

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



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# Journal of the Bromeliad Society

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**Cover photographs.** **Front:** A Pacific Tree Frog *Hyla regilla* peers out from within the protecting leaves of a *Billbergia*. Tree frogs frequently look on bromeliads as imported housing and adapt to them readily. Photograph by Tom Koerber. **Back:** An attractive bigeneric hybrid, x *Guzvriesea* 'Marion Oppenheimer'. Photograph by John Anderson.

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## In The Beginning

Elmer J. Lorenz

The Bromeliad Society will soon be looking forward to the year 2000 when we will celebrate our fiftieth year of existence. For almost 50 years we have been accumulating a vast amount of bromeliad information from various members, discovering new species, creating new hybrids, cultural information, etc. All of this important information has been recorded in our publications and the *Journal of the Bromeliad Society* for us to profit from and use.

The Society was formed not due to the effort, interest or enthusiasm of a group, but to the energy and foresight of a single individual. This person is probably unknown to the large majority of the members of The Bromeliad Society. However, it was through his effort that The Bromeliad Society originated in California where, quoting Mulford Foster, "there are no native bromeliads, but plenty of natives growing bromeliads!"

The individual responsible for the beginning of the Bromeliad Society was Joseph Schneider. It was through his efforts and encouragement that we finally developed the organization we know today. A society for bromeliads would surely have eventually been established, but through the efforts of Joseph Schneider it was organized earlier rather than later. This made our store of a knowledge and enthusiasm available much sooner and greater because the society was formed years ago—almost 50 years ago!

Joseph Schneider was employed as a gardener of the cactus and succulent collection at the Huntington Library and Botanical Gardens, located in San Marino, California. He started working for the Huntington Botanical Gardens in April, 1949 and was employed there for 17 years. It was during early 1948, a short period before working for the Huntington gardens, that Joseph Schneider sent a request to the Flower Grower magazine Round Robin organizer inquiring if she would place a call in the magazine asking anyone interested in becoming a member of a bromeliad Round Robin to contact her. Miss Victoria Padilla and Mrs. Sue Hutchinson responded immediately, soon followed by eleven others.

During the Spring of 1950 an invitation was mailed to all members of the Round Robin and others interested in bromeliads, to attend a pot luck luncheon to be held at the home of Dorothy Behrends, on May 21, 1950, to consider a suggestion made by Joseph Schneider that we organize a Bromeliad Society. On September 17, 1950, the organizational meeting creating The Bromeliad Society was held at the home of Mr. & Mrs. Frank Overton in Glendale, California. Twenty-one persons attended the opening meeting. To the amazement of all guests present, Mr. & Mrs. Overton presented Mr. Mulford Foster to the group. He had made a special flight from Orlando, Florida to be present at this momentous occasion. Ironically, even though this special occasion was the result



of a suggestion by Joseph Schneider, he was unable to attend the meeting.

In the first issue of *The Bromeliad Society Bulletin*, Mulford Foster wrote, "that a small group of plant lovers met and organized a society - not just a local society but an international society for the benefit of bromeliad enthusiasts all over the world."



Photograph courtesy of Huntington Library and Botanical Gardens

Figure 1. Joseph Schneider admiring the inflorescence of *Bromelia balansae*.

Joseph Schneider's interests were most intent on cacti, succulents and bromeliads. He was especially interested in the terrestrial bromeliads since they grew in almost the same environment as cacti and other succulents. At the Huntington Gardens, Joe was involved with a large area devoted to terrestrial bromeliads containing many species which, in the early days, were very rare and indeed, some still are.

Before coming to the Huntington Botanical Gardens, Joseph Schneider had been an engineer in charge of several large buildings in downtown Los Angeles. He and his family had a pleasant home in the small suburban town of Garvey in the San Gabriel Valley. He also had built a nice greenhouse to house his collection of cacti and bromeliads. Through his job as an engineer in several large buildings he had access to choice pieces of marble slabs and a great deal of other materials when the buildings were remodeled. I can remember him telling me that his greenhouse benches were built of marble with marble sides high enough to hold several inches of planter mix. He did not grow his bromeliads in containers, but directly in the mix on the benches. The marble never rotted and he did not have to repot every year—just divide the plants occasionally when the clumps became too large. Besides growing bromeliads and cacti it is said he had

a wide variety of different plants in his general garden and even tried growing eastern wildflowers.

As he became older he began to tire of the hassle of driving downtown every day and weary of his work. He wanted something else to do...something he was interested in and enjoyed doing. It was then that he came to the Huntington Botanical Gardens, applied for a job, was hired by the then Superintendent of the grounds, Mr. Townsend, and employed as a gardener.

However, accepting a lower paying job did produce a strain on his marriage which led ultimately to divorce and estrangement from his family. Joseph loved his work but the tragedy of his family life and the loss of contact made him a very quiet and unassuming individual. During the period I knew Joe he never talked about his family and I never pried. Years later Joe remarried.

Howland Atwood, Joseph Schneider's foreman for a brief time wrote: "Joe had a 'green thumb' and was an excellent propagator. Joe was a very brilliant man. One of his friends at the Bromeliad Society (probably Victoria Padilla) referred to him as 'the man with the ten story brain.' Joe could rattle off more plant names by genera and family, than anyone I know. It was almost as if he had memorized many nursery catalogues. He not only knew their names however, he also knew the plants as well.

Joseph Schneider passed away on April 21, 1966.

The time is long overdue for Joseph Schneider to be recognized and honored, in some permanent manner, as founder of The Bromeliad Society.

#### ACKNOWLEDGMENTS:

I wish to thank Myron Kinnach for informing me of the existence of the photograph used to illustrate this article and the letter dated May 7, 1989 written by Howland Atwood containing a few remarks about Joseph Schneider. I also thank the Huntington Library and Botanical Gardens for copies of the photograph and letter.

Los Angeles, California

# *Ronnbergia neoregelioides*, Another new species from Brazil

Elton M. C. Leme<sup>1</sup>

Illustrations by the author

Since 1985, when *Ronnbergia brasiliensis* was first described from Bahia, Brazil (Pereira, & Penna, 1985), the genus *Ronnbergia* E. Morren & André is no longer regarded as being restricted to countries such as Panama, Colombia, and Ecuador. After the publication of the second Bahian species, *R. carvalhoi* (Martinelli & Leme, 1987), it became clear the genus was not accidentally reported to that part of Brazil. In fact, the State of Bahia, with its unique Atlantic Forest deeply influenced by Amazonian flora, revealed a surprisingly rich concentration for the genus, which is confirmed by another recently collected new species described below.

*Ronnbergia neoregelioides* Leme, sp. nov. (Figures 2 & 3)

*A. R. carvalhoi* Martinelli & Leme, affinis, sed foliis brevioribus, subcoriaceis, basin versus haud obtuse carinatis, petalis apice lilacinis, acutis, basi ca. 4 mm connatis, tubo epigyno ca. 5 mm longo differt.

**Type.** Brazil. State of Bahia: Wenceslau Guimarães, Ecological Station of Nova Esperança, 25 July 1998, E. Leme 4368 & R. Alves, fl. cult. April. 1999. (holotype: HB).

**Plant** epiphytic, propagating by slender stolons 5—10 x 0.2 cm. **Leaves** ca. 10, suberect, subcoriaceous, forming at base a narrowly funnelform rosette, the outer ones much narrowed and attenuate-caudate. **Sheaths** elliptic, ca. 6 x 3 cm, subdensely and minutely white-lepidote, dark purple mainly inside. **Blades** narrowly triangular-lanceolate, 7—19 x 1.3—2 cm, subdensely and minutely white lepidote mainly abaxially, green, entire, apex acuminate and apiculate, apiculous 5—7 mm long. **Scape** ca. 7 cm long, ca. 0.3 cm in diameter, pale green, sparsely white-lanate to glabrescent. **Scape bracts** oblong-elliptic to sublinear, acuminate, submembranaceous, pale-green, 30—40 x 5—10 mm, sparsely white-lanate, entire, the upper ones erect and involucrate, about equaling the middle of the sepals. **Inflorescence** subellipsoid-capitate, simple, clearly surpassing the leaf-sheaths but not distinctly elevated above the leaf-rosette, ca. 40 mm long (excluding the petals), ca. 15 mm in diameter. **Floral bracts** narrowly ovate-lanceolate, acuminate-caudate, 10—15 x 3—4 mm, ecarinate, membranaceous, entire, pale-green, sparsely white-lanate, about equaling to slightly exceeding the ovary. **Flowers** ca. 6 in number, ca. 35 mm long and densely arranged at anthesis, very slightly fragrant, sessile, erect, rachis slightly elongate but not visible, ca. 2 mm in diameter, pale green, sparsely white-lanate. **Sepals** strongly asymmetrical, bearing a large rounded lateral wing,

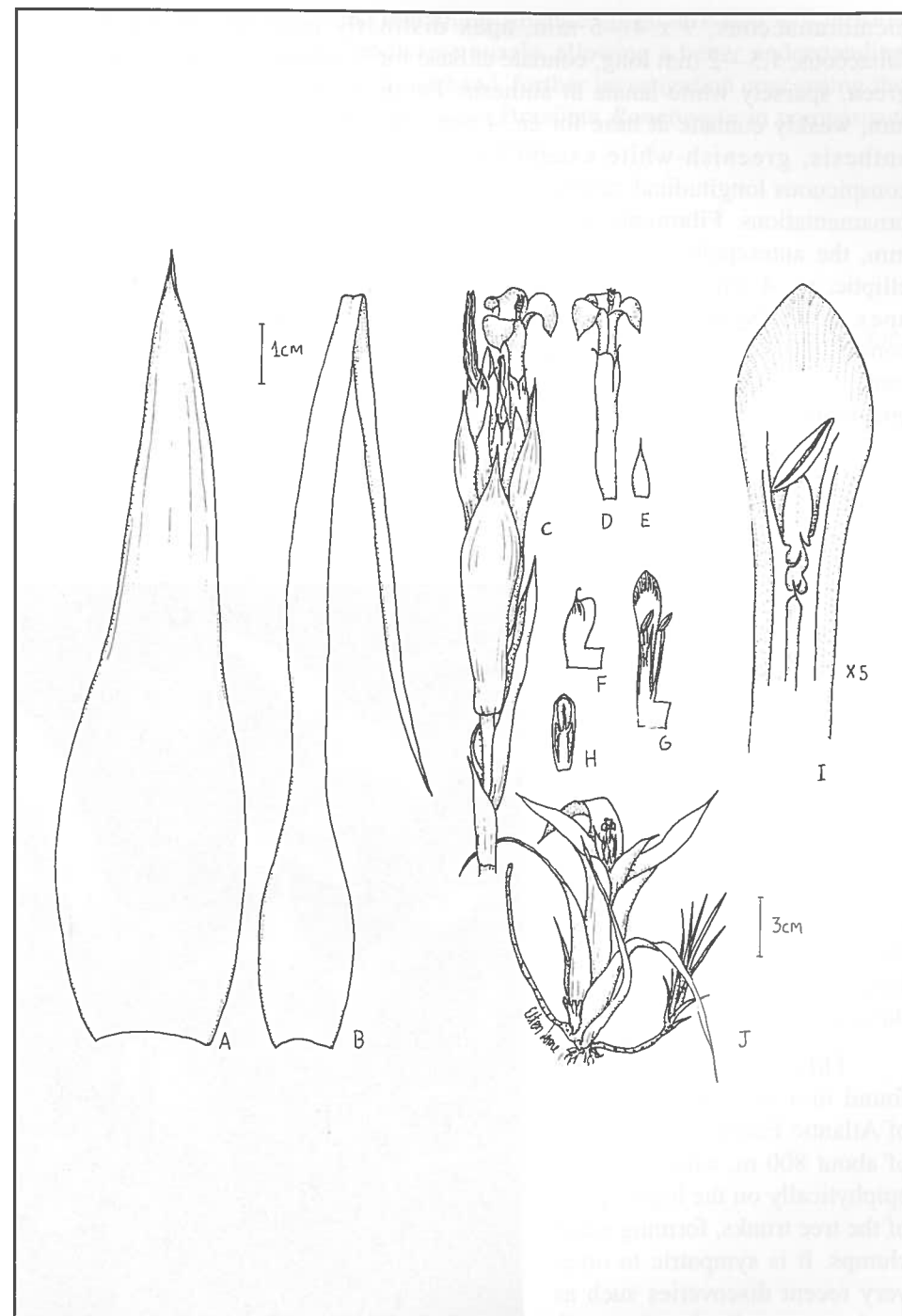


Figure 2. *Ronnbergia neoregelioides* Leme: a) inner leaf; b) outer leaf; c) inflorescence; d) flower; e) floral bracts; f) sepal; g) petal; h) cross-section of the ovary; i) apical portion of the petal; j) habit.

<sup>1</sup> Herbarium Bradeanum, Rio de Janeiro — RJ. E-mail: [leme@tj.rj.gov.br](mailto:leme@tj.rj.gov.br)

membranaceous, 9 x 4—5 mm, apex distinctly mucronulate-caudate and foliaceous, 1.5—2 mm long, connate at base for 3—4 mm, entire, ecarinate, pale green, sparsely white-lanate at anthesis. **Petals** subspatulate, acute, ca. 21 x 5 mm, weakly connate at base for ca. 4 mm, spreading-recurved near the apex at anthesis, greenish-white except for the lilac apex, naked but bearing 2 conspicuous longitudinal callosities along the filaments with irregular fingerlike ornamentations. **Filaments** the antepetalous ones adnate to the petals for ca. 13 mm, the antesealous ones adnate to the corolla tube only. **Anthers** narrowly elliptic, ca. 4 mm long, fixed about 1/3 of its length above the base, base and apex acute. **Stigma** cylindraceous, ca. 3 mm long, ca. 1 mm in diameter, conduplicate-spiral, whitish, blades fimbriate. **Ovary** subcylindrical, ca. 12 mm long, ca. 3 mm in diameter, sparsely white-lanate at anthesis, pale green, epigynous tube narrowly funnellform, ca. 5 mm long; placentation apical; ovules subobtuse.

*Ronnbergia neoregeloides*, which reminds a spineless, short-leafed kind of the Bahian *Neoregelia wilsoniana*, is very close related to *R. carvalhoi*. It differs from it by the shorter and subcoriaceous leaves, without an obtuse keel toward base, petals with acute lilac apex, connate at base for ca. 4 mm, and by the larger epigynous tube, ca. 5 mm long. Despite their close relationship, these two species are well apart from *R. brasiliensis*, which presents distinct floral morphology. The inflorescence of the latter, without involucre bracts, is elongated, subaxly flowered, and often branched at base, being well elevated above the leaf-rosette.

This new species was found in a well preserved area of Atlantic Forest, at an altitude of about 800 m, where it grows epiphytically on the higher parts of the tree trunks, forming small clumps. It is sympatric to other very recent discoveries such as *Aechmea canaliculata* Leme & Luther, *A. glandulosa* Leme, *Araeococcus montanus* Leme, and *Canistrum guzmanoides* Leme.



Figure 3. Close up of the type-specimen of *Ronnbergia neoregeloides* in bloom (photo E. Leme).

Surely, new searches in the remaining Atlantic Forest at Bahia will provide more unique pieces of such a biodiverse puzzle, allowing a better understanding of that bromeliad genera. On the other hand, further investigation concerning the natural taxonomical position of these three Brazilian *Ronnbergia* in comparison to *Aechmea* in a broad sense is urgently required.

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- Pereira, E. & Penna, I. A. 1985. Species Novae in Brasilia Bromeliacearum XXII. *Bol. Museu Bot. Mun. Curitiba* 62: 1-2, 5.

Rio De Janero, Brazil

## Looking for Posters

The BSI is looking for a full set of World Conference Posters to auction at the WBC BIC rare plant auction in San Francisco. Two posters are needed to make a complete set. They are the 1982 Corpus Christi Conference poster and the 1988 Miami Conference. If you have one of these posters that you would be willing to sell or donate, contact Joyce Brehm at 5080 Dawne St., San Diego, CA 92117 or by e-mail at [Joycesjoy@aol.com](mailto:Joycesjoy@aol.com)



# Notes On Foliage Color

Robert Tucker

It doesn't take much knowledge of bromeliads to make one realize that their foliage colors are perhaps quite unique and distinct. The bizarre reds of many species are not to be found in any other family and a quick think to the colored leafed calatheas, gingers, cordylines, orchids and aroids soon demonstrates this point. It takes hybrids, sports and mutations in crotons or begonias as dicots to bring out similar colors. Monocots have mastered colors in foliage and bromeliads have surpassed all other monocots.

Color seems to be a rather vague term when trying to describe the tones, tinges and opalescent hues of some plants and to make orthodox color definitions more ridiculous, contrasting colors are often blended so as to be quite distinct from each other, yet neither seems incongruous. Brilliant reds and purples can fade to green so smoothly and without sudden contrast as in many Neoregelias, yet try yourself to merge such colors on paper and you would have a gaudy mess.

I find it very odd and fascinating that so many species have colored leaf tips. Among my plants *Neoregelia* is conspicuous, but so are its hybrids and other members of that genus. *Aechmea* 'Bert' has such obvious black spots on its tips that neither of its parents have and *Vriesea philippo-coburgii* has red tips somewhat similar.

These tips seem to be so common as to be traditional bromeliad equipment but what purpose they serve must be as obscure as the reason for their absence in other species. The type of pigmentation differs somewhat, *Aechmea* 'Bert' and *Vriesea philippo-coburgii* have surface color laid over the green leaf while neoregelias exclude all the green from their tips and fill the tissue with a generous amount of red, pink or purple.

I have found these latter types to be bleached by strong light, becoming pale pink or white, and they can be unsightly, but when colored to perfection they appear as signals defining the extremes of the rosette. During wet weather in subdued light the shine of the wet leaves and the glow of the red tips can be stunning. Neoregelias remind me of cosmic happenings, an exploding star or a vast spiraling galaxy, hardly earth bound plants to be related to the rest of the mob.

It is strange how some people describe the markings of some bromeliads. I have always thought of *Neoregelia spectabilis* x *marmorata* as having reddish leaves with areas lacking in color and having only green, like reverse freckles, rather spots of plain green amidst a mass of pigmented red. Some people tell me the plant is mottled with red, I am sure it is mottled with plain green.

Some guzmanias and vrieseas have bright colors inside their leaves concentrated along vascular bundles just below the epidermis. A similar condition seems to occur in many neoregelias in their bright centers during flowering, giving them opalescent hues. *Cryptanthus* with fleshy midribs are very opalescent, and to look at them through a microscope is most incredible, like living gemstones, a light layer of cells forming their epidermis actually refracts the light in fascinating ways.

Increased sunlight brings out darker colors in many plants. Red is most frequent but black and purple also occur. I take this as being a measure the plant has taken to prevent it from receiving too much light, especially when sunlight increase means a drop in humidity and increased photosynthesis. Overcast weather, with or without rain, has obviously given my plants better growth, and having so much cloud cover the foliage colors, although subdued, are quite evenly suffused through the leaves.

Temperature drops are interesting color stimuli, even reductions are most benign. During our early dry season the nights are quite cool, and dew falls heavily. Plants on trees or those terrestrials enduring much exposure assume bright colors that are quickly lost when hot weather returns. A slight increase in acidity in the soil or leaf tanks has a similar effect and increases colors quite sharply, alkalinity on the other hand (with the exception of dyckias and hechtias) reduces color or induces the plant to concentrate the colors in irregular patches.

Mild starvation and low moisture levels are great color-making conditions. Billbergias react most conspicuously even to the extent of forming thicker and thus more vivid bands of scales on their reverse. Bright light is necessary in my growing area so obviously a little bit of stress is not harmful to these plants, especially in my climate where billbergias seem to grow too lushly otherwise.

Bromeliads could be noted not only for their weird colors but also for their bizarre markings other than leaf tips. *Vriesea splendens* is conspicuous with its bold purple and black bands. On the desk in front of me a near mature specimen sits, its colors heightened somewhat due to the plant being wet from recent torrential rains. *Aechmea chantinii*, *Guzmania musaica*, *Guzmania lindenii* and *Vriesea hieroglyphica* have similar markings. They seem very bright, but in a dense rainforest would serve to conceal the plant somewhat until the inflorescence emerges. These markings with one exception are not surface deep only, and increase in brilliance with more light. The exception is *Aechmea chantinii* whose vivid bands are formed by scales, an increase in light yellows, the foliage and the silvery bands become less obvious. The difference between the types is great but they must have a similar function, what that is remains quite obscure.

*Vriesea splendens* has interesting markings. They are less conspicuous on the upper leaf surface. Looking at the plant from above one sees a rosette of lightly banded leaves. From below with light passing through, the markings are

almost black and contrast with the light green leaf. *Aechmea fosteriana* and *orlandiana* have similar markings, but their joint hybrid, 'Bert', has the most interesting combination. My *Aechmea* 'Bert' is a trifle different from those I saw in the south. It is larger and more open and less colorful, but vivid and striking all the same. Why the bands should be lighter above than below seems odd, but this plant has a different nature again. Its dark bands and zigzags underneath are not brought out above, but are overshadowed with green, while the areas underneath that are green, are superimposed with brown, so that the plant, if viewed from below, appears to be heavily colored. When looking at it from below or side-on, it is only banded. Perhaps these differences are adapted for crown-dwelling creatures who would pollinate the plant or perhaps live inside, while those living below would not notice it so well.

Some plants, like most neoregelias and a few aechmeas (*pectinata*, *mexicana*) attain their brightest coloration shortly before flowering, and maintain this until the seeds ripen. Obviously this helps to attract pollinators to these plants which have rather small flowers that lack bright colors. Interesting is the manner in which the colors are displayed, they generally make the rosette more symmetrical and centralized like runways or landing fields, all coming to one central point. Indeed I have watched bees land on neoregelia leaves and walk down the leaf to the water where they fly to the nearest flower. I would have thought they would fly straight to the flower.

Banded billbergias can be uninteresting when viewed from above, but from the side or below, they are very attractive. For this reason I have put those banded billbergias up in a tree where they can only be seen from a distance below, along with a few *Vriesea splendens* and *Aechmea chantinii* to make a startling display.

There are many things which we observe so casually and then take for granted but which are more complex and require more understanding, but to do this in the case of bromeliads we would need to stay in their homeland among the plants. They are complete opposites to us warm-blooded, oxygen breathing, mobile beings, but what wonderful opposites they are.

Gordonvale, North Queensland, Australia

Reprinted from *Bromeliacea*, Bulletin of the Bromeliad Society of Queensland, 32(2) Mar/Apr 1999

## San Francisco Conference: Your Assistance is Needed

Joyce Brehm

There are several opportunities for affiliates and general members to participate in the planning and success of the Bromeliad Society International's 50th Anniversary Celebration to be held June 30 to July 3, 2000 in San Francisco, CA. It should be noted that the discounted hotel rates (\$109.00 for all you can cram into a room with two beds) are available from June 26 to July 5, 2000. Plan your vacation around the conference.

We have asked Harry Luther, Director of The Bromeliad Identification Center, to organize a Bromeliad Taxonomist's meeting. Harry has agreed but because many of the researchers are from Latin America and are graduate students, some will need financial assistance to attend the San meeting. Harry will send each contributing Affiliate Society reprints for your library, from the latest issue of *Selbyana*.

The large expense of plant show awards is also weighing heavily on Charlien Rose, Plant Show Chair. She has requested financial assistance to fund these awards. Each affiliate should consider making a donation or having a benefit auction to support these World Conference Activities. We will also gladly accept individual donations. Your name or the name of your society will be recognized in the Conference Program.

We have already received donations from:

San Francisco Bromeliad Society  
Florida West Coast Bromeliad Society  
Dean Fairchild

Sacramento Bromeliad Society  
Bromeliad Guild of Tampa Bay

Please mark the desired usage for your donation below and mail along with your check.

We are happy to help the BSI celebrate the 50th Anniversary.

Enclosed is our check for \$\_\_\_\_\_ Please use these monies to assist in financing the

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The WBC Program should give recognition to: Print names as you wish them to appear.

Mail to: Clyde Jackson, Treasurer BSI, 21 Sherwood, Dayton, Texas 77535.

# Functions of Your Potting Mix

John Catlan

Stop! And for the rest of this article, think about what your potting mix should be, then compare it with what you use. Don't defend your mix because you use it. Everyone must take into account cost, time you want to devote to your hobby and also the availability of ingredients, but your plants have predetermined requirements that do not relate to these constraints. Over the years, our basic philosophies on the culture of bromeliads in containers have changed and so has the potting mix. Viewed from this angle, the ideas are important as they motivate the evolving change for the improvements.

The bromeliad growers belonging to any one affiliate have an enormous number of plants that are the same or require the same conditions but the soil mix for every grower is different and they all place their faith in the good/bad results they achieve with their personal mix. I believe that often the mix we prefer is based around a special group of broms that were grown during a particular season. The possibility that some factor other than the potting mix may have been largely responsible for the superior results is totally ignored because the potting mix is a tangible that we can touch. The intangibles such as temperature and its variations, humidity, shade or lack of it from a nearby tree, rain, watering program, wind or lack thereof, attention through having time or interest or keenness are all hard to define or remember, so we place our trust in our lucky potting mix.

There are four sections to this article: Support, Moisture, Aeration and Nutrients.

## SUPPORT

Where do your plants grow? They may grow on cliff faces, attached to trees, rocks, deep litter and, yes, there are some that only grow in the ground, e.g., pitcairnia, bromelias, and ananas. How many of these terrestrials do you grow in comparison to the epiphytes such as neoregelias, vrieseas, tillandsias, billbergias, aechmeas etc? The pot contains the growing medium and the growing medium supports your plant. Bromeliads we normally grow do not grow in soil but in great clumps of roots and leaf litter attached to trees as well as the dead leaves (of the bromeliad) that fall down over the root ball.

## MOISTURE

Living plants are largely composed of water that is normally obtained from the soil and it is usually the limiting factor in their growth. It seems to me a constant supply of moisture and/or water is so important to bromeliads that they have developed more adaptations for collecting, storing and conserving water than is their due. For example:

- Pineapples and bromelias grow in huge clumps that protect the ground from drying out and the shape of the plant channels rain and dew towards the base of the plant;
- Pitcairnia grows in moist shady locations along streams and soakages;
- Dyckias and hechtias grow in open situations around and between rocks that collect and funnel rain to their edges. Rocks are great collectors of dew and also very good mulch. They keep the soil underneath moist. Although these plants are bromeliads they are classified as succulents because they have developed thick fleshy leaves to hold water.

Billbergias are generally tube shaped and in the wild much more so than you find in collections. They grow in open conditions towards the tops of trees where they get maximum light. Their adaptation is a very tight tube that holds water and is subject to very little evaporation. This tube sheds and resists heat in the sun similar to a crowbar standing upright.

Guzmanias grow in darker areas that are moist. This ability to grow in darker areas is a very important adaptation because as the temperature drops, the relative humidity rises and evaporation of moisture from the plant is slowed down. You can be pretty certain that plants growing under these conditions do not like to dry out.

Neoregelias typify what people consider to be a bromeliad. A circular bunch of leaves with a cup in the center that holds water, but the plants deceive you. They hold far more water in the outer leaves than they do in the center. A lot of bromeliads that do not have a well-defined cup hold water in the outer leaves.

Tillandsias. The silver scurf you find on the silver tillandsias helps to protect the plant from moisture evaporation and holds moisture in contact with the plant for a longer period of times so the plant has a better chance to absorb its requirements. Plants normally manufacture their food during daylight hours. This results in moisture evaporating but tillandsias have reserved this process by manufacturing their food at night when there is less evaporation of moisture.

Brocchinias have adapted to survive under very wet conditions. The one thing that they do not lack is water but there is a downside to such a situation in as much that nourishment is leached from the soil, so to counteract this at least two of this group of bromeliads are carnivorous, *Brocchinia reducta* and *Brocchinia hechtiioides*. Their style of growth as a tube is a pitfall trap with waxed walls and a lower digestive zone.

Aechmeas, big or small, seem to have developed the ability of holding a respectable quantity of water in their foliage but *Aechmea brassyoides* seems to have developed an adaptation to conserve moisture that is not found in other bromeliads (as far as I know). The pups form normally with a central cup that holds water. When more than half the leaves have developed, the last few leaves totally seal the cup and when you look down onto the plant, it looks like a small



cabbage, hence the name '*brassicoides*' (like a cabbage). Any evaporation from the cup is stopped. The flower spike punches a hole through the leaves when emerging. The flower is long-lasting and has a very delicate and pretty appearance.

#### AERATION:

The roots of plants obtain water and nutrients which are carried upwards to the leaves. The leaves manufacture compounds required for growth and reproduction and in the process use carbon dioxide from the air. For the roots to function, they must be supplied with a source of energy and conditions suitable for using it. The top of the plant sends some of its energy back down to the roots to promote their growth. Roots need oxygen and expel carbon dioxide and because of the tiny air spaces in the soil through which the gases move, aeration of the roots can become a limiting factor. A good soil mix must ensure the best possible aeration consistent with its other requirements. Excess moisture retained by the mix in a container reduces the air space. This makes it important to have maximum porosity. It is primarily by diffusion that gases move into and out of the soil but with pots, water is effective in displacing soil air. If the soil pore spaces are very small, water will fill them and reduce aeration until the water content has been reduced by evaporation or by the plant's use. Bromeliads can exist without roots, but will they be vigorous enough to stand adverse conditions and reproduce and look good?

#### MINERAL NUTRIENTS:

Nowadays with liquid feeding and slow release, this should not be a problem. It should only need slight adjustment for superior results - but how much is wasted by not having a good root system?

(Reprinted from Bromlink, July/August 1998, the Journal of the Gold Coast Succulent and Bromeliad Society Inc.)

## Additional Information about *Vriesea hasei* R. Ehlers from Venezuela

Francisco Oliva-Esteve and Bruno Manara

In 1975, while working on the preparation of the *Flora del Avila* (Mount Avila, north of Caracas and a National Park, belongs to the central section of the *Cordillera de la Costa*, or Coastal Range in northern Venezuela), the second author collected a bromeliad with an ascending simple inflorescence. The inflorescence bore brown-salmon bracts and dark purple flowers. Its taxonomical status was unclear and the plant perhaps had not been previously described. The late Dr. Julian Steyermark submitted that specimen (*Manara s.n.*, VEN 133269) to Dr. Lyman B. Smith, and his determination was that the specimen sent for study was just a form of *Vriesea incurva*. For this reason, that plant, illustrated in the *Flora del Avila*, 1978, (plate 71, C), was adscribed to *V. incurva*, as well as the typical form (plate 69, A). However, it is worth remarking that in the typical *V. incurva* the inflorescence, sometimes simple, but mostly branched, is pendant. In addition, Dr. L.B. Smith, neither in his classical *Flora Neotropica* treatment on bromeliads, nor in his study of the Venezuelan bromeliads, mentions any variety of *V. incurva* with an ascending or erect inflorescence.

Twenty years later, May 4, 1996, these authors visited the Parque Nacional Yacambú, an area located in the last eastern slopes of the Venezuelan Andes, in the state of Lara in central-western Venezuela. There the same bromeliad was found at 1600 m above sea level, and another botanical sample (*Oliva-Esteve & Manara 281*) was prepared. The plant was frequent enough on tree branches, together with *Tillandsia myriantha*, from which, when in a vegetative state, it was not easily distinguishable.

In the Herbario Nacional de Venezuela (VEN) there are two other ancient collections of the same plant, i.e.: *Steyermark 92.003*, collected Nov. 15-19, 1963, in the northern forested slopes of Pico Naiguatá in the Avila range system, at 1500-1635 m above sea level; and *Steyermark & Rabe 95.997*, collected near "Portachuelo", 2 mi. below the junction of El Junquito-Colonia Tovar road, July 31, 1966, at 1700 m above sea level. Both specimens had already been identified by L.B. Smith as *Tillandsia (Vriesea) incurva*.

The above quotations are made on account of two reports and the description of this as a "new species" from Venezuela (F.J. Hase, "Neue *Vriesea* aus Venezuela"; Jiirgen Brinckmann, "*Vriesea hasei* spec. nov. R. Ehlers -eine neue *Vriesea* aus Venezuela [eine Anmerkungen]"; and Renate Ehlers, "*Vriesea hasei* Ehlers sp. nov.", in: *Die Bromelie* 2-1998-54).

In these articles, the type locality given for *Vriesea hasei* is "near Biscucuy", 2200 m above sea level, in the Venezuelan Andes, where it was



Figure 4. *Vriesea hasei* in habit

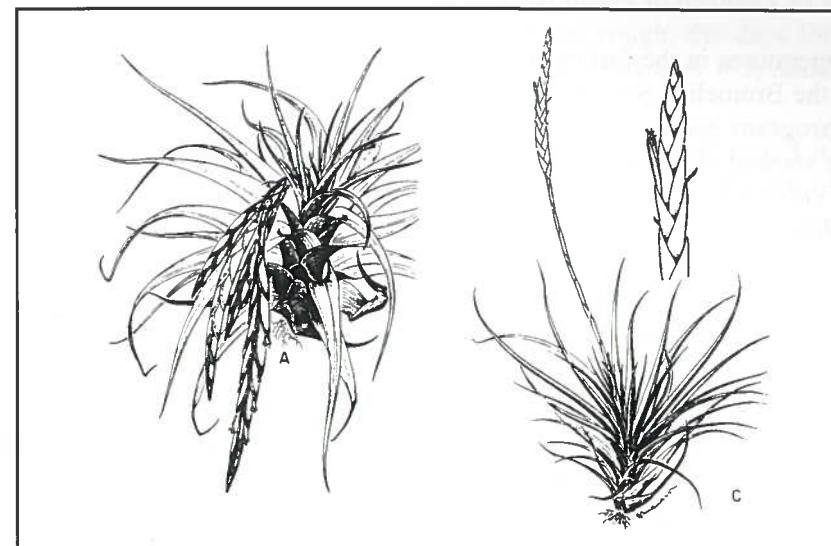
Photograph by Francisco Oliva-Estevé



Figure 5. Inflorescence detail of *Vriesea hasei* showing purple petals

Photograph by Francisco Oliva-Estevé

collected by F.J. Hase, Jan 17, 1997, no.7.4. Another locality, "along the road Colonia Tovar-El Junquito, 2000 m", is reported by Jiirgen Brinckmann, February-March 1994.



Illustrations by Bruno Manara

Figure 6. Illustration from *Flora del Avila* (Caracas 1978). A) *Tillandsia (Vriesea) incurva* (pp. 69.A); C) *Tillandsia (Vriesea) incurva* (pp. 71.C).

Nothing is surprising in this distribution, since this bromeliad was already known from the Colonia Tovar area, which is located in the Cordillera de la Costa close to the Avila range, and Biscucuy is a town in the Andes, not far from Yacambú National Park. Therefore, *Vriesea hasei* Ehlers is a plant whose known distribution includes both the Andes and the Cordillera de la Costa, Venezuela, in forested areas at 1500-2200 m above sea level.

We agree that this taxon, clearly distinct from other related species, and particularly from *V. incurva*, with which it was mistaken by L. B. Smith, deserves a name of its own. However, as this article relates, Venezuelan bromeliad collectors and researchers had already been acquainted with the plant for a long time, but it was not described earlier as a new species due to the great authority of Dr. L.B. Smith, who certainly never saw that plant alive in the field.

Caracas, Venezuela

## Affiliates in Action

### Gene Schmidt

Temperatures in the forties failed to keep members from the January meeting of the Bromeliad Society of South Florida. Those that didn't attend missed a great program given by Dennis Cathcart of Tropiflora Nursery in Sarasota. Dennis showed slides he took in Honduras, a bittersweet program. There were lovely shots of tillandsias growing on cliffs and rocks, such as the elusive *Tillandsia copanensis* and *Tillandsia subteres*, but every slide was clouded by smoke from forest fires caused by months of drought. Even sadder, many of the sites Dennis and Dr. Hiroyuke Takizawa (President of the newly formed Bromeliad Society of Japan) visited have since been utterly destroyed by Hurricane Mitch. (*The Bromeliadvisory, February, 1999, The Bromeliad Society of South Florida*) It has been noted in the *Journal* before, but it bears repeating that Dennis Cathcart's encouragement of BSI membership earns him a great deal of thanks and respect from our BSI membership as a whole. - Gene

Hat's off to editor Larry Giroux for undertaking the job as editor of the *Cryptanthus Journal*. One of the things we've liked about the *Cryptanthus Journal* is the fact that it has good color pictures, and the articles are not too technical.

This year the Editor, Andrew Flower, of the Bromeliad Society of New Zealand Inc. Bulletin will be running a competition to find the champion Bromeliad Hat designer and model. Designer and model must be one and the same person, and all entries will be adjudged by Mrs. Flower. Prize will be awarded in December 1999, and will be a flowering-size plant of *Vriesia nephrolepis*, a Costa Rican species not previously available in New Zealand. Send photos no later than 30 November, 1999, to the Editor, PO Box 11-375, Wellington, New Zealand. (The Bromeliad of New Zealand Inc. Bulletin, January, 1999)

The Bromeliad Guild of Tampa Bay (FL) presented their 1998 Distinguished Service Award to Jerry and June Griffin at their January meeting. Jerry and June have been BGTB members for many years, being generous with their time and talents. They enjoy bringing pleasure to other people, and promote a spirit of hospitality and encouragement within the club. The BGTB is very proud to have faithful, hard working members like the Griffins, and feel they are well deserving of the award for all their contributions to the success of the BGTB in 1998. Congratulations! Thanks to Lyla Shepard who had the awards engraved and the beautiful medallions made for each of them.

(*The Bromeliad Guild of Tampa Bay Newsletter, February, 1999*)

Dan Kinnard and friends entertained the Saddleback Valley Bromeliad Society of California with their most recent adventure as part of the "fearless

five". The fearless five (Dan Kinnard, Pam Koide, Wayne Schuster, Hiroyuki Takizawa, and Eloise Lau) took off for parts known and unknown for a week and a day of rediscovering tillandsia species in the central highlands of Mexico. The trip led them through some interesting and unusual places to recollect 35 species of *Tillandsia* and a few other genera. The road was rough, the days long, the company great, and the rewards big. (*The Pup Talk, Volume 6, # 3, Saddleback Valley Bromeliad Society*)

The Caloosahatchee Bromeliad Society of Florida celebrated its 19th anniversary in April. Their 1999 membership lists 132 members, 16 of them being charter members. (*Caloosahatchee Meristem, April '99, Caloosahatchee Bromeliad Society*)

President Lynette Wageman of the Hawaii Bromeliad Society presented plaques of appreciation to three members of the HBS who have been instrumental in the growth of the organization. Hatsumi Maertz, a charter member with her late husband Warb, was noted for her guidance and encouragement of new members, as a hostess and speaker, and as a former president of the society. Bob Okazaki was remembered for bringing in many famous plants from Australia, as well as his work in developing plants. A visit to his garden in Makiki was impressive for the beauty of his bromeliads and for the fun of his jokes and stories. Gwen Ihrig was the 3rd member honored. A member since 1983, she is longtime chairperson of the garden at Lyon Arboretum, where she has lavished untold hours of work on the garden along with the crew that gathered on Saturday mornings to work before the meetings. (*The HBS Newsletter, April '99, Hawaii Bromeliad Society*)

It was with great sadness that the Bromeliad Society of New South Wales advised members of the passing of Don Percival. Don, together with his wife Lila, joined the society in 1988 and from the very beginning worked unceasingly in any way he could for the society. He served as a member of the Executive Committee from 1989 to 1996 and in recognition of his outstanding service was made a Life Member in 1997. (*The Bromeliad Newsletter, March '99, Bromeliad Society of New South Wales, Inc.*)

Please give consideration to attending the Australian Bromeliads X Conference held 26th-30th August by the Cairns Bromeliad Study Group, Inc. There has been a change in guest speaker, with Pam Koide of Bird Rock Tropicals Nursery filling in for Don Beadle, certainly no easy task! Those of us who have seen her speak at past conferences can attest to her experience and expertise. The Bromeliads X website can be reached on the Internet at <http://members.xoom.com/bromeliads10>.



## Errata: *Mezobromelia capituligera*/*Guzmania variegata*

Harry E. Luther

To know and mean one thing and say another isn't totally the realm of politicians. Several years ago, while identifying specimens collected in northern Peru by Lee Moore I annotated the label on one of the dried plants as one thing (*Guzmania variegata*) and told Lee something else (a *Mezobromelia*). So for anyone wishing to see what an example of *Guzmania variegata* looks like, check out figure 15 on page 215 of the September-October 1998 Journal of The Bromeliad Society.

For comparison I offer photographs of two superficially similar *Mezobromelia* species. Both of these taxa are quite variable in coloration throughout their extensive ranges. For a brief synopsis of *Mezobromelia* please see Luther in *Bromelia* 2(1):3-5r 1995.

## Check your New Directories

The latest membership directory was enclosed with the March-April 1999 issue of the Journal of the Bromeliad Society. You will note some changes and improvements over previous directories, a major one being the addition of e-mail addresses.

Unfortunately, it has been recently discovered that a limited number of the directories were received from the printers with pages 31 through 62 missing. Some of them may have been mailed out. Please double-check your directory to ensure that you have a complete one. If you should find that you received a directory with those pages missing, contact Membership Secretary Carolyn Schoenau for a replacement.

Carolyn Schoenau, BSI Membership Secretary  
PO Box 12981  
Gainesville, FL 32604  
Telephone 352-372-6589  
E-mail BSI@nervm.nerdc.ufl.edu

And while you are doing that, take a moment to correct Director John Anderson's telephone number. The correct number should be 361-852-5146.



Photo by E. Besse.

Figure 7.  
*Mezobromelia capituligera*, a giant epiphyte in northwestern Ecuador. Note the globose branches.



Figure 8. The inflorescence of *Mezobromelia pleiosticha* photographed in western Ecuador. Note the rather elongate branches.

Photo by A. Hirtz.

# The Many Gardens of Bill Paylen

Seth Napel

Photographs by the author

The paths meander gently through the fern garden. Staghorn ferns hang from the ancient oaks in large clusters. Tree ferns inhabit the garden throughout, as seas of green baby's tears wash over the ground below. The fern garden, located at Lotusland in Montecito, was designed by Bill Paylen for Madame Ganna Walska. "Bill Paylen's knowledge of landscape design has made him and his gardens internationally acclaimed," says Paul Mills, a member of the Lotusland grounds staff. With a natural flair for design, Paylen credits 'using his instincts' for the creation of these living masterpieces.

Paylen's flavor for tropical gardens stems from his extensive travels to South and Central America, and other far-off lands. With an interest in bromeliads, he and 28 others once boarded a DC10 to collect bromeliads in Iquitos, Peru. This first trip, made in 1965, sparked "an incurable urge to travel," says Paylen. He then went on to continue his travels throughout Australia, Malaysia, Borneo, Argentina, Guatemala, Costa Rica, Belize and other exotic countries. Many of these foreign adventures were in conjunction with international plant societies in which Paylen is an active participant. He is a proud member of the Bromeliad Society International<sup>1</sup>, the Fern Society and the Orchid Society.

Born August 14, 1917 in Java, Paylen was raised on a plantation. His father taught him to grow the plantation's crops of coffee, rubber and coca. At the age of ten, Paylen was selling his own plants to friends and neighbors. He grew gladiolus, zinnias and cacti for a hobby and as a source of income.

In the town of Deventer, Holland, Paylen attended a local university and received a degree in tropical engineering. Paylen, who has lived and worked in the US for many years, says he has "had no mentors or teachers" on landscape design techniques during his career. Everything he knows about design he taught himself through instinct and imagination. "Everything starts out as idea, from gardens to the largest skyscrapers," says Paylen while working in his own garden at home in Camarillo. He reminisces about Lotusland, stopping only to show off his favorite of all his plant collection, a rare Malaysian Rhododendron.

Paylen's work at Lotusland began in 1968, when he received a long telegram from Madame Walska inquiring about a garden she wished to be created on her estate. After a five minute discussion and a quick sketch of the proposed design, Paylen had the job. As construction of the fern garden began, the Madame expressed her dislike of the large tufa rocks. "You will like the

rocks, Madame" Paylen told her, and that was the end of it. Nothing was ever mentioned about it again. When it came time to place the rocks, a large crane was rented to move them. Paylen had no plan to go by and the Madame refused the use of heavy equipment in her garden. Just as the Madame left to receive a phone call, the crane lifted the first large stone and the crane's front end quickly sank in a mudhole. This caused the rock to swing violently. Paylen immediately called for the crane operator to drop the rock, and thus began the fern garden. After construction of the hardscape the plants were soon shipped in. Dozens of tree ferns, numerous other ferns and many colorful begonias were sent up from the Los Angeles area.

In addition to the fern gardens at the Lotusland estate, Paylen also re-created an original design by Fritz Kubish. This project was in effort to revive the badly neglected bromeliad gardens of Lotusland. Kubish, a well known bromeliad collector, installed the original bromeliad gardens in the early 60's. Over the course of many months, Paylen reorganized all the plants and then began adding new bromeliads as well as more large landscape rocks. Mass plantings are brilliantly displayed among trees festooned with air plants. A rock grotto decorated with ferns and bromeliads creates a tranquil dripping sound to further replicate a tropical rain forest. Paylen still plays an active role in the display and culture of both the fern and bromeliad gardens at Lotusland. He consults with the gardeners on a routine basis, lending his expertise in everything from plant identification to choosing landscaping rocks.

In 1994 Paylen was chosen as an advisor in the design of the outdoor gardens at the new Getty Museum in Los Angeles. His reputation as a remarkable landscape designer opened up a historic opportunity to again design another timeless treasure. He lent his knowledge on practical plant palette choices for the various garden designs.

"Paylen is a genuine, compassionate guy with an incredible talent for displaying and growing exotic plants," says a Lotusland docent. Along with rare plants, he collects semiprecious stones that he displays throughout the interior of his home in large glass cases. Since his retirement in 1986 he has continued his travels to South America, and frequently to Costa Rica. With his extensive knowledge in horticulture, Paylen openly shares his notes and experiences with all who approach him on the subject. In a world that now strictly regulates the design industry with four to seven years of mandated college education, Paylen simply designs beautiful gardens.

*Santa Barbara, California*

<sup>1</sup> Bill Paylen served as President of the BSI from mid 1971 through mid 1975.





Figure 9. Bill Paylen in the backyard of his home in Camarillo, California



Figure 10. Path through the fern garden at Lotusland



Figure 11. Bird's Nest Fern in the fern garden



Figure 12. Bed of bromeliads at Lotusland



# New Species of *Puya* and *Pitcairnia* (Bromeliaceae) from the Amboró National Park and Vicinities (Santa Cruz, Bolivia): A Neglected Center of Diversity and Endemism of Pitcairnioideae

Pierre L. Ibisch<sup>1</sup>, Roberto Vásquez<sup>2</sup>, and Elvira Gross<sup>3</sup>

**Abstract.** Three new species of Pitcairnioideae (Bromeliaceae) from the area of the Southern Amboró National Park and vicinity (Río Pirai river system) are described and illustrated: *Pitcairnia amboroensis*, *P. longissimiflora*, *Puya claudiae*. The records of the new species emphasize the importance of the area as a center of diversity of this bromeliad subfamily. Among the supposed factors which generated the high species diversity are complex temporal and spatial climatic transitions and habitat diversity.

Amboró National Park is located in the western part of the Department of Santa Cruz, Bolivia, in the region of the "Andean knee" where the ecological conditions of the Eastern Andean slopes change substantially from north to south. The zone covers a variety of vegetation zones from humid lowland rain forest to different types of montane rain forests (Yungas; the southernmost perhumid tropical Andean rain forests), cloud forest, and, to a lesser extent, semihumid and dry montane forests (Figure 13).

Although the floristic collection density in the zone is improving there are still many species to be discovered. The most extensive collecting has been achieved by Michael Nee who currently is preparing a flora of Amboró National Park (*Nee in prep.*). Up to now he has recorded about 3,000 plant species in the park and its vicinity. Nee thinks that the species number may reach 3,500 (*Nee, pers. com.*) but we think it might be as high as 4,000 to 5,000. The following example will serve to illustrate our meager knowledge of the area. In the small valley of "El Fuerte", around an important archeological site (about 2 km<sup>2</sup>), a very intensive inventory of the flora (>350 species; Ibisch *et al.* 1996) had been accumulated. Yet a new bromeliad species from this area is described in this paper.

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<sup>2</sup> Sociedad Boliviana de Botánica, Casilla 4039, Santa Cruz, Bolivia (r.vasquez@diathec.scz.com)

<sup>3</sup> Botanisches Institut, Universität Bonn, Meckenheimer Allee 170, D-53115 Bonn, Germany.

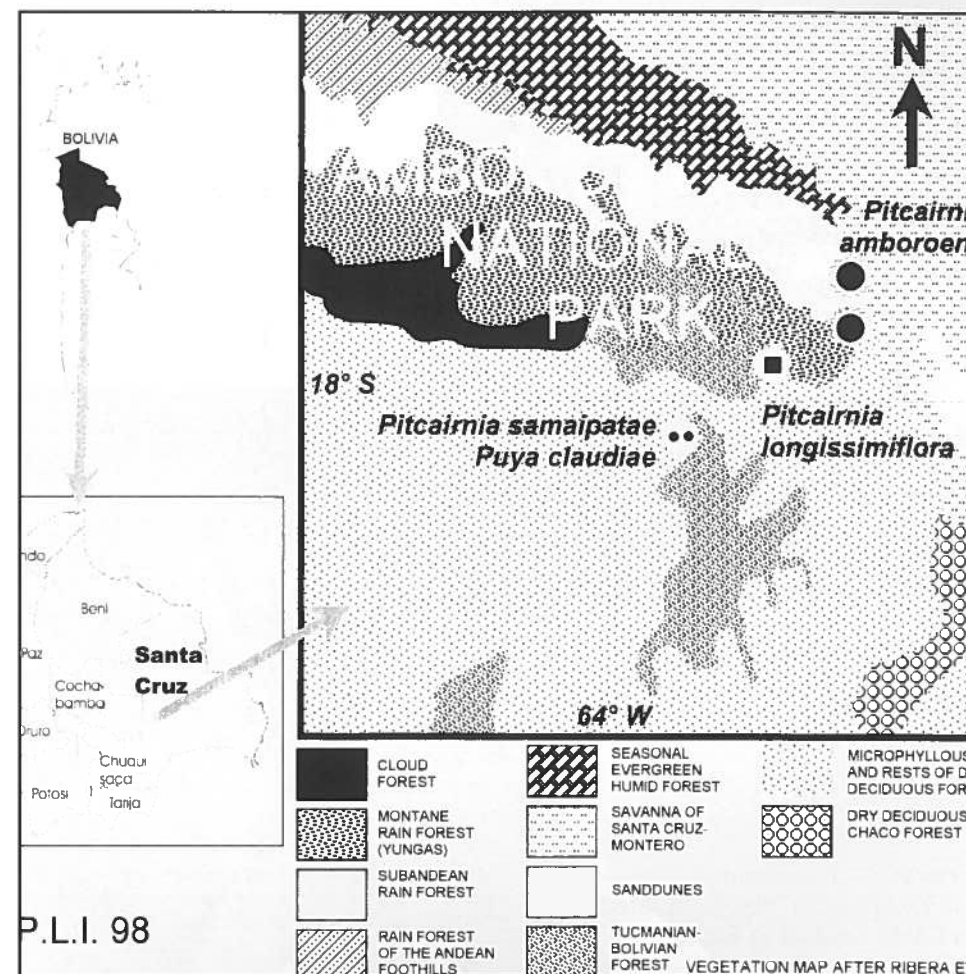


Figure 13. Simplified map of vegetation of the Amboró National Park and vicinity and location of the new species described in the present paper.

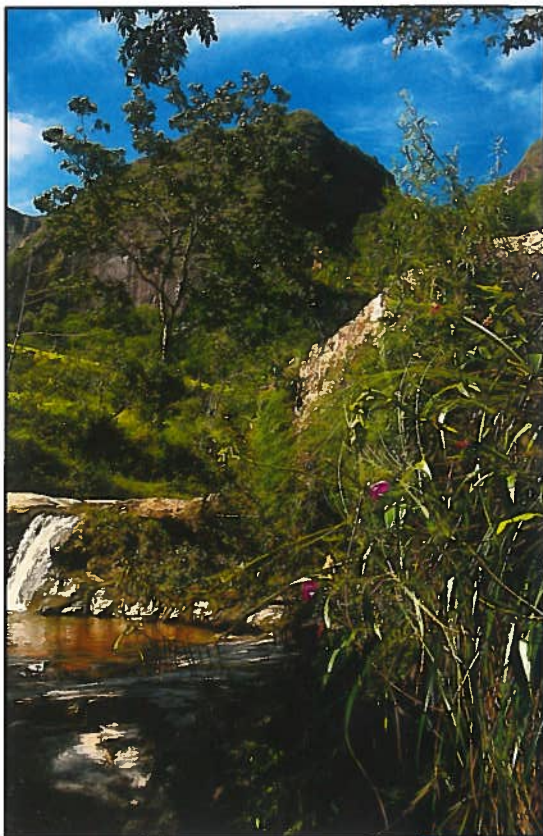


Figure 14.  
*Pitcairnia longissimiflora* sp.  
nov. and its habitat  
(at type locality)

photo P. Ibsch



Figure 15. *Pitcairnia amboroensis* sp. nov. (cultivated in Santa Cruz de la Sierra).

photo P. Ibsch

Obviously, following the bibliography (Smith & Downs 1974, *Nee in prep.*, Ibsch *et al.* 1996, Ibsch & Gross 1998) and our own records from the mentioned region suggests that the area is a neglected center of diversity and endemism of Pitcairnioideae - especially the adjacent area of the southern part of the Amboró National Park. Known to be growing there presently are species of the genera *Deuterocohnia* [3 spp.; *D. longipetala*, *D. meziana*, *D. sp.*], *Dyckia* (1 sp.; *D. pulquinensis*), *Fosterella* [at least 4 spp.; e.g. *F. albicans*, *F. spectabilis*, *F. sp.1*, *F. sp.2*], *Pitcairnia* (about 7 spp., including the species described in this article; e.g. *P. cardenasii*, *P. crassa*, *P. lanuginosa*, *P. paniculata*, *P. sp.*), and *Puya* [about 10 spp., including the species described in this article; e.g. *P. atra*, *P. dyckioides*, *P. olivacea*, *P. laxa*, *P. nana*, *P. sanctae-crucis*, *P. cf. stenothyrsa*, *P. tuberosa*, *P. vasquezii*].

Among those species are several to be regarded as local or regional endemics. The most spectacular species of the genus *Fosterella* occurs only in this area: the red-flowered *F. spectabilis* (Luther 1996). Two special puyas are the dwarf species *P. tuberosa* (discovered by Thaddeus Haenke and falsely cited for Peru; see Ibsch *et al.* 1996) and the stout *P. nana* (discovered by the German Theodor Herzog).

Also, in this region, several other endemic bromeliads from the Tillandsioideae (e.g. *Tillandsia samaipatensis*, *T. bermejoensis*) are known to occur. We expect that more new terrestrial bromeliad species will be discovered in this area. Described below are two new species of Pitcairnioideae.

***Pitcairnia longissimiflora***  
**Ibsch, Vásquez & Gross, sp.**  
**nov.** (Figures 14, 17).

**Type:** Bolivia Departamento Santa Cruz: Province Florida, private property "Los Volcanes", on the border of the Amboró National Park, about 63°40' W, 18°05' S, +/- 1,000 m a.s.l. On the border of a small river with inflorescences hanging free above the water, associated with *Sobralia* sp. (Orchidaceae); the surrounding

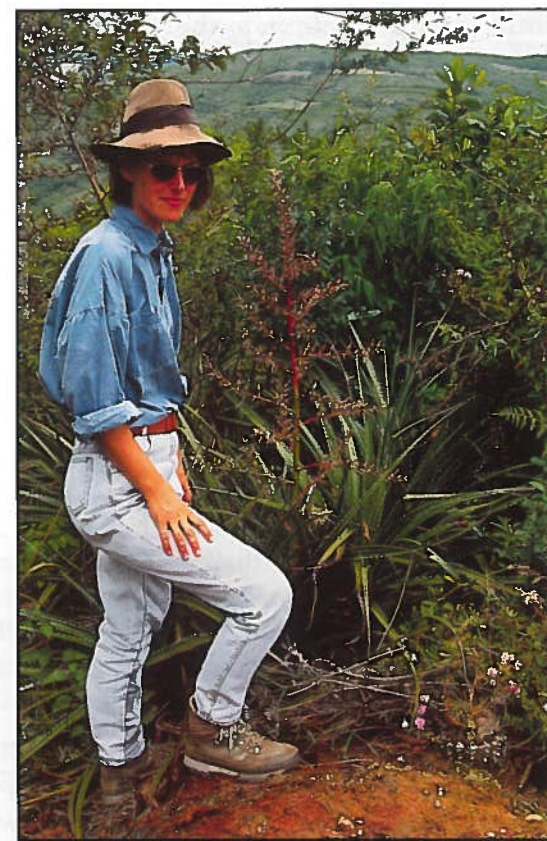


Figure 16. *Puya claudiae* sp. nov. with its discoverer, Claudia Ibsch. (at type locality, photo P. Ibsch).



forest is humid and evergreen and rather intact. 31 December 1997, *Pierre & Claudia Ibisch* No. 97.097 (holotype LPB).

*Pitcairnia longissimiflora* differt ab omnibus speciebus cum petalibus nudis, pedicellis longioribus quam 2 mm et foliis deciduiis secus lineam rectam in characteribus sequentibus: Sepala ad 50 mm longa, non 25-37 mm. Petala ad 130 mm longa, non 70-100 mm.

**Plant** flowering up to 140 cm high. **Stem** erect, stout, ringed with leaf-scars. **Leaves** to 80 cm long, deciduous along a straight line in about 70–90 mm from the leaf base, the apex of the remaining rest incurving. **Leaf sheaths** to 50 mm wide, to 25 mm high, abaxially brown-castaneous, adaxially light brown. **Leaf blades** grass-like, to 17 mm wide at the straight line, attenuate, entire. **Scape** suberect to curved, to 110 cm long, to 7 mm wide, white-floccose, green. **Scape bracts** attenuate, gradually changing to floral bracts. **Inflorescence** simple, laxly many-flowered, to 30 cm long, white-floccose, green. **Floral bracts**

ovate, acute, to 15 mm wide, 25–50 mm long, reflexed, green to papyraceously dry, entire, all longer than the pedicels. **Flowers** pendent, to 160 mm long. **Pedicels** slender, green, white-tomentose, 20 mm long. **Sepals** to 50 mm long, to 6 mm wide, attenuate, green, white-tomentose. **Petals** to 130 mm long, white, glabrous, naked. **Stamens** to 105 mm long. **Gynoeceum** including style and stigma to 115 mm long. **Ovary** inferior.

*P. longissimiflora* sp. nov. is differs from all *Pitcairnia* species with naked petals, with pedicels much longer than 2 mm, and with deciduous leaves along a straight line, by petals to 130 mm long, not 70-100 mm, sepals to 50 mm, not 25-37 mm. It belongs to the *Pitcairnia* species with the largest flowers and is probably bat-pollinated. Among the syntopic terrestrial bromeliads are *Fosterella albicans* and *Fosterella* sp.;

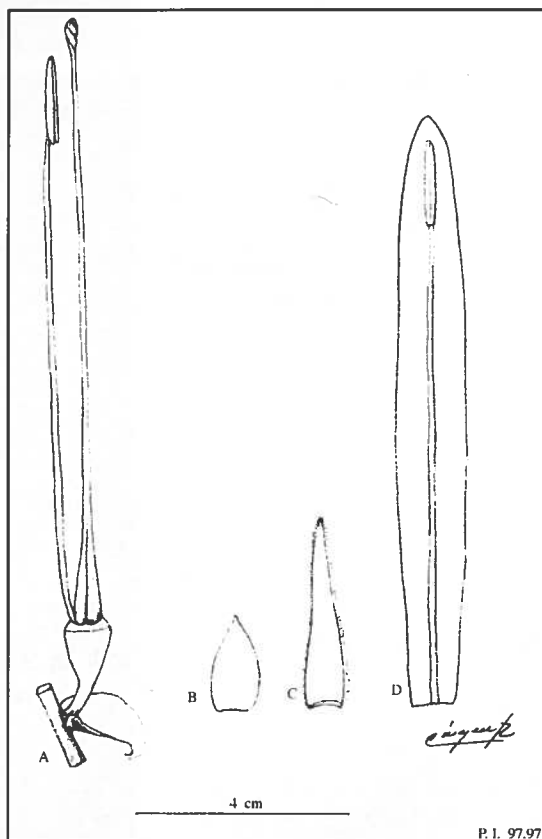


Figure 17. *Pitcairnia longissimiflora* sp. nov. - A. flower with floral bract, B. floral bract, C. sepal, D. petal with stamen (drawing R. Vásquez No. 2871; type specimen P. & C. Ibisch 97.097)

epiphytic bromeliads registered nearby the type locality are *Racinaea* cf. *spiculosa* and *Vriesea maxoniana*.

**Paratype:** Bolivia, Departamento Santa Cruz, Province Florida, road from Santa Cruz to Samaipata, 2 km after Bermejo, +- 1,000 m a.s.l. On the border of the road on steep and wet rocky slope. 29 December 1998, *Pierre & Claudia Ibisch* No. 98.225 (paratype herb. Ibisch).

*Pitcairnia amboroensis* Ibisch, Vásquez, Gross & Kessler, sp. nov. (Figures 15, 18, 19)

**Type.** Bolivia. Departamento Santa Cruz: Province A. Ibáñez, waterfalls of the Río Surutú, nearby Jardín de las Delicias, in the zone of influence of Amboró National Park, about 63°35' W, 17°50' S, about 600 m a.s.l., on steep rock cliff in semideciduous forest. 5 October 1997, *Pierre & Claudia Ibisch* No. 97.00044 (holotype LPB).

*Pitcairnia amboroensis* affinis est *P. pungens* H.B.K. et *P. heterophylla* (Lindley) Beer, sed differt ab eis in characteribus sequentibus: A *P. pungens* differt bulbis destitutis, foliis interioribus risulae gradatim transientibus in bracteis scapi, ovario ad medio supero; a *P. heterophylla* inflorescentia scapo ad 17 cm longo provisa, bracteis sepalis multo longioribus, foliis synanthiis.

**Plant** flowering up to 30 cm high, heterophyllous, forming small clusters. **Outer leaves** modified, dry, stiff, dark brown, with retrorse spines, 2–3 cm long, to 1 mm wide, the apex pungent. **Inner leaves** green, grass-like, to 28 cm long, to 13 mm wide, glabrous, not petiolate, acute, gradually changing into the scape bracts, some with inconspicuous antrorse spines at the base. **Scape** erect, 17 cm long, 3–4 mm wide, red, lepidote. **Scape bracts** linear, attenuate, to 7 mm wide, upper ones to 3 cm long, 5 mm wide, in the upper half of the scape turning red, glabrous, the upper ones lepidote only at the base. **Inflorescence** to 8 cm long, simple, compact, the axis not visible, but completely covered by the bracts, with up to 20 densely spirally arranged flowers. **Floral bracts** slightly zygomorphic, lanceolate, to 40 mm long, to 10 mm wide, appressed to the flowers, two days before anthesis completely covering the flowers, at anthesis covering half of the flowers, red, laxly lepidote. **Flowers** subsessile, tubular, diurnal, opened only at the extreme apex for one day. **Sepals** cuneate, the base fleshy, to 25 mm long, to 5 mm wide, lepidote, red, at the base white-reddish, in general lighter than the petals. **Petals** bright red, somewhat lighter than the bracts, bearing a scale. **Stamens** included, 50 mm long. **Gynoeceum** with style and stigma 60 mm long. **Ovary** 1/2 superior, 6-7 mm wide.

Similar to *P. pungens* H.B.K. but plants not bulbous at the base; inner leaves gradually changing into the scape bracts, not deciduous above the sheaths; floral bracts covering half of the flowers at anthesis; ovary half superior, not wholly superior. Also similar to *P. heterophylla* but leaves present in flowering period; scape present, 17 cm long; floral bracts much longer than the sepals, not shorter; sepals up to 25 mm, not to 30 mm long.



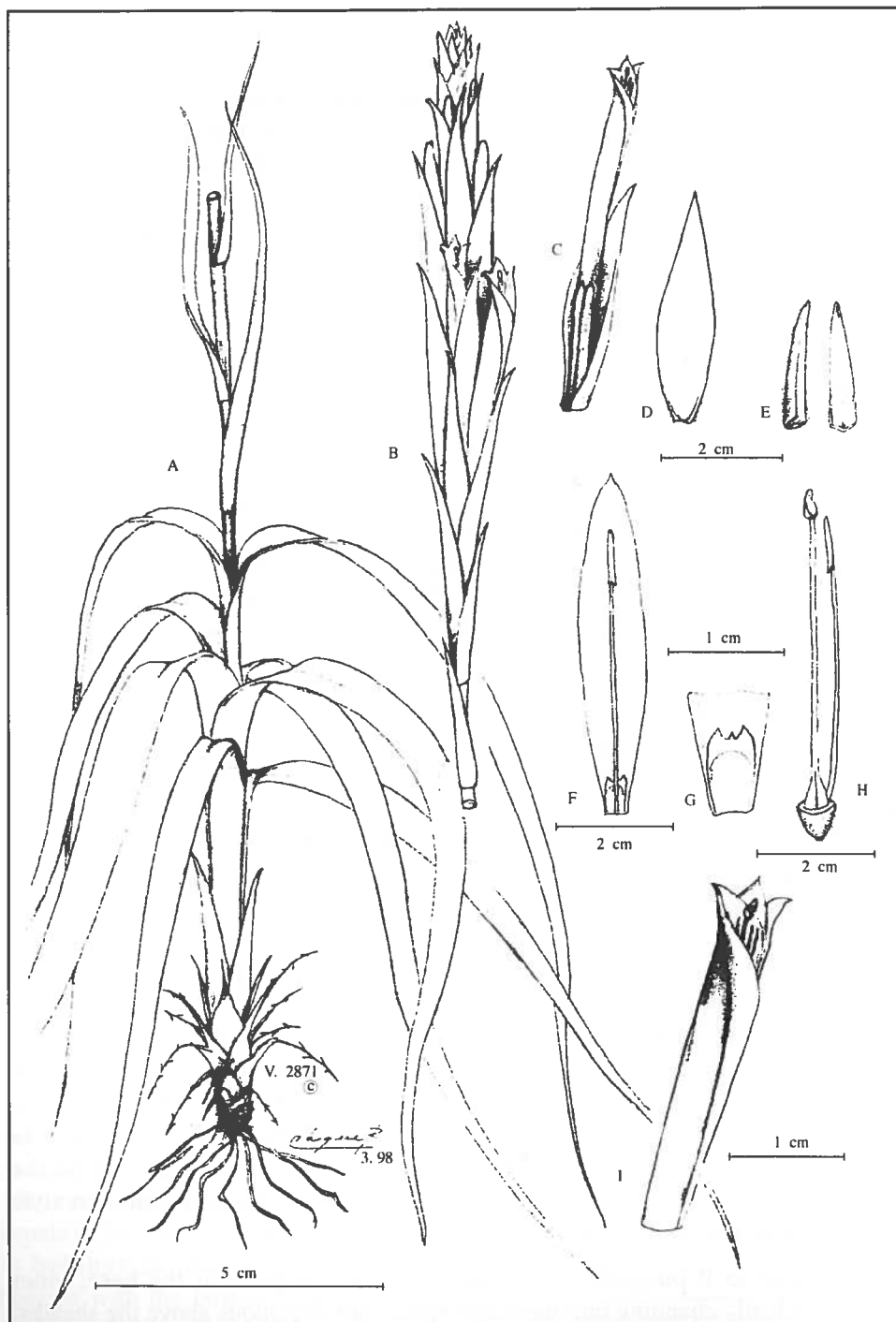


Figure 18. *Pitcairnia amboroensis* sp. nov. - A. habit, B. inflorescence, C. flower with floral bract, D. floral bract, E. sepal, F. petal with stamen, G. petal scale, H. gynoecium and stamen I. apex of flower (drawing R. Vasquez No. 2871; type specimen P. & C. Ibsch 97.004A)

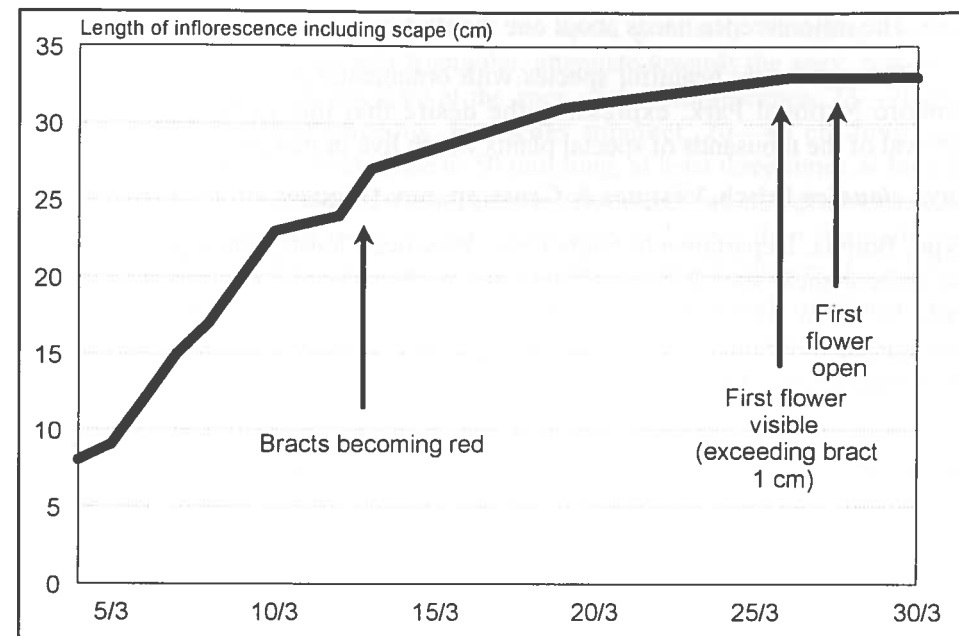


Figure 19. Growth-scheme of the inflorescence of a cultivated specimen of *Pitcairnia amboroensis* sp. nov. (Santa Cruz de la Sierra, March 1998).

**Paratype:** Dpto. Santa Cruz, Province Ichilo, Río Macuñucú, 500 m a.s.l., saxicolous in sandstone cliff. 26 September 1996, *Michael Kessler et al.* No. 8660, (paratype GOET, LPB, SEL).

This saxicolous species probably is endemic to Amboró National Park and vicinity. Until now it is only known from the Río Surutú river system in Santa Cruz. We have found this species growing mostly in the lower part of steep sandstone rock faces in places with some soil accumulation on the rocks or in rock crevices, often in the shade of trees or shrubs. In its habitat *P. amboroensis* in Macuñucú had well-developed leaves in September (time of collection) and in Surutú it was just developing leaves in October.

As syntopic terrestrial bromeliads at the Surutú site we have found *Pitcairnia* cf. *lanuginosa*. and *Puya* sp. Among the epiphytes in nearby forests are *Tillandsia tenuifolia*, *T. streptocarpa* and *Tillandsia* sp. At the Macuñucú site, which has a more humid climate than the Surutú area, syntopic saxicolous species included *Fosterella* sp., *Guzmania calothyrsus*, *G. sp.*, *Pitcairnia crassa*, *P. paniculata*, *P. sp.*, *Tillandsia samaipatensis* and *T. tenuifolia*. Epiphytic bromeliads in adjacent semideciduous to evergreen gallery forests included *Aechmea bromeliifolia*, *Guzmania calothyrsus*, *Tillandsia australis*, *T. complanata*, *T. didisticha*, *T. streptocarpa*, *T. tenuifolia*, *T. vernicosa* and *Werauhia sanguinolenta*. In cultivation in Santa Cruz (where the climate is comparable to the Surutú site), flowering has been observed from January to

June. The inflorescence needs about one month for development (Fig. 19).

This extremely beautiful species with ornamental potential is named after Amboró National Park, expressing the desire that this park may assure the survival of the thousands of special plants which live in this area and its vicinity.

***Puya claudiae* Ibisch, Vásquez & Gross, sp. nov. (Figures 16, 18, 19).**

**Type.** Bolivia. Departamento Santa Cruz: Province Florida, Samaipata, valley of the archeological site "El Fuerte", near the southern border of Amboró National Park, 63°54' W, 18°11' S, about 2,000 m a.s.l., within disturbed shrub replacing semihumid montane forest. 23 February 1998, *Pierre & Claudia Ibisch* No. 98.040 (holotype LPB).

*Puya claudiae* affinis est *P. cristata* L. B. Smith, sed differt ab ea in caracteribus sequentibus: Planta altior, folii longiores, spinae longiores et nigeriae non castaneae, inflorescentia glabra non alba floccosa, rami ultra triplo longiores quam bracteae floralis, rami longiores cum basibus sterilibus longioribus, bracteae florales integrae non serratae, pedicelli 5-13 mm longi non 10-15 mm, non triangulati ad apicem, petala excedentes sepala plus quam 20 mm, non quam 10 mm.

**Plant** stemless, flowering up to 160 cm high, forming clusters. **Leaves** triangular, attenuate towards the apex, to 50 mm wide, more than 150 cm long, olive-green, glabrous, only the margins above covered with white scales at the base of the spines, the spines black, antrorse, to 15 mm long. Inflorescence compound, a lax double raceme, with the rachis wholly visible. **Scape** to 20 mm thick, red (at the base green-red), glabrous. **Scape bracts** triangular,

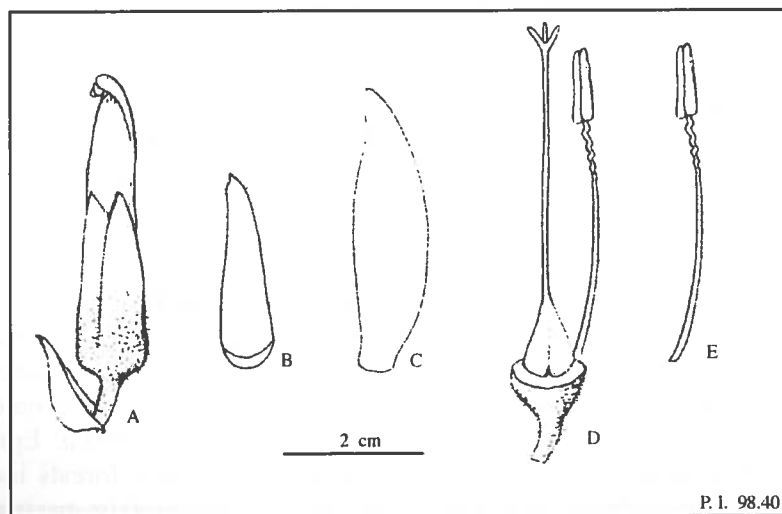


Figure 20. *Puya claudiae* sp. nov. A. flower with floral bract, B. sepal, C. petal, D. gynoecium and stamen, E. stamen, filament curled towards the anther (drawing R. Vásquez No. 2875; type specimen *P. & C. Ibisch* No. 98.040).

serrulate-denticulate, attenuate towards the apex, gradually changing into the primary bracts. **Primary bracts** triangular, attenuate towards the apex, serrulate-denticulate, to entire and apiculate at the apex of the inflorescence, 23—70 mm long, glabrous, dry, papyraceous. **Branches** suberect, 20—40 cm long, red, partially green beneath, sterile base to 50 mm long, at least three times as long as the primary bracts. **Floral bracts** entire, triangular, acute, glabrous, dry, papyraceous, 10-15 mm long, 8—10 mm wide, all longer than the pedicels. **Flowers** suberect, more than 50 mm long. **Pedicels** curved, slender, 5—13 mm long, white-tomentose. **Sepals** 20—30 mm long, 6—7 mm wide, apiculate, red, green at the base, lepidote, becoming glabrous, fleshy and subulate at base, sulcate and nerved when dry, appressed to the petals. **Petals** to 50 mm long, to 10 mm wide, exceeding the sepals by more than 20 mm, oblique, oblong, widest in the middle, green. Stamens and style included. **Stamens** to 45 mm long, with filaments curled towards the anthers. **Gynoeceum** including style and stigma to 50 mm long. **Ovary** 10 mm long, 6 mm wide, about 1/3 inferior. **Fruits** to 13 mm long, to 7 mm wide. **Seeds** broadly triangular, white-alate, 2—3 mm long.

Similar to *Puya cristata*, but differing in following characters: Habitat not dry grassy slopes at 3,000 m a.s.l., but within disturbed shrubland within semihumid forest at 2,000 m a.s.l. Plant higher. Leaves longer, spines of the leaves black not brown and longer. Inflorescence glabrous not white-flocculose, branches more than three times longer than the bracts, branches much longer with longer sterile bases. Floral bracts entire, not serrulate. Pedicels 5—13 mm long, not 10—15 mm, not triangled at apex. Petals exceeding the sepals by more than 20 mm, not by 10 mm.

The syntopic terrestrial bromeliads which have been recorded are: *Puya nana*, *P. tuberosa*, *P. dyckiioides*, *Pitcairnia paniculata*, and *Tillandsia australis*. Epiphytic bromeliads in forests nearby are: *Tillandsia capillaris*, *T. fendleri*, *T. rubella*, *T. sphaerocephala*, *T. streptocarpa*, *T. tenuifolia*.

The species is named after the discoverer of this species: Claudia Ibisch who also supports substantially all the botanical work of her husband.

#### Why are there so many terrestrial bromeliads in the Southern Amboró region?

The high species diversity within the Pitcairnioideae in the southern Amboró region is supposed to be the result of a combination of several favorable factors. The topographic and geologic situation within a zone of complex climatic transition (see also Fig. 1) probably guaranteed, even in times of climatic change, the maintenance of zones with Pitcairnioideae climate, which is characterized by semihumid (to semiarid) conditions (especially favorable for *Fosterella* and *Puya*). Another factor is the mosaic of abundant rock cliffs being exposed to all possible directions. The geology has created diverse habitats which in turn helped maintain high species diversity. Speciation probably has been supported by isolation of populations in times of climatic change, especially as the semihumid area of the Río Pirai river system is well separated from similar

areas in the north or in the south.

It is remarkable that this region obviously evolved a considerable *Puya* diversity as this genus from Bolivia till now has been known as quite high Andean. With regard to other genera of Pitcairnioideae it is quite probable that the zone also turns out to be a center of diversity of *Fosterella* which would change the currently known patterns (IBISCH *et al.* 1997).

The speciation processes will be understood more adequately when we will know more about the parental relationships of the species involved to disjunct sister taxa in other zones.

#### Conservation status of the new species

Amboró National Park does not cover the region of the highest diversity and endemism of the Pitcairnioideae. This diversity center is found in a belt south of the park where sandstone mountains are found in the transition from humid/semihumid to semiarid climate. However, this does not mean that the species described in this article are especially endangered. As many members of Pitcairnioideae they are species of azonal sites like rock cliffs and grow in open vegetation. The transformation and utilization of natural habitats does not harm them easily (Ibisch 1998).

All of the new species described in this article are known only from their type localities and may be local endemics. In the case of *Puya claudiae*, its habitat, the valley of "El Fuerte" has been disturbed and influenced by humans for many centuries and now cattle grazing is the most important impact on the vegetation (Ibisch *et al.* 1996). They will survive if the land use does not change dramatically. *Pitcairnia amboroensis* lives on steep rock cliffs within the canyons of the Río Surutú river system where human intervention can not easily harm the populations. *Pitcairnia longissimiflora*, more than the other species, could be regarded as a forest species at least needing intact riparian vegetation. It has been found within a private reserve on the border of Amboró National Park used for a restricted eco-tourism. Therefore there is currently no danger for the (type) population that can be identified.

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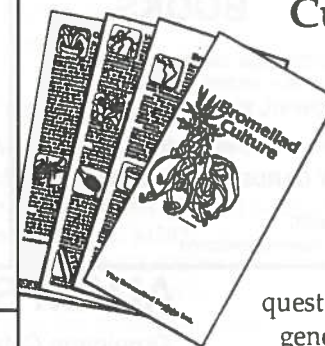
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Seed Fund: Harvey C. Beltz, 6327 South Inwood Road, Shreveport, LA 71119-7260.

Slide Library: Christopher Krumrey, 5206 Robinsdale Lane, Austin, TX 78723

Web Site: Dan Kinnard, 6901 Kellyn Lane, Vista, CA 92084.

World Conference: Hattie Lou Smith, 3460 River Run Lane, Ft. Myers, FL 33905.



Photograph by John Anderson

## A colorful Bigeneric

x *Guzvriesea* 'Marian Oppenheimer' has been around for almost 30 years, but surprisingly, is infrequently found in collections in spite of its many good traits. Its conspicuous cherry to wine-red inflorescence lasts in color for many months, it is a small to medium-sized plant, and it is easy to grow. The yellow flowers are said to rarely mature. The plant is a Deroose-Waterschoot hybrid between a cultivar of *Vriesea* 'Viminalis-Rex' x *Guzmania lingulata* v. *minor*.

## Calendar

- |              |   |
|--------------|---|
| 31 Jul-1 Aug | The South Bay Bromeliad Associates will present their 31st annual bromeliad show and plant sale at the South Coast Botanic Garden, 26300 South Crenshaw Blvd., Palos Verdes Peninsula, California. Show Noon to 4:30 p.m. on Saturday and 10 a.m. to 4:30 p.m. on Sunday. Plant sales hours on both days are from 10 a.m. to 4:30 p.m. There is an admission fee to the botanical gardens which include entrance to the show and sale. Contact: Bryan Chan. (818) 787-4265 or e-mail BCBROME@aol.com. |
| 31 Jul-1 Aug | The Sacramento Bromeliad Society will hold its annual show and sale at the Shepard Garden and Arts Center, 3330 McKinley Blvd, Sacramento, California. Hours for both the show and sale are from 10 a.m. to 4 p.m. on both days. Contact: Keith Smith (530)823-0203.  |
| 28-30 Aug    | Bromeliads X, hosted by the Cairns Bromeliad Study Group will be held at Cairns in Queensland with a full program of show, plant sales, seminars, tours and other conference trappings. For more information see the Bromeliads X website at <a href="http://members.xoom.com/bromeliads10">http://members.xoom.com/bromeliads10</a> or contact Lynn Hudson 0740-533-913.   |
| 18-19 Sep    | The River Ridge Bromeliad Society show and sale will be held at the Esplanade Mall, 1401 W. Esplanade, Kenner AL. Show hours 1-9 p.m. on Saturday, noon to 6 p.m. on Sunday. Sales are from 10 a.m. to 9 p.m. on Saturday, noon to 6 p.m. on Sunday. Contact: Al Alcock 607-799-4813.   |