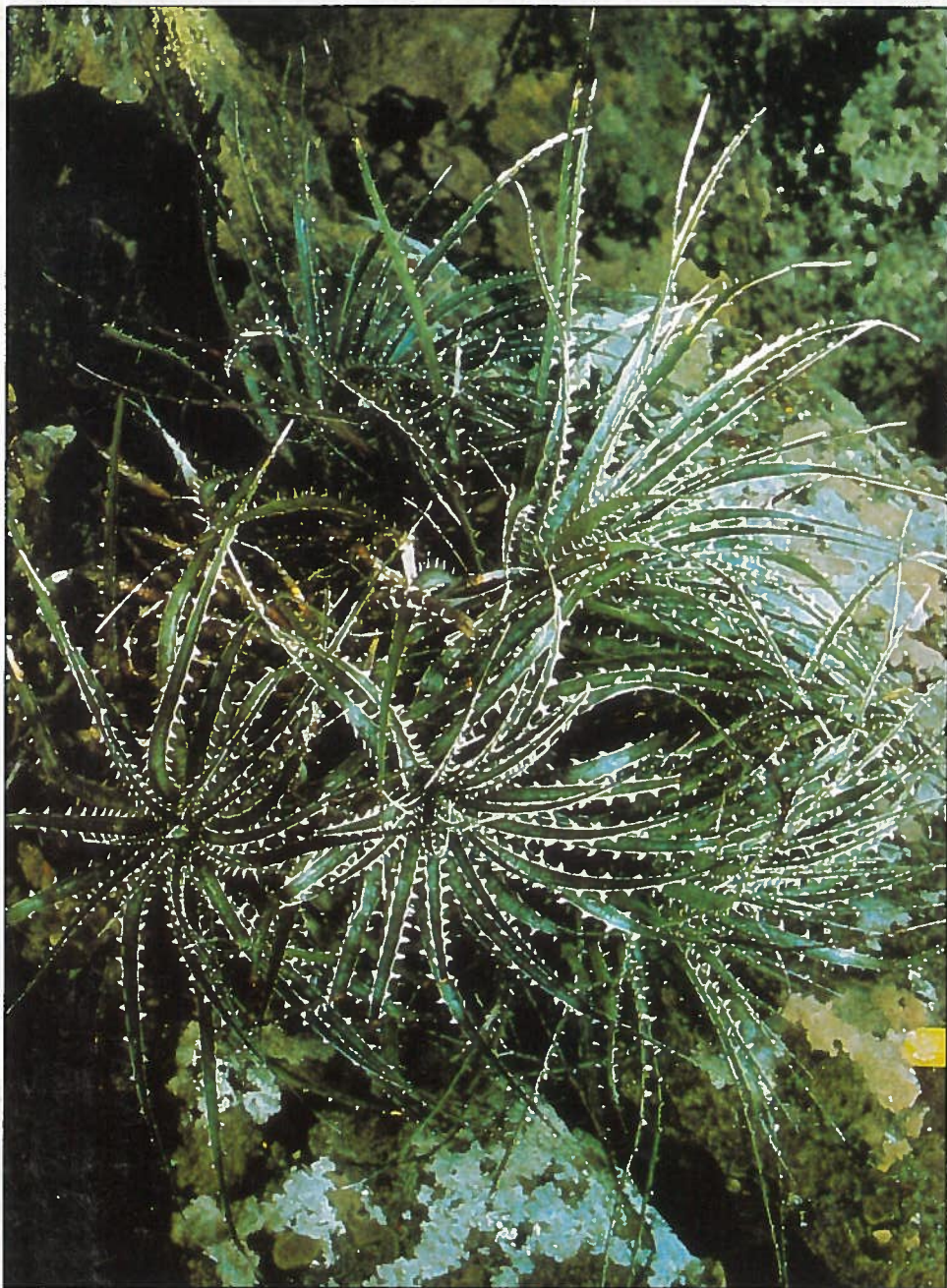


Journal of The Bromeliad Society



VOLUME 40

•

JULY—AUGUST 1990

•

NUMBER 4

Journal of the Bromeliad Society

© 1990 by the Bromeliad Society, Inc.

Vol. 40, No. 4

July-August 1990

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

Editorial Advisory Board: David H. Benzing, Gregory K. Brown, Mark A. Dimmitt, Racine S. Foster, W. John Kress, Harry E. Luther, Robert W. Read

Cover photographs. Front: *Puya gilmartinii*. A close-up photograph of the type specimen showing the saxicolous nature and remarkable foliage of this new species. Photo by A. Flores. Text begins on page 161. Back: Richard Spivey photographed his prize-winning *Vriesea fenestralis* at the 1989 Shreveport Regional Bromeliad Society show. Text begins on page 169.

CONTENTS

- 147 An Accolade for the Great Lady of Hawaii: May A. Moir
Jack Percival
- 150 Bromeliad Internship Applications Are Invited Harry E. Luther
- 151 *Vriesea farneyi* (subgenus *Alcantarea*), a New Species from Brazil
Gustavo Martinelli and Andrea Costa
- 154 Misnamed Bromeliads, No. 6: Some Confused Aechmeas
Harry E. Luther
- 157 Looking Back Bea Hanson
- 158 Moisture Management Strategies of Bromeliads Peter Paroz
- 161 Novelties of *Puya* Molina (Pitcairnioideae), II: A New Species from Chile
G.S. Varadarajan and A. Flores
- 166 *Tillandsia tortilis* Subspecies *curvifolia* Renate Ehlers and Werner Rauh
- 169 The Best of the Best Valerie Steckler
- 174 *Tillandsia* in Central Florida: Lessons and Questions Kenneth Quinn
- 176 *Tillandsia chartacea* and I Derek Butcher
- 178 Regional Reflections Carol M. Johnson, Jack Percival
- 181 Questions and Answers Conducted by Derek Butcher

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 or advertising 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 and subscription correspondence to Membership Secretary Linda Harbert, 2488 E. 49th, Tulsa, OK 74015.

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 1984-to-date issues from the editor; 1976–1983 from H. W. Wiedman, Dept. of Biological Sciences, Calif. State University-Sacramento, CA 95819. Make checks payable to B.S.I.

Printed by: Cody Publications, Inc., Kissimmee, Florida.
Typography by: Daybreak Distributing, Orlando, Florida.

An Accolade for the Great Lady of Hawaii: May A. Moir Jack Percival

Recently, while browsing through my collection of the *Journal*, I discovered an art form that I had not fully appreciated when it first was published some five years ago. The series¹ is a voluminous sequence of bromeliad flower arrangements created by the well-known May A. Moir of Hawaii. After I studied each of these arrangements, all 20, I realized that they were the work of an artist of high order, most certainly ones of lasting value, and deserving of being reassembled into a separate, bound collection. I was intrigued with the mammoth variations of design and sculpture, the clever utilization of different materials, the unusual mixture of plants all with bromeliads—both living and dried—prominently displayed, as well as the wide use of many genera and the artistic manner of displaying leaves, stems, and colorful flowers in eye-catching designs. What talent and imagination!

Right after this discovery, I took off for a holiday in Oahu, Hawaii. Enroute, I recalled that the island is the home of Mrs. Moir and that she and her late husband W.W.G. Moir were widely known for their plant collection from all over the world, their successful pursuits in agronomy, and their ownership of one of the finest private botanical gardens in existence today. As for May Moir, I wondered, with all this talent and fame, what manner of woman might she be? Would she be receptive to a visit or aloof? A quick letter, followed by a phone call proved my apprehension unwarranted: to my delight, the charming voice at the other end was assuring, "Of course you may come, let me tell you how to find the house. The road up here is tricky."

A day and time were set, I checked the Honolulu map carefully, then went weaving up the mountainside looking for the landmark Mrs. Moir had detailed for me: a white-walled house on the corner with a brown gate. After a few turns and dog-leg twists, I spotted the house on the corner with a white wall and a brown gate. There, standing by the brown gate was May Moir, slim, erect, a smile on her face and pruning shears in her hand. As we strolled through a broad courtyard, I was struck by her mature, unstudied dignity coupled with warm, casual friendliness. She is the kind who makes one feel at home.

The courtyard directly in front of the entrance to the house was a showcase of hundreds of huge clumps of portea, aechmea, neoregelia, nidularium, and vriesea to name the most prominent (figure 1). Interspersed were literally thousands of species of colorful succulents and tree ferns. A paradise of tropics

1. Volume 34, no. 6 (1984) through v. 38, no. 5 (1988).



Author

Fig. 1

The first view of the garden at the front of Mrs. Moir's house is nearly overwhelming with the profusion of growth and wide variety of species.

appearing as if they had come on the scene by Nature's hand rather than having been carefully planned by the Moirs.

The walls enclosing the courtyard were partially hidden by massive clusters of neoregelia. A path led us to another section that presented a picture not unlike that of the Big Cypress Swamp in Florida. Now on view were tropical trees covered with mature and seedling tillandsias. The trunks and branches were matted solid with anthurium, staghorn and other ferns, and an occasional orchid. Most of the plants throughout the gardens are self-distributed. Very few have been mounted. Mrs. Moir pointed out that walls constructed of hollow cinder blocks have been turned at regular intervals to create air openings. This, she explained, was her idea for assuring valuable aeration.

In fact, the Moir garden is a sectionalized group of gardens, each having its own character, its own height above the pathways, and its own configurations of turf. Some spots are very low while others are elevated by the use of mounds. Three-fourths of the grounds around the house are taken up with the garden plots. A splendid example of minute planning of curving walkways, high and low areas, all leading the wanderer from one section to the next. The array of forest plants of all kinds continued smoothly from one section to the other. Nowhere did I note any insect infestations, yellow, unhealthy leaves, or any sign of malnutrition or



Author

Fig. 2

May A. Moir in her Honolulu living room with pride and joy Julia. A small part of her garden can be seen through the windows. Note the cinder block wall with openings for air flow.

neglect. I expressed this surprise to my hostess who, with an Hawaiian grin, handed me a surprise: she does all the work and has no help. She lamented the fact that she had lost her old, faithful gardener of many years and has decided to carry on even though the load of maintenance is heavy.

We came to the last section at the rear of the house. There were forests of heliconia, portea, anthurium, and elk- and staghorn ferns. Nearby in an enclosed section were lovely blooming orchids. By this time, I had become tired of tritely exclaiming: "Oh! Look at that." I'm sure that Mrs. Moir was tired of hearing it.

The walk through the garden concluded, Mrs. Moir invited me to see the interior of the house with its thick walls and unusually high ceiling. The spacious dining and living rooms were warm and comfortably filled with fine furniture, all the setting for many joyous gatherings of years past. The living room was designed to be part of the lush tropical outside garden as evidenced by the massive picture windows. It was then that Mrs. Moir introduced me to one of her very closest and faithful friends—Julia. She was dainty and small, had light black coloration, and unbelievably beautiful, yellow eyes. She is Mrs. Moir's pride and joy, her cat.

I brought up the subject of her career in flower arrangement. She related that through the many years, a great deal of her time had been spent travelling all over the world collecting seeds and plants, planting them, and maintaining the garden. She became interested in flower arrangement, taught the subject, and gave lectures and demonstrations. Her main interest centered on the Honolulu Academy of Arts where she, over a long period, supervised a school on flower arrangement. Now, Mrs. Moir has curtailed old obligations and responsibilities. She has purposely slowed her pace but devotes every Monday morning to flower

arrangement at the Academy. Her philosophy is homespun: as she grows older, she pointed out, the more valuable time becomes. She wants to use that time as she sees fit. She plans to use it to the fullest. From the twinkle in her eyes, one gathers that she is enjoying every minute of it.

The time all too soon had come to take my leave. As we walked toward the white wall and brown gate, I concluded that May Moir was more than just the name of the well-known, talented designer, world traveller, and horticulturist. In the few moments we had together, I found her to be a genuinely warm lady who thoroughly enjoyed sharing her joys. Yes, I had wondered what manner of woman she might be. I now know and it helps me retain my faith in humanity.

San Diego, California

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 \$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. 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 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.

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

Vriesea farneyi (subgenus *Alcantarea*), a New Species from Brazil

Gustavo Martinelli and Andrea Costa

We present this new species of *Vriesea*, which occurs on rocky cliffs of eastern Brazil (figures 3 and 4) in continuation of Brazilian Bromeliad Studies and the Floristic Inventory of the Atlantic Coastal Forest Altitudinal Field Project—Area III, being developed by the Rio de Janeiro Botanical Gardens with the support of the World Wildlife Fund (WWF).

Vriesea farneyi Martinelli & Costa, sp. nov.

Habitu *V. barclayana* (Baker) L.B. Smith appropinquat, sed rachi tereti simplici, inflorescentia glabra, sepalis breviter connatis, ovatis, apice obtusis et non apiculatis, petalis flavis et seminibus cum appendice apicali in brevi coma discedenti differt.

Plant saxicolous, flowering 66–70 cm high, propagating by short ascending shoots. *Leaves* 10–15 forming a subbulbous rosette 3.5–4 cm in diameter; *sheaths* purple, ovate, 10 cm long, 4.4 cm wide, densely lepidote; *blades* linear-triangular, 60 cm long, 1–1.5 cm wide, green with very small purple spots, obscurely lepidote, dark red margin, long attenuate purple apex; *scape* suberect, stout, exceeding the leaves, 60 cm long, 0.5–0.7 cm in diameter; *scape bracts* imbricate, the lower ones green foliaceous, longer than the internodes, the middle ones elliptic red-purple with long, attenuate, castaneous apex, 10.5 cm long, 2.3 cm wide, the upper ones reddish purple, elliptic, with acute castaneous apex, 4.3 cm long, 2.8 cm wide, longer than the internodes. *Inflorescence* simple, suberect, 11 cm long, rachis geniculate, 0.5 cm in diameter. *Floral bracts* distichous, reddish purple, ovate, imbricate, ecarinate, obtuse apex, equalling the sepals at anthesis; *flowers* distichous, slowly secund at anthesis, pedicel stout, 0.7 cm long. *Sepals* green, ovate, symmetric, connate, 3.2 cm long, 1.6 cm wide, with scales on the inner surface, obtuse apex; *petals* symmetric, 6.1 cm long, 0.8 cm wide, yellow, glabrous, free, flaccid and recurving at anthesis, 2 scales at base, 1.8 cm long; *stamens* free, exserted; *ovary* 0.7 cm long, 0.2 cm in diameter, glabrous, placentae central; *stigma* 3 divisions; *ovules* caudate; *capsule* up to 2.5 cm long, dark castaneous; *seeds* fusiform, 0.8 cm long with the apical appendage divided into a short coma.

Type. BRAZIL. State of Rio de Janeiro: County of Santa Maria Madalena, Desengano State Park, Desengano Peak, on rocky cliffs, 1500–1600 msm, 17 IX 1986, C. Farney no. 1217 and J. Caruzo (holotype RB; isotype NY); same locality, 17 XII 1986, G. Martinelli no. 11989 & C. Farney, J. Caruzo (paratype RB).



G. Martinelli

Fig. 3 *Vriesea farneyi*,
habitat on rocky cliffs.

meters above sea level in full sun. The vegetation where *Vriesea farneyi* was found is characterized as "Altitudinal Fields." The region is above the altitudinal limit of the Atlantic Forest in the highest peaks of the coastal mountains of eastern Brazil. It is notable for its isolation and the richness of its flora.

Conditions such as low temperatures, sun exposure, wind and other natural phenomena give this habitat a xeric character. The vegetation, which occurs in island-like masses, appears to be typical of that growing in shallow soil or on bare, steep rocks.

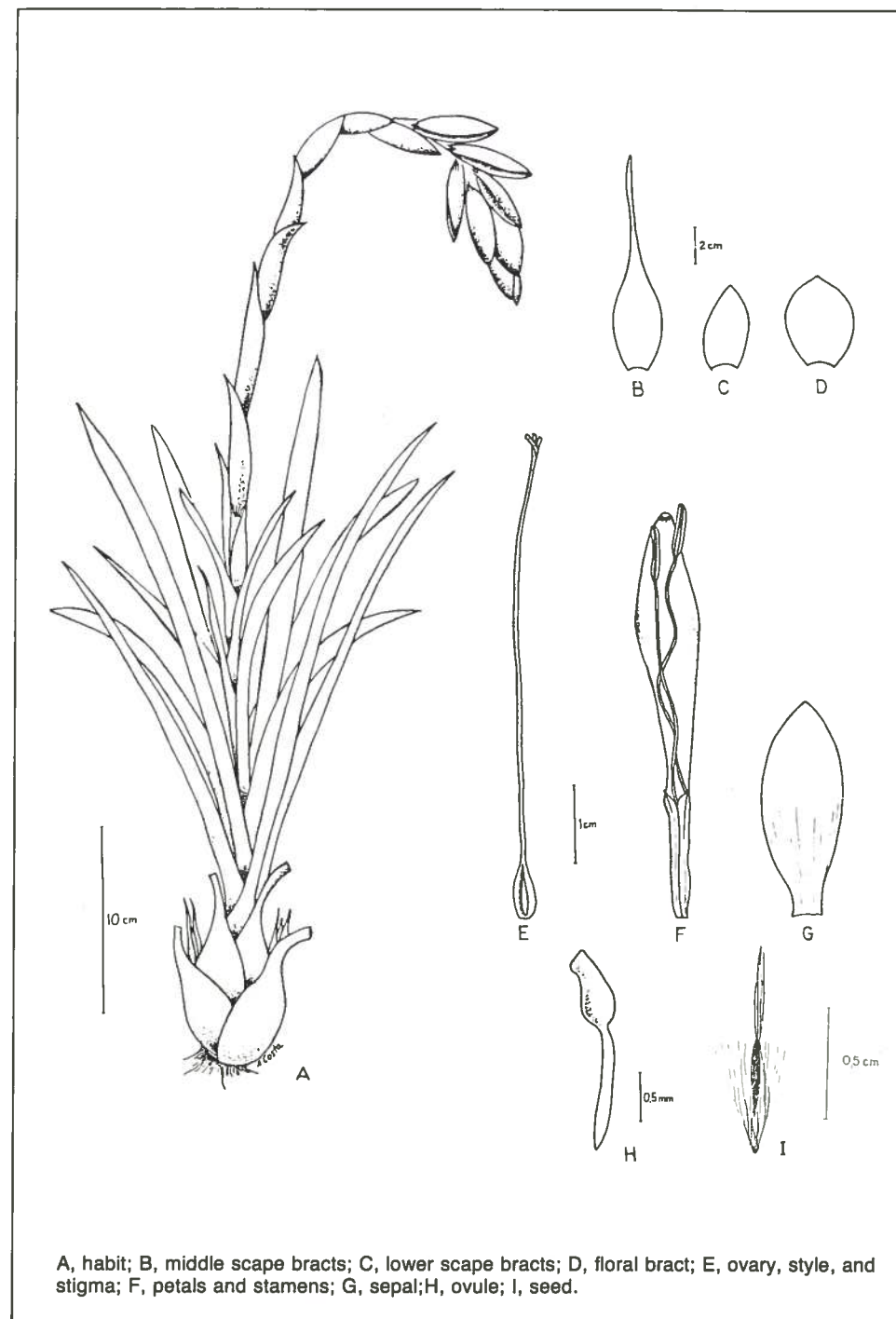
Systemic Division, Rio de Janeiro Botanical Gardens
Rio de Janeiro

Distribution: same locality, 05 X 1988, G. Martinelli no. 13143 & al. (RB); same locality, 21 XII 1988, A. Costa no. 258 & al. (RB); same locality, cultivated in Rio de Janeiro Botanic Gardens.

Vriesea farneyi Martinelli & Costa is unusual because its overall characteristics seem to relate to the subgenus *Vriesea*. With more keen analysis, especially of the seed, we consider it to belong to the subgenus *Alcantarea* even though the inflorescence is simple.

In addition to the seed, which is well characterized by the apical appendage divided into a short coma, the soft and curved petals at anthesis are also a characteristic in this subgenus.

So far, this new species has been found only in the County of Santa Maria Madalena on Desengano Peak, including the Desengano State Park, at 1600



A, habit; B, middle scape bracts; C, lower scape bracts; D, floral bract; E, ovary, style, and stigma; F, petals and stamens; G, sepal; H, ovule; I, seed.

Andrea Costa

Fig. 4
Vriesea farneyi Martinelli and Costa, sp. nov.

Misnamed Bromeliads, No. 6: Some Confused Aechmeas

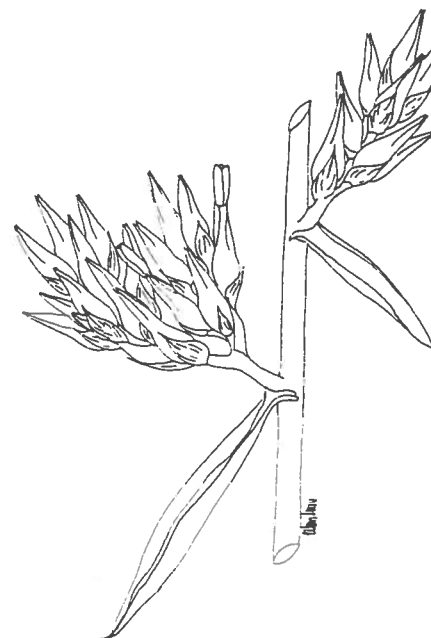
Harry E. Luther



Several large aechmeas have been the source of confusion (at least to some Florida growers) for several years. To the best of my knowledge, all can be identified readily when in flower as one of four possible species. If you have a fresh inflorescence available, the following notes should allow you to identify your plant and save you \$5.00.

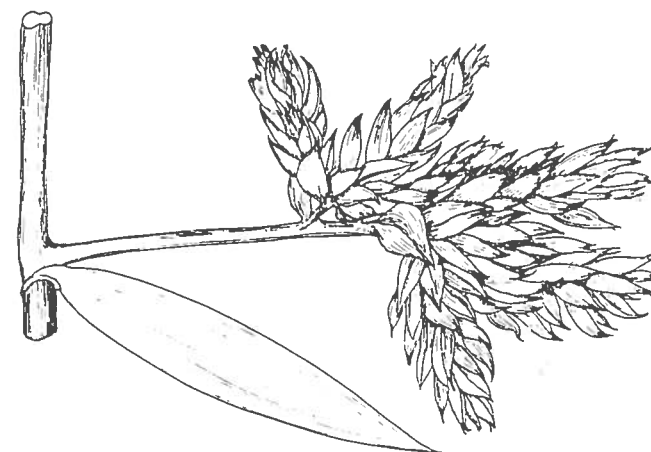
1. If the primary bracts are all longer than the branches, which may be green, yellow, or orange, and the flowers are in dense, globous heads, then you have *Aechmea aquilega*. Grisebach, in 1864, thought it looked eagle-like so he named it "aquilega."

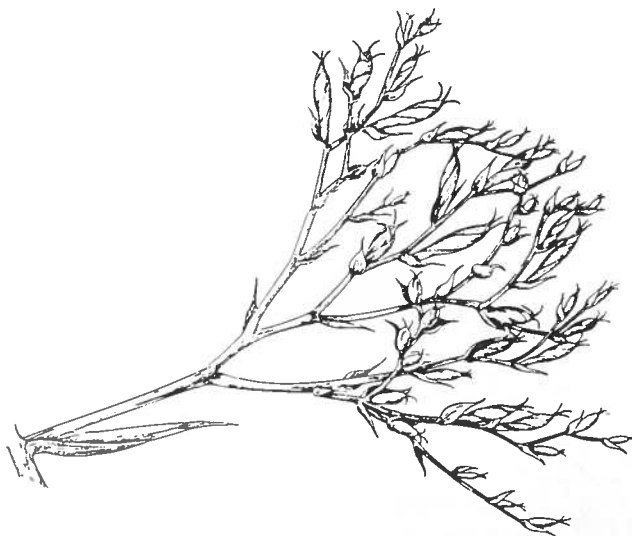
2. If all, or nearly all of the branches (which are usually yellow or orange) are longer than the primary bracts, then examine the floral bracts and flowers. If the floral bracts are as long or longer than the sepals then you have *Aechmea rubens*. I have not seen this species in Florida.



3. If the floral bracts are narrow and about the same length or shorter than the ovary, the species is *Aechmea emmerichii*. This species is relatively new. It was described by E.M.C. Leme in 1987¹ and named for Margarete Emmerich, director, Herbarium Bradeanum, Rio de Janeiro.

4. If the floral bracts are broad and longer, and conceal the ovary, then you have *Aechmea mulfordii*. Mulford Foster collected this plant in Agua Preta, Brazil, in 1939. L.B. Smith described the plant and named it for Foster.





5. *Aechmea eurycorymbus* is another large, landscape bromeliad that has much longer and more slender branches than these other species. It is often mislabelled *Portea leptantha* but that species is very rare in cultivation.

This species was described by Harms in 1935. It is also from Brazil: Paraiba do Norte, in the state of Paraiba. *Eurycorymbus* is truly

descriptive: *Eury-*, is a combining form meaning "broad" or "wide." + *corymb*, meaning a more or less flat-topped, indeterminate² flower cluster.

NOTES:

1. *Bradea* IV: 309; 1987.
2. You will just have to order *A Bromeliad Glossary* at \$3.60 postpaid from Robert Soppe, BSI Publications, 709 E. Sheridan, Newberg, Oregon 97132 USA.
3. The drawings, except as stated in Note 1, are from Smith & Downs, *Bromeliodeae*. *Neotropica* 14/3, figures 608A, 613C, 615I and 616A, with thanks.

Correction:

Disteganthus basi-lateralis, illustrated on page 100 of the May-June 1990 *Journal*, shows two inflorescences, not offsets. The text explains that these are "axillary, basal inflorescences." The caption writer has been admonished.

ADVERTISEMENTS AND NOTICES to appear in the November-December 1990 *Journal* must reach the editor not later than 1 September—Ed.

Looking Back Bea Hanson

May I take this opportunity to congratulate The Bromeliad Society on the achievement of publishing their *Journal* for 40 years. It is, indeed, something to be proud of and I hope the next forty years will see it flourishing.

Let us not forget the editors who did a tremendous job on all the issues. As an ex-editor I know the difficulties, but they all carried on and the journals have always been most interesting and informative.

I have several of the very early issues which were given to me by the late Muriel Waterman. They were really the first printed matter I had ever read on bromeliads and I remember how thrilled I was to get them.

Over the years, the *Journal* has improved steadily and I am sure the high standard of the coming issues will be as good.

In the early days of bromeliads here we had no reading matter except the *Journal*—dealing with bromeliads that is—and most of us learned a great deal about bromeliads from it. We also found the addresses of growers who sold these fascinating plants and it was not long before I sent for my first bromeliads. That parcel came by sea! Imagine the time I had to wait for its arrival, though in those days there were a lot more ships coming to New Zealand from America.

That was balanced by the fact that we needed no permits nor any of the things to bother us the way they do today. I will never forget the arrival of my first parcel. Though the plants had been quite a while on the way they opened up in perfect condition and I was thrilled. My husband arrived home to find me doing some sort of dance and clutching bromeliads in my arms. To say he was surprised was to put it mildly.

Since then I have had many parcels of bromeliads from several countries and though I always get excited, they don't thrill me as those first ones did.

Through the *Journal* I have met many people, mostly by corresponding with them and I well remember my first visit to a conference and meeting many of the people who had written for the *Journal*.

I wonder how many people will be reading and enjoying the *Journal* another forty years on? I hope, and I am sure, there will be a great many. I also hope they will find it as helpful as we did so long ago, and still do. Keep up the good work and may there be plenty of editors to carry on and may there be many members who have the urge to write and see their names in print in such an excellent publication.

Auckland, New Zealand

Moisture Management Strategies of Bromeliads

Peter Paroz

Water is essential to all living things and a soft-leaved bromeliad, for example, has a moisture content in excess of 90 percent. Within the bromeliad family, plants have evolved in a number of different ways to ensure that they have sufficient water for their needs.

Moisture management can be considered from two points of view: moisture acquisition and moisture conservation.

Moisture acquisition. One of the most obvious evolutionary features of bromeliads is the development of a tank to impound water to sustain the plant over dry periods. Tank-forming bromeliads have evolved into two distinct forms. One is the multileaved plant with a small pond of water in the axil of each leaf. This kind is typified by the large vrieseas such as *Vriesea gigantea* and *V. fosteriana*, which can impound about ten litres of water. Another is *Glomeropitcairnia erectifolia*, reputed to hold up to twenty litres. The second kind includes *Quesnelia marmorata*, which has very few leaves and a single, central tank. This is an interesting contrast of evolution: a large number of small tanks with a relatively large surface area in contrast with a single tank with very restricted surface area. There does not appear to be any advantage of one over the other and both seem to be well adapted to their environments.

In addition to providing a moisture reservoir, the water supports a mini-ecosystem of algae, insects and small animals. The detritus from their presence undoubtedly contributes to the nutrition of the plant. The question of whether or not some of these plants are active carnivores is an interesting one but it does not appear to have been resolved at the present time.

Ananas comosus has evolved a very efficient water harvesting mechanism. It is a large plant with channelled leaves that funnel any water from dew or fog to the centre of the plant. The cups at the leaf axil are small but contain interfoliar roots with copious root hairs so that the water is quickly absorbed.

Many of the pitcairniae have evolved a different mechanism for water foraging. These plants develop an extensive fibrous root system to enable extraction of water from a large volume of soil.

A distinctive characteristic of bromeliads is the trichome development that allows absorption of water into the leaf. At a high trichome density, the leaves are silvery in appearance and this coloration is considered to be of some additional advantage as a heat reflector. This development is typified by the silvery leafed tillandsias often referred to as atmospheric tillandsias. These plants are very

efficient at absorbing moisture from dew and fog. With a more pronounced trichome development, we have a fuzzy appearance as in *Tillandsia tectorum*. This insulating layer not only keeps the leaf surface cooler, it increases the distance between the leaf surface and free air. Both of these benefits reduce moisture loss.

Moisture conservation. A number of genera of Bromelioideae and Pitcairnoioideae generally have evolved extensive water storage tissues. They take the form of thickened leaves adapted for water storage as in many species of *Dyckia*, *Hechtia*, and in the specific case of *Puya laxa*. In some *Dyckia*, the leaves are very short and thick. The reduced surface area further minimises moisture loss. This strategy is sometimes referred to as "drought enduring."

Pitcairnia heterophylla is an example of a "drought evader." This plant is deciduous, dropping its leaves in autumn and remaining dormant during winter, the dry season in its natural habitat.

A water conservation mechanism that is not visible is that of Crassulacean Acid Metabolism, C.A.M. or C_4 metabolism. All plants use the energy of sunlight with the chlorophyll of the leaf to form sugars from carbon dioxide and water. This sugar is then transported to other tissues where it is used as an energy source for growth. The most energy-efficient conversion is the C_3 or Calvin-Benson pathway, but there is a penalty. For the carbon dioxide to diffuse into the leaf during daylight, the leaf pores (stomata) must be open allowing moisture loss from the leaf. One way of expressing this loss is to measure the water used as a ratio to the gain in dry matter. A typical tank bromeliad with C_3 metabolism—*Catopsis nutans* has a ratio of 2000:1.

With C.A.M., the stomata remain closed during the day and moisture loss is minimal. The stomata open at night, take in carbon dioxide, which is converted to malic acid in the leaf. Since it is cooler at night and humidities are higher, moisture loss is low. During the day, the malic acid in the leaf is broken down to carbon dioxide and it is converted to sugar by the C_3 path. This method is not nearly as energy efficient as the direct C_3 conversion but it requires much less water. A C_4 tillandsia such as *Tillandsia paucifolia* has a water/dry matter ratio around 200:1. The most efficient C_4 bromeliad is *Ananas comosus* with a ratio around 50:1. Plants with C.A.M. metabolism will be slower growing but able to colonise much dryer areas.

What are the implications of these adaptations for the culture of the plants? These variations are survival strategies and while they give some indication of cultural requirements, extra care may be still be needed if plants are to be grown at their best.

Tank bromeliads will suffer from moisture stress if the tanks are without water for any appreciable time. The solution for growers in areas with cold

winters is to fog the leaves frequently with a fine spray but to leave the tanks dry.

Drought evasion is a strategy for survival. Such plants can survive long periods without water but often at the expense of severe leaf-tip dieback. For good culture, these plants will benefit from a regular supply of moisture. It may be noted that leaf-tip dieback may be also the result of potassium deficiency.

Pitcairnia heterophylla should be allowed to dry out when it is dormant and watering and feeding should be delayed until growth commences in spring. C.A.M. plants need a supply of carbon dioxide at night and for bushhouse plants this is not likely to be a problem. Plants grown in a tightly sealed glasshouse, however, may suffer from lack of carbon dioxide and slow growth will result.

Bromeliads have a great diversity of size, form, and colour. When we consider the strategies that have evolved to provide water for the survival of these plants, we find another dimension to their fascination.

REFERENCE:

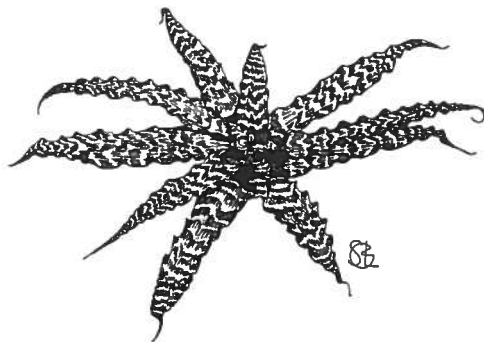
Benzing, D.H. 1980. The biology of bromeliads. Eureka, CA: Mad River Press.

Brisbane, Queensland

Peter Paroz, a former director of The Bromeliad Society, Inc., a member of the Bromeliad Society of Queensland, and a frequent contributor to the *Journal*, has been presented with his Life Membership Badge by his home society. We offer our delayed but cordial congratulations to him.

Note to Authors and Other Contributors

Contributors are invited to send their proposed material to the editor in the form of 5½" or 3½" diskettes prepared with Word Perfect 4.2 or 5.0 word processing software for P.C. After months of balking at the idea of using such innovative material the editor concedes that progress is inevitable. —TUL



Novelties of *Puya* Molina (Pitcairnioideae), II: A New Species from Chile

G.S. Varadarajan¹ and A. Flores²

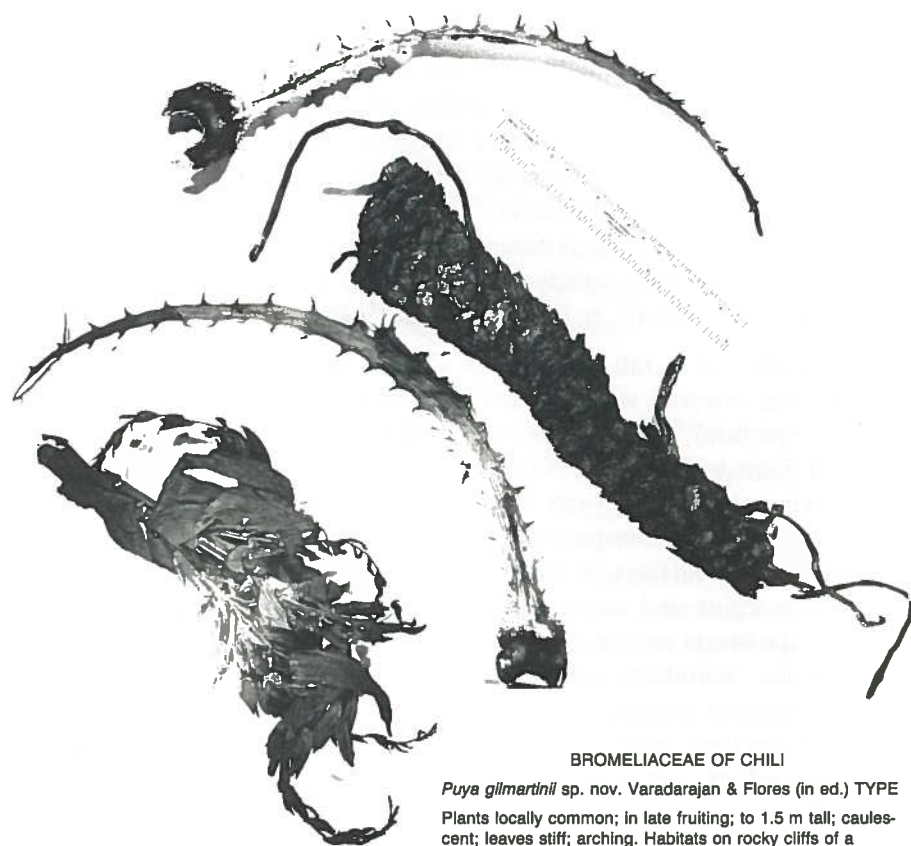
Puya gilmartinii G.S. Varadarajan et A. Flores, sp. nov.

Puya boliviensis Baker in statura plantae totae, habitu, bracteis scapi, inflorescentia et petalis flavis, sed in caudice distincto, magnitudo foliae, indumento, textura bractearum primariorum, magnitudo formaque bracteis floralium, longitudine pedicellorum, et magnitudo sepalarum petalorumque; *Puya chilensis* Molina similis in caudice distincto, bracteis scapi, inflorescentia, bracteis primariis, et petalis flavis, sed in stature plantae, magnitudo indumentoque foliae, crassitudine scapi, numero ramulorum, lateralibus peduncularis inflorescentiae, magnitudo sepalis petalisve, et forma capsulae, differt.

Plant nearly 1.5 m tall, caulescent. *Caudex* massive, branched, prostrate, 30–50 cm long, covered with dry and persistent sheaths of leaf bases. *Leaves* 15–20 (cover picture), in a compact rosette, with a broadly ovate, dark castaneous sheath, 4–4.5 cm wide; blades 50–60 cm long at the maximum, 2.5 cm wide, arching, laxly serrate with 1-cm long, uncinat, antrorse and retrorse spines; cinereous foliar scales conspicuous, covering upper one third of the sheath, abaxial and adaxial surfaces of blades and bases of spines; scale density higher along blade margins and spine bases. *Scape* erect, to 45 cm tall, 1–2 cm in diameter, scape bracts reflexed, partly deciduous at maturity, the lower ones narrowly triangular, acuminate, coarsely serrate, the upper ones broadly lanceolate, entire. *Inflorescence* compound, bipinnate, nearly 60 cm long, lateral branches to 20, about 35 cm long, with stalk nearly 2 cm, floriferous through the proximal one third to one half, and sterile with numerous reduced bracts for the remainder of the distal portion of the branch; the primary axis and branches densely tomentose. *Primary bracts* broadly ovate-lanceolate, acuminate, entire, coriaceous, strongly nerved, covering from nearly one third to more than one half of the lateral branches, persistently lanate. *Floral bracts* broadly ovate, acuminate, subcoriaceous, sparsely tomentose, almost equalling the sepals. *Pedicels* to 1 cm long, tomentose-lepidote. *Sepals* elliptic to lanceolate, obtuse, 1.5–2 cm long, naked, sulfur yellow. *Stamens* included. *Capsules* globose, enclosed by the sepals. *Seed* *Puya hamata* type (broadly triangular) 2–3 mm in size.

Type. Chile. Region IV (La Serena): Prov. Elqui, about 60 km north of La Serena, on the way to Puerta Totorallilo, near El Oliva, Isla Tilago, 29° 16' S, 71° 17' W; alt. 50 m; May 22, 1987, G.S. and Usha Varadarajan, A. Peñaloza, and A. Flores 1481 (holotype, GH; isotypes MO, WS).

1. School of Agriculture, Tuskegee Univ., Millbank Agriculture Hall, Tuskegee, AL 36088.
2. Departamento de Biología, Universidad de Chile, Santiago, Chile.



BROMELIACEAE OF CHILE

Puya gilmartinii sp. nov. Varadarajan & Flores (in ed.) TYPE

Plants locally common; in late fruiting; to 1.5 m tall; caulescent; leaves stiff; arching. Habitats on rocky cliffs of a coastal scrub vegetation characterized by *Trichocereus*, *Nolana*, *Oxalis*, *Gigantea*.

CHILE: Region IV (La Serena): Prov. Elqui. About 60 km N. of La Serena. On the way to Pta Totorallito, near El Oliva, Isla Trilgo. Approximate location: Lat. 29° 28', long. 71° 17'. Alt. 50 m.

May 22, 1987
No. 1481

G.S. & Usha Varadarajan,
A. Peñaloza, and A. Flores

Fig. 5
Puya gilmartinii



G.S. Varadarajan

Fig. 6
Puya gilmartinii.
The protruding sterile apices of the lateral branches of the inflorescence are characteristic of all species of *Puya* subgenus *Puya*. Note the desert habitat in the background.

Puya gilmartinii appears to be closely related to two other Chilean species, *P. boliviensis* and *P. chilensis*. These species share reflexed scape bracts, inflorescence type, elliptic-lanceolate sepals, elliptic petals, and sepals completely enclosing the capsules. In addition, the new species displays some characters in common with one species that are different from the other (Tables 1 & 2). Tables 3 and 4 list characters that distinguish *P. gilmartinii* from *P. boliviensis* and *P. chilensis*.

Puya gilmartinii exhibits a saxicolous habit in a small area in the coastal desert (fig. 6). The populations are limited to about twenty individuals. Although *P. chilensis* grows in the same general area as *P. gilmartinii*, populations of these taxa are not intermingled. The suite of similarities and differences in morphological traits may suggest an instance of hybridization involving *P. boliviensis*, *P. chilensis*, and *P. gilmartinii*. Their geographic distributions (Varadarajan 1989) further support the idea of hybridization in the past. This suggestion, however, is not to cast doubt on the identity, validity, or taxonomic rank of the new species.

We name this new *Puya* in memory of Dr. Amy Jean Gilmartin's significant research contributions to the bromeliad family.

Table 1.
Characters represented in *Puya gilmartinii* and *P. boliviensis*
but not in *P. chilensis*

1. Plant size range	1.5–2 m
2. Scape	1.5–2 cm in diameter
3. Upper scape bracts	broadly lanceolate
4. Number of lateral branches of inflorescence	up to 20
5. Lateral branches of inflorescence	stalked
6. Inflorescence branches	persistently lanate
7. Capsule	subglobose

Table 2.
Characters found in *Puya gilmartinii* and *P. chilensis*
but not in *P. boliviensis*.

1. Plants	with caudex
2. Primary bracts	ovate to lanceolate

Table 3.
Characters that differentiate *Puya gilmartinii* from *P. boliviensis*.

1. Caudex	present	absent
2. Leaf size	50–60 cm long, 2.5 cm wide	100 cm long, 6 cm wide
3. Leaf orientation	arching	erect
4. Indument on blades	densely white lanate, persistent especially along margins and bases of spines	sparsely lepidote above when young, soon glabrous
5. Primary bracts	coriaceous	thin (membranous)
6. Floral bracts (shape)	broadly ovate-lanceolate	lanceolate-elliptic
7. Floral bracts (apex)	acuminate	acute
8. Floral bracts (texture)	subcoriaceous	membranous
9. Pedicels	1 cm long	1.5 cm long
10. Sepals	1.5–2 cm long	3 cm long
11. Petals	3 cm long	5 cm long
12. Petal color	yellow	yellow or yellowish green

Table 4.
Characters that distinguish *Puya gilmartinii* from *P. chilensis*.

1. Plant size (maximum)	1.5 m	5 m
2. Leaf size	50–60 cm long, 2.5 cm wide	100 cm long, 5 cm wide
3. Leaf orientation	arching	erect or stiffly spreading
4. Leaf blades	with densely white lanate, persistent indument	glabrous
5. Scape diameter	1–2 cm	up to 5 cm
6. Lateral branches of inflorescence	up to 20	80–100
7. Attachment of lateral branches of inflores- cence with main axis	with a nearly 2 cm stalk	direct (sessile)
8. Inflorescence branches	persistently lanate	glabrous at maturity
9. Primary bracts	coriaceous	submembranous
10. Floral bracts	broadly ovate	narrowly elliptic
11. Pedicels	1 cm long	1.5 cm long
12. Sepals	1.5–2 cm long	3.5 cm long
13. Petals	3 cm long	5 cm long
14. Petal color	sulfur yellow	varying from sulfur yellow to green
15. Capsules	subglobose	ellipsoid

REFERENCE:

Varadarajan, G.S. 1989. Genus *Puya* Molina (Pitcairnioideae): relocation of several rare species and some preliminary remarks on geographic distributions and species divergence. J. Brom. Soc. 39:3-7.

ACKNOWLEDGMENTS:

I wish to thank Dr. Peter Stevens for the Latin diagnosis, Dr. M.K.T. Arroyo for the help and advice in organizing field work in Chile, Dr. David Boufford for providing facilities at the Harvard University Herbaria, and my wife Usha for her untiring cooperation, support, and assistance in the field and manuscript typing. Also, I wish to acknowledge the support of a National Geographic Society Research Grant (#3463-86) for my field explorations.

Tillandsia tortilis Subspecies *curvifolia* Renate Ehlers and Werner Rauh



Fig. 7

Tillandsia tortilis subspecies *curvifolia* is a native of Mexico found growing in large clusters on rocks at medium elevations.

Photos by R. Ehlers



Fig. 8

Tillandsia tortilis subsp. *curvifolia* inflorescence detail.

*Tillandsia tortilis*¹ Klotzsch ex Baker subsp. *curvifolia* Ehlers & Rauh, subsp. nov.

A subspecies typica characteribus sequentibus differt: habitu minore, foliis rectis secundisque, indumento tomentosiore; scapo brevior robustioreque, inflorescentia minore, teretiuscula, rachide flexuosa lepidotaque; floribus minoribus, polystiche dispositis; sepalis subglabris; petalis brevioribus, sepalis solum 5–7 mm longioribus, apice distincte recurvatis.

Typus: *R. Ehlers M 850201*, 6.3.1985 (holotypus WU).

Patria: Mexico. Estdo. Guanajuato: apud Guanajuato, 2,200–2,400 msm (Typus), Estdo. Zacatecas inter Tlaltenango et Jalpa, 1,800 msm.

Plant acaulescent or very short caulescent, flowering up to 15 cm tall with about 8–12 polystichous leaves, forming an erect, secund rosette. *Leaves* silvery white lepidote; *sheaths* 15 mm long, 12 mm wide, somewhat succulent except the bases, tomentose except for a glabrous region at the base where surfaces are contiguous, with broad hyaline margins; *blades* divergent from the sheaths, up to 12 mm long, 7 mm wide above the sheaths, narrow-triangular, long-attenuate, strongly involute, subulate, adaxial densely adpressed lepidote, abaxial with spreading excentric trichomes, succulent, turning secund. *Scape* elongate, erect, up to 5 cm long, 2 mm in diameter, glabrous to sparsely lepidote, covered by 3–5 densely imbricate, erect scape bracts, these 3–4 times longer than the internodes, the lower ones foliaceous with long (to 7 cm), subulate, acuminate blades, the upper ones like the floral bracts. *Inflorescence* shorter or slightly longer than the leaves, simple or rarely with a smaller lateral spike, elliptic to oblong, acute, 2–3 cm long, to 1 cm wide, terete, with 2–5 sessile, polystichous to subpolystichous flowers, mostly 3 flowers and 1 sterile flower at the apex; rachis not visible, flexuous, angled, densely lepidote, stout. *Floral bracts* erect, densely imbricate, 1–2 cm long, to 1 cm wide, ovate to lanceolate, acute, thin, with hyaline margins, adaxial, green, glabrous, nerved; abaxial, rose, densely lepidote, slightly nerved, distinctly nerved towards the apex, 2–3 times longer than the internodes, slightly longer than the *sepals*; these up to 15 mm long, 4 mm wide, lanceolate-oblong, acute, membranous with hyaline margins, free, the posterior ones distinctly carinate, glabrous or somewhat lepidote toward the apex. *Petals* 5 mm longer than the floral bracts, 2–2.7 cm long, 4 mm wide, ligulate, erect, the rounded apices distinctly recurved, #80 Nile green, white towards base. *Stamens* deeply included. *Filaments* up to 15 mm long, equal in length, filiform and flat in cross section, white, *anthers* erect, 3–5 mm long, sagitate, basifixed, light brown, *pollen* pale yellow. *Style* whitish green, green toward apex, elongating after anthers mature, *stigma* small, Nile green, lobes erect, spreading in anthesis. *Ovary* elliptic, 4 mm long, 2 mm wide, green. Flowering time: January–March.

1. Dr. Walter Till determined that *T. ehrenbergii* (K. Koch) Klotzsch ex Mez must be treated as a synonym of *T. tortilis* Klotzsch ex Baker in accordance with material of Parry & Palmer 872 (Die Bromelie 3/1986:39–41).

Holotype: Mexico. Guanajuato: near Guanajuato, 2,400 m leg. R. & K. Ehlers EM 850201 (holotype WU).

Distribution: Mexico, at elevations between 1700 to 2500 m, saxicolous. Between Guanajuato and San Miguel Allende (2400 m, 2300 m, and 2200 m), in big clusters together with *Mammillaria pettersonii*, *M. densispina*, and *Echinofossulocactus*; only occasionally can plants be found on trees near the rocks. *Tillandsia lepidosepala* EM 850202 was found at a distance of 50 m growing on trees. Other material of *T. tortilis* subsp. *curvifolia* was collected in Zacatecas near the road from Tlaltenango to Jalpa, 1800 m, saxicolous growing together with *Mammillaria* spec. and *Echinocereus* spec. (EM 850902).

Subspecies *curvifolia* differs from *Tillandsia tortilis* Klotzsch ex Baker in the following characteristics: plant smaller, leaves neither spreading nor reflexed but erect and strongly secund, trichomes more tomentose. Scape shorter, more stout and sparsely lepidote. Scape bracts twice as long with filiform, acuminate blades. Inflorescence smaller, not strongly complanate, but terete with polystichous flowers. Rachis not nearly straight but flexuous and lepidote. Flowers smaller, petals only 5–7 mm longer than the sepals (in *T. tortilis* Kl. ex Bak. petals 10–15 mm longer), petals much shorter (2–2.7 cm long instead of to 3.8 cm). Petal blades distinctly recurved, lighter green (#80 Nile green instead of #82 moss green), sepals not lepidote but subglabrous.

The subspecies *curvifolia* differs from *T. lepidosepala* L.B. Smith as follows: leaves secund, scape longer, flowers polystichous, sepals smaller.

Material examined: *T. lepidosepala* EM 7831 Queretaro, San Juan del Rio-Tula; EM 850101 Queretaro-San Miguel Allende; EM 850103 Dolores Hidalgo-Guanajuato; EM 850202 Guanajuato-San Miguel Allende.

T. ehrenbergii EM 7840 Valle de Metzitan (Pachuca); EM 7740 Pachuca (epiphytic); EM 850401 between San Luis Potosi and Zacatecas (lithophytic).

ACKNOWLEDGMENT:

We are grateful to Dr. Walter Till for the Latin diagnosis.

REFERENCES:

- Gardner, C.S. 1982. A systematic study of *Tillandsia* subgenus *Tillandsia*. College Station: Texas A&M Univ.; Ann Arbor, MI, Univ. Microfilms International; 1983.
- _____. 1982. *Tillandsia ehrenbergii* (K. Koch) Klotzsch ex Mez, an ancient case of mistaken identity. J. Brom. Soc. 32:17–19.
- Isley, P.T. 1987. *Tillandsia*. Gardena, CA: Botanical Press. (color chart)
- Smith, L.B.; Downs, R.J. 1977. *Tillandsioideae*. Flora Neotropica. Monograph no. 14, pt. 2. New York: Hafner Press: 1015–1016.

Stuttgart, West Germany

The Best of the Best

Valerie Steckler

At most Standard BSI Bromeliad Shows,¹ two beautiful wood and brass plaques are awarded: the Mulford B. Foster Best of Show Award—Horticulture and the Morris Henry Hobbs Best of Show Award—Artistic. The Foster award is bestowed on the highest-scoring horticultural specimen and the Hobbs award on the best from the artistic divisions. The winners of these awards are usually placed in a special area of honor for all to admire and photograph. In addition to the plaques, they are also awarded gold medallions, blue ribbons, and Award of Merit ribbons signifying that they scored 95 points or better against the possible score of 100. The exhibitor who wins the most blue ribbons at any show receives the Sweepstakes Award and a gold medallion. The 1989 winners of the Foster, Hobbs, and the Sweepstakes Awards are listed in the accompanying table.

After every standard show, the judges chairman of the show completes a show report and forwards it with color slides of the Foster and Hobbs prize plants to the Affiliate Shows Committee chairman. Five of the slides are shown here with information about the plants. We are sorry that not all of the winners could be shown.

The outstanding horticultural entry at the Caloosahatchee Bromeliad Society show in Fort Myers, Florida, was Joe Bailey's beautiful *Neoregelia* hybrid (fig. 9) of Dexter's Pride crossed with a cultivar known in the trade as "Fantastic Garden's Grande." The wide, stacked, green leaves splotted with deep maroon and with leaf tips repeating that color display a pleasing, round form. Successive generations of this plant have shown it to be hardy and prolific. Joe adds Magamp when potting pups and foliar feeds "everything" every three to four months. He hopes to register this candidate as *Neoregelia* Isabel cv. Bailey.

A spectacular \times *Neophytum* Ralph Davis with white-bordered leaves (fig. 10) won the Foster award for Jimmy Antle at the Bromeliad Society/Houston, Inc. show. In 1987, the late Dr. Tom Montgomery gave Jimmy a half-grown specimen with about one-quarter of its leaves showing variegation. He hoped that Jimmy could cultivate fully variegated plants from it. Jimmy removed the inflorescence as soon as possible to force pupping and then saved about 20 pups showing at least some variegation. One of the 20 with "albo-margined" leaves bloomed in time for the Houston show. Most of its progeny are showing white borders. These plants are potted in a quick-draining mix and are fertilized weekly with Peters 20/20/20 highly diluted in rain water. They are grown under 63% shade in summer but are given the most available light, the warmest temperature, and the lowest humidity in winter.

1. As defined in the Handbook for Judges, Exhibitors, and Affiliates, 2nd ed., 1987, published by The Bromeliad Society, Inc.



Anne Collings

Fig. 9

Neoregelia Dexter's Pride crossed with *N.* "Fantastic Gardens Grande" produced this cultivar, *N.* 'Bailey' to win the best-of-show award for Joe Bailey at the Caloosahatchee Bromeliad Show in Fort Myers, Florida, November 1989.



J.F. Mayfield

Fig. 10

× *Neophytum* Ralph Davis with variegated leaves won the M.B. Foster award for horticultural excellence at the Bromeliad Society/Houston show, May 1989. It was entered by Jimmy Antle.

Fig. 11

This beautifully variegated *Tillandsia cyanea*, entered by Nelwyn Anderson, won the Foster award at the Southwest Bromeliad Guild show in November 1989.



Robert Stucker



J.F. Mayfield

Fig. 12

By skillfully combining *Cryptanthus* 'Pink Starlite' with a specially decorated pot, Blynn Miller won the Morris Henry Hobbs award at the Bromeliad Society/Houston show in May 1989.

1989 Winners at Standard BSI Bromeliad Shows

Affiliate	State	Foster Award	Hobbs Award	Sweepstakes
The Acadiana Bromeliad Society	LA	Lou Trahan <i>Tillandsia complanata</i>	Michael Young "Bromeliads à la Naturelle"*	Michael Young
Bromeliad Guild of Tampa Bay	FL	see article	Mike & Ruth LeVasseur <i>Neoregelia mooreana</i> **	Mike & Ruth LeVasseur
The Bromeliad Society of Baton Rouge	LA	Dick Wuensch <i>Tillandsia Victoria</i>	Gerald Smith <i>Aechmea orlandiana</i> **	Michael Young
Bromeliad Society/Houston, Inc.	TX	see article	see article	Crystal Jackson
Caloosahatchee Bromeliad Society	FL	see article	[not available]	Hattie Lou Smith
The Florida Council of Bromeliad Society, Inc. sponsored by Bromeliad Society of Central Florida	FL	Eloise Beach <i>Aechmea orlandiana</i> 'Ensign'	[no award]	Dorothy McNulty
Greater New Orleans Bromeliad Society	LA	Alex Holmes <i>Vriesea gigantea</i>	Gerald Smith <i>Aechmea orlandiana</i> **	Alex Holmes
San Diego Bromeliad Society	CA	Donald Patterson <i>Neoregelia concentrica</i>	Thelma O'Reilly <i>Billbergia</i> 'Catherine Wilson'	Donald Patterson
Shreveport Regional Bromeliad Society	LA	see article	Robert Spivey <i>Guzmania</i> 'Symfonie'*	Harvey C. Beltz
The Southwest Bromeliad Guild hosted by Dallas-Ft. Worth Bromeliad Society	TX	see article	see article	Crystal Jackson
Tarrant County Bromeliad Society	TX	Rod French <i>Guzmania</i> 'Symfonie'	Bill Timm <i>Tillandsia mauryana</i> **	Rod French

*artistic arrangement

**decorative container

Richard Spivey won the Foster award at the Shreveport [Louisiana] Regional Bromeliad Society show with his beautifully marked and well-shaped *Vriesea fenestralis* (please see back cover). The plant was three years old, 12" tall, and 17" in diameter. The leaves were 4" wide at the base. Bob grows these vrieseas in a greenhouse with temperature control in the form of a wet wall, medium to medium-high light, and much air movement from his many fans. He attributes his success with this difficult-to-grow species to the constant air circulation.

Nelwyn Anderson of Corpus Christi took home the Foster plaque from the Southwest Bromeliad Guild Show held in Dallas, Texas, with a beautifully variegated, blooming *Tillandsia cyanea* (fig. 11). She and John acquired this tillandsia in Hawaii when it was half grown. Once potted, it was given medium light (1800 foot-candles) and lots of water laced with Superthrive and a dilute mixture of Peters 9/45/15, called "Plant Starter," with every watering. John believes that this feeding program caused their winner to grow and bloom so beautifully.

Blynn Miller won the Hobbs award at the Bromeliad Society/Houston, Inc. show for his decorative container entry (fig. 12). He skillfully combined *Cryptanthus* 'Pink Starlite' with a "Blynn Original" ceramic container. Last Easter, he watched his schoolteacher wife Sylvia dyeing Easter eggs and noted that the oil-based dyes floated atop the water. The multiple colors did not mix but combined into interesting, swirling patterns. Thinking that he could apply them to make decorative containers, he began experimenting with red and green dyes. Placing his hand inside a white container, he slowly dipped it into the swirling dyes. The red turned out to be a pretty shade of pink and its combination with the green reminded him of a pot of 'Pink Starlite' in his greenhouse, hence the happy combination.



Austin, Texas

Tillandsia in Central Florida: Lessons and Questions

Kenneth Quinn

The thrill of seeing bromeliads growing wild in their native habitat is one that I suspect many other growers share with me. Part of the feeling is hard to describe: it is in part the delight at seeing old friends in their true home rather than the artificial conditions we provide. Another part consists of admiration for the pure beauty of the wild plants. The third component is the hope of learning about the plants and how they can best be cultivated, by observing their response to natural conditions. For instance, having noted that *Tillandsia fasciculata* in Florida likes relatively moist conditions and *T. utriculata* likes it even moister, I spray each of them as often as possible when conditions are at all arid.

A fortunate few of us manage to visit Central America or South America and see a diverse assembly of bromeliads. Those with bank account or health restrictions must content themselves with closer and less arduous areas such as central Florida. But that should not cause despair; anyone can find enough stimulation to last a lifetime among our native tillandsias. Recent trips to the Orlando area have shown me that the area has a number of interesting problems concerning the local species.

The most complex problem is how many species are present. Everyone knows and recognizes *Tillandsia usneoides* and *T. recurvata*; these are not only very distinctive in form but are also very widespread. *T. utriculata* is also distinctive, although very young ones can be mistaken for *T. fasciculata*. The hairlike needles of *T. setacea* also are hard to mistake. *T. balbisiana* has been reported from Osceola County; its swollen base helps to identify it. Past that, though, it starts getting a little more difficult. Depending on whom you ask, you will get a different number of how many species and hybrids there are in central Florida.

Tillandsia fasciculata is obviously present. There are, however, several taxons less familiar and perhaps less distinct, at least for me; these include *T. bartramii* and *T. simulans*. I am unable to distinguish these with certainty and will not venture to do so in this article. To make matters more confusing, a hybrid swarm almost certainly exists among *Tillandsia* in central Florida. Several species will hybridize with each other forming fertile hybrids that will cross breed with other hybrids or with the parent species. The result is that any given specimen may be a mixture of characteristics from several species making it impossible to assign that particular specimen to a particular taxon. Such hybridization is part of the evolutionary process. Perhaps in several thousand years there will be several more distinct species in the area, as hybrids particularly gifted for survival develop into recognizable populations.¹

It is not necessary to know exactly what species you have in order to benefit from observing the conditions in which it grows. Sometimes these conditions can be a surprise, such as seeing tillandsias growing on the ground. An area with an almost pure sand as soil, near Kissimmee, had a number of the *fasciculata-bartramii-simulans* complex (as I shall call that assemblage of similar phenotypes) that seemed rooted in the dirt. Close inspection showed the plants to be very shallowly rooted, with the roots almost totally in the leaf mould that was on top of the sand. The lesson to be learned was that these plants would probably grow well in a planting medium, but perfect drainage and air circulation through the medium would be necessary.

Seeing the more moisture-loving of the tillandsias near Orlando can involve some detective work. The trick is to find a moister-than-average area that has public access and where one does not sink to the knees or deeper in mud. There are two areas I can recommend. One is Wekiva State Park near Apopka. At that place, which has a small entrance fee, a boardwalk and trail lead you through several plant communities and allow you to see the changes in the species as you go from a large spring, through a swamp, and into pine woodlands. Less accessible is a nature preserve run by the Osceola County School System off Poinciana Boulevard one mile north of its southern end, about eight miles south of Kissimmee. This preserve has a 1,000-foot-long boardwalk through a cypress swamp. *Tillandsia utriculata* is especially abundant here, unlike the other locality, and if you keep your eyes peeled you can also see the orchid *Encyclia tampenses*. Please note that collecting is forbidden at either place. Perhaps the best time to go to the Kissimmee preserve is in March, the end of the dry season. Not only is access to swampy areas good, but *T. fasciculata* is in bloom.

Los Alamos, New Mexico

NOTES:

1. Two articles with more information on this subject are:
 - a. Harry Luther's Notes on Native Florida Bromeliads, (J. Brom. Sco. 28:178-180; 1978).
 - b. R.W. Read's Natural Hybridization: the problem. Gardner, C.S., ed. Proceedings of the 1982 World Bromeliad Conference; June 10-13; Corpus Christi, TX. 1984:98-104.



Tillandsia chartacea and I

Derek Butcher

This story starts with me as a pseudobotanist studying Cactaceae genus *copiapoa* in the 1970s. This group of plants comes from the coastal areas of the northern portion of Chile close to, if not within, the Atacama desert where rainfall is virtually nonexistent and plants survive on mists created by the Humboldt Current. Growing this genus of plants in Adelaide was a challenge because in Adelaide there are hot and dry summers, cold and wet winters, and very few mists. Further, because importation is not encouraged, seed raising is a popular way of increasing your plant collection.

These endeavours with seed led me to write to Karel Knize, a German-speaking expatriate Czech whose base was Lima, Peru, but who rode the barren wastes on a motor bike collecting seed. The seed I purchased was fresh and germinated well. In broadening my outlook from cactus I found that other plants grew in that arid area, in fact, some grew on plants and some in sand dunes with apparently no root systems. Oddly enough, as my interest turned towards tillandsias so too did that of Karel Knize. Cactuses could be grown from seed with a bit of trial and error so why not tillandsias? My optimism was jolted and although to this day I still try tillandsia seed I cannot say that my success rate has been encouraging.

In 1978 I took the plunge and imported tillandsias from a cactus expert into a country where the quarantine authorities were just getting accustomed to tillandsias. Trying to work out names was an interesting project. I still have unnamed species yet to flower and species that seem to key out halfway between known species; for example, one with flower structure of *Tillandsia paleacea* and plant structure of *Tillandsia purpurea*.

I also had a plant named *Tillandsia multiflora* that under my conditions became caulescent, so much so that I believed I had a large form of *T. cauligera*. After all, *T. multiflora* was supposed to have no stem, as such.

On and on the plant grew and then suddenly a flower spike emerged and grew at a similar rate. It, too, didn't seem to know when to stop but eventually did and after some agonising few weeks decided to flower.

It was not *Tillandsia multiflora* or *T. cauligera* or even a large form of *T. latifolia*. In disgust at my lack of naming prowess I removed the required portions and sent them to Harry Luther for naming.

Back came the reply: *Tillandsia chartacea*. With immediate referral to Smith & Downs I was able to confirm. How could I have missed this when working

diligently through the keys? How could I have missed this when I gave up on the keys but read every species in the book?

Tillandsia chartacea was named by Dr. L.B. Smith in 1951 for its papery floral bracts. The plant is short-caulescent, flowering nearly 1 meter high. Leaf sheaths are elliptic to 8 cm in length with the blades narrowly triangular to 3 cm in width, all densely silver lepidote. The scape is erect, the upper portion red. The inflorescence is pinnate, petals linear, erect to slightly spreading, obtuse; white with dark pink [H.E.L. says that the petals look purple in the photo]; stamens included.

There are two recognised varieties, one from Colombia and Ecuador named variety *chartacea*. The other, from Peru, is named variety *peruviana*. I assume that Knize's range of influence would more likely encompass Peru than Colombia and thus mine is more likely to be the Peruvian variety.

This is a vigorous species growing well in Adelaide conditions with a little protection from the sun. It appears to enjoy the cold, wet winters, which are its main growing period. After flowering it offsets profusely producing a new plant from virtually every leaf axil. It has certainly found one ecological niche here in South Australia.

Adelaide

SELBY GARDENS SYMPOSIUM, "The Biology and Conservation of Epiphytes," will be held on May 5-8, 1991. Papers will address botanical, ecological, and horticultural topics pertaining to tropical and temperate vascular and nonvascular epiphytes. The large collection of living plants at the gardens will be open to conferees. Symposium is open to all biologists and horticulturists interested in epiphytes. Contact: Dr. Nalini M. Nadkarni, Director of Research, The Marie Selby Botanical Gardens, 811 South Palm Ave., Sarasota, FL 34236.



Regional Reflections

Arithmetic Lesson; or Additions Through Multiplication, Subtraction & Division

Carol M. Johnson

One of the first things a new bromeliad fancier learns is that most generally the plants will bloom only once, produce offsets in some fashion, then die. Some growers never progress beyond the taking and growing on of these pups to perpetuate the collection.

There are other ways of increasing production:

- **Multiplication.** Pups belong in this category and are usually produced at the base of the plant. They should not be taken off until large enough to fend for themselves. It is usually true that the more pups taken, the more will be produced. My first *Aechmea chantinii* 'Samurai' produced eight offsets through systematic excision of each one as soon as it was big enough to plant. Some bromeliads, notably certain vrieseas and guzmanias, produce new plants from the center of the parent plant and removing them can prove to be a traumatic experience. For example: *Vriesea glutinosa* and *Guzmania sanguinea*. If you are a new grower or have only one plant, perhaps you should be content with only one for one and just cut away the old leaves as they become unsightly. Offsets are supposedly all true reproductions of the parent plant. Often a plant grown from seed will not show its true character until it is grown from its first crop of offsets.

If you are young and patient enough, growing bromeliads from seed is a fascinating multiplication process. Some seeds, such as those of *Aechmea merten-sii*, can be grown into blooming-size plants within a year. But some take a very long time. *Vriesea heliconioides* seed planted in May 1981 has just begun to produce blooms eight years later.

Still another form of multiplication is tissue culture. It is a scientific process of producing thousands of plants from a small portion of the meristem of a bromeliad. I mention it only because of its importance in the commercial production of bromeliads. You and I cannot accomplish this process under ordinary growing conditions. Some bromeliads, notably tillandsias, produce no offsets and can be reproduced only by seed or tissue culture.

- **Subtraction.** It is possible to take away and yet get more plants and this is done by reversing the process of taking offsets. Instead, with a cluster of pups at the base of the plant, just cut away the spent and unsightly parent plant. Leave this cluster of plants to grow on together either in the original pot or a new, and larger one. The result is usually smaller plants, but better color and conformation. Examples of these plants are *Neoregelia* Fireball, *N. ampullacea*, *N. compacta*, *Vriesea carinata*, *V. lubbersii*, *V. flammea*, and many billbergias.

- **Division.** When plants become too thick in a pot or on a tree limb we must divide them. Sometimes the root ball is so thick it will break the pot or the pot must be cut away from the clump of plants. When root-bound, the plants tend to become progressively smaller and weaker.

Some bromeliads can be divided, cut into pieces and new plants grown from the pieces. *Cryptanthus* Cascade, for example, tends to become ugly after blooming with the long stolons hanging over and down from the basket. Cut off the long stolons, divide them into pieces, one- to one and one-half inches long. Bury the pieces in potting mix, perlite, or sand where they will make new plants. There are *Orthophytum* species that can be divided in the same fashion, most commonly *Orthophytum vagans* which actually produces root nodes on the sections of the upright stem. The orthophytums are not as easy to grow in this fashion as *C. Cascade*. They must never be allowed to dry out during the process. Some tillandsias, notably *Tillandsia secunda*, are viviparous. This means offsets are produced from seed which germinates and grows on the parent plant. Then there is *Tillandsia paucifolia*, a form of which (called proliferating) continues to bloom, branch, bloom, branch. A big specimen can be divided into many fresh starts.

The strangest of all is the production of pseudobulbs. This, to my knowledge, occurs only in the *Fosterella* and *Pitcairnia* genera. Pointed bulbs appear above ground surrounding the bloom spike, for all the world in the fashion of orchids (or onions). Carefully divided and dried, these can be individually planted to produce new plants. With *Fosterella*, of course, the habit of broadcasting thousands of seeds makes reproduction by bulbs superfluous, but interesting. Those *Pitcairnia* species that produce pseudobulbs should be allowed to start leaf production before being divided. Watch it! Some of the *Pitcairnia* "bulbs" also have wicked spines.

[Reprinted from

Florida Council of Bromeliad Societies, Inc. Newsletter, May 1989.]

The Unseen Role Played by the Jungle Ant

Jack Percival

Of considerable interest to the plant scientist and hobbyist is the role the forest ant plays on the jungle floor as well as in the canopy high above in the tropical trees. While this relatively unnoticed creature has numerous interesting functions in the forest, we here in this short space shall restrict our observations and comments to the curious relationship of the ant and several bromeliads. As a postscript, the author will describe his Latin American experience in actually witnessing the ant and its explosively violent defense of the Ant Acacia tree. The tropical ant has two small groups of collaborating bromeliads: one, a cluster consisting of several tillandsias, and the other, a few aechmeas.

The ant chews a small opening in the bulbous base of the tillandsia and moves in the chamber conveniently ample for storing food, resting, breeding, and raising young. It does not harm to the tissue of its host. Common it is to observe more than one kind of ant occupying the plant, each living in harmony but in separate sections. Also of benefit to the ant are the protection from predators the hardy tillandsia tissue structure furnishes, and the dry shelter from the severe rain storms, moisture and cold temperatures. On the other hand, the ant, in return for these benefits, not only provides nutritional supplements (from excrement of the colony and minerals from decayed insect victims) to the tillandsia but also furnishes physical protection from plant-eating insects such as the caterpillar, the worm, and the beetle. This is truly a partnership to excite the curiosity.

In the case of a few aechmeas such as *Aechmea mertensii* and *A. brevicollis*, it appears that they frequent the site of the ant next in the ground floor of the forest and in the high canopy. One possible explanation for this rather odd teaming-up of a few select aechmeas and the ant-nest inhabitant is the fact that ants collect seeds of these aechmeas and carry them to their nest with the result that some of these seeds are not actually eaten by the ant but later germinate sending their roots deep into the nest securing permanent residency for the aechmea. In this cooperative setting, the bromeliad consumes nutrition from the nest and the ant benefits by having the large plant and its roots as a protective cover for its nest. This is a curious episode of the mysterious jungle and is unseen by the casual observer.

In the jungles of Costa Rica, the author actually witnessed another remarkable event of plant-ant united effort between a diminutive ant and the typical Ant Acacia tree. The very tiny ant bores a hole in the base of the acacia's sharp thorn on the branches and moves in as a permanent guest. The branches are literally covered with these menacing spikes. The ant is drawn to the acacia to feed upon a nutritional fluid the tree provides. In return for this favor, the ant assumes the role of a permanent guardian and is very efficient in its performance as such. If a branch is ever so lightly touched or disturbed, the guardian ants burst forth from the thorns by the thousands and with the shocking speed of lightning literally cover a hand or leg and inflict devastating pain to the intruder. They not only have a stinging bite but they cling to the skin. If a growing vine approaches the tree or if a seedling sprouts nearby, the ants attack savagely and devour the culprit. All vegetation is eliminated from the area surrounding the tree thus assuring it good air circulation, adequate light and sunshine. It is a common sight to observe an acacia tree in the thick forest residing all by itself in a small clearing with no trace of vegetation nearby. This acacia oddity and the rarity of the plant-ant mutual cooperation are pictures of nature at its fascinating best.

Reprinted from the San Diego Bromeliad Society Newsletter, July 1989.

Questions & Answers

Conducted by Derek Butcher

Beginning with this issue, "Questions & Answers" will be conducted by Derek Butcher of Adelaide, South Australia. Derek's success in growing bromeliads in the driest state in the driest continent is the result of attention to the needs of the plants and persistence as he says "in finding the right ecological niche in my back yard." We welcome all questions and any comments that you wish to make—provided that they will mean the greater appreciation of our plants.

Q. How do you grow puyas?

A. The first part of the problem has to do with obtaining offsets or seeds since the genus lacks the general eye-appeal of other genera. Still, the plants are cultivated and seed may be available occasionally from various seed banks and collectors.¹ Some puyas have magnificent flowers and are worth growing but can be daunting because of their well-armed leaves and penchant for offsetting. The offsetting and sprawl can be held in check by potting in tubs. Many of the larger species will flower despite this restriction.

I have found that *Puya raimondii* is easy to grow from seed. Perhaps it has the wrong name on it but I won't be able to check for some years to come. My plants, however, have not formed offsets and that is a good sign.

The larger puyas seem easier to grow from seed than the smaller species. Just as an example, I found the seeds of *Puya depauperata* and *P. mitis* very difficult to germinate despite having tried many methods at different times of the year. This seems a pity because these species could be grown to maturity in a 5"-6" pot. There are many more puyas of similar size if we have read the botanical descriptions correctly.

Puya mirabilis is a favourite in Australia because it is not a large plant at first flowering. It can be planted outside in rockeries or in pot culture and takes full sun. It even makes a great hanging basket subject with its many pendant leaves completely hiding the pot. The problem starts when it produces its erect 3-foot flower spike. The lime green flower reminds one so much of a lily.

Remember that puyas are terrestrial and can be grown outside in a rockery if you have plenty of space. They will reward you by growing faster and flowering earlier. If you want to resort to pot culture, use a good commercial general potting mixture.

Don't throw away spare seedlings of the rarer kinds but offer them to your local botanic garden. The Adelaide Botanic Garden now has a wide range of puyas thanks to my spares and, of course, they have more space than I.

1. For example, the BSI Seed Fund, 3927 Michigan Circle, Shreveport, LA 71109; the Bromeliad Society of Australia Seed Bank, c/o Mrs. Olwen Ferris, Bromeliad Display Garden, 148 Oxley Dr., Paradise Point, 4216 Queensland, Australia; and Karel Knize, P.O. Box 10248, Lima 1, Peru.

Q. I have trouble understanding the technical terms used in the *Journal*. Can you help me?

A. Technical terms are, I am sorry to say, a necessity if you want to describe exactly what you mean. These terms will be strange to newcomers but, be assured, practice makes perfect. Write down the terms you don't know. Speak to others about them. Why not purchase *A Bromeliad Glossary* from the Publications Sales Committee (see ad). If you are really keen, then purchase, borrow, or scrounge, *Botanical Latin*, by W.T. Stearn. It is the indispensable guide for the serious grower. Ask for it at your local book store or write to the editor for information.

Q. What do I do if I see a trail of ants winding its way to one of my prize plants?

A. Nothing. Just stand and watch for a moment. In their natural environment, bromeliads learn to live with the various insects, winning some battles and losing others but mainly winning. Some bromeliads live in a symbiotic relationship with insects such as ants, where both plant and insect get some mutual benefit and depend on each other to a certain extent.

In our own gardens, we have our own breeds of insects. Some are good and some bad, but in many cases they would have never seen a bromeliad before. So there is no need to be violent and insecticidal just because of a trail of ants.

I believe there are three main reasons why ants may be behaving toward bromeliads in this manner. (1) They are thirsty and hungry, and have sought out a supply of nectar. Let them have their share but when they become too adventuresome and remove stamens and styles or chew holes in the sides of the flowers for easy access I will allow you to be annoyed. (2) They get that reproductive feeling and want to make a nest. Not what you would really want especially if they are the type that demand territorial rights. Not what you would really want if they take over the bottom half of the pot and remove all soil mixture leaving you wondering why moisture does not stay in the pot. (3) They want to take up husbandry and farm aphids and the like. This evidence may include mealybugs and some forms of scale, but I am not sure why ants would want to protect them.

Now that you have stood and pondered and have made that decision, remember that prevention is better than cure. Use any proprietary brand of Ant Rid or just discourage the ants. I would not recommend dousing the whole plant in doubtful chemicals. Since you now know many of the conditions, I shall leave the solution up to you.

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

	Rates ¹	One Issue	Six Issues
ALL ADVERTISING	Full Page	\$125.00	\$625.00 ²
PREPAID.	1/2 Page	70.00	350.00 ²
Advertisers to provide any art work desired.	1/4 Page	45.00	220.00 ²
	1/8 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.

Bromeliad Society, Inc. SEEDS For Sale, Purchase, Trade

HARVEY C. BELTZ
SEED FUND CHAIRMAN
3927 Michigan Circle
Shreveport, LA 71109
(318) 635-4980

(Send stamped, addressed envelope for listing of available seeds.)

SADDLEBACK VALLEY BROMELIAD SOCIETY PLANT SHOW & SALE

August 18-19
Saturday, 12:00-5:00 P.M.
Sunday, 10:00 A.M.-4:00 P.M.

San Juan Elementary School
31642 El Camino Real
San Juan Capistrano, CA

Contact: Grace Barnes (714) 581-7314



Bird Rock Tropicals

Specializing in Tillandsias

6523 EL CAMINO REAL
CARLSBAD, CA 92009
(619) 438-9393

Send SASE for price list

BACK ISSUES OF BULLETIN AND JOURNAL

Still available: original & complete *Bulletin* volumes 1-3 (1951-1953) and selected numbers of vol. 4-8; also all *Journal* volumes 33-current (1983-).

Write to the editor for details:
1508 Lake Shore Drive
Orlando, FL 32803 USA
407-896-3722

BROMELIAD BOOKS

41 Titles Available
Send for free catalog

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

The perfect companion plants
African Violets, Episcias & other gesneriads

Gesneriad Society International

Mail \$13.25 annual dues to:
GSI Membership Coordinator
2119 Pile
Clovis, NM 88101 U.S.A.
payable in U.S. funds

**MEXICAN TILLANDSIAS,
ORCHIDS, CYCADS, CACTI,
SUCCULENTS AND SEEDS:
(WHOLESALE ONLY)**

QUALITY CACTUS

P.O. Box 319
Alamo, TX 78516 U.S.A.
Tel. 1-800-237-5326 Telex 621-97610
Tel. (512) 464-2357; send for free List



Tillandsias *our Specialty*

P.O. Box 15283
Plantation, FL 33318
(305) 584-7590

Send S.A.S.E. for price list

INTERESTED IN A SHADY DEAL?

Shade vegetables and ornamentals with SHADE CLOTH.
Custom fabricated with reinforced binding and brass
grommets.

Write or call collect
(404) 778-8654
8:00 a.m. to 4:00 p.m. EST weekdays.

FREE informational kit.

Yonah Manufacturing Company
P.O. Box 280BSJ
Cornelia, GA 30531

MASTERCARD. VISA.

Member of the Bromeliad Society

THINKING OF A HOT NEW ITEM?

...Think of Air Plants (Tillandsias)

- * Air Plants are most suited for live arrangements ! Plants are beautiful ! Versatile ! Sturdy and long living !
- * Neither soil nor water is required to make your arrangements...
- * All Plants are Nursery grown !
- * Low, low prices and volume discounts !
- * Extraordinary high profit potential !
- * Quick air deliveries to anywhere !

Please: telex, fax or phone. We will be most happy to hear from you !

 **Bromelifolia**
Tillandsias... Our Speciality !

P.O. Box 165 "A" / Guatemala City / Central America
TELEX: 5450 BROMEL-GU Fax: (5022) 313907
Tels.: 314195, 347166, 313907

Tropiflora



Quality Bromeliads

- Collectors
- Growers
- Importers
- Exporters

— Since 1976 —
Wholesale & Retail
Tillandsias our Specialty
SASE for Price List

3530 Tallevast Road
 Sarasota, Florida 34243
 (813) 351-2267

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

NEW 64-PAGE
COLOR CATALOG
\$5 145 PLANTS
 IN GLORIOUS
 FULL COLOR

or 3 first-class stamps for list



Cryptanthus
 and other bromeliads

SOUTHERN EXPOSURE

35 MINOR AT RUSK • BEAUMONT, TX 77702 USA
 (409) 835-0644 FAX (409) 835-5265



OSCAR E. ALLEN

Purveyor of
 high quality seed-grown
 Bromeliads

1990 SPECIALS

DIFFERENT BROMELIADS	PRICE	SHIPPING
10	20.00...	5.00
20	35.00...	7.50
30	45.00...	10.00

I'll provide a good mix of up to 8 species

BROMELIAD SOCIETIES

Plants for society sales and plant tables —
 I'll provide a good mix of up to 8 species.
 40 plants 50.00 15.00 shipping
 Please see 1990 Price List for
 shipping details

For 1990 Price List - please send **SASE**

P.O. Box 20683 Oakland, CA 94620-0683

Since 1978

COLIN'S NURSERY, INC. CRYPTANTHUS ONLY

12,000 square feet of greenhouses
 with over 200 of the best varieties.

Call (407) 886-2982 and come visit us at
 448 N. LK. PLEASANT RD.
 APOPKA, FL 32712

You will be glad you did!

Mail orders welcome.

S.A.S.E. will bring a descriptive price list.

Michael's Bromeliads

Providing an outstanding selection
 of quality Bromeliads at
 reasonable prices.

Many Coolbaugh & Skotak
 Neoregelia hybrids.

Order by mail, or contact for appointment.
 Send stamp for price list.

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



TILLANDSIA SPECIALISTS

43714 Road 415 • Coarsegold, CA 93614

(209) 683-7097

FAX (209) 658-8847

**North America's
 Largest Inventory
 Over 2 Million
 Plants in Stock.**

Send S.A.S.E. for New Price List
 Wholesale Only

TREEBORNE GARDENS



GRAPEVINE
 AND
 MANZANITA
 CRAFTWOOD

916-944-2761

BOX 872

CARMICHAEL, CA 95609-0872

Holladay Jungle

For the Finest in Tillandsias

Call Barbara
 We Ship Everywhere

P.O. Box 5727, Dept. Q
 Fresno, CA 93755

(209) 229-9858

Bromeliad Society, Inc. Publications

<i>A Bromeliad Glossary</i>	\$ 3.60
<i>Bromeliads by Walter Richter</i>	3.60
<i>Colorful Bromeliads by Victoria Padilla</i>	13.50
<i>A Cultural Handbook</i>	3.60
<i>Handbook for Judges Rev. ed.</i>	\$2.50 postage plus 20.00
<i>Binder for The Journal</i>	7.50
(holds two volumes, 2 years)	

Quantity prices are available on request. All prices include postage. Send checks (international customers please use international money orders) payable to the Bromeliad Society, Inc., to:

Robert Soppe, BSI Publications, 709 E. Sheridan, Newberg, Oregon 97132, USA

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

Largest Tillandsia Nursery in the U.S.

- Overall Lowest Prices
- 98% of Species Are 2nd Generation Plants
- Many New Hybrids Now Available

Providing Quality Plants Since 1974



Send S.A.S.E.
latest Price List.

**Rainforest
Flora
Inc.**

Wholesale distributors of exotic plants and related products

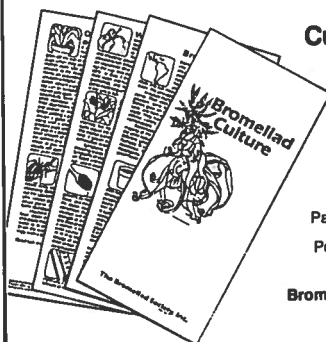
1927 W. Rosecrans Ave.
Gardena, CA 90249
(213) 515-5200

Tillandsias From Guatemala

(Retail & Wholesale)

Arthur Boe Distributor
P.O. Box 6655
New Orleans, LA 70114

Enclose stamped, self-addressed envelope for flyer.



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

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

"Schultz-Instant" LIQUID PLANT FOOD

EASY DIRECTIONS
"7 drops per quart water
Every time you water,
Every thing you grow."



"Schultz-Instant" Fertilizer

EASY DIRECTIONS
"1/4 teasp. per gal. water
Every time you water,
Every thing you grow."



Available at leading Garden Centers and Plant Departments.
Garden Clubs. SEND FOR OUR FUND RAISING OFFER
Schultz Co. 11730 Northline, St. Louis, MO 63043

NEW ADDRESS:

14090 Riverport Drive
P. O. Box 173
Maryland Heights, MO 63040



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

BRAZIL

June 11-21, 1990

post-conference bromeliad collecting and photographic tour with American guide Daniel Morris-Brewer. Please contact us for free information outlining this and other available tours.



Fiestatur
botanical tours division

Rua da Quitanda 19/207
Rio de Janeiro, Brazil 20011

Telex 21-36879 FAVT

FAX 242-3866

Phone (5521) 252-2114



braziliana

orchids and bromeliads limited

WHOLESALE / RETAIL

TILLANDSIAS AND VRIESEAS
are our specialty.

Send SASE for new 1990 price list.
Please specify Wholesale or Retail

Send SASE to:
av henrique valadares 17 cob. 1
rio de janeiro, r.j. brazil 20231
FAX (5521) 242-3866

BRAZILIAN ORCHIDS AND BROMELIADS

Nursery-Grown Plants

Our CATALOG NO. 83 offers approximately 3,000 different orchids and bromeliads and contains more than 400 illustrations (in color). The catalog also offers seeds of orchids, bromeliads, philodendrons, palms, and other greenhouse plants.

If you are interested in receiving a copy, please send us U.S. \$5.00 cash for airmail expenses (for postage only). We have received many checks WITHOUT FUNDS. We no longer accept payment by checks for catalogs.

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 registered air 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.

20 different orchid species	US \$ 50.00
35 different orchid species	US \$102.00
60 different orchid species	US \$182.00
100 different orchid species	US \$378.00
20 different bromeliad species	US \$ 35.00
35 different bromeliad species	US \$ 66.00
60 different bromeliad species	US \$148.00
100 different bromeliad species	US \$320.00

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

Founder: Roberto Seidel, 1906

Rua (Street) Roberto Seidel, 1981

Telex 474 211 ORKI BR

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.

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 or 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
- ☐ Fellowship United States 35.00
- ☐ Fellowship International 40.00
- ☐ 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 about 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.

_____ Money Order _____



R. Spivey

Richard Spivey won the Mulford B. Foster award for horticultural excellence at the 1989 Shreveport [Louisiana] Regional Bromeliad Society show with his beautifully marked and perfectly shaped *Vriesea fenestralis*. Information about this and other prize-winning bromeliads begins on page 169.

Calendar of Shows

- | | |
|-----------------|---|
| 4 - 5 August | South Bay Bromeliad Associates 23rd Annual Bromeliad Show and Sale. South Coast Botanic Garden, 26300 South Crenshaw Blvd., Palos Verdes Peninsula, CA. Saturday, noon to 4:30 p.m.; Sunday 10 a.m. to 4:30 p.m. Plant sales both days 10 a.m. to 4:30 p.m. Admission to gardens: regular—\$3.00, students & seniors—\$1.50. Philip Fetchko 213-664-6164. |
| 18 August | Seminole Bromeliad Society 4th Annual Show and Sale. Earl Brown Park, Activity Center on Alabama St. and Beresford, DeLand, FL. Saturday, 9 a.m. to 5 p.m. Charles Tait, Jr. 904-789-1052. |
| 18 - 19 August | Saddleback Valley Bromeliad Society Judged Show and Plant Sale. San Juan Elementary School, 31642 El Camino Real, San Juan Capistrano, CA. Saturday, noon to 5:00 P.M.; Sunday, 10:00 a.m. to 4:00 p.m. Grace Barnes, 714-581-7314. |
| 8 September | Southwest Bromeliad Guild Semiannual Meeting. 2 p.m. Tulsa Garden Center, 2435 S. Peoria, Tulsa, OK. |
| 8 - 9 September | Sooner State Bromeliad Study Group Show and Sale. Tulsa Garden Center, 2435 S. Peoria, Tulsa, OK. Georgia Waggoner 918-733-4602. |
| 11 - 14 October | Sarasota Bromeliad Society Annual Show and Sale. Selby Botanical Gardens, 811 South Palm Ave., Sarasota, FL. Plant entries, 11 Oct.; judging 12 Oct.; Show and sale: Saturday, 10 a.m. to 5 p.m.; Sunday, 10 a.m. to 4 p.m. George M. Cooley, 813-924-8545. |