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Editor: Chet Blackburn, 720 Millertown Road, Auburn, California 95603.
Telephone and Fax: 530-885-0201, E-mail: blackburn@neworld.net

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

Cover photographs. Front: *Tillandsia X marceloi,* a natural hybrid between *T. achyrostachys* and *T. bourgaei.* Text begins on page 213. Photo by Hiroyuki Takizawa. **Back**: *Neoregelia* 'Alpine Rose'. Photograph by Robert Spivey.

CONTENTS

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Going Eye-to-Eye with Epiphytes

Chet Blackburn

Anyone who has ever photographed or collected bromeliads in the wild has had this experience. You will be driving slowly down a pair of muddy ruts someone has whimsically called a road, your eyes scanning the roadside vegetation for interesting plants, birds or insects when a sudden splash of color grabs your attention. It turns out to be a spectacular bromeliad in full bloom - and not more than 20 yards off the road! Your vehicle skids to a stop and you leap out rushing toward your coveted prize only to stop short when you realize that the shoulder of the road ends at a precipice. While that glorious bromeliad may be only 20 yards away at eye level, it happens to be at the top of a 100-foot tree with a chasm in between, and is unobtainable.

A variation on that theme is coming upon a cliffside of bromeliads, none of which you have ever seen before, but that are growing on a steep cliff jutting above a churning river and you happen to be on the opposite bank. Generally speaking, bromeliads in habitat tend to be a lot like Superman's slogan...up, up and awaaay!

So you can imagine how exciting it was to come upon a forest of bromeliads growing on trunks of trees that were actually at eye-level and were also easily approachable. This can be experienced at the Pine River Forest Reserve in Belize. A considerable stretch of the road passes through a pine forest with the lower trunks of trees conspicuously adorned with tillandsias - and not just any tillandsias, but such spectacular ones as *Tillandsia streptophylla* and the large form of *Tillandsia bulbosa*!

They are still not obtainable, however, because the reserve is a protected area, as it should be. In fact, I find that I am becoming less interested in collecting bromeliads these days and becoming increasingly more interested in just seeing them and photographing them in habitat. Photographs are so much easier to care for.

The little Central American country of Belize is a favored destination for eco-tourism. Until recently, most visitors to the country have gone there for what is commonly regarded as the best scuba diving and snorkeling to be found in this hemisphere. Like Costa Rica however, Belize has shown more foresight than many of its neighbors and is not as actively engaged in the wholesale destruction of its natural resources. Their restraint is paying dividends in attracting tourists who are interested in natural wonders.

It is not a big country. One can drive from Belize City on the coast across the entire country to the Guatemalan border in several hours. Nor would you need a 4-wheel drive vehicle to do it. The 80-mile (133 km) Western Highway is paved, in good shape and lightly traveled from Coast to the Border. If venturing out on secondary roads however, especially during or after a rainfall, 4-wheel drive is strongly advised.

Photograph by Chet Blackburn

Figure 1.
Tillandsia streptophylla growing on pine trunks.

Photograph by Chet Blackburn

Figure 2.
Tillandsia streptophylla

Photograph by Chet Blackburn

Figure 3.
The giant form of *Tillandsia bulbosa* growing at eye level. Notice the numerous seedlings on the trunk.

Figure 4.
Jean Blackburn eye-to-eye with *Tillandsia dasylirifolia.*

Photograph by Chet Blackburn

Mountain Pine Ridge Forest Reserve, also known as the Pine Ridge Nature Reserve is a 300 square mile (800 sq. km) natural area located in the Cayo District of western Belize in the Maya Mountains. The Maya Range parallels the Guatemala border and consists of some of the oldest rocks in Central America. Old granite intrusions have thrust their way up through even older limestone creating a landscape composed of rolling hills, waterfalls, caves and steep cliffs. Vegetation varies. Much of it consists of open pine forests, not unlike parts of the State of Georgia, but there are intermittent grasslands as well and the river valleys are lined with broadleaf tropical forests that eventually give way to rainforest.

On November 16, 1993 Jo & Ted Groll, and my wife Jean and I embarked on a day-long trip to the reserve. We left San Ignacio, which is situated at 300 feet (90 meters) to drive up to the reserve with its elevations ranging from 2,000 to 2,300 feet. (ca. 695 meters). Leaving San Ignacio you clatter across the Hawkesworth Bridge, Belize's only suspension bridge, spanning the Macal River. The metal plating of the bridge's heavily traveled roadbed causes rattling that can be heard for up to 3 miles and makes a continuous racket throughout the day.

On the other side of the bridge is the small town of Santa Elena. Starting here tillandsias were seen growing on telephone wires. However they were not the ubiquitous *Tillandsia recurvata,* or ball moss, which is so familiar on telephone wires over most of the tropical and subtropical Americas, but instead the large form of *Tillandsia Bulbosa*.

Leaving the paved Western Highway, and turning south on a branch road leads into the mountains. The branch road passes through a patchwork of fields cleared for agriculture but they are interspersed with areas of second growth forest and clumps of cohune palms. Brilliant blue morpho butterflies occasionally flit in and out among the foliage or precariously dash across the road, as do the more delicate zebra and other colorful *Heliconius* butterflies. Also found here and other parts of Belize is the cracker butterfly *Hamadryas feronia*, which makes a surprisingly loud cracking sound as it flies. We had come across some of them the day before along the Macal River and were fascinated by their noisy flight as they fled our approach.

Birds sighted on the drive included the wedge-tailed sabrewing, golden fronted woodpecker, rufous-tailed hummingbird, great-tailed grackle, Montezuma oropendola, and of course the colorful kiskadee flycatcher seems to be present at every wet spot in the countryside.

It doesn't take long to arrive at the gate of the reserve. From there, as the second growth gives way to pines, the tillandsias begins appearing more frequently along the roadside, the most conspicuous being *Tillandsia streptophylla* and *T. Bulbosa*.

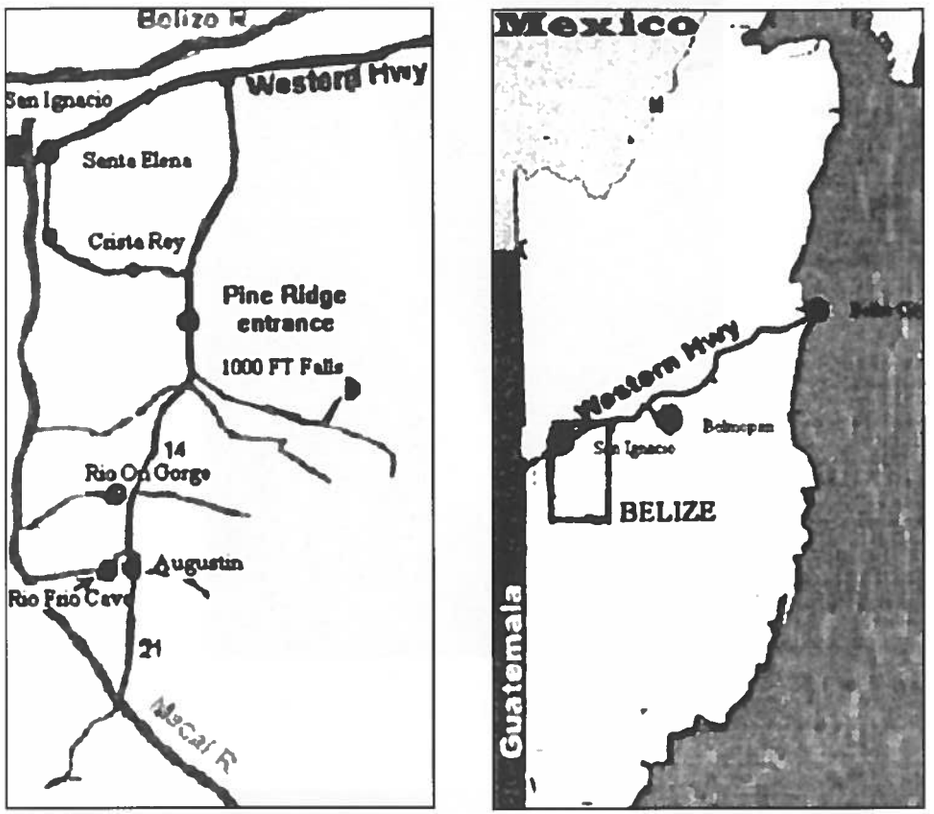
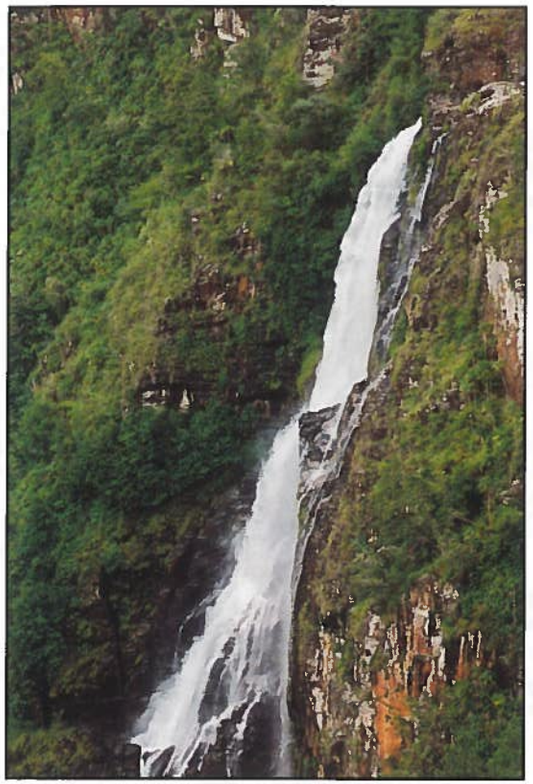


Figure 5. Map showing location of Mountain Pine Ridge Forest Reserve in Belize.



Photograph by Chet Blackburn

Figure 6. 1000 foot falls in Mountain Pine Ridge Reserve.

Photograph by Jo Groll

Figure 7. The Rio Frio Cave. For an idea of scale notice the author and his wife at the bottom of the picture.

Another branch road veers off toward 1000 Foot Falls. The name is a misnomer. The falls actually drop over 1,600 feet (488 meters) and are the highest in Central America. After a rain, the road to the falls becomes almost undrivable and more than one visitor to the reserve has opted to forego seeing the falls because of the condition of the road, even though they can be reached by an easy 2.5-mile hike from where vehicles usually have to stop.

The main road continues on to Augustin, where the reserve headquarters is located. On the way it passes by a gorge on the River On, a small stream of great natural beauty. The river has carved out a series of pools and small cataracts in the broad gorge that are so scenic that an observation area and picnic area has been built to overlook it. We hiked down to the river from that point and along the way observed not only the two tillandsias that had already become so familiar to us (*T. streptophylla* and *T. bulbosa*) but also large clumps of *T. dasylirifolia* growing in vegetation only a few feet off the ground. A *Catopsis* species (*sessiliflora*?) grew on the tips of branches in trees hanging high above the river. None grew close enough to be able to identify for certainty nor were there any fresh bloom stalks. For identification purposes at least, a plant in the hand is worth two in the bush, but we preferred leaving them in the bush. A *Pitcairnia* species was also present along the trail.

At Augustin, a branch road drops down to the Rio Frio. Near that small stream the vegetation becomes distinctly tropical with large lichen-encrusted, broad-leafed trees and many species of *Philodendron* and other aroids present. There was a particularly attractive small tree-hugging *Philodendron* and an attractive *Syngonium* with white veins clasping the trunks of some of the trees. Bromeliads found at this location included *Tillandsia schiediana*, *Tillandsia balbisiana*, *Aechmea bracteata*, an unidentified small *Vriesea* and the same *Catopsis* that was found back at the River On.

There are a number of caves in the area, the best known and most accessible of which is simply called the Rio Frio Cave. It is impressive for a number of reasons. It not only has stalactites typical of most caves, but the Rio Frio flows through it forming small pools and cascades and even a sandy beach at one point. The Entrances at both ends of the cave are huge (you might even say cavernous), and allow enough light in so that no artificial light is needed to negotiate the floor of the cavern for its1/4 mile length.

There is much to see and do in the Cayo District of Belize. There are numerous Mayan ruins to explore, caves to spelunk, rivers to canoe and raft, butterfly farms to visit, waterfalls to admire, and best of all, a good place to go eye-to-eye with a bromeliad in habitat without having to wear safety ropes.

Auburn, California

Bromeliads in the Landscape

Marjorie Lowe

This subject is an extensive one so I will concentrate on one aspect only - an aspect in which bromeliads are far superior to most other plants in suitable climates. I suspect that most of you read gardening articles and watch and/or listen to gardening programs. Sooner or later the subject crops up: what to plant under trees and tall shrubs and how to go about it? The usual advice given is, first, dig over the area to be planted (no mention on whether to use a spade or a fork, what kind or rooting system is present and the damage that can be done if there are surface roots). Second, dig in lots of compost and plant food and, third, usually suggestions (some quite extraordinary) for suitable plants to use. Often no reference is made as to whether the canopy is evergreen or deciduous or has a flowering season. In short, a recipe for hard work and frequent failure. What is needed here is some lateral thinking. Logic suggests using plants that do not require nourishment from the soil (if any), that will appreciate the fast drainage provided by the existing rooting systems (especially fibrous roots) and that have species and cultivars that will take the varying conditions of sun and shade.

The obvious contenders are epiphytic plants such as bromeliads, orchids, ferns, rainforest cacti, vireya rhododendrons etc. Bromeliads, with their wide range of colorful and patterned foliage and their striking and bright inflorescences that can be available at any time of the year provide by far the greatest range and impact. Most are easy to grow if placed correctly. The canopy, if evergreen, will provide protection from excessive winter rain in mild areas and/or frost in cooler districts.

What to check for:

- Density of the canopy - this can be lightened by careful pruning.
- Height of the canopy - is it high enough to clear the flower spike or to allow the sun to penetrate under the branches?
- Size of leaves - do they decompose easily; do they constitute a grooming problem?
- If the canopy is deciduous - ensure that the bromeliads underneath can stand full winter sun. There is an exception here in that trees and shrubs described as fully deciduous do not necessarily drop their leaves in winter. Most of these exceptions are tropical or sub-tropical plans that shed their leaves before flowering. In the case of *Chorisia speciosa*, flowering time is usually autumn, so it sheds its leaves late summer. The *Jacaranda* flowers late spring/early summer and is in leaf all winter. Others in this category are *Bauhinia*, *Brachychiton*, some *Cassia*, *Kowhai* and *Poinciana*. All are showy so that the bromeliads below should complement not compete during the flowering period.
- Moisture - extra moisture will usually be needed in summer because of the umbrella effect of the canopy. A good hose down will put fresh water in the reservoirs also.
- Maintenance grooming - is usually just removing old and drying leaves and dead parent plants, to allow room for the pups to expand and clump up.
- When choosing plants - are they to be seen from above or below? Are they suitable for sun, dappled shade, morning sun, afternoon sun? Is there enough space to accommodate a mature, well developed clump?
- If only bromeliads are being planted, consider using rocks to define the clumps and add a change in texture to the design. Scoria is light, cheap and weathers very quickly with a little help. Ponga be used in a similar fashion and tree fern stumps and large pieces of driftwood can be stunning. Another use for pieces of ponga and driftwood is for planting both in and on, making a light portable perch.

For collectors, hybridizers and enthusiasts "The plant is the thing". For keen gardeners the plants are components in the total design and "The garden is the thing".

Nidularium fulgens

Most nidulariums need moist shade but *Nidularium fulgens* is one of the few that will take bright light (but not direct sun). There are both red and orange forms. The more common form is bright red that eventually changes to cerise. From the first coloring up of the center to the last can be as much as twelve months.

Nidularium fulgens makes very attractive low-growing clumps of shiny light green leaves, mottled with darker green and with soft spiny margins. With good drainage, it grows well in the ground and it will stand fairly low temperatures. Moist, light shade is probably best as too much light can turn the leaves yellow.

According to Victoria Padilla (Bromeliads, Crown Publishers, 1973) [it] grows on branches of high trees in southern Brazil, where it is also used as a garden plant at altitudes of 1,200 to 3,300 feet (350 to 1000 meters).

Auckland, New Zealand

Reprinted from Bromeliad, 38(7), 1988, Journal of the Bromeliad Society of New Zealand).

PEST FREE?

Gary Gallick

Am I wrong, or does just about every bromeliad book state something to the effect that one of the reasons broms are so easy to grow is because they are of low susceptibility to pests. *Well, them there writers ain't never seen my plant collection!* Therefore, I extend an open invitation to future writers of "How to grow bromeliads" books to pay me a visit prior to placing any words about pests on their computer screens. An even more special invitation is made to botanists, for whom we molecular biologists have reserved a special niche in Hades for their insidious classification schemes that often bear little resemblance to real biology. But I digress.

Let me begin describing my problem with pests with my cryptanthus plants... or what's left of them. The squirrels (937 of them at last estimate) have long crusaded to destroy my crypts. Burying nuts in their pots I can understand...even the uprooting of the plants once a week, but shredding all the leaves? This seems a little much. I did find a temporary (one day) remedy. I had (notice the word had) two beautiful vrieseas in bloom, *Vriesea saundersii* and *V. incurvata*. To enjoy them I placed them on a table on the deck. When I returned from work, the table was littered with bits and pieces of yellow and red scraps - the remnants of the blooms. Those squirrels taught me a lesson!

But let's move on to my billbergias, or should I say ground zero for red-bellied woodpeckers? These suckers land on the base of the plants and peck holes in them. More specifically, they take the seeds I so generously provide from the birdfeeder, fly to the Billbergias, eat the seeds, then start pecking. The ingrates! Even worse, I swear they have a special affinity for the Beadle hybrids. Are they able to read the price tags?

Ah, but none of the above is what prompted this diatribe. After a generous rain we had in June, nearly every slug and snail in the city of Houston decided to take up residence in my garden. So much for complaining about the minor problems described above. Now, I don't even get to see my plants bloom. Naturally, I had some plants ready to bloom that I really wanted to see.

Let's start with *Deuterocohnia longipetala*, which in botanical gardens, is a plant that may bloom for years once it starts. Well, in my yard, it started, with a spike approaching 10 centimeters in height before it got chewed. I hope I live to see this plant bloom again. Then there was (yes, again that word "was") *Vr. gladioflammans*. It is a small plant with beautiful large red bracts. I know this from the bromeliad books, certainly not from seeing my own plant whose bloom spike was destroyed.

I hate to even mention Don Garrison's beautiful hybrid *Dyckia choristaminea* x *marnier-lapostollei*. When two attempts at blooms got chopped earlier this spring, I thought it was just bad luck. However, when my clump prepared to bloom again, with two additional spikes showing buds in June, only to once more be destroyed, I am beginning to settle on conspiracy theories.

Finally, I'I1 describe the case of my *Pitcairnia orchidifolia*. When this plant decided to bloom, it received special attention. I put it in the house, and watched it very carefully. But, pitcairnias like lots of water, and don't seem to do well inside, so one day when rain was predicted, I put it back outside on the way to work. When I came home.., well, you can guess the rest of the story.

Now, I know many snail and slug remedies, and they all work. Cups of beer, slug and snail pellets, etc. do fine at destroying some of these critters. But unless I can flood my yard with beer for about a month, I fear I'm stuck with my pet slugs and snails for some time to come - just another of the joys of growing bromeliads in the beautiful outdoors.

I hope you are having better success than I am with blooming plants. For plant growth and color, this seems to have been as good a summer as I can remember. Apparently it has also been a good year for bromeliad tasting as well.

Kingwood, Texas

Reprinted in part from the newsletter of the Houston Bromeliad Society, 32(7), July, 1999.

Jumping to Conclusions...a Frog Errata

The cover of volume 49(3), May-June 1999 has a photo of a tree frog peering out from the protecting foliage of an unidentified *Billbergia*. The frog was identified as a Pacific Tree Frog, *Hyla regilla*. I assumed that, since the photo was taken in Tom Koerber's greenhouse in Berkeley, California and only one species of tree frog is native to that (and my) area, that the frog would be of that species. I have many color variations of the Pacific Tree Frog inhabiting bromeliads in my own greenhouse, including green ones. I should have looked more closely at the frog as BSI member Jeff McKee did. He pointed out that the frog is more likely to be the Green Tree Frog, *Hyla cinera* from the eastern United States. A quick call to Tom Koerber has confirmed Mr. McKee's identification.

Further Spread of the Weevil *Metamasius callizona* in Florida

J.H. Frank[1]

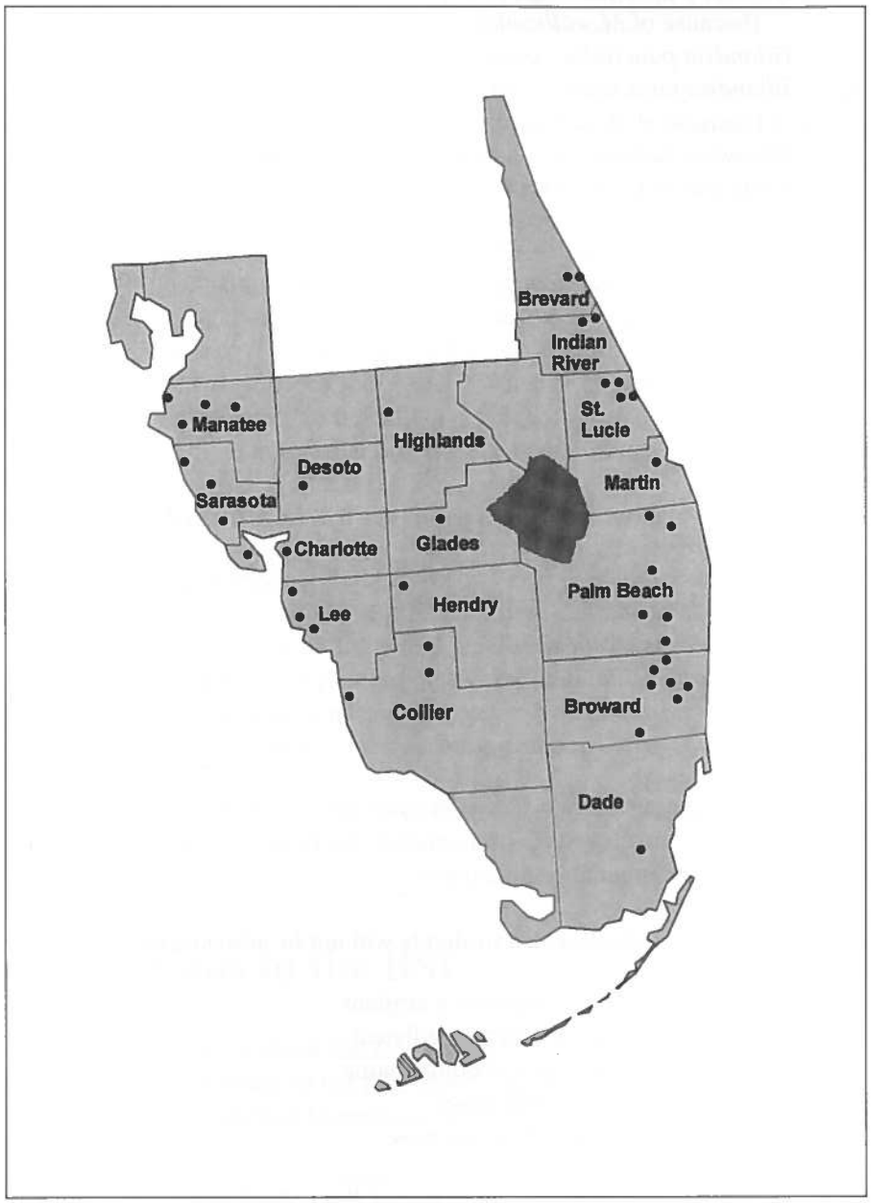
Metamasius callizona is a weevil of Mexican origin that was detected by Florida Department of Agriculture and Consumer Services inspectors at a nursery in Broward County, Florida, in 1989. By the time the weevil was detected, there was no hope of eradicating it by use of chemical pesticides — it had become feral and established populations in native bromeliads in Broward County parks. It was too widespread, so would be very expensive to eradicate by chemicals, especially bearing in mind that chemicals would have to be applied by helicopter so that they could hit epiphytic bromeliads. Moreover, use of chemical pesticides (such as Dursban and Carbamate, which are useful in controlling the weevil in greenhouses, shadehouses, and private collections) is not permitted in parks because of the damage these chemicals do to non-target native insects.

By 1991, this weevil was found to occupy parts of four counties in southern Florida. These were Broward County (where it was first detected), Palm Beach County (where it probably spread by dispersal of feral weevils), Lee County, on Florida's west coast (where it undoubtedly spread by movement of infested bromeliads, perhaps even as an independent introduction from Mexico), and southern Dade County (where it likewise must have spread by movement of infested plants). It attacked native tillandsias in natural areas.

Metamasius callizona is one of 20 or more species of pest weevils that are known to attack — and sometimes kill — bromeliads in countries south of the USA. We don't read much, if anything, about them in books about bromeliads, perhaps because they don't seem very common in their native countries. But *M. callizona* is now far too common in Florida. By 1991 it had been found in only four Florida counties. By early 1999, it had been found in 12 more.

By 1991 it had been found to attack the most abundant of the larger bromeliads in the areas it occupied: *Tillandsia utriculata*, *T. paucifolia*, and *T. fasciculata* (cardinal airplant or red-flowered "wild pine" or "air pine" seen in cypress trees). More recently, bromeliad enthusiast Olan R. Creel (Port St. Lucie, Florida) has also seen it to attack *T. balbisiana* and *T. flexuosa*. The status of the bromeliads is as listed in the 1998 Florida Administrative Code under authority of the Florida Statutes.

[1] Entomology & Nematology Department University of Florida Gainesville, FL 32611-0630



Map 1. Distribution of *Metamasius callizona* in southern Florida. Dots indicate places where the weevil had been found to April 1999.

Table 1. Florida bromeliads under attack by *M. callizona* in native habitats.

Tillandsia utriculata - giant airplant - endangered
(because of *M. callizona*)
Tillandsia paucifolia - potbelly airplant
Tillandsia fasciculata - cardinal airplant - endangered
(*because of M. callizona*)
Tillandsia balbisiana - northern needleleaf – threatened
Tillandsia flexuosa - twisted airplant - endangered

Tillandsia utriculata and *T. fasciculata* (for some reason, not *T. paucifolia*) were listed as endangered species because of attack by the weevil. They are still widespread. *Tillandsia fasciculata* seems much more resistant to the weevil than is *T. utriculata*, which is killed. What of Florida's other endangered and threatened species? They, too, probably will be attacked once the weevil reaches the restricted areas in which they grow. (This weevil has been seen to attack various cultivated *Catopsis* and *Guzmania* in greenhouses).

Table 2. Florida bromeliads which probably will be attacked by *M. callizona*

Tillandsia pruinosa - fuzzywuzzy airplant – endangered
Tillandsia variabilis - leatherleaf airplant – threatened
Guzmania monostachia - West Indian tufted airplant - endangered
Catopsis berteroniana - powdery strap airplant - endangered
Catopsis floribunda - Florida strap airplant – endangered
Catopsis nutans - nodding strap airplant - endangered

The remaining Florida native bromeliads are unlikely to be attacked by *M. callizona* because they seem too small to be mined by the larvae. None of them is listed as endangered or threatened .

Table 3. Florida bromeliads which probably will not be attacked by *M. callizona*.

Tillandsia bartramii - Bartram's airplant
Tillandsia setacea - southern needleleaf
Tillandsia simulata - no colloquial name
Tillandsia recurvata - ball moss
Tillandsia usneioides - Spanish moss

M. callizona is now on the verge of the natural areas that contain the bromeliads listed in Table 2. These plants already were very rare, with their rarity determined in part by their climatic needs. Another determinant of their rarity has been habitat destruction, from which they are not protected by Florida law. In federal and state parks and nature preserves they are protected from developers, but not from the weevil. Florida law does not mandate that anything be done to control an invasive pest such as *Metamasius callizona* that kills

endangered plants. The weevil is now killing bromeliads in the Savannas State Preserve (St. Lucie County) and Highlands Hammock State Park (Highlands County). It is on the verge of the Big Cypress National Preserve and the Fakahatchee Strand State Preserve (both in Collier County).

The three tables give colloquial names of the bromeliads as used in Richard P. Wunderiin (1998) *Guide to the vascular plants of Florida*. Reports on *M. callizona* have appeared in the following issues of Journal of the Bromeliad Society: 40(5): 203-205, 222; 41(3): 107-108; 41(6): 253-255; 42(3): 128; 42(6): 272; 44(4): 173-176; 47(2): 60-64; 47(6): 244-249; and 48(5):165-168.

More information is given on the web site below:
http://www.ifas.ufl.edu/~frank/wvbrom.htm

Gainesville, Florida

Welcome New Members

The following individuals joined the Bromeliad Society International in the last several months. The BSI welcomes them aboard and thanks them for their support.

The Bromeliad Library
Bromeliad Society of Japan
James Bush
Marquetta Collie
Dot Cooper
George Coulam
Eloisa De Paulis
Penrith Goff
Marian Hamby
Rosemary Hanna
Dorothy Howson
Lois Kruger
T.S.G. Lee
Valerie Pinder
Elzbieta Rukscinski
Hortencio Viera
Virginia Spinks

Contributions to the BSI

We would like to thank the following individuals and organizations for contributions made recently to the BSI, the *Bromeliad Journal* color fund, or the Mulford B. Foster Bromeliad Identification Center.

Joan Berryman
Marie Bessellieu
R. Boardman
Melvin First
George Long
Verdia Lowe
Thomas Moran
Joseph Scott III
Alexander Stoddart
James Thurrott
David Whipkey
Kenneth Woods
Gainesville/Jacksonville Brom. Soc.

Misnamed Bromeliads No 19: *Aechmea confusa*

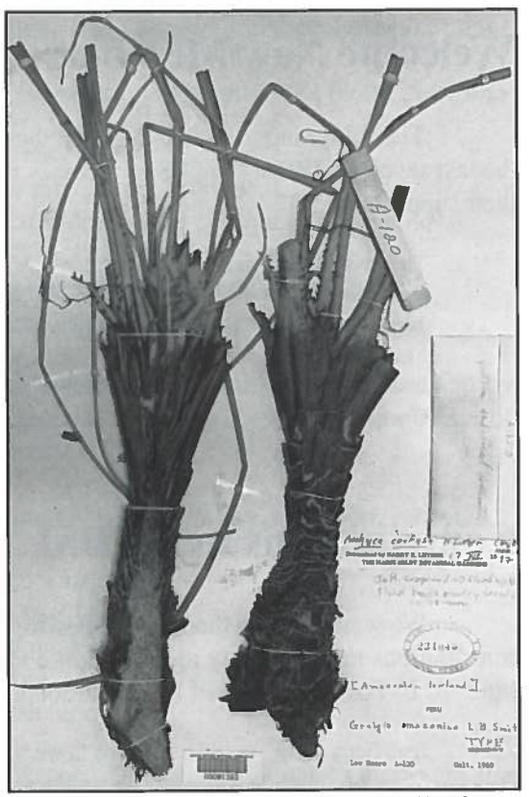
Harry E. Luther

In 1997, prior to describing a number of Bolivian *Greigia* species, it was necessary to check the identities of nearby Peruvian species. Brako and Zarucchi (1993) attributed *Greigia amazonica* and *G. macbrideana* to Peru. It was a surprise to find that the most distinctive of the pair, *G. amazonica*, was not a *Greigia* at all but was a member of the "former Streptocalyx" now placed in *Aechmea*. As this species, published in Selbyana as *Aechmea confusa* H.Luther, comb, et nom. nov., is in limited cultivation, the Selbyana treatment is here reprinted in part (slightly modified) and the plant is illustrated for the first time.

Aechmea confusa H. Luther, Selbyana 19(2). 1998.

Type: Peru: PROV. LORETO: Amazon lowland, cultivated, 1960. *Lee Moore A-120* (Holotype: US). Basionym: *Greigia amazonica* L.B.Smith, Phytologia 8:226. 1962; not *Aechmea amazonica* Ule, Verh. Bot. Ver. Brand. 48:136. 1907.

The type specimen is an odd caulescent (etiolated?) plant with a very small inflorescence. The inflorescence is clearly central with a short scape concealed by the inner leaf sheaths. The "outer bracts" are in reality primary bracts subtending two-flowered branches. The floral bracts are elliptic, somewhat asymmetrical, carinate and minutely serrulate. The petals (poorly preserved) have dried black.



Photograph by Vern Sawyer

Figure 8. The type of *Greigia amazonica* at the Smithsonian Institution

Photograph by Sandra Williamson

Figure 9. *Aechmea confusa* (the Smith clone) flowering at the Marie Selby Botanical Gardens.

Correspondence from Lee Moore (8 Dec. 1997) in response to questions concerning the origin of his collection reveals that his A-120 was from "either the Itaya or Nanay Rivers not far from Iquitos because that was all that was accessible to me at the time". These general localities are close to the collection sites of a pair of cultivated specimens, submitted to the B.I.C., that appear to represent the same taxon: "near Iguitos" from Sam & Hattie Lou Smith and "from the Nape River, Peru" from Audrey McCrory.

The two specimens cited immediately above have much larger inflorescences than the type, but I consider them to be conspecific and more typical for the species.

Aechmea confusa (figures 8-9) is similar to the Ecuadorian *A. kentii* (H.Luther) Smith & Spencer (Basionym: *Streptocalyx kentii* H.Luther), but differs by having sessile to subsessile branches (vs. 6—18 mm pedunculate), longer floral bracts (24—33 vs- 12—22 mm long), longer sepals (25—35 vas. 19-21 mm long) and white (vs. purple) petals.

With the removal of this taxon from *Greigia* the remainder of the genus consists of cool-growing, mostly high elevation species distributed from Mexico to Chile and Bolivia.

Plants of the McCrory clone of *A. confusa* were introduced into general cultivation as *Aechmea* 'Dolores' at the 1996 World Bromeliad Conference at Orlando, Florida.

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Marie Selby Botanical Gardens, Sarasota, FL

Membership Dues to Increase January 1, 2000

The BSI Board of Directors has been reluctant to increase the cost of membership dues even though the BSI has been operating at a deficit and drawing down its reserve in recent years. A motion to increase the dues was tabled at the 1996 board meeting in Orlando with the understanding that a concerted membership drive would be undertaken instead. The goal of the membership drive was to bring the membership up to 1700, an increase of approximately 300 new members. That was the figure identified at the time as the number needed to break even in income Vs expenses.

The membership drive did bring in nearly 300 new members by the time of the 1998 board meeting in Houston and a proposed dues increase was again tabled in the hopes that the membership would continue to increase. However, it was also recognized that many of the new memberships were the result of donations by affiliates and individuals, and there was some question as to how many of the beneficiaries of those donations would renew their membership. As it turns out, only about 50% of them did, and along with that, the membership has started to slightly decline.

Therefore, at the 1999 board meeting at Longwood Gardens, the board had no choice but to vote to increase the dues by $5.00 per membership category. There will be no increase in postage rates. The new rates will take effect on January 1, 2000.

A New Natural Hybrid *Tillandsia* from Mexico

Hiroyuki Takizawa **Illustrations by the author**

***Tillandsia* × *marceloi* H. Takizawa & P. Koide, hyb. nov.** (cover, figures 10-12)

Hybrida naturalis e *Tillandsia achyrostachys* E. Morren ex Baker et *T. bourgaei* Baker, inter parentes media, inflorescentia ramosus cum ramis anguste lanceolatus

Type. Mexico: OAXACA: Guelatao to Ixtlan, 1,700 m., 12 February 1999, *H. Takizawa, Koide, Schuster, Kinnard & Lau s.n.* (Holotype: SEL).

Distribution and Ecology: Mexico. Estado Oaxaca; midway from Guelatao to Ixtlan, 1,700 m. Epiphytic in disturbed pine forest with its presumed parents *T. achyrostachys* and *T. bourgaei*. Only one plant was blooming, 12 February 1999, but several seedlings thought to be of this taxon were found in the area.

Plant a stemless epiphyte, flowering to 43 cm high. **Leaves** numerous, forming a subcrateriform rosette, 40—45 cm long, covered throughout with finely appressed cinereous or dark brown scales. **Sheaths** ovate. **Blades** curved and spreading, linear-triangular, caudate-attenuate, 30 mm wide at the base. **Scape** erect, 9 mm wide at base. **Scape bracts** densely imbricate, foliaceous with subinflated sheaths, densely lepidote, filiform-attenuate, the upper ones reddish. **Inflorescence** exceeding the leaves, bipinnate with six spikes that spread at an angle of 15—20° from the main axis. **Primary bracts** imbricate; the lowest with a broadly ovate base with filiform attenuate blades that are much longer than the axillary spikes, the upper much shorter; all densely lepidote, colored roseate to ruby red. **Spikes** strict, pendunculate with 5—6 mm long naked base, suberect, narrowly lanceolate, acute, densely 8—10 flowered, 8—11 cm long, 17—20 mm wide, complanate. **Floral bracts** densely imbricate and concealing the rachis at anthesis, ovate, triangular-acute, 36 mm long, exceeding the sepals, carinate, lepidote, even to nerved toward the apex. **Flowers** subsessile. **Sepals** linear-lanceolate, acute, 23 mm long, 4—5 mm wide, membranaceous, weakly nerved, carinate. **Petals** erect, 45 mm long, tongue-shaped, obtuse, bright green. **Stamens** exserted. **Filaments** 53—55 mm long, 0.8 mm wide, greenish, white toward the base, thin and twisted. **Anthers** 3 mm long, 1 mm wide, fixed 1/4 from base, light brown, pollen golden yellow. **Style** 55 mm long, 1 mm wide, yellow-green. **Stigma** 2.5 mm long, 1.8 mm wide, simple, erect. **Ovary** 5 mm long, 2.5 wide at base, conical, greenish.

Etymology: The specific name honors Mr. Marcelo Pablo, Ms. Pamela Koide's father. When he was only 14 years old, he left his native Philippines by ship for an uncharted future. He had surmounted many difficulties and eventually became a United States citizen. He rose to Chief Petty Officer during a 22-year career in the U.S. Navy, and died February 8, 1999 in his Serra Mesa home. He was 85.

Figure 10. Flowering plant of *T.* x marceloi in cultivation

Figure 11.
Tillandsia x marceloi in habitat

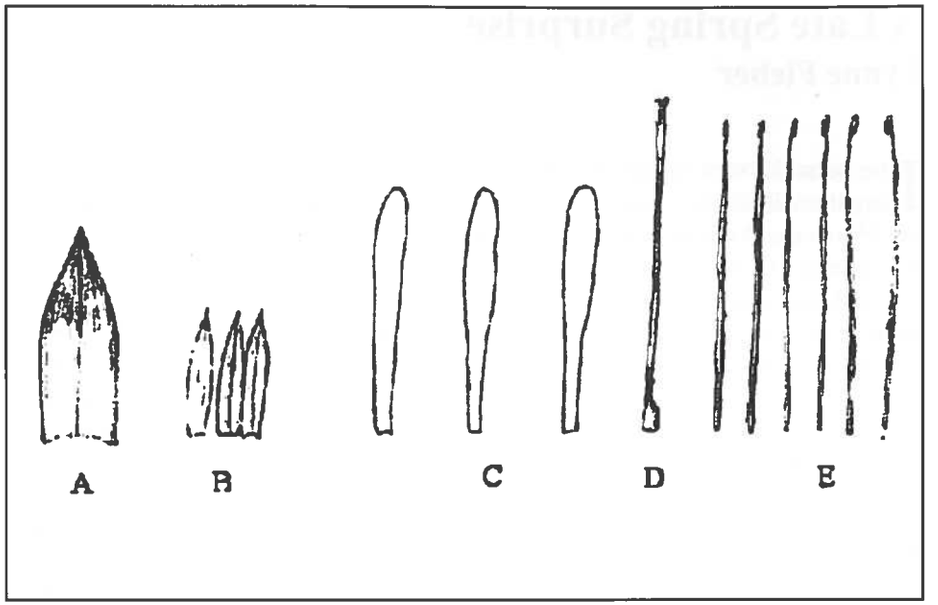

Figure 12. *Tillandsia* x marceloi H. Takizawa & P. Koide. A) floral bract; B) sepal; C) petals; D) pistil; E) stamens.

ACKNOWLEDGMENT:

I would like to thank Harry E. Luther, Director of the Mulford B. Foster Bromeliad Identification Center at the Marie Selby Botanical Gardens for his assistance and advice in preparation of the plant description.

Tokyo, Japan

A Late Spring Surprise

Lynne Fieber

I've been devoted to bromeliads for about seven years, ever since a cluster of forgotten *Billbergia pyramidalis* poked through the salt charred wreckage of my Hurricane Andrew-scoured backyard and bloomed the week after the storm. My interest in the hobby has been sustained more by an ability to be easily amused than any claim to horticultural talent. The discovery of a first offshoot peering demurely from underneath its mother plant's leaves makes my day. The first time I triumphed over leaf scale with non-chemical means I related the tale so often my friends began to avoid me. But like most bromeliad devotees, the event that entertains most is when, against all odds, a plant not only survives and grows, but blooms.

It doesn't have to be a Nat DeLeon spectacular, either. This past month, a phenomenon I have never before witnessed is unfolding beneath the branches of my olive tree. A large clump of dangling *Tillandsia usneoides* is blooming like there's no tomorrow. I often examine this three-year-old plant, because its exuberant vegetative growth habit is endlessly fascinating to me. When I discovered the first tiny, three-petaled green inflorescence one evening, I excitedly pulled my husband Michael off the couch and insisted he come take a look. He wasn't going to believe this! Dutiful and supportive mate that he is, he not only came to look, but he broke out his camera gear, and patiently fired off a roll of vanity photos of the understated blossom from every conceivable angle. So long did that little flower sit under the hot lights that it started to smell. *T. usneoides* has a fragrant bloom!

Literature discussing the fine points of the flowering habit of this species is lacking in our library, so I have not been able to read up on *T. usneoides*. My guess is that there is either a maturation aspect to the flowering of this plant, or merely a law of averages at work, because younger, thinner strands of *T. usneoides* under the same tree have not bloomed.

Over the course of the next few days, more blooms on the clump opened. Counting and admiring them and their fragrance has become a daily duty. For all I know, this may never happen again in my garden, and I want to make the most of it. Two weeks later the flowering event is still going strong. If you have *T. usneoides* and you have never noticed its flower before, look for it this month. It is a subtle but distinct pleasure.

Miami, Florida

Reprinted from the Bromeliadvisory, *the bulletin of the Bromeliad Society of South Florida, July/August 1999.*

Cultivar Corner

Chet Blackburn

Billbergia 'Strawberry' (figure 13) has been around since 1977 but is still not widely distributed. Thom/Schwarz Greenhouses created this cultivar by crossing *Billbergia* 'Fantasia' with *Billbergia* 'Muriel Waterman'. Pamela Leaver introduced it into the trade. The plant is a 10 to 12 inch open tubular rosette consisting of a white base with rich pink and red mottling. The inflorescence has large rose primary bracts and appears low in the vase. Petals are white shading to purple toward the tips. It is a very colorful plant when grown in the right light.

Aechmea 'Orange River' (figure 14) is a natural hybrid from Ecuador. The parents are *A. cucullata* and *A. retusa*. The cultivar was registered by Sam Smith in 1994. It is a medium-sized plant with 25 pale-green, moderately soft leaves with an A. chantinii type of inflorescence and a brilliant orange-gold scape, primary bracts and floral bracts blending upwards to a coral orange color, and producing orange flowers.

Aechmea 'Jack' (figure 15) is a cultivar of a cross made between *Aechmea moorei* and *A. brevicollis*. *Ae. moorei* is a large plant with a tall inflorescence and spreading leaves, while *A. brevicollis* is a small plant with upright, urn-shaped leaves. *Aechmea* 'Jack' is a medium-sized plant with green leaves in a tubular form with attractive purple-spotting near the base – a combination of both parents. It is stoloniferous with a compound inflorescence carrying yellow sepals and white petals. The cross was made by Sam Smith and registered in 1995.

Aechmea 'Peggy Joe' (figure 16) is another Sam Smith cultivar resulting from a cross between *Aechmea moorei* and *A. fasciata* var. *purpurea*. It produces a medium-sized flaring tubular rosette of intense red with an inflorescence of deep red-pink which stays in color for as long as 10 months. It most resembles the *A. moorei* parent in form but the *A. fasciata* parent in inflorescence. It was registered by Sam Smith in 1995.

Neoregelia 'Alpine Rose', (back cover) created by Robert Spivey, is a cultivar produced from crossing *Neoregelia* 'Meyendorfii' x *Neoregelia chlorosticta* 'Marble Throat'. It is a very attractive small plant with leaves about 9 inches long. The pale leaves are lime green in a unique mottled pattern. The leaf tips are blunt and apiculate. The plant produces 1 inch stolons and flushes pinkish-red throughout when it blooms, but with the color being more pronounced toward the center of the plant.

Auburn, California

Figure 13.
Billbergia 'Strawberry'

Photograph by Robert Monteith

Figure 14.
Aechmea 'Orange River'

Photograph by Sam Smith

Figure 15.
Aechmea 'Jack'

Photograph by Sam Smith

Figure 16.
Aechmea 'Peggy Joe'

Photograph by Sam Smith

WBC 2000 Information

Chet Blackburn

The World Bromeliad Conference in San Francisco will be a commemoration of the fiftieth anniversary of the Bromeliad Society International. As such, we would like to have photos and information on display relating to three areas: the history of the Bromeliad Society International, the history of the individual affiliates, and the history of bromeliad cultivation.

Affiliates are urged to prepare their own displays depicting both their past and current activities. When were you founded? Who was responsible for founding your affiliate? Who were the charter members? Do you have any early photos? Do you have any recent photos? What activities have you undertaken in the past and what are your activities today? Where and when do you meet? If you plan on setting up a display (and we strongly urge you to do so), please contact either Joyce Brehm or Hattie Lou Smith as soon as possible. We need to know how much space to reserve for the historical displays.

Joyce Brehm
5080 Dawne St.
San Diego, CA 92117
E-mail joycesjoy@aol.com

Hattie Lou Smith
3460 River Run Ln.
Fort Myers, FL 33905
E-mail ssmith163@aol.com

Historical photos and information are also needed that depict the history of the BSI. Do you have photos or material from the early days of the society that you could lend to the BSI? Do you have materials or photos from the past world conferences? If you have any of this or any other material that might be relevant, please contact Chet Blackburn by January 1, 2000.

Chet Blackburn
720 Millertown Road
Auburn, California.
E-mail blackburn@neworld.net

We are also looking for items for use in preparation of a display covering the history of bromeliad cultivation. We are especially interested in both early and recent commercial catalogues. Please contact Chet Blackburn if you have any of these items.

The conference dates are from June 26 through July 5. If you have not sent in your registration by now, please consider doing so. Remember that the registration fees will increase on January 2, 2000. Also remember that the cutoff date for registration by mail is June 1, 2000. After that date, you will only be able to register at the door.

My Favorite Bromeliad: *Dyckia* 'Lad Cutak'

Fay Fishburne **Photographs by the author**

Dyckias are natives of Brazil, Argentina and neighboring South American countries. They thrive on minimum care, and can withstand direct sun and low temperatures. Most are found on dry open plains. Some are as small as three to four inches in diameter (1-2 cm), others are extremely large – sometimes five or six feet tall (1.5-2 m). All dyckias have spiny edged leaves that terminate in sharp points. The underside of the leaves bear small scales, usually silvery in color, sometimes arranged in parallel lines. Tall, slender flower spikes are openly branched and produce orange, occasionally yellow, or nearly red blooms.

My favorite bromeliad is actually a group of bromeliads – twenty-two *Dyckia* 'Lad Cutak's F2 seedling plants grown from seeds of an extremely large plant in Grace Barne's Mission Viejo (California) garden. For nearly seven years, Bill and I have watched them grow and flourish, from tiny seeds in tiny pots to small plants in small pots, on to larger pots, and finally, to a special area in our garden.

Dyckia 'Lad Cutak' (*D. brevifolia* x *D. leptostachya*) was registered in 1956 by Ladislaus Cutak, and was described as follows: "A beautiful, vigorous hybrid, intermediate in size between the two parents, but nearly retaining the mahogany color of *Dyckia leptostachya*. It produces many simple flower stalks up to three feet or more, each carrying numerous yellow-orange flowers."

We have enjoyed watching the descendents of that plant grow in our garden. One can understand Gregor Mendel's fascination with his research into plants and their inheritance of genes in varying combinations, from their predecessors. Our various F2 seedlings from the 'Lad Cutak' plant exhibit great differences from each other. With each generation some plants show characteristics that differ from one or both parents. Some of our Lad Cutak F2 plants resemble the dark green pincushion-like *Dyckia brevifolia*; others display the narrow, reddish-brown sharply pointed leaves of *Dyckia leptostachya*. In between are **very** small to large plants, ranging in color from a light pea green to a very dark green, to light brown, to dark mahogany. Some have very narrow pointed leaves with long sharp spines. Others have shorter, wider leaves with almost insignificant spines. Some have soft leaves, others have thick, very firm leaves. The blooms range from yellow to red.

Though I found no evidence during my research of further hybridizing of this particular plant, it may exist somewhere.

Figure 17.
An F2 plant from Dyckia 'Lad Cutak' exhibiting green coloration.

Figure 18.
Another plant from the same seed batch with reddish leaves.

Since dyckias are terrestrials, they thrive under the same cultivation conditions as cacti and other succulents. They fit nicely into a cactus garden and thrive equally well as potted plants. With few exceptions, ours continue to flourish and we continue to enjoy them.

Research proved difficult because so many years have passed since Mr. Cutak registered his *Dyckia* 'Lad Cutak'. I sought help from Thelma O'Reilly and Dorothy Byer. Both were familiar with the work of Mr. Cutak and helped me find reference materials. As a result of my research, I became quite interested in Mr. Cutak and his many contributions to the world of horticulture.

He was one of the original board members of the Bromeliad Society when it was incorporated in 1951 and he contributed many articles for the bulletin in its early years. He searched for plants in Mexico and throughout South America, then wrote and lectured extensively regarding his plant research. Mr. Cutak wrote several publications on tropical and desert plants. Actually, he was most noted for his work with cacti and other succulents. He founded the Henry Shaw Cactus Society in 1943 and wrote a column for the *Cactus and Succulent Journal* entitled "Spine Chats" for thirty years! He was the Curator-Chief Horticulturist of the Missouri Botanical Gardens for many years. He first became interested in bromeliads when he met Mulford Foster, who encouraged him to intersperse dyckias and hechtias into the succulent displays at the Missouri Botanical Gardens. Eventually, under Foster's guidance, he established several greenhouses at the gardens devoted solely to bromeliad displays.

Mr. Cutak was the author of *The Cactus Guide* published by Van Nostrand in 1956. He also authored the *Handbook on Succulent Plants* published by the Brooklyn Botanical Gardens. The first printing was available in 1963, the last in 1974. His articles in the Bromeliad Journal include "How to graft cacti", "How to become interested in bromeliads", and "Collecting bromeliads in Mexico".

Upon his death in 1973, Ladislaus Cutak was highly praised by horticulturists and plant lovers worldwide for his contributions to the field of horticulture.

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The Cactus and Succulent Journal – December, 1951

San Diego, California

A Sand-groper's View on Growing Bromeliads

Kim Chipper

I'm going to tell you about growing conditions for bromeliads in Perth, Western Australia and some of the problems we have to overcome to successfully do so. I am also going to tell you about some of the advantages of our climate (besides it being the best in the world and the fact that we have a wonderful lifestyle!) Our weather patterns allow us to have an outdoors lifestyle from September to April (eight months) with a short, sharp winter. Long evenings give us time for casual meals, blizzardly cold beer, chilled light wines and light meals of exquisite flavor.

First, let me tell you that the inhabitants in each State of Australia have a nickname which dates back about a hundred years. For instance, Queenslanders are known as "Banana-benders," South Australians are known as "Crow-eaters" and Western Australians are known as "Sand-gropers." Some people think that we were named after the subterranean insect, *Cylindracheta*, which inhabits the sandy coastal plains, but we were known as sand-gropers long before it was discovered.

We are not too sure of the origins of "Sand-groper" but we think it's because our plains are hot, dry, dusty sand and most of Western Australia's early inhabitants in the 1880's were gold miners. Henry Lawson wrote in 1896, "The curse of this country is gold...the old Sand-gropers are the best to work for or have dealings with. The T'othersiders are cutting each others throats".

Now miners dig holes and leave the dirt heaped around the hole. A lot of Americans came to the gold fields (in his early days, Herbert Hoover, subsequently an American president, was one of them) and they recognized these holes, and we became known as sand-gropers, probably a corruption of sand gophers.

To understand better how to grow bromeliads, we need to know what the climate is like where they grow naturally. Bromeliads largely come from tropical and subtropical zones. In these zones, the seasons are characterized by precipitation. Where we live, in our temperate zone, the seasons are characterized by temperature.

Consider that many bromeliads come from a climate where summers are warm and wet and winters are warm and dry. Our biggest problem to overcome in growing bromeliads then, is the climate. We live in a temperate zone designated as a Mediterranean climate and it is one of the unusual climates of the

world. The summers are hot and dry and the winters are cold and wet, exactly opposite the climate where bromeliads grow. As bromeliad growers, one of the first things that we have to overcome is the complete lack of co-operation from the climate. Everything happens at the wrong time. Additionally, one of the curious things about growing any plant in Perth is that we have two vigorous growing periods: autumn and spring, when most of them flower. Plants rest in the extremes of the weather, mid-summer and the mid-winter.

In fact, the new philosophy of gardening in Perth is to let a garden "coast" in the height of summer (January/February) and concentrate growing efforts in autumn, winter and spring. A lot of native plants flower in winter so the seed can take advantage of the rain to germinate and get established before mid summer.

I want you to particularly note when we get our rain. It comes in winter, just when we don't need it! This means we have to stop the rain from getting to our plants because by now they have stopped growing. If they get a lot of water and they have the slightest tendency to rot, we will lose them. We do however, collect as much rain as possible as it is soft, clean water very suitable for bromeliads. I'11 say more about water quality later. Therefore, another of our growing problems is rain in winter.

Because of light intensity we have to put something between our plants and the sky. This may take the shape of vegetation, such as trees or other large plants. Another possibility is providing shade producing material overhead. This is probably the most successful for growing bromeliads as it provides a number of other benefits.

In summer, one thing you must do is to allow the superheated air at the top of a hothouse to escape, especially on very hot days. If you don't, you can guarantee that you will lose tillandsias and sometimes other bromeliads to the heat. Ventilation in hothouses is very important for the successful growing of bromeliads, especially tillandsias. As long as we generate enough humidity by carefully controlled watering, at least once or twice a day, we can achieve a minimum of about 50-60% relative humidity, enough to successfully grow bromeliads. To cut down the wind and constant breezes blowing away all the carefully generated humidity, we have fences combined with trees which hold in the humidity while allowing the air movement necessary to stop plants rotting. Placing bromeliads on a bed of sawdust, which retains moisture, is another way to imitate the tropical jungle conditions with the humidity rising from beneath the plants. In gardens, heavy mulching with compost, straw, newspapers covered with other materials like manure, and the like, help to hold the water and release it back into the atmosphere as humidity, which provides the plant with protection from drying out and keeps it cool in the heat of the day.

Since most plants have their roots near the surface, the mulch holds the water where it is needed and protects the delicate roots from the sun's rays drying out the soil and burning them. By the way, mulch in Perth provides another benefit. The silvery colored sands of Perth reflect the heat beautifully and if you don't have mulch, the underside of plant leaves get burnt as well as the roots near the surface.

Our tap water leaves a lot to be desired when growing bromeliads. The water is hard because of the heavy deposits of limestone that the water passes through, and the use of bore (well) water, which on occasion is worse. The water, if left in the bromeliad cup or on the leaves, can easily grow algae. The plant must be flushed regularly with rainwater if using Perth tap water. For showing plants, the calcium deposits can be removed from the leaves using a weak solution of detergent. It should be rinsed off carefully so it does not affect the plant. If the plant is placed so that it receives any sunlight, the hard water deposits left on leaves causes leaf damage through burning.

The general tenet of growing bromeliads in Perth is to grow them on the dry side. In Perth, too much water causes rot and once they start to rot it's hard to bring them back. To help achieve this dry growing, we use a neutral pH potting mix which holds water, and depending on the genus being grown, we add cow manure, pine needles, crushed pine bark, charcoal and chunky pine bark. To provide the good drainage the most successful, because it is the cheapest, is adding medium crushed pine bark and coarse river sand. One of the mediums we don't use is fine-crushed pine bark. The fine texture contributes to rot by holding too much water and it acts like mud. Medium bark allows enough drainage, while holding some water in the mix to stop it drying out completely.

This how the "Sand-gropers" grow bromeliads. Perhaps some of the same methods can be used by growers in other Mediterranean climate areas.

Perth, Western Australia

Reprinted in part from Bromeliaceae, *the bulletin of the Bromeliad Society of Queensland (30)4:7-9.*

Book Reviews

Jason R. Grant

Especies Vegetales Promisorias de los paises del Convenio Andrés Bello, Tome III. Correa, J. Enrique & H.Y. Bernal. Editora Guadalupe Ltda., Colombia, 1990. 485 pages, soft cover, 23 cm, ISBN 958-92-6-01-8 (entire work), ISBN 958-9206-05-0 (Vol. 3). Order from Editora Guadalupe Ltda., A.A. 29765, Bogota, D.E., Colombia, Tel.: 2690788, or Koeltz Scientific Books, P.O. Box 1360, D-61453 Koenigstein, Germany. Tel.: (+49) 0617493720, fax (+049) 06174937240, web site: http://www.koeltz.com.

This book written in Spanish describes the potential economic value of members of five plant families of the Andean countries (Bolivia, Colombia, Chile, Ecuador, Panama, Peru, and Venezuela). The families with results published in this book include Bromeliaceae (8 species) (pp. 1-44 of the 485 page book), Buddlejaceae (3 species), Burseraceae (3 species), Cactaceae (16 species), and Caesalpiniaceae [Leguminosae subfam. Caesalpinioideae] (28 species).

Since the Andes is the native region of many important economic crops, e.g. corn, beans, potatoes, and cotton, a renewed effort to examine the flora of the Andes in search of potentially economically important plants was undertaken. This book contains the results of the "Inventario de Recursos Vegetales empleados con fines alimenticos, medicinales e industriales de la Subregi6n Andina".

Of bromeliads, there are reports on eight species: *Aechmea magdalenae*, *Bromelia hieronymii*, *B. pinguin*, *B. plumieri*, *B. serra, B. trianae*, *Puya chilensis*, and *P. pyramidata*. Each entry has a taxonomic description, list of common names, habit information, geographic distribution, ecology, properties (nutritional, medicinal, industrial, or "others"), and a much larger and more important section on uses and economic importance. There is also an important bibliography at the end of each species listing many obscure references not often encountered. The entries essentially draw information from a number of sources into a single location on a few potentially economic species. The book is probably only of interest to those studying the economic interests of bromeliads, but would be an important resource for a library.

Bromelienstudien I. Neue und wenig bekannte Arten aus Peru und anderen Ländern. (XXIII. Mitteilung). Gross, E. 1997. Trop. Subtrop. Pflanzenwelt 95: 1-41. Soft cover, ISBN 3-515-07083-4. Order from: Dr. Elvira Gross, Am Fürstenweiher 61, D-69118, Heidelberg, Germany.

This 23rd installment of Rauh's series on bromeliads from Peru and other countries is written by Elvira Gross. There are notes on *Pitcairnia dracaenoides* (*P. palmoides*), *Puya prosanae*, and *Cryptanthus scaposus*, and the description of eight new taxa: *Encholirium crassiscapum* E. Gross, *Pepinia verrucosa* E. Gross, *Pitcairnia koeneniana* E. Gross & Barthlott, *Pitcairnia roseoalba* E. Gross & Rauh, *Pitcairnia roseoalba* var. *rubra* E. Gross & Rauh, *Guzmania alliodora* E.

Gross, *Guzmania remediosensis* E. Gross, and *Guzmania viridiflora* E. Gross. Black and white photographs of the habit of each species, and SEM photos of the pollen of *Pitcairnia koeneniana,* and of the leaf scales of *Puya prosanae.*

Atlas Tilandsii. Fasc. I. (1-15). Chvastek, J. (ed.), J. Closer, J. Zima, J. Chvastek. 1990. Fr′ydek-Mistek [Czech Republic]: M. Magdonové. 24 cm. Hardcover stock enclosing a 4 page bound pamphlet, and 15 separate sheets on cover-stock each describing a single species of *Tillandsia*. Fasc. II. (1-15). Chvastek, Jaromir (ed.), Jaromir Chvastek & Regina Novotna. 1992. Fr″dek-Mistek [Czech Republic]: M. Magdonové. 24 cm. Hardcover stock enclosing a 22 page bound pamphlet, and 15 separate sheets on cover-stock each describing a single species of *Tillandsia*. These two booklets are sold together. Order from M. Magdonové 235, 738 01 Fr″dek-Mistek, Czech Republic, or Koeltz Scientific Books, P.O. Box 1360, D-614S3 Koenigstein, Germany. Tel.: (+49) 0617493720, fax (+049) 06174937240, web site: http://www.koeltz.com.

This is an open-ended series on the genus *Tillandsia* written in Czech. In the first fascicle there is a short introduction on the biology of bromeliads. The second has a much expanded introduction with a history of the discovery and subsequent naming of tillandsias over the centuries. It is followed by an introduction to the taxonomy of *Tillandsia*, a detailed description of their characteristics, and a section on cultivation. On each of the separate sheets describing a single species there is a line drawing above its Latin name and full synonymy, followed by a description of the species, and notes on their cultivation. Representative species covered in these first two fascicles of this open-ended series include *Tillandsia aeranthos*, *T. cyanea*, *T. duratii*, *T. ionantha*, *T. schiedeana*, and *T.tricholepis*. This will serve as an important resource for readers of Czech, but probably only for the collector for non-Czech readers.

Bromélie. Kristek, J. & J. Duπek. 1978. Prague: Academia, nakladatelstvi Ceskoslovenské akademie ved. 102 pages, 21 cm, hardcover, 81 color photos. Order from: F. Flück-Wirth, Internationale Buchhandlung für Botanik und Naturwissenschaften, CH-9053, Teufen AR, Switzerland, tel. 071 33 16 87, fax 071 33 16 64.

This book was written in Czech during the time when the Czech Republic and Slovakia were united as Czechoslovakia. For readers of Czech, this book may serve as the primary source of information on bromeliads. It may be used in concert with the Atlas *Tilandsii* for information on tillandsias. There is much information on the biology of bromeliads, their ecology, distribution, and methods of cultivation. Descriptions for many species are provided with accompanying color photos. This is to be recommended for readers of Czech, but probably only for the collector for non-Czech readers.

Bromélias Brasileiras: aquarelas de Margaret Mee Mee, M.; text and commentary by M. das Graças Lapa Wanderley. 1992. São Paulo, Brazil: Institute de Botânica de São Paulo. 30 cm, hardcover, 160 pages, ISBN 85-85131-41-1. Order from: Koeltz Scientific Books, P.O. Box 1360, D-61453 Koenigstein, Germany. Tel.: (+49) 0617493720, fax (+049) 06174937240, web site: http://www.koeltz.com.

This hardcover book illustrates 59 of Margaret Mee's original watercolors of bromeliads from Brazil conserved at the Institute de Botânica de São Paulo in São Paulo, Brazil. It is a more than a coffee-table book in that the watercolors are of such great beauty and scientific accuracy. Within the book there are sections describing the unfinished watercolors at São Paulo, general characteristics of the family, and the life of Margaret Mee. The spectacular paintings are obviously the most striking and important feature of the book. These watercolors rival or often surpass the quality of watercolors in the Édouard Morren collection of bromeliad watercolors conserved at the Royal Botanic Gardens, Kew. In fact, the style of painting is very similar between Mee and the four principal painters of the watercolors in Morren's collection, Cambresier, Sartorius, Stroobant, and De Tollenaere. Opposite each is text written parallel in Portuguese and English describing the species the watercolor depicts. The book finishes with an eloquent postface by Elton Leme, and its publication funded by BANESPA.

Margaret Mee: Return to the Amazon. Stiff, R. Royal Botanic Gardens, Kew. The Stationary Office, London. 1996. 201 pages, soft cover, 29 cm. Order from: The Stationary Office, Publications Centre, P.O. Box 276, London SW8 5DT England. Tel.: O 171 873 9090, fax: O 171 873 82000.

This is a soft-cover book is intended to accompany the currently touring exhibition of Margaret Mee's famous watercolors in the United States. It has a number of interesting papers and dedications, as well as prints of many of Mee's paintings, many published here for the first time. There is a list of exhibition sites, a letter from the sponsors Cynthia and George Mitchell, Preface by Prof. Sir Ghillean T. Prance, Acknowledgements by Ruth L.A. Sieff, and Introduction by Prof. Grenville LI. Lucas, followed by the papers 'The Royal Botanic Gardens, Kew: A Brief History' by Ray Desmond, 'Margaret Mee: Life and Legacy' by Dr. Simon Mayo, 'Margaret Mee: The Artist' by Dr. Brinsley Burbidge, 'Conservation of the Amazon Rainforest' by Prof. Sir Ghillean T. Prance, and 'Historic Riverine Journeys' by Ruth L.A. Sieff.

There are 76 watercolors printed, mostly of bromeliads and orchids. There are 26 plates of bromeliads including: *Aechmea fosteriana*, *A. huebneri*, *A. meeana, A. polyantha*, *A. rodriguesiana, A. tillandsioides*, *A. tocantina*, *Billbergia decora*, *Neoregelia concentrica*, *N. eleutheropetala*, *N. leviana*, *N. margaretae*, *N. sp.*, *Nidularium antoineanum*, *N. innocentii* var. *wittmackianum*, *Quesnelia arvensis*, *Streptocalyx* (*Aechmea*) *longifolius*, *S. poeppigii* (*A. beeriana*), *S. poeppigii* (again), *Tillandsia linearis*, *T. stricta*, *Vriesea ensiformis* var. *bicolor*, *V. erythrodactylon*, *V. guttata*, *V. heliconioides*, and *V. jonghei.*

The plates are taken from the collections at the Royal Botanic Gardens, Kew, the Smithsonian Institution, Washington, D.C., the São Paolo Botanical Institute, as well as several private collections. It is a very fine book that can be used either for reading or as a coffee-table book. The text is intriguing with much information, and the watercolors amazing. It is recommended for anyone interested in bromeliads.

Fontaine-Andre 30, Neuchatel 2000, Switzerland

Notes from a Beginner on Hybridizing and Seed Starting

L.D. Stewart III

I am a bromeliad fan who would like to share my notes and story with other bromeliad people. I've always had a few scattered bromeliads, but really started getting involved with them in the spring of 1998. I began seriously collecting then, adding many new plants to my growing collection. I now have approximately 150 different bromeliads, although if I counted all my seedlings and plantlets, I'm sure the number more closely approaches 1,000 to 1,500. I am now in need another greenhouse before winter.

I recently installed an electric/gas heater in my greenhouse but still have to run a gas line to it. Most of my bromeliads are billbergias, and I recently started a collection of dyckias and orthophytums. I find they are really fast growers contrary to what I've heard about them being slow. Gary Gallick, President of Houston Bromeliad Society helped start my collection of dyckias and orthophytums.

They have proven to be so fascinating that I wish I had gotten into bromeliads twenty years ago. I now must play catch-up to make up for lost time. I tend to my plants, seedlings, and plantlets every chance I get – every day, 7 days a week, morning noon and night. If I can't sleep, I'll sometimes go out and check them at 2 or 3 in the morning. This has helped me to combat insects and nocturnal pests wanting to dine on my plants. I've had a caterpillar and snail problem this year but think I have gotten over the hump. I trust no insects in my greenhouse.

I tried my first hybridization in January and February 1999. As a beginning hybridizer, my advice to any other newcomer who want to try hybridizing, is to keep notes on everything you do, regardless of whether the cross attempted worked or not. I even keep notes on what time and what the temperature is when I pollinate my bromeliads. This information may not be needed, but then again, one day it might prove invaluable. I attempted three hybridizations in Jan 1999 and three in February 1999. I started with billbergias, my favorite. Of the six hybridizations, only one worked, but that was a success to my way of thinking. 1 out of 6 is better than 0 out of 6. I was rewarded with (3) three nice seed pods from a Feb 14, 1999 pollination crossing *Billbergia nutans* with an unknown *Billbergia* that I'm still trying to identify. For any one thinking of trying to hybridize for the first time, here are my notes:

TIMETABLE

2-14	*Billbergia Nutans* pollinated, 3 flowers.
2-14 to 4-4	Seeds maturing in 3 pods.
4-11	Seeds already sprouting (took 6-7 days). Everything must have been right.
4 -19	Plantlets 1/8 to 1/4 inch tall in 14 days. Thought I planted 150-200 seeds, counted over 300 plantlets. Later count revealed over 400. Every time I count, I get a different figure.
4-21	Second leaf more readily visible, some leaves almost 1/4 to 1/2 inch long.
4-25	Third leaves visible on a lot of plantlets.
5-1	Leaves on some approaching 3/4 inch long.
5-10 to 5-20	Third and fourth leaves visible.
5-25	Plantlets growing well. Keeping them under gro-lites all night.
6-1 to 6-12	Plantlets have 5, 6, and 7 leaves. Also noticed different leaf patterns on plantlets. Some have distinct lines running lengthwise down the leaves. Others do not. This is exciting! Some leaves now are over 3 inches long.

Flushed with that early success, I tried pollinating several species. On May 5, 1999 I pollinated a total of five flowers on two *Aechmea nudicaulis* plants. Two of them have taken, and I'm eagerly waiting to see if other 3 do.

I pollinated 25 flowers on *Billbergia nutans* from 6-2-99 to 6-8-99. I've already lost a couple to slugs. You must keep a sharp eye on your work if you want to be successful. All of your efforts are wasted if you don't control hungry insects.

I can't wait until my dyckias and orthophytums start blooming. I have grand designs for them.

I've also noticed some differences in performance between seedlings from different batches. I planted some *Aechmea recurvata* seeds in a clear plastic shoe box with lid on 5-16-99. On 5-25-99, seeds began germinating and

growing. On 5-25-99 I planted a second batch of *Aechmea recurvata* seeds in a clear, brown-tinted, plastic refrigerator box (garage sale item) and covered it with a piece of glass. These seeds sprouted, and now the plantlets are larger than the first batch of seeds planted nine days earlier. For some reason, the brownish color of the clear plastic must make a difference. I am looking for additional clear brownish-colored boxes for future plantings.

I've also noticed that when transplanting into individual containers, you must touch the plantlets as little as possible. I noticed weeks later that every plantlet that I thought I had touched gently had leaf damage. It will even kill plantlets as I've lost quite a few due to my carelessness.

If positive thinking and attention to detail are the keys to successful hybridizing, then I fully intend to be a successful hybridizer.

Houston, Texas

Florida Director Vacancy Filled

Thomas W. Wolfe

Dr. Theresa Bert has been appointed to fill the vacancy created by the resignation of Don Beadle from one of the Florida Director's positions. Dr. Bert will serve the duration of the term for the Director's position that runs from 1999 through 2001. She is an avid grower and is well traveled in pursuit of conservation interests in Central and South America.

Dr. Bert is the current President of the Sarasota Bromeliad Society, a representative on the Florida Council of Bromeliad Societies and a BSI Judge. She received her Ph.D. from Yale University in 1985 and presently works at the Florida Marine Research Institute where she directs the Biochemical Genetics Laboratory and the Crustacean Research Program. She is a member of the Steering Committee for the Aquatic Rapid Assessment Program sponsored by Conservation International and the Field Museum of Natural History in Chicago. As part of her international research obligations she is chair of the National Academy of Sciences, United States National Committee for the International Union of the Biological Sciences.

We thank her for accepting the appointment and welcome her to the board.

Golden Anniversary

The Bromeliad Society International
World Bromeliad Conference

Registration form

San Francisco, CA

Hyatt Regency Hotel

June 26 through July 5, 2000

Registration Rates are:

$115.00 January 2, 1999-January 1, 2000

$130.00 January 2, 2000-June 1, 2000

$150.00 June 2, 2000 and at the door.

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Add $15.00 per registrant if not a BSI voting member. (Do not pay dues and receive *The Journal of The Bromeliad Society*)

Send this form and payment to: Carolyn Schoenau, P.O. Box 12981, Gainesville, FL 32604

The registration fee is 70% refundable until June 15, 2000. After that no refund will be given (except in cases of illness or death)

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By Harry Luther & Edna Sieff (1998 issue)

The Bromeliad Cultivar Register — $40.00 each
By Don Beadle

Prices include postage at book rate. Order from BSI Publications, 6523 Camino Real, Carlsbad CA 92009. California residents add 7.75% sales tax. Please make checks out to "Bromeliad Society, Int." Publications may be ordered on line at htttp://bsi.org

The Bromeliad Society International

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.

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Photograph by Robert Spivey

Neoregelia 'Alpine Rose', cultivar of a cross between *Neoregelia* 'Meyendorfii' x *chlorosticta* 'Marble Throat' by Robert C. Spivey of Shreveport, Louisiana. This attractive small plant was registered in 1996.

Calendar

24-25 Sep	1999 FCBS Annual Bromeliad Extravaganza in Tampa at the Holiday Inn, 2701 E. Fowler Ave., Tampa, FL 33612. Setup, cash bar, pool party and buffet on Friday. Sales, home tours, seminars and rare plant auction on Sunday. Contact: Tom or Carol Wolfe (813) 961-1475.
18-19 Sep	The River Ridge Bromeliad Society show and sale will be held at the Esplanade Mall, 1401 W. Esplenade, Kenner AL. Show hours 1-9 p.m. on Saturday, noon to 6 p.m. on Sunday. Sales are from 10 a.m. to 9 p.m. on Saturday, noon to 6 p.m. on Sunday. Contact: Al Alcock 607-799-4813.
5-7 Nov	The Caloosahatchee Bromeliad Society will present their BSI Standard Judged Show at Terry Park on Palm Beach Blvd in Ft. Myers, Fla.Sale & Show open Saturday 9 a.m. to 5 p.m., and Sunday from 10 a.m. to 4 p.m. Contact: Dianne Molnar 549-3404 or Gene McKenzie, 997-6392.