be:

- TO stimulate and promote interest in *Begonias* and other shade-loving plants;
- TO encourage the introduction and development of new types of these plants;
- TO standardize the nomenclature of *Begonias*;

- TO gather and publish information in regard to kinds, propagation and culture of *Begonias* and companion plants;
- TO issue a bulletin which will be mailed to all members of the Society; and
- TO bring into friendly contact all who love and grow *Begonias*.

LETTERS TO THE EDITOR

Dear Marge:

I liked your picture of *B. herbacea* in the January *The Begonian* but was amazed that with all written on it there was no mention of hybrids so I am sending you some pictures of what we have done with it.

One shows *B. bowerae nigramarga* with flowers as one of the parents of *B. 'Norah Bedson'* compared with *B. herbacea* which has been blooming constantly for over a year. *B. 'Norah Bedson'* crossed with *B. herbacea* gave the three seedlings in foreground with leaves intermediate in shape and from plain to near all brown with various mottlings between. Perhaps the first time this cross has been made. None have flowered yet.

Two shows *B. herbacea* and its flowers compared with *B. socotrana* flowers but too little of its round leaf and growth habit for a good comparison. The plant in the front is *B. socotrana* x *B. herbacea* with again intermediate leaf habit. If the flowering habit and color comes through in this cross like the Lady Mac-Melior group does with *B. dregii* we could have all leaves and flowers from ground up in a rhizomatous Christmas begonia that would bloom all year. This cross should be tremendously important for future breeding work, especially with tuberous, if fertile.

Our tuberous x *B. socotrana* proceeding well with over a thousand from baby transplants to flowering as the picture of the flower cluster of one of them. We have small seedlings growing from double red, pink, white, yellow and orange tuberous

Special Membership Meeting

A special membership meeting will be held on the first Thursday night in June, 1974, in conjunction with a regular meeting of the Westchester Branch. The purpose of the meeting is to vote on the following resolution pertaining to the non-profit status of the American Begonia Society.

The resolution is as follows:

"RESOLVED: That the Articles of Incorporation of the American Begonia Society, a California Corporation, be amended by the addition thereto of Paragraph 7, reading as follows:

"7. The property of this corporation is irrevocably dedicated to charitable purposes and no part of the net income or assets of this corporation shall ever inure to the benefit of any director, officer or member thereof or to the benefit of any private persons. Upon the dissolution or winding up of the corporation, its assets remaining after payment, or provision for payment, of all debts and liabilities of this corporation shall be distributed to a nonprofit fund, foundation or corporation which is organized and operated exclusively for charitable purposes and which has established its tax exempt status under Section 501 (c) (3) of the Internal Revenue Code.

If this corporation holds any assets in trust, or the corporation is formed for charitable purposes, such assets shall be disposed of in such manner as may be directed by decree of the Superior Court of the county in which the corporation has its principal office, upon petition therefore by the Attorney General or by any person concerned in the liquidation, in a proceeding to which the Attorney General is a party."

At least fifty members must be present at the meeting.

and pink and red multiflora crossed with *B. socotrana*. The first tuberous x *B. 'Wild Rose'* is opening and is as sweet as our crosses made some 25 years ago and lost by no heat in our greenhouse.

The last is our *B. 'Tiger Kitten'*, a *B. bowerae nigramarga* cross with

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1974 CONVENTION AND SHOW

By Margaret Ziesenhenne

Mark your calendars for the 1974 ANNUAL CONVENTION AND PLANT SHOW on September 7, 8, and 9 at Francisco Torres, Goleta, California. It has been many years since we have had a convention and show under the same roof, and the first time with rooms and meals at a very reasonable rate and an Olympic-size swimming pool, tennis courts and other recreation provided.

Convention hosts, Santa Barbara Branch, are planning meetings, seminars, dinners, luncheons, sight-seeing tours, garden visitations, and many activities for your pleasure. Show hosts, Ventura's Theodosia Burr Shepherd Branch, are planning transportation, the competitive show, special educational exhibits, and a plant sales table where rare and wanted

begonias will be available. There is plenty of parking and the ocean is within walking distance.

If you have any special subjects you would like discussed, please contact Rudolf Ziesenhenne, 1130 N. Milpas St., Santa Barbara, Ca. 93103, who is planning the seminars. National officers will be available for conferences. If you have amendments to ABS Constitution, By Laws, or Standing Rules, please submit them as soon as possible so they can be studied, negotiated, and copied before they are submitted to the membership at the annual meeting on Saturday.

We will have figures soon on costs of rooms, meals, special events, tours, etc., so that you can prepay your costs of you wish.

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IS GROWING TUBEROUS BEGONIAS YOUR HANGUP?

By Walter Pease

If you are awed by the magnificence and beauty of tuberous begonias but terrified by your own lack of confidence in growing them, belay your fears, and let me try to convince you that growing them is not as difficult as you may have been led to believe.

Perhaps it would be best to begin by understanding what tuberous begonias do not like. If the factors that hinder their growth can be overcome, the plants should practically grow by themselves. Therefore, the following conditions should be avoided: extreme heat, cold, shade, light, moisture, dryness, wind and improper ventilation. When you stop to think about it, they are much like people. Ideal growing conditions involve temperature between 55° - 80° F, 50 - 60% shade, humidity in the 60 - 70% range (they do exceptionally well in the fog belts), moist, rich soil but with good drainage, very little wind but proper ventilation. If these basic conditions are maintained, tuberous begonias will grow in spite of your apprehensions. However, there are certain refinements necessary to insure quality plants, but they are minimal and require very little of your time.

Tuberous begonias can be grown from seed, cuttings, or established tubers, but for the less experienced grower, growing from tubers is the simplest method by far.

Tubers can be purchased from most nurseries from January to April and should be planted as soon as the new buds appear. They can be planted directly into the ground

(properly prepared) or pots with a proper mix, but best results are usually obtained by first planting tubers in flats containing well-decayed, coarse leaf mold. The tubers should be planted 2½" to 3" apart, concave side up, and covered with ¾" to 1" of leaf mold to insure good root development of the entire tuber surface. The flats should be watered thoroughly but good drainage is required. They should be kept moist but not overwatered. Soggy tubers become rotten tubers. The flats should be kept in an area protected from extreme temperature but with good filtered light. In cooler weather, bottom heat gives excellent results.

When the new plants reach a height of 4 to 6 inches, they should have a well formed root system and can be transplanted into individual containers. Tuberous begonias do not have to be up-potted during the growing season and, being shallow rooted plants, do much better in low-profile containers than in deep ones. Fern pots and shallow redwood tubs are excellent. Unless the tubers are exceptionally small (less than 1½ inches in diameter), containers less than 8" in diameter should not be used.

A good potting mix for tuberous Begonias can be made with 2 or 3 parts well decayed coarse leaf mold and 3 parts fir bark or coarse builders sand. When transplanting from the flats, a small handful of fish meal or cottonseed meal in the bottom half of the containers will stimulate good healthy growth. Care should be taken not to place the young tender

roots in direct contact with the fish meal or burning may occur. Again, cover the tubers with $\frac{3}{4}$ " to 1" of mix. An application of Vitamin B1 solution will help to overcome any transplant shock. At this time, staking of upright varieties may be done to prevent possible damaging of tuber and roots. Plants should not be fertilized until 2 or 3 weeks after transplanting.

During the early growing stages, tuberous begonias should be fed with a high nitrogen fertilizer every 2 to 3 weeks changing to a bloom producing fertilizer as the blooming season approaches. Occasional applications of fish emulsion help to produce strong healthy plants. Care should be taken not to overfeed. When overfed, the leaves of some tuberous begonias should be fed with tuberous begonias tend to curl at the edges, and in the early blooming stages, the buds tend to drop.

It is not necessary to pinch back the upright varieties but it is recommended that hanging or basket types be pinched one or two times before blooming. This will stimulate a denser, bushier type growth producing a greater abundance of blooms. More effective baskets may be produced by planting more than one tuber per container. However, care should be taken that all the plants are of the same type and color and that each plant faces the outer edge of the container.

Whether or not a tuberous begonia develops to your satisfaction depends a great deal on the amount of light it receives. One commercial grower maintains that tuberous begonias require as much light as they can stand without burning. If grown

in too much shade, the foliage will be lush and dark green, but very few blooms will appear; if grown in too much light, the foliage will be light and sparse with many blooms appearing but falling off early. As previously stated, 50 - 60% shade is usually ideal. They will produce beautiful blooms from mid-June until October.

In the late fall or early winter months, the plants will go into dormancy naturally. After the plant has lost most of its foliage, water should be withheld and the stems allowed to separate from the tuber without cutting or breaking. After the separation, the tubers should be lifted from the containers or ground, all the soil removed and the tuber washed thoroughly. They should then be dried in the sun for a few days, placed in flats, taking care to keep them separated, and stored in a cool, dry, ventilated area. They should not be covered with sawdust, peat moss or other medium as long as there is any possibility of collecting moisture.

When the buds begin to appear on the tubers in the early spring, you are ready to start all over again.

The major pests and diseases affecting tuberous begonias are powdery mildew which can effectively be controlled with preventatives containing Karathane, worms which can

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HYBRIDIZING TUBEROUS BEGONIAS

By Gene Daniels

Hybridizing of begonias is the first major advance after a new A.B.S. member has successfully grown a few specimen plants. But this move seldom includes the tuberous begonia, although there is no valid reason why it shouldn't.

My interest in working with tuberous begonias as an amateur was kindled by the most enthusiastic and successful grower of tubers that I know, Mrs. Ethel Reid of Ventura, Calif. I had learned from her to grow a reasonably good plant with six to nine inch blooms, but I felt I wanted to take part in the initial structure of new plants so I began hybridizing out of doors in my propylene 50% shade cloth structure. The first year was nothing but a haphazard try-and-see routine ending up with hundreds of plants which, due to space problems, were mostly assigned to the trash can. I began to realize, as every hybridizer must, that records have to be kept and goals must be set. I had been observing the tendency of many double tuberous plants to grow either three or five double blooms per side branch. This, on the surface, appears to be a desirable trait, but I also observed that if these flowers tend to crowd each other that the touching parts of the bloom would begin to rot. So as goal number one I have set out for plants that keep the multiple blooms but do not have this problem. I had one plant of an unreleased Frank Reinelt hybrid named "FRECKLES". This plant's blooms had pronounced orange and white spots which probably came originally from the *mar-*

morata species and I thought I would try to produce varieties of this.

I live in a slightly warmer and dryer climate than what might be considered a choice tuberous begonia area. The selection of my best plants as parents should automatically bring about a strain which will better suit this specific location. I suspect this climate tends to keep mildew away for the most part, but I still do not use a mildewed plant as stud material as each characteristic of the parent plant may be transmitted to the offspring to a lesser or greater degree.

I also decided to try my hand with single flowered plants by introducing *B. micranthera venturii* into the tuberous *B. crispera* and came up with the very vigorous *B. "Ethel Reid"*, a delightful, easy to grow, red and white flowered single.

As the seasons went by I began to realize that the most important thing a hybridizer can do is to observe and make records. A plant that looks good in July and terrible in August is a bad one to use as a parent. The size of the bloom should remain reasonably large throughout the season. The strength of the stem and the side shoots can vary throughout the summer. A plant that resists mildew, or insects, or sunburn, or a poor watering and fertilization routine has desirable characteristics that are not obvious but should be considered when the cross is being made. There are other observations to make also. I started peeling the large doubled flowers and discovered that some of these so-called "male" flow-

ers have ovaries and stigma hidden deep within the bloom. I have not yet been able to use one of these flowers in a "cross", but I always try, thinking that I might end up with a plant that has all double flowers.

For the beginner I have a few tips. Don't limit your hybridizing efforts to your own garden. A friend might have a perfection plant that you should use. Don't use any plant that puts out pollen early in the season. The offspring will have very few double flowers. If you are a good grower of tubers, you will fast discover that you seldom have any male flowers showing pollen. If this is your problem, make cuttings of the choicest plants and then grow these cuttings under *starved* conditions. They will, of course, be identical plants, but if you starve them and also hold off on watering, it forces the double flowers to turn single and the pollen then appears. A tiny piece of vary-colored wire obtained from a telephone repair man is ideal for twisting around the female flower to facilitate your record keeping. Use a numbering system for each stud plant and mark it large with a non fading ink, and never separate the tuber from the tag! Expect viable seed from about one in every eight crosses attempted. Do not grow any single flowered species tuberous begonias near your parent plants as wind blown pollen will ruin your crosses. Do your pollinating on a warm dry day. Remove the male flower from the plant when pollinating, then remove all petals from this so that you can easily pollinate the female with it. And last but not least, donate extra seed to the A.B.S. seed fund!

CALENDAR

June 12, Long Island Branch, 7:30 P.M. — at Planting Fields Arboretum in Oyster Bay, Long Island, New York. Plants, Supplies and Literature Sales, the Question Box, Plant Raffles, Name the Begonia Contest, Slide and Book Libraries precede the meeting which begins at 8:00 P.M. The June meeting will be devoted to Begonia Basics. Millie Thompson will explain the various groups of Begonias, Gene Moglia will talk on general culture, propagation by leaves, stems and seeds will be discussed by Margie Donnelly, Frances Hoffman and Lynn McMahon. The Begonia of the Month will be B. 'Lady Clare' by Lois Schneyer. Convention News for the Eastern Begonia Convention in Hempstead will also be discussed. Refreshments will be served.

May 23 — Rubidoux Branch — 7:30 P.M. 4393 Riverview Dr., Rubidoux, Ca. Rudy Zieshenne, Mr. Begonia, himself, will present another interesting and most informative program on Begonias. Visitors always welcome.

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NOMINATION FOR THE 1974 ABS AWARDS

With the Forty - Second Annual Convention and Show only four months away, it is time to start thinking about nominations for the three American Begonia Society Awards for 1974: the Eva Kenworthy Gray Award, the Alfred D. Robinson Memorial Medal and the Herbert P. Dyckman Service Award. Nominations may be made by any member of the ABS and must be in writing. Please remember that these awards are not given as the result of a popularity contest but for merit and extraordinary service. The rules governing these awards are as follows:

EVA KENWORTHY GRAY AWARD

This award is presented to a person who has contributed original literary material which aided members in their study of begonias, or who has been outstanding in his or her promotion of interest in the culture of begonias and the creation of goodwill and understanding between the members in their search for knowledge of begonias. He or she need not be a member of the American Begonia Society.

HERBERT P. DYCKMAN SERVICE AWARD

This award is to be presented to a person who has rendered long-time or very outstanding service above and beyond that usually expected of a member or officer of the ABS.

ALFRED D. ROBINSON MEMORIAL MEDAL

This medal is awarded to an outstanding begonia hybrid with the following stipulations:

1. All begonia nominees must have

been registered with the ABS Nomenclature director.

2. The originator of the begonia nominee must be a member of the ABS.
3. The begonia nominee must have been released to the public for at least five years but not more than ten years prior to nomination.

Each nomination for the Eva Kenworthy Gray and the Herbert P. Dyckman Awards *must* include a list of specific reasons why the nominees are deemed worthy of receiving these awards, and no nominations will be considered without such list.

All nominations must reach the Chairman of the Awards Committee by July 1, 1974, in order that they may be forwarded to the other six members of the committee for review and analysis. The awards will be based on the nominees' merits rather than the number of letters received. A single letter of nomination will receive just as much attention and carry just as much weight as several. I must repeat that these are awards for merit and service, not popularity, so keep this in mind and send in your nominations. Mail all nominations to:

Mr. Walter W. Pease,
Awards Chairman, ABS
8101 Vicksburg Avenue
Los Angeles, Calif. 90045

July 1st is the deadline for sending in your nominations. DO IT NOW.

Previous recipients of the Eva Kenworthy Gray Award are: Mrs. Bessie Buxton, 1955; Miss Charlotte Hoak, 1956; Miss Constance Bower, 1957; Mrs. Alice Clark, 1958; Mr. Rudolf

Ziesenhenné, 1959; Mrs. Louise Schwerdtfeger, 1960; Mrs. Helen Krauss, 1961; Mr. Bert Slatter, 1962; Mrs. Bernice Brilmayer, 1962; Dr. Clyde Drummond, 1963; No award, 1964; Mary L. Gillingwaters, 1965; Mrs. May Taft Drew, 1966; Mrs. Sylvia B. Leatherman, 1967; Drs. Lyman B. Smith & Bernice G. Schubert, 1968; Mr. Harry M. Butterfield, 1969; Mrs. Ruth Pease, 1970; no award, 1971; Mrs. Elda Haring, 1972 and Dr. Fred Barkley, 1973.

Previous recipients of the Herbert P. Dyckman Service Award are: Mrs. Florence Gee, 1968; Mr. Herb Warwick, 1968; Mrs. Alva Graham, 1969; Mrs. Edna Korts, 1969; no awards, 1970 or 1971; Mr. Everett Wright, 1972; and Mr. Walter Barnett, 1973.

Previous recipients of the Alfred D. Robinson Medal are: *B.* 'Silver Star', *B.* 'Freddie' and *B.* 'Golden West', 1949; *B.* 'Ricky Minter', 1950; *B.* 'Glendale', 1950; *B.* 'Virbob', 1951; *B.* 'Orange Rubra', 1954; *B.* 'Verde Grande', 1957; *B.* 'Kumwa', 1961; *B.* 'Madame Queen', 1964; *B.* 'Sophie Cecile', 1966; *B.* 'Purple Petticoats', 1968; *B.* 'Lady Frances Jean', 1969; *B.* 'Eunice Gray', 1972; and *B.* 'Paul Bee', 1973.

GROWING TUBEROUS BEGONIAS

(Continued from Page 111)

be controlled in the early stages with insecticides and later by manually removing them (preferably at night when they feed), and rot which can best be controlled by not overwatering and making certain the planting medium is clean and free of fungi. When lifting tubers in the winter, they should be inspected for signs of rot and any infected area removed with a sharp knife, treated with soil sulphur or powdered charcoal and dried as previously explained.

If this still seems complicated and you are still a little apprehensive, just give it the old college try and I am sure that your efforts will be well rewarded with the self-satisfaction of having grown some of the most beautiful plants in the world—the tuberous begonia.

PUBLICATION NOTICE

All material for publication—articles, notices, photographs—should be sent to the Editor, preferably five weeks before date of publication. Deadline is the first of the month preceding month of publication.

Advertising copy and inquiries should be sent to the Advertising Manager.

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ROUND ROBIN NOTES

With over 70 robin packets making the rounds, the subjects are quite varied: General Culture, Greenhouse, Growing Under Lights, Bowls and Terrariums, Miniatures, Rhizomatous, Canes, Rexes, Tuberos and Riegers, Species, Hybridizing, Odd and Rare Begonias, Propagation, Seeds, Windowsill, Mounted Begonias, Photographing Begonias, All Eastern Growers, All Canada, All Texas, All Florida, International, All Male, Ferns, Gesneriads. More requests are needed to begin one on Pathology and there are vacancies in most of the above subjects in some of the flights. We always begin new groups when needed so there is always a place for any member of A.B.S. when a particular subject is desired. Each group is like a miniature branch, with members discussing their problems and delights in their favorite phase of begonia growing. It is a great way to become acquainted with many of the members from some of the National Offices to the most isolated member, truly linking them all together in friendship.

Debi Miller of California said her first experience with growing begonias from seed has been very satisfying. Her only problem was getting seeds too close together so she had quite a thinning job to do, transplanting them at a very tender age. Roots were very tangled but she saved a good number of them. She never realized how important feeding was. She fed them once, half strength solution from the bottom, and within a week some had almost tripled in size. All showed considerable growth.

Debi got a second plant of B. 'Wanda' from the same leaf that grew her big plant of it. The new plant, growing in a 2½" pot in a jar covered with plastic wrap, had about 15 leaves about the size of a quarter, looking much like a miniature. Her larger plant was growing in a bubble bowl. Both are grown under lights.

After hearing much discussion concerning the use of enzyme solutions on begonias, Betty Stuart, California, was told she could substitute papaya enzymes from the health food store instead of waiting a year for them to be made from tubs of rotting bananas, etc. Art Sackenruther, California, said he had a small bottle of enzymes given him by a friend who works for a winery.

Asked about sterilizing sphagnum moss, Dora Lee Dorsey of Florida said she understood that baking it destroys its natural resistance to fungi and dampoff. If she thinks it has been stored where it could have live insects in it, she scalds it enough to kill them and the eggs, which is far less heat than baking.

Dora Lee finds *B. acida* easy to grow but not so easy to groom into a nice specimen. Some seasons it branches and spreads rapidly, flowering in the spring with small white flowers. The past season it has grown large leaves but failed to branch with no sign of flowers so far. She finds it not too difficult to propagate by leaf or stem cuttings.

Dora Lee found it hard to get basal growth on *B. lubbersi* until she started lowering it in pot each time she repotted it. She found cuts rooted easily but the stalk dies back too far

or only puts out one new branch near the top for her.

Yvonne Wells, Texas, cut the top out of her *B. luxurians* because it was so lanky. The cut rooted and the plant started sprouting from the bottom after a month or so.

Orby Clemence, Michigan, tried the cone method of propagation with his rexes. Making the leaf in the form of a cone, he placed it in a hole in a styrofoam tray floating in water with about 1/2" of the cone in water. Every one he tried grew plants. He found it a little slower than following the same procedure with a leaf cutting. He had no luck with the stem cutting method.

Orby, too, had some "forgotten" wedges that grew. With no time to attend to them, he wrapped them in wet paper napkins, placed them in a plastic shoe box and put them on the lower bench under one end of the lights. When he finally remembered them, he discovered he had small plants from each wedge, some 1/2" long.

To members who have difficulty bringing young plants through the difficult transplanting stage, Orby advised: when you transplant your young plants do one thing — fill the pot to be used with soil or mix up to 1/4" of the rim, then flood the pot with water so the mix is a SLOPPY MESS. Take the small plant out of the propagating box with as much soil or mix around the roots as possible, then plunge the root ball into the pot. You will find small plant and root ball will sink into pot mix very easily with no harm to the root ball. Let pot drain. Firm mix but DON'T PACK. Add new soil or mix to firm plant. THEN

WATER AGAIN. This will settle the new soil. Doing it this way, he has never lost a plant in transplanting, he said.

Gordon Lepisto, Minnesota, keeps his rexes and other begonias anywhere from 10" to 18" from the tubes under lights. Some are stuck in corners with little light and they still grow beautifully and are not leggy. They just don't need that much light, he believes, under fluorescent lights. It may be different under natural light. He doesn't fuss around with lighting problems as he has found that temperature and humidity are more important for good rex growth. Gordy used to use Gro-lux tubes but it bleached his leaves so badly he had to go back to cool white. He said you don't notice the leaves are affected until plants are brought out into natural light or put under different tubes. He found even the bright red leaves turned a light gray.

If you would like to join one or more of these groups, just write and let me know. Tell me how you grow your plants and which subjects you are interested in learning more about. It's a great way to become an active member of The American Begonia Society, no matter WHERE you live!

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NINTH EASTERN REGIONAL BEGONIA CONVENTION

September 12, 13, 14, 1974

PROGRAM

Thursday:

- 8:00 P.M. Informal Slide Program: Gardens and growing areas representative of members in all regions. Conducted by Priscilla Beck and James Wyrzten
- 6:00-10:00 P.M. Flower Show Entries

Friday:

- 8:00- 9:00 A.M. Late Flower Show Entries
- 9:30-12:00 Noon Flower Show Judging
- 9:00- 9:45 A.M. Greenhouse Workshop
- 9:45-10:30 A.M. Indoor Light Gardening Workshop by Jack Golding
- 10:30-11:30 A.M. Growing Begonias by Seeds:
Slide Program prepared by Isabel Cutler
presented by Zelda Isaacs
Seed Propagation for Advanced Growers
by Zelma Clark
- 12:00 Noon Luncheon
Greetings by Mildred Thompson, Convention
Chairman
Greetings from Margaret Ziesenhenne, ABS
President
Honor Commercial Growers
New Begonia Hybrids from the West by
Walter Barnett
Master of Ceremonies: Jack Golding
- 1:30 P.M. Flower Show Opens
- 1:30 P.M. Plant Sale Opens
- 2:30- 3:30 P.M. Terrariums
How To Plant and Arrange a Terrarium
by Wendy Stuart
What Begonias to Use in a Terrarium
by Corliss Engle
- 3:30- 4:30 P.M. Rare and Unusual Begonias
by Orpha Fox and Michael Kartuz
- 6:30- 7:30 P.M. Cocktail Hour

- 7:30 P.M. Banquet
 Honor Branch Presidents
 Flower Show Awards presented by Wendy Stuart,
 Show Chairman
 Begonia Species
 by Rudolf Ziesenhenn
 Master of Ceremonies: Walter Barnett
- 9:30 P.M. Informal Meeting of Elected Officers of All Branches
 Conducted by Mildred Thompson

Saturday:

- 9:30-10:30 A.M. Indoor Decoration with Begonias
 Decorative Arranging
 by Evelyn Cronin
 Use of Unique and Unusual Containers
 by Robert Horvath and Frank Kerin
- 10:30-11:30 A.M. Begonias in the Garden
 Landscaping with Begonias
 by James Wyrzten
 Hanging Containers
 by Edward Thompson
- 12:00 Noon Luncheon
 Honor Senior Distinguished Members of Eastern
 Region
 Begonia Research Projects
 by Carl L'Hommedieu
 Mistress of Ceremonies: Edna Stewart
- 1:30- 3:45 P.M. Old Westbury Gardens Tour
 Transportation Provided
- 4:00 P.M. Plant Sale Closed
- 4:00- 5:00 P.M. Close of Flower Show
- 7:00 P.M. Cocktails
- 8:00 P.M. Dinner
 Honor Speakers of the Convention
 Nature in Motion
 by Dr. William Donnelly
 Mistress of Ceremonies: Margaret Ziesenhenn
 Raffle Drawings: by Elizabeth Schaefer

Sunday:

- Coffee at the Wyrzten Home
 Independent transportation

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"Culture of Begonias", a 12 page pamphlet discussing Begonias in General, describing the different characteristics of the basic classes; their culture and care.\$.50 each

My 1—*B. cathayana* x *B. xanthina*

This is a new cross, the results of which haven't been seen, but should prove quite interesting. per pkt. \$1.00

My 2—*B. cathayana* x *B. pavonina*

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My 3—*B. decora*

Name means 'elegant'. Rhizomatous with plushy brown-green leaves sharply etched with light veins. Sweet-scented white flowers. Terrarium care is recommended for this one. per pkt. \$1.00

My 4—*B. deliciosa*

An Asian species, grows to 2 feet. Upright, branched with untypical rhizome-like stem which hides just above the surface. Nicknamed 'Indian-spotted' for the area of its origin and the large gray spots on its olive-drab, deeply palmately lobed leaves. Surprisingly large and soft pink flowers. per pkt. \$.50

My 5—*B. gracilis* var. *grandiflora*

Name means 'slender, graceful'. The Hollyhock begonia, so-called for its tallish stalks with rosy flowers nestled close. This species was found in Mexico. per pkt. \$1.00

My 6—*B. grandis*

This is also called *B. evansiana*, and was first found in China. It grows to about 2 feet tall. The bright yellow-green leaves, veined beneath with red, are a pleasing contrast to the long-stemmed sprays of rose-pink flowers. per pkt. \$.50

My 7—*B. josephii*

These seeds came from seeds sold through this seed fund some time ago, but there is a question if it is the true *B. josephii* originally found in India. This supposedly is a tuberous type, has peltate leaves, varies in size and habit, carrying small rose-red flowers. per pkt. \$1.00

My 8—*B. molleri*

Species from West Africa — grows to 2 or 3 feet, branches arching; leaves oval, perfectly symmetrical, smooth and shiny. Flowers large, white, separate, or only a few in an inflorescence. per pkt. \$.50

My 9—*B. mollicaulis*, syn. *subvillosa*

From Brazil, shrub like, medium plant with soft fuzzy leaves. Velvety, oval leaves, green over and under, stems juicy; flowers white or pink. Does not branch frequently. per pkt. \$.50

(Continued on Page 133)

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METHODS OF INDUCING A PERMANENT FRAGRANCE IN TUBEROUS BEGONIAS

By H. Britton Logan, Jr.

Reprinted from *The Begonian*, April, May, June, 1940

Many of us, both begonia hobbyists and growers, have been dreaming a dream, yet doing little to realize it. With the rediscovery of the quince-scented tuberous begonia, *Baummannii*, and the recent introduction of the rose-scented species, still named 37.1041, we have developed a tremendous yen to hybridize these fragrances into the modern garden varieties of begonias.

While this may seem like "painting the lily," it is not an impossible task. To a slight extent it already has been accomplished. The English firm of Blackmore and Langdon offers "John G. White", a full-double camellia-type begonia with a quince fragrance. More recently Brown in Capitola, Woodriff in Inglewood, and Ziesenhenné in Santa Barbara have developed flowers with one or the other fragrance.

And yet, in spite of the work being done by these individuals, they have failed so far in one important factor. The fragrance of *Baummannii* and 37.1041 is noticeable only in the early morning hours — and at no other time. This is also true of their hybrid progeny over a period of several generations.

So, it appears that we have allowed our enthusiasm to run away. We are putting the cart before the horse. We are trying to hitch a scent onto modern tuberous begonias, forgetting that we must first try to perfect the scent in its original species.

Apparently the customary methods of hybridizing begonias will not help

us to produce a permanent scent as rapidly as we would like. Therefore, it becomes necessary to use supernumerary methods which are not ordinarily available. This is a big job, an exacting one, and an exciting one. It is a job that most commercial firms won't touch. They are so busy making a living they do not have the time to experiment. In the long run, this puts the job of perfecting a scent in begonias squarely up to the interested amateur gardener or hybridist.

Today it is largely with the amateur gardener that you find the combination of time, patience and a deep enthusiasm that is necessary to successful flower hybridizing. It was an amateur who introduced the magnificent fuchsia "Cascade." It was an amateur who bred the extraordinary giant race of freesias to be marketed in the fall of 1940. It was an amateur who rediscovered the red-flowering gazania.

It would be impossible, within the limits of this article, to write exhaustively of the four artificial methods — used in connection with "inbreeding" — by which botanists are producing new plant species. The most I can do is to suggest what the problem is, the four ways of solving it, and list a bibliography which you may read in order to secure a working outline of the method that may appeal to you.

Each plant is made up of a multitude of microscopic cells designated as somatic — or body — cells. In each of these cells is a nucleus con-

taining threads of differentiated protoplasm called chromosomes. The chromosomes are the bearers of heredity. A change in the pattern the chromosomes form, an increase or decrease in their number, forecasts a change in some characteristic or habit of the plant.

Our problem, then, is to so change the chromosome pattern, or alter the number of chromosomes that eventually we will find just that combination which will directly, or indirectly, produce a lasting fragrance in either *Baumannii* or 37.1041.

We possibly can accomplish this by "inbreeding," or "selfing," as the method is variously called. So far as I know, this is the only natural method which has not been tried. I recommend that it be used in connection with the more recent artificial methods of inducing a rearrangement of chromosomes. Simply, it consists of taking the pollen from a male flower and applying it to a female flower on the same plant, and preferably on the same bloom stem.

In a way, inbreeding is contrary to nature, for most plants are not self-fertile, and begonias distinctly are no exception to this. A plant must have new blood constantly in order to develop vigorously and survive in the struggle for existence. By inbreeding we rob the plant of its vigor. We weaken its morphological structure. And, most important, we weaken the tendency of the chromosomes to form always in a definite pattern.

The strongest urge a plant knows is the urge to complete its life cycle — to mature, to flower and seed and thus perpetuate its kind. This it cannot do if its vigor is lessened. Consequently the chromosome pattern

breaks, new patterns are formed, new characteristics and habits appear through which the plant hopes to gain a renewed vigor or re-adapt itself to its environment. These altered chromosome patterns result in plants which are called "mutations." Perhaps one of these mutations will have the characteristic we desire — in this instance a permanent scent.

It is too much to hope that in one generation we can produce just the mutation we want. Generally, it requires from five to ten years of inbreeding to develop the exact characteristic we are searching for. It is necessary, then, to select each year from our "inbred" stock the five or six strongest plants — or those which may show a tendency to develop a more lasting fragrance — and repeat the inbreeding.

For most amateurs this inbreeding offers the greatest possibilities. It is not difficult or involved, although it is essential toward the end of the inbreeding period to raise several thousand or more plants in order to reduce the odds against which you are working.

Should this method of hybridizing intrigue you, I suggest — for further information — you read:

"The Genetics of Garden Plants" by Crane and Lawrence,

"Chromosomes and Plant Breeding" by Darlington.

Probably the best-known, and least understood, method of producing chromosome re-arrangements is with colchicine and x-rays. These artificial stimulants induce chromosome duplication, or doubling of the chromosomes as it is more commonly called. Therefore, because you have increased the number of chromosomes, the

possibility of these chromosomes forming new patterns is increased.

Unfortunately, colchicine is a highly dangerous alkaloid. It can be absorbed through the skin of human beings and produces extreme sickness, even death. Equally as unfortunate, colchicine is the simplest and surest way of producing chromosome aberrations. Frankly, I do not recommend this method for the average amateur unless he does considerable research into the experiments already made with colchicine; and then, can follow instructions carefully and intelligently.

A weak concentration of colchicine in an aqueous solution, or a lanolin emulsion, is applied to the growing tips of mature plants, of the leaves of cotyledons. Occasionally, cuttings are immersed in a special culture solution of colchicine and mineral salts. The immediate effect of the chemical on the plant tissues is to cause growth irregularities and distortions. Its ultimate effect — the one you are striving for — is to produce some female germ cells, and some pollen grains containing twice the normal number of chromosomes.

If, by inbreeding, you can affect a union between these cells, you will secure fertile seed. From this seed will come plants appreciably larger than the parent. They will breed true to Mendelian laws, and respond to the same methods of inbreeding I previously outlined. Since, in these plants, the chromosome number is doubled, they will form a correspondingly greater number of patterns, and your chances of succeeding are immeasurably increased.

Remember, though, that colchicine is dangerous. Use it, if possible, un-

der the guidance of a competent instructor of botany, who also can explain to you the more technical parts of the following bibliographical material.

Blakeslee and Avery (1937)

"Methods of Inducing Doubling of Chromosomes in Plants by Treatment with Colchicine,"

Journal of Heredity, 28:393 - 412.

Nebel and Ruttle (1938)

"The Cytological and Genetical Significance of Colchicine,"

Journal of Heredity, 29:3 - 9.

Mallinckrodt Chemical Works

2nd and Mallinckrodt Sts., St.

Louis, Mo.

The use of x-rays to produce mutations in plant life is not as difficult or dangerous as colchicine. Nor is it, by any means, as certain. Naturally, an x-ray machine itself should be handled only by an expert who can control the strength of the rays. Other than this one requirement, the amateur gardener merely has to sow his seed, wait until the roots appear (never let the first leaves develop), and then subject small quantities of the immature seedlings to different intensities or time periods of x-rays.

Unfortunately, x-rays so far have produced more growth irregularities than mutations in plants. Very few of the induced mutations in the past have had qualities or characteristics sufficiently commendable for commercial reproduction. Ordinarily the good qualities of an x-ray-induced mutation are overbalanced by bad qualities. Nor is it at all certain but that many of the mutations, so-called at present, are really striking growth irregularities; which cannot be transmitted to successive generations. X-rayed freesia corms which developed

deformities immediately after treatment grew normally the following year. Some seed from these corms showed a few irregular leaf growths which later disappeared.

However, do not let these remarks dissuade you from experimenting with x-rays. Perhaps you will find a mutation that will point the way to a more permanent scent in begonias. In that case you must cross-breed the mutation, taking away its probable bad characteristics. After you have done that, you can start inbreeding the progeny. And once having broken the chromosome pattern with x-rays, it should not be too difficult to find the pattern you want.

Goodspeed and Avery

"The Cytogenetics of 14 Types,"
Journal of Genetics, 29:327-353.

Moore (1935)

"X-Ray Lily"

Literary Digest, 120 (September 14) 20.

Morgan

"Growth Irregularities,"

Indiana Academy of Science Proc.
(1931) 41:139-144.

There remains two further methods of artificially inducing plant mutations, or rather chromosome changes. Neither of them have been experimented with to the extent that colchicine and x-ray have been. They are comparatively virgin fields, and filled with interest for the amateur who wants to pave his own way, and possibly discover a path to greater achievements in botanical science.

The first of these methods applies heat — a certain fixed temperature, ordinarily a high one — to the plant ovaries just before, or during, the stage when the pollen fertilizes the ovules. Heat acts on the germ cells

of a plant much in the same fashion as colchicine does — inducing a doubling of the chromosomes. The resultant seed, and the future plants follow similar habits of growth, and can be used for hybridizing in the same manner as colchicine-induced mutations.

While this method of heat-application is not as complicated as colchicine, it entails considerably more preliminary experimenting. You will have to determine by the trial and error method the exact moment that pollen from a male begonia flower will unite with the ovules. In general, this union occurs in plants after a period as short as two hours and as long as ten days. From the objective reaction of female begonia flowers after pollination, I would suggest that fertilization occurs somewhere between eight hours and twenty-four hours, depending upon the receptivity of the female flower to the pollen grains.

However, if you would like to experiment with this method, you will find it advantageous to apply heat to the ovaries one hour after fertilization, two hours afterward, three hours afterward, and so on up to twenty-four hours. Somewhere in these twenty-four hour intervals, you will hit on the right one. This will be shown in the growth of such seed as you may secure; the plants will be much larger than the parent. By so discovering the approximate hour that fertilization takes place in one species of begonias, you will contribute much to botany, as well, perhaps, as succeeding in your more practical goal of developing a scent in tuberous begonias.

So little work has been done with

the heat applications that, for further information, you will have to be satisfied with the two very brief reports of one man:

L. F. Randolph (1932)

"Some Effects of High Temperature on Polyploidy,"

National Academy of Science Proc. 18:222-229.

"Cytogenetics of Tetraploid Maize,"

Journal of Agricultural Research, 50:591-605.

The final method by which mutations have been produced is the decapitation or wounding of plants. This has worked very well for species of tomatoes, potatoes and geraniums, but probably, because of the considerably different morphological structure of begonias, would not be applicable to them. However, no one has tried it as yet and until it has been tried, no one can say with any reasonable degree of accuracy whether it will or will not work.

With this method seedlings are allowed to reach a height of three or four inches and then decapitated. Not infrequently the side shoots growing from the remaining portion of the decapitated plant, particularly from, or near, the wound, will produce a stock that has doubled the chromosome number of the original seedling. This stock with the double chromosome number can be cut off and propagated vegetatively, brought to the flowering point, and then used for hybridizing purposes.

A variation of this technique consists in wounding (or cutting into) a plant stock, or a root that is capable of asexual reproduction. From the healing tissues which surround the wound a bud may be initiated. Some-

times this bud may contain somatic cells with a doubled chromosome number. If it does you can propagate the bud and develop a new plant species with which to work.

Jorgensen and Crane (1927)

"Formation and Morphology of Salanun Chinaeras,"

Journal of Genetics, 18:247-273.

Shachavinskaya (1937)

"Restoration of Fertility in the Geranium",

Bulletin of Applied Botanical Genetics, II. 7:13-33.

(Continued on Page 135)

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Reprint *Neth. J. agric. Sci.* 21 (1973): 167-170
CHROMOSOME NUMBERS IN BEGONIA. 3 *

By R. A. H. Legro¹ and J. Doorenbos²

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Received: 30 March 1973

* Publication 389, Laboratorium voor Tuinbouwplantenteelt, Landbouwhogeschool, Wageningen, the Netherlands.

SUMMARY

The somatic chromosome numbers of 34 species of *Begonia* were counted. The following numbers were found: 26, 38, 52 (African species), 22, 30, 44 (Asiatic species), 26, 28, 52, 56, 68 and possibly 104 (American species). All numbers could be fitted into previously established polyploid series. In the discussion it is emphasized that triploidy must have played an important role in evolution of *Begonia* species.

INTRODUCTION

In previous publications (Legro & Doorenbos, 1969, 1971) the somatic chromosome numbers of 190 species of *Begonia* were given. The variation was found to be considerable. Twenty-two different numbers were counted, ranging from 16 to 156. This complicated situation is considerably clarified if the species are arranged into sections. Most sections were found to be characterized by one basic chromosome number, from which the other numbers within the section (if any) have been derived by polyploidy.

Since our second paper a number of species have become available for study which had never been examined cytologically. Among these are species belonging to four sections not represented in previous work.

MATERIAL AND METHODS

Much of the material for the present study was generously supplied by the directors of the botanic gardens at Edinburgh, Glasgow, Kew, München and Frankfurt. The Clayton M. Kelly Seed Fund of the American Begonia Society, Mr. R. Ziesenhenne, and Mrs. Thelma O'Reilly kindly sent to us material from private American collections. The following species were grown from plants or seed collected in nature: an unidentified species collected by Dr. W. J. J. O. de Wilde in Cameroun; *B. squamulosa* Hook.f. collected near Ebolowa, Cameroun, also by Dr. de Wilde; *B. rostrata* Welw., collected at Misa Hohe, Togo, by Mr. F. J. Breteler; *B. laciniata* Roxb. collected in N. Thailand, about 150 km SE of Vientiane and sent by Mrs. T. van den Eelaart-de Sitter; *B. naumoniensis* Irmsch., collected in New Guinea by Mr. J. F. U. Zieck; and *B. rosae-flora* Hook.f., collected by Dr. Barbara Pickersgill in Ayacucho, Peru.

The species were identified with the help of the available descriptions, not by comparison with type material. Voucher specimens have been deposited in WAG, the herbarium of the Department of Plant Taxonomy and Plant Geography at Wageningen. Colour transparencies and photographs are available at the Department of Horticulture.

The cytological methods applied

were similar to those described in the first paper of this series.

RESULTS

The results are summarized in Table 1. As in the two previous papers, the sections have been grouped in the order given in Imscher's review (1925). Within each section, the order of the species is alphabetical. The somatic chromosome number of each species is given. Brackets around a number indicate that only a small number of clear metaphase plates could be found, which was considered to be insufficient for definitive conclusions. All species listed have been studied cytologically

for the first time, except *B. sulcata* Scheidw., already counted by Legro & Doorenbos (1969), but with an erroneous result which now can be corrected.

DISCUSSION

Among the African species, two belong to sections not previously studied: Mezeirea (*B. seychellensis*, $2n = 26$), and Quadrilobaria (*B.* sp. from Madagascar, $2n = 38$). The latter, received from the Botanic Garden at Munich as 'species from Bekulosa', could not be matched with any of the species of Quadrilobaria described so far. It appears to be related to *B. francoisii* Gagnep., but

Table 1. Somatic chromosome numbers in *Begonia*.

<i>African species</i>		<i>American species</i>	
<i>Mezeirea</i>		<i>Steineria</i>	
<i>B. seychellensis</i> Hemsl.	26	<i>B. caraguatatubensis</i> Brade	(56)
<i>Squamibegonia</i>		<i>B. confertiflora</i> Gardner	(56)
<i>B. poculifera</i> Hook.f.	38	<i>Doratometra</i>	
<i>Scutobegonia</i>		<i>B. wallichiana</i> Steud.	26
<i>B. sp.</i> from Cameroun	26	<i>Scheidweileria</i>	
<i>B. sp.</i> from Liberia	52	<i>B. inciso-serrata</i> A.DC.	56
<i>Tetraphila</i>		<i>Pritzelia</i>	
<i>B. mauricei</i> Ziesenhenné	38	<i>B. capanemae</i> Brade	(56)
<i>B. molleri</i> (C.DC.) Warb.	38	<i>B. dietrichiana</i> Imsch.	(56)
<i>B. squamulosa</i> Hook.f.	38	<i>B. odeteiantha</i> Handro	(56)
<i>Rostrobegonia</i>		<i>Bradea</i>	
<i>B. rostrata</i> Welw.	38	<i>B. rufosericea</i> Toledo	(56)
<i>Quadrilobaria</i>		<i>Huszia</i>	
<i>B. sp.</i> from Madagascar	(38)	<i>B. rosaeflora</i> Hook.f.	28
<i>Asiatic species</i>		<i>Hydristyles</i>	
<i>Reichenheimia</i>		<i>B. sp.</i>	52
<i>B. morelii</i> Imsch.	30	<i>Ruizopavonia</i>	
<i>B. nuri</i> Imsch.	44	<i>B. roezlii</i> Regel	52
<i>Platycentrum</i>		<i>Gireoudia</i>	
<i>B. laciniata</i> Roxb.		<i>B. bettinae</i> Ziesenhenné	28
from N. Thailand	22	<i>B. hispida-villosa</i> Ziesenhenné	28
<i>B. sikkimensis</i> A.DC.	22	<i>B. pinetorum</i> A.DC.	28
<i>Petermannia</i>		<i>B. pruinata</i> A.DC.	28
<i>B. naumoniensis</i> Imsch.	30	<i>Saueria</i>	
		<i>B. sulcata</i> Scheidw.	68
		<i>Begoniastrum</i>	
		<i>B. guaduensis</i> HBK	(104)
		<i>B. paulensis</i> A.DC.	(52)
		<i>B. serratifolia</i> C.DC.	(104)
		<i>B. venosa</i> Skan	(52)

the leaves are not quite so large and are completely smooth. The prevalent chromosome numbers among the African Begonias appear to be 26 and 38. It is tempting to regard 38 as having evolved from 26 as a triploid number (39, with subsequent loss of the odd chromosome). This possibility was underlined by the discovery that an unidentified species of the section *Scutobegonia*, collected by Dr. W. J. J. O. de Wilde in Cameroun, has 26 chromosomes, while another species of this section (received without name or habitat from the late Dr. E. Irmscher's collection of living plants, but present among herbarium material in WAG collected by Mr. F. J. Breteler in Liberia) has 52 chromosomes. We venture the hypothesis that the basic number of *Scutobegonia* is $2n = 26$, and that the previously determined numbers of $2n = 34 - 38$ have been derived from the triploid level.

In the large section *Tetraphila* only $2n = 38$ has been found so far. It should be noted that a few times $2n = 36$ has been counted, usually in plants that also had cells with $2n = 38$. A possible explanation is that contraction is retarded in one pair of chromosomes, but this hypothesis could not be tested.

B. mauricei has been included among the African species although it is stated that it was collected on Trinidad. Ziesenhenné formed a new section *Irmschera* for it. To us, however, it seems to be a representative of *Tetraphila*, and as we find it hard to believe that it would hitherto have been overlooked on Trinidad, we doubt the American origin until this is confirmed by further evidence.

Among the Asiatic species studied,

B. nuri Irmsch. should be noted as the first species of *Reichenheimia* with $2n = 44$ chromosomes. This again is a case in which triploidy must have played a role, unless the ancestor of *B. nuri* had 22 chromosomes, in which case the species of *Reichenheimia* with 30-34 chromosomes represent the triploid level. However, so far no species of *Reichenheimia* with $2n = 22$ has been found.

B. laciniata Roxb. from N. Thailand has been included because the forms commonly cultivated come from further south. The present form is an upright plant, 50 to 70 cm high, which could not be matched with any of the varieties distinguished by Irmscher (1939).

A plant from seed sent by Mr. Zieck from New Guinea tallies in every respect with the description of *B. naumoniensis* Irmsch., except that the picture accompanying the description shows a female flower with 5 tepals, whereas the present plant has only 3. Species of *Petermannia* with 3 female tepals are not numerous. The present plant, if not *B. naumoniensis*, could possibly be *B. eliasii* Warb. but the description of the latter is too short to permit identification.

The following American species merit further comment. *B. wallichiana* Steud. was believed by its author to come from India, but in conformity with most authorities we assume here that it is of American origin. The species of the section *Doratometra*, to which *B. wallichiana* belongs, are closely related to those of *Begoniastrum*. This is confirmed by the chromosome number of $2n = 26$, which is probably the basic num-

ber of both sections, although it has not yet been found in *Begoniastrum*. After many fruitless efforts, a few clear metaphase plates could be found in four *Begoniastrum* species the chromosomes of which had so far been elusive. For these species 52 and 104 chromosomes were counted, although still better material is required before this can be regarded as absolutely proven. Within *Begoniastrum*, we now have a polyploid series of 52, 78, 104 and 156. In addition, there are several species, especially from Brazil, which have $2n = 32$ and $2n = 34$. The latter number we now regard as derived from the triploid number (39), analogous to the situation in other sections, e.g. *Scutobegonia*. In their turn, these triploid numbers have been doubled and yielded plants like *B. cucullata* Willd. with $2n = 64$ and the cultivars of *B. semperflorens* Lk & Otto with $2n = 68$ (Zeilinga, 1962). Perhaps *B. sulcata* Scheidw. for which we previously published $2n = 72$ but which was now shown to have $2n = 68$ has a similar origin, as it seems to be related to *Begoniastrum*.

From Kew we received a plant under an erroneous name which undoubtedly belongs to the section *Hydristyles*, although it could not be matched with any of the six species described within this section. It has 52 chromosomes. The same number was found for the first representative of *Ruizopavonia* to be counted, *B. roezlii* Regel (*B. lynch-eana* Hook.f.). Unfortunately, species like *B. convallariodora* C.DC. and *B. cooperi* C.DC., grown in our collection and more typical of *Ruizo-*

pavonia than *B. roezlii*, could not be counted yet.

CORRECTIONS

Since our previous publications we have had second thoughts about the identity of a few species. *B. inflata* Graham and *B. popenoei* Standley should be deleted from the first paper of this series. The first was probably a hybrid of *B. inflata* and *B. roxburghii* A.DC., the second is a true species (it is reproduced by seed) but remains unidentified for the moment. The publication by Ziesenhenné (1972) of the type specimen of *B. lindleyana* Walp. has shown that this is the plant which we have called *B. sparsipila* Baker in our second paper. This leaves us without a name for the plant received from the Irmischer collection as *B. lindleyana* Walp. The species from Brazil identified as *B. crinita* Oliv. we would now prefer to call *B. setulosa* Klotzsch. Finally, a slip of the pen: *B. parviflora* Schott should be *B. parviflora* Klotzsch.

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SEED FUND

(Continued from Page 123)

My 10—Species from Taiwan

Leaves oval, entire, smooth and completely green. Flowers large, pink. Unidentified, and probably undescribed. per pkt. \$1.00

My 11—Species from Venezuela.

This plant belongs to a group of species which are very difficult to identify. It is related to *B. guadensis*, but it is smaller (a spreading shrub of 1 to 2 feet) and more floriferous. per pkt. \$.50

This next is a hybrid, but I have had requests for it:

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Unidentified *Begonia* species from Taiwan.
Photo by R. Jansen

LETTERS TO THE EDITOR

(Continued from Page 108)

leaves about twice the size of *B. bowerae nigramarga* and a very attractive plant. Have seed planted of it on *B. socotrana* and a hundred or so seedlings of *B. socotrana* showing the mottle brown of *B. bowerae nigramarga* on *B. socotrana*, just another attempt to eliminate staking by breeding. None of them have flowered yet but from *B. 'Lady Mac'* we expect them to carry flowers like *B. socotrana*.

We have double tuberous x Iron Cross in flower, tuberous x *B. sutherlandi* giving a far better trailing habit than *B. lloydi* but needing another generation or two to get right flower types. They are very slightly fertile as are the tuberous x "stars" that carry tiny plantlets on the stem like moss and might if worked on enough give a built in meristem propagation potential. I have a couple dozen plants growing from these tiny plantlets taken off and planted with seedlings. Most rhizomatous on tuberous produce some of the tiny plantlets on stems and petioles and sometimes on leaves.

Hope you can come up and see what we are doing sometime. Per-

haps some of this information and photos might interest readers.

Sincerely,

Leslie Woodruff

Dear Marge Kirchoff,

Just a note to tell you of the success with growing the tuberous begonias during the fall and winter months here in Dallas.

Mrs. Clarence Kloppe, Jr., one of our members-at-large, stored the tubers from early spring to November in her beer cooler — started them as usual — brought them to maturity with incandescent light in her covered patio garden.

The plants are vigorous with many beautiful blossoms of all the types. The florescences have been opening since the first week in January, so crisp and thick-textured. The apricot-colored hanging basket form is a sight to behold — many blossoms four inches plus in diameter, holding the first just as fresh as the succeeding ones.

Our Dallas summers are so discouraging that the tuberous begonia has been a gamble. No more of that!

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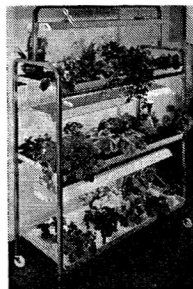
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FRAGRANCE IN TUBEROUS BEGONIAS

(Continued from Page 128)

Probably the best working outline for you to use in trying to secure a permanent scent in *Begonia Baumannii* and 37.1041 is to first weaken them with several successive generations of inbreeding. Then apply to the inbred progeny one or more of the four artificial methods of inducing chromosome changes. Inbreed your plants with the doubled chromosomes. Cross them back and forth with the original inbred progeny — and, in the end, so thoroughly mix up your plants' habits and characteristics that they will start producing mutations and continue to produce mutations until you finally locate the individual with the strongest and the most lasting fragrance.

If you succeed in doing this, don't think your success is complete. You have to "fix" the fragrance. Having forced your plants to mutate, they may keep on doing just that — and you will get some plants having no scent at all, some with a temporary fragrance, and a few with a permanent scent.

So pick out the best plant with, of course, the most desirable fragrance and inbreed it for one or, at the most, two generations. This will tend to fix the scent. After you have accomplished this you can then hybridize the fragrant plant into the modern tuberous varieties.

One last word of warning. Don't under-estimate the importance of hybridizing and go about it haphazardly. Always keep permanent records of each experiment you make. Whether it succeeds or fails — many

of us would like to know. Sometimes a failure is more indicative of the path to take than a temporary success. And the more experimental data we can accumulate, the more exactly can we formulate laws and rules for future botanical investigations. Ten years from now your records may be the difference between success and failure in some gravely important botanical research.

So — good luck to you, if you want to try these modern methods of hybridizing. Whatever approach you may use to the problem of putting a scent in tuberous begonias, it may be difficult and it probably will take a long time. You certainly won't get rich; if you succeed you might even find the expense prohibitive. But, in the end, you will always have the satisfaction of a work enthusiastically undertaken and a job well worth your while.

IN MEMORIAM

Liana Hughes, a young and enthusiastic Santa Clara Valley Branch member since October, was killed Sunday, Feb. 3.

Although Liana had been a member only a few months, her cheerful disposition and ready smile endeared her to many. Those members who knew Liana were saddened, but, having had the opportunity to know her — even briefly — enriched all of us. We will always think of her laughing and smiling.

The executive board decided to establish a perpetual show trophy in her memory. To reflect Liana's novice status, the trophy will be awarded each year for the best novice entry in the branch summer show.

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