

# ***Journal of The Bromeliad Society***



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# Journal of the Bromeliad Society

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**Cover photographs.** Front: *Vriesea malzinei*, a colorful species from Mexico. Photograph by Marcel LeCoulle. Back: *Guzmania sanguinea* var. *sanguinea* crossed with *G. sanguinea* var. *brevipedicellata*. Photograph by Pamela Laever.

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## Where Bromeliads Really Come From

Tom Koerber

Photographs by the author

Readers of this *Journal* know that most bromeliads in cultivation originate in Central and South America and more knowledgeable readers would know that *Tillandsia cyanea*, for example, is native to the low elevation forests of Ecuador. However, it is very unlikely that a *Tillandsia cyanea* you bought from your favorite plant dealer came from Ecuador. It is much more probable that it started life in a large commercial greenhouse in Holland or Belgium.

The largest of these bromeliad producers is Corn. Bak B.V. located at Assendelft, near Amsterdam, Holland. On a recent trip to Europe, my wife and I made a point of stopping by that firm to see where many of our favorite bromeliads really come from.

Corn. Bak is a family business founded by Cornelis Bak in 1929. Initially it was a general nursery producing flower and vegetable plants for the local market. In 1958 his son, Jacob Bak, started specializing in bromeliads. Since then Jacob's son Peter and daughter Elly Bak have been added to the management team and the business has grown until at present a staff of 65 people produces between 18 and 20 million bromeliad plants per year.

Hybrid guzmanias are a major specialty with 22 cultivars (including 9 patented varieties) in production. These include *Guzmania* 'Samba', *G.* 'Morado', and *G.* 'Torch'. Seven vrieseas including *V.* 'Splendret', *V.* 'Poelmanii' and *V.* 'Elan' are offered along with 20 varieties of *Tillandsia* including long-time favorites *T. cyanea* and *T. dyeriana*. The popular *Aechmea fasciata* 'Morgana' is also a high-volume component of production. Most plants are grown from seed with meristem culture providing a minor amount of production.

Located on the North Sea at 53 degrees north latitude, Holland does not have a very favorable climate for growing tropical plants such as bromeliads. Winter days are short and cool. Cloudy weather prevails much of the year. Offsetting the inherent climatic disadvantages requires large capital investments in facilities and equipment and a lot of ingenuity. The production facilities at Corn. Bak B.V. consist of 320,000 square feet (7.35 acres) of climate-controlled greenhouses. A large natural gas-fired heating plant brings temperatures in the greenhouses up to the required tropical levels. A system of electronic sensors located throughout the greenhouses and also outside is linked to a computer system that holds the temperature, humidity and light within the greenhouses at predetermined levels. Reversible electric motors open and close roof vents and adjust the position of shade curtains. During dark winter periods supplementary light is provided for especially light sensitive seedlings. The computer also keeps a continuous record of conditions within the system.

Figure 1.  
Peter Bak holding a new  
form of *Tillandsia cyanea*.



Figure 2.  
The extensive interior of a Corn. Bak greenhouse.

Producing millions of plants with a closed system requires constant vigilance to avoid devastating pest outbreaks. Biological control is employed in the form of predatory nematodes added to the growing medium. Constant pest monitoring and selective pesticide applications detect and eliminate any pests before they become serious problems.

Although Corn. Bak B.V. produces 18 to 20 million bromeliads per year, you have probably never seen one of their labels in a bromeliad pot. The reason for this is that nearly all the plants produced are marketed to other growers as seedlings. The seedlings are sold in styrofoam flats that, depending upon the variety, hold from 100 to 250 plants each. Plants ready for sale look more like patches of especially lush lawn than familiar bromeliads. The seedlings are sold to commercial growers who transfer them to pots and grow them on to maturity, requiring from eight months to two years, depending upon the variety. The mature plants, usually in spike, then reach the retail market carrying the label of the commercial grower who grew them on. The location of the Corn. Bak nursery, just a few miles from Schiphol International Airport, enables them to deliver shipments anywhere in the world within 72 hours. In keeping with a worldwide client roster the Corn. Bak catalogue and detailed growing directions are printed in five languages.

The staff at Corn. Bak is constantly working to improve production methods. There is a continuous research program investigating growing conditions with the objective of producing uniform, strong, fast-growing plants. There is also a very active hybridization and selection program. At any time there will be eight to ten new varieties under development. New, soon-to-be-marketed plants include such items as a spineless *Aechmea fasciata* and a new *Tillandsia cyanea* variety which has an inflorescence that glows like a neon light. Peter Bak is especially interested in developing new *Guzmania* hybrids. To that end he makes several collecting trips to South America each year in search of new breeding stock. A special greenhouse section houses a large selection of breeding stock and large numbers of new crosses under evaluation.

It's proper to remember that bromeliads originate in Central and South America and to appreciate the efforts of the intrepid explorers and collectors who brought them into cultivation. I hope you will also appreciate the hard work and ingenuity of those folks in Holland who do such a fine job of producing and making them readily available.

Berkeley, California



## Our Growing is Getting Better

### Odean Head

Betty and I have been able to make numerous trips to Florida, California, and many points between over the last ten to fifteen years. We have either been judging or visiting shows and have always been fortunate enough to visit growers and see their collections.

It's amazing how many improvements have been made during this period in growing environments and how much more beautifully the bromeliads are being grown. My observation is that a lot of the improvement can be attributed to growing under stronger light. More and more bromeliad growers are removing or trimming trees and building greenhouses and shade houses where they can provide the optimum sunlight to their plants.

So, what is optimum? I would say that optimum is all the sun that a plant can take without burning or bleaching. Temperature and air movement are two factors that have a direct relationship in determining the optimum light conditions. The cooler the temperature the more intense the light that the plants can take without fading or burning. In fact, cooler temperatures alone will enhance plant color and giving them increased endurable light will maximize plant color. Of course, if you don't have cool temperatures, you will have to do the best with what you have. If the humidity is not too high, you can get good heat relief with evaporative cooling. I have seen many greenhouses with wetwalls and big exhaust fans that have done an effective job.

If your temperatures are hot and humidity is high, it is not practical to grow in closed structures during the summertime. All you can do is increase the air movement which will certainly help. It may also be necessary to increase the amount of shading during the hottest part of the summer.

We now need to consider one of the most frequently asked questions on this subject. "I have limited space that receives the ideal strong light that you describe, so which genera should I grow?" This is not an easy question to answer without knowing more about a person's collection and plant preferences. Most of the good growers I know who have preferences for a particular genus will tell you to grow that genus in the best light you can give it. The question can probably best be answered with another question. "What genera do you prefer growing?" Of course, there are some plants in each genus that will tolerate stronger light while others will respond better under lower light. Some of this you learn from your own growing experiences and you can learn more from your society's shows and "show-and-tell presentations" at meetings. As a general rule, the softer leafed plants in various genera do not like the stronger light and will do better in lower but still good light.

Good watering habits also provide a major role in quality growing. Most bromeliads will grow, or at least continue to exist, when growing conditions are too dry. We sometimes brag about the neglect they will take, but the better growers have good watering habits. A growing medium that will drain well to prevent soggy conditions is also essential. Regular wetting, through the root systems when potted, will produce more leaves and hold them better.

Some of us are limited as to the improvements that we can make in our growing environment. However, look it over. Maybe there are things you can do to provide better light. Perhaps trimming adjacent shrubbery or locating the plants that require the highest light to the brightest parts of the greenhouse. Of course we should always continually monitor our watering practices as the amount of light changes with the seasons.

Maintaining good growing conditions will always bring out the best in your plants.

*Houston, Texas*

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## Recent Slide Donations

We would like to thank Marcel LeCoufle for the donation of additional slides to the already generous collection that he had donated earlier for use in the JOURNAL. Quality slides and prints are always appreciated for use as cover photographs, to illustrate articles, or simply to appear as photographs to print periodically to depict the color and diversity of the family.

Slides and prints may be sent to:

Chet Blackburn  
BSI Editor  
720 Millertown Road  
Auburn, Ca. 95603

Figure 3.  
*Aechmea bicolor*



Figure 4.  
*Aechmea burle-marxii*, the  
closest relative of *A. bicolor*

## Rediscovering *Aechmea bicolor*

Elton M. C. Leme

Photographs by the Author

*Aechmea bicolor* was described over 40 years ago on the basis of a Mulford B. Foster (#2450) specimen "collected on trees in dense forest between Ituaçu ("Iturassu" according to the label on the type; the correct name is Itiruçu) and Jequié, State of Bahia, Brazil, altitude 480 meters". In 1979, when monographing the bromeliads, Smith & Downs stated that in fact it came from Blumenau to Itajaí, Santa Catarina State, based on Foster 2514 which flowered in cultivation 1 November 1948, but was "erroneously described as *Foster 2450* from Bahia, Brazil, and then corrected in a letter dated 7 August, 1958". This species was originally conceived as a member of the subgenus *Ortgiesia*, which supported the data of collection indicated by Smith & Downs (1979), because 11 of the 17 known species of *Ortgiesia* can be found in Santa Catarina State, the center of diversity for the group.

After several years researching the Bromeliaceae of Santa Catarina State, Reitz (1983), who had collected with Foster during his short stay in Santa Catarina, discussed the origin of a few species that were supposed to grow in that State. Concerning *A. bicolor*, Father Reitz stated that they did not search for plants on the road between Blumenau and Itajaí. The late Brazilian bromeliad expert concluded that *A. bicolor* does not occur in Santa Catarina and rejected the new collection data introduced by Smith & Downs (1979).

Recently some new data sheds some light on what *A. bicolor* really is. In 1994, during an excursion to the County of Santa Teresinha, Bahia State, Sandra Linhares and Roberto Menescal found the true *A. bicolor* growing as an epiphyte in a very wet forest at an elevation of about 600 meters. The specimen collected conforms very well to the original description of the species and provides excellent evidence that the original information associated with *Foster 2450* is correct.

*Aechmea bicolor* L.B. Smith (figure 3).

*Miscellaneous collection 126* (1): 12, 213, figure 100, 1955.

**Plant** epiphytic, stoloniferous. **Leaves** coriaceous, forming a narrow funnellform rosette, much exceeding the inflorescence, densely covered beneath with finely appressed cinereous scales. **Sheaths** broadly elliptic, 10–13 × 3.5–4 cm, purple adaxially. **Blades** linear, acute with a thick pungent apical cusp, 20–47 × 2.5 cm, flat, laxly serrulate with teeth 0.5 mm long, densely cinerous-lepidote above, glabrescent with age. **Scape** erect, slender, ca. 20 cm long, ca. 0.5 cm in diameter, densely white-floccose when young. **Scape bracts** linear-lanceolate, acuminate, membranaceous, erect, equaling to exceeding the internodes, exposing the scape, the lowest serrulate. **Inflorescence** simple, laxly to subdensely cylindrical, 5–8 cm long, white-flocculose. **Floral bracts** narrowly

triangular-lanceolate and acuminate to broadly ovate and acute, thin, yellowish, the lowest about equaling the sepals, the others much shorter, triangulate, acute, ca. 3 mm long. **Flowers** ca. 18 mm long, sessile, polystichously arranged, divergent. **Sepals** subreniform, strongly asymmetric, the lateral wing rounded, 4 mm long exclusive of the slender 1 mm long mucro, ca. 5 mm wide, connate for nearly half their length, ecarinate, bright yellow. **Petals** narrowly obovate, emarginate, suberect at anthesis,  $9 \times 4$  mm, subfree, bearing 2 lacerate appendages at base, as well as 2 conspicuous callosities which equals the filaments, white. **Stamens** included. **Filaments**: the epipetalous ones shortly adnate to the petals, the episepalous ones free. **Anthers** narrowly ellipsoid, base obtuse, apex apiculate, ca. 3 mm long, fixed near the middle. **Style** slightly surpassing the anthers. **Stigma** conduplicate-spiral, narrowly ellipsoid, white, blades with subentire margins. **Ovary** broadly obconic, terete, 5–6 mm long, ca. 4 mm in diameter, bright yellow. **Placentae** subcentral to apical. **Ovules** obtuse to apiculate. **Epigynous tube** ca. 1.5 mm long.

TYPE: Brazil. Bahia: between Itirucú and Jequié, 18 Oct. 1948, *M. B. Foster 2450* (Holotype: US,n.v.; photo HB).

MATERIAL EXAMINED: Bahia, Santa Teresinha, Nov. 1994, *S. Linhares & R. Menescal s.n.*, fl. cult. Nov. 1995, *E. Leme 2790* (HB).

Despite the fact that its sepals are distinctly connate and mucronate, *A. bicolor* is not related to any species of the *Orgiesia* subgenus from southwestern Brazil. Its closest relatives belong to the *A. lingulata* complex of species from the states of Bahia and Minas Gerais. One of them is *A. burle-marxii* (figure 4.) E.Pereira from which *A. bicolor* differs mainly by the narrower leaves, simple inflorescence, higher connate sepals, and by the emarginate petals.

#### ACKNOWLEDGMENT:

I thank Sociedade Brasileira de Bromélias (SBBR) members Sandra Linhares and Roberto Menescal, who kindly provided the living specimens used in this study.

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- & R.J. Downs. 1979. Bromelioideae (Bromeliaceae). *Flora Neotropica*, Monograph 14, part 3. New York Botanical Garden, New York, New York.

Rio de Janeiro, Brazil

## Making a Miniature Bromeliad Tree

Joan Williams

Whether in your home or at a bromeliad show, a miniature bromeliad tree will always draw interest and admiration from those viewing it.

If your climate allows you to start a bromeliad tree in your garden, choose a tree which provides some shelter from strong winds and full sun. Make sure that it does not shed its bark frequently or you will lose bromeliads in the process. A tree with rough bark is the best choice. To attach the plants to the tree, wrap their roots in sphagnum moss or coconut fiber and tie them on firmly with strips of panty hose, hessian or some other non-obtrusive binding material. Once the roots grow and attach themselves to the tree, you can remove the ties if you wish.

Most bromeliads will adapt as readily to tree dwelling as they do in their natural habitat but it is best to choose the hardier types. Stoloniferous ones are ideal. Vrieseas, aechmeas, billbergias, neoregelias, and tillandsias are all suitable to grow in this fashion, but tillandsias and miniature neoregelias are the best. Place the larger species at the base of the tree and smaller ones nearer to the top.

Plants will dry out more quickly when grown on trees than they would if grown in soil in a pot, so water frequently during summer and less often in winter.

For those not fortunate enough to be able to grow bromeliads outdoors, a miniature bromeliad tree can be grown in a glass house or any other protected area where there is good light. Driftwood, an old gnarled branch, an old tree-fern stump or even a nice rock will suffice. If it is top-heavy enough to need a base, you can cement it into a fancy container or place it directly into soil, sand or gravel used to fill the pot. If using any of the latter, particularly with tree fern, remember that the base of the tree will become the weakest point. Several years ago I bought a tree fern stump already made into a bromeliad tree at a plant auction at one of our meetings. I placed it in a prime location next to my fish pond under 70% shade cloth and the plants grew very well. The tree was in a large pot with soil, and had plants growing in the soil as well as on the tree fern trunk. After many years I noticed that the tree had a lean to it and found that its base had rotted away and was in danger of falling into the pond. It was quickly banished to a garden corner where the plants still grow, but it now has to be propped up so as not to fall since the tree fern fiber has badly deteriorated.

If you prefer driftwood from a beach, remember that it is probably saturated with salt which needs to be leached out before use or it will damage your plants. Soaking the driftwood for about week or so in a bucket of fresh water, changing the water daily, will do the trick. Then leave it out in the sun until you are sure

that it is completely dry before you start glueing your plants on to their new host. When using an old branch or log, make sure that there are no suspicious holes that could be harboring borers or other creatures that you may not wish to invite indoors. Also, in the case of borers, you might one day see your masterpiece crumple before your very eyes.

Also remember to leave a couple of drainage holes if you are cementing your tree into a fancy pot, or it may eventually rot off at the base. Poke some smooth sticks up through the natural drain holes of your container, cement the tree in place, and when the cement is nearly dry, remove the sticks. This should prevent water from collecting at the base of the tree.

Some people say that a tree struck by lightning can't be used for firewood as it will not burn, as it is said to become almost petrified. If true, that would make a perfect host for your plants but unfortunately, there are not many of these available. Instead, you might do as some growers have done and mould your own bromeliad tree out of roughened cement. These can be made to look quite natural with touches of paint if you have an artistic flair. Most plants grow quite happily on this type of host.

To grow bromeliads on a rock provides a separate challenge. The biggest problem is attaching the plant and keeping it upright until it is able to grow roots and hang on to its host unaided. One technique is to drill holes in the rock and drive sphagnum moss around the base of the plant to keep it firmly in place until it is rooted, but there is a risk of water lodging in the hole and rotting the plant. If your rock has nooks and crannies in it, mounting will be a much easier job. If your plant is small, just a small glob of glue on the surface of the rock will probably suffice to hold it. Remember that many bromeliads grow on rocks and cliff faces in their natural habitat, so it is worth the challenge. Most plants grow quite well once they get a hold on their new substrate.<sup>1</sup>

If the plants are small enough you can use any durable non-toxic glue to give them a start but you may need nylon strips to hold them firmly until they grow roots. It is up to you whether to fertilize or not, but most bromeliads respond to foliar feeding.

For indoor trees, you should select smaller bromeliads for use than you might use outdoors. If you are mounting tillandsias, the silvery-grey ones are the best, but they need bright light and plenty of air movement. Using all plants of the same species often looks nicest but a using a mixture of plants can also look attractive. Know beforehand how big each plant will grow. Otherwise, small seedlings can provide an unwanted surprise when they grow too big for the tree.

Another consideration when selecting plants is the compatibility factor. You should not mix sun-loving plants with shade-loving plants, for example. In fact,

<sup>1</sup> See also "Bromeliad Rock Gardens". J. Brom. Soc. 44(2):60-63.

your first consideration should be where you are going to put your bromeliad tree. That will determine which plants you should select. It is not good planning, for example, to grow *Aechmea recurvata* with many vrieseas, for example, as your *A. recurvata* would lack color if grown in a shady spot, and the vrieseas would suffer leaf burn in full sun. Plants selected should also be compatible in their watering needs.

Remember that except perhaps for many tillandsias, the plants mounted on your bromeliad tree will become stressed to some degree. The disadvantage is that they will require more frequent watering but the advantage is that they are likely to remain smaller and more compact and become more colorful than those grown in soil.

The pleasure you derive from your bromeliad tree will well compensate you for the extra maintenance involved.

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## Recent Gifts to the Society

We are happy to acknowledge gifts from the following members and friends of the BSI who have contributed to the Color Fund, to the BSI general fund, or to the Bromeliad Identification Center, or other program of the BSI.

Ed Doherty

John Leonard

Kay Netscher

John & Ardie Reilly

Eleanor Kinzie

Melvin First

Verdia Lowe

A M Oshag & Ann

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## Adventures of a Novice: Part II

### Ed Prince

After my first real collecting trip to Ecuador,<sup>1</sup> and its associated trauma, you would think I had learned my lesson. But "The Dream" persists. It's the one where I hack my way through a lush rain forest, when just before dark, I spot a never-before-seen *Guzmania* that is so beautiful that every collector just has to have one. Later, after considerable research, Harry Luther describes the plant, names it *Guzmania princeii*, and I become immortalized. In early spring Wally Berg called and spoke the magic words, "Chester and I are planning a trip to Panama in July, would you like to join us?" My response was immediate. Of course I would. Could "The Dream" become reality?

I think that many enthusiasts might be put off by the thought of a foreign land that may be rife with dengue fever, malaria and a host of other tropical horrors, and consequently wouldn't go. I can only say that if somewhere in the vast universe, a list of potential health cowards exists, trust me, my name appears at the very top. After agreeing to go with Wally and Chester I soon realized that I was about to take an enormous health risk for the sake of a few dog-eared plants that have probably been in cultivation for decades. With no concern for the long distance charges, I called the Centers for Disease Control in Atlanta and asked them what I might do to protect myself. They replied by sending me nine pages of material (Document #220160) that in summary recommended that travelers should take appropriate malaria prevention measures, take steps to prevent insect bites, and should be aware of the fact that transmission of typhoid fever, cholera, hepatitis, and the ever-popular traveler's diarrhea, are all the result of eating or drinking contaminated food or water. My fears transcended mild concern.

For the next several weeks I prepared for every contingency. Armed with the material from the CDC, I had my doctor start me on Chloroquine, a malaria preventative. I bought long-sleeved shirts and tropical-weight extra long pants as well as waterproof socks and boots. I treated all of my purchases with Permethrin, a long-lasting insect repellent for use on clothing. Another acquisition was a large hat with pull-down mosquito netting. Additionally, I had a pair of work gloves so that at any given time I could be completely covered and therefore impervious to the attack of flying or crawling predators. I easily supplied the biggest belly laugh when I modeled my gear for Chester and Wally. Let them laugh...I was ready!

Having made all necessary preparations, Wally and I left Miami on July 22nd and arrived in Panama three hours later in the middle of a torrential rain storm. Chester arrived from Costa Rica the following day. Just four minutes from the very modern airport at Tocumen (twenty miles from Panama City) is the

equally modern Hotel Continental where we established our base of operations. The staff, for the most part, spoke English. We rented a brand new four wheel drive Mitsubishi that had every bell and whistle; a built in compass, a gyroscope, and an altimeter. The back seat had its own air conditioner and map lights. Let the games begin!

Early the next morning (it was still very dark) we headed for Colón, a bustling center of commerce on the Atlantic coast. The road was good and we covered the sixty miles in good time. Near Colon we crossed the canal at Gatun and entered an area that was under the control of the U.S. Army. We traveled miles through virgin forest and saw an abundance of plant life...but no bromeliads. Retracing our steps we made our way back to the Pacific coast and to Cerra Azul, a mountain formerly known as Cerra Jefe. Here we saw our first plants; *Guzmania sprucei*, *G. circinnata*, *G. filiorum*, a nice form of *Tillandsia anceps*, *Catopsis micrantha* and *Racinaea spiculosa*.

It had been raining but as soon as we left the mountain, of course, it stopped. By the time we returned to the hotel it was dark. That night at dinner I discovered why Chester never gets Montezuma's Revenge. Whereas I take a daily antibiotic (just in case), Chester travels with small cans of hot Mexican peppers that he eats with most meals. Apparently the peppers fend off all transmittable evils as well as most human beings.

The next morning we drove to Panama City, across the spectacular Bridge of the Americas, and up the Pan American Highway. Our destination was Trinidad de Cerra. I'm sure that you've seen signs regarding railroad crossings and their associated barriers. Well, we didn't see any of these, but we did cross a section of road that went across the middle of an airport runway. Think about the possibilities.

About two hours later we reached the side road leading to our mountain destination. Less than six miles later we discovered why the occasional travelers were either walking or on horseback. Our nicely paved road changed from a solid surface with medium-sized potholes to a less stable surface filled with horrible craters large enough to be named. The road bed now consisted of an orange clay-like substance that had an adhesive quality akin to Elmer's Glue. Scattered throughout the ooze were boulders of varying sizes. Every few hundred yards or so there was evidence of a mud slide that further deteriorated the road. Chester however, proved equal to the challenge and we slowly proceeded, constantly gaining altitude. When we reached the highest point we came to a farm that was situated at the very base of our quest. Chester somehow convinced the farmer not only to allow us access to his property but to guide us to a large rock face that held promise of potential treasures. For the next exhausting hour we struggled up

<sup>1</sup> See "Adventures of a Novice", J. Brom. Soc. 44(4):147-152, 176





Figure 5.  
Wally Berg with our first  
bromeliad, *Ananus comosus*,  
collected without leaving the  
hotel.

Photograph by Ed Prince



Figure 6.  
*Werauhia sanguinolenta*  
growing on the thatching of  
a house.

Photograph by Ed Prince

the Panamanian version of an advanced Stairmaster. Just a few minutes later a very difficult climb became an impossible task and reluctantly admitting defeat, we opted to move on to friendlier territory. With his characteristic devil-may-care driving and a somewhat cavalier attitude, Chester got us down the mountain road and back to the main highway.

The town of El Valle, unquestionably the most attractive community we visited, was our next stop. At an altitude of about 2,000 feet, El Valle can honestly boast of fairly good roads, a souvenir shop, two hotels, and the honor of being home to the famous Panamanian Golden Frog, *Atelopus zeteki*. Our hotel had an outdoor rock and screen terrarium with about a dozen resident frogs. They are truly unique.

I don't want to seem to be dwelling on food but the dining room at our hotel offered one-half of a roasted chicken as the house specialty. I imagine that it is the top profit item on the menu. Their chef has devised a way to cut and slice the chicken so that two things occur. One, it is done in a manner that defies detection as to exactly what part of the bird you are eating. Secondly, it is cut so cleverly that they manage to obtain four orders from one chicken. At any rate it was tender and tasty and we had a pleasant meal, although I was a trifle unnerved when a bat flew into the dining room and disappeared into a nearby alcove. Needless to say, since our room had no screens, the windows remained shut.

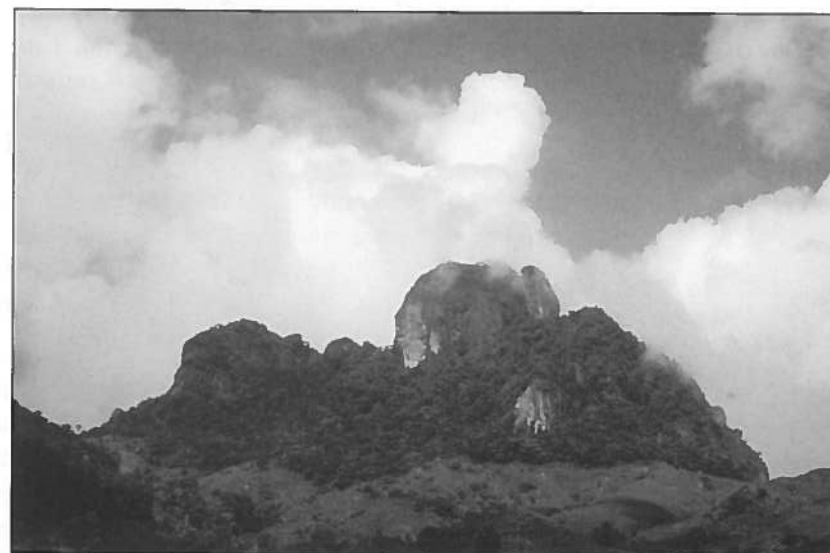


Figure 7.  
Cerra Trinidad, one of the sites visited on our trip.

Photograph by Ed Prince



Figure 8.

Photograph by Ed Prince

A "road" leading to one of our collecting sites.

A couple of years ago Wally had been in this same region and had seen quite a few unusual plants. The following morning was devoted to finding that same road. Although the landscape had changed dramatically, (it was now ostensibly a vast chicken ranch), Wally directed us to a not-too-distant mountain peak that had not as yet been cleared. Here we saw *Pitcairnia wendlandii*, *Aechmea mexicana*, *Werauhia ringens*, *W. vittata*, *W. sanguinolenta*, *Catopsis pisiformis* as well as *Guzmania calamifolia*, *G. rosea*, *G. donnell-smithii*, and *G. spectabilis*. Wherever we went at lower altitudes we saw *Tillandsia fasciculata*, *T. balbisiana* and *Guzmania musaica*.

That evening we entered the town of Penonome, a fairly large community catering to the high-volume of traffic traversing the Pan American Highway. The biggest decision facing us was where to have dinner. After rejecting our hotel and a highly recommended restaurant, which on inspection failed in every measurable category, we settled for a small cantina and had a surprisingly good pizza.

For the next couple of days we headed in the general direction of Panama City making detours to investigate every side road that led in a northerly direction. As stated earlier I had some slight reservations about this trip relating to potential health hazards. Now, a new and infinitely more serious cause for alarm filled me with trepidation. On one particular mountain road while driving downhill we rounded a curve that came dangerously close, in my estimation, to a raging river. Chester and Wally actually debated the pros and cons of attempting to forge the torrent before common sense took hold and it was decided to turn back. Unfortunately the road was too narrow for turning and the necessity of



Figure 9.

Photograph by Wally Berg

*Catopsis pisiformis*.



Figure 10.

Photograph by Wally Berg

*Werauhia ringens* in habitat.



backing up became the next challenge. At this point the road was of that perfect consistency that denied any traction and merely allowed us to sink deeper and deeper into the morass of clay and mud. The tires spun faster and faster as the once pristine mountain air became fouled by the noxious fumes of burnt rubber combined with the palpable smell of fear emanating from your scribe. It was only after many failed attempts and the strategic placement of some fairly large rocks that we were able, inch by inch, to move to a more solid surface.

Then it got worse. The clutch went out. Some might say I panicked. I confess that the thought of being light years distant from Mr. Goodwrench did induce a new high on my personal terror meter. Wally and Chester reacted to this new catastrophe by calmly walking into the forest to seek new treasures while I waited by the car praying for divine intervention. Fifteen or twenty minutes later the two reappeared, Wally proudly clutching a handsome *Aechmea dactylina* and Chester sporting a "I know something you don't know" smirk. We got into the car and just as suddenly as the clutch went out it came back. I later discovered that the mud, while wet, allowed the fly wheel to spin merrily around without engaging the clutch but as soon as it dried, it operated properly. Do you think that Chester could possibly have known about that?

After investigating the last of the mountain roads and seeing the same plants previously noted, we headed for our base, the Hotel Continental. Our biggest concern now involved returning the vehicle to the rental agency. It was fortuitous that two men with pails and sponges just happened to be in the parking lot and agreed to wash it for \$5.00. Even after their efforts it was obvious that the car had indeed been subjected to cruel and unusual punishment. The agent, after a casual inspection, said that an additional fee of \$50.00 would take care of cleaning the upholstery. Chester, switching between indignation and charm, managed to negotiate a more acceptable fee of \$10.00

The next day Wally and I caught an early flight to Miami while Chester returned to Costa Rica. As for my health related preparations, except for a few birds and the bat, nada, nothing, zero, zilch, not a creature was stirring. About my dream, perhaps somewhere down the road I'll have another opportunity. But for now it remains just that, a dream.

Miami, Florida

## *Tillandsia atrovioleacea*, A New Species from Oaxaca, Mexico

Renate Ehlers

*Tillandsia atrovioleacea* R. Ehlers & P. Koide, sp. nov. (figures 11-12)

**Type.** Mexico. Estado Oaxaca: San Mateo Penasco, 1700 m s. m., lithophytic, leg. P. Koide & A. Lau 91-90285, 19 Mar. 1991 (holotype, MEXU); from the same area, EM 930901, 14 Mar. 1993, leg. K. & R. Ehlers. Flowering March 1995 in coll. Ehlers (Paratype, WU).

A *Tillandsia pamela* Rauh, folis magis succulentibus, coriaceis, rigidis, non cretaceis, vaginis foliorum distinctis, atrobrunneis et laminis foliorum discoloribus, laminis subtriangularibus non lingulatis; bracteis primariis ovatis, non cretaceis; spicis magis complanatis paucioribus floribus compositis, internodiis rhachidis longioribus; bracteis florigeris sepalis aequantibus, marginibus non hyalinis, nullo modo lepidotis nec cretaceis; sepalis angustioribus, adaxialibus breviter connatis, glabris, non cretaceis; petalis brevioribus sed amplioribus differt.

**Plant** growing saxicolously, stemless but with long rhizomatous base, 40–60 cm high, to 50 cm wide, few leaves (10 to 20 in number) form a narrow, suberect, funnellform rosette with basal offshoots. **Leaves** 30–60 cm long, very stiff and coriaceous, sub-succulent, brown, adaxially dark brown, bearing minute, appressed, brown-centered scales throughout. **Blades** 4–7 cm wide at base, to 50 cm long, sub-triangular, attenuate, nearly erect, green, densely and finely adpressed lepidote, nerved, abaxially strongly nerved. **Scape** shorter than the rosette, to 20 cm long, stout, to 1 cm in diameter, erect at base, then curved or subdecurved, imbricately concealed by few, foliaceous, erect scape bracts, the triangular blades slightly spreading, the upper ones becoming rose. **Inflorescence** pendent or subpendent, 30 to 50 cm long, to 25 cm wide, laxly bipinnate, composed of 7 to 15 branches, internodes 2–2.5 cm, spreading 45–75 degrees, axis stout, slightly flexuous, glabrous, red like the primary bracts. **Primary bracts** much shorter than the spikes, the basal ones about 1/3 as long as the spike, the apical ones only slightly longer than the floral bracts, mostly only as long as the sterile bracteate base of the branch, and enfolding it, to 7 cm long and 3 cm wide, ovate, acute, the basic ones caudate, adaxially green, strongly nerved, abaxially red, lustrous, glabrous, slightly nerved. **Spikes** 5–16 cm long, 2.5–3 cm wide, stipe 1–4 cm long, narrowly elliptic, acute, complanate, distichously composed of 6 to 11 flowers with 2 to 4 sterile bracts at base, and a strongly bicarinate bract adjacent rhachis, rhachis glabrous, nearly straight, flowers subsessile, odorless. **Floral bracts** densely imbricate, concealing the quadrangular, slightly flexuous, glabrous rhachis, 3.2–4.3 cm long, equaling the sepals, 1.7–2.2 cm wide, ovate, acute, enfolding the sepals, ecarinate, coriaceous, adaxially strongly nerved, abaxially rose. **Sepals** 3–4 cm long, 10–13 mm wide,





Photography by Pamela Koide

Figure 11.  
*Tillandsia atrovioleacea*

elliptic, acute, yellow-green, nerved, the margins sub-hyaline, the posterior ones slightly carinate and short connate (1–2 mm). **Petals** 5–5.2 cm long, 7 mm wide, ligulate, erect, their tips slightly revolute, corolla throat closed around the filaments, blackish-violet, basal 2/3 white. **Stamens** exserted. Filaments 5–5.5 cm long, in two series of unequal length, 0.8 mm wide near apex, yellow-green, becoming white and thin at base, anthers 3 mm long, 1 mm wide, versatile fixed 1/4 from base, olive-green, pollen egg-yellow. **Style** 4.5–5 cm long, greenish-white, light violet towards apex. **Stigma** very small, 1 mm long, 1 mm wide, lobes dirty violet, erect, not spreading, once twisted, Type 1 of Brown & Gilmartin (1984). **Ovary** 8 mm long, 3.5 mm wide, conical, green.

**Distribution:** Saxicolous on steep rock cliffs, 1700 m s.m. near San Mateo Penasco, growing with *Tillandsia* aff. *juncea* (Ruiz & Pavon) Poir., and orchids. So far, known only from the State of Oaxaca.

Due to the nearly black petals the plant is named *Tillandsia atrovioleacea*.

*Tillandsia atrovioleacea* seems to be related to *Tillandsia pamela* from which it differs by the following characters: Leaves more succulent, coriaceous

and stiff, not cretaceous, sheaths distinct, dark brown, contrasting with the blade, blades sub-triangular not ligulate; primary bracts ovate, not cretaceous; spikes more complanate, composed of fewer flowers, the internodes between the flowers longer; floral bracts equaling the sepals, without hyaline margins, not at all lepidote nor cretaceous; sepals narrower, the posterior ones short connate, not cretaceous nor lepidote; petals shorter but wider.

The plant was discovered by Pamela Koide and Alfred Lau Jr. in March, 1991. In March, 1993, Klaus & Renate Ehlers recollected plants at the habit and plants flowered in March, 1995 in their collection.

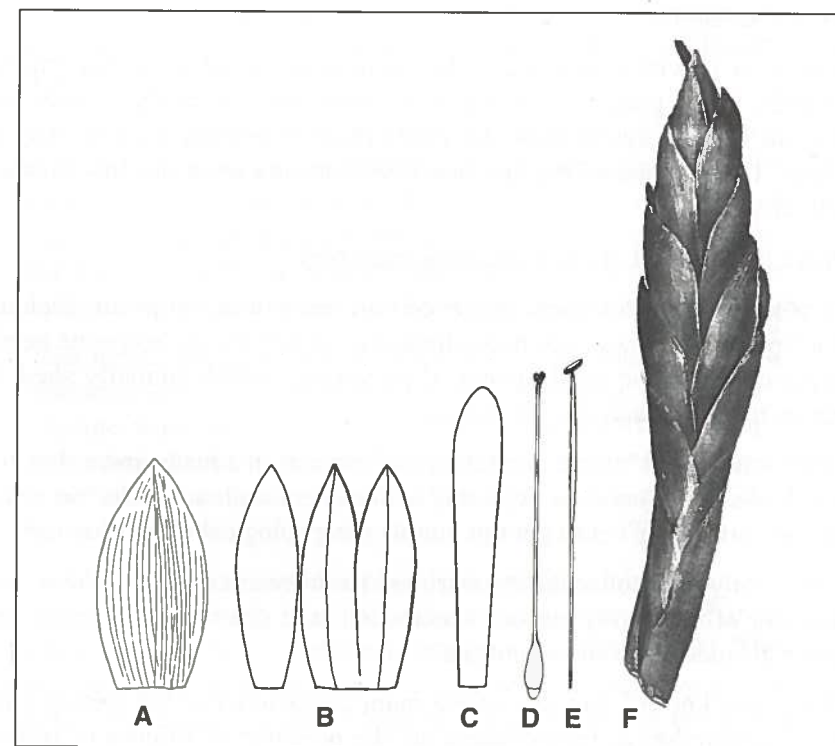


Figure 12.  
*Tillandsia atrovioleacea*

A, Floral bract; B, Sepals; C, Petal; D, Style; E, Filament; F, Spike.

#### ACKNOWLEDGMENT

Our thanks to Dr. Walter Till, University of Vienna, for his cooperation and for the Latin diagnosis.

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## The Unruly Pitcairnia

### Chet Blackburn

Every family has a horse thief somewhere in its past. In fact, for many families horse thieves make up one or more branches of the family tree. In my family, they probably make up the whole damned canopy, but the point is that no family is without the occasional outsider who refuses to conform to traditions held by the rest of its members - an outlaw who refuses to behave like every other member of the family.

And so it is with bromeliads. The recalcitrant member of this otherwise stable family is the genus *Pitcairnia*. *Pitcairnia*, and its unruly brother genus *Pepinia*, do not always follow the rules that "everyone knows" apply to bromeliads. This in spite of the fact that *Pitcairnia* is one of the first bromeliad genera to evolve.

Prove it you say? Let's just cite some examples:

1. Maple trees are deciduous, grapevines are deciduous, tulips are deciduous, but "everyone knows" that bromeliads are not deciduous. Someone needs to explain that to the small group of pitcairnia which annually shed their leaves to get through the dry season.
2. "Everyone knows" that a bromeliad leaf consists of a blade and a sheath. No one looks at a bromeliad expecting to see a leaf with a petiole. Yet some of the pitcairnia can't even get this simple morphological adaptation right.
3. The family Bromeliaceae is restricted to the western hemisphere...every member of the family but one species is found there. Care to guess which genus includes the solitary outcast?
4. "Everyone knows" that one of the main characteristics for sorting out the three subfamilies of bromeliaceae are the presence or absence of spines on the foliage. The subfamilies Bromelioideae and Pitcairnioideae have them, Tillandsioideae does not. Leave it to *Pitcairnia* to disrupt this comfortable scheme by some of its members having both types of leaves - spiny and spineless - on the same plant. Some even have spines at the bases of the leaf but none along the blades.
5. "Everyone knows" that bromeliads do not like to be overwatered or grow in soggy soil. Yet there are pitcairnia growing in the wild in what can only be described as sopping wet conditions.
6. Bromeliads, like orchids, are the subjects of rampant if not random hybridizing. Hybridizers can't seem to pass a pair of blooming bromeliads

without wondering what the offspring between them would look like. For example, there are only about 40 species of *Cryptanthus*, but there are close to a thousand hybrids and cultivars listed, the differences between some of them so small that "subtle" would even be too strong a word to use in describing them. There are less than 100 *Neoregelia* species described, but there are 100 pages of hybrids and cultivars (about 21 plants per page) listed in Don Beadle's *Preliminary Listing of All Known Cultivar and Grex Names for the Bromeliaceae*.

Therefore you would expect a huge genus like *Pitcairnia*, second only to *Tillandsia* in the number of species in the bromeliad family, to have been hybridized and cultivated to high heaven, wouldn't you? Beadle lists eleven hybrids and no cultivars.

7. Another compulsion of hybridizers is the creation of bigenerics. There are a lot of horticultural Doctor Franksteins among hybridizers who are bent on creating new life forms, even if some of them do turn out to be monsters. *Navia* is the genus closest to *Pitcairnia*, hence it is the most likely candidate for bigeneric dallying, but have you ever heard of an X Navcairnia? If even hybridizers ignore a genus, you know it must be a disreputable one.
8. That bromeliad growers will collect almost anything is apparent by the fact that some of those bigenerics remain in collections. Why in the world would anyone want to grow an X *Neomea* 'Nebula' for example? Still, as indiscriminate as we bromeliad collectors often are, do you know anyone who has as many as six of the 320 or so species of *Pitcairnia* in their collection?

Not only are pitcairnia and pepinia a primitive bunch, but as shown above, they are also an unruly one. For sake of simplicity, in this discussion no distinction is made between the genera *Pepinia* and *Pitcairnia*. They both were formerly included as subgenera of *Pitcairnia* but recently *Pepinia* has been elevated to the status of genus. However, I might add that in his introduction to *The Alphabetical List of Bromeliad Binomials*, Harry Luther remarks, "Nomenclatural problems continue to plague the resurrected genus *Pepinia*. A number of taxa that appear to belong in *Pepinia* have never been formally transferred from *Pitcairnia*".

Why doesn't that surprise me?

Auburn, California

Reprinted in part from the BROMELIAD NEWS, the newsletter of the Sacramento Bromeliad Society, June 1996.

## Letters To the Editor

### Bromeliad Fruits Wanted for Research

Hello! My name is Kaelyn Stiles and I am a senior at Oberlin College. Earlier this year, in the January-February 1996 issue of the JOURNAL, my professor and I published an article entitled "Seeds Needed For Research" by David Benzing. The article, perhaps mistitled, explained that I am asking for donations of *fruits* from the subfamily Bromelioideae for my senior thesis project which is scheduled to begin in the fall of 1996 at Oberlin College. This summer I spent two weeks learning from Harry Luther at the Marie Selby Botanical Gardens in Sarasota, Florida. There I collected fruits from many different species of aechmeas and several other genera.

I plan to subject the fruit samples to chemical analysis in order to determine the major nutritional constituents, specifically the types and proportions of simple sugars, lipids, and total protein present. I am trying to come up with a comprehensive list of the fruits of the Bromelioideae. I am also looking at the sticky appendages on the seeds of these fruits in order to more thoroughly understand the methods of fruit dispersal.

I am going to be looking at distinctive physical and chemical features of the fruits. My objective is to end up with sets of fruit and plant characteristics within the subfamily Bromelioideae which correspond to the animals dispersing these fruits. Several reports indicate that Bromelioideae rely on a variety of vertebrate animals in addition to ants to disperse seeds. Specific bromeliad species may possess characteristics that encourage seed carriage by bats, non-flying mammals, or birds. Berry color, odor, and perhaps size among Bromelioideae already suggest fruit specialization to attract different types of animals.

I am writing this as a follow up to my initial request. I would appreciate if you would pass this information on to people who have access to collections of Bromelioideae and who would be willing to keep an eye out for ripe fruit to collect. If you are interested in this project and would like to help. Please feel free to write or call me with any question you might have.

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12 Harbourton-Woodsville Road  
Pennington, NJ 08534  
(609) 466-3763

### BSI Show Rules Questioned

I buy, trade, sell, grow and show bromeliads as a hobbyist. However I will not show my terrestrial bromeliads at a BSI show until certain rules are changed. I believe that the existing rules were developed by growers who were unfamiliar

with growing dyckias, hechtias, puyas, etc. Let me explain. These bromeliads are typically armed with vicious spines; they form extensive roots; their leaves are brittle; and they don't die after blooming. Therefore, I and other fanciers of these genera, grow them in nice ceramic pots which become their permanent homes for many years. To show these bromeliads at a BSI show we have two options. We can repot them in plain plastic or clay pots. In so doing, it is probable that ceramic pots will be broken, roots lost, leaves snapped off or damaged, and human hands wounded. Ok, so that option is out for most of us. The other option is to enter them in a non-horticultural division. I consider this an insult. When I enter a *Dyckia* in a show, I want it judged with the other dyckias. I don't enter it to have the pot judged. These same plants can be entered in a Cactus & Succulent Society show and be judged among other dyckias, without regard to its pot. Perhaps we could learn from the Cactus & Succulent Society and adopt some of their show rules.

The current BSI rules result in beautiful plants not being entered in BSI judged shows (this deprives all of us and the show is poorer for it) *or* BSI show rules are modified or ignored at local bromeliad society shows. I find both of these results unsatisfactory.

It is time that the BSI show rules be revised with attention given to the revisions suggested by those members actually growing the plants. Hopefully this will result in revised BSI show rules we can live with.

George Allaria

### Enjoyed World Conference

First, thank you so much for the World Conference in Orlando. I am a medical doctor and live in Tokyo, Japan. I started collecting bromeliads 8 years ago, especially tillandsias. I am now cultivating more than 300 species of tillandsias in my greenhouses.

I was a little apprehensive about attending the conference in Orlando because I was the only Japanese grower there, but my nervousness was unfounded because all in attendance were very kind and friendly to me, "the foreigner," and I felt at ease attending the meetings, garden tours, show, plant sale, seminars, and banquet. Everything was very nice and I will never forget it. There were so many nice bromeliads that I had never seen in Japan and I brought many of them back with me! My friend says that Japan is likely to sink into the sea from the weight of all my new bromeliads.

Bromeliads are not as popular yet in my country and I have only a few other friends who grow them.

I would like to thank everyone for the friendship and I am looking forward to seeing them again in Houston.

Hiroyuki Takizawa



## Come on Spring!!

Valerie Steckler

Frankly, I've had enough of this! When it's 96 in the shade, the humidity is 97%, and the mosquitos have forced me to drench myself in so much Skin-So-Soft that my flesh would rival any newborn's, I happily think of winter's cool elegance. The reality of winter is another thing altogether.

Certain rules are "de rigueur" for keeping your plants in healthy condition when the temperature plunges. The following suggestions work for me.

1. When you water, water well! This means the entire greenhouse: sides, door, windows, and floor, as well as the plants and pots. You want your plants warm, but not toasty. Most bromeliads prefer moist warmth over dry heat. Check the plants. A week of cloudy, cool days will not require the same watering procedure as a week of warm sunny days.
2. Don't de-pup during the worst winter months. Pups are happier and healthier remaining attached to the mother plant until spring.
3. Shut off your heaters in the morning if the temperature is not abnormally low. As the sun heats up the greenhouse, crack or fully open the doors to prevent overheating. If the daytime air is cold, just crack a door a bit, but don't create a draft. If the daytime temperature remains low and the day is rainy or cloudy, you may have to leave your heater on at a low setting.
4. Move the more cold-sensitive plants closer to the heat source.
5. Be on the lookout for snails, fungi, scale, mealy bugs, etc. With the plants in cozy proximity, warmth and high humidity combine to encourage varminths.
6. Air movement is extremely important, and often critical at this time. Utilizing fans to circulate the air is very beneficial to plants.
7. Don't fertilize at this time. Let your plants survive the winter in a quasi-dormant state. They'll take off like crazy come spring.
8. Be a good housekeeper. Keep old leaves and other debris off the ground. Thoroughly wet your plants when you water so that dust and gunk are removed. The atmospherics especially need this for they use their trichomes for survival.
9. Keep your chin up. Nobody likes crowded winter greenhouses, loss of color in some plants, cold water from the hose dripping on shoes, and gray days. But, don't ignore the plants. They depend upon you as surely as your pets do.

10. Spring is not that far away. Smile and enjoy your winter blooming Billbergias.

*Ferriday, Louisiana*

*Reprinted in part from the newsletter of the Houston Bromeliad Society, Vol 29 No 3 (March 1996).*

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## Second Call for Nominations

This is the second reminder that there are vacancies for directors of the Bromeliad Society International for the 1998-2000 term:

California: 1 director  
Florida: 1 director

If you or your local society have not yet sent nominations to the chairman of the Nominations Committee, please consider doing so immediately. An active, committed board of directors is essential to the future of BSI. Surely every affiliate is aware of talented, qualified individuals within their region who would be willing to serve on the board.

All you have to do is to obtain the consent of your candidate and send their names and qualifications by letter to:

Dan Kinnard  
Nominations Chairman  
32552 Alipaz St. #9d  
San Juan Capistrano, CA 92675  
(714) 489-0766  
E-mail DKINNARD@exo.com

NOMINATIONS MUST BE MADE BY MARCH 18, 1997. (Nominations must reach the chairman of the Nominations Committee by 20 March, 1997). You may nominate by telephone through March 15, but you must follow up with written confirmation. Answers to any additional questions may be found in the BSI bylaws, a copy of which should be in the possession of every affiliate.

# On the endemic Paraguayan *Tillandsia ramellae*

Walter Till and Susanne Till      Photographs by the authors

Last year we described *Tillandsia ramellae* W. Till & S. Till (TILL & TILL, 1995) as a novelty based on herbarium material which kindly had been brought to our attention by its collector, Lorenzo Ramella from the Conservatoire et Jardin botaniques in Genève, Switzerland. The material was mainly fruiting and some floral details were lacking in the diagnosis.

Mr. Ramella also sent us a living specimen which flowered in the Botanical Garden of the University of Vienna in December 1995 (figs. 13, 14). This fresh flower material enables us to add a few characteristics to the original description:

**Flowers** ca. 3 mm, stoutly pedicellate, 50–54 mm long, not at all fragrant. **Floral bracts** pale green to flesh-colored. **Sepals** adaxially 2.5 mm connate, pale green, to 29 mm long. **Petals** to 52 mm long. **Filaments** subbasifixed, slightly plicated 1 cm above their bases, narrowed towards their apices, white with a touch of violet in the upper half. **Anthers** greenish-yellow, pollen pale yellow. **Gynoeceum** 44 mm long, ovary obovoidal,  $4.5 \times 2.2$  mm, pale green, style 38 mm long, white, stigma white, the lobes erect, spreading, papillose. **Ovules** stout, short caudate.

*Tillandsia ramellae* usually grows on steep rocks (escarpments), only occasionally is it found as an epiphyte on trees. It is recognized by its yellowish green foliage which is densely covered by appressed trichomes giving the plant a dull, pale gray appearance (fig. 13). The inflorescence is usually simple and distichously flowered, rarely an additional spike is produced. Floral bracts are dull flesh-colored in the field but pale green in cultivation, petals are violet blue (fig. 14). The sepals, densely lepidote except for their margins, are very distinctive.

In the protologue this new *Tillandsia* has been compared with *T. esseriana* Rauh & L.B. Smith. However, according to the floral details and the stigma morphology it is related to the alliance of *T. lorentziana* Griseb. It is hitherto known only from one isolated mountain in northwestern Paraguay at the Bolivian border. It seems to be a locally endemic species and should be legally protected from exploitation.

## CITED LITERATURE:

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Dr. Walter Till, Mag. Dr. Susanne Till  
Institute of Botany  
University of Vienna  
Rennweg 14, A-1030 Vienna, AUSTRIA



Figure 13.  
Habit of flowering  
*Tillandsia ramellae*



Figure 14.  
*Tillandsia ramellae*, closeup  
of the inflorescence

## Brazil

(Selections from the book BRAZIL)  
by Mulford B. and Racine Foster

### X

#### BOTANIZING IS ENDLESS

Becoming more of the complete botanist in making the herbariums and the color drawings takes more and more time, and more candle light.

Last year Mulford was satisfied with as near as possible an exact likeness in form and color of the inflorescence. But this year he is not satisfied with just the exterior beauty of the inflorescence. He bought another microscope and is now deeper and further down inside the interior parts of the flower than he was on the outside before! If there is not time to draw the whole flowering spike he at least does the interior of one flower. In many cases where the flowers are very small they must be enlarged in the drawing many, many times to show the necessary details.

He has always insisted that he is not a botanist and now he says that he doesn't ever want to be one! For they work almost entirely from dried, pressed herbarium specimens. He is willing to collect the plants and is perfectly willing for Racine to prepare the specimens for those who wish to study the dead plants; but he wants to make most of his studies and observations from the living plants. He will leave the dead bromeliads to the botanists. When it comes to living bromeliads you will most likely find Mulford in a tree collecting them or planting their seeds and nursing them through their first three to ten years after which he will be pleased to see their first bloom.

One might wonder what we would find inside these flowers that would be of so much interest and importance. It is inside the flower, in the minutest detail, that the basis or key for identification of the species is found. A surprising number of these plants when not in bloom look so much alike that they defy identification until the flowers are examined. Very often two of them from the same kind of plant, growing under different conditions, look unbelievably different and appear to be different species. Even the colors of the petals may be different, but the final determination of the plant comes from the inner structure of the flowers. In bromeliads, one of the most important of all features or parts of the flower are the little nectar-gathering scales fastened to the inside of the petals. They have various locations, colors and shapes. Generally they are transparent and may be shaped like a dagger, a spear, a boat, a cup, a hand. They may be delicately fringed or crudely margined or they may appear like fantastic undersea coral growths. There are only a few hours in which these scales can be examined

in their mature development for many of the individual bromeliad flowers last but a few hours or at most a day. One *Aechmea* which we found high in the mountains of Espirito Santo, stayed open for only a few hours during the night. It was rather amusing to watch the chagrin and defeat on Mulford's face when he tried for three days to find a flower open on that plant. Although the green and white spike held over forty flowers, he never saw one open. Try as he might he was unable to find one in bloom at any time of day or evening. It would look hopeful, then the next day there would be another row of flowers, matured, closed, and black with age. So on the third night we sat up until after midnight waiting for those tiny petals to open. It was in the wee hours when his vigil was finally rewarded with a tiny flower, but it almost took a microscope to reveal that it was open. They were miniature cups overflowing the brim with pure nectar, nearly as thick as honey and as sweet. It was well worth the midnight watch for by three o'clock those petals were practically dissolved in their own nectar. How could a botanist in a herbarium ever find these delicate features from the dried and crushed specimen!

If we had remained at this stop-over another day quite probably Mulford would have spent the night up in a tree near one of those *Aechmeas* just to find out what beautiful night moth had learned the secret hour when this *licor de flor* was released, a sweet offering to the insect in compensation for its service in carrying the pollen to the other flowers...

Another day in this vicinity we tramped over and around Morro de Sal, Hill of Salt, which it resembled as it was covered with pure white, coarse, crystal sand. The blinding light and reflected heat from the sun made us wish for a cool drink and dark sun-glasses which we had neglected to bring. We could scarcely look for plants in this intense glare, and, anyway, most bromeliads were not so keen under such conditions. Yet at the moment we were feeling most weary and overheated, being about ready to give up, Mulford who had, as usual, gone just a little farther shouted that he had found something. Oh, yes! It was a bromeliad! Yes, here in the broiling hot sun, in pure sand, but surrounded by a humid valley, was a beauty that almost equalled the magnificent *hieroglyphica*! In fact, the longer we gazed at it the more we thought it surpassed the beauty of *Vriesia hieroglyphica*. This new lovely *Vriesia* had finer markings of hieroglyphics in bands across the light yellow-green leaf and the weird markings were not black as in many other bromels with queer leaf markings, but were a lovely maroon. The markings could have been done by a native designing a piece of Marajó pottery. What a color combination! Thrilling us beyond any thought of the insistent sun overhead. This was a prize indeed. We collected a few plants but small ones were difficult to find and large ones difficult to transport. Later this was identified as a new species and named *Vriesia fosteriana*. This was well worth the great effort and numerous discomforts of the day's collecting.



Separating this "hill of salt" from a mountainside of almost impenetrable jungle was a lovely cool, rocky, rushing stream. The two great slopes that met in this ever-changing valley were as different as day and night, in temperature, in vegetation and in geological formation. It was like two eras joining in one eternity...

The temperature was well up around the 100 mark in the shade and there was very little shade; Racine, exhausted, found a spot near the stream to rest while Mulford took his usually "really last look." He had cut his way up along the stream for some distance looking for a possible crossing. Spying a colony of interesting *Vriesias* just on the other side where rock and jungle formed a "no-man's land," he wanted more than ever to get across that stream. He finally located a fallen tree over which he crawled to procure those *Vriesias* that appeared to be a very unusual natural hybrid. With his sack and basket filled he started back, doing the balancing act again, this time with much confidence. Half way over he slipped and down into the stream below fell his basket and sack filled with plants. He prayed for a snag and was caught on it himself before he had finished praying! The snag he had wished for was to have been in the stream to catch those precious plants but the snag was misplaced and had caught him by the pants! Frantically he released himself so as to work his way back to an open area on the tree where he could see the stream again, and there right in the middle were the marooned basket and sack. By the time he had cut a long pole with his *facão* and managed to reach toward the lost prizes they were dislodged, suddenly resuming their voyage downstream. Again he hacked his way anxiously through briar and brush just in time to see them caught on another rock far on the other side. Remembering an open space back where he had cut before, he returned there, and much against the pleadings of Racine he took off his clothes, from the belt down, rolled them up in a bundle and started his first attempt to cross the stream via water. Cautiously feeling his way he found himself in an almost bottomless quicksand area. This was out or he would be in! By going further upstream he found enough rocks to make a crossing possible. He dressed hastily and cut his way along the bank. This time it was a big hanging hornet's nest which almost proved fatal, but he avoided it just as he saw his precious sack and basket slowly losing themselves from their anchorage on the rock. Then in a desperate last chance he jumped into the stream. A few seconds more delay and they would have dropped over the falls in their final plunge. He returned to safer ground, wet, tired, happy and hot. All of the plants were saved and he had made an additional find, a cluster of large *Zygopetalum* orchids.

After taking a hand shower bath on a slippery rock we wearily worked our way back up the valley. It was dark before we reached our cold quarters...

One of the most interesting and beautiful trips in all of Brazil is accessible to everyone. From the humming station at Rio the train slides northward between banana plantations of wet mucky soil which deflects the hot humid air so

essential to the life of the banana but so wilting to the city folks who seek relief from tropical heat in the cool heights of Therezopolis, the "Alps" of Brazil. When the train reaches the mountain barrier it lets down its cog and assumes a much slower and more jerky tempo. Cog by cog you rise into the air! The jungle mountainsides are but a stone's throw from your window. You are being literally pulled up into heaven, a heaven of tropical splendor in high cool mountains, the Organ Mountains, whose distant organ pipe silhouettes were shrouded in haze when you first entered Guanabara Bay at Rio. This is a train ride which no visitor should miss, because, while perhaps he has enjoyed the funiculars of Europe, they do not include the peerless, lush displays of tropical jungle.

It is what the garden of Eden must have looked like in every man's mind-picture. Lush, verdant green with dashes of colored foliage and flowers, heavy and mysterious. Is there anyone that could traverse this scenic paradise and not fall under its spell? It was a botanist's dream-come-true. It had been found over 150 years ago, and that was one reason we had not tried to collect there the year before. It had been "done." But finding it even more wonderful than around Petropolis made us wonder why we had not at least taken a look before.

We had become accustomed to expecting the worst so when we found a lovely hotel at reasonable rates in Alto Therezopolis we were greatly pleased as well as surprised. It was a medium-sized resort hotel and equal to many we might find in Europe or the United States in a similar location, in the way of cleanliness, good food, plenty of hot water, comfortable mattresses and plenty of blankets. In short, we were for the first time (outside of Rio and São Paulo) completely comfortable on a collecting trip, enjoying the luxury of good living even while in the jungle "on location."

From our window we could enjoy the silent rugged skyline of the Organ Mountains and felt how forcibly they spoke all the power they concealed, power of the ages, etching itself in a thrilling silhouette against an ever-changing tropical sky. Being winter, the sky was generally in haze, but that softened the rugged outline of the organ-pipe peaks and made them all the more haunting, more intensely beckoning. Afar off we felt small and insignificant but in a certain communion with them. To get closer to them, to collect on them, was to feel their harshness and feel their cruelty, reversing our own significance.

Distinguishing the irregular skyline from other mountainous horizons was another *Dedo de Deus*, a finger of God mountain, gesturing masterfully to the sky seeming to say "the sky is the limit." And not far away in the same sweeping view was another monolithic human profile of stone lying against the sky, this one called *O Frade*, the monk, reminding us of the *Caraça* in Minas. *O Frade* is a two-faced mountain because two masculine face forms can be seen in either direction, one with a pimple on his nose, the other with the pimple on his chin.

The collecting was not easy here and in the few days we could stay there we could not cover a great amount of territory. One could spend many weeks here, but since it had been very well collected by so many botanists of many countries for 150 years, we somehow, did not wish to spend too much of our very limited time going over ground in which we felt there was little chance of new species. Not that we were entirely out for new species but we wanted the chances to be greater and therefore more interesting. Much to our surprise we did find some new things right under the noses of the old collectors!

After a morning of hard going, through almost impenetrable jungles, we had our first reward. It was near the left eye of the giant *O Frade* that a new yellow variety of *Pitcairnia flammea* was waiting for us to find. It is a long-foilage terrestrial bromeliad that seems to enjoy the slippery rocks which were continuously wet as though by tears pouring down the cheek of the great face.

Beyond the face when we were trying to encircle the great "Finger of God" we found in the dense jungle of the "knuckle" a new *Vriesia*, *Vriesia haematina*, and also a branched specimen of *Vriesia longicaulis*.

Among earlier collectors in this area was considerable confusion regarding a local *Quesnelia*. The plant was first found with the flower stem coming out of the base of the tubular-shaped plant, so it was named *Quesnelia lateralis*. This *Quesnelia*, by the way, has ethereal marine-blue flowers held by flame-colored bracts which make it one of the loveliest bromeliad flowers we have ever seen. A few years later some collector found another plant similar in form and inflorescence to *Q. lateralis*, but this inflorescence was emerging from the center of the tube, so it was named *Q. centralis*.

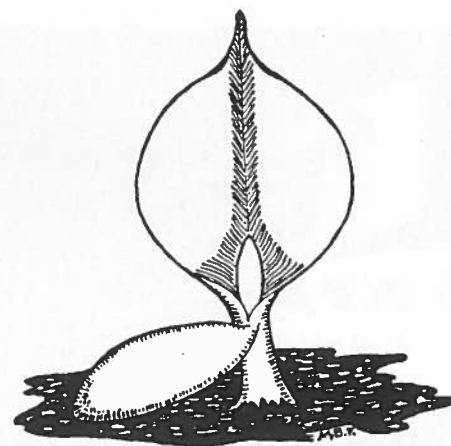
We happened to find both of these plants the same day but were unaware of their previous records. The flowers upon examination seemed to be identical. When our own plants came into bloom we found that first they bloomed from the base, then two or three months later they bloomed from the center, a peculiar phenomenon, not observed in any other bromeliad. It is now called *Q. lateralis* since that was its original name and since it records the peculiarity of its lateral inflorescence.

This was an air plant paradise if ever one was created. Thousands of acres of dank jungle which never knows a dry moment makes happy air garden homes for countless epiphytic ferns, cacti, orchids and bromeliads. It was almost stifling in its luxuriance, and thrilling to the botanist who knows that many of those plants abounding here have never been found in any other section of the world. And yet there was an exception, the interesting shoestring fern, *Vittaria lineata*, growing here profusely, grows also on the trunks of cabbage palms in Florida.

At the time of our visit to this vast jungle garden negotiations were then under way for this great area to be turned over to the government for a National Park. This move not only preserves a paradise of tropical beauty but credits Brazil with having one of the most magnificent, superb National Parks in the world.

Return to Rio, always a locus for coming and going in Brazil, was just long enough to take care of our plants and herbarium specimens, for we were soon on our way to Mt. Itatiaia, our second visit, Margot and John's first; it was a rest-stop between Rio and São Paulo, and an opportunity to verify certain collections made before. But even with a let-down on intensive collecting we surprised ourselves with a new bromeliad! (Right under our own noses and intense search of last year!) It was a fragile-leafed *Vriesia* whose perky red and green flower head had so much the natural form of a question mark that Dr. Smith named it appropriately, *Vriesia interrogatoria*.

This made our score of new *Vriesias*, in the two collecting expeditions, amount to twenty-one. We should have been satisfied because in the past 150 years only seventy-five had been discovered by all the other botanists, but we were soon wondering where and when we would find out next one...



*Aechmea Orlandiana* seed and first leaf—greatly enlarged

[To be continued]

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## Another Label Suggestion

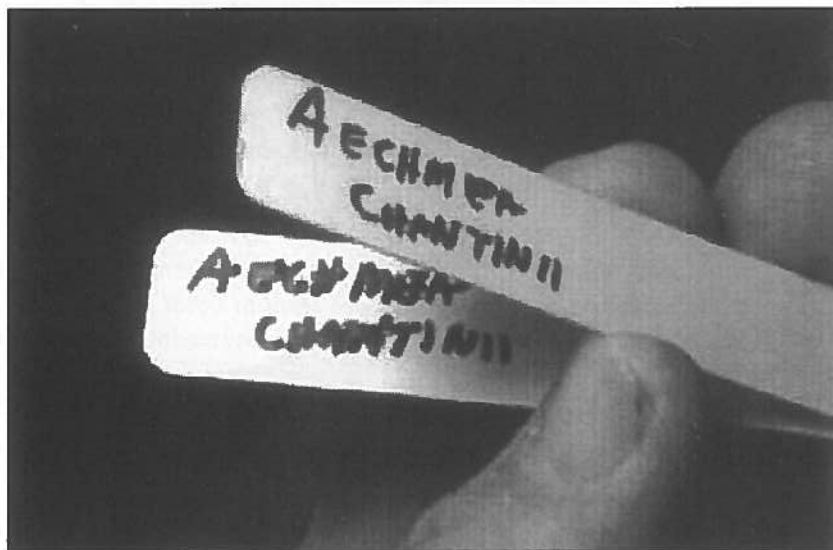
Charles Dills

I'm patient. Sometimes things don't bloom for years! I don't mind. My philosophy is to get a lot of plants and pretty soon something is bound to bloom.

But what I do find most exasperating is to see something bloom and then find that the sun has bleached the label. I have tried many things but the sun does them all in. If it doesn't bleach the pigment, it ruins the adhesive on the labelmaker. I find names on the ground and I'm not sure what they belong to.

Finally, I think I've got it licked, at least for the potted varieties. I use a permanent laundry marking pen. The trick is to write on two labels. Then glue them together so that one of them has the writing on the inside! Now when the outer one bleaches, all I have to do is look on the inside to find out what it was. I can then rewrite the outside label and I'm back in business!

Of course your printing will probably be better than mine.



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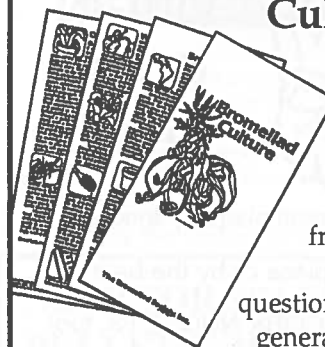
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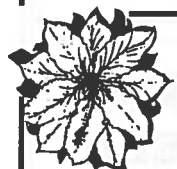
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Mulford B. Foster Bromeliad Identification center: Send specimens and contributions to Harry E. Luther, at the Center, The Marie Selby Botanical Gardens, 811 South Palm Ave., Sarasota, FL 34236. FAX: 941-951-1474.

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Photograph by Pamela Laever

A cross made by Pamela Laever between *Guzmania sanguinea* var. *sanguinea* and *Guzmania sanguinea* var. *predicellata*.

## New Policy on Calendar Items

Beginning with this issue, show dates submitted to the Journal as calendar items will also be posted automatically to the BSI Web page calendar. When submitting a calendar item please include the name of the affiliate, the dates and times of the show and sale, the location, and a contact person with a telephone number and e-mail address (if available).

Remember that calendar items must be submitted at least 60 days prior to the date of the issue of the Journal in which it is to appear. Any calendar item received after the 60 day cutoff will still go to the web page but may not make the Journal.

We would also like to encourage international affiliates to utilize the calendar to help publicize upcoming shows or major events.

## Calendar

- |           |  |
|-----------|--|
| 6-8 Jun   | An International Conference on Orchid Conservation sponsored by the Selby Botanical Gardens and the Orchid Conservation Committee will be held at the Marie Selby Botanical Gardens in Sarasota, Florida. Space is limited to 300 registrants. Registration fee is \$195 per person and includes lectures, lunch on June 6 & 7, Thursday night reception and a copy of the proceedings. for more information contact TOCC at 813-653-1170. |
| 26-29 Sep | "Western Bromanza" is the name chosen for the ninth Australian Bromeliad Conference, which will be hosted by the Western Australian Bromeliad Society, Inc. in Perth, Western Australia. Contacts and additional details will be provided at a future time.  |