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Editor: Thomas U. Lineham, Jr., 1508 Lake Shore Drive, Orlando, Florida 32803-1305. Telephone: 407-896-3722.

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

Cover photographs. Front: *Aechmea cylindrata.* Chet Blackburn's analysis is on pages 63 and 64. Photograph by Marcel Lecoufle. Back: *Aechmea* 'Aztec Gold'. Text begins on page 59. Photograph by Jim Racca.

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 of The Bromeliad Society, Inc. will be held in St. Louis, Missouri, at the Frontenac Hilton at 9:00 a.m. on June 1995 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 general 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 submit budget requirements and financial accounting to the treasurer. (Standing Rules 3 and 6).

2) 30 days before the meeting: 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).

Since the three-year terms of the president and vice-president will expire in June and the secretary has resigned effective with the election of a successor, nominations for those offices are invited. Nominations may be made by any member on or before 15 April 1995 to John Anderson, chairman of the Nominations Committee, P.O. Box 5202, Corpus Christi, TX 78465. Nominations may also be made from the floor. In either case, the consent of the nominee must be obtained in advance. Eligibility requirements are stated in Article IV of the Bylaws.

Chairmen of standing committees are elected annually by the board. Nominations may be made as stated above.

Odean Head, president
7818 Braes Meadow
Houston, TX 77071

A New Vriesea from Ecuador

Harry E. Luther

***Vriesea cathcartii* Luther, sp. nov.** Figures 1 and 2

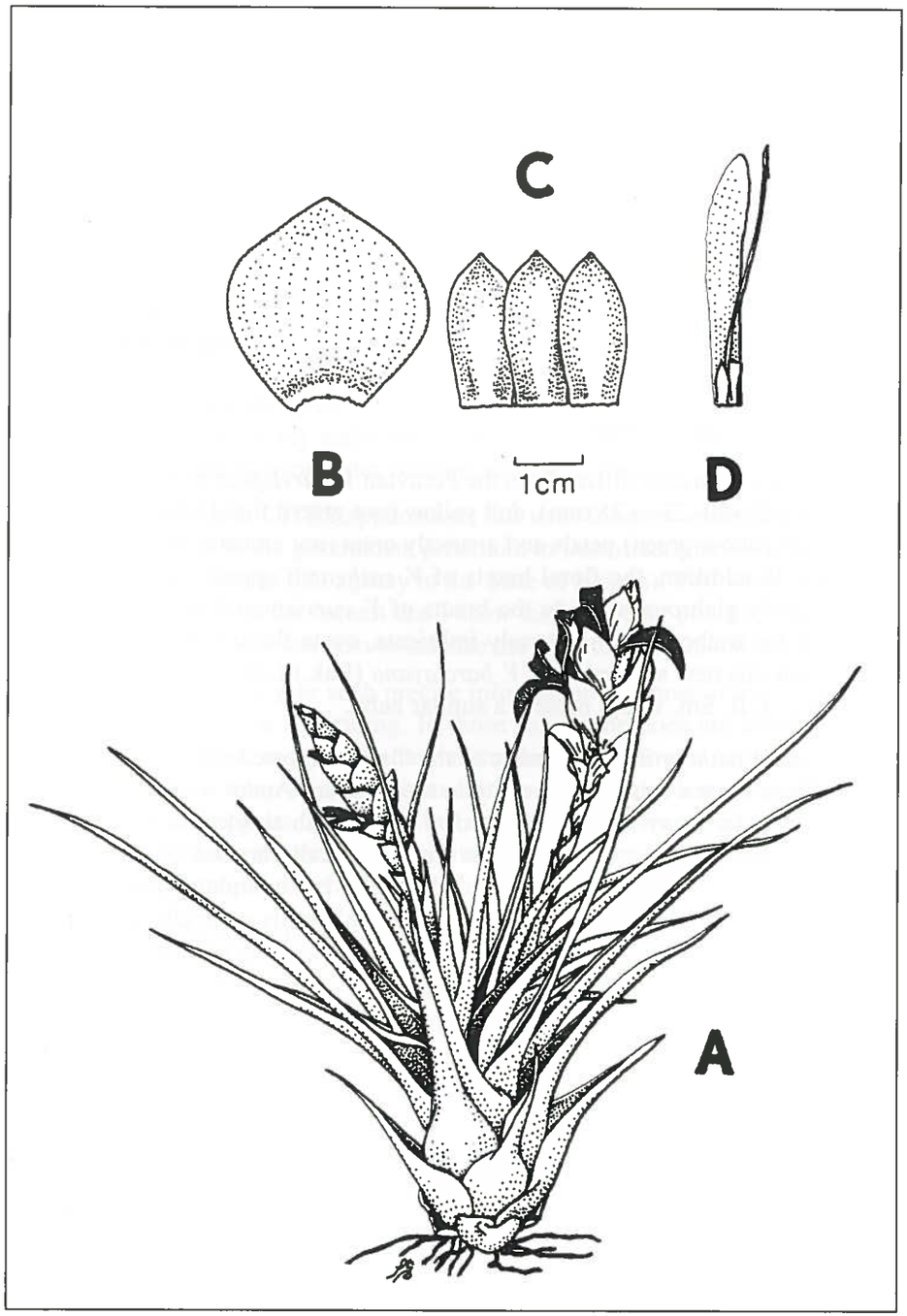
A *V. curvispica* Rauh, cui similis et affinis, scapis et inflorescentia erectioribus, sepalis minoribus et petalis atroviolaceus differt.

TYPE. Ecuador: Zamora-Chinchipe, 1.6 km east of Zumbi on Zumbi-Paquisha road, elev. ca. 850 m; August 1994, *D. Cathcart 81794-1* (SEL, holotype; QCNE, isotype).

Tropiflora

Figure 1.
Freshly collected specimens of *Vriesea cathcartii* from which the description was prepared. The plant with the yellow spike was the model for the accompanying drawing and provides an interesting comparison.

Plant an epiphyte, clustering, flowering 25–40 cm tall. **Leaves** densely rosulate, erect to spreading, 30–40 in number, 20–30 cm long, stiff, coriaceous, grey-green to entirely red-purple. **Leaf sheaths** broadly elliptic to ovate, 6–7 x 4–5 cm, somewhat inflated, dark castaneous except at the extreme base, densely ferruginous lepidote. **Leaf blades** narrowly triangular, 15–25 mm wide, acute to attenuate, pungent, channeled, densely pale punctate lepidote especially abaxially. **Scape** erect, 5–14 cm x 4–5 mm, pale lepidote. **Scape bracts** erect, imbricate, the lowest subfoliaceous, the upper broadly elliptic, exceeding and conceal-



Stig Dalström

Figure 2.
Vriesea cathcartii. A, habit of flowering and fruiting plant; B, floral bract; C, calyx; D, petal with single stamen.

ing the internodes, colored like the leaves. **Inflorescence** erect, simple, narrowly elliptic, 6–10 x 2–3 cm, 6- to 12-flowered. **Rachis** broad, excavated, white fimbriate lepidote. **Floral bracts** tightly imbricate, ovate, acute, 28–32 x 25–30 mm, ecarinate, even, inconspicuously appressed punctate lepidote, rather lustrous, thin coriaceous, dull yellow becoming castaneous with age. **Flowers** with a stout 2–3-mm-long pedicel. **Sepals** free, oblanceolate, acute, 20–23 mm long, ecarinate but with a slight thickening at the base, glabrous, pale green. **Corolla** with erect to slightly spreading lobes, **Petals** ligulate, broadly acute, 36–38 x 5 mm, each with a pair of basal appendages 5–7 mm long, dark blue-violet. **Filaments** unequal, white to pale blue, slightly shorter than the petals. **Style** white, stigma conduplicate-spiral with spreading lobes, equalling to exceeding the petals. **Fruit** a dry capsule to 5 cm long.

Discussion of relationships

Vriesea cathcartii differs from the Peruvian *V. curvispica* by having slightly shorter sepals (20–23 vs 25 mm), dull yellow (not green) floral bracts, dark blue-violet (not yellow-green) petals and a strictly erect (not arcuate) scape and inflorescence. In addition, the floral bracts of *V. cathcartii* appear far less lepidote (superficially glabrous) than do the bracts of *V. curvispica* due to the size and nature of the trichomes. The densely imbricate, ovate floral bracts immediately distinguish this new species from *V. barclayana* (Bak.) L.B. Smith and *V. petrea* (L.B. Sm.) L.B. Sm. which present a similar habit.

Vriesea cathcartii is a member of the "large-flowered-grey-Vriesea" complex.[1] These have a center of diversity in the northern Andes with a few species occurring as far away as Cuba and Costa Rica. With single exception,[2] sepal length of these species exceeds 15 mm and is generally around 20 mm. In contrast, the "small-flowered-grey-Vriesea" complex[3] has a slightly wider distribution (but still centered in the northern Andes), and sepals generally less than 12 mm in length. Neither of these complexes of species appears to be closely related to *Vriesea sensu stricto* [Type: *V. psittacina* (Hooker) Lindley] of eastern South America.

Perhaps this new species and its relatives would be best placed in *Tillandsia sensu stricto* (Type: *T. utriculata* L.) as advocated by Grant (1993). However, until a thorough and thoughtful revision of *Tillandsia* and *Vriesea*—based on a synthesis of morphological, molecular, distributional and ecological data—is accomplished, I prefer to use the conservative and traditional (albeit artificial) generic concepts.

[Continued on page 56]

Experiences with Applications for CITES

Andreas Krietsch

The following article is reprinted with permission from Die Bromelie *3/1993, the journal of the Deutsche Bromeliengesellschaft. Harvey L. Kendall generously supplied this translation.*

In our journal, DIE BROMELIE, number 3, 1993, it was recommended that members report informally to the responsible authorities any tillandsias listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (*T. harrisii, kammii, kautskyi, mauryana, sprengeliana, sucrei,* and *xerographica*) that were received since July 20, 1992. Since I have these species in my collection, I had to request the papers required by the authorities in order to avoid later consternation with them.

I still had some CITES applications left over from my orchids, filled them out, and sent them to the government presidium in Darmstadt (the lower division of the environmental protection agency in the State of Hessen). Two weeks later I got these papers back with the request that I show the receipts or proof of origin for all the plants. If possible, I was also to indicate the year, day, and month of receipt.

I was not able to give such precise information for most of the plants since I got them at shows or by trading. In those cases, one does not normally get a receipt (and it wasn't required by law at that time). Without a card catalog, it is hardly possible to keep all this information in your head when you have such a large collection of plants. So I described my problem to the officials, but I was at least able to indicate the year of acquisition. After another ten weeks of waiting, I received the required papers (32 DM for 7 CITES).[1]

I took particular note of the information from the authorities that the papers were being sent by way of exception since precise information about the origin of the plants was missing. Also, I am now no longer permitted to acquire plants without CITES or proof of domestic cultivation. For the hobbyist, that means no purchase of species plants of the seven named without CITES copy or the CITES number of the seller. However, a CITES must be obtained for the mother plants (importation from the native habitat). If you buy or trade plants without such papers, you are, strictly speaking, committing a crime. Also, any time a plant that has been listed with CITES papers dies you must report it to the authorities. It is presumably sufficient to report these negative changes in your collection once a year. New acquisitions and dispersal of plants with CITES must be noted in an "Acquisition/Dispersal Book" with the botanical names, CITES number, the issuing authority, as well as the names of the dispenser and the receiver. the authorities can make inspections.

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[1] *approximately US $20.00.*

My advice: Report your plants immediately in order to avoid later difficulties. Use the prescribed forms and thus save time and money. You can get them either from your responsible division of the environmental protection authority or get one from me along with the filled-in example and make copies as needed. In the latter case, please include a SASE. If you decline to report, consider the fact that the burden of proof, according to our laws, would be reversed. If sometime later there should be trouble, you would have to prove when and where you got the plants. If you are not able convincing proof, the plants can be taken into custody and a lawsuit could be launched against you. Thus, a trusting cooperation with the environmental authorities of your state is therefore in your interest.

Horloffstrasse 23. 61209 Echzell, Germany
Telephone (06008) 1304

A New Vriesea from Ecuador

[Continued from page 54]

NOTES:

[1] Includes at least the following taxa: *V. petrea* (L.B. Sm.) L.B. Sm., *drewii* L.B. Sm., *hitchcockiana* (L.B. Sm.) L.B. Sm., *rauhii* L.B. Sm., *robusta* (Griseb.) L.B. Sm., *patula* (Mez) L.B. Sm., *cereicola* (Mez) L.B. Sm., *incurva* (Griseb.) R.W. Read, *castaneobulbosa* (Mez & Werckle) J.R. Grant, *koideae* Rauh, *olmosana* L.B. Sm., *cylindrica* L.B. Sm., *sagasteguii* L.B. Sm., *harmsiana* L.B. Sm., *tillandsioides* L.B. Sm., *arpocalyx* (André) L.B. Sm., *tequendamae* (André) L.B. Sm., *pereziana* (André) L.B. Sm., *barclayana* (Bak.) L.B. Sm., *penduliscapa* Rauh, *andreettae* Rauh, *wuelfinghoffii* Rauh & Gross, *limonensis* Rauh, *strobeliae* Rah, *curvispica* Rauh, *boeghii* Luther, and perhaps *espinosae* (L.B. Sm.) Gilm. The last differs from the rest not only in flower size but in habit, lacking inflated, castaneous leaf sheaths. Perhaps its affinities lie elsewhere. All have bi-appendaged petals (but see Read, 1986).

[2] *Vriesea espinosae* has sepals from 10–12 mm in length.

[3] Includes at least the following taxa: *V. chontalensis* (Bak.) L.B. Sm., *crenulipetala* (Mez) L.B. sm., *appendiculata* (L.B. Sm.) L.B. Sm., *heterandra* (André) L.B. Sm., *piepenbringii* Rauh, *appenii* Rauh, *didistichioides* (Mez) L.B. Sm., *fragrans* (André) L.B. Sm., and very likely *Tillandsia hemkeri* Rauh, *T. rusbyi* Bak., *T. bismarckii* Rauh & Lehmann, and *T. myriantha* Bak. Flower morphology of this complex is rather similar to species of *Tillandsia* placed in the subgenus *Allardtia* (Type: *Allardtia cyanea* A. Dietrich = *T. guatemalensis* L.B. Sm.) with the exception of the bi-appendaged petals of the majority of the species. They share with the "large-flowered" complex, inflated, castaneous leaf sheaths.

LITERATURE CITED:

Grant, J.R. 1993. True tillandsias misplaced in *Vriesea* (Bromeliaceae: Tillandsioideae) Phytologia 75: 170–175.

Read, R.W. 1986. A new combination in *Vriesea* (Bromeliaceae). Phytologia 16:457–458.

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

Book Review

BLOOMING BROMELIADS, by Ulrich and Ursula Baensch. Tropic Beauty Publishers, P.O. Box N 1105, Nassau, Bahamas, 1994. 28 x 23 cm (11½" x 8½"), hardbound, 270 pages, 1000 illustrations in color, maps, glossary, bibliography, index. Distributor: Bodé Export Corp, 48 N.W. 29th St., Miami, FL 33127 (English/Spanish spoken), telephone 305-573-2525, FAX 305-573-0209. List $119; minimum 6: $99 each; 12 or more: special discount upon request. Postage, packing and handling $6.00 first copy, $1.00 each additional. For overseas postage and handling inquire by FAX or ask UPS. Book weight 1.650 kg (3.6 lbs.). For the German language edition, consult authors/publishers.

BLOOMING BROMELIADS

Besides cacti, succulents, and orchids, bromeliads have come into wide-spread use as house plants during the last few decades and today there are many nurseries all over the world breeding bromeliads, the spectacular and colorful flowering plants of the New World. For that reason, it is understandable that in recent years several illustrated books about bromeliads have been published. Walter Richter was the first to have said in his book, published in 1965, that bromeliads will be the "houseplants of tomorrow."

The fundamental scientific monograph of Lyman B. Smith and Robert J. Downs (1974–1979), followed by Werner Rauh (1979, 1990), Francisco Oliva-Esteve (1987); Paul Isley (1987), Jürgen Röth (1991), Elvira Gross (1992), Elton M.C. Leme (1993), and others have increased the popularity and understanding of bromeliads, consequently, the number of bromeliad enthusiasts.

Now, another striking book, BLOOMING BROMELIADS by Ulrich and Ursula Baensch, has been published. It is the best and most fascinating book of its kind that I have ever seen. In 270 pages, about 1,000 flowering bromeliads are reproduced in color, many of them in full-page size, of a quality that cannot be exceeded. The photographs, nearly all taken by Urusula Baensch, are really masterpieces of photography of great brilliance. Of the 52 genera of the three subfamilies of the Bromeliaceae (Bromelioideae, Pitcairnioideae, and Tillandsioideae) 33 are described and illustrated, not only the species, but also varieties and hybrids. Each photograph is accompanied by a short text and note of distribution.

New genera such as *Ursulaea* R.W. Read & H.U. Baensch are included. Most of the plants pictured in the book are cultivated in the Baensch garden, "Tropic Beauty," on the island of Nassau in the Bahamas.

But the present book is not only a fantastic picture book; it is more: it gives information about and impressions of two native centers of bromeliads, of Costa Rica and Mexico; there are also maps with the distribution centers of the genera. The reader is informed of the morphology, ecology, and physiology of these remarkable plants, which are artists of survival. There is also a short chapter about bromeliad frogs, espe-

cially the poison-dart frogs. In the last chapters, the authors report on culture factors (light, warmth, water, and nutriments), propagation, cultivation, containers, hybridizing techniques, diseases and pests, and on the final pages, the authors give well-illustrated advice and proposals for arranging bromeliads in the home and garden.

The book is closed with a list of the meaning of plant names, a glossary of botanical terms, a bibliography, and an index.

All in all, I congratulate Ulrich and Ursula Baensch on this fantastic work that must be recommended not only to all bromeliad lovers but also to horticulturists, breeders, and naturalists.

We wish Ulrich and Ursula Baensch many more happy years of living in their "Tropic Beauty" together with thousands of bromeliads and that they will soon prepare a second edition.

There is also a German-language edition of this book, BLÜHENDE BROMELIEN.

Professor Dr. Werner Rauh
Heidelberg Germany

FURTHER COMMENTS:

The Baenschs' work, BLOOMING BROMELIADS, has been awaited for many months, and now it is available. The superlatives used by Dr. Rauh in describing the book are fully justified. The bromeliad world has had the good fortune during 1994 to receive two superior books: BROMELIADS IN THE BRAZILIAN WILDERNESS by Elton Leme and Luiz Claudio Marigo and BLOOMING BROMELIADS by Ulrich and Ursula Baensch. The chief similarity between the two is the quality of the photography but in other respects they are unalike. The former is a detailed study of certain Brazilian bromeliads in habitat while the latter is a broad survey of selected genera of the entire family. They are complementary.

The concept of an illustrated encyclopedia of bromeliads, something along the lines of a modern, illustrated version of the Smith and Downs monograph has been a goal for years. The Baenschs' book is the closest approach yet toward achieving that goal. Working with their own plants, for the most part, they have produced an abridged compendium that includes not fewer than 33 of the recognized 52 genera. With each genus, the book describes and illustrates many of the species, varieties, hybrids and cultivars. Taking *Aechmea,* for example, 147 species and varieties as well as 39 hybrids and cultivars are included.

The illustrated dust jacket, the illustrated covers with maps on the lining, the paper and printing, the color reproduction, and the binding are first class.

An assiduous critic could find occasional bumps and jars scattered here and there throughout the text, the inevitable products of a first edition. A corrected printing would bring the work closer to perfection.

The price of this book may cause the individual hobbyist to think twice before ordering but it should not discourage serious collectors, growers, libraries and societies. If used only as an identification tool it will reward the buyer. If studied in detail it will educate any reader.-TUL

Aechmea recurvata 'Aztec Gold'

John Catlan

'Aztec Gold' is really the story of trying to produce a desirable plant by swinging the odds in the grower's favour.

One day in 1981 a friend of mine, Ian Sellars, found a plant in a group of my *Aechmea recurvata* plants with a good, clear yellow stripe on one of its leaves. The variegated leaf appeared on a fully mature plant that had failed to flower that year.

It was the unanimous lament that many plants of friends as well as our own had shown partial variegation that had not been passed on to the pups. The low averages were definitely against success, but with this plant we hoped it was possible as the variegated leaf was low down in the butt of the plant where the pups originate.

After researching the material available, looking for a magic wand, I found that there was none, or more precisely, none that I could find. Now was the time to put into action three lessons learnt while observing our plants.

One day while sitting on an old stump, with a shovel in one hand and a cup of coffee in the other, trying to get inspiration, I noted just how hardy bromeliads really were. There were dozens of discarded plants lying on their sides with their pups happily sitting up ready to grow into new clumps.

LESSON 1. If a plant falls over and a pup forms, nine times out of ten the pup will start on the top side of the plant.

Like most bromeliad growers, being short of room, I would take pups off and sit them in a pot in a very open mix to keep them upright till I had time to tend to them. If you are too long, you would wind up with a solid ball of roots. This resulted in tearing them apart and damaging the roots. Gradually it dawned on me that the root system initiated from one side of the pup. The opposite side from the heel piece from the mother plant. The rule became: face the wound side to the centre of the pot. The roots all grow to the outside of the pot and are easier to separate. This explained to me why in a clump of bromeliads the pups are generally grown on the mother plant farthest from the grandmother. I reasoned that the roots on that side absorbed the nourishment and gave slightly more food to that side of the plant. I foliar fed the plants on one side only and this resulted in a very high percentage of pups from that side.

LESSON 2. If you liquid feed a plant, by foliar feeding it on one side, you increase your chances of getting a pup from that side.

I remembered one year, there being not enough bench space for all the plants, that some were placed under a bench. Being winter, the sun was low in the sky and light penetrated very well in under the bench as it faced north. Spring arrived and busy—busy—busy then, well into summer. Lo and behold! There were the plants with all their pups, like soldiers, facing the path. At the time I thought it was rather convenient for the removal of the pups.

LESSON 3. If the slant is denied light on one side, it will throw its pups on the side facing the light source.

The time had come to bite the bullet. We laid the plant at an angle of 45 degrees facing away from the sun with our yellow stripe being on top facing the sun. A few weeks later at an angle of 90 degrees to the yellow stripe appeared a green pup. This was removed with a sharpened screwdriver. Our theory was that the pup had started its growth cycle prior to our meddling with nature. Be patient and wait. Success immediately followed by disaster. The pup was there but it was pure yellow. We had only the one variegated leaf and the pup was right under it. So all we could do was leave it as an interesting experiment.

A few months later and the pup had grown and we looked and wondered for there on the upper side of the leaves was a solid green stripe. A phenomenon of this plant is: all pups appear as plain yellow, but as the leaves develop the green stripe improves and it turns into a sturdy, vigorous grower for a variegate.

To promote the growth of 'Aztec Gold' we left it attached to its parent. This promoted vigorous growth resulting in a mature plant that produced 10 pups over three years. Any pups appearing on the green side were cut off so the 'Aztec Gold' received all the energy.

Over the years 'Aztec Gold' has never produced a pup for me that has reverted to green. In the first couple of years we had to destroy only about six plants that did not grow strong enough for me.

Our climate is described as subtropical but 'Aztec Gold' has not been adversely affected by our heat. In 1985 our winter produced 16 frosts in a row and that year the flowering was the most spectacular we have ever witnessed.

'Aztec Gold' was grown in seven-inch hanging baskets potted in a very open mix and hung 18 cm from the roof. They had plenty of light and nine-month Osmocote as fertilizer. They were watered regularly, but they were very well drained and had plenty of air movement. They grow in full sun on a wire bench one foot from the ground now and they are doing fine.

[Continued on page 62)

What Bromeliad Judges Do When They Are Not Judging

Betty Ann Prevatt, Registrar, Florida-Georgia District

On November the 19th, 1994, the Florida-Georgia District master judges met at Selby Gardens in Sarasota, Florida for a refresher symposium. That very productive day included a study session when ideas were shared, old problems were reviewed, new species were described, possible changes to the HANDBOOK and other judging problems were discussed. In addition, Harry Luther, director of the Bromeliad Identification Center elaborated on recent name changes: why some species were moved to a different genus and why new genera were formed.

This district has conducted two schools for judges. Twenty-four of the graduates of the first school that began in November 1978[1] have renewed their certificates by completing three refresher symposia (among other requirements) and have reached the grade of master judge. Even that rank demands attendance at refresher meetings and this was the second. Twenty of the 24 were present and eight judges from the second school attended voluntarily.

One of the discussion subjects was the need to get judges in the Australia Region certified. The affiliated societies in that Region lack certified judges although they have for many years been conducting bromeliad shows. We agreed to extend our support to any positive action that Roger Lane, chairman of the Judges Certification Committee, might recommend on that subject to the BSI directors at the June 1995 meeting.

A recommendation approved by the group was to propose to the Florida-Georgia affiliated societies to make up a form consisting of the most frequently made judges'comments that could be stamped on the back of entry cards. With that form, judges no longer would have to write their comments (a practice too frequently ignored) but could make check marks by the appropriate comments. Exhibitors could then benefit from the information instead of being left to guess why they got less than a blue ribbon.

One senior judge submitted a formal request to change HANDBOOK requirements concerning the qualification and selection of judges school and symposia instructors. After much discussion, but general agreement, the group requested the originator to clarify the request and to resubmit it.

We agreed to propose changing the Handbook to eliminate the point scoring requirement at symposia by master judges but to retain the requirement to attend symposia and to take part in practice point scoring sessions. (By way of explanation, the Judges Certification Committee working with the Affiliate Shows Committee is responsible for revising the Handbook. Since the Judges Certification committee

[1] Grande 1978 (3):22.

usually meets only at the time of the periodic world bromeliad conferences and no meeting was convened in 1994 there is no way of knowing if and when that change will take place.

After the discussion period there was point scoring of plants brought in by some of the judges and then the point scoring test.

It was a long day but one shared with friends with a deep interest in bromeliads.

2902 Second Street
Fort Myers, Florida 33916

Aechmea recurvata 'Aztec Gold'

(Continued from page 60)

Some people who have had trouble growing 'Aztec Gold' are probably giving too much water and not enough light and air movement to keep up with the watering.

After our success with 'Aztec Gold' I acquired a plant of *Aechmea orlandiana* 'Ensign'. This plant had a good variegation on one side. The other side was only slightly variegated. We faced the slightly variegated side against a fibro wall—the strong variegation facing the light source. Pups came out all over the place, but we did eventually get a good 'Ensign' that we left on the parent plant till we got a good, sturdy plant.

We wondered whether, as *Aechmea orlandiana* was a climbing bromeliad more than a clumper, maybe our rules for this type were not as applicable.

I hope that the preceding information will help along your collection of bromeliads. Don't forget to let us hear of your results.

Mango Mansion, Queensland 4208

This article was first published in in the May–June 1992 issue of Bromeliaceae, *the bulletin of the Bromeliad Society of Queensland. It appears here corrected by the author. We have determined that the plant shown in the photograph on the back cover is a direct descendant of the plant described by the author. We thank him and the secretary of the Bromeliad Society of Queensland for their cooperation and permission to reprint; Maura Williams, who exhibited the plant at the 1994 World Bromeliad Conference show; Bill Baker (California Gardens) and Carol Johnson (Pineapple Place) for their help in tracing the lineage of this specimen; and Jim Racca, BSI Slide Librarian, who loaned the slide.*—TUL

Notice

We have been informed that the buildings of Las Cruces Biological Station at San Vito, Costa Rica, were damaged extensively by a fire that occurred in November. Applications for internships mentioned on page 34 of the January–February 1995 issue of the JOURNAL are, nevertheless, encouraged.—Ed.

What's This *Aechmea cylindrata* All About?

Chet Blackburn

. . . Now that communism poses less of a threat than earlier, I guess the conspiracy crowd is devoting increasing attention to environmentalists and the media. Frankly, I've never been able to understand why so many people have such a deeply ingrained need to believe in conspiracy theories. I'm certainly glad I'm not that paranoid.

But, say . . . have you noticed what's been going on with *Aechmea cylindrata* too? Consider the following:

Do you know anyone who doesn't have an *Aechmea cylindrata*? Its presence is almost universal in bromeliad collections, but just think about it. Have you ever actually known anyone who ever **bought** an *Aechmea cylindrata*? Did you buy yours? For that matter, have you ever seen an *Aechmea cylindrata* even **for sale** at a nursery, supermarket, or plant shop?

Have you every heard of anyone importing or bringing one back from its native Brazil? No, they just suddenly appear one day, usually among the very earliest plants in a collection.

Aren't your suspicions aroused when you realize that we all have *Aechmea cylindrata* but none of us has ever bought, imported, or grown one from seed?

And, there's more to ponder. Once in our collections, they are among the most prolific of all bromeliads in producing offsets. The lone pot soon becomes a clump that requires dividing into more pots, that in turn become bigger clumps, and before you know it, *Aechmea cylindrata* is taking up a sizeable portion of our greenhouse. Could it be that we have a horticultural version of a computer virus on our hands?

Also, if there is not something going on, why do they go to such lengths to sneak in under assumed names? In our area, most plants labelled *Aechmea kleinii* are actually *Aechmea cylindrata.* So are those labelled as *Aechmea cylindrica.* They've even slipped into my greenhouse labeled *Aechmea calyculata* "blue form." Then let's not forget those that make their way in simply as *"Aechmea* sp.?!!"

O.K. So the inflorescence is attractive, consisting of a stout, rosy-hued cylinder densely covered with sky-blue flowers *[please see the front cover]* that never fail to elicit favorable comment from those who see them. Trouble is, you have to really be on your toes to see them. They are conspicuous at the height of their bloom, but the azure flowers all open over a period of just a few days. The plant's flowering period is one of the shortest in the bromeliad family. Why? Could it be that it is trying to avoid detection and blend in inconspicuously amidst all the other rosettes?

Add to those facts that it is one of the hardiest and toughest of the bromeliads around so that once in a collection, they are there to stay, and you have to wonder about this whole *Aechmea cylindrata* phenomenon.

Taking all the aforementioned circumstances into consideration any sensible person could come to only one conclusion. For purposes known only to them, someone out there is intent on spreading *Aechmea cylindrata* around to overrun the rest of our collections.

I'm calling this to your attention so that the next time you see an *Aechmea cylindrata* on the plant table (which is quite frequent, I might add) you can sidle up to the person responsible and whisper into his (her) ear that you're on to the game and let him (her) know you'll be watching them in the future.

And just maybe someone ought to let Rush know about all this . . . .

Reprinted in part from The Bromeliad News, *July 1993 . The Sacramento [California] Bromeliad Society*

Need for Selected Back Issues of the BULLETIN/JOURNAL

I would be very grateful to anyone who will send me a copy of the November-December 1973 issue of the JOURNAL. The BSI library has a complete bound set of the BULLETIN/JOURNAL and an unbound set lacking only that one issue. I can copy material from the unbound issues because they can be opened flat, something that can't be done with bound volumes. Please send to: BSI Editor, 1508 Lake Shore Drive, Orlando, FL 32803-1305. I will refund the cost of postage and pay a reasonable price.

There is a continuing demand for *Bulletin/Journal* volumes and separate issues of the 1951 through 1975 volumes. We can supply scattered issues of 1951 through 1958 but have none for 1959 through 1975 except for 1970, no. 6.

If you have any of these volumes or separates in reasonably good condition to donate or offer for sale, write to the editor: 1508 Lake Shore Drive, Orlando, FL 32803-1305, telephone: 407-896-3722.

CORRECTION:

January–February 1995: page 7. The author has pointed out the omission of essential words. The sentence beginning, "The concentrated products . . ." should have read:

The concentrated products are much more economical to use. The ready-to-use products are expensive but may be worth the cost for the convenience of instant treatment.

January–February 1995: page 31, figure 18. That is a picture of *Tillandsia albertiana* and not *Tillandsia andreana.* Please correct your copy. Thank you, Harry.

A Guide to the Species of *Tillandsia* Regulated by Appendix II of CITES, Part III

Harry E. Luther[1]

Part III of the Guide concludes the series begun in the November–December 1994 issue of the JOURNAL. *It includes* Tillandsia sprengeliana, T. sucrei *and* T. xerographica. *The drawings were made by Barbara Culbertson, the photographs by Vern Sawyer and Pamela Koide.*

Tillandsia sprengeliana Klotzsch ex Mez in Martius, *Flora brasiliensis 3(3): 596. 1894.* Figures 3 and 4.

DISTRIBUTION. Endemic to restinga and Atlantic Forest at low elevations in the states of Rio de Janeiro and Espirito Santo, Brazil.

STATUS IN HORTICULTURE. Rare in cultivation.

DESCRIPTION. **Plant** an epiphyte, nearly stemless, 4–8 cm tall, single or densely clustering; roots wiry, 1 mm or less in diameter, brown. **Leaves** densely arranged, curving secund erect, 25 to 50 in number, grey-green to silver-grey, only a few of the oldest leaves reflexing toward the root system or stembase. **Leaf sheaths** broadly elliptic, 6–10 mm wide, subdensely and coarsely white lepidote except at the base. **Leaf blades** narrowly triangular, acute to acuminate, 3–8 cm long, 4–8 mm wide, slightly channeled, soft, subdensely and irregularly covered with coarse, spreading white trichomes and appearing conspicuously rough or pruinose. **Scape** erect, as long as or exceeding the leaves. **Scape bracts** like the leaves but less lepidote and tinged reddish. **Inflorescence** 10–25 mm long, simple, densely polystichously 4- to 10-flowered. **Floral bracts** ovate, acute to apiculate, 15–18 mm long, soft, sparsely white lepidote, rose-red. **Flowers** opening during the day and lasting 2-3 days. **Sepals** lanceolate, acute, 9–12 mm long, free, sparsely lepidote to glabrous, pale green. **Corolla** spreading. Petals narrowly oblanceolate, 15–20 mm long, rose.

SUMMARY. Small (4–8 cm tall) plant with curving, secund erect, slightly channeled leaves that appear grey-green or silver-grey and conspicuously rough or pruinose due to the less than complete and irregular covering of coarse spreading trichomes; a short rose-red inflorescence with rose, spreading petals.

VEGETATIVELY RESEMBLES:

Tillandsia kautskyi E. Pereira which has a more pseudobulbous form with more erect leaves that are densely covered with appressed trichomes and appear metallic;

[1] Mulford B. Foster Bromeliad Identification Center, The Marie Selby Botanical Gardens, 811 South Palm Avenue, Sarasota, FL 34236, U.S.A.

Figure 3.
Tillandsia sprengeliana.

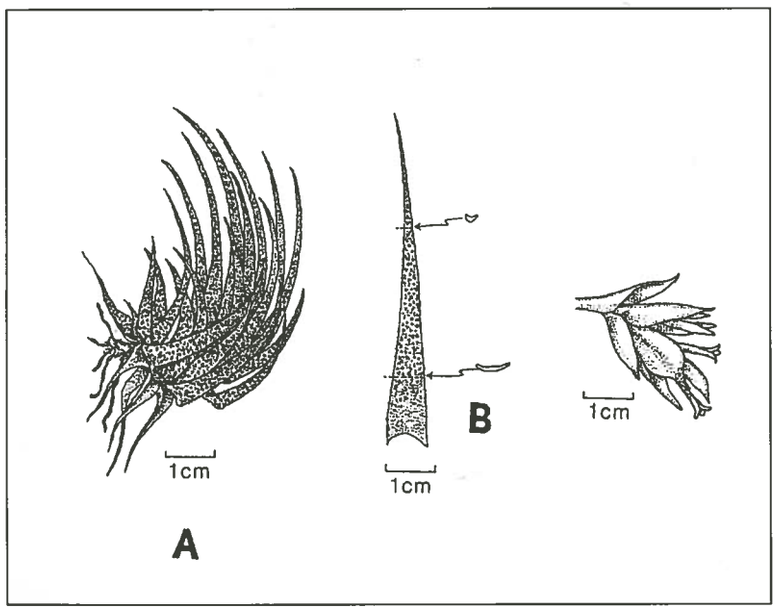


Figure 4.
Tillandsia sprengeliana.
A, habit; B, leaf; C, inflorescence.

Figure 5.
Tillandsia sucrei.

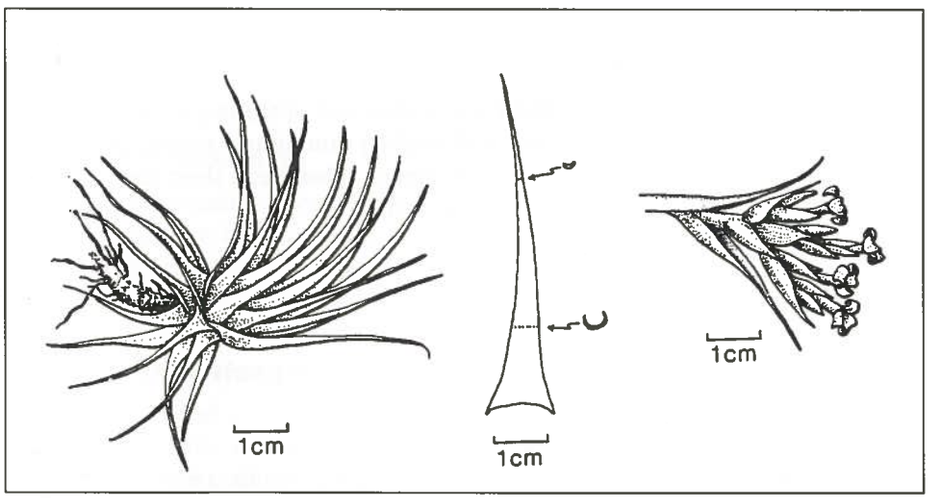


Figure 6.
Tillandsia sucrei. A, habit; B, leaf; C, inflorescence.

T. brachyphylla Baker which has broader leaves that are densely covered with coarse spreading trichomes and more conspicuously channeled;

T. thiekenii R. Ehlers which has more channeled to involute succulent leaves that, due to its pendent, lithophytic habit, are more tightly erect and not at all secund.

Tillandsia sucrei E. Pereira, *Rodriguesia* 26(38):115, Est. IV. 1971. Figures 5 and 6.

DISTRIBUTION. Endemic to a few rock faces within the city of Rio de Janeiro, Brazil, at elevations of 100 to 500 meters.

STATUS IN CULTIVATION. Uncommon in cultivation.

DESCRIPTION. **Plant** a lithophyte, nearly stemless to short caulescent, 3–6 cm tall, single or clustering; old plants may have the stembase covered with dead, reflexed leaves or the stem bare; roots wiry, ca. 1 mm in diameter, brown. **Leaves** laxly arranged, spreading to secund erect, 20 to 40 in number, silver-grey, the oldest leaves usually reflexing against the root system or substrate. **Leaf sheaths** broadly triangular, 6–10 mm wide, white lepidote except at the base. **Leaf blades** narrowly triangular, acute to attenuate, 3–5 cm long, 4–7 mm wide, channeled to involute, rather soft, densely covered with coarse, spreading white trichomes and appearing slightly rough or pruinose. **Scape** erect, usually shorter than the leaves. **Scape bracts** like the leaves but tinged rose. **Inflorescence** 10–25 mm long, compound with 3 to 6 branches. **Primary bracts** elliptic to ovate, acute, about equalling the branches, densely white lepidote, rose. **Branches** of the inflorescence 2- to 3-flowered, laxly spreading. **Floral bracts** ovate, acute, 8–12 mm long, carinate, rather soft, densely white lepidote, rose. **Flowers** opening during the day and lasting 2–3 days. **Sepals** lanceolate, acute, 12–14 mm long, the adaxial pair carinate and 1/3 connate, white lepidote, rose. **Corolla** spreading. *Petals* oblanceolate, 15-18 mm long, pink or lavender-pink.

SUMMARY. Small (3–6 cm tall) plant with rather soft spreading to secund erect channeled leaves that appear silver and slightly rough and scurfy, the oldest leaves usually reflexing toward the root system or substrate; a short rose inflorescence with pink or lavender-pink, spreading petals.

VEGETATIVELY RESEMBLES:

Tillandsia brachyphylla Baker which has broader, more densely arranged leaves with more strictly erect leaf blades;

T. gardneri Lindley which is several times larger with nearly plane, not channeled, leaf blades.

Tillandsia xerographica Rohweder, *Senckenbergiana* 34:113. 1953. (Synonyms: *T. kruseana* Matuda, *Cactaceas y Suculentas Mexicanas* 19(1):24–5. 1974. *T. tomasellii* DeLuca, Sabato & Balduzzi, *Brittonia* 31: 474–7. 1979). Figures 7 and 8.

DISTRIBUTION. Native in dry forests from southwestern Mexico to El Salvador, Guatemala and Nicaragua(?) at elevations of 150–700 meters.

STATUS IN HORTICULTURE. Very common in cultivation.

DESCRIPTION. **Plant** usually an epiphyte, rarely a lithophyte, nearly stemless, 10–100 cm tall, usually single; roots tough, wiry, ca. 1 mm in diameter, tan to brown. **Leaves** densely arranged, spreading to recurving (more or less erect or secund erect in young offsets), rarely twisted and pendent, 35 to 100 in number, light grey to silver-white, usually forming a full, pseuobulbous rosette. **Leaf sheaths** broadly ovate, 6–10 cm wide, inflated, brown but densely subappressed white lepidote except at the extreme base. **Leaf blades** narrowly triangular to nearly linear, acute to long attenuate, 30–75 cm long, 2–5 cm wide, channeled but becoming plane distally, usually obtusely ribbed, 1–2 mm thick, tough and leathery, very densely covered with coarse subspreading white trichomes and appearing nearly smooth and usually very white (occasionally tinged with pink). **Scape** erect, variable but always exserted above the leafy rosette. **Scape bracts** like the leaves, nearly always recurving. **Inflorescence** compound, densely digitate to very laxly pinnate, 20–50 cm long with 5 to 40 branches. **Primary bracts** from similar to the leaves (the proximal) to ovate and apiculate (the distal), mostly shorter than the branches, white lepidote, orange to rose. **Branches of the inflorescence** erect to spreading, narrowly lanceolate, 5–15 cm long, 5- to 15-flowered. **Floral bracts** tightly imbricate, lanceolate, acute, 30–45 mm long, variably carinate or nerved, glabrous, shiny, light orange to yellow to yellow-green. **Flowers** lasting a single day. **Sepals** lanceolate, acute, 20–35 mm long, the adaxial pair carinate and ½ connate, pale green. **Corolla** tubular. **Petals** very narrowly oblanceolate, 5–6 cm long, shorter than the stamens and style, lavender.

SUMMARY. Medium to large (unflowered 10–35 cm tall), heavy plant with usually spreading to recurving channeled to plane, thick leaves that appear nearly smooth and very white; a leaf cross section usually reveals obtuse ribbing; a tall branched inflorescence of orange to rose and yellow to yellow-green bracts and a lavender, tubular corolla.

VEGETATIVELY RESEMBLES:

Tillandsia fasciculata Swartz which usually has narrower leaf blades that are channeled to involute throughout and smaller leaf sheaths that, due to the less dense covering of smaller trichomes, appear distinctly dark brown; young plants usually have very straight, stiff leaf blades and appear much less silver or white (in most cases, *T. fasciculata* appears grey-green to nearly pale green, rarely silver-grey);

T. rothii Rauh and *T. roland-gosselinii* Mez which have green or yellow-green (occasionally tinged red) leaves with much smaller, more appressed trichomes and smaller, less inflated leaf sheaths.

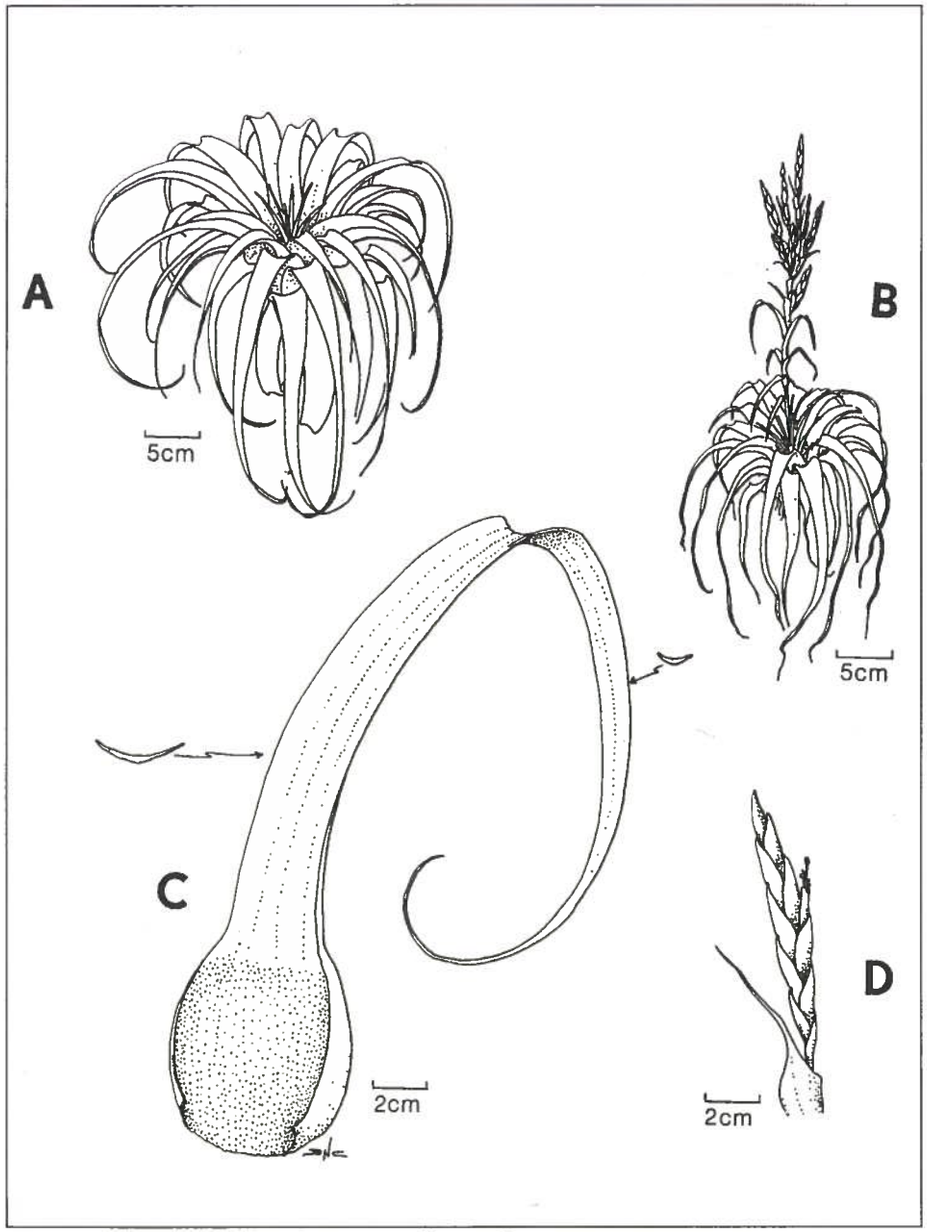


Figure 7.
Tillandsia xerographica.
A, habit of flowering plant; B, habit; C, leaf; D, branch of inflorescence.

P. Koide

Figure 8.
Tillandsia xerographica.

NOTE. *Tillandsia xerographica* is propagated by offsets in very large quantities in Latin America (principally Guatemala) and occasionally seed grown in Europe and USA. Seedlings resemble adult plants in conformation more than do young offsets. Young plants in the trade may be labeled as *T.* "Fasciculata Blanca," or rarely, *T.* "Sphaerocephala."

ACKNOWLEDGEMENTS

Production and publication of this paper was supported by the United States Department of Agriculture; I thank Don Thompson for his assistance. I also thank Dennis and Linda Cathcart, Pamela Koide, Elton M.C. Leme and Georg Zizka for their much appreciated comments and information; Barbara Culbertson and Stig Dalström for the drawings; Gregory Brown, Linda Hornberger, Pamela Koide, and Vern Sawyer for the photography; and my assistant, Edna Sieff, for production of the manuscript.

A Trip for Bromeliads South of the Orinoco River

Francisco Oliva-Esteve and Bruno Manara

Starting out on the 24th of October, 1994, the authors made a trip intended for four days to the State of Bolívar in southeastern Venezuela. The goal was to explore the Cerro E1 Trueno (The Thunder) midway between the cities of Caicara del Orinoco and Ciudad Bolívar and, according to the map, about 47 kilometers south of the main east-west road that flanks the southern banks of the Orinoco River. Since no botanical records had ever collected in that area, we hoped to find some rare bromeliads, especially navias or pitcairnias, to be included and illustrated in the new book on bromeliads now being prepared.

We started from Caracas at six in the morning, passed through the National Park of Guatopo and then headed south to Cabruta, a small town on the northern bank of the Orinoco River. Along that track we were impressed with the massive blooming of the colorful morning-glories, blue, pink, white, yellow, and especially the lilac-flowered "batatilla" *(Ipomoea batatas),* that carpeted the roadside, the fences and entire hillsides especially where fire and farming had depleted the original woodlands. This charming show, however, ended at noon since by about one o'clock all those millions of flowers had closed forever.

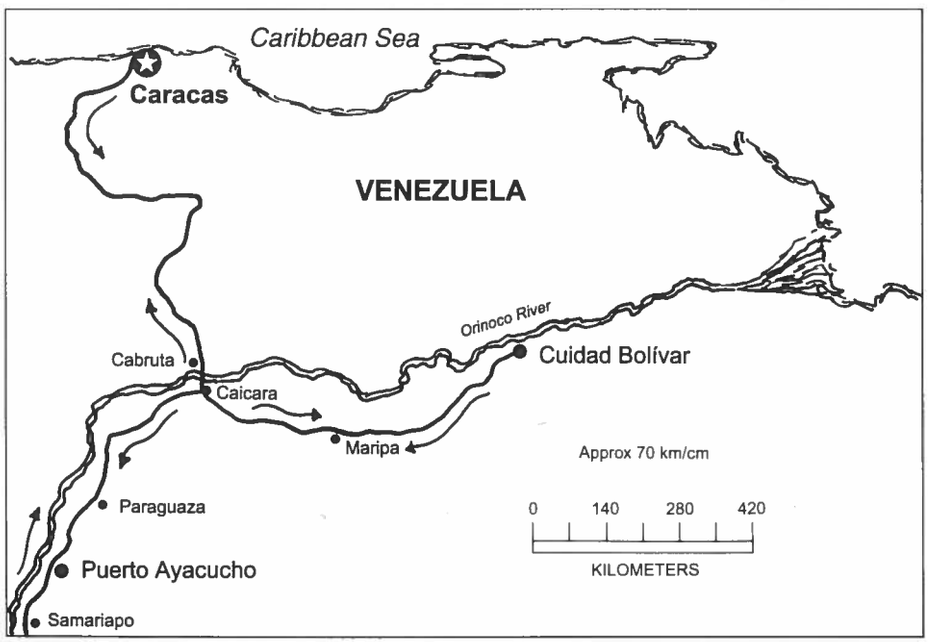


Figure 9. North-central Venezuela showing the authors' route.

Bruno Manara

Figure 10.
The *chalana* (ferryboat) to cross the Orinoco between Cabruta and Caicara del Orinoco returns for the authors.

In all that distance no bromeliad was seen but for two or three common epiphitic individuals in the Guatopo National Park. Since E1 Trueno was far away, we hurried to reach Cabruta before 3 p.m. in order not to waste time awaiting the ferry that we must take to cross the Orinoco. While searching for the landing we lost precious minutes and arrived when the ferry, loaded with trucks, cars, and buses, had just departed and was five to six meters away from the shore.

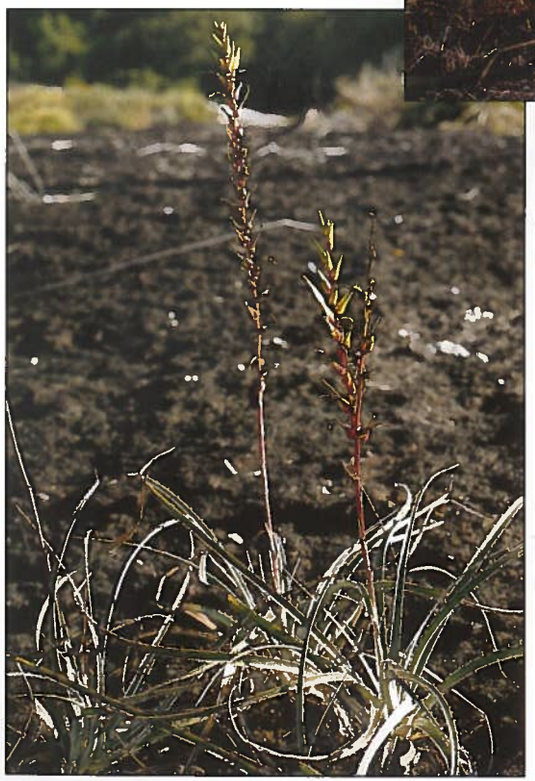
In distress, we gazed at an empty place on the deck, big enough for our car (figure 10), but resigned ourselves to wait a couple of hours until the ferry would return for the several trucks that were also waiting. As we started to back up, incredible as it might seem, we noticed that a sailor was yelling and waving his hat at us—and the ferry came back.

An hour later, after a happy crossing of the mighty Orinoco River, we landed in Caicara del Orinoco and immediately started east to Maripa about 130 km away on the Caura River, where we arrived at 7 p.m.

Early the next morning we started east again along the well-maintained road and after an hour or so we found our first bromeliad on the south side of the Orinoco. It was a sterile *Bromelia goeldiana* growing among rocks in full sun. So far, we had been driving mostly through savannas but also within sight of the

Bruno Manara

Figure 11.
Pitcairnia pruinosa
Humboldt, Bonpland & Kunth.



F. Oliva-Esteve

Figure 12.
Pitcairnia armata Maury.
Habit and inflorescence detail.

Bruno Manara

Figure 13.
Navia igneosicola L.B. Smith, Steyermark & Robinson

characteristic mountains of the Guayana Shield, actually, huge black blocks of stone, fancifully eroded and partially covered with forests and grasses.

After about half an hour since we couldn't locate the way to El Trueno, we stopped at a shack eating place for information. A man told us that we had left the road we were looking for far behind. Anyway, he added, it was in very bad shape and it might take us a week or so to reach El Trueno. In other words, so far *not* so good.

Disappointed, we decided to go back to Caicara, about 200 kilometers away and then drive to Puerto Ayacucho, the capital of the State of Amazonas, another 350 km southwest. From that area several bromeliads had been recorded frequently but none of them had so far been illustrated in a book. This was their chance.

When we again reached the Caura River, we saw a sterile bromeliad high on the trunk of a huge tree. It was, obviously, an aechmea, the second bromeliad spotted south of the Orinoco.

We paused in the town of Caicara at about 1:30 p.m., filled the tank and then headed toward Puerto Ayacucho. It was a very monotonous trek. The weather was hot and humid, and we were frustrated at not finding the bromeliads we had hoped to find.

After driving another couple of hours and passing Los Pijiguaos and the Parguaza River, Francisco decided to stop to rest. Then, we had the first surprise of the day! Right on the huge rocks that bordered our stopping place was a plen-

tiful colony of *Pitcairnia breweri* with most of the mature individuals already in fruiting stage but some still flowering. We hurried to take pictures of the habit of the plant and also some closeups of a flower.

On we went with higher spirits and some time later had the second surprise: another bromeliad. It was *Pitcairnia pruinosa*[1] (figure 11) looking astonishingly like an aloe or a young agave, growing on naked rocks close to the road, fully exposed to the sun. Once again, however, all of the mature plants were in fruiting stage. We had to resign ourselves to taking pictures of the habit hoping that we might find some late blooming plants farther on.

Since it was late, and the sky was densely covered with dark clouds, and there was rain in front and around us, we put aside the search for bromeliads and concentrated on reaching Puerto Ayacucho. We arrived there at 7 p.m.

Early the next morning, we moved on toward Tobogán de la Selva, about 30 km south, famous both as a bathing place and for the several new botanical (including bromeliad) species found in and around it. On the way, we visited the famous Raudales (Rapids) of Atures on the Orinoco River where, alas, no bromeliad was to be found, but then we were lucky enough to find a laja (a ledge) on the roadside where there were several late-blooming individuals of both *Pitcairnia armata* (figure 12) and *P. pruinosa. P. bulbosa* was also present although all of the mature individuals were in the fruiting stage.

As usual, however, we kept hoping that further on we might find some good, late-blooming plant. In fact, when we reached Tobogán, there on the bare rock were several colonies of *Pitcairnia bulbosa* with a number of plants in full bloom. We were lucky enough to take a picture of an opened flower. Lucky, we say, since by 10 a.m. all the flowers were already closed.

Then, we followed a path into the jungle and on a huge boulder we found three more bromeliads: *Vriesea bi-beatricis*, the already familiar *Bromelia goeldiana* and the recently described *Navia igneosicola* L.B. Smith, Steyermark & Robinson (figure 13), closely related to *Navia arida,* but with sterile individuals only.

At noon, after a light lunch, we moved south and on top of another boulder, close to the road, we met a "family" of *Aechmea tocantina.* All five or six individuals constituting that thick colony, not even 50 cm wide, were attached through rhizomes to the central mother plant.

Then, just as a matter of pride, we continued the village of Samariapo on the Orinoco, where the road ended, and turned back.

Caracas, Venezuela

[1] *Listed as* Pepinia *in the* ALPHABETICAL LIST OF BROMELIAD BINOMIALS *by Harry E. Luther and Edna Sieff.*—Ed.

Brocchinia reducta: A Carnivorous Bromeliad from the Guayana Highlands of Venezuela

Julio Schneider; translated by Harvey L. Kendall; illustrated by the author

ABSTRACT

Bromeliads exhibit traits that seem to be preadaptations for a carnivorous life. They possess absorptive foliar scales and water-impounding tanks. In the case of the epiphytic species they would benefit from additional nutrients. Nevertheless, we know only about one, or if we recognize *Catopsis berteroniana* as such, then two carnivorous bromeliads.[1] *Brocchinia reducta,* its characteristics, habitat, and systematic position within subfamily Pitcairnioideae are presented.

Brocchinia reducta Baker is a perennial, herbaceous plant 50 to 60 cm tall in bloom with leaves forming an upright, cylindrical rosette 25 to 50 cm tall. The inflorescence is doubly branched and at the base occasionally divided into the third order. The relatively small, ca. 5-mm-long, white flowers have an inferior ovary with few seed chambers. The fruit is a cylindrical capsule 10 mm in length. The seeds are elongated and bicaudate; the two tail-like ends are unequal in shape. The apical end is flattened while the basal end is divided into four to eight finger-shaped lobes (Varadarajan & Gilmartin 1988a). The long, smooth-edged leaf blades are rounded at the apical end and equipped with a sharp tip; they are also densely covered with absorptive scales set into the epidermis. In addition, they are covered with a fine, powdery wax layer, which is easily rubbed off.

The genus *Brocchinia* along with *Ayensua, Connellia, Navia*, and to a large extent *Cottendorfia* (all Pitcairnioideae) are endemic to the Guayana Highlands. The Guayana Highlands stretch across southern Venezuela but also include northern Brazil, southeastern Colombia, the western end of Guayana, and an isolated area in Surinam. They encompass a total area of approximately 1.2 million square kilometers. Characteristic of the area are the mighty sandstone, table-like mountains, called tepuis, some of which exceed

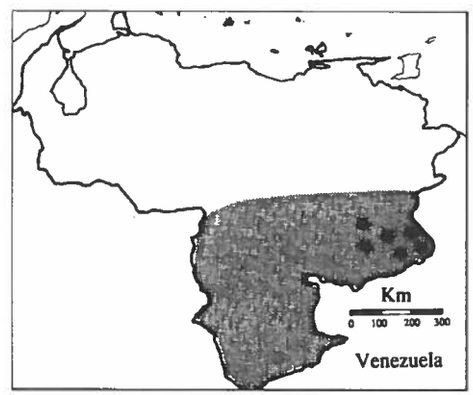


Figure 14.
Distribution of *Brocchinia reducta* Sterne within the Guayana Highlands of Venezuela (shaded).

Figure 15.
Blooming *Brocchinia* species in a wet highland savanna at the foot of Mt. Roraima.

Figure 16.
Fruiting *Brocchinia reducta* in the savanna of Guayaraca.

Figure 17.
Population of *Brocchinia* species *(B. hechtioides* or *B. reducta)* on Auyan-tepui.

3,000 m. The age of these huge sediments is 1.5 billion years—the pre-Cambrian era.

Brocchinia reducta is limited primarily to the southeastern highlands of Venezuela, the Gran Sabana (figure 14). There, it appears in relatively dry highland savannas dominated by brush or in swampy savannas dominated by grass (figures 15 and 16). Habitats also include sandy, turf-covered substrata and bare rock on the heights of the tepuis (figure 17). This bromeliad thus ranges from ca. 500 m to 2,900 m. The soil is extremely acidic (pH up to 3.0) and poor in nutrients. Light exposure, especially on the tepuis, is very strong. The annual precipitation amounts to between 2,000 and 3,000 mm. The rainy season extends from April or May to December. The remaining months are relatively dry.

Brocchinia reducta belongs to the subfamily Pitcairnioideae, which, according to Varadarajan & Gilmartin (1988c), comprises 16 genera. It is viewed as the most primitive of the three subfamilies of Bromeliceae: Pitcairnioideae, Tillandsioideae, and Bromelioideae. As phylogenetic studies have shown, this group is nevertheless heterogeneous so that it appears justifiable to divide Pitcairnioideae into the three tribes Pitcairnieae, Puyeae, and Brocchinieae. The latter consists of the genus *Brocchinia* only. This fact reflects the isolated habitat of this genus. [2] On the basis of synapomorphies (common derivative) characteris-

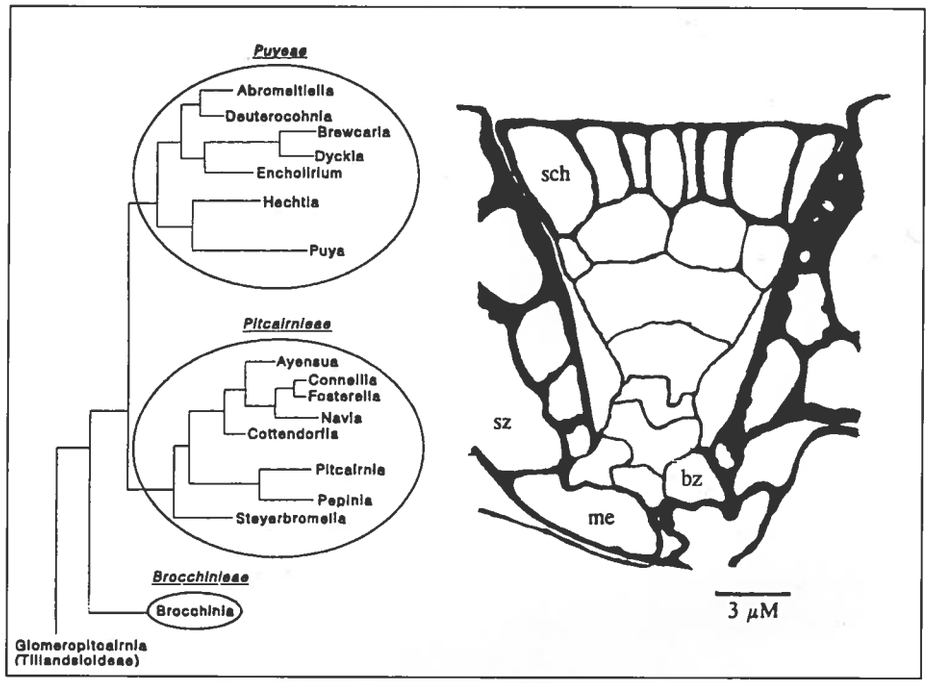


Figure 18.
(Left) Relationships within the subfamily Pitcairnioideae, which is divided into three *tribes*. The connection to Tillandsioideae is determined by way of a common, extinct ancestor (after Varadarajan et al. 1988b).

Figure 19.
(Right) Tangential cut through a trichome of *Brocchinia reducta:* bz = basal cells; me = mesophyll cells; sch = shield cells; sz = stem cells (after Owen et al. 1988).

tics the question has subsequently been asked whether *Brocchinia* should still be placed in Pitcairnioideae at all. On the basis of the proposed relationships among genera in this subfamily one assumes that *Brocchinia* split off very early (Varadarajan & Gilmartin (1988b). Perhaps it even represents a connection to the subfamily Tillandsioideae by way of *Glomeropitcairnia* with which it shares some common characteristics (Benzing et. al. 1985 (figure 18). The separation happened presumably toward the end of the cretaceous era in the area of today's Guayana Highlands. Thereafter, this line of development evolved only slightly and was limited to this region since insufficient distribution mechanisms and adaptation to nutritionally poor, acidic sandstone soil made it difficult for the genus to spread (Varadarajan & Gilmartin 1988b). Today, the genus *Brocchinia,* which was named for the Italian natural scientist G.B. Brocchi (1772–1826), encompasses 21 species.

Structure and function of the absorptive foliar scales

Characteristic of the bromeliads are the so-called foliar scales (highly specialized trichomes). Within Tillandsioideae and Bromelioideae these trichomes

are essential especially in the absorption of water and nutrition. Thus, they are closely bound to the plant's epiphytic nature. For Pitcairnioideae, whose members are predominantly terrestrial, absorptive trichomes could be proven up until now only in exceptional cases.

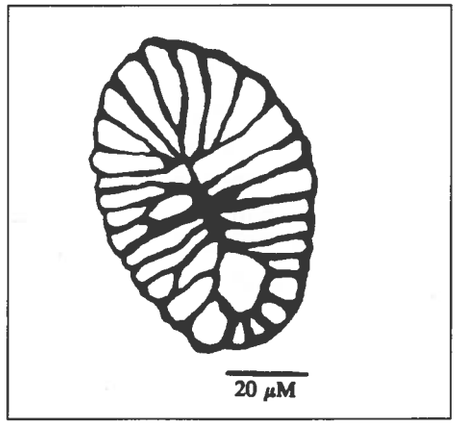


Figure 20.
View of a trichome shield of *Brocchinia reducta* (after Owen et al. 1988).

With this background, it seems all the more noteworthy that *Brocchinia reducta* has developed such trichomes, especially since it is exclusively terrestrial. Their absorptive scales do not rise above the leaf surface [unlike those of *Tillandsia,* for example]. The trichomes, which absorb water and nutrition, however, are found only at the base of the rosette. They consist of large, basal cells surmounted by stem cells and finally shield cells on the surface. In comparison with hitherto known absorptive scales of other bromeliad species, those of *Brocchinia reducta* are exceptional in that their shield cells remain viable after maturity and the stalk consists of multiple rows of cells (figure 19) The shield is constructed of about 30 elongated, radially arranged cells. The shield cells, and in some cases also, the outer stem cells show a peculiar labyrinthine cell-wall structure (figure 20). The cuticle covering these areas is relatively thin. Investigations have proven that it is a finely branched network of canals that probably have a regulating function in the absorption of nutrients. Through these canals amino acids and proteins up to a diameter of about 6.6 nm are absorbed. These also penetrate the relatively thin primary wall and then by endocytosis (pinocytosis) reach the cytoplasm of the shield cells. During dry periods the canal structures provide an effective protection against evaporation (Benzing et. al 1985, Owen et al. 1987, Owen & Thompson 1991).

Carnivory in *Brocchinia reducta*

According to Givnish et al. (1983) there are two stipulations in the definition of carnivory. First, the plant in question must be capable of absorbing nutrients from captured prey and thereby exhibit enhanced fitness in the form of greater vigor and survivorship (e.g. in the form of greater pollen production or number of seed). Next, it must have adaptive devices that clearly exist to entice, catch, and digest the prey.

As already mentioned, *Brocchinia reducta* has an upright, cylindrical, tubular tank made up of only a few leaves and in which water collects. The leaves are covered with a fine, powdery loose deposit of wax that makes it difficult or

impossible for insects to escape once they have fallen into the tank. The tank liquid emits a sweet, nectar-like aroma that entices insects. The liquid is extremely acidic with a pH of 2.8 to 3.0. There are no digestive glands. Nearly 90% of the dead arthropods found in the tanks were ants of various species. Some ants, as we know, frequently feed on nectar. The trichomes are able to absorb amino acids and similar products resulting from the animal decay. With that evidence, both stipulations for carnivory are sufficiently met. *Brocchinia reducta,* like *Heliamphora,* the South American pitcher plant, which is frequently found with it, belongs among the plants with pitfalls.

The development of carnivory may have occurred in the following way: The closest relatives of *Brocchinia reducta* were presumably facultative tank-forming plants as, for example, *Brocchinia tatei.* They colonize shady cloud forests and possess spreading leaves typical of bromeliads of that habitat. In colonizing sunny savannas, the formation of upright leaves covered with a thick, reflecting cuticle is advantageous to reflect excess radiant energy. Terrestrial populations of *Brocchinia tatei* growing in sunny locations also show such characteristics.

The first requirements for carnivory were thus given. The next decisive step was accomplished by emitting a sweet, nectarlike aroma into the tank water to lure insects. Through the trichomes, the products of decomposition, e.g. amino acids, could be absorbed (Givnish et al. 1984).

Along with the prey there are, however, other arthropods for which *Brocchinia reducta* serves as habitat. In the dry regions pseudoscorpions live among the leaves; spiders live in the tank; even mosquito larvae are found in the tank water. Larger animals such as frogs and snails can be observed in the plant now and then.

Cultivation

Brocchinia reducta is easily cultivated in full sun. It can survive with less light but with the loss of its natural growth habit. Fertilizer is needed for faster growth. You can grow the plants at room temperature in clay pots with a mixture of peat and sand in a ratio of 5:1. The medium should be kept slightly (to moderately) moist at all times . . . .

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NOTES:

1. Brocchinia hechtioides, *closely related to* B. reducta, *is also carnivorous.*—D.H.B.
2. *There are many other genera which have isolated ranges that do not merit separate tribe status.* —D.H.B.

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Recent Gifts to the Society

In recent months the following named members and friends have contributed to the Color Fund, to the BSI general fund, or to the Bromeliad Identification Center, some to all three. We acknowledge their generosity with thanks.

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Orlando World Bromeliad Conference, 1996 –*Orlandiana '96*

B.C. McKinney

Now that you've decided to come to, and perhaps may even be involved with, the next World Bromeliad Conference in Orlando, called *Orlandiana '96,* what information would you like to have? You know all about bromeliad shows and conferences. I'll bet you want to know more about the hotel, the beautiful Clarion Plaza.

Surrounded by lush tropical landscaping, the Clarion Plaza Hotel Orlando is located on famous International Drive next to the huge Orange County Convention Center. Here are a picture of the front of the 14-story hotel and a map showing its location right in the center of the well-known tourist attractions (figures 21 and 22) (more about that in the next issue).

Scheduled transportation is available from Orlando International Airport, just 15 minutes away by the Beeline Expressway (State Road 528). Car and van rentals are available at the airport, of course, but also from Thrifty Rent-A-Car Company right on the hotel premises.

Accommodations, you ask? There are 810 guest rooms and suites. Wheelchair accessibility is provided in 220 rooms and 12 special rooms are ADA-approved for disabled guests. All rooms have remote-control color TV, in-room movies, 15 free TV channels. There are in-room safes, separate vanity areas, full-length mirrors, individually controlled air conditioning, and in-room express check-out.

Photograph provided by the hotel

Figure 21.
Clarion Plaza Hotel Orlando.

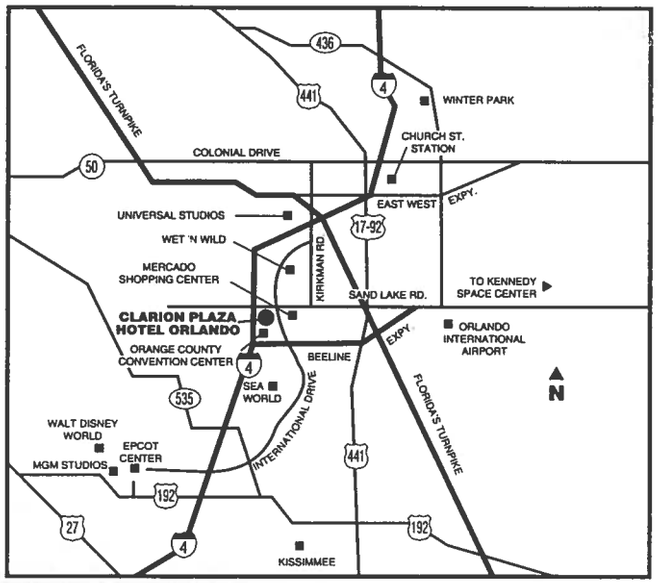

Figure 22.
Central Florida map showing hotel and attractions.

Numerous guest services are provided by the Clarion Plaza: a business center (office away from home), operated by the Xerox Corporation, providing copying, FAX, and secretarial services; computer modem capability in 50 rooms; convenience store off the lobby; gift and sundries shop, coin laundry on every other floor; outdoor pool and jacuzzi; infant care; overnight photofinishing; room service; scheduled transportation to area attractions and shopping; soft-drink vending on each floor; valet parking available; and video game room. If you don't see it, ask.

Your sponsoring societies are busy exploring the 60,000 square feet of unobstructed space for the various functions. There is a grand ballroom of 26,000 square feet, a preparation room almost half that big, 18 meeting rooms that have 1,000 square foot areas.

I know you are going to get hungry, even at the oddest times. Clarion Plaza has anticipated your needs with extensive food and beverage service. Jack's Place offers fine dining in the evening. Cafe Matisse is a full-service coffee shop with elaborate buffets and a la carte menu. There you can order breakfast, lunch, and dinner from 6:30 a.m. until midnight. In addition, there's Lite Bite open 24 hours every day with delicatessen, convenience foods, and fresh-baked delicacies, beer, wine, and spirits. More yet. for just sitting around, there is the Lobby Lounge where you may enjoy your favorite beverage. It is open from 11 a.m. until 2 a.m. For dancing and live entertainment there's Backstage, one of Orlando's most popular night spots. You can rest when you get back home.

730 Springview Drive
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Report of the BSI Slide Librarian

Jim Racca

The BSI Slide Library has eight programs available for loan to affiliated societies. All programs are in slide carousels for gravity-drop projectors and include written descriptions with the exception of program #5 which includes an audio cassette. They are as follows:

1. Brazilian bromeliads; habitats and homeland. By R. W. Spencer. 80 slides.
2. Costa Rican bromeliad adventure. By Thelma O'Reilly and Elmer Lorenz. 73 slides.
3. Aechmea jewels. 75 slides.
4. Tillandsia. 80 Slides.
5. Other Genera. Developed and narrated by Carol Johnson. 72 slides.
6. Ensign collection ca. 1950. By Ed. Ensign. 80 slides.
7. Bromeliads in Paradise; 11th World Bromeliad Conference, San Diego, CA. June 1994, by Jim Racca.
8. Bromeliads on the Red; 23rd Annual Southwest Bromeliad Guild Show, hosted by the Shreveport Bromeliad Society, Sept. 1994. By Jim Racca.

Rental of a slide program requires a $50 deposit of which $25 will be refunded upon return of the program. The use fee is assessed to allow the BSI Slide Library to be self-supporting. The library fund pays the postage to you and your society pays the return postage. The deposit check should be made payable to the BSI Slide Library. For all correspondence, please send a stamped, self-addressed envelope. List the order of preference and the date you will be showing the program.

Return the program promptly after use. If not received within 10 days of the program date, a fine of $.50 per day will be deducted from the refund check, which is normally returned upon receipt of the returning program. Return the program in the same condition as sent: intact in the carousel with narration/cassette included.

Insure the package for $50 and mail it First Class. No duplication of these slides is permitted. You must not pass these programs on to other groups, clubs, affiliates, etc without my express permission. Return the program with any comments, suggestions, and/or questions to me.

Dr. Jim Racca, BSI Slide Library Chairman
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WE AGAIN WISH HAPPY BIRTHDAY to Ella Kelley on the occasion of her **107th** birthday, March 15, 1995. Mrs. Kelley is an honorary member of the Seminole Bromeliad Society. She still loves bromeliads and cards. Her address is: Mrs. Ella Kelley, DeLand Convalescent Center, 451 S. Amelia Ave., DeLand, FL 32724.

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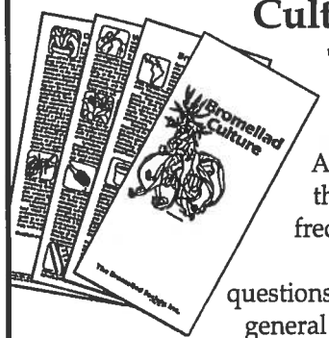

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The purpose of this nonprofit corporation is to promote and maintain public and scientific interest in the research, development, preservation, and distribution of bromeliads, both natural and hybrid, throughout the world. You are invited to join.

Jim Racca

Aechmea 'Aztec Gold', Maura Williams's prize-winning entry in the San Diego World Bromeliad conference show, June 1994. Please see the text page 59 and following.

Calendar

2–5 March	The 1995 New York Flower Show. Piers 90 and 92, Westside, New York City. Thursday–Saturday, 10 a.m. to 9 p.m.; Sunday, 10 a.m. to 6 p.m. The New York Bromeliad Society will present a display of blooming bromeliads. Other exhibits by the Begonia, Cactus & Succulent, Gesneriad, Orchid, and African Violet Societies, the New York and Brooklyn Botanical Gardens and leading private and commercial gardens.
15–17 April 1994	Bromeliads VIII, sponsored by the Bromeliad Society of South Australia. Royal Coach Motor Inn, Adelaide, South Australia. Lectures, visits to collections, rare plant auction. Some activities extra charge. Principal speaker: Renate Ehlers, Stuttgart, Germany. Registration AUS$85 before 16 Dec. 1994. Registrar: M. Robinson, P.O. Box 260, Woodville, South Australia 5011, Australia.
22–23 April	Sarasota Bromeliad Society Annual Show and Sale, co-sponsored 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.
29–30 April	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. Potting demonstration both days. Free admission and parking. Charlyne Stewart 310-391-4118.
29–30 April	Broward County Biennial Show and Sale, "Bromeliad Adventure III; Luau Holiday." Flamingo Gardens, Fort Lauderdale, FL. Standard BSI-judged show, Saturday evening luau, lectures, visits to members' homes and collections. Saturday & Sunday, 10 a.m. – 5 p.m. Tom Naylor 305-797-7797.