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Cover photographs. Front: *Orthophytum toscanoi*, described herein on page 23, was flowered and photographed in cultivation by Elton Leme, who is also the author of this new species. Back: A few of the attractive hybrids made by Mark Dimmitt of Arizona using *Tillandsia albertiana* as one of the parents. See article on page 25. Photographs by Mark Dimmitt.

FEATURE ARTICLES

BROMELIAD SOCIETY BUSINESS AND NEWS

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Two New Species of *Aechmea* from Bahia, Brazil

Elton M.C. Leme[1] & Harry E. Luther[2]

Field research in the Bromeliaceae for the state of Bahia reveals that there are several endemic or nearly endemic species complexes of *Aechmea* in the broad sense. One, described by Leme as the "southern Bahia complex" (Leme 1997a, Leme 2000) bridges the gap between *Aechmea* and *Canistrum*. The following two taxa are members of another assemblage, not quite endemic, treated most recently in the journal in a review of *Aechmea bicolor* (Leme 1997b).

Aechmea andersoniana Leme & H. Luther, sp. nov. **Type:** Brazil. Bahia: Wenceslau Guimarães, Boa Esperança, 25 July 1998, *E. Leme & R. Alves 4365* (HT: HB).

> A *Aechmea bicolor* L.B. Sm, cui affinis, foliis subcoriaceis, laminis foliorum angustioribus, distincte canaliculatis, apice acuminatis, marginibus basin versus integris, bracteis floriferis apice acuminato-caudatis, sepalis longioribus, petalis longioribus, acutis vel subacutis, exapendicullatis differt.

Plant epiphytic, stoloniferous, stolons suberect, ca. 6 cm long, ca. 0.6 cm diam. ***Leaves*** ca. 15 in number, subcoriaceous, suberect, forming a narrow funnelform rosette, equaling to exceeding the inflorescence; ***sheaths*** elliptic, ca. 8 × 4.5 cm, wine colored mainly inside, densely and inconspicuously white-lepidote on both sides; ***blades*** linear, acuminate, apically pungent, 14-30 × 1.4-1.7 cm, distinctly canaliculate, entire toward base, laxly and irregularly spinulose near the apex, spines less than 0.5 mm long, inconspicuously white-lepidote on both sides, green. ***Scape*** erect, slender, ca. 20 cm long, ca. 0.3 cm diam., subdensely white-lanate when young; ***scape bracts*** linear-lanceolate, acuminate, 18-25 × 3-4 mm, membranaceous, erect, shorter to slightly exceeding the internodes, exposing the scape, entire, pale greenish-white to pale stramineous, nerved, inconspicuously white-lanate. ***Inflorescence*** simple, subdensely cylindric, 5.5-7 cm long, ca. 2.5 cm diam.; ***floral bracts*** lanceolate to narrowly triangular, acuminate-caudate, membranaceous, yellowish to pale stramineous, sparsely lepidote to glabrous, 6-15 × 4-5 mm, the lower ones equaling to slightly exceeding the sepals, the upper ones distinctly shorter than the sepals to equaling the ovary. ***Flowers*** 30 to 60, ca. 20 mm long, sessile, polystichously arrranged, suberect, anthesis diurnal, odorless; ***sepals*** ovate, ca. 7 × 4 mm, strongly asymmetrical, the lateral wing rounded, membranaceous, bearing at apex a slender 1 mm long mucro, connate for ca.

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Photograph by Elton Leme

Figure 1. *Aechmea andersoniana*, named in honor of John Anderson of Corpus Christi, Texas.

Photograph by Elton Leme

Figure 2. *Aechmea viridostigma.*

Photograph by Elton Leme

Figure 3. Closeup of *Aechmea viridostigma.*

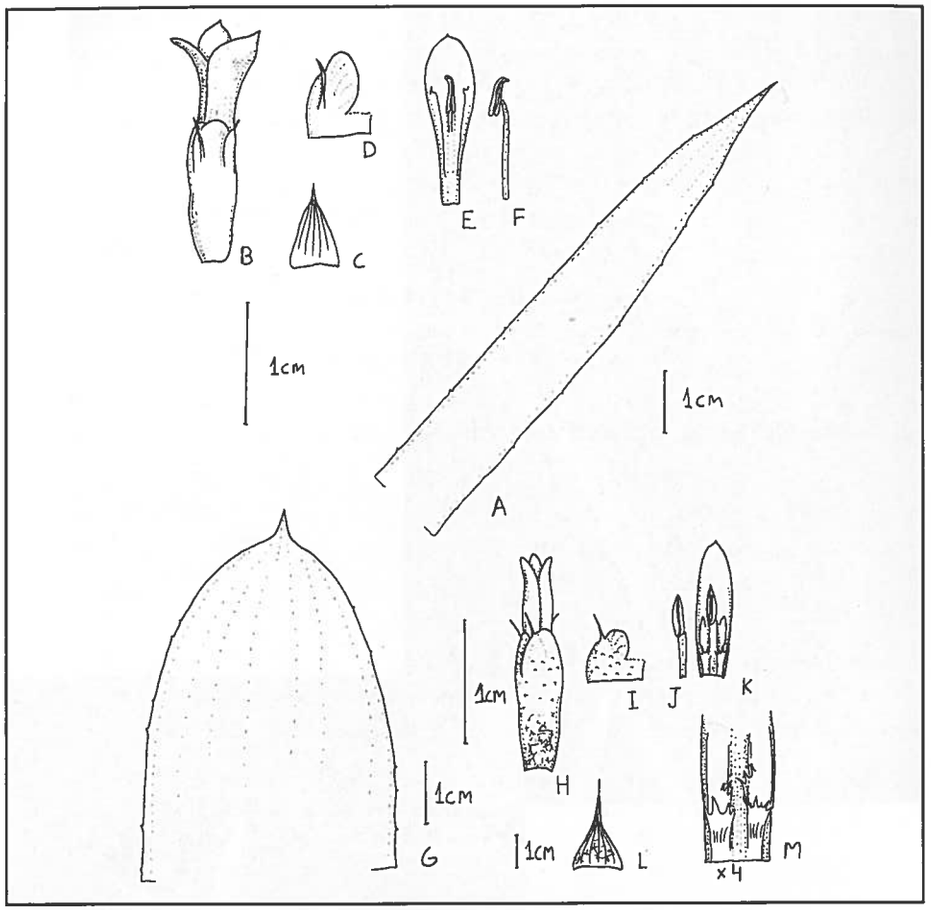

Figure 4. A-F: *Aechmea andersoniana*. A. Leaf apex. B. Flower. C. Floral bract. D. Sepal. E. Petal. F. Antesepalous filament. G-M: *Aechmea viridostigma*. G. Leaf apex. H. Flower. I. Sepal. J. Antesepalous filament. K. Petal. L. Floral bract. L. Detail of petal appendages.

2 mm, ecarinate, glabrous, yellow; ***petals*** narrowly subspatulate, acute to subacute, suberect at anthesis, ca. 14 × 4 mm, free, white, without any appendages, bearing 2 conspicuous callosities which equal the filaments; ***stamens*** included; ***filaments*** the antepetalous ones adnate to the petals at base for ca. 6 mm, the antesepalous free; ***anthers*** sublinear, base saggitate, apex acute, slightly recurved, ca. 3 mm long, fixed near the middle; ***stigma*** conduplicate-spiral, ellipsoid, greenish-yellow, blades inconspicuously crenulate; ***ovary*** broadly obconic, terete, ca. 6 mm long, ca. 5 mm diam., yellow; epigynous tube ca. 1 mm long; placentation apical; ovules obtuse. ***Fruits*** ovoid, 7-8 × 6-7 mm, black when ripe.

Paratype: Clone of the plant from which the holotype was made, flowered in cultivation, *H.E. Luther s.n.* 3 Sep. 2002 (SEL).

This new species is morphologically related to *Aechmea bicolor*, but differs from it by its subcoriaceous leaves (vs. coriaceous), leaf blades narrower (1.4-1.7 cm vs. ca. 2.5 cm), distinctly canaliculate, apex acuminate (vs. acute with a thick pungent apical cusp), margins entire toward base (vs. laxly spinulose), floral bracts with apex acuminate-caudate (vs. acute to acuminate), sepals longer (ca. 7 mm vs. ca. 5 mm), petals longer (ca. 14 mm vs. ca. 9 mm), acute or subacute (vs. emarginate), and without any basal appendages (vs. bearing lacerate appendages).

Aechmea andersoniana was found in a well preserved area of Atlantic Forest, where it grows epiphytically at about 800 m elevation, sharing the same microhabitat with other very recently discovered bromelioids, including *A. glandulosa* Leme, *Araeococcus montanus* Leme, *Canistrum gusmanioides* Leme, and *Ronnbergia neoregelioides* Leme.

As announced during the St. Petersburg World Bromeliad Conference, this new species is named after the well-known bromeliad enthusiast and *Aechmea* hunter, John Anderson, from Corpus Christi, Texas. Mr. Anderson has greatly contributed to the bromeliad world in general and to the Bromeliad Society International in particular.

Aechmea viridostigma Leme & H. Luther, sp. nov. **Type:** Brazil, Bahia: Ibicuí-Nova Canaã, Serra da Boa Vita, field collected Apr. 2001 by *Edmundo Silva s.n.*, flowered in cultivation Aug. 2002, *E. Leme 5136* (HT: HB).

> Species nova a *Aechmea bicolor* L. B. Sm. affinis, laminis foliorum latioribus, inflorescentia composita, rache viridi, sepalis longioribus, petalis sublinearibus, longioribus angustioribusque, apice acutis, stigme viridi differt. A *A. burle-marxii* E. Pereira, cui proxima, laminis foliorum marginibus subintegris vel sparse spinulosis, inflorescentia solum 4.5-6 cm longa, ramulis lateralibus minus numerosis et manifeste brevioribus, sepalis mucrone longioribus, petalis per anthesim erectis vel suberect, stigme viridi differt.

Plant epiphytic, flowering ca. 45 cm tall. ***Leaves*** ca. 8, rosulate, suberect, subcoriaceous, forming at base a narrowly funnelform rosette; ***sheaths*** elliptic, 7-8 × 5 cm, densely and minutely pale lepidote on both sides, adaxially slightly purple toward apex; ***blades*** linear, 32-40 × 3.8-4.3 cm, green, densely white-lepidote abaxially, subdensely and inconspicuously white-lepidote to glabrescent adaxially, apex acute to broadly acute and apiculate, apiculus ca. 4 mm long, margins subentire to laxly and remotely spinulose, spines less than 0.5 mm long. ***Scape*** erect, slender, ca. 31 cm long, ca. 0.4 cm diam., green, sparsely white-lanate to glabrous; ***scape bracts*** lanceolate, acuminate, 35-37 × 7-10 cm, green, remotely spinulose to entire, sublanate near the base, white-floccose toward apex, thin in texture, erect, equaling to slightly shorter than the internodes and not completely hiding the scape. ***Inflorescence*** shortly paniculate, bipinnate, erect, 4.5-6 cm long, 3-4 cm diam., rachis 2-3 mm in diam., sparsely white-lanate, green; ***primary***

bracts shorter to slightly exceeding the branches, narrowly lanceolate, slenderly acuminate, 15-25 × 3-4 mm, entire to subentire, thin in texture, suberect, green, white-floccose, trichomes fimbriate; ***branches*** ca. 2, subspreading, ca. 20 mm long (including the petals), ca. 2-flowered, basal peduncle inconspicuous, 2-3 mm long, ca. 2 mm in diam., green, white-floccose, rachis very short and inconspicuous; ***floral bracts*** with an ovate-triangular base and a long and slender spinescent-caudate apex, membranaceous, greenish at base and yellowish toward apex, nerved, entire, inconspicuously and sparsely white-sublanate, about equaling the ovary, ecarinate, ca. 5 mm long, ca. 3 mm wide at base. ***Flowers*** sessile, 17-18 mm long, odorless, subdensely and polystichously arranged, those of the branches nearly distichously arranged; ***sepals*** 6-7 × 3-4 mm (including the apical mucro), strongly asymmetrical with the lateral membranaceous wing rounded and distinctly surpassing the midnerve but shorter than the apical, ca. 2 mm long mucro, connate at base for ca. 2 mm, greenish-yellow to yellow, ecarinate, sparsely white-lepidote toward base, trichomes fimbriate, inconspicuously verrucose at base; ***petals*** sublinear, acute, 11 × 2.5-3 mm, free, white, erect except for the suberect apex at anthesis, bearing 2 appendages at base, 2-2.5 mm long, at apex irregularly digitate-denticulate, as well as 2 distinct longitudinal callosities 5-6 mm long; ***filaments*** ca. 6 mm long, the antesepalous ones free, the antepetalous ones basally adnate to the petals for 3-4 mm; ***anthers*** ca. 3 mm long, dorsifixed near the middle, base obtuse, apex apiculate; ***stigma*** conduplicate-spiral, elliptic, blades ca. 2 mm long, green, very shortly crenulate to subentire; ***ovary*** ca. 6 mm long, terete, yellow, sparsely white-lepidote, trichomes fimbriate; epigynous tube ca. 2 mm long; placentation apical; ovules obtusely apiculate. ***Fruits*** unknown.

Aechmea viridostigma is closely related to *A. bicolor* but can be distinguished by the leaf blades broader (3.8-4.3 cm vs. 2.5 cm), inflorescence compound (vs. simple), rachis green (vs. yellow), sepals 6-7 mm long (vs. 4 mm long), and by the petals sublinear (vs. narrowly obovate), longer and narrower (11 × 2.5-3 mm vs. ca. 9 × 4 mm), and the apex acute (vs. emarginate). *Aechmea viridostigma* is morphologically related to *A. burle-marxii*, but differs by having the leaf blades with margins subentire to sparsely spinulose (vs. densely spinulose toward apex), relatively short inflorescence (4.5-6 cm long vs. 12-20 cm), and with a reduced number of lateral branches which are distinctly shorter, as well as by the sepals with a longer apical mucro (ca. 2 mm vs. ca. 1 mm), petals erect to suberect at anthesis (vs. subspreading-recurved at anthesis), and by the green stigma (vs. white).

This new species was originally collected by the orchid and bromeliad collector Edmundo Ferreira Silva in the mountainous region between Ibicuí and Nova Canaã, called Serra da Boa Vista. There, one can still find difficult-to-access areas at 500 to 600 m elevation which still contain fragments of Atlantic Forest surrounded by pasturelands. *Aechmea viridostigma* is a typical inhabitant of the lower tree trunks in the remnant forest.

Acknowledgments

We are grateful for the logistical support in Bahia provided by Sandra Linhares during the expedition in which *Aechmea andersoniana* was discovered, as well as Edmundo Ferreira Silva, who kindly furnished the specimens of *A. viridostigma* for this study.

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Watering and Wetting Agents for Bromeliads

Geoff Lawn[3]

Although water is essential to all living organisms, most gardeners take for granted their watering routine in sustaining a bromeliad collection. It is often assumed that when simply applying moisture to open beds or potted specimens under cover, it will automatically find its way through the soil to the roots to sustain the plants.

There are natural principles at work when moisture soaks into soil or potting mixes. The water absorption rate is affected by:

- Potting mix composition and existing surface moisture level. Decomposed humus can absorb and retain at least 3 to 4 times the amount of moisture compared to soil particles or inert fillers such as perlite.
- Water temperature, droplet size and volume.
- Air temperature
- Relative humidity

Water infiltration is more effective if cool water is sprinkler-sprayed onto an open, chunky, slightly damp, humus-filled mix on a hot, humid day. When cold water is applied by hand-held hose to a compacted, fine, dry soil in freezing, almost humidity-free weather, seepage into the mix is not as fast or uniform. Furthermore, compaction or settling of mix ingredients occurs over time as the humus portion decays and its nutrients are used up by the plant roots. If not fertilized, repotted or if other ingredients are not added, the mix finally becomes an anaerobic, nutrient-deficient mass incapable of sustaining live roots.

Since growth of many bromeliads is semi-dormant in winter, watering is less frequent, and this potentially sets up future problems. The potting mix can

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develop dry pockets as the surface, especially if uneven, becomes bone dry and the water trickles to the side, down the inside of the pot, past the root ball. This problem is easily detected by upending the pot to inspect for a uniformly moist mix (or otherwise) immediately after watering. With their fibrous, vascular leaf tissue, parched bromeliads generally fail to wilt like other plants, but the leaf margins of broad-leaved tank forms roll inward, and those of succulent silvery species shrivel and curl. Leaf tip die-back or dying lower leaves are also telltale stress signs of insufficient moisture and nutrient deficiencies.

Soil or potting mix fertility relies on four factors:

1. **Physical aeration:** The spaces between mix particles, which assist the roots to "breathe"—vitally important for epiphytes and lithophytes. Most terrestrial bromeliads also prefer fast drainage of excess water once the saturation point is reached—few bromeliads inhabit bogs or swamps in the wild. In open ground, earthworm movements aerate the soil, but their constant processing of the same humus within containers is detrimental, eventually turning the contents into sludge.
2. **Chemical nutrition:** Natural leaf or wood litter, soil minerals and trace elements, manures and/or man-made fertilizers improve soil quality.
3. **Water:** Preferably natural rain (pH- 7 [neutral]), which carries fewer dissolved salts and pollutants than surface or underground water.
4. **Microorganisms and biochemical activity:** Bacteria and fungi assist the breakdown of humus, releasing its nutrients to the plant's roots.

Three factors affect the movement of water into the soil or potting mix, simplified here of complex sciences :

1. **Gravity:** The universal constant force which pulls the water downward, taking the route of least resistance under normal conditions.
2. **Cohesion:** Water molecules, being polar, are attracted to each other. This force holds a water droplet together, creating surface tension and causing the droplet to behave as if a thin flexible film covered its surface. Water molecules therefore tend to stay apart from other substances.
3. **Adhesion:** The attraction of water molecules to other hydrophylic (water-loving) substances, such as soil particles, wood or humus. In a growing medium, moisture stays spread in suspension because the adhesive force is greater than both gravity and the cohesive force.

If moisture is not absorbed by the plant, an allied fourth force is of course evaporation. Depending on the retentive properties and volume of the growing medium, the higher the air temperature and drier the

atmosphere, the quicker the rate at which water will evaporate. Also, unsealed clay or terracotta pots extract water from the mix, and therefore the contents dry out faster than if in plastic containers.

Other important variables influencing many of the above factors are the strength, duration and frequency of sunlight and wind (or ventilation). All these elements in cultivating bromeliads may seem obviously basic but sometimes we overlook some or think they don't matter, perhaps hoping our plants will adapt.

Hydrophobic soils (which repel water) occur where there is a build-up of a wax-like coating on dry soil particles, usually at the mix surface. In studies of localized dry spots in turf grass for example, the soil particles were found to be coated with a complex organic, acidic material which appeared to be the mycelium (growth structure) of a fungus. Water beads up when applied to such a surface. This is a larger problem in finely-textured clay or loam soils compared to sandy soil particles which tend to be larger and therefore more aerated. Repotting or replacing soil with a more porous mix can often solve this water repellency problem, at least temporarily. Water repellency occurs more in terrestrial mixes where the top 3 cms. are mainly soil and are allowed to dry out.

Wetting agents are useful for bromeliads, and two main types come in granular, liquid and crystal forms.

Surfactants (surface spreaders) are biodegradable detergents which reduce the surface tension of water, allowing the water molecules to spread out and more easily penetrate the soil surface. The granular polymer (compound) types are effective immediately and if they are multi-coated in different surfactants, they tend to operate longer—up to 6 months or more. Horticultural use brand names include Multicrop's Deep Watering Granules, Debco's Saturaid, Yates Slippery Water and Richgro Ezi-Wet. These granules are seldom necessary for pot-grown or garden bed epiphytes or lithophytes if the open mix is largely coarse bark, scoria or humus-based. In addition, rosettes of epiphytic bromeliads are invariably cup or tank-shaped for water and nutrient catchment, with the overlapping leaf axil reservoirs chanelling any overflow down the sheathed stem to the root zone. Hence the value of overhead watering. This vertical trickle-down effect works the same way as micro-drip irrigation. There is also some capillary wetting sideways (like a sponge), especially if the mix has a high humus content. Automatic sprinkling from above relies on this principle because, with crowded plants and foliage overlapping pots, not all surface areas of the growing medium are wetted as compared to thorough hand-watering. In epiphytes in the wild, the primary role of roots is host attachment, not sustenance. In cultivation, however, they act more as feeding roots, supplementing the nutrient intake of the rosettes. Surfactants assist fertilizers to reach this target.

Few bromeliads which are exclusively terrestrial have water-storing rosettes—their relatively narrow, arching, recurved leaves act like an umbrella, shedding water to the outer root zone. In my experience, dyckias, despite being xerophytic, flourish more with regular watering and the use of surfactants. Cryptanthus and orthophytums benefit also, appearing less stressed if constant moisture is available. Pitcairnias, ananas, hechtias, deuterocohnias, puyas, and other ground-dwellers experiencing seasonal habitat dryness show more active growth in cultivation if drying soil is not a constant problem.

Liquid surfactants have similar results to granular polymers but generally the active ingredients are used up or leached out quicker. Brand names in liquid form include Garden King's Wettasoil, Multicrop's Eco Wet, Brunning's Easy Wetta, and Wetter Soak. These are high concentrates needing dilution (follow the manufacturer's instructions), and as with the granular types, it is better to not apply to the plant's foliage, as tissue damage may occur and they can possibly clog the water-absorbing trichomes. Both granular and diluted liquid polymers are suitable for adding within the growing mix.

Humectants ("super absorbents") are industrial silica crystals which attract and store water in potting mixes. Brand names available include Hortex Australia's Rainsavers, Yates' Waterwise, Hydrobead's hydrogels, Terra-Sorb and Agrosoke, although the latter two I have not seen locally. A little goes a long way with these compounds, for when immersed in water the solid crystals expand enormously into soft gel form, absorbing moisture up to 200 times their own weight within one hour. Again, follow the manufacturer's directions on proportions when adding this slurry to your growing medium. A second method is adding the crystals dry into the mix, pot up the plant, water thoroughly and the crystals will expand. Another watering two hours later ensures the crystals are fully charged. To apply to established plants without undue disturbance, a few crystals can be inserted in individual holes made by a stick probe to the root area, covered over then water added. These gels last at least several years, rehydrating at each watering. Eventually the crystals disintegrate, depending on the fertilizers and the pH of the mix and the water. They can be invaluable for cryptanthus and orthophytums in particular, and especially for specimens in small pots and hanging baskets which dry out so fast otherwise in hot, windy weather. Crystals are probably better suited to controlled watering under cover, as their use in garden beds may leave bromeliads' roots too damp in cold, wet winters.

Apart from rain, there is no substitute for regular watering which creates extra humidity for those bromeliads which need it to really thrive. Wetting agents are a handy supplement to keep water in the rooting medium, but they alone cannot counteract an unsuitable mix as a quick fix. Although claimed to be "environmentally-friendly," there is some evidence that long-term use of these synthetic compounds destroys soil

microbes. However, if repotting is done annually, wetting agents should not adversely affect the health of a plant. Some new lines (in the U.S.A. at least) have microbes and organic fertilizer added to the wetting agents, but the fertilizer is probably not specifically suited to bromeliads.

As outlined, growing media for terrestrial bromeliads have many problems in water infiltration and retention, unless epiphytes are grown in earthy dirt only. Rainforest epiphytes in the wild often experience daily rapid saturation and drying out of roots steadfastly clinging to tree branch bark covered in mosses and lichens during the wet season—perhaps conditions we should try to replicate with "difficult" species. Though perhaps only in a fully controlled glasshouse can a cloud forest canopy for mist-wet epiphytes be recreated. Dry woodland epiphytes in their normal habitat are often dehydrated; not a condition to be duplicated to attain showbench quality specimens. Dry seeds need to imbibe moisture to germinate and misting seedlings is usually a must in the early stages of seed-raising.

Other watering methods with limited use include self-watering pots with built-in wells, capillary matting, and wick-watering—ideal for select specimens to "mind themselves" while the gardner is away. In addition, applying mulch to garden bromeliads both conserves moisture and feeds the roots.

Plant tissues are 80-90% water; thus the importance of watering. There are moisture meter probes on the market but they're probably impractical for large collections—observation and experience are still the best indicators of all.

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From the Editors

With this issue, we are introducing a slightly new style for the Journal that reincorporates the BSI logo on the cover, last used in 1981. The new font used on the cover is "Batang" with the collation information in "Abadi Condensed." The text within the Journal is "Garamond" and the figure captions "Helvetica." We thank April Ward for her assistance with the cover design.

Our apologies to the organizers of several April Bromeliad events, the Sarasota Bromeliad Society, Bromeliad Society of Broward County, and the Bromeliad Society of Houston, for the delay with this issue and hence not being able to provide prior notice of your events. We are working hard to catch up with the regular journal schedule.

Errata: *Tillandsia candelifera*, reported as originating from Mexico in Derek Butcher and Renate Ehlers article in the November-December 2002 issue, is from El Salvador according to Harry Luther of the Bromeliad Identification Center.

Notice of the Annual Meeting of the Bromeliad Society International, Inc., and the Members of the Board of Directors

Tom Wolfe[4]

The Annual meeting of the BSI voting members will be held in Chicago at the Weston (O'Hare) Hotel on Saturday, June 14, 2003 at 9:00 AM. The meeting will be followed immediately by the Annual Meeting of the Board of Directors. Any proposed business requiring a vote by either body must be submitted in writing to the President not less than 60 days prior to the meeting.

Book Review

Leonard & Inez Dolatowski[5]

Bromeliads and Bromeliad Weevils of Florida. Barbra Larson and J. Howard Frank, 2002. SP 321, Cooperative Extension Service, University of Florida, Institute of Food and Agricultural Sciences.

This guide to Florida bromeliads and bromeliad weevils consists of a laminated card deck with color photographs of all native Florida bromeliads, brief species descriptions, and county distribution maps. The 4"x 3" deck is held together by clip-rings. The lamination helps to keep the deck clean and

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the pages free from tearing. The guide makes a handy pocket reference, and has a very reasonable price. With many $100-plus bromeliad books on the market nowadays, the $5 price tag makes this a truly good deal.

Fourteen species and two natural hybrids are pictured in color. The picture quality is only fair but this might be due partially to reducing the size of the original pictures to fit in the deck. Distinguishing between similar species, such as *Tillandsia bartramii* and *T. setacea* from the photos alone might be difficult, but the non-technical descriptions provide further identification characteristics. The guide also has pictures of the Mexican bromeliad weevil and the Florida bromeliad weevil in their various stages of life.

The guide was funded by the U.S. Department of Agriculture, T-STAR (Tropical-Subtropical Agricultural Research), The Florida Division of Forestry, and the Florida Park Service, as well as a grant from Gulfstream Environmental and Recreational Trust Program as part of a biological control research grant.

The identification deck is available for $5.00 from any Florida Council of Bromeliad Societies representative or by contacting Barbra Larson, University of Florida, Entomology & Nematology Dept., Box 110620, Gainesville, FL 32611; phone 352-392-1902, ext.122; e-mail BCLarson@ifas.ufl.edu. Further information is available on the Save Florida's Native Bromeliads Web site (http://savebromeliads.ifas.ufl.edu) or the Florida Council of Bromeliad Societies Web site at (http://fcbs.org).

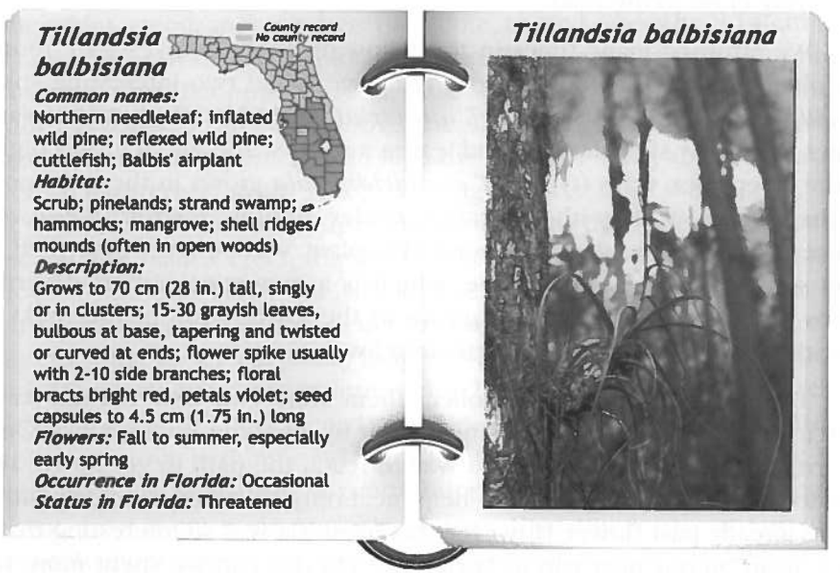

Figure 5. Pages from "Bromeliads and Bromeliad Weevils of Florida."

A New Tillandsia from Oaxaca, Mexico

Renate Ehlers[6]

We have visited the Tonala Canyon in Oaxaca, Mexico many times. It is very impressive with steep rock walls along the banks of a small river. The entry to the canyon is via the road between Huajuapan de Leon and Juxtlahuaca-Copala. Many new tillandsias have been discovered there, including *T. atenangoensis* Ehlers & Wülfinghoff, *T. copalaensis* Ehlers, *Tillandsia lauii* Matuda, and *T. kolbii* W. Till & Schatzl.

My husband Klaus and I visited the area for the first time in 1978 when the road to the canyon was very small and rocky and we had a regular car rather than a 'Combi' (a small van). A friend of ours, who was in Mexico for the first time was with us, and was very skeptical that we could make it on such a road. On the main road between Tlaxiaco and Putla, I asked the driver of a very old bus about the road, and when I told him what we intended to do, he said that only a very good driver could pass the big holes and stones in the road! I went back to our car and told my two partners that the driver thinks we could make it with no problems!

Well, we made it, but with some small problems and it took the whole day (nowadays it takes three hours). Of course there was not time enough to investigate properly, but the most wonderful plants such as the orchids *Cuitlauzina pendula* and *Euchile citrina*, as well as many tillandsias were flowering close to the road.

We returned many times in the following years to investigate more of the plants growing in Tonala Canyon and we found two interesting species of *Tillandsia*. One is related to *T. atroviridipetala* Matuda, but the plant is larger, has nearly succulent secund leaves, a short scape, and it grows high up in the steep rock walls (typical *T. atroviridipetala* grows in the trees on top of the canyon walls with *T. circinnatoides* Matuda, *T. caput-medusae* E. Morren, and *T. ionantha* Planchon). This plant will be later described as a new subspecies. The second one, which is a new species here-described, forms a big grayish rosette and grows in the lower parts of the rocks and near the river among many *T. fasciculata* Sw.

To see the plants and to collect them were two different matters! In March 1988 I was able to get a single plant by climbing up the rocks. On the return, however, I could not see a way to reach the path to get down, and it was so difficult that Klaus had to help me. I only collected a single plant and it was already past flower. However, this tillandsia was so interesting that we tried again on our next trip in April 1989. On this trip we spent more time, and after passing the small river, managed to collect some plants.

[6] Herrenbergerstr. 14, D 70563 Stuttgart; P.O. Box 1657, Tallevast, FL 34270-1657

Later, our friend Jürgen Lautner from Göttingen told us that he found a similar plant near Juxtlahuaca. In March 1993 we made another collection of these plants between Juxtlahuaca and Tecomaxtlahuaca on rocks near the river, at 1750 m elevation. At this location the plants looked slightly different; the rosette being wider and more open and the leaves often black-spotted. We went to Tonala Canyon yet another time, but we paid a high price. Our car, which we had parked in the small shadow of a big cactus, had been broken into. Though we heard the alarm, and hurried back as quick as we could, small but valuable things had been stolen; only the big luggage was left. It was very annoying because I lost my glasses, shoes, binoculars, and many important and valuable items not easily replaced. But we still had some of the interesting tillandsias!

I have known for so many years that this plant is new to science and it is finally time to describe it.

Tillandsia tonalaensis Ehlers, sp. nov. **Type:** Mexico. Oaxaca: in fauce Tonala inter urbes Copala et Huajuapan de Leon, 23 Apr. 1989, *K. & R. Ehlers EM892305* (HT: MEXU).

> A *Tillandsia thyrsigera* E. Morren ex Baker laminis foliorum strictis nec recurvatis, angustioribus, triangulariter acuminatis, nervatis, spicis angustioribus, rhachidis internodiis majoribus, bracteis florigeris minoribus, carinatis et sepalis carinatis angustioribus, paulo minoribus differt.

Plant stemless, flowering 60-120 cm high, a funnel-form rosette 40-60 cm high and about 40 cm wide. ***Leaves*** to 45 cm long, coriaceous, subsucculent, green, appressed grey-lepidote, nerved. ***Sheaths*** 8-14 cm long, 6-10 mm wide, elliptic, inconspicuous, adaxially brown, abaxially light brown at the base then becoming green, on both sides appressed grey-brown lepidote. ***Blades*** 5 cm wide above the sheath, to 35 cm long, narrowly triangular, canaliculate, green, pale lepidote on both sides, abaxially strongly nerved. ***Scape*** erect, stout, 15-20 cm long, shorter than the rosette, 1 cm diam., round, the foliaceous scape bracts imbricate, their sheaths concealing the scape, the blades erect, triangular acute. ***Primary bracts*** erect, short, the lowest not longer than the sterile base of the branches, the apical ones much shorter, ovate and only acute. ***Inflorescence*** exceeding the rosette, 30-60 cm long, to 15 cm wide, long sub-thyrsoid, bipinnately compound from 3-15 polystichous spikes, internodes 2-3 cm long, branches suberect or slightly spreading, 10-45 cm long, 1.5-2 cm wide, lanceolate-linear, complanate, stout peduncle 3-10 cm long with sterile bracts at the base, flowers 5-18, rachis slightly flexuous, internodes 15 cm. ***Floral bracts*** 3-4 cm long, 1.3-1.8 cm wide, variable, shorter than the sepals or surpassing them, ovate acute, slightly to strongly carinate, coriaceous, adaxially strongly nerved, minutely punctulate-lepidote, abaxially glabrous, red or green-red. ***Sepals*** 3-3.5 cm long, 8-10 mm wide, narrowly elliptic acute, subfree, (2-3 mm connate), nerved, glabrous, apical part yellow and thin, getting thicker

Photograph by Renate Ehlers

Figure 6. Habit of *Tillandsia tonalaensis*.

Photograph by Renate Ehlers

Figure 7. Inflorescence of *Tillandsia tonalaensis*.

Photograph by Jürgen Lautner

Figure 8. *Tillandsia tonalaensis* growing on the rock walls of the Tonala Canyon.

and green toward base, the posterior ones carinate. ***Petals*** tubular-erect, 4.2-4.8 cm long to 7 mm wide, spatulate, dark violet with white margins, whitish-green toward base. ***Stamens*** widely exserted, filaments with unequal lengths in 2 sets of 3 each, 5-5.8 cm long, 1 mm wide near apex, light green, becoming narrower and white toward base. ***Anthers*** 4 mm long, 1 mm wide, dark brown, attached 1/4-1/5 of the length from the base, pollen egg yellow. ***Ovary*** 5-7 mm high, 2.5-3 mm wide, conical. Style 4.3-5.1 cm long, concolourous with the filaments. ***Stigma*** small, not much wider than the style, the lobes erect, postfloral twisted, slightly papillose, violet.

Paratypes: Mexico. Oaxaca: Same locality as the type collection, 9 Mar. 1993, *K. & R. Ehlers EM930602* (WU); *K. & R. Ehlers EM882111* (SEL, US, WU); Prope coniunctio viarum ad Juxtlahuaca et Tecomaxtlahuaca, 10 Mar. 1993, *K. & R. Ehlers EM930701* (WU).

Tillandsia tonalaensis seems to be related to *Tillandsia thyrsigera* Morren ex Baker and *T. parryi* J.G. Baker. *Tillandsia tonalaensis* differs from *T. thyrsigera* by having the leaves erect, the blades not recurved, narrower, green, not densely appressed lepidote but strongly nerved. The spikes are narrower, only to 20 mm wide (vs. 30-35 mm), internodes of the floral bracts bigger. The floral bracts are only twice as long as the internodes, smaller, carinate, and nerved, and the sepals are shorter, narrower, and carinate.

Tillandsia tonalaensis differs from *Tillandsia parryi* by having the leaves harder and more coriaceous, green, strongly nerved; blades not spreading, broadly triangular not caudate-attenuate. The primary bracts are

shorter and without subfoliaceous blade. The spikes are linear and longer but less wide. The floral bracts are glabrous, carinate, only twice as long as the internodes, and the sepals are carinate.

Only known from Oaxaca state between Huajuapan de Leon and Copala, *Tillandsia tonalaensis* can be found growing epilithically in the Tonala Canyon, an impressive tourist-attraction. It occurs on steep rock walls with *Tillandsia fasciculata*, and a nice, small gray tillandsia with secund leaves related to *T. atroviridipetala*.

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Acknowledgments

My thanks to Walter Till, University of Vienna for his cooperation and help with the Latin diagnosis.

Two New Orthophytum Species from Bahia, Brazil

Elton M.C. Leme[7]

In July 2000, a cooperative relationship was established with two bromeliad and orchid collectors and amateur archeologists, Raymundo Fernandes Reis Júnior and José Carlos Martinez Falcon, from Vitória da Conquita, Bahia State. Along with their regular jobs as surgical dentist and surgical doctor, respectively, they find free time to explore the countryside, often together, for unknown bromeliads and orchids. Dr. Reis and Dr. Falconi were introduced to me by the botanist and old friend Antonio Toscano de Brito, now living in the heart of the rupestral fields in the historical city of Rio de Contas, Bahia.

The two new species described below are just the first of the novelties they brought back from recent expeditions, all from areas within a one-day drive from the city where they live.

[7] Herbarium Bradeanum, Rio de Janeiro, Brazil. E-mail: leme@tj.rj.gov.br.

Orthophytum falconii Leme, sp. nov. **Type:** Brazil. Bahia: Candido Sales, bank of Rio Pardo, Mata de Cipó, field collected in Nov. 2000 by *Raymundo F. Reis & José Carlos M. Falcon s.n.*, flowered in cultivation Dec. 2001, *E. Leme 4938* (HT: HB).

A *Orthophytum benzingii* Leme & H. Luther, cui affinis, planta florifera 42-45 cm longa, rhizomis distinctis, laminis foliorum anguste lanceolatis, angustioribus, inflorescentia ca. 3.5 (-10) cm longa, sepalis rubris, glabris, antheris apice apiculatis differt.

Plant terrestrial, long-caulescent, 42-45 cm high, propagating by slender rhizomes ca. 7 cm long, ca. 0.5 cm diameter, main stem indistinguishable from the scape, green, densely white-lanate, 0.7-1.2 cm diameter. ***Leaves*** not forming a rosette even before anthesis due to the early elongation of the stem, laxly arranged and indistinguishable from the scape bracts, subspreading-recurved; ***sheaths*** indistinguishable from the blades; ***blades*** narrowly lanceolate, acuminate, ending in an acicular and pungent spine, 8-13 cm long, 2.5-3.5 cm wide at base, coriaceous, nearly flat toward apex, densely and coarsely white lepidote abaxially, adaxially subdensely and coarsely white lepidote at base and glabrous toward apex, green, margins subdensely spinose, spines subtriangular-uncinate, complanate, straight to antrorse, 1.5-2 mm long, ca. 1 mm wide at base, 5-10 mm apart. ***Scape*** indistinguishable from the main elongate stem, 3-7 mm in diameter, densely white-lanate to glabrescent with age, pale green; ***scape bracts*** indistinguishable from the leaves, gradually reduced toward apex. ***Inflorescence*** subcorymbose, densely bipinnate, erect, ca. 3.5 cm long (or ca. 10 cm long when taking into consideration the aborted and rudimentary basal fascicles), 2-3 cm in diameter; ***primary bracts*** subfoliaceous, densely and coarsely white-lepidote abaxially, green, strongly recurved, ovate, apex acuminate-caudate, densely spinose, spines 1-1.5 mm long, prevailing antrorse, the basal primary bracts distinctly exceeding the fascicles, 25-30 × 10 mm, gradually reduced in length toward the inflorescence apex; ***fascicles*** ca. 4 in number (excluding the aborted or rudimentary ones), polystichously disposed, suberect, sessile, ca. 13 mm long (excluding the petals), ca. 10 mm in diameter, ca. 7-flowered, the basal ones 10 to 15 mm apart from the upper ones, the upper ones densely arranged at inflorescence apex; ***floral bracts*** triangular-ovate, acuminate, ecarinate to slightly carinate at apex, slightly shorter than the sepals, but recurved and distinctly exposing them, red toward apex, nerved, inconspicuously and sparsely white-lepidote to glabrescent, ca. 10 × 7 mm, densely spinulose, spines irregularly curved, ca. 0.5 mm long; ***flowers*** ca. 17 mm long (including the petals), sessile, densely arranged, odorless; ***sepals*** narrowly lanceolate, apex acuminate-caudate, ca. 8 × 3 mm, free, entire, red, glabrous, carinate, the posterior ones with keels decurrent on the ovary; ***petals*** sublinear, obtuse and slenderly and minutely apiculate, ca. 13 × 2.5 mm, free, erect at anthesis except for the

suberect apex, green with white apex, bearing 2 densely and upwardly fimbriate appendages ca. 3 mm above the base, as well as 2 conspicuous longitudinal callosities which nearly equal the filaments; ***filaments*** ca. 8 mm long, terete, green, the antepetalous ones adnate to the petals for ca. 4 mm, the antesepalous ones free; ***anthers*** ca. 2 mm long, base obtuse and apex apiculate, fixed near the middle; ***stigma*** simple-erect, white; ***ovary*** 3-4 mm long, ca. 4 mm wide, trigonous, green; epigynous tube ca. 1 mm long; placentation apical; ovules obtusely apiculate. ***Fruits*** unknown.

Orthophytum falconii is related to *O. benzingii* Leme & H. Luther, but differs from it by its smaller stature (42-45 cm vs. 60-100 cm long), its propagation by means of slender rhizomes, the leaf blades narrowly lanceolate (vs. ovate) and much narrower (2.5-3.5 cm vs. 4.5 cm wide), the inflorescence ca. 3.5 (-10) cm long (vs. 17-22 cm), sepals red (vs. green) and glabrous (vs. densely white lanate toward apex), and the anthers with apiculate apex (vs. apex obtuse).

Photograph by Elton Leme

Figure 9: Habit of *Orthophytum falconii* in cultivation.

This new species was found growing terrestrially on the banks of the Rio Pardo, in the county of Candido Sales, Bahia State, in a type of forest called Mata de Cipó. *Orthophytum falconii* is dedicated to one of its collectors, José Carlos Martinez Falcon, who is responsible for the recent horticultural introduction of some unusual bromeliad species from Bahia.

Orthophytum toscanoi Leme, sp. nov. **Type:** Brazil. Bahia: Cordeiros, Poço da Moça, field collected July 2000 by *Raymundo F. Reis s.n.*, flowered in cultivation Oct. 2001, *E. Leme 4920* (HT: HB).

Photograph by Elton Leme

Figure 10: Close up of *Orthophytum toscanoi* inflorescence, in cultivation.

A *Orthophytum lemei* Pereira & Penna, cui affinis, foliis brevioribus, laminis foliorum spinis late triangularibus, longioribus densioribusque, inflorescentia ca. 15 cm longa, bracteis floriferis viridibus, sepalis viridibus, petalis apice apiculis minutis uncinatis ornatis differt.

Plant terrestrial or saxicolous, stemless, ca. 30 cm high, propagating by short basal shoots. ***Leaves*** ca. 12, rosulate, subdensely arranged and forming a distinct rosette; ***sheaths*** inconspicuous; ***blades*** narrowly-triangular, ca. 10 cm long, ca. 2.5 cm wide at base, ca. 3 mm thick, strongly coriaceous, slightly channeled to nearly flat, completely covered by a thick layer of white trichomes on both sides, abaxially distinctly nerved, apex nearly subulate, attenuate-caudate, margins entire on the apical portion, densely spinose toward base, spines triangular, thick toward base, nearly straight to slightly retrorse, densely white-lepidote except for the glabrous and reddish-brown apical portion, 3-5 mm long, 2-4 mm wide at base, 1-8 mm apart. ***Scape*** erect, ca. 13 cm long, 0.5-0.6 cm in diameter, densely white-lanate, greenish-bronze colored; ***scape bracts*** resembling the leaves but the upper ones gradually reduced in size, white-lanate at base, exposing the scape, suberect-arcuate. ***Inflorescence*** corymbose, laxly bipinnate at least toward base, erect, ca. 15 cm long; ***primary bracts***

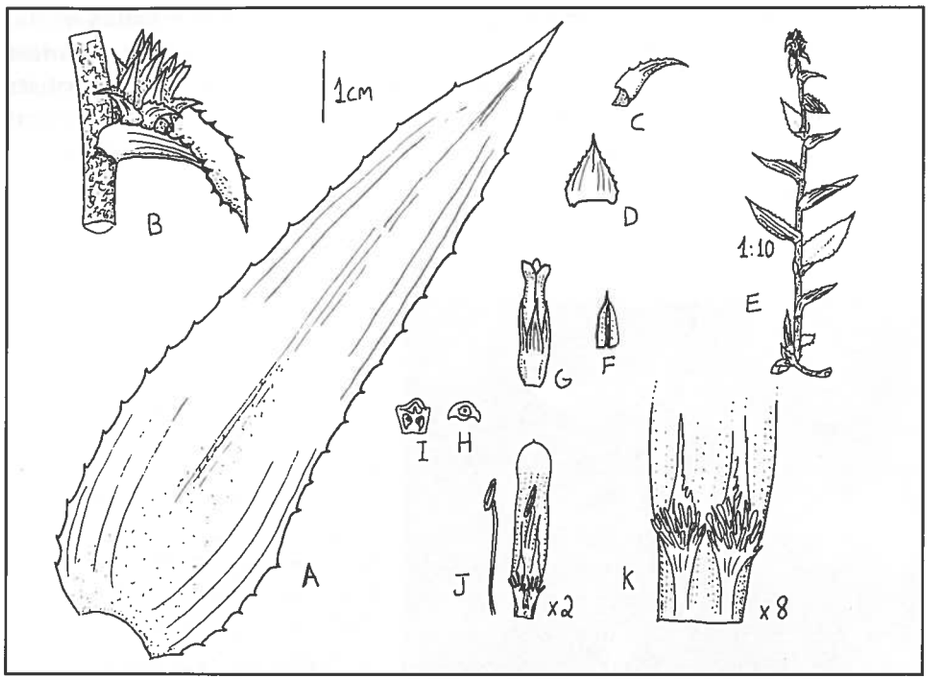

Figure 11. *Orthophytum falconii*. A. Leaf-blade. B. Basal fascicle. C. Side view of floral bract. D. Front view of floral bract. E. Habit. F. Sepal. G. Flower. H. Cross-section of ovary. I. Longitutinal cross-section of the ovary. J. Petal. K. Petal appendages (drawing by Elton Leme).

resembling the upper scape bracts but gradually smaller, 20-55 × 12-17 mm, distinctly exceeding the fascicles but gradually reduced in length toward inflorescence apex, the basal ones spreading, the upper ones slightly reflexed and slightly exceeding the fascicles, margins on the basal half densely to subdensely spinose, spines 1-3 mm long, the apical half entire and nearly subulate; ***fascicles*** ca. 8 in number, polystichously and laxly disposed, sessile, shortly rosulate-strobilate, 10-12 mm long (excluding the petals), 15-17 mm wide, 4 to 7-flowered; ***floral bracts*** ovate, acuminate, strongly carinate and recurved, equaling to exceeding the sepals, green, nerved, coriaceous, sparsely white-sublanate, 10-11 × 7 mm, subdensely and minutely spinulose, spines uncinate, irregularly curved, ca. 0.5 mm; ***flowers*** ca. 16 mm long (including the petals), sessile, densely arranged, odorless; ***sepals*** subsymmetrical, narrowly ovate, apex spinescent-acuminate, ca. 7 × 3 mm, free, entire, green, rigid, sparsely white-sublanate, carinate, the posterior ones with keels decurrent on the ovary; ***petals*** sublinear, apex obtuse to slightly emmarginate and bearing a hook-like minute apiculous inconspicuously fimbriate, 11 × 2-3 mm, free, erect at anthesis, green except for the white apex, bearing 2 densely fimbriate appendages ca. 3 mm above the base, as well as 2 conspicuous longitudinal callosities which nearly equal the filaments; ***filaments*** ca. 6 mm long, terete, the antepetalous ones adnate to the petals for ca. 3 mm, the antesepalous ones free; [cont'd. on p.28]

Tillandsia Hybrids with *T. albertiana* as One of the Parents

Derek Butcher[8] **Photographs by Mark Dimmitt**[9]

During the period of 1982 to 1985, Mark Dimmitt of Tucson, Arizona saw the hybridizing potential of *Tillandsia albertiana* and wondered how its brilliant colored flower would be when combined with other species. He tried hybridizing with seven other species and the long wait began. Plants began flowering in the early1990's and progeny of each crossing seemed to have their own character. A few plants were donated to local plant societies but most have been distributed by Rainforest Flora and Bird Rock Tropical in California under their grex parentage. Therefore, many of you may well be the owner of one of these man-made hybrids.

Natural hybrids-that is, not directly due to human influence but possibly indirectly because of human influence on the environment-tend to be forgotten by the taxonomist. For this reason, a list of these is presented in the Cultivar Corner section of the BSI website (www.bsi.org). There, you can find a link to a natural hybrid data base maintained at the Florida Council of Bromeliad Societies website (www.fcbs.org). You will notice that many of these are tillandsias. Some have been formally described with herbarium specimens and some not described but recorded by formula which is allowed under the International Code of Botanical Nomenclature (ICBN) rules. The seed parent is not known for obvious reasons and the ones reported to me are shown in alphabetical order. Because of the evolution of natural hybrids very rarely would they be of an F1 generation. If these hybrids are found in different locations they could well have backcrossed to either parent showing a range of characters between the two.

From a registrars perspective, I am not enamored with the idea of these being given a cultivar name because as we know a cultivar name should only follow the clone (offset). However, the right to name because of its uniqueness is with the applicant and all I can do is advise! A check into the natural hybrid list provides a glimpse of the problems to be faced, for example, *Tillandsia ionantha* × *schiedeana* has been named under ICBN rules as *T.* × *rectifolia* and under International Code of Nomenclature of Cultivated Plants (ICNCP) rules as 'Jack Staub'. It is your decision as to which of the three names you call your plant!

Man-made hybrids are not recognized under the ICNCP rules unless they have a cultivar name and a photograph instead of a herbarium specimen. Here, you should know both parents and the role they play. Many are F1 generation, meaning their progeny should look similar and can share the same cultivar name, *but not always*, so you need to be vigilant.

[8] BSI Cultivar Registrar
[9] 4331 Oxbow Rd., Tucson, AZ 85745

As we now have photographs, some of Mark Dimmitt's hybrids have been named and information is as follows. Note that seed parent is named first and its name is that used at the time of pollination.

'Mystic Albert' = *stricta* × *albertiana*, named by D.Butcher
'Mystic Burgundy' = *mubriae* × *albertiana*, named by B.Timm
'Mystic Circle' = *meridionalis* × *albertiana*, named by D. Butcher
'Mystic Flame' = *albertiana* × *ixioides* (and reverse), named by M. Dimmitt
'Mystic Flame Orange' = *albertiana* × *ixioides* (and reverse), named by M. Dimmitt
'Mystic Rainbow' = *albertiana* × *arequitae*, named by D. Butcher
'Mystic Rainbow Peach' = *albertiana* × *arequitae*, named by D.Butcher
'Mystic Rainbow Pink' = *albertiana* × *arequitae*, named by D. Butcher
'Mystic Trumpet' = *albertiana* × *xiphioides*, named by M.Dimmitt
'Mystic Trumpet Peach' = *albertiana* × *xiphioides*, named by M. Dimmitt
'Mystic Trumpet Pink' = *albertiana* × *xiphioides*, named by M. Dimmitt
'Mystic Twins' = *albertiana* × *geminiflora*, named by D.Butcher

I hope this is just the start of us separating natural hybrids from man-made ones.

Figure 12. 'Mystic Rainbow Peach' (*Tillandsia albertiana* × *arequitae*).

Figure 13. 'Mystic Flame Red' (*Tillandsia ixioides* × *albertiana*).

See additional photographs on back cover.

Sixteenth BSI World Bromeliad Conference Chicago, Illinois — July 29 - Aug. 1, 2004

WELCOME TO CHICAGO! We hope to say this many, many times in July, 2004. Things are moving right along and the BSI and BSGC are working diligently to have a great conference here in the northern United States.

The second discount period has past and the third is coming up at the end of June, 2003, so those who haven't registered please send in your registration. Forms are available on the BSI web site (www.bsi.org). and in the Nov.-Dec. 2002 Journal.

Questions contact: Jack Reilly, 248 Lawrence St., Illiopolis, IL 62539. Phone: 217-486-5874. E-mail: jar56@one-eleven.net

World Conference Pin Now Available

The 16th World Bromeliad Conference to be held at the Westin O'Hare at Rosemont, Illinois (Chicago) from July 27 through August 2, 2004 is coming up fast. The pin as shown commemorating the event is available for advance sale now.

The artists for the 16th World Conference pin are Jack Reilly and Craig Deluhery, engineers—not artists. The pin represents the Chicago skyline. The sun is represented by a Neoregelia. Some leeway was taken with the position of the rest of the buildings and of course the mushroom, bottom left, is the famous Picasso statue.

The pin will sell for $10.00 at the world conference, but if ordered prior to the conference, can be obtained for $8.00 including postage. It is available through the BSI on line store at BSI.ORG.

[Leme, New *Orthophytum*. Continued from p.24]

anthers ca. 1 mm long, base sagittate and apex obtuse, fixed at 1/3 above the base; ***stigma*** simple-erect, ca. 1 mm in diameter, blades suberect; ***ovary*** ca. 3 mm long, trigonous; epigynous tube inconspicuous; placentation apical; ovules obtuse. ***Fruits*** unknown.

Orthophytum toscanoi is closely related to *O. lemei* Pereira & Penna, but can be distinguished by the shorter leaves (10 cm long vs. 20-26 cm), the leaf blades with spines broadly triangular, longer, and more densely arranged, a shorter inflorescence (ca. 15 cm long vs. 30 cm), the floral bracts green (vs. wine-red-colored), the green sepals (vs. red), and by the petals with an unusual small, slender uncinate apiculus at apex.

Orthophytum toscanoi is a terrestrial species known from a wet, forested site at Poço da Moça, Cordeiros, in Bahia State. This species honors the botanist and orchid specialist, Antonio Luiz Toscano de Brito, member of Herbarium Bradeanum and Associate Professor of the University of Feira de Santana, Bahia, now living in the Bahian city of Rio de Contas, Chapada Diamantina. Dr. Toscano has greatly contributed to the study of the flora of the State of Bahia.

Acknowledgments

The authors thank the bromeliad collectors Raymundo Fernandes Reis Júnior and José Carlos Martinez Falcon for their generous gifts of living specimens used in this work.

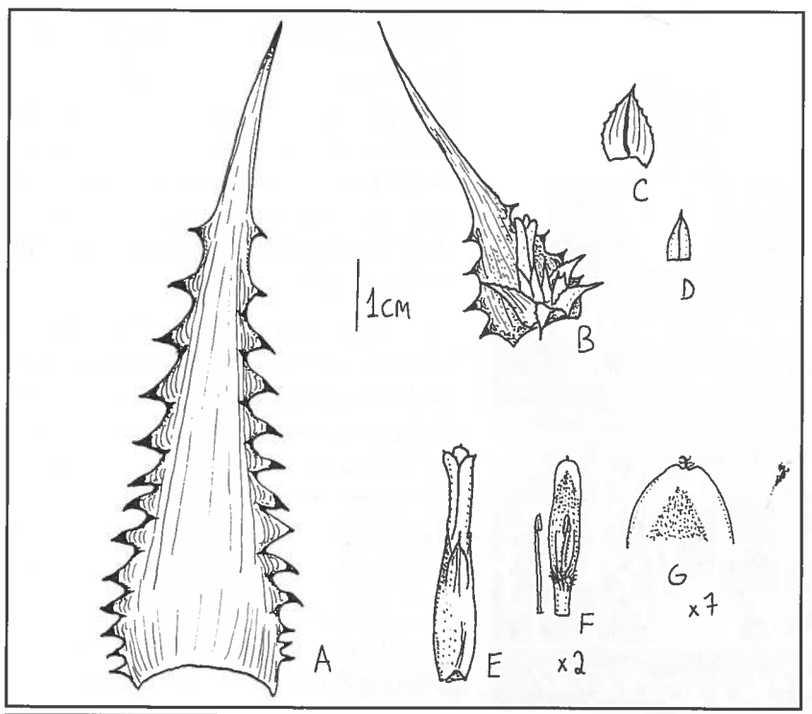

Figure 14. *Orthophytum toscanoi*. A. Leaf-blade. B. Basal fascicle. C. Floral bract. D. Sepal. E. Flower. F. Petal. G. Petal apex (drawing: E. Leme).

The Fifteenth World Bromeliad Conference

Karen Andreas[10] **Photographs by Michael Andreas**

The Fifteenth World Bromeliad Conference, hosted by the Florida West Coast Bromeliad Society, was held in St. Petersburg, Florida, May 16 - 19, 2002. The Bromeliad Beach Party was fun in the sun and more, with awards, auctions, a fantastic show, seminars, a memorable banquet, and a generous dose of Southern hospitality.

On the day before the official start of the World Conference, Harry Luther, director of the Mulford B. Foster Bromeliad Identification Center at Marie Selby Botanical Gardens in Sarasota, Florida, facilitated the Scientific Seminars. This daylong event drew distinguished speakers from all over the world and an attentive and appreciative audience. David Benzing of Ohio; Renate Ehlers, Germany; Elton M.C. Leme, Brazil; Sue Sill, Georgia; Walter Till, Austria; and John Utley and Kathleen Burt-Utley, New Orleans shared their experiences and photographs, and led discussions on various bromeliad topics. The Scientific Seminars ended with Harry Luther, who offered "'an illustrated ramble' on the Bromeliads of Florida" and "Bromeliads in Florida."

While conference attendees were arriving on Thursday, things were hustling behind the scenes. Thirteen imaginative, beach-themed floor displays and seven table-top exhibits were set up by affiliate societies, commercial members and special organizations in the hallways leading to all the seminar rooms and sales areas. Judges and clerks prepared to judge bromeliads entered in the show. Sale plants were slipped in through side doors. At noon sharp, the conference was officially opened as BSI President Tom Wolfe greeted everyone at the luncheon for the registrants. Volunteers opened the hospitality desk and started the ongoing raffle sales, and the conference was off to a great start.

Before the opening of the sales area on Thursday evening, Tom Wolfe announced the recipient of the Wally Berg Award, the BSI award to recognize the outstanding contributions of an individual to the bromeliad world. The field of distinguished nominees included John Anderson, Don Beadle, Dennis Cathcart, Harry Luther, and Sam & Hattie Lou Smith. Bromeliad adventurer Dennis Cathcart, (owner, with wife Linda, of Tropiflora in Sarasota, Florida) received this award for his many years of service to the bromeliad community. Artist Don Lee presented the first of a collector bromeliad plate series to Betsy McCrory, for her parents Audrey and Bill McCrory, all of Boggy Creek Bromeliads in Kissimmee, Florida. Tom Wolfe then opened the sales for the conference attendees, and it was another mad rush as bromeliad enthusiasts tore into the room, reveling in the incredible assortment of bromeliads, artwork,

[10] St. Petersburg, Florida

Figure 15.
Sarasota Bromeliad Society display.

Figure 16.
Bromeliad Society of Tampa Bay display.

Figure 17.
Caloosahatchee Bromeliad Society display.

Figure 18. This *Aechmea biflora*, shown by John Anderson, won Best of Show - hobbyist.

Figure 19.
Ray Lemieux won Division II with this *Encholirium horridum*.

Figure 20.
Neoregelia 'One and Only', shown by Michael Kiehl, was the Sweepstakes Winner - Commercial.

yard art, growing supplies and books. As with past conferences, the sales area never stopped humming, and the surprise finds never stopped appearing.

This World Conference once again offered a slate of informative and interesting seminars with lively and creative presentations and discussions.

Pioneer bromeliad hybridizer Nat DeLeon talked about variegation and how it enters into bromeliad cultivation; he also demonstrated several techniques for pushing pups. Renate Ehlers shared slides of her beloved tillandsias from Oaxaca in southern Mexico. A "Pictographic Safari" was offered by John Utley and Kathleen Burt-Utley-a journey through the diverse habitats of Mexico and Mesoamerica. Creative Peggy Nuse wowed her audience with her artistic arrangements using bromeliads, bromeliad parts and other natural elements. Hawaiian hybridizer David Shigi shared his passion for guzmanias and vrieseas in a slide show of his creations. JosÈ Manzanares spoke of the bromeliads of Ecuador's Cordillera del Condor and showed wonderful pictures of that region. Pam Koide of Bird Rock Tropicals in California has made more than one thousand *Tillandsia* hybrids and has journeyed to Mexico where she discovered a new *Tillandsia*. Pam shared her experiences with conference attendees in her seminar. Tom Koerber gave a photo tour of bromeliads in magnificent German conservatories, and Elton Leme presented a photographic tour of "Novelties in Brazilian Bromeliaceae." Keith Golinski introduced his audience to the history of hybridizing in Australia via a slide show with pictures of both the creations and creators. BSI and Florida Council of Bromeliad Societies Web Masters Ken Marks and Michael Andreas reviewed the websites and discussed the Internet as a bromeliad resource with members of the audience. The executive director of Selby Botanical Gardens, Meg Lowman, summarized her educational activities relating to bromeliad ecology in the canopies of the Peruvian Amazon. The last seminar was a memorable and entertaining trip down Memory Lane as Odean Head showed a CD he has created using photographs and movies from every world conference he has ever attended.

One of the high points of the Conference was the Rare Plant Auction, proceeds of which benefit the Bromeliad Identification Center. Auctioneers for this conference were the Dynamic Duo, John Anderson and Don Beadle, and gentleman Herb Hill. An unexpected auction talent appeared on the scene in the person of Len Trevor of Australia, whose gymnastic antics and rapid-fire banter raised funds as well as pulses. The bidding was fast and furious over rare and unexpected bromeliads, artwork, and even a nametag written in a rare hand. In the end, almost $20,000 was raised to benefit the BIC. There was yet another lively and interesting auction for the Cryptanthus Society where these beautifully grown bromeliads were snapped up by an enthusiastic audience.

The show lived up to everyone's expectations with 385 entries by 123 different people. The Commercial Section of the show had 85 and the

Hobbyist section had 280. For a complete list of award recipients, see the November-December 2002 issue.

After three days of the delightful Bromeliad Beach Party, a friendly crowd was prepared to have a good time with Key Note Speaker Don Beadle at the banquet. That Louisiana charm was in full evidence as Don reminisced on his early bromeliad days and adventures with then neighbor John Anderson, shared sly Cajun stories, and remembered many bromeliad good times shared by a good many people. At the end of the evening, Tom Wolfe extended his thanks to all the BSI Board members and the members of the Florida West Coast Bromeliad Society for their tireless efforts in planning and putting on the World Conference. Jack Reilly of the Bromeliad Society of Greater Chicago extended his greetings from his society as well as an invitation for everyone to get back together again in Chicago in 2004.

It was a warm, memorable, and successful Fifteenth World Bromeliad Conference.

Figure 21. BSI President Tom Wolfe presents the Wally Berg Award to Dennis Cathcart in recognition of Dennis' service to the bromeliad community.

Figure 22. John Anderson and Don Beadle prepare to open the bidding at the Auction.

Dropping in at the BIC

Tammy Marks[11]

Nearly everyone in the bromeliad world has either been to or heard of the Marie Selby Botanical Gardens, or as it's fondly called, just "Selby." In addition to the wonderful gardens, Selby is home of the Mulford B. Foster Bromeliad Identification Center (BIC), and the person in charge of the BIC is Harry Luther.

Why is the BIC important? The trail often starts a long way from Sarasota, Florida. First, some intrepid soul decides to go tramping in the rain forests of Ecuador, Brazil, Venezuela, or possibly it's swimming in the Dominican Republic. They happen upon some bromeliads, and, if they're lucky, the bromeliads are in bloom. By means of the inflorescence, the foliage, and the habitat, combined with a little common sense, good literature, and bromeliad knowledge, they may be able to put a name on the plant. However, if none of the above are available, they probably won't be able to determine if the bromeliad is a common, everyday variety or perhaps a brand new species. With a good photograph, or a collecting permit in hand, they capture the bromeliad and haul it home.

What's so important about finding a new species you say? Well, if the plant turns out to have a drop-dead gorgeous bloom, it could have some financial rewards. In addition, all new species are important to help in creating the bromeliad tree of life. Even if it turns out to be a dog and looks like something the cat dragged in after having gnawed on it for a week or two, you, as the discoverer, may be lucky enough to get the plant named for you! This is important stuff. We're talking immortality here.

So how is a fearless discoverer of lost continents and plants going to convince everyone he/she has found the first recorded specimen of *Tillandsia tammii*? (I like the sound of this). A non-biased, knowledgeable person will have to agree with our plant collector and this is where Harry comes in.

As the Director of the Mulford B. Foster Bromeliad Identification Center, Curator of Living Collections at Selby, and world renowned bromeliad taxonomist, Harry would have the authority to say, "yes, indeed this is a new species." A blooming specimen would have to be sent to the BIC (or at least the full inflorescence and a few leaves). If you're lucky, Harry might agree to grow your plant to maturity for you and identify it when it comes into bloom. Since the inflorescence is critical to identifying a species, somewhere along this trail to notoriety a flowering specimen has to be found. Comparisons of the plant will have to be made with all the similar known species to insure that the little foundling is not, in reality, a previously

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Photograph by Ken Marks

Figure 23. Harry Luther with a specimen of *Tillandsia* deposited in the Marie Selby Botanical Gardens Herbarium.

Photograph by Ken Marks

Figure 24. Harry Luther in the Bromeliad Identification Center office.

identified species that has been grown in too much light, too little light, a miniature of a normal plant, a giant of a miniature, or even a natural hybrid of two existing plants! Egad, it makes your head spin.

As you can imagine, this makes for a lot of work. Harry's office is much as you would expect, with a wall of filing cabinets on one side and book cases of bromeliad and plant books forming the other walls. A short walk to the bromeliad section of the Selby Herbarium reveals bunkers of filing cabinets filling up one whole wing of the little office building located in the Research and Conservation Department, just outside of Selby proper. There are 9000 bromeliad specimens housed there. Once a bromeliad (usually at least the inflorescence and some of the foliage) has been pressed and dried, the resulting specimen is then attached to a large piece of paper called a herbarium sheet. On this sheet is a label with a description of the live plant (especially anything that would not be well preserved in the dried specimen, such as colors), along with the name of the collector, location and description of the collection site, and date of collection can also be found on the label.

Generally speaking, bromeliad herbarium sheets are a bit heftier than those of other plants. Where a filing case might hold 1000 "normal" plants, the same case will only hold about 300 bromeliad specimens. Because some bromeliad flowers can shrink up to 30% when dried, it is useful to pickle the

flowers in small jars of alcohol in addition to being pressed, and these spirit collections take up still more room.

There is an interesting side note concerning shrinkage of dried flowers and Lyman B. Smith, the famous bromeliad taxonomist, who wrote many scientific papers which are still in use today. Since most of Smith's papers were written based on dried specimens, any comparison to plants he described would also have to be dried so that the shrinkage of the sepals and petals are taken into consideration during the identification process. Therefore, a dried specimen may be easier to identify then a fresh one.

The BIC is working to database as much bromeliad information as possible so it can be more accessible. Selby Gardens is helping by making high resolution scans of each herbarium type specimen, making it possible for other taxonomists to make comparisons without the need to ship herbarium sheets around the world. Samples of these herbarium specimens can be found at this link: **http://selby.org/research/herb/herb.htm.**

Maintaining the bromeliad herbarium, identifying bromeliads shipped to the BIC, cultivating the living specimens in Selby's greenhouses, numerous speaking engagements at bromeliad societies along with occasional treks into the wild each year all vie for Harry's time and attention. Harry has worked more than 20 years at Selby and during that time the bromeliad family has grown, and the public is showing more interest in this family of plants, of which all but one species are found in the new world tropics. Lucky for us, Selby and Harry are there to continue the work on the bromeliads in support of our habit.

How You Mount Tillandsias Does Make a Difference—Mother Nature Says So!

Kenneth Quinn[12]

About 10 years ago I was visiting Myakka River State Park, near Sarasota, Florida. It was my first chance to see *Tillandsia fasciculata* growing in the wild, and the horizontal limbs of the live oaks were covered with plants of this species as well as *Tillandsia setacea* and *Tillandsia utriculata*. As I gazed at the trees, it occurred to me that the upper surfaces of the limbs were almost completely devoid of bromeliads; instead, they all were attached along the sides of the limbs or even on the bottom of the massive branches. During the next few years I noticed that a lot of tillandsias that I ordered, belonging to quite a few species, had an upward turn at their very base; they also had been growing on the underside of some branch and were in the shape of a "J."

A perusal of books showing tillandsias in habitat, such as New *Tillandsia* Handbook, by Hideo Shimizu and Hiroyuki Takizawa, and *Tillandsia* by Paul

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Isley, shows that this phenomenon is widespread. The first book mentioned has some excellent examples; in particular, there is the photo on page 9 that shows a number of *T. latifolia* var. *divaricata* growing from the sides of a large horizontal tree limb. The same book, on page 23, shows the natural hybrid T. nidus growing upside down on a small branch. Few examples of a *Tillandsia* growing on the top of a horizontal branch are seen. Obviously, this habit of growing on vertical surfaces or from the underside of a branch is the normal way of things, not the exception. Many plants that were growing upright when mature were apparently growing upside down or horizontally when seedlings.

Now comes a question—why are the plants growing this way? In a shaded area underneath a branch, a seedling would not get direct sunshine or be struck by rain. This lack of direct light and rain would at first glance seem to be disadvantageous—but is it? Perhaps the opposite is true. Hard rains could easily dislodge *Tillandsia* seeds clinging to the upper part of a limb by the coma hairs that formerly served to catch the wind and bring the seed to that spot, and could also overwhelm the meager roots of an older but still small seedling. Likewise, the hot sun of tropical and subtropical areas could dehydrate and kill small seedlings. These are conjectures, but they may be the explanations for the position of the plants. Some support for my conjecture is in an article by J.C. Castro-Hernandez et al.(1999), who studied the establishment of *Tillandsia guatemalensis* on oaks and pines in Chiapas, Mexico. This species is mesic when mature. Seedling mortality was high, but on the higher parts of oak trees the bark retained more water and released it over a long period of time; it is in this part of the oak trees that seedling establishment was highest, indicating moisture availability is important if a *Tillandsia* seedling is to live.

I am not the only one to notice this preference for attachment to the side or underside of a horizontal limb. A recent scientific study (Harvey, 1996) of *Tillandsia recurvata* clusters on sand oaks in Florida demonstrated much the same thing; on horizontal branches 88% of the clusters were on the side or underside. I have talked to a professional botanist who has studied bromeliads in the wild, and he also confirms that this growth pattern is very common but not universal.

A similar phenomenon is ageotropism, in which plants pay no attention to the direction of gravity. Isley's book shows *Tillandsia bulbosa* growing this way, and he notes that in some species, such as *T. magnusiana*, the grower would be well advised to mount the plant in such a way that the apex of the plant is sideways or even pointing downward. This prevents water from accumulating among the leaf bases and thus may prevent rot.

In the humid, rainy climate of New Orleans I have had a lot of trouble with the pseudobulbous *Tillandsia* species such as *T. bulbosa, T. butzi, T. caput-medusa* and others of that growth form; they seldom lived more than a year for me and did not stick around long enough for any pups to grow to a size where they could live independently. Several years ago, I switched mounting styles and started putting these species on their supports with the growing point horizontal or pointing downward. The results have been good; as I write, a second generation of *T. bulbosa* is starting to flower. I've always believed that we can improve our horticultural practices by observing how plants grow in the wild, and this confirms it. Whatever reason tillandsias have for growing in other than a vertical position—and many do so as young seedlings, even if vertical when mature—we can benefit from growing them horizontally or even upside down.

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Castro-Hernandez, J.C., et al. 1999. The influence of humidity, nutrients, and light on the establishment of the epiphytic bromeliad *Tillandsia guatemalensis* in the highlands of Chiapas, Mexico. Revista de Biologia Tropical 47(4): 763-773.

Harvey, Celia. 1996. A. Patterns of seed colonization and seedling establishment of ball moss *(Tillandsia recurvata)* on sand live oak trees *(Quercus geminata)* in central Florida. Florida Scientist 59(2): 76-81.

Figure 25. *Tillandsia paucifolia*, seen here at Corkscrew Swamp Sanctuary, Florida, displays the upward turn, or "J" shape described in the article.

Photograph by Bruce Holst.

Events Calendar

April 11-13, 2003. BROMELIADS ON THE NET - 23RD ANNUAL SHOW AND SALE. Sarasota Bromeliad Society. Selby Botanical Gardens, Sarasota, Florida, USA. 10-4. Plant sale only on April 11. Show and sale April 12 and 13. Exhibits, sales, food, rare plant auction. For more information: Inez Dolatowski (941-748-2120; ldolatow@tampabay.rr.com) or Rob Branch (941-358-4953).

April 12,13, 2003. BSBC SHOW AND SALE. Bromeliad Society of Broward County. International Fishing Hall of Fame, Dania Beach, Florida, USA. For more information, contact Ann Schandelmayer (954-583-1124). The FLORIDA COUNCIL OF BROMELIAD SOCIETIES MEETING will be held in conjunction, on April 12.

April 12,13, 2003. SPRING ARBORETUM SALE. Bromeliad Society of Houston. Houston Arboretum and Nature Center, 4501 Woodway, Houston, Texas, USA. Sale hours, Sat. 9-5, Sun 11-4. Odean Head will present seminars at 1 pm on Saturday and Sunday. For more information: Allyn Perlman (713-772-7831 or deliboys@ev1.net).

May 3,4, 2003. 2003 SHOW. Bromeliad Society of South Florida. Fairchild Tropical Garden, Miami, Florida, USA. For more information: Karl Green (305-255-4888).

May 3,4, 2003. BROMELIADS ON THE BAYOU, a show for the Greater New Orleans Bromeliad Society. Lakeside Mall, Metairie, Louisiana, USA. For more information: Carol Hertz (504-486-8190) or Fred Ross (504-891-9301).

May 9-11, 2003. 28TH ANNUAL MOTHER'S DAY SHOW & SALE, a BSI judged event hosted by the Bromeliad Society of Central Florida. Florida Mall, 8001 S. Orange Blossom Trail, Orlando, Florida, USA. Fri. & Sat. 10-9, Mon. 12-6. Admission is free. For more information: John Boardman (407-957-5477 or e-mail jboard55@yahoo.com.

May 30 to June 1, 2003. 35TH ANNIVERSARY STANDARD BROMELIAD SHOW AND SALE. Bromeliad Society of Houston. Houston Arboretum and Nature Center, 4501 Woodway, Houston, Texas, USA. Sales, Fri. 12-6, Sat. 9-5, Sun. 11-4. Show schedule, Sat. 2-5, Sun. 11-4. For more information, contact Allyn Perlman (713-772-7831 or deliboys@ev1.net).

July 26 to August 2, 2004. WORLD BROMELIAD CONFERENCE. Bromeliad Society International/Bromeliad Society of Greater Chicago. Rosemont, Illinois, USA.

BSI JOURNALS FOR SALE

A complete set of the Journal of the Bromeliad Society, from the beginning (1951) through September-October 2002, is offered for sale. First 10 years in black and white. Best offer over $700.

Submit bids to Harvey Kendall, 110 Palo Duro Drive, San Antonio TX 78232-3027 or to Harkend@aol.com by July 1, 2003.

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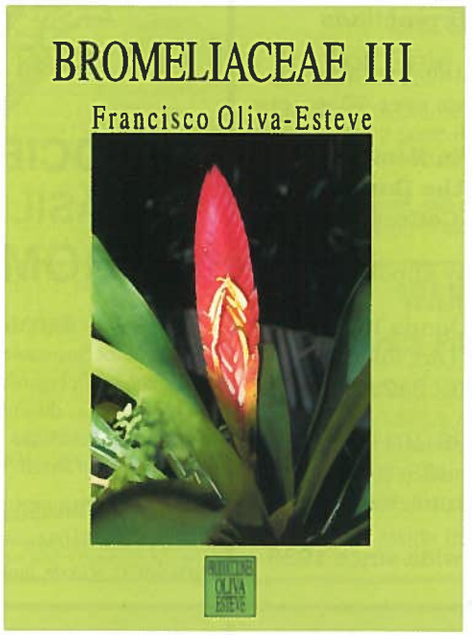
"Bromeliaceae III"

By: Francisco Oliva-Esteve



This handsome new book on bromeliads, published by Producciones Oliva-Esteve in Venezuela, is richly illustrated and printed on high-quality coated paper. 9 1/4 x 13 inches (32 x 25 cm). Photos, 564 in color. Hard Cover. 275 pp. English and Spanish editions available. ISBN 980-07-7310-X.

The opening chapter, "A Short Venezuelan Historical Review of the First Explorers," is followed by text and color photographs describing 29 genera. Among these are 108 species of *Tillandsia*, 38 of *Guzmania*, 34 of *Aechmea*, 17 *Pitcairnia*, and 15 *Vriesea*. This books adds new species to those covered in Oliva-Esteve's previous works.

Bromeliaceae III is priced $95 plus shipping and handling and applicable sales tax (Florida 7%). To order a copy, send check in US Dollars and made to SBG Press to:

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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.

Photograph by Mark Dimmitt

'Mystic Rainbow Peach' (*Tillandsia albertiana* × *arequitae*).

'Mystic Circle' (*Tillandsia recurvifolia* × *albertiana*).

Photograph by Mark Dimmitt