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Cover photographs. Front: *Aechmea haltonii* flowering at the Marie Selby Botanical Gardens. The text by Harry Luther is on page 52. Back: *Hohenbergia andina*. The text is on page 64. Photographs by Vern Sawyer for Selby Gardens.

CONTENTS

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Notice of Annual Meetings, Call for Budget and Other Business Items

You are hereby notified that the **annual general meeting** will be held in San Diego, California, at the Hanalei Hotel at 9:00 a.m. on June 15, 1994 to consider such business as may be brought to the attention of the Board of Directors. All business matters must be sent in writing to the president at least 60 days before the meeting (Bylaws, Art. VII, part 2).

The **annual meeting of the Board of Directors** will be held immediately after the general meeting. The following schedule applies:

1) 90 days before the meeting: Officers, other directors, and committee chairmen shall send budget requirements and financial accounting to the treasurer. (Standing Rules 3 and 6).

2) 30 days before the meetings: Officers, other directors, and committee chairmen shall submit annual reports to the president and send copies to each officer and director. (Standing Rules 3 and 6).

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

Chairmen of the standing committees are elected by the Board of Directors. Nominations may be made by any member of the society in writing at least 30 days before the annual meeting. Nominations may also be made from the floor. You are invited to take part in this very important function by nominating for any committee chairmanship anyone you have found to be qualified, capable, and willing to serve.

Odean Head, President
7818 Braes Meadow
Houston, Texas 77071, U.S.A.

Misnamed Bromeliads, No. 14: *Aechmea haltonii*

Harry E. Luther

Aechmea haltonii Luther had the misfortune of being introduced into horticulture under the wrong name. In the fall of 1987, seedlings of *A. haltonii* (grown from the type collection) were distributed to judges and helpers at the Sarasota Bromeliad Society show as *A. pittieri,* a totally dissimilar aechmea. It was not until 1990 that I realized how badly I had misinterpreted the original specimen and that I had a rather distinctive, new species on my hands. A description and illustration were eventually published,[1] but this did little to solve the problem of all the now-mature *A. haltonii* (labeled *A. pittieri*) specimens proliferating in collections and being sold and traded around the world. I hope that this note and photograph will clear up the identification problem.

Vern Sawyer for Selby Gardens

Figure 1.
A closer view of a branch of the inflorescence of *Aechmea haltonii.*

Aechmea haltonii is a colorful, medium-to-large, epiphytic and lithophytic plant known from two collections in central Panama. Culture suitable for such species as *A. bracteata* or *A. mexicana* is required.

The name honors the original collector, the late Joe Halton of Sarasota, Florida, the first Display Greenhouse manager at the Marie Selby Botanical Gardens.

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

[1] H.E. Luther, Two new species of *Aechmea* (Bromeliaceae). PHYTOLOGIA 71:382–386; 1991.

Chevaliera (Aechmea) strobilacea, A Monumental Species from Ecuador

Elvira Gross **Illustrations by the author**

Chevaliera strobilacea L.B. Smith[1] was found by Asplund in 1956 in the region of Vera Cruz, Province of Pastaza, Ecuador, at an altitude of 900 m. It was described by Dr. Lyman Smith in 1959.[2] This material, deposited in the herbaria of Stockholm and Washington, D.C., has been the only proof of this species until recently when several collections were made south to the Province of Morona-Santiago.

In March 1992, in the Botanical Garden of the University of Heidelberg, a very large plant began to develop an inflorescence. We were very curious to learn what species it might be. When the first flowers became visible, we determined that this plant was *Chevaliera strobilacea.*

But it was not found in exactly the same region in which Asplund collected his plant. Professor Dr. Werner Rauh (Heidelberg) found this specimen further

Figure 2.
Chevaliera strobilacea.
The inflorescence becomes elongated as the peak of flowering approaches. In the left background, an offshoot.

east when he visited the Aucas in Ecuador in 1975. The Aucas are an isolated Indian tribe. They live in a region extending from Fort Curaray to Cononaco and almost to Limonocha, an area in the tropical rain forest that encloses the border between the departments of Pastaza and Napo. Not many people have visited this district because the Indians are said to be dreaded headhunters.

Now, 17 years later, the plant was beginning to flower for the first time. The diagnosis by L.B. Smith can be emended as follows.

***Chevaliera strobilacea* (L.B. Smith) Smith & Kress, emend. E. Gross**
(Basionym: *Aechmea strobilacea* (L.B. Smith).

Plant stemless, 1.5–2 m high, propagating by offshoots. *Leaves* rosulate, coriaceous, erect, with recurved apices. *Sheaths* elliptic, ± 10 cm high, brown on both sides. *Blades* up to 2.5 m long, above the sheath 7 cm wide, strongly channeled in the basal part (figure 3, left), in the apical part flat, linear-ligulate, with a cusp 3 cm long, pungent, not channeled (figure 3, right), lepidote on both sides, at the base dark brown lepidote, to the apex gray lepidote more so abaxially than adaxially; teeth at the margins in the basal part of the blade laxly arranged,

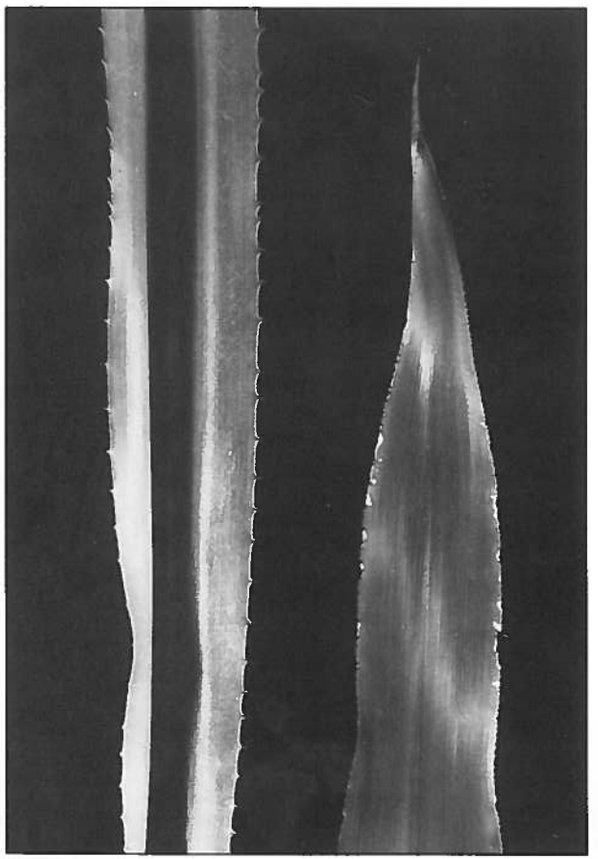


Figure 3.
Details of the leaf blade: The strongly channeled basal section (left); the flat, linear- lingulate upper portion with sharply pointed tip (right).

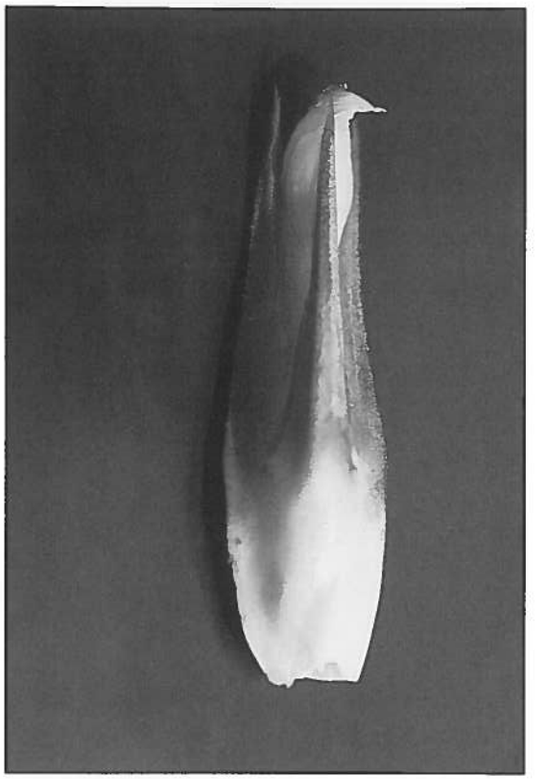


Fig. 4.
Flower with pungent, posterior-winged sepals.

± horizontally spreading, light brown, 3 mm long, in the upper part of the blade very densely antrorse serrulate (figure 3). *Scape* erect, stout, up to 25 cm long and 4 cm thick. *Scape bracts* subfoliate, densely imbricate, with light brown sheaths, blades ligulate, acuminate, with a pungent cusp, abaxially densely gray lepidote, adaxially laxly lepidote to glabrous, green, densely antrorse, serrulate at the margin, the bracts becoming smaller toward the inflorescence, reddish tinged and gradually resembling the floral bracts. *Inflorescence* simple, strobilate, cylindric, 15 cm long, 15 cm wide; in the early flowering state flattened, elongating as anthesis proceeds (figure 2). *Flowers* very numerous, arranged in a dense spiral, 5.5 cm long, sessile. *Floral bracts* coarse, triangular-acuminate, 6 cm long, at the base 3 cm wide, red, with reflexed tips, abaxially brown, adaxially gray lepidote, densely serrulate, sheath ferruginous on both sides, abaxially glabrous, nerved. *Sepals* short connate, asymmetrical, triangular-acuminate, pungent, 3–3.5cm long, hyaline margined, red, in the middle part densely brown or gray lepidote, coriaceous, succulent at the base, the posterior ones carinate, nearly winged, the wings continuous on the ovary (figure 4). *Petals* erect, not opening, tips somewhat spirally twisted, 4 cm long, yellow, fleshy, loosely joined at 1 cm in height, at the base becoming narrower and in the gaps the filaments are visible, 1 cm above the base petal folds arise with lobe-like protuberances (figure 5). *Stamens* and style included. *Filaments* adnate to the petals, light yellow, *anthers* 1 cm

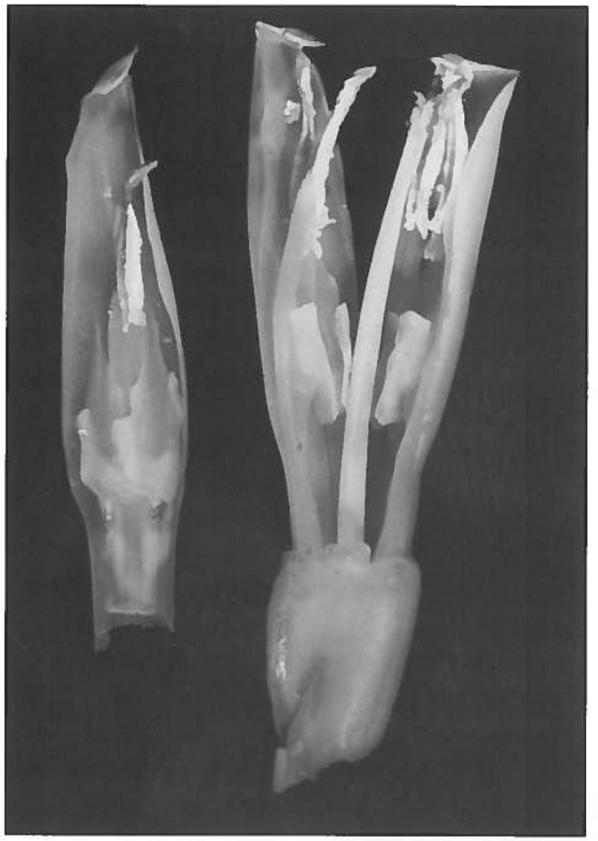


Fig. 5.
Flower with one petal (left) separated to show the lobe-like folds; (right) the stamens and style are evident.

long, light yellow. *Style* shorter than the stamens, the branches of the stigma somewhat spirally turned and forming a papillous stigma head. Ovary 1.5 cm high, epigynous tube conspicuous. Ovules few, obtuse.

Collection number: Rauh 37 867 (July 1975), in Herb. Inst. System. Bot. Univ. Heidelberg (HEID).

Locality: Terrestrial, growing in the tropical rain forest, Auca region, Province of Pastaza, Ecuador.

The plant produces offshoots just before flowering on rhizomes that are very thick and up to 50 cm long. As a result, the offsets are quite large when the inflorescence arises (figure 2, left in the background). It is also interesting that the root system is relatively small in spite of the size of the plant. The spectacular inflorescence is not fully developed when the first flowers appear. The nearly disc-like inflorescence elongates to a short-cylindric strobile so that the fresh, receptive flowers are always at the top (figure 2). Nothing is known, unfortunately, about the pollination of the flowers. They may be self-fertile since they do not open. Another astonishing feature is the petal folds, which have lobe-

like protuberances. These are really folds because they continue on the petals and are not free in the upper part like scales (figure 5, left). The (sub-) genus *Chevaliera* is characterized by the reduction or lack of petal scales.

Institut für Systematische Botanik und Pflanzengeographie
Ruprecht-Karls Universität, Heidelberg

NOTES:

1. The subgenera of *Aechmea* were erected or restored into genera in 1989 by L.B. Smith and W. John Kress (PHYTOLOGIA 66/1:70–79). In compliance with that paper *Aechmea strobilacea,* which belongs in the subgenus *Chevaliera,* must be named *Chevaliera strobilacea.* (H.E. Luther adds to this statement: There is no consensus to accept these segregate "genera" at this time although some of the members of *Chevaliera* should probably be excised from *Aechmea.*)

2. PHYTOLOGIA 6:435; 1959.

HAPPY BIRTHDAY

On March 13, 1994, our honorary member of the Seminole Bromeliad Society will be celebrating her 106th birthday. To this very day she keeps articles about bromeliads and any news about our membership close at hand. Her age changes but her interest in bromeliads remains constant. She is truly a remarkable woman and we are proud to have her as a member of the Seminole Bromeliad Society. Cards and any correspondence bring her great joy. Her address remains as follows:

Mrs. Ella Kelley
DeLand Convalescent Center
451 S. Amelia Avenue
DeLand, Florida 32724

Jeanne A. Tait
1442 Elkcam Blvd., Deltona, FL 32725

THANK YOU

The Hawai'i Bromeliad Society members recently sent in a $200 contribution to the JOURNAL Color Fund. We thank them for their support and generous gift.—TUL

Book Review

Bromeliads in the Brazilian Wilderness

Text by Elton M.C. Leme, photography by Luiz Claudio Marigo. Publisher: Marigo Communicação Visual, Rio de Janeiro, 1993. 29 x 23cm (11.5" x 9"), hardbound, 184 pages, 210 col. photographs, 2 drawings in color, 7 maps. Preface by Roberto Burle Marx, alphabetical list of 209 binomials and authors, glossary, bibliography, index. Price: US $65.00 (US $60.00 for BSI members) plus shipping and handling:

	Registered surface mail	Registered airmail
United States	US $18.00	US $23.00
Europe	US $20.00	US $31.00
Australia, New Zealand	US $24.00	US $41.00

Order from: Luiz Claudio Marigo, Rua General Glicerio, 364 Apto. 604, 22245-120, Laranjeiras, Rio de Janeiro - RJ, Brazil. Tel: 55-21-285 4606; FAX 55-21-556-1832.

Elton Leme, the well-known specialist in the taxonomy of Brazilian bromeliads, has pursued his avocation in botany since 1978. He has searched for bromeliads in almost all areas of Brazil and developed an extensive private collection for study. In addition to publishing a large number of reports, he is an outspoken advocate of conservation and a promoter of research.

For his part, Luiz Claudio Marigo, an internationally recognized photographer of nature, has travelled extensively with Sr. Leme to observe, collect, and photograph bromeliads. The evidence provided by his work is both artistically and technically superior. These are not posed studio portraits but evidence of bromeliads as part of ecosystems.

As Roberto Burle Marx explains in his preface, the overall purpose of this work is to increase knowledge with the hope that attention to the need for conservation will result in action.

The text, in English, is stated in clear, formal language. It begins with a discussion of bromeliad characteristics and progresses through analyses of bromeliads native to six regions: the Atlantic rain forest, high-altitude grasslands, sandy coastal plains, grasslands of rocky soils, caatinga, and Amazonia. Other communities, including mangrove swamps and the Pantanal region of swamps and marshland of the southern Matto Grosso state, are omitted because those bromeliad populations are small.

Two additional chapters discuss the fauna associated with bromeliads and man's relationships with this plant family. The latter chapter mentions the names and accomplishments of the most eminent bromeliad specialists. It includes also a brief essay on man's destructive effects on Nature.

It would be fruitless to attempt to compare this work with Lyman Smith's The Bromeliaceae of Brazil, published in 1955, his monograph (1974–1979), or with Fr. Raulino Reitz's Bromeliáceas even if we could disregard the extensive changes in groups and nomenclature that have been made over the years. Those landmark works were systematic arrangements based on classical taxonomy. This book is derived from those great studies, but it emphasizes the relationship of plants and environment. For that reason also it is significantly different from the many books reviewed here during the past ten years.

The fortunate collaboration of author and photographer has produced a detailed view of selected bromeliads in the wild presented in Elton's words as, "a real-life triangle...through information, photographer, and Nature to approach bromeliads as dynamically living beings." The result is that interested readers will be able to understand and appreciate better these Brazilian natives and their habitats. Stated another way: this book is the next best experience to having a personally guided tour.

We hope that some way will be found to improve the international distribution of the book since the postal rates required to insure reliable delivery are intimidating. Nevertheless, we heartily recommend this book to bromeliad enthusiasts, and to public and scientific libraries.—TUL

CORRECTION

Volume 44, no. 1, page 14. Figure 10 caption should read *Guzmania* instead of *Quesnelia*. The photograph should have been credited to Harvey C. Beltz instead of Bob Spivey.

Bromeliad Rock Gardens

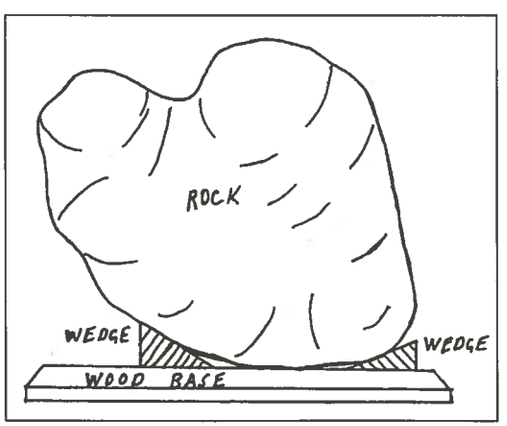
Tom Koerber **Illustrations by the author**

Many species of bromeliads are found growing on rocks in their native environments. In the Andes of South America and the mountains of central and southern Mexico, entire mountainsides are covered with bromeliads. The saxicolous habit of those plants gives us the opportunity to create rock gardens consisting of one or several bromeliads growing on a single rock.

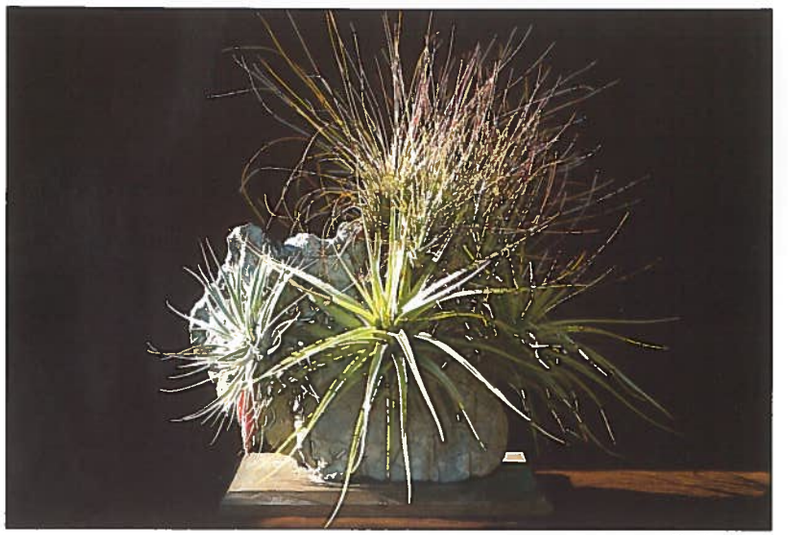
The almost infinite combinations of color, shape, and texture of natural stone offer a fine outlet for artistic expression in selecting combinations of plants and rocks. The first step in creating a rock garden is to chose a suitable rock. I like to use rock that has weathered for a few thousand years in a harsh environment. The pitted, fissured surface of such material provides both interesting textures and favorable environment for bromeliad roots.

Sedimentary rocks such as sandstone, limestone, and shale are comparatively soft, an important consideration if you are planning to cut or shape the material. They come in a wide range of white, gray, brown, and red. Since they were originally deposited in horizontal layers, they will split readily into blocks or plates with at least one flat side. Volcanic rocks are harder and more difficult to shape or cut but are often found in blocks or slabs. Some are porous, providing an excellent rooting medium. The usual colors are black, gray, brown, and red. Granitic and metamorphic rocks are even harder and usually provide a less favorable rooting surface. They are found in a wide range of color and texture.

The mountains and deserts of the southwestern United States are liberally paved with nicely weathered stone of every texture and color. I enjoy searching for just the right stone to set off a favorite plant. On most public land, collecting a few nice rocks is entirely legal. Most state and national parks, however, have regulations forbidding the removal of natural objects. It is always advisable to be informed of the regulations in force at the place where you would like to collect.



If you don't enjoy hiking across a desert with a knapsack full of rocks, or if you don't have a mountain handy, I recommend you find a dealer in masonry supplies and landscaping materials. He may have various types of stone for sale.



T. Koerber

Figure 6.
Tillandsia velickiana, T. juncea, and *T.concolor*
shown mounted on limestone

T. Koerber

Figure 7.
Vriesea corcovadensis growing on lava rock
with a mat of living moss.

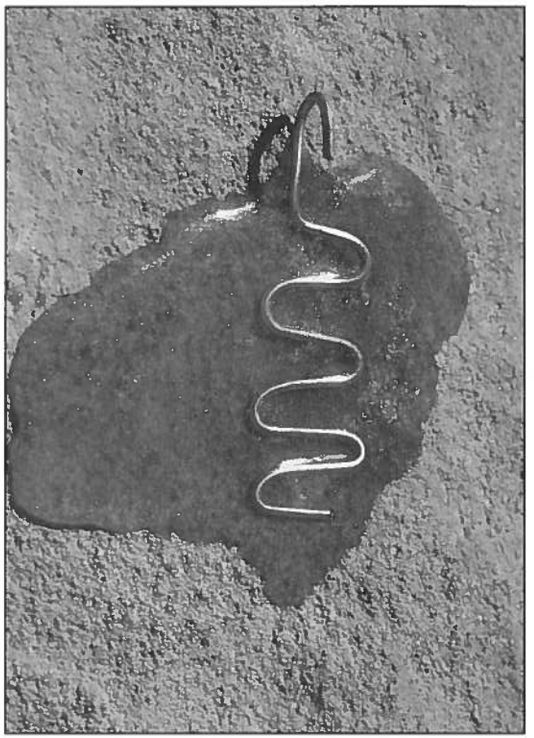


Figure 8.

On the other hand, trying to buy a nice rock sometimes presents another kind of problem. The dealer who just quoted a price of $477 per ton may not be pleased to hear that you need only one nine-pound rock.

Having selected the rock, the next step is to decide how to position it. Common rocks weigh about 175 pounds per cubic foot. If the rock garden falls or tips over it will turn prized plants into compost in the blink of an eye so it is very important to have a stable base. If your rock has a flat side, use it at the bottom. You may have to chip or grind to remove high spots. An irregularly shaped rock can be fastened to a flat rock or a board with epoxy cement using wedges to hold it in the desired position.

If you plan to exhibit the garden on a table, use a cork or felt pad to protect the table top. A thin slab of stone can be hung on a wall by means of a hook. The hook may be inserted into a hole drilled with a masonry bit and secured with epoxy. On hard rock the wire is bent into a series of loops and attached with epoxy cement (figure 8).

Finally, select plants. If several species are used, they must have the same habitat requirements (figure 6). Mesophytic and xerophytic species will not grow well together. The size and form of the mature plants are important considerations. You could grow a large plant on a small rock but it would look funny. I like to combine rocks and plants of contrasting colors. Silver-leafed tillandsias look especially good on dark rock. Green leaves look nice against red or brown rock.

Use contact cement to attach the plants. Soft, plastic-coated aluminum wire will hold the plants in the desired position until the cement hardens. A few shreds of dried moss may be used to cover the attachment point. With proper care, the plants will send out abundant roots that soon attach firmly to the rock. Porous sandstone and volcanic rock surfaces are especially favorable to extensive root development.

I have found rock gardens an ideal solution to growing bromeliads in windy locations. My second-floor-level deck has the bright light and good air

movement that hard-leafed tillandsias love. A large pine tree provides protection from noonday sun. Night and morning fog drifting in from San Franscisco Bay presents excessive drying. When a storm roars in off the north Pacific, however, and the wind gets up to 35 or 40 miles an hour, potted plants are treated like chaff in a threshing machine. But plants rooted on a 20-pound rock stay right where I put them and give every indication of enjoying the weather.

In a greenhouse with daily misting, small vrieseas, neoregelias, and mesic tillandsias grow very well on blocks of stone that also support a mat of living moss (figure 7). The moss never dries out completely and a dense network of tough bromeliad roots helps hold the moss in place.

Rock gardens offer an attractive alternative to the usual ways of growing bromeliads. Any species normally mounted on cork or driftwood will do well on stone. Many small species normally grown in pots are also good rock garden candidates.

P.O. Box 922
Berkeley, California 94701

MEDICAL REPORT

Thank you for your kind expressions of support and goodwill during my recent encounter with medical problems. The cardiologist and surgeon are happy with the results of their work. I feel fine and have resumed the march.—TUL

Calendar *[continued from back cover]*

6–8 May	Bromeliad Society of Central Florida 19th Annual Show & Sale. Florida Mall, Sand Lake Rd. (S.R. 482) and S. Orange Blossom Trail (U.S. 17-92-441), Orlando, Florida. Friday and Saturday, 10 a.m.–9 p.m.; Sunday, noon–6 p.m. the public is invited to enter plants for display or competition. Plant entries Thursday, May 5, 9–11 p.m. through Mall north entrance. BSCF members only may bring plants for sale. Bud Martin, 407-321-0838; 1405 Pine Way, Sanford, FL.
14–15 May	Houston Bromeliad Society Show and Plant Sale. Hermann Park, Houston, TX. Saturday plant sales, 9:30 a.m.–5:00 p.m.; show, 2:00 p.m.–5:00 p.m.; Sunday plant sales and show, 11:00 a.m.–4:00 p.m. Charlien Rose, 713-686-9969;4933 Weeping Willow, Houston, TX 77892.
15–19 June	San Diego World Bromeliad Conference. 1994, "Bromeliads in Paradise." Hanalei Hotel, 2270 Hotel Circle North, San Diego, California 92108. Please see pages 69–70 and 87 for activities and advertising. Joyce Brehm, 5080 Dawne St., San Diego, CA 92117, 619-277-1030.
27–28 August	Bromeliad Society of Greater Chicago 10th Annual Accredited Show and Sale. Chicago Botanic Gardens, Lake-Cook Rd. and Eden Expressway at Glenco. Len Dolatowski, 708-526-3693.

The deadline for articles, ads, calendar, and other notices for the May–June 1994 issue of the JOURNAL is 15 March 1994.

Introducing: *Hohenbergia andina*

Harry E. Luther

This article is the first of an irregular series to introduce to JOURNAL *readers species of bromeliads, both old and new, that are scarcely known in horticulture—HEL.*

Hohenbergia andina Betancur is a medium- to large, colorful species recently described[1] that deserves wide cultivation and, perhaps, additional study. Its surprising, disjunct distribution on the Pacific slopes of the Andes in Colombia is a continent away from its congenera, which are native to the West Indies, coastal Venezuela, and eastern Brazil. In form and structure it appears to have no near relatives in the genus *Hohenbergia.* It may be more closely related to the eastern Amazonian *Aechmea rodriguesiana* (L.B. Smith) L.B. Smith. The latter is very likely misplaced in the subgenus (genus?) *Chevaliera.* Such problems of relationships will not be solved overnight. They have little practical impact, fortunately, on the value of a species in horticulture.

The specimen of *Hohenbergia andina* illustrated on the back cover was received several years ago from Jean Merkel of Boynton Beach, Florida. It was obtained originally from Jaime Posado of Colomborquideas in Medellin, Colombia. The laxly spreading rosette of strongly serrate leaves attains a diameter of 0.7–1.0 meters. In flower, the plant is about 45 cm tall. The inflorescence is durable and lasts in good color for 2–3 months. Plants in cultivation at Selby Botanical Gardens have shown some distress (foliage curling and discoloration) when subjected to both low (less than 50° F or 10° C) and very high (greater than 90° F or 35° C) temperatures. The recorded distribution of this species, between 780 and 1000 m in elevation, suggests a requirement for greenhouse conditions in all but tropical, moist areas. I expect to have a plant available for the Bromeliad Identification Center benefit auction at the San Diego World Bromeliad Conference this coming June.

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

[1] Betancur, J. *Hohenbergia andina* (Bromeliaceae), nueva especie del noroccidente de Colombia. CALDASIA 16(79): 425–428; 1991.

Some Mexican Tillandsias

Jaromir Chvastek **Illustrations by the author**

Tillandsias in the Area of Mitla, Oaxaca

My first visit to Mexico was in December of 1987 at which time I gave most of my attention to studying cacti, which have been the essential part of my hobby for 27 years. I did, however, reserve a few days for tillandsias also. Those plants are well suited to fit in with European cacti collections and many growers in the Czech Republic are interested in them.

Mitla was the area I chose for my short trip devoted to tillandsias. Looking back, I realize how I underestimated the situation on that December day, although I was well aware that Oaxaca is sun country. That morning, I left the city of Oaxaca by bus for Mitla. The driver dropped me off in town near the famous archaeological site, which is near a mountain. I was travelling with my friend, Jarda Swak, but this day we had gone separate ways. I had not provided food or drink for myself with the result that the powerful, glowing sun quickly diminished my physical resources.

My first find was a tree covered with epiphytes—a large form of *Tillandsia schiedeana* and *T. atroviridipetala.* I climbed the mountain but the going was difficult, perhaps more so than on previous days. I found *T. fasciculata* and only one cluster of the popular *T. ionantha* f. *hasenub.*[1] Although I continued to search for other specimens, by two o'clock I had to return to find water. On the way back, I saw the same species I had seen earlier as well as a second cluster of *T. ionantha.* Because of the heat and my thirst, I was exhausted. That evening I met Jarda back at the hotel in Oaxaca. We were both very tired.

Five years later, in March, I returned to Mexico and also to Mitla. I wanted to overcome the failure of the previous trip. This time, together with three friends, we were able to find accommodations in Mitla and after a good breakfast, we began our search in nearby mountains. This time also, I separated from my companions and headed for some vertical rocks nearby. Along the way I could see many *Tillandsia atroviridipetala* always growing under the branches of shrubs. *Tillandsia dasyliriifolia* was plentiful in this area too. As I approached the rocks, I could see silver-colored patches, which through the telephoto lens turned out to be interesting-looking plants. They turned out to be the wonderful *T. mitlaensis* Weber & Ehlers (figure 9). I had to assume the role of mountaineer in order to study them closely. The difficulty in reaching them was well worth while. I observed a group of plants just coming into flower. The plants of this

[1] Probably *Tillandsia ionantha* var. *stricta* f. *fastigiata.* See JOURNAL July–August 1993, pages 160–164 for a discussion.

species are formed by a few, tough leaves about 10 to 14 cm long, densely covered with coarse, silver scales. The species is similar to *T. pueblensis,* which grows more to the north in the valley of Tehuacan, Puebla, where I had found them several days earlier. *T. mitlaensis* has a pink inflorescence while *T. pueblensis,* which is larger, has a longer, simple, red inflorescence.

After a short rest in the shade of some rocks, I continued climbing up a steep slope. When I reached the top of the mountain, a strong wind started to blow and dark clouds rapidly appeared. Then, it started to hail! I had just found an interesting cactus, *Mammillaria mitlaensis* and large plants of *Tillandsia violacea* with pendent inflorescences, but I had to find a hiding place in order to get out of the storm. There was no chance then of studying these very interesting floras.

My second attempt to humble the mountain scenery of Mitla had ended with only partial success. Maybe next time....

Tillandsias of Arriaga, Chiapas

Three friends and I arrived in Arriaga early in the morning of April 1, 1992 from Oaxaca. The town is situated in the southernmost state of Mexico, Chiapas, only 18 km from the sea. I had expected to find a verdant and humid environment with many bromeliads but, much to my surprise, I found the opposite. The vegetation here was very dry and only the tops of the coastal mountains were enveloped in mist. A brief exploration of the areas surrounding Arriaga

Figure 9.
Tillandsia mitlaensis. In order to photograph this group, the author had to resort to his mountaineering skills.

Figure 10.
Tillandsia seleriana was found by the author growing on the windward side of pine trees, facing the sea.

Figure 11.
Tillandsia concolor. Usually epiphytic, these plants appear to be growing as terrestrials.

convinced us that we would have to continue our search the following day on up into the mountains.

The next morning, we followed Route 195 up through a pass that provided magnificent views. Best of all, we were sure that this country would provide us with the tillandsias we were seeking. First, we discovered small plants of *Catopsis nutans* at the time when their seed pods were ripening. The next discoveries really pleased us. *Tillandsia streptophylla* was growing on the trunks of pine trees. The mature plants had just begun to flower with mauve blooms. A population of *Tillandsia seleriana* was found growing under similar circumstances (figure 10). The plants were 25 cm tall with their pseudobulb bases exceeding 12 cm. This species grows only on one side of the tree trunks, specifically on the windward side, which faced the sea. I also noticed that these plants were common only on the mountain ridge. A few meters lower, amid shrubs and bamboo grew many plants of bright red *T. ionantha.* I observed many forms of this species differing in size and shape. There were compact forms and others both large and small quite open.

I first saw *Tillandsia caput-medusae* during my first trip to Mexico when I visited Pachuca in the state of Hidalgo in 1987. There, I found large forms with leaves up to 45 cm long. Here, near Arriaga, I found a more common form in flower with leaves 17 cm long. But this was not the last species. We found *T. concolor* also in this area about 200 meters lower on the mountainside facing the sea. That species is most decorative when blooming (figure 11). It forms a stemless, spreading rosette that can grow to 30 cm in diameter. The uniqueness of this plant is seen during its blooming phase when its atypical inflorescence appears. It may be either simple or digitately compound, and the floral bracts may vary from green to cherry red. Most often, the bracts are a combination of the two with the colors of the margins being red while the rest of the bract is green. No other xeric tillandsias has the same combination of exquisite color and large corollas.

After this wonderful day, we returned to the hotel in Arriaga where we found ourselves covered with ticks. Then we learned that we were in the center of a cholera outbreak! Needless to say, we spent the whole evening disinfecting ourselves.

ACKNOWLEDGMENT

My thanks to William P. Olliver, a long-time member of The Bromeliad Society, for helping to edit these articles.

M. Magdonove 235
738 01 Frydek-Mistek, Czech Republic

San Diego World Bromeliad Conference, 1994 – *Bromeliads In Paradise,* Update #6

Jack Percival

San Diego Calling!
San Diego Calling!
San Diego Calling!

June 15th is getting closer by the minute! It's Conference time! San Diego is ready and wants you to be too! The World Conference brings you educational seminars conducted by 12 of the world's most respected horticulturists; some 600 display bromeliads mostly grown in southern California (giving non-Californians the opportunity to compare leaf and flower color, growth structure, mature size, etc.); eight tours including the world famous San Diego Zoo, Wild Animal Park, and Sea World; intriguing sale plants from the United States and Europe; and two major parties, one being an authentic luau. All this in the tropical setting of the Hanalei Hotel! Especially for the ladies—the Hanalei is just minutes away from two major shopping malls!

SO GRAB YOUR JUNE CALENDAR AND FIRM UP YOUR TIME IN SAN DIEGO!

Note on the Schedule of Events below (A) some tours are scheduled before and after the conference, and (B) the Hanalei Hotel extends its Conference rates to include seven days before and after the Conference. Now you have an excellent excuse to come early and stay late.

Conference Schedule of Events

Tuesday, June 14, 1994

0800–1700 Judges' school
0900–1500 San Diego Zoo Tour

Wednesday, June 15, 1994

0730–0900 BSI Board of Directors' continental breakfast
0900–1500 Sea World Tour
0900–1700 BSI annual general meeting followed by Board of Directors' Meeting
1200–2000 Guest registration

Thursday, June 16, 1994

0730–0800 Judges' and clerks' continental breakfast
0815–1550 Wild Animal Park Tour
0830–1200 Judging
0900–1700 Guest Registration

1200–1330 Judges' lunch
1330–1700 Judging
1830–2000 Opening Party
2000–2230 Show and sales open

Friday, June 17, 1994

0800–0900 Show open to photographers
0800–1700 Guest Registration
0800–1200 Bill Tweet and Jim Wright garden tours
0900–1200 Seminars
0900–1700 Show opens
0930 Sales open
1300–1700 Tweet and Wright garden tours
1300–1600 Seminars
1900 No-host bar prior to auction
1930 Rare Plant Auction

Saturday, June 18, 1994

0745–1300 Quail Botanical Garden tour
0900–1145 Seminars
1300–1500 Seminars
1530 Cryptanthus rare plant auction
1830 No-host Bar prior to luau
1930 Luau and entertainment

Sunday, June 19, 1994

0900–1200 Cryptanthus Board meeting
1000–1130 Worldwide show & tell
1300 Newsletter Editors' Meeting
1600 Show closes

Monday, June 20, 1994

0845–1600 John Arden garden &
Bird Rock Tropicals Nursery garden tour

Featured Speakers:

Elton M.C. Leme at the Seminar
Elmer Lorenz at the luau

27 Willow Street, San Diego, California

Please see our ad on page 87

Regional Reflections

Puya; a Short Mention

The following notes are from a discussion presented by Laurie Dephoff at a meeting of the New Zealand Bromeliad Society. They are reprinted from the November 1993 BULLETIN *of that society.*

Whenever anyone mentions puyas, our thoughts immediately turn to *Puya alpestris* as it is the species most commonly seen in our gardens. Yet there are over 160 species of Puya, mostly with very spiny leaves, making weeding very difficult, but as so many of them have colourful flowers, we have to be prepared to put up with the spines and wait for the blooms.

Puyas have three distinctions.

1) The oldest and most primitive form of bromeliad.
2) The largest bromeliad.
3) The slowest to flower.

Because of size and harsh growing conditions, only a few of the 160 species are in cultivation. Their main home is in the high mountains in the north and west of South America where they are to be found at altitudes from 7,000 to over 10,000 feet. Mulford Foster, in his early travels in the Andes,[1] did not find any puyas growing below 7,000 feet so if you are having trouble with yours in cultivation, take them for a trip up the nearest mountain. Conditions in their homeland are cold, rocky, and fairly dry with snowfalls, but little other vegetation. Don't worry about their getting frosted as they have been observed to be undamaged at –8° Celsius in the Andes.

Strangely enough, in Colombia at least, one species grows in swampy conditions in deep beds of spaghnum moss. In cultivation, it has been noted that a plant that one person can grow successfully may not do the same for someone else in a different district.

• ***Puya raimondii.*** Discovered by Antonio Raimondi in 1874. This is the giant of the family. Mulford Foster was taken to see a flowering specimen growing at 7,500 feet in the Andes of Bolivia in November of 1948. It was a solitary plant 300 miles from the nearest colony, so how it got there is a mystery unless it was the sole surviving member of another colony. The total height of the plant was 30 feet, the inflorescence alone being 20 feet tall and 8 feet in circumference, so it may have taken up to 150 years to reach

this state. Just imagine, small plants, like this one on the table, seen by Antonio in 1874, are only now reaching maturity, if they have survived. It was estimated that there were about 8,000 flowers, creamy-white, embedded in green bracts, but no offsets as this puya propagates only from seed. Even small birds were found impaled on the spines. Cultivated plants may flower in as little as 25 years. It is unfortunate for *P. raimondii* that local people use flowering specimens as torches in religious ceremonies with the result that the seed does not have time to ripen or disperse. Another botanist travelled up to the plant some time later for seed, but it was too late and only the burnt stump remained.

• ***Puya alpestris*** does not grow more than 2 feet high here [in Auckland], but it clumps and may have 6 or 7 flower spikes from 1 to 7 feet high about November. My plant first bloomed in 1957 when it was about seven years old and on only three occasions since then has it failed to flower. Friends in the South Island say that their plants flower only about every five years. The teal blue petals and orange pollen are very eye-catching and there are usually a few orange-headed sparrows and waxeyes around who have been dipping into the big drops of nectar in the base of the flower. *P. alpestris* is a native of the Chilean Andes....

• ***Puya fosteriana.*** This was a new species found by Mulford Foster in Bolivia at a height of 10,650 feet—the highest altitude found for a puya at the time. The teal blue flowers are embedded in tufts of wool as protection from the cold. I have grown some from seed sent from the United States. The small plant here has large brown spines on the leaves making it look more vicious than any of the others.

Puya alpestris (Poepp.) Gray.Habit and part of the inflorescence.
Drawing from W. Rauh, BROMELIEN.

• ***Puya mirabilis.*** This plant grows to a height of about 14 inches but it offsets readily into a clump. The inflorescences are about 3 feet tall with creamy white, large-petalled flowers. Mine had seven stems in its first year of flowering.

• ***Puya laxa*** is a good rockery plant as it is a low-growing, spreading plant only 7–8 inches in height. The stiff, grey, hairy leaves are edged with stout, brown spines. The offsets seem to keep on growing further from the mother plant without forming any roots of their own. The thin inflorescences are about 4 feet long, branched with tiny tubular flowers much the colour of *alpestris*....

Lastly, puyas are house-trained. You don't have to tip the water out before you take them somewhere.

Puya alpestris

Chet Blackburn wrote his observations of Puya alpestris *in the November 1993* BROMELIAD NEWS *of the Sacramento Bromeliad Society. So here we have additional thoughts on a genus that is infrequently reported by hobbyists.*

If you were to come upon this plant in a nursery and it was not in flower you might easily pass it by. Furthermore, if you were told that it had green flowers, you would be even more like to ignore it. That would be a real mistake. You would be missing out on owning one of the most beautiful inflorescences in the bromeliad family, which is to say, one of the most beautiful in the plant kingdom.

Not only are the inflorescence and the individual flowers rather large, but the color is unique...a wonderfully surprising combination that never fails to impress those who see it for the first (and every) time. It is difficult to describe and even more difficult to capture accurately on film. I've heard the petals described as "aqua" but that doesn't quite seem to do them justice. Their color is a shimmering, metallic blue-green of the hue that I doubt is duplicated anywhere else in nature. The large petals are conspicuous in themselves, but they are further set off by showy orange anthers and to a lesser extent by the light green stigma in their midst. The individual flowers look unreal, or at least not of this earth. As if any additional embellishment were needed, numerous flowers along the large spike are all in bloom at the same time! It is a spectacle well worth the occasionally jab from its deceptively spiny leaves.

The plant is not unattractive out of bloom. The numerous, succulent, narrow, arching leaves are green above and silvery below. It tends to form clumps.

Mine does quite well outdoors here in Auburn [California] in full sun and seems to withstand our normally hot, dry summers and cold, damp winters with equal vigor. However, the foliage was frozen back to the ground during "the big freeze" a couple of years ago when temperatures fell to 13 degrees one evening...but even more damaging, remained well below freezing for ten consecutive evenings. By the end of the following summer, the effects of the freeze were barely discernable.

Mine has been in the ground since 1982 and flowered for the first (and so far only) time in 1990. Of course, the original plant that flowered has since died back and has been replaced by a pair of offsets that have reached flowering size now. I'm hoping to see them flowering the coming summer, but they will probably wait until we're in San Diego at the world bromeliad conference.

This Chilean native has never been widely available in the trade, but seems to be even less so now than it was twenty years ago. I obtained mine not from a bromeliad dealer, but from the Western Hills Rare Plant Nursery near Occidental in Sonoma County....

Puya alpestris can reach 5 to 6 feet in height but the inflorescence is normally only in the 3 to 4 foot range. However, it can form clumps that spread out from the center after many years, so for the sake of your grandchildren plant it back about five feet or so from a pathway. It seems to delight in snagging any passerby it can reach.

If you can find one, it's a worthwhile addition to even a nonbromaphile's yard.

Additional Reading in the JOURNAL:

a. Volume 34 (1984) pages 147–153, reprinted from NATIONAL GEOGRAPHIC volume 98 (October 1950), includes M.B. Foster's account of his visit to a *Puya raimondii* in Bolivia.

b. Volume 35 (1985) page 166 includes a color photograph of *Puya alpestris* inflorescence.

c. Volume 37 (1987) pages 24–25 and 48 have photos of *Puya raimondii* at Berkeley, California.

d. Volume 41 (1991) pages 165–166 include a color photograph of *Puya* Doris Coleman.

Scale Pests

During the past two years many members have complained about scale infestations on their collections, and we have even found scale on a few plants on our sale table. Without doubt the sources of these pests were plants we purchased from bromeliad nurseries for our spring orders of the past few years.

There were no obvious signs of scale on these plants or we would not have delivered them. But clearly scale eggs must have been present on some of them. As the economic and labor problems of bromel nurseries increase we can expect continuing problems with scale and other insect pests. It is important that we stay on the alert and inform ourselves about what can be done.

The authoritative GARDNERS BUG BOOK by Cynthia Westcott (Doubleday & Co.) describes about 150 species of this large group of scale pests. There are two general types: armored scales and soft scales. Armored scales are covered with a hard, waxy shell which is separate from the body.

"Females are wingless and are mostly responsible for plant injury. After a brief 6-legged crawling stage they insert their threadlike mouths through the epidermis of a leaf... and start sucking sap. They molt twice, lose eggs and antennae, and remaining the same spot for the rest of their lives, laying eggs, in some cases giving birth to living young, under the shell. The males have an elongated body after the 2nd molt and after the 4th molt have one pair of wings, legs and antennae but no mouth parts. They look like small gnats but have a style-like process at the end of abdomen."

Soft scales are not covered by a separate shell but their bodies may be as hard as the armored scale shells. They have small legs but move so imperceptibly they appear to be stationary.

Some forms of armored scales dig so deeply into the epidermis they can't be removed without cutting them out. But the most common scales seen on our plants are soft scales with tan, light brown, or tannish green outer bodies (the inner bodies are red) which can be removed easily with a fingernail. The pale color blends with the leaf color so you don't notice the scales until there are very many of them. If you spot a shiny, sticky substance glinting on the leaves you should take immediate action because a scale infestation is breaking out. The telltale honeydew which smuts up the leaves signals a scale explosion.

Occasionally we see an armored form of small black scale that lays thousands of eggs and can be very difficult to eliminate. Scales won't kill your bromeliads unless you permit the infestation to grow to large proportions. These sap-sucking pests will weaken and stunt the plants and, of course, will mar and

scar the leaves. If you let the infestation persist the plant will soon succumb. This raises the complicated question of prevention and treatment.

Since scale insects don't hide or burrow deeply into the leaf axils they are vulnerable to being killed by a direct spray of contact chemicals like Malathion. However, Malathion treatment is best performed outdoors because it is a very smelly, odious pesticide. Systemic pesticides have the advantage that their poisons are absorbed through the leaves into the plant's capillary system where they remain potent for months, so the chemical doesn't have to make direct contact with the insects. Thus even scale pests born after the treatment will die when they begin sucking sap from the leaves.

The systemic Cygon 2E is unquestionably the most effective pesticide against scale. Unfortunately, it contains a carcinogen and it does not break down and cannot be disposed of without contaminating the ground or water tables.

I don't know enough about the safety of the systemic pesticide, Isotox, which contains Sevin. As yet I haven't heard any nasty information about Isotox, and it is probably safer to use than Cygon 2E. At this point I am getting quite leery about using most chemicals, especially indoors.

A number of years ago we used a "safe" product called Ceda-Flora to treat scale. You applied it with an applicator or a cotton swab and it left a high shine on the leaves. However, I haven't seen it around on the shelves, and I don't know if it is still available.

The systemic Bonide can be more easily used indoors because it is introduced into the potting medium in powder form. However, it is not immediately potent and the treatment needs to be repeated a number of times. For treating an infestation, Bonide may be more effective when used in combination with other treatments such as manually attacking the infestation, leaf by leaf.

This is hard work but it can be quite effective if you act before the infestation becomes too widespread. You must make time to inspect your plants for scale every time you water them. If you find evidence of scale, then you must work over the surface of every leaf to remove scales and eggs.

An alcohol-soaked cotton swab will work fine to kill a few pests, but for a wider infestation I find it faster and more effective to soak a few layers of facial tissue with alcohol or even Physan 20 and then scrub both surfaces of each leaf. If there is an infestation, you will find lots of dead, red bodies on the tissue.

Close inspection is necessary because the pests are not always easy to spot on green leaves. It is even more difficult to spot scale on gray or silver tillandsias, and, believe it or not, if you have a general infestation, these pests will hit your tillandsias sooner or later. I have found scale on a *Tillandsia erubescens* and

[continued on page 82]

Xeric Bromeliads

Ana Rousse

Xeric plants are drought and temperature resistant. Adaptability is also a feature. They tolerate altitudes up to 3,000 meters, high humidity, temperature fluctuations near freezing point at night and up to 50° C during the day, maximal luminosity or shaded areas, strong winds and heavy rain.

Xeric bromeliads grow, flourish, and produce seed even if the starvation regime of their original habitat is changed by giving them water and nutrients and keeping them in sunny areas.

Xeric bromeliads are a large number of the plants of the family Bromeliaceae. Some entire genera and certain species of different genera fulfill the criteria for xeric: *Aechmea, Billbergia, Bromelia, Neoregelia, Ananas, Pseudananas* (subfamily Bromelioideae); *Tillandsia, Guzmania, Vriesea* and *Catopsis* (subfamily Tillandsioideae); *Puya, Dyckia, Hechtia, Orthophytum, Deuterocohnia Enchlorium,* (subfamily Pitcairnioideae) (figures 12 and 13).

The habitat of the xeric Bromelioideae subfamily is widely distributed in dry coastal regions and dry forests in Central and South America and Caribbean islands, although there is a great scarcity of these genera compared with others. They coexist with other xerophytes such as cacti, dividive and so forth.

The subfamily Tillandsioideae is found in the Andes, the southeast coast of Brazil, Central America up to the southern United States, and Caribbean islands.

Xeric Pitcairnioideae have very particular habitat: *Puya* are distributed in the Andes; *Dyckia* in Brazil; *Hechtia* in desert regions of Central America from Mexico to Guatemala; *Deuterocohnia* in the north of Chile, Peru, Argentina, and Bolivia.

Cultivators dislike most of the xeric bromeliads because they have big, aggressive spines capable of producing grave wounds if the leaves are touched. Most of them have a poor appearance but others show extraordinary colors at the time of inflorescence and also produce edible fruits.

The prominent features are hard, stiff, recurving leaves bordered by sharp spines. They have a heavy root system for securing nutrition and holding to the soil. A tank may be formed by enlargement of leaves in the base of the rosette that stores water and nutrients, which are absorbed by trichomes.

Author

Figure 12.
A view of the succulent garden at the Marie Selby Botanical Gardens showing specimens of *Hechtia, Deuterocohnia*, and *Dyckia.*

Author

Figure13.
A cluster of *Puya ctenorhycha* collected in Bolivia in 1981.
The epithet is the combination of the Greek meaning "comb-crest."

Other morphophysiological characteristics in xeric bromeliads are: gross keratin cuticle covering the tissues, which retard the evaporation process; trichomes and associated tissues are responsible for water absorption. They pump water from the exterior to the mesophyllic tissue into the leaves. Trichomes also protect delicate cell structures from the intense sunlight, heat, and desiccation by reflecting ultraviolet rays. Gas exchange is done through stomates; water and carbon dioxide are utilized in photosynthesis to produce sugar for the plant.

CAM metabolism is another feature of xeric plants. Their stomates open at night and the CO_2 fixation is realized. CAM metabolism is important in plant survival when recurrent water deficits are present. This has recently been demonstrated to be a more complicated situation.

It seems that there has to be a different approach to compile all xeric bromeliads based on nature and morphological features.

Preservation of these plants from destruction by advancing civilization is necessary. They are in danger in coastal areas, deserts, and in dry forest. They are carelessly eradicated from large areas, together with other xerophytes. The best way to preserve these plants is to put them in xerophytic botanical gardens or conservatories, in reserve plant areas, and also to encourage their culture in places where water and nutrient supplies are scarce.

Volunteer, Marie Selby Botanical Gardens
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A Commentary on *Tillandsia pamelae* (Bromeliaceae)

Miguel Cházaro-Basañez

Introduction

Dr. Werner Rauh described *Tillandsia pamelae* in 1986 but little material was deposited in herbaria, a situation that has fostered incorrect impressions about its status in nature.

The purpose of this report is to provide more information about this plant, including illustrations. In fact, *Tillandsia pamelae* is not a rare species since it occurs abundantly beyond Ayutla, the type site recorded by Rauh.

History

Pamela Koide, owner of Bird Rock Tropicals in Carlsbad, California, a nursery specializing in *Tillandsia* species, visited the state of Jalisco in 1984. Near the village of Ayutla, on the road to Talpa de Allende, she collected an unfamiliar tillandsia that later flowered in her nursery. A year later, Dr. Rauh, well known for his numerous and outstanding articles and books on bromeliads and succulent plants, visited Pamela's nursery and determined that her discovery was new to science. He described the new species and named it after her.

Dr. Rauh's publication (1986) represents the entire literature of *Tillandsia pamelae* except that Dr. Rogers McVaugh included that description in his treatment of bromeliads in his FLORA NOVO-GALICIANA (1989).

On the first of March in 1987, three months after arriving in Jalisco, I took a field trip with my cousin E. De la Mora-Basañez, a long-time resident who knows the local geography. At Sierra Tapalpa, along the unpaved road from Tapalpa to Venustiano Carranza, we stopped the truck when we noticed a large inflorescence (spikes) of a century plant that was growing on a nearby, rocky cliff. On closer inspection, we saw that it was *Agave pedunculifera* Trel. and close by, growing on a ledge, was an attractive tillandsia with a large, pendulous inflorescence.

After a difficult and risky maneuver, we finally collected the specimen. Despite my having worked for several years with the bromeliads of eastern Mexico (Chazaro, 1988), I could not identify the plant. I forgot the matter for a few years until McVaugh's book arrived after which I concluded that my unknown tillandsia was the supposedly rare *Tillandsia pamelae.* Indeed! Perhaps the paucity of material is the result of its preference for hard-to-reach spots.

Author

Figure 14.
Tillandsia pamelae. Once thought to be a rare species, the author describes it as abundant in central Jalisco.

Phenology, habitat, and distribution:

Flowering season: March–June.

Habitat: Saxicolous on rocky cliffs; occasionally epiphytic. Saxicolous specimens form colonies that associated with *Agave pedunculifera.*

Geographic distribution: Endemic to central Jalisco, Mexico; in the mountains of the trans-Mexican volcanic belt. In addition to Ayutla, we found this species in abundance in two other regions:

– Sierra Tapalpa: Barranca del Nogal, SE of Ataco, abundant on rocky cliffs; along the road Tapalpa-Venustiano Carranza, also abundant on rocky cliffs.

– Sierra de Quila. J.J. Guerrero N. discovered one thriving population in 1990 in the Río Grande ravine where it is both epiphytic and saxicolous.

Status of conservation:

This is not a troubled species; it grows abundantly in the places mentioned above.

[continued on page 85]

Regional Reflections *[continued from page 76]*

even on the large, silver form of *T. straminea.* It is hard to believe scales' mouths can penetrate the thick trichome coating of that plant but they do.

Once you have essentially eliminated obvious signs of scale on your plants, you still need to apply a prophylaxis periodically to keep the pests in check. Spraying the leaves with Safer's Soap and/or Physan 20 and using Bonide in the medium from time to time and can be helpful in keeping your plants free of scale.

Herb Plever
Reprinted from Bromeliana published by the New York Bromeliad Society, Inc., December 1993

Of Dreams'n Schemes

One of the joys of being human is our ability to translate our dreams into reality. Approving of such aspirations that have benign intent with respect to our fellows, I enjoyed Bea Hansen's account of her "wall of *Tillandsia tectorum*" dream ("What We Missed," August 1993). A dream I share! but getting there is much easier said than done....

Tillandsia tectorum ranges naturally from southern Ecuador to central Peru. Rauh's LEXICON has a photo of what appears to be the typical caulescent type (the one we call "stem type") growing in masses on open rocks among cacti at 800 m in the Casma valley in central Peru.[1] Natural populations have been reported growing as high as 2700 m[2]—these higher altitude types are, I think, the larger-scaled rosette forms.[3]

My earliest attempts to raise *Tillandsia tectorum* were by importing seed from a cacti collector in Peru. First there was a batch of the "type variety" received in March 1991. Sown in the living room on Oeser sticks hung in a southern window, they started germinating visibly after six days, by 31 days were green and fat, and after five week had died. August 1991, another batch sown in an incubator started to swell but pegged out after a week. In June 1992 I got another batch of these, but no germination at all. Also in my March 1991 shipment was one called *tectorum* v. *filifoliatum.*[4] Sown in the dining room, the seed started swelling after eight days, and was fat and green after 23 days. After five weeks, though, they seemed to be going backwards, and after two months there was nothing left. But, finally, I had success with another lot of v. *filifoliatum* in August 1991. These were started, on an Oeser stick, in the small incubator. They started swelling after five days, and after nine days I took them out and hung them in the dining room window, not far from a small fan switched on 24 hours per day (the reason I took them out of the incubator so soon was that I was

too scared to leave a very xeric species enclosed in hot, very damp still air for too long, a worry I have since found to be unwarranted. But more about that another time. After another eight days, I moved them out to my garden shelter—still green and fat, but without any leaves formed yet. Six months later, in February 1992, there were about 40 little plants with three leaves, and 2 mm high. At that time I moved them into my new greenhouse where they progressed to 7 mm high by February 1993. Then I increased the light, and now they are up to 10 mm high and forming quite large whitish scales.

In June 1992 my plant of *tectorum* "stem type" was flowering and so was one of Peter Johnson's. I took mine out to Paraparaumu where Peter did the business between them, and we got one seed pod on my plant. I sowed my half of the seed in July this year, and they germinated within two days. These were kept in my new indoor incubator cabinet for three months, then moved out into the greenhouse and are now sturdy little two-leafers all of 1 mm high! Then in August this year a friend in Auckland sent me some nice fresh *T. tectorum* "rosette type" seed, which germinated within a few hours and are also now about 1 mm high.

So finally, I have three batches of *T. tectorum* coming along—give them four or five years and there may be a beginning of the great wall of *T. tectorum* stem and rosettes!

But, why did so many die off after a couple of months, you ask? Good question.... My thoughts are that the early batches were not kept in a high temperature, high humidity environment long enough. And I think they might need a longer day-length. Now I have a larger incubator with built-in fluorescent lights (GroLux) that I switch on 13 hours per day—giving them about 20,000 lux (2,000 footcandles). And my success rate with tillandsias has improved quite dramatically. Trouble is, tillandsia seed is too scarce and precious to do the necessary controlled experiments. And, of course, germinating old imported seed is far harder than it is with fresh seed—which resemble radishes for germination if not for speed!

NOTES:

1. Werner Rauh, THE BROMELIAD LEXICON. Ill. 18; 1979.

2. Smith & Downs, TILLANDSIOIDEAE (BROMELIACEAE) FLORA NEOTROPICA no. 14, pt. 2: 786; 1977.

3. Paul T. Isley; III, TILLANDSIA: 116–117; 1987.

4. The Bromeliad Society, Inc. does not recognize any natural varieties of *T. tectorum* so the names "v. *filifoliatum*" and "v. *casmensis*" have as much botanical validity as our common differentiator "stem-type" and "rosette-type." Which is none.

Andrew Flower
Wellington, New Zealand
Reprinted from Bromeliad Society of New Zealand BULLETIN
January 1994

Bromeliad Internship Applications Are Invited

Harry E. Luther

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

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

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

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

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

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

A Commentary on *Tillandsia pamelae* (Bromeliaceae)

[continued from page 81]

Voucher specimens:

Mexico. Jalisco: San Martin Hidalgo County; 3 km SW of Río Grande, 1450 m s.m., *J.J. Guerrero 1040,* Nov. 18, 1990 (CBUG);

Jalisco: Tapalpa County, walnut ravine, 1800 m s.m., *Martín Huerta Mtz 5,* April 16, 1991 (IEB); Road Tapalpa–Venustiano Carranza, 1850 m s.m., *M. Cházaro B. R. Cházaro Hdz* and *P. Cházaro Hdz. 7018,* Nov. 8, 1992 (XAL, WIS).; Road Tapalpa-Venustiano Carranza, 1850 m s.m., *Eduardo Sahagun 51,* May 9, 1991 (GUADA).

ACKNOWLEDGEMENTS:

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Rauh, W. 1968. *Tillandsia pamelae,* a striking, new, big species from Mexico. J. Brom. Soc. 36:117–118.

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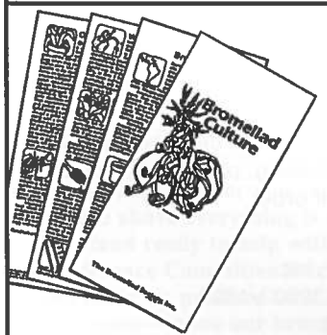

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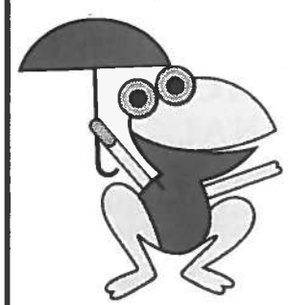

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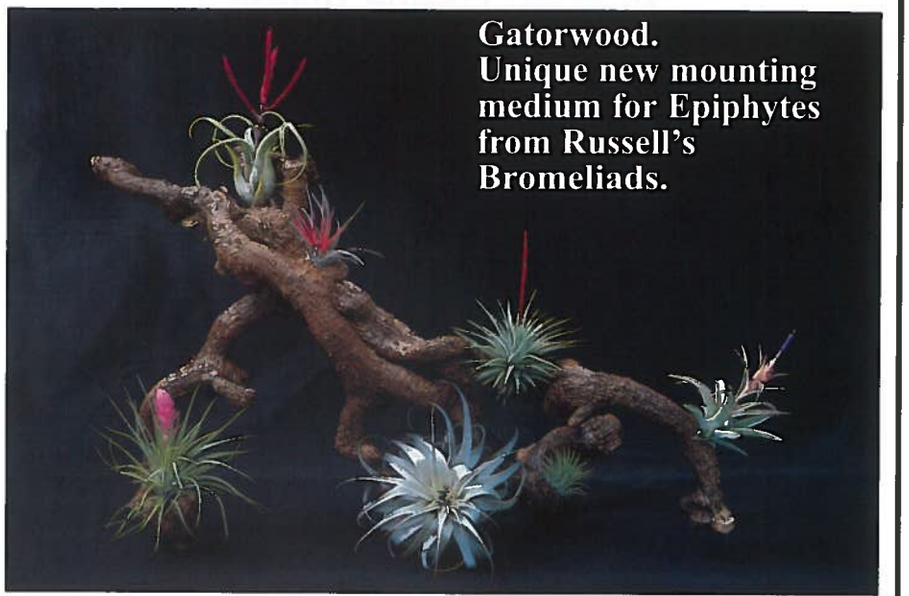

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Nominations: T.A. Calamari, 1061 Rosa Ave., Metairie, LA 70005.

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

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Vern Sawyer for Selby Gardens

Hohenbergia andina flowering at the Marie Selby Botanical Gardens. Note the small, very pale lilac petals barely exserted above the floral bracts.

Calendar

17–20 March	Florida East Coast Bromeliad Society presents its first show and sale in conjunction with "Everybody's Flower Show," Ocean Center, Daytona Beach, FL. Entries from the public and members of other bromeliad societies are invited. Art Hyland, 904-775-9919; 22 Pine Hill Place, Orange City, FL 32763.
25–27 March	Bromeliad Society of Greater Mobile 17th Annual Show and Sale. Bel Air Mall front entrance, 2 blocks east of I-65 on Airport Blvd. Friday, 10 am–10 pm; Saturday, 9 a.m.–10 p.m.; Sunday, noon–6 p.m. C.E. Burrell; 320 Hillside Dr., Mobile, AL 36611.
3–6 April	Beginning on Easter Sunday, the Great Cathedral of St. John the Divine will present a special showing of rainforest plants sponsored by and for the benefit of The Rainforest Alliance. Amsterdam Ave. and 112th St., New York, NY 10025. The entire cathedral will be decorated with displays of blooming bromeliads and orchids presented by the New York Bromeliad Society, the Westchester Orchid Society, and the Manhattan Orchid Society. Sunday, noon–6 p.m.; Monday–Wednesday, 9 a.m.–5 p.m. Theresa Begley, 718-720-7630.
16–17 April	Sarasota Bromeliad Society Annual Show and Sale, cosponsored with Marie Selby Botanical Gardens. At the Gardens, 811 South Palm Ave., Sarasota, FL. Saturday, 10 a.m.–5 p.m.; Sunday, 10 a.m.–4 p.m. Patsy Worley, 813-747-2231.
April 23	Greater Dallas-Fort Worth Bromeliad Society Spring Show and Sale. Walnut Hill Recreation Center, 10011 Midway Rd., Dallas, TX. Show open to the public 12:30 p.m.–6:00 p.m.; plant sale hours, 8 a.m.–6 p.m. Pat McGregor, chairperson.
23–24 April	Shreveport Bromeliad Society non-judged show. Barnwell Garden and Art Center, 601 Clyde Fant Parkway, Shreveport, LA 71101. Saturday, 1–5 p.m.; Sunday, 1–5 p.m. Harvey C. Beltz; 6327 South Inwood Road, Shreveport, LA 71119-7260.
30 April–1 May	La Ballona Valley Bromeliad Society Annual Show and Sale. Veterans Memorial Auditorium, Culver City (Overland Ave. at Culver Blvd.). Saturday, noon–4:30 p.m.; Sunday, 10 a.m.–4 p.m. Bromeliad display, plant sale, expert advice; potting demonstration both days at 2 p.m. Richard Fleg, 310-839-8346.

[continued on page 63]