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Covers

Front—*Tillandsia brachycaulos* in its Mexican habitat, photo by Ivón M. Ramírez. See page 149.

Back—*Aechmea zebrina* 'Enaldo' (unreg.) A selected seedling raised by Greg Oldana at Innisfield, south of Cairns in Australia. This plant was growing epiphytically in Bob and Lyn Hudson's bromeliad garden in Cairns. Photo by Andrew Flower during WBC 2008.

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Editorial

In our last issue the Editor had an epistemological rant about the need for scientific disciplines to have a clearly defined terminology. There has not been the expected avalanche of comments and critiques from the scientific community! Are we all asleep out there? Don't we care? Perhaps we are all just too busy - well, editorial research will continue so if you wake up one day and find a proposal on the agenda that you disagree with you have only yourself to blame if you do not speak up!

Scientific

In another paper from the tillandsia symposium at WBC2006, Ivón Ramírez and her associates report on the breeding systems adopted by six epiphytic tillandsia species in the Yucatan Penninsular of Mexico. Despite having similar floral structures, the species have developed differing breeding systems - an important marker for future conservation strategies.

Eric Gouda and José Manzanarés describe for the first time *Racinaea penduliflora*, native to damp montane forest at 2100-3000m. on the Amazonian-side Andes in Peru. Following this, on page 159, we have a group of distinguished bromeliad scientists reviewing a recent work on the bromeliad flora in the São Paulo state of Brazil. The reviewers point out a number of significant issues where they consider the work deviates from mainstream modern taxonomy, and it is instructive to read through their arguments.

De Paula and Goldschmidt bring us another habitat review from South America, this time the Campos Rupestres of Parque Estadual do Itacolomi in Minas Gerais, Brazil. Habitat destruction has been particularly devastating on epiphytic populations and, sadly, *Racinaea aerinsincola* is thought to now be extinct in the area.

Cultivation

Lyn Wegner is a fired-up bromeliad enthusiast from South Africa, and on page 169 we have her account of early adventures with her broms. Lyn and her husband Trevor made it over to the WBC in Cairns this year, making many new friends with their warm personalities. Following her article, Dennis Heckart from Hawaii shows us some of his hybrids.

Retiring Cultivar Registrar Derek Butcher raises another set of conundrums in his corner, even going so far as to suggest that hybridists "seem to have lost the plot..." What do you think - or is it really Derek who has "lost the plot"? Those who have encountered Derek will realise that it is not his personality that could be described as "retiring" - he has actually announced his retirement as Cultivar Registrar from the close of 2008. Coincidentally, the BSI has formed a cultivar committee to review the whole cultivar registration system, so the next few years will be an exciting opportunity for some keen person to take over and (with plenty of advice from Derek!) help form the registration system for the future. So if you are passionate about cultivar registration, please get in contact with President Joyce Brehm forthwith.

“...Hybridists seem to have lost the plot...”

On page 176 Leo Dijkgraaf brings us the second part of his fascinating review of early bromeliad illustrations (“Bromeliad Icons”). This time he covers eighteenth century publications from the United Kingdom, future parts will deal with works from continental Europe. Leo is one of many keen and knowledgeable members in the Netherlands, and we are very fortunate to have them.

The World Bromeliad Conference in Cairns was an outstanding achievement, and with 358 registrations it was larger than recent World Conferences in the USA. We all owe a huge vote of gratitude to Lynn and Bob Hudson for their courage and ability to bring off such a daring enterprise. On page 184 Lynn brings us her summing up, and next issue we will bring you a show report and illustrations of major prize winners.

Closing off this issue, President Joyce Brehm discusses the new member rates.

Bromeliads Succor Ancient Beetles.

Thanks to Gary Gallick for sending us the following abstract:

“Water reservoirs formed by the leaf axils of bromeliads are a highly derived system for nutrient and water capture that also house a diverse fauna of invertebrate specialists. Here we investigate the origin and specificity of bromeliad-associated insects using Copelatinae diving beetles (Dytiscidae). This group is widely distributed in small water bodies throughout tropical forests, but a subset of species encountered in bromeliad tanks is strictly specialized to this habitat. An extensive molecular phylogenetic analysis of Neotropical Copelatinae places these bromeliadiculous species in at least three clades nested within other Copelatus. One lineage is morphologically distinct, and its origin was estimated to reach back to 12-23 million years ago, comparable to the age of the tank habitat itself. Species of this clade in the Atlantic rainforest of southern Brazil and mountain ranges of northern Venezuela and Trinidad show marked phylogeographical structure with up to 8% mtDNA divergence, possibly indicating allopatric speciation. The other two invasions of bromeliad water tanks are more recent, and haplotypedistributions within species are best explained by recent expansion into newly formed habitat. Hence, bromeliad tanks create a second stratum of aquatic freshwater habitat independent of that on the ground but affected by parallel processes of species and population diversification at various temporal scales, possibly reflecting the paleoclimatic history of neotropical forests.”

Balke M, Gómez-Zurita J, Ribera I, Vilorio A, Zillikens A, Steiner J, García M, Hendrich I, Vogler AP (2008) “Ancient Associations of Aquatic Beetles and Tank Bromeliads in the Neotropical Forest Canopy” *Proc Natl Acad Sci U S A*. 2008 Apr 29 ;105(17):6356-61. Epub 2008 Apr 23. Corresponding author: michael_balke@yahoo.de

Reproductive Biology of Six Species of *Tillandsia* L. (Bromeliaceae) in Mexico

Ivón M. Ramírez M., José U. González, Francisco Chi, Germán Carnevali and Filogonio May

Abstract

We investigated the breeding systems of six Mexican species of *Tillandsia* in the Yucatan Peninsula; *Tillandsia balbisiana* Schult. & Schult. f., *T. brachycaulos* Schltdl., *T. dasyliriifolia* Baker, *T. elongata* Kunth var. *subimbricata* (Baker) L. B. Sm., *T. streptophylla* Scheidw. ex E. Morren, and *T. utriculata* L. All species are epiphytic and inhabit a variety of vegetation types in the area, from low caducifolius forest, low inundated forests, medium-statured evergreen forests, coastal shrublands to mangroves. Results suggest that species have different breeding systems in spite of their similar floral morphology as well as different growth strategies, involving seed recruitment and clonal growth. Five out of six species are self compatible. *Tillandsia streptophylla* was self incompatible, the first report of this breeding system for the genus. The information emerging from these studies is of considerable importance in proposing and formulating conservation strategies for plant species.



Figure 1. *Tillandsia brachycaulos* in bloom. Photo by I. Ramírez.

Introduction

Bromeliaceae is the largest family endemic to the Neotropics, with 56 genera and ca. 3,086 species (Luther 2006). Mexico has 18 genera and 342 species of Bromeliaceae (Espejo-Serna, López-Ferrari et al. 2004), with *Tillandsia* as the most diverse genus in the country with ca. 192 spp.

Despite the key importance of the family mainly in the epiphytic guild in Neotropical communities, the reproductive biology of bromeliads is still poorly known. Breeding systems and pollination biology play an important role in the conservation biology of the species. Data from these studies combined with population demography, abundance, pollinator behavior, population genetics and dynamics, supply the biological bases to propose conservation strategies in plant populations. The epiphytic guild in particular has specific nutritional and water restrictions that imply a different scenario as compared to terrestrial plants, i.e., the high nutritional restrictions imposed a set of different life strategies, such as the fact that they have to grow, reproduce, and perpetuate with limited resources, attached to and tied to the phorophyte life cycle.



Figure 2. *Tillandsia elongata* var. *subimbricata*. Flower detail. Photo by I. Ramírez.



Figure 3. *Tillandsia balbisiana* in bloom. Photo by I. Ramírez.

Bromeliaceae is a clade composed mainly of hermaphroditic species and with wide morphological, floral, ecological variation, and different life histories that suggest different breeding systems. Different flower sexes and breeding systems have been reported for Bromeliaceae (Table 1) ranging from bisexual flowers to unisexual flowers and from xenogamy to cleistogamy.

In this study, the main questions were: how variable are breeding systems in the genus *Tillandsia*? How much floral morphology and biology predict breeding systems? How could this information help us in proposing conservation strategies about bromeliads?

Genus	Floral sex/Breeding system	References
<i>Tillandsia</i>	Hermaphrodite/ Xenogamy, Cleistogamy	Gilmartin & Brown, 1985; Gardner, 1986
<i>Hechtia</i> , <i>Dyckia</i> , <i>Cottendorfia</i> , <i>Lindmania</i>	Unisexual, bisexual/ Polygamomonoecy, monoecy, xenogamy	Benzing, 2000; Lenz, 1995; Ramírez et al., 2000
<i>Cryptanthus</i>	Hermaphrodite, unisexual/andromonoecy, xenogamy	Ramírez, 1996
<i>Pitcarinia</i>	Hermaphrodite/self compatibility, autogamy, xenogamy	Wendt et al., 2001

Table I. Different floral sex and breeding systems reported in Bromeliaceae.



Figure 4. Temple of the seven dolls in Dzibilchaltún (meaning “writing on flat stones”). Photograph by Francisco Chi.

Study Site: We studied the pollination biology and evaluated the breeding systems of the sympatric species *Tillandsia brachycaulos* (Figure 1), *T. elongata* var. *subimbricata* (Figure 2) and *T. balbisiana* (Figure 3) in low caducifolius forest at the Dzibilchaltún National Park (figure 4), ca. 17 km N of the city of Merida (21°5’N, 89°35’W), while studies on *T. utriculata* (Figure 5) were carried out in mangrove forest at the Zona Arqueológica de Xcambó (Figure 6), N of the village of Dzemul, Yucatán (21°20’N, 89°20’W) on the coast of Yucatan. Studies of *T. dasylirifolia* populations were performed at the coastal shrublands near San Benito, N of Dzemul, Yucatán (21°19’N, 89°25’W), while those of *T. streptophylla* were performed in mangrove vegetation at Celestún, Yucatan. All locations are less than 50 m above sea level (see Figure 7).

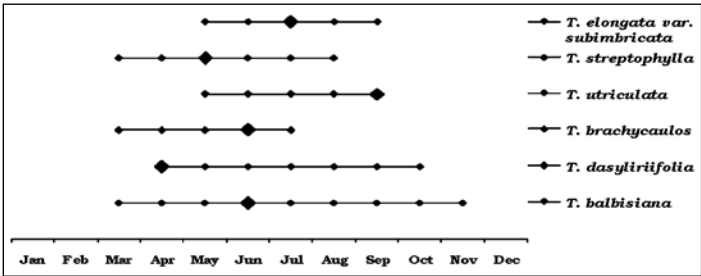


Figure 5. Flowering phenology of six species of *Tillandsia* in the Yucatan Peninsula, Mexico. The line indicates months when flowering individuals have been recorded, and the larger triangles the flowering peak.

The studies were conducted during the flowering seasons of the species (see Figure 5). The Mexican portion of the Yucatan Peninsula comprises the states of Yucatan, Campeche, and Quintana Roo, surrounded by the Mexican Gulf, and the Caribbean sea, while to the south it shares boundaries with the Mexican state of Tabasco, Belize, and the Guatemalan Peten. Yucatan as here defined is a diverse region; the climate varies from hot and dry in the northwest to humid in the south with average annual temperature 24 to 26°C.

Study group: We selected six *Tillandsia* species native although not endemic to the Mexican portion of the Yucatan Peninsula. Selected species vary in floral morphology and biology, i.e., inflorescence architecture, corolla shape and color, sexual organs (anthers and/or stigma exerted or inserted in corolla tube) anthesis hours and fruit setting (see Table 2 for a detailed comparison). All species belong in subgenus *Tillandsia* sensu Smith & Downs except *Tillandsia elongata* var. *subimbricata* that has been placed in subgenus *Allardtia* (Smith and Downs 1977).

Species	Inflorescence scape	Corolla shape	Corolla color	Sexual organs	Anthesis hours		New recruitment of individuals	Fruit setting in the field	Vegetation type	Phorophyte position	Geographical distribution
<i>T. balbisiana</i>	Long scape, panicle 1-divided Rarely simple	Tubular	Purple, tubular	Exerted from corolla tube	Diurnal (morning)		By seeds and less frequently offsets	Below 50%	Mainly low caducifolius forests, medium statured forests and mangroves	Mostly exposed places	N South America to Florida
<i>T. brachycaulos</i>	Non scape, nidular, panicle 2- 1-divided, condensed branches	Tubular	Purple, actinomorphic	Exerted from corolla tube	Diurnal (morning)		By offsets and less frequently by seeds	Ca. 100%	Mainly low caducifolius forests, also medium statured caducifolious forest	In shaded and less frequently exposed places	South Mexico to Panama Venezuela
<i>T. dasyliirifolia</i>	Long scape, panicle 2-divided	Tubular	Whitish, actinomorphic	Exerted from corolla tube	Diurnal (morning)		By seeds, offsets, and “keikis” on the inflorescence	Ca. 100%	Coastal scrubland, low inundated forest, tall evergreen forest	Mostly exposed places	Mexico and Belize
<i>T. elongata</i> var. <i>subimbricata</i>	Inflorescence with long scape, panicle 1-divided	Basally tubular, then petals spreading	White basally, light purple apically, actinomorphic	Inserted in corolla tube	Diurnal (late afternoon)		Mostly new individuals from seeds	Ca. 100%	Low caducifolious forest	Isolated individuals on exposed places	Florida Mexico to N South America
<i>T. streptophylla</i>	Inflorescence with long scape, panicle 1-divided	Tubular	Light purple, actinomorphic	Exerted from corolla tube	Diurnal (morning)		By seeds, rarely by offsets	Below 50%	Mangroves and low inundated forests	Isolated individuals on exposed places, rarely clumps of 2-3 rosettes	N Mexico to Honduras Costa Rica

Table II. Comparison of different life history characters among Tillandsia species in this study.



Figure 5. Tillandsia utriculata in bloom. Photo by I. Ramírez.

Methodology: To evaluate the breeding systems we performed a series of manipulated crosses following the methodology of Ramírez & Seres (1994) and summarized in Ramírez-Morillo, Carnevali et al. (2004). With the use of this methodology we try to assess whether the plant sets fruit or not, if produce seeds without fertilization (agamospermy, or also called apomixis) or only produce fruits by cross pollination. Also, we studied possible mechanisms that have evolved in order to avoid selfing in those species that are self compatible.

Results: Results of manipulated crosses in the six species of Tillandsia are shown on Table III. All species except *Tillandsia streptophylla* are self compatible (no fruits produced in manual or unassisted selfing). All species display high fruit set by cross pollination except *T. elongata* var. *subimbricata*. In the field,

all species produced fruits with *T. balbisiana* having the lowest fruit production (34%). *T. dasyliirifolia* is the species with the highest fruit set in all experimental crosses, it is self compatible and also produced fruits by cross pollination.

Discussion and conclusions: These preliminary results suggest that mating systems are variable even among species with similar floral morphology and biology, i.e. tubular flowers, exerted sexual organs and diurnal anthesis, probably all pollinated by hummingbirds. We suggest mechanisms such as herkogamy (separation of sexual organs) and dicogamy (differential maturation of sexual organs) prevent self pollination in self-compatible species. Self incompatibility is reported for the first time in a tillandsia species: *Tillandsia streptophylla* only produces fruits by cross pollination while, unlike most tillandsia species, its fruit production in the field is very low, suggesting pollinator limitation. *Tillandsia balbisiana* is a xenogamous species based on results of cross pollination but its fruit setting is relatively low, probably another case of pollinator limitant. *Tillandsia brachycaulos* seems to produce fruits in all crosses, suggesting self compatibility although it has relatively low fruit setting that is balanced by the strategy of high production of offsets. *Tillandsia elongata* var. *subimbricata* has the sexual organs inserted in the corolla tube and late afternoon anthesis, and also shows highest fruit setting by selfing. This species usually grows as solitary rosettes that bloom and produce many fruits with seeds that germinate close to the mother plant forming a large colony of seedlings. Finally, *T. dasyliirifolia* and *T. utriculata* seem to be the best adapted species since they produce fruit by unassisted pollination, self and cross pollination and present the highest fruit setting in the field. *Tillandsia dasyliirifolia* also produced “keikis” in the inflorescence (see Ramírez and Carnevali 2004).

Mating systems and pollination ecology suggest strong bases to explain distributional patterns and abundance of several species of Tillandsia in the natural habitat. More studies evaluating the mating systems based on seed amount, viability and germination, are needed to evaluate the effects of the different breeding systems in this species that produced fruits by several strategies. Also, density, biology, dynamics of the populations as well as pollinator behavior will provide important data to understand the different scenarios regarding the capacity of the populations to maintain and grow and the effect of natural phenomena such as hurricanes in this epiphytic species.

Species	Unassisted selfing	Manual selfing	Cross pollination	Natural pollination	Xi2
<i>T. balbisiana</i>	0.6D	60B	82A	34C	148.75 ($p < 0.05^{**}$)
<i>T. brachycaulos</i>	24B	19B	43A	50A	124.37 ($p < 0.05^{*}$)
<i>T. dasyliriifolia</i>	93A	93A	91A	88A	462.35 ($p < 0.01^{**}$)

Table III. Results on manipulated crossings in six Tillandsia species in Mexico. Numbers represent percentage of fruit setting. Numbers with same letters do not differ statistically for the same species. An Xi2 test was performed to test for differences among crosses and all are significantly different.



Figure 6. Xcambó (means "Place of crabs or crocodiles"), also known as X-Tampu. Photo by Francisco Chi.

Finally, self compatible species with unassisted pollination and clonal growth will have better chances to perpetuate (i.e., *Tillandsia dasyliriifolia* and *T. utriculata*) compared to those self incompatible and pollinator dependant species (i.e. *T. streptophylla*).



Figure 7. Location of the study sites (●) in the Yucatan Peninsula, Mexico.)

Acknowledgments: To the Bromeliad Society Inc. and Dr. Sue Sill for the invitation to the First International Tillandsia Symposium where the first author presented these results. The first author thanks the Elizabeth Bascom Scholarship from the Missouri Botanical Garden and the Kew Latin America Research Fellowships Programme (Klarf) for scholarships granted to study their Mexican Bromeliaceae herbarium collections. Authors thanks to the authorities of Dzibilchaltun National Park and Celestún Reserve for granting permission to carry out field studies in the park. Thanks to Herbarium CICY, Centro de Investigación Científica de Yucatán, A. C. The second author thanks CONACYT for the scholarship to pursue part of this study as a thesis research.

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2009 Australian Bromeliad Conference

Bromelaide 2009 will be held in Adelaide over Easter 2009; Friday 10 to Monday 13th April. Information and registration forms are online at:

www.bromeliad.org.au/BROMADELAIDE2009.htm.

Keynote speaker is Dr Jason Grant, and the Conference will have a reception/cocktail event, plant sales, rare plant auction, and balanced educational and stimulating talks. Early bird registration AU\$185 if paid before 31 December 2008.

A new species of *Racinaea* (Bromeliaceae) from Peru

Eric John Gouda and José Manuel Manzanares. Photographs by Philip Wittman.

By coincidence both authors were initially working independently on manuscripts describing material that, we later found out, related to the same new species. Manzanares had the specimen collected by Robin B. Foster on loan from the Missouri Botanical Garden (MO) and Gouda was working on the C. Porter et al. specimen after Ricardo Fernández contacted Gouda by email for a name for their 3 collections from Cuzco. The much smaller Foster specimen has been chosen for the holotype because it was collected at anthesis. This specimen seems to be slightly more bulbous than the comparatively utriculate Porter et al. collections. The taller plants of the Porter et al. collections are from the Dept. of Cuzco and are collected not more than 50 km apart of each other, but the Foster collection is 500 km to the North-East in the Dept. of Pasco. All collections are from the damp montane forest at the Amazonian side of the main ridge of the Andes, Peru.

Racinaea penduliflora Gouda & Manzan., sp.nov.

Planta florens 30-40 cm alta rosula utriculata. Laminae triangulares basi 3 cm latae, cinereo-lepidotae. Inflorescentia inclinata, bis vel ter ramificata ramulis distincte stipitatis, spicis deflexis vel pendulis. Flores deorsum secundi vel penduli. Bractee florales carinatae dense lepidotae, sepalis 6 mm longis superatae.

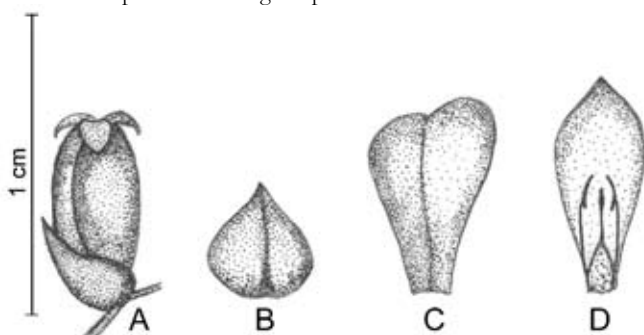


Figure 1. A, flower; B, floral bract; C, sepal; D, petal, stamen, pistil and ovary. Drawing by J. Manzanares.

Plant an epiphyte, flowering 30-40 cm tall, rosulate, rosette utriculate, ca. 24 cm wide, with 20-30 leaves, the inflorescence much exceeding the leaves. **Leaves** densely cinereous-lepidote, numerous; sheaths 7-11 cm long, 5.5 cm wide, conspicuous, sub-erect, ovate-elliptic, densely lepidote, brown castaneous to brown

reddish in the upper part; blades 15-20 cm long, ca. 3 cm wide at the base, triangular, spreading, nearly flat, attenuate, recurving, often with purple spots and/or margins, densely lepidote, cinereous green. **Inflorescence** 17-45 cm long (stretched), 12-15 cm wide, arching to one side, laxly paniculate, green, densely cinereous lepidote except the sepals ferrugineous lepidote, 2 times branched or slightly 3 times branched, with 10-15 branches 2 cm apart from each other; **peduncle** about equaling to exceeding the leaves, 18-30 cm long, 3-4 mm in diameter, erect to curved; **peduncle-bracts**: the lower ones exceeding the internodes and imbricate, soon shorter than the internodes, 3.5-6 cm long, extended 1 cm wide, the lower ones triangular, attenuate, the upper elliptic

and more apiculate, erect with recurving apex, densely cinereous-lepidote; **primary-bracts** spreading, elliptic, the lower ones like the peduncle-bracts, 2-3 cm long, 0.8-1 cm wide, slightly exceeding or shorter than the stipe, apiculate, densely cinereous lepidote, branches 3-12 cm long, with a stipe of 1.2-3 cm length and without sterile bracts, lower branches divided into 3-6 (the upper less divided) spikes, lax, polystichous; **secondary-bracts** elliptical, lepidote, 6-8 mm long exceeded by the sterile bases of the spikes. **Spikes** arching-pendulous, laxly distichously 3-8-flowered, 1-3.5 cm long, 0.6 cm wide, rachis exposed by the bracts, flexuous to geniculate, subterete, internodes 3-5 mm, green, lepidote; **stipes** 1-1.5 cm long, without sterile bracts, subterete; **floral-bracts** 3-5 mm long, 4.5 mm wide, ovate, apiculate and the apex incurved, in the upper part carinate, densely cinereous-lepidote, much shorter than the sepals, remote to each other, cinereous-green. **Flowers** subsessile, the lower ones pendulous-secund, corolla yellow; **sepals** free, 6 mm long, extended 3 mm wide, obovate, asymmetrical, the adaxial ones carinate, obtuse, adaxially glabrous, abaxially densely covered with ferrugineous trichomes, brown to yellow; **petals** 7 mm long, yellow, spatulate, acute, the blade spreading with recurving apex; **stamens** basally adnate to the petals; **filaments** 2-3 mm long, flat, white; **anthers** sagittate and closely arranged around the stigma, 1 mm long, yellow; **ovary** 1.5 mm long, ovoid; style 1 mm long, with a 0.5 mm long stigma. **Fruit** subcylindric.



Figure 2. *Racinaea penduliflora* in fruit (coll. PE08-60).

Holotype: Robin B. Foster 9043 (holotype: MO), PERU, Pasco, Cerro Pajonal "Chacos", 12 km al SE de Oxapampa, Cordillera Yanachaga, Oxapampa, 10°35'S 75°20' W, Alt. 2700-2800 m, 7 Oct. 1982.

Paratypes: C. Porter, R. Fernandez & P. Wittman PE08-60 (USM), PERU, Dpto. Cuzco, Prov. Cuzco, Acjanaco, on Acjanaco-Pillahuata Road, 13°10.688'S 71°35.123'W, Alt. 2,969 m. 4 Mar. 2005. C. Porter, R. Fernandez & P. Wittman PE08-358 (USM), PERU, Dpto. Cuzco, Prov. Paucartambo, Pillahuata, 13°10.689'S 71°3.125'W, Alt. 2,904 m. 1 Apr. 2005. C. Porter, R. Fernandez & P. Wittman PE08-298 (USM); PERU, Dpto. Cuzco, Pillahuata, 13°10.759'S 71°35.023'W, Alt. 2,178 m. 27 Mar. 2005.

Habitat and distribution: misty, cloudy and cool montane forest at the Amazonian side of the Andes of Dept. Pasco to Dept. Cuzco, Peru (not yet known from Dept. Junin but probably there), between about 2100-3000 m.



Figure 3. *Racinaea penduliflora* showing the reddish colouration of the leaf base and margins and some spotting, and an old inflorescence (coll. PE08-358)

Etymology: “Pendulus” means hanging, pendent; “-flora” is flowered (with hanging flowers). A typical aspect of this species is the pendent spikes and flowers, which is rare in *Racinaea*. Especially the first flowers in a spike are strongly downwardly second, the ones toward the apex are downward (pendent) because of the pendent curving spike.

Discussion: This new species resembles *Racinaea flexuosa*, *R. pallidoflavens* and *R. kessleri* and can be distinguished from these and other species by a combination of following characteristics: Plant flowering 30-40 cm tall with an utriculate rosette. Leaf-blades triangular, ca. 3 cm wide at the base, cinereous-lepidote. Inflorescence bent over to one side, twice to thrice branched with distinctly stipitate branches, the spikes arching-pendulous. Flowers at the base of the spikes downwardly second, the apical ones pendulous with the spike. Floral-bracts carinate, densely lepidote, exceeded by the 6 mm long sepals.

Acknowledgments: we want to thank Dr. Lubbert Westra (U) for providing the Latin diagnosis, Dr. Ricardo Fernández (Universidad San Marcos, Lima, Peru, Herbarium USM) for making the specimens available for examination, and Dr. Philip Wittman for providing digital images of the plants in situ. The Missouri Botanical Garden (MO) for the access to their specimen. The paratype vouchers (C. Porter et al.) were collected during expeditions support by the National Geographic Society grant 7731-04.

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A Review: *Bromeliaceae* – *Flora Fanerogamica do Estado de São Paulo*

Gregory K. Brown, Walter Till, Elton Leme, and Jason Grant

Recently, volume 5 of *Flora Fanerogamica do Estado de São Paulo* was published (Melhem, Wanderley et al. 2007). This contribution to the flora of São Paulo state, Brazil covers an interesting group of 12 flowering plant families, one monocot (*Bromeliaceae*) and eleven dicots (*Araliaceae*, *Basellaceae*, *Bombacaceae*, *Cactaceae*, *Ebenaceae*, *Flacourtiaceae*, *Menispermaceae*, *Phytolaccaceae*, *Podostemaceae*, *Quiinaceae*, *Rubiaceae*). This review concerns only the *Bromeliaceae* treatment coordinated by Wanderley & Martins (Wanderley and Martins 2007).

Based on approximately 2700 herbarium specimens (exicata) 16 authors (Table 1) recognize 149 species in 18 genera, and four undescribed species (1 *Aechmea*, 3 *Vriesea*) of bromeliads from São Paulo state, Brazil. In general, the structure and information within this floristic treatment of *Bromeliaceae* adheres to normal conventions for this type of work. In addition to a general technical description for the family there is a key to genera, a brief description for each genus, and species-level keys where appropriate. For each species there are descriptions, brief notes on distribution, a list of selected material examined, and commentary on taxonomy and noted variations. A total of 29 plates are included that illustrate one or more aspect, usually habit, for 65 of the 148 recognized species.

This contribution is significant because it represents the first published floristic treatment of *Bromeliaceae* for São Paulo state. There are, however, a number of curious features about the work that detract from its value.

In the key to genera, and in the generic description for *Bromelia*, the rosette of leaves is characterized as forming a tank, a condition not associated with the genus, and for a neophyte this would likely lead to identifying a *Bromelia* specimen as *Acanthostachys* when using this key. Application of the tank habit to *Bromelia* broadens the morphological concept of the tank to a point where it becomes synonymous with rosette, and thus has no diagnostic significance.

There is some confusion concerning the listed exicata as part of each species treatment. For example, “Material Seleccionado”, a list of one to several selected specimens used to document each species is used most often, but then “Material Examinado”, is also encountered in other cases (e.g., *Aechmea lingulata*, *Vriesea vulpinoidea*). The mixed use of Material “Seleccionado” and “Examinado” is most likely an editorial error and probably goes unnoted by most users. However, because the specimens examined are the data upon which a scientific floristic treatment is based, specimen citation needs to be clear. This brings us to the “Lista de exsicatas”, or list of herbarium specimens examined for the entire family treatment. Estimated at approximately 2,700, this list is not reader/user-friendly. For example, an entry consists of the collector’s last name and initial(s), followed by the collection number and finally

Subfamily	Genus	number of species recognized	Authorship of generic treatment
Bromelioideae	Acanthostachys	1	Proença & Wanderley
	Aechmea	17 + 1 undesc.	Martins, Wanderley & Proença
	Ananas	4	Martins, Proença & Wanderley
	Billbergia	7	Proença, Wanderley & Martins
	Bromelia	3	Proença, Louzada & Wanderley
	Canistrum	7	Wanderley, Martins, Proença & Moreira
	Fernseea	2	Proença & Wanderley
	Hohenbergia	2	Proença, Martins & Wanderley
	Neoregelia	11	Wanderley & Sousa
	Nidularium	22	Moreira, Wanderley & Martinelli
Pitcairnioideae	Quesnelia	5	Proença, Martins & Wanderley
	Dyckia	4	Forzza
Tillandsioideae	Pitcairnea	1	Forzza
	Alcantarea	1	Versieux & Wanderley
	Catopsis	3	Oliveira & Lima
	Racinae	2	Fiorato & Wanderley
	Tillandsia	15	Wanderley, Fiorato, Ogawa & Tardivo
	Vriesea	47 + 3 undesc.	Costa, Wanderley & Moura

Table 1. Bromeliad genera, number of species, and authorship, arranged by subfamily, in the Bromeliaceae - Flora of São Paulo state, Brazil (Melhem et al. 2007).

the taxon number (e.g., Gomez, S.M.: 451 (15.5)). In this example the taxon number, 15.5, is the number for *Quesnelia violacea*, but because Gomez 451 is not listed as one of the selected specimens examined, the interested reader receives no information on location, it would take an unreasonable effort to determine the herbarium location for examination. This is not a trivial problem, since it appears that only about half of the estimated 2,700 exicata are listed with more detailed information in the "Material Seleccionado" (or "Examinado") sections, and thus could not be easily located.

A couple of taxonomic judgments also deserve mention. First is the decision to include full treatments for four undescribed species, one in *Aechmea* (with full illustration in plate 5), and three in *Vriesea* (none illustrated). This is largely unprecedented in modern plant taxonomy where the norm is to describe new taxa either before a floristic treatment is published so that the new binomial can be used; or publish the new binomial within the floristic treatment; or only mention existence of a putative, new species, but not include a full treatment.

Second, the authors also demonstrate a strong tendency to maintain broad circumscription concepts, more in line with Smith & Downs (1974, 1977, 1979) (Smith and Downs 1974; Smith and Downs 1977; Smith and Downs 1979) rather than follow published revisionary changes that are based on focused, systematic monographic study (e.g., (Grant 1995); Leme (Leme 1997), (Leme 1998)). Thus, certain generic level taxonomic concepts (Table 1; i.e., *Canistrum*, *Nidularium*, *Wittrockia*), are contrary to the mainstream views of the Bromeliaceae research community. For example, Martinelli

(Martinelli, Viera et al. 2008), and Luther (Luther 2008) utilize the more current and progressive circumscriptions (e.g., Grant 1995, Leme, 1997, 1998, (Leme 2000)) that reflect a more refined understanding of taxon variation and diversity.

One of the major goals of modern plant systematics is to develop classifications, based on sound data, which better reflect presumed phylogenetic relationships, and do not perpetuate known polyphyletic groups (see (Brown, Luther et al. 1993); (Tuthill and Brown 2003)). This means that any nomenclatural change, including the designation of taxonomic synonyms, should be based on tangible data and explicit scientific justification. However, this floristic treatment of Bromeliaceae provides neither new data, nor a data based justification, to explain the maintenance of older arguably artificial generic concepts (e.g., Smith & Downs 1979) over more recent, rational monographic revisions. Examples of this include the rejection of *Edmundoa* and *Wittrockia* (Wanderley, Martins et al. 2007), as distinct genera from *Canistrum*, and *Canistropsis*, which was placed into synonymy under *Nidularium* (Moreira, Wanderley et al. 2007). In the case of *Edmundoa* and *Wittrockia* the only explanation given was that variability of the diagnostic characteristics was continuous. With *Canistropsis* the justification was, again, vague and not rooted in any newly produced scientific data. This results in the new combinations *Canistrum ambiguum*, *C. paulistanum*, and *Nidularium exiguum*, which should have been avoided under the current state of knowledge, as this does not add new information, only nomenclatural instability.

Section 9 of the preamble of the International Code of Botanical Nomenclature states that "the only proper reason for changing a name are either a more profound knowledge of the facts resulting from adequate taxonomic study or the necessity of giving up a nomenclature that is contrary to the rules" (McNeill, Barrie et al. 2006). Based on this principle, the situation here is not different from that depicted by Brown et al. (Brown, Luther et al. 1993) who rejected the proposal of Smith & Kress (Smith and Kress 1989) to raise all subgenera of *Aechmea* to generic rank, also grounded on the fact that no new information concerning *Aechmea* was presented.

According to Brummitt & Sosef ((Brummitt and Sosef 1998), it is wrong to reject a proposed hypothesis that is well-founded on data, just because one does not agree with that proposal, or because it could possibly be wrong; one must await new data that demonstrate the contrary or a more reasonable hypothesis. However, neither new data nor more reasonable hypotheses were raised in the treatment of Bromeliaceae for São Paulo state. The consequence is a significant number of new superfluous binomials.

More information about the Flora Fanerogamica do Estado de Sao Paulo project can be found at: <http://www.ibot.sp.gov.br/PESQUISA/florasp/florasp.htm>

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Bromeliaceae from Parque Estadual do Itacolomi, Minas Gerais, Brazil

Cláudio Coelho de Paula and Aruay Goldschmidt



Figure 1. Ouro Preto city in the foreground, overlooking a partial view of Parque Estadual do Itacolomi. Photo by Carlos Alberto.

Abstract

The Bromeliaceae floral data was collected in Campos Rupestres of Parque Estadual do Itacolomi (PEI), municipal district of Ouro Preto and Mariana, in the state of Minas Gerais, Brazil. The review identified three subfamilies, eight genera and 15 species. *Racinaea aerisincola* is now considered extinct from PEI. This work is a contribution to the study and consequent conservation of the Campos Rupestres' Bromeliaceae from the state of Minas Gerais.

Key words: Floristic, Bromeliaceae, Campos Rupestres

Introduction

The Parque Estadual do Itacolomi (PEI) area is located in the southern reaches of the Espinhaço mountain range (Cadeia do Espinhaço). This range begins in the southeast area of Brazil, in the state of Minas Gerais, and extends for about 1,100 km south-north direction from the area of Serra do Ouro Branco (20° 30' S) to Serra do Curral Feio (10° 30' S) (Giulietti, Menezes et al. 1987; Giulietti, Harley et al. 2000)

The Cadeia do Espinhaço is characterized by a mosaic of vegetative environments called “Campos Rupestres” that according to Vitta (2002) is made up of three physiognomies: Campos Graminóides (field with grass predominance), Afloramentos Rochosos (rock grouping) and Mata de Galeria (forests located in the bottom of the valleys). However, in a study of Serra do Ouro Branco, Paula, Silva et al. (2005) consider Campos Rupestres as a mosaic of five physiognomies (Campos Graminosos, Afloramentos Rochosos, Matas de Galeria, Campos Brejosos (swamps in mountain areas) and Campos de Velózias (fields with Velloziaceae predominance) determined mainly by the predominant substrate. This ecosystem occurs at 900m or higher altitude over a substrate originated mainly by quartzite rocks (Giulietti, Menezes et al. 1987). We have adopted the definition of Campo Rupestres according to Paula et al. (2005).

The Bromeliaceae family is an important component in the Campo Rupestre, with a great diversity of species, many of them endemic (Leme and Marigo 1993). According to these authors, the most characteristic genera from Campo Rupestre are *Dyckia* (Pitcairnioideae) and *Vriesea* (Tillandsioideae).

Beside the ecological importance of the Bromeliaceae, the floristic diversity of this family is still not well known in the extreme south of the Cadeia do Espinhaço; especially in Parque Estadual do Itacolomi (PEI). The only study about the PEI Bromeliaceae diversity was accomplished by Péron (1989) and that identified six genera and seven species.

Our aim was to collect all the bromeliad species living in the in Campos Rupestre from Parque Estadual do Itacolomi (Figure 1), thereby adding to our knowledge of the Bromeliaceae family from Cadeia do Espinhaço, in Minas Gerais.

Materials and Methods

The Parque Estadual do Itacolomi (PEI) (Itacolomi State Forest) is located in the Quadrilátero Ferrífero in Minas Gerais, in the municipal district of Ouro Preto and Mariana, between the 43° 32'30" and 43° 22'33"W meridians and 20° 30'00" and 20° 22'30"S parallels, in the extreme south of Cadeia do Espinhaço (Perón, 1989). According to Messias et al. (Messias, Dias et al. 1997) the PEI has a total area of about 7000 ha and a maximum altitude of 1,772m, in a transitional area between the Atlantic Rainforest and the Cerrado (Savannah), in the extreme south of Cadeia do Espinhaço. Predominant vegetation is Campos Rupestres, whilst the lower reaches incorporate part of the Atlantic Rainforest.

The floristic study was accomplished through monthly collecting over a period of 12 months, only in the Campo Rupestres area. We collected fertile samples in the Baú, Lagoa Seca and Serrinha track. Observations about the populations and their habitat were made in the entire study area.

The material was deposited in the Herbarium (VIC) of the Departamento de Biologia Vegetal (Vegetal Biology Department) of the Universidade Federal de Viçosa, including some assembly, labeling and deposition of the exsiccated. The identification was based on the description of the respective taxa presented by Mez (1892); Smith & Downs 1974, 1977, 1979; Reitz (1983 p.518); use of keys; consulting the Herbarium VIC collection of the Universidade Federal de Ouro Preto (UFOP); and also help from specialists.



Figure 2. Population of *Billbergia elegans* Martius ex Schultes f.



Figure 3. *Vriesea bituminosa* as a heliophilous species.

Results and Discussion

The Bromeliaceae from PEI are classified in three subfamilies, eight genera and 15 species (Table 1). Four species belong to the subfamily Pitcairnioideae (*Dyckia cinerea* Mez, *D. minarum* Mez, *D. sordida* Baker and *Pitcairnia flammea* Lindl.), seven belong to the subfamily Tillandsioideae (*Racinaea aerisicola* (Mez) A. Spencer & L.B. Smith, *Tillandsia stricta* Solander, *Vriesea clauseniana* (Baker) Mez, *V. bituminosa* Wawra, *V. crassa* Mez, *V. gigantea* Gaudichaud and *V. longicaulis* (Baker) Mez) and four belong to the subfamily Bromelioideae (*Billbergia elegans* Martius ex Schultes f., *B. vittata* Brongniart, *Cryptanthus shwackeanus* Mez and *Pseudananas sagenarius* (Arruda da Camara) Camargo).

The Campos Rupestres in PEI have four predominant physiognomies: Campos Graminosos, Campos Brejosos, Afloramentos Rochosos and Matas de Galeria. We did not observe the Campos de Velózias, although it was found by Paula et al. (2005) in Serra do Ouro Branco, located about 30 km from PEI. The PEI Bromeliaceae occurred only in the Afloramentos Rochosos and Matas de Galerias physiognomies. Seven species

(*Dyckia cinerea*, *D. minarum*, *D. sordida*, *Pitcairnia flammea*, *Cryptanthus shwackeanus*, *Vriesea clauseniana*, *V. crassa*) occur mainly in Afloramentos Rochosos. Five species (*Racinaea aerisicola*, *Tillandsia stricta*, *Vriesea longicaulis*, *V. gigantea* and *Pseudananas sagenarius*) are restricted to the Mata de Galerias and three (*Billbergia elegans*, *B. vittata* and *Vriesea bituminosa*) occur in Mata de Galerias and also on trees between Afloramentos Rochosos. Habitats were classified as epiphyte, rupicolous, saxicola or terrestrial, with six species living in more than one habitat (Table 1).



Figure 4. *Cryptanthus shwackeanus* growing in full sun and a rupicolous habit.

The species *Billbergia elegans* (Figure 2), *Cryptanthus shwackeanus* and *Vriesea bituminosa* are distributed throughout PEI, forming populations with numerous rosettes. On the other hand *Dyckia minarum* and *Pseudananas sagenarius* have smaller populations, occurring respectively in the Afloramentos Rochosos and Mata de Galeria, in Serrinha's track area. The species *Racinaea aerisicola* referred in this work, collected for the last time in 1995 (VIC 23.656), was not found in the indicated area in PEI or even among other appropriate habitats. Probably this species, typical from Matas de Galeria, is extinct in PEI. Works aiming at its reintroduction must be accomplished. *Dyckia cinerea* and *D. sordida* are represented in PEI by uncountable populations, concentrated in the Serrinha area above 1500m. Both species flower in May and June.

The largest number of Bromeliaceae species from PEI are heliophile, although occasionally the same species occur in distinctive environments related to its luminosity. *Billbergia elegans*, *B. vittata* and *Vriesea bituminosa* develop as heliophiles in Afloramentos Rochosos or sciophytes in Mata de Galeria (Figure 3). *Vriesea longicaulis* is the only exclusively sciophyte species.

Phenotypic plasticity is very common in the family, and is notable in *Cryptanthus shwackeanus*. When this species lives in full sun and has a rupicolous habit, it becomes

extremely reduced with an average 2 cm length leave (Figure 4), although when it grows in areas with less luminosity and with saxicolous habit it can grow ten times larger.

Three current species of the Tillandsioideae subfamily in PEI were also identified by Coffani-Nunes (1997) in the Campos Rupestres in the Parque Nacional da Serra do Cipó (National Forest of Serra do Cipó): *Tillandsia stricta*, *Vriesea bituminosa* and *V. crassa*. Forzza & Wanderley (1998) working with the Pitcairnioideae from this National Forest identified 11 species distributed in three genera, with similarities only for the *Dyckia cinerea* and *D. sordida* species.

All the species of the genera *Vriesea* that occur in PEI belong to sub-genus *Xyphion* (Smith & Downs 1977) which indicates the importance of the Bromeliaceae for the maintenance of certain members of the fauna such as moths and bats. It was observed that the Bromeliaceae perform important interaction with the local fauna, especially due to the water that accumulate itself in the cisterns formed by the leaves, and remains even during the six drier weeks (Reitz, 1983; Leme & Marigo, 1993). Anurous species that live in the PEI depend mainly on this water supply. In the *Vriesea clauseniana* population it is common to find amphibians inside its cisterns. Besides the amphibians, some bird species also use the cistern's water, although with a lesser degree of dependence.

Some epiphyte Bromeliaceae had their population drastically reduced or even destroyed completely in PEI because long tracks of the Mata de Galeria were destroyed by fire. Indeed, the frequent fires may have been the cause of the reduced number of *Tillandsia stricta* observed.

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Where to Find Them

Some of the plants illustrated in this issue (including those on both covers!) are available from Michaels Bromeliads - see their ad. on page 178:

Aechmea recurvata, *Aechmea zebrina*, *Billbergia elegans*, *Tillandsia brachycanlos*.

Michaels ship worldwide - tell them you are a member and they will give you 10% discount on the above plants.

Seed of *Tillandsia elongata* var. *subimbricata* (p. 150) is available in our BSI Seed Bank on page 183

Bromeliads for Africa!

Lyn Wegner

I live in South Africa in a small city, East London which is situated on the coast between Cape Town & Durban. Our climate is fairly mild & very suited to bromeliads. We have summer rains & good humidity. Our winter temperatures average a minimum of 10 deg C & we average a maximum of +28 deg C in the summer.

It has been my intention for a while to tell you my story but a very exciting visit by Dennis Cathcart in Sept 2007 has prompted me to eventually do so. Dennis was in SA for a photographic succulent visit. We were extremely honoured to have him spend a couple of hours with us and I wanted to show him that bromeliads are very much alive & well in SA.



Lyn with some of her broms.

My fascination with broms started in 1991 & it has now become an all consuming passion! I didn't make a conscious decision to collect broms. They somehow crept into my life & took over! The first book I managed to find was The Bromeliad Lexicon & I purchased mine in 1991. I had a few plants & was always on the lookout for more that I didn't have. I certainly had no idea just how addicted I was to become. There were very few bromeliads available in our small nurseries & not one was named. I would get very excited if I found a plant I thought I didn't have, maybe even a few & would buy one of each type just in case I didn't have it only to discover that almost every plant I had just purchased I already had in my small collection. My obsession with bromeliads had begun. I remember saying to my husband that I didn't want these 'things' all over the garden. I must have had a premonition of what was to come. My husband, Trevor, is not a gardener, but very supportive of my hobby (or is it addiction?). It takes a special kind of person to be involved with a bromeliad enthusiast as it becomes an all consuming passion !

In January of 2000 I decided I wanted to open a small 'nursery' specialising in bromeliads. I named it "Bromeliads for Africa". In SA the expression 'for Africa' means you have lots of something ie I had lots of broms. I planned to open in the Spring which is officially the 1st of September. "I wanted to educate people about bromeliads, to show them how wonderful these plants were, so easy to grow, in the sun, shade, mounted on trees or drift wood, even rocks or grown in the garden. Most would not

need too much water & were happy with the wind. Strangely, I felt it my duty to promote these wonderful plants in South Africa. There are many people who don't know what a bromeliad is, many are also not aware that Tillandsias are also bromeliads.

Our nursery opened on the 2nd September 2000. It has grown beyond my wildest dreams! I am as passionate about it as I was 7 years ago. We operate from our home on weekends only, both days from 9 to 5. The garden is also open. We have no staff assisting with the nursery or our home so there is lots to do. I was employed at First National Battery as the Automotive Production Planner, but retired at the end of April last year at the age of 54. It became very difficult to manage batteries & bromeliads! I was sad to leave but now I have all day to spend with my broms.

We opened a teagarden on the first Sunday of each month to promote 'Bromeliads for Africa'. We ran it for 3 1/2 years & we made many new friends.

Everything that I earn in the nursery is used to import more plants for the nursery & my collection. There are other costs to cover too eg pots, bags & bags of potting soil, labels & advertising. We also carry a range of brom books as I know how desperate I was for books which are not freely available in SA. I have given a few Bromeliad talks at Gardening clubs. I was terrified at first, but felt this was a chance to promote broms. I discovered that if you are passionate about something it is actually quite easy to talk to a group of people. I always say I may only get 6 out of 10 for knowledge but I definitely get 10 out of 10 and a heap of gold stars for passion!

We do have a huge problem with space! & even briefly considered buying the property adjoining the back of ours. It would just be too expensive & I suppose a matter of time before more space would be needed. It was nice to dream though!

We post many plants out of East London, but I am glad that the interest is growing here too. We cater for gardeners, beginner collectors & the neurotic like me who are totally obsessed!

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I am a little disappointed that most people are attracted by neos only. I hope to change this! I have many varieties of billbergias (a favourite of mine), also dyckias & ortho-phytums (more favourites!). I am working on improving with cryptanthus - have given them a warmer position and made an effort to feed them. Lots of aechmea, guzmania, nidularium, tillandsias plus some hohenbergia, edmundoa, fosterella, bromelia, pepinia, araeococcus, annanas ??? I find it very difficult to decide which plants are my favourite - I love them all.

I would like to have a catalogue, with pictures, of all our plants as this is a big problem for most people. A catalogue listing 100's of names of plants means nothing especially to beginner gardeners or collectors. Many don't have access to Internet which also doesn't show every plant.

Another problem is that some growers already have unnamed bromeliads & don't want to duplicate them. I am slowly taking photos but this is going to take a long time & I wonder if my catalogue will ever be available! I don't know of anyone else who is happy to take pot luck when ordering new plants. For me there is nothing more exciting than opening a box (many boxes even better!) of broms I have no idea of what to expect. I would like to thank, in particular, Tropiflora and Michael's Bromeliads for making it possible for me to have all the magnificent plants I have and for enabling me to continue adding to my collection and nursery.

I think the highlight of my life must be the unbelievable email I received from Dennis Cathcart at the end of December last year. I couldn't believe what I was reading! Dennis had named a bromeliad *Billbergia* 'Lyn Wegner' (clone of *B. 'Strawberry'* x *B. vittata* 'Domingos Martins'). Wow, what an unexpected honour. I have re-read this email many times. This means so much to me. I love the form and foilage of billbergias and I am determined to increase their popularity in SA.



Billbergia 'Lyn Wegner'

Hybridizing Bromeliads for Fun

Dennis Heckart

My interest in bromeliads came from seeing some unusual plants in the 1970's at the Conservatory in San Francisco's Golden Gate Park. The Conservatory is a grandiose Victorian glass structure in which a small part of the west wing had a very nice display of bromeliads, the grandest of which, in my opinion, was *Vriesea hieroglyphica*. Thus my interest began.

At the time the only way I knew how to purchase unusual bromeliads was to import them from Brazil. My first successful bromeliad hybrid was *Vriesea hieroglyphica* x *V. racinae*. I thought at the time that I could achieve a smaller *V. hieroglyphica*, which I did in the form of *Vriesea* 'Pamela Leaver,' named for the person who let me rent space in her greenhouse in Concord, California. She helped rescue the plant when I moved to Florida in 1980. There are interesting F-2 versions of the plant.



Billbergia 'Kahakai.'



Aechmea 'Royanne' (unreg.)

I have always sought contrast in hybrids. One unusual plant crossed with another. Hopefully you get interesting or beautiful results. I have had ready access to blooming bromeliads since moving to Hawaii in 2003. Every corner of my third of an acre has some bromeliad growing on it. David Shiigi has made any plant in bloom available from his large nursery. John Arden has given me any plant I wanted.

At one time a few years ago I had so many seedlings, it was hard to keep up with the maintenance!



xPortemea 'Puna' (unreg.)



Vriesea "Painted Canyon" (unreg.)

Billbergia 'Kahakai' (pronounced ka ha kye, it means beaches in Hawaiian). I live in a subdivision called Hawaiian Beaches, off of Kahakai Blvd., thus the name. It was the first hybrid I did after moving to Hawaii. It combines the best attributes of *Billbergia sanderiana* x *B. 'Domingos Martins'*. It has larger but similar markings of *B. 'Domingos Martins'* with the beautiful pink and purple inflorescence of *B. sanderiana*.

Aechmea 'Royanne' is a large hybrid of *Aechmea fendleri* x *A. serrata*. It has serrate leaves and a large elongated purple violet inflorescence with a long lasting berries that turn dark purple when ripe. Named after Royanne Shiigi, it has turned out to be a good landscape subject.

xPortemea 'Puna' was named for Puna, the district I live in on the Island of Hawaii. People are called punatics, like lunatic, because of the exaggerated lifestyle many who live here possess. A cross between *Portea petropolitana* and *Aechmea mulfordii* 'Malva,' it has the purple or pink coloring and bulbous base of *A. 'Malva'* and the upright inflorescence that sometimes arches with age. The leaves have the texture and the striking long lasting berries of *P. petropolitana*. It makes an excellent landscape subject.

Last but not least is *Vriesea* 'Painted Canyon', a cross I did between *Vriesea gigantea* x *V. 'Grand Canyon'*. I actually did it many years ago, but it just blooming now. It combines the form and size of *V. gigantea* and the purple colored leaves and yellow flowers of *V. 'Grand Canyon'*.

These are a few of my hybrids. Hope you enjoyed them.

Cultivar Corner

Derek Butcher

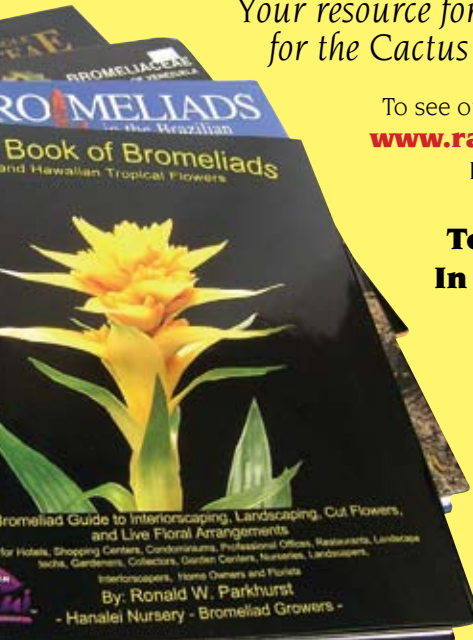
I am encouraged by the number who do visit Cultivar Corner in the <http://bsi.org> website. This means you will be interested in the latest innovation. You will no doubt have read about the concept of Cultivar Groups which has taken over from the grex concept that applies solely to Orchidaceae. The grex concept is based on parentage but the Cultivar Group is based on visible similarities irrespective of alleged parentage.

Hidden in the two Cultivar databases are some 40 Cultivar Groups. Anybody can find them out by entering Group in the Cultivar name field and press 'Search'! When you have found out which Cultivar Group you want to look at you have the re-enter the name, this time in the Cultivar Group field. Mike Andreas has come up with a solution with a scroll down of names of Cultivar Groups. If you are aware of any Cultivar that is missing from a group please let the Registrar know. We are hopeful that this will be used by hybridists to help them decide if their new super duper hybrid is really different.

Talking of differences there is a problem that any person growing neoregelia hybrids from seed will have to face. How different is different? The days of species crossed with species have long gone. We know that a species evolves in the wild by

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crossing and backcrossing over several centuries until you get a fairly stable population. Neoregelia growers are well down the track of converting different species to a look-alike fairly stable population in say 50 years! The problem seems to be that hybrid crossed hybrid is very prevalent. Even the same results can come from just harvesting seed from a neoregelia hybrid.



Hybridists seem to have lost the plot where a hybridist should have goals as to what sort of plant he wants to achieve. He/she should be ruthless with plants not up to scratch. We know that commercial pressures means that those not quite up to scratch will be sold anyway, named or not. Another solution could be widening the views as to what is different. The 9 plants illustrated above came from the same grex. There were many more in the grex but we would run out of space! With my Registrar's hat off, I consider they could all have the same name, in that they all share white to yellow blotches on wide reddish leaves, taking into consideration the variations you will get with offsets. The hybridist considered 9 different names. Work out for yourself where the 'correct' answer lies. I don't think there is a correct answer but it is one that must be decided by the hybridist alone.

All who grow neoregelia from seed will have this King Solomon problem! Just remember that there is a great responsibility on any person bringing a new plant into this world.

Bromeliad Icons in Old Publications, part 2

Leo Dijkgraaf



Figure 1. *Tillandsia utriculata* Linnaeus. Syn.: *Tillandsia flexuosa* var. *pallida* Lindley. Drawing M. Hart, engraving S. Watts, *The Botanical Register* vol.9 plate 749 (1823).

Figure 2. *Pitcairnia heterophylla* (Lindley) Beer. Syn.: *Puya heterophylla* Lindley. Drawing Miss Drake, lithography G. Barclay, *Edwards's Botanical Register* vol.26 plate 71 (1840).

Several other magazines and works published in the form of a series followed in the wake of *Curtis's Botanical Magazine*.

In 1815 Sydenham Edwards started *The Botanical Register*. The text on the title-page of the first volume reads that it “consisted of coloured figures of exotic plants cultivated in British gardens, with their history and mode of treatment”. Initially the text was by John Ker-Gawler, later by John Lindley. For the volumes 15-33 the magazine

was titled *Edwards's Botanical Register*. Edwards made many drawings for the coloured copper engravings in the first 15 volumes but he was not an engraver himself. Drawing the illustration and making the actual print (via engraving or lithography) was often done by different persons. When publication of *Edwards's Botanical Register* ceased in 1847, a total of 2702 plates had been published, including 20 bromeliads.

An important article in *The Botanical Register* is the one connected to plate 1068 of *Billbergia iridifolia* in volume 13. John Lindley - the first professor of botany at University College London in 1829 and Britain's pioneer orchidologist - gives here a synopsis of the bromeliad genera known at the time: *Aechmea*, *Ananas*, *Billbergia*, *Bonapartea*, *Bromelia*, *Caraguata*, *Guzmania*, *Pitcairnia*, *Pourretia* and *Tillandsia*. The bromeliads formed in his words “a family of plants interesting from their beauty or singularity but of which the systematic arrangement has not been carefully studied”.

The first illustration I selected from this publication depicts a plant provisionally described as a pale-flowered variety (*y. pallida*) of *Tillandsia flexuosa* Swartz (Figure 1). Lindley writes that “*Tillandsia flexuosa* must either be a very variable plant, or more species than one are already included in it by those who have described the wild subject”. He didn't see the flowering plant after which the drawing was made himself, but judged that in foliage and form of parts it resembled the specimens in the Banksian Herbarium. We now know this plant under the name of *Tillandsia utriculata*, the description by Linnaeus dates from 1753. This epiphyte has a distribution from the south of the United States to Venezuela.

One more new species described by Lindley was *Puya heterophylla* (Figure 2). Later this species was classified in the genus *Pitcairnia* by Austrian botanist Johann Beer. The plant was imported from Mexico in 1838 and was found “most remarkable as bearing two different kinds of leaves, short brown spiny and long green lanceolate”. It was after this characteristic feature called “heterophylly”, later encountered in other *Pitcairnia*s too, that the species was named. The plant is epiphytic in moist forests but also saxicolous on dry cliffs and is very widespread, ranging from Mexico to Peru.



Figure 3. *Pitcairnia staminea* Loddiges. Drawing G. Loddiges, engraving G. Cooke, *The Botanical Cabinet* vol.8 plate 722 (1823).



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General

The next periodical treated here was founded by Conrad and George Loddiges. Conrad was a Dutch-born horticulturist who settled in Hackney (now part of London); his son George was the main author of the text in the 20 volumes produced from 1817-1833 of *The Botanical Cabinet - consisting of coloured delineations of plants from all countries, with a short account of each, directions for management &c. &c.* The 2000 handcoloured engravings - 7 of bromeliads - were made by George Cooke. The drawings for the engravings came from numerous persons, including Cooke and G. Loddiges. All the copper plates were later stolen by one of Loddiges's men from the library in his garden, only the original drawings were preserved. *Pitcairnia staminea* (Figure 3) was newly described as "a stately plant in the genus named after Dr. Pitcairn of Islington who had a good collection of plants, many of them recorded in the Hortus Kewensis as having been introduced by him".

The description reads further that the flowers, which were near a hundred at their first opening, roll back initially but after a few days become straight again. The name of the species relates to the striking long stamens. It is saxicolous in eastern Brazil.

William Jackson Hooker, when professor of botany at the university of Glasgow, was the author of *Exotic Flora* with 3 volumes from 1823-1827 published in Edinburgh, containing 232 coloured engravings of exotic plants. Among several bromeliads were some new species, like *Tillandsia nitida* (now *Catopsis nitida*) and *Tillandsia bulbosa*. Reproduced here is the plate of *Tillandsia aloifolia* (Figure 4), the "aloe-leaved Tillandsia" as Hooker called it. A plant was sent by Baron De Schack from Trinidad to Glasgow where it flowered in 1825. The species had been described earlier by Swartz under the currently still valid name of *Tillandsia flexuosa*. The distribution of this epiphyte ranges from Florida to Venezuela.

Successive works by W. Hooker between 1830 and 1857 are *Botanical Miscellany*, *The Journal of Botany*, *The London Journal of Botany* and *Hooker's Journal of Botany and Kew Garden Miscellany* with in total 448 uncoloured lithographs including some bromeliads, most of them made by Walter Fitch who is best known for his work for the magazine of



Figure 4. *Tillandsia flexuosa* Swartz. Syn.: *Tillandsia aloifolia* Hooker. Engraving J. Swan, *Exotic Flora* vol.3 plate 205 (1827).



Figure 5. *Ochagavia carnea* (Beer) L.B. Smith & Looser. Syn.: *Bromelia longifolia* sensu Lindley. Drawing W.H. Fitch, Paxton's Flower Garden vol.2 plate 70 (Baines ed. 1883).

William Curtis. In London, as director of the Royal Botanic Gardens at Kew, Hooker also edited the first 2 series of *Icones Plantarum* (volume 1-10, 1837-1854), illustrated with 1000 lithographs of plants from his herbarium, again many made by Fitch; this publication was later continued by his son Joseph Dalton Hooker with a 3rd series (volume 11-20, 1867-1891) and by Daniel Oliver with a 4th series (volume 21-30, 1892-1913). There is a 5th series (volume 31-38, 1922-1975) and the grand total of monochrome plates in all series is 3750. As for bromeliads, in the 3rd series is a plate of *Androlepis*

skinneri (reproduced in the Flora Neotropica Monograph no.14 by Smith & Downs) and in the 4th series one of *Bromelia balansae*.

Joseph Paxton produced both a magazine and a series-work with coloured plates. He was a versatile person, his occupations and achievements were impressive and earned him a knighthood in 1851. Sir Joseph was horticulturist, editor, landscape gardener, railroad promotor, builder of glass structures (such as the famous Crystal Palace for the world exposition in London in 1851, later destroyed by fire), architect, civil engineer and politician. He achieved the first blooming of *Victoria amazonica* when serving as head gardener to the Duke of Devonshire at Chatsworth. From Paxton's *Magazine of Botany and register of flowering plants* 16 volumes were published between 1834-1849. Besides woodcuts in the text it contained 768 coloured plates with some bromeliads (engravings by F. Smith and lithographs by S. Holden). Paxton founded with John Lindley the magazine *The Gardener's Chronicle*, but that was illustrated only with drawings in the text. They were also the authors of *Paxton's Flower Garden*, consisting of 3 volumes published in parts from 1850-1853, with 108 excellent handcoloured lithographs by L. Constans and E. Prévost. In the revised edition of *Paxton's Flower Garden* by Baines published from 1882-1884 the plates were printed as chromolithographs and of less quality. Among the 4 bromeliads in this work is the illustration of *Bromelia longifolia* (Figure 5), called "the long-leaved bromelia from Guiana". Mr. Henderson of the Wellington Road Nursery exhibited the plant on a meeting of the Horticultural Society. It is referred to as the same species described by Rudge under that name in *Plantae Guianenses* (1805), however Rudge's plant originated from quite some other type of habitat and represents the species now known under the name of *Aechmea longifolia*. The plant figured in Paxton's *Flower Garden* is from Chile; in 1857 Austrian botanist Johann Beer gave it the new name *Bromelia carnea* and the current name is *Ochagavia carnea*.

From *The Gardener's Magazine of Botany, Horticulture, Floriculture and Natural Sciences* edited by Thomas Moore and William Ayres, 3 volumes were produced in London in 1850-1851. In the first volume are plates of some bromeliad species very often portrayed in those days, namely *Aechmea fulgens* and *Vriesea splendens*. There has once been made an inventory of coloured plates from *Vriesea splendens* published in the 19th century, counting at least 10 (Lecoufle 1967). Moore, a curator of the Chelsea botanic gardens, has also been editor of *The Gardener's Chronicle* and *The Floral Magazine*; the latter magazine was illustrated with 1022 lithographed plates in the two series published from 1861-1881.

Refugium Botanicum was published by William Wilson Saunders, botanist and horticulturist. From 1869-1873 there were 5 volumes, each in 3 parts with in total 360 plates by Fitch (both drawing and lithography). Each plate is only partially coloured. The text was written by John Gilbert Baker and - for the orchids - by Heinrich Reichenbach. There are 6 bromeliads illustrated in this serieswork. The plate of *Hohenbergia legrelliana* Baker (Figure 6) shows the illustration technique used. No derivation of the speciesname is given by Baker in his description; in his *Handbook of the Bromeliaceae*



Figure 6. *Aechmea recurvata* (Klotzsch) L.B. Smith. Syn.: *Hohenbergia legrelliana* Baker. Drawing and lithography W.H. Fitch, *Refugium Botanicum* vol.4 plate 285 (1871).

directed by G.B. Knowles and Frederic Westcott.

This concludes my overview of bromeliad icons from the United Kingdom; although certainly not complete it covers the most interesting and important publications. The next parts in this series of articles will deal with botanical and horticultural works from the European continent.

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- Lecoufle, M. (1967). Early illustrations of *Vriesea splendens* in horticultural periodicals. *J. Bromeliad Soc.* 17(3):64-65.
- Nissen, C. (1966). *Die botanische Buchillustration, ihre Geschichte und Bibliographie*. 2nd ed. Verlag Hiersemann, Stuttgart, Germany.

from 1889 it is listed as *Ortgiesia legrelliana*. Most probably the species honors Belgian mrs. Legrelle born d'Hanis who cultivated the bromeliads send by her brother from exotic places. Saunders received the plant from the European continent, but lost all further history of it. This species had already been described in 1856 by German botanist Klotzsch under the name *Macrochordion recurvatum* and has also been classified as a *Billbergia* and a *Portea* before ending up as *Aechmea recurvata*. It is a plant from southern Brasil and adjacent areas of bordering countries, usually growing as an epiphyte.

There were more publications in 19th century England and Scotland with the occasional icon of a bromeliad; from a referencebook on botanical illustrations (Nissen 1966) I selected some titles:

Collectanea botanica, or figures and botanical illustrations of rare and curious exotic plants, London 1821, with 40 coloured engravings, text by John Lindley.

Botanist's Repository, for new and rare plants, volume 1-10 1797-1811 London, with 664 coloured plates; drawings, engravings and text by H.C. Andrews.

The Floral Cabinet and Magazine of exotic botany, volume 1-3 1837-1840 London, with 138 chromolithographs,

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Bromeliads Downunder is Over, just the Memories Remain.

Lynn Hudson

On entering the hotel most people found there was an almost tangible rush of excitement and this was wrapped in a confrontation of colour, the best colour we know – bromeliad colour. Four societies (Gold Coast, Queensland, Sunshine Coast and Mackay) and two commercial growers (Dandaloo Valley and the Olive Branch) had packed and carted magnificent plants and props for displays in the foyer. Most bromeliaceae genera were represented and the range of shape and colour was overwhelming.

I had told the hotel staff it would be busy, happily noisy and colourful but how can anyone describe a group of bromeliad lovers with their plants? The staff were amazed “They just keep coming, people and plants, plants and more plants”. Then came the sale plants and amid it all were the shrieks of delight from friends meeting up again. We had 358 registrations but 27 of those did not turn up and 25 did not advise us they could not come. We had 16 register at the conference plus 8 for one day sessions. Add partners and families and that was a real lot of people gathered together! Delegates came from Australia, Bahamas, Belgium, Costa Rica, Germany, Japan, Netherlands, New Zealand, Puerto Rico, Singapore and USA.

The Board Meeting was held on Tuesday plus the Judges School run by Robert Kopfstein. This was well attended and for most Australians it was their only chance to attend a BSI School. They said they learned lots and now better understood the judging system. They praised Robert’s teaching approach and skill. We thank you Robert for your valuable input. There was an unofficial Golf game that players enjoyed, but I heard there was a bit of cheating!

Wednesday was Show entry day. Responses received from the Registrant’s letter said there would be 108 Show entries – there were 294!! There were beautiful plants crammed into a space far too small. I apologise to Larry & Steve, their helpers and entrants for this situation. Instead of asking ‘how do we fit it in?’ someone should have asked me ‘can we move it all?’ We could have taken it all upstairs but my brain was too full to think clearly – yes hindsight is great but I usually ‘think fast on my feet’. The small room made it hard to arrange, to judge, to photograph and to view. A really big Thank You to the Show organisers Larry & Steve and their retinue of workers who kept their cool under very trying conditions. Thank you also to the Judges and Clerks.

Wednesday also had the Australian Tillnuts meeting – a small group of tillandsia lovers who meet biennially to discuss, swap and buy tillandsias. For the first time it was open to ‘observers’ and was well attended by both Australian and Overseas delegates.



“...beautiful plants crammed into a space far too small.” - some of the 294 Show entries.

On Wednesday afternoon most International Delegates were escorted with the war cry of Aussie, Aussie, Aussie, OY! OY! OY! to the Cairns Yacht Club on the waterfront, for the International Reception. Olive & Len Trevor hosted this event and we introduced the visitors to sausages & onion wrapped in bread and washed down with fine wine, beer & juices. It was a really happy time. Len stood on a chair and made a welcome speech and as soon as he vacated, Madam President Joyce was on the chair thanking him. Luckily the chair jumping stopped, as I don’t trust plastic chairs!

The official opening was Thursday afternoon and began with Ken Reys giving visitors a Traditional Welcome to his tribal land - good comments came from this talk. Local horticulturist Kim Morris, officially opened the conference and then Madam President, Joyce Brehm welcomed Delegates. Joyce announced Derek Butcher (Australia) and Peter Waters (New Zealand) as new BSI Honorary Trustees, and presented Grace Goode OAM with the Wally Berg Award of excellence.

Thursday night was the opening of the Sales Room for Registrants and it had the traditional anticipation, queues of excited people, then armloads of plants and more queues for the cash registers.

Friday and Saturday were Seminar Days and most Delegates said they enjoyed the talks, learned lots of bromeliad data, were enthralled and entertained. Speakers were Peter Bak, Cristy Brenner, Derek Butcher, John Catlan, Andrew Flower, Larry Giroux, Paul Isley, Robert Kopfstein, David Liddle, Vic Przetocki, Herb Plevier, Chester

Skotak and Jay Thurrot and their topics ranged from bromeliad expeditions through to cultivation methods, including flowering inducement. Thank You to the Speakers who taught and entertained us. The Proceedings Books were handed out on Saturday at the end of the seminars. Friday night was the John Anderson Memorial Rare Plant Auction, there were plenty of plants and bromeliad related items plus excited people. Len Trevor began by saying it was all about giving – all items were donated and all proceeds would go to the Bromeliad Identification Centre at Mary Selby Gardens. There was lots of spirited bidding with a variegated *Alcantarea* raising \$4,500.00. It now resides at the Olive Branch in Olive's tender and expert care and we look forward to seeing beautiful offsets. Thank you to the donors and to the buyers, your giving is truly appreciated.

Sunday was the Local Gardens bus trip. We had five gardens the buses were able to access but it was pretty tricky sorting the timetable so the five buses did not overlap. Thank You to the sandwich makers, and Marguerite & Nalda the servers, they were really popular. I was amazed at the reactions to this trip – “mind-blowing, unreal, spectacular, magical” were adjectives I heard. Then it was time to pack up prepare for the Banquet and say goodbye to old and new friends.

This conference had a few changes from the normal WBC. Firstly the refreshment times allowed the delegates to spend time getting to know each other and ‘network’ and we received many good comments from overseas delegates. Secondly there were no organized tours or garden visits while seminars were on – this is the Australian way. Personally I feel it is an insult to the Speaker to have these together. At the first WBC I attended they were lucky to have 35 attend each seminar and it was not a reflection on the quality of the Speakers – they were good. There were more attend in 2004 & 2006. The Proceedings Book is a contentious issue. It is a lot of work whether it is prepared before or after the conference and there are plusses and minuses either way. I have found it is almost impossible to take notes that are decipherable after the conference is over and few delegates can remember the salient points of twelve seminars. Most Speakers sent me notes and pictures as requested and Delegates appreciated receiving the book.

I have received lots of accolades but I did not do it all. Thank you to the Donors, the Societies and Persons who dug deep when the US dollar died. Thank you to Larry and Steve, their Helpers and Judges and Clerks for their work on the Show. Thank you to the Persons who delivered & erected the displays; the Persons who brought plants to sell; to Olive & Len Trevor for your valued support; the ever smiling Persons who policed the doors; the Registration desk Workers; the Persons on cash registers and packing plants; and the Persons who packed, lifted and carried all kinds of stuff.

Thank you to the Delegates for attending. WBC18 is over, now just the memories remain. We look forward to WBC19 at the Big Easy. When received please answer your Delegate Letter promptly to enable the volunteer planners in their preparations.



A small section of Lynn and Bob Hudson's magnificent bromeliad garden. Photo by Andrew Flower.

Did You Know?

Message from the President of the Bromeliad Society International, Joyce Brehm

Of course you do, but that is the name of this column. While this may seem boring, it is important that you read it.

The United States Postal Service has increased mailing rates for the third time in 6 years and other charges have increased as well. The Journal of the Bromeliad Society can no longer be sent as regular mail, it must be posted as "large envelope" increasing the mailing rate substantially.

During the past 8 years the rate for BSI membership has remained unchanged. In order to maintain viability we are forced to increase the general membership rate. We want to make the cost of membership as reasonable as possible for all of our members, world-wide. Much thought has gone into the change so I want to explain it to you as best I can.

We have deleted the additional cost for Dual Memberships. The rate for the general membership will be \$40.00 US for any one or two names going to one address. Bulk delivery is standard for US addresses. Because we must mail The Journal to all international (non-US addressed) memberships via air mail, the international rate will be \$45.00 US as will be First Class mail to United States addresses.

The International Bromeliad Society Board truly appreciates the Affiliated Societies. To show our appreciation we have decided to decrease the Affiliated Society Membership to \$25.00 US. The International Affiliated Society rate will be \$30.00 US as will be first class mail for United States Affiliated Societies.

Institutional Memberships (unaffiliated societies, libraries, institutions, botanical gardens) will have a rate \$45.00 US. The rate for international institutional memberships and those with US addresses desiring first class mail delivery will be \$50.00 US.

The Commercial Membership has not been well defined in the past. The BSI Board has designated the following definition for Commercial Membership Rates. Any membership that makes a living selling Bromeliad plants or Bromeliad Related Items and desires to be listed in the Membership Directory by their commercial name, or if they receive free advertising on BSI.ORG web site, will be considered Commercial Members. The Commercial Membership Rate will now be \$60.00 US and \$65.00 US for International Commercial Membership and US addresses with first class delivery.

Lifetime Membership for any single member was changed to \$900.00 US (including US and international mailing). If two names are included, the lifetime member will be considered to be the first name on the application.

All classes of memberships may be renewed online at www.bsi.org. or by mail to Dan Kinnard, 6901 Kellyn Ln., Vista CA 92084-1243, USA.

Please remember that the Journal is now in full color, usually on time and very informative for both scientific research and the general hobbyist. The Bromeliad Society International, Inc through our publication The Journal of the Bromeliad Society is the noted scientific source for Bromeliad information world wide. The cost of membership just covers the cost of the publication of the Journal and updating your membership information. Extra funds are always needed to support the Bromeliad Identification Center, the research grants, and conservation efforts. Like any corporation, we also have general daily operating expenses. We welcome your contributions to any of these activities.

If you have any questions, please do not hesitate to telephone me at United States number 858-277-1030 or email me at my preferred email address of joycesjoy@aol.com. The email address of president@BSI.org may be used but because these go to a different email address, my response takes significantly longer.

Bromeliad Society International. Membership Rates

United States Membership (includes bulk mail rate—first class add \$5 per year)

International Membership (includes Airmail delivery)

	1 Year	3 Years
Individual	\$40	\$110
Dual	\$40	\$110
Affiliate Society	\$25	\$75
Institutional	\$45	\$125
Commercial	\$60	\$170
1st class mail	+\$5	+\$15

	1 Year	3 Years
Individual	\$45	\$125
Dual	\$45	\$125
Affiliate Society	\$30	\$90
Institutional	\$50	\$140
Commercial	\$65	\$185

Life Membership (*one time only fee*) \$900.

Payment by check or money order payable to The Bromeliad Society International, USA members US Banks and US funds only. International members US funds only; US domestic checks, international money order, or foreign bank cheques. Credit card payments and sign-ups/renewals may be made online at www.bsi.org.

Please send mail transactions to: Dan Kinnard, BSI Membership Secretary, 6901 Kellyn Ln, Vista, CA 92084-1243, USA.

EVENTS CALENDAR

Australia

October 11-12, 2008. Bromeliad Society of Australia Spring Show, Burwood

October 25-26, 2008. Bromeliad Society of NSW Spring Show, Concord.

April 10-13, 2009, XV Australian Bromeliad Conference, Adelaide. Contact (08) 8356 7728 or www.bromeliad.org.au/BROMADELAIDE2009.htm

United States of America

September 20-21, 2008. San Diego Bromeliad Society Show & Sale. Casa del Prado, Room 101, Balboa Park, San Diego CA. Sat noon-5:00, Sun. 10:00 am - 4:00 pm. Judged BSI Show. Contact Nancy Groves (858) 453-6486 or ngroves@sbcglobal.net.

October 11-12, 2008 Bromeliad Guild of Tampa Bay, University of South Florida. Fall Sale. 4202 East Fowler Ave., Tampa.

July 26 - August 1, 2010. BSI World Conference to be held at the Astor Crowne Plaza in New Orleans.

A Warm Welcome to New Members

Mrs Rae Aimer, Auckland, New Zealand	Louie Renter, Carlsbad, CA
Geoff Ball, Miranda, Australia	Robyn Rickard, Auckland, New Zealand
Juliaann Bond, Yeppoon, Australia	Efrain Vega Rodriguez, Carolina, PR
Mario Eduardo Bello, Buenos Aires, Argentina	Patricia M. Sindlinger, Sarasota, FL
Thomas W Childress, Gainesville, FL	Naomi Skinner, Rockingham, Australia
Edna Cossill, Frenchs Forest, Australia	Michael Strayer, Moraga, CA
John A. Crawford, Ashmore City, Australia	Anton Van Der Schans, Marina, Singapore
Juan Pablo Esquivel, Yucatan, Mexico	Gary Signs, Orlando, FL
Sally & Jay Gawler, Vero Beach, FL	Jeremy Spath, Encinitas, CA
Daryl Ganter, Central Coast, Australia	Steve Studer, West Linn, OR
David Heckard, Marrero, LA	Kyle Thibaudeau, Boca Raton, FL
Noel Hays, Nairobi, Kenya	Martyn Tidball, Turo, UK
Lynne Horne, Los Alamitos, CA	Tony Ting, Auckland, New Zealand
Jean Jewell, Zephyrhills, FL	Karin & Paul Van Tol, Burleigh Waters, Australia
David A Johnson, University Park, FL	Ying-Pang Tien, Tainan City, Taiwan
Mark Klaus, Chicago, IL	Maryann Utegg, Apopka, FL
Lijun Lek, Woodlands Industrial Park, Singapore	Rudy Van der Zwart, Melton South, Australia
Ander Marlatt, Pensacola, FL	Genny Vauhkonen & John Catlan, Jacob's Well, Australia
Michael McWeeny, Cutler Bay, FL	Adrian Walter, Darwin, Australia
Shirlene Moss, Jubilee pocket, Australia	Mary Wilson, Melbourne, FL
Nanct Nasib, Gainesville, FL	Sheri Wright, Louisville, KY
Gill Passman, Reading, UK	
Watcharachot Praditvakin, Bangkok, Thailand	

We hope you enjoy your membership with us, welcome aboard!.

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.

OFFICERS

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(To e-mail Directors, write "firstname@bsi.org," Not all Directors have e-mail)

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2007-2009	California: Rodney Kline, Keith Smith
2008-2010.....	Florida: Jose Donayre. Louisiana: Bonnie Boutwell. Texas: Gene Powers. International: Francisco Oliva-Esteve

STANDING COMMITTEES

<i>Affiliated Shows</i>	Theresa M. Bert, 9251 13th Ave. Cir NW, Bradenton, FL 34209, USA. shows@bsi.org
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<i>Publications Sales</i>	Robert & Karen Kopfstein, 6903 Kellyn Ln., Vista CA 92084, USA. publications@bsi.org
<i>Research Grant</i>	Gregory K. Brown, University of Wyoming, P.O. Box 3165, Laramie, WY 82071-3165. grants@bsi.org
<i>Seed Bank</i>	Harvey C. Beltz, 6327 South Inwood Rd., Shreveport, LA 71119-7260
<i>Media Library</i>	Keith Smith, 1330 Millerton Rd., Auburn CA 95603-1243, USA. slides@bsi.org
<i>Web Site</i>	Ken Marks, 22690 Lemon Tree Ln., Boca Raton, FL 33428-5514, USA, webmaster@bsi.org
<i>World Headquarters</i>	Tom Wolfe, 5211 Lake Le Claire Rd., Lutz, FL 33549-4833, USA.

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