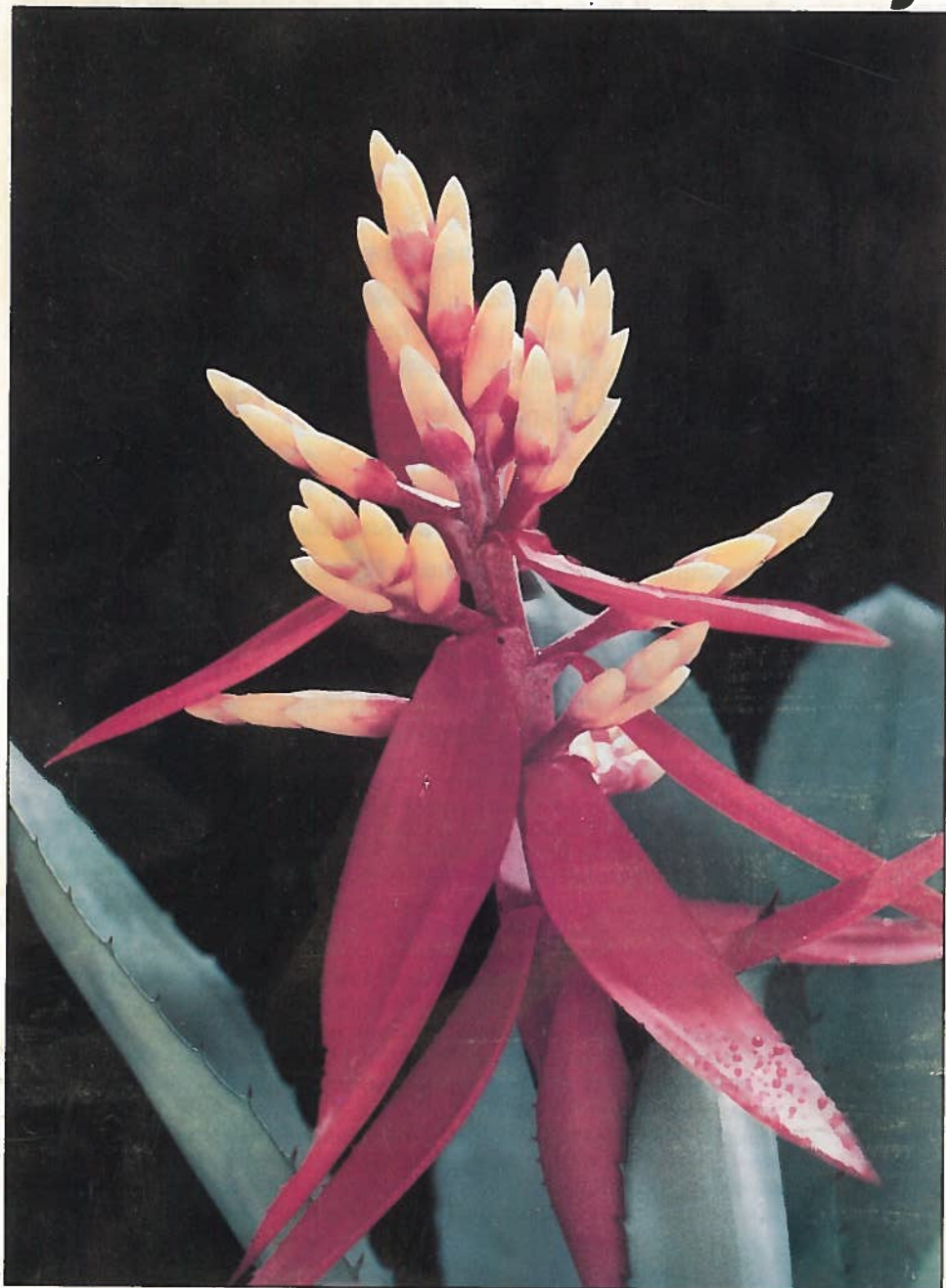


Journal of The Bromeliad Society



VOLUME 43



JANUARY-FEBRUARY, 1993



NUMBER 1

Journal of the Bromeliad Society

©1993 by the Bromeliad Society, Inc.

Vol. 43, No. 1

January–February, 1993

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: *Aechmea chantinii* x *A. corymbosa*, an unnamed DeLeon hybrid. This photograph, by Dorothy Berg, won the photography subdivision at the Sarasota [Florida] Bromeliad Society show in October 1992. Back: An artistic arrangement, "A 'Berry' Nice Collection of Bromeliad Seeds," won the Morris Hobbs Award for best in show in the Artistic Category at the same show for Wally Berg. Photo by Vern Sawyer, Selby Gardens.

CONTENTS

- 3 *Wittrockia amazonica*; A Long-Standing Mystery Unveiled Elton M.C. Leme
- 7 A Remarkable New Subspecies of *Tillandsia paleacea* from Southern Perú
Walter Till
- 11 Some Bromeliads of the North Atlantic Coast of Nicaragua Pat Werner
- 15 The Bromeliads of Brazil Mulford B. Foster
- 18 *Tillandsia subteres*; a Large and Ornamental Species from Central Honduras
Harry E. Luther
- 22 Misnamed Bromeliads, No. 12: *Guzmania cabreræ* Harry E. Luther
- 23 Bromeliad Internship Applications Are Invited Harry E. Luther
- 24 A Tale of a Mouse-Tail—With Details George Kalmbacher
- 26 *Tillandsia xerographica* Chet Blackburn
- 28 1992 Election of Directors; Call for 1993 Nominations
- 29 The Genus *Bromelia* in Venezuela, Part II: *Bromelia goeldiana* Ana Rousse

The *Journal*, ISSN 0090-8738, is published bimonthly at Orlando, Florida by the Bromeliad Society, Inc. Articles and photographs are earnestly solicited. Closing date is 60 days before month of issue. Advertising rates are listed in the advertising section. Permission is granted to reprint articles in the *Journal*, in whole or in part, when credit is given to the author and to the Bromeliad Society, Inc. Please address all correspondence about articles, advertising, or subscriptions to the editor.

Subscription price (in U.S. \$) is included in the 12-month membership dues: single—\$20.00, dual (two members at one address receiving one *Journal*)—\$25.00, fellowship—\$35.00, life—\$750.00. Please add \$5.00 for international mail, except for life members. For first class or airmail add \$7.50.

Please address all membership correspondence to Membership Secretary Linda Harbert, 2488 E. 49th, Tulsa, OK 74105.

Back issues: All single copies \$4.50 1st class postpaid to ZIP addresses, international \$5.50 airmail postpaid. Per volume \$20.00 to ZIP addresses, \$25.00 to international addresses, 3rd class or surface postpaid. Order back issues from the editor; make checks payable to B.S.I. Please see page 41 for special sale.

Printed by Willis Printing Group, Orlando, Florida.

Typography by Sutherland Printing, Orlando, Florida.

Wittrockia amazonica; A Long-Standing Mystery Unveiled

Elton M.C. Leme

Introduced into cultivation by Linden in 1870, *Wittrockia amazonica* played an outstanding role in horticulture toward the end of the last century. A flowering specimen was seen for the first time by J.G. Baker in 1878 although he did not describe it officially until 1886 since he had expected Edouard Morren to do that. At the time, it was believed that the species originated in the "Valley of the Amazon," which gave rise to its provisional name of *Nidularium amazonicum*,¹ originally attributed by Linden and Morren in 1873.

The species was transferred to the genus *Wittrockia* by Lyman B. Smith in 1952 because of the appendages at the bases of its partially connate petals. The curious point is that all known specimens in herbaria (a total of four) are reputed to be clonotypes, meaning that they came from the same source of cultivation of the type specimen deposited in the Royal Botanic Gardens, Kew. We have not heard, however, of any other descendants of the original clone that have survived to the present day in cultivation.

The fact that we have never located *Wittrockia amazonica* in either the wild state or in Brazilian herbaria has always intrigued us, particularly when we considered that the genus is endemic to the region of Brazil where we have concentrated our surveys and research projects. But finally, having examined the specimens from Kew and the Berlin-Dahlem Botanical Museum, as well as photocopies of the specimens from Liège University in Belgium and the Smithsonian Institution in Washington, D.C., we believe that we have the solution to this mystery.

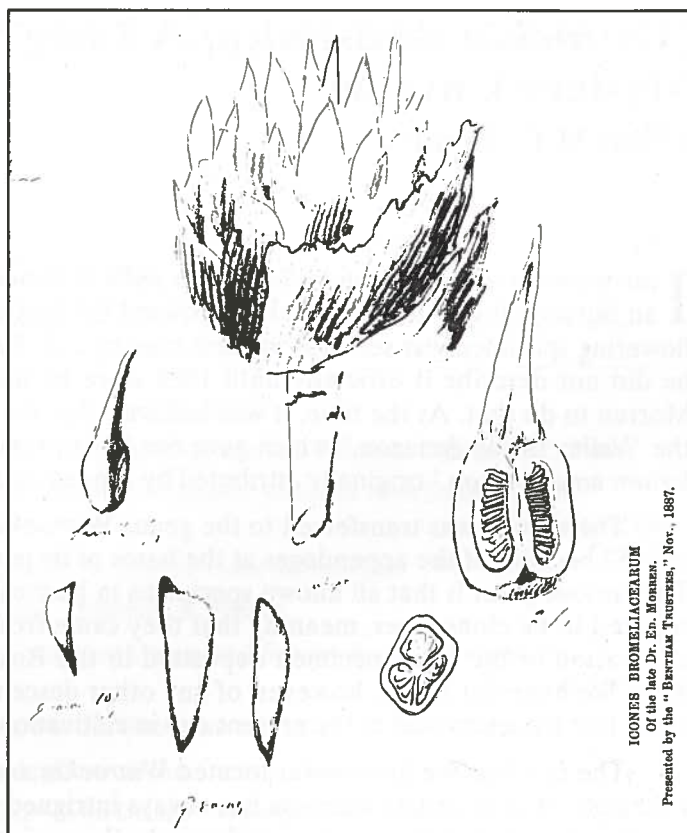
In accordance with the key drawn up by Smith & Downs,² *Wittrockia amazonica* is shown to have affinities with *W. smithii* Reitz. The basic differences are the free sepals as well as secondary characteristics such as the shape of the sepals and the degree of concrescence of the petals of *W. amazonica*. In addition, these characteristics do not appear either expressly or implicitly in the original description of that species.

That being the case, we move on to an examination of its closest relative, *Wittrockia smithii* with over twenty dried specimens in Brazilian herbaria

¹ Mulford Foster in Bromeliad Society Bulletin, vol. 10, p. 56, 1960, stated that the name *Nidularium amazonicum* had been misapplied for years to *N. innocentii* var. *innocentii* in horticulture, and that the latter is "NOT *Wittrockia amazonica* as many persons have recently, wrongly, relabeled it." From that "Nomenclature Clarification, No. 11," it is obvious that the confusion in names lasted until recent times.—HEL

² Smith, L.B.; Downs, R.J. Bromelioideae. Flora Neotropica. Monograph no. 14, pt. 3; 1979: 1726.

Figure 1.
Holotype of
Wittrockia amazonica
in the Royal Botanic
Gardens, Kew. The
sketch drawing
provided by E. Morren
of the holotype of
W. amazonica (under
the name *Nidularium*
amazonicum) was
probably done on the
basis of one of the two
exsiccata deposited in
Liège, which flowered
in cultivation
in Oct. 1874.



Royal Botanic Gardens, Kew

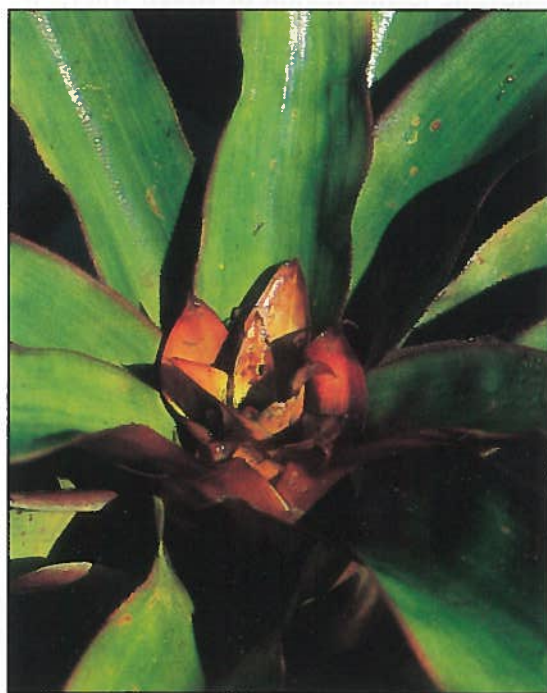
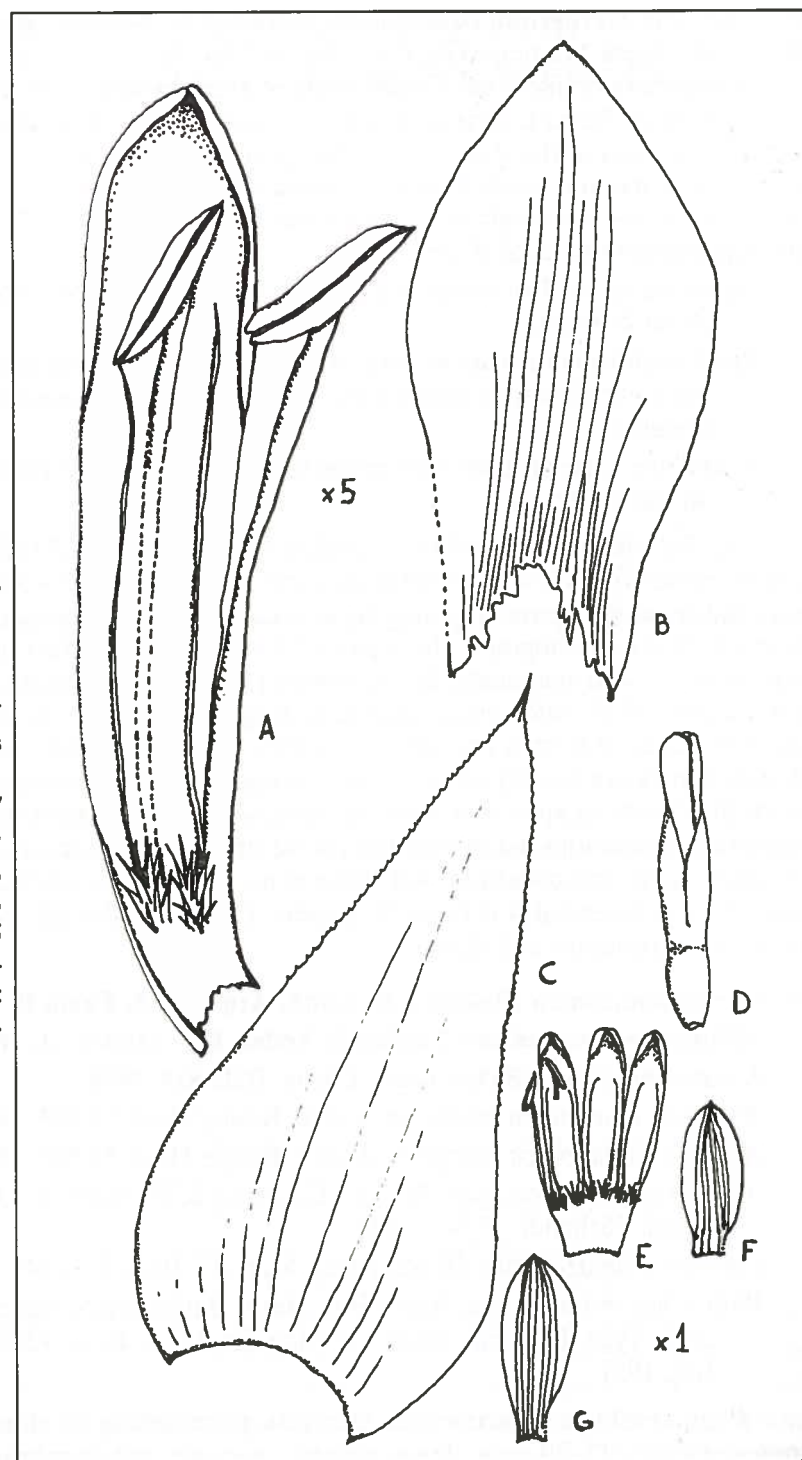


Figure 2
Wittrockia amazonica, a very typical
specimen from the Atlantic Forest of
Santa Catarina.

Figure 3
Wittrockia
amazonica.

A-B
(Kew hortus
s.n., 1878):
A-petal;
B-sepal;
C-F
(Berlin hortus
s.n., 1966):
C-primary
bract,
D-flower,
E-petals,
F-sepal;
G (Hatsch-
bach 6722):
G-sepal.



Author

including the Herbarium Bradeanum, Instituto de Botânica de São Paulo, Museu Botânica Municipal de Curitiba, and Herbário Barbosa Rodrigues. Those specimens came from a wide range of areas including the states of São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul. In addition, we collected specimens in the states where the species is most common, Paraná and Santa Catarina, and made various observations largely on the variability of this species. As the result of these studies it is now possible to outline the average characteristics of *W. smithii*:

Sepals no more than acute and connate reveal connation at their base of about 2–3 mm.

Petals uniformly connate at base for about 10 mm, varying in color including greenish white, green with white margins, yellowish with whitish margins.

Leaf color varying from pure green to reddish brown or purplish mainly on the underside.

As the dimensions and the morphological standard of the leaves and inflorescences of both species seem identical to us, *W. smithii* would be differentiated from *W. amazonica* only if, in accordance with the concept of the Smith & Downs monograph, the sepals of the latter were in fact free, strongly asymmetrical, and acuminate. Since, however, we were able to study the original material of *W. amazonica*, despite its fragmentary state, as well as other original material from a probable clonotype in perfect condition, we noted that its sepals are basally connate for 2–3 mm, slightly asymmetrical and no more than acute at apex. For these reasons, we do not confirm the small, but important, alterations made over the course of time in the original concept of *W. amazonica*, and conclude that there is no significant morphological element that differentiates it from *W. smithii*. The latter should, therefore, be reduced to synonymy as follows:

***Wittrockia amazonica* (Baker) L.B. Smith, Arq. Bot. S. Paulo II. 2:197. 1952.**

Nidularium amazonicum Linden & André, Cat. Linden 11. 1873; nomen.

Karatas amazonica Baker, Gard. Chron. II.25:814. 1886.

Bromelia amazonica hortus ex André, Revue Hort. 58:503. 1886; nomen.

Aechmea amazonica hortus ex André, Revue Hort. 58:503. 1886; nomen.

Nidularium amazonicum (Baker) Lindman & E. Morren, Oefvers Vet. Akad. Förhandl. 47:541. 1890.

Canistrum amazonicum (Baker) Mez, Mart. Fl. Bras. 3(3):249. 1891.

Wittrockia smithii Reitz, Anais Bot. Herb. Barbosa Rodrigues 4:19, pl.5. 1952. Type. Fachinal, Santa Catarina, Brazil, R. Reitz 4207 (HBR), 15 July. 1951.

Plant epiphytic or saxicolous, stemless, propagating by short basal rhizomes. *Leaves* 15–20 in a dense rosette, arcuate, submembranaceous or papyraceous; *sheaths* elliptic, ca. 12 cm long, 6–7 (–12) cm wide, densely
(continued on page 32)

A Remarkable New Subspecies of *Tillandsia paleacea* from Southern Perú

Walter Till

During travels through southern Perú in August 1982 the author and Dr. Ernst Vitek, University of Vienna, found two populations of tillandsias in the valley of the Río Pachachaca southwest of the city of Abancay. The plants, which were covering large parts of very steep rock walls (fig. 4), reminded us of *Tillandsia paleacea* but differed so markedly that we could not name them right off. Now, after nearly ten years of cultivation, it is evident that the characters exhibited in the field are stable, genetically fixed, and not ecological modifications. The great similarity in the features of the reproductive parts and the separate distribution area of this taxon persuade us that it is a subspecies of *T. paleacea*.

***Tillandsia paleacea* Presl subsp. *apurimacensis* W. Till, subspecies nova** (figs. 4, 5).

A subspecies typica caule breviori cum internodiis multo brevioribus, foliis rectoribus et indumento appresso recedit.

Typus: Peru, Depto. Apurimac, Prov. Abancay, km 87 in via de Chalhuanca a Abancay, 30 km ante Abancay, 1840 m.s.m., 12. 8. 1982, leg. W. Till & E. & F. Vitek WT183, epilithica in rupibus fere verticalibus (holotypus: WU, isotypi: USM, WU); Depto. Apurimac, Prov. Abancay, Hac. Casinchihua in valle fluminis Rio Pachachaca, 33 km (per aerem) SW ab Abancay, 2300–2500 m.s.m., 21. 12. 1962, leg. H.H. & C.M. Iltis & D. & V. Ugent 826a (paratypus: K).

Plants moderately stemmed (5–12 cm), without or only with dead leaves in the older (basal) part, with strong, woody, adhesive roots, internodes very short and wholly concealed by the leaves. *Leaves* densely polystichous, narrowly triangular, (4–) 6–10 cm long, densely appressed lepidote, slightly succulent, more or less flat but the margins rolled up and hence semicircular in cross section, evenly tapering to a subulate apex. *Inflorescence scape* well developed, 10–13 cm long, concealed by lanceolate *scape bracts*, these abaxially densely lepidote and slightly longer than the internodes; *inflorescence* simple or very rarely with a reduced lateral branch. *Flowers* c. 2 mm very stout pedicelate, without fragrance. *Floral bracts* 10–14 (–16) mm long, c. 3 mm wide, broadly linear, acute, densely to moderately lepidote, ecarinate, nerved towards apex when dry, stramineous. *Sepals* elliptic-lanceolate, obtuse, glabrous, 10–12 mm long, c. 4.5 mm wide, usually about equalling the floral bracts, subfree



Author

Figure 4.
Tillandsia paleacea subsp. *apurimacensis*, typical form and f. *disticha* growing on chalky rock walls.



Author

Figure 5.
T. paleacea subsp. *apurimacensis*.
Right: typical form; left: distichous form; middle: intermediate.

(c. 0.5–0.7 mm equally connate), ecarinate. *Petals* c. 19 mm long, the blade purplish blue, rhombic-cuneate with undulate-crenate upper margin, c. 9 mm long and c. 8.5 mm wide, the claw white, linear, c. 10 mm long and c. 2 mm wide. *Stamens* 6 mm long, exceeding the ovary but deeply included into the throat of the flower, the anthers orange, cylindric, c. 2 x 0.5 mm, the filaments white, broadly linear and 0.5 mm wide, flat, rather abruptly contracted into a subulate apex, basally attached to the anthers. *Ovary* cylindric, c. 3 x 1.5 mm, style very short and stout, stigma lobes simple-erect. Fruit unknown.

The plants are named after the province, Apurimac.

Distribution: Typical plants are found in the lower valley of the Río Pachachaca. Similar plants have also been collected in Prov. Ayachucho near Huanta at 2300 m elevation (*O. Irnstorfer* 33a, WU), in Prov. Huancavelica near Mayocc in the valley of the Río Mantaro at 2200 m elevation (*H. & L. Hromadnik* 2036, WU), and in Prov. Cuzco, valley of the Río Urubamba (*R. & K. Ehlers* P8103, WU). They all differ in rosette width; the floral bract covering varies from more or less lepidote to glabrous.

Sixteen kilometers farther up in the same valley the second population was found under the same ecological conditions. The peculiarity was that within one and the same population the leaves were arranged polystichously and distichously, with all transitions. Some of the distichously leafed plants were in flower (fig.4).

Tillandsia paleacea subsp. *apurimacensis* f. *disticha* W. Till, forma nova

A forma typica foliis distichis et foliorum marginibus magis involutis differt.

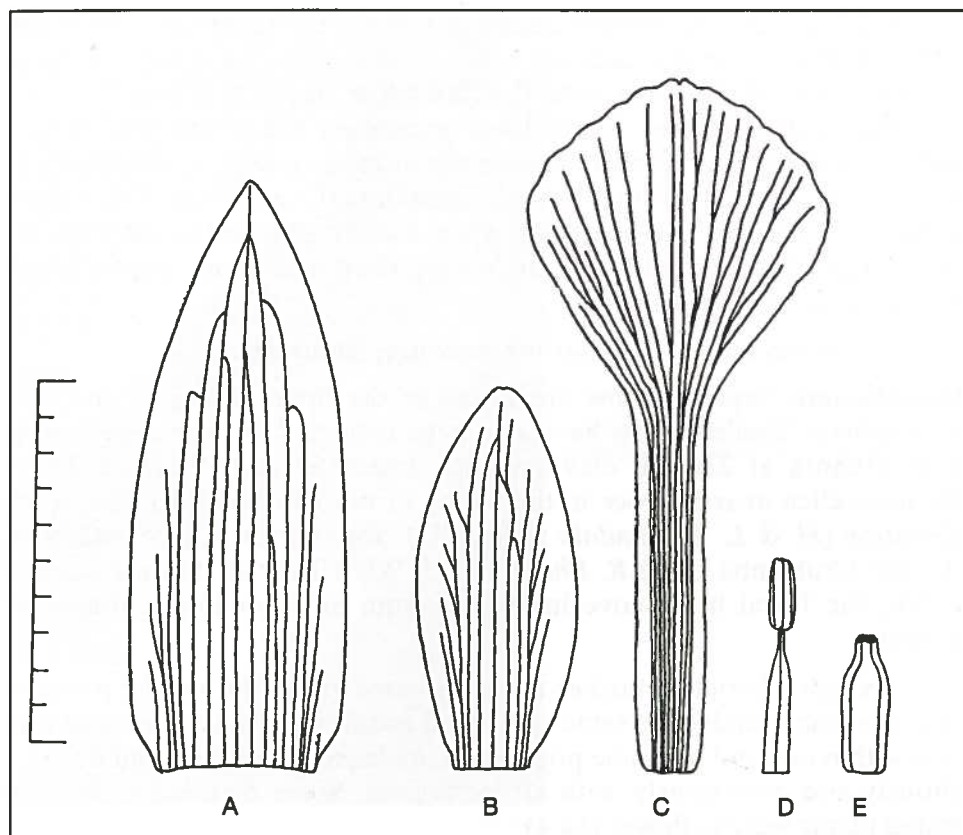
Typus: Peru, Depto. Apurimac, Prov. Abancay, in via inter urbes Chalhuanca et Abancay, circiter 46 km ante Abancay, 2000 m.s.m., 12. 8. 1982, leg. W. Till & E. & F. Vitek WT182, epilithica in rupibus fere verticalibus (holo- et isotypus: WU).

Leaves distichously arranged, slightly more succulent than in the typical form and the margins of the leaves more involute.

Tillandsia paleacea is closely related to *T. streptocarpa* Baker as stated in Smith & Downs (1977)¹ and in Rauh (1987).² Those species can be separated mainly by a combination of characters:

T. paleacea: long stems, leaves shorter than the stem, inflorescence mostly simple, floral bracts mostly lepidote.

T. streptocarpa: stems very short, leaves longer than the stem, inflorescence mostly digitately compound, floral bracts mostly glabrous or subglabrous.



W. Till

Figure 6. *Tillandsia paleacea* subsp. *apurimacensis*.

A–C, drawn from ventral view, flattened, with bundles of crystals in special cells (idioblasts); A, floral bract, lepidote outside; B, sepal, very slightly asymmetric, glabrous; C, petal; D, stamen: note the thin apex of the broad filament; E, ovary with very short style. – bar=1 cm

Simple inflorescences are not very rare in *T. streptocarpa*³ and the floral bracts can also be rather densely lepidote.⁴ Those facts stress the close affinity of both. The new subspecies resembles *T. paleacea* in its inflorescence morphology, in its vegetative morphology, however, it comes nearer to *T. streptocarpa* and seems to link both species.

NOTES:

1. Smith, L.B.; Downs, R.J. Tillandsioideae. Flora Neotropica. Monograph no. 14, pt. 2; 1977: 858.
2. Bromeliestudien, 19. Mitteilung. Tropische und subtropische Pflanzenwelt 60: p. 74, footnote 10.
3. W. Till 131 (WU); H. Hromadnik 9132, 9183 (WU); H. & L. Hromadnik 2132, 4178 (WU).
4. T. Feuerer & N. Höhne 4583 (WU); W. & S. Till & M. Guerra 4013 (WU).

Institut für Botanik der Universität Wien
Rennweg 14, A-1030, Wien

Some Bromeliads of the North Atlantic Coast of Nicaragua

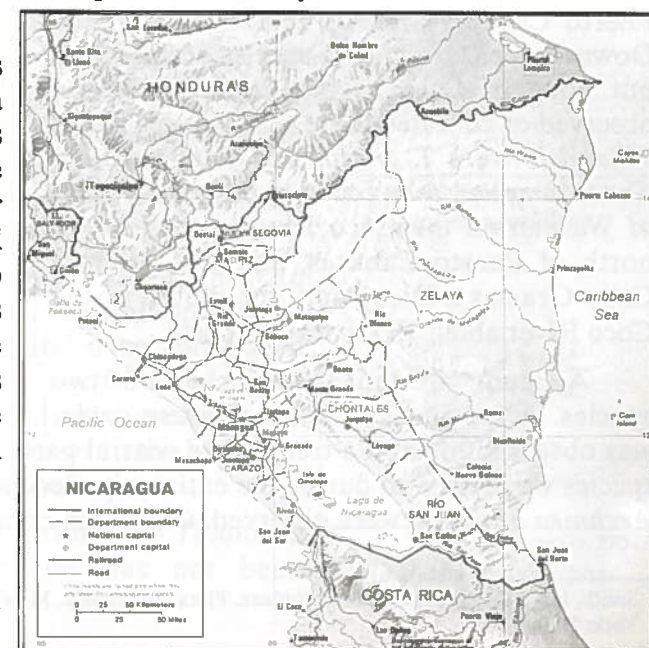
Pat Werner

When the elections of February 1990 brought Violeta Chamorro to power and the war with the Contras to an end, interest began to be taken of the majestic, but little known, natural resources of Nicaragua.

Recently, the government of Nicaragua declared the Miskito Keys a national reserve and began to assemble a team of experts in various scientific fields to study the area, inventory the flora and fauna, and determine the appropriate boundaries of the reserve. The Miskito Keys are a group of islands located approximately 50 km to the east of the Caribbean port of Puerto Cabezas in the North Atlantic Autonomous Region.¹ One of the groups involved with the project is the Caribbean Conservation Corporation of Gainesville, Florida.

Dr. Jaime Villa, an expert on Nicaraguan herpetology and ichthyology, of the Florida Atlantic University, was invited by the Caribbean Conservation Corporation to take part in the study of the Miskito Keys. Dr. Villa wrote the first books about Nicaraguan snakes and fresh water fishes. He invited me to join him in a brief trip to the Miskito Keys and the Puerto Cabezas area to compile an inventory of bromeliads and orchids in the area.

Although there is a road from Managua to Puerto Cabezas, it is 559 km long and the last 400 km is over gravel and in marginal condition. The trip takes at least two days if there are no vehicle problems or shortages of fuel. The alternative is an hour-long flight in



¹ The author explains: "I used the term 'Atlantic' instead of 'Caribbean' because that is what the region is called here in Nicaragua."

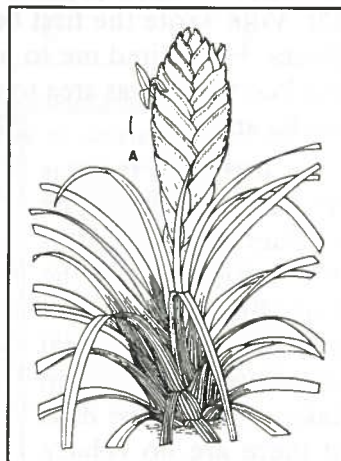
a Soviet AN-32 turbojet and that was the means of transportation taken.

Upon arrival in Puerto Cabezas it was obvious that the climate was substantially different from that of Managua. The average annual rainfall of Puerto Cabezas is a bit over 3000 mm (118 inches) and the average annual temperature is 26 degrees Celsius (about 80 degrees Fahrenheit). The terrain is flat, the soil is mostly sand and gravel. There are four different kinds of natural growth in close proximity.

First, miles of pine savanna. Nicaragua is the farthest south in Central America where pines such as *Pinus oocarpus* and *Pinus caribbea* are found. Second, there are extensive mangrove colonies in the large, brackish lagoons close to the Caribbean. About 10 km just south of Puerto Cabezas is the small port of Lamlaya where there is a small fish and lobster processing plant. Along the sides of the canal that leads from Lamlaya to Lamlaya Lagoon and finally to the Caribbean both red and white mangroves are found. Third, there are gallery forests along the banks of the large rivers of the region. These rivers are the Río Coco, the longest and largest river in Central America, that establishes the border with Honduras for over 400 km and the Wawa River that drains extensive areas in the rain forests west of the pine savannas. Fourth, remnants of disturbed forest in the city of Puerto Cabezas proper, with many orchids and bromeliads perched on trees—mainly mangos.

It became apparent soon after our arrival that no boats were available to travel to the Miskito Keys so our collecting began in the Puerto Cabezas area. A review of Smith & Downs² revealed that two species of *Tillandsia* but none of *Catopsis* or *Vriesea* had been observed or collected there. The two species of *Tillandsia* were *T. anceps* and *T. festucoides*. The former had been found at the small village of Waspan on the Coco River, about 70 km north of Puerto Cabezas, and the latter at Cabo Gracias a Dios itself, the mouth of the Coco River about 10 km farther north.

A jaunt around town produced two species. A specimen of *Tillandsia festucoides* was observed high on a tree by the central park. No other plant of that species was observed during the entire trip. Second, several specimens of *Aechmea bracteata* were observed, usually on mango trees and usually in



(Smith & Downs Fig. 269-A)
Tillandsia anceps

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

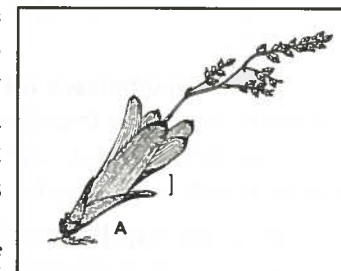
association with the orchid *Epidendrum radicans*.

The first trip out of town was to the mangrove swamp of Lamlaya. There, many *Aechmea bracteata* were seen. *Tillandsia balbisiana* was also present to a limited extent. It is interesting that *T. balbisiana* is perhaps the most common plant on the lava beds in the Masaya Volcano National Park where it seems to thrive on the intense, relatively dry heat. Lamlaya is hot and very damp but those conditions did not seem to affect that species.

The next species seen in abundance in the mangrove swamp was *Tillandsia bulbosa*. It had been collected before along the Escondido River in central Nicaragua and along the San Juan River in southern Nicaragua. It has been found also on the west coast and in the central mountains of Costa Rica but not in the mountains of Nicaragua just to the north.

While still in the Lamlaya mangrove swamp we found a few plants of *Tillandsia elongata*. They were attached to some of the low-growing palm trees. One was found with the flower scape intact shortly after flowering. Previously, *T. elongata* has been found in the central mountains along the road from Matagalpa to Muy Muy. Other collections have been made on the east side of Lake Nicaragua near the town of Acoyapa, which is in a transitional area of cattle ranching country and rain forest.

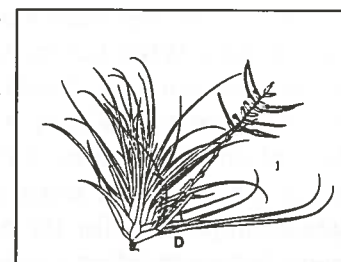
An unusual find, attached to many of the trees 10–15 feet in the air, was *Catopsis sessiliflora*. This plant, which likes shade and plenty of humidity, has not been reported before in Nicaragua, at least not in Smith & Downs, but it has been noted in Tela, Honduras, as well as in Turrialba and Puerto Limon, Costa Rica. The absence in Nicaragua is probably more of a gap in collecting than its being a rarity in this country.



(Smith & Downs Fig. 461-A)
Catopsis sessiliflora

The mangrove swamp was also host to *Tillandsia monadelpha*. Several specimens were found with scape and developing seed capsule. They appear to have flowered sometime in March or April, and were found attached to mangrove roots or to the low palm trees that are common in the swamp.

Lastly, the swamp was host to *Tillandsia streptophylla*. This species has not been



(Smith & Downs Fig. 270-D)
Tillandsia monadelpha

reported earlier in Nicaragua, according to Smith & Downs. The locations farthest south where *T. streptophylla* has been observed are Puerto Cortes and Río Lindo on the north coast of Honduras.³ In the swamp, *T. streptophylla* was numerous, growing on both mangrove roots and palm trees.

Travel in the pine savannas demonstrated that they are relatively sterile habitats, at least for bromeliads. As the road to Waspan led out of Puerto Cabezas, the only species observed were *Aechmea bracteata* and *Tillandsia streptophylla*. Farther on, the aechmea became uncommon while *T. streptophylla* was common, favoring high pines as its place of attachment.

Nestled in the pine savannas were tiny micro-environments of deciduous bushes and trees, of one to several acres in size. These areas were surrounded by large expanses of pine trees and usually were a cornucopia of plant life. All of the species noted in the mangrove swamp of Lamlaya were there, with one addition. *Tillandsia caput-medusae*, common to the Pacific coast and in central Nicaragua, was found on one of these groups of deciduous trees.

Gallery forests were seen along the Wawa River, both where the river empties into the Lamlaya lagoon and upstream where the Puerto Cabezas-Managua road crosses the river at a ferry called Wawa Boom. No new species were observed but most of the already mentioned species were represented except for *Tillandsia caput-medusae*, which was found only once.

Of the bromeliads found in the Puerto Cabezas area, then, it can be said that some are found only in very humid environments. Others, such as *T. balbisiana* and *T. caput-medusae* are found in both dryer areas of the Pacific coast as well as the more humid Atlantic side.

Heading south, there is a great amount of country that has been collected only sporadically. The locations mentioned in Smith & Downs, located south of Puerto Cabezas, are either on the Managua-Rama road, or in places accessible by water, such as Bluefields Bay and its vicinity and the mouth of the San Juan River at San Juan del Norte (known also as Greytown). What lies in between, and particularly south of Bluefields, is located in true, relatively undisturbed rain forest that receives up to 6000 mm of rain a year but has no roads and few people. The Yolaina Mountains, the southernmost range of the country is here. These mountains run east-west toward the Caribbean, which they meet at the very beautiful (except for the name) Monkey Point. The Nicaraguan government is now building a road from Nueva Guinea, a small town at the base of the Volaina Mountains, to Bluefields to replace a dirt road that is

³ More recently recorded from the province of Alajuela in Costa Rica. —H.E.L.

[continued on page 21]

The Bromeliads of Brazil

Mulford B. Foster

Editors' notes: Newcomers to the field of bromeliads should not overlook the fact that interest in these plants in America had its beginnings with the work of Mulford B. Foster of Orlando, Florida. He was the first American to venture into the tropics specifically to search out these plants. His first trip to Brazil was a landmark event, and his description of this trip, first published in the Smithsonian Report for 1942, is an historical document, besides being a fascinating travel adventure.—V.P.

Victoria Padilla reprinted this report in Journal volume 25 (1975), pages 107–113 and 146–153. Now, fifty years after the initial publication date, the report remains both interesting and instructive. It is reprinted here without change noting that Miss Padilla omitted the first paragraph of the Smithsonian Report, which contains general background information well known to most of our readers. Genus names when used in the general sense remain capitalized in the former style, but we have added modern binomials as footnotes in the order in which the older name is given by Mr. Foster.—TUL

WHERE THE BROMELIADS GROW

The range of the widespread Spanish moss (*Tillandsia usneoides*) marks the outer boundaries of this interesting family, which extends over all the tropical and subtropical areas of the Americas. From southeastern Virginia through Central and South America across the Argentine and from Chile up as far as Baja California, this cosmopolitan group of plants has spread itself.

The wide range of bromeliads gives them versatile growth habits, but they are happy in the desert, by the side of the ocean, in the wettest jungles, in full or part sun, and in complete or partial shade, and they grow on almost anything, including the smooth or rough bark of trees, on rocks, in sand, on cacti, on palms, and even clinging on telephone wires as do *Tillandsia usneoides* and *Tillandsia recurvata*.

Having collected bromeliads in Mexico and Cuba, Mrs. Foster and I found irresistible the opportunity to collect them in the jungles of Brazil, home of the greatest number of bromeliad species. Accordingly we sailed from New York in the spring of 1939, but when we landed 2 weeks later in Brazil, it was fall below the Equator.

While waiting for our permit, we took several short collecting trips near Rio with Dr. Bertha Lutz, botanist, who is making an intensive study of the flora in the Distrito Federal. However, her work is not confined to botany, for she is an eager student of zoology with particular interest in frogs and, with her father, the late Dr. Adolpho Lutz, has made outstanding contributions to the knowledge of frogs in Brazil. While collecting with her, we developed a

new interest in bromeliads—that of the fauna, particularly the frogs, that live deep in the centers of the water-filled bromeliads. From that time on we found the study of frogs to be an interesting accompaniment to the collecting of bromeliads.

Our first collecting trip to Brazil was prophetic in that we found our first new species of bromeliads, for we later realized that this set the pattern for our whole Brazilian trip—we were always turning up new species. Our total of over 60 (with more yet to be described) was as much of a surprise to us as to the botanists, especially Dr. Smith, the bromeliad specialist. In the thousands of herbarium sheets from Brazil which he had examined in the past 10 years, only 9 new bromeliads had shown up from that country. While I had hopes of finding a few new species, I did not expect to find very many because this family has been well collected in Brazil, nearly one-third of the known species having been found within its confines.

Our “safari” numbered two. Our equipment was meager: two suitcases, two cameras, a herbarium press, and a gasoline stove. The most important factors, however, in our equipment was our limitless enthusiasm for the fascinating family of Bromeliaceae.

Searching for bromeliads has taught us many lessons in topography for Brazil is a land of contrasts. It includes extremes of weather and terrain. During two winters of some 12,000 miles trekking by water, rail, auto, and on foot, the bromeliads took us into almost every kind of condition that that great country has to offer. One day we were in the rainiest jungle of Brazil, at Alto da Serra south of Rio, which is over 1,500 miles south of the Amazon; and next we traveled nearly a thousand miles by coastwise steamer, by narrow-gauge railway, by ox cart, and on foot, through Bahia, where it had not rained in 2 years.

One does not have to travel far after reaching Rio to do a bit of plant collecting. Even within the city limits there are still vast jungles covering the mountainsides high above the inhabited area. These rain forests of the Serra do Mar, mountains along the sea, stretch for miles both north and south, and there is a wealth of material for the botanist within a comparatively short distance of the coast. It is probably for this reason that the greatest number of bromeliads have been taken from this area within the past half century.

Strangely enough, one of our most pleasant experiences in Brazil was the visit to Alto da Serra, where we could not collect any plants. It is a sanctuary where the balance of life is to be sacredly maintained. Man is not to disturb the plant, animal, or insect life in any way. He may come there and see it unfold before his eyes, but no collecting or molesting is allowed. This is the great plan of the able Dr. F. C. Hoehne, of the Instituto de Botânica at São Paulo, whose sincere desire it is to preserve for posterity a complete rain forest in one of the most unusual situations in the world. Here is Brazil's greatest rainfall. It is at the high edge of the Serra do Mar mountains, which rise

abruptly from sea level. The warm rain clouds from over the sea striking this cold mountain barrier produce almost continuous precipitation in the form of either rain or fog. This makes a perfect home for innumerable moisture-loving epiphytes.

A very comfortable guest house had recently been built here for the accommodation of observing scientists, and we were complimented by being the first guests to use it. This was one of our favorite “collecting” spots, where we collected only photographs and many an impression on the mind's eye of the luxuriant fantasies in myriad forms of plant life. Everything was doing its individual bit toward making this one of the natural beauty spots of Brazil.

We were also invited to be the first guests to use Dr. Hoehne's unique creation, a botanical truck. It was a giant Chevrolet, rebuilt so as to have sleeping quarters for six, with ample storage space for supplies, and, best of all, it had a heating “oven” where a huge press of fresh botanical material could be “cooked” until thoroughly dry. In this truck we experienced a truly delightful trip in the land of the decorative Pinheiro do Paraná (*Araucaria brasiliensis*).

Villa Velha should be as well known in Brazil as the Painted Desert or the Bad Lands in North America, but so far few others than naturalists are aware of it. “Old City” it is called, because from a distance it resembles the skyline of an ancient abandoned city. It is a “rock continent in a sea” of vast rolling plains. Mother Nature has for centuries been slowly revealing this marvelous work in sandstone which stands now tranquil, dominant, in a turbulent sea of shifting sands. For miles we had rolled over treeless land to reach this “rock of ages.” Only the time-carved monoliths had vegetation. They were covered with *Arecastrum* palms (*Cocus plumosa*) and *Araucarias* (the Paraná “pine”), cacti, ferns, orchids, and bromeliads living in every crevice, hanging on with grim determination as though they would not give up until the rocks themselves disintegrate. Every narrow canyon, dark and damp, harbored bromeliads of the more delicate type, while above, braving wind, sun, cold, and heat, were the xerophytic ones. Villa Velha is a botanist's and geologist's paradise.

THE BROMELIAD CHARACTERISTICS

When you enjoy the sweet, juicy fruit of a pineapple, you are eating a bromeliad, *Ananas comosus* (*sativus*). When you sink into a soft, well-cushioned automobile seat, the filling responsible for your comfort may be a bromeliad, *Tillandsia usneoides*, or Spanish moss. In manner of growth these two represent the two extremes: the pineapple is strictly terrestrial, while the Spanish moss is wholly epiphytic, even going so far as to dispense with roots. Between these two extremes, bromeliads exhibit a great variety of plant characteristics.

(continued on page 33)

Tillandsia subteres; a Large and Ornamental Species from Central Honduras

Harry E. Luther

Tillandsia specialists seem to have little trouble in introducing new and noteworthy species into horticulture. Many are small or not very colorful but some, as in the following example, are large and spectacular causing one to wonder how they remained hidden for so long.

Tillandsia subteres Luther, sp. nov.

A *T. parryi* Baker, cui affinis, ramis inflorescentiae et bracteis florigeris longioribus, sepalis minoribus, petalis violaceis differt; a *T. sueae* Ehlers, cui affinis, ramis inflorescentiae et bracteis florigeris longioribus differt.

Type. Honduras: Francisco Morazan; north of Tegucigalpa near Río Hondo, 800–1000 m elev., lower slopes of steep barranca. *E. Kamm legit.* Fl. in cult., 25 Nov. 1991, *Steve Correale s.n.* (SEL holotype; US, WU, EAP, SEL isotypes).

Plant terrestrial and lithophytic, clustering, flowering 0.6–2 m tall. *Leaves* densely rosulate, spreading, 40–75 cm long, stiff, coriaceous. *Leaf sheaths* elliptic, 6–8 x 4–6 cm, castaneous, densely brown lepidote. *Leaf blades* narrowly triangular, attenuate, channeled, 2–3 cm wide, densely cinereous lepidote especially abaxially, obscurely banded, reddish silver. *Scape* erect, 20–60 x 1 cm, nearly glabrous, reddish. *Scape bracts* densely imbricate, erect to spreading, the lowest subfoliaceous, the upper elliptic and attenuate, exceeding and mostly concealing the internodes. *Inflorescence* densely to laxly bipinnate. *Primary bracts* elliptic, acute to attenuate, 4–10 cm long, thin coriaceous, densely cinereous lepidote, rose. *Branches* with a bracteate sterile base 10–15 cm long, spreading at 30–45 degrees from the main axis at anthesis, 30–50 cm x 10–15 mm, nearly terete just prior to anthesis. *Floral bracts* elliptic, acute, 50–58 x 10–14 mm, thin coriaceous, nerved, ecarinate, imbricate and concealing the axis at anthesis, spreading when dried, subdensely pale lepidote, dark rose. *Flowers* with a stout 2–3 mm pedicel. *Sepals* free, oblanceolate, acute, 18 mm long, thin, nerved, the adaxial pair carinate, green. *Corolla* tubular, spreading very slightly at the throat. *Petals* lingulate, obtuse, 45–48 mm long, violet. *Filaments* in 2 uneven series of 3, flattened, apically dilated, violet. *Style and stigma* cream.



D. Cathcart

Figure 7.

Tillandsia subteres in habitat. This newly described species is a rock grower found at 2400 to 3000 feet above sea level in a difficult and remote part of Honduras.



D. Cathcart

Figure 8.

Tillandsia subteres, in cultivation.

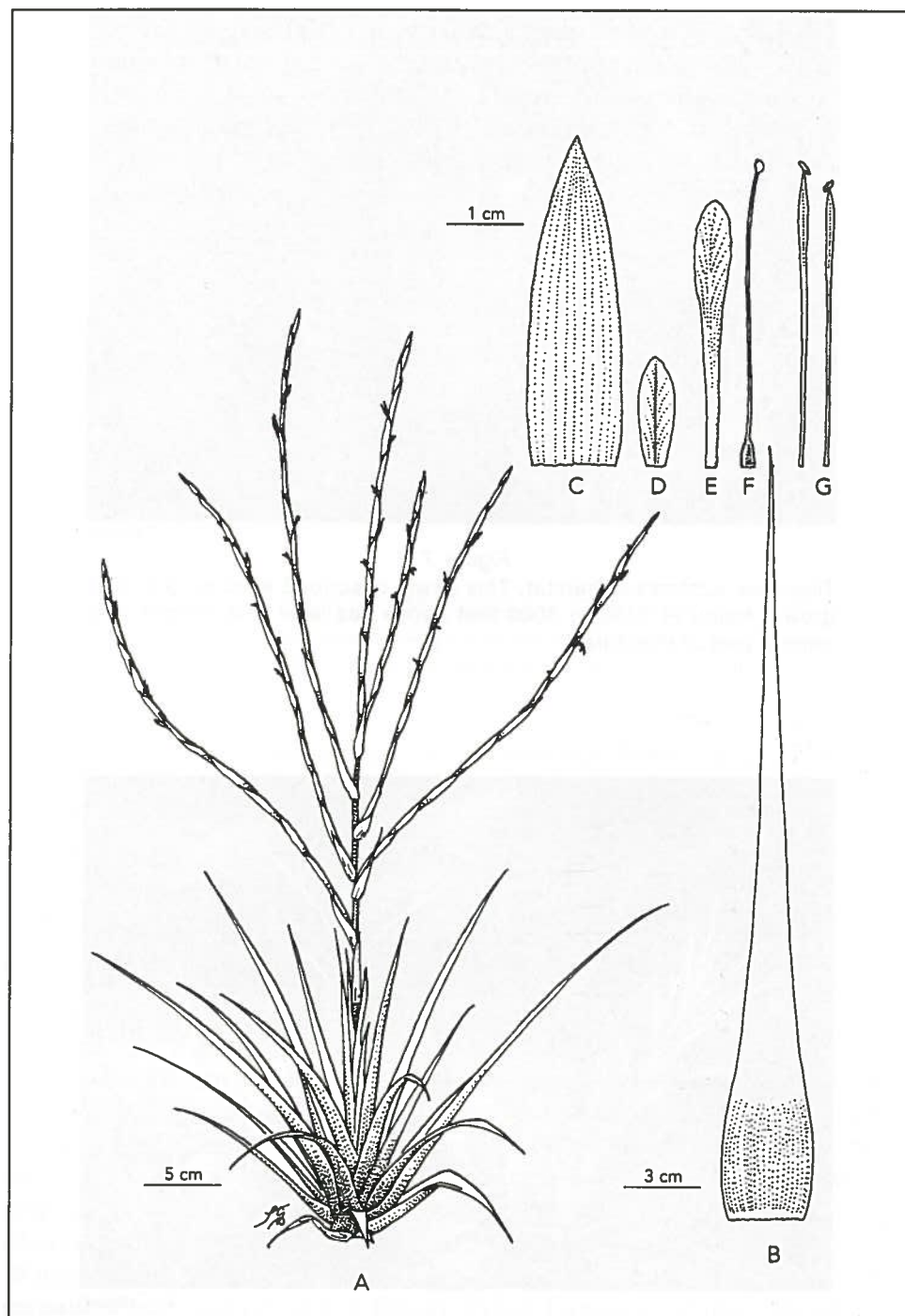


Figure 9.

Tillandsia subteres Luther. A, habit; B, leaf; C, floral bract; D, sepal; E, petal; F, pistil; G, stamens, two of six.

This large tillandsia seems most closely related to the northern Mexican *Tillandsia parryi*, but may be immediately distinguished by its much longer, slender, nearly terete (not definitely complanate) inflorescence branches, larger floral bracts (50–58 vs 35–45 mm), smaller sepals (18 vs 25–30 mm) and violet, not green, petals. From the recently described *T. sueae*,¹ this new species differs most conspicuously by its longer branches and larger floral bracts, and its terrestrial and lithophytic, not epiphytic, habit.

It should be noted that old inflorescences and dried specimens often exhibit spreading floral bracts obscuring the nearly terete nature of the branches of the fresh, living plant.

A few plants of *Tillandsia subteres* in American horticulture have been misidentified and distributed as *T. copanensis* Rauh. The latter species is very different in flower and occurs on vertical rock faces, not on the more level stony ground at the base of cliffs favored by *T. subteres*. According to Dennis Cathcart, who recently visited the type population of *T. subteres*, the plants are numerous but the very rough terrain and lack of nearby roads make access difficult and dangerous. A large, cultivated population is maintained by Enrique Kamm at his Valle de Angeles nursery.

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

Ed. note: We must work to understand botanical terms, as we all know, but this word "terete" is a little different from the usual terms meaning "it is narrow," or "it is pointy," because it is describing a geometrical space. W.T. Stearn, the ultimate authority, says: "...terete, i.e. circular in transverse sections, tapering or narrowly cylindric." Something like Tillandsia flabellata. Mr. Luther says that the inflorescence is not flat (complanate) but somewhat cylindrical.

¹ J. Brom. Soc. 41:208–213; 1991.

Some Bromeliads of the North Atlantic Coast of Nicaragua

[continued from page 14]

accessible in the short dry seasons. The government has declared much of the area a forest reserve so no trees can be cut. It is to be hoped that this action will preserve this virgin rain forest and allow me and other specialists to discover the bromeliad species in this, one of the last stretches of rain forest between the United States and the Amazon River basin.

Managua, Nicaragua

Misnamed Bromeliads, No. 12:

Guzmania cabreræ

Harry E. Luther



Vern Sawyer

Figure 10.
Guzmania cabreræ

Guzmania cabreræ is an attractive but poorly known species from southern Colombia.¹ Prior to its description it was introduced to cultivation by Kent's Bromeliad Nursery in Vista, California, and illustrated as *Guzmania longipetala* (Baker) Mez in the *Journal of the Bromeliad Society*, volume 30, page 32, 1980. The text accompanying the notice was, unfortunately, not applicable to the misnamed plant shown. For the record, *G. cabreræ* is not a small plant but reaches a meter or more in height when in flower, with leaves 50–100 cm in length and 20–35 mm in

¹ A.J. Gilmartin, Recent collections of Bromeliaceae from Colombia. *Brittonia* 33 (20): 254–256; 1981.

width. The rose-bracted inflorescence is composed of short, 5–10-flowered branches. The flowers have spreading, white petals 60–70 mm long. It is very closely related to the much more robust, red-bracted *G. lehmanniana* (Wittmack) Mez from Ecuador and Colombia, which is not known to be in cultivation.

Guzmania cabreræ is native to moist premontane forests at elevation of 2000 m.

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

Bromeliad Internship Applications Are Invited

Harry E. Luther

The Bromeliad Society, Inc., in cooperation with The Marie Selby Botanical Gardens, invites applications for internships involving intensive study of bromeliads. College-level students who have demonstrated an interest in pursuing a career in horticulture, botany, or a related field are encouraged to apply.

Bromeliad Society and Selby Gardens representatives will screen applications for this work-and-study program consisting of 14 weeks of 40 hours at the garden in Sarasota, Florida. Successful candidates will be awarded a stipend of \$11.00 per day and living quarters. Intern sessions begin in February, May, and September.

The work portion will be assigned and supervised by the director of the Bromeliad Identification Center. A study portion should be devoted to a project mutually agreed upon by the intern and the director. A study proposal should accompany each application, and must be approved within the first two weeks of the program.

In order to complete the program satisfactorily, the intern is expected to prepare a project report of general interest and acceptable quality. The reports will be forwarded to the *Journal* editor for possible publication.

The director of the Bromeliad Identification Center continues to welcome suggestions from society members for relevant projects.

Director, M.B. Foster Bromeliad Identification Center
The Marie Selby Botanical Gardens
811 South Palm Avenue, Sarasota, Florida 34236

A Tale of a Mouse-Tail—With Details

George Kalmbacher



(W. Rauh. Bromelien, Fig. 42)

Figure 11.

Tillandsia myosura Griseb. ex Baker,
ca. ¾ natural size.

It took about two months for an inflorescence of the *Tillandsia myosura* here at the Brooklyn Botanic Garden to grow to its full length of eight inches. The tip of the inflorescence looked so dry for such a long time that I felt the flowering had come to a dehydrated ignoble end, but then one day I happened to look at it and saw that the lowest flower had opened, and that there were more buds above it. Before describing the flower, let me say it must be a very variable species. Prof. Rauh describes the color of the flower as yellow, Dr. Smith as light yellow. The original description did not mention any color since it was made from a dried specimen, but Castellanos in describing it in his *Genera and Species Plantarum Argentinae* mentions the corolla as yellow and the sepals as purple. The painting in the same book shows a yellow corolla and a calyx of a dull metallic but attractive red. Our flower had

grey sepals but the petals were a dark chocolate color, that under a hand lens showed an involved pattern of many darker lines or spots on a lighter background, with an unornamented central stripe with some yellow in it.

The lower, not quite a half-inch across, had a rich fragrance, but one had to be close to the flower to get the scent. The fragrance was unique, suggesting, but differing from that of a carnation. From the coloring of the corolla it could have been a bat-pollinated flower or a moth flower—I could imagine both. The flower lasted for several days with the fragrance modulating. The other two flowers came later, but each one retained some kind of scent for several days after drying. This caused me to hypothesize that this tillandsia grows in clumps, and dead flowers continue to give off a scent to direct any pollinizers to flowers still coming on by heightening the effect. The persistent crumpled dried flowers turned black.

What was so unusual about that first flower was that, instead of having three petals, there were three modified stamens that were petaloid, of the same size and coloring as the petals, so as to make it look like a six-petaled flower. In addition another stamen was similarly modified but much smaller, setting down inside. The second flower had one petaloid stamen, making the flower look like a four-petaled flower. The top flower was normal. Not only was the double-flowering effect extraordinary, but in addition this gradation added dimension to the general phenomenon.

In those cases in plant life where species have flowers with a few to numerous stamens, double-flowering has been the origin of such well-known plants as tea-roses, Japanese flowering cherries, paeonias, and tuberous begonias. One or more stamens can appear petaloid in both monocots and dicots—in the just mentioned forms the change-over is highly ornamental, but in other cases, like bromeliads, the change detracts from the normal, and in the case of orchids can be downright freakish....

The species name, *myosura*, comes from two ancient Greek words, transliterated as *myos*, meaning mouse, and *ura* for tail. In fact, our word, mouse, traces back to the Latin, Greek and even to Sanskrit with little change in form. And mouse-tail is an apt term to designate our plant; the four-inch, wispy-long leaves covered with a silky coat of appressed scale-hairs, the leaves very narrow and tapering, and trailing off, and even the similarly coated four and one-half inch long peduncle of the inflorescence looks like some small rodent's tail.

The application of "mouse-tail" was the product of the imagination of a famous German botanist, Grisebach. August Heinrich Rudolph Grisebach was his full name, unless he had other first-names that he did not choose to use! He was the author of the *Flora of the British West Indian Islands*. J.G. Baker confirmed and validated the name presenting its first description because Grisebach had simply used this original name by applying it to a herbarium sheet of the plant. Baker published the first description of *T. myosura* in the *Journal of Botany*, London, in 1878. Grisebach was born in 1814 and died in 1879. So this happened the year before Grisebach's death.

In the *Contributions from the Gray Herbarium*, No. CVI (1935) Dr. Lyman B. Smith gives a long description of *T. myosura* and informs us Grisebach had applied the name to a herbarium specimen, that it was later validated by Baker and that Grisebach republished it the year he died.

Tillandsia myosura is epiphytic, but also has been found growing on rocks. It is native to southern Bolivia, Uruguay and northern Argentina. Our plant came from Argentina and was collected by Dorothea Muhr....

Reprinted from the *Journal*, v. 25:103–105. The drawing from W. Rauh, *Bromelien*, fig. 42, replaces the original drawing in the interest of better definition.—Ed.

Brooklyn Botanic Garden

Tillandsia xerographica

Chet Blackburn

The best known of the seven species of *Tillandsia* recently placed on the CITES list is *Tillandsia xerographica*. It is also one of the best illustrations of the difficulty in trying to establish such a list.

Tillandsia xerographica occurs in a number of populations ranging from southern Mexico to El Salvador. The Mexican form has a limited range in the state of Oaxaca and has had the further bad luck of having the Pan American Highway winding through its range. A combination of habitat destruction and collection has made the Mexican population a legitimate candidate for the CITES list.

Almost all *Tillandsia xerographica* plants in commerce, however, are from Guatemalan sources and many growers and vendors maintain that most of the Guatemalan populations are still thriving, and collecting does



P. Koide

Figure 12.
Tillandsia xerographica, a
specimen plant from Guatemala.

not currently pose a threat to them. It has been more than twenty years since I have been to Guatemala so I am not in a position to know whether that is true or not. I last saw the Mexican habitat in 1981 and they were not common then. I suspect their numbers have declined dramatically in the eleven years since.

In any case, the issue of collecting bromeliads and other plants from the wild will become an increasingly controversial one. That is fodder for a future article. For now, we are discussing *Tillandsia xerographica*.

Tillandsia xerographica is one of the most striking tillandsias and has long been one of the most popular. The bold, silvery rosette with long, tapering leaves never fails to attract attention. Amazingly, for such a conspicuous plant, it was not described until 1953. In the wild, it grows as an epiphyte in rocky, semiarid situations in full sun at elevations ranging from 500–1800 feet. At the height of the dry season, wild populations tend to look rather bedraggled.

They are more tender to cold than moist tillandsias but are otherwise rather easy to grow and flower. After flowering, they send out one or more pups that are not difficult to grow to maturity.

At one time, the name *Tillandsia tomaselli* was applied to the Mexican form. Most taxonomists do not regard the differences between the Mexican and Guatemalan form as significant enough to warrant taxonomic separation. Some even regard the differences as being culturally induced, but that has not been my experience. The Mexican form is a larger plant with a taller, denser spike. It is also a lot more tender. My experience has been that the two forms can be readily distinguished even after having been grown side by side for years.

To complicate matters further, another Mexican plant found in oak woodlands near Rincon de la Via in the state of Guerrero was described as *T. kruseana* in 1973. In appearance at least, it looks like it is simply a larger form of the Oaxacan *T. xerographica*, and its description (except for ultimate size) in the Smith and Downs monograph does not seem to separate it from *T. xerographica*.¹

If you don't have *Tillandsia xerographica* in your collection and you want one, you'd better get it soon. Prices will be rising before long.

Reprinted from the Bromeliad News, Sacramento Bromeliad Society, May 1992, with the author's permission.

¹ *T. kruseana* Matuda was reduced to synonymy with *T. xerographica* Rohweder by Sue Gardner in her doctoral dissertation (1983) but the change does not seem to have become common knowledge. We thank Mr. Blackburn for this opportunity to make it better known.—Ed.

New Directors, 1993–1995

California:	Pamela Koide	Louisiana:	Fred Ross
Florida:	Geoffrey Johnson	Texas:	Don Garrison

No nominations were received from the Australia Region and there was no contest in the California and Florida regions. Congratulations to our new and reelected directors.

Second Call for Nominations

This is the second reminder that there are vacancies for directors of The Bromeliad Society, Inc. for the 1994–1996 term:

California:	2 directors	Northeast:	1 director
Central:	1 director	Southern:	1 director
Florida:	1 director	Western:	1 director
International: 1 director			

If you or your local society have not yet sent nominations to the chairman of the Nominations Committee you are not doing your part of the job.

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

Dr. Tim Calamari, Jr.
Chairman, B.S.I. Nominations Committee
1016 Rosa Avenue
Metairie, LA 70005
Telephone: 504-831-1764

NOMINATIONS MUST BE MADE BY 18 MARCH 1993. You may nominate by telephone through 15 March, but you must send written confirmation. The details are listed in the November–December 1992 *Journal* and in the BSI bylaws. Every affiliated society has a copy of the bylaws.—T.A.C.

THE MARCH–APRIL ISSUE OF THE *JOURNAL* will be mailed during the last week of February 1993. All ads, calendar notices, new articles must be received at least 60 days before then.

The Genus *Bromelia* in Venezuela, Part II: *Bromelia goeldiana*

Ana Rousse

On a recent trip to the southeast of Venezuela, more precisely to the southern region of the Orinoco River, with the purpose of studying bromelias, we drove on Road 10 up to Santa Elena de Uairen near the border between Venezuela and Brazil. This vast region of the Grand Savanna is surrounded by tepuis. It includes several rivers that originate in waterfalls.

In this area are the most ancient bromelias pertaining to the family Bromeliaceae. As a matter of fact, it is very hard to cultivate these plants because of their special habitat. All year round in that stony and sandy land, the temperature is neither cold nor warm, there is frequent rain, the humidity is high, and there is a constant wind.

Among the bromeliads of this particular region are many species of *Navia*, *Ayensua*, *Brocchinia*, *Lindmania*, and *Pitcairnia*. It is also possible to find species of *Guzmania*, *Vriesea*, and even a few species of Bromelioideae.

During this trip we found *Bromelia goeldiana*. It is an interesting and showy genus of large size and with an enormous cluster of edible fruit.

Bromelia goeldiana grows in the middle of the tropical forest, called the gallery forest, close to rivers and the savannas. This bromeliad gathers in colonies of 10–20 plants. It comes from the south of the Orinoco River and from the northeastern region of Brazil.¹

Bromelia goeldiana reaches a maximum height of four meters (fig. 13), stemless, with a length of three meters, and multiple leaves with a diameter of 10 centimeters, folded or curved downwards. The edge of the leaves has numerous curved spines three millimeters long. The most evident characteristic is the intense red coloration of their tips. When flowering, the entire plant turns bright red, making it highly decorative.² It is spread by thick, woody stolons that grow to lengths of up to two meters. We did not find any specimens of this species in flower but several in fruit. The cone-shaped scape is 40–50 centimeters long and full of enormous oval, yellow berries with tough skins (figure 14). The berries are up

¹ Smith, L.B.; Downs, R.J. Bromelioideae. Flora Neotropica. Monograph no. 14, pt. 3. New York: N.Y. Botanical Garden; 1979:1668–1669.

² Oliva-Esteva, F; Steyermark, J.A. Bromeliaceae of Venezuela. Caracas: Edit. Armitano; 1987:121.



Author

Figure 13.
Bromelia goeldiana, in habitat. A Pemon Indian is showing the red leaf tip.



Author

Figure 14.
A cluster of fruits of *B. goeldiana*. The cluster is 50 cm long and each fruit is 5-6 cm in diameter.

to six centimeters in diameter, the seeds are black, spherical, and 3 millimeters in diameter. They are flattened like lentils.

The many clusters of berries that we examined had biting scars made by large birds of the sparrow hawk family, parrots, as well as by rats, squirrels, and rabbits, which are frequently found in this region. The empty fruit capsules remained affixed to the scape. In many cases, the remaining seeds were still attached to the neatly broken capsule.

The Pemon Indians of Waramasen, a locality in the Canaima National Park (a park of 30,000 square kilometers), kept insisting that this fruit is edible. We thought that doubtful because when we squeezed the capsules to extract the seeds the juice caused a burning sensation on our skin.

The inside of the berry contains a rich, white pulp with a pleasant smell, and a sweet-sour taste. The pulp also burned the inside of our mouths. This kind of berry is different from that of *Bromelia pinguin*, which produces a similar fruit, locally called "maya." Although that fruit is smaller, it is definitely edible.

Bromelia pinguin, together with *B. chrysantha*, will be part of a future report.

Caracas, Venezuela

A Note To All Members

DO NOT SUFFER SILENTLY IF:

(1) Your *Journal* copy is late. Four weeks should be enough for it to reach Sacramento and four months enough to reach Perth. We pay people to mail the *Journal* accurately and quickly and we know how to complain about postal system problems. Tell me. Write or telephone (407-896-3722).

(2) You do not get an issue of the *Journal* and you know that you have paid your dues. Tell me.

(3) You get an empty envelope (it has happened). Sometimes the labels are stuck on the envelopes before the printer delivers the new issue. Labeling, applying postage labels, and inserting the *Journal* into the envelope are manual tasks. The problem is human frailty. Tell me.

(4) You find blank pages, incomplete text, upside down pictures. Don't mumble to yourself, tell me.

ON THE OTHER HAND: If you have something nice to say, and especially if you have an article that you want to contribute, tell me.—TUL

Wittrockia amazonica... (continued from page 6)

brown-lepidote on both sides, abaxially often tinged with red-brown or purple; *blades* narrowed toward base, narrowly lanceolate, acuminate-caudate, canaliculate with a more rigid median channel, 20–50 cm long, 3–6 (–9) cm wide, very densely and finely serrulate, spines ca. 0.5 mm long, green or very often tinged abaxially with red-brown or purple, lepidote to glabrescent toward apex. *Scape* 5–7 (–14) cm long; *scape bracts* subfoliaceous. *Inflorescence* densely bipinnate to inconspicuously tripinnate, subcorymbose, subcapitiform-obconic, sunk in the rosette, ca. 6 cm long, ca. 10 (–15) cm in diameter at apex; *primary bracts* oval-lanceolate, apex short acuminate-caudate, ca. 10 (–12) cm long, ca. 5 (–7) cm wide at base, reddish brown to bright red, densely lepidote toward apex, very densely serrulate, suberect but the apex recurving; *fascicles* flabellate, complanate, with 3–8 (–13) flowers, 30–35 mm long (without the petals); *floral bracts* ovate, to nearly equaling the center of the sepals, acute, entire, lepidote, carinate, membranaceous; *flowers* 40–50 (–56) mm long, near sessil; *sepals* oblong-elliptic, apex acute and apiculate, subsymmetric, ca. 20 (–25) mm long, 7–10 mm wide, connate at base for 2–3 (–7) mm, glabrous; *petals* linear, 30–35 mm long, apex obtuse-cucullate, connate at base for 10 mm, bearing 2 fimbriate appendages ca. 10 mm above the base and 2 longitudinal calluses equaling the length of the filaments, blades erect, greenish white, green or yellowish with whitish margins; *filaments*: the epipetalous ones highly adnate to the petals, the episepalous adnate for ca. 10 mm; *ovary* 10–12 mm long, ca. 6 mm in diameter, ellipsoid-obovate, slightly constricted at apex; *placentae* subcentral; *epigynous tube* ca. 1 mm long; *ovules* many, obtuse.

Basic material studied:

Holotype: Kew Hortus s.n., flowered in 1878 (K).

Probable clonotypes: Kew Hortus s.n., Sept. 1885 (K); Liège Hortus s.n., Oct. 1874 (LG); DeLeon s.n., 1 Nov. 1961 (US); Berlin Hortus s.n., 10 Mar. 1966 (B).

Diverse material: Brazil, Santa Catarina State, Antonio Carlos (old Biguaçu), Fachinal, R. Reitz 4207, 15 July 1951 (HBR).

The reason for the “disappearance” of *Wittrockia amazonica* from the wild now becomes quite understandable. With the stated characteristics, principally those of its sepals, misinterpreted it could never have been recognized except as *W. smithii*, which from the 1950s onwards acted as a disguise for its identity and forms the key piece in this puzzle.

ACKNOWLEDGMENTS:

We thank the curators of the herbaria of the Royal Botanic Gardens, Kew, and the Botanisches Museum Berlin-Dahlem for loaning the original material of *W. amazonica*; the University of Liège and the Smithsonian Institution, mainly Mr. Michael Spencer, for supplying photocopies of the materials. We thank also the Herbarium Bradeanum (HB), Instituto de Botânica Municipal de Curitiba (MBM), and Herbário Barbosa Rodrigues (HBR) for opening their collections to help our studies.

Rio de Janeiro

The Bromeliads of Brazil (continued from page 17)

It would not be difficult to surmise that these two forms might be the latest development, each in its own type of fruiting method—the appendaged-seed type (represented by the Spanish moss) and the berry-seed type (represented by the pineapple). The pineapple has had all its fruits fused into one big “berry.” No other fruit-bearing type in this family has the individual berries that hold the seed more completely welded than in the pineapple fruit. On the other hand, the Spanish moss, with its appendaged seeds in a pod, grows with such a fusion of leaves in one continuous growth that there is no evidence of roots (which, I believe, have been absorbed) or of the usual maturing of individual plants, characteristics which probably make it the latest development in the appendaged-seed division. We might say that this “freak” of a plant is certainly the most modern, for it travels entirely by air.

The bromeliad flower pattern is formed in multiples of three. Its flowers generally are formed in spikes or racemes with brightly colored bracts. In the botanical descriptions of this family every flower has been said to be monoecious or perfect, even though in some of the Hechtias (of Mexico), the flowers of which have both stamens and pistils, only one of them functions.

An exception appeared during January 1942, when I observed that in several of the species of *Cryptanthus* the flowers were not monoecious, but dioecious, for there were separate male and female flowers in the same plant. (One of our *Cryptanthus* species, not yet determined, however, does have all perfect flowers.) this condition of separate sex flowers has apparently not been noted before, as there seems to be no record of it in literature.

Flowers throughout the family range in size from tiny, almost microscopic blossoms as in the giant *Hohenbergia augusta*, in which the minute stamens even hide the petals, to the large, lovely, blue-violet flowers 2 inches in diameter of the *Tillandsia lindenii* of Ecuador. Flowers that stay open for several days are the exception, but a stranger exception is the flower of a new and as yet unnamed *Aechmea* I found in Brazil that opens after midnight; 3 hours later the petals close and begin to dissolve into the sweet nectar already formed at the perianth. While each species has its more or less regular blooming period, I have by careful and persistent search found a great number of species blooming out of their “time” for some unknown reason.

Along with the variance in flower sizes goes a peculiar range of odors; the white flower of one of our new species (*Vriesea hamata*)¹ smells like an onion, another (*Vriesea vulpinoidea*)² like a fox. Some have an exquisitely sweet perfume as in *Tillandsia decomposita*,³ or the fresh fragrance of a ripening apple as in the unopened buds of the new *Vriesea racinae*. When this flower opens, the fragrance disappears. The majority of bromeliad flowers, however, have little fragrance. While the flowers, it is agreed, generally

¹ *V. fenestralis*

² *V. vulpinoidea*

³ *T. duratii* var. *saxatilis*

produce the odor, in the case of *Aechmea purpureo-rosea* I have found that the entire inflorescence independent of the flowers has a "toilet soap" fragrance for weeks before and after the flowers are open, as well as during the blooming period.

The color of the flowers covers the entire range of the spectrum, but the predominant hue seems to be in the lavender to blue range, although white, yellow, green, and red are frequent. Most of the bromeliads are colorful during the blooming period but not always because of the flowers. Many species have small and inconspicuous flowers, but the colorful red bracts or leaves surrounding them will give the inflorescence the brilliant and dashing display so much admired. In some species, for example, *Cryptanthopsis navioides*,⁴ the entire plant turns scarlet at blooming time, but as soon as the flowers have finished their mission the color of the leaves fades away and it becomes just another green plant.

One of the new Neoregelias that we found holds its blaze of color in the wide cup bracts for months, until after the seeds have matured. But some of the Nidulariums that so colorfully surround their lavender flowers with a rosette of bright red bracts give up that color after the last flower is gone.

The fundamental motif of plant form in this family is a whorl of leaves forming a rosette. In most of the terrestrial bromeliads the rosette form is obvious and resembles to a certain extent the familiar pineapple plant. In many of the epiphytes, of both the rosette and tubular form, the leaves are held so securely above the base that they become most efficient reservoirs and hold rain water constantly. In many of the Tillandsias the rosette form is close and the leaves are constricted and generally covered with tiny peltate scales which serve as "cups."

In the "style" of leaves there is great diversity in color and form, which makes so many of the bromeliads highly decorative plants even when not in bloom. Spots, horizontal and longitudinal stripes, zigzag mottling and plain green, spiny and perfectly smooth surfaces, are leaf characteristics which, together with a wide range of color from many shades of green and yellow to grays, reds, and maroons, combine to produce the bromeliads' bizarre beauty. Some leaves are coarse and stiff, others are delicately drooping and grasslike. Some leaves are so curled and dried up that they give little appearance of life. The half-inch leaves of *Tillandsia tricholepis* are indeed dwarfs in comparison to the 9-foot leaves of *Streptocalyx floribundus*.⁵

Wide variation in the size of the bromeliad plants is well illustrated even within the genus *Tillandsia* by the tiny 1-inch *Tillandsia loliacea* and the huge *Tillandsia grandis* of Mexico which shoots a branched inflorescence 11 feet high.

⁴*Orthophytum navioides*

⁵*Aechmea floribunda* [recently changed from *Streptocalyx floribundus* as announced in *Phytologia* 72(2):97; Feb. 1992.]

Most of the bromeliads have roots, but in many species these no longer function as feeders. The ability to feed through the leaves is particularly emphasized in the epiphytic types. *Tillandsia usneoides* (Spanish moss) and *Tillandsia decomposita* thrive, although entirely lacking in so fundamental a part as roots. *Tillandsia usneoides* seems to merge the roots with the leaves, both in function and appearance. *Tillandsia decomposita* of Matto Grosso develops a few roots in infancy and then dispenses with them and matures with the leaves tenaciously curled around the twigs within its octopus-like grasp.

However, most epiphytic types retain enough roots to serve as a brace to hold the plant either in an upright position so as to catch the rainfall or in a downward position (as we found them in high, cold Mexican climates), so as not to hold the water which might freeze between the leaves. This method of clinging to trees has been the cause of the mistaken viewpoint that these epiphytes are parasitic. They actually take no substance from the trees to which they cling. They need only a position where they will get adequate aeration and where they will be able to catch the rainfall as well as the falling leaves from trees above, which decompose into a vegetable "tea" in the "cup" of water. This is the food taken in by the leaves, a process that eliminates the age-old plant habit of feeding through the roots. It may be conjectured that at the remote period when the first terrestrial bromeliads were developing, they encountered the choking, dark, overcrowded jungles. For survival they took to the trees, where they lost most of the feeder function of their roots.

Yet it is interesting to see how quickly the hold-fast roots of the epiphytes can be converted to function more as feeder roots. In a greenhouse the roots of a potted bromeliad function as feeders and become succulent, but when the plant is attached to a tree in the jungle the food comes from above, and the hard and wiry roots are used only for holding fast. Many of the bromeliads are undoubtedly versatile enough to get their food the easiest way, but the more highly epiphytic types have specialized to such an extent and gone so long without root feeders that they simply cannot stand "wet feet" or roots smothered in a heavy soil, for they promptly rot at the base.

Those epiphytic bromeliads which out in the jungle accumulate decayed vegetable matter in the center cups must have rain water to make the food soluble, and those bromeliads which have neither center cups nor feeder roots, such as many Tillandsias, also need rain to help assimilate their food from the dust particles of the air. But in the absence of rain, the dew collected daily in the peltate scales that cover their leaves enables them to live for months without rain, attached to a limb or the perpendicular side of a rock in full sun; thus they are true xerophytes.

Although Tillandsias such as *T. usneoides* and *T. decomposita* will certainly grow profusely without the aid of roots or any visible supply of food, the experiments that I have carried out and seen conducted have convinced

me beyond any doubt that most of the bromeliads must have a source of food other than just air and rain. The plants will live for some time without proper nourishment if not exposed to too much sun, but they certainly will not thrive, especially if they are suspended from wires as was done in an experiment in Brazil to prove the theory that they need no food other than air and water. I have seen these plants there. They hang on wires and hooks, hundreds of them, and, yes, they were living—some of them—but they were gasping pitifully for existence and were dying one by one. The only happy ones were the exceptionally few types of Tillandsias that really can “do the impossible.” Even pineapple plants were hung on wire, but I assure you that they would never bear fruit. Each plant had literally to live on itself, gradually getting smaller and finally drying up. It was a terrible test and, except for some of the orchids, I know of no other plants that could have held on so long.

In the field I have found isolated examples of “natural misplacement:” pineapple plants and plants of *Bromelia serra*, both terrestrial, whose seeds undoubtedly were dropped by birds in the boots of a palm high off the ground. However, the plants were not happy, nor were they bearing fruit, but were gradually growing smaller.

That terrestrial bromeliads also tend to feed through the leaves has been shown by the commercial pineapple growers, who have found that fertilizer thrown into the base of the lower leaves is more readily taken up as nourishment and produces faster growth than where it is distributed only in the soil surrounding the plant. This is an illustration of the tendency of practically the entire family to be able to feed through the base of their leaves. However, I believe that the more primitive forms such as Puyas, Dyckias, and Encholiriums still feed mostly through their roots.

In trying to grow these interesting plants I have not learned of all the “food” they like, but I have learned certain things they do not like. They cannot tolerate the dripping of water from lime, copper, or galvanized iron. The drip from these will burn the leaves and any such burn often kills the plant in a short time. Even a small copper wire piercing a leaf will usually kill that leaf. While they have an amazing capacity for going without apparent food and withstanding adverse conditions, in other respects they are much more fastidious. Any food given bromeliads must be acid, as alkalinity derived from water or from foreign substances is disastrous to them. [To be concluded].

The Bromeliad Society of South Florida has contributed generously to our color fund. We are especially grateful to our Miami friends for their gift as we remember the terrible problems that Hurricane Andrew created for many of them.—Ed.

You are cordially invited to become a member of The Bromeliad Society, Inc.

The Bromeliad Society, Inc., a nonprofit, educational, horticultural organization was formed to promote interest and disseminate knowledge in this interesting family of plants. Membership is worldwide, and includes apartment and home gardeners, greenhouse hobbyists, nurserymen, teachers, scientists, and directors and personnel of botanic gardens. Everyone interested in bromeliads, in learning more about them, in growing them, and participating in the activities of The Bromeliad Society is welcome to become a member.

The activities of the Bromeliad Society consist of

- The publication of the *Journal*, a bimonthly magazine for both amateur and professional, well illustrated in color and black and white.
- The publication of information booklets on bromeliads such as Cultural Handbook, Glossary, and the Handbook for judges and Exhibitors, etc.
- The fostering of affiliated societies. There are many such groups throughout the world.
- The sale of bromeliad seeds through the Society Seed Fund.
- The encouragement of correspondence among growers of all countries in order that bromeliads may become better known and more widely appreciated.

Classes of Membership

- **ANNUAL:** A regular membership for an individual, society, or institution.
- **DUAL:** Two members at the same address to receive one *Journal*, each may vote, and have all benefits of membership.
- **CONTRIBUTING:** For an individual, society or institution. Additional funds are used to help underwrite cost of color plates in the *Journal*.
- **FELLOWSHIP:** Same as contributing, member will receive a copy of the Cultural Handbook.
- **LIFE:** No annual dues will again be paid for the lifetime of the member. Individual will receive a copy of the Cultural Handbook, a life membership certificate, card, and pin. Not available to societies or institutions.

All memberships commence upon receipt of dues and include the next bimonthly *Journal*. Current back issues are available. Memberships are tax deductible. To learn more, fill out the form below and send it in today.

Application for Membership to The Bromeliad Society, Inc.

Please fill in every line that applies to you and type print carefully. Your mailing label is made from this form. Every member should return this application to 2488 East 49th, Tulsa, Oklahoma 74105.

Please check type of membership. International memberships are increased by \$5 to cover postage.

Choose one:

- ☐ Individual
☐ Society
☐ Institution

Choose one:

- ☐ Renewal
☐ New Member

Choose one:

- ☐ Annual United States 20.00
☐ Annual International 25.00
☐ Dual United States 25.00
☐ Dual International 30.00

Contributing Members:

- ☐ Fellowship United States 35.00
☐ Fellowship International 40.00
☐ Commercial 50.00
☐ Life 750.00

First Class handling add 7.50

Amount Enclosed \$ _____

Name _____ Phone (_____) _____

Second name on dual membership _____

Address _____

City _____ State _____ Zip _____

Name and location of affiliate to which you belong _____

Name and address of affiliate president _____

How did you find out the BSI? _____

Checks should be made payable to The Bromeliad Society, Inc. Members outside the United States should remit by international money order or cashier's check payable in U.S.A. funds on any U.S. bank. Personal checks not drawn on U.S. banks will not be accepted.

☐ If money order is to come under separate mailing, please indicate and include a copy, or the number and type of order.

_____ Type of order _____

Advertising space in the *Journal of the Bromeliad Society* is available at the following rates:

	Rates ¹	One Issue	Six Issues
ALL ADVERTISING PREPAID.	Full Pages	\$125.00	\$625.00 ²
	½ Page	70.00	350.00 ²
Advertisers to provide any art work desired.	¼ Page	45.00	220.00 ²
	⅛ Page	25.00	125.00 ²

¹ Cost for color ad furnished on request. ² Plus \$25.00 per ad change.

Advertising is presented as a service to our membership and does not necessarily imply endorsement of the product. Please address all correspondence to: Editor—Thomas U. Lineham, Jr., 1508 Lake Shore Drive, Orlando, FL 32803.

BROMELIADS, A CULTURAL MANUAL

Brand new, BSI cultural handbook—43 pages, color pictures

PRICES: All orders postpaid	1-9 copies	\$3.00 each
EXCEPT for overseas orders	10-49 copies	2.00 each
for caselots, which will be billed	50-329 copies	1.50 each
at surface mail rates.	330 copies (1 case)	1.00 each

Order from Mrs. Sally Thompson, BSI Publication Sales, 29275 N.E. Putnam Road, Newberg, OR 97132 USA. Please send payment with order. Checks should be made payable to The Bromeliad Society, Inc. Orders from outside the United States should be by International Money Order or cashier's check payable in U.S. funds on any U.S. bank. Personal checks not drawn on U.S. banks cannot be accepted. If money order is to come under separate mailing, please include a copy or the number and type of order.

SURINAM ADVENTURE



Lee Moore The Adventurer

P.O. BOX 822
MIAMI, FLORIDA 33156
TELEPHONE (305) 274-3980

A Collecting Adventure in Surinam, March 1993

An exploring expedition along the rivers and virgin jungle of Surinam for scientific and cultural purposes.

Write for information. Register early. Membership on this expedition will be limited. Price and exact dates to be announced.

DYCKIAS, PUYAS AECHMEAS

LARGE SASE
FOR LIST.

JOE'S
NURSERY



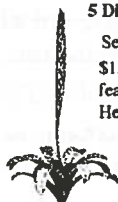
P.O. BOX 1867
VISTA, CA 92085

NORTHWEST BROMELIADS & TROPICAL EXOTICS

Special Bromeliad Packages for Beginners: Includes species from Aechmea, Billbergia, Cryptanthus, & Neoregelia genera

10 Different Bromeliads for \$20.00 PLUS SHIPPING
5 Different Bromeliads for \$12.00 PLUS SHIPPING

Send S.A.S.E. for Bromeliad listing.
\$1.00 for illustrated Tropical Exotics Catalogue featuring Bananas, Bromeliads, Ginger, & Heliconia. Plants, rhizomes, seeds.



NORTHWEST BROMELIADS
P.O. Box 1136
Point Roberts, WA. 98281
Ph. (604) 272-3371 Ph. (604) 271-4330

Heartland Hydroponics



FOR ALL OF YOUR GROWING NEEDS

- A COMPLETE LINE OF FERTILIZERS
- LIGHTING SYSTEMS
- A COMPLETE LINE OF ORGANICS
- BARK MIX • PERLITE
- SPHAGNUM MOSS • BOOKS

VISIT OUR SHOWROOM AND SEE HOW WE'RE GROWING!



Heartland Hydroponics

Vernon Hills
115 Townline Road
Vernon Hills, IL

(3.5 Miles West of I-94 on Route 60)

800-354-GROW

CALL FOR A
FREE CATALOG

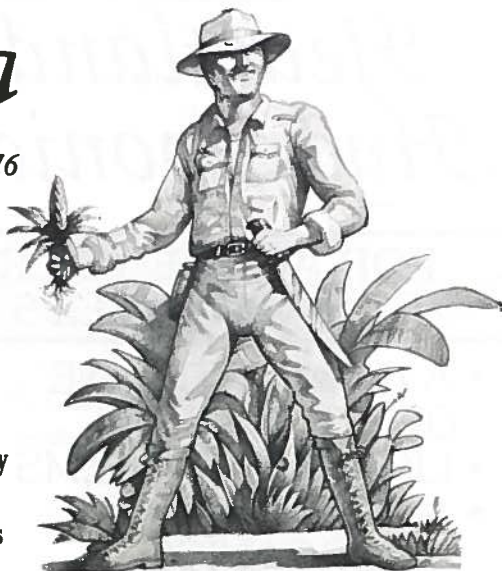
1/93

Tropiflora

A Tradition of Quality Since 1976

**Catering to Collectors
and the Wholesale Trade**

**Hundreds of varieties of
greenhouse-grown
Bromeliads in stock and a
constantly changing inventory
of new, collected and
imported species and hybrids**



**Tillandsia Specialist, Largest Selection in the U.S.
Wholesale and Retail Catalogs FREE • Shipping Worldwide**

3530 Tallevast Road, Sarasota, FL 34243
Phone (813) 351-2267 • Fax (813) 351-6985

You are invited to join
THE CRYPTANTHUS SOCIETY
the largest affiliate of The Bromeliad Society, Inc.



learn how to grow the
dazzling Earth Stars
and make new friends
all over the world.

Membership (\$10 USA) (\$15 International) includes
four colorful issues of *The Cryptanthus Society Journal*
Ongoing Research and Plant Identification • Cultivar Publication,
Slide Library • Cultural Information Exchange • Registration Assistance
International Shows with exhibits, seminars, tours, and plant sales

Send SASE for cultural information
or \$3.00 for a sample Journal to:

Kathleen Stucker, Secretary
3629 Bordeaux Court Arlington, TX 76016 USA



**BRAND NEW 84-PAGE
COLOR CATALOG**
\$5
185 PLANTS
IN GLORIOUS
FULL COLOR
Cryptanthus
Bromeliads & Tropicals

Grow three times as many plants
in the same amount of space.
ADJUSTABLE™ POT HANGERS increase
light distribution, air circulation and
drainage. Durable plastic coating prevents
rust. Sizes to fit 3 to 8-inch pots in 6, 9
& 12 inch lengths. Grow better plants.
Send SASE for information, today!

SOUTHERN EXPOSURE

35 Minor Beaumont, TX 77702 USA (409) 835-0644

TREEBORNE GARDENS



GRAPEVINE
AND
MANZANITA
CRAFTWOOD

503-469-6539

99211 BLACKBERRY LANE
BROOKINGS, OR 97415

Michael's Bromeliads

Providing an outstanding selection
of quality Bromeliads for the collector.

Send stamp for list of over
800 varieties from 30 genera.
Specializing in Neoregelias.

Order by mail, or contact for appointment.

Michael H. Kiehl
1365 Canterbury Rd. N.
St. Petersburg, FL 33710
Phone: (813) 347-0349

SPECIAL SALE OF JOURNAL BACK ISSUES

The closing date of this sale is extended through 31 March 1993.

Journal volumes for 1976 through 1986,
when ordered in groups of any three\$10.00 per volume

Conditions: Postpaid cheapest rate. Insured at your request,
if available, at added cost

Journal separate issues (1976-1986).....\$2.50 per issue

Bromeliad Society Bulletin (1951-1958).....\$10.00 per six issues

Issues are still available. Volume 1 (1951) is complete, others are incomplete.
Write for Availability

PLEASE NOTE: There are no volumes or separate issues of the *Bulletin* or *Journal*
available for the years 1959-1975.

PAYMENT: Checks should be made payable to The Bromeliad Society, Inc. Members
outside the United States should remit by International Money Order or
cashier's check payable in U.S.A. funds on any U.S. bank. Personal checks
not drawn on U.S. banks will not be accepted. If money order is to come
under separate mailing, please indicate and include a copy, or the number
and type of order.

ORDER FROM or address inquiries to:

Editor, The Bromeliad Society, Inc.
1508 Lake Shore Drive, Orlando, FL 32803-1305
Telephone: 407-896-3722

AVAILABLE AGAIN

GARDEN PLANTS OF THE TROPICS (VENEZUELA)

by Francisco Oliva-Esteva; introduction by Dr. Julian A. Steyermark.

430 pages, extensively illustrated in color; 27-24 cm (10½" x 9½"). Reviewed
in the *Journal*, November-December 1987. "Includes 23 bromeliads...a
work of reference value." \$75.00

BROMELIACEAE OF VENEZUELA

by Francisco Oliva-Esteva and Julian A. Steyermark.

10½" x 9½", 397 p., 466 color photos; 223 bromeliads including 29 genera,
many new to science. Reviewed in the *Journal*, March-April 1988. "A lavish
quantity of color pictures and other illustrations." \$75.00

Both books postpaid in the United States. If ordering from outside the U.S.
please add \$5.00 and allow 6-8 weeks for delivery.

Order from:

Elisenda Andrews
16 Willow Lane
Cumberland, ME 04021

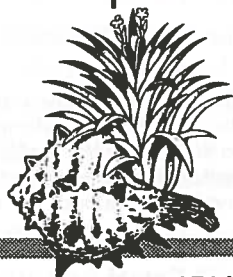
Welcome to
TILLANDSIALAND

Growing only Tillandsia since 1977.

Largest Tillandsia Nursery in
North America.

All our plants are Greenhouse grown.

Prompt, Professional Service
North America's Largest Inventory.
Wholesale Only



Tillandsia
INTERNATIONAL

43714 ROAD 415-A / COARSEGOLD, CA 93614
(209) 683-7097 / FAX (209) 658-8847

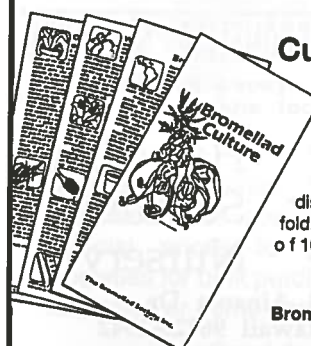


**BROMELIAD
BOOKS**

Send for FREE 28-page catalog featuring
172+ cactus books, + orchid, bromeliad,
fern, South African, desert, stationery.

Sent surface mail anywhere in the world!

RAINBOW GARDENS BOOKSHOP
1444 E. Taylor St. Vista, CA
Phone 619-758-4290 92084
visa/mc welcome



**Bromeliad
Cultural Tips**

Answers the
most frequently
asked questions by
the general public.

Hand out at shows,
displays and sales. 8-
fold, self-mailer. Packet
of 100—\$3.50. Postage
will be billed.

Order early from:
Bromeliad Society, Inc.
2488 E. 49th
Tulsa, OK 74105

*Blooming
Bromeliads*

by

*Ulrich & Ursula
Baensch*

800 color photographs by the authors

After many years of studying and
searching, waiting for blooms,
photographing, writing, enlarging, and
steadily improving, this vivid, scientific,
and tasteful work is now in the final
stages before being type set.

In English and German

Delivery is planned for fall 1993.

TROPIC BEAUTY, PUBLISHERS
P.O. Box CB 11317
Nassau / Bahamas

"Schultz-Instant"



The
Natural
Way to
Bug-Free
Plants.

the
**NATURAL
PYRETHRINS**
Insecticide

**Kills: Aphids • Whiteflies • Gnats
• Mealy Bugs • Red Spiders • Moths
• Spider Mites • Mosquitoes Etc.**

Available at leading Garden Centers and Plant Departments
Garden Clubs. SEND FOR OUR FUND RAISING OFFER
Schultz Co. 14099 Riverport Drive, Maryland Heights, MO 63043



**VIRGIN
CORK
BARK!**

Super for all plaqued species

By the piece or by the bale.

Ask about CORK NUGGETS, too!

Call for the Dealer or
the Distributor nearest you!

Maryland Cork Company, Inc.

Toll Free: (800) 662-CORK
Inside MD: (301) 398-2955

P.O. Box 126, Elkton, MD. 21921



**Rainforest®
Flora
Inc.**

GROWERS AND DISTRIBUTORS OF
TILLANDSIAS AND BROMELIADS

1927 W. ROSECRANS AVE.
GARDENA, CA 90249
(213) 515-5200
FAX (213) 515-1177

Quality Tillandsia Since 1974

- GREATEST NUMBER OF SPECIES
- BEST PRICES AND QUALITY
- 98% OF PLANTS ARE PRODUCED AT
OUR 10 ACRE GROWING FACILITIES.
- FULL LINE OF PROMOTIONAL MATERIALS:
-270 PAGE, FULL COLOR, TILLANDSIA
BY PAUL T. ISLEY, III
-24 PAGE GENUS TILLANDSIA BOOKLET
-HIGHLY PRAISED EPIPHYTES DELIGHT
FERTILIZER
-COLOR POSTERS AND LAMINATED PLACARDS

SEND FOR PRICE LIST
PAUL T. ISLEY III • JERROLD A. ROBINSON



**Shelldance
Nursery**

The most complete Bromeliad Nursery in the United States

Featuring exclusive Yamamoto hybrids • Wholesale/Retail

Open to the public Monday - Friday 9:00 to 4:30

Weekends by appointment only.

2000 Cabrillo Highway, Pacifica, CA 94044 (415) 355-4845

We ship anywhere • Send \$1.00 for catalog

Located ten minutes south of San Francisco

RUSSELL'S BROMELIADS



Large Selection
Competitive Prices
for
Wholesale and
Collector

Grower and
Distributor

Quality
and
Service

1690 Beardall Ave.
P.O. Box 1447
Sanford, Florida
32772-1447

407-322-0864
800-832-5632
Fax 407-322-0867

John
Jimye Kaye

GROWING BROMELIADS

by
The Bromeliad Society of Australia Inc.

A most useful handbook
for the bromeliad hobbyist
Corrected 2nd ed., 112 p., 95 color plates plus b&w illus.

Available from
Seven Hills Book Distributors
49 Central Avenue
Cincinnati, Ohio 45202
Tel.: 513-381-3881, 800-545-2005; FAX 513-381-0753
US \$11.95 + US \$2.00 shipping Credit cards accepted
Outside US and Canada contact Kangaroo Press P/L
P.O. Box 75, Kenthurst, NSW 2156, Australia

WHOLESALE BROMELIAD SEEDLINGS

Tillandsia cyanea & *Vrieseas*
Bareroot and Liners



Hawaiian
Sunshine
Nursery

2191 Ainaola Dr.
Hilo, Hawaii 96720-3542

(808) 959-4088 Fax 959-4089

Tillandsias From Guatemala

(Retail & Wholesale)

Arthur Boe Distributor

P.O. Box 6655
New Orleans, LA 70114

Enclose stamped, self-addressed
envelope for flyer.



Catch
The
Sunshine!

- Hobby to Commercial Sizes
- Environmental Systems & Accessories
- Fully Warranted
- Free Color Brochure and "Practical Guide To Greenhouse Selection."

Gothic Arch Greenhouses
A DIVISION OF TRANS-SPHERE CORP.
P.O. Box 1584-THC • Mobile, AL 36633-1584
CALL TOLL-FREE 800-628-4874

Bromeliad Society, Inc. SEEDS For Sale or Trade

HARVEY C. BELTZ, SEED FUND
CHAIRMAN

6327 South Inwood Road
Shreveport, LA 71119-7260

Send stamped, self-addressed
envelope for listing of available seeds.

WANTED *Aechmea prava*

Aechmea roberto-anselmi

John Anderson
Epiphitlm Extension Station
P.O. Box 5202
Corpus Christi, TX 78465-5202

PINEAPPLE PLACE

3961 Markham Woods Rd.
Longwood, Florida 32779
(407) 333-0445



Open 1-5
Daily
Sunday by
Appointment

Mail orders invited. We cater to
purchasers of specimen plants.
Special prices to BSI Affiliate
Societies for bulk purchases. SASE
for listing or come see us.

Carol & Jeff Johnson



THE DON BEADLE
BILLBERGIA
COLLECTION

Send self-addressed stamped envelope for list.

1205 HARBOR LIGHTS
P. O. BOX 81464
CORPUS CHRISTI, TEXAS 78468
(512) 993-3928

Bird Rock Tropicals



Specializing in Tillandsias

6523 EL CAMINO REAL
CARLSBAD, CA 92009

Tel.: 619-438-9393

FAX: 619-438-1316

Send SASE for price list

Cactus & Succulent Society of
America
Invites You to Join!

As a member you will receive:

- A Subscription to the *Cactus and Succulent Journal* (6 issues)
- Voting Privileges
- CSSA Newsletters

To begin your membership, send a check or
money order for \$30 (U.S., Canada, Mexico)
or \$35 (other countries) in U.S. dollars
drawn on U.S. bank to:

CSSA, P.O. Box 35034
Des Moines, IA 50315-0301 U.S.A.

BROMELIAD BOOKS

Send for free catalog

Myron Kimmach
5508 N. Astell Ave.
Azusa, CA 91702
(818) 334-7349

ORCHIDS AND BROMELIADS

Nursery-Grown Plants

Our Catalog No. 83 offers approximately 3,000 different Orchids and Bromeliads, species and hybrids. The Catalog also offers seeds of Orchids, Bromeliads, Philodendrons, Palms, and other greenhouse plants.

If you are interested in a copy of it, please send us US \$5.00 for airmail expenses (Cash only). We cannot accept checks of such small value.

SPECIAL PLANT OFFERS FOR BEGINNERS

We offer the following collections of orchid and bromeliad species, all carefully selected and correctly named, our choice. These are blooming-size plants. We guarantee their safe arrival and delivery by E.M.S. (Express Mail). All shipments listed will be accompanied by phytosanitary certificates. U.S. and Canadian customers must include import permit numbers with their orders. Shipments of orchid plants must be accompanied by the CITES certificate that costs \$5.00 for each order and often takes 2-3 months to be obtained. Please consider this when sending us your order.

	FOB	Inclusive EMS Mail expenses
50 different Orchid species	US \$190.00	US \$250.00
100 different Orchid species.....	375.00	450.00
50 different Bromeliad species	90.00	150.00
100 different Bromeliad species.....	250.00	325.00

Larger quantities may be sent by air freight collect.

If you are interested, please write for our Wholesale Price List No. 90.

Make checks for orders payable to: Alvim Seidel, any bank in U.S.A.

ALVIM SEIDEL ORQUIDEARIO CATARINENSE

P.O. Box 1, 89280 CORUPA - S. Catarina, Brazil

Tel. (0473) 75-1244

Rua (Street) Roberto Seidel, 1981

Founder: Roberto Seidel, 1906

Telex 474 211 ORKI BR

INT. FAX NO. 55 473 75 1042

Since 1906 - One of the world's most complete nurseries

The Bromeliad Society, Inc.

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.

OFFICERS AND DIRECTORS

President - Odean Head, 7818 Braes Meadow, Houston, TX 77071.

Vice-president - Thomas W. Wolfe, 5211 Lake LeClaire Road, Lutz, FL 33549.

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

Membership secretary - Linda Harbert, 2488 E. 49th, Tulsa, OK 74105.

Secretary - Don Beadle, P.O. Box 81464, Corpus Christi, TX 78412.

Treasurer - Clyde P. Jackson, 3705 Shadycress, Pearland, TX 77581.

1991-1993 Directors - Mark A. Dimmitt, *Western*; Sharon Garcia, *Southern*; Enrique Graf, *International*; Al Hodes, *Northeast*; Thelma Mean, *Central*; Frank Messina, *California*; Jerrold A. Robinson, *California*; Jacqui A. Watts, *International*; Thomas W. Wolfe, *Florida*.

1992-1994 Directors - Maurice Kellett, *Australia*; Polly Pascal, *Florida*; Charlien Rose, *Texas*.

1993-1995 Directors - Don Garrison, *Texas*; Geoffrey Johnson, *Florida*; Pamela Koide, *California*; Fred Ross, *Louisiana*.

HONORARY TRUSTEES

David H. Benzing, *United States*; Roberto Burle Marx, *Brazil*; Olwen Ferris, *Australia*; Grace M. Goode, *Australia*; A.B. Graf, *United States*; Roberto A. Kautsky, *Brazil*; Marcel Lecoufle, *France*; Elmer J. Lorenz, *United States*; Harold Martin, *New Zealand*; William Morris, *Australia*; Werner Rauh, *Germany*; Robert W. Read, *United States*; Walter Richter, *Germany*; Lyman B. Smith, *United States*.

DIRECTORY OF COMMITTEE CHAIRMEN AND SERVICES

Affiliate Shows; Charlien Rose, 4933 Weeping Willow, Houston, TX 77092.

Affiliated Societies: Mary Jane Lincoln, 1201 Waltham St., Metairie, LA 70001.

Conservation: Mark A. Dimmitt, The Arizona-Sonora Desert Museum, 2021 N. Kinney Rd., Tucson, AZ 85743.

Cultivar Registration: Don Beadle, P.O. Box 81464, Corpus Christi, TX 78468-1464.

Finance & Audit (acting): Don Garrison, 406 E. Witcher Ln., Houston, TX 77076.

Judges Certification: Geoffrey Johnson, 3961 Markham Woods Rd., Longwood, FL 32779.

Membership and subscriptions to the *Journal*: Please see inside front cover.

Mulford B. Foster Bromeliad Identification Center: Send specimens and contributions to Harry E. Luther, at the Center, The Marie Selby Botanical Gardens, 811 South Palm Ave., Sarasota, FL 34236. FAX: 813-366-9807.

Nominations (acting): T.A. Calamari, 1061 Rosa Ave., Metairie, LA 70005.

Publication Sales: Sally Thompson, 29275 N.E. Putnam Rd., Newberg, OR 97132.

Research Grant: David H. Benzing, Dept. of Biology, Oberlin College, Oberlin, OH 44074.

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

Slide Library: Weston K. Furukawa, 3763 Monteith Dr., Los Angeles, CA 90043.

World Conference: Thomas W. Wolfe, 5211 Lake LeClaire Road, Lutz, FL 33549.



This artistic arrangement, "A 'Berry' Nice Collection of Bromeliad Seeds," won the Morris Henry Hobbs Award for best in show in the Artistic Category at the Sarasota Bromeliad Society show in October 1992. Wally Berg prepared the arrangement and Vern Sawyer, Selby Gardens, took the picture.

Calendar of Shows

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.

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.

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.