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Cover photographs. Front: *Portea leptantha* growing in Roberto Burle Marx's formal garden, a relatively new species (1919), large but highly decorative. M.B. Foster gave the history of this genus in *Bulletin* vol. 6, pp. 89–91. Back: *Aechmea weilbachii* var. *weilbachii* forma *viridisepala,* also from the Burle Marx garden. This plant was described in 1987 as one of four forms but H.E. Luther has since decided otherwise. Please see back cover. Photographs by T.U. Lineham.

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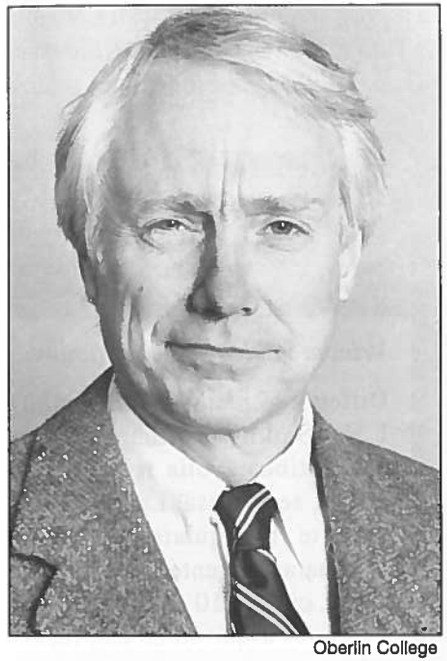
Dr. David H. Benzing Elected Honorary Trustee



Oberlin College

Figure 1. David H. Benzing

We are greatly pleased to announce that the Board of Directors elected David H. Benzing an honorary trustee at the 10th of June meeting. Dr. Benzing has served both the scientific world and this society in many ways for many years and well deserves our recognition.

Dr. Benzing is the Robert S. Danforth Professor of Biology at Oberlin College, Oberlin, Ohio. He was awarded the degree of Ph.D. by the University of Michigan in 1965 and has continued his career as teacher and researcher since then. He has received grants and awards as well as contracts for studies including the effects of air pollution on vegetation, the flora of New Guinea and the table mountain region of Venezuela. He has published more than 30 papers on bromeliad and epiphyte biology. The president of Oberlin said on the occasion of appointing him to the endowed chair: "Dr. Benzing is widely recognized as a world authority on bromeliads. His research is broad and compelling."

Dr. Benzing published his well-known first book, *The Biology of the Bromeliads* in 1980. It has become the basic reference for studies and reports on that plant family. The Cambridge University Press published his second book, *Vascular Epiphytes,* in 1990, and he is completing another book, *The Adaptive Biology of the Orchids.*

Dr. Benzing served The Bromeliad Society as a director for three terms beginning in 1971. He is chairman of the Research Grant Committee, a member of the Editorial Advisory Board, and a member of the Conservation Committee. We congratulate him on his election.—TUL

Vriesea koideae, a New Species from Peru

Werner Rauh

During our trip together to northern Peru in January–February 1988, Pamela Koide of Carlsbad, California, collected a gray, lepidote tillandsioid, which came into flower in May 1991 in her nursery. This specimen was not a *Tillandsia* but an unknown *Vriesea* related to *V. petraea* (L.B. Smith) L.B. Smith from southern Ecuador[1] (fig 2.).

Both plants have a simple, linear, sword-like inflorescence and pale green flowers. There are some important differences between these species that give me basis for describing the Peruvian plant as new. I dedicate it to Pamela Koide.

A. Blass

Figure 2
Vriesea petraea. The newly described *V. koideae* is compared with this species by the author in this article.

***Vriesea koideae* Rauh, sp. nov.**

Differt a V. petraea (L.B. Smith) L.B. Smith in characteribus sequentibus: Folia rosulae non erecta, sed effusa. Laminae non anguste triangulares et longe attenuatae, argenteo-grisea lepidotae, circum 10 cm longae, sed longiores usque ad 25 cm, recurvatae, colore roseo. Inflorescentia cum scapo usque ad 60 cm longa, aliquantum inflata. Bracteae florales non 6 cm longae et glabrae, roseae, sed tantum 3 usque ad 3.5 cm longae et dense lepidotae. Sepala non 30 mm, sed tantum 22 mm longa et lepidota. Petala non 6 cm, sed tantum 4 cm longa. Stamina inaequaliter longa, exserta. Styli cum stigmatibus multum longiores quam petala.

1. L.B. Smith and R.J. Downs, Tillandsioideae. Flora Neotropica, monograph, no. 14, pt. 2. (New York: Hafner Press. 1977), p. 1193. Type locality: on rocks, Llanos Payama, Chepel, northeast of Zaruma, 2950 m alt., Oro, Ecuador.

P. Koide

Figure 3
Vriesea koideae, flowering plant in the nursery of Pamela Koide, Carlsbad, California.

P. Koide

Figure 4. Vriesea koideae, part of the inflorescence spike.

Holotypus: *P. Koide 8802142* (January 1988), in Herb. Inst. Bot. System. Univ. Heidelb. (HEID).

Patria et distributio: Saxicolus Lago Seco, prope Rio Chonta, 6 km ante Yaconora, Dptm. Cajamarca, Peruvia septentrionalis, in altitudine 2215 m.s.m.

Plant stemless, flowering up to 50 cm tall. *Leaves* numerous, forming a dense, stemless, subbulbous rosette up to 20 cm tall and 50 cm wide (fig. 3). *Sheaths* up to 5 cm long and 2.5 cm wide, dark brown, lepidote on both faces. *Blades* narrow-triangular, attenuate, 25–30 cm long, 2.5 cm wide at the base, recurved, densely appressed lepidote, gray-red (influence of the sun) with a narrow, red margin. *Inflorescence* ascending, a simple, somewhat inflated spike up to 20 cm long and 3 cm wide (fig. 4). *Scape* 25 cm long. 0.7 cm thick, densely covered with scape bracts, the basal ones subfoliate, with a narrow, 2 mm-wide blade, the upper scape bracts short acute, inflated, densely white lepidote, gradating into the floral bracts. *Floral bracts* erect and densely imbricate , ecarinate in the upper half, 3–3.5 cm long, 2.5 cm wide, shortly beaked at the apex,somewhat fleshy coriaceous, obtusely 2-keeled and flattened at the base, gray-green and densely lepidote, scales with a lacerate margin, longer than the sepals. *Sepals* lanceolate, obtuse, the posterior subcarinate, 22 mm long, 1 cm wide in the middle, sparsely lepidote, these scales also strongly lacerate. *Petals* lingulate, 40 mm long, 6 mm wide, the obtuse blades spreading, lemon-yellow (fig. 4) with 2 ligules at the base. *Filaments* unequal but as long as the petals, pale yellow; anthers gray-brown, exserted. *Style* longer than the *stamens* with 3 spreading, green, papillose stigmas. *Ovary* cone-shaped, 5 mm long.

Holotype: *P. Koide 8802142* (January 1988), in Herbarium, Institut für Systematische Botanik und Pflanzengeographie der Universität Heidelberg (HEID).

Locality: On rocks at Lago Seco, near the river Chonta, 6 km south of Yaconora, Dptm. Cajamarca, northern Peru, alt. 2215 m.

For comparison with *Vriesea koideae* we add a picture of *V. petraea* from the type locality, cultivated in the collection of A. Blass (without number). The differences between the species are clear: the long-attenuate, silver-gray leaves forming an erect rosette, the inflorescence erect, the rose-red floral bracts glabrous.

Heidelberg, Germany

Bromeliad Culture, No. 6: Nidulariums Are Nice

Carol M. Johnson

The name *Nidularium,* from the Latin *nidus* meaning nest, is used to describe the circular arrangement of the blooms within the colored inner bracts of the genus.

There seems to be a lot of confusion regarding the genus *Nidularium* and people complain that it is difficult to grow them well. The problem is that the plants are very similar in appearance to neoregelias and are, consequently, given the same treatment, with adverse results. Nidulariums are tolerant of cold, wet conditions, most of them like low light, and they should be fed regularly. This treatment is the direct opposite of that given neoregelias, which are grown in strong light, are seldom fed and are kept on the dry side. To my notion, the genus *Nidularium* more closely resembles the genus *Canistrum* and the cultural requirements are very similar.

The latest Luther Alphabetical list of Bromeliad Binomials lists 43 species and many varieties and forms of *Nidularium.* When the Smith and Downs monograph (Flora Neotropica, no. 14, pt. 3) was published in 1979 there were only 23 species listed so the number has nearly doubled since that time. It is doubtful, however if many of the newly named species are in Florida collections. I have 14 species in my collection but many of them, such as *N. innocentii,* have several varieties.

All species of *Nidularium* are native to southeastern Brazil where they grow in low-light, moist areas, fairly close to or on the ground. The nidulariums with discolor leaves (red on the underside, green on top) are definitely low light plants and if grown in strong light will lose leaf color. The leaves are longer and generally softer than the neoregelias and the spines are much friendlier. Some of the species are rather disappointing but most color up beautifully and stay in bloom and color over a long period of time. The plants survive a lot of neglect but are most rewarding when given proper treatment. One of the hybrids, *N.* François Spae, can be trained to pup from a heavy main trunk into a nidularium tree. At one time, my nidularium tree sported eleven blooming plants and was three feet tall. Do not be alarmed if your nidulariums drop lower leaves regularly. That is typical of the genus.

Blooming nidulariums, vrieseas, and guzmanias make a striking combination for a shady pool area.

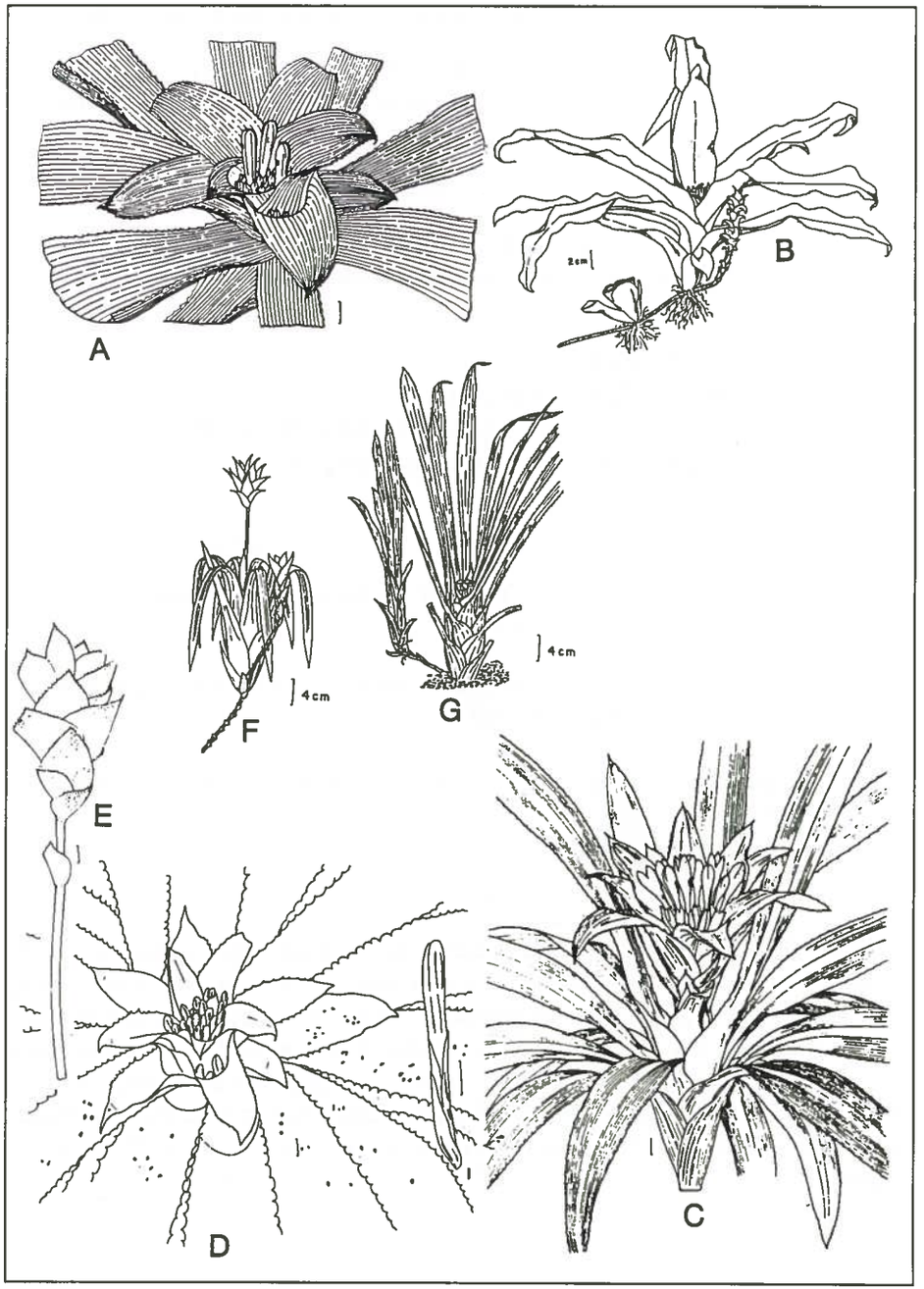
Photos by the author

Figure 5

N. seidelii L.B. Smith & Reitz, named for Alvim Seidel,collector and grower. The erect scape, as noted by Victoria Padilla, rises above the foliage with large, shiny, boatlike bracts. The bracts and petals are vivid lemon green.

Figure 6

Nidularium fulgens Lemaire (shining, bright-colored). This species is easily identified by its shiny, bright green leaves mottled with dark green spots, and prominent serrations. The inflorescence with dark red bracts surrounding the white-edged blue petals makes a strong, attractive contrast.



From Smith & Downs figs. 523, 525, 526, 529

Figure 7

Species of *Nidularium:* A. *N. innocentii* var. *innocentii;* B. *N. burchellii;* C. *N. fernando-coburgii,* D. *N. fulgens,* E. *N. seidelii,* F. *N. billbergioides,* G. *N. microps* var. *microps.*

Recommended larger forms with blooms sunken in the center of the plants in the manner of neoregelias are:

Nidularium innocentii (all forms), *N. fulgens, N. regelioides, N. rosulatum,* and *N. rutilans.*

Those with blooms borne on spikes above the plants:

Nidularium burchellii, N. billbergioides (including form *azureum), N. seidelii, N. ferdinando-coburgii, N. scheremetiewii, N. microps,* and *N. procerum.*

Hybrids and cultivars include:[1]
N. x *chantrieri* = *fulgens* x *innocentii*
N. x *digeneum* = innocentii *x* fulgens *(also Mme. Robert Morobé)*
N. François Spae = *innocentii* v. *striatum* x *fulgens*
N. fulgens x *regelioides,*[2]
N. innocentii x *regelioides*
N. 'Maureanum' = cv of *N. innocentii*
N. 'Ruby Lee' = *innocentii* v. *lineatum* x *innocentii* v. *variegata* (?)
N. Vienna = parentage unknown

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1. [The list expanded by the editor to include formulas as in the Beadle list of bromeliad hybrids and cultivars, 1991.]

2 [Not identified in Beadle list.]

NEW BOOK. *Bromeliads; a cultural handbook* is a 48-page, illustrated, soft-cover book compiled by Mark A. Dimmitt with the help of many bromeliad specialists known for their skill as growers. This book is a guide for beginners; it does not replace the 1977 cultural handbook. It is intended for new members and potential members; for promotion of interest by nurserymen. Write or telephone Sally Thompson, BSI Publication Sales, 29275 N.E. Putnam Road, Newberg, OR 97132. Telephone 503-538-2774. Special price for quantity orders.

Growing Tillandsia Seed Using Artificial Media and Sterile Techniques

Gordon Slack

Anyone bitten by the plant bug logically wants to have more plants and growers of bromeliads are fortunate in that nature takes care of most of our wishes by the natural pupping process of our plants. However, those of us who have a really bad infection from this bug are usually not satisfied with the one or two pups our plants produce to maintain our plant collection and to swap with our friends. We succumb to the desire to have as many good plants as possible, so we start dabbling in growing bromeliads from seed. With pitcairnioid and bromelioid seed there is usually little problem and satisfactory germination and growth occurs on a number of different moist growing media. With tillandsioid seed, nature has designed a different dispersal mechanism such that only a few seeds land on a suitable substrate in a favourable growing environment. The bromeliad literature is full of methods designed to improve on nature and provide ideal conditions for tillandsioid seed growth and my first trial was the twig method of Richard Oeser.[1] Unfortunately I was not able to achieve "complete success in raising tillandsias from seed" using this method and other methods tried over a period of a coupon of years were equally unsuccessful.

Obviously a number of people have succeeded in growing tillandsias from seed as demonstrated by the recent article of Mark Dimmett in the *Journal of the Bromeliad Society*[2] and the presentations at Bromeliads III in Brisbane in 1985. About six years ago I was bitten by the orchid bug and after successfully germinating and reflasking my first orchids using aseptic cultural techniques, I felt that similar methods would be ideal to provide a long-term growing environment for tillandsia seed. This has proven to be the case and I would like to demonstrate this method to you. Some background reading was necessary and some of the chemical and botanical terms were unfamiliar. Obviously, modifications are necessary to adapt methods used in the massive orchid factories of Taiwan to our kitchen table and window sill.

Unlike orchids, bromeliads, on germination, are capable of producing a plantlet with chlorophyll to synthesise sugars for the plant's energy needs. By providing a sterile environment with adequate humidity, the effects of casual pathogenic fungi or predatory insects are overcome. The minute amounts of chemicals needed for the growth of cell walls and the production of protein and

1. [Propagation of tillandsias from seed. Brom. Soc. Bull. 16:8–12.]

2. [40:17–20, 29–30; 72–80; 118–123.]

sugars in these cells is provided by the growing medium which is based on agar—a seaweed extract with physical characteristics similar to gelatine.

A number of formulae for the composition of media suitable for the germination of orchid seeds have been published—the standard probably being Knudson's "C." Benzing suggests the use of a soluble fertiliser in dilute form mixed with agar and I have tried on one occasion a mixture of hydroponic fertiliser and a small amount of fish emulsion in agar and this gave satisfactory tillandsia seed germination, although growth rate was slower than with the G and B orchid seed growing or replate media I normally use (obtainable from Bacto Laboratories). These scientifically formulated mixtures are provided in containers of either 35 gm or 500 gm and the bulk powder should be weighed out in quantities of 35 gm, the amount necessary to make one litre of growing medium. This is sufficient for about twenty small bottles which provide enough surface area for the germination of about one hundred tillandsia seed in each.

Preparation of the Growing Medium:

Clear glass or sterilisable plastic containers are used and any small glass bottle with a wide neck, such as those holding fruit juice or cordial, is satisfactory. Most of my bottles come from hospitals and have contained X-ray contrast or anaesthetic solutions and anyone with access to these will find them of suitable size and the rubber bung is easily pierced. Whatever bottles are used, they should be thoroughly cleaned and a tight fitting lid or rubber bung inserted. As germinating seeds and plantlets need oxygen and carbon dioxide, air must be able to enter the bottle without bringing with it bacterial or fungal spores. A breathing hole can be punched out of the lid and filled with cotton wool or in some types of glass bottles or test-tube agar slopes, a wad of cotton wool is placed in the neck of the container and covered with several layers of aluminium foil. The growing medium is made up by adding the appropriate weight of agar and nutrient chemicals to one litre of distilled (I use de-ionised ironing) water while it is gently heated and stirred constantly until dissolved.

Lids with breathing holes are placed on each container after an appropriate amount of solution is added to provide a half to one-centimetre thick layer of jelly. This growing medium must now be sterilised to eliminate fungal spores and bacteria which have probably fallen into the solution during its preparation. The most efficient sterilisation is achieved by using a kitchen pressure cooker with a pressure of fifteen pounds per square inch for ten to fifteen minutes. Other methods of sterilisation are described, usually consisting of repeated boiling of the solution and yet another method described for sterilisation of orchid growing media incorporates hydrogen peroxide in the growing medium. I have no personal experience of this.

After the pressure cooker cools and its lid is removed, the bottles containing the growing medium are removed and placed on their side to allow

cooling and solidification of the jelly. It is important that the layer of jelly does not reach the neck or the breathing tube in the lid. Only a thin layer is necessary to provide adequate plant nutrition. Resterilise any containers which have blown their top during the pressure cooking process as spores may re-enter once the pressure cooker is opened. Bottles can be kept for a period of several weeks or months or used as soon as the agar cools and solidifies. I prefer to leave them for a couple of days and any contamination usually becomes visible within this period.

Preparation of Seed:

Most tillandsia seed would be contaminated by the usual airborne fungal spores by the time we harvest and prepare to sow it. Using the normal methods of seed germination, we depend on local fungicides and the creation of conditions unfavourable for fungal growth to prevent these spores germinating and fungi causing plant death. If growth is to occur in a sterile environment this surface contamination must be eliminated. The method used has been gleaned from a number of different orchid references, but involves first soaking the seed in a small quantity of sugar solution, one teaspoon per cup, for twenty four hours or so (a few drops of detergent or surfactant solution help the wetting of seed and hairs). This encourages the germination of fungal spores and makes them more susceptible to the later chemical disinfection, which is usually achieved with common household bleach in about fifty/fifty dilution with water, although I have used pure bleach and I have also achieved seed disinfection with hydrogen peroxide. Theoretically this should be best as it oxidises to water and in the growing flask would not leave behind any chemical residue which could harm growth. However, sodium hypochlorite bleach has not caused any problems to my knowledge in actual seed germination.

Seed Sowing:

The area where the seed is transferred to the sterile growing medium obviously should also be sterile. This, in a large commercial concern, is achieved by using laminar flow cabinets with air sterilisation by ultraviolet light. On the kitchen table it can be done in a plastic bag, again using bleach for surface disinfection. Some tools are needed to physically transfer the seed and my most commonly used one is a pair of angled tweezers, a stainless steel wire loop or hook embedded in a glass handle and sometimes an old broken dentist's pick. These can be sterilised in a flame and cooled in a bleach-soaked cloth before transferring into the plastic bag or simply sprayed with bleach and wrapped in a clean, bleach-soaked cloth. A clear plastic bag big enough to contain the number of bottles required is used for the transfer chamber and after the tools, the seed container and the growing bottles are transferred into the bag, the inside of the bag is liberally sprayed with full strength bleach solution and a rubber band is placed around the open end of the bag.

After washing my hands thoroughly I spray my right hand and part of the forearm with bleach solution, although it would be more appropriate to wear a glove and spray the glove with bleach solution and insert it through the rubber band closure so that inside the bag we now have a container of seed, a bottle containing our growing medium, some cloths, a number of tools to transfer the seed from one bottle to the other, and a right hand. Through the clear plastic these procedures are carried out under direct vision and the left hand outside the bag is used to hold bottles, instruments and generally manipulate things so that the transfer can be achieved as rapidly and efficiently as possible. Even after spraying bleach into the bag, there is a possibility of contamination still existing. The risk of transferring this to the growing medium is greatly reduced if the growing bottles are laid horizontally on the work surface, a small vertical opening is presented for seed transfer and the growing container is open for as short a period as possible.

The stopper is placed on a bleach-soaked cloth—the forceps or a hook is used to pick out the mass of seed with its tangled hair appendages and transfer it to the growing medium. A very short time is spent trying to spread out the seed as much as possible before the growing bottle is resealed. In Benzing's description of this process, he suggests removal of the coma hairs from the seed and having attempted to do this on a few occasions it is a most tedious process and does not seem to improve germination. It probably does not greatly decrease the chance of contamination. Initially I spent a great deal of time trying to separate the mass of seed in the belief that a tight wad would not germinate freely. This has proved not to be the case. I usually work with batches of about six different bottles at a time so it is most important before putting the growing bottles and the seed bottles in the plastic bag that they be correctly identified by a label which will not wash off or fade when bleach is sprayed all over them.

After the last growing bottle is stoppered and with the growing containers still horizontal, they are removed and put to one side before transfer to their ultimate growing position. If more seed sowing or replating is to be done, the tools are resanitised either with heat or with more bleach—excess bleach solution is run out of the bag into the sink, the bag is resprayed and the process is repeated. I have not used one bag for more than two consecutive sowing sessions and actually the plastic bags are probably the cheapest piece of equipment.

Where To Grow:

Your bottles of seed can be placed for germination where your tillandsias are already growing or they can be placed on a shaded windowsill. I put them under fluorescent light on a six hour light / six hour dark cycle in the belief that this speeds up the rate of growth. Certainly, six hours of light is enough for satisfactory photosynthesis. I have not conducted a controlled trial comparing a twelve hour dark/light cycle. This six hour cycle is regulated by a simple timer

plug obtainable for about $20.00 at the local supermarket. I use ordinary fluorescent tubes over what was an old fish tank but better results may be achieved by special Grolux tubes and any covered area which can be kept dark during the day would be suitable for short cycle growth. Within a week you will know if your sterilisation procedures have been successful and within two weeks, small green blobs will appear at the end of the seed attached to the coma hair. Rarely is 100% germination achieved and with Seed Bank seed I am very happy if any germination occurs. Obviously, the fresher the seed the more likelihood there is of good germination.

Once placed in a suitable growing area your bottles can be virtually forgotten although it is hard to resist the urge to peer at them a couple of times a day, at least for the first few weeks. The growth rate of tillandsioid seedlings varies considerably and the most rapid growth I have achieved has been with *T. caput-medusae* and *T. streptophylla.*

Within twelve months the seedlings are approximately 1 cm in diameter and even before this stage they would benefit from reflasking. Similar preparations are made and more bottles of sterilised growing medium are necessary. These, along with the bottle containing your small plants and your instruments are placed inside the plastic bag, sprayed thoroughly with bleach and left for a short period. With bottles resting horizontally, lids are removed and using angled forceps or a wire hook, plants and clumps of plants are removed from the germination flask and placed individually, with a space of about 1 cm between plants, onto but not necessarily into the new growing medium. Don't worry if old seed or hair is also transferred. This would be sterile. Flasks are restoppered and the new flasks are returned to the growing area. Sometimes with poor germination, reflasking is not necessary and I simply leave the few plants to grow to a suitable size where survival in the outside world can confidently be expected.

Deflasking:

One of the many advantages of this method is that you can choose the most suitable season and time to transfer your plants to the outside world. Lately, my time has been limited and there are a few bottles of plants growing happily under lights in which the seed was sown years ago and they have never been touched since. Their growth rate is less than ideal but they are living quite happily and will wait until it is convenient for me to attend to them. The growing on area should be slightly more humid initially than your normal tillandsia growing area.

To begin with, I soaked the plants in systemic fungicide solution—a combination of Benlate and Fungorid, but lately this step has been omitted, again without apparently causing any fungal problems. The grey-leafed tillandsias are grown on old palings or cork slabs. Simply wind fishing line or nylon knitting

[Continued on page 179]

Bromeliad Crawling in Brazil

Thomas U. Lineham **Photographs by the author**

If you can imagine travelling by automobile for about a week in a triangle with sides roughly 400 kilometers long[1] in a country of more than five million square kilometers (a percentage so small that my little calculator will record only zeros) you will understand how small a sample of Brazil we visited. But that's what we did.

Elton Leme invited me to visit and to bring a friend, so Sam Smith of Fort Myers, Florida, and I flew to Rio de Janeiro. Elton met us outside the customs area of the air terminal, to our great relief, and packed us off to a hotel across the boulevard from Ipanema beach. The girls of Ipanema wear thongs at the beach, as you may have noticed in various magazine pictures, and the other scenery was interesting.

1. 250 miles.

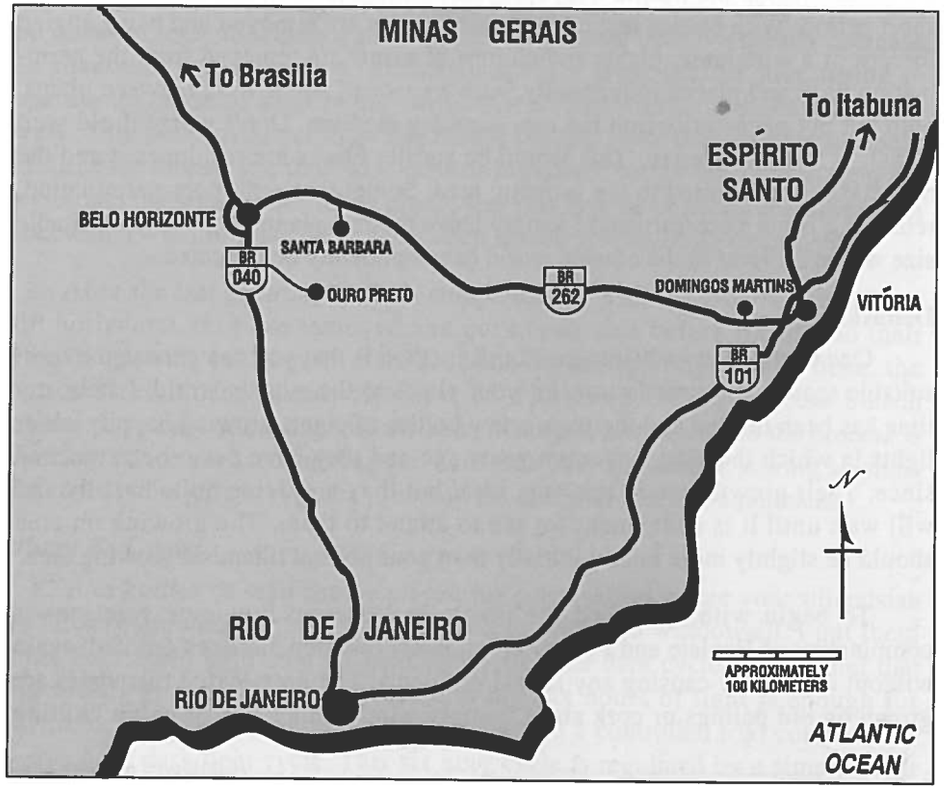


Figure 8
Roberto Burle Marx at the dedication of the Margaret Mee plant house on his estate near Guarantiba on the outskirts of Rio de Janeiro, 21 April 1990.

Figure 9
The complete photographer, Claudio Marigo, and the prepared explorer, Elton Leme, the latter holding a machete.

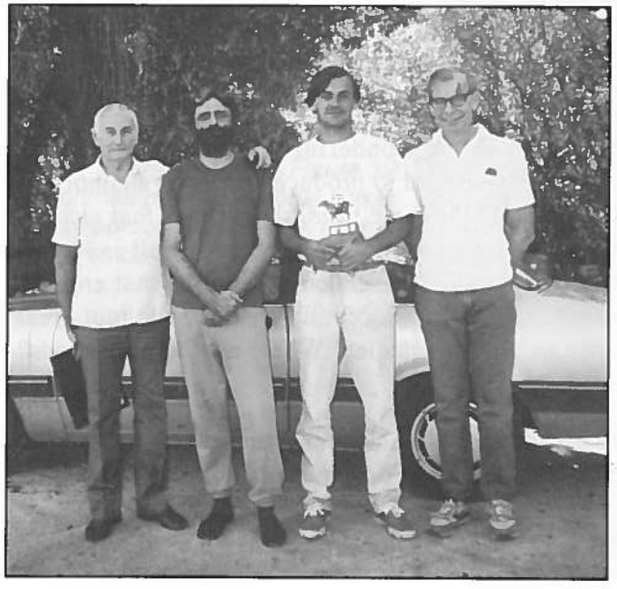


Figure 10
Everbody in clean clothes before the exertions of the day: (l. to r.) Roberto Kautsky, Luiz Claudio Marigo, Elton Leme, and Sam Smith.

We had several objectives in addition to watching the beach people: to visit Roberto Burle Marx at his dedication of a large shade house to the memory of Margaret Mee, to visit local collections, to collect in a portion of the Organ Mountains near Rio, and then to explore in the state of Minas Gerais. It was a good plan.

Before the first day ended we were in the middle of the best possible imitation of a hurricane that blew all night and the next day. We wanted to visit Sr. Burle Marx but his telephone was out of order. Nevertheless, we tried and nearly spent the night on the flooded roads. By the third day the sun had come out and we attended the dedication ceremony. We met Roberto and many members of the English colony of São Paulo, where Mrs. Mee had lived for many years. We also met botanists and friends including Gustavo Martinelli, a botanist of the Rio de Janeiro Botanical Garden and *Journal* author. Others have described the estate and the charming hospitality of Sr. Burle Marx. Later in the day we met Luiz Claudio Marigo, a photographer whose work has been published world wide[2] and collaborator with Elton Leme in illustrating the latter's reports.

On the fourth day, with beautifully clear weather, the four of us, Sam, Elton, Claudio, and I packed our bags and ourselves and a large container of spare alcohol (for the car) into Elton's Chevrolet and were off in the direction of Belo Horizonte. That city of more than a million people is the capital of Minas Gerais and the third largest city in Brazil. The road was up, over, and through the Organ Mountains with glimpses of foliage, but there was no time to stop. It seemed that there were no two straight kilometers of highway in the area. We went up and around curves or down and around more curves. We found fine roads, mountain scenery, strange foliage, and little towns beginning and ending with speed bumps.

Toward noon, with the fuel gauge getting to the nervous mark, we began a long series of searches for alcohol. In the wonderful world of international banking and trade, Brazil has been encouraged to produce industrial alcohol and alcohol-burning automobile engines. At the same time, she exports that alcohol for trade credits but imports expensive gasoline. The natural result is lots of gasoline and frequent droughts of alcohol. The related problem is that engines designed for alcohol fuel can't be fooled into accepting gasoline without great risk of damage. But why all this preliminary chatter? Where are the bromeliads? This is the place to do some explaining.

Collectors who travel from domesticated collections to bromeliad nurseries have many advantages. They can refer to catalogs and sales lists, peek at little

2. For example, the Canon ad in the front, unnumbered pages of *National Geographic* vol. 181, no. 6 (June 1992).

Figure 11
Wrought iron plant stands decorate Roberto Burle Marx's formal garden in addition to the many specimen plants such as shown below.

Figure 12
Aechmea phanerophlebia Baker (conspicuously veined), a large epiphyte or terrestial native to southern Brazil. Note the butterfly.

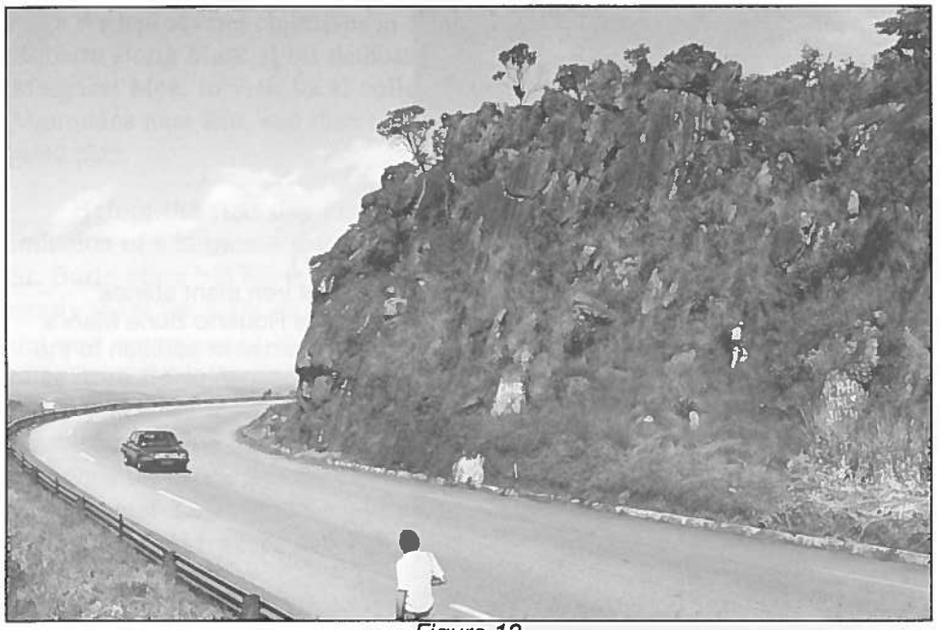


Figure 13
On Brazil 040 near Ouro Preto through mountainous country, a fine road winding up and down and around curves. Sam (white shirt on hillside) is prospecting for plants.

white tags, and make instant identifications. They know. They don't even have to examine the plants for leaf shape, inflorescence, and flower details. Take that variety of collector from that world and ask her/him to search memory and identify some little green plant and there you have the elements of a problem. Unless he has been in that area and examined those plants before, studied hard in advance, and has marvelous recall ability, identification may not be instant.[3] But, there is nothing to compare with the experience of searching and collecting. I am going to describe some of what we did and my reactions. If you want to read about plants you will have to look at the accompanying list that Elton wrote (in the next issue).

The major difference between Elton's objective and that of other collecting-trip leaders was that he did not know what we might find even though he had collected bromeliads in various parts of Minas Gerais at other times. It is true that some trips are arranged by bromeliad collectors who have been to various places, learned what plants to expect, and then guide others to those same places. That has not always happened, as Carol Johnson described in her account of the

3. These informal comments most certainly should not be read to question the value of such truly important publications as Dr. Lyman B. Smith's *Bromeliaceae of Brazil* and other area studies. Perhaps the most recent inventory is "Preliminary checklist of the Bromeliaceae of Rio de Janeiro State, Brazil," by Talita Fontoura, Andrea Costa, and Tania Wendt, Selbyana, v. 12: 5–45; 1991. Other such area studies and flora are being completed.

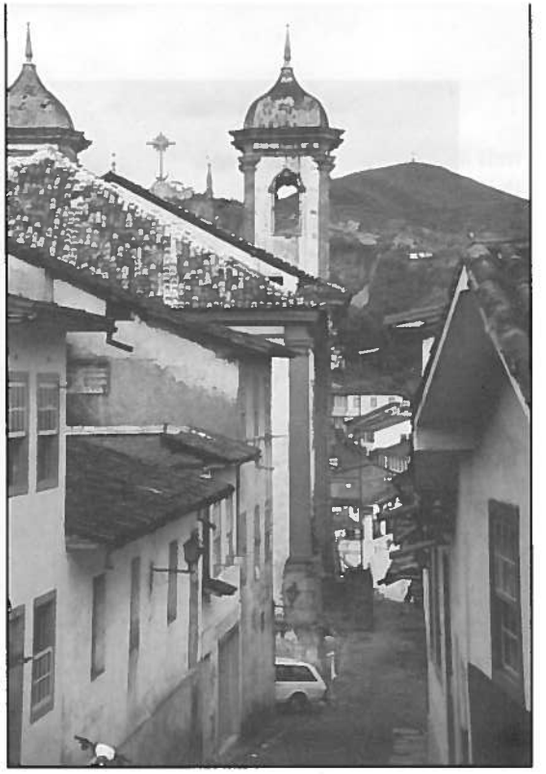


Figure 14
The city of Ouro Preto is built on steep slopes as emphasized in this view.

trip to Peru in 1988 when the leader was found to be an ornithologist, but it is frequently the case. Just plain, rough exploring is another matter dependent on stamina, optimism, and good humor.

Back to the trip and the sensations. Time for lunch? Not yet. Fuel? Zoom into Atlantic, Texaco, any other service station with Claudio yelling out the right front window: "Tem alcool?" "Não." Zoom back down the road hoping for the best and banking on the emergency five (or 10) liters. Belo Horizonte is a fine-looking city but it had no alcool.

By midafternoon we had reached Ouro Preto, a few kilometers back down the road. There, we found food and our local travelling companion Marco Antonio Andrade, an ornithologist, who introduced us to the resident biologist of Itacolome State Park, a biological preserve. She gave permission for us to stay at the little house in the Tripuí Preserve, which serves as both living space and office, so that problem was solved. The preserve is up another hill and around a few curves from Ouro Prete and off we went for the night.

Ouro Preto means *black gold.* It was a center in the 17th century of gold, diamond, and semiprecious stone trading. Now it is a national museum, a city of

Figure 15
Neoregelia cruenta (R. Graham) L.B. Smith, in the Burle Marx collection. Sr. Leme asserts that this is the true *N. cruenta.*

Figure 16
Ouro Preto, Minas Gerais, a city preserved for its 17th century Portuguese architecture. The hilly terrain is emphasized by the two church domes that appear to be sinking (see figure 14). Itacolomi State Park with its oddly shaped rock formation is in the background.

churches, Portuguese colonial architecture in all forms, and cobbled streets that seem to go steeply up or down but never on the level. We had time only to visit an open-air market with handmade objects of soapstone figurines and boxes. In the shops were quartz crystals. Shopping? Press on!

Food? For breakfast, potato bread with melted cheese and orange juice. For late afternoon lunch there was a crowded restaurant with trestle tables, a limited menu, and lots of food.

At Ouro Preto I learned that Elton does not know the word fatigue. We visited three sites in that area using an aged but reliable, four-wheeled vehicle: Tripuí Park, where we stayed over night, Itacolomi Park overlooking Ouro Preto from about 1,500 meters, and Cachoeira das Andorinhas at about 1,000 meters.

How do you go about collecting? You carry a collecting bag and, sometimes, a long stick for knocking plants out of trees or off rock perches. Roberto Kautsky carries a machete and a market basket. Elton Leme carries a machete and a large sack. The uninitiated goes about marvelling over the strange scenery and unable to see for looking. Where are the tags? Even an experienced collector may get no farther than *"Pitcairnia* sp." or *"Dyckia* sp." and then have to give up until able to consult the records. It is an enlightening experience. What kind of *Billbergia* is that? Oh! Of course.

By early afternoon of the fifth day we were back in the faithful, thirsty Chevrolet and on the main road bypassing Belo Horizonte and heading towards the east. After refueling at Santa Bárbara, where we turned off the main road, we had no more problems with finding alcohol. This time, we were going to visit Caraça, a Roman Catholic preserve of 11,233 hectares, 120 kilometers east of Belo Horizonte, and 1,400 meters above sea level with mountain tops over 2,000 meters high. We arrived just before the gates were closed for the night.

[To be concluded]

NOTICE. Advertising to appear in the *1992 Membership Directory* is invited. Please communicate with Membership Secretary Linda Harbert for publishing and price schedules. Her address is: 2488 E. 49th Street, Tulsa, OK 74105.

A Giant New Guzmania from Amazonian Ecuador

Harry E. Luther

***Guzmania hollinense,*[1] Luther sp. nov.**

A *G. pungens* et *G. stricta,* quibus affinibus, sepalis perbrevioribus quam bracteis florigeris.

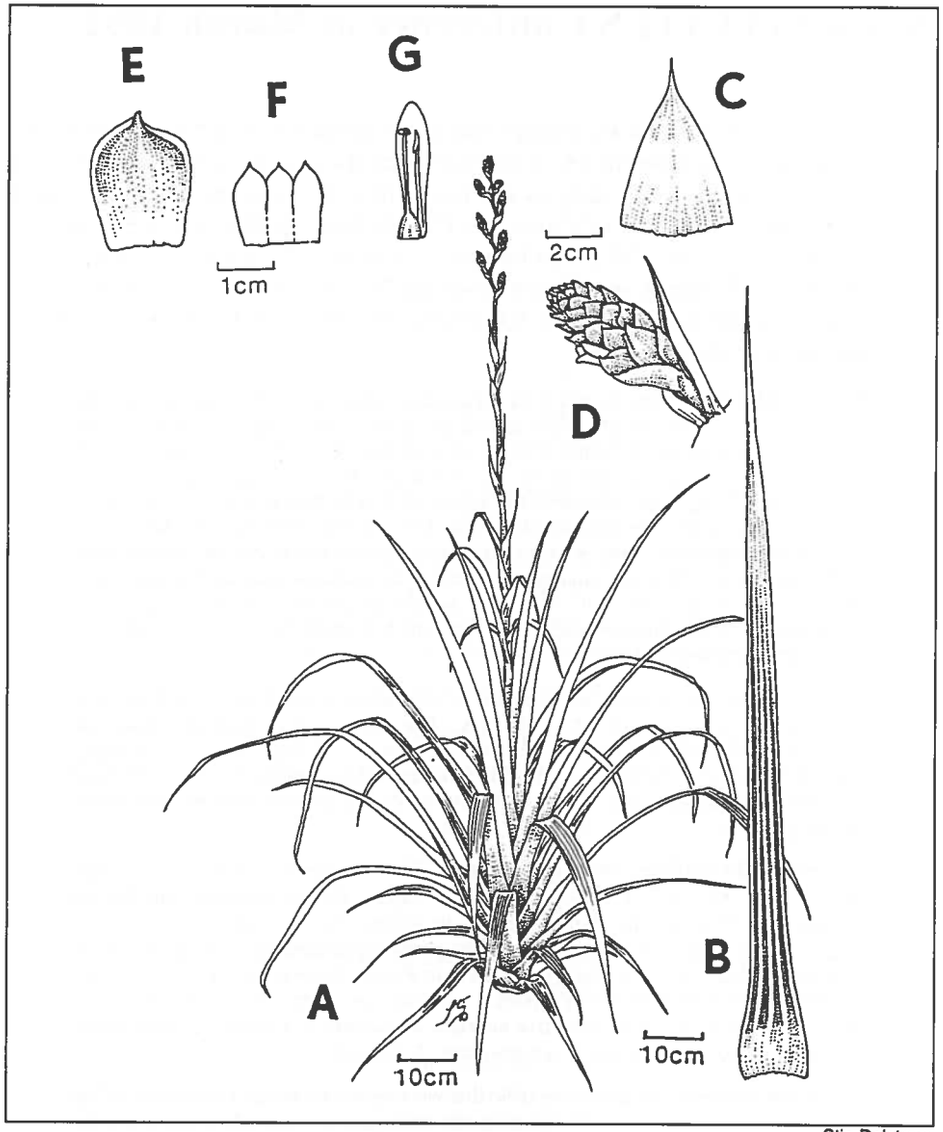
Type. Ecuador: Napo, new road Hollin–Coca, 1300 m, 27 Feb. 1988. *Luther, Kress, Roesel 1274* (holotype SEL; isotypes US, QCA, QCNE).

Plant flowering 1.5–3 m tall, clustering. *Leaves* rosulate, erect to spreading, 1–2.25 m long, appressed lepidote throughout, green or bronzy red. *Leaf sheaths* elliptic, 8–15 x 4–10 cm, concolorous with the blades or slightly paler, ferruginous lepidote adaxially. *Leaf blades* ligulate, long acuminate, pungent, 38–55 mm wide, conspicuously plicate with 4 to 5 obtuse folds. *Scape* erect, 1–2 m x 2–3 cm, pale furfuraceous, green or reddish. *Scape bracts* erect to spreading, foliaceous, plicate, pungent, much exceeding the internodes but exposing the scape, green or reddish. *Inflorescence* erect, 15–40 x 8–20 cm, laxly bipinnate with 8–20 polystichously arranged branches. *Primary bracts* like the upper scape bracts, the lowest exceeding the branches, the upper much shorter, green or reddish. *Branches* with a stout 1–2 cm-long sterile base, spreading at 30–50 degrees from the axis, 3–8 x 2–3 cm, densely polystichous-flowered. *Floral bracts* broadly elliptic to obovate, acute, 18–25 x 18–20 mm, coriaceous, even to slightly nerved, obtusely carinate at the apex, green or reddish. *Flowers* with a stout 1–2 mm pedicel, erect to slightly spreading, nocturnal. *Sepals* elliptic to obovate, rounded and apiculate, 13–16 mm long, connate for 4–7 mm, the adaxial pair carinate, pale green. *Corolla* with spreading lobes. *Petals* ligulate, obtuse, basally connate for 1–2 mm, 24–27 mm long, cream. *Fruit* a dry capsule 15–18 mm long.

This new species differs from the related *Guzmania pungens* and *G. stricta* by its sepals that are much shorter than the floral bracts. It may be further distinguished from *G. pungens* by having broader floral bracts and from *G. stricta* by having longer floral bracts and shorter sepals.

This very tall guzmania is locally abundant near streams and flooded areas where it grows both terrestrially and as a low epiphyte. Plants within a single population may have concolorous green leaves or some, usually a minority, may have striking bronzy red foliage. Sun exposure is not a factor as red plants may be lightly or very densely shaded. Sympatric bromeliads include *Tillandsia asplundii* L.B. Smith and *Guzmania melinonis* Regel.

1. Pronounced: oy-yeen-en-see



Stig Dalstrom

Figure 17.
Guzmania hollinense. A, habit; B, leaf; C, primary bract; D, branch of inflorescence; E, floral bract; F, calyx; G, petal, stamen and pistil.

The general aspect of the plant resembles a large, coarse grass or sedge especially when growing terrestrially in swampy areas. Except for its impressive size, this plant has no qualities recommending it as a horticultural subject.

M.B. Foster Bromeliad Identification Center
The Marie Selby Botanical Gardens, Sarasota, Florida

Results of CITES Conference of March 1992

It is probably general knowledge that seven species of Tillandsia *were added to Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as the result of a decision made at the eighth meeting of the Conference of Parties to CITES held on March 2–13, 1992, in Kyoto, Japan. They are:* Tillandsia harrisii, T. kammii, T. kautskyi, T. mauryana, T. sprengeliana, T. sucrei, *and* T. xerographica. *The following quotation from the* Federal Register [U.S.] *vol. 57, no. 93, Wednesday, May 13, 1992, provides basic information about this decision.*

> **BACKGROUND.** The Convention regulates import, export, reexport, and introduction from the sea of certain animal and plant species. Species for which the trade is controlled are included in three appendices. Appendix I includes species threatened with extinction that are or may be affected by trade. Appendix II includes species that although not necessarily threatened with extinction may become so unless trade in them is strictly controlled. It also lists species that must be subject to regulation in order that trade in other currently or potentially threatened species may be brought under effective control...Appendix III includes species that any Party identifies as being subject to regulation within its jurisdiction for purposes of preventing or restricting exploitation, and for which it needs the cooperation of other Parties in controlling trade.
>
> Any Party may propose amendments to appendices I and II for consideration at meetings of the Conference of Parties. The text of any proposal must be communicated to the Convention's Secretariat at least 150 days before the meeting. The Secretariat must then consult the other Parties and appropriate intergovernmental agencies, and communicate their responses to all Parties no later than 30 days before the meeting.
>
> **RECENT DECISIONS.** The eighth meeting of the Conference of Parties to CITES was held on March 2–13, 1992, in Kyoto, Japan. At the meeting, the Parties considered...27 different plant proposals to amend the Appendices...Results of actions by the Conference of Parties on the proposed amendments are given in the following table, *(which states with respect to Family Bromeliaceae):* Add to Appendix II (400-500 + suppl.); Proponent: Austria; Germany; Final decision of the parties: Revised and only *Tillandsia harrisii, T. kammii, T. kautskyi, T. mauryana, T. sprengeliana, T. sucrei,* and *T. xerographica.* Approved.
>
> All proposals in the preceding table that were approved by the Conference of the Parties will enter into effect 90 days after the meeting (i.e., June 11, 1992) under the terms of the Convention.

The full text of the decisions will be published later. Any discussion of the effect of the decision in this report would be without foundation in fact and will, for that reason, be avoided.

Pamela Koide, Wayne Schuster, and Harry Luther performed exceptional service on behalf of this society in providing information to the United States representative to the conference. Their work contributed significantly to the decision to limit the restriction to seven species. They deserve the thanks of all members.—TUL

Book Reviews

***A Distributional Check-list of the Genus* Tillandsia,** Lloyd F. Kiff. Botanical Diversions, 5404 Encino Ave., Encino, CA, 1991. 93 pp., bibliography, index of *Tillandsia* synonyms, country lists, 23 cm. Paper cover, postpaid $15 (U.S.); $17 (international). ISBN 0-935868-550.

The author presents a thorough alphabetical checklist of all tillandsias described through May 1991. The main list comprises all accepted taxa. All synonyms are found in Appendix 1 and country lists are provided in Appendix 2 for quick reference to the distribution of the species. Full author citations are given, followed by the year of publication, the latter being helpful in questions of priority. The main list contains many comments by various collaborators.

This booklet provides several major benefits: first, both amateurs and scientists now have a complete survey of what taxa exist at all and can recognize how many have changed since publication of the Smith and Downs monograph 1977; second, at one glance the reader can learn what the gross distribution of a species is, and conversely, what species can be looked for in any particular country. The latter information is especially helpful for scientists who are involved with flora projects, and for amateurs who are planning a tillandsia trip.

The many comments on critical species in the main list demonstrate how lacking the knowledge of this genus still is and how unstable the systematics are. A further contribution of this book is for all those who are hunting names for their collections, it may serve as a guide although readers should keep always in mind that a name that today is most desired may turn into a synonym and then become something uninteresting.

Walter Till
Institut für Botanik und Botanischer Garten der Universität Wien
Rennweg 14, A-1030, Vienna, Austria

Houseplant Magazine is a new full-color quarterly mostly about indoor growing but with related information. The first issue (spring 1992) includes articles on the new yellow African violet and hydroponics. The editor, Larry Hodgson, is a long-time member of this society. U.S. subscription is $19.95, other addresses $24.95. *HousePlant Magazine,* P.O. Box 1538, Elkins, WV 26241-9909.—TUL

Not long ago we received **Gardeners Source Guide,** a new publication "differing from other mail order source directories in that all of the companies listed send FREE catalogs." The review copy lists four categories: vegetables & flowers; berries, vines, shrubs & trees; flowers, plants & bulbs; misc: bamboo, cacti & herbs for a total of 510 companies. This 13-page guide costs $5.00 from Gardener's Source Guide, P.O. Box 206, Gowanda, N.Y. 14070. The reviewer found only one bromeliad source so he sent a copy of the BSI Buyers Guide to the publisher.—TUL

Native *Tillandsia* species of Georgia

Alexander Callison

When we think of areas in the United States where species of *Tillandsia* are native, we most often think of Florida. Yet, published reports indicate that some of the Florida species also occur in Georgia.

The ubiquitous *Tillandsia usneoides* (Spanish moss) can be located in many Georgia counties, while the closely related *T. recurvata* (ball moss) has been collected only in coastal Glynn County (fig. 18). *T. setacea,* with its pine needle-like leaves is found in that county also.

It was believed that *T. setacea* occurred in several other coastal Georgia counties, but recent examinations of the herbarium specimens revealed all but one to be *T. bartramii.*[1]

That the two species should be confused is not surprising as they are similar. *T. bartramii* has the same scaly gray coloration as most of the Florida *Tillandsia* species, while the leaves of *T. setacea* are a distinctive green, occasionally faintly gray, turning reddish in strong sunlight.

According to James C. Brooks,[2] *T. setacea* has been collected also inland at swampy sites in Laurens and Ben Hill Counties. Those sites are up to 100 miles from the coast. Dr. Brooks collected *T. fasciculata* in Camden County where *T. utriculata* is also reported.[3] Herbarium vouchers were not made, however, for those collections and while those populations may still occur in Georgia, their presence must be verified before they can be added to this list. It would be interesting to see if the colonies are still extant, as nearly three decades have elapsed since their putative discovery.

At any rate, isolated populations outside the usual range are not uncommon. As climatic conditions change, so do the distribution of species.[4]

The type specimen of *Tillandsia bartramii* was described from Liberty County, Georgia.[5] Collections were made also Camden, Charlton, Clinch, and Brantley Counties.[1]

A map of the known collection points in Georgia of *Tillandsia setacea* and *T. bartramii* from herbarium vouchers, combined with the collections made by Dr. Brooks reveals a central area where they have not yet been found (figure 19). It is possible that the distribution of these species includes some of the counties inside the known range.

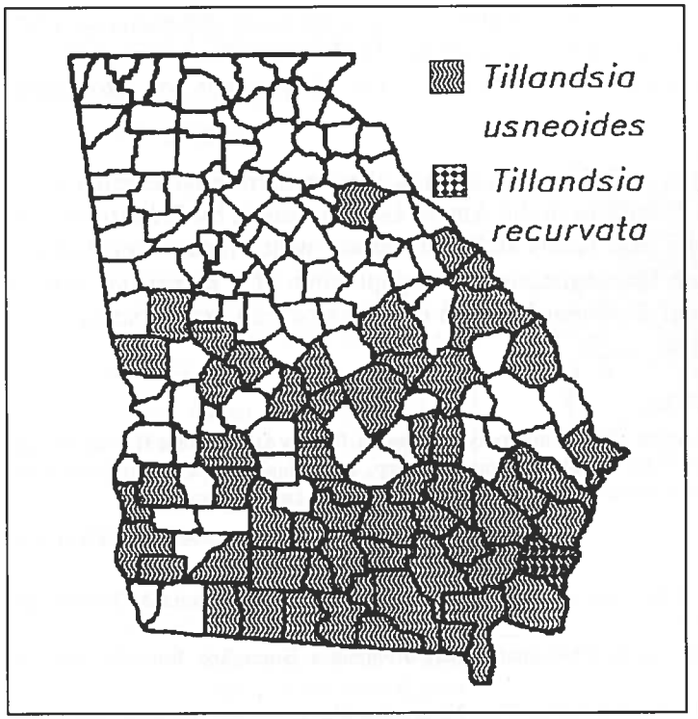


Figure 18
Tillandsia usneoides has been collected in many counties, while *T. recurvata* has been found in only one to date.

Map details by the author

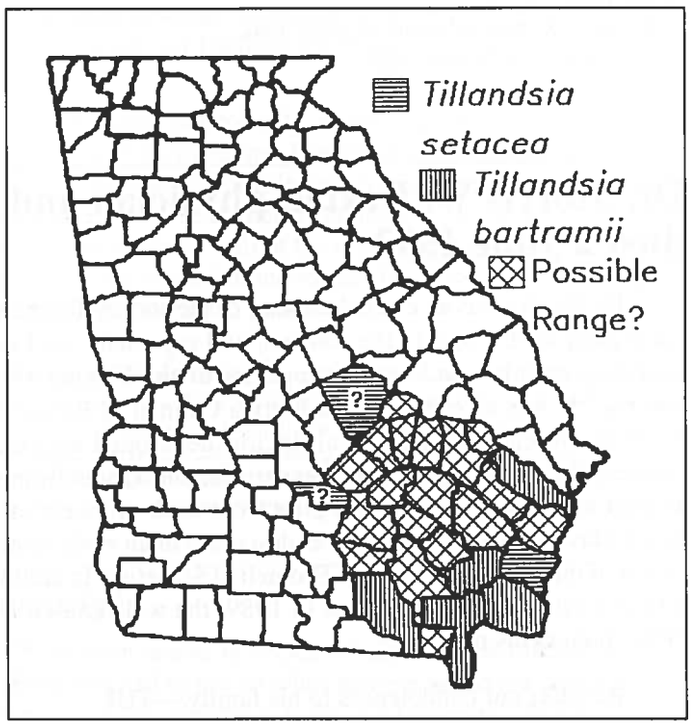


Figure 19
Tillandsia bartramii and *T. setacea* may have a wider distribution in Georgia than previously thought.

I intend to travel through this region searching for these *Tillandsia* species; the cypress bogs and blackwater rivers are ideal habitat for these taxa. Any collections will be in accordance with the Code of Conduct for Bromeliad Collections.

The coastal plain of Georgia contains the northernmost extension of *Tillandsia* subgenus *Tillandsia* in the Americas, represented by *T. bartramii, T. setacea,* and possibly *T. fasciculata* and *T. utriculata,* which require verification. This area also contains the northeasternmost population of *T. recurvata,* as well as large populations of *T. usneoides,* both of which belong in *Tillandsia,* subgenus *Diaphoranthema.*

ACKNOWLEDGEMENTS:

I thank the staff members of the University of Georgia Botany Department Herbarium for their cooperation; Dr. Vicki McConnell, Dr. Douglas Kemp, Tony Hughey, and Martin Nelson for their assistance; the *Journal* reviewers for their valuable comments and criticism.

Athens, Georgia

NOTES:

1. Luther, H.E.; Brown, G.K. Flora of North America: Bromeliaceae. St. Louis, MO: Missouri Botanical Garden (in press).

2. Brooks, J.C. Range extensions of two southeastern bromeliads. Brom. Soc. Bull. 18:116–117; 1968.

3. Smith, L.B.; Downs, R.J. Tillandsioideae. Flora Neotropica. Monograph, no. 14, pt. 2. New York: Hafner Press; 1977:972.

4. Brown, G.K. Personal communication; 1991.

5. Smith, L.B. (note 3 above):920.

Dr. Morris W. Dexter, physician and plantsman, died 2 June 1992.

Dr. Dexter was an elected director of the society for the years, 1980–1982, an occasional contributor to the *Journal,* and especially well known in Florida as a founding member and major supporter of the Florida West Coast Bromeliad Society. He was an officer of the Florida Council of Bromeliad Societies. He and his wife Helen, also a medical doctor, developed an extensive collection of bromeliads as well as orchids, gesneriads, and aroids from wild-growing plants as well as from purchases and gifts from such pioneers as Mulford Foster and Ralph Davis. Their collection was described in an early issue of *Grande,* a publication of the Florida Council of Bromeliad Societies. In addition to *Tillandsia dexteri,* described by Harry Luther in 1989, the well-known *Neoregelia* 'Dexter's Pride' honors his memory.

We offer our condolences to his family.—TUL

Regional Reflections

Tillandsia butzii and *T. friesii* Culture

from Smith & Downs figure 253

Figure 20. Tillandsia friesii

I am writing about these two tillandsias, *T. butzii* and *T. friesii* because I have heard it expressed in many circles that people are finding them hard to grow. I find them extremely easy to grow or at least perhaps they like the conditions I have in my shed.

Tillandsia butzii is considered in America a hard plant to grow in cultivation but is easier to manage once it starts to clump. It grows at altitudes of 1000 to 2300 metres from southern Mexico to Panama. Mine grows at sea level on the southern wall of a fibreglass shed with 50% shade cloth. The shed was built for orchids. I water them every time I water the orchids, up to daily in summer due to the high drying southeast winds I have on the coast and up to twice a week in winter. I fertilize them with whatever the current fertilizer I am using for the orchids but I believe phostogen may have a slight advantage.

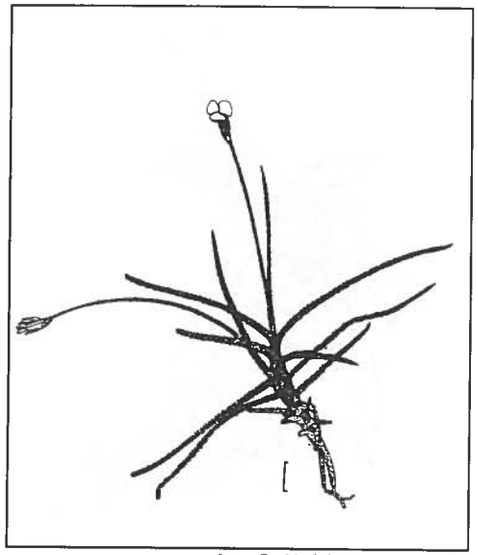
Tillandsia freisii grows in nature saxicolously at altitudes 3000 to 3550 metres in the Andean valleys in northwestern Argentina. This plant is not considered difficult to grow and is supposed to adapt readily to wide ranges of conditions. It likes bright light and likes frequent watering. To me it appears at times to be parched and crying out for a drink. I grow it on the northern wall of the same shed mentioned above near a window through which there is plenty of air movement. However, although in nature it clumps readily, mine only gets one or two pups.

Des Anderson

Reprinted from Bromeliaceae, *The Bromeliad Society of Queensland, Inc., Sept.–Oct. 1991. These species are described and illustrated in Paul Isley's* Tillandsia, *on pages 32–33, and 58–59, respectively.* T. butzii *is also reported and illustrated in* Journal, *Nov.–Dec. 1991, p. 270. The drawing of* T. friesii *is from Smith & Downs, fig. 253. It is especially interesting to note that while both species originate at relatively high altitudes they have adapted to sea level conditions in at least one part of Queensland.* T. butzii *is listed in several nursery catalogs but you may have to search for commercial sources of* T. friesii.*—Ed.*

What's Your Favourite?

For many years I have been unable to decide which of all my tillandsias is my favourite. I loved so many and had to say so when anyone asked me which I liked best. At last I have found the one I am sure is really my favourite—*Tillandsia cro-*



from Smith & Downs figure 278

Figure 21. Tillandsia crocata

cata. It is only a small plant so takes up little room. The silver-white leaves are covered with a white "felt" and are slightly curved.[1] It is quite easy to grow and also easy to mount and looks most attractive on a nice piece of driftwood or similar. It prefers to be on the dry side and likes a very good light and some sun if you get any in your shade house or greenhouse.

Flowers are a bright yellow and borne on a long, thin stem. An added bonus is the lovely scent that gets extra strong towards night. In fact, when one enters the place where it grows, the scent is immediately noticeable.

This year I had 18 flowers on the plant and they lasted a long time. Eventually they all seemed to be finished though the old petals still held the colour. Much to my surprise after about a week a second lot of buds opened, rather smaller than the first flowers but the scent was as strong. The spent flowers still hung on and were still colourful so the whole clump was a picture.

It is now three months since the first flower appeared so you can understand how pleased I am. I am wondering what it will do next year—more or less?

See why it is my favourite tillandsia?

Bea Hanson

Reprinted from Bromeliad Society of New Zealand, Inc., Bulletin, *August 1991.*

Editor's note: P.T. Isley's book, *Tillandsia,* (1987) includes a description and color photograph of *T. crocata* on pages 40–41. The black and white drawing reproduced here is from Smith and Downs, fig. 278. The keys to successful growing seem to be: water, but sparingly; provide bright light, but not direct, hot sun (sounds sort of fussy). This species is not endangered, it is inexpensive and available from several of our advertisers. Better to try a clump in order to enjoy the scent.

The "Right" Plants For Your Particular Spaces

In every home and greenhouse, and even under different fluorescent light setups using the same tubes, there are many diverse microenvironments. These may vary as to available light, temperature range, humidity, and space. These differences may be only inconsequential or they may be critical, so you should consider them carefully when buying bromeliads and choosing where to place and grow them.

Does this window face south, east, west, or north? Is it unobstructed or is it blocked by the building across the street? Is your apartment high enough to receive horizon light regardless of the sun? How many hours of sunlight does the window receive? Do the plants under your light fixture also receive natural light? How close to the lights can you grow them? Are there enough tubes to light the entire plant? (A typical 2-tube fixture won't cover more than a medium-size *Cryptanthus.).* These are but a few of the questions you must ask yourself.

It helps to know the optimum range of the light required by each plant. This means that ultimately you will have to learn a lot about your bromels' cultural needs...

If you want to grow and flower aechmeas, billbergias, and neoregelias you will need to give them strong light. A south or west window or an eastern exposure with at least three hours of sunlight will suffice. Some species of *Aechmea* such *A.* Foster's Favorite and *A. racinae* are more light sensitive and can get by with moderate light.

Some members complain that they have been unable to flower *Aechmea fasciata* indoors even after many years of growing the plant in good light. Perhaps the plant needs to be moved to another bright spot, and certainly a steady regimen of fertilizing will help it set bud. You may consider acquiring the new cultivar of *A. fasciata* called 'Morgana'. This cultivar grows like a weed and will reach flowering maturity indoors in one and one-half to two years.

In deciding where to place your billbergias, consider that they are photosensitive, winter-flowering plants that need long periods of darkness to trigger blooming. This means that they should not be placed in a room where you keep the light on in the evening or night, for this will retard blooming. If you have mature billbergias that have not yet bloomed, try placing them in a room that stays dark at night, even if the exposure is not the best. You may find that they quickly set bud.

Most neoregelias will not grow compactly or attain high color and markings indoors unless they receive strong light with many hours of sun. However, some hybrids as *N.* Gespacho and *N.* Little Rose are quite light sensitive.

My *N.* Gespacho has brilliant red leaves with many strong, yellow markings growing in an unobstructed east window that receives 2–3 hours of morning sun. And my *N.* Little Rose, growing 6" under a bank of Vita Lita fluorescent tubes has stronger color and markings than the specimen we got from Florida. **But be careful not to fertilize neos with foliar spray as this will wash out the markings.**

Cryptanthus will grow well under a range of from low to moderately strong light, and they seem to thrive best grown under fluorescent light. But they are sensitive to cold so you should consider keeping them set back or removed from the cold window panes during the winter.

Guzmanias (along with tillandsias) are probably the easiest plants to grow and flower indoors. They can grow in low to moderate light, yet they do well on capillary

mats in my south window (set back several feet) and don't burn because they are kept moist.

I have a bromeliad tree under a high-output fluorescent ceiling fixture with 6 cool white tubes and *Guzmania* Orangeade (sitting about two to 2 and one-half feet from the lights) just flowered there.

Catopsis are very suitable to indoor culture. They are small in size, grow in small pots and take little space. They can reach flowering maturity in a short time. I have grown *Catopsis nutans* mounted on a piece of cork bark in very low light hanging behind some cork logs in an east window. I soaked it with my tillandsias for 30–60 minutes every 7 to 14 days and it has dug roots into the cork, flowered, and pupped.

Nidulariums are reputedly low light plants, but I have found that indoors they do better in moderately strong light. *N. fulgens* grows compactly with strong markings in a full-sun south window. However, *N. innocentii* var. *lineatum* grows better under fluorescent lights.

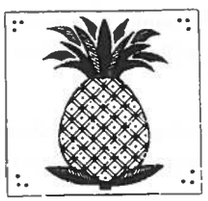
Most tillandsias will grow well under a range of different lighting conditions whether natural or fluorescent. And you can grow 50–60 small tillandsias on a 3-foot cork log hanging in the window or under lights. Or, you can mount five or six tillandsias on a small piece of cork and set it on a narrow window sill.

Most vrieseas will thrive under moderate to strong light. *V. splendens, V. glutinosa, V.* Fire, *V.* 'Favorite', and *V.* Double Pleasure get by under low light while *V. fenestralis, V. gigantea, V. hieroglyphica,* and *V.* 'Red Chestnut' need strong light to grow compactly and develop bold markings.

To accommodate larger plants at the window, you can enlarge a narrow sill by attaching a shelf flush with the sill level....

Herb Plever

Reprinted from Bromeliana, *the New York Bromeliad Society, Inc., April 1992.*



Growing Tillandsia Seed Using Artificial Media and Sterile Techniques

[Continued from page 159]

ribbon around the paling firmly. After washing the agar jelly off the plantlets under running water, slip them under the fishing line or allow their roots to be held by this support. Vrieseas, guzmanias and green-leafed tillandsias are usually transferred to community pots with sphagnum moss on the surface. For the first week or so humidity is maintained by the method Olwen Ferris first showed me. Cut the top off a suitably sized plastic soft drink bottle and invert this over the pot. After the initial watering no further watering is carried out until the cover is removed after three or four weeks. Further growth proceeds in the usual growing environment of these plants maintaining a fairly high humidity in the heat of summer. This also applies to the palings on which silver-leafed tillandsia plants are grown although it amazes me how quickly the green immature leaves acquire a silvery covering of tricomes. This can occur within a week and often within a month small, green-tipped rootlets are attaching the plants to their substrate.

The advantages of this method are:

1. TIME—The initial preparation of media, soaking of seeds, disinfection of seeds, setting up the plastic bag and seed transfer would probably take two to three hours for enough medium to grow twenty separate bottles. After this, you can virtually forget about them. No worries about maintaining humidity by watering two or three times a day at the height of summer or worrying about too much cold or damp in the middle of winter. The lights appear to provide sufficient warmth for growth during the coldest winter months.

2. CONVENIENCE—Apart from attempting to sow seeds as soon after harvest as possible, everything can be done at your own convenience and one is not tied to one's growing area for fear of atmospheric change. For viable seed there is a very small mortality rate from germination to deflasking compared to the possible mortality rate with other methods of culture.

3. OTHER SEED—This method works equally well with both green-leafed and silver-leafed tillandsia species. In fact it works extremely well with aechmea, billbergia, pitcairnia and quesnelia seed in my experience. The plant growth in these species is extremely rapid and plants hit the top of the bottle in a couple of months and, on deflasking into community pots, appear to have an excellent rate of survival in my growing conditions.

Disadvantages:

1. (a) Initial Cost—I feel that the investment in a pressure cooker is well worthwhile and your wife may also appreciate the opportunity of having an alternative cooking method.

(b) Plastic bags are cheap. A small cost is involved in obtaining the steel wire and glass rod and a gas cylinder with a flame to melt glass to make handles.

(c) The latest quote from Bacto for sufficient orchid mother flask medium to make up one litre of solution was $12.00 but remember this will probably make up at least twenty bottles ($84 for 500 gm).

2. Finding suitable glass containers—I obtained mine in the hospital system but small pure fruit juice bottles would be equally suitable and test tubes are reasonably cheap. All glass containers are reusable.

3. Possible sensitivity to bleach. I frequently develop a rash on my forearm where the rubber band rubs with movement. This lasts about a week and probably should teach me to wear a glove when carrying out this procedure.

4. What to do with all the beautiful plants which are about to flower four years after you have sown the seed? There is no easy answer to this minor problem.

SUGGESTED READING:

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Reprinted from [Proceedings] 6th National Bromeliad Conference (Bromeliads VI), Sydney, 1991: pp. 48-52.

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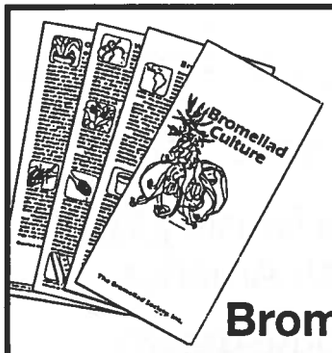

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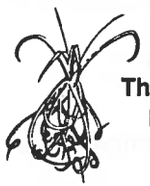

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The purpose of this nonprofit corporation is to promote and maintain public and scientific interest in the research, development, preservation, and distribution of bromeliads, both natural and hybrid, throughout the world. You are invited to join.

The results of the elections of officers and committee chairmen held on 10 June 1992 at the annual Board meeting, the minutes of that meeting, and the treasurer's reports will be published as soon as possible.

T.U. Lineham

Aechmea weilbachii var. *weilbachii* forma *viridisepala*. There are four distinctive appearances of this species: var. *weilbachii* and its two forms, *leodiensis* and *viridisepala* all have erect inflorescences; var. *pendula* is self-descriptive. The bright green sepals of the form shown here make it easily recognizable.

Calendar of Shows

14 June–7 Sept.	"Epiphytic Jewels; Canopy Dwellers of the Tropical Rain Forest," by Ms. Bonnie Arant Ertelt. Museum of Botany and the Arts, The Marie Selby Botanical Gardens, 811 South Palm Avenue, Sarasota, Florida. This show has been scheduled to coincide with the 1992 World Bromeliad Conference.
1–2 August	South Bay Bromeliad Associates 25th Annual Bromeliad Show & Sale. South Coast Botanic Garden, 26300 South Crenshaw Blvd., Palos Verdes Peninsula, CA. Saturday noon to 4:30 p.m.; Sunday 10 a.m. to 4:30 p.m. Judged show, demonstrations. Admission $3.00, students and seniors over 61 $1.50.
22–23 August	San Diego Bromeliad Society Annual Show, "Bromeliads on Parade." Balboa Park. Mitch Gos 619-422-8557.
31 October–1 November	Caloosahatchee Bromeliad Society Exhibition and Sale (not a judged show). Exhibition Hall, 1320 Hendry Street, downtown Fort Myers, FL. Saturday 9 a.m. to 5 p.m., Sunday 10 a.m. to 4 p.m. MAIN EVENT: Florida Council of Bromeliad Societies, Inc. 1992 EXTRAVAGANZA sale & auction. Sale hours, Sat. 9 a.m. to 5 p.m.; dinner & auction 7 p.m. Betty Ann Prevatt 813-334-0242.

Please send all copy and 1992 show and related notices to reach the editor at least 60 days before publication date of the *Journal*. The deadline for November–December is September 1992.