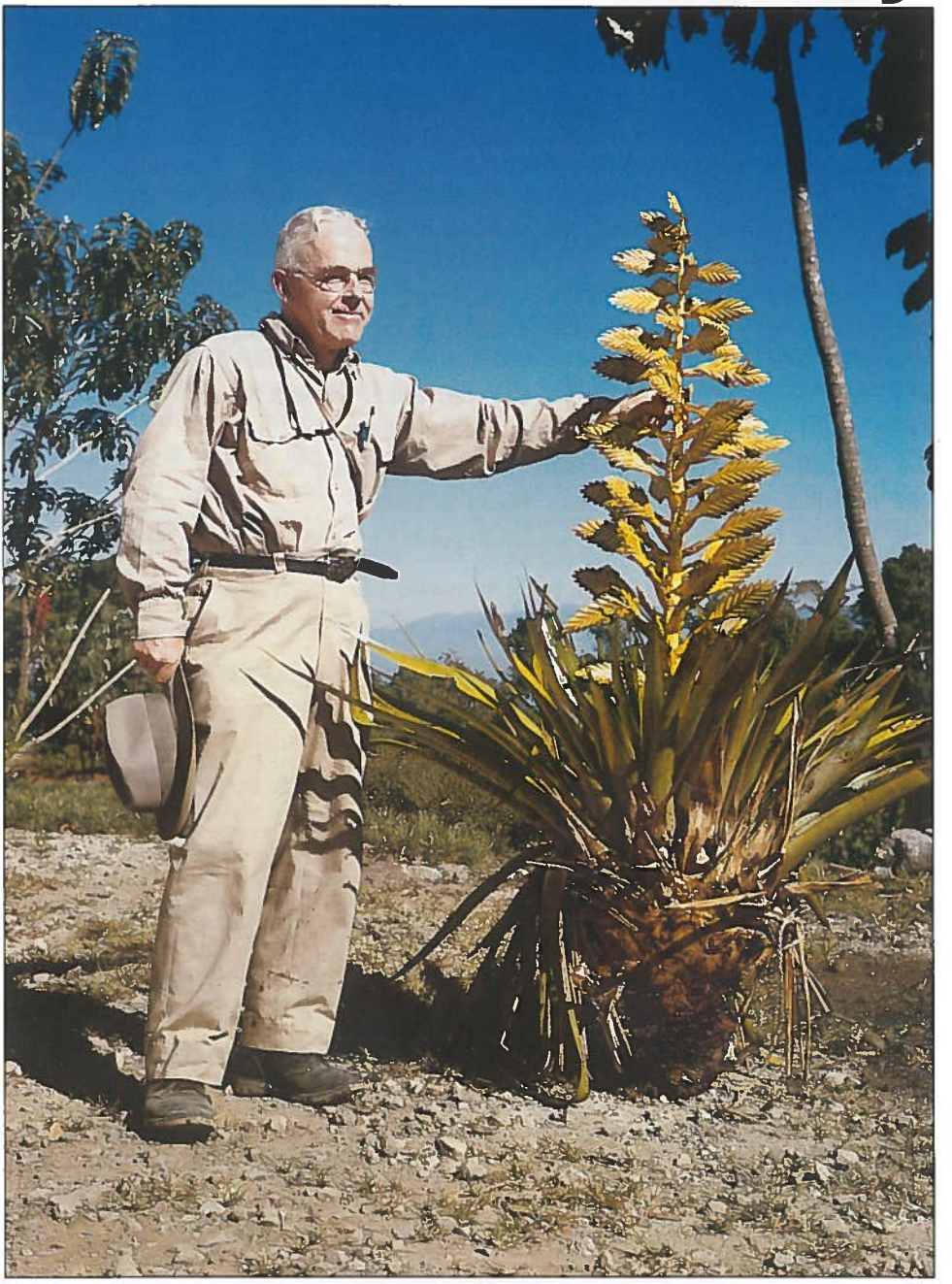
Journal of The Bromeliad Society



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Cover photographs. Front: Here is the 62-year-old Dr. Lyman B. Smith on 10 March 1966 in Costa Rica standing next to *Tillandsia oerstediana*, which he described that year. Photograph by Hollings Andrews. Please see the text on pages 254–256 Back: A tray of flowering *Tillandsia straminea,* one of the fragrant tillandsias discussed by Greg Payne on pages 268–270. Photograph by Chet Blackburn.

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The Venezuelan *Brocchinia micrantha*

Francisco Oliva-Esteve

In the so-called Guayana Highlands of the state of Bolívar in isolated, southern Venezuela, with Guyana toward the east, Colombia to the west, and Brazil to the south, deep in the jungle along the road to La Gran Sabana (The Grand Savanna) is found the mighty *Brocchinia micrantha* (Baker) Mez. It was originally collected in 1872 near the Essequibo River in Guyana and has since been collected by such botanists and naturalists as Appun, Steyermark & Aristeguieta, Jenman, Maguire & Wilson-Browne, Foldats, Varadarajan & Oliva-Esteve.

Many unusual, new genera and species of plants are known only from this vast "Lost World" where most of the sandstone or quartzite strata domes, table-like mountains or "tepuis" are located. Tepui is a Pemón Indian word for mountain. These tepuis are scattered over an area of 180,000 square miles. They are the remains of giant plateaus that at one time stretched across the entire region. Angel Falls, at 960 m, the highest in the world, is located here on Aúyan-Tepui (figure 1). In the course of centuries these flat-topped mountains were gradually eroded and washed to the sea. This composite erosion along ancient fractures is the result of the changing climate and geologic conditions that determined the age. These deposits were laid down at least 1.8 billion years ago atop the Guayana Shield, the oldest rock formation in South America.[1]

In 1838 the German explorer Robert Schomburgk visited the area and collected many rare plant samples. He explored the tepui region for the British Royal Society. His writings inspired others to come, among them the British botanist Everard im Thurn, who came to Venezuela in 1884. He succeeded in reaching the top of one of the most famous tepuis, Mount Roraima (figure 2). On his return to Europe he gave several lectures about his expeditions to his colleagues. One of those meetings in England was attended by the novelist Arthur Conan Doyle, creator of the legendary Sherlock Holmes. Doyle was so enchanted with im Thurn's descriptions that he was inspired to write THE LOST WORLD (published in 1912) describing the legend of a South American tepui located in southeastern Venezuela (Mount Roraima} where prehistoric plants and animals had lived in isolation for millions of years.

Later on, various expeditions from the United States were made over a period of years the participants including Smith, Tate, Hitchcock, Williams, Spruce, Maguire, Wurdack, Politi, Tillett, Bunting, Pittier, and Steyermark, as well as several Venezuelan explorers. These authors collected and named many new genera. As a consequence, most of the genera of Pitcairnioideae have been

Daniel Oliva-Hinckley

Figure 1.
Angel Falls, the highest in the world, with a free drop of 960 m, Aúyan-Tepui.

Author

Figure 2.
Mount Roraima (right) and Mount Kukenán, 2700 m high, Bolívar, Venezuela.

Author

Figure 3.
Brocchinia micrantha in its habitat, La Escalera (the Ladder), the entrance to La Gran Sabana. The road climbs from 200 m altitude up to 1100 m and twists and climbs like a ladder.

Author

Figure 4.
Brocchinia micrantha.
The scape alone is 2–3 m high.

found and described: *Navia, Lindmania, Connellia, Brewcaria, Steyerbromelia,* as well as endemic species of *Pitcairnia, Vriesea,* and *Tillandsia.* The genus *Brocchinia* Schultes filius occurs there too, especially on the talus (slopes) of the tepuis and lower lands.

Of the 21 or more species of *Brocchinia* already classified, *B. micrantha* stands as the largest of the genus and consequently becomes, to my knowledge, after the enormous Peruvian-Bolivian *Puya raimondii*, the next largest bromeliad ever found. It reaches a height of seven to eight meters. Then, in order, *B. paniculata* Schultes f. and *B. tatei* L.B. Smith, attaining about five to six meters. They are the dominant plants of the vegetation of the site in which they occur. The habitat of such giant specimens develops around rocky and humid regions often on the lower talus of many tepuis.

Brocchinia micrantha (figures 3 and 4) has a tank-like habit; its lofty columnar stem is encircled by enormous, wide, strap-shaped, ascending, yellow-green leaves flushed with purple in the lower half and dark black-brown at the base. The leaves are 1–2 m long and 15–25 cm wide. They start growing in opposite levels from the bottom of the rosette up to the summit of the stem becoming broadly acute and apiculate. The strikingly tall, diffuse inflorescence, in contrast, has small and insignificant flowers, usually creamy, with sepals and petals 5–7 mm long in many branched panicles.

The plants need much air and humidity around their root system, adequate drainage, plenty of humus-bearing soil, and lots of water. Several attempts have been made to grow them in Caracas, some succeeded, others succumbed. Since they grow at altitudes between 700–1100 m there is no reason why they could not grow indoors in botanical gardens or any other place with the same climate. In any case, the whole plant with its tiny flowers and large, long, leaves offers a magnificent spectacle.

Caracas, Venezuela

END NOTE:

[1] For more information see "VENEZUELA'S ISLANDS IN TIME," by Uwe George, National Geographic, May 1989, and "*Lost World of the Tepuis*," by Tom Melham, photographed by Jay Dickman. In: BEYOND THE HORIZON; ADVENTURES IN FARAWAY PLACES. (Washington, D.C.: National Geographic Society, 1992), 124–155.

Vegetative Propagation: Treatment with Cytokinin BAP Brings Interesting Initial Results

Bernhard Bessler **Translated by Harvey L. Kendall**

Besides the growing number of commercial nurseries that have an interest in the highest possible propagation rate for the plants that they deal with, plant hobbyists are also interested in being able to propagate their plants effectively. No matter whether you would like to have trading material or whether you are trying to preserve and propagate rare species, a high propagation rate is always desired.

Collecting in the wild together with the destruction of natural habitats (e.g. rain forests) has led to the unanticipated inclusion of several tillandsia species in the Washington Species Protection Law. Thus, in the past year in Kyoto, seven-species *(T. harrisii, T. kammii, T. kautskyi, T.mauryana, T. sprengeliana, T. sucrei,* and *T. xerographica)* have been included in the appendix of the Washington Species Protection Law.

With the growing trend of including tillandsias in bromeliad collections or simply having them in the home, the volume has also increased in the trade. Figure 5 gives an insight into the dimension of trade just in the horticultural trade

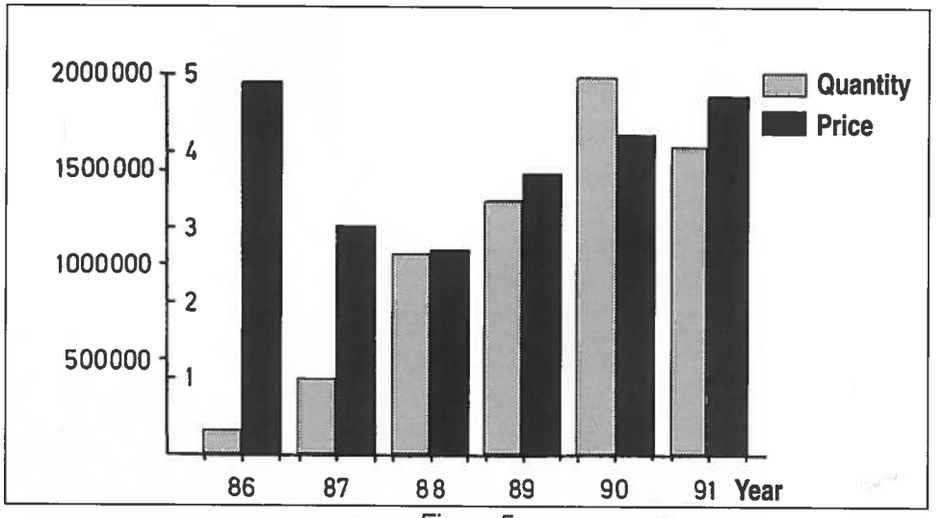

Figure 5.
Marketed quantity and average price of the tillandsias sold in recent years in Aalsmer. (Auction and sales office without note of individually listed species, e.g. *T. cyanea).*

Figure 6.
Tillandsia aeranthos after treatment with BAP. Left, control plant of equal age. The high degree of pupping and the retardation of leaf formation at the apex of the treated plant are seen clearly.

Photos by Author

Figure 7.
Even in *Vriesea zamoriensis*, the potential for offshoot formation after BAP treatment is evident.

center in Aalsmer, Holland (auction and sales office together). The actual number of plants must be even higher, since statistics in Dutch establishments in the categories evaluated here, "other tillandsias" (which excludes, for example, *T. cyanea* and other tillandsias) are listed as well as arrangements made up of several plants, for example, epiphyte trees. The average price shown in figure 5 has been compiled from data from the sales office and from auction. In 1990 in Aalsmer, tillandsias were sold in numbers similar to large-flowered cyclamen, for example. In 1991 the now-protected *T. xerographica* mentioned above in regard to the Washington Protected Species Law appears in the statistics.

Seed growing of tillandsias is possible in our latitude, but it is extremely tedious. A *Tillandsia aeranthos* takes about five years to reach bloom stage. Flower induction and subsequent seed development and harvest is possible by means of Bromeliad Ethrel (Zimmer and Weyers, 1991. See also DIE BROMELIE, February 1992). Of course bromeliads produce a few offshoots ("pups")—generally between one and four—in the leaf axils after the apical meristem (the tip of the growing shoot) has been transformed into an inflorescence. The growth system of bromeliads, however, is constructed in such a way that there is a dormant meristem ('sleeping eye') in every leaf axil of the rosette of leaves. These dormant meristems serve as reserves in case something destroys the pups that are most remote from the growing tip. As long as the plant continues to grow and form leaves at the tip, the axil buds are almost always prevented from growing. (Exceptions are possible, as, for example, in *Tillandsia butzii.)*

By removing the growing tip (breaking the apical dominance), we know that we can often induce branching of the plant structure. In *Tillandsia aeranthos,* however, such treatment has resulted in only about 50% of the cases producing more than one, usually only two, offshoots (Zimmer and Weyers, 1991).

In addition to actively destroying or chemically altering the apex, we know from the literature of substances that attack the hormonal balance of the plants in such a way that the apical dominance can be conquered and several side shoots can be produced. An example of these is the cytokinin Benzylaminopurin (BAP). In sunflowers, which generally are single-stemmed but nevertheless harbor sleeping eyes in their leaf axils, a spraying of BAP can cause strong branching. In Holland, attempts were recently made to increase the number of offshoots in cymbidiums (Vanos and Braamhorst, 1993). In 1977, Steward and Button were able to prove that spent shoots of paphiopedilums can be induced into vegetative propagation by an application of BAP. Plant material that is normally thrown away formed offshoots from dormant meristems; the offshoots grew into normal plants. Undoubtedly inspired by success in this field, there are some unsystematic attempts at using BAP on bromeliads described in American literature for bromeliad growers (Gardner, S. 1977 and Stoutemeyer, V. 1976). In an article on vegetative propagation of orchids, Billensteiner and Ritter (1983) also mention success with *Tillandsia tricolor.*

With this background—given the need for new propagation techniques for the practical protection of species and propagation of bromeliads—experiments have been conducted during the last two years at the Institute of the Cultivation of Ornamental Plants to propagate bromeliads vegetatively with applications of BAP. Some of these experiments have already been reported in the literature (Bessler, B. and K. Zimmer 1993). In the cases described here, self-propagated, mature plants of *Tillandsia aeranthos* were used as models.

Two possibilities exist for applying the BAP. After flowering (either through Bromeliad-Ethrel or naturally), the plant system branches. The pups can be removed. The old plant is usually discarded. If there are viable eyes on this old plant, there is still material for possible propagation. The second possibility lies in the direct treatment of young plants before the induction of bloom. By the appropriate stimulation of the "sleeping eyes," the sprouting system could be used similar to mother plants from which offshoots are taken. Both methods were pursued at the Institute. Five-year-old plants of *Tillandsia aeranthos* grown from seed were brought into bloom by using Bromeliad-Ethrel. After offshoots were formed, they were left attached to the old plant for another 15 months. From all the plants that formed more than one offshoot, these pups were removed and grown on another three months as individual plants. The approximately seven-year-old remnants, i.e. the spent plants without offshoots, were dipped into a Cytokinin solution (0; 5 or 50 mg/l BAP) or were sprayed with solutions (three times per week with 25 mg/l BAP).

Similar treatment was given the former offshoots. In addition to a one-hour or 24-hour submersion in BAP solutions (0; 1; 5; 10; 25; 50 mg/l), a further batch of plants was sprayed so intensively with solutions of identical concentrations three times per week, that all the leaves and leaf axils were saturated. By the assessment date of the plants of former offshoots (10, 20, 30 weeks after beginning the experiment), the number of leaves developed after the beginning of the experiment was recorded. The "remnants" were examined for new offshoots only twice (after 18 and 36 weeks).

Results

Remnants

As shown in Table 1, the remnants definitely offer the possibility of increasing the production of offshoots. After 36 weeks, however, many individuals of the dipped variants showed such severe damage that the treated specimens produced fewer offshoots than the control plant.

Remnants that were regularly sprayed (25 mg/l) produced the highest number of offshoots with an average of almost 5.6 viable pups.

Table 1. Effect of BAP treatment on remnants of *T. aeranthos*.

Method of treatment	Concentration	Number of offshoots after 18 weeks	Number of offshoots after 36 weeks	Number of dead plants after 18 weeks	Number of dead plants after 36 weeks
	0 ppm	3.6 ±2.0	4.1 ±1.5	4	6
4 hours submersion	25 ppm	1.8 ±1.8	2.9 ±1.4	3	12
	50 ppm	0.9 ±1.1	2.2 ±1.0	7	19
Spraying 3 times per week	25 ppm	4.8 ±3.4	5.6 ±3.1	0	4

Former offshoots

Although there were interesting results in the use of the old remnants, the results from the young individual offshoots were considerably more impressive. Similar to the dipped specimens of the remnants, the results of dipping the former offshoots were not convincing. Just 31 of 72 plants in the variants in the levels of concentrations 10, 25, and 50 mg/l showed a tendency to induced offshoot formation with 3.5 ± 2.3 offshoots. Much more noticeable in this part of the experiment was the number of plants with leaf damage. The higher the concentrations and the longer the plants were submerged, the more damage, which looked much like sunburn and which sometimes caused the individual plant to die.

Regular spraying with cytokinin solutions proved to be much more effective. With this form of application, there was no leaf damage; there was also no death of whole plants. On the contrary: many plants, especially those sprayed with the concentrations of 10 and 25 mg/l, developed a large number of offshoots in the leaf axils (figure 6). As can be seen in figure 7, twenty weeks after the beginning of the experiment the best specimens formed 20 offshoots on the average. At higher concentrations, the number of offshoots diminished. The analysis of the leaves formed during the treatment shows that the offshoot formation takes place at a cost to the number of leaves developed at the apex. The higher the concentration of the cytokinin solution, the fewer the leaves were developed. By an exterior tampering with the plant's hormone balance, there is somewhat of reduction of the apical dominance. It may also be assumed that after formation of offshoots, the latter take over the "leadership role" and correspondingly limit the apex.

Today, almost a year after the beginning of the experiment, it is further shown that in the specimens receiving concentrations of 25 and 50mg/l BAP, the growth of the tip is limited. Also, almost all of the newly formed offshoots of the

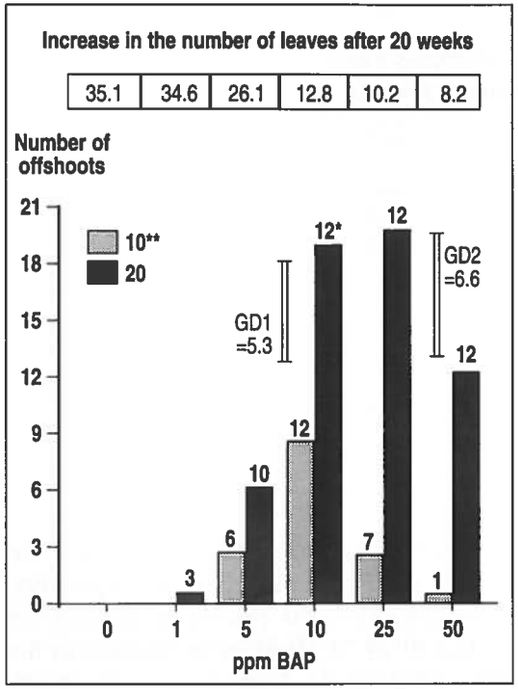

Figure 8.
Average number of offshoots and leaves developed during treatment in regard to BAP concentration and length of treatment

*=Number of plants with new shoots: n=12;

**=Number of weeks after beginning the experiment;

GD 1: Comparison of variants 5 and 10 ppm, 20 weeks;

GD 2: Comparision of variants 5 and 50 ppm, 20 weeks).

specimens receiving 50 mg/l are browned and retarded in their growth. The specimens receiving less than 10 mg/l BAP show an essentially more inhomogenous image than the specimens receiving 10 mg/l. Some plants developed no offshoots and subsequent to the treatment came into bloom. The optimal concentration for propagation of *Tillandsia aeranthos* in the use of BAP according to the present date is clearly 10 mg/l.

There are currently more experiments of this type underway. At the moment tests are being made to learn how many applications of the optimal BAP amount are necessary to achieve the maximum number of offshoots for propagation. Also, following these commercially useful results from using one species, other genera and species are being tested for their ability to form propagatable offshoots after directly tampering with the hormone system. As shown in figure 7, *Vriesea zamoriensis* demonstrates the ability to form offshoots without destroying or altering the apex. To be sure, in the current experiments the tendencies are not so clear as in *Tillandsia aeranthos;* nevertheless, the potential for use of this vegetative form of propagation for bromeliads is in any case present. For tillandsias, a path of propagation has been pioneered with the application of BAP. When the techniques still to be investigated are applied to additional species in the countries of origin where solar irradiation is greater, the removal of material from nature can be dispensed with completely. Also, in regard to BAP, one must consider the cost of the substance (5 grams cost about 90 DM and is enough for 500 liters at the concentration of 10 mg/l). But let it be noted here that according to figures from the Sigma Company, which distributes BAP, there have been no intensive investigations of the toxic effect on humans. But there is warning that swallowing the substance can be deadly and that contact with the skin or with mucous membranes causes irritation.

If further experiments should show that the use of BAP can be expanded in bromeliads, a consideration of commercial use of BAP makes a lot of sense. The process of causing plants to produce pups when they have not yet bloomed and being able to utilize practically every leaf axil for the production of new plants, is intriguing. The applications are very promising and should be pursued further.

Institute for Cultivation of Ornamental Plants
of the University of Hannover

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Statistics: Statistisch overzicht Kamerplanten—Vereinigte Bloemenveiling Aalsmer, various years.

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Marjorie H. Pearl of Fort Lauderdale, Florida has sent a complimentary note enclosing a check for the JOURNAL color fund. Her esteem and generosity are greatly appreciated. Thank you, Maggie.—TUL

The Plants Named in Honor of Dr. Lyman B. Smith

Jason R. Grant

By the date of his ninetieth birthday, the eleventh of September 1994, one genus, one hybrid, and 41 species of plants had been named in honor of Dr. Lyman Bradford Smith. Of these, the genus, the hybrid, and 20 species are bromeliads. Most of the others were based on collections made by Dr. Smith during his expeditions to southern Brazil in 1928–29, 1952, 1956, and 1964.

Nearly all of the taxa names are of the usual etymological sort, a Latinization of either Dr. Smith's first or last name, or a combination of the two. One name, however, stands apart from the rest providing a glimpse of one of Dr. Smith's activities that few of us have known about. John J. Wurdack (1962:198) named and described *Leandra luctatoris*, based on plants that Dr. Smith collected in Santa Catarina, Brazil. He stated: "The epithet refers to both the classificatory courage and avocational activity of Lyman B. Smith." The Latin *luctator* means wrestler.

In order to find out more about his athletic interests and the plants named after him, I spoke with Dr. Smith at his home in Kensington, Maryland, on July 28th of this year. I learned that he had been an avid Greco-Roman wrestler during his undergraduate years at Harvard. Later, he wrestled as a member of the Boston Athletic Association and for the Washington, D.C., Y.M.C.A, winning numerous awards in the 125 lb. weight category. He spoke with great enthusiasm while describing his athletic achievements, especially his invention of a wrestling move he termed "the spinner."

While on the subject of sports, Dr. Smith recalled that it was during his high school days while playing golf with his father that he first became interested in botany. It seems that while standing in the middle of a fairway, he spied a *Carex* (sedge). Knowing that carices don't usually grow in such areas, he immediately began to examine the plant, forgetting the score, and losing interest in the game.

After discussing sports and the species named after him, Dr. Smith asked if I had checked *Hechtia*. I told him yes, there is a species in that genus named after him. Seeming pleased, he then asked about *Navia*. I told him that there was not. Thinking he had set me up, he replied quickly: "That's your assignment." With that, there was the perhaps too often-encountered famous line, "well...I mustn't take any more of your time," a clear indication that he was eager to get back to his own work.

The following list of taxa named in honor of Lyman B. Smith was compiled by searching INDEX KEWENSIS on CD-ROM, the lists of type specimens at both the U.S. National Herbarium and the Harvard University Herbaria available through the Gopher Server on the Internet, and simply asking the wise. Once separate lists were generated for those names with the potential of having been named in honor of Dr. Smith, each record was scrutinized and excluded on the basis of its publication date or verified in its original publication.

De Plantis in Honorem L.B. Smithii Nominatis

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

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Baccharis lymanii G.M. Barroso, Rodriguesia 28(4):165. 1976. (Asteraceae)

Begonia lyman-smithii K. Burt-Utley & J.F. Utley, Brittonia 39(1):59. 1987. (Begoniaceae)

Bulbostylis smithii Barros, Darwiniana 11:761. 1959. (Cyperaceae)

Coccocypselum lyman-smithii Standley, Publ. Field Mus. Nat. Hist. Chicago, Bot. Ser. 8:165. 1930. (Rubiaceae)

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Dyschoriste smithii Leonard, Sellowia 9:81. 1958. (Acanthaceae).

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Linum smithii Mildner, Phytologia 23(5):439. 1972. (Linaceae)

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Reitzia smithii Swallen, Sellowia 7:8. 1956. (Poaceae)

Rhynchospora smithii W.W. Thomas, Nem. New York Bot. Gard. 37:37. 1984. (Cyperaceae)

Symphyopappus lymansmithii B.L. Robinson, Contr. Gray Herb. 96:19. 1931. *Eupatorium lymansmithii* (B.L. Robinson) Steyermark, Fieldiana, Bot. 28(3):636. 1953. (Asteraceae)

ACKNOWLEDGMENTS:

I thank Dr. Lyman B. Smith for his thought-provoking and always entertaining conversation and Hollings Andrews for making his photograph available for publication.

LITERATURE CITED:

Wurdack, J.J. 1962. Melastomataceae of Santa Catarina. Sellowia 14:109–217.

A note concerning the photograph: Dr. Smith was an instructor during the 1966 Organization of Tropical Studies Tropical Epiphytes course. The photo was taken 3 km southeast of Sabalito, a town just east of San Vito. While in San Vito, Dr. Smith and members of the OTS course visited the home of Robert and Catherine Wilson, now the Robert and Catherine Wilson Botanical Garden.

Dept. of Botany, Univ. of Maryland
College Park, MD 20742-5815

Call for 1995 Nominations for the Office of Director

The Bromeliad Society, Inc., is managed by a Board of Directors elected to represent the members of the 10 regions of the society and by officers elected by the board. The details of the BSI organization and how the business of the society are conducted are explained in the bylaws. Every affiliated society has a copy of the bylaws. If you cannot find a copy, write to the BSI secretary, whose name and address are listed in the inside back cover of every issue of the JOURNAL. Your participation in the conduct of BSI business matters is essential. The matter at hand is the nomination of directors.

THIS IS THE CALL FOR NOMINATIONS FOR THE TERMS 1996–1998:

Regions having vacancies for the regular three-year term, 1996–1998—

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

Who may nominate? Any voting member of the society who resides in a region for which there is an opening may nominate any number of candidates to compete for that opening or openings.

Who may be nominated? A nominee must: (1) be a current, voting member of the society and have been a voting member for the three consecutive years prior to nominations; (2) reside in the region for which nominated; (3) not have served two consecutive terms as a director immediately preceding nomination; (4) agree to being nominated; (5) agree to serve as a director, if elected.

Procedure for nominating: (1) obtain the consent of the prospective nominee and verify compliance with the qualification criteria; (2) airmail nominations to the chairman of the Nominations Committee between 1 January and 18 March 1995 inclusive. Nominations by telephone will be accepted through 15 March but must be confirmed in writing; (3) supply with each nomination the full name, address, and telephone number of the nominee, the region to be represented, the nominee's local society affiliation (if any), and a brief autobiography of the nominee.

Mail nominations to:

John M. Anderson
Chairman, BSI Nominations Committee
Post Office Box 5202
Corpus Christi, Texas 78405 USA
Telephone: (512) 882-4551

Bromeliad Internship Applications Are Invited

Harry E. Luther

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

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

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

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

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

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

Introducing: *Aechmea melinonii*

by Harry E. Luther

Aechmea melinonii has had a long history in and out (mostly out) of horticulture. It was described in 1861 by Joseph Dalton Hooker based on a plant introduced into cultivation four years earlier from "South America." He gave it the common name "Copious-flowered Aechmea." He also likened the flower buds to the seeds of the "Crabs' Eye," *Abrus precatorius*, a poisonous, vining Pea.

Aechmea melinonii is native to northern South America, the Guianas and northeastern Brazil, in wet forests at low elevations. Its scarcity in contemporary horticulture is probably based on the fact that few bromeliad collectors visit this area.[1] The plant certainly possesses the attributes of a choice ornamental: medium size, ease of cultivation, and a colorful bloom of long duration. The pictured plant was obtained several years ago from Nat DeLeon. Its origin was not stated. As you can see, true *A. melinonii* should not be confused with an imposter that is often offered under this name. The latter, according to Elton Leme, is probably a form of *A. macrochlamys*.

M.B. Foster Bromeliad Identification Center
Marie Selby Botanical Gardens

Vern Sawyer for Selby Gardens

Figure 9. Aechmea melinonii

1. For an account of *A. melinonii* in its homeland see Lecoufle, M, *Plant Collecting in French Guiana*, the Brom. Soc. Bulletin 19:1, pp. 12–16, 1969.

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

Harry E. Luther[1]

ABSTRACT: As of 11 June 1992, international trade in seven species of *Tillandsia* (Bromeliaceae) is regulated under Appendix II of CITES. To facilitate identification, *Tillandsia harrisii, T. kammii, T. kautskyi, T. mauryana, T. sprengeliana, T. sucrei, T. xerographica* are described and illustrated.[2]

Introduction

At the eighth meeting of the Conference of the Parties, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), held in Kyoto Japan, March 1992, two proposals (by Austria and Germany) were made to regulate trade in the bromeliad genus *Tillandsia*. Both proposed to list the entire genus (400–600 species) under CITES Appendix II. After opposition by the delegates of several of the range states (Bolivia, Guatemala, Honduras and Mexico) and the Netherlands, Switzerland and the United Kingdom, the proposal by Austria was withdrawn and the proposal from Germany was modified to include only seven species for listing on Appendix II. This proposal was accepted without objection. Regulation for these became effective on 11 June 1992.

To facilitate the identification, by regulatory officials, of the seven affected species of *Tillandsia*, this guide has been produced. Descriptions have been prepared based on examination of living specimens and supplemented by the published literature. In all cases, studies have included several examples of each species, growing under a variety of conditions and at different stages of maturity. Gross vegetative characters of each species are emphasized in the text and illustrations.

NOTE: Tillandsias prepared for shipment are often dried slightly. This usually results in increased recurving of the leaf blade toward the base of the plant and the leaf cross-section becoming more channeled or involute. Trichomes from dry plants should be examined and compared to the SEM photographs; wetting will mat the trichomes and obscure their features. Trichome features can be examined adequately under high magnification of a standard binocular dissecting microscope. Mature leaves taken from the lower 1/3 of the rosette are best; the abaxial (lower) surface of the leaf blade is usually free of dust or debris and is the area represented on the SEM photographs. Trichomes vary in size, shape and density on other parts of the leaf.

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

[2] Reprinted in part from Selbyana, vol. 15, part 1, pages 112–115. The other five species will be described and illustrated in successive issues of the Journal. Photographs were made by Vern Sawyer, drawings by Barbara Culbertson and Stig Dalström.

Tillandsia harrisii R. Ehlers, die Bromelie 1987(3):34–6. 1987....

Distribution: Known for certain only from the cliffs along the Rio Teculutan, El Zapato, Department of Zacapa, Guatemala at 500 m elevation.

Status in Horticulture: Common in cultivation.

Description: **Plant** a lithophyte, short to long caulescent, 6–30 (rarely to 80) cm tall, single or clustering; roots wiry, 1–2 mm in diameter, brown. **Leaves** densely arranged, spreading to recurving, often secund curving, 30 to 60 in number, light grey to silver-white. **Leaf sheaths** broadly elliptic, 20–30 mm wide, brown but densely and coarsely pale lepidote except at the extreme base. **Leaf blades** narrowly triangular, acute to attenuate, 10–25 cm long, 10–15 mm wide, channeled to involute, rather soft and brittle, densely covered with coarse, spreading, white trichomes and appearing slightly rough or pruinose. **Scape** erect, exserted above the leafy rosette. **Scape bracts** like the leaves but shorter. **Inflorescence** simple, cylindrical, 6–15 mm long, polystichously 5- to 10-flowered. **Floral bracts** broadly elliptic, rounded and apiculate to acute, 30–45 mm long, mostly or completely glabrous, shiny, orange to red. **Flowers** lasting a single day. **Sepals** oblanceolate, acute, 26–30 mm long, the adaxial pair carinate and 3–5 mm connate, pale green. **Corolla** tubular. **Petals** very narrowly oblanceolate, 55–60 mm long, shorter than the stamens and **style**, blue-violet.

Summary: Small to medium (usually 6–30 cm tall; old, very long caulescent specimens are unlikely to be encountered) caulescent plant with spreading to recurving, channeled to involute leaves that appear slightly rough or pruinose and light grey to silver-white; a cylindrical inflorescence of red to orange bracts with a blue-violet, tubular corolla.

Vegetatively Resembles:

Tillandsia hondurensis Rauh, which is nearly stemless or very short caulescent with much shorter and narrower straighter leaves;

Tillandsia aff. *capitata* Grisebach (hort. synonym: *T.* "Sphaerocephala") which has longer, more numerous and more densely arranged grey-green or dark grey leaves that are often tinged pink or salmon.

Note: *Tillandsia harrisii* is sometimes labeled by nurserymen as *T.* "Blanca", *T.* "Sphaerocephala Alba", *T.* "Himnorum" or *T.* "Capitata White." It is propagated by offsets in large quantities by Guatemalan nurserymen.

Vern Sawyer for Selby Gardens

Figure. 10. Tillandsia harrisii.

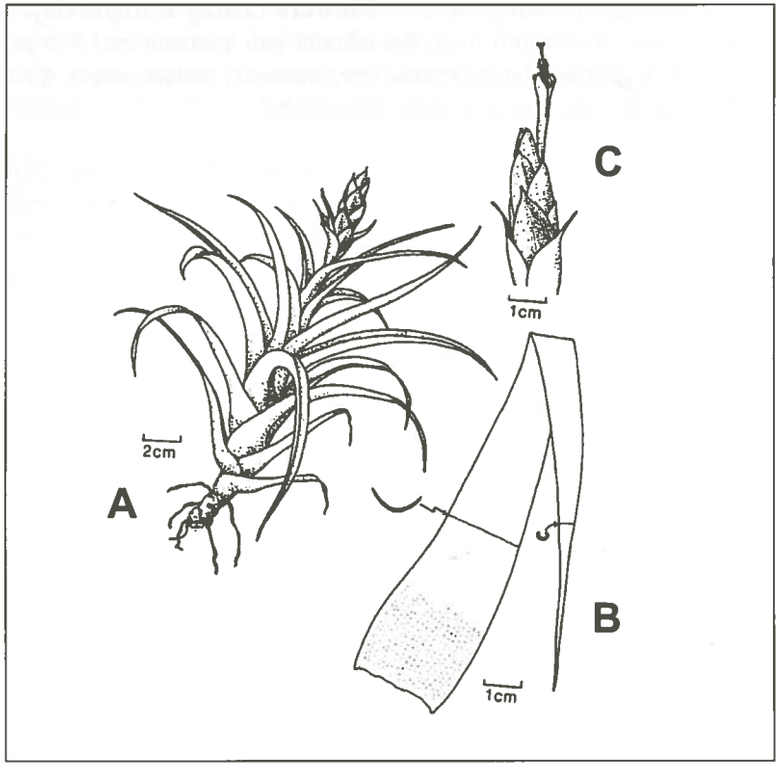

Figure. 11. Tillandsia harrisii.
A, habit; B, leaf; C, inflorescence.

Vern Sawyer for Selby Gardens

Figure. 12. Tillandsia kammii.

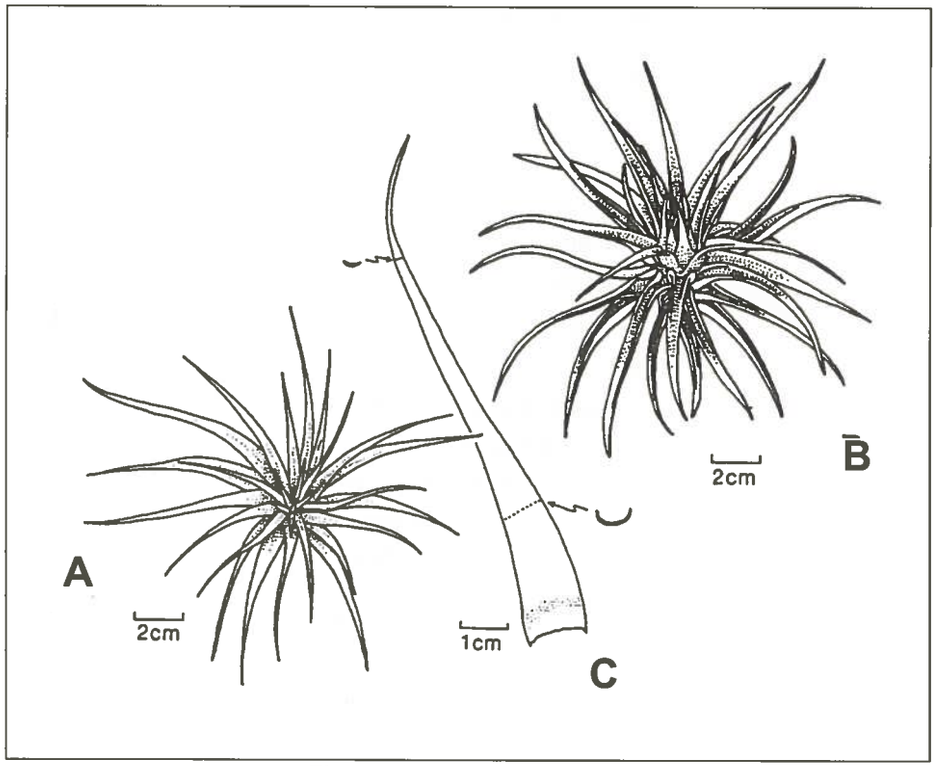

Figure. 13. Tillandsia kammii
A, habit; B, habit of flowering plant; C, leaf.

Tillandsia kammii Rauh, *Tropische und subtropische Pflanzenwelt* 21:45–8. 1977....

DISTRIBUTION: Known from three disjunct sites in Honduras in the Departments of Olancho, Lempira and Copan, at elevations of 500–1200 m.

STATUS IN HORTICULTURE: Rare in cultivation.

DESCRIPTION: **Plant** an epiphyte, nearly 5–10 cm tall, single or clustering; roots wiry, 1 mm or less in diameter, brown. **Leaves** densely arranged, spreading to recurving, 30 to 50 in number, pale grey-green to silver. **Leaf sheaths** ovate to elliptic, 10–18 mm wide, tan but densely and coarsely pale lepidote. **Leaf blades** very narrowly triangular, attenuate, 5–12 cm long, 5–8 mm wide, channeled to involute, soft, densely covered with coarse, spreading, white trichomes and appearing slightly rough and pruinose. **Scape** very short, concealed within the leafy rosette. **Scape bracts** like the leaves but smaller, becoming rose or red during flowering. **Inflorescence** simple, very short and dense, 1–2 cm long, polystichously 3- to 8-flowered. **Floral bracts** ovate, attenuate to acute, 20 mm long, white lepidote, rose to red. **Flowers** lasting a single day. **Sepals** elliptic, obtuse, 14–16 mm long, the adaxial pair carinate and low connate, glabrous, pale green. **Corolla** tubular. **Petals** narrowly oblanceolate, 4 cm long, equalling or exceeded by the stamens and **style,** light blue-violet.

SUMMARY: Small to medium (5–10 cm tall) stemless plant with numerous and narrow soft, spreading to recurving, channeled to involute leaves that appear slightly rough and pruinose and pale grey-green to silver; a very short, partly concealed inflorescence with red to rose bracts with a tubular light blue-violet corolla.

VEGETATIVELY RESEMBLES:

Tillandsia sp. nov. (*T. velutina* R. Ehlers.; hort. synonyms *T.* "Brachycaulos var. Multiflora," and *T.* "Brachycaulos Abdita") which has fewer, broader, darker grey leaves that have less densely arranged, smaller silver trichomes;

Tillandsia plagiotropica Rohweder which has broader, usually shorter leaves that are stiffer and brittle and appear nearly white.

NOTE: The *Tillandsia* "Brachycaulos var. Multiflora" is very common in cultivation and is frequently exported from Guatemala. The *T. plagiotropica* is uncommon in cultivation.

[to be continued]

Journal of the Bromeliad Society Index
Volume 44, 1994

Covers (unnumbered pages) are listed as if numbered. Page numbers in *italics* refer to black and white illustrations; those in **bold face** refer to color photographs. New species or those with status changes are shown in both *italics* and **bold face.**

The Way It Was

Elmer J. Lorenz

Even after these many years since The Bromeliad Society was organized, the question is still asked: "Who was the founder of the society?" Probably very few members can answer that question.

In the first issue of the Bromeliad Society BULLETIN, Mulford Foster wrote: "The seed has germinated! A new horticultural society has been born. The Bromeliad Society came into being in the State of California where there are no native bromeliads growing, but where there are many natives growing bromeliads.

"It takes more than wishful thinking to start a real living and growing society, and it took a live, earnest group of southern Californians to bring this idea into being."

The one person who planted the seed that germinated into The Bromeliad Society was the founder of that society. It was Joseph Schneider who, at that time, was in charge of the world-famous cactus and succulent collection at the Huntington Library and Botanical Gardens in San Marino, California.

The Bromeliad Society had its beginning early in 1948 when Joseph Schneider wrote to Miss Kemble, organizer of Round Robins for the FLOWER GROWER MAGAZINE asking if she would gather a group interested in bromeliads to start a Round Robin flight. Her call for members brought responses from 13 prospective members including Victoria Padilla.

Miss Padilla became director of the Round Robin and we exchanged experiences with our bromeliads by correspondence for almost two years. Many excellent ideas were contributed by the members. It was the only cultural information available to early bromeliad enthusiasts. We soon, however, concluded that the Robin did not completely fill our needs especially since its flight was rather erratic at times, subject to long delays and occasional lapses.

In the summer of 1949 someone who realized that most of the Round Robin members lived in southern California suggested a get-acquainted picnic, but that excellent plan was not carried out. Then, in the spring of 1950, a notice was sent out to all members and others interested in bromeliads to attend a pot luck dinner at the home of Dorothy Behrends in Los Angeles on May 21st to discuss Joseph Schneider's suggestion that a bromeliad society be organized. Preliminary plans were made for forming such a group at that very enjoyable and friendly gathering where many of the fourteen who attended met one another for the first time.

That informal get-together was followed by an organizational meeting at the home of Mr. and Mrs. Frank Overton in Glendale. Rain deluged us the whole day. It never rains in California in September—well, hardly ever—but that day it poured.

When it was time to start the meeting you can imagine the surprise and delight of everyone when the one and only Mulford Foster made his appearance. Victoria, beaming proudly, presented him to the group. He had flown from Orlando, Florida, to join us. No one except the Overtons and Victoria knew of his being there until the moment he was presented.

We finally started discussing the organization of a bromeliad society with David Barry as temporary chairman. The first order of business was what to name the society. Names mentioned were: The International Bromeliad Society, The National Bromeliad Society, The Bromeliad Society. Mr. Foster favored the name THE BROMELIAD SOCIETY. He was very determined that we use that name for the simple reason that the shorter a name the easier it is to handle. He remarked that if we accepted the name The Bromeliad Society no matter how many other bromeliad societies were formed and named we would always be THE Bromeliad Society. He was so very persuasive with his arguments that we voted to name our group The Bromeliad Society.

The next procedure was to elect a Board of Directors. The following were chosen: Dr. Lyman B. Smith, Dr. H.B. Traub, Mr. Mulford B Foster, Mr. Ladislaus Cutak, Dr. Russell J. Seibert, Mr. David Barry, Jr., Mr. Morris Schick, Miss Victoria Padilla, and Mr. Elmer J. Lorenz. From the Board of Directors the following were elected officers: Mr. Foster, president; Mr. Barry, first vice-president; Dr. Seibert, second vice-president; Miss Padilla, secretary; and Mr. Overton, treasurer.

After the election of officers, committees were appointed to establish the bylaws, the matter of publications, dues, memberships, and affiliation groups. It was also decided that all individuals present would be known as FOUNDER members and all persons joining during the first year would be known as CHARTER members.

After the formal meeting, Mrs. Overton served refreshments and asked the 21 guests to sign their names on the tablecloth. Later, Mrs. Overton's sister embroidered the names and in that way preserved the signatures from fading. The first and second annual meetings of The Bromeliad Society were also held at the Overtons' home and members and guests who had not previously signed the tablecloth were asked to add their signatures. That cloth was displayed at the 1994 San Diego World Bromeliad Conference.

Through the efforts of The Bromeliad Society and all the people involved in its success we have advanced from the question asked in the early days: "What is a bromeliad?" to the exclamation: "Oh, isn't that a beautiful bromeliad!"

Listed below are the names of the 21 individuals who attended the organizational meeting. A single asterisk indicates the names of active members, a double asterisk indicates those no longer active. The others are no longer living.

David Barry, Jr.
Ralph R. Barton*
Dorothy Behrends**
Lucy Brooks
W. G. Brooks
Dr. W. C. Drummond
Mulford B. Foster
J. N. Giridlian
Mr. and Mrs. M. V. Hartman
Susan W. Hutchinson
Elmer J. and Joyce W. Lorenz*
Frank and Lucille Overton
Victoria Padilla
Carolyn K. Rector
Morris Schick
Denny Seibert**
Dr. Russell J. Seibert**
Wilbur Wood*

Los Angeles, California

In addition to being a founder member and a past-president, Mr. Lorenz is also an honorary trustee of the society.—Ed.

We Are Considering a Name Change

I have always though of the BSI as being an international society and I know that most of you feel the same way. We should feel this way because, in fact, we are a society with members in over fifty countries. This fact is evident at each of our World Conferences where we usually have at least twenty countries represented, some with good representation.

At the BSI Board meeting held in San Diego this year during the World Conference, we voted to proceed with the steps necessary to change our name officially from The Bromeliad Society, Inc. to The Bromeliad Society International. One of these steps may require a vote of the membership. So I want you to be thinking about whether you would be interested in such a change. We would still be the BSI but the main idea was to add some emphasis to the fact that we are international for the benefit of the entire membership.

We will let you know when and if the name change becomes official. It would then take some time to get the name changed in all the places that it appears.

Odean Head, president
7818 Braes Meadow, Houston, TX 77071

Fragrance in Bromeliads

Greg Payne

A while back I was asked about how one locates fragrant tillandsias. I responded that there was no one complete source, that sources were scattered across the country and, in my experience, there wasn't even a good list of what to look for. Although true, I was not comfortable with that response. There had to be a better answer.

There's good new and bad news. First, we'll dispense with the latter. Fragrance among bromeliads can be considered a novelty, with probably fewer than 1 percent of the species falling into this category. There are, however, more fragrant *Tillandsia* species than in any other genus, which is good news as they are generally more available and more practical for collecting. Among these tillandsias, the xerophytic species tend to possess the stronger fragrances.

My exposure to fragrant tillandsias was the highlight of my first bromeliad show. Apart from the fantastic shapes and colors, those fragrances made a strong impression. I started a want list culling likely candidates from shows and references in magazines, books, and catalogs. The desired plants were slow to come by. So slow that fragrance eventually took a back seat to choices of shape and color. Whenever I saw a bromeliad I liked, I would ask if it was fragrant. It rarely was, of course, but another plant, which was fragrant, was sometimes suggested. There were easier hobbies but I persisted. The want list grew faster than the list of those found.

Serendipity factored in a few plants I bought simply on account of their shape. It was more than a pleasant surprise when I discovered the fragrant blooms. One, *Tillandsia scaligera,* which was not on my list, I acquired at the 1992 BSI World Conference from California Gardens. A couple of *Catopsis* species proved to be very fragrant. They were among miscellaneous, unidentified Mexican species from Pamela Koide of Bird Rock Tropicals. An otherwise unassuming plant with a fragrant bloom can become a quiet charmer.

Since we are thinking about a poorly defined subject, let me offer my observations about methods of pollination and fragrance. Most bromeliads are pollinated by birds. These plants produce larger amounts of nectar and have no fragrance. Their colors are shades of red and orange. The remaining bromeliads are pollinated by moths, bees or butterflies, and a few other insects. Among these are the fragrant bromeliads whose colors tend to be paler: whites, yellows, and yellowish orange, lavenders, olives, and browns. Moth-pollinated species are nocturnal bloomers having larger blooms and a fragrance that is strongest from

dusk to dawn. Those pollinated by bees and butterflies and the like have smaller flowers but also may possess the more intense fragrance. Among these, the xerophytic tillandsias are well represented.

Although the appeal of fragrance is universally observed, an individual's measure of it remains colored, in no small way, by personal preference. Our sense of smell is inextricably influenced in the present by environmental factors, sentiment, matters at hand, etc. More subtly, it becomes linked to memories elicited: things tied to a prior time, place, and emotion. We do not have the same olfactory references. What is enjoyable to one, might bring nausea to another. It seems a stretch that the same nose that savors an eye-smarting slice of limburger cheese can appreciate the bouquet of a rose. Apart from such extremes, we have varying delights within that range. Unlike the quantitative traits of color or sepal characteristics, the description of a fragrance remains a personal observation and can be related only in general terms. Personal preference is hard to judge.

The English language holds us at a slight disadvantage as well. It is easier to describe an unpleasant odor than a pleasant one. Unpleasant adjectives far outnumber pleasant ones. Disagreeable odors can be a source of humor and practical jokes, of derision, or even an indicator of ill health. Pleasant odors, on the other hand, connote ease and well-being and are just pleasant—unless overbearing, and then they stink.

Consider the foregoing and compound this muddle with bloom times and variables of humidity, temperature, and wind, which affect the perceived fragrance. Add to this the thoroughness exhibited by the taxonomist and we have some idea for the casual information on fragrance among bromeliads.

Not all bromeliad odors are equally engaging. Should you want a plant with a meaner air, consider *Billbergia horrida* whose scent has been compared to urea. Another charmer is *Vriesea jonghii.* Werner Rauh has likened its bouquet to opossum. Some of the not-so-fragrant dyckias remind me of a snout full of back-road dust. The fragrant neos are intriguing, but their delicate scent must compete with the algae present in the cup. The nose is quick to note the spiny-edged leaves.

My list began with three plants; it now contains more than forty. Knowing *what* to look for helps immensely. With a bit of research, one might limit selections by size, flower color, or even requirements of culture, which range from xerophytic to terrestrial, full sun to shade. Nearly half of these plants are readily available, but perhaps not all from the same source. Some suppliers annotate their lists for fragrance. Among them are Holladay Jungle,[1] Pineapple Place,[2] and Tropiflora.[3] With a sharp eye and a list you may be in for a welcome surprise at your local plant table or nursery.

The next time the question about fragrant tillandsias arises, I will be better prepared. Meanwhile, for an added dimension to this esoteric pursuit, keep those olfactories prepared. You never know what a visit to the greenhouse or show might reveal.

Partial Listing of Fragrant Bromeliads

Tillandsia arhiza
Tillandsia bandensis
Tillandsia crocata
Tillandsia cyanea
Tillandsia diaguitensis
Tillandsia disticha
Tillandsia dodsonii
Tillandsia duratii
Tillandsia dyeriana
Tillandsia hamaleana
Tillandsia kurt-horstii
Tillandsia mallemontii
Tillandsia monadelpha
Tillandsia myosura
Tillandsia narthecioides
Tillandsia palacea
Tillandsia peiranoi
Tillandsia polycarpa[4]
Tillandsia purpurea
Tillandsia reichenbachii
Tillandsia scaligera
Tillandsia straminea
Tillandsia streptocarpa
Tillandsia usneoides
Tillandsia venusta
Tillandsia yuncharaensis
Tillandsia xiphioides

Aechmea cylindrata
Aechmea purpureorosea

Catopsis nutans
Catopsis wangerinii

Cryptanthus odoratissimus

Dyckia chlorosticta
Dyckia odorata

Neoregelia chlorosticta
Neoregelia laevis
Neoregelia olens
Neoregelia oligantha

Vriesea fenestralis
Vriesea fragrans
Vriesea cylindrata
Vriesea gigantea
Vriesea racinae
Vriesea regina

This article appeared first in the February 1994 issue of The Bromeliad News, *the Sacramento Bromeliad Society. It has since been revised by the author and is printed here with his permission.—Ed.*

END NOTES:

1. P.O. Box 5727, Fresno, CA 93755.
2. 3961 Markham Woods Road, Longwood, FL 32779.
3. 3530 Tallevast Road, Sarasota, FL 34243.
4. This tillandsia labeled *"T. polycarpa"* came from Barrie and Yvette Fisher of Los Angeles. The name is not found in Luther's binomial list or Kiff's tillandsia check-list. It resembles *T. reichenbachii, T. palacea,* etc., but remains distinctive. The Fishers also sell a plant they call "T. duratti," long form that they got from Mike Kashkin some years back. This plant resembles an exaggerated form of *T. diaguitensis* more than *T. duratii*. It, too, is fragrant.

More Than Stamp Collecting

Diana Lutz

The loss of biodiversity is considered by many scientists to be the most serious problem facing humanity. But even as the planet loses species, so it may be losing expertise in some scientific fields needed for tackling the crisis.

"Everybody's talking about biodiversity and how we must assess the 'hot spots' of biodiversity," says Hugh Iltis, emeritus professor of botany and emeritus and acting director of the herbarium at the University of Wisconsin at Madison. "But where are the hands and minds that are needed to do the work of measuring petals and measuring stamens?"

The work Iltis describes with mock self-disparagement is the province of systematic biologists, the people who can tell one plant or animal from another and read the evolutionary story written in leaves and bones. A rational response to the biodiversity decline will require systematic knowledge about the world's biota. Toward that end, the U.S. Department of Interior has launched a National Biological Survey, with one of its missions to "inventory, monitor, and report on the status and trends in the Nation's biotic resources." And systematic biologists themselves are proposing, under the rubric Systematics Agenda 2000, "to discover, describe, and classify the world's species within 25 years."

But some biologists worry that there might not be enough trained personnel to carry out these initiatives. Rather like the endangered species they study, systematists are showing sign of distress. And some worry that shortages of funding and jobs in their field will continue.

The roots of the systematists' concerns lie partly in the growth of newer kinds of biology over the past three decades. "Academia simply expunged systematists and experts on groups of organisms, to replace them with trendier molecular, cell and population biologists," says E. O. Wilson, the Harvard biologist who has done more than anyone to call attention to the biodiversity crisis.

"The people who are making use of the biodiversity issue for increased visibility and funding and the like are, for the most part, not systematists," Wilson says. "We haven't quite reached the crunch time yet when the ecologists and the molecular biologists and the environmental planners and others come to realize that their operations are going to be thwarted by a simple inability to tell one kind of organism from another."

Iltis uses a German fairy tale to describe the relationship of systematic biology to biodiversity. "Schlarafenland is a land of milk and honey, where the quail

fly through the air, and if you're hungry you just grab one and eat it. There are whole ponds full of preserved sweet cherries, and there are mountains of pies, everything just for the taking. But to get there, you have to eat your way through an enormous mountain of porridge." The land of milk and honey, one gathers, is a world of species richness, and the mountain of porridge is the systematic biology that must be done to get there.

It is not clear whether the supply of expert porridge-eaters is declining; no one seems to have taken a good inventory of systematic biologists. Other indicators suggest a sort of stasis in the support for research and training in the field. James Rodman, program director of the systematic and population biology cluster at the National Science Foundation, says that funding for systematics "certainly has not increased [over the past 10 years]. In fact it has probably lost to inflation—despite all the hoopla over biodiversity." Rodman assesses the state of graduate training in systematics as "slightly worse than in 1985, but not dramatically so."

Systematists find cause for worry in smaller slices of data and in their experiences. Howell V. Daly of the University of California at Berkeley conducted a survey of entomology departments in 1992 and found that the number of faculty members who are systematists has remained remarkably stable over the past 10 years. But the number of graduate students seeking a Ph.D. in systematics has dropped by 28 percent—a trend that, if extrapolated, means "there will be no graduate students in systematic entomology in the year 2017."

Jane Gallagher, a phycologist at City College of the City University of New York, adds that those graduates still can't find jobs. Gallagher, with Carl Gans of the University of Michigan, chaired the human-resources committee for Systematics Agenda 2000. "It is clear that the number of students being trained in many fields of systematics now exceeds the number of collections-based jobs that can be filled," the committee concluded after analyzing a database compiled by the Association of Systematics Collections.

Or as Gallagher puts it, "It's the job market, the bloody job market, that's killing this field."

Certainly there is anecdotal evidence that looking for a job in systematics is a punishing experience. William Alverson, a young systematist who studies the Bombacacae (the bass wood family) using both traditional monographic methods and the latest molecular and cladistic techniques, leads a financially precarious life these days as an honorary fellow at the University of Wisconsin's herbarium.

"To me it's like a bad love affair, in the sense that I'm not at the point where I feel I can walk away from it yet," Alverson says. "This is really what I want to do, and I've had a lot of training, and I love this kind of work. But it gets

so ridiculous at times, I do find myself thinking might be better to say forget it, I'm going to go make a living doing something else."

The good news for systematics is its solid base of respect among other biologists. In the early days of molecular biology it was fashionable to label systematics a higher form of stamp collecting. But no more. Peter Raven, director of the Missouri Botanical Garden, notes that just as the properties of metals cannot be used to predict the traffic flow in a city, "you can't predict the properties of organisms or aggregations of organisms from the principles of molecular biology."

Raven attributes the troubles of systematics to the vagaries of funding mechanisms and public patronage. "Biomedical sciences are funded by the National Institutes of Health, which have a budget of over $10 billion, because we all want to live forever," he says. Federal support for the rest of biology, however, must be extracted from the budget of the National Science Foundation, which is roughly one-fourth the NIH budget.

Wilson and others hope systematists will persevere in the face of discouragement. They suggest that growing public concern over biodiversity will eventually translate into increased support.

Raven, for one, expresses some impatience with his peers' pessimism. He points out that the membership of the American Society of Plant Taxonomists has nearly doubled in the past 30 years. Systematic biology has grown more slowly than the rest of biology and is perceived to be shrinking, he says, "because what we want it to do and can see and imagine it can do is much larger and more important than we ever used to think."

Wilson says the "real revolution, in systematics lies ahead, in the serious expansion of biodiversity surveys combined with long term studies of local biodiversity directed toward understanding where biodiversity comes from and what maintains it. And the coming revolution will, I think, catapult systematists to a central position in biology." After a moment's thought he adds, "You can quote me on that."

Pages 120-121, v. 82 THE AMERICAN SCIENTIST, 5 May 1994. *Reprinted by permission of* AMERICAN SCIENTIST, *journal of Sigma Xi, The Scientific Research Society.*

Letter to the Editor

Dear Sir:

As a chemist I couldn't ignore Herb Plever's note about "No More Detergent!"[1]

Transportation can be a significant factor when one makes a strong chemical. Look at many of your labels and note the high percentage of "Inert Ingredients." These are often there to dilute the chemical because the public cannot be trusted with the real thing. People too often do not read labels or follow directions. Also the American mentality often is "If one is good, two is better, and ten is glorious."

A friend in Minnesota wanted to kill some weeds. When I saw her lawn, there were back and forth streaks of brown, a cut leaf weeping birch dead halfway up and the new growth candles on her evergreen were curled like pigtails. It was obviously chemical damage so I asked her what she did. She said she was just trying to kill the dandelions. I asked her to show me the can. I asked how she used it, she said, "I put it it a fly sprayer and sprayed it." She was applying it straight!!

I pointed out that the label told her to put two tablespoons in a gallon of water before she used it. The company was trying to save her the shipping costs of a hundred gallons of water all the way from New Jersey, but she didn't read the label.

I just checked some labels I have. Two 2,4-D preparations were 85% and 90% inert. A Sevin dust was 95% inert and Chevron's Grass-B-Gon is a whopping 99.5% inert!

These manufacturers just can't take a chance with the real thing. What they sell you is still very strong, even after the dilution.

Unfortunately, most Americans are impatient. When they spray a dandelion they expect it to curl up and die while they watch. Actually, it is fairly subtle. Some curling of leaves appears. Then a couple of weeks later you will notice they are gone.

You must read the labels, follow directions and be patient. They will do what they promise.

Detergents are strong too, in their own way. I looked at several cleaners in our closet. Only two had a list of ingredients. When ingredients are listed on a label, they are listed in order of %. Both of the ones with a list had water as the major ingredient!

People also relate sudsing to cleaning. Actually I believe sudsing inhibits cleaning because it prevents contact between the detergent and the "dirt." In the early days, when detergents were first introduced by the ANSCO Corporation, free samples were passed out. Housewives did not believe a capful was enough when it

[continued on page 278]

[1]JOURNAL, September–October 1993, pages 222–223.

BROMELIAD SOCIETY, INC.
BALANCE SHEET AS OF 12/31/93

	12/31/92	12/31/93
CURRENT ASSETS		
Cash – Texas Commerce Bank	21,261.80	21,997.28
Cash – General Fund Special	42,883.73	44,062.92
Cash – Life Membership Spec.	12,543.48	12,894.73
Cash – Padilla Research Fund	821.28	843.92
Cash – Padilla Endowment Fund	3,098.31	4,395.21
Total Cash	80,608.60	84,194.06
ADVANCES		
Beltz – Seed Fund	200.00	200.00
WBC – San Diego 1994	1,000.00	1,000.00
Total Advances	1,200.00	1,200.00
FIXED ASSETS		
Library and Equipment	5,643.39	5,728.39
Less Depreciation	2,089.54	2,089.54
Total Depreciated Assets	3,553.85	3,638.85
OTHER ASSETS		
Investments – Unisys	200.00	200.00
Investments – USTN	14,665.65	14,665.65
Inventory – not adjusted	52,497.00	52,497.00
Total Other Assets	67,362.65	67,362.65
LIABILITIES		
BSI Memorial Fund General	125.00	125.00
TOTAL NET WORTH	152,600.10	156,270.56

BANKS

Texas Commerce Bank Houston, Texas Account 0055517	Merrill Lynch Houston, Texas Account 581-07J70

BROMELIAD SOCIETY, INC.
FINANCIAL STATEMENT – 1993

INCOME		
Checking Account Balance – Start		21,261.80
RECEIPTS		
Advertising – Journal	4,768.00	
Back Issues	3,905.62	
Color Fund	2,646.00	
Culture Brochure	128.50	
Cultivar Registration	120.00	
Interest – General	2,048.00	
Interest – Endowment	1,299.89	
Medallions/Trophies	2,678.40	
Memberships	32,017.20	
Postage Refund	67.54	
Seed Fund	1,299.00	
Slide Library	220.00	
Donations	466.17	
Publications	12,168.40	
Total Receipts		63,832.72
DISTRIBUTION		
Bank Charges/Fees	57.71	

Culture Book		182.04	
BSI Meetings		319.16	
Grants		500.00	
Journal – Allowance	1,800.00		
Journal – Mail Service	7,541.24		
Journal – Misc.	1,037.01		
Journal – Printing & Photo	25,531.56		
Journal – Typesetting	7,372.00		
Journal – Storage	371.00		
Journal total		43,652.81	
Judges Certification		149.94	
Membership – Contract	5,400.00		
Membership Expenses	1,276.80		
Membership total		6,676.80	
President's Expenses		142.18	
Publications		7,246.83	
Seed Fund		1,117.28	
Treasurer's Expenses		50.61	
Contingency Fund		66.90	
Total Distribution			60,162.26
TRANSFERS			
Total Gain/Loss period			3,670.46
TRANSFERS – INCOME/EXPENSE			
Library		–85.00	
Interest – Special Accounts		–2,907.69	
Charges – Special Accounts		57.71	
Total Income/Expense Transfers			–2,934.98
Checking Account Balance end of period			21,997.28

BROMELIAD SOCIETY SPECIAL ACCOUNTS
YEAR ENDING DECEMBER 31, 1993

GENERAL FUND	
Begining Balance	42,883.73
Interest Received	1,221.01
Total Income	1,221.01
Bank Charges, Fees	41.82
Total Disbursements	41.82
Ending Balance	44,062.92
LIFE MEMBERSHIPS	
Beginning Balance	12,543.48
Interest Earned	363.35
Total Income	363.35
Bank Charges	12.10
Total Disbursements	12.10
Ending Balance	12,894.73
PADILLA RESEARCH	
Beginning Balance	821.28
Interest Received/Donations	23.44
Total Income	23.44
Bank Charges	.80
Total Disbursements	.80
Ending Balance	843.92

PADILLA ENDOWMENT	
Beginning Balance	3,098.31
Interest – Bonds	1,200.00
Interest – Other	99.89
Total Income	1,299.89
Bank Charges	2.99
Total Disbursements	2.99
Ending Balance	4,395.21
BROMELIAD IDENTIFICATION CENTER	
Beginning Balance	23,579.96
Interest Earned	609.37
Donations	489.50
Auctions	—
Total Income	1,098.87
Bank Charges	22.74
Director's Expenses	5,200.00
Total Disbursement	5,222.74
Ending Balance	19,456.09

BROMELIAD SOCIETY, INC.
BUDGETS – 1993 AND 1994

	1994 BUDGET	1995 BUDGET
RECEIPTS:		
Advertising – Journal	6,000.00	5,000.00
Advertising – Roster	800.00	—
Back Issues	3,500.00	4,000.00
Color Fund	1,000.00	1,500.00
Cultivar Registration	350.00	—
Culture Brochure	400.00	400.00
Dividends	6.00	—
Donations – BSI	300.00	500.00
Interest – General	3,000.00	3,000.00
Interest – Endowment	1,500.00	1,500.00
Judges Certification	100.00	100.00
Medallions/Trophies	200.00	200.00
Memberships	37,000.00	35,000.00
Postage Refund	100.00	100.00
Publications	12,000.00	12,000.00
Seed Fund	1,700.00	1,500.00
Slide Program	100.00	200.00
From General Funds	2,000.00	2,000.00
Total Receipts	70,056.00	67,000.00
DISBURSEMENTS		
Administrative Expense	100.00	100.00
Affiliate Newsletter	250.00	—
Bank Charges	100.00	100.00
Conservation	200.00	200.00
Cultivar Registration	—	200.00
Culture Book	400.00	200.00
Director/BSI Mtgs.	600.00	600.00
Franchise Tax	10.00	10.00
Grants	3,000.00	3,000.00
Journal – Allowance	1,800.00	1,800.00
Journal – Mail Service	9,000.00	8,000.00
Journal – Miscellaneous	1,500.00	1,500.00
Journal – Print & Photos	27,000.00	27,000.00

Journal – Typesetting	7,300.00	7,300.00
Journal – Envelopes	1,000.00	—
Journal – Storage	600.00	650.00
Judges Certification	300.00	200.00
Medallions/Trophies	2,750.00	2,500.00
Membership – Contract	5,400.00	5,400.00
Membership – Expenses	2,000.00	2,000.00
President's Expenses	200.00	200.00
Publications	2,000.00	1,500.00
Roster	1,000.00	1,000.00
Secretary's Expenses	100.00	100.00
Seed Fund	1,350.00	1,350.00
Treasurer's Expenses	100.00	100.00
Contingency	300.00	990.00
Reserves	696.00	—
CITES Program	1,000.00	1,000.00
Total Expenditures	70,056.00	67,000.00

Letter to the Editor *[continued from page 274]*

didn't suds. So they added more. There is famous picture of traffic stalled on a bridge as people watched an enormous raft of suds coming down the river after the excess detergent went through the sewer plant and got all whipped up.

A sudsing agent has to be added to prevent people from overusing it. The cleaning action of the detergent is due to a long molecule with a water soluble end and a fat soluble end. It stabilizes an emulsion of oil and water so it can be rinsed out. The negatively charged "micelles" repel each other, thus stabilizing the emulsion.

To get back to Mr. Plever's problem, he was adding the straight detergent, dropwise. This is actually an enormous amount.

I suggest diluting it first and then adding a drop of the diluted detergent. I can't give you an accurate amount, but if I were doing it, I would add a couple drops of detergent to a tablespoon of water and then use this mixture by the drop. Or you might put a "squirt" in a pint spray bottle and fill it with water. Mix well.

But, with all your chemicals, in the greenhouse, the garden, the garage, the kitchen, the bathroom, or anywhere else,

READ THE LABEL AND FOLLOW DIRECTIONS.

Charles E. Dills
1371 Avalon, San Luis Obispo, CA 93405

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by Harry Luther & Edna Sieff
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Compiled by Registrar Ellen Baskerville
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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.

Chet Blackburn

A tray of flowering *Tillandsia straminea* photographed at Bird Rock Tropicals nursery. This is one of the fragrant tillandsias discussed by Greg Payne on pages 268–270.

Calendar

12–13 November Caloosahatchee Bromeliad Society exhibition (not a judged show) and sale. Lee County Garden Council & Activity Center, Fort Myers, FL. (Located directly in front of Lee Memorial Hospital on U.S. 41 (Cleveland Ave.) about 1 mile south of the Caloosahatchee River Bridge). Saturday, 9 a.m. to 5 p.m.; Sunday 10 a.m. to 4 p.m. Marie Bessellieu 813-674-0656.

25–27 January 4th Brazilian Bromeliad Symposium. Univ. of São Paulo campus, Ribeirao Preto, São Paulo, Brazil. Themes include ecology, physiology and taxonomy of the family, associated fauna, species conservation and legislation, the collector's role, ethics vs. collecting and extractivism. Speakers will include Harry Luther, David Benzing, Walter Till of the Univ. of Vienna, as well as Brazilian subject experts. Coordinators: Dr. Maria das Graças L. Wanderley, Botanical Institute, São Paulo and Dr. Helenice Mercier, Univ. of São Paulo. Preconference trips to three different regions and a postconference trip by boat to the Amazon region at special prices for members of Sociedade Brasileira de Bromélias. For trip information and booking: Lorraine Martins, telephone/fax (55) (021) 257-1510, address: Rua Joseph Bloch, 49, apto. CO-2, Copacabana, Rio de Janeiro-RJ, 22031-040 Brazil. For conference information: Dra. Helenice Mercier, tel. 11 813-8139, Rua Valdomiro Fleuri #251, São Paulo CEP 05514, Brazil.

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.