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

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

Cover photographs. Front: *Tillandsia albertiana*, a small, tidy little tillandsia with bright red flowers from Argentina. Photograph by Marcel Lecoufle. **Back:** *Tillandsia crocata*, one of the most fragrant tillandsias. Photograph by Marcel Lecoufle.

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A New *Lymania* species from Bahia, Brazil

Elton M. C. Leme[1] & Rafaela C. Forzza[2]

***Lymania spiculata* Leme & Forzza, sp. nov.** (Figures 1–3)

Species nova a *Lymania alvimii* (L. B. Sm. & R. W. Read) R. W. Read affinis, a qua laminis foliorum dense spinulosis, inflorescentia vix bipinnata, ramulis lateralibus patentibus vel fere, saltem duplo vel triplo brevioribus, floribus prope apicem ramulorum dense dispositis differt.

TYPE: Brazil, State of Bahia, JuÁari, Jun. 1999, *Rafaela C. Forzza & AndrÈ Amorim s. n. legit*, fl. cult. Nov. 2000, *E. Leme* 4638. (Holotype: HB).

Plant epiphytic, flowering ca. 37 cm tall, propagating by ca. 6 cm × 0.8 cm stolons. **Leaves** ca. 9 in number, rosulate, suberect-arcuate, chartaceous, forming at base a narrowly funnelform rosette. **Sheaths** elliptic, ca. 12 × 7.5 mm, subdensely and minutely brown-lepidote, abaxially wine colored toward apex. **Blades** sublinear, 12–17 × 4–5 cm, very sparsely and inconspicuously white-lepidote to glabrescent, lustrous mainly abaxially, adaxially green, abaxially wine colored, apex acute to subrounded and apiculate, margins densely spinulose, spines ca. 0.5 mm long, 1–3 mm apart. **Scape** erect, ca. 16 cm long, ca. 0.3 cm in diameter, glabrescent; **Scape bracts** lanceolate, acuminate, ca. 30 × 5 cm, stramineous, membranaceous and soon disintegrating. **Inflorescence** shortly paniculate, laxly bipinnate, erect, ca. 18 cm long, ca. 9 cm in diameter, rachis slender, straight, glabrescent, inconspicuously verrucose, reddish-green. **Primary bracts** narrowly linear-lanceolate, slenderly acuminate, 20–28 × 3 mm, stramineous, membranaceous and soon disintegrating, about equaling the ebracteate basal peduncle; Branches, the lateral ones ca. 7 in number, spreading or nearly so, 35–50 mm long, ca. 15 mm in diameter at apex (excluding the petals), 8 to 13-flowered, basal peduncle slender, 16–27 × 1.5–2 mm, ebracteate, straight, inconspicuously verrucose, greenish-red, the terminal one erect, ca. 55 mm long, ca. 18-flowered. **Floral bracts** triangular, acuminate, membranaceous, stramineous, nerved, entire or very inconspicuously and irregularly denticulate, glabrous, distinctly shorter than the ovary, ecarinate, ca. 3 × 2 mm. **Flowers** sessile, ca. 15 mm long with petals extended, anthesis diurnal, concentrated at the apex of the lateral branches and densely and subpolystichously arranged, but laxly arranged at base and densely disposed toward the apex of the terminal branch. **Sepals** strongly asymmetrical, muticous or very inconspicuously apiculate, ca. 5 mm long, connate at base for ca. 1.5 mm, green, inconspicuously verrucose, glabrous, ecarinate, with a lateral membranaceous, rounded, translucent wing distinctly surpassing the midnerve. **Petals** subspatulate,

[1] Herbarium Bradeanum, Rio de Janeiro, RJ, Brazil. E-mail: leme@tj.rj.gov.br
[2] FAPESP scholar, Departamento de Botânica, Instituto de BiociÍncias da Universidade de São Paulo, CP 11461, CEP 05422-970, São Paulo, SP, Brazil. E-mail: rforzza@hotmail.com.

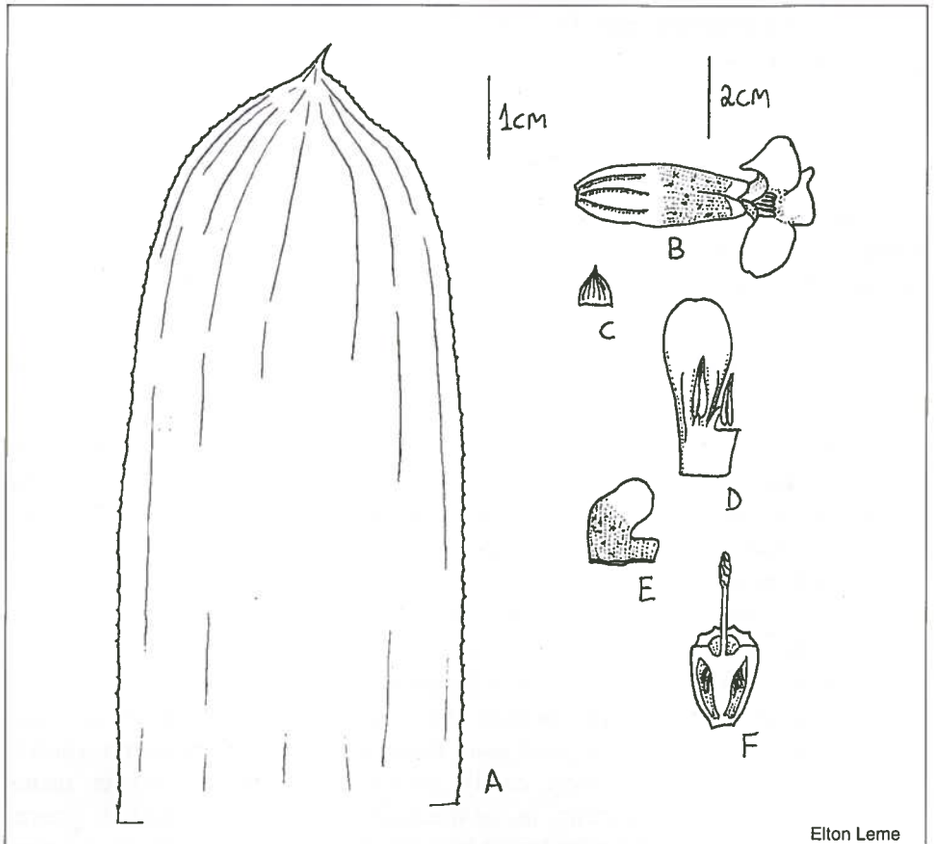

Figure 1. *Lymania spiculata:* a) leaf apex; b) flower; c) floral bract; d) petal; e) sepal; f) longitudinal cross-section of ovary.

emarginate, ca. 11 mm long, ca. 4 mm wide at apex, connate at base for ca. 3 mm, white, spreading-recurved at anthesis, naked, bearing 2 longitudinal callosities. **Filaments** ca. 7 mm long, adnate to the petals tube and free above it. **Anthers** ca. 3.5 mm long, dorsifixed near the middle, base obtusely sagittate, apex acuminate. **Stigma** conduplicate-spiral, narrowly ellipsoidal, blades ca. 2.5 mm long, white, very shortly crenulate. **Ovary** ca. 5 mm long, ca. 4 mm in diameter, longitudinally and deeply sulcate (obtusely multicarinate), glabrous, greenish-white and sharply contrasting with sepals color; epigynous tube ca. 1 mm long; placentation apical; ovules long caudate. **Fruit** unknown.

Lymania spiculata is closely related to *L. alvimii*, differing from it mainly by its leaf blades densely spinulose, inflorescence bipinnate (not broadly tripinnate), as well as by the spreading lateral branches (not suberect-ascending), at least 2 to 3 times shorter. Another outstanding distinction of *L. spiculata* is its densely arranged flowers at the apical half of the lateral branches, while its closer parent *L. alvimii* has sparsely disposed flowers from the base to the apex of the branches even before anthesis.

Figure 2. Habit of the flowering type specimen of *Lymania spiculata*

Figure 3. Close up of *Lymania spiculata*

Based on the inclusion of this new taxon, the genus *Lymania* now has a total of seven recognized species, mostly endemic to the State of Bahia, except for *L. smithii* which grows north to the State of Pernambuco (pers. obs.). There are two natural distinct groups of species in the genus (Read, 1984; Leme, 1989). The first group has species with ecarinate sepals and deeply sulcate (obtusely multicarinate) ovary, being composed by *L. azurea*, *L. alvimii*, *L. smithii*, and *L. spiculata*. The second group is formed by *L. corallina*, *L. globosa*, and the poorly known *L. marantoides*, with bicarinate sepals and sharply multicarinate ovary.

The name of this new epiphytic species from the Atlantic forest of Bahia State is a reference to its uncommon flowers arrangement. The flowers become densely disposed at the apex of the lateral branches, resembling tiny spikes.

REFERENCE

Leme, E. M. C. 1989. New *Lymania* Species and Identification Key. *J. Bromeliad Soc. 39* (6):262–264.

Read, R. W. 1984. The "evolution" of a new genus. *Lymania* gen. nov. *J. Bromeliad Soc. 34* (5): 199–201, 212–216.

Rio de Janeiro, Brazil

New look for Bromélia

To start off its sixth year of existence, the excellent quarterly magazine published by the Sociedade Brasiliera de Bromélias has both a new editor and a new look. The magazine now has an 8 1/2 by 11-inch format but continues to contain numerous color photographs and both Portuguese and English versions of articles. Congratulations to new Editor/Publisher Miriam Cristina Alvarez Pereira for her excellent work and to former editor Elton M.C. Leme for setting the standards of quality for which the magazine has come to be noted.

Cultivar Corner

Derek Butcher

Vriesea 'Conferta'

Vriesea 'Conferta' appears in the *Bromeliad Cultivar Registry* (1998) and I had been asked why *Vriesea* 'Baron de Selys' is the mother of 'Conferta' under the "Conferta' reference but 'Conferta' is mother of 'Baron de Selys' under the 'Baron de Selys' reference!

This called for urgent investigation. It appears that ever since the International Check List of Bromeliad Hybrids was published in 1979 this reference has been incorrect. It all stems from incorrect translation from the French in Chevalier's "Monographie des Bromeliacees - Tillandsiees" (1930). When describing Vriesea 'Excelsior', Chevalier mentioned that this hybrid obtained the red color of the spike from V. barilletii and the bract shape from V. conferta (both are grandparents!). In the Bromeliad Cultivar Registry (1998) the parentage of Vriesea 'Excelsior' is correct as 'Baron de Selys' and ('Morreniana' x barilletii) where the formula can also be expressed as 'Closoniana'. Purely because of the mistranslation the reference to Vriesea conferta was linked to the parentage of Vriesea 'Excelsior'!

As far as I am aware *Vriesea* 'Excelsior' is not in cultivation whereas its parents *Vriesea* 'Baron de Selys' and *Vriesea* 'Closoniana' are at least being grown in Belgium. (personal communication with G. Samyn).

Vriesea 'Conferta' has therefore never been a hybrid but a species that was treated as a synonym of *Vriesea ensiformis* as long ago as Baker's 'Bromeliaceae' (1889). There is a reference to a *Vriesea ensiformis* var. *conferta* in Padilla's 'Bromeliads'[3] on page 102 but this is botanically incorrect.

I will therefore be deleting all reference to this cultivar name in the *Bromeliad Cultivar Registry*. *Vriesea* 'Conferta Major' and 'Conferto-Rex' will remain although the seed parent should be shown as *conferta* not 'Conferta' because it was treated as a species at that time. The same applies to the seed parent of *Vriesea* 'Baron de Selys'. *Vriesea* 'Blackie' also makes an appearance.

Variegated cultivars that are sports

Because even the most stable of variegates sometimes loses variegation or changes the form of variegation we must look at the way that these cultivars are currently named so that they can easily be identified.

The only reference in the ICNCP rules is in Section 17.15 which states: "The words 'variety' (or var.) and 'form' may not be used in new cultivar epithets. However, when var. denotes variegated the epithet is established with

[3] Padilla, Victoria. *Bromeliads*. New York: Crown Publishers, 1973

the word 'variegated' written in full". This is not that informative perhaps because variegation plays a very small role in the general world of plant cultivars. Variegation is much more specialized in Bromeliaceae where the following non-Latin adjectives could apply:

marginate (outside stripes)
mediate (solid median stripe)
variegate (varying width of stripes)
striate (fine lines)

There are, of course, other adjectives that could be used but regrettably, I do not see us getting a general consensus on which ones to use. The ICBN rules cover like-plants from the wild where the "normal" version is described at species level and the variegated form at the next level, e.g. *Aechmea coelestis* v. *albomarginata*.

If you have a plant without variegations it becomes just *Aechmea coelestis*! This is easy to understand.

How do we follow the instability of cultivar variegates?

The word 'sport' has been in horticultural use for many years but has rarely been formally applied to bromeliads. A 'sport' is defined as a visible asexual mutation and occurs in bromeliads where offsets (or pups) are different from the 'mother' plant. To my mind there is a closer relationship between a 'sport' and a 'mother' plant, than between siblings in a grex and we should record this fact when it occurs.

Figure 4. *Aechmea orlandiana* 'Ensign' (top) and *Aechmea orlandiana* 'Reverse Ensign' (bottom).

Chet Blackburn

United States plant patent law covers all offsets of a patented plant whether sports or not but is broken by seed raising and this seems to be a firm basis to start from. The phenomenon of 'sporting' has become more prevalent in the past 10 years or so because of the avalanche of named variegated plants that are notoriously unstable. Just what do you do with an offset that is different to 'mother'? To be strictly correct this should be destroyed but in reality they are not only not destroyed but are even nurtured!

As an example, *Aechmea* 'Ensign' (See Baensch *Blooming Bromeliads*, p. 44) should be an albo-marginate form of *Aechmea orlandiana*. It was raised from seed where the mutation occurred. Note that *Aechmea* 'Ensign' is not a sport of *Aechmea orlandiana*! A sport of A. 'Ensign' is 'Reverse Ensign' which has a white median line. These will be linked in the *Bromeliad Cultivar Registry* by a 'sport' indicator. Any offset of *A.* 'Ensign' which is not albo-marginate (or reverse) should in my mind be called *A.* 'Ensign' sport until such time that it 'stabilizes' and someone gives it a name. Even if it loses its variegation it should still be called *A.* 'Ensign' sport and NOT *A. orlandiana* because it still retains the erratic genes and could easily revert back to *A.* 'Ensign'

Many of the registered variegated neoregelias could well have developed as sports and not as siblings within a grex but the registration form did not allow for this situation. This omission has now been rectified. We will probably never know whether *Neoregelia* 'Yin' and 'Yang' are siblings or linked as sports!

Plants that have sported directly from a species include *Billbergia* 'Perriam's Pride' which was originally *Billbergia distachia*.

So please use the word 'sport' as a temporary measure to cover aberrant offsets.

This solution will make it easier for the 'show bench' to accept the inevitable non-stable plants that do not agree with the original description or photograph by the quick addition of the word 'sport'. It will also help sellers (and purchasers!) of a plant to know its true relationship with its 'mother' in that temporary period before naming.

Fulham, South Australia

Micropropagation for Mass Propagation and Conservation of *Vriesea friburgensis* var. *paludosa* From Microbuds

Glaise Mara Alves & Miguel Pedro Guerra[4]

SUMMARY

Microbuds are considered morphogenetic competent structures that arose in *in vitro* cultures of *Vriesea friburgensis* var. *paludosa*, a bromeliad species from the Atlantic Rain Forest, south of Brazil. For cloning and multiplication of these regenerative structures these microbuds were isolated and cultured in basal MS culture medium supplemented with different types and levels of plant growth regulators (NAA 2,4-D, BAP, KIN and 2-iP) or in their absence. For the synchronic progression of the microbuds to shoots it was tested the absence of plant growth regulators and different levels of GA_3. All the treatments promoted weight increment, without statistical differences in the microbud multiplication, without stimulating the differentiation of those in sprouts. The culture medium free of plant growth regulators or supplemented with GA_3 resulted in the differentiation and development of multiple shoots starting from microbuds. Selected treatments for a suitable *in vitro* mass propagation protocol were those that stimulated the development of at least 170 shoots per gram of microbuds.

INTRODUCTION

The Atlantic Rain Forest is considered a biome containing a very high genetic diversity being classified as a hotspot of megadiversity (Myers *et al*, 2000). Bromeliad species make up an important part of this biome, and among them populations of *Vriesea friburgensis* var. *paludosa* are commonly found in the south and southeastern region of Brazil (Reitz, 1983). The increasing deforestation threatens most of the bromeliads in this region. Tissue culture techniques encompass multiple tools that may be applied to the mass propagation and conservation of endangered bromeliad species. Additionally micropropagation has been employed for the mass clonal propagation of ornamental bromeliad species which are experiencing increasing demand and acceptance worldwide.

In vitro cultures of *Bromeliaceae* species present some specific features, showing the formation of quite peculiar morphogenic competent structures which has received different terminology. For example, *in vitro* cultures of *V. fosteriana* showed the formation of protuberances (cellular masses). The largest multiplication rate was 22.5 shoots/explant after three months of culture in culture medium supplemented with NAA and BAP (Mercier and Kerbauy, 1992). Protuberances also appeared starting from leaf basal region of *Dyckia macedoi*

[4] Plant Genetics and Developmental Physiology Laboratory, Dpto. Plant Sciences, Federal University of Santa Catarina, 88.040-900, FlonanÛpolis, Santa Catarina, BraLil. E-mail: mpguerra@cca.ufsc.br

submitted to different combinations of NAA and BA, resulting in the development of adventitious buds (Mercier and Kerbauy, 1993). These two plant growth regulators have been considered the most efficient in the induction of adventitious buds of bromeliads in in vitro cultures (Mercier and Kerbauy, 1997).

In *Aechmea fasciata*, adventitious shoots were differentiated from callus induced from leaf explants cultivated in MS culture medium supplemented with KIN and IAA or with BA and NAA (Vinterhalter & Vinterhalter, 1994). In *Dyckia distachya*, an endangered bromeliad from southern Brazil, the induction of callus was observed when buds of the inflorescence stalk were inoculated in culture medium supplemented with different types and levels of auxins (Daquinta *et al.*, 1998). With *Cryptanthus sinuosus*, an endemic bromeliad species from Eastern Brazil, young leaves were employed as explants and inoculated in MS culture medium supplemented with BAP and TDZ. The highest regenerative proliferation of shoots was obtained in the culture medium supplemented with BAP (22 µM) and these cultures kept the regenerative capacity for two years (Cameiro et al., 1998a). Also Cameiro *et al.*, (1998b) developed an efficient protocol for the micropropagation of *Neoregelia cruenta* an endemic bromeliad from eastern Brazil starting from leaf explants. Shoot differentiation occurred directly from the basal region when the explants were cultivated in MS culture medium supplemented with BA and NAA.

In the present work we describe the morphogenic events associated with the induction, multiplication and development of special regenerative structures, called microbuds, observed spontaneously during the in vitro germination of seeds, or induced in the basal region of young leaves of *Vriesea friburgensis* var. *paludosa* cultivated in MS culture medium supplemented with NAA (2.0 µM) and BAP (4.0 µM).

MATERIAL AND METHODS

The basal culture medium consisted of the basal formulation of MS (Murashige & Skoog, 1962), Morel vitamins (Morel & Wetmore, 1951), supplemented or not with NAA(2.0 µM) and BAP (4.0 µM), and solidified or not with agar (0.7%). The pH was adjusted to 5.8 before autoclaving at 121°C during 15 min. During the incubation period the cultures were kept in growth room at 25 ± l°C temperature, 37µE/m²/s intensity light during 16 hour light periods.

Experiment 1: Isolated microbuds of *Vriesea friburgensis* var. *paludosa* derived from glass flasks containing 15 ml of basal culture basal medium supplemented with NAA (2.0 µM) and BAP (4.0 µM), were inoculated in test tubes (150 ? 25 mm), containing 15 ml of basal culture semi-solid free of plant growth regulators or supplemented with NAA (2.0 µM) and BAP (4.0 µM); GA_3 (6.0 µM); and 2,4-D (5.0 µM) plus KIN (1.0 µM). The treatments were constituted by 30 repetitions, each repetition containing 0.05 g of microbuds. After 60 days, the increment of microbuds biomass was evaluated. The resulting data were transformed to log (x+2) and submitted to ANOVA and SNK test.

Experiment 2: Microbuds (0.05 g) of *Vriesea friburgensis* var. *paludosa* were inoculated in test tubes containing 15 ml of basal semi-solid medium supplemented with different levels of GA_3 (0.0; 5.0; 10.0 and 15.0 μM). Each treatment was constituted by 20 repetitions. After 60 days in culture the fresh weight values were scored, the data were transformed to (x+0.5) and submitted to ANOVA and SNK test.

Experiment 3: Microbuds of *Vriesea friburgensis* var. *paludosa* maintained in basal culture medium were inoculated in test tubes containing 15 ml semi-solid culture medium free of plant growth regulators or supplemented with; a) NAA (12.0 μM); b) BAP (12.0 μM); c) NAA (2.0 μM) and BAP (4.0 μM); d) KIN (12.0 μM); e) 2-iP (12.0 μM). Each test tube received 0.10 g of microbuds and each treatment was constituted by ten repetitions. After 60 days, the increment in biomass weight was scored, the values were transformed to log (x+2) and submitted to ANOVA and SNK test.

Experiment 4: Microbuds of *Vriesea friburgensis* var. *paludosa* derived from the various treatments of the previous experiment were inoculated over paper filter bridges in test tubes containing 15 ml of MS liquid culture medium supplemented with different concentrations of GA_3 (0.0; 5.0; 10.0 and 15.0 μM). 0.10 g of microbuds were inoculated in rehearsal tubes contents 15 ml of middle of culture. Each treatment was composed by 30 repetitions, equivalent to a test tube containing 0.10 g of microbuds. After 60 days, the weight values in grams of the microbuds were scored and the data were transformed to (x+0.5). The data derived from the scored number of buds and buds per gram of biomass were transformed to log (x+2). The transformed data were further submitted to ANOVA and SNK test.

RESULTS AND DISCUSSION

Experiment 1: After 60 days of the inoculation, the microbuds inoculated in culture medium free of plant growth regulators and supplemented with NAA (2.0 μM) and BAP (4.0 μM), resulted in larger weight increment in biomass resulting in values of 2.42 g and 2.24 g, respectively. These results were statistically different from those resulting from the other treatments. The culture medium supplemented with GA_3 (6.0 μM) resulted in an average weight of 1.59 g, differing statistically from the results observed in response of culture medium supplemented with 2,4-D (5.0 μM) and KIN (1.0 μM) (Table 1). The treatment containing 2,4-D induced some morphogenetic alterations in the microbuds, inducing the formation of embryogenic-like callus (Figure 5[5]).

This increase in the biomass production of microbuds was not accompanied by any visible process of enlargement and development (Figure 5 [2, 4, 5 and 6]). The fact that the culture medium free of plant growth regulators promoted the largest increase in the proliferation rate, suggest that the microbuds have the capacity to synthesize the hormones needed for the morphogenetic process.

Experiment 2: The largest increment in the production of microbuds (1.73 g) was obtained in the MS culture medium free of plant growth regulators, this treatment differing statistically from the other treatments. Culture medium supplemented with GA_3 (5.0 and 10.0 μM) resulted in the biomass microbuds production of 1.17g and 0.99g respectively. The lowest production of microbuds resulted from the treatment containing 15.0 μM of GA_3, with 0.69 g (Table 2). The increasing concentration of GA3 in the culture medium decreased the proliferation rate of the cultures, possibly due to a toxicity effect as noted by the occurrence of necrosis in the microbuds. None of the treatments promoted the differentiation of the microbuds in shoots.

Experiment 3: Significant differences were not observed in the increment in the microbuds biomass in response to different treatments 60 days after the inoculation. The culture medium supplemented with 2-iP (12.0 μM) and with NAA (12.0 μM) gave the highest and lowest increment in the biomass of microbuds with values of 2.858 and 1.79g respectively. Culture medium supplemented BAP (12.0 μM) resulted in cultures with symptoms of hyperhydricity (Figure 5[6]).

Experiment 4: Microbuds cultivated in culture medium free of plant growth regulators when submitted to the treatments designed to induce their further development showed two main features, the increment in the microbuds biomass and their elongation (Table 3a, Figures 5[11] and 5[12]). The culture medium supplemented with treatment GA_3 (5.0 μM) resulted in the largest weight increment (1.37 g) that was not statistically different from the other treatments.

All of the treatments promoted the development to shoots. The culture medium supplemented with GA_3 (5.0 μM) resulted in the best results elongation and development rates. Each gram of microbuds resulted in an average value of 236.16 shoots. These results were not statistically different from those observed in the culture medium supplemented with GA_3 (15.0 μM) which resulted in 202.26 shoots. The culture medium free of plant growth regulators resulted in low conversion rates as compared to other treatments (193.24 shoots/g). However the shoots derived from this treatment showed the best morphological features.

When first cultured in the presence of NAA then after submitted to different levels of GA_3 or in culture medium free of plant growth regulators the increment in microbuds biomass ranged from 0.80 to 0.99g after 60 days in culture (Table 3b). In this case all the treatments resulted in the progression of microbuds to shoots, with emphasis to the culture medium supplemented with GA3 that resulted in an average value of 107.30 shoots per gram of microbuds.

When maintained in the culture medium supplemented with NAA (12.0 μM), the microbud agglomerates presented regression to callus and revealed the presence of roots, as well hyperhydric aspect (Figure 5[6]). Thus, similarly with the responses attributed to 2,4-D, the presence of NAA seems to negatively affect the morphology and development of microbuds.

When multiplied initially in culture medium supplemented with GA_3 (6.0 µM), and after cultivated in culture medium supplemented with different levels of GA_3 the microbuds had the largest increment in biomass in the level of 15.0 M (0.80 g). For the progression of microbuds to shoots the best performance was achieved with 15.0 µM (182.16 microbuds/g) (Table 3c).

The progression to shoots was enhanced when the of microbuds were cultivated in the presence of GA_3, in the levels of 15.0, 5.0 and 10.0 µM, resulting in mean values of 295.51, 285.24 and 248.06 shoots respectively. The culture medium free of plant growth regulators resulted in 173.04 shoots per gram, differing statistically from the other treatments.

Microbuds initially maintained in culture medium supplemented with NAA (2.0 µM) and BAP (4.0 µM), and after submitted to different levels of GA_3, or to a culture medium free of plant growth regulators resulted in the largest increment in biomass production in the latter treatment (1.13 g).

The culture medium supplemented with GA_3 (10.0 and 5.0 µM) and the treatment free of plant growth regulators resulted in a total conversion values of 231.86, 218.40 and 200.23 shoots per gram, respectively. The treatment with GA_3 (15.0 µM) promoted the development of 161.26 shoots per gram (Table 3d).

Microbuds initially maintained in culture medium supplemented with KIN (12.0 µM), when submitted to different concentrations of GA_3, had their largest biomass increment in the presence of 15.0 µM of this plant growth regulator (Table 3e). Figures 4, 5 and 8 show the development of shoots after 30 days in culture, as well the presence of globular structures (Figure 5[5]), probably microbuds morphogenic precursors. Like the others, all treatments resulted in the development of shoots, with emphasis to the culture medium free of plant growth regulators that resulted in an average of 257.42 shoots per gram of microbuds.

Microbuds initially maintained in culture medium supplemented with 2-iP (12.0 µM) and after cultured in culture medium supplemented with different concentrations of GA_3, or in culture medium free of plant growth regulators had their best performance in terms of conversion in the later treatment with 177.76 shoots per gram (Table 3f).

In the present work the highest regenerative rate resulted from the culture medium supplemented with GA_3 (15.0 µM) yielding an average value of 295.51 plantlets per gram of inoculated microbuds, previously cultivated in culture medium supplemented with 6.0 µM of GA_3 (Table 3). However, other treatments revealed adequate regenerative rates, when we consider the normal rates observed in several micropropagation protocols. Thus, in the present work, we considered the treatments that yielded at least 170.00 plantlets per gram of microbuds as satisfactory. This value was the general average of regenerative rate induced by the different treatments. Similarly in the multiplication phase satisfactory rates of microbuds biomass increment was considered when at least 0.90g of microbuds was yielded after 60 days in culture.

The definition of the GA_3 levels used for the development of microbuds derived from the results obtained in the experiment 2 where the treatment free of plant growth regulators was considered the best one.

TABLE 1. Microbuds biomass (g) from a starting fresh weight of 0.05g of *V. friburgensis* var. *paludosa* microbuds, in response to various types and levels of plant growth regulators (PGR) supplemented to MS culture medium after 60 days in culture. Means followed by different letter are statistically different by SNK test (P<0.05).

Treatment (µM)	Biomass	Increase
MS free PGR	2.42 A	48.48
NAA 2.0; BAP 4.0	2.24 A	44.96
GA_3 6.0	1.59 B	31.95
2,4-D 5.0; e KIN 1.0	0.13 C	2.70
CV%	16.42	

The results of the present work did not allow for establishing a clear separation in the effects attributed to the different levels of GA_3. Also, the results showed that the growth and development of microbuds are governed by endogenous factors, considering the results observed in culture media free of plant growth regulators.

TABLE 2. Microbuds biomass in vitro production (g) from a starting fresh weight of 0.05g of *V. friburgensis* var. *paludosa* microbuds in response to various levels of GA_3 supplemented to MS culture medium after 60 days in culture. Means follows by different letter are statistically different by SNK test (P<0.05).

GA_3 (µM)	Biomass (g)	Increase
0.0	1.73 A	34.60
5.0	1.17 B	23.40
10.0	0.99 B	19.80
15.0	0.69 C	13.80
CV%	11.41	

Table 3. Microbuds biomass (g) from a starting fresh weight of 0.10g and conversion of microbuds in plantlets of *V. friburgensis* var. *paludosa* maintained previously various types and levels of plant growth regulators (PGR) and further cultured in MS culture medium supplemented with various levels of GA_3, after 60 days in culture. Means followed by different letter are statistically different by SNK test ($P < 0.05$).

PGR (µM)	GA_3 (µM)	Weight (g)	Increase (X)	No. of shoots	No. shoots/g
a. PGR free	0.0	0.9 C	9.00	156.56 C	193.24 A
	5.0	1.37 A	13.70	236.16 A	170.10 A
	10.0	1.02 BC	10.20	165.13 BC	172.04 A
	15.0	1.17 AB	11.70	202.26 AB	157.27 A
	CV (%)	14.41		8.50	5.0
b.NAA (12.0)	0.0	0.80 A	8.00	83.33 A	100.52 A
	5.0	0.90 A	9.00	107.30 A	117.34 A
	10.0	0.89 A	8.90	104.03 A	118.52 A
	15.0	0.80 A	8.00	92.20 A	111.15 A
	CV (%)	7.5		9.3	7.6
c. GA_3 (6.0)	0.0	0.71 A	7.10	116.70 B	173.04 B
	5.0	0.67 A	6.70	163.50 AB	285.24 A
	10.0	0.73 A	7.30	170.13 AB	248.06 A
	15.0	0.80 A	8.00	182.16 A	295.51 A
	CV (%)	17.36		9.90	7.11
d. NAA 2.0; BAP 4.0	0.0	1.13 A	11.30	200.23 AB	173.63 B
	5.0	1.10 A	11.00	218.40 A	210.74 A
	10.0	1.12 A	11.20	231.86 A	197.86 A
	15.0	0.98 A	9.80	161.26 B	178.74 B
	CV (%)	11.37		7.52	4.49
e. KIN (12.0)	0.0	0.59 A	5.90	133.10 A	257.42 A
	5.0	0.41 B	4.10	83.10 B	212.65 A
	10.0	0.43 B	4.30	97.53 AB	229.58 A
	15.0	0.61 A	6.10	135.60 A	226.05 A
	CV (%)	12.71		13.80	6.55
f. 2-iP (12.0)	0.0	0.90 A	9.00	152.23 A	177.76 A
	5.0	0.72 B	7.20	120.00 B	172.67 A
	10.0	0.72 B	7.20	114.06 B	171.46 A
	15.0	0.85 AB	8.50	127.13 B	178.99 B
	CV (%)	10.47		6.62	4.11

In the present work the microbuds arose spontaneously during the germination of seeds in semi-solid MS culture medium free of plant growth regulators or during the multiplication phase in liquid MS culture medium supplemented with NAA (2.0 µM) and BAP (4.0 µM) (Figure 5[1]). Even considering that it was not possible to establish unequivocally the correct origin of the microbuds from the original explant, it was observed that these structures arose from the basal portion of young leaves. In pineapple these same structures were reported arising from the same region, that showed high meristematic activity (Hosoki & Asahim, 1980). Similar morphogenetic structures with the same origin were denominated protuberances (Mercier & Kerbauy, 1992, 1993), cellular masses (Mercier & Kerbauy, 1992), protorcomoids bodies (Mapes, 1973), and nodules (Teng, 1997). This last author developed a micropropagation

system for *Ananas comosus* based on the culture of nodules, which were developed starting from lateral buds. These nodules were characterized as cell agglomerates exhibiting a consistent pattern of internal differentiation, and kept proliferative capacity for long time. McCown et al. (1988) found in those nodules, three types of cells: meristematic, parenquimatic and vascular elements; and two layers: epidermis and internal cortex. Some of these anatomic features were also observed in the present work (Figure 5[3]).

Following these concepts we postulate the term microbuds as competent morphogenic structures showing high regenerative capacity. In orchids cultivated *in vitro* the protocormoids are considered as similar morphogenic structures of the direct or indirect somatic embryogenesis (George, 1993). The results obtained in the present work suggest that the microbuds should not be considered similar to the protocormoids since they give rise to bipolar structures. The shoots differentiated from the microbuds were monopolar structures that originate roots in culture or after acclimatization. Histologic and anatomic studies revealed the induction of meristematic clumps in the border of the original explants, from which microbuds arose (figure 5[3]).

In the present work, the culture medium free of plant growth regulators or supplemented with NAA (2.0 µM) and BAP (4.0 µM) used during the multiplication phase was efficient to allow the repetitive cloning of microbuds. The great advantage of this *in vitro* system is the high regenerative potential of the microbuds. For the accomplishment of all the experiments established in the present work and destined to the differentiation and growth of microbuds it was necessary 72.0 g of microbuds. After 60 days in culture the average increase in the biomass of microbuds was 8.5 times, reaching a total yield of 612.66 g. This biomass of microbuds resulted in 106,441.00 shoots, corresponding to 173.73 plantlets per gram. Thus, it can be inferred that a single gram may result in the development of 1478 shoots at the end of 60 days in culture. Another advantage of this regenerative system was the synchrony of the development of shoots. The importance of the regenerative system based on microbuds refers to the fact that, once controlled the *in vitro* morphogenic the regenerative protocols can be tested and applied to other bromeliads species, thus allowing mass propagation for commercial or conservation purposes.

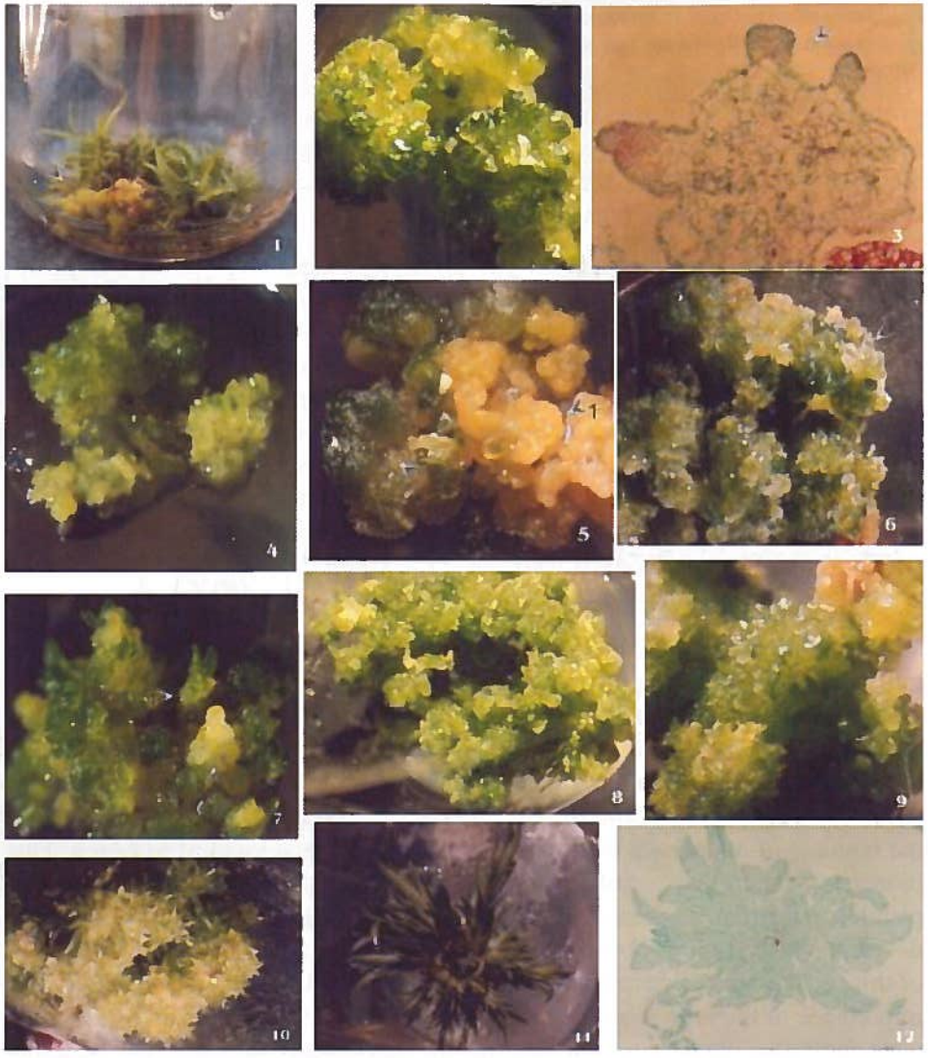

Figure 5. Micropropagation illustrations for *Vriesea friburgensis* var. *paludosa*. **[1]**. Induction of microbuds of Vriesea friburgensis var. paludosa in culture medium supplemented with NAA (2 µM) and BAP (4 µM). **[2]**. Microbuds cultivated culture medium supplemented with NAA(12 µM), after 30 days in culture (7.5 ?). **[3]**. Longisections showing meristematic clumps from which microbuds arose (10 ×). **[4]**. Microbuds cultivated in MS culture medium free of plant growth regulators after 30 days in culture (5.0 ×). **[5]**. Induction of globular (1) and organogenic structures from microbuds (2) cultivated in 2,4-D (5 µM) and KIN (1 µM), after 30 days in culture (10 ?). **[6]**. Microbuds with symptoms of hyperhydricity (10 ×). **[7]**. Cultures showing mixed sections of microbuds initials and developing shoots (12.5 ×). **[8]**. Microbuds after 30 days in culture (10 ×). **[9]**. Development of shoots after 50 days in culture (12.5 ×). **[10]**. Shoots developed from microbuds after 70 days in culture (12.5 ×). **[11]**. Shoots after 100 days in culture (12.5 ×). **[12]**. Longisections of shoots after 100 days in culture (40 ×).

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Update on Judges School at the WBC

Betty Ann Prevatt, JCC Chairman, states that a judging school is tentatively scheduled for the World Bromeliad Conference in St. Petersburg, Florida. Wednesday, May 15th from 9 a.m. to 4 p.m. The reason that the school remains tentative is that a minimum of five people are required and as of the date of publication, four have signed up. The cost will depend upon the number of students but is expected to be around $20.

Requirements for attendance are that an enrollee must be a member of a BSI affiliate, must grow at least 50 bromeliads from at least 10 genera, and must possess the handbook for Judges, Exhibitors and Affiliates. The handbook may be purchased from BSI Publications.

If you have not already signed up, please do so as soon as possible by calling Betty Ann Prevatt, JCC Chairman, at 941-334-0242 or writing to her at 2902 Second Street, Fort Myers, FL 33916.

Werauhia jenii, a Novel Highland Species

Simon Pierce[5]

Abstract. A new taxon of Bromeliaceae is described: Werauhia jenii from the highlands of central Panama, with ruddy-speckled foliage.

***Werauhia jenii* S. Pierce sp. nov.** (figures 6–10)

TYPE: Panama. Prov. Panama. Cerro Jefe, Parque Nacional Chagres, 2nd August 2000, *Pierce 00-00015* (Holotype: SEL; Isotype: SCZ).

A *W. bracteosa* (Mez & Wercklé) J.R. Grant cui affinis, sed laminis foliorium patulis faciebus abaxialibus maculatis rubris, scapo longiore (54–65 cm vs. 36.5–48.0 cm) et bracteis primariis brevioribus (4.0 cm vs. 5.1–7.3 cm) verdis differt.

Plant epiphytic in exposed situations, with Type IV phytotelm shoot, 99 cm tall in flower, short caulescent with woody stem. **Leaves** in spreading to sub-erect rosette, 35 – 41 cm long. **Leaf sheaths** elliptic, 13 (16) cm long × 8.1 cm wide, persistent. **Leaf blades** 26.3 cm long, triangular (6.5–7.5 cm wide basally, decreasing acropetally to ~2.5 cm), pale green adaxially, with base to mid portion of abaxial surface suffused with maroon in ill-defined maculate transverse bands, apex rounded to acuminate, usually senesced and brown even in expanding leaves. **Scape** erect to curved erect, 54 (65) cm long, 8 (9) mm in diameter. **Scape bracts** imbricate, acute, 4.5–8.5 (13) cm long, senesced and dried brown with blade recurving. **Inflorescence** cylindrical, 8 (14) cm long by 5 (6) cm in width at base. **Primary bracts** entirely green, broad, cupulate, acute, 40 mm long. **Lateral branches** 3–4 cm long, 2-flowered, often with vestigial third bud. **Flowers**, peduncles 0.0–0.5 mm. **Floral bracts** acute, 3.5–3.7 × 2.4–3.0 cm, light green with no other coloration, glabrous, acute, exceeding sepals, conduplicate along keel and enclosing flowers and colorless mucilage. **Sepals** rounded, 22.0–25.0 × 12 mm, green and glabrous with no markings. **Petals** not seen.

Phenology

Observed at the conclusion of flowering at the beginning of August.

Habitat and further notes

An account of the habitat of *Werauhia jenii*, Cerro Jefe elfin cloudforest in Central Panama, has been given previously (Pierce and Aranda, 2000). *Werauhia jenii* is found growing alongside *Werauhia. lutheri* S. Pierce & J.E. Aranda in this habitat, and what appear to be seedlings of *Werauhia jenii* have also been

[5] Smithsonian Tropical Research Institute, Apartado 2072, Balboa, Panama City, Republic of Panama.

Simon Pierce

Figure 6. *Werauhia jenii*, inflorescence.

Simon Pierce

Figure 7. *Werauhia jenii* at Cerro Jefe with infructescence.

Simon Pierce

Figure 8. Seedlings of *Werauhia jenii.*

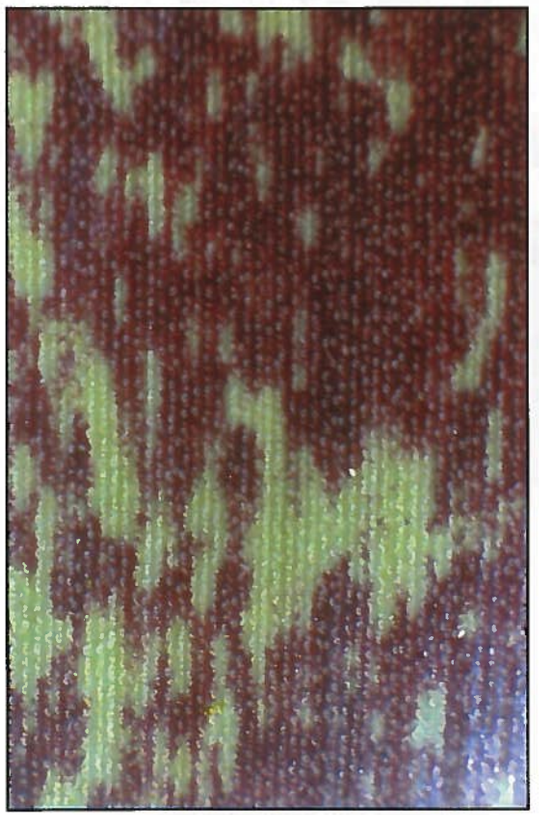

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Figure 9. Detail of diffuse leaf blade pigmentation of mature specimen.

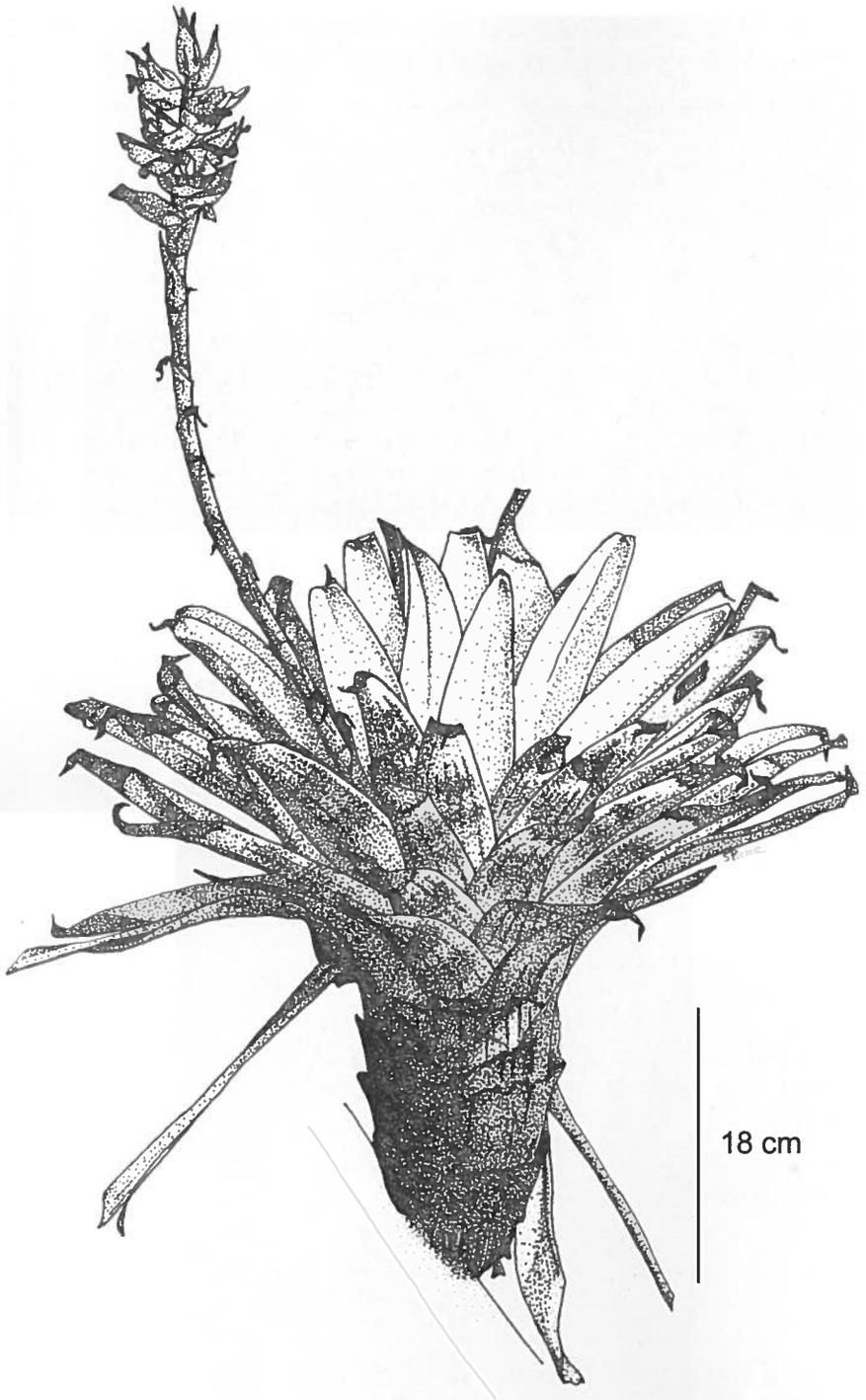

Figure 10. *Werauhia jenii*, habit with inflorescence.

photographed at Fortuna, Panama (H. Luther, pers. comm.). *Werauhia jenii* may prove to be restricted in range to a small number of montane sites in Panama.

The holotype specimen was discovered, not by the author, but by a Garden Emerald hummingbird (*Chlorostilbon assimilis* Lawrence; Wetmore, 1968). This flew in front of the author and then up approximately 4 m to hover beside the bromeliad inflorescence in the crown of a tree (ironically this was almost directly above the author's tent, which had been pitched for two days without the bromeliad being noticed). On shaking the phorophyte tree, the thin rotting branch to which the specimen was attached snapped and fell off. The bromeliad had apparently just finished flowering, and the hummingbird was therefore not observed visiting the flowers. However, as hummingbirds remember the position of nectar sources (Miller *et al.*, 1985) and will revisit these sites, it is possible that this individual plant may have been visited by hummingbirds during flowering. If so, this is likely to represent opportunistic feeding on the part of the hummingbird as *W. jenii* does not possess a typical tillandsioid bird-pollination syndrome, lacking red bracts (Benzing, 2000).

The foliage of younger plants of *W. jenii* is somewhat more attractive than mature specimens; seedlings possess red-maroon pigmentation over both surfaces of the leaf blade, produced in more distinct, solid, transverse bands (Figure 4). As plants age, these bands become more diffuse and maculate (speckling the entire mid section of the leaf blade; Figure 5), and are not produced on the upper surface. The appearance of older plants suffers from the propensity of leaf tips to senesce from an early stage (sometimes when the leaves are still expanding). The plant also becomes progressively caulescent with age, the short woody stem being surrounded by rotting leaf sheaths. The end result is a large and somewhat messy individual, but with plenty of character.

ACKNOWLEDGMENT

I thank Jason R. Grant for help with Latin (also belated thanks for similar help in a previous description (Pierce and Aranda, 2000), and an apology for overlooking an acknowledgement in that description). Also, Richard Gottsberger for general assistance in the field, and Marìa Stapf of the main STRI herbarium (SCZ) for help in preparing herbarium specimens.

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Panama City, Republic of Panama

A Four-petaled *Tillandsia cyanea*

Jeffrey Kent

At Kent's Bromeliad Nursery we receive millions of young plants derived from tissue culture production to grow on to maturity. In the process some outstanding new varieties have come into being because of ongoing mutations. Reports of mutations occurring every 10,000 divisions, while initially appearing implausible, now seem to me to be quite plausible after having observed the diversity in young plants received from seedling suppliers. Genetic mutations being expressed somatically can vary from the bizarre to the beautiful. An aberrant plant may have striped leaves (variegations), the color of the inflorescence may be different from the rest of the batch, or any other number differences can occur that set the plant apart from the norm. Of course deleterious mutations can also occur resulting in deformed or defective plants.

I recently discovered a *Tillandsia cyanea* with a pyramidal shaped inflorescence here at Kent's Nursery that differs from the "*Tillandsia cyanea* 3-D" found in a DeLeon selection by having four petals rather than the usual three. For a bromeliad to have four petals is unheard of. It even violates one of the basic taxonomical criteria used in defining a bromeliad. The basic description of a bromeliad is that the bromeliad flower parts are in 3's. Who knows what will be found next?

Vista, California

Jeffrey Kent

Figure 11. *Tillandsia cyanea* with an unusual four-petaled inflorescence.

Bromeliad Tips

Bob Reilly

Below are listed a number of cultural tips based upon my own experience in growing bromeliads in Queensland, Australia. Hopefully others will find some of them useful no matter where they may live.

1. If mounting tillandsias onto wooden or cork mounts, try to do it well before the plant flowers. This will improve the chances of the plant sending out roots onto the mount, as flowering plants often do not do this. Instead, flowering plants are expending their energy making the flowers, then seeds and pups.
2. For mounting tillandsias, some people prefer using *Leptospermum* or *Callistemon* branches that have dried completely out. This can be achieved by removing all twigs and leaves from the branches and putting them in a shady place for 12 months to dry out. The process can be hastened by leaving the twigs and leaves attached to the branch for 4 to 6 weeks. The leaves tend to draw all of the sap out of the branch, thus accelerating the drying out.
3. Consider re-potting bromeliads as soon as you obtain them. The mixture they may be growing in will often be different than your own and could stay either too "wet" or "dry" for your conditions. If it stays too wet or soggy, there is a real risk the plant could rot. If it stays too dry, you will either need to water it more frequently than your other plants, or its growth will be affected adversely.
4. If you can, delay removing pups until they are one-third to half the size of the parent plant. They will tend to grow more quickly, and be less likely to rot (or suffer from other death-inducing problems), than pups removed at a smaller size. The downside of this approach is that the plant may produce fewer pups, than if they were removed at an earlier stage of their development.
5. Try to avoid removing pups until winter is definitely over. In the Southern Hemisphere, this means taking pups off during the period from mid September to late April, in the Northern Hemisphere the best times would be between March and September. Pups taken off during this period will usually develop roots and commence active growth more quickly, than pups removed during winter. Losses due to rot and other problems are also likely to be less.
6. Before applying liquid fertilizer to bromeliads, thoroughly wet the leaves with water. This helps to ensure the leaves are in the best condition to absorb the nutrients in the liquid fertilizer.

7. If you are trying to decide which potting mix is best for your conditions, it is worth remembering:
   - A potting mixture which stays wet and soggy for any length of time will probably cause you more problems than one which tends to be on the dry side; and,
   - You may only experience some adverse weather conditions e.g. a wet spell of a fortnight's duration in winter, once in several years. However, if your potting mixture isn't designed with these conditions in mind, you can suffer a lot of plant losses when they do occur.
8. If you are thinking of building a shade house, it may be best to build it during fall or early winter. Not only will you find it more comfortable to build then, rather than during hot weather, but the shade house will be ready to house the Spring "explosion" in bromeliad numbers due to the potting of pups, and acquisition of new plants.
9. There is no need to root pups in a special potting mixture. Just plant then in the regular potting mixture you use for that type of bromeliad.
10. Many bromeliad species like high levels of sunlight (but few can tolerate full sun in the middle of summer!). If a plant of a light-loving species has been grown in shady conditions, moving it straight into a well-lit position may result in sun damage e.g. yellowing of the leaves, bleached "spots" on leaves. Give the plant time to adjust by moving it, over several months, into progressively more sunny locations.
11. Some bromeliads never seem to flower, even though they appear to be mature. Shifting them to a new location, where they receive more (or less) light, or changing the potting mixture in which they are grown, may induce flowering.

Good luck!

Brisbane, Queensland, Australia

ERRATA: In the July-August issue of the JOURNAL, [50(4):178] in the article profiling the candidates for BSI Director for the Texas Region, the names of two of the candidates were misspelled. Gary Gallick (not Gillick) and Alan Richtmyer (not Richtmeyer) along with Ed Doherty are the three candidates for the two available positions. Our apologies to Mr. Gallick and Mr. Richtmyer for the error.

Also, in the same issue on page 170, the photo credit of figure 16 attributed to H. Luther should have been attributed to Chester Skotak.

WBC Side Trips - Corkscrew Swamp Sanctuary

Chet Blackburn

There are many locations within 150 miles of St. Petersburg, the site of the BSI World Bromeliad Conference in May 2001, that persons interested in natural history would find worthy of a visit.

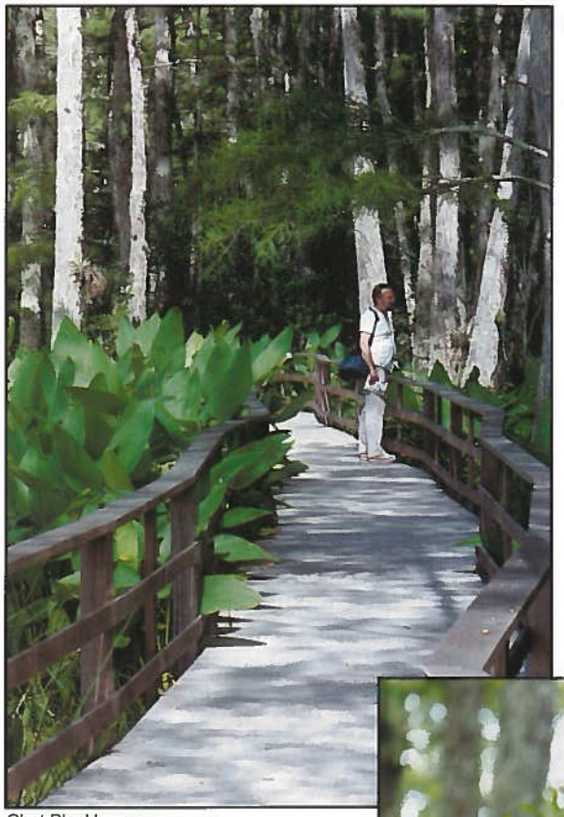
After attending the BSI World Conference in Orlando in 1996, Greg Payne, Keith Smith and I headed south to spend a week roaming around some of the swamplands in southern Florida before returning to California. Dennis Cathcart provided us with some excellent suggestions on places to go and it will come as no surprise to those of you who know Dennis that for him "best places" and "off the beaten-track" are synonymous terms.

It turned out to be a thoroughly delightful week of driving over (sometimes submerged) back roads, wading, exploring, and botanizing places like the Fahkahatchee Strand, Loop Road, The Big Cypress National Preserve and Corkscrew Swamp. All were interesting and each was unique, but perhaps the most unique and certainly the most accessible of these captivating locations was the Corkscrew Swamp Sanctuary.

A National Audubon Society Sanctuary since 1954, Corkscrew Swamp is the home of the world's largest remaining old-growth Bald Cypress Forest. It consists of more than 11,000 acres near the northern tip of the Big Cypress Swamp. Having never been logged, it affords a totally different experience than forays into swampland in other parts of Florida. A two-mile boardwalk winds its way through 500-year old trees, breaking out occasionally into sunlight and pools of water lettuce, wet prairie, marsh or pinelands. It includes some of the most beautiful wetlands in America. It is a remnant of what South Florida once was before becoming mauled and malled.

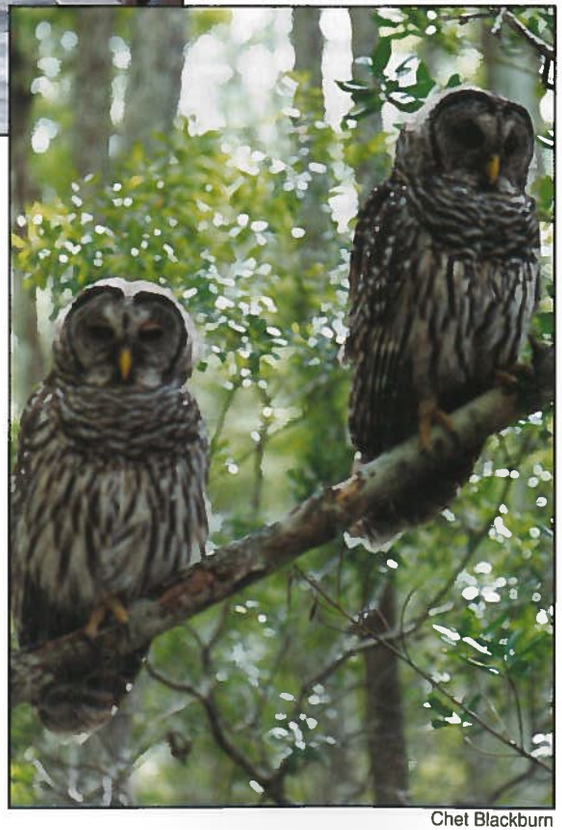
Tourists tend to avoid South Florida in mid-summer because of the heat and humidity. However shortage of people can be a definite advantage in a place like Corkscrew Swamp, because a place like that should be experienced in solitude. Besides, once inside the shaded cypress forest, it is not uncomfortable. We could only imagine how it would have been with the boardwalk full of running kids and tourists excitedly babbling about alligators at the height of the season.

For us, the silence was only occasionally broken by eerie sounds like those made by pig frogs. Pig Frogs (*Rana grylio*) make a most unfrog-like grunting sound, and one that is almost impossible to pinpoint as to source. We tried to find the source of the sounds many times as we ambled along the boardwalk, stalking with camera at the ready, but were never successful. There were also occasional birdcalls, such as that of the pileated woodpecker (*Dryocopus pileatus*), and the hooting of barred owls (*Strix varia*) answering each other back and forth, but



Chet Blackburn

Figure 12. Keith Smith wandering the boardwalk at Corkscrew Swamp.



Chet Blackburn

Figure 13. A pair of barred owls in trees adjacent to the boardwalk.

Chet Blackburn

Figure 14. *Tillandsia utriculata* at Corkscrew Swamp Sanctuary.

Chet Blackburn

Figure 15. *Tillandsia variabilis* inflorescence.

mostly it was sublime silence. Even the buzzing of mosquitoes was missing. In fact, Corkscrew is remarkably free of mosquitoes because of the many natural predators in the waters below that feed on the larvae.

We saw alligators, as we had at most of the previous locations, but all of these were less than three feet in length, although larger ones are here. There were turtles sunning on moss-colored logs, and of course the ubiquitous anole lizards (*Anoles carolinensis*) and tree frogs (*Hyla* sp.?). A highlight of the hike was a pair of barred owls in a tree next to the boardwalk, totally unconcerned with our intrusion. Nearly 200 species of birds have been sighted in Corkscrew Swamp, and it is a major nesting site for wood storks, but birds are more visible in the winter when they concentrate around the drying pools. It has always been a major nesting site for wood storks (*Mycteria americana*) and great egrets (*Casmerodius albus egretta*).

More than 546 species of plants from 118 families can be found in Corkscrew, including eleven species of bromeliads. The genus *Catopsis* is represented by *C. berteroniana*, and *C. floribunda*. The nine species of *Tillandsia* found here are *T. balbisiana*, *T. fasciculata* var. *densispica*, *T. paucifolia*, *T. pruinosa*, *T. recurvata*, *T. setacea*, *T. usneoides*, *T. utriculata* and *T. variabilis*.

Consider visiting Corkscrew Swamp before or after attending the conference. It is near Naples, about 145 miles from St. Petersburg. From Naples take old highway 846 and turn left at the sign at the sanctuary entrance. It is open every day of the year. Hours are from 7 a.m. to 5 p.m. from December to April, and 8 a.m. to 5 p.m. from May to November. Early morning is the best time to go if you can. It is not only cooler then, but there are fewer people.

In other matters relating to the world conference, for several years there has been strong demand, especially from members outside the US, to schedule the Conference before the month of June, when airfares tend to increase. The Conference Committee was fortunate enough to be able to schedule pre-conference activities for May 13, through the final post-conference tour to Selby Gardens on May 20th. Typically, the beautiful city of St. Petersburg with its lovely beaches, gardens, marinas, and museums is at its best in the month of May.

Updated details of the WBC 2002 may be viewed on the BSI Web site, bsi.org. The WBC2002 will be a wonderful way to spend a vacation in one of the most beautiful parts of Florida. A registration form is located elsewhere in this JOURNAL or may be printed from the Web site.

Auburn, California

Letters to the Editor

[*Ed note: I cringe when articles on judging are submitted for publication. They always generate comment, and the odd thing is that most letters agreeing with the content of an article usually go to the author, while letters disagreeing with it come to the editor. The following letters are in response to the article Thoughts on show arrangements and judging by John Arden in the March-April 2001 issue (51(2):57–59).*]

Judged shows: a fundamental part of the BSI

Judged bromeliad shows have always been a vital part of the BSI and affiliate societies. They provide a means by which growers can display their best plants, thereby promoting and maintaining a public interest in bromeliads. They provide educational information and a means of sharing cultivation information with other growers. They provide incentive to strive for excellence while having a good time interacting with other members of bromeliad societies. In my opinion, bromeliad shows are excellent tools to share our wonderful plants with each other, with the public, and to continue to attract new members to local and international societies.

The Judges Handbook is presently going through a major revision to further simplify things. In contrast to what some have come to believe, flower show judges have had very little influence in writing or revising the handbook. I have compared flower show schedules many times and have found few similarities. In the bromeliad shows in Tampa over the years, plants have always been displayed by genus. There is nothing in the handbook that requires shows to mix the genera. This is at the discretion of the show committee. Many affiliates offer "best-in-genus" awards, but that is also the decision of the affiliate or the show committee. The sample schedules in the handbook: A, B, & C are for those who have never sponsored a show and may need some guidance.

In the horticulture division, we are judging plants for horticultural excellence. Therefore, pots should not be the focus but rather simply support for the plant. Granted that the pot should be clean and the proper size for the plant but it should be unobtrusive. However, in the artistic division of the show the decorative containers section is designed to use any type of container a grower chooses and the entry is judged on the compatibility between the plant and the container with less emphasis on the plant than would be in the horticulture division. This gives people on opportunity to use their artistic talent and ability to compete in a creative manner.

I see nothing confusing or difficult about any of this. These categories are designed to be fair to the plant and the grower. If confusion exists, perhaps it is due more to the fact that there are so many choices, not restricted choices.

I would recommend that an affiliate devote one or two monthly programs prior to a show to instruct members on cleaning and grooming plants and their placement in the show. Many affiliates do this to help teach new members how to participate.

Trained judges are an essential part of the show. In most cases, judges either chair the show or play a vital role on the show committee. To insure impartiality, a bromeliad show should be judged by judges who are not members of the affiliate sponsoring the show. Judges and growers can't be separated because all judges are required to be growers as part of their qualifications, but not all growers are judges. Qualifications for BSI Accredited Judges can be found in the Judges Handbook.

Without rules for a show, or any other function in our society, there would be chaos and confusion. There must be standards, otherwise, you would not know if you have something good, bad, or indifferent. This is true for horse shows, cooking shows, dog shows, or any other type of competitive show. Even people who do not want their plants judged may share them at a judged show through "exhibit only" entries.

Judges spend much time each year attending schools, symposiums, and seminars in order to meet qualification requirements. They do this at their own expense. They also agree to judge shows, often at long distances from their homes, and pay their own travel, motel, and food expenses. Usually they are awarded a token gift at the conclusion of judging. Most societies could not afford these expenses but because of the judges' love for bromeliads and their sacrificial efforts, bromeliad shows are made possible. I believe these folks deserve more praise and recognition for their efforts than they usually receive.

Betty Ann Prevatt, who is currently the BSI Judges Certification Chair, is compiling material from her committee members to revise the Judges Handbook once again. Let's give them a chance to come forth with a simple, workable solution for a show held anywhere by anyone.

Bromeliad shows are a lot of fun! I am thankful that, through attending local and international shows, I have been exposed to a wide variety of bromeliads and met wonderful "bromeliad folks" that have become like family. I have also had the opportunity to learn from many growers while conversing at shows and sharing with other judges when serving on the same panel. Many times members, some whom I hardly knew, invited me to their homes to share their bromeliad collection, to eat a meal together, or to spend the night with them. There are not many organizations in which you can share and enjoy your mutual interests and make life long friends at the same time. Bromeliad Shows have truly opened the door to a better life!

Tom Wolfe, President, BSI

Reply to Thoughts on Show Arrangements and Judging.

I believe that members of the Judges Handbook Committee, who have consistently been meeting and burning the midnight oil trying to make the handbook better than it is, deserve more credit than is given to them in Mr. Arden's article. The handbook is not just the work of a "flower judge" but of many experienced bromeliad growers who have spent several years compiling it. It has been an evolutionary process. We have consistently tried to get ALL affiliates to appoint someone from their club to attend Handbook Committee meetings to resolve any perceived conflicts or confusion.

In the early days of the BSI there were no accredited judges. A group of bromeliad enthusiasts thought it would be a great idea to start a judge's school and the handbook is an outgrowth from that initial effort. After 4 years of trial and error the handbook was finally compiled. I was one of only 12 judges completing the initial courses. That was not very many for an international organization, but it was a beginning. We now have numerous judges who have completed these courses, practiced point scoring, served on show committees, served as show clerks (where they learn a lot) and observed the final and most difficult part of awarding those plants of greatest merit the award the for which it qualified.

Before a show it is imperative that the member read and STUDY the schedule. He/she should check the rules and regulations and the classification definitions. Many societies vary the schedule and that is why it is important to do this. But the judging procedures vary very little and, to insure fairness, this is exactly what the whole handbook and schedule is trying to accomplish.

Fred Ross

My own thoughts on show arrangements and judging

As a relative newcomer and someone without an axe to grind in this issue, Moyna Prince, currently a member of the BSI Board of Directors, asked me what I thought of the article "Thoughts on show arrangements and judging" in the March–April issue of the Journal of the Bromeliad Society.

Should we jettison the Handbook for Judges? I think not! There is tradition and history in BSI rules, and most clubs feel a necessity to run a BSI-standard show. In some circles at least, there seems to be a stigma associated with a non-BSI standard show. I can understand why there might be a push to change BSI rules for those who feel strongly that the rules shouldn't universally apply to all bromeliads everywhere, all the time, but still want their plants and their judges to reap the benefits of a BSI-standard show.

Yet, maybe there is some room for change in the ideas of what constitutes standard - maybe even going so far as to decree that any one of 3 or so kinds of plant categorization represent "standard". Changes such as allowing a grower to decide if his container is part of his display or not, or the idea of judging singles and multiples simply according to which is the best grown plant, might make it easier for an affiliate whose members largely feel they want to enter plants according to those criteria so that a given show can satisfy everyone in the club and still be BSI-standard.

I do wish there was a little more flexibility in the BSI rules to allow for these kinds of things, where an affiliate can do one thing or the other, but still run a BSI-standard show. Frankly, I see many of these alternatives (e.g., multiples judged along with single plants, or not,) as minor concerns, and thus, good test cases for built-in flexibility. On the other hand, I can understand those who are more in favor of sticking with strict uniformity. To some, there is no such thing as a minor point. I am pretty far away from being either a judge or having 20 years' experience with the BSI, so while I appreciate Moyna asking me for my input, I respect that there may be 10 reasons that what I am saying should not be heeded.

The place where I absolutely disagree with Mr. Arden is in his view of the role of judges, which he seems to think is to simply do as they are told. I feel quite the opposite. We need our judges, and we need their cooperation and good will. Judging is a real sacrifice. If there are affiliates whose members feel as Mr. Arden does, that changes or choices in how a certain category (such as decorative container) are warranted, then I think that their local judges, who judge those shows might be a viable mechanism for making those changes. The judges could petition the BSI to change the rules to allow for flexibility where they feel it is appropriate, as discussed with the people whose plants they judge.

Change can be good! Especially small changes that speak directly to the unique plants that bromeliads are, and that don't give purists a coronary. Maybe there are some small changes that could go a long way to making all growers happier.

Lynne Fieber

Judges Certification Committee is Responsive to Suggestions

The Judges Certification Committee is currently working on a major revision to the handbook. This is a time consuming task and taking longer than expected. However, I want to make it clear that the JCC does listen and does discuss all ideas and concerns forwarded to them. If anyone has an issue regarding staging a BSI show, or judging of a BSI show, they should contact their District Judges Registrar. The judges in each district meet annually to discuss shows, judging, new ideas and perceived problems. Every district has representation on the Judges Certification Committee and their responsibility is to pass along concerns that need to be addressed. While JCC does review all submissions, of course all of them cannot and should not be implemented.

Betty Ann Prevatt

Reply to Thoughts on Show Arrangements and Judging

I do not understand how the Decorative Containers Division can be a source of confusion. This is in the Artistic Section of the show schedule and is not a requirement of a standard show. It is in most schedules to allow exhibitors to display artistic talents not evident in the pure horticulture divisions. It also allows exhibiting plants that have not grown on or in their decorative mounting or container. Fancy woods and pots are allowed in this division, where horticulture points are decreased to 20 and artistic skill is rewarded.

The judging rules are written in the show schedule and, while judges have been trained to read a schedule, there is nothing very complicated about it. Changes have been made based on suggestions presented to the Judges Certification Committee by exhibitors, not judges. Anyone feeling a need for changes has the option to present them to the committee for consideration.

There are only three divisions required for a "standard show". The only required divisions in the standard show are *Horticulture:* 1) Single specimen plant; 2) Multiple Specimen plant (two or more in a pot); and 3) Horticulture Displays. The Horticulture Display is a division for showing plants growing on or in a medium other than soil and pots. A Standard show may have as few as 25 plants in 6 genera, and oh yes, there must be a judges section for judges actively judging the show to exhibit their own plants. The artistic divisions are at the affiliate's discretion.

The judging rules are simple and understandable. The affiliate may display and judge the plants any way that fits their schedule. The changes made for the world conferences were made in response to requests from exhibitors, some of

them Mr. Arden's own requests. For example, we added a division for terrestrials that grow best in heavy ceramic pots and cannot be removed and placed into plastic for a show.

Books and catalogs list plants by single plants. They are not attempting to judge the best of anything. They are providing knowledge for comparison or sales and how they list plants is not necessarily relevant to how they are shown. Besides, there is a show schedule available in the handbook as a sample that lists plants by genus.

I feel it is unfair to state that present judging rules were written by a flower judge. A great deal of effort was made to include bromeliad specialists in the first judging classes to make the handbook specific for bromeliad judging. These rules do not dictate a way to display bromeliads. But there are instructions given in judging schools as to what to look for in a bromeliad as a judge. The best bromeliad growers available teach these schools today.

Judges do not have any say as to how a show is displayed or arranged. The Staging Chairman, usually not a judge, has to make this decision along with the Placement Chair.

There is no reason that a bromeliad grower need know anything but the name (both parents, preferably) of the plant to enter any show. That is why there is a classification chairman. They help the grower get the bromeliad into a division of the schedule where it can be judged fairly.

I doubt that any judge has ever written a schedule for the show that he or she is judging. However, a judge who is a member of the affiliate holding the show usually volunteers for this job, but this is not a requirement. The schedule does need to be approved by the Affiliated Shows Chairman. The person volunteering for this task is one of the Bromeliad Society's committee chairs. The BSI awards, free of charge, the Mulford B. Foster (best horticulture award) and the Morris Henry Hobbs (best artistic award, if this division is included in the schedule) plaques, to any affiliate holding a "standard show". It therefore behooves the BSI to ensure that the Horticulture Division and three required sections are present. This chair also ensures that the judge's panel is qualified to judge the show.

"Awards are presently given in the horticulture division to individual specimen plant, multiple, and who knows what else" to increase the number of awards given in each show. Winning an award usually encourages an exhibitor to show bromeliads again at the next show. There is no rule on having special divisions for multiples, mounted, or any other division. When schedules are written, the writer usually tries to think of the many different ways a bromeliad grower can exhibit a plant and how the exhibitor can be encouraged to participate.

Again, there is no rule in the handbook that states there must be more than the three horticulture divisions. The schedule writer decides this, and the schedule writer can be anyone; they do not have to be a judge.

Mr. Arden also stated that there is no schedule in the handbook, listing the plants by genus. Page 10, Schedule A, has an example listed by genus. The schedule however does not dictate how the show plants are to be displayed. There is no rule in the handbook as to the genus either being assembled at one location, or scattered around the room. This is not a schedule or handbook rule, it is up to the Placement and Staging committees.

The genus can be placed "where they belong" before judging. Most shows are merit judged and each plant is judged on its own merit. Judges, being human, can better judge a plant that is not right next to its kind, because there is no way to compare anything and they are forced to use the scale of points for each exhibit. However, the placement is of no concern to a judge.

For societies using a simple schedule, plants can be judged and displayed by genus or any other way the staging and placement chairmen wish. There is no BSI system, other than having an approved schedule, that is in order to ensure there are the three HORTICULTURE sections. I have judged at least one of the affiliate shows that is not BSI approved and points are taken off where cultural perfection is not perfect. That sometimes means dirty plants or pots.

Mr. Arden questioned judging of pots and cites Cactus and Succulent shows as examples. When you read a schedule for a standard Cactus and Succulent show you will be struck by the points given for *staging*. This refers to whether the plant fits the pot and whether the pot shows off the plant to its best advantage. Since Cacti are terrestrials, they grow in large ceramic pots. In 2000, we allowed bromeliad terrestrials to be shown in ceramic pots. This change was requested by some of the exhibitors. There were 14 of the 475 plants in that show in ceramic pots and Mr. Arden won best of show horticulture in San Francisco using a ceramic pot for his prize-winning *Vriesea*, which is not a terrestrial. I think credit for our many changes and attempts to please exhibitors have been overlooked.

The Accredited Judges are open to all views. There is no such thing a standard schedule. If you travel throughout the US, as I do, judging shows, you know there are lots of variations on a theme. There are no Standard BSI show schedules either. The handbook lists three as *samples*, part of the organization of the "standard show".

No matter what changes the Judges Certification Committee and the Judges make, they will be criticized. That comes with the territory, but it is only fair that the criticism be based on actual conditions.

Joyce Brehm

In Fond Memory
Betty Am Prevatt, JCC Chairman

It is with much sadness that I report the loss of one of Marie Kinzie Bessellieu who passed away on May 5, 2001. Marie had been battling metastatic breast cancer for 4 years. It had metastasized to her bones, liver and finally in March, to her lungs.

Marie became a BSI judge in 1998, and as she did with all her interests, attacked it with zest. She was an excellent grower and one of the finest judges we had. Although she loved all bromeliads, her favorites were the neoregelias. The bigger the better! A few years back she had a battle with copper (see BSI JOURNAL July–August 1998 issue, Vol.48, # 4) which could have destroyed her collection, but she worked so hard, cleaning, flushing, and taking loving care of them that most recovered. She had been advised to throw them all away because the pups wouldn't do well, but she did not and never gave up! Most of her collection survived, pupped and grew up to be prettier than ever!

Marie was a member of the Caloosahatchee Bromeliad Society in Fort Myers, Florida since 1987 where she served as secretary, vice-president, president, show chairman, judges chairman, and in many other capacities. She attended all of the World Bromeliad Conferences since attending New Orleans "One 'mo time" in 1986. She bravely went to San Francisco last June, even though she just found out about the liver cancer. However, she was not well and had to miss many of the events.

It was Marie's wish that a sale be held to dispose of her bromeliads and that one-half of the proceeds of the sale be donated to the BSI Journal Color Fund. On June 16th, the sale was held at their home and $3,200 worth of bromeliads were sold. A check for $1,600 has been sent by her husband, Cecil, in memory of Marie.

Marie was a great supporter of the BSI and BSI JOURNAL. She looked forward to each issue, absorbing every word. She was proud to be a judge and took it very

seriously. She was truly a wonderful person with many friends and will be greatly missed by all. We have all lost other dear bromeliad friends, but this was different. Marie was more than a friend to me; she was my sister!

Fort Myers, Florida

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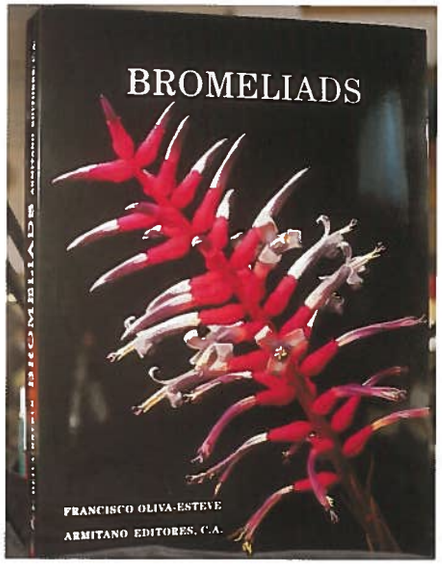

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The Bromeliad Society International

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 Marcel Lecoufle

What it lacks in size, *Tillandsia crocata* makes up for in fragrance. Although it is only 3 to 4 inches tall, pound for pound, this interesting little tillandsia has to be the fragrance champion of the bromeliad family. Some liken its fragrance to carnations, others to roses, and Victoria Padilla once described it as having an aroma like cinnamon. To me it smells like a florist shop. The oversized (for the plant), bright yellow flowers would be sure to draw your attention even if the fragrance didn't. It's home is on rocky cliffs in southern Brazil, Uruguay, Argentina, and Bolivia. The small, stiff, arching, channeled leaves are heavily coated with trichomes giving the plant a silvery appearance. It will eventually form large clumps.

Calendar

27 Oct	The Bromeliad Society of Central Florida will host the 2001 Extravaganza of the Florida Council of Bromeliad Societies at the Maitland Civic Center, 641 S. Maitland Ave., Maitland, FL (just north of Orlando). Activities include a large sale, interesting speakers, rare plant auction and banquet. Admission and parking are free, but there is a charge for the banquet. Hours are 9 a.m. to 5 p.m. Contact: Eloise Beach, 407-886-8892, e-mail floridapro@aol.com.
9–11 Nov	The Caloosahatchee Bromeliad Society will host its 2001 Standard BSI Bromeliad Show and Sale at Terry Park, 3410 Palm Beach Blvd., Fort Myers, FL. Judging will be held on Friday and the show and sales areas will be open to the public on Saturday and Sunday. For more information contact Dr. Lawrence Giroux, FAX 941-997-6377 or by e-mail at n2finchs@peganet.com or Brian Weber, 941-591-4268 or by e-mail at brianweber1b@aol.com.
13–20 May	"Bromeliad Beach Party", the 15th World Bromeliad Conference, will be held at the St. Petersburg (Florida) Hilton Hotel. Look for the registration form with details inside the JOURNAL.