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Editor: Thomas U. Lineham, Jr., 1508 Lake Shore Drive, Orlando, Florida 32803-1305

Editorial Advisory Board: David H. Benzing, Gregory K. Brown, Harry E. Luther, Robert W. Read, Walter Till.

Cover photographs: Front: *Tillandsia velickiana.* The long-standing confusion about this species is cleared away by Harry Luther's explanation on pages 59–63. We thank Honorary Trustee Marcel Lecoufle for the photograph. Back: *Tillandsia belloensis.* The validity of this species is asserted by Renate Ehlers in a brief discussion on pages 74–75. Photo by R. & K. Ehlers.

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Revalidating the Status of an Old Species

Elton M.C. Leme and Walter Till

In 1880, the director of the Imperial Gardens of Rio de Janeiro, August Glaziou, introduced to Europe an ornamental vriesea collected in Brazil but without an accurate description of the exact place of collection. It flowered for the first time during September 1882 and two years later it was described by Edouard Morren as *Vriesea warmingii,* honoring Johann E.B. Warming (1841–1924), professor of the Royal Academy of Sciences of Copenhagen.

Transferred to the genus *Tillandsia* in 1888 by J.G. Baker, it was returned to *Vriesea* in 1935 by C. Mez, although he considered it a synonym of *V. ensiformis* (Vellozo) Beer. In 1943, L.B. Smith treated it as a variety of that species.

On the basis of newly collected material, at first supposed to be a new species, we re-identified the Warming species, verifying enough differential characteristics to reestablish its original status as conceived by Morren.

Vriesea warmingii E. Morren, Belg. Hort. 34:260, pls. 12–13; 1884.

Tillandsia warmingii (E. Morren) Baker, J. Bot. London 26:104; 1888.

Vriesea ensiformis var. *warmingii* (E. Morren) L.B. Smith, Arq. Bot. S. Paulo 1(5):116; 1943.

Plant saxicolous or terrestrial, flowering 1–1.4 m high. *Leaves* 25–30, suberect-arcuate, forming a broad funnelform rosette; *leaf sheaths* suboblong, ca. 16 cm long, 8–9 cm wide, very inconspicuously but densely brown-lepidote on both sides, pale but sometimes brownish at base and wine colored outside and toward apex; *leaf blades* linear, very slightly if at all narrowed toward base, apex acute and apiculate, 90–100 cm long, 5–5.5 cm wide, green or dark wine-colored abaxially, glabrescent. *Scape* 40–60 cm long, ca. 1 cm in diameter, erect, greenish to dark reddish, glabrous; *scape bracts* narrowly ovate, acute, the lowest ones conspicuously apiculate, glabrescent, equaling to exceeding the internodes and clasping the scape, imbricate. *Inflorescence* simple, erect, many-flowered, lax only at anthesis, 50–60 (-70) cm long, ca. 11 cm wide, overtopping the leaves; *rachis* stout, nearly straight, slightly angled, usually dark red, ca. 7 mm in diameter; *floral bracts* ovate, acute to subrounded and inconspicuously apiculate, ca. 5 cm long, ca. 3 cm wide, very obscurely lepidote toward apex, ecarinate, slightly shorter to equaling the sepals, yellow with green apex, the base truncate, enfolding the flowers; *flowers* 25–34, to

Figure 1.
Vriesea warmingii, Morren, plates 12 and 13 Belgique horticole volume 34, 1884.

W. Till

Figure 2
Vriesea warmingii In habitat.

E.M.C. Leme

70 mm long, laxly distichous and spreading at anthesis (never reflexed), longer than the internodes, producing mucilage; *pedicels* stout, ca. 10 mm long, ca. 8 mm in diameter, green; *sepals* free, narrowly lanceolate-elliptic, subobtuse, ca. 40 mm long, ca. 15 mm wide, greenish yellow, very inconspicuously lepidote inside, ecarinate; *petals* linear, 47–55 mm long, ca. 10 mm wide, yellow, apex rounded and strongly recurved at anthesis, connate at base for 7 mm, bearing 2 subspathulate appendages at base with apex 9 mm in length and 4 mm in width, acute to irregularly dentate; *stamens* exserted; *anthers* ca. 10 mm long, fixed near the base, apex and base obtuse; *stigma* green, convolute-bladed, the lobes 1.5 mm long with strongly crisped margins.

Material examined: Brazil. Rio de Janeiro: Serra das Piabas, Barra das Piabas near Barra de Guaratiba, coll. *Elton M.C. Leme 1869,* March 23, 1992 (HB, WU).

About 10 years ago, *Vriesea warmingii* was collected by plant vendors who offered it along roads at the extreme south region of the city of Rio de Janeiro. We were informed recently of the exact locality of the natural populations, and it was not difficult to reach the desired place near Barra de Guaratiba at an elevation of 50–100 meters. Roberto Burle Marx lives within the area of distribution of this species, and that explains why it has been known as the "vriesea of Burle Marx" in local nurseries.

Vriesea warmingii grows in a comparatively dry watershed of a ridge of low mountains partially covered by a kind of Atlantic forest. As a shade-lover, it was found terrestrially or on rocks (never epiphytically) under the protection of trees. At the collection site, the dark wine-leafed specimens predominate, although occasionally completely green-leafed plants were also observed.

Really, *Vriesea warmingii* is very closely related to *V. ensiformis* as reported by its author and followed by the other specialists. The main differences are:

plant flowering 1–1.4 m high;

terrestrial or **saxicolous** (vs. ca. 70 cm high and epiphytic);

inflorescence 50–70 cm long (vs. 30–40 cm);

floral bracts ca. 5 cm long, yellow with green apices (vs. ca. 4 cm and red throughout);

flowers ca. 7 cm long, producing mucilage (vs. ca. 50 cm long), with longer sepals and petals.

Nowadays the Warming species is assumed to be restricted to the reported region of Barra de Guaratiba because the neighboring ecosystems of

similar nature have been completely destroyed by urban expansion. It is likely that the type specimen collected by Glaziou came from the lowland forest area very near to the then much smaller imperial city of Rio de Janeiro.

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Rio de Janeiro, Brazil / Vienna, Austria

WE ARE VERY GRATEFUL TO THE MEMBERS who contributed to the Color Fund, or who made undesignated gifts to the society, during the past year. Such gifts are important to our continued financial health. We appreciate the thoughtful generosity of:

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A New *Vriesea* from the Venezuelan Amazonas

Ivón M. Ramírez and Germán Carnevali F.C.[1]

The genus *Vriesea* Lindley comprises about 300 species widely distributed in the Neotropics. It is especially well represented in Costa Rica and eastern Brazil (Smith & Downs 1977; Utley, 1978).

The Amazon basin is particularly species-poor in *Vriesea,* with about 25–30 species; a few of these such as *V. heliconioides* (Humboldt, Bonpland & Kunth) Hooker ex Walpers, and *V. platynema* Gaudichaud are wide-ranging. Most of the Amazonian species, however, are restricted to limited geographic areas or particular vegetation associations.

The northwestern portion of the Venezuelan Guayana is characterized by the presence of large, granitic outcrops, locally called "lajas," that support a highly specialized and diversified flora. They also provide a home for a mixture of Amazonian, Guayanan, and dry-forest elements, plus an important endemic component (Steyermark 1982).

These lajas are 80–300 and even up to 1500 meters above sea level in elevation. Several of the tank-forming *Vriesea* species in this region tend to grow as lithophytes on the lajas under the shade of medium-height forest or thick-leafed scrub. These include the endemic *V. bi-beatricis* Morillo, *V. sulcata* L.B. Smith, *V. fibrosa* L.B. Smith, *V. wurdackii* L.B. Smith. An additional species has proved to be new to science and is described here.

***Vriesea melgueiroi* I. Ramírez & Carnevali, sp. nov.**

Species haec *V. viridiflorae* (Regel) Wittmack ex Mez sed foliis discoloribus rotundatis apiculatis; sepalis longioribus bracteis superantibus; petalis ellipticis acutis differt.

Plant flowering to 65 cm high. *Leaves* chartaceous, 10–15 in a spreading rosette 38 cm long; *sheaths* elliptic, large, densely and minutely appressed lepidote, 7.5–9.5 cm long, to 7 cm wide; *blades* ligulate, 23–27 cm long, broadly obtuse and apiculate, 5.5–7 cm wide, glabrous and dull green above, deep reddish purple beneath, obscurely lepidote. *Scape* suberect, to 7 mm in diameter, glabrous; *scape bracts* erect and enfolding the scape, little surpassing the internodes and then imbricating, scarious, elliptic, subacute and apiculate,

[1] Fundación Instituto Botánico de Venezuela, Apartado 2156, Caracas 1010-A, Venezuela; Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166-0299.

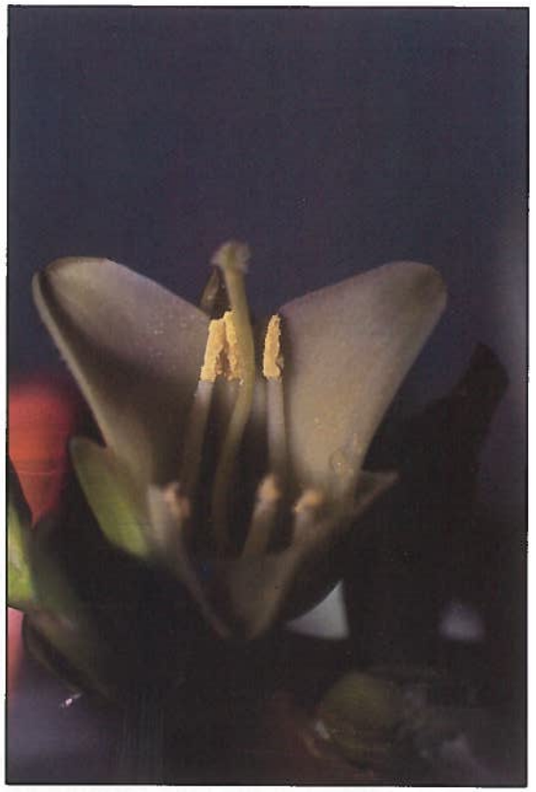
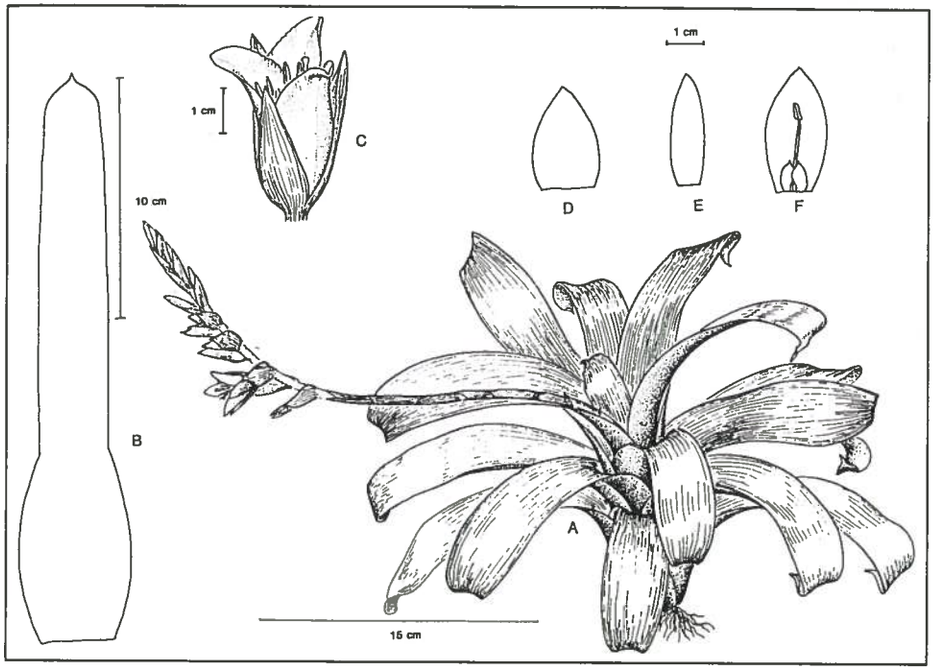


Figure 3.
Vriesea melgueiroi, flower with stamens and style at anthesis.

F. Oliva-Esteva

4–5 cm long, 1.4 cm wide. *Inflorescence* simple, 15-flowered, 18 cm long, dense at anthesis; internodes 8–11 mm long, glabrous; axis thick, somewhat 3-angled in cross-section. *Floral bracts* becoming secund with the flowers at anthesis, oblong ovate-elliptic, obtusely acute and apiculate, 2.5–3.4 cm long; 1.7–1.9 cm wide, distinctly surpassed by the sepals at anthesis, green, membranaceous, convex, subcoriaceous when dried. *Flowers* secund, with nocturnal anthesis, campanulate. *Pedicels* thick, terete, 5–7 mm long. *Sepals* green, elliptic, acute, dorsally subcarinate, 2.7–3 cm long, 0.9–1.1 cm wide. *Petals* elliptic with spreading tips, ice green when fresh, submarginate, acute, 33–36 mm long, 2 cm wide, bearing two lobed scales basally, adnate to the petals for one half of their length, entire, elliptic and acute, 13 x 7 mm; *stamens* shorter than the petals and subequaling the sepals; *style* subequaling the petals, green as the stigma. *Stigma* convolute blade, with stigmatic surface in the distal portion of the lobes. *Fruits* narrowly cylindric.

Type. Venezuela. Territory of Amazonas: Dept. Atures, Río Sipapo, 4–5 km above the mouth of the Río Guayapo, Laja granítica Zamuro, 4° 30' N., 67° 30' W, 80–100 m elev. Collected Feb. 21, 1985, flowered under cultivation



Bruno Manara

Figure 4.
Vriesea melgueiroi I. Ramírez & Carnevali. A, flowering habit; B, leaf; C, lateral view of flower at anthesis; D, floral bract flattened; E, sepal flattened; F, petal, scales, and stamen.

in Maracay, Venezuela, 27 May 1988, *G. Carnevali & I. Ramírez 2653* (Holotype VEN). Paratype: (same locality as the holotype) 21 Feb. 1985. *F. Guánchez, G. Carnevali & E. Melgueiro 3959* (TFAV). (Sterile specimen).

Vriesea melgueiroi belongs to subgenus *Vriesea,* Sect. *Xiphion* and seems most closely related to *V. viridiflora* (Regel) Wittm. ex Mez, a species distributed from Central America to Ecuador and the Guianas. The most important differences between *V. melgueiroi* and *V. viridiflora* are listed in Table 1.

Table 1.

Comparison between *Vriesea melgueiroi* and *V. viridiflora*

Character	*V. melgueiroi*	*V. viridiflora*
Leaves	discolorous	concolorous
Leaf apex	broadly obtuse and apiculate	attenuate and acuminate
Sepals	1.5–1.9 (2.1) cm	2.7–3 cm
Petals	oblong, subtruncate	elliptic, acute

Vriesea melgueiroi grows in dense colonies in shade on granitic outcrops in rain forests at altitude of 80–100 m, while *V. viridiflora* is an epiphyte inhabiting rain- or cloud forests at 600–1,100 m. altitude.

We name this species in honor of Emidgio Melgueiro, former assistant at the herbarium Territorio Federal Amazonas Venezuela (TVAS) whose knowledge of the flora of southern Venezuela has been valuable on many botanical expeditions.

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ACKNOWLEDGMENTS. We are indebted to the late Julian Steyermark and the Flora of the Venezuelan Guayana Project (Missouri Botanical Garden [in progress]) for permitting us to use Bruno Manara's plate (figure 4); to Francisco Guánchez, who organized the trip during which this plant was collected; to the M.B. Foster Bromeliad Identification Center for providing the first author with an internship; to Harry E. Luther for his criticism of this article; to Francisco Oliva-Esteva for use of the color photograph.

THE BROMELIAD SOCIETY OF CENTRAL FLORIDA has contributed most generously to the Victoria Padilla Memorial Bromeliad Research Fund in memory of Glenna (Mrs. Edward C.) Simmons, a charter member who died in September 1992.

During the 1970s when Glenna and Ed were travelling and collecting bromeliads, she wrote frequent notes for the *Journal.* She was not one to elaborate, but she wrote carefully. On thinking about her accounts, we wonder what has happened to travellers. Who are they and why are they not writing? Are they not travelling? Are they recording their adventures for us on camcorders?

In the early days of the Bromeliad Society of Central Florida, a regular event was the arrival of Glenna and Ed Simmons. Quiet smiles, gentle handshakes; a rush to the plant sales table to see what they had brought as gifts. No pots, no special grooming, but unusual specimens. As Carol Johnson has said, some of us can remember friends by their gifts: "Good morning, Dr. Taylor," "Good morning, Dr. Dexter, Mr. Foster....

Thank you, BSCF members, for your gift. As the Padilla Fund grows, dividends for research grants will increase and so will the number of bromeliad researchers, to our eventual benefit.—TUL

Misnamed Bromeliads, No. 13: *Tillandsia velickiana*

Harry E. Luther

One of the most confusing and frequently misidentified species of cultivated *Tillandsia* is *T. velickiana* L.B. Smith (cover photograph). Opinions regarding its identity and status have varied widely and changed rapidly. My own "Explanations For Taxa No Longer on the Bromeliad Binomial List," BIC, 1 May 1992 (distributed to BSI affiliated societies), was caught in midstride, so to speak, with *T. velickiana* listed both as a synonym and as a valid name.

In the spring of 1992, I examined and compared types of *T. velickiana* and *T. matudae* L.B. Smith, supplemental material in herbaria and in cultivation, the original literature pertaining to those species (Smith, 1949, 1974a, 1974b), and the published account of the recently described species *T. feldhoffii* Ehlers (1990). It is now reasonably certain what taxa exist, how they should be circumscribed, and how most of the confusion developed. The following should clear up most of the misunderstandings.

In his original description of *T. velickiana,* L.B. Smith (1974a) compared Gerson Velick's new species to both *T. lepidosepala* L.B. Smith and *T. benthamiana* Klotzsch ex Baker (now *T. erubescens* Schlectendal). *T. velickiana* actually shares very few characters with the former but appears to be closely related to the latter differing, as stated in the Latin diagnosis, by a shorter scape, and scape bracts much shorter than the floral bracts. So far, so good!

Problems begin with the full English description. At this point, it must be explained that the sender, Velick, was not aware that his shipment of unknown Guatemalan tillandsias evidently contained two superficially similar species: the new *T. velickiana* and the earlier-described *T. matudae.* The stated petal color (white) was not observed by either Smith or Velick but was based on a description of another plant from the original shipment (undoubtedly a *T. matudae)* flowered by William Paylen (correspondence in the *T. velickiana* folder at the United States National Herbarium (US). In addition, a supplementary note (with the species name misspelled) in the *Journal of the Bromeliad Society* (Smith, 1974b) was illustrated with an excellent photograph taken by Kathy Dorr (G. Velick, pers. comm., 1992) of a well-grown *T. matudae.* I am certain that this photo along with the somewhat fragmentary and distorted state of the type specimen (one of the inflorescences is flattened and appears to be more or less distichously-flowered) was the main cause for C.S. Gardner's decision to sink *T. velickiana* into *T. matudae* (Gardner, 1983, 1986). Most of us followed her lead.

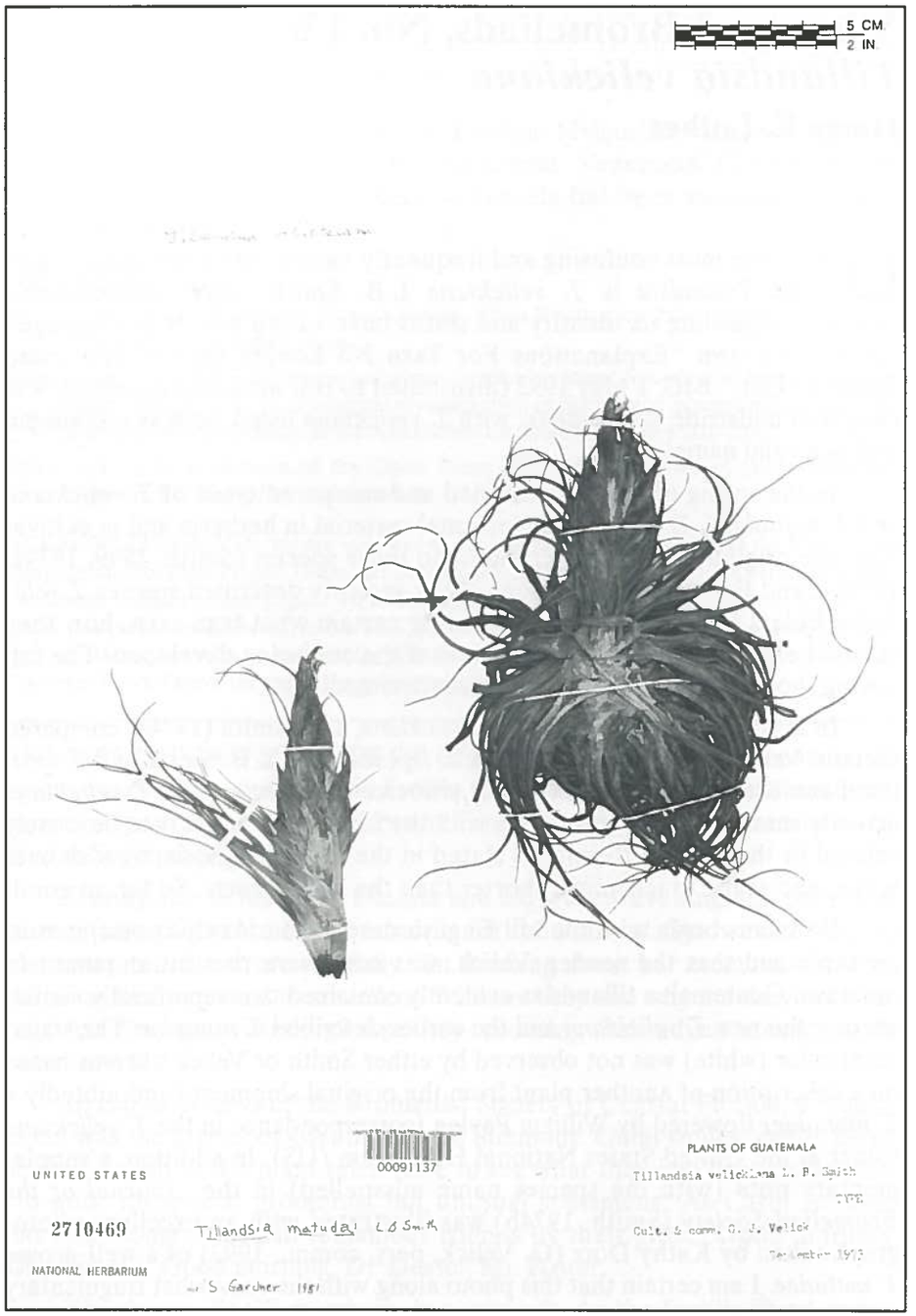
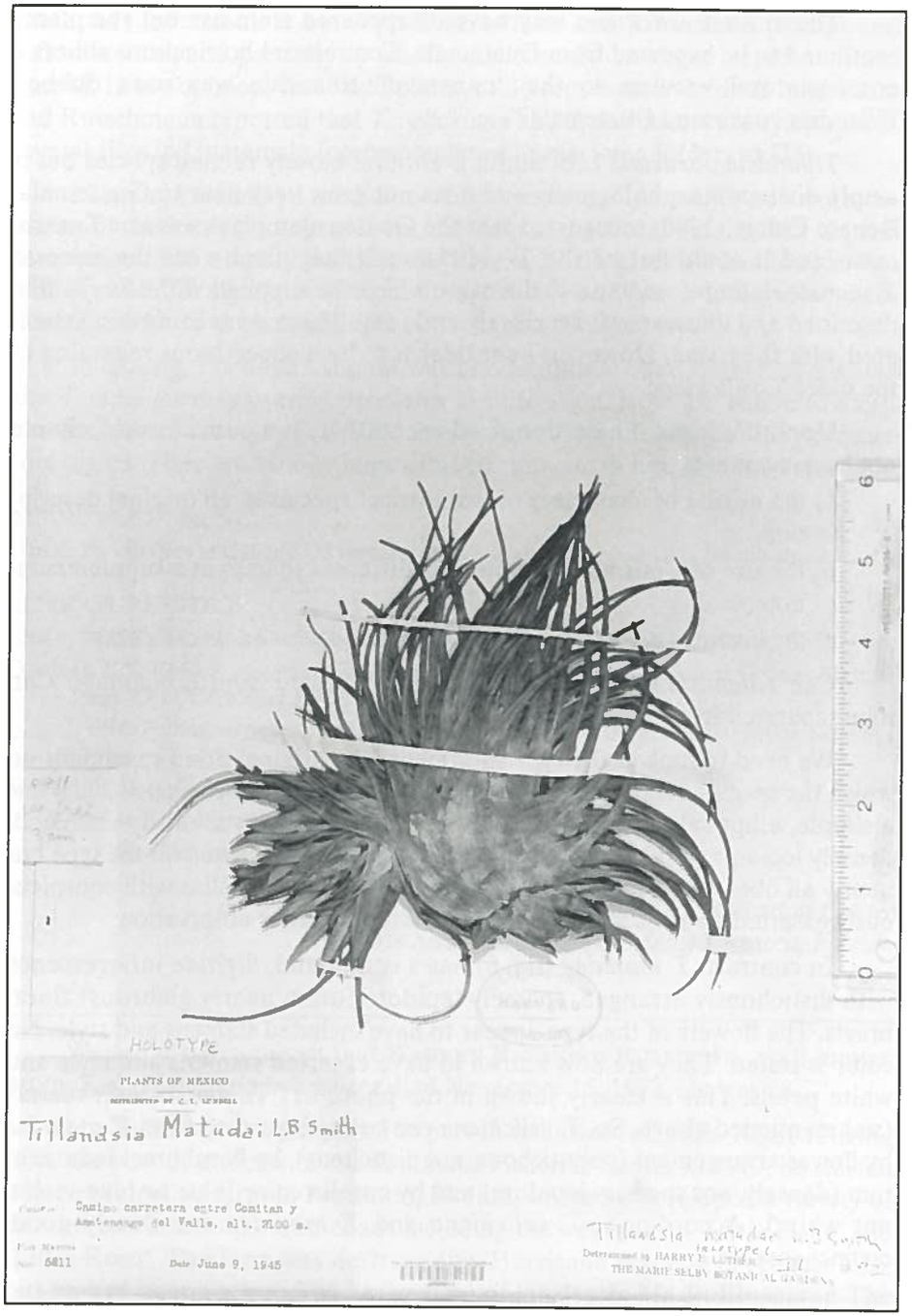


Figure 5.
Holotype specimen of *Tillandsia velickiana* L.B. Smith at the United States National Herbarium (US). Photo courtesy of the Dept. of Botany, Smithsonian Institution.



Vern Sawyer for Selby Gardens

Figure 6.
Holotype specimen of *Tillandsia matudae* L.B. Smith at the Gray Herbarium, Harvard University.

The epithet *velickiana* may have disappeared from use but the plants continued to be exported from Guatemala. Commercial horticulture abhors a nomenclatural vacuum so the "unnamed" tillandsia was soon dubbed *Tillandsia* "oaxacana Guatemala."

Tillandsia oaxacana L.B. Smith is another closely related species but is amply distinct morphologically and does not grow very near to Guatemala. Renate Ehlers (1990) recognized that the Guatemalan plant was not *T. oaxacana* (and it could not be the *T. velickiana* if that plant were the same as *T. matudae*); therefore, it needed a name which she supplied: *T. feldhoffii.* She described and illustrated it accurately and fully. There is no confusion associated with the name. However, I consider it to be a superfluous renaming of the older *T. velickiana.*

Up to this point, I have described events that, in a perfect world, should not have occurred:

a) the mixing of characters of two distinct species in an original description,

b) the use of a misnamed photo of a different species in a supplemental note,

c) the erroneous synonymizing of a good species and its renaming.

Can *Tillandsia velickiana* really be distinguished from *T. matudae*? Can it be separated from *T. feldhoffii*?

We need to look at the type specimens (the original dried specimens on which the species author based their names). Note that *T. velickiana* (fig.5) has a simple, elliptical inflorescence with more or less polystichously-arranged, densely lepidote floral bracts. No mature flowers are preserved on the type but nearly all observers report blue or blue-violet tubular corollas with conspicuously exserted stamens and style. I concur with the latter observation.

In contrast, *T. matudae* (fig. 6) has a compound, digitate inflorescence with distichously arranged, sparsely lepidote (often nearly glabrous) floral bracts. The flowers of the type appear to have included stamens and style. No color is stated. They are now known to have exserted stamens and style and white petals. This is clearly shown in the photo of "Tillandsia velickeana" (sic) mentioned above. So, *T. velickiana* can be distinguished from *T. matudae* by flower arrangement (polystichous, not distichous), by floral bract indumentum (densely, not sparsely lepidote) and by corolla color (blue or blue-violet, not white). Accordingly, *T. velickiana* and *T. matudae* are clearly good, distinct species.

It must be mentioned that both Drs. W. Rauh and J. Rutschmann understood the problems back in 1975 (correspondence in specimen folders at US) but did not elaborate or clarify matters in the literature. The reason may have been the existence of specimens (cf. *Rauh 38838, 38842, 44063* at US) with

characters intermediate between *T. velickiana* and *T. matudae* (compound inflorescences and partially or wholly distichously-arranged, lepidote floral bracts). In my opinion, these odd plants could represent hybrids as both Rauh and Rutschmann reported that *T. velickiana* and *T. matudae* were sympatric at several sites in Guatemala (correspondence in specimen folders at US).

I have not examined the holotype specimen to *T. feldhoffii,* but my evaluation of the habit photograph, the drawing of the floral details, and the full description in its original publication (Ehlers, 1990), gives me confidence that it does not differ significantly from the type of *T. velickiana.* I, therefore, consider *T. feldhoffii* to be a synonym of the earlier *T. velickiana.*

In closing, I believe I should warn horticulturists that both *T. velickiana* and *T. matudae* may present problems in cultivation. Both are native to moist pine/oak cloud forests of ca. 2000 m elevation. This means that they require cool nights. They are usually impossible to cultivate in hot, lowland areas.

ACKNOWLEDGMENT:

I thank the curators at GH and US for making critical specimens available for this study.

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

We are sorry to report that **Harvey Raymond Bullis, Jr.**, well-known bromeliad grower and hybridizer died November 15, 1992. He was 68.

Mr. Bullis was a recognized expert in fisheries research. After retiring from the post of director of the Southeast Fisheries Center in 1979, he started a large bromeliad farm in Princeton, Florida, where he developed a variety of interior and landscape bromeliads including the well-known 'Little Harv' and 'Little Rose'. The farm was destroyed by Hurricane Andrew in August 1992 but he had begun rebuilding at the time of his death. Mr. Bullis served The Bromeliad Society, Inc. as director from 1988 through 1990.

[We are indebted to The Miami Herald, *Nov. 27, 1992, for much of this information.]*

The Bromeliads of Brazil

[Continued from January–February 1993]

Mulford B. Foster

THE EPIPHYTIC RELATIVES

Before going to Brazil our interest in bromeliads was focused on the epiphytic types. From a decorative standpoint and because of their interesting way of life, we found them completely fascinating. The epiphytic types were found in the rain forests all along the coastal areas where it is high and cool at night yet warm during the day, where frequent rains or heavy dew supplied their water. The trees were laden with a dazzling profusion of bromeliads and other epiphytes making unique pattern and design everywhere in the lush jungle.

We expected to find the epiphytes wherever there were moist areas. A ravine, a stream, or a swamp seemed to be the very choicest spot for them. But one of the greatest surprises and disappointments came when we collected in the huge swamp areas of Matto Grosso. We had come by train from eastern Brazil to the far west, where the Rio Paraguay cuts through South America's largest swamp. Up the river we had traveled for miles and had seen countless thousands of trees, but they were barren of bromeliads. Only where there is an elevation will be found trees and rocks that may harbor a few epiphytes. If a similar swamp area occurred near the great jungles on the coast it would be a paradise for the epiphytes, as well as for the collectors who enjoy finding them.

The high plains between the vast swamp area and the jungles of the coast section have been the "Green Hell" barrier that these moisture-loving plants could not cross. A few Tillandsias that disperse by means of wind-blown plumose seeds have flown over those dry areas, and a few drought-resisting tubular types of Billbergias and Aechmeas have also come most of the way. It would be interesting to go back there a few thousand years hence to see what descendants will be developed from some of these pioneers, for certainly the migration to this, geologically speaking, young territory will produce interesting new species.

In the great primeval forest at the Cacão Experiment Station in Agua Preta, Bahia, we found a lush jungle garden, a plant paradise for eager collectors. Great masses of climbing begonias startled us, Philodendrons of fantastic

shapes and design blended in an ornate pattern with Calatheas and Tradescantias of fancy foliage, and ferns crowded every available opening on trees, rocks, and ground. Many areas were almost impossible to walk through. If we were not being tripped by stout cords of lianas, thorny leaves and treacherous small palms were always reminding us of the things on the ground and interfering with our more ethereal aspirations of looking for the epiphytic beauties above us.

There in the "upper strata" we found two huge epiphytes, both new species. These plants, *Aechmea conifera* and *Aechmea depressa,* were giants among epiphytes. The flower head alone of *Aechmea conifera* weighed nearly 12 pounds and measured 18 inches in length, resembling a huge pine cone. This plant was reposing serenely and securely in the crotch of a limb over 80 feet from the ground. Secure it was until, with the assistance of three human "monkeys," we succeeded in loosening it from its aerial home and with ropes lowered it to earth. This epiphyte, including its several side shoots, weighed considerably over 125 pounds. From the ground this *Aechmea* did not greatly differ in appearance from *Aechmea depressa,* but the field glasses helped to convince me that it was another species. That meant another tough climb.

To climb these huge trees one most resort to monkey tactics and not try to tackle first the tree he wishes to conquer. A small tree possibly 50 feet away may be the first one to climb, for its upper branches will intermesh with those of the larger tree. And so with the assistance of ropes and vines the climber finally reaches the lower branches of the giant tree and then all he has to do is to finish the climb and get the plant, which may be accomplished in another hour or two.

But we forgot all about the difficulties of getting it when our thoughts turned to the perseverance and determination that a plant must have to be able to live perched at such a precarious height. With its huge reservoir to catch rain and vegetable matter it builds a body heavier than almost any of its terrestrial cousins, with the exception of some of the great Puyas of the high Andes. These great Aechmeas often hold from 1 to 3 gallons of water, which not only serves the plants themselves but also becomes a breeding place for animal life and even aquatic plants. Utricularias and aquatic mosses and algae are often found living in some species. In various specimens we found lizards, frogs, scorpions, small snakes, centipedes, various insect larvae, roaches, ants, and bees, some preferring a particular type of bromeliad. The frogs that find a permanent residence in the deep, dark cylinders and cups of the bromeliads interested us most, and we made a small collection of them for Dr. Lutz. She has stated that "bromeliads make frogs independent of climate and environment, by creating a special environment."

[continued on page 80]

The Genus *Bromelia* in Venezuela, Part III: *Bromelia chrysantha* and *Bromelia pinguin*: two edible species

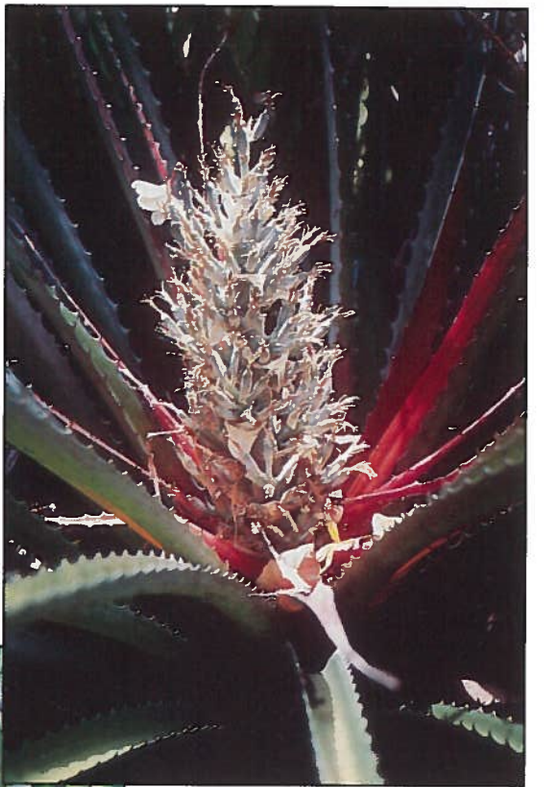
Ana Rousse

Since 1498 when Columbus sailed along the northeastern coast of Venezuela and the island of Trinidad, the existence of *Bromelia chrysantha* and *Bromelia pinguin* have been known. It was Marc de Civrieux, ethnobotanist and anthropologist, whose book entitled The Caribs and the Spanish Guiana Conquest, made evident the importance of these species in the life of the Caribbean tribes. The fruits, called "mayas" were edible and they had medicinal properties such as sedative medicines of the nervous system and as vermifuge drugs. They were very useful also for the fibers used for manufacturing ropes used in the making of hammocks.

At present, all the significant importance of the edible *Bromelia* genus seems to be forgotten. When travelling around most of the coast of Margarita

Author

Figure 7.
Bromelia chrysantha inflorescence with two small, yellow flowers.



F. Oliva-Esteva

Figure 8.
Bromelia pinguin a large inflorescence with white and pink flowers.

F. Oliva-Esteva

Figure 9
Fruits of *Bromelia pinguin*, illustrating the yellow color and mealy powder covering.

Island, Araya, Paria, the Gulf of Cariaco, and the northern coast of Anzoategui, I noticed that there is some confusion about the identification of these species. The native inhabitants call both species "maya" or "chiguichigue," and many times they have said that bromelias attract snakes.

Harvest time is during April and May. Cultivation is on a small scale, and the chief uses are as fences to mark property lines and as ornamentals in xerophytic gardens.

These species grow in the same habitat, the dry north coast, mixed with cactus, at an altitude of sea level to 600 meters, and they rather like to have a little shade. They gather in colonies and are found anywhere, especially close to roads leading to large villages.

Bromelia chrysantha (fig. 7) reaches a height of one and a half meters, with dense rosettes having elongated leaves, edged with curved spines. The leaves are dark green above and light green and scaled underneath.

The inflorescence can reach a length of thirty to forty centimeters with green scape and floral bracts. The flowers are light yellow, sweet-smelling, and they have three petals with a length of one centimeter. The fruit, called "maya" is elliptical, three centimeters in diameter, yellow, and smooth. It has a sweet and sour taste.

The *Bromelia pinguin* rosette is composed of numerous, elongated leaves reaching up to a height of two meters and with a width of four to five centimeters. The edges are armed with sharp spines one centimeter long.

At flowering time, the center of the plant turns intensely red. The inflorescence is conical and shows multiple pink and white flowers six centimeters long. The smooth petals are three centimeters long (fig. 8). The fruit is ovoidal, three centimeters long, yellow, with a leathery capsule and warty surface (fig. 9). The pulp is white, plentiful, with a sweet and sour taste. It is slightly aromatic. The seeds are brown.

In some regions the fruits are eaten baked or boiled in order to lessen the burning sensation they cause on the mucous membrane. This species is distributed in Mexico, West Indies, Venezuela, Guiana, Colombia, and Ecuador.

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Caracas, Venezuela

Tillandsia paleacea vs. *T. marconae*

Walter Till

Only a few tillandsias are able to live in the coastal desert of Peru and Chile. These species are listed in the following note.[1]

When the author published *Tillandsia marconae* as a new species in 1985, that taxon had been collected by R. Ferreyra in the same locality in 1958, it was known to L.B. Smith and cited by him in his monograph as *T. paleacea.*[2] His opinion was followed recently by that of Harry Luther.[3] The purpose of this communication is to demonstrate that while these species are related, they can be differentiated by several characteristics.

In the vegetative state, *Tillandsia marconae* is of more slender habit than *T. paleacea;* in cultivation, the leaves are more erect, narrow, and greenish (fig.10). Those characteristics have proved to be stable after ten years of cultivation. In nature, however, the plants have a more bluish grey appearance and can be distinguished easily from the sympatric *T. purpurea* with its brownish grey leaves.

Tillandsia paleacea has not been found in the type locality of *T. marconae,* nor in its vicinity. The inflorescence of *T. marconae* is borne on a shorter scape, it is smaller than that of *T. paleacea* and is composed of 2–4 flowers only (fig. 11).

Figure 12 shows the floral details of *T. paleacea* (upper row: a–g) and *T. marconae* (lower row: h–n). The sepals of *T. marconae* are ovate, broadly acute, shorter but broader than those of *T. paleacea,* which has lanceolate sepals with round apex. The petals of *T. marconae* are much shorter and narrower, the blade is only half as long as the claw, the latter being rather stout. In *T. paleacea* the petal blade is as long as and much broader than the claw. Differences can be found even in stamens and pistils: the anthers of *T. marconae* are shorter and more slender, the style is slender but distinct. In both cases the throat of the corolla is very narrow and the stamens are deeply included, the anthers are located a very short distance above the stigmas and form hood, more or less. We may assume that self-pollination is possible and advantageous under desert climate conditions.

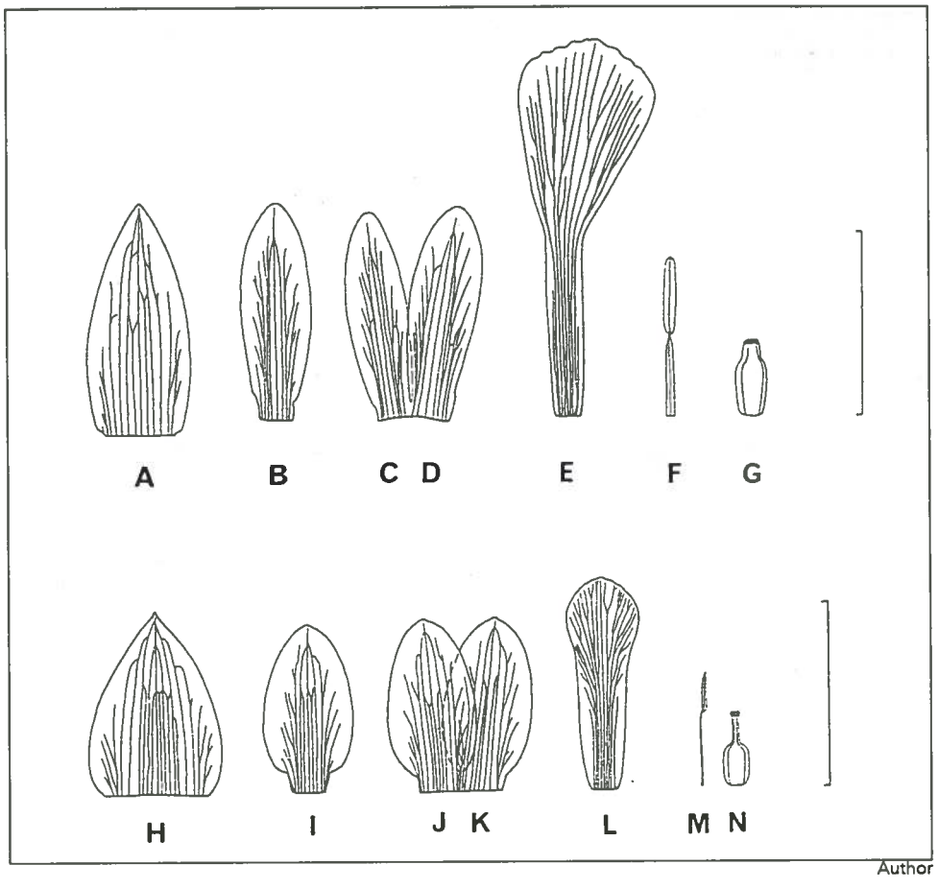
The distribution map (fig. 13) exhibits the known area of *T. paleacea* subsp. *paleacea* (black squares) and subsp. *apurimacensis* W. Till (black dots). The isolated position of the locality of *T. marconae* (reversed triangle) is striking. The locality of *T. kirschnekii* Rauh & W. Till has been added (upright

Author

Figure 10.
Comparison of the vegetative bodies of *T. marconae* (left; WT 234, from type locality) and *T. paleacea* (right; H. & L. Hromadnik 5350, near Lima).

Author

Figure 11
T. marconae, closeup of the inflorescence (WT 234, flowered 30 Oct. 1982 after two months in cultivation).



Author

Figure 12
Floral details of *T. paleacea* (upper row) and *T. marconae* (lower row): *T. paleacea:* A, floral bract; B, posterior sepal; C, anterior sepal; D, posterior sepal; E, petal; F, stamen; G, pistil; *T. marconae:* H, floral bract; I, anterior sepal; J–K, posterior sepals; L, petal; M, stamen; N, pistil.. Bar 25 mm in both cases.

triangle) as it is a narrowly endemic species evidently related to *T. paleacea.*

Smith and Downs (1977) give further citations for *T. paleacea* for Colombia and Bolivia. The specimens for Colombia have been reviewed by the author in the herbaria of the British Natural History Museum and of Kew Gardens and have been found to be *T. streptocarpa* Baker. No exact locality is given for Bolivia. The citation represents an old collection, which could have been made in modern Peru. For these reasons, the area of distribution has been restricted to Peru in this paper. The citation for Moyobamba in northern Peru is questionable and more probably also represents *T. streptocarpa.* The remaining area is rather uniform with the only exception of the isolated point in coastal southern Peru.

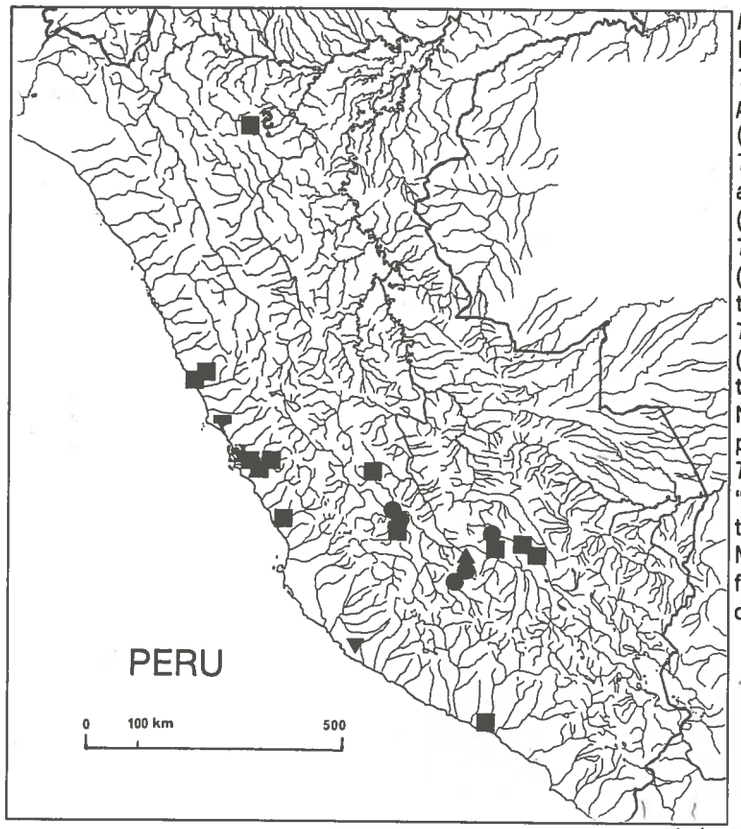


Figure 13
Distribution of *T. paleacea* subsp. *paleacea* (black squares), *T. paleacea* subsp. *apurimacensis* (black dots), *T. marconae* (reversed black triangle), and *T. kirschnekii* (upright black triangle). Note the isolated position of *T. marconae*. "?" indicates that the locality of Moyobamba given for *T. paleacea* is questionable.

Author

NOTES:

1. Subgenus *Allardtia:*
   Tillandsia latifolia Meyen
   T. tragophoba Dillon
   T. werdermannii Harms
   Subgenus *Anoplophytum:*
   T. geissei Philippi.
   Subgenus *Phytarrhiza:*
   T. marconae W. Till & E. Vitek
   T. paleacea Presl
   T. purpurea Ruiz Lopez & Pavón y Jiménez.
   Subgenus *Diaphoranthema:*
   T. capillaris R. & P.
   T. landbeckii Philippi subsp. *landbeckii*
   T. recurvata (L.) L. (the latter cited with reservation.)
2. Smith, L.B.; Downs, R.J. 1977. Tillandsioideae. Flora Neotropica. Monograph no. 14, pt. 2.
3. Kiff, L.F. 1991. A distributional check-list of the genus *Tillandsia.* Encino, California: Botanical Diversions.

Institut für Botanik, Universität Wien
A-1030 Vienna, Austria

San Diego World Bromeliad Conference, 1994

SAN DIEGO BROMELIAD SOCIETY PROUDLY SPONSORS AND INVITES YOU TO THE ELEVENTH WORLD BROMELIAD CONFERENCE, JUNE 15–19, 1994.

The World Bromeliad Conference of 1994 will be held at the Hanalei Hotel, San Diego, California from June 15–19, 1994. The San Diego Bromeliad Society has been busy with preliminary work since receiving approval by The Bromeliad Society, Inc. to sponsor the conference. Conference and hotel reservation forms will be mailed with the next issue of the *Journal.*

Experience the magic of a Hawaiian paradise right in the heart of San Diego. Located in Mission Valley just ten minutes from the San Diego Airport, the Hanalei is at the center of all the city's finest attractions.

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Comments on *Tillandsia belloensis*

Renate Ehlers

In the Distributional Check-List of the Genus *Tillandsia* by Lloyd F. Kiff there are two comments concerning *T. belloensis* Weber:[1] Harry Luther states that it might be synonymous with *T. polystachia* (Linnaeus) Linnaeus; Walter Till observed that it might be a natural hybrid of *T. polystachia* and some other species.

We collected the type specimen on the road to the Lagunas de Montebello in Chiapas in 1982. At that time the plant was very common in that area, but the only other bromeliad growing with it was a catopsis. In the meantime the area has been cultivated and few plants can be found. But the plant is widespread in Chiapas and Veracruz.

We have also found *Tillandsia belloensis* in the state of Chiapas near Ocozocoautla, near Tuxtla Gutiérrez, in the Sumidero Canyon, much of it near La Prusia, and in the state of Veracruz between Cordoba and Huatusco and near Jalapa. In the area of Ocozocoautla we found *T. polystachia* near the type location of *T. chiapensis* Gardner but no *T. belloensis.* We are sure *T. belloensis* is not a natural hybrid.

Although the author, Wilhelm Weber, compared *T. belloensis* with *T. mexicana* L.B. Smith, Luther is right: the plant is closely related to *T. polystachia.* It differs by the narrow-cylindric inflorescence with erect spikes adpressed to the main axis; the primary bracts are not much shorter than the axillary spikes but the sheaths of the basal ones are as long as the spikes, the blades much surpassing them; the flower spikes are one and one-half times as wide as those of *T. polystachia.* The plant is very consistently distinguished from *T. polystachia.*

My conclusion is that *Tillandsia belloensis* is a distinct species.

Stuttgart, Germany

[1] Weber, Wilhelm. Feddes Repertorium, Bd. 94, Heft 9–10:602–604; Dez. 1983.

Wilhelm Weber

Figure 14.
T. belloensis Weber, habitus, drawing Wilhelm Weber 21. 5.82 A, habit; B, spike with primary bract; C, floral bract; D, flower, postfloral; E, posterior sepals; F, anterior sepal.

Book Reviews

Tillandsien—Blüten der Lüfte, Jürgen Röth and Wilhelm Weber. Neumann Verlag Radebeul (Germany). 1991. 216 pages, 60 colored photos and 66 drawings; glossary, bibliography, index; illustrated hard cover; 26 cm. DM 58. ISBN 3-7402-0086-3. Order through your local bookseller.

The author acknowledges the help and encouragement of Wilhelm Weber who will be remembered for his many contributions to the Journal to improve our knowledge of bromeliads. There is an unusual amount of detail in the first 83 pages of this work, *Tillandsias—Air Plants,* concerning growing conditions, culture, diseases and pests, the botany of the genus, and instructions for displaying them. The text is in German. The next 133 pages, "Tillandsias from A to Z," include descriptions of more than 200 species with color photographs and drawings of many of them. There is an unusual amount of information in this book that is not entirely dependent on language. For example, each species name is given an accent mark to help with pronunciation (why has this technique not been used before?). Each species is identified with its subgenus and the etymology of each name is explained. The author has provided a series of symbols representing culture conditions including shelter, light, aeration, potting or mounting requirements. After you spend five minutes studying the list of symbols you will need to give just a glance to understand the recommended care of each species. Synonyms are included in the text. The drawings are reasonably large and exceptionally clear.

Tillandsia hobbyists will find this a very useful book but an English translation would be welcome. Careful study will show how difficult it is to keep up with the constant flow of additions and changes. One criticism is that the size of the plants is not shown in the drawings. Individuals may not feel like spending some $35 for this book but society libraries will find it a useful acquisition. Recommended for serious growers and for libraries.—TUL

Tillandsia Handbook, Hideo Shimizu, Atagawa Tropical & Alligator Garden, Japan Cactus Planning Co. Press, Atagawa, Higashi Izu Machi, Kamo Gun, Shizuoka 413.03 Japan. 36 pages, 120 color photos, text in Japanese with Latin binomials and English descriptions. Soft cover; 26 cm. In the United States order from Tropiflora, 3530 Tallevast Road, Sarasota, FL 34243; price $15.00 plus $2.00 for first class postage.

Here is a quick reference book. You certainly do not need to be able to read Japanese to use this picture book of nearly 150 species and there is a "Scientific name index." Each entry is clear and succinct. For example: "*T. achyrostachys* E. Morr. ex Baker. Mexico. 1990.3.19. Pink bract, pale green flower. Succulent leaves." "*T. aëranthos* (Loisel) L.B. Smith. Uruguay. 1990.4.6. Popular easy species. Prefer dry climate." The dates are not explained; perhaps they refer to the photographs of which each page has as many as six.

In contrast with Jürgen Röth's book (see above) this is one for beginners. Again, the size of the plants is not shown, but these are beautiful pictures of blooming plants. According to the author, a major part of the proceeds will be given to Dr. Alfred Lau to help support his work in Mexico with orphaned Indian boys. All tillandsia hobbyists should have a copy of this book.—TUL

In the May-June issue a third tillandsia book will be reviewed. Tillandsia people must be on the right track.

Calendar of Events *(Continued from back cover)*

1–2 May	La Ballona Valley Bromeliad Society Annual Show and Sale. Veterans Memorial Auditorium, Culver City (Overland Ave. at Culver Blvd.). Saturday, noon to 4:30 p.m.; Sunday, 10 a.m. to 4 p.m. Bromeliad display, plant sale, expert advice; potting demonstration both days at 2 p.m. Charlyne Stewart, 11335 Rose Ave., Los Angeles, CA 90066; 310-301-4118.
1–2 May	Saddleback Valley Bromeliad Society standard show and plant sale, Crown Valley Community Park, 29751 Crown Valley Parkway, Laguna Niguel, CA. Saturday: show 1 p.m. to 5 p.m.; sale, 9 a.m. to 5 p.m.; Sunday: show and sale: 9 a.m. to 4:30 p.m. Brandon Page, 1047 Oro St., Laguna Beach, CA 92651; 714-494-2051.
7–9 May	Bromeliad Society of Central Florida 18th Annual Show & Sale, Florida Mall, Orlando, Sand Lake Road (S.R. 482) and South Orange Blossom Trail U.S. 17-92-441). Friday and Saturday 10 a.m. to 9 p.m.; Sunday 12 noon to 6 p.m. The public is invited to enter plants for display or competition. Plant entries, Thursday, May 6, 9–11 p.m. to Mall north entrance. BSCF members only may brings plants for sale. Bud Martin, 1405 Pine Way, Sanford, FL 32773; 407-321-0838.
7–9 May	Bromeliad Society of Houston 25th Annual Show and Sale. Houston Garden Center, Hermann Park, 15 Hermann Ave., Houston, TX. Friday: entries and set up 1 p.m.; Saturday: sale 9 a.m.–5 p.m., judging 9 a.m.–2 p.m., show, 2 p.m.–5 p.m.; Sunday: show and sale 11 a.m.–4 p.m.Lou Trahan, 318-893-3059.
15–16 May	Bromeliad Society of South Florida Annual Show and Sale. Fairchild Tropical Garden, 10901 Old Cutler Road, Coral Gables, FL 33156. Details to be announced. Moyna Prince, 305-596-7582.

Please send 1993 show and related notices to reach the editor at least 60 days before publication date of the *Journal.* The deadline for May–June 1993 is 1 March 1993.

Regional Reflections

Deuterocohnia longipetala

Edward L. Sard has reported his experience with *Deuterocohnia longipetala* in the December 1992 issue of Bromeliana, the newsletter of the New York Bromeliad Society. He says, "I was just about to cut off the 3-foot, curved inflorescence last spring when I received the March-April, 1992, issue of the Bromeliad Journal. In it I read the...article by Charles Dills called, 'An Easter Tale'. Charles reported that his *D. longipetala* had first flowered in the spring of 1985 and then the same plant has flowered again every Easter. Now, I, too, have witnessed the impossible—a bromeliad that bloomed twice on the same inflorescence! Will it bloom a third time?"

We hope the timing of this note will encourage our readers to inspect their specimens of *D. longipetala* and to hesitate before cutting. We have searched the Bulletin/Journal for information about the flowering characteristic of this species without success although it has not been a secret. It is clearly stated in Dr. Rauh's book, Bromeliads (English language edition, 1979):

> A very decorative plant at flowering time, which is of very long duration; flowering continues from the same branches so these must not be cut off....

The new edition of the German text of his book (1990) is much more blunt:

> ...Nicht abschneiden, da sie mehrmals bluhen!

WHO OR WHAT IS FLORA NEOTROPICA? Sort of like, "Who is Sylvia? What is she...." Somebody is always referring to Flora Neotropica as if it were a book title, something like *Vascular Epiphytes.* This is the kind of mess that a nit-picking librarian enjoys. If you have a copy of the Smith & Downs monograph, turn the title page and look at the Library of Congress Cataloging in Publication Data. It says: Smith, Lyman B. (author), Bromelioideas [the publisher's typographical error] (Bromeliaceae) [title of part 3]. Below that are still more parentheses: (Flora neotropica; monograph no. 14, pt. 3).

So we have caught up with Flora. It seems that the Organization for Flora Neotropica, a UNESCO unit, failed to assign an overall title such as Bromeliaceae to the monograph and instead, gave each part a title. Flora Neotropica is merely a series title. It identifies a related group of publications. By 1992, the Organization for Flora Neotropica had assigned numbers to at least 56 monographs in that series. So, when you speak of Flora Neotropica which monograph do you mean?

In referring to scientific material it is nice to be accurate. With unflagging attention, therefore, the sometime librarian, now editor, writes up the citation in the library-approved manner while authors go along their scientific ways. Just remember that Flora is not what you might have thought her to be.—TUL

OUR SENIOR CITIZEN, without doubt, Honorary Member of the Seminole Bromeliad Society Mrs. Ella Kelly will celebrate her 105th birthday on 15 March 1993. We offer her our congratulations. Mrs. Kelly continues to be interested in bromeliad culture, national and local politics, and women's clothing styles. She likes to receive cards. Her address is: DeLand Convalescent Center, 451 S. Amelia Ave., DeLand, FL 32724. We thank Jeanne Tait, our Deltona member, for this information.—Ed.

NOTICE OF ANNUAL MEETINGS, CALL FOR BUDGET AND OTHER BUSINESS ITEMS.

Each officer, director, and president of affiliated society has in her/his possession a copy of the BSI Bylaws and Standing Rules, 1990, as amended. You are hereby notified that the annual general meeting will be held in Houston, Texas, on May 8, 1993, at such place and time as shall be announced, to consider such business as may be brought to the attention of the Board of Directors. All business matters must be sent in writing to the president at least 60 days before the meeting (Bylaws, Art. VII, part. 2).

The annual meeting of the Board of Directors will be held immediately after the general meeting. While the bylaws do not specify the 60-day written requirement for business matters the following schedule does apply:

1) 90 days before the meetings: send budget requirements and financial accounting to the treasurer. (Standing Rules 3 and 6).

2) 30 days before the meetings: submit annual report to the president and send copies to each officer and director. (Standing Rules 3 and 6).

3) 30 days before the meetings: the president will mail agenda to each officer and director. (Standing Rule 3 par. 2g).

The Bromeliads of Brazil *[continued from page 65]*

In dry areas of Matto Grosso I found one of the biggest and most curious of the tree frogs, known as *Hyla venulosa* because of prominent veins in the eye. I had a hard time dislodging this one. It seemed to be stuck to the inside of the *Billbergia zebrina* where it was hibernating through a dry season. I shook and shook the plant but finally had to cut it open, and when I pulled the frog out of the little "canoe" of the bromeliad leaf, my fingers were all glued together. The frog had immediately thrown out his smoke screen, or rather, his rubber screen. When I touched him, a pure white latex oozed out of every pore of his body.

I am very sorry now that we did not bring back a good supply of these frogs. In the later rubber famine we might have helped solve a national problem!

The bromeliads apparently depend more on color to attract the fauna that act as an aid to pollinization than on perfume which in most flowers attracts the insects. Nectar gatherers that seem to have a special accord with bromeliads are the darting hummingbirds whose small, nimble bodies can get between the most complicated parts of a bromeliad flower and whose long, thin bills are especially adapted for efficient use in the tubular or deep-set flowers. Judging by the frequency of seeing hummingbirds at a brilliant bromeliad flower and also by the fact that hummingbirds would frequently hover around the red rain coat Mrs. Foster sometimes wore, I would say that they are attracted to the long tubes of bromeliad nectar more by color than by perfume. In Brazil they call these dainty little birds most appropriately "beija-flora," the flower kisser.

THE TERRESTRIAL RELATIVES

The most familiar bromeliad is the terrestrial pineapple. Because of its delicious fruits, much desired by mankind, it has become a great globetrotter and now seems even to be most at home in the Hawaiian Islands far from its birthplace in Central and South America. Since the form of the pineapple plant is typical of that of other terrestrial bromeliads, the Bromeliaceae have become known as the "pineapple family."

The pineapple type of foliage is common to many of the terrestrial genera. The more compact spiny types such as *Deuterocohnia, Dyckia,* and *Encholirium* resemble each other so much in foliage that unless flowers are present it is almost impossible to identify them correctly. Being semisucculent and very efficient xerophytes, these plants withstand almost incredible conditions. In certain sections these formidable terrestrial bromeliads grow in such profusion that it is almost impossible to climb the rocky slopes, for the plants

are as well armed with spines as any cactus I know—in fact, they are often mistakenly called cacti.

Many of these extreme drought-resisting species, like most of the cacti and other succulents, have endured adverse conditions for so many centuries that such conditions have become normal for them—adverse only from our point of view. They are conditions under which they thrive, and should the plant fall from a ledge or a tree to a moist, cool, shady spot, it would probably die. If it did not, its growth would be weak and abnormally fast. They have developed hardy qualities and are seldom found in the soft, shady places where the more tender ones such as Vriesias, Nidulariums, Neoregelias, or Billbergias seek cloister.

Dr. Smith believes that *Puya* is the most primitive bromeliad, and he is convincing in his argument against Mez's contention that the most primitive bromeliad is *Navia.* He suggests that probably Puyas came into being in the high Andes and that their offspring, meeting new situations, produced the various other genera. I, too, surmise that Puyas originated in the territory that is now the Andes, but I suggest that they came into being before the Andes rose to their present height, and that as the environment is presumably responsible for creating the various genera, they developed from ancestors that have since become extinct.

But what about the genera, morphologically very close to *Puya,* that are now on the eastern edge of South America, such as *Cottendorfia, Encholirium,* or *Prionophyllum*[1] now isolated on the Atlantic coast of Brazil? Finding primitive types of bromeliads so far from their "parents," the Puyas, seems to indicate that in early ages many of these genera perhaps did not evolve from the Puyas but developed simultaneously as a result of their environment. *Encholirium, Lindmania, Deuterocohnia,* and *Cottendorfia* are similar in construction to *Puya,* but that does not necessarily mean that they descended from *Puya;* they could have evolved from other ancestors now extinct.

During the period of our two extensive trips into Brazil we collected in three extremes of country which produced the terrestrial species morphologically nearest to the primitive species of *Puya.* In the Matto Grosso on the Bolivian border we were as close to the "source" as our trip permitted.

Rising out of the vast marshes in southern Matto Grosso was the strange mountain Urucum, 2,000 feet high and 75 percent manganese ore. Dry areas were always presenting themselves in unexpected places in Brazil, and this was one of them. Instead of the usual moist, humid forest on the mountain-

[1] *Dyckia*

sides, we found a dry, dusty jungle of bamboos and dwarf trees through which for hours we hacked our way with sharp facão. It was here that we found *Deuterocohnia meziana,* that unique bromeliad whose 5- to 7-foot flower stem continues to bloom for years from the same stalk. It grows as well on limestone rocks overhanging the Paraguay River as on the manganese rocks. Unlike most of the bromeliads, this plant is caulescent. I have seen overhanging the high rocky ledges specimens probably 50 years old, with large, ridged trunks that gave them the appearance of prostrate yuccas.

In evolutionary development *Deuterocohnia* is so close to *Puya* that it seems to be but an advanced form of that genus "distinguished by the advanced characters of appendaged petals and woody habit."[2]

In central Brazil, on the edge of the high plateau in the state of Minas Geraes, we found other terrestrials that were relatives of the pineapple and close to the primitive form of *Puya.* This is a section of mines—gold, iron, and diamond. In every direction we could see the effect of the vast deposits of ores in the soil, and at evening the purple haze, mingled with red and yellow glints from the sun, made a glowing spectacle radiating earth colors seldom seed outside of a mining district.

It was in this section that Glaziou, the French botanist who spent the latter part of his life in Brazil, did considerable collecting. He was a bromeliad enthusiast, and in his years of collecting he discovered some 65 new species in this family, a greater number than any other collector had ever found. It was interesting to find many of his species, and in a number of cases our specimens were the first found since the type was named. It was a keen satisfaction to be able to collect two new Dyckias and three new Vriesias in the rather arid rocky areas of Minas Geraes (with promise of still other undescribed species in the material obtained).

In most of these rocky areas one would expect to find cacti, as in Mexico, but in parts of Brazil most of the soil is acid, whereas the regions of Mexico in which cacti thrive are alkaline. So in Minas Geraes cacti were the exception rather than the rule. We seldom found bromeliads and cacti together.

In southern Brazil our collecting was confined to Paraná, where *Dyckia encholirioides* was typical of the primitive terrestrials near *Puya.* Unlike other Dyckias, it grew on bare granite rocks on the Atlantic coast at as low an altitude as 6 feet above sea level. Its species name indicates how close are the Dyckias and Encholiriums. *Dyckia encholirioides* is one of the few Dyckias

[2] Smith, L.B., Geographical evidence on the lines of evolution in the Bromeliaceae. Sonderdr. Bot. Jahrb., Bd. 66, Heft 4, p. 460, 1934.

that have developed a trunk 7 or 8 feet long. Most of the Dyckias increased by stolons or side shoots and form bed masses of plants.

Clinging to the granite rocks in a similar position on the Atlantic coast, but much farther north in the state of Espírito Santo, we found a new *Encholirium.* This, too, had developed a prostrate trunk, and it might well have been named *Encholirium dyckioides,* but my description convinced Dr. Smith that the best name for the plant was *Encholirium horridum,* for my flesh was badly scratched and torn when I cut my way over a huge colony of these plants with their formidable, stiff masses of barbed leaves. This was the first species of *Encholirium* to show a branched inflorescence. It was the second new species in the genus for us, as we had discovered our first new one in Bahia and named it *Encholirium hoehneanum* in honor of Dr. F.C. Hoehne of São Paulo.

One of our trips took us into both dry and humid territory in Bahia, northern Brazil. Here was a wide range of conditions, varying from the hot sands of the sea coast, where we found our new *Hohenbergia littoralis,* to the dry caatinga similar to the mesquite lands of Mexico. In this dry, shadowless desert covered with thorny, harsh vegetation punctuated with a few tall cacti we found the new *Cryptanthus bahianus.* During our month there we added nine new species to the total from that state, including *Cryptanthopsis navoides.*[3] Of this latter genus only one species had ever been collected, and that by Ulé some 30 years ago. This interesting whorl of delicately spined, stiff, grasslike leaves grew in a moist ravine in extremely dry country, a habitat similar to that preferred by most species of *Cryptanthus.*

Under the open, thorny vegetation we found another individualistic bromeliad, *Neoglaziovia variegata.* The dull, brown-green leaves of this plant with their vivid whitish bands look at first glance like snakes. In Brazil it is one of the most useful bromeliads, having been used by the Indians for centuries—and now on a commercial scale—as a source of excellent fiber which is stronger than sisal and makes a cloth that is softer than linen. The natives call the plant *caroá* or *caraguata,* names that are also used for several other kinds of terrestrial plants that yield fibers.

I am convinced that the type of country tends to produce the change in plants that creates varieties and species, and certainly it is the adaptability of the bromeliads that has made the family so prolific. Plants with this quality, like people, go places and do things and make the best of a situation even if they have to change their color, habits, food, or methods of travel. Every hundred feet of elevation, and sometimes even every mile from the sea, one sees a change in the bromeliads. When soil conditions, rocks, precipitation, and air

[3] *Orthophytum navioides*

currents differ, the bromeliads which have adapted themselves to these changes will be different.

It was especially interesting to observe the continually changing parade of species during the ascent of Mount Itatiaya, which is nearly 10,000 feet high. At every rise of a few hundred feet, new bromeliads would appear, and then gradually disappear as we reached higher plant strata. And yet one *Vriesia* and one *Aechmea* started with us near the bottom and stayed with us until we had almost reached the top. But as we passed the tree line, they were left behind, although they attempted to stick it out on the sides of some of the large boulders. At the top, the exposure to wind and cold was too great for them, and they relinquished the territory to the *Fernseea itatiaiae,* the range of which is restricted to this mountain top. It is the sole member of its genus and seems completely satisfied with its isolation. It withstands frost, sun, wind, and drought and requires only the modicum of food that can be obtained from small crevices or cracks in the boulders.

Aechmea nudicaulis, on the other hand, has not been satisfied and has wandered all over the American Tropics. We found it in Mexico, Cuba, Trinidad, and Brazil; it is profuse in Central and South America. It lives in trees or on rocks in the coastal area and generally enjoys either sun or shade. With its range extending for thousands of miles, its plant form and its flower do not show as much variation as one would expect.

On the shadowless sand dunes of the Atlantic coast in the state of Espírito Santo we found another *Aechmea* as yet not definitely determined but undoubtedly close to *A. nudicaulis.* It is a stiff, gray-brown, tubular plant, almost metallic in texture. It grew right up to within a few years of the sandy beach. Almost by its side we found a new *Portea* with short, stiff 18-inch leaves. This same *Portea* we found again growing on mangrove trees in a swamp, just a few feet above the water. There its leaves were narrow, limp, and 6 feet long. The stiff *Aechmea,* however, refuses to grow rapidly no matter where you place it, and while it does change to a more greenish cast in color in certain locations, its growth still remains slow, stiff, and rough.

An example of what happens to certain plants if the conditions are changed is found in *Billbergia meyeri,* which I found in palm boots in harsh, dry country on the western border of São Paulo, where it was exposed to both extreme drought and torrential rains. We brought some of these plants back with us. Those that I kept in full light and gave no water retained their original shape; the plants kept in the shade made rapid growth and produced leaves three times their original length. When seeds of this species were planted, they germinated in 2 days; at the end of 4 weeks they were 6 inches high and ready to be placed in pots. At 3 months of age they were glabrous,

succulent, green as grass, and showed no trace of resemblance (as most bromeliads do even at an earlier age) to the parent plant, which is a gray-brown, blotched plant with a texture like emery paper.

Some of the species that have a wide range will vary so much in plant form, and at the same time have flowers so much alike, that they would exasperate almost any botanist. Again, there are many species, especially in the genus *Vriesia,* in which the plant forms appear to be almost identical, but which have entirely different flowers. I suspect that many botanists have passed by some of these more closely similar plants without realizing that there might be a new species among them.

I have had one advantage over the botanist who collects only blooming or fruiting material. I take the living specimens as well as the herbarium material, and the plants coming to bloom at a later date in my greenhouse have given me fresh material to be studied before the process of drying destroys certain characteristics. They have also given me flower material which I would otherwise not have procured unless I had made another trip in some other season.

From the hundreds of visitors who come to our Orchidario in Florida to see the plants we have gathered comes an almost universal exclamation: "It must be thrilling to go into the jungles and get all these wonderful plants! They see the romance only; we, too, see that romance as we look at the interesting flowers and plants. But we recall also other things that intensify the memories of tropical exploration—the bites of mosquitoes, carapatos, bichous, and giant ants, the stings of huge swarms of bees and wasps, the penetrating of areas where malaria, yellow fever, or Chagas' disease is prevalent, the difficulties of transportation, food, water, and shelter. And invariably the most beautiful flower is safely perched just beyond the point that is possible to reach.

And not the least of these memories is the preparation of thousands of herbarium specimens. These specimens may have to made from a 14-pound juicy flower head or from stiff, spiny leaves 9 feet long. They must be preserved regardless of the weather—in tropical rains and heat, or on cold, humid mountain tops. It is the surmounting of all these difficulties and conditions that produces the romance for our memory. But it is this part of the affair that would take most of the romance out of a jungle experience for many people, so they collect their jungle flowers from the florist.

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

R. & K. Ehlers

Tillandsia belloensis W. Weber, inflorescence detail. Questions concerning the validity of this species are refuted by Renate Ehlers on pages 74 and 75.

Calendar of Shows

5–7 March — Venezuelan Society of Natural Sciences 4th Exhibition of Bromeliads, Banco Consolidado, Plaza La Castellana, Caracas. The society invites you to attend this event and to share the friendliness of the members and the warm weather of Caracas. Write or FAX: Teresa de Yepes, Avenida Los Castaños, no. 15, Urbanización Los Chorros, Caracas, Venezuela; FAX - 58 2 263-8203.

13–21 March — The New York Flower Show, "Gardens For Our Future," will be held at Pier 92, 55th St. and the Hudson River, New York City. Weekday hours: 10 a.m. to 8 p.m.; weekend hours: 10 a.m. to 6 p.m.; benefit preview: March 12, 1993. The New York Bromeliad Society will present an exhibit. For advance ticket sales or information call or write to: The Horticultural Society of New York, 128 West 58th St., New York, NY 10019; Fax 212-246-1207; Theresa Begley, Secretary, N.Y. Bromeliad Society, 130 Vanderbilt Ave., Staten Island, NY 10304.

17–18 April — Shreveport Regional Bromeliad Society Annual Show and Sale. Barnwell Garden and Art Center. 501 Clyde Fant Parkway, Shreveport, LA. Saturday and Sunday, 1–5 p.m. Free admission. Harvey C. Beltz 318-635-4980.

22–25 April — Bromeliad Society of Mobile 16th Annual Show and Sale. Bel Air Mall, intersection of Airport Blvd. and I-65, Mobile, Alabama. Friday, 1 p.m. to 9 p.m.; Saturday, 9 a.m. to 9 p.m.; Sunday, 1 p.m. to 6 p.m. F.D. Armstrong, P.O. Box 746, Daphne, Alabama 36526, 205-626-1276; Ray Irizarry, 205-460-0166.

24–25 April — Greater Dallas-Fort Worth Bromeliad Society Annual Show and Sale. Walnut Hill Recreation Center, 10011 Midway Road, Dallas, TX 75229. Show hours: Saturday and Sunday, noon to 5 p.m.; Sale hours: Saturday, 9 a.m. to 5 p.m.; Sunday, noon to 5 p.m. Rick Richtmyer, 214-596-7074.

(continued on page 77)