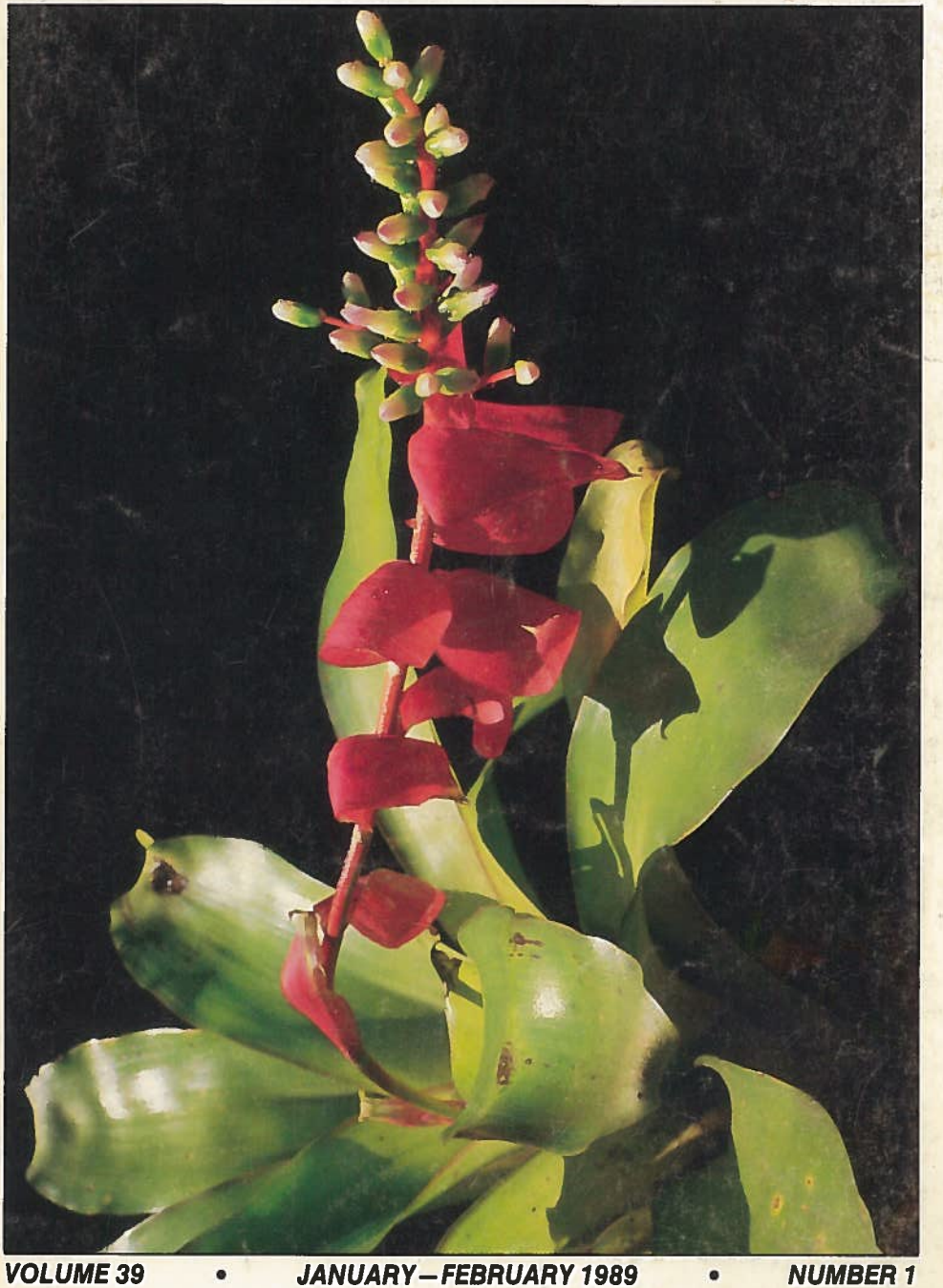
Journal of The Bromeliad Society



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Cover photographs. Front: *Aechmea carvalhoi*, collected in Bahia, Brazil. The photograph is by E.M.C. Leme and his description is on page 17. Back: *Aechmea purpureo-rosea*. Photograph by South Florida Bromeliad Society. Photo Committee.

CONTENTS

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Genus *Puya* Molina (Pitcairnioideae): Relocation of Several Rare Species and Some Preliminary Remarks on Geographic Distributions and Species Divergence *(continued)*

G.S. Varadarajan

PUYAS OF ARGENTINA

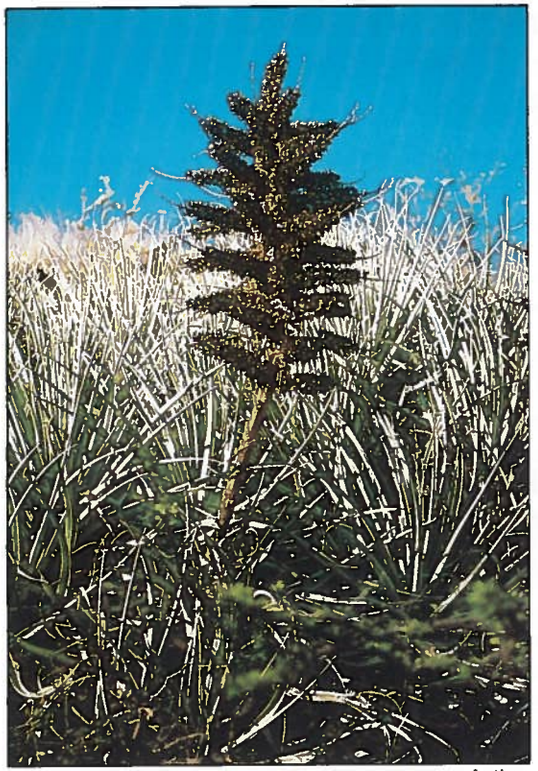
Argentina, particularly its northwestern sector, includes a wide variety of vegetational types and habitats of puya (Varadarajan 1986, 1987b). Despite the practical difficulties involved in visiting the field areas, herbarium collections are moderately available for a number of species as compared with those of Peru and Colombia. Plant explorers, especially Castellanos, Hieronymus, Hunziker, Schreiter, Venturi, have been responsible, in particular, for the extensive field collections.

From the list of rare species I collected, I wish to make a few remarks on *P. assurgens* L.B. Smith, *P. castellanosii* L.B. Smith (fig. 1), *P. harmsii* (Castellanos) Castellanos, *P. yakespala* Castellanos. These are probably good examples of local endemics, which are also widely separated from their related species.

An apically simple (undivided) and basally branched (pinnate) inflorescence type is seen in *P. assurgens* and is perhaps unusual, although there are species with predominantly simple inflorescences that produce occasional lateral branches or vice versa *(P. meriana* Wittmack, *P. mirabilis* [Mez] L.B. Smith). My collection of *P. assurgens* is from the Yala River area in Jujuy province, which is its type locality. Smith and Downs (1974) separate in their artificial key *P. assurgens* from *P. dyckioides* (Baker) Mez. Closer comparisons reveal that the related species of *P. assurgens* are probably in the more general group of dwarf species, some of which are widespread in Bolivia.

Puya castellanosii is the only representative of *Puya* subgenus *Puya* in Argentina. There are extensive populations of this species in the Brealito area, near Cachi, Salta province. Its peculiar, compound inflorescence characterized by sterile, terminal portions of the branches identifies it with Chilean species *P. berteroniana* Mez and *P. chilensis*. *P. castellanosii* occurs in a remote and somewhat isolated range separated from its supposed allies by at least a few thousand kilometers. This distribution pattern may suggest that the latter species originated by biogeographic splitting of habitats.

Puya harmsii is a strikingly robust species that grows in dense aggregations along the arid, high punas of Tucumán and Catamarca provinces. At least a few



Author

Fig. 1
P. castellanosii L. B. Smith, one of the three species of *Puya* subgenus *Puya* occurring outside of Chile. Photographed in a monte vegetation in the Brealito area, Cachi, northwestern Argentina.

hundreds of individuals constitute the population in a given locality, which is rather unusual for a majority of species. The plants are nearly 2 m tall, with a relatively thick scape and conspicuous primary bracts that cover nearly a third of lateral branches. It resembles several members of a complex of species in Argentina: *P. lilloi* Castellanos, *P. spathacea* (Grisebach) Mez. This observation is supported by the gross inflorescence type and foliar anatomy (Varadarajan 1986). However, *P. harmsii* exhibits a much narrower and somewhat isolated geographic range compared with the other members of the putative complex. The magnitude of distribution of *P. harmsii* is especially limited to the highly arid punas while its related taxa seem to exhibit a much wider range of tolerances.

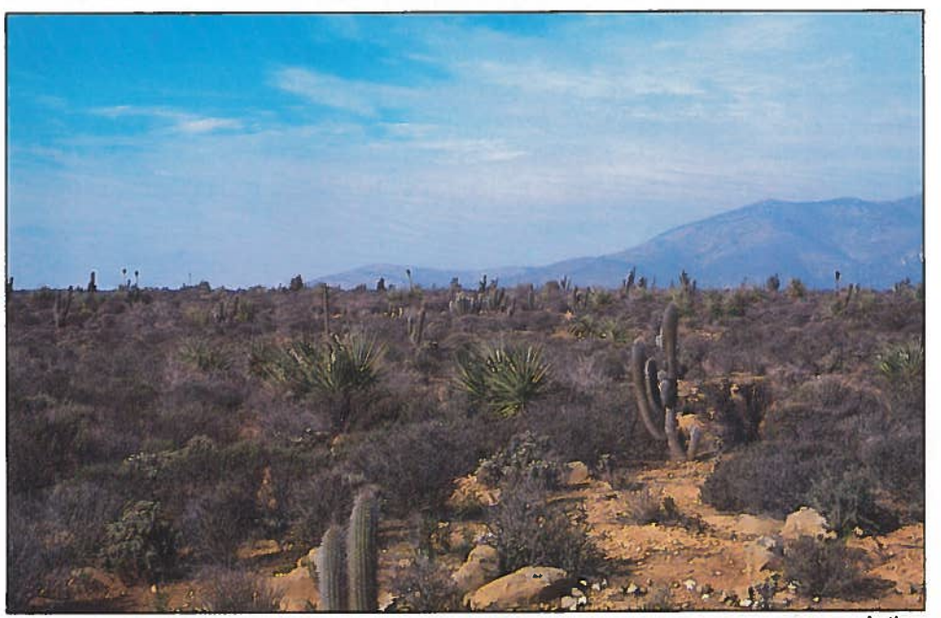
Puya yakespala is presently known from the Yakespala puna slopes near Santa Victoria in northwestern Argentina. Some characters of this species are interesting: nearly 3-m tall caulescent plants, a dry scape, more or less fibrous, papery floral bracts, inflorescence decurved and with creamy yellow, woolly indument. Only a few populations were noted over a nearly 45-km range and each had no more than 5 individual plants. The habitats of *P. yakespala* are rock outcrops in open, moist punas at 4,000 m, characterized by a wide variety of grass species *(Calamagrostis, Festuca, Stipa)*. This simple-inflorescence puya appears

to have no closely related member in the nearby region, and *P. nivalis* Baker, a Colombian species, is probably its only allied taxon.

Most of the species of *Puya* in Argentina are confined to relatively small, isolated regions, single mountain ranges and valleys. Field and herbarium studies suggest that sympatric species association is rare. Compared with other regions, the species lineages are much less diverse and are geographically rather widely separated from their closely related members in other parts of South America. A species subset including *P. lilloi* Castellanos, *P. micrantha* Mez, *P. mirabilis, P. pearcei, P. sanctae-crucis, P. smithii* Castellanos, *P. spathacea* (Grisebach) Mez is represented in Argentina and to a limited degree in Bolivia. It is characterized by a laxly paniculate inflorescence, *Puya ferruginea*-type seed, and a few other common traits (Varadarajan 1986; Varadarajan and Gilmartin 1987, 1988). The diverse species in the lineage appear to have evolved from the same parental stock before their proliferation into the presently known regions. Further, for another group that has an apparent center of primary expansion in Chile *(Puya* subgen. *Puya)*, the species somewhat remotely distributed in Argentina *(P. castellanosii)*, Peru, and Bolivia *(P. raimondii, P. weddelliana* (Baker) Mez may represent instances of peripheral radiation and divergence.

PUYAS OF CHILE

Compared with other geographic regions, the proportion of puya in Chile is significantly low. Six species are presently known to be native and a new species,



Author

Fig. 2. This arid, coastal scrub forest in Chile includes habitats for several puyas. Cacti and xeromorphic shrubs characterize the vegetation.

Puya gilmartinii Varadarajan and Flores is being described. All are limited to the hills, sand dunes, and scrubs along the coast, except that *P. berteroniana* ranges from sea level to the Andean cordilleras (ca. 2,000 m).

Puya gilmartinii appears to be closely related to *P. boliviensis* Baker and *P. chilensis*. Several morphological characteristics of *P. gilmartinii* include a combination of different traits from the allied members, suggesting that it may be a hybrid. In the absence of ploidy level chromosomal data, which often is used to infer the hybrid status of a species, the distributional aspects seem to provide some clues.

A relatively small population of about 15 individuals of *P. gilmartinii* was found in the type locality, La Serena region, situated between the limits of the ranges of *P. boliviensis* and *P. chilensis*. This locality is approximately 200–300 km south of the southern limits of *P. boliviensis* (Anthofagasta-Atacama region) and at least 300 cm north of the northern limits of *P. chilensis* (Coquimbo region). In hypothesizing hybridization, it must be emphasized that both *P. boliviensis* and *P. chilensis* had much wider distributions in the past and their overlapping sites approximated the La Serena region. Notable absence of the parental populations from that region is probably an instance of local extinction that may have been caused by some minor environmental changes.

Superficial morphological comparisons may suggest an instance of supposed hybrid origin also for *P. alpestris* (Poeppig) Gay, probably involving parents similar to *P. berteroniana* and *P. chilensis*. It is interesting, however, that the present range of distribution of *P. alpestris* (south-central Chile) is overlapped only by *P. chilensis* but not by *P. berteroniana*. Further, in about twenty localities in north-central and central Chile where I found *P. berteroniana* and *P. chilensis* co-occuring, I did not encounter populations or individual plants that would conform to any intergrading category.

Summary. The species of *Puya* in Chile present perhaps the most interesting, well-defined examples suited for detailed investigations of the patterns and processes of speciation. While it would be premature even to speculate on the probably migratory directions, a few general statements may be important to remember. Species native to Chile are unknown from other regions, and no member from any other region seems to exhibit even some peripheral extension into Chile. Pending further explorations of *P. alpestris* and *P. gilmartinii*, the population size of every other species in Chile is strikingly large. There are several hundreds of individuals in more than a few localities, unlike the situation in a majority of taxa occurring elsewhere.

Note:

1. J. Solomon, S. Beck, G. Schmidt, M. Libermann, personal communication.

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Marion Ownbey Herbarium and Dept. of Botany
Washington State University, Pullman

Tillandsia turquinensis, a New Species from Cuba

Karel Willinger

***Tillandsia turquinensis* Willinger & Michálek, sp. nov.**

Planta epiphytica ad 18–20 cm alta, caulem brevem, usque ad inflorescentiam foliosum, rosula breviorem formans; *radices* crassas, per totam longitudinem ramosas emittens; *rosula* erecta, usque ad 12 cm alta, pseudobulbum maxime 3.5–4 cm latum faciens. *Folia* firma, iuventute recta, posterius retrorsa, carinata, apiculata; *vaginae* 2.6 cm latae subalbae, margine carmesine rubrae, marginibus suis pseudobulbum stricta amplectentes, in folia usque ad 23 cm longa et basi 1 cm lata transeuntes. Foliorum coloratio variabilis secundum soli expositionem ab griseo-viridi ad viridi-luteam cum ultima quarta parte rubra. Folii margo tota longitudine usque ad pseudobulbum rubra. Planta tota subtiliter lepidota. *Inflorescentia* 4 cm longa, 0.5 cm lata, simplex, compacta, viridis. *Scapus* erectus, 3–4 cm longus, 0.5 cm in diametro, bracteis scapi omnino circumdatus. *Sepala* viridia, lanceolata et manifeste acuminata, 2.5 cm longa, 1 cm lata. *Petala* erecta, 0.4–0.5 cm lata, obtuse acuta, violacea, *sepala* per 2–2.7 cm superantia. *Stigma* symmetricum, album, petalis per 8–10 mm et antheris luteis per 1 mm longius.

Author

Fig. 3
Tillandsia turquinensis, a new species collected in the mountains near Santiago de Cuba in June 1985.

Planta habito *Tillandsia balbisianae* similis, a qua foliorum colore necnon inflorescentia distincta. Colore ad *T. concolorem* accedit, quae autem manifeste magis regida necnon compacta.

Holotypus: in herbario musei Bohemiae centralis "Středočeské muzeum" dicti oppidi Roztoky u Prahy sub no. 35671 asservatur. Clonotypi in caldario domini Karel Willinger in oppido České Budějovice, Czechoslovakia, inveniuntur.

Habitat in insula Cuba, et quidem in montibus Sierra Maestra ubi ca. 100 km situ occ. ab opp. Santiago de Cuba, julio anni 1985, alt. ca. 300 m.s.m. lecta.

Plant forming short stem with leaves up to the inflorescence. The whole plant with inflorescence 18–20 cm high, stem shorter than rosette has stout roots branched out all over. Rosette erect, up to 12 cm in height, forming pseudobulb up to 3.5–4 cm wide. Stiff and recurved leaves, canaliculate, narrow triangular, flat when young. Sheaths 2.6 cm wide, white-woolly with carmine red margins, canaliculate, 0.5 cm deep. Sheaths close to pseudobulb at the margin, changing at a distance of 1.5 cm into a blade about 23 cm long and 1 cm wide at the base. Colour of leaves varying according to amount of sunshine from grey-green to greenish yellow with red in 1st quarter. Leaf margin is red down to pseudobulb (i.e. lengthwise). Plant completely covered with soft, unsupported scales. Inflorescence 4 cm long, 1.8 cm wide, simple, compact, green. Scape erect, with sporadic leaves 3–4 cm long and 5 mm wide. Sepals lanceolate, acute, 2.5 cm long, 1 cm wide, green. Petals erect with blunt edge, 0.4–0.5 cm wide, purple, exceeding the sepals about 2–2.7 cm. Symmetrical, white stigma exceeds petals about 8–10 mm; anthers about 1 mm.

Habit of plant is similar to that of *Tillandsia balbisiana* from which it differs in the colour of leaves and inflorescence. In colour, it is similar to *T. concolor,* which is more stout and compact.

Holotype: Museum stredniho Povltaví in Roztoky u Prahy, Czechoslovakia, No. 35671. Clonotype: Mr. Willinger's hothouse, České Budějovice, Czechoslovakia.

Distribution and origin: Cuba. Santiago de Cuba; collected in the southern coastal mountains to 300 m above sea level; June 1985. Plant is an epiphyte.

České Budějovice, Czechoslovakia

Mulford Foster's 1948 Flight Around South America (concluded)

Racine Foster

[This 5th part of the Flight continues the account of M. B. Foster's bromeliad exploration in Ecuador and ends with his return home.]

"I looked intently for *Tillandsia lindenii* but did not find it and after eight hours I gave up. No bus was due before two days, so I caught one of those favorite camións, a combination passenger and cargo truck. What a ride! We returned to Loja just before midnight.

"Today, the collecting project is *Tillandsia cyanea.* I am supposed to be in that collecting area by midmorning. I leave at seven on one of the gold mine trucks going to Minas Nuevas. There, a guide and mules await me so that I can collect between Loja and Cuenca, the area where I passed by bus the other day; I saw that there were plenty of bromels waiting for my eager hands.

"Three days later between Cuenca and Ona, near the Inca Trail, I was in paramo conditions where it is cold with a wet drizzle most of the time. The perfect conditions for puyas.

"I found *Puya hamata, P. gummifera,* and *P. lanata.* There was a cluster of puya growing over a vast area in a very dry section that looks like a slope of silver in the sun. The plant, at 12,500 feet, a silver-maroon in color slashed with tomentose silver scales. Also growing there was *Puya nutans;* it, too, had silver-like leaves.

"Back to Cuenca, the land of the Canari Indians who were skilled in gold jewelry, ceramics and weaving."

Cuenca was founded in about 1557, forty years after Pizarro was there. It is near the old Canari city of Tomebamba. Today, Cuenca is Ecuador's third largest city of over 150,000 inhabitants. South of the Tomebamba area is a city of more modern times, whereas the part north of the river is definitely colonial with churches built in the 16th and 17th centuries.

Mon. evening, Dec. 6/48.

"Another day lost! I left Cuenca this morning by air with all baggage checked through to Quito. We stopped for lunch in Guayaquil, on the coast to the west of the cordillera. Then, on the same plane, we flew up and up, curving along the cordillera to Quito. We floated around there at 16,000 feet for a couple of hours; then the pilot gave up and we returned to Guayaquil for the night. That means one more day lost. Four other planes returned because of the clouds around the high city of Quito.

"Fortunately, lodgings and meals were to be found at the Hotel Metropole. After leaving the dining room, I was standing in the lobby when a gentleman came up and said: 'Well, Mr. Foster, how are you? Do you remember me? I introduced you when you gave the lecture at the Field Museum in Chicago'.

"It was Dr. Llewelyn Williams; with him was George Seaman, both of them with the Dreyfus Co. (Wrigley Chewing Gum Co.). He remembered my face! What a coincidence! A friend out of my past greeting me in Ecuador! As we chatted about what to do that evening, I mentioned that I had seen an advertisement for a violin concert. A very pleasant surprise, indeed, awaited us in the performance by Yehudi Menuhin, world-famous violinist in a *concierto magico.* All the frustrations I had encountered in this small country of Ecuador vanished in the magic of his music.

"The next day it was finally clear enough to land in Quito, the capital of Ecuador. It is a city of over 215,000 inhabitants who enjoy mild temperatures even at 9,300 feet because it is only fifteen miles from the equator.

"A trip to Santo Domingo de Los Colorados, December 7th, was arranged. My hired car surprised me by being on time, to the minute, a most unusual circumstance in all of my travels in South America! We made 129 kilometers for the day, just the driver and I. We drove southwest of Quito to the area where the Colorado Indians come for market day. These Indians paint their bodies red with *achiote, Bixa orellana,* and make a paste of the same for the hair. According to the books and magazines, they are a sight to behold! This red coloring is a symbol of blood used to protect themselves from evil spirits. I wanted to see them and photograph them, but it was not the proper day for their market. It would take a full day on horseback to where they live. That would mean a two-day delay, so I had to cancel that anticipated experience.

"Santo Domingo is a small town at 2,000 feet noted, mainly, for the market day of Los Colorados. We did not linger here, but proceeded back up the mountains making stops along the way.

"*Guzmania gloriosa* (remember we found this in Colombia) grew in profusion along the way with many other guzmanias. *Guzmania patula, G. bracteosa, G. fosteriana, G. fuerstenbergiana,* and *G. hitchcockiana,* were some of the bromeliads I found at altitudes between 2,000 and 3,000 feet."

Other bromeliads collected that day were: *Aechmea angustifolia, Pitcairnia sceptrigera, P. lehmanii, Vriesea paupera, V. cylindrica, Tillandsia cornuta,* and *T. truncata,* which Mulford learned later was a new species. It had been a collecting effort well worth while in bromeliads as well as other genera.

"I was happy to find a very dense jungle on one of my little side treks this afternoon. I have never seen its equal for aroids; there were more kinds of philodendrons than you can imagine, all growing in one place! Three of them are really

Author

Fig. 4. Tillandsia clavigera Mez collected near Portovelo, Ecuador at 2,000 ft.

good subjects, especially the one with a dark, blood-red underside; it is a knock-out! One philodendron had a most attractive crinkled leaf; another one with a white center rib; also, one with a cut leaf and hairy stem. A round leaf anthurium interested me very much. I wanted to spend several days in this lush jungle of endless tropical plants, but I had to be satisifed with just a taste of what western Ecuador offered.

"On the way up the cordillera, back to Quito, we were delayed for three hours on one of those narrow roads just like in Colombia with a locked chain across the road. Finally, a guard unlocked it. By a hard push, we ascended to Quito where we managed to arrive by dark.

"After dinner, I started packing. It was after 3 a.m. by the time I had numbered and described all the plants and packed them. Then, without enough sleep, I was called at 7:00 a.m. to take care of all the details of departure.

"I was at Garcia's office (the consul) by 9:00 a.m. but he did not arrive until 10:00. Then I rushed to the Panagra office where it was said the plane was full, but I could go to the airport and take 'shipside' luck. That means you get a seat if someone else doesn't show up. O.K., I'll try.

"I hurried over to the customs house with three boxes of plants and herbarium material. Then I rushed back to the airport in a taxi. All my papers were cleared just as the plane arrived; then they told me it was full and that they could not possibly take me! I could have cried and then easily have choked the whole outfit. I begged the captain to let me sit up front on anything or anywhere. No! Well, another line, Avianca, was ready to go to Cali in Colombia, so they changed my ticket and baggage for Cali. They even held that other plane for me! And fifteen minutes after our arrival in Cali, the Panagra plane came in. Then they changed my ticket and baggage back again to Panagra; I was flown to Balboa, Panama, the plane I should have been on in the first place! I rushed over to the ticket window to confirm my reservation for the 5:50 a.m. plane. When the clerk looked over my papers and visa for Costa Rica, he saw that it was made out in September and, by the new rules, was good for only 60 days. He could do nothing about it as the Costa Rican consul's office was closed! I scurried around to get the address of the Costa Rican ambassador; went there by taxi (even though it was 6:45 in the evening). My dilemma persuaded him to give me a new visa. Then I rushed to the hotel where they said no room was available! However, by 8 o'clock they had one for me.

"By the way, I found a fantastic tillandsia that turned out to be a vriesea, at least it has regular vriesea nectar scales at the base of the petals. I have a lot of separate flowers pressed. I'm bringing them with me, as I am afraid they would get lost in the other herbarium material.

December 14, 1948.

"One hour after my arrival in Costa Rica, Mr. and Mrs. Carlos Lankester met me at the airport. We left very soon by private plane for the Pacific coast and the banana plantations. About ten minutes after we left, word was sent out to ground all planes because of a revolution! We learned of this after our arrival. We were told that we could not go anywhere until it was over. I could not send mail! Then, last night, a special dispensation was made and a special plane came to take us back to San José. The revolution is still on, but I doubt if it will inconvenience me too much. The traffic is regulated, guards are on the highways at close intervals. We have to have a permit to travel back and forth, even out to Mr. Lankester's ranch. The Lankester's country place is a plantsman's dream; he is a collector without inhibitions!

"This revolution doesn't appear to be very serious, but it limits me from getting far out into the collecting areas. Fortunately, it is not in the Lankester's back yard as it was in April! Machine guns are placed at all airports, so all my reservations are cancelled temporarily.

"My introduction to Costa Rican bromeliads was sort of in reverse; everything else on this trip had been a little out of the ordinary, so my plant collecting in Costa Rica also started out in reverse! I was in a Central American country replete with rain forests, lush tropical jungles, forests dripping with epiphytes, bromeliads in every direction as you looked skyward. Incongruously, I found my first bromeliad in this country low on the shore of the Pacific Ocean on the west coast of this country which is noted for its rich, montane, epiphytic bromeliads!

"Soon other bromeliads followed: *Vriesea bicolor,* another new species described by Dr. Smith (from near Cartago) and *Thecophyllum ororiensis* which Mez had described before that genus was sunk into *Vriesea.*

"Near Santa Maria de Dota (at 8,000 feet), I found *Greigia columbiana,* a terrestrial in a cloud forest. This plant, which actually was standing in water, develops a caudex at five feet and the inflorescence is lateral.

"At Lankester's place in Cartago (Las Concavas), *Vriesea sanguinolenta* greeted me. It was a great pleasure to find an old friend from our collections in Colombia two years ago, as well as the ubiquitous *Tillandsia multicaulis* with its distichous spikes coming out of the plant laterally; a conspicuous sight in the forest with its orange-red bracts and blue petals speaking a floral language to me.

"It didn't take too long to get into the mountains where we collected at various elevations. *Tillandsia adpressa* was at 6,000 feet, while a thousand feet higher we found *T. incurva* and *T. excelsa* as well as *Vriesea viridis.* Higher up, at 9,000 feet, was *Puya dasylirioides* and *Vriesea williamsii* thriving in dense growth of cloud forests.

"On another slope, with eastern exposure, the tillandsias were everywhere; they kept me busy collecting: *T. deppeana* var. *costaricensis, T. fasciculata, T. schiedeana, T. punctulata, T. monadelpha,* and *T. valenzuelana.* Unfortunately, *T. leiboldiana* is prolific in high mountain forests; the colorful bracts make a perfect target for the native collectors who gather large quantities to be sold in the market at Christmas time.

"Coming up IS Christmas, and my 60th birthday! The urge to get home is, now, uppermost in my mind. So, lift-off is arranged for the 22nd to Miami, then home at last, hopefully on December 23rd."

RETROSPECT

For the second segment of the 1948 Flight, Mulford had to be satisfied with minimal accomplishments. So, considering all the delays, changes of plans, the

food poisoning, and endless difficulties in transportation, the sixteen new bromeliads was a satisfactory accomplishment (5 in Bolivia, 8 in Ecuador, and 3 in Costa Rica).

It took three months to circle South America. Some of the tangible results included nineteen vials of pollen from nineteen different bromeliad genera; uncounted philodendron cuttings; numerous begonia specimens; thousands of fern spores, some palm seeds and three new amaryllis.

The biggest accomplishment was, of course, being in the presence of *Puya raimondii,* the biggest bromeliad. Touching it was communicating with eons of botanical time; it conveyed the majesty of the ages. It must be preserved *in situ!*

It was a singular accomplishment to photograph in color (probably the first), and to share with readers of the *National Geographic* the uniqueness of the great *Puya raimondii.*

Thanks to Dr. Lyman B. Smith's tireless efforts, the known bromeliads of the entire trip were rather promptly identified. The unknown ones took more time, but eventually, thirty new species in the Bromeliaceae, plus one new variety were credited to the 1948 Flight Around South America.

Orlando, Florida

1990 World Bromeliad Conference

Hosted by Bromeliad Society/Houston, Inc.

June 6-10, 1990

The theme for next year's World Bromeliad Conference is "BROMELIADS IN SPACE" in recognition of Houston's role in the American space effort. You are urged to start thinking now about how your participation can make this a TRUE WORLD CONFERENCE.

Clyde Jackson, Conference Chairman
3705 Shadycrest
Pearland, Texas 77581

Nominations Open for the 1989 Election of Directors

Jerry Raack

Nominations are now being accepted for the election of directors of the Bromeliad Society, Inc. for the term 1990–1992. The Society is divided into 10 geographical regions and each region elects its own director(s). Ballots for this election will be mailed with the May-June issue of the *Journal.*

Nominations, telephoned or mailed, must reach any Nominations Committee member on or before 15 March 1989. Telephoned nominations must be confirmed in writing with mail being postmarked between 1 January and 12 March 1989 inclusive. The use of airmail is strongly advised.

Regions having positions open in 1990:

California	2 directors
Florida	1 director
International	2 directors
Louisiana	1 director
Texas	1 director

Who may nominate? Each voting member of the Bromeliad Society, Inc. residing in a region for which a position is open may nominate one person from that region for the position of director in that region.

Who may be nominated: A nominee must: 1. be currently a voting member of the Bromeliad Society, Inc. and must also have been a member of the Bromeliad Society, Inc. for at least three consecutive years immediately prior to his/her nomination. 2. reside permanently in the region for which he/she is being nominated. 3. not have served two consecutive terms as a director immediately preceding his/her nomination. 4. agree to having his/her name placed in nomination. 5. agree to serve as a director if elected.

Procedure for nominating: 1. Obtain the consent of the nominee and verify the criteria for nomination. 2. Mail to each member of the nominating committee the full name and address of the nominee, position for which nomination is being made, local society affiliation (if any), and a brief biography of the nominee. Nominations may be telephoned to any member of the Nominations Committee before 15 March and must be confirmed in writing as specified above.

Responsibilities of the nominees: 1. To accept the nomination and agree to serve if elected. 2. To attend all annual Board meetings at his/her expense (not applicable to Australia and International Region directors). 3. To carry out the duties of director outlined in the current bylaws. 4. To provide the person making the nomination the information listed in step 2 under Procedure for nominating, above.

Mail nominations to each member of the Nominations Committee:

Jerry Raack, Chairman
472 Greenhollow Drive
Pataskala, OH 43062
(Telephone 614-927-5964)

Paul T. Isley III
1400 3rd Street
Manhattan Beach, CA 90266
(Telephone 213-376-2738)

Charlien Rose
4933 Weeping Willow
Houston, TX 77092
(Telephone 713-686-9969)

Brazilian Reports, Numbers 2, 3, and 4

Elton M. C. Leme

Aechmea carvalhoi Pereira & Leme.

Among several new bromeliads recently collected in the State of Bahia we have *Aechmea carvalhoi* Pereira & Leme (shown on the front cover).[1] Originally found in the region of Itamaraju by the botanist André M. de Carvalho of the Cocoa Research Center (CEPEC). Some young samples of the species sent to the authors bloomed in cultivation in October 1985. As this new bromeliad developed its inflorescence, our first impression was that we had before us an unknown species of *Lymania* judging by its furrowed ovary, which is typical of the latter genus. However, we observed later that its petals presented well developed scales on their bases, which, together with other characteristics of the plant, place it in the subgenus *Lamprococcus* of *Aechmea.*

Aechmea carvalhoi, named after its collector, bears as much resemblance to *A. fulgens* Brongniart as to *A. victoriana* L.B. Smith but differs from them by the well developed and bright primary and scape bracts; the ovaries green, furrowed, and plain; and in the white sepals. Typical of the hygrophylous forest of Bahia, it is easy to grow as long as it is given humidity and adequate light. It blooms from October to November in Rio de Janeiro.

Nidularium billbergioides forma *azureum* Pereira & Leme.

Nidularium billbergioides (Schultes f.) L.B. Smith[2] belonging to the subgenus *Canistropsis* Mez is a species that presents the greatest geographical distribution. Its habitat is the humid forest along the Brazilian Atlantic coast from the State of Bahia in the north to Santa Catarina in the south. Along the Atlantic forest, some variations of *N. billbergioides* can be observed as to the coloring of its bracts. Its primary bracts can be yellow, orange, or wine, while the color of the petals remains unchanged. As for the observed variations, it was not possible on the basis of the collected data to establish a relationship between these differences and definite geographic limits for the purpose of organizing different groups in nomenclatural categories below the rank of species. On the other hand, unlike that mentioned in the southern part of the State of Rio de Janeiro, we had proof of the existence of a population of *N. billbergioides* with very peculiar characteristics and definite geographical predominance. Therefore, we proposed the establishment of *N. billbergioides* f. *azureum* Pereira & Leme (fig. 5). This new form presents intensely red primary bracts and light blue petals. According to our data, it has its population concentrated along the coastal forest between Angra dos Reis and Parati. Yet, this region is suffering intense deforestation and, at least in the region of Mambucaba, the population that was growing in the forest on

Author

Fig. 5
Nidularium billbergioides forma *azureum* Pereira & Leme.

Author

Fig. 6
Billbergia nana
E. Pereira.

flooded lands has already been totally destroyed. Although established in cultivation in Brazil, it is equally important that it be preserved *in situ* in order to continue its evoluation integrated with the natural environment which permitted this new form to arise.

Billbergia nana E. Pereira.

Billbergia nana E. Pereira (fig. 6)[3] was one more, among many, discovered by Alvim Seidel in the region of Pedra Azul, State of Espírito Santo. The specific name chosen by its author signifies the small size of the species.

Edmundo Pereira in describing the species commented on the affinities between *B. nana* and plants of the complex of *B. amoena* (Loddiges) Lindley. He decided, in spite of the large number of variations in these plants, to consider the specimen collected by Seidel a new species. In fact, the susceptibility of plants of *B. amoena* complex to environmental changes as for shape, form, size, and coloring, makes it difficult to identify varieties that used to be considered valid. Further, we do not have evidence of geographical support for such varieties as, for example, the predominance of some in a given area as compared to others. We noted as an exception *B. amoena* var. *stolonifera.*[4]

In the particular case of *Billbergia nana,* however, several supplementary collections were made through the years mainly by Roberto Kautsky and Luiz Correia de Araujo. These strengthened belief about the validity of these species. Today, we know that *B. nana* can grow on trees or rocks in a relatively restricted area between Pedra Azul and the surrounding countryside. It differs from the varieties of *B. amoena,* including the typical variety, by its very small size (about 20 cm in length), which really is not an important variation, the violet color of the upper half of its sepals, and by the color of the petals which are violet for one-third of their length near the apex. We also noticed that the inflorescence may be simple or compound at the base.

In any case, in order to determine definitely whether *Billbergia nana* should remain a species or be reduced to an interspecific category of *B. amoena,* a detailed study is needed of the *B. amoena* complex in the field. In spite of this requirement, this interesting bromeliad can be appreciated for its undeniable beauty.

[To be continued]

NOTES:

1. Bradea 4(34):267-268; 1986.
2. _____ 4(32):235; 1986.
3. _____ 1(29):326-317; 1973.
4. J. Brom. Soc. 34(5):218; 1984.
5. _____ 34(5): 318; 1984.

V.P.I. Gothic Greenhouse for Many Climates

Thomas U. Lineham, Jr.

About eight years ago, the local newspaper reprinted a description of a Gothic arch greenhouse complete with step-by-step instructions, working drawings, and a bill of materials. The information originated from publications of the Virginia Polytechnic Institute[1] and the United States Department of Agriculture.[2] Ed McNulty, president of the Central Florida Bromeliad Society, recognized the possibilities of this design and built such a greenhouse and later improved on the original design and built a second and larger one.

Ed's first greenhouse (fig. 7, A) was 10′×14′, dimensions slightly different from the original plans. His changes simply emphasize the versatility of the plans, especially when we consider that his second structure (fig. 7, B) was 17′ high and 40′ long.

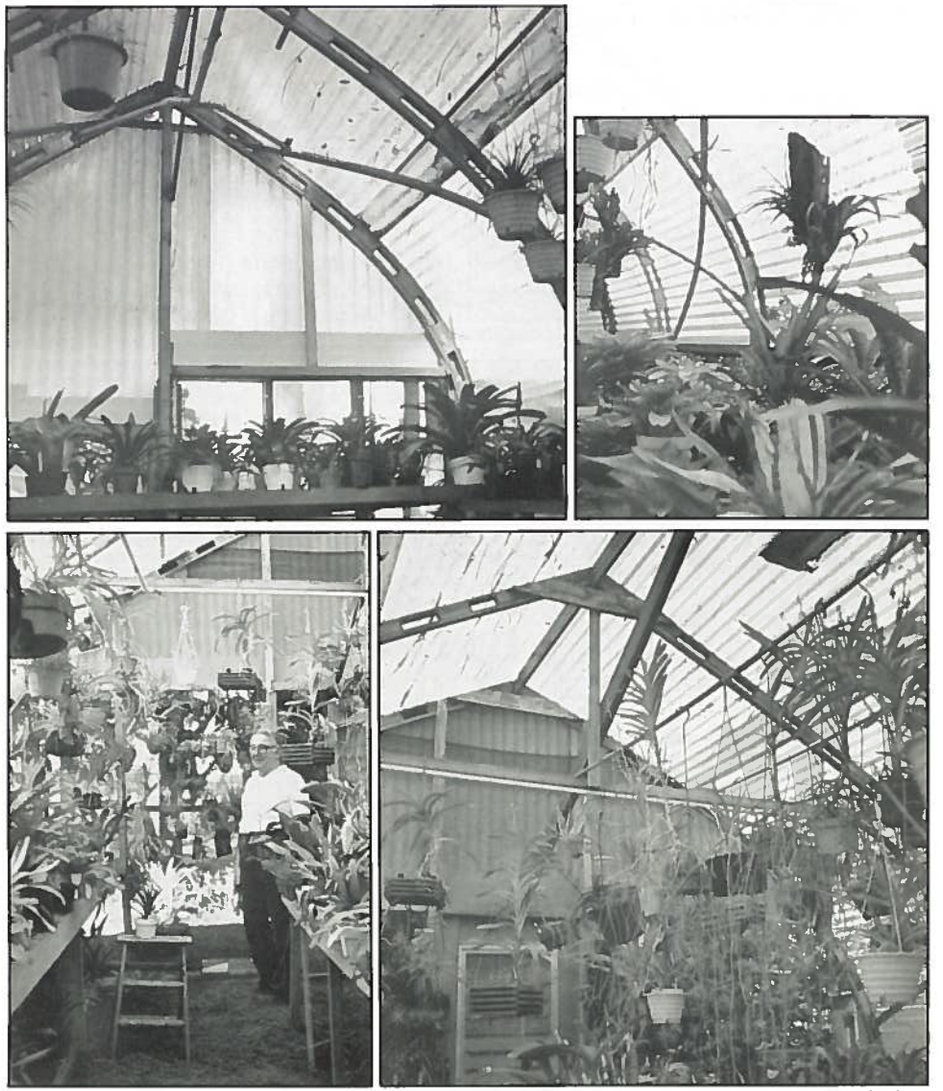
Circular 760B (published by Virginia Polytechnic Institute) states: "Principal features of Gothic greenhouse are—1) pleasing appearance, 2) low cost, 3) ease of construction, 4) structural strength, 5) clear span with no support posts to work around and good head room, and 6) ease of applying plastic covering.

"The structure has withstood snow, hail, and sleet, and winds in excess of 70 miles per hour. The 21′-wide greenhouse can be built of desired length in multiples of 4′, up to a maximum of 100′. The framework is composed of built-up, rib-type curved rafters attached to short, planted posts. The two framed ends with desired doors complete the structure."

Author

Fig. 7

A—first greenhouse built by Ed McNulty was 10′×14′; B—second greenhouse dimensions are 17′ high and 40′ long, which shows the versatility of the plans.

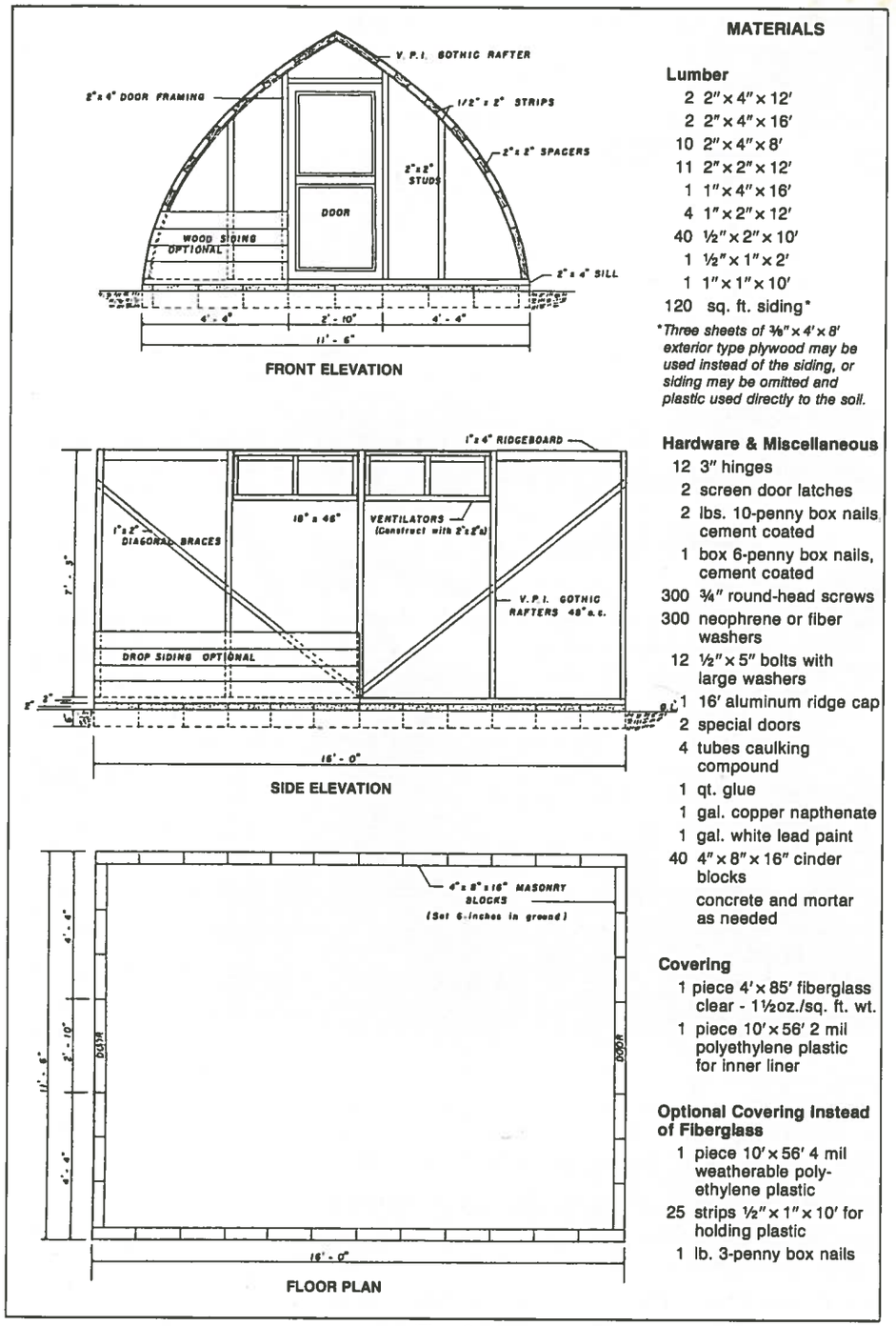


Author

Fig. 8

The photos above show the interior of the 40-foot greenhouse (clockwise)—Details of the bow construction, diagonal braces, longitudinal brace, and Ed McNulty admiring his handiwork.

The structure may be covered with 4-mil UVI polyethylene film on the outside and on the inside also when additional insulation is needed. Ed covered his houses with sheets of fiberglass and left the bottom four feet on the sides open for added ventilation. He covered those spaces with shade cloth to help control visiting bugs. During the cold months he closes the open areas with polyethelyene.



MATERIALS

Lumber

2	2″ × 4″ × 12′
2	2″ × 4″ × 16′
10	2″ × 4″ × 8′
11	2″ × 2″ × 12′
1	1″ × 4″ × 16′
4	1″ × 2″ × 12′
40	½″ × 2″ × 10′
1	½″ × 1″ × 2′
1	1″ × 1″ × 10′
120	sq. ft. siding*

Three sheets of ⅜″ × 4′ × 8′ exterior type plywood may be used instead of the siding, or siding may be omitted and plastic used directly to the soil.

Hardware & Miscellaneous

12	3″ hinges
2	screen door latches
2	lbs. 10-penny box nails cement coated
1	box 6-penny box nails, cement coated
300	¾″ round-head screws
300	neophrene or fiber washers
12	½″ × 5″ bolts with large washers
1	16′ aluminum ridge cap
2	special doors
4	tubes caulking compound
1	qt. glue
1	gal. copper napthenate
1	gal. white lead paint
40	4″ × 8″ × 16″ cinder blocks
	concrete and mortar as needed

Covering

1	piece 4′ × 85′ fiberglass clear - 1½oz./sq. ft. wt.
1	piece 10′ × 56′ 2 mil polyethylene plastic for inner liner

Optional Covering Instead of Fiberglass

1	piece 10′ × 56′ 4 mil weatherable poly-ethylene plastic
25	strips ½″ × 1″ × 10′ for holding plastic
1	lb. 3-penny box nails

Fig. 9
Plans (reduced) for the smaller V.P.I. Gothic Greenhouse.

Members might like this structure because it is adaptable to many climates. The plans were drawn with horticultural crop production in mind, so don't dismiss this as a toy. If you have space for a free-standing structure (and you could probably adapt the plans to build an attached greenhouse or garden room) these plans might meet your needs. They are out of print, but I will send you photocopies for the cost of postage and copying ($1.00 for ZIP addresses, $2.00 international).

NOTES:

1. R.W. Gray II, McNeil Marshall, P.H. Massey, Jr. V.P.I. Gothic Greenhouse (Circular 760B, August 1963). Blacksburg, VA: Virginia Polytechnic Institute. A modification of the earlier plan with dimensions 21′ × multiples of 4′×13′. These plans included detailed instructions for constructing the rafter jig.

2. An Estate Type Greenhouse for Town and Country Use (Circular 892, July 1961). Blacksburg, VA: VPI and USDA cooperating: Extension Service. Plan dimensions, 11′ 6″×16′.

ACKNOWLEDGEMENT:

Thanks are owed to Professor Thomas A Fretz, Dept. of Horticulture, V.P.I. for providing a copy of Circular 760B.

Orlando, Florida

New Directors, 1989-1991

Jack Percival

The directors elected by the membership for the 1989-1991 term are:

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

Odean Head
7818 Braes Meadow
Houston, TX 77071

Australia
Maurice Kellett
P.O. Box 115
Hurstbridge, Victoria 3099
Australia

Florida
Polly Pascal
4413 S.W. 38th Terrace
Fort Lauderdale, FL 33312

Texas
Charlien Rose
4933 Weeping Willow
Houston, TX 77092

I tallied these results and forwarded the results with my actual ballot count sheet to the president on 20 September 1988 in compliance with his instructions.

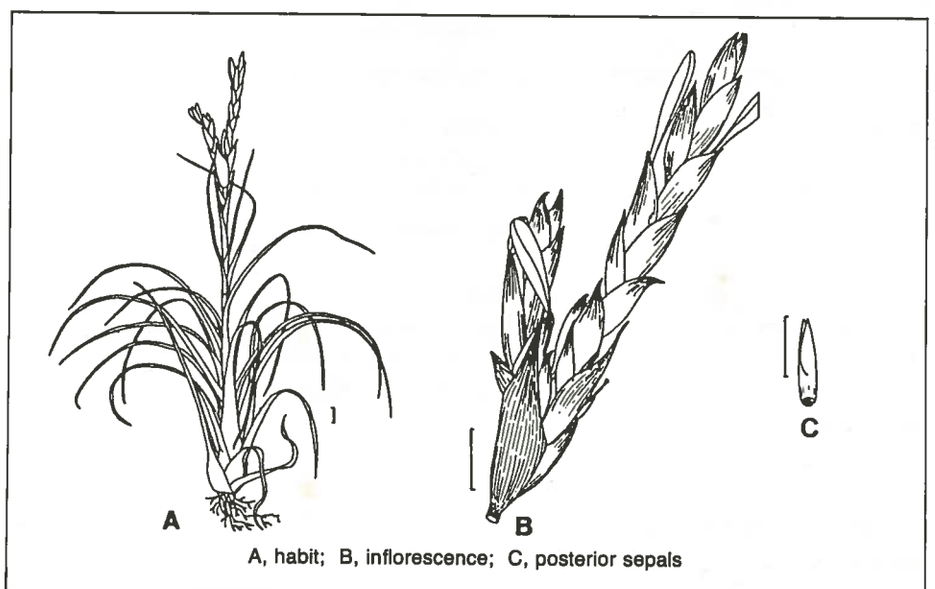
Vote Tally Chairman
San Diego, California

Misnamed Bromeliads, No. 2

Harry E. Luther

***Dyckia choristaminea* Mez.** This small, densely clustering dyckia is usually grown as *Dyckia cabrerae*, a totally dissimilar species not known to me to be in cultivation. This latter species is much larger, to nearly 2 m tall in flower. *Dyckia choristaminea* is among the smallest of the dyckias with very narrow, succulent leaves less than 14 cm long, a few-flowered inflorescence less than 25 cm tall with bright yellow, very fragrant blooms.

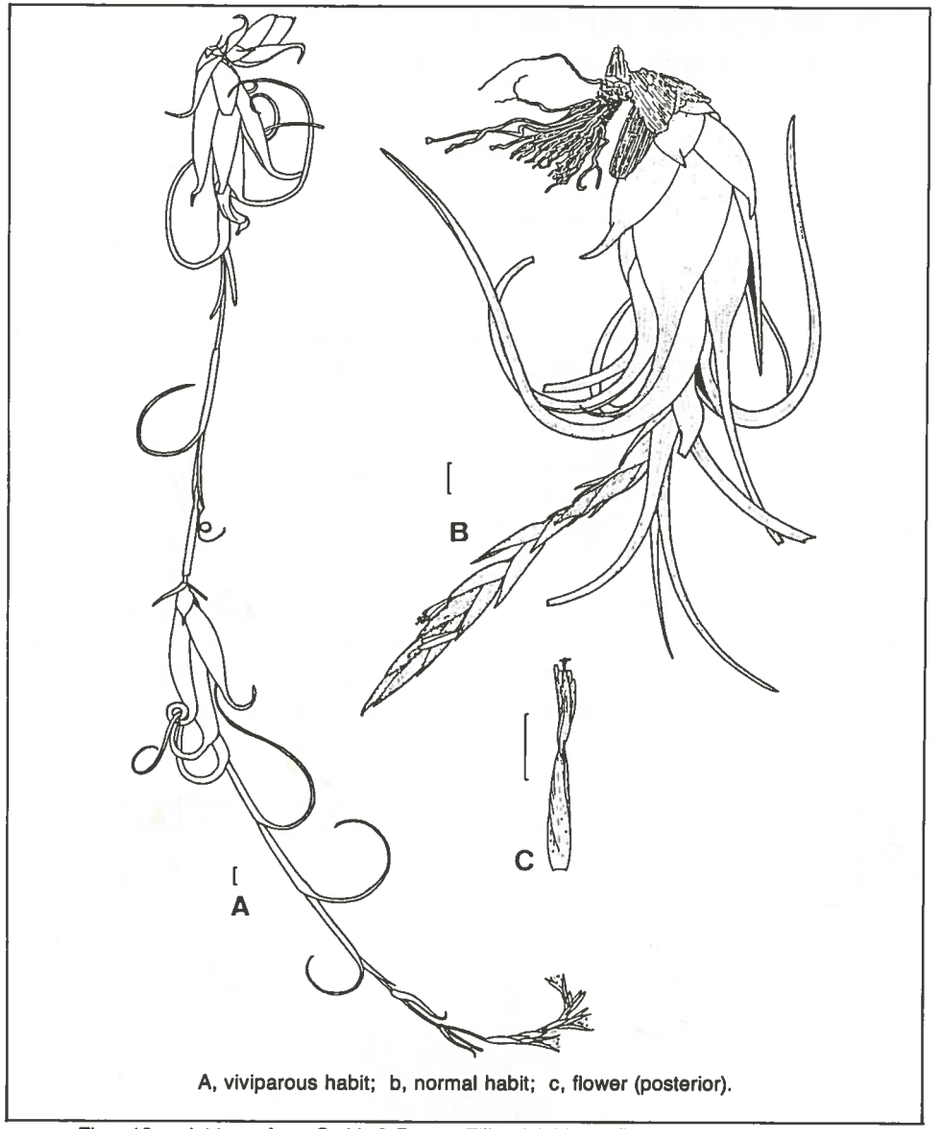
***Tillandsia* ×*smalliana* Luther.** The name *Tillandsia polystachia* has long been misapplied to a plant native to southern Florida. That plant is correctly named *T.* ×*smalliana*, a natural hybrid of *T. fasciculata* and *T. balbisiana*. True *T. polystachia*, a very different appearing species, is widespread from the West Indies and Mexico to northern South America but is not native to Florida. The illustration below represents *T.* ×*smalliana* and not *T. polystachia*. Collectors desiring the latter species should contact exporters in Mexico or Guatemala where it is abundant. The natural hybrid is rather infrequent and I hope that it will not be over-collected for commercial purposes.



A, habit; B, inflorescence; C, posterior sepals

Fig. 10. Tillandsia ×*smalliana.*

***Tillandsia paucifolia* Baker.** This common tillandsia (fig. 11) is still widely grown with the misplaced specific epithet of *circinnata*. As explained by



A, viviparous habit; b, normal habit; c, flower (posterior).

Figs. 10 and 11 are from Smith & Downs Tillandsioideae, figures 296 and 317 respectively.

Fig. 11. Tillandsia paucifolia Baker.

W. Weber in the *Journal of the Bromeliad Society*, volume 32, pages 28-31, 1982, *T. circinnata* is actually a synonym for *T. streptophylla* and the plant long identified as *T. circinnata* should be called *T. paucifolia*, the first available valid name. Growers should purge the name *T. circinnata* immediately from their minds and labels.

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

Two Beautiful Bromeliad Frogs from the Andes of Venezuela

Juan A. Rivero

The bromeliad frog fauna of Venezuela is not exuberant. Several genera may be represented in bromeliads, but it is very seldom that a genus has more than one or two bromelicolous species.

The genus *Eleutherodactylus* is no exception. As far as is known today, there are only four bromelicolous species of *Eleutherodactylus* in all Venezuela, but only three of these are Andean.

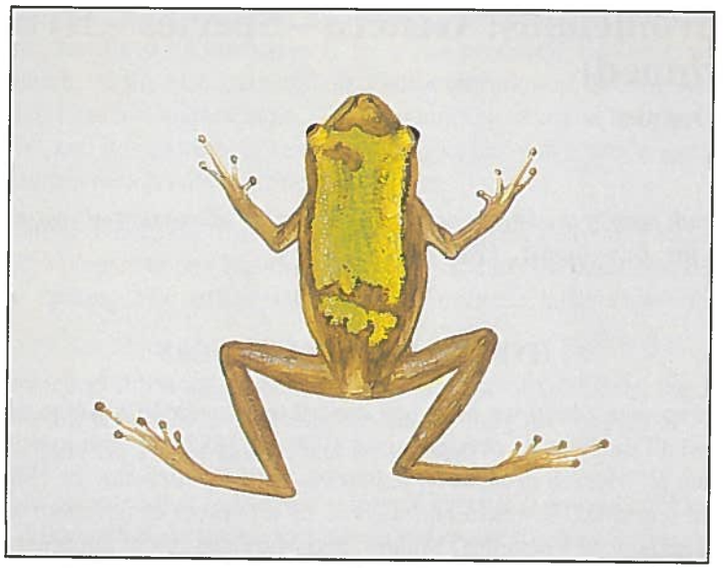
The two species depicted here were the last to be described from the country. They are also the most colorful and the only green or partially green *Eleutherodactylus* from Venezuela. In fact, there are very few, green *Eleutherodactylus* anywhere.

Besides their beautiful coloration, these two *Eleutherodactylus* have another feature in common (not well shown in the drawings): a small tubercle or protuberance at the tip of the snout. These two characteristics place these two species among the most distinctive members of the genus in South America.

REFERENCE:

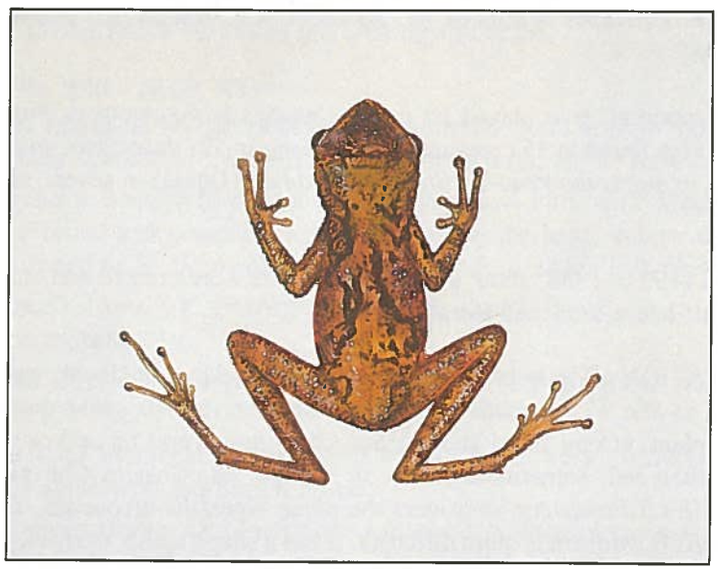
Rivero, J.A. Los *Eleutherodactylus* (Amphibia, Leptodactylidae) de los Andes Venezolanos. II, Las Especies Subparameras. Mem. Soc. Menez. Ciencias Nat. 42:57-132; 1982.

University of Puerto Rico
Mayaguez 00708



Author

Fig. 12. Eleutherodactylus chlorosoma - 22 mm.



Author

Fig. 13. Eleutherodactylus tubernasus - 23 mm.

The Bromeliads: Genera–Species–Hybrids (Continued)

Louis Dutrie

[This seventh part of the Dutrie series continues the discussion of vrieseas that appeared in the July-August, 1988 issue. –Ed]

HYBRIDS OF THE VRIESEAS

These species which we have just described provided (when crossed among themselves) all the hybrids obtained until 1930. In 1882, the first hybrid was produced when E. Morren crossed *V. psittacina* with *V. carinata.* In 1888, Duval's first hybrid appeared. It would be followed by a number of others of top quality. In 1889, Truffaut, at Versailles, Makoy, and Maréchal, chief gardener of the Jardin Botanique de Liège, produced their first innovations. Finally, during these last years, and with outstanding success, M. Charles Chevalier, Conservateur Honoraire of the Jardin Botanique de Liège, created numerous and superb varieties. It is, therefore, to Liège and to Versailles that we owe almost all of the known magnificent hybrids.

Of all these hybrids–about fifty–obtained between 1882 and 1894, only one, the *V. kitteliana* Wittmack *(V. barilletii* × *V. saundersii)* has a branched floral stem.

The important role played by certain species is noteworthy. For example, *V. barilletii* is found in 15 crossings, *morreniana* in 12, *duvaliana, splendens* and *psittacina* in eight, *morreno-barilletii,* and *fulgida* (Duval) in seven, *incurvata* in six.

From 1895 to 1938, about sixty other hybrids were created and among them, a good half had a branched floral stem.

OBSERVATION–The hybrid *V. viminalis rex,* produced at Ghent, was probably the same as the *V. viminalis erecta* that answers to the same description: a vigorous plant, strong floral stem, erect, carrying several fat spikes with bracts that are often red, sometimes yellow or orange. M. Charles Chevalier, in his *Etude sur les Tillandsiées,* considers the name *viminalis* erroneous. Indeed, the *V. viminalis* E. Morren is quite different. It has a single spike, narrow, with green bracts, on a long, frayed-out floral stem, and of poor lasting qualities. Could it, by having been fertilized by *V.* Rex which has a voluminous and brilliantly colored, but single spike, have produced a hybrid with the large, branched and colored

inflorescence such as in question? One could answer that *V. rodigasiana,* with green bracts, fertilized by this same *V.* Rex, has produced *V. vigeri,* red like the sire, and which, itself, also transmits its vivid coloration to its descendants. But, *V. rodigasiana* has a branched stem. There is nothing changed here but the color, not the form, and it is extremely rare that two species with a single spike, crossed between themselves, produce a branched spike.

However that may be, this *V. viminalis rex,* much cultivated in Ghent, is a very beautiful plant, but one can find fault with the extreme heaviness of rigid and too upright spikes. The stiffness of the inflorescence takes away much of its grace. . . .

The branched floral stems are much more elegant whenever the spikes are less broad and less stiff as is generally the case among the hybrids of *V.* Polonia-*vigeri* and *vigeri major, kitteliana,* and *saundersii.*

It should be noted that in this last series of hybrids, *vigeri* occurs ten times as the parent, Mephisto eight times, Rex seven, *witteana* six, *barilletii* and *incurvata* five times.

A Selection of Some Hybrids.

It would take too long to give the description of each one of these hybrids. Let us be content with describing in summary 12 varieties with a single spike and 12 with a branched stem, each series composed of plants as varied as possible in size and color. Most have already served in some hybridizations, the others appear capable of giving fertile results in the crossings to come.

Varieties with a single spike:

- *V.* Aurora Maréchal *(V. morreniana* × *ensiformis),* stem upright, 60 cm high, flowers widely spaced, of a beautiful, bright orange-red color. Rare coloring.
- *V. brachystachys major* Maréchal *(V. morreniana* × *barilletii).* Medium sized plant, spike broad and compact, with bracts red at the base, yellow at the top. Could be likened to *V. closoniana* and *V. leodiensis* to which it is very similar.
- *V. cardinalis* Duval *(V. brachystachys* × *krameri).* Small plant, beautiful, upright, scarlet spike.
- *V.* Gemma Duval *(V. morreno-barilletii* × *fulgide* (Duval). Small plant, short, fat spike, bright red.
- *V. leopoldiana* Maréchal *(V. splendens* × *malzinei).* Very distinctive, brown leaves, long spike with red-brown bracts.
- *V. morreniana* Hortus ex Morren *(V. psittacina* × *brachystachys).* Medium-sized plant, bracts vividly colored with red and yellow.
- *V.* Menelik Maréchal *(V. witteana* × Baron de Sélys). Strong plant, short, thick spike, bracts violet-red, almost black.

• *V.* Mephisto Maréchal *(V. barilletii* × *brachystachys)*, broad spike, very upright, with blood-red bracts.

• *V. poelmanii* Duval *(V. gloriosa* × *V.* Van Geertii). Very much cultivated; medium-sized plant, strong spike, bracts bright red.

• *V.* Rex Duval *(V. morreno-barilletii* × *cardinalis)*. Large spike, 25 cm tall, 6 cm broad, scarlet bracts.

• *V. rubens* Maréchal *(V. conferta* × *leodiensis)*. A thick-set plant, spike of mahogany red, separate bracts.

• *V.* Wallonia Chevalier *(V. leodiensis* × Van Geertii). A vigorous plant, spike 45 cm long, red bracts, tinted with yellow.

Varieties with branched stem:

• *V.* Africain Chevalier *(V. lubbersii* × Mephisto). Strong stem, bracts dark purple, almost black.

• *V.* Belgica Chevalier *(V. kitteliana* × *vigeri)*. Strong stem, yellow bracts.

• *V.* Boduonnat Chevalier *(V.* Administrateur Dehalu × *vigeri)*. A strong plant, stems well branched, orange-red, spaced bracts.

• *A. crousseana* Maréchal *(V. warmingii* × *amethystina)*. A strong plant, leaves marbled brown, yellow bracts.

• *V.* Louis Dutrie Chevalier *(V. poelmanii* × *splendens)*. Medium sized plant, stem 50 cm long, bright red bracts.

• *V. kitteliana* Wittmack *(V. barilletii* × *xaundersii)*. Leaves stippled with brown at the base, bracts brown-red.

• *V. Pax supérieur* and *Pax superba (V. Pax* × *rexaundersii)*. Stem well branched, red bracts.

• *V.* Polonia Chevalier *(V. kitteliana* × *vigeri)*. Strong plant, medium sized, well branched, red bracts, carmine at the base.

• *V.* Prince Charles Chevalier *(V. kitteliana* × *vigeri)*. A strong plant, well branched, bracts salmon red.

• *V.* Prince Léopold Chevalier *(V. kitteliana* × *vigeri)*. Plant rather large, spaced bracts, salmon, flushed with yellow.

• *V. vigeri* Duval *(V. rodigasiana* × *cardinalis)*. A small plant, very interesting, space bracts, cardinal.

• *V. vigeri major*, origin not determined; plant a little more robust, abundantly branched, bracts bright red.

Hybrids recently obtained, New crossings.

Several horticulturists of Ghent have worked in the course of these past years particularly with the species having decorative foliage, whether among themselves or with the species having flowers. The results obtained have certainly

been interesting, but the dream of bringing together in the hybrids the characteristics of the two parents has not been fully realized.

We know of only one crossing that has given such results; it is the one by M. Chevalier of *V.* Mephisto by *V. pastuchoffiana.* The hybrid has retained the decorative foliage (the fine network of dark green lines) of the sire completely while improving the color of the bracts which, from the brown of *pastuchoffiana,* has passed to the blood-red of "Papa Chevalier," the name given by the originator to this new hybrid. With me, the crossing of *V. pastuchoffiana* by *V. viminalis rex* produced plants where the transverse lines were hardly apparent, with flowers of little interest.

M. R. Morobé obtained from *V. hieroglyphica* × *V. viminalis rex* a beautiful hybrid to which he gave the name of *V. intermedia* (Morobé non Hort. leod.). It is a quite robust plant, it looks like *V. hieroglyphica,* with broad leaves where the blackish brown zones of the mother are replaced by the fine, wavy, but very clear, dark, brownish green lines, equidistant, less closely drawn together than in *V. pastuchoffiana* but much more connected. The floral stem, strong and very upright, carries as many as 12 secondary spikes, rather narrow, 10–12 cm long, semi-upright, with bracts of a brown-red, more or less bright. The first specimen of this crossing displayed at the meeting of May 1, 1944 was rewarded with a Certificat de Mérite, by acclamation. Under the name of *V. intermedia pax,* another received on July 1, 1945 a Certificate de Mérite, first class.

M. Piens, of Gentbrugge, pollinated *V. hieroglyphica* with *V. splendens major.* It is curious that the plants obtained had the same appearance and the same transverse lines as the *V. intermedia* of M. Morobé. The plant and its floral stem appeared, however, a little less strong. The inflorescence, less branched, had upright spikes and dark, brown-red bracts. Nothing about it recalled *V. splendens.*

With the goal of obtaining a type of *V. fenestralis* with red flowers, I had pollinated this species with *V. poelmanii* and with *V. viminalis rex* in 1937. In a lot of about forty plants that flowered, eleven had flowers that were cherry-red, a spike strong and longer than those produced normally by *V. fenestralis.* The plants were, in general, visibly stronger than the mother, but the variegation of the leaves, although still very apparent, was, however, much less distinct and brilliant than I had wished for. The results seemed to me, however, sufficiently interesting to call to the attention of M. Chevalier who must remember it.

I had given one of these plants to MM. Bier, of Melle, who used it to pollinate a *V. saundersii.* The plants are still small but show already many different characteristics. Some cannot be distinguished from *V. saundersii,* others, much stronger, are clearly different. They are of a brilliant red-brown, darker on the reverse side, or of the gray-green of *V. saundersii,* but with large violet-red dots on the upper surface and brown on the underside. At this time, the cross-lining

of *V. fenestralis* is not apparent. It seems at present, that we shall have some plants with interesting foliage. As for the flower, we shall see later.

The crossing by MM. Bier of *V. splendens major* with *V. tesselata* gave plants that are still young scarcely a dozen centimeters in height, which have all the characteristics of *V. splendens major* but are perceptibly stronger than those coming from the same mother plant, but not crossed.

Vriesea fenestralis with red flowers has been pollinated with *V. tesselata.* Since those two species are very similar as to type of variegation, one could expect hybrids to be very much like the parents. This seems, actually, to be the case, the young plants seeming to be lined and striped with brown.

Among the species with flowers, M. Ch. Spae, of Melle, having pollinated *V.* Polonia with *V. viminalis rex,* obtained some similar intermediate plants like *V.* Polonia in size and like *V. viminalis rex* in flowers. Their spikes however, were a little less heavy and of a very beautiful bright red color. The appearance of the plant and of the floral stem is excellent in spite of a little heaviness inherited from the mother.

M. R. Morobé displayed a group of hybrids of *V. viminalis rex* × *V. psittacina coccinea* at the meeting of November 4, 1945. The plants, in spite of the rather large size of the mother, hardly exceeded that of the sire. They are, however, of a darker green and of better appearance. The floral stems, very erect, carry single spikes that are very compact, with bicolored or red bracts, in general, of a bright and vivid color. A Certificate de Mérite was awarded by acclamation.

A specimen from this group of seedlings presented separately under the name of *V. coccinea,* and particularly brilliant, was awarded a Certificat de Mérite, first class.

[To be continued]

DR. ELVIRA GROSS, assistant to Dr. Werner Rauh, has published a paper, "Germination in Bromeliaceae (Über die Keimung der Bromeliaceen)" in Beiträge zur Biologie der Pflanzen 63 (1-2); 1988. The abstract states: "The function of fixation to the substrate in the Pitcairnioideae and Bromelioideae is due to the crown of root hairs and the primary and lateral roots; in the Tillandsioideae this function is taken over by the coma hairs or the seed. The appearance of vivipary in two species of the genus *Ronnbergia* is reported." The Beiträge are indexed in Current Advances in Biological Sciences. —Ed.

Bromeliad Internship Applications Are Invited

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 $10 per day ($70 a week) 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. The study portion will 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 report 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.

Harry E. Luther
Director, M.B. Foster Bromeliad Identification Center
Marie Selby Botanical Gardens
811 South Palm Avenue
Sarasota, Florida

Research Grant Availability

Proposals are solicited from qualified persons wishing to conduct research on bromeliads. Grants normally not to exceed $500.00 are available from the Victoria Padilla Memorial Bromeliad Research Fund. Proposals dealing with either applied or basic problems are encouraged. Interest, for instance, has been expressed in finding ways to improve seed storage and in circumventing self-incompatibility in rare species or those represented in culture by a single clone. Individuals wishing to submit proposals should contact David H. Benzing, Department of Biology, Oberlin College, Oberlin, Ohio 44074.

Regional Reflections

Growing Bigger and Better Cryptanthus

Most growers who have persevered with cryptanthus are having problems growing decent size plants. I think that I have come closer to solving the problem. About 18 months ago I experimented with different soil mixes.

Mix 1. pure river sand
Mix 2. my own mix of river sand, charcoal, soil and compost
Mix 3. pure German peat.

During the summer period I planted an offset of *Cryptanthus zonatus* into each mix. To my surprise the mix which I thought would be the worst turned out to be the best. After about three months I noticed that the plant in the German peat had grown to twice the size of the other plants. When the pots were removed, the plant in the peat had an extensive and healthy root system. The other two plants showed about the same amount of root and leaf growth as each other and considerably less than the German peat specimen.

It appears from these observations that cryptanthus like high acidity and moisture content in the medium. I proceeded to repot all of my cryptanthus into the peat mixture. This was no easy feat with around 200 plants.

Next was to start fertilising. First I put Osmocote around each plant (nine month slow release) and then I started applying soluble fertiliser alternating from Thrive to Phostrogen.

Thrive:		Phostrogen:	
N-Nitrogen	31%	N	10%
P - Phosphorous	4.57%	P	4.4%
K - Potassium	8.71%	K	22.5%
Other elements	0.136%	Other elements	4.8%

I now prefer Thrive because of the higher nitrogen content which gives better leaf growth. Fertiliser strength was first applied at a quarter recommended strength at three- to four-week intervals. I then slowly increased the strength to half the recommended strength. Great care should be taken not to allow any Osmocote to become lodged in the leaf axils as this will severely burn the leaves. When applying liquid fertiliser I use a watering can to pour the solution over the plants, allowing sufficient soaking of the medium. If the peat dries out, put the plant and pot into a container of water for about fifteen to twenty minutes.

Keeping in mind that I grow all of my cryptanthus in a glasshouse, we come to the end result of the above experiment: 1) Healthy plants, 2) Larger plants, and 3) Increased vigor in producing offsets.

Two points to remember when removing offsets:

1. Don't remove them when they are too small. Like other bromeliads, cryptanthus will root and grow much faster if the offset is a decent size.
2. If offsets are removed during winter you will find that few or no roots will be produced for quite some time. Remember cryptanthus are terrestrial growers and rely on a good root system for food. I would suggest that propagation of offsets should occur from September until the end of April [during the warm months].

Problems: Unfortunately cold weather does not agree with cryptanthus, leaf tip burn will occur during the winter months. You will notice that the leaf tip will go soft and brownish looking. This will continue down the leaf until all or part of the leaf dies. Because peat will stay moist for a longer period than most mixes, less watering during the winter months will help with this problem. Installing a heating system will definitely help though this can be costly to run.

Mealybug is my main insect problem. I eradicate by using a systemic insecticide. Infestation is difficult to realise until you see either blemishes or spots appearing close to the leaf axil. Eradicate this pest quickly.

I hope these hints will help you grow bigger and better cryptanthus.

Vic Przetocki
From Bromeliad Society of New South Wales Bromeliad Newsletter
April 1988

Polymers Rescue Thirsty Plants

Time was when Sacramento landscape designer Marc Askew was terribly embarrassed when visitors asked about the dead potted plants lining his office window. "I really felt guilty," Askew explains, "but I'd get involved on landscape projects and simply forget about the plants, and didn't think to have someone else come in and water for me." That was more than a decade ago. If he could have used the same soil polymers he incorporates today in imaginative large pots of colorful (and fruitful) specimens, he probably would have been spared that embarrassment. And the plants would have had longer lives.

Askew said that super-absorbent polymers (developed by the U.S. Department of Agriculture to increase water-holding properties of soil and other growing media) were the sensation of the New York Horticultural Trade Show, which he attended recently.

Polymers (generic name: polyacrylamides) are gels that come in powdered or granular form and swell up hundreds of times in size when watered, and hold water (and fertilizer) that normally drains off. Then, when the roots of plants

demand water, polymers release their stored water. They go through this cycle time and time again over a normal life expectancy of 10 years. Each time they expand or contract, they also "work" the soil to create air spaces and improve its structure. Their use could be of particular value to bonsai enthusiasts, whose shallow-rooted container trees are quick to suffer from even a short break in their watering routine.

Polymer products like Broadleaf P-4 or Moisture Mizer [also marketed under the name of Agrosoke] can be added to potting mix for plants or seeding trays, or to houseplants by punching holes in the existing mix to two-thirds the depth of the pot. Users then can add the label-recommended amount of dry polymers, cover with mix, and water thoroughly.

Polyacrylamides are labeled non-toxic by the Environmental Protection Agency. Broadleaf P-4 was field-tested on a wide variety of edible and ornamental plants by the editors of *Sunset* magazine. "Watering polymer-treated soil is different from watering regular soil," the reported stated. "You can't judge water need by feel, since the soil can feel dry to the touch while the polymers still contain water." The solution offered: If a plant ordinarily is watered once a week, change the routine to once every two weeks.

Jim Crumley, a representative for Moisture Mizer, said that in the past some customers have used the product without thoroughly reading instructions. "Some people mistakenly feel it's like a fertilizer, so they scatter it on [top of] the soil or potting mix and try to water it in," he explains. "In one case, on a military post in Arizona, they did that with a newly seeded soccer field. The seed loved growing on top of the gel, but there was no need for it to put roots into the soil. So, it was like a big green throw rug!" The field later was reseeded properly, said Crumley...

White-colored and large-grained Broadleaf P-4 is available in blister packs (enough to treat 10 six-inch pots) for about $4 or in an 8-ounce jar that costs about $8. For details, contact Broadleaf Industries, 6150 Lusk Blvd., Suite B-103, San Diego, Califor. 92121.

Moisture Mizer comes in 2 oz. ($3.59 plus $1 for shipping and handling), 10 oz. ($9.95, plus $1.50 shipping cost) and 1 pound ($12.95 plus $2 for shipping) sizes and is available from Multiple Concepts Inc., P.O. Box 4248, Chattanooga, Tennessee 37405.

Dick Tracy

NOTES:

1. This article reprinted by permission of the copyright holder, The Sacramento Bee, ©1988.

2. Thanks to Flo Adams, editor, *Tarrant County Bromeliad Society Newsletter*, for bringing the information to our attention.

3. Please see related article on Agrosoke in the *Journal*, July-August 1988.

Aechmea purpureo-rosea (Hooker) Wawra. 1880, Brazil

A tubular rosette with few hard, slender, arching, and somewhat contorted, glabrous, lustrous, medium green leaves conspicuously marked with distinct, stout, black spines. The tall scape is clear, bright pink, silver frosted, and erect scape bracts are rose-pink topped by an airy panicle with rose-pink bracts, pedicels and sepals. Petals are deep lavender. Beautiful!

I acquired my plant from Fantastic Gardens, Florida in 1970. Growing outdoors for twelve years, it refused to bloom. It steadily increased in size until the pot contained seven offsets (two offsets died during this time from a few nights of 28 degrees). Finally, in desperation, two years ago I said "Bloom or die!" pulled it out of a redwood box (difficult job because the roots had penetrated the wood) and broke it into pieces. I shared a plant with a friend and sat back to wait, hoping my operation and generosity would force results.

Guess what? Six months later, in early October, two of the mature plants favored me with a delicately, beautiful bloom. Last year another bloomed and this year one of my plants came into flower for our Annual Show. I am still trying to figure out why it refused to bloom for twelve years. I think it may be a "loner" and needs separating and fresh soil yearly.

Now I grow it in a hanging plastic pot, in a mix of three parts small fir bark, two parts Jungle Growth, one part large perlite and fertilize with Magamp on a regular basis.

A distinct, stunning, easy-to-grow bromeliad, *Aechmea purpureo-rosea* is a must for every collection.

Thelma O'Reilly
Reprinted from the San Diego Bromeliad Society Bulletin
November 1984

Superpup

To obtain the biggest and fastest growing pups you've ever seen, try this: After the plant has budded, but before the first flowers have broken, add a bit of Triple Superphosphate to the media surface. A teaspoon is sufficient for a 5" pot. Although the results are apparent after the first generation, after several generations when the phosphate has accumulated in the lineage, the pup production and the growth will be amazing.

John E. Laroche
Reprinted from The Commentary
The Bromeliad Society of Broward County
July 1988

Questions & Answers

Conducted by Kathy Dorr

I would like to preface this column with a salient thought. Answers to many questions can only be used as guidelines and not as the ***only*** *procedures or methods in growing bromeliads. There are many factors involved that can vary from one area to another. To list some of these: pot type (plastic, ceramic, or clay) and size, greenhouse, shadehouse, or outside growing, temperature, air movement, watering procedures, fertilizing program, and amount of light. If, for example, I were asked what mix is the best for growing bromeliads, I would have to answer, "A mix that drains well and is on the acid side." (No specifics.) I could list a number of ingredients that are used by different growers and by suggestions would be that* ***you*** *experiment until you find what is successful for you.*

I have found through the years that cut and dried answers do not always apply to bromeliads. That is one of the reasons I have found them so fascinating.

All readers are invited to send their questions and observations about growing bromeliads as a hobby to the editor. Answers will be sent directly to you and some questions will be published.

Q. As I was cleaning plants on a bench, I found several that had been at the back of the bench and hidden by larger plants. They were very dry and apparently not much air had been able to reach them. They were also covered with scale. Is there any connection between the condition of the plants and the concentration of scale on them? Also, what can I do for a plant that is so badly dried out that it is nearly dead?

A. Scale seems to seek out those plants that are neglected, particularly if air circulation is bad and the plants are allowed to dry out. Plants that are grown very close together give scale a chance to dine. Light is also a deterrent to parasitic hordes. If the plants have to be close together it is a good idea to place the larger ones together at the back of the bench. By so doing you get a chance to observe what is happening and you also allow more air circulation around the plants. A small fan may also be of some assistance in keeping down the population of scale.

A plant that is badly dried out can sometimes be saved it if is removed from the pot, cleaned thoroughly, and then placed in a solution of sugar water for 24 hours. I dissolve a cup of sugar in a quart of warm water for this purpose then completely immerse the plant in the solution. I have also used this method of reviving imported plants that arrived in a severely dehydrated condition.

Q. I purchased a *Cryptanthus* 'Ti' that was attached to a piece of driftwood. It was beautiful when I brought it home, but it seems to be dying. What am I doing wrong?

A. Cryptanthus are terrestrials (they grow in the ground) and do not adapt to epiphytic growing. Remove the plant from the driftwood and replant it in a pot. Use a mix that retains moisture. Cryptanthus are not cold hardy and should be grown in warm, protected areas. They make excellent plants for a light stand in the home.

Q. Is it necessary to sterilize implements used in removing offsets of bromeliads?

A. When I first started growing bromeliads, I was very conscientious about this, but as time went on and the number of plants increased, I became more and more negligent until I finally I ceased the practice.

For many years now I have not bothered to sterilize and must confess that some of the implements even sport some rust. In my experience, I have not seen that it made any difference. Perhaps I have been fortunate for I'm sure there are growers who would disagree with me. I do clean the dirt from anything used after I have completed the job but do not disinfect the implements in any way.

Q. Is there a fragrant dyckia?

A. Yes. It is *Dyckia choristaminea.* I don't know if it does the same thing in all areas that happens in my back yard. During early morning and late evening it has a sour odor but during the warm part of the day it has a delightful fragrance. It is a small, easily grown dyckia with very narrow leaves. It produces a shorter-than-usual bloom spike.

Q. How deep does one plant bromeliad seed? I planted seed some time ago and apparently it did not germinate.

A. You do not cover bromeliad seed. It is planted on top of lightly packed mix.

Q. What is an adventitious offset?

A. Adventitious offests are those that appear in unusual places. For example the so-called hair pups found on *Vriesea glutinosa* and *Tillandsia viridiflora.* The offsets produced by *T. somnians* is another example as they appear all along the bloom spike.

Q. What causes long, thin leaves?

A. This condition is usually caused by insufficient light in the area where the plants are grown. It can also be caused by using too much nitrogen in your fertilizer. Check your area and the light needs of your plants carefully.

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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 encouragement of exhibitions and competitive shows featuring bromeliads.
- 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.

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- 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.
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South Florida Bromeliad Society Photo Committee

Aechmea purpureo-rosea (Hooker) Wawra.

On page 37, Thelma O'Reilly describes drastic measures that caused her plant to flower. The specimen shown won Best-in-Show award at the 1985 Florida State Bromeliad Show held at Fairchild Gardens, Miami. Exhibited by Jeffrey Block.

Calendar of Shows

17-19 March 1989 Bromeliad Society of Greater Mobile 12th Annual Show and Sale. Fountain in Springdale Mall, Airport Blvd., Mobile, Alabama. Friday, 1:00 p.m. to 9:00 p.m.; Saturday, 10:00 a.m. to 9:00 p.m.; Sunday, 10:00 a.m. to 8:00 p.m. Mary Thompson (205) 626-7210.

24-27 March 1989 The Bromeliad Society of Victoria, Inc. "Conference 89." Townhouse Hotel, Melbourne. Competitive displays, speakers, tours, discussion groups. Maurice J. Kellett, P.O. Box 115, Hurstbridge, Victoria 3099, Australia. (03) 718-2887.