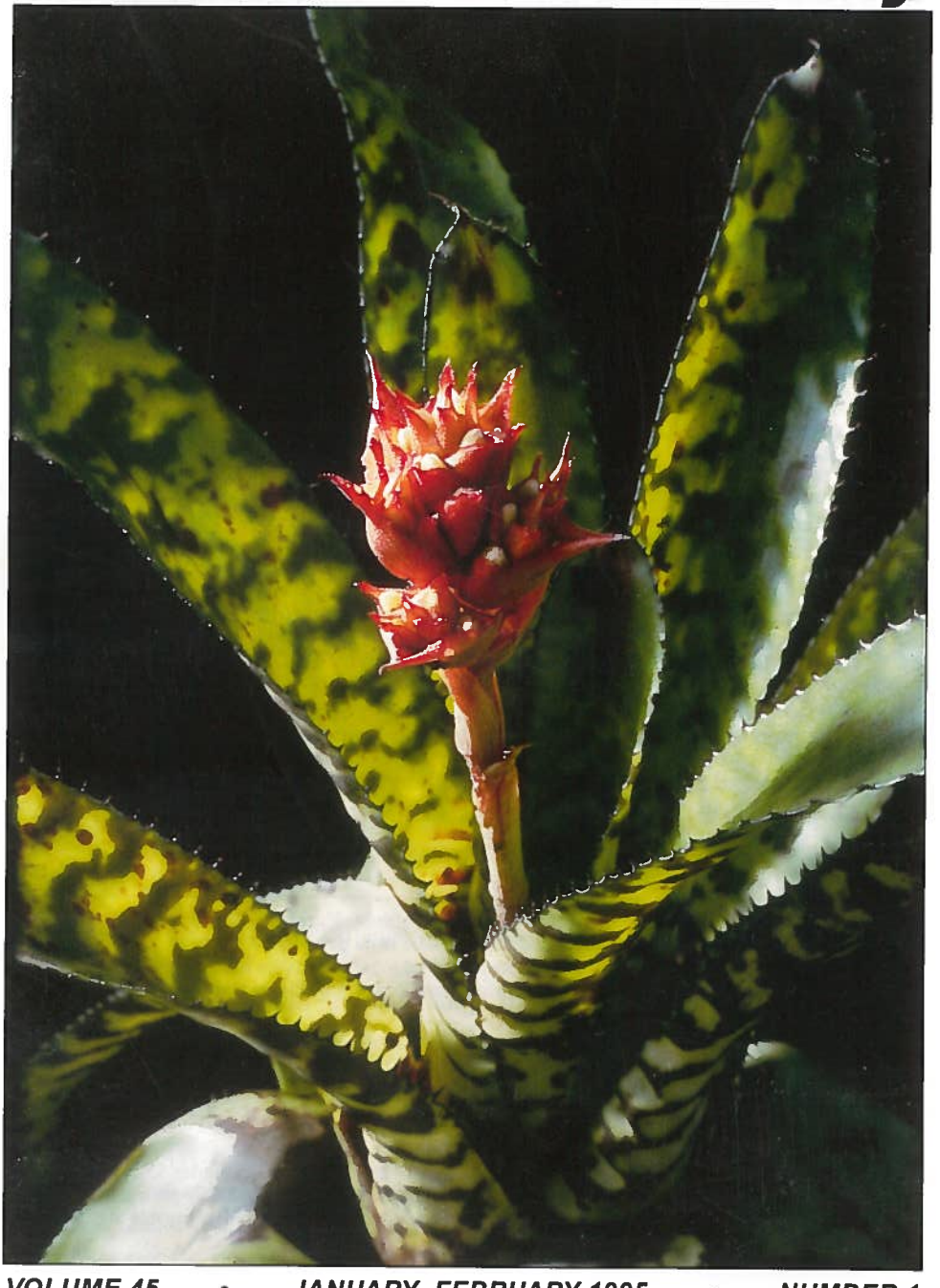
Journal of The Bromeliad Society



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

Cover photographs. Front: *Aechmea orlandiana* L.B. Smith has provided its name to the 1996 World Bromeliad Conference to be held on 1–8 July in Orlando, Florida. Please see the text on page 25. Photograph by Marcel Lecoufle. Back: *Orthophytum supthutii,* E. Gross & W. Barthlott emend. Leme & E. Gross. Text by Elton Leme on pages 3–5. Photograph by W. Barthlott.

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A New Identity for a Mysterious Species

Elton M.C. Leme

For almost 40 years *Cryptanthus duartei* L.B. Smith has been the object of speculation and mystery since it is the only species of the genus with orange-colored petals. Collected originally in 1949 in the Serra do Cipó, Minas Gerais State, by Apparicio P. Duarte, the species was presented to science in 1955 being named after its discoverer. This bromeliad has never again been collected despite the intense botanical work that has been carried out in the area where it was found, today a national park.

As a mandatory step in the work of revising the *Cryptanthus* genus, we had the opportunity of examining the isotype of *C. duartei* deposited in the herbarium of the Rio de Janeiro Botanical Garden. Although we were dealing with a dried specimen composed of fragments, it was possible to recognize the presence of two well-developed appendages at the base of its free petals, which characteristics were not observed in the original description. The fact is sufficiently relevant to alter the concept of the species, requiring a transfer to the genus *Orthophytum.*

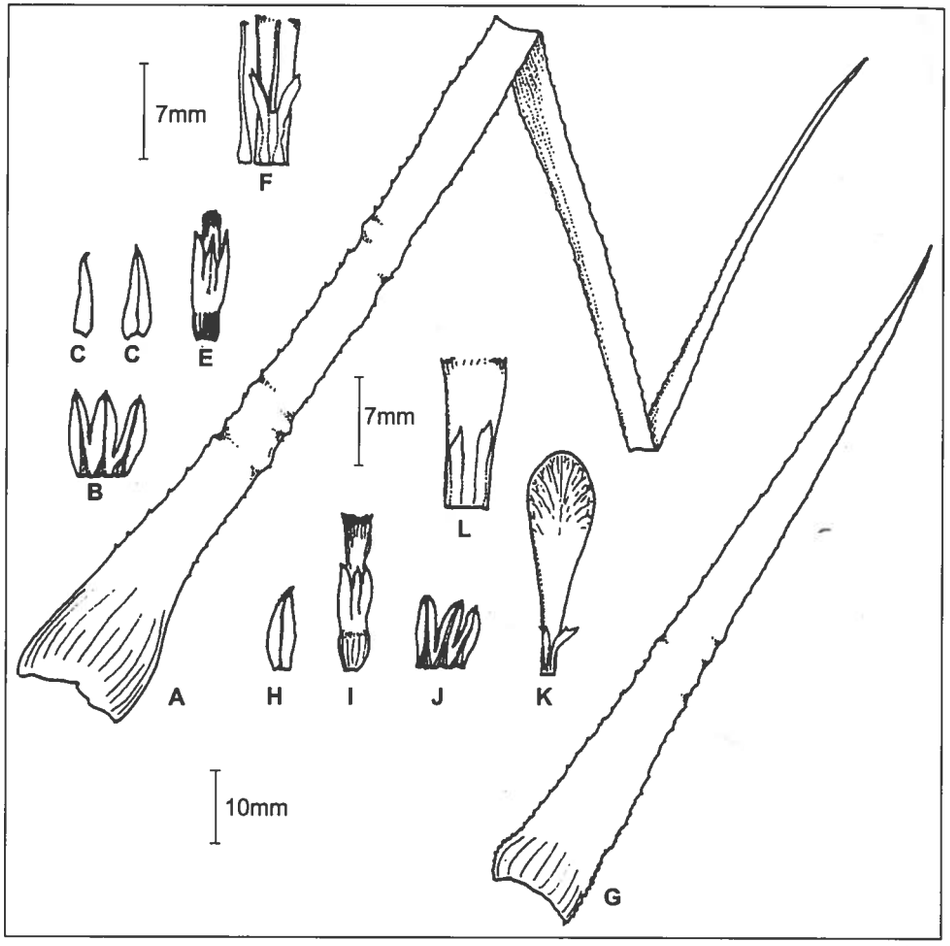
When compared to species of the *Orthophytum* genus, *Cryptanthus duartei* was found to be similar to *O. supthutii* E. Gross & W. Barthlott, described in 1990,[1] also collected in the Serra do Cipó, and also having orange-yellow petals. Although the original description of this species indicated some distinctions, we noted after reexamining the holotype deposited in the Herbarium Bradeanum that such differences were simply the result of faulty interpretation of identical morphological characteristics. We confirmed that observation by examining live specimens collected by the biologist Pedro I. Nahoum in the same microregion. For these reasons, we conclude that *O. supthutii,* which in 1990 had impressed us because of the never-before-seen color of its flowers, is not botanically different from *Cryptanthus duartei.*

Taking into consideration the impossibility of a new combination for *Cryptanthus duartei* since there is *Orthophytum duartei,* a distinct species also described by L.B. Smith, we must adopt the next available valid name for the species, as follows:

***Orthophytum supthutii* E. Gross & W. Barthlott emend. Leme & E. Gross.** [2] (back cover photo.)

[1] E. Gross, W. Barthlott. 1990. J. Bromeliad Society 40:217–219.

[2] W. Rauh & E. Gross. 1990. Trop. subtrop. Pflanz. 75:46–48, fig. 23.



Drawing by Author

Figure 1.
Orthophytum supthutii. A-F (A.P. Duarte, s.n.): A, leaf; B. sepals; C, side view of floral bract; D, floral bract; E, fragments of flowers; F. basal portion of petal and filaments (2:1). G-L (Barthlott & Supthut 10315): G. leaf; H. floral bract; I, fragments of flowers; J. sepals; K, petals; L, basal portion of the petal (2:1).

Synonym: *Cryptanthus duartei* L.B. Smith, Smithson. Misc. Collect. 126:23, 159, fig. 67. 1955.

Plant stemless or very short caulescent, variable in size, flowering ca. 6 cm high, propagating by basal stolons. *Leaves* numerous, not narrowed between sheath and blade, suberect to spreading and arched-recurving, usually forming a dense, flat rosette at anthesis; *sheaths* small but distinct, broadly elliptic to suborbiculate, 1–2 cm long, ca. 1.4–2 cm wide, very densely spinulose toward apex, lustrous, glabrous; *blades* very narrowly triangular, filiform-acuminate, 7–25 cm long, ca. 1 cm wide at base, flat, thin in texture, green, lustrous and glabrous

adaxially, finely but distinctly nerved and very densely white lepidote abaxially, the trichomes becoming pale castaneous when dry, margins densely serrulate, *spines* ca 0.5 mm long, slightly undulate in drying. *Inflorescence* few- to many-flowered, sessile, pseudosimple to inconspicuously bipinnate; *primary bracts* foliaceous; *fascicles* 2-flowered; *floral bracts* narrowly triangular-lanceolate, acuminate, apex curved, 6–15 mm long, 3–4 mm wide, lepidote at apex or glabrescent, membranaceous, about equaling $^2/_3$ of the length of sepals, entire or denticulate toward apex, sharply carinate; *flowers* 32–45 mm long; *sepals* (7–) 11–13 mm long, ca. 3 mm wide, suboblong, symmetric, apex subacute, apiculate, and slightly recurved when dry, subcuculate, unequally connate for 2–5 mm, entire, inconspicuously lepidote to glabrescent, carinate (mainly the posterior ones), soon drying; *petals* (27–) 35–40 mm long, ca. 10 mm wide near the apex, ca. 2 mm wide at base, orange-yellow, spathulate, apex obtuse, slightly exceeding the stamens, free, erect at anthesis, bearing 2 linear-lanceolate appendages at base of 5–7 mm in length, apex acuminate or irregularly bidentate, about ½ adnate to the petal; *stamens* included; *filaments:* the epipetalous ones adnate to the petals for ca. 2 mm, the episepalous free; *anthers* ca. 2 mm long, fixed near $^1/_3$ of their length about the base; *ovary* ca. 5 mm long, ca. 4 mm wide, broadly obovate, subcomplanate, white, glabrous; *epigynous tube* shallow; *placentae* central; *ovules* many, obtuse.

TYPE: Brazil. Minas Gerais: Serra do Cipó, 50 km north of Chapéu do Sol, Feb. 1988, *W. Barthlott & D. Supthut 10315* (holotype HB; isotype HEID, n.v).

Material examined: Minas Gerais: Serra do Cipó, Nov. 1949, *A. P. Duarte s.n.* (type of *Cryptanthus duartei* L.B. Smith) (RB, US, n.v.); ibidem, Nov. 1993, *P. Nahoum s.n.* (HB).

According to available information, *Othophytum supthutii* is a species of restricted distribution even within the limits of its area of occurrence in the region of Serra do Cipó. For that reason, the long silence and uncertainty about its true identity should not be found strange. It grows in small populations on rocky walls at altitudes of more than 1000 meters. The plant varies somewhat in size, presenting a delicate appearance as a rule. When sterile, it resembles *Orthophytum amoenum* (Ule) L.B. Smith because of its size and the green and lustrous leaves. When in bloom, however, its orange-yellow petals have no equals in this genus.

ACKNOWLEDGMENT: I thank Harry E. Luther, director of the Mulford B. Foster Bromeliad Identification Center of the Marie Selby Botanical Gardens, for his suggestions concerning the manuscript.

Rio de Janeiro, Brazil

Integrated Pest Management; The Key to Healthy Bromeliads

Tom Koerber

Bromeliads have fewer pest problems than most plants you could grow but if you have very many for a long time you will find they are not entirely pest free. A pest is an organism that interferes with your objectives. Integrated pest management is the use of a combination of methods to minimize the effect of pests. To use integrated pest management you should define your objectives, identify the pests that will interfere with them and identify the pest control methods that might be effective. If your objective is to win the top awards at the next world conference you will have a much lower tolerance for pest activities than someone who includes some bromeliads in his or her garden. Your objective will determine which creatures are defined as pests and the intensity of your pest control efforts.

The first line of defense is physical barriers between your plants and the pests. If your plants are in an enclosed environment such as a greenhouse, some attention to design and construction details will prevent a lot of pest problems. Caulking the joint between the foundation and the wall, weather stripping and a rubber threshold seal around the door, and screening over vent openings will keep out a lot of unwelcome creatures. My greenhouse vents have an outer screen of half-inch galvanized steel mesh and an inner screen of 1/16-inch copper mesh. The outer screen excludes the local raccoon and rodent populations and the inner keeps out snails, slugs, and most insects. The door is kept closed and locked to keep out pets and grandchildren.

Sanitation is the next line of defense. I have found a garbage can to be a very effective pest management tool. It works best when used in combination with a sharp eye and a hard heart. Often the best thing to do with an insect-damaged plant is to throw it out. Field-collected plants should be carefully inspected for pests. Those found to harbor pests are best discarded at their place of origin rather than having the problem found by plant quarantine inspectors, or worse, risking the introduction of a new pest. Bromeliads should be groomed regularly and any leaves that are removed or trimmed should be placed immediately in the garbage can. This action deprives pests of hiding places and makes detection much easier.

Consider that every plant you have has a limited useful life. Everyone seems to have a favorite plant. Perhaps you paid a lot of money for it at the rare plant auction or perhaps it won best of show. Inevitably the day will come when it is an old plant. It will never win another ribbon but perhaps it has enough life

left to produce a few more pups. Now think of your objective. If it is to produce the maximum number of offsets, by all means keep the plant but don't put it under a bench or in some out-of-the-way place where in its weakened condition it will become a breeding ground for pests. Keep it in a prominent place, inspect it often, and give it the best of care. Otherwise, deposit it in the garbage can with proper ceremony befitting its status as a favorite plant.

Another useful strategy is to enlist a little help from your friends. These include birds, lizards, salamanders, frogs, and predatory insects. In an outdoor situation providing nesting opportunities of birds, a water source for frogs and salamanders and a wide selection of flowering plants to sustain predatory insect populations will make life harder and shorter for pest species. A few lizards, frogs, and salamanders will play the same role when added to a greenhouse. I especially like tree frogs (Figure 2). They are expert climbers, even able to run up and off walls. During the day they hide in the water-filled centers of tank-type bromeliads emerging at night to ambush any insects that find their way in. Toads and salamanders are among the few predators that will eat snails and slugs. Several types of predatory insects are now commercially available from garden supply dealers. These include ladybird beetles, lacewing flies and mantids. Any of these can be added to either your garden or greenhouse.

Most bromeliad growers find that judicious use of chemical pesticides is the best way to control pests that slip through the other defenses. A comprehensive arsenal of chemical weapons would include a **systemic insecticide,** e.g. acephate or dimethoate, to kill sucking insects and pests feeding in concealed locations; a **fast-acting contact insecticide,** e.g. malathion or pyrethrins, to kill flying and crawling insects in exposed locations; a **molluscicide,** e.g. metaldehyde, to kill snails and slugs; a **fungicide,** e.g. benomyl or captan to protect seedlings and newly separated pups from fungus infections. To make sense out of the bewildering array of pesticide products in your local garden supply store you must learn to read the fine print on the labels. This will include the chemical name of the active ingredients, a list of pests controlled, directions for use, and a precautionary statement describing any hazards associated with use. Most pesticides are available as concentrated powders or liquid formulations that you must mix according to directions to use, and as ready-mixed sprays and bait formulations that are ready to use. The concentrated products are expensive but may be worth the cost for the convenience of instant treatment as soon as a pest problem is spotted rather than hypothetically mixing up a batch of spray as soon as you have time. If you are a champion procrastinator, as I am, you will save time now and avoid a bigger pest problem later.

Chemical pesticides are most effective when used to prevent problems rather than to cure them. Newly acquired plants should be sprayed or dipped in systemic insecticide before being added to your collection. This precaution will

Figure 2.
A tree frog resting in a billbergia tube.

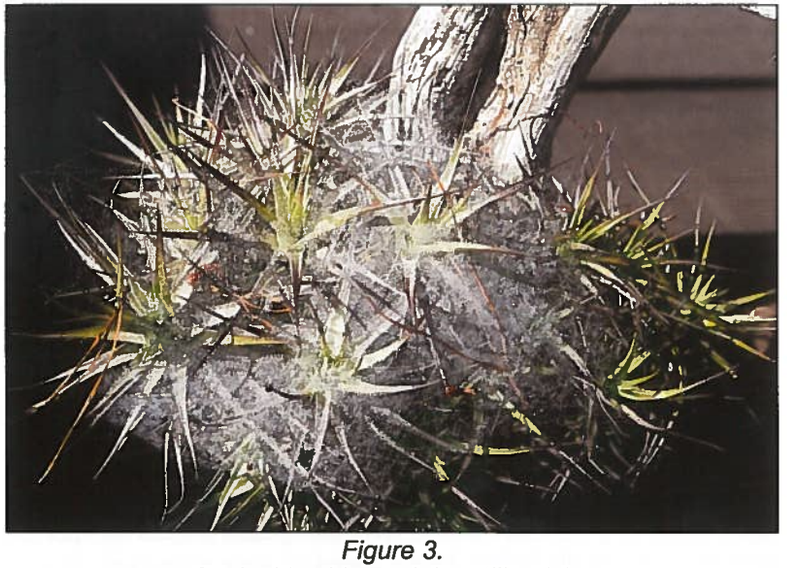


Figure 3.
Anglenid spider web in a tillandsia.

eliminate any concealed pests before they have a chance to multiply and spread to the rest of your plants. Field-collected plants should be thoroughly cleaned and dipped in systemic insecticide at their source rather than after you bring them home. Adding a fungicide to the growing medium before the seeds are planted is more effective than trying to save the seedlings after they are infected.

The most commonly encountered insect pests on bromeliads are scale insects (Figure 4). The adult scale insects are immobile, pinhead-size, sucking insects that feed on the foliage of bromeliads. A female scale will produce up to a hundred eggs packed into the space under her body. The eggs hatch into tiny aphid-like crawlers that are very mobile. They move readily from plant to plant. They may hitchhike on your hands or clothing and may even be wind-borne. Once established on a plant they lose their legs, insert their sucking mouthparts into the leaf tissues and grow a protective shell over their bodies. They inject digestive enzymes into the leaf tissues destroying the pigments causing a white spot to appear around each insect. The plant is not able to replace the lost pigment and the spot remains for the life of the leaf.

If you have a few scales on a small number of plants, they may be killed by touching each one with a cotton swab dipped in insecticide or rubbing alcohol. DO NOT SCRAPE THEM OFF! While scraping will kill the scale insects, it will disperse any eggs present and the crawlers produced will reinfest your plants. If you have a heavy infestation or a lot of infested plants, it's time to remember your objective. Those spots on the leaves will never go away. A spray or dip in systemic insecticide is a practical treatment for large numbers of plants and the garbage can option should certainly be considered.

Several species of mealybugs are also prevalent pests on bromeliads (Figure 5). These are sucking insects that live in concealed locations between leaf bases and under stem and flower bracts. They secrete a white, waxy powder that readily comes off their bodies. The little tufts or granules of white powder on leaves or shapes is often the first clue to their presence. The life cycle is similar to that of scale insects except that the adults have three pairs of legs and can crawl slowly. They also inject digestive enzymes in the feeding process. This kills little patches of plant tissues leaving black spots. The same treatments used for scale insects are effective against mealybugs.

The most serious threat to bromeliads is the recently introduced "Evil Weevil" *(Metamasius callizona)*. According to Howard Frank, entomologist at the University of Florida, this weevil (Figures 6 a, b, c) was probably introduced accidentally from Mexico and Central America and is now established in native bromeliad population in four counties in southern Florida *[please see the following bibliography and note]*. In contrast with the other pests described here, *Metamasius* does not just damage bromeliads. It kills them. Female weevils deposit eggs singly in slits cut in the leaf bases of bromeliads (Figure 6 d). The

Figure 4.
Scale insects on the leaf of a canistrum. Note the white spots caused by the feeding process surrounding each insect.

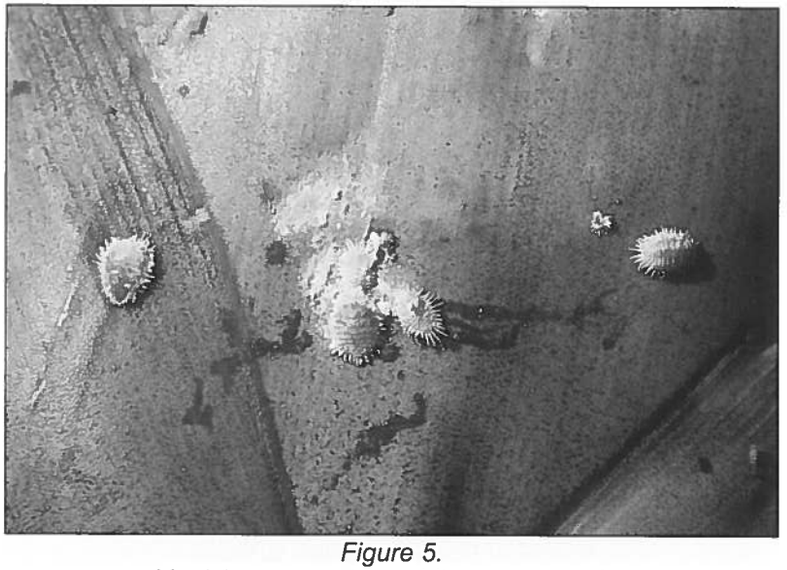


Figure 5.
Mealybugs secrete a white, waxy powder providing a clue to their presence.

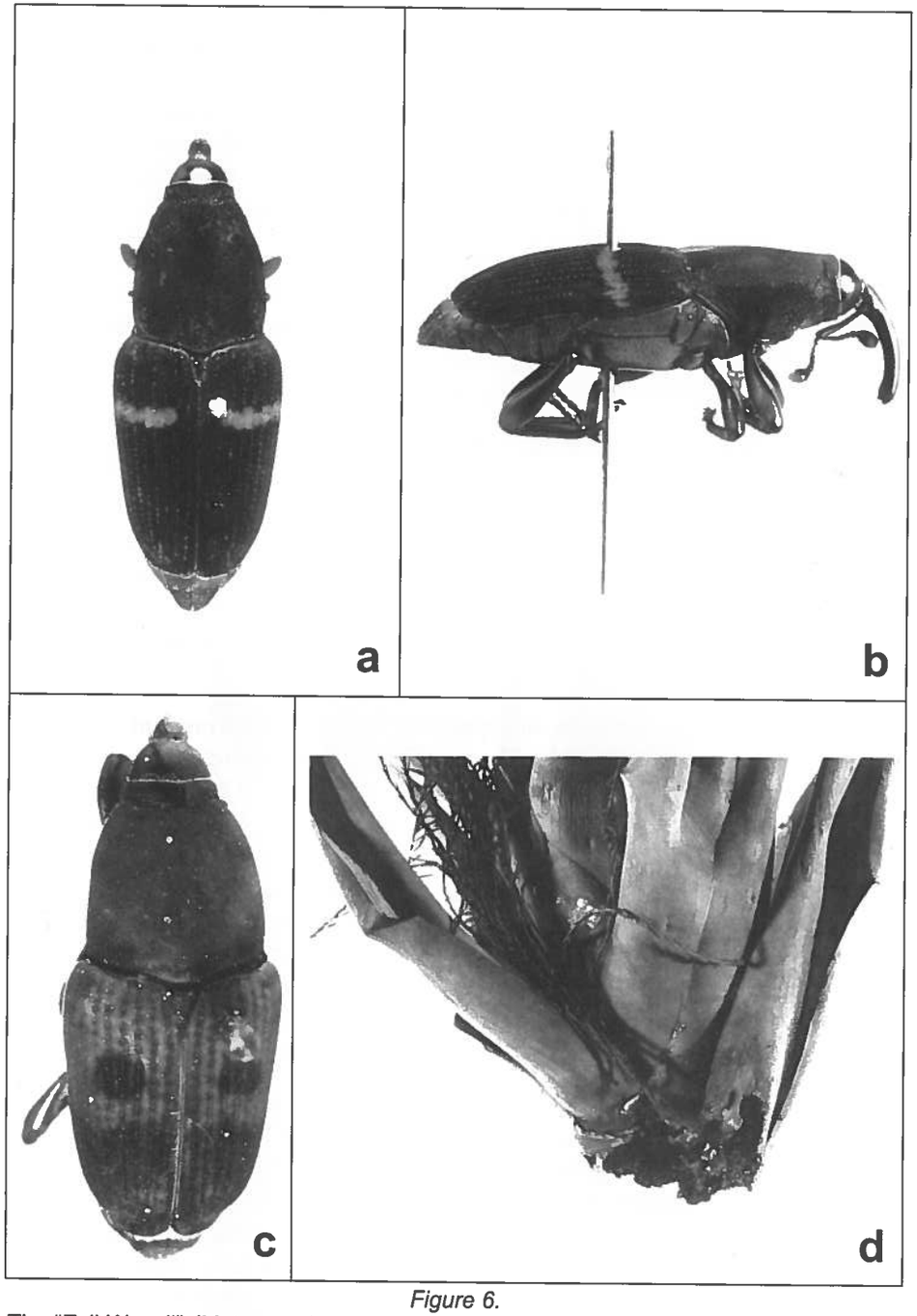


Figure 6.
The "Evil Weevil" *(Metamasuis callizona)* is probably the most serious threat to bromeliads. A. dorsal view; B. lateral view. Note the banding which may be yellow or orange. Length 11–16 mm (about ½–¾"); C. *Metamasius moseri* dorsal view, length 6–9 mm, red and black with two black spots on the wing covers; D. larval damage to *Tillandsia fasciculata*.

eggs hatch producing legless white grubs with brown heads. The grubs feed internally destroying the apical meristem of the plant with subsequent disintegration and death of the plant (Figure 7). Mature larvae transform to adults in fibrous cocoons within the dying plant. The adult is a black weevil with an orange band across its upper wing covers. Twelve genera of commonly grown bromeliads are known to be suitable hosts for *Metamasius*. Probably only thin-stemmed, caulescent species are not susceptible to infestation.

Field-collected bromeliads should be very carefully examined for weevil infestation. No commercial nurseries are known to be infested at this time and I hope all dealers will do their best to keep it that way. A thorough systemic insecticide soak should kill eggs and concealed larvae in field-collected plants. Certainly, infested plants should be the destroyed promptly.

There are a great many insect species that are not specific bromeliad pests but that will feed on them if they have a chance. These include leafhoppers, crickets, earwigs, and sowbugs. It is virtually impossible to keep outdoor bromeliads free from these opportunistic pests. Earwigs can be a particular nuisance since they like to dine on blossoms and young seedlings. On the other hand, they eat scale insects and mealybugs. A periodic spray with contact insecticide will hold these pests in check. A review of your objective may be in order before setting out to eradicate these minor pests.

Bromeliad plants provide an especially favorable environment for snails and slugs. The water-holding leaf bases of tank-type bromeliads provide the exact kind of concealed wet place they like to call home. They range out from their hiding places at night to feed on young leaves Figure 8) and flowers, especially the anthers. Seedlings are a special delicacy and they will graze on the trichomes of gray-leafed tillandsias leaving characteristic bare strips on the leaves. Adult snails and slugs deposit their eggs in loose soil or under debris on the ground. The spherical, pearly white eggs stick together in clusters. Metaldehyde, in the form of granular bait is the usual control method. A periodic midnight inspection of your plants with a flashlight ia a good practice. Some growers find the crunch of a snail under foot a very pleasing sound.

Spiders are a special case. They do not feed on plants but, rather, prey on insects that might do so. Unfortunately, their webs catch dust and debris and are difficult to clean off, especially from the more fuzzy *Tillandsia* species (Figure 3). I find it nearly impossible to keep them off of bromeliads growing outdoors. Rather than trying to rid all my plants of spider webs I identify individual plants that are flower show candidates and selectively assassinate individual spiders that settle on the wrong plants with a quick shot of pyrethrins.

Integrating pesticide applications with the use of natural predators may present a problem for your bug-eating friends. Infested plants can be moved else-

Figure 7.
Full-grown larva of *Metamasius callizona* in a tunnelled-out bromeliad stem.

Figure 8.
Snail damage on a tillandsia leaf.

where to be treated and returned after a few days. Alternately, you may want to move your favorite frogs, lizards, etc. to a terrarium for a few days. Theoretically, pesticide treatments will eliminate all the insects and predators will starve. In my experience to date, having so few insects that a frog can't find lunch is still a dream.

Entomological Service Company
P.O. Box 992 Berkeley, CA 94701

CREDITS:

All illustrations by the author except figures 6 and 7 by J. L. Castner.

AN ANNOTATED BIBLIOGRAPHY OF *METAMASIUS CALLIZONA:*

The following list of articles published in the JOURNAL is arranged in date order.

1) O'Brien, C.W.; Thomas, M.C.; Frank, J.H. A new weevil pest of *Tillandsia* in South Florida. 1990. 40:203-205, 222. Includes illustrations of *M. callizona, M. mosieri,* and larval damage; a table of species of *Metamasius* recorded from bromeliads.

2) Frank, J.H.; Thomas, M.C. *Metamasius callizona* kills bromeliads in southeastern Florida. 1991. 41:107-108. With a map of infested area.

3) _____, _____. *Metamasius callizona* in four counties in South Florida. 1991. 41:253–255. Illustrations of adult *M. callizona,* a fully grown larva of *M. callizona* and base of destroyed bromeliad.

4) Johnson, Carol M. Weevil research funds. 1991. 41:255. Discusses fund raising for weevil research by the Florida Council of Bromeliad Societies and the Bromeliad Society of South Florida.

5) Frank, J.H. Collection of the weevil *Metamasius callizona.* 1992. 42:128. Encourages the collection of suspected specimens and describes how to prepare them for mailing to him at the Entomology/Nematology Dept, Univ. of Florida, Gainesville, FL 32611-0740.

6) Short, Donald. Chemical control of *Metamasius callizona* in bromeliads. 1992. 42:128. Recommends preventive spraying of bromeliads with a Dursban solution; may also be used as a dip.

7) Frank, J.H.; Thomas, M.C. The homeland of *Metamasius callizona.* 1994. 44:173-176. Describes collecting activities, includes map and bibliography including material not listed here.

NOTE:

Dr. J. Howard Frank as the principal researcher encourages correspondence relating to suspected weevil infestation (see item 5 above for his address). His work is being supported by the Florida Council of Bromeliad Societies with the cooperation of affiliated societies. The primary objective is to find a natural parasitoid to control the weevil. As stated by Dr. Koerber, the weevil is the most serious threat to bromeliads. While the first discoveries were made in Florida and research is being done in Florida it is not known how widespread this pest is and for that reason we should all be aware of the problem and actively support the research.—Ed.

Population Dynamics of Some Native Florida Epiphytes. II. Mortality after a Storm

Meg Lowman[1] and Warren Linnerooth[2]

Introduction

Although it is assumed that hurricanes and severe winds cause high levels of epiphyte mortality, very little data exist to quantify this phenomenon. In March 1993, a severe storm (called the "no-name storm" because it occurred outside of the official hurricane season) blew along the west coast of Florida causing widespread damage to buildings, roads, and vegetation. It blew directly over a coastal cedar hammock on Longboat Key in Sarasota, Florida, the site of a long-term project to monitor the growth and population dynamics of epiphytes in this endangered ecosystem (Lowman and Doblecki, 1993).

Epiphytes in trees of *open* (i.e. not surrounded by other trees) and *wooded* (i.e. surrounded by trees forming a continuous canopy) canopies were counted and marked during January 1993. Mature cedar trees (approximately 12 m high) contained from 150 epiphytes in a wooded canopy to as many as 700 epiphytes in trees of the open region. Species included one orchid, *Encyclia tampensis,* and three bromeliads: *Tillandsia recurvata, T. utriculata* and *T. usneoides.* The cedar canopies averaged 40% orchids and 60% bromeliads. *T. utriculata* was the most common species.

In this report, we present the results of post-storm mortality on the epiphytes between the canopies of open and wooded cedars. We hypothesised that epiphytes growing in a wooded canopy situation would have a greater likelihood of survival because of the buffering of surrounding trees. In contrast, epiphytes growing in an open canopy would suffer higher mortality of the greater exposure to the storm and, especially, the effect of salt spray.

Methods

After the storm, two trees approximately 12 m tall were selected from the nine trees in the initial population survey (Lowman and Doblecki, 1993). The wooded tree formed part of a continuous forest stand; an open tree was isolated. These two types of trees are typical in many Florida developments; condominium owners often retain stands of trees but more commonly retain scattered, individual trees in their landscape designs.

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[1] Director of research, Selby Botanical Gardens, 811 S. Palm Avenue, Sarasota, FL 34236.

[2] Environmental Studies Program, New College, Sarasota, FL 34237.

The epiphytes were counted according to species and size classes on both trees, using a ladder for access. Epiphyte seedlings were tallied separately so that mortality of the original population could be calculated as well as mortality in relation to the overall recruiting population.

Results

Epiphyte mortality was extremely high after the storm averaging 44% of all individuals and ranging from 0% to 64% losses for different species. As hypothesised, epiphyte mortality was higher in the *open* canopy (49%) than the *wooded* one (28%) (Table 1).

Table 1. Abundance and mortality of epiphytes before and after a storm on Longboat Key, Florida.

Epiphyte	Pre-Storm Abundance	% Mortality from Storm	1994 Recruits	% Overall Population
T. recurvata	37	38%	6	–21%
T. utriculata	39	21%	14	+52%
T. usneoides	4	0%	0	0%
Encyclia tampensis	4	0%	0	0%
TOTAL for Wooded Tree	84	21%	20	+ 3%
T. recurvata	45	64%	5	–53%
T. utriculata	100	57%	14	–43%
T. usneoides	1	0%	0	0%
E. tampensis	90	33%	0	–33%
TOTAL for Open Tree	236	49%	19	–41%
TOTAL for hammock	320	42%	39	–30%

Tillandsia recurvata suffered the greatest losses of individuals, with 38% and 64% mortality in the wooded and open trees, respectively. Approximately 26% of the epiphytes blown off the trees were replaced by newly germinated individuals. In contrast, *T. usneoides* had no mortality in either canopy (and no recruits either). *T. utriculata* lost only 10% individuals in the wooded canopy but 57% mortality in the open canopy. *Encyclia tampensis* had no mortality in the wooded tree but 33% losses in the open.

Despite the proportionally high losses of epiphytes from the storm, the relative abundance of each epiphyte changed very little. For example, *Tillandsia recurvata* remained the most abundant species in the wooded canopy whereas *T. utriculata* and *Encyclia tampensis* remained equally abundant in the open canopy. *T. usneoides* represented only 6% and <1% of the epiphytes in the wooded and open canopies, respectively, both before and after the storm.

In this survey, epiphyte mortality was defined as the loss of an epiphyte from its natural position in the canopy. To examine the survival of epiphytes when fallen to the ground, we marked the fallen individuals and monitored their fate. Almost 50% of the epiphytes on the ground were dead at the time of this census (approximately six months after the storm). we predict that the remaining 50% will experience the same fate.

Summary

The storm caused a significant loss of bromeliads, especially *Tillandsia recurvata* and *T. utriculata,* to the canopies of cedars in this Florida coastal hammock. Isolated trees suffered higher bromeliad mortality than did trees that were part of a contiguous stand. Of the three bromeliads native to this hammock, *T. usneoides* suffered no mortality, perhaps a consequence of its growth form that intertwines securely around its host branch.

The conservation of native Florida bromeliads may require more documentation than merely listing their abundance and distribution. The host trees and their canopy architecture on the landscape may be equally important to epiphyte survival. It may also be necessary to encourage landowners to retain stands of host trees with continuous canopy rather than landscapes with isolated trees for epiphyte conservation.

ACKNOWLEDGEMENTS:

We are grateful to Harry Luther for confirmation of bromeliad identification and to the staff of the Water Club construction site for their cooperation. Ellen Baskerville assisted with the preparation of this manuscript

LITERATURE CITED.

Lowman, M; Doblecki, S. 1993. Population dynamics of some native Florida epiphytes. J. Bromeliad Soc. 43:175-178.

CORRECTIONS

1) It should be noted that Dr. Clyde F. Reed's Cumulative Index to the Bulletin and Journal of the Bromeliad Society, Volumes I–XXX contains an error in pagination: pages 137 and 138 are in reverse order.

Please note also Dr. Reed's address: **1222** Main Street, Darlington, MD 21034. (See page 40).

2) The Cultivar/Grex Registrations for 1991–June 1994 published in the September-October 1994 issue of the Journal contains an error on page 219 in the entry *Tillandsia* Creation: the namer of the plant is P. Bak and not P. Koide.

3) Volume 44, May–June, page 103, figure 4, change plant name to *Puya killipii* instead of *P. cardonae.*

A New Tillandsia from Western Mexico

Renate Ehlers[1] and Pamela Koide[2]

***Tillandsia ventanaensis* Ehlers & Koide spec. nov.**

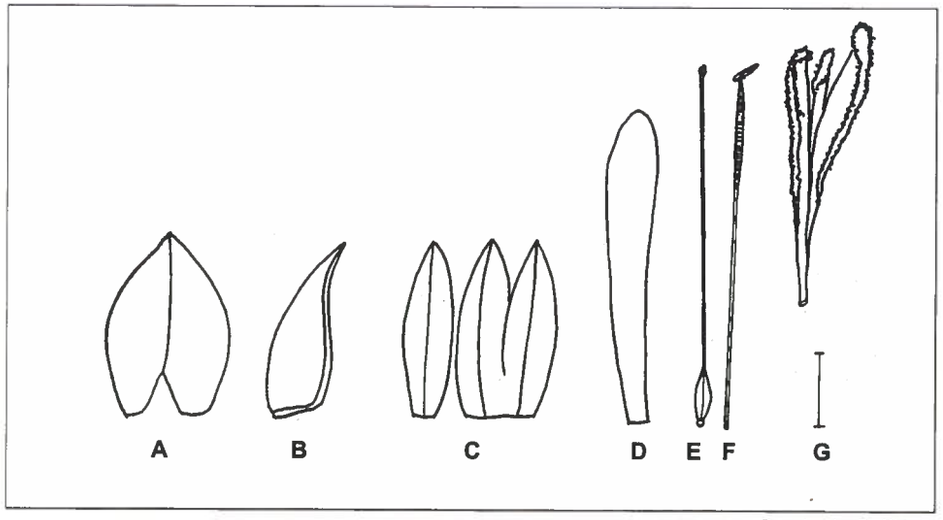
A *T. langlasseana* Mez foliis perrigidis, cinereo-lepidotis, vaginis foliorum subinflatis, laminis foliorum multo angustioribus apice filiformi, inflorescentia subtripinnata, multis spicis composita, spicis stipitatis, angustioribus, applanatis, bracteis primariis multo longioribus, et totis sepalis carinatis valde nervatisque differt.

TYPUS: Mexico. Estado Durango: Sierra Ventana, 1800-2000 m s.m., *leg Pamela Koide M2T* and *Gary Hamer,* Nov. 1988 (holotypus, WU; 2 fol.).

Plant stemless, flowering 35-55 cm high. *Leaves* to 55 cm long, very rigid, densely covered with cinereous adpressed scales. *Leaf sheaths* 4.5–6 cm long, 2–4 cm wide, ovate, subinflated, conspicuous, adaxially dark brown, abaxially light brown, both sides densely covered with brown-centered scales, 1–1.5 cm wide above the sheaths. *Leaf blades* narrowly triangular, tapering in a long filiform apex, spreading, adaxially slightly keeled, dark green or red, cinereous lepidote, abaxially denser lepidote, appearing grey. *Scape* erect, 5–8 cm long, very stout, imbricately covered by few, leaf-like scape bracts with long, reflexed, red blades. *Inflorescence* bipinnate or subtripinnate, 13–40 cm long, 9–10 cm wide, cylindric or thyrsiform, compound with 15–30 spikes, the lower ones sometimes with a secondary lateral spike. Internodes of the spikes 10–20 mm, the apical ones very densely arranged, often subdigitate, the basal ones spreading to 45 degrees, the apical ones

P. Koide

Figure 9.
Tillandsia ventanaensis, a new species from western Mexico in habitat.



Drawing by R. Ehlers

Figure 10.
Tillandsia ventanaensis. A, B, floral bracts; C, sepals; D, petal; E, style; F, filament; G, stigma, enlarged. Scale: 1 cm.

suberect. Sheaths of the primary bracts of the lower spikes about half as long as the spikes, gradually smaller towards apex, ovate, to 3 cm wide, thin, erect, covering the flat side of the spike, the blades 5 mm wide at base, narrowly triangular subulate-filiform, rigid, to 40 cm long, deflexed, red, finely lepidote, the apical ones only apiculate. Ultimate spikes 4–8 cm long, 15–25 mm wide, elliptic, acute, complanate, 5–10 stipitate with carinate sterile bracts adjacent to the stout peduncle, 5–13 sessile, odorless flowers. *Floral bracts* densely imbricate concealing the rachis, 20–25 mm long, to 17 mm wide, equaling the sepals, broadly ovate, acute, carinate, rigid with thin margins, abaxially green, lustrous, mostly glabrous, only at apex sparsely lepidote, adaxially minutely fine punctate, lepidote. *Sepals* 20–23 mm long, 5–6 mm wide, elliptic, acute, yellow-green, glabrous, strongly nerved, the anterior carinate, the posterior ones carinate and connate, 5–8 mm. *Petals* to 4 cm long, 7 mm wide, spatulate, forming an erect tube, corolla throat closed, the tips very slightly curled back, lavender, base white. *Stamens* exserted, the filaments 45 mm long, in 2 sets of unequal length, broadened near apex, concolorous with the petals, anthers 35 mm long, 0.9 mm wide, fixed versatile ¼ from base, light brown, pollen yellow. *Style* 45 mm long, white, 3 mm high, 1.5 mm wide, whitish, lobes erect, papillose, (Type I Brown & Gilmartin). *Ovary* 7 mm high, 2.5 mm wide, conical,

DISTRIBUTION: Mexico. Estado Durango: Sierra de las Ventanas, about 190 km from Durango in direction Mazatlan, 1800–2000 m s.m. Epiphytic in forest with *Tillandsia machrochlamys* Baker, *T. macdougalii* L.B. Smith, *T. erubescens* var. *patentibracteata* Weber & Ehlers, *T. seleriana* Mez, *T. magnusiana* Wittm., and

the orchids *Encyclia citrina* (La Llave & Lex.) Dressler and *E. kennedyi* (Fowl. & Withn.) Hagsater. In the same area were plants that differ by a shorter, subdigitate inflorescence and very short primary bracts with the sheath of the primary bract only as long as the stipe of the spike, blade only to 8 cm long and laminate. EM 871105 Klaus & Renate Ehlers, March 1987, flowering August 1991 in col. Ehlers, (WU).

Tillandsia ventanaensis seems to be related to *T. langlasseana* Mez but differs in the following characters: leaves very rigid, grey lepidote, sheaths subbulbous, blades much narrower with much longer, filiform apex. Inflorescence subtripinnate, compound with many more spikes, spikes stipitate, narrower, dorsiventrally more compressed, sheaths and blades of the primary bracts much longer; all three sepals carinate, strongly nerved.

NOTE: *Tillandsia intumescens* L.B. Smith and *T. langlasseana* Mez are treated by L.B. Smith (1977) as two different species. He distinguished var. *intumescens* with blades of the primary bracts exceeding the lower spikes and var. *brevilamina* with blades of the primary bracts all much exceeded by the spikes. But the drawings published in his monograph[3] show the spikes of both varieties with very short primary bracts with no lamina, both shorter than the stipe of the spike. In her dissertation[4] Sue Gardner treated *T. intumescens* as a synonym of *T. langlasseana.*

ACKNOWLEDGMENT:

We thank Dr. Walter Till, University of Vienna, for his cooperation in providing the Latin diagnosis and Harry Luther, director of the M.B. Foster Bromeliad Identification Center, Selby Botanical Gardens, for his comments.

NOTES:

1. Herrenberger-Strasse 14, Stuttgart 80, D70563 Germany.
2. Bird Rock Tropicals, 6523 El Camino Real, Carlsbad, CA 92009.
3. Flora Neotropica. Monograph no. 14, pt. 2, Tillandsioideae (New York: Hafner Press, 1977), p. 934, 936, fig. 300.
4. Gardner, C.S. 1983. A systematic study of *Tillandsia* subgenus *Tillandsia.* College Station: Texas A&M University. Dissertation.

Bud Martin, chairman of the 1996 World Bromeliad Conference has announced that James Boynton, editor of the Florida West Coast Bromeliad society, submitted the winning name of the conference, "Orlandiana '96." Our congratulations to Mr. Boynton.—Ed.

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

Harry E. Luther[1]

Part II of the Guide continues the series begun in the November–December 1994 issue of the JOURNAL. *It includes* T. kautskyi *and* T. mauryana. *The remaining three species will be published in succeeding issues of this* JOURNAL. *The Guide is being reprinted in part from* SELBYANA, *vol. 15, pt. 1, pages 112–115. As with Part I, the photographs were made by Vern Sawyer for Selby Gardens and the drawings by Barbara Culbertson.*

Tillandsia kautskyi E. Pereira, *Bradea* 1:438, Tab. II. 1974.

DISTRIBUTION: Endemic to wet mountain forests at elevations of 800–1000 m in the vicinity of Domingos Martins, State of Espirito Santo, Brazil.

STATUS IN HORTICULTURE: Uncommon in cultivation.

DESCRIPTION: **Plant** an epiphyte, nearly stemless, 3–8 cm tall, single or tightly clustering; roots wiry, 1 mm or less in diameter, brown. **Leaves** densely arranged, erect or slightly curving secund erect, 18 to 30 in number, light grey-green or silver-grey forming a slightly pseudobulbous, conical, rather strict rosette. **Leaf sheaths** ovate to broadly triangular, 8–13 mm wide, appressed white lepidote except at the base. **Leaf blades** narrowly triangular, acute to attenuate, 3–6 cm long, 8–13 mm wide, slightly channeled to nearly plane, soft and brittle, densely covered with appressed white trichomes and appearing metallic. **Scape** erect, shorter than or equalling the leaves. **Scape bracts** like the leaves but tinged red or rose. **Inflorescence** 12–25 mm long, simple or compound with 3 to 6 branches. **Primary bracts** elliptic to ovate, acuminate, equalling to or exceeding the branches, soft, sparsely appressed white lepidote, pale red to rose or salmon. **Branches of the inflorescence** 2-flowered, erect to slightly spreading. **Floral bracts** ovate, acute, 8–10 mm long, carinate, soft, glabrous, pale red, rose or salmon. **Flowers** opening during the day and lasting 1–2 days. **Sepals** lanceolate, acute, 9–10 mm long, nearly free, ecarinate, glabrous, pale green to pale salmon. **Corolla** spreading. **Petals** narrowly oblanceolate, 16–18 mm long, lilac to pink.

SUMMARY: Small (3–8 cm tall) plant with soft and brittle erect, only slightly channeled leaves that appear metallic grey-green or silver, the rosette slightly

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

Figure 11.
Tillandsia kautskyi

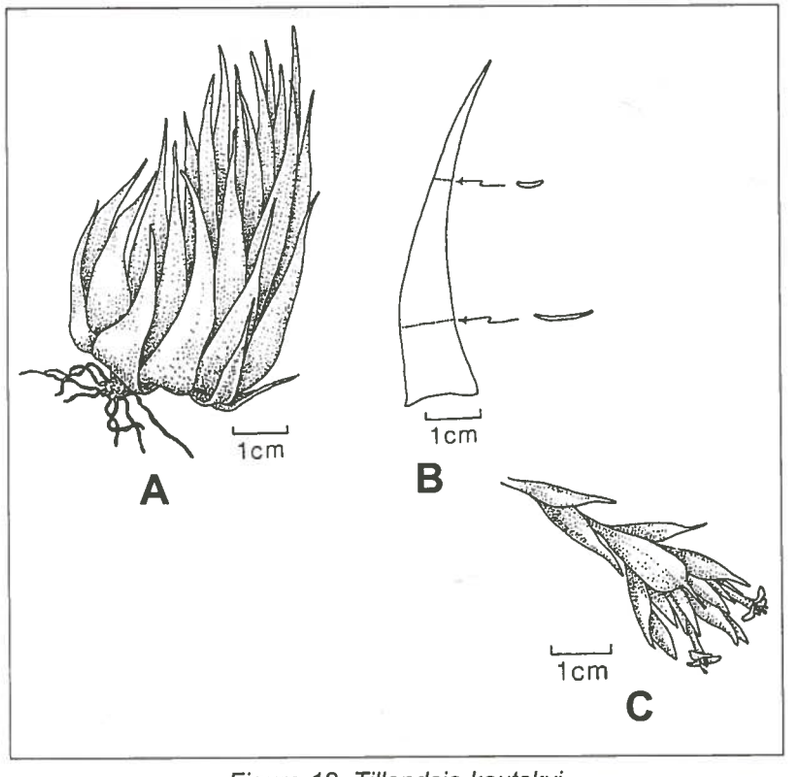


Figure 12. Tillandsia kautskyi.
A, habit; B, leaf; C, inflorescence.

Figure 13.
Tillandsia mauryana

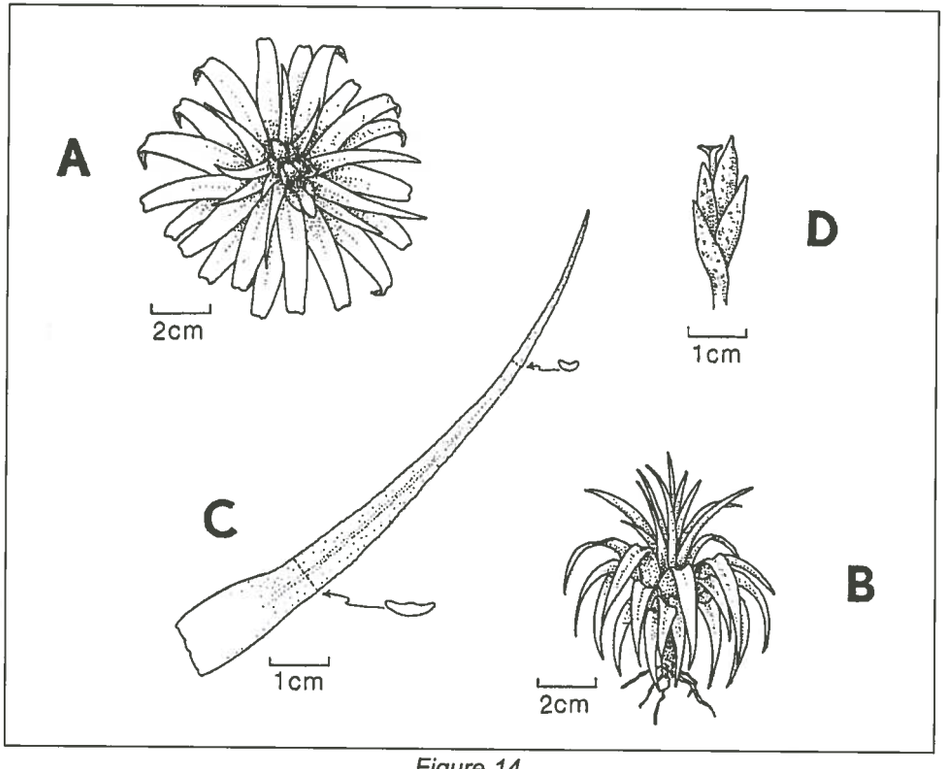


Figure 14.
Tillandsia mauryana.
A, habit of flowering plant; B, habit; C, leaf; C, branch of inflorescence.

pseudobulbous and conical; a short red, rose or salmon inflorescence with lilac or pink, spreading petals.

VEGETATIVELY RESEMBLES:

Tillandsia sprengliana Klotzsch ex Mez which has more secund curving leaves that are subdensely covered with coarse spreading trichomes;

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

Tillandsia mauryana L.B. Smith, Contributions from the Gray Herbarium 117:31, pl. 31, figs. 32–3. 1937.

DISTRIBUTION: Native in Mexico, in the States of Hidalgo and Puebla, on steep, dry cliffs at elevations of 1500–2700 m.

STATUS IN HORTICULTURE: Not common in cultivation.

DESCRIPTION: **Plant** usually a lithophyte, nearly stemless to short caulescent, 5–12 cm tall, usually single, rarely tightly clustering; roots 1-2 mm in diameter, brown. **Leaves** very densely arranged, all but the centermost tightly recurving (the centermost leaves often stiffly erect), 60 to 80 in number, silver-grey to silver, usually forming a spherical rosette. **Leaf sheaths** broadly elliptic, 8–20 mm wide, thick, pale green or tan but densely white lepidote except at the extreme base. **Leaf blades** very narrowly triangular, subulate, acute, 5–10 cm long, 5–8 mm wide, 1–2 mm thick, succulent, brittle, very slightly channeled, keeled or ribbed, very densely covered with coarse spreading white trichomes and appearing slightly rough or pruinose. **Scape** very short, concealed within the leafy rosette. **Scape bracts** like the leaves. **Inflorescence** compound, very densely digitate with 2 to 6 branches. **Primary bracts** elliptic, shorter than the branches, densely white lepidote. **Branches of the inflorescence** erect to slightly spreading, 1–3 cm long, 2- to 6-flowered. **Floral bracts** tightly imbricate, ovate, acute, 12–25 mm long, carinate, green, yellow or orange but densely white lepidote. **Flowers** lasting 1 to 3 days. **Sepals** lanceolate, acute, 12–15 long, green but densely white lepidote. **Corolla** spreading. **Petals** very narrowly lanceolate, 15–23 mm long, exceeding the stamens and style, green.

SUMMARY. Small to medium (5–12 cm tall) spherical plant with many recurving, thick, succulent, ribbed leaves that appear rough or pruinose and silver-gray to silver; a very short inflorescence with white lepidote bracts and a green, spreading corolla.

VEGETATIVELY RESEMBLES:

Tillandsia atroviridipetala Matuda which is smaller with nearly filiform leaf blades only 1–4 mm wide and more ciliate appearing trichomes;

T. ionantha Planchon (odd forms) which has fewer, more erect, narrower leaf blades which are less silver and frequently tinged red.

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

B.C. McKinney

With the blessing of The Bromeliad Society, Inc., the world bromeliad conference for 1996 will be held in Orlando, Florida, sponsored by the Bromeliad Society of Central Florida, the Florida East Coast Bromeliad Society, and the Seminole Bromeliad Society. The conference name has been borrowed from the popular *Aechmea orlandiana,* which was named by Dr. Lyman B. Smith after the adopted home of Mulford and Racine Foster who collected the plant.

The conference is scheduled for July 1–8, 1996. It will be held at the beautiful Clarion Plaza Hotel right in the heart of the many attractions that have made Orlando one of the premier tourist destinations of the world. The Clarion Plaza, only 15 minutes from the Orlando International Airport, will provide the finest in quality accommodations, meeting and banquet space, and services. Room rates (singles, double/twins) begin at $79.00. Twenty-four-hour food service will be available at the hotel or in nearby restaurants.

Plan to bring the whole family. While the bromiliophiles are up to their ears in plants, the rest of the bunch can be taking in attractions including Sea World, Universal Studios, and Walt Disney World. Or, how about Busch Gardens, Cypress Gardens, or the Kennedy Space Center? The list is almost endless. There'll be more in updates of conference information.

While in the area, you will want to visit private gardens and collections and the Harry P. Leu Botanical Gardens. There will be opportunities for visits before and after the conference to the Mulford B. Foster Bromeliad Identification Center at Selby Gardens in Sarasota, as well as to the many near or not-too-far-distant commercial growers including Blossom World, Boggy Creek Bromeliads, Beadle's Los Milagros Billbergias, Michael Kiehl's Bromeliads, Russell's Bromeliads, Pineapple Place, and Tropiflora.

You won't have to take notes during the speeches and seminars. We plan to publish a comprehensive PROCEEDINGS OF THE 1996 WORLD BROMELIAD CONFERENCE soon after the conference closes.

The conference general chairman is Bud Martin, 1405 Pineway Drive, Sanford, FL 32773. His telephone number is 407-321-0838; FAX 407-330-3045.

730 Springview Drive
Orlando, FL 32806

Misnamed Bromeliads, No. 15: *Aechmea smithiorum*

Harry E. Luther

Aechmea smithiorum Mez is widely grown but usually misidentified as the closely related *A. serrata* (L.) Mez. The latter is also cultivated, to a much lesser extent, and has been difficult to identify with confidence because the horticultural material differs from the type in a very important feature. More on this in a later installment.

Aechmea smithiorum is a large plant, often flowering to well over a meter tall. The bright green or occasionally grey-green leaves form an upright, dense rosette. The erect inflorescence may be lax or very dense. The bracts are usually some shade of pink (rarely white) and the petals blue or blue violet. The flowers are often self-pollinating, a factor that has led to its rather wide distribution in horticulture. It is a beautiful plant for the tropical garden.

The long history of misnaming of this plant has lead to several problems. For instance, I strongly suspect that the parentage of Marcel Lecoufle's hybrid *Aechmea* Henrietta contains *A. smithiorum* not *A. serrata*.

Aechmea smithiorum is found in the Lesser Antilles from Grenada to Montserrat in wet forests from near sea level to 1200 m elevation.

Figure 15. A specimen of *Aechmea smithorium* from Dominica flowering at the Marie Selby Botanical Gardens.

Photo by Vern Sawyer

A List of the Bromeliads Collected in 1875–1876 by Ed. André in South America (Venezuela, Colombia, Ecuador) and Diagnoses of the New Species

Most readers will have heard of the famous work BROMELIACEAE ANDREANAE *by Édouard François André published in Paris in 1889. An unsigned review published in* THE GARDENERS' CHRONICLE *of October 26, 1889 describes the book as arranged in quarto with 118 pages and including 39 plates and a map. The review concludes:* "This book will add very materially to our knowledge of the order, and his [André's] harvest of new Bromeliaceae alone would be a rich result of his expedition. It is a great boon to have figures with analysis of so many new species."

It is small wonder then that Michael Rothenberg decided to satisfy the need for an English language edition of the book by publishing his translation with annotations in 1983. Many bromeliad fanciers and most bromeliad societies will own copies of that edition but the size and technical depth of the work make it somewhat formidable.

Some time ago, honorary trustee Marcel Lecoufle sent me copies of pages 563–568 of REVUE HORTICOLE *of 13 December 1888 in which André himself summarizes the results of his expedition and lists the bromeliads collected. The following translation is complete but I limited the names in the plant list to those of genera and species recognized today and omitted the diagnoses. I compared the modern names given in the Rothenberg edition with those in Harry Luther's alphabetical list and his* "De Rebus Bromeliacearum" *and arranged them in alphabetical order. My purpose has been to emphasize the importance of André's work by listing the imposing number of bromeliads that carry his name as author. André listed 83 new bromeliads. It is remarkable that 105 years after the publication of* BROMELIACEAE ANDREANAE *56 are still recognized, although a few have been moved around among the genera.*—TUL

During an expedition that I made during 1875 and 1876 in South America, having been given charge of a scientific mission by the Ministry of Public Instruction, I paid particular attention to the bromeliad family. Those plants are my special favorites. I had had the good luck to describe some species recently collected by travellers who had preceded me in those exceptionally rich regions,

and I thought that the unexplored wilderness of the Cordillereas might conceal even more unpublished novelties.

That hope was not deceived. The collection that I brought back to Europe includes 133 species and 11 varieties. It is a enlightening total if compared with what was known about bromeliads in the time of Linnaeus, that is, 15 species, or even the quantity produced during the famous voyage of Humboldt and Bonpland, comprising both Americas, that is, 19 species.

On my return, I brought my bromeliads to my friend Edouard Morren who wanted to study them but death overtook him before he could ascertain even the known species. I have, therefore, undertaken the task that I shall review briefly now to our readers while awaiting the imminent appearance of a more complete work.[1]

The list that follows includes the enumeration of the species preceded by descriptions and brief diagnoses of the novelties numbering 83, of which there are 72 species and 11 varieties.

The principal purpose of this publication is to describe our actual knowledge to botanists who may have to identify other collections from the same countries, confusions in synonymy are always regrettable in science.

THE BROMELIADS DESCRIBED BY ÉDOUARD FRANÇOIS ANDRÉ

Aechmea drakeana André
A. involucrata André
A. magdalenae (André) André ex Baker
A. pendulifera André
A. servitensis André

Bromelia nidus-puellae (André) André ex Mez

Greigia volcanica André

Guzmania bracteosa (André) André ex Mez
G. calamifolia André ex Mez
G. candelabrum (André) André ex Mez
G. caricifolia (André ex Baker) L.B. Smith
G. conifera (André) André ex Mez
G. dissitiflora (André) L.B. Smith
G. eduardii André ex Mez
G. gloriosa (André) André ex Mez
G. graminifolia (André ex Baker) L.B. Smith
G. lepidota (André) André ex Mez

[1] This book is now in press. It contains French and Latin descriptions, the history and criticism of all of the new species and 38 lithograph plates in quarto on royal (paper).

G. lingulata var. *cardinalis* (André) André ex Mez
G. multiflora (André) André ex Mez
G. sanguinea (André) André ex Mez (Figure 16)
G. sphaeroidea (André) André
G. sprucei (André) L.B. Smith
G. vanvolxemii (André) André ex Mez

Pitcairnia arcuata (André) André
P. bakeri (André) André ex Mez
P. brachysperma André
P. brongniartiana André
P. dendroidea André
P. guaritermae André
P. macranthera André
P. macrobotrys André
P. nigra (Carriere) André
P. reflexiflora André
P. trianae André

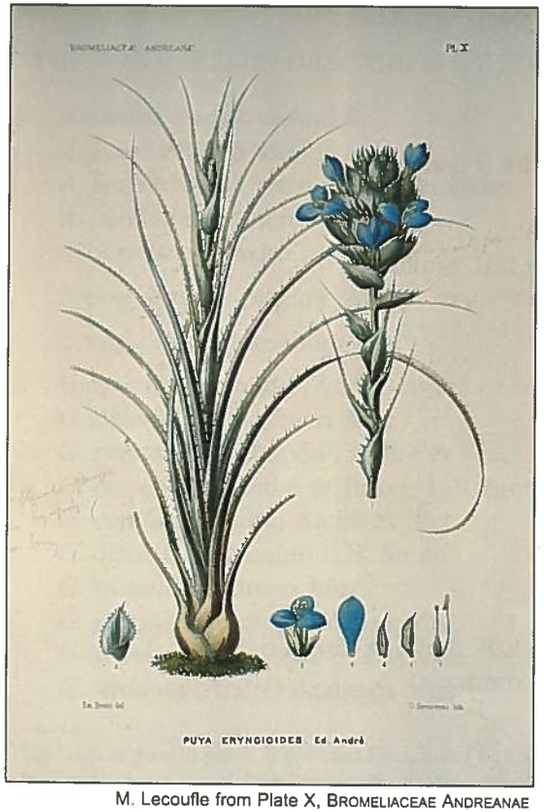
Puya aequitorialis André var. *albiflora* André
P. eryngioides André (Figure 17)
P. gigas André
P. thomasiana André
P. vestita André

Tillandsia adpressa André
T. andreana E. Morren ex André (Figure 18)
T. carrierei André
T. confertiflora André
T. cyanea var. *tricolor* (André) L.B. Smith
T. denudata André
T. dyeriana André (Figure 19)
T. ionochroma André ex Mez
T. laiensis André
T. pastensis André
T. pyramidata André
T. rariflora André
T. restrepoana André
T. rhomboidea André
T. umbellata André

Vriesea hygrometrica (André) L.B. Smith & Pittendrigh
V. tequendamae (André) L.B. Smith

M. Lecoufle

Figure 16.
Guzmania sanguinea (André) André ex Mez



M. Lecoufle from Plate X, BROMELIACEAE ANDREANAE

Figure 17.
Puya eryngioides André

Figure 18.
Tillandsia andreana
E. Morren ex André

M. Lecoufle

W. Rauh

Figure 19.
Tillandsia dyeriana André

A Diagram of Bromeliad Habitats

P. Raulino Reitz

Thanks to a series of studies based on ecological observations made in southern Brazil, especially Santa Catarina, by Henrique P. Veloso and Roberto M. Klein, we have a clear idea of the habitat of the commoner bromeliads. It has been proved that bromeliads have no particular preference for any species of tree. There is only an indirect relation to the shape and size of the tree. If, for example, a certain species of wild fig, *Ficus organensis (Miq.)* Miq., has a taller trunk and longer stouter limbs that overtop other trees, then more sun-loving (heliophile bromeliads will grow on it than on other trees. On the other hand, if a given species of tree prefers shady valleys, then it offers a more favorable ambient for shade-loving (ciophile) species.

On entering our forests one soon sees that certain species of bromeliads live only on the bases of tree trunks or on the ground, others only at the middle of the trunk, still others on the great limbs, and a final group at the ends of the branches. It is a perfect staircase of life, which has also been observed in the animal kingdom. A species falling from the outer branches to the ground, dies. Similarly, a ground species is seriously damaged if we raise it to the top of the tree.

The secret of these levels of life is the preference that each species has for certain intensities of light and relative humidity.

After detailed observation we can distinguish four levels in the distribution of species from the jungle floor to the treetops.

The first level is the ground. On it live the ciophile species; that is, those that need little light and high humidity. They are most notably *Nidularium innocentii* Lem. var. *paxianum* (Mez) L. B. Smith and *Nidularium procerum* Lindm. They grow in enormous quantities in the forest shade, making the densest of green carpets, and on the bases of bushes and trees, especially on the buttress roots of the latter. These ground level bromeliads are partly responsible for the great humidity of the environment, since they hold an enormous quantity of water and form veritable hanging lakes.

The second or midtrunk level. Here live the semiciophiles. From some six feet up the trunk nearly to the bases of the first limbs of the high trees there is a second level already less affected by the enormous humidity of ground level and with a little more light; it is also on top of the shrubs. This is the level of *Vriesia incurvata* Gaud., *Vriesia ensiformis* (Vell.) Beer, and Vriesia *carinata* Wawra. These species fasten not only on the tree trunks large and small but on the

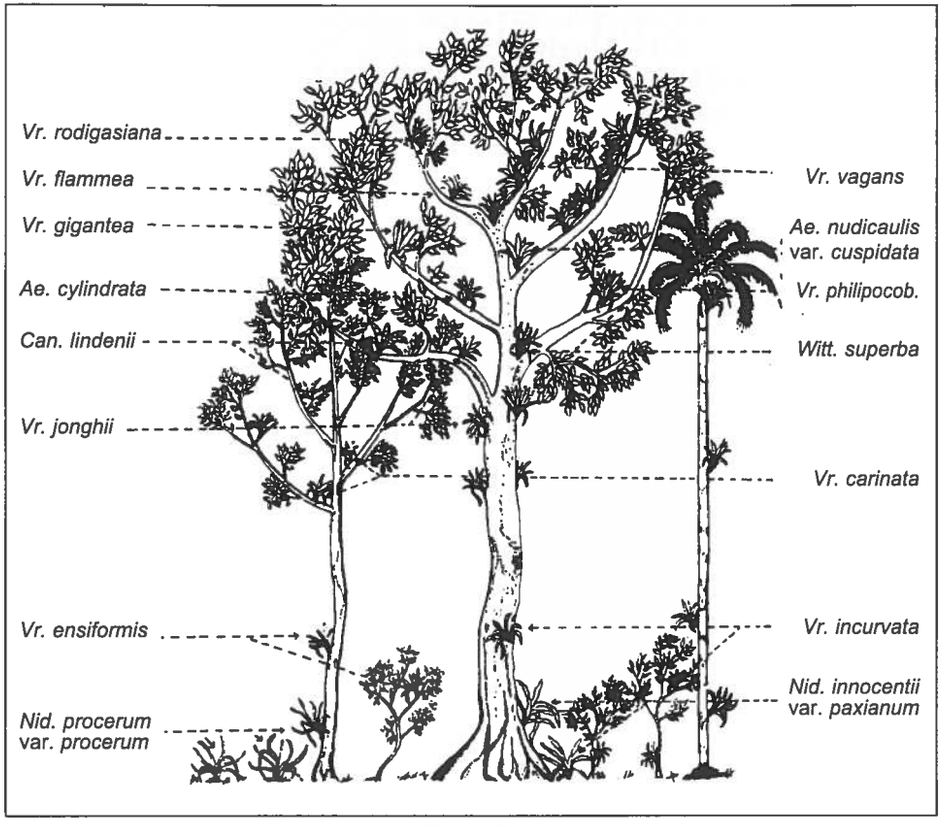


Figure 20.
Habitat of bromeliads in the forests of the State of Santa Catarina, Brazil. (Veloso and Klein, Sellowia, 8:198, 1957)

branches of shrubs and saplings that are below the lower limbs of the large trees. It is a space of about 25 feet in depth.

The third or limb level. The species which we may call *indifferent* inhabit the space from the bases of the large limbs to their outer forks. They require a medium light intensity and slightly more humidity than the heliophile species. There are many more species at this level than at the others. The commonest are: *Vriesia jonghei* (K. Koch) E. Morr., *Wittrockia superba* Lindm., *Canistrum lindenii* (Reg.) Mez, *Vriesia philippo-coburgii* Wawra, *Aechmea nudicaulis* (L.) Griseb. var. *cuspidata* Bak., *Aechmea cylindrata* Lindm., *Vriesia gigantea* Gaud., and *Vriesia flammea* L. B. Smith. Here we find the species of the greatest stature like *Vriesia gigantea* Gaud. whose inflorescence reaches 10 feet, and *Vriesia jonghii* (K. Koch) E. Morr. and *Wittrockia superba* Lindm.

The fourth or branch tip level. Here live the *heliophile* elements. They require great light intensity and relatively little humidity. They are principally *Vriesia vagans* L. B. Smith, *Vriesia rodigasiana* E. Morr. and various species of *Tillandsia*. These plants are directly exposed to sunlight.

It is important for the grower to know something of the ecological life of the bromeliads, especially of their habitat in relation to light and humidity, in order to obtain healthy and beautiful plants by cultivation.

The figure shows the principal elements of a tropical forest in the State of Santa Catarina (southern Brazil) which reaches an average height of 80 feet. In these forests there can be distinguished the ground cover vegetation, shrubs (3–12 feet), saplings (15–40 feet), palms (up to 70 feet) and large trees (50–80 feet), all represented here. The placing of the bromeliads in order of their altitude on the trees is based on the observation of more than 100,000 specimens. All the species shown in the figure are indicated by arrows according to their altitude in the forest.

Itajai, Santa Catarina, Brazil.

Reprinted from THE BROMELIAD SOCIETY BULLETIN, *Vol. IX, September–October, 1959, No. 5.*

The R. & C. Wilson Botanical Garden of the Organization for Tropical Studies in Coto Brus, southwestern Costa Rica, is offering a series of internships for 3-, 6-, 12-month periods starting July 1st, 1994. The internships are for curatorial work (identification and documentation) of the main living collections. This year priority will be given to Araceae, Bromeliaceae and Palmae. Internships consist of station fees (room and board), some travel support and a monthly stipend. Interns will be able to devote some time to research of their choice in botany and horticulture.

Botanists, horticulturists, graduate students and others are welcome to apply. Send CV and three references to:

Internships, C/O The Director
Las Cruces Biological Station
Apartado 73-8257
San Vito, Coto Brus
COSTA RICA

The Bromeliad Society, Incorporated (An International Society)
Business Matters

1) The first item requiring your attention is the nomination in 1995 of members for the office of director for the 1996–1998 term. The November-December 1994 issue of the JOURNAL printed the first call for nominations. Any member may nominate candidate(s) from his or her region. Nominations must be in writing, or if telephoned, must be followed up in writing to John M. Anderson, chairman, Nominations Committee, P.O. Box 5202, Corpus Christi, Texas. They must be received no later than 15 March 1995. There are vacancies of one director for Australia, California, Florida, Louisiana, Texas, and two for the international region. The society cannot work unless you and your directors do your parts. For one thing, the directors elect the officers and the committee chairmen. This year the board will elect a new president and vice president (and editor, membership secretary, secretary, and treasurer if there is cause) as well as committee heads. Don't give me the don't care, don't know, too busy. It is up to you to take part.

We are now at the lowest point in membership numbers even though several affiliates are happily reporting large increases in numbers. We congratulate them because the strength of the society is in the local groups. Individual members are important but the affiliates include members who have not joined the BSI who should be encouraged to join. It is not enough that we manage still to pay our bills. We, the whole bunch, need to participate: to be willing to serve in office, to nominate, to write for the JOURNAL, to recruit members. Bromeliad meetings are more than pretty plants and cookies. They should be places where people think and plan together about how to improve their local societies, how to strengthen the BSI, how to tell the world about bromeliads.

Do you know that five years after that illustrated article about bromeliads was printed in SOUTHERN LIVING magazine we are still getting letters: "Please tell me all about bromeliads." So we try to reach them. You can take part, too. Just do it. Nominate. Agree to serve.

2) What to do about getting the attention of the officers and the board members? Write. Every affiliate has a copy of the current bylaws. If you can't find a copy, write to or call Secretary Don Beadle, First Dirt Road, Venice, FL 34292-1830. telephone/FAX 813-485-1096. The bylaws (Art. VII A.3) say, "any proposed business requiring a vote shall be submitted in writing to the president not

less than 60 days before the meeting, or as provided otherwise [mail or telephone emergency actions] in these bylaws, or by a two-thirds vote of the board."

What's wrong with writing to the president now when the annual business meeting will take place in June? Nothing. Just takes a little doing. If matters requiring a vote are not prepared 60 days before the meeting, the board members won't have enough time to think carefully about the effect of their decisions, they will be tempted to treat everything as if it were an emergency to be acted on hastily (say, when are we going to break for lunch?). Everything is wrong with that procedure. It's a no-think process. Don't bother to read, just react. Vote. Done.

That's why the bylaws say 60 days. If you want constructive action write it down so that the board members may have time to think before voting. Nothing fancy. Just the usual torn-off sheet of notebook paper, with fringe. Write. Don't call. Take part. Be constructive.—Ed.

Book Reviews

Volume 15, number 1, 1994 of SELBYANA, the journal of the Marie Selby Botanical Gardens, is a special issue given over to the subject of bromeliads. Personal subscriptions to SELBYANA are available at $35 per volume for individuals, $55 for libraries and institutions, from Selbyana, P.O. Box 1897, Lawrence, Kansas 66044-8897, telephone 1-800-627-0629.

Among the six articles in this issue is "De Rebus Bromeliacearum I," by Harry E. Luther and Edna Sieff. It contains taxonomic and publication information for the bromeliad type specimens not included in, or not published until after the appearance of, the L.B. Smith and R.J. Downs Flora Neotropica monograph 14, parts 1–3. Listed are publication sources, dates, country of origin and locations, as well as synonyms and basionyms. The format for the new information is directly comparable and supplementary to the Smith and Downs monograph. An alphabetically arranged index provides for easy references to any particular species. This compilation of taxonomic information has been much needed and will be very useful for all who are interested in the accuracy of nomenclature, taxonomy, and the attendant documentation.

Another article by Mr. Luther in this issue is entitled: "A Guide to the Species of *Tillandsia* Regulated by Appendix II of CITES." It describes the seven endangered species. Black and white, botanical drawings and photographs of whole plants, and SEM photographs of trichomes will greatly aid in their identification.

In addition, there are three other interesting articles: David H. Benzing's "How Much is Known About Bromeliaceae in 1994?," Walter Till's "The Type Specimens of Bromeliaceae in the Herbarium of the Museum of Natural History in Vienna, Austria," and Bruce K. Holst's "Checklist of Venezuelan Bromeliaceae with Notes on Species Distribution by State and Levels of Endemism."

This issue of SELBYANA is one that bromeliad specialists will not want to do without.

Lee Kavaljian
Dept. of Biological Sciences
California State University, Sacramento, CA

LE BROMELIACEE, GUIDA ALLA LORO CONOSCENZE E COLTIVAZIONE [The Bromeliaceae, a guide to their acquaintance and cultivation], by Luciano Guignolini. Edizioni Il Vantaggio, Firenze, 1988. 150 pages, 39 color photos and 80 line drawings; introduction by Prof. Guido Moggi, professor of botany at the University of Florence and director of the Botany Museum; glossary, bibliography, index; illustrated soft cover; 24 cm. Order from: Casalini Libri, Via Benedetto da Maiano 3, 50014 Fiesole (Firenze), Italy. Tel. (055) 59.99.41, Fax. (39-55) 59.88.95. 29,000 Italian lira (approximately U.S. $20.00) plus postage and handling.

Luciano Guignolini, of the Botanical Garden of the University of Florence, Italy, combines his knowledge gained during collecting trips in the Americas with his experience in indoor bromeliad cultivation. The book is a concise guide to the bromeliad family stressing general characteristics and methods of cultivation. It is the first book on bromeliads in the Italian language. It will be useful for readers of Italian as well as for the serious enthusiast and the curious.

The book is divided into ten sections: general principles, introduction [of bromeliads] in Europe, biological and ecological aspects of bromeliads, general morphological characteristics, hypotheses on the diffusion and evolution of Bromeliaceae on the Andean Cordillera, requirements for cultivation, reproduction, diseases, classification, and descriptions of the genera arranged alphabetically within each subfamily.

The author describes forty-four genera (26 Bromelioideae, 12 Pitcairnioideae, and 6 Tillandsioideae). For each genus, there are one to several small, black and white line drawings. The text for each begins with the etymology of the name. This is the first work, to my knowledge, to do so. Many of the explanations for names commemorating individuals are particularly interesting. Taxonomic descriptions and cultivation requirements for each genus follow.

Of interest are two diagramatic sketches, one depicting Guignolini's hypotheses on the dissemination of bromeliads on the Andean Cordillera, and the other illustrating the probably adaptive evolution of bromeliads across different ecological zones.

The text covers basic and essential information without becoming bogged down in complicated detail. It easily accomplishes its mandate of describing the general characteristics of the family and should satisfy the intended audience. The book is pleasantly readable and recommended.

Jason R. Grant
Dept. of Botany
University of Maryland, College Park, MD 20742-5815

ACKNOWLEDGEMENT OF GIFTS

A Memorial Gift. The Bromeliad Society of Central Florida has contributed generously to the JOURNAL Color Fund in memory of Charles Tait, Jr. who died suddenly on the 26th of October 1994. Mr. Tait was president of the Seminole Bromeliad Society and a past-president of the Bromeliad Society of Central Florida. We offer our sympathy to Mrs. Tait.

The Florida West Coast Bromeliad Society has given to the Color Fund from the proceeds of the plant auction held in conjunction with the state-wide "Extravaganza," the annual sale and auction conducted on a rotating basis by the affiliates of the Florida Council of Bromeliad Societies.

Mrs. Joyce Brehm, chairperson of the 11th World Bromeliad Conference recently announced that the **Conference Committee and the San Diego Bromeliad Society** have contributed $2,500 for the BSI general fund and $2,000 for the JOURNAL Color Fund. These gifts were made from the profit share of the conference. While the sponsoring societies are under no obligation to contribute to The Bromeliad Society, it is gratifying to note that almost without exception gifts have been received following the past several conferences.

We greatly appreciate gifts to the Color Fund and the encouragement that they represent. With such gifts we have been better able to meet production expenses and to increase the number of color pictures in the JOURNAL from time to time.—TUL

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by Harry Luther & Edna Sieff
4th edition, 1994. 62 pp., 11 inches. $10.00 each
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The Bromeliad Society, Inc.

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.

W. Barthlott

Orthophytum supthutii E. Gross & W. Barthlott emend. Leme & E. Gross. In the text on pages 3–5, Elton Leme determines that this species and *Cryptanthus duartei* are so alike that the latter should be reduced to synonymy. Note the distinctive orange-yellow color of the petals.

Calendar

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.

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.