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Cover photographs. Front: Close-up of *Orthophytum eddie-estevesii*, a new species from Minas Gerais State, Brazil. Text begins on page 55. Photo by Elton M.C. Leme. **Back:** *Tillandsia 'Aristocrat' a John Arden cross between T. ionantha and T. bourgaei*. Photograph by John Arden.

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

You are hereby notified that the **annual general meeting** of the Bromeliad Society International will be held at the Hyatt Regency Hotel, 1333 Bayshore Highway, Burlingame, California at 9 a.m. on June 28, 2000 to consider such business as may be brought to the attention of the BSI Board of Directors. All business matters must be sent in writing to the president at least 60 days before the meeting (Bylaws, Art. VII, part 2). The **annual meeting of the Board of Directors** will be held immediately after the general meeting. The following schedule applies:

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

2) 30 days before the meetings: Officers, other directors, and committee chairmen shall submit annual reports to the president and send copies to each officer and director. (Standing Rules 3 and 6). Annual reports are due by May 12, 1999. Agenda items that would require a vote by the board of directors should be submitted to the president by April 12, 1999 for inclusion in the agenda.

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

Chairmen of the standing committees are elected by the Board of Directors. Nominations may be made by any member of the society in writing at least 30 days before the annual meeting. Nominations may also be made from the floor.

Any BSI member who has an issue or issues that they wish to be brought before the board, may either attend the general members meeting preceding the Board of Directors meeting or convey those issues to their local Director who is a member of the board. A list of all Directors, the regions they represent, and their current addresses can be located on page 95 of this issue of the JOURNAL.

Thomas W. Wolfe, President,
5211 Lake Le Claire Road,
Lutz, Florida, 33549

A New Night-blooming *Vriesea* from Rio de Janeiro, Brazil

Elton M. C. Leme[1] **Illustrations by the author**

***Vriesea grandiflora* Leme, sp. nov.** (Figures 1-3).

Species novae *Vriesea fenestralis* Linden & André, cui proxima, sed laminis foliorum suberectis, angustioribus, apice acuminatis, floribus longioribus, staminibus altitudinem petalorum superantibus differt; a *Vriesea clausseniana* (Baker) Mez, cui affinis, sed laminis foliorum angustioribus, apice acuminatis, floribus longioribus, per anthesim divergentibus, bracteis floriferis et sepalis manifeste vinaceo-maculatis differt.

Type. Brazil. RIO DE JANEIRO: Mun. Sumidouro, *G. Croce & J. Gastin s. n. legit*, April 1997, fl. cult. Oct. 1999, *E. Leme* 3865. (Holotype: HB).

Plant epiphytic, lacking rhizomes, flowering ca. 90 cm high. **Leaves** ca. 28 in number, suberect, ascending toward apex, densely rosulate, forming a crateriform rosette. **Sheaths** ovate-elliptic, 13–14 x 9.5 cm, densely and minutely brown-lepidote on both sides, brown and subcoriaceous abaxially and toward base, greenish with dark purple margins toward apex, adaxially pale colored. **Blades** sublinear, not narrowed at base, apex acuminate and apiculate, 30–32 x 4–5.5 cm, green with dark green somewhat transversally disposed, irregular spots, basal and apical margins often dark purple, without any dark apical spot, obscurely white-lepidote to glabrescent, white cretaceous mainly abaxially, thin in texture. **Scape** suberect, stout, ca. 45 cm long, ca. 0.9 cm in diameter, green, glabrous. **Scape bracts** the basal ones subfoliaceous, the upper ones ovate, acuminate and apiculate, erect, imbricate, exceeding the internodes, green with wine-purple spots mainly toward base, ca. 5.5 x 3.3 cm. **Inflorescence** simple, erect, sublinear in outline at anthesis, 27 x 12–13 cm, laxly flowered at anthesis. **Rachis** stout, 7–9 mm in diameter, sulcate, slightly flexuous, angled, purplish-green and ornamented with sparse, small purplish-wine spots, glabrous, rugulose, internodes 20–25 mm long. **Floral bracts** broadly elliptic to suborbiculate, narrowly obtuse, ca. 37 x 33 mm, glabrous, not lustrous, not concave, ecarinate, bearing a conspicuous decurrent auricles at base, not imbricate even before anthesis, equaling 1/3 of the sepals' length, green with dense purplish-wine spots outside, thin in texture. **Flowers** ca. 12 in number, ca. 100 mm long (including the stamens), nocturnal, distichous, divergent, laxly arranged, suberect at anthesis, with an odor similar to garlic, not producing mucilaginous material. **Pedicels** stout, obconic, ca. 16 mm long, 11–13 mm in diameter at apex, purplish-green. **Sepals** elliptic, obtuse but appearing acuminate by the inrolling apical margins, 54 x 25 mm, yellowish-

1Herbarium Bradeanum, Rio de Janeiro, Brazil. e-mail: leme.@.tj.j.gov.br

Figure 1. *Vriesea grandiflora* flowering in cultivation.

Figure 2. Close-up of the flower of *Vriesea grandiflora*

green with dense purplish-wine spots, ecarinate, glabrous outside, inconspicuously white-lepidote inside, slightly coriaceous at base and membranaceous toward apex, concave, **Petals** broadly obovate, apex narrowly and distinctly emarginate, suberect at anthesis, ca. 65 x 32 mm, free, very pale yellow except for the small purplish-wine spots outside and along its center mainly toward apex, bearing at the base 2 appendages which are narrowly lanceolate, acuminate, suberect-ascending, 8–10 x 2 mm at ca. 11 mm above the base. **Stamens** longer than the petals at anthesis. **Filaments** free or nearly so, subcomplanate, not distinctly dilated toward apex, ca. 2 mm in diameter. **Anthers** ca. 15 mm long, dorsifixed near the base, base and apex obtuse. **Stigma** convolute-bladed, ca. 3 mm in diameter, very densely papilose, pale yellow. **Ovary** yellow; ovules long caudate.

This new species has no clear affinity to any other species in the genus. Its unique character is defined by its leaves being suberect, ascending toward apex, with blades sublinear, not narrowed at base, apex acuminate and apiculate, which makes it resemble a form of *Vriesea gigantea*, mainly to the clones from Espirito Santo and Bahia. In addition, the inflorescence is densely marked by large purplish-wine spots, in a similar way to *V. fenestralis*. On the other hand, the structure of its flowers, despite not being secund, looks like *V. classeniana*, mainly due to its petal shape and similar appendages, as well as the exserted stamens. However, the flowers of *V. grandiflora* are one of the largest ever observed in the genus, being ca. 10 cm in length (including the stamens), opening at night and producing an odor similar to garlic, which reinforce its uniqueness.

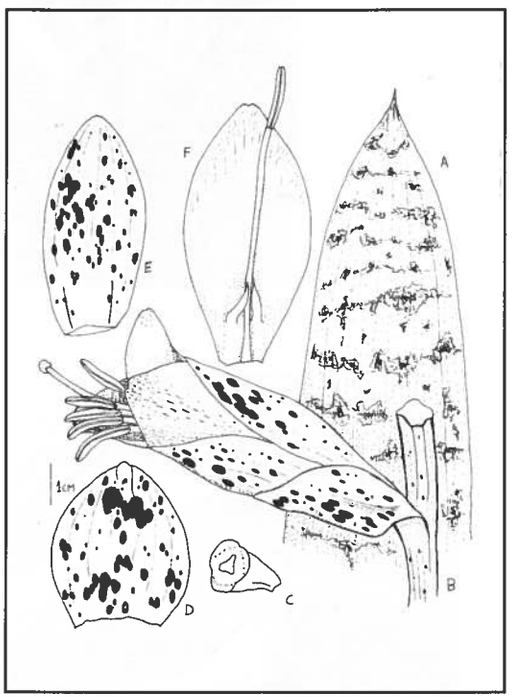

Figure 3. *Vriesea grandiflora* Leme. A) leaf apex; B) basal flower; C) pedicel; D) floral bract; E) sepal; F) petal.

Vriesea grandiflora was found growing epiphytically in the Atlantic rain forest of Rio de Janeiro State, at an elevation of about 900 m. There are probably two additional collections of this new species in cultivation, one being from the remaining forested areas of historical farms in Coronel Pacheco, Minas Gerais State, and the second one came from Pedra Azul, Espirito Santo, suggesting a broader distribution gradually effected by widespread deforestation.

Rio de Janeiro, Brazil

A new *Orthophytum* from Minas Gerais State, Brazil

Elton M. C. Leme[1] **Illustrations by the author**

***Orthophytum eddie-estevesii* Leme, sp. nov.** (Front cover, figures 4-5).

A 0. *mello-barretoi* L. B. Sm., cui affinis, foliis utrimque perdense albo-lepidotis, dense spinosis, sepalis distincte longioribus, aurantiaco-rubellis, glabris, petalis longioribus differt.

Type. Brazil. MINAS GERAIS: Monte Azul, August 1999, *Eddie Esteves Pereira 499 legit*, fl. Cult. Sept. 1999, *E. Leme 4693*. (Holotype: HB. Isotype UFG).

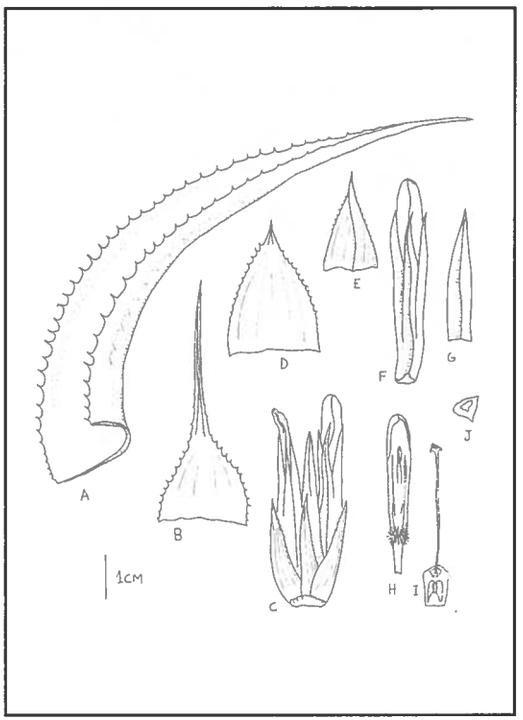

Figure 4. *Orthophytum eddie-estevesii*: A) leaf-blade; B) basal primary bract; C) fascicle; D) floral bract of the simple apical part of the inflorescence; E) floral bract of the fascicle; F) flower; G) sepal; H) petal; I) longitudinal cross-section of the ovary and style; J) cross-section of ovary.

Plant saxicolous, short caulescent, 17–19 cm high, propagating by slender stolons ca. 10 cm long, ca. 0:5 cm in diameter. **Leaves** subdensely arranged, recurved. **Sheaths** inconspicuous. **Blades** narrowly-triangular, attenuate-caudate, 10–15 cm long, ca. 2.5 cm wide at base, strongly coriaceous, distinctly channeled with upright margins, completely covered by a thick layer of white trichomes on both sides, margins densely spinose, spines narrowly triangular, complanate, nearly straight to slightly retrorse, densely white-lepidote except for the yellowish apical portion, ca. 3 mm long, ca. 1 mm wide at base. **Scape** 6–7 cm long, ca. 1 cm in diameter, densely white-lanate, green, sulcate, **Scape bracts** foliaceous but slightly reduced in size toward apex, almost completely covering the scape. **Inflorescence** subcorymbose, densely bipinnate, ellipsoid, erect, 5–6 cm long, ca. 2 cm in diameter. **Primary bracts** foliaceous to subfoliaceous, the basal ones distinctly exceeding the fascicles but gradually reduced in length toward the

[1]Herbarium Bradeanum, Rio de Janeiro, RJ. e-mail: leme.@,tj.rj.gov.br

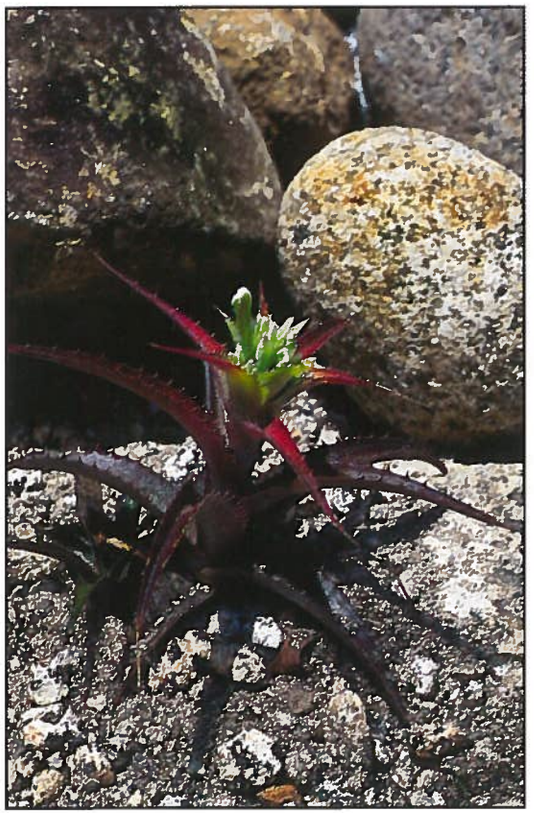

Figure 5. Another Minas Gerais species, *Orthophytum mello-barretoi*, is the closest relative of *Orthophytum eddie-estevesii*.

inflorescence apex, bearing a broadly ovate-triangular base, densely spinose, spines 1.5–2 mm long, blades long caudate, laxly spinulose to subentire, the upper primary bracts equaling to slightly exceeding the fascicles. **Fascicles** ca. 5 in number, polystichously and densely disposed, erect, nearly sessile, narrowly flabellate, complanate, ca. 4 cm long (excluding the petals), ca. 1.5 cm wide, 2 to 3-flowered. **Floral bracts** those of the fascicles triangular, acuminate, densely spinulose toward apex, spines irregularly curved, less than 0.5 mm, strongly carinate, equaling the middle of the sepals, greenish-hyaline toward base and orange at apex, nerved, membranaceous, sparsely white-lepidote, 22–23 x 12 mm, those of the simple apical part of the inflorescence broadly ovate, long apiculate, apiculous pungent, densely spinulose, spines irregularly curved, ca. 1 mm long, ecarinate, about equaling 3/4 of the sepal length, suberect, densely white-lepidote mainly abaxially, nerved, coriaceous toward apex, ca. 30 x 20 mm. **Flowers** ca. 45 mm long (including the petals), sessile, densely arranged, odorless. **Sepals** narrowly lanceolate, apex acuminate, ca. 30 x 6 mm, free, entire, reddish-orange toward the apex, submembranaceous, glabrous, carinate, the posterior ones with keels decurrent on the ovary. **Petals** sublinear-spatulate, strongly obtuse-cucullate, ca. 36 x 5 mm, free, erect at anthesis, greenish-yellow, bearing 2 densely fimbriate appendages ca. 8 mm above the base, as well as 2 conspicuous longitudinal callosities which nearly equal the anthers. **Filaments** ca. 26 mm long, terete, the antepetalous ones adnate to the petals for ca. 20 mm, the antesepalous ones free. **Anthers** ca. 3 mm long, base obtuse and apex acute, fixed near the middle. **Stigma** simple-erect, ca. 2.5 mm in diameter, blades densely papillose, recurved. **Ovary** ca. 9 mm long, trigonous; epigynous tube ca. 1.5 mm long; placentation apical; ovules obtuse.

Due to its small size and its white colored leaves, contrasting with the reddish-orange sepals and the greenish-yellow petals, *0. eddie-estevesii* (cover photograph) is one of the most attractive species of the scapose complex of the genus. It is related to *0. mello-barretoi* (figure 5), differing by its leaves very densely white-lepidote and densely spinose, sepals distinctly longer, reddish-orange colored, and glabrous, besides the longer petals. *Orthophytum eddie-estevesii* was found growing in an open area at 1,300 m in grasslands on rocky soils (*campos rupestres*) of the inland mountains of Minas Gerais State.

The new species is a tribute to its collector, Eddie Esteves Pereira, from Goiânia, Goiás State in Brazil. Esteves is responsible for the introduction of many rare and new bromeliad species mainly from the neglected Cerrado vegetation in Central Brazil. During the collection of this new species, Esteves was accompanied by, and had the valuable assistance of Pierre J. Braun, from Kiiln-Kerpen, Germany.

Rio de Janeiro, Brazil

MOVING?

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Boost your Humidity

Herb Plever

Most bromeliads grow in a range that extends from the southern United States through Central and South America. Other than hechtias and puyas, which are often found in dry desert-like areas, most species of the rest of the genera grow in high humidity, whether it be at the seashore, in the amazon basin, or in cloud forests. Cloud forests may be at high altitudes where it can get cold, but plants growing there are bathed in the moisture of thick clouds that roll in most afternoons and do not dissipate until they are burned off by the sun the next day.

It is axiomatic that without such special cloud conditions, cold air cannot hold much moisture. Bromeliad growers in the South don't have the problem of too little humidity - sometimes, perhaps, they get too much for themselves as well as for their plants. But in the northern climes, indoor growers face the problem of living in very dry air when the cold winter weather sets in.

This condition is exacerbated when homes and apartments are heated to make them comfortable in the winter. The heat further reduces what little relative humidity you get from plant trays and bromeliad reservoirs. Your usually adaptable plants become unhappy in the dry air, and so do your nasal tissues and your pianos. The glue in the joints of your furniture dries and you may find the legs of your tables and chairs have loosened.

If your home remains heated and dry, you will find this condition tends to also promote the growth of mites and mealy bugs. When it is really cold outside, the air may hold only 10% to 15% relative humidity and the heated air inside an apartment or home may hold even less. It therefore behooves growers to take at least some steps to boost the relative humidity in their homes. I try to keep my rooms at between 50% to 65% relative humidity. Even if you can't reach those levels, it will help if you use as many of the following devices as you and your budget can manage:

1. Keep heating at the lowest level that can be maintained without being uncomfortable. It is better to put on a sweater if you feel cold than to raise the heat.

2. Fill the cups of your bromeliads as frequently as is convenient. These reservoirs of water will constantly evaporate moisture into your rooms, especially if the rooms are hot. The use of pebble trays will also add to the relative humidity.

3. The most effective way to maintain good humidity is to use cold mist humidifiers. If you can afford it, run one in each plant room and in your own bedroom. I used to use a big, console humidifier with a 10-gallon reservoir. It had a big rotating drum with a foam pad on the circumference that dipped into the water reservoir and stayed wet. A motorized fan blew moisture off the pad into the room. It was a very effective device with several drawbacks. It required filling a small pail 3 or 4 times, carrying it from the sink to the humidifier. The reservoir and the foam pad got gunky very fast with algae and with brown fungus, slimes and molds. The constant cleaning required was a major job. In addition I feared the possibility of Legionnaire's disease from the large standing reservoir of water.

The hard work and fears caused me to abandon the humidifier, and I relied just on trays of water and bromeliad reservoirs for humidity. But that is when I started having trouble with mites. I have resumed the use of humidifiers, this time with a number of small, 3-gallon cold mist appliances. (I am using the Holmes HM-2060-W. There are other good humidifiers available in the stores made by other manufacturers. My humidifier costs $45.00.) This appliance has a 3-speed fan and a humidistat that automatically turns the motor on and off when the humidity setting is reached. It comes with a small hygrometer that shows approximate measurements of relative humidity, adequate for the purpose of setting the humidistat.

Holmes recommends keeping the humidity between 45% and 55%. I prefer to maintain a range of relative humidity between 50% and 65%, especially for my tillandsias. Even when it is cold outside, I can keep the humidity within that range by setting the humidistat higher so the appliance is turned on more frequently and stays on longer to reach the higher level of relative humidity. The blower motor can be set to high, medium or low speeds. At higher humidistat settings more moisture will be blown into the air (the cold mist is invisible) and the reservoir will empty more quickly. To retain humidity within a room and use less water, keep the doors closed.

Depending on the outside humidity and the humidistat setting, the reservoir needs to be refilled every 3 to 7 days. These are easy to fill, easy to clean, and the filter needs replacing about every three months. I clean the reservoir every second filling with 2 teaspoons of Clorox bleach to about two quarts of water that I shake around with the cap closed. At the same time I use the bleach water on a rag to clean off any scum that has collected on the tray the reservoir sits on.

I have gotten into a routine with filling and cleaning of the humidifiers and I find that it really takes very little time to maintain them. When I see the difference on my plants, the small sacrifice of time and money becomes trivial. Finicky tillandsias have perked up and show good growth and the leaves of potted plants look crisp, shiny and brighter.

New York, New York

Reprinted from the newsletter of the New York Bromeliad Society, Bromeliana 37(1).

Techniques to Raise Humidity for Tillandsias

Paul Kaufman

When I became interested in bromeliads, it was the tillandsias that really attracted me. I admit to having become a tillandsia "freak". I don't have the space, patience or energy for potted plants, but I try to buy every small tillandsia I can find.

With their specialized coating of trichome cells, tillandsias exemplify the adaptable epiphytes that seem to live off the atmosphere in their native habitats. However they do need to have water vapor in the air to be able grow and survive. Those of us who grow them indoors in homes or apartments have the problem of providing enough humidity.

I came up with an idea to increase humidity around the plants without buying and maintaining a humidifier. First, I purchased different sizes of round, plastic plant saucers. They are available wherever plants are sold. Their diameters range from 4 inches to 17 inches. The small diameter saucers are for my windowsills. Next I purchased a 50-pound bag of marble chips to place in each saucer. Then I bought aluminum screening from a hardware store. The screening comes in 30-inch widths and can be cut to the size you wish. (Use gloves when cutting or handling the screening as the cut edges can be sharp.)

I fill each saucer with marble chips about 2/3 to the top and then cover the saucer with a piece of cut screening which fits the top of the saucer. Crimp the edges of the screening around the circumference of the saucer and fill it with water to just below the screening. I use the large saucers and also plastic trays as reservoirs that sit on a table near the window. For larger containers, you can use plastic egg-crate material instead of screening if you can find it.

My tillandsias sit on top of the screening; it will hold the weight of the tillandsias and any medium to which they may be attached. I have many plants not attached to anything that are just resting on the screening. Voila! You have constant water evaporation around your tillandsias without them being in water. All you need to do is refill the water (through the screening) when it needs it. Occasionally, you can remove the screening and clean out the saucers.

I place these containers on my windowsills or on tables near them, wherever they can receive some bright light, and they grow well and flower. Of course this provides decent humidity but may be nowhere near the humidity in habitat, so I soak my plants in fertilized water for about 45 minutes every 10 days to two weeks. Even xerophytic plants such as *Tillandsia xerographica and T. tectorum*, which grow in more arid regions and survive the dry conditions in their habitats, seem to benefit from the soaking. In habitat, even if they don't get to experience much rainfall, at least they have access to atmospheric humidity.

I have flowered many tillandsias. Right now the fragrant *T. duratii* is in bloom, and the large, purple flowers of its tall inflorescence add a wonderful perfume to the room.

I have found that some plants don't do well in bright light, especially where there is direct sunlight. Tillandsias such as *T. tenuifolia* and *T. moscosoi* turned to straw when grown in bright light. Now I grow them shaded from the sun in moderate light, and with good humidity provided, they are growing well. I'm going to add such finicky plants as *Tillandsia geminiflora* and *T. punctulata* to my collection when I receive the spring order form from my suppliers and try growing them shaded and humidified. The relative humidity immediately around the saucers is higher than it is in the rest of the room due to the evaporating water, and the tillandsias are able to absorb it. They like it and so will you.

New York, New York

Reprinted from BROMELIANA, the bulletin of the New York Bromeliad Society. 37(3). March 2000

Portraits of Bromeliaceae from the Mexican Yucatan Peninsula-II: A new Species of *Tillandsia*

Ivón M. Ramirez M., Germán Carnevali F.C., and Francisco Chi May[1]

ABSTRACT: *Tillandsia jaguactalensis* I. Ramirez, Carnevali & Chi is described and illustrated. The proposed new taxon is closely related to *T. streptophylla* Scweidw. ex Morren but is a smaller plant overall with different colors and inflorescence structure. This is the second new *Tillandsia* species from the same locality at the Sabana del Jaguactal, in the Mexican State of Quintana Roo. Apparently, the new taxon as well as a previously described entity, *Tillandsia maypatii* I. Ramirez and Carnevali, may belong in a complex of hybrid swarms involving *Tillandsia brachycaulos* Schltdl. which is sympatric with the new taxa at the mentioned locality. The new taxon resembles *Tillandsia streptophylla* in habit but the overall structure of the inflorescence and flower color resemble *Tillandsia brachycaulos.*

There are 22 genera and nearly 360 species of Bromeliaceae reported for Mexico (Espejo & López-Ferrari, 1998). A recent account by these authors differs from a previous one (López-Ferrari & Espejo, 1995) in the recognition of *Ursulaea* Read & Baensch and the segregates of *Aechmea* Ruiz & Pav. as distinctive genera. *Tillandsia* L. (ca. 175 spp.), *Hechtia* Klotzsch (ca. 50 spp.), and *Pitcairnia* (46 spp.) are the most diverse bromeliad genera in the country.

The Yucatán Peninsula has a depauperated epiphytic flora, represented mostly by members of Orchidaceae, Bromeliaceae, and Cactaceae, but with a few representatives of the Piperaceae, and of several ferns of different families (Olmsted and Gómez-Juárez, 1996; Andrews and Gutiérrez, 1988). This pattern was found previously to be common in other mainly dry tropical localities (Gentry and Dodson, 1987). A member of the Gesneriaceae has recently been collected in the southernmost sections of the peninsula (Carnevali et al., in press). Bromeliaceae is the second most numerous epiphytic family in the area, represented by *Tillandsia* (ca. 20 species), *Catopsis* Griseb. (ca. 3 species), *Aechmea* (3 species), *Bromelia* L. (3 species) and one endemic species of *Hechtia (H.* schottii Baker ex Hemsl.). Within the genus *Tillandsia* in the Mexican portion of the Yucatán Peninsula, 17 species belong to subgenus *Tillandsia*, 1 to subgenus *Allardtia*, and 2 to subgenus *Diaphoranthema*. Most species of *Tillandsia* occurring in the Yucatán Peninsula have a wide distribution in the Neotropics, such as *T. usneoides* (L.) L. and *T. recurvata* (L.) L., yet some other taxa have a more restricted distribution, (i.e. *T. streptophylla* Schweid. ex E. Morren known from Nicaragua, Costa Rica, Honduras, Belize, the Yucatán Peninsula, Veracruz, and Chiapas).

[1]Herbarium CICY, Centro de Investigacion Cientifica de Yucatan, A. C. (CICY) Calle 43 No. 130. Colonia Chuburna de Hidalgo 97200 Merida, Yucatan, Mexico

The vegetation of the Yucatán Peninsula is conformed by a mosaic of secondary and primary habitats, ranging from coastal dunes (north) to tall evergreen forests (south). Although the family is represented in all of these ecosystems, the highest diversity in the Bromeliaceae as well as for the epiphytic flora in general is towards the south, particularly in the tall evergreen forests and low inundated forests, but species of *Tillandsia* are also abundant and diversified in the low caducifolious forests and coastal dunes of the northern portion (Olmsted and Gómez-Juárez, 1996, Ramirez & Carnevali, 1999).

A recent trip to the southernmost portions of the peninsula uncovered among other novelties a previously unreported member of the genus *Tillandsia* that is herein proposed as new:

***Tillandsia jaguactalensis* I. Ramirez, Carnevali & Chi,** sp. nov. (Figure 6-7).

Type: Mexico. Quintana Roo: Municipio Othón P. Bianco, Ejido Caobas, Sabana del Jaguactal, un desvio de 9.5 km por carreterra de terracería al este de la carretera hacia Tres Garantias, unos 21 km al sur de la carretera principal desde Xpujil a Chetumal, aprox. 18°18'00"N, 89°O7'OO"W collected originally in January 1999, flowering in cultivation in Mérida, Yucatán, México on 10 August 1999, *G. Carnevali, J. L. Tapia, F. May, R. Jiménez, L. Sánchez, A. Cibrián, M Gómez-Juáez, J. Quiroz, F. Castillo & C. Espadas 5651* (holotype: CICY).

Species vel nothospecies haec *T. streptophylla* Schweid. ex E. Morren similis sed planta et inflorescentia minores, pseudobulbo proportione minore, foliis et bracteis sparse lepidotisque, inflorescentia proportione longioribus, ramiis cum rachidiis adpressis parviflorus brevioribus, petalis atroviolaceus non palide coelestis, Jilamentiis apicale pavte quam petala concolora recedit.

Etymology: The specific epithet refers to the type locality, a unique habitat in the Yucatan Peninsula.

Epiphytic herbs growing low on trees. **Rosettes** forming a pseudobulbose base, with 15–20 (–25) leaves. **Foliar sheaths** broadly elliptic to ovate-elliptic, 4–6 cm long, 1.5–3 cm wide, attenuate toward the apex, margins somewhat revolute, soft coriaceous, green, densely lepidote on both surfaces, dark castaneous inside, more so when dried. **Foliar blades** narrowly triangular, attenuate, apex recurved, twisted, white lepidote on both surfaces, 20–30 cm long, 1.5–2 cm wide, somewhat concave. **Inflorescence** an abbreviated panicle, 20–27 cm long measured from the base of the rosette, erect, cylindrical, many flowered, as long or longer than the leaves. **Scape** totally enveloped by the primary bracts, these foliaceous, leaf-like. **Primary bracts** broadly-elliptic to ovate-elliptic at base, 1.2–1.5 wide, 6–11 cm long, free portions of the primary bract abruptly tapering into a narrowly triangular, acuminate lamina, which diverges and exposes the apex of the branch, basally dull pale purplish red, apically greenish, lepidote on both surfaces; fertile portion of the inflorescence

5–8 cm long, with 5–9 polystichous arranged branches closely appressed to the main axis of the inflorescence; branches 2–3 long, 0.6–1 cm wide, distically 3–5-flowered, laterally compressed. **Flowers** perfect, ca. 5 cm long, distichous, erect, one open per branch at a time, so that the inflorescence has several flowers open simultaneously, each one lasting one day. **Floral bracts** 18–20 mm long, 6.5–7.5 mm wide, triangular, acute, navicular, not keeled, dense lepidote outside, acute, green, apically red upon anthesis. **Sepals** 2 connate, 1 free, the free one 16–17 mm long, 4–4.5 mm wide, oblong, acute, soft-membranaceous, connate ones fuse by 6 mm from the base, 16–17 mm long, 5–5.5 mm wide, keeled, less membranaceous, all basally green, apically reddish, sparsely lepidote without. **Corolla** tubular. **Petals** 33–35 mm long, 6–8 mm wide, obovate, obtuse, apex revolute, petaloid, purple, basally white, constricted at 10–11 mm from the base, where the apical parts of the sepals converge. **Stamens** with plicate filaments on the upper half, basally white, apically light purple, in 2 series, the longest 34–35 mm long, the shortest 32–34 mm long, erect. **Pollen** bright yellow. **Anthers** 4–5 mm long, 0.9–1.1 mm wide, versatile, dehiscing longitudinally, black. Style 30–32 mm long, conduplicate-spiral, white, with three white lobes, surpassing the anthers in anthesis. **Ovary** 4.8–5.1 mm long, with many ovules.

The new species belongs to subgenus *Tillandsia* and closely resembles *Tillandsia streptophylla* in habit with its twisted, white lepidote leaves which confer to the two taxa an octopus-like gestalt. The new taxon, however, features smaller rosettes and narrower leaves, which are greener than in *T. streptophylla*. The new taxon also has sessile branches tightly appressed to the main axis of the inflorescence, instead of the elongated, conspicuous, widely diverging branches of *T. streptophylla*. *Tillandsia streptophylla* displays pinkish primary bracts instead of the dull red purplish primary bracts of the new taxon. In *T. jaguactalensis*, flowers are purple especially towards the apex and concolorous with the filaments of the stamens whereas in *T. streptophylla* petals are light purple and the filaments of the stamens are violet, contrasting strikingly with the petals. Under close examination in the microscope of preserved flower material, petals of *T. streptophylla* present small crystals; these are absent in the same structures in *T. jaguactalensis*.

The new taxon also resembles the recently described species, *T. may-patii*, from the same locality. These two taxa display an abbreviated panicle, with short, sessile fascicles which are tightly appressed to the rachis and partially enclosed by the primary bracts (figure 8). Nevertheless, they differ because *T. may-patii* has a different, non pseudobulbose rosette, leaves are fewer, nor curled neither concave, the primary and floral bracts are cherry-red, petals and filaments are white, and the stigma is green. *Tillandsia may-patii* seems intermediate between and might be a natural hybrid of *T. brachycaulos* and *T. dasyliriifolia* Baker, a subject to be developed further in a forthcoming paper.

The dimensions of the floral parts are very similar in *T. brachycaulos, T. streptophylla*, and *T. may-patii*, but the new taxon has relatively smaller flowers compared with the above taxa.

Ecological comments: The lone plant of this taxon was found growing low on small *Bucida sp.* (Combretaceae) tree in a very particular habitat. The place, called *Sabana del Jaguactal* (see Chavelas Polite, 1981; Ramirez & Carnevali, 1999, for a description and discussion of the locality) is located in the southeastern-most portion of the Yucatán Peninsula, close to the boundaries with Belize. In general it can be described as an open, scrubby-savanna association located in a large natural depression. The soils remain flooded probably for 6-7 months a year and saturated for several additional months. There is an underlying layer of sand, several meters deep (Chavelas Polite, 1981). The accumulation of organic matter associated with the sandy conditions of the parental material render the soils acidic, an unusual condition in the essentially alkaline, limestone derived Yucatan Peninsula. This unique habitat is inhabited by many plant taxa that grow only in this locality in the Yucatan, including such acidic soil specialists as *Drosera brevifolia* Pursh (Droseraceae), *Eriocaulon seemannii* Moldenke (Eriocaulaceae), *Myrica cerifera* L. (Myricaceae), and *Sauvagesia erecta* L. (Ochnaceae). The shrubby savanna habitat is embedded in a general matrix of tall evergreen forests and surrounded by an ecotone of low inundated forests, which are locally called "tintales" or "pucteales" due to the usual monodominance of the tree species "palo de tinte" (*Haematoxylon campechianus* L.: Caesalpinaceae) or of "pucté" (*Bucida buceras* L.: Combretaceae). These low inundated forests harbor the highest diversity of epiphytes in the Yucatan peninsula area.

The close proximity of the three different ecosystems, tall evergreen forests, low inundated forests, and the Jaguactal shrubby savanna, creates a variety of unusual microhabitats, mostly ecotonal, which seem to have locally favored the breakdown of breeding barriers between several *Tillandsia* taxa. These include *T. brachycaulos*, whose interaction or introgression with *T. dasyliriifolia* may have originated *T. may-patii*, while its interaction with *T. streptophylla* may have given rise to *T. jaguactalensis*. Studies with the use of a variety of methodologies are underway to assess these purported hybrid relationships.

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Figure 6. *Tillandsia jaguactalensis* sp. nov. (*G. Carnevali et al.* 5651, CICY). Habit.

Photograph by Ivón Ramirez

Figure 7. *Tillandsia jaguactalensis* sp. nov. (*G. Carnevali et al.* 5651, CICY). Flower.

Photograph by Ivón Ramirez

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Photograph by Ivón Ramirez

Figure 8. *Tillandsia may-patii* I. Ramirez & Carnevali (G. Carnevali et al. 5094a, CICY).

Portraits of Bromeliaceae from the Mexican Yucatan Peninsula-III: A new subspecies of *Tillandsia pseudobaileyi* C. S. Gardner

Ivón M. Ramírez[1] **Photographs by the author**

ABSTRACT: *Tillandsia pseudobaileyi* C. S. Gardner ssp. *yucatanensis* I. Ramírez, Carnevali & Olmsted, is described and illustrated. The new taxon is distributed in the Yucatan Peninsula (Campeche and Quintana Roo) and closely resembles typical *Tillandsia pseudobaileyi* from the Pacific Coast of the Mexican states of Jalisco, Nayarit, and Chiapas, to Honduras, El Salvador, and Nicaragua but differs in trichome density on the leaves, the color of the inflorescence bracts, and petal color.

The genus *Tillandsia* is the most diverse genus of the Bromeliaceae in the Mexican Yucatan Peninsula. There are currently 20 species recognized in the area, most of them belonging in subgenus *Tillandsia* (Ramirez & Carnevali, 1999).

Tillandsia baileyi Rose ex Small was described from a plant collected in Texas (USA), in the vicinity of Corpus Christi near the Mexican border. It is also distributed in the Mexican states of Tamaulipas and probably in northern Veracruz (fide Hietz & Hietz-Seifert, 1994). All of these localities are situated on the drainage of the Gulf of Mexico. *Tillandsia baileyi* is characterized by a narrowly ovoid pseudobulbose base, long-narrow leaves, and simple, erect inflorescence, with lepidote, pink, imbricate floral bracts and purple, tubular flowers, besides the geographical distribution in the Gulf of Mexico. Plants from other portions of Mexico and northern Central America, though somewhat different, were referred to this taxon by several authors, including the treatment of the species in the seminal, monumental revision of the whole family by Smith and Downs (1974) for Flora Neotropica and by Sosa et al. (1985) in their checklist of the Yucatán Peninsula Flora. Later, Gardner (1984) described a new taxon, *Tillandsia pseudobaileyi* C. S. Gardner, to accommodate the plants of the complex occurring in southern Mexico and northern Central America. The newly proposed taxon resembled *Tillandsia baileyi* but differed by the presence of a conspicuous ovoid or suborbicular-ovoid, pseudobulbose base, a compound inflorescence, green floral bracts which rarely had red margins, purple flowers, and more glabrous leaves with smaller foliar trichomes (0.25 mm diameter, formula 4-8-16-32), compared with the leaves of *T. baileyi* that are more lepidote and with larger foliar trichomes (0.35 mm diameter, formula 4-8-16-64)

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(Gardner, 1984). The type of the new species (*Gardner 1118*, holotype, SEL) came from Ocozocoautla on the Pacific drainage of Chiapas, and plants closely resembling the type material occur as far north as Nayarit and Jalisco, and as far south as El Salvador, Honduras, and Nicaragua, always along the Pacific drainage of these countries.

The plants of this complex growing in the Mexican Yucatan Peninsula, which is on the Mexican Gulf and Caribbean drainage, were then referred in following treatments to *Tillandsia pseudobaileyi* (Olmsted & Gómez-Juárez, 1996; Ramírez & Carnevali, 1999). These plants, however, differ from typical *T. pseudobaileyi* in several features that came to our attention when we first observed plants in bloom from the states of Campeche and Quintana Roo and compared them with freshly flowering plants for the Pacific drainage distribution of the species. Although the plants look very similar to typical *T. pseudobaileyi*, the Yucatan material differs in its more lepidote leaves, the pinkish inflorescence bracts, and the light-violet petals. These differences are consistent and geographically correlated. Since it resembles more *T. pseudobaileyi* in its pseudobulbose base, compound inflorescence and differs only in floral and petal color and plant indumentum density, while differing strikingly from *T. baileyi* in the more pseudobulbose base, inflorescence structure, and petal color, we propose to recognize it as a subspecies of *T. pseudobaileyi*.

***Tillandsia pseudobaileyi* C. S. Gardner ssp. *yucatanensis* I. Ramírez, Carnevali & Olmsted, ssp. nov.** (figure 9).

Type: Mexico. Campeche: Municipio Calakmul, selva baja inundable (tintal), unos 200-300 m al sur del poblado de Becán, unos 0.5-1 km al sur de la carretera Escárcega-Chetumal, 18°30'47"N, 89°27'40"W, 50-100 m, tintal (asociación dominada por palo de tinte, *Haematoxylon campecheanum*) bien desarrollado con árboles de 4-10 m, con gran biomasa y diversidad de epífitas y árboles como *Diospyros spp. Gymnopodium sp. y Thevetia sp.*; epífitas comúnes incluyen orquídeas como *Brassavola cucullata* (L.) R. Br., *Encyclia alata* (Batem.) Schltr., *E. belizenzis* (Rchb.f.) Schltr., *Epidendrum stamfordianum* Batem, *Stelis ciliaris* Lindl., y 12 especies de *Tillandsia*, 3 Feb. 1998, *G. Carnevali, R. Jiménez, M. Gómez, C. Espadas & D. Mondragón 4923* (holotype, CICY, isotypes MEXU, MO, SEL).

Subspecies haec subspecies pseudobaileyii C. S. Gardner similis sed foliis dense lepidotis, bracteis floralibus roseis, petalis palide violaceis abhorret.

This new subspecies shares with typical *Tillandsia pseudobaileyi* the conspicuously pseudobulbose rosettes, the individuals composed by few rosettes (as opposed to *Tillandsia baileyi* which tends to form dense, many-rosetted colonies). Leaves in the new subspecies are more lepidote as compared to typical plants of subspecies *pseudobaileyi*. Although the inflorescence in both subspecies is compound, the floral bracts in subspecies *yucatanensis* are rose

Figure 9. *Tillandsia pseudobaileyi* ssp. *yucatanensis* I. Ramírez, Carnevali & Olmsted, ssp. nov. (G. Carnevali et al. 4923, CICY).

(chart 2.5 R, a color between 8/4 y 7/8), and the petal are light violet to rose, while the stamens and style barely reach the corolla mouth. On the other hand, *T. pseudobaileyi* spp. *pseudobaileyi* has green floral bracts, sometimes "flushed blood red" (S. Gardner, 1986) and the petals are deep violet. These small, yet consistent, differences, associated with the disjunct distribution of both taxa, strongly argue in favor of nomenclaturally recognizing the vicariant Yucatan populations. *Tillandsia pseudobaileyi* subspecies *yucatanensis* resembles *T. baileyi* in floral bract color but it appears to be more closely related with typical *T. pseudobaileyi* on account of all other features.

Additional specimens examined: Mexico. **Campeche**: Municipio Champotón, carretera Champotón-Moquel, desvío por carretera de terracería a unos 4-6 km, ca. 19°83'00"N, 90°40'40"W, 0-50, selva baja inundable (tintal) con árboles como *Gymnopodium floribundum* Rolfe, *Acacia gaumeri* Blake, *Manilkara sapota* (L.) Van Royen, *Cameraria latifolia* L. *y Metopium brownei* (Jacq.) Urban, alta biomasa y diversidad de epífitas tanto orquídeas como *Tillandsia* spp., 5 June 1997, *G. Carnevali, F. May & M. Gómez 4463* (CICY). **Quintana Roo**: Municipio Othón Blanco, 3-4 km al oeste de Nuevo Progreso, unos 24 km al oeste de Graciano Sánchez (La Pantera), aprox. 19°04'30"N, 88°42'10" W, tintales con alta diversidad y biomasa de epífitas, incluyendo especies tales como *Tillandsia dasyliriifolia* Baker, *T. variabilis* Schltdl., *Rhyncholaelia digbyana* (Lindl.) Schltr., *Pleurothallis tikalensis* Correll & C. Schweinf., *Oncidium*

sphacelatum Lindl. y *Maxillaria tenuifolia* Lindl., 2 July 1997. *G. Carnevali, F. May & D. & L. Benzing 4534* (CICY); same locality, 4 February 1998, *G. Carnevali, R. Jiménez, M. Gómez, C. Espadas & D. Mondragón 4973* (CICY).

The table 1 features a comparison of the three entities of the Tillandsia baileyi complex along a series of diagnostic features.

Table 1. A comparison of *Tillandsia baileyi, T. pseudobaileyii ssp. pseudobaileyi*, and *T. pseudobaileyi ssp. yucatanensis*

Character	***T. baileyi***	***T. pseudobaileyi* ssp. *pseudobaileyi***	***T. pseudobaileyi* ssp. *yucatanenis***
Pseudobulb	Narrowly ovoid, 2 - 5 cm long	Ovoid-pseudobulbose, 4 - 5(-8) x 2 - 2.5 (-4) cm diameter	Ovoid-pseudobulbose, 2 - 2.5 diameter
Leaf number	4 - 8	10 - 12	6 - 8
Foliar sheaths; shape and dimensions	Ovate, 2-5 x 1.5-2.5 (-3.5) cm	Wide-ovate, 4 - 5 cm largo, 5 - 6 cm wide, inflate	Ovate, 3 - 4 (-5) x 2 - 3 cm, inflate
Inflorescence type	Simple, 4 - 9 cm long	Compound, 2 - 3 (-5) branches, rarely simple	Compound, (1) 2 - 3 branches
Spikes	4 - 10 cm long, 6 - 17 flowered	3 - 5 (-8) cm long 4 - 6 flowered	2 - 5 (-8) cm long (2) 4 - 6 flowered
Floral bracts	Roseate	Green or roseate, lepidote	Pink, lepidote
Stigma: exertion	Exerted above flower mouth, well above anthers	Above anthers	Barely exerted in flower mouth, along with anthers
Petals	Purple	Purple	Light purple to roseate
Capsule	4 cm long	2.5 - 3.5 cm long	2 - 4.5 cm long
Flowering time	April - May	January - March	February
Geographical range	Texas to Mexico (Tamaulipas), 0 - 1080 m of elevation	Pacific coast of Mexico (Jalisco, Nayarit, Chiapas) to Honduras and Nicaragua, 0 - 1500 m of elevation	Yucatan Peninsula (Campeche & Quintana Roo), 0 - 100 m of elevation

Ecological comments: *Tillandsia pseudobaileyii* ssp. *yucatanensis* is restricted to a particular, distinctive ecological association. It grows in a particular type of dwarf forests that grow at low points in the relief and thick, clayish soils accumulate. These soils remain flooded during several months each year, ranging from 6-7 months toward the south of the peninsula to 3-4 months in the northern portions of Yucatan. During of the rainy season, the clayish soils expand forming small mounds, while they dramatically contract at the peak of the dry season, breaking into thick chunks. These expansion-contraction cycles create an extremely hostile environment to root growth. This, associated with the

anaerobic conditions of the flooded soils, stunt tree growth. Thus, only a few tree species survive in these places, and they are usually low in stature (3-7 m tall), thus making the association to be known as low inundated forests. They are usually dominated by either "palo de tinte" (*Haematoxylon campechianus* L.: Caesalpinaceae) or by "pucté" (*Bucida buceras* L.: Combretaceae). The environment inside these forests is usually extremely humid and since trees are low and spaced, there is good light penetration, thus creating unexcelled conditions for epiphyte growth and diversity. These low inundated forests harbor the highest diversity and biomass of epiphytes in the Yucatan peninsula area, some "tintales" containing as much as 20-30 epiphytic taxa, a high figure for the epiphyte-depauperated Yucatan peninsula. *Tillandsia pseudobaileyi* ssp. *yucatanensis* is restricted to these associations in the southern portions of the states of Campeche and Quintana Roo, becoming reasonably common locally. It always grows as scattered, isolated individuals in low, shady positions on the phorophytes. Other distinctive epiphytes that grow along with *T. pseudobaileyi* ssp. *yucatanensis* include Bromeliaceae such as *Tillandsia brachycaulos* Schlechtendal, *T. bulbosa* Hooker, *T. dasyliriifolia* Hook., *Tillandsia variabilis* Schlecht., and Orchidaceae such as *Campylocentrum poeppigii* (Reichb. f.) Rolfe, *Encyclia alata* (Batem.) Schltr., *E. belizensis* (Reichb.f.) Schltr., *E. bractescens* (Lindley) Hoehne, *Maxillaria crassifolia* (Lindley) Reichb. f., *Notylia orbicularis* A. Rich & Gal. ssp. *orbicularis*, and *Rhyncholaelia digbyana* (Lindley) Schltr.

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The International Flower Trade Show 1999

Eric Gouda[1]

The 37th International Flower Trade Show in Alsmeer, the Netherlands (NL) clearly demonstrated the growing importance of bromeliads in the floral industry. The trade show was held from November 3 through November 6, 1999 and bromeliads were an important component of many displays. Many bromeliads were distributed over a few dozen stands of participants. Nine bromeliad nurseries were listed in the list of participants.

You would have discovered that many exceptional new plants have been introduced during the last 10 years or so. These were the result of many years of hybridization and selection. Many Dutch house and pot plant nurseries showed beautiful aechmeas, neoregelias, vrieseas, guzmanias and tillandsias, that originated from specialized nurseries such as Corn. Bak from the Netherlands and Deroose Plants and Exotic Plant nv, both in Belgium.

Prize results from the show were: a first prize for Deroose Plants and BVBA - Evergem for their total entries of Bromeliaceae with a score of 9.90 (second best total score). They showed some very spectacular and colorful compositions of all kinds of Bromeliaceae inflorescences (see figures 10 and 11). Beside all the hybrids and cultivars we also found a very nice *Aechmea nidularioides* in flower (figure 12.)

A first prize was given for very large clumps of *Neoregelia schultesiana* 'Fireball Margin' entered by Andre Alderden, Rijsenhout NL with a score of 9.80. A second prize for *Neoregelia* 'Madame van Durme' entered by Toon Kuipers BV, De Kwakel NL (who also showed some beautiful *Aechema chantinii*) with a score of 9.75. A third prize was awarded for Vriesea 'Carly' from Bunnik Vriesias, Kudelstaart NL, with a score of 9.70

The show, which is a meeting point for all kinds of plant and flower growers, attracts about 55,000 visitors, about half of them from abroad. Nearly 500 participants from almost 40 countries presented the complete range of flowers and plants, parental material, the newest cultivation techniques and specialized services, representing every link in the chain from breeder right through to retailer.

Utrecht University Botanic Gardens

[1]Curator, Utrecht University Botanic Gardens

Figure 10: A floral display by De Roose Nurseries composed of bromeliad inflorescences at the 1999 International Floral Trade Show.

Figure 11. Another De Roose display at the Aalsmeer show.

Figure 12. *Aechmea nidularioides*

Figure 13. *Aechmea chantinii*

Affiliates in Action

Gene Schmidt

The October meeting of the Bromeliad Society of South Florida was quite festive, thanks to the surprise celebration of the 40th birthday of the BSSF. The board, spurred on by Ergo Gonzalez, had anniversary patches made for all in attendance. Nat DeLeon, one of the founding members, was presented with a crystal award thanking him for his 40 years of service to the BSSF. Nat has played an active role in the society and is generous with his knowledge and suggestions. It was appropriate that this special occasion was enhanced by a speaker of the caliber of Pam Koide. Pam and her partner operate Bird Rock Tropicals in southern California. Congratulations to the BSSF for their efforts to maintain an atmosphere of strong bromeliad society growth and for their longevity! There was also news from the BSSF concerning the dedication of an Epiphyte Tree in the memory of Frank Sherman at the Fairchild Tropical Garden on October 31st. Family and friends of Dr. Sherman were joined by two dozen BSSF members to view an epiphyte tree created by Craig Allen, conservatory manager. He used many of Dr. Sherman's bromeliads to cover the branches of the tree, and many of the larger bromeliads in Dr. Sherman's collection are distributed throughout the Garden. It is a fitting memorial for a man who loved all plants, and for whom Fairchild Tropical Garden was a favorite spot. *(The Bromeliadvisory, Dec. '99, Vol. 42, #11, BSSF)*

The Bromeliad Society of New South Wales would like to thank Dennis and Joan Georgeson for sponsorship of a new trophy in memory of Don Percival. The trophy is to be known as the Don Percival Memorial Trophy and is to be presented for 'Best Billbergia in Show'. *(Bromeliad Newsletter, Oct. '99, Vol. 17, #10, Bromeliad Society of New South Wales, Inc.)*

Continuing development of the Mount Coot-tha Botanic Gardens (Queensland, Australia) includes a large area for display of bromeliads in natural surroundings. Thanks to the efforts of President Bob Cross and the Gardens' Curator Ross McKinnon, a brand new amphitheater setting has been given to the Bromeliad Society of Queensland to plant. Located on the side of a small hill, the terraced site is ideal for bromeliads as it has perfect drainage and dappled light all year round. On September 25th, about 30 members enjoyed a sausage sizzle breakfast before proceeding to plant 180 bromeliads they had donated to the project. *(Bromeliaceae, Sept./Oct. & Nov./Dec. '99, Vol. 32, #5 & #6, Bromeliad Society of Queensland, Inc.)*

The Bromeliad Hat Competition sponsored by the Bromeliad Society of New Zealand and past editor Andrew Flower had two winners. Norma Cook from Awhitu and Audrey Hewson of Tauranga will both receive first prize. If only you could see the picture of the winning hat which accompanied the article! *(Journal, Nov. '99, Vol. 39, # 9, Bromeliad Society of New Zealand, Inc.)*

Duluth, Minnesota

Geoffrey Charles Johnson, 1952-2000

Geoff Johnson died on the 4th of February of coronary problems.

Geoff was a director of the Bromeliad Society, International for the 1993-1995 term but was known even more widely for having worked with his mother Carol as owners and operators of the Pineapple Place bromeliad nursery in Longwood, Florida.

Their nursery became well known as a major source of species, in contrast with other growers who specialize in hybrids. Their collection included species collected in at least seven countries of the Caribbean, Mexico, and South America as well as more commonly grown bromeliads. The Pineapple Place was frequented by experienced professional growers, armchair collectors, fanciers from Europe and South America who just happened to be in the area. All were welcomed; every visitor got the full tour with running commentary.

While the structure of the BSI and the efforts of the officers and committee chairmen are important, it is the work of knowledgeable, enthusiastic, and articulate growers that promote interest in bromeliads. Geoff was certainly one of those. He spoke to individuals who came to visit, to admire, and to buy. He frequently was invited to talk with (address is too formal a description) groups of society members in Florida and other states. You could depend on finding Geoff presiding over an enviable display of plants at regional bromeliad shows and the biennial World Bromeliad Conferences.

Geoff was most recently both editor and treasurer of the Florida Council of Bromeliad Societies. He was a leader in the Seminole Bromeliad Society, but he was also the mainstay of the Bromeliad Society of Central Florida. He accepted the opportunities to serve the bromeliad cause and worked hard to produce results.

We shall miss his beaming smile, his self-deprecating manner, his recently adopted close-cropped haircut, his uncritical, outgoing manner.

The Johnson Family in recent months has suffered the deaths of Carol, James, and now Geoff.- - - TUL

Photograph courtesy of the Johnson family

Figure 14. Geoffrey and Carol Johnson at Pineapple Place Nursery

Introducing: *Aechmea contracta*

H.E. Luther[1]

Even though it appears to have been in cultivation for at least 30 years, *Aechmea contracta* has never been illustrated in color in this journal. The recent flowering of an exceptionally attractive clone at Selby Gardens seems to be cause enough to rectify that situation, but first a little history.

Drawing by B. Culbertson

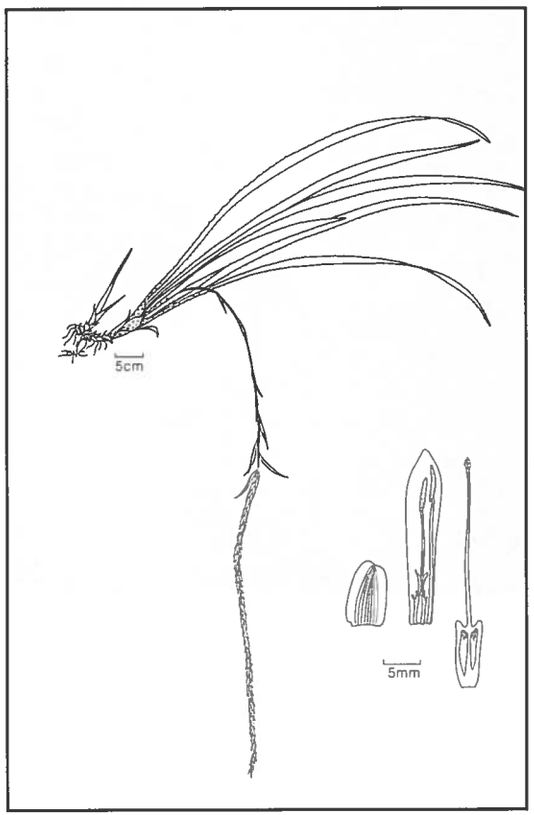
Figure 15. *Aechmea contracta*. Habit and flower detail

Aechmea contracta was originally collected in eastern Colombia in 1820 and was described as a species of *Billbergia* ten years later. In 1879 it was transferred to *Aechmea*. Since then it has been allied with various groups within *Aechmea s.l.*, most recently within the subgenus *Platyachmea* (the *A. chantinii* group), by Smith and Downs (1979). This subgenus was bumped to genus level by Smith and Kress (1990), but the latter classification has received virtually no support and, indeed, *Aechmea contracta* does not seem particularly related to *A. chantinii* but is very similar in many features, both vegetatively and florally, to a group of taxa that includes *A. abbreviata, roeseliae, brevicollis and angustifolia.*

Aechmea contracta has a wide distribution in northern and western Amazonia from Guyana and Venezuela to Brazil and Peru. The first living collections known to the writer were introduced by George Bergin sometime in

[1]Director, Mulford B. Foster, Bromeliad Identification Center, Marie Selby Botanical Gardens, 811 South Palm Ave., Sarasota, FL 34236 USA

the early 1970's from near Leticia, Colombia. At least one of his clones has attractive, spotted foliage and often produces an extremely elongate simple inflorescence (Figure 15). A decade or so later, a somewhat smaller and unmarked plant was collected in Peru by Carol Johnson. The most impressive collection, at least from a horticultural point of view, is one by Jose Manzanares who found this plant in eastern Sucumbios Province, Ecuador in 1997. A division of this plant was obtained by John Anderson of Corpus Christi, Texas who donated a plant to the research collection at Selby Gardens. The photo (Figures 16) depicts this plant. The compact, more or less upright inflorescence is unique and I encourage Señor Manzanares to give the plant a cultivar name.



Photograph by Vern Sawyer

Figure 16. *Aechmea contracta*. A new collection from eastern Ecuador flowering at the Marie Selby Botanical Gardens.

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Marie Selby Botanical Gardens,
Sarasota, Florida

Bromeliads: Biodiversity Amplifiers

Carlos Frederico D. Da Rocha, Luciana Cogliatti-Carvalho, Danielle R. Almeida & André Felippe Nunes De Freitas

In Nature the presence of an organism in an ecosystem always provides an opportunity for the survival of other species. For instance, members of a certain species living in a given ecosystem allow their predators to become established also. Many animals are hosts to parasites that live inside (endoparasites) or outside (ectoparasites) their bodies. Likewise, a plant species provides a microhabitat where other species find shelter and feed on plant tissues (these are called herbivores -- those which feed on plant leaves or sap). Studies have shown that the more branches, twigs and leaves a plant has, the greater is its "architectural complexity" and therefore the more organisms that find shelter, food and mates there.

Thus we see that each organism in an ecosystem provides a chance for other species to exist and that biodiversity will be greater or smaller, depending on how many species that organism can support.

Accordingly, we can conceive of the importance of bromeliads as organisms that act as true amplifiers of biodiversity in an ecosystem. Two characteristics of bromeliads are responsible for this: the complex and heterogeneous architecture of the plant and the ability of most species to collect water in the tank. The complex architecture of bromeliads offers a wide range of microhabitats for organisms to find the necessary conditions for their survival. These organisms use the bromeliad in a variety of ways depending on their needs. Many animals seek shelter in bromeliads from predators or from the harsher weather outside the plant. Many invertebrate species are part of the bromeliad fauna, and live their whole life cycle, or part of it, inside these plants. Some vertebrates such as lizards and frogs find refuge from predators. Of course, since bromeliads attract a large number of organisms, many predators, like some snakes, also search here for their prey.

Furthermore, the water accumulated in the bromeliad tank is a vital resource for many animal and plant species. Several invertebrates, such as dragonflies and beetles, or even some vertebrates, such as frogs, depend on the tank water as a place to lay eggs and where larvae can grow and complete their life cycle. Several other animals (small mammals such as marsupials and rodents) depend on the water stored in forest bromeliads to maintain a balanced metabolism.

The humidity found inside bromeliads is very important not only to animals but to some plants as well. Seeds that fall inside a bromeliad during dispersal find more favorable conditions for germination and development as seedlings than in the drier environment outside the plant. This happens quite

frequently, especially in habitats where water is scarce and is concentrated inside the bromeliads, as in some coastal plain environments (restingas). Here, seed germination is rarer on the sandy soil than inside the bromeliads; these soils are poor in nutrients and exposed to high temperatures because of the sun shining on the sand. So it's easy to find seedlings growing inside many terrestrial bromeliads in forests and restingas.

However, it is not only in the water of the bromeliad tank or among its leaves that other organisms live or find resources. Bromeliad flowers and their nectar draw a wide range of pollinators that find nutrition here. So flowering bromeliads are an important source of food for pollinators such as bees, wasps, moths, butterflies and hummingbirds, among others. Organisms such as acarids also complete their life cycle in these flowers. Bromeliad flowers are a refuge for many acarid species that use the beak and nostrils of pollinating hummingbirds as a means of transportation from one flower to another in search of mates (Colwell, 1988). This relationship is so specialized that the flowers of one bromeliad species have only one acarid species. Although a humming bird pollinates the flowers of many different bromeliad species and therefore carries many acarid species in its beak and nostrils, each acarid gets off at the appropriate bromeliad species to find its mate and reproduce.

Of course, a relationship so specialized has taken thousands of years to evolve, but all can be lost in a few days when bromeliads are lost to forest destruction.

Recent estimates from scientific studies give an idea of how important bromeliads are to the environment where they live. One of these studies estimated that an impressive two million liters of water are stored inside the tanks of just one bromeliad species (*Vriesea neoglutinosa*) in an 210 hectare (520 acres) area of restinga in the state of Espirito Santo (Alves et al., 1996). This estimate leads us to imagine how many other life forms would be lost if this water were to vanish with the destruction of bromeliads. Another study estimated that there are nearly 104,000 bromeliads in each hectare (2.4 acres) of Atlantic forest. If we estimate conservatively that each bromeliad may hold some 50 organisms of different species (disregarding those that are aquatic or microscopic) then every hectare of forest would have at least 5,200,000 organisms living inside bromeliads. Furthermore, if we consider the thousands of microscopic beings that live in the water of the bromeliad tank and in its flowers, this number would swell to hundreds of millions of organisms. Suppose that we now add the animals that seek out bromeliads in search of drinking water or as a thermo-regulatory site or to find prey. The result would be that a considerable portion of ecosystem biodiversity depends on bromeliads for survival, making bromeliads key players in the ecosystem.

Thus we can imagine the huge amount of life that is lost when the bromeliads of a habitat are destroyed because the bromeliads act as amplifiers and multipliers of local biodiversity. Biodiversity is one of Brazil's greatest

riches, but, at the same time, preservation of this wealth is one of the biggest challenges we face today.

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Ecology Sector, DBAV, Biology Institute, Rio de Janeiro State Universtiy

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Elton Martinez Carvalho Leme named Honorary Trustee

The BSI Board of Directors has voted to honor Elton M.C. Leme by naming him as an Honorary Trustee of the Bromeliad Society International.

Elton M.C. Leme has been one of the most active scientists in the bromeliad world in recent years, having described approximately 250 new species, many of them on the pages of the JOURNAL OF THE BROMELIAD SOCIETY. He has authored or co-authored more than 55 articles printed in the JOURNAL, including the description of two new species in this issue. Only Mulford B. Foster, Harry Luther, Victoria Padilla, Werner Rauh and Lyman B. Smith have published more articles in the JOURNAL'S 50-year history. He has written and published three wonderful books about the bromeliads of Brazil's Atlantic Rain Forest and a fourth, the long-awaited revision of the genus *Nidularium*, will be available very soon.

Elton has been a featured speaker at three of the World Conferences. He is a passionate conservationist and a powerful voice in the movement to preserve Brazil's magnificent bromeliad flora. Until recently, he has also been the editor of the Brazilian bromeliad journal BROMÉLIA. It is even more amazing that all of this has been accomplished while holding down a full time job as a Judge in the State of Rio de Janeiro's judicial system, and prior to that, as a Public Defender for the State of Rio de Janeiro....CHB

Cultivar Corner

Derek Butcher

As the newly appointed Registrar of Bromeliad Cultivars, I'd like to take this opportunity to introduce myself and pass along some information on the Cultivar Registry and on registering bromeliads.

My name is Derek Butcher of 25 Crace Rd, Fulham, 5024, South Australia, Australia. E-mail tillands@senet.com.au

Thanks primarily to Don Beadle, the previous Registrar, I have a computer Data Base which is held in the USA but which I can access and amend from here in Australia. This is the same base that was used to print the Bromeliad Cultivar Registry in 1998. I have established the following goals for my tenure in office.

BROMELIAD CULTIVAR REGISTRY

The printed version of this registry can be obtained from the Publications Chair, Pamela Koide, whose address can be found in the publications advertisement in the back of this issue of the JOURNAL. While the registry is not available to you in its current computerized form, I am planning to have the photographs on the BSI web site of all the registrations which previously had been unavailable to members except for those that had been reproduced on the JOURNAL pages.

BROMELIAD CULTIVAR REGISTRY UPDATES

Every two years I intend to provide an update that will be on the BSI web site so that you can print it to update your own copy of the Bromeliad Cultivar Registry 1998. I expect to have the first list available in June 2000 to coincide with the San Francisco World Conference

NOTICE TO HYBRIDISTS

The catch-phrase is *quality not quantity*! Bromeliads are naturally promiscuous and fecund and we all have a responsibility to weed out inferior forms and grow the better ones. If in doubt, put it in the trash bin! Remember also that if a plant is good enough to grow, then it is good enough to be given a registered name. Please check the Registration form on the BSI web site. This can easily be printed for as many copies as you want. If you do not have internet access, drop me a note at the address above and I'll mail a copy to you.

NOTICE TO AFFILIATE SOCIETIES

We know the problems that occur when you have a plant of show quality but which has a grex formula, or a name not found in the Bromeliad Cultivar Registry. An example of grex formula is *Aechmea* (*recurvata* x *chantinii*). You don't know whether it is acceptable - according to the rules! Why not take a photograph and give me as much detail as possible (and a new name instead of the grex formula) and I'll put it in the Bromeliad Cultivar Registry. This way we will be capturing the better class cultivars for posterity. We must also stress to hybridists for *quality not quantity* and hope that we can work ourselves out of the myriad of say, inferior unnamed *Neoregelia* hybrids that should have been culled years ago.

Also, remember that a man-made hybrid is a cultivar but a cultivar is not necessarily a hybrid because it can also be a cultural form of a wild species.

Fulham, South Australia

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.

Robert Adams
Judy Agostinelli
Juliet Anderson
Roy Bath
Roberta Bohdan
Randy Bowser
Bromeliad Society of Japan
Nancy Brown
Trevor Brown
Heather Burch
James Bush
Isabella Canella
Kazuko Carpenter
Richard Carter
Naomi Ceniza
Robert Chang
Dotty Christiansen
Gregg Clark
Marquetta Collie
Dot Cooper
George Coulam
Eloise De Paulis
Jose De Senna
John Domenie
Kerry Downs
Takahisa Endo
Herbert Fishman
Jeffrey & Sara Fox
Roberta Goldman
Bonnie Good
Penrith Goff
Amy Graham
Marian Hamby
William Hamilton
Rosemary Hanna
D. Harrison
Eileen Hart
Dorothy Howson
Mr. & Mr. James Hunter
Emilia Koumans
Lois Kruger
Bill Kurtz
Catherine Lane
T.S.G. Lee
Joseph Link
Tanya Lodriguss
Emilia Luna
Henry & Miranda Maliborski
Ed Malmgren
Nancy Mangieri
Sallee Matson
Carol McMorrow
Nancy Megill
Bob Middlebrook
Bryan Mose
Donald & Helen Nores
Peggy Norton
Paradise Nursery
Rodrieo Ospina
Michael Pascall
Susan Phillips
Simon Pierce
Valerie Pinder
Stephen Preston
Brian Ransom
Gordon Roberts
Elizabeth Rukscin
Donald Rumkunas
Ann & Erik Schonberg
Noriyuki Seki
Lisa Severino
Florian Skomski
Lorraine Slatkin
Nai Smith
David Snyder Jr.
Jeannine Steinmetz
Siegrid Stern
Mary Tan
Robert Terhune
Grant Tychonenko
Luis Tonizzo
Zenaida Toquero
Hortensia Viera
Adriana Villalobos
Marc Walters
Karen Whorrall
Margo wiedenroth
Florence Williams
Cynthia Wroblowsky
Wellington Tillandsia Study Group

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.

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Bromeliad Soc. Central Fla.
Bromeliad Soc. South Fla.
Bromeliad Soc. of Japan
Lolita Brooks
Caloosahatchee Bromeliad Soc.
Catherine Campbell
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Trixie Clarke
Anne Collings
Anita Cooper
William Davis
Nat De Leon
Helen Dexter, MD
Mark Dimmitt
W. Dole
Dana Field
Roberta Fine
Melvin First
Jean Fishbuene
Virginia Gage
Gainesville/Jacksonville Soc.
Robert Germer
Betty Girko
Grace Goode
Karl Green
Tierney Grinavic
Fay Hagan
Willard Hartman
Alexander Holmes Jr
Houston Bromeliad Society
Beverly Johnsen
James Jones
Dale Kammerlohr
May Kaneshiro
Bruce Katz
B. Keith
Carl Kocher
Frances La Mar
Roger Lane
Eloise Lau
Michael Lee
Leopoldo Leon
George Long
Verdia Lowe
John Mareing
Leonard Maudens
Bruce McCoy
Sylvia Méluzin
James Millar
Thomas Moran
Hugh Mozingo
Craig Murray
Pat Niemeyer
Geoffrey Nicholson
Joseph Ondrejko
Bird Peddicord
Januario Pehnk
Jack Percival
Rand Plewak
Betty Prevatt
Alayne Richards
Betty Rogers
Jurg Rutschmann
San Diego Brom. Society
San Francisco Brom. Soc
Sarasota Bromeliad Soc.
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Joseph Scott III
Joanna Smith
Louis Spielman
Evelyn Stemler
Alexander Stoddart
Herb Stone
Tarrant County Brom. Soc
Robert Terhune
James Thurrott
Bill & Connie Timm
Andy Trevino
Peter Tristram
Tropiflora Nursery
Darrel Wall
Ronald E. Walters
Adeline Wance
Maria Das Wanderley
Peter Waters
David Whipkey
Charles Witmore
Kenneth Woods
Robert Wright
Carol Wujcik
Ervin Wurthman
Charles Zimmerman

Donations may be made by check or international money order payable to THE BROMELIAD SOCIETY INTERNATIONAL. They may be mailed to Membership Secretary Carolyn Schoenau, P.O. Box 12981, Gainesville, FL, 32604; the editor, Chet Blackburn, 720 Millertown Rd., Auburn, CA 95603, or to treasurer Clyde Jackson, 21 Sherwood, Dayton TX 77535.

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.

A JOURNAL First. *Tillandsia* 'Aristocrat', a John Arden Hybrid, is a cross between *Tillandsia ionantha* and *Tillandsia bourgaei*. The cross was made in February-March 1979 and produced its first inflorescence in 1997 - almost 18 years later!

The plant is unique in its unusual parentage and also has the distinction of being the subject of the first photographic image transmitted to the Journal electronically. George Allardia forwarded the image and several more of John Arden's hybrids in February 1998. Not only did the plant take a long time to come into bloom, it has also taken a long time to make its appearance in the JOURNAL'S pages.

Calendar

6-7 May	The La Ballona Bromeliad Society Show & Sale will be held in conjunction with a cactus & succulent society sale at the Veteran's Memorial Building, 4117 Overland (at Culver), in Culver City, California. Hours are 12-5 on Saturday & 10-4 on Sunday. Admission is free. For information call 310-822-1783.
6-7 May	Annual Sarasota Bromeliad Society Show and sale, "Bromeliad Magic", with exhibits, sales, food, rare plant auction at Selby Botanical Gardens, 811 S. Palm Ave., Sarasota Fl. Hours are 10 a.m. to 4 p.m. For information call 941-366-5731 ext. 10.
12-14 May	The Bromeliad Society of Central Florida will hold its 25th annual Mother's Day Show and Sale at the Florida Mall, 8001 S. Orange Blossom Trail in Orlando, Florida. Hours of this BSI standard judged event are 10 a.m. to 9 p.m. on Friday & Saturday, and noon to 6 p.m. on Sunday. Contact: Eloise Beach, 407-886-8892 or Betsy McCrory at 407-348-2139.
May 20-21	The Greater New Orleans Bromeliad Society will hold its annual standard show at Lakeside Mall, Veterans & Causeway Blvds., in New Orleans. Show hours are 1 to 6 p.m. on Saturday and 11 a.m. to 4 p.m. on Sunday. For information call Carol Hertz at 504-486-8190 or Fred Ross at 504-891-9301.
10-11 June	The River Ridge Bromeliad Society will hold its annual show and sale at the Esplanade Mall, 1401 W. Esplanade Ave., Kenner, LA. Sale hours are 10 a.m. to 9 p.m. Saturday & noon to 6 p.m. Sunday. Show hours are 1-9 p.m. on Saturday and noon to 6 p.m. on Sunday. Contact Al Alcock at 601-799-4813
26 Jun -5 Jul	The Bromeliad Society International will commemorate its 50th anniversary at the World Bromeliad Conference to be held at the Hyatt Regency Hotel in San Francisco, California. Tours, seminars conducted by leading bromeliad authorities from around the world, competitive show, sales of plants and other items, banquet, rare plant auction, social gatherings, and educational displays.