Journal of The Bromeliad Society

VOLUME 52 • March-April 2002 • NUMBER 2

Journal of the Bromeliad Society

Vol. 52, No. 2 March-April, 2002

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Cover photographs. Front: *Tillandsia viridiflora* (Beer) Baker ranges from Mexico to Nicaragua. It has relatively large, spidery-like flowers that when faded, tend to hang down like tassels. Before it reaches maturity, the plant sends out numerous plantlets that are easy to detach and grow separately. A variegated form is also available but the variegation is unstable in offsets. Photograph by Marcel Lecoufle. **Back:** *Tillandsia flabellate* from Mexico, Guatemala and El Salvador. Photograph by Marcel Lecoufle.

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The Journal, ISSN 0090-8738, is published bimonthly at Orlando, Florida by the Bromeliad Society International. Articles and photographs are earnestly solicited. Closing date is 60 days before month of issue. Advertising rates are listed in the advertising section. Permission is granted to reprint articles in the Journal, in whole or in part, when credit is given to the author and to the Bromeliad Society International. **Please address all correspondence about articles and advertising to the editor.**

Subscription price (in U.S. $) is included in the 12-month membership dues: single–$30.00, dual (two members at one address receiving one Journal)–$35.00, fellowship–$45.00, life-$800.00 in U.S., $1056 outside of U.S. For first class mail add $10.00.

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Printed by Fidelity Press, Orlando, Florida.

Cultivar Corner - Two Oddities from Oz and one from Florida

Derek Butcher[1]

It does appear that nothogenera are in and I have three separate stories to relate about three new ones.

1. In January 1999 Len Summers of Melbourne, Australia harvested seed from *Deuterocohnia brevifolia* to which he had applied pollen from a *Pitcairnia hartwigii* but was not confident of success. The seed germinated and the resultant plants grew well until only three years later. He got his first flower in January 2002. Needless to say, he invited around all his bromeliad mates to view the achievement. Photos were taken and information sent to me. It was decided to call the plant ×*Deuterocairnia* 'Lenny' that I was quite happy with because the photograph clearly showed attributes from both genera. What did puzzle me was the *Pitcairnia hartwigii*, which was either incorrectly spelled or had not been described. I was informed that the late Eizi Matuda had found this plant in Mexico in the 1980's and we are still trying to ascertain its correct name.

2. In November 1994 John Catlan of Brisbane obtained a plant called *Hohenbergia membranostrobilis* from New South Wales and which had originally been imported from Brazil. One year later the plant flowered and a photograph was sent to me for my files. Alas it did not seem to be the correct name, but as we all know it is easier to say a plant is wrongly named than it is to give its correct name! I was stumped for a while because this plant had dark blotches on the leaves. I then came across the same plant but with totally green leaves. The plant just had to be *Hohenbergia disjuncta*. John tried self pollinating his plant but had no success. Did he have a mule? In 1997 John was in a 'yellow' mood and decided that he would use the pollen from the cream petalled yellow bracted *Quesnelia edmundoi* var. *edmundoi*. He did not do the reverse cross. Seed was set and planted and the plants grew well. John wanted to name the plant after his friend, Neville Ryan and as Neville is somewhat quick witted the name 'Nifty Nev' was coined. I refused to believe that John had created a bigeneric hybrid and he had to flower it before I would be satisfied, so John handed out seedlings to a select few for growing on. Some got to Melbourne with Len Summers mentioned above. The plant flowered under Len's care and I broke the good news to John that I should not have doubted his word. So now we have ×*Hohenelia* 'Nifty Nev' in circulation. As John says the plant has hybrid vigor, banding, strong yellow bracts, and is a reasonable size for a hanging basket or 150 mm pot.

[1] BSI Cultivar Registrar

3. In late 2001 I was reading the very comprehensive Plant listing from Michael's Bromeliads of Venice, Florida and happened to see a bigeneric called Dyckipu that fascinated me. It was an illegitimate name because the first syllables from both genera involved had been used whereas the first and last should be used. The correct nothogenus should have been ×*Puckia* because *Puya laxa* was the seed parent and a hybrid of *Dyckia fosteriana* × *platyphylla* was the pollen parent. If you have this plant please change the name to ×*Puckia* 'Sparkle.'

You will notice that I have an open door as far as cultivars are concerned but I am disturbed when the likes of *Dyckia fosteriana* × *platyphylla* are considered worthy of growing and appearing on nurserymen's lists but are not considered worthy of a cultivar name. Someone must know who did this hybrid and even if we named it after this person posthumously I am sure they would not mind!

Fulham, S.A., Australia

Chris Larson

Figure 1. ×*Deuterocairnia* 'Lenny'

Chris Larson

Figure 2. ×*Hohenelia* 'Nifty Nev'

Herb Plever

Figure 3. ×*Puckia* 'Sparkle'

Two New *Guzmania* Natural Hybrids from Northwestern Ecuador

Harry E. Luther[1]

***Guzmania* ×*amoena* H. Luther, hyb. nat. nov.** (Figures 4-5, Table 1)

Type: Ecuador. PROV. CARCHI, Chical-Tobar Donoso, 01°06'N, 78°"16'W, 800m, 8 Feb. 1985, *B. Øllgaard, J. Korning, K. Thomsen & T. Illum 57621* (Holotype: AAU; Isotype: QCA)

Hybrida naturalis ex *G. kraenzliniana* Wittmack et *G. longipetala* (Baker) Mez interparentes medias, bracteae primarae 6-12 cm longae, sepala 14-15 mm longae, petala 45 mm longae.

Plant caulescent, flowering 30-40 cm tall. **Leaves** densely imbricate, spreading. **Leaf sheaths** elliptic, concolorous with the blades. **Leaf blades** ligulate, broadly acute, apiculate, 8-10 cm × 10-15 mm, appressed-lepidote, green or tinged reddish. **Scape** erect. **Scape bracts** foliaceous, densely imbricate. **Inflorescence** laxly bipinnate with 6-8 branches. **Primary bracts** foliaceous, spreading, 6-12 cm long, purple to rose. **Branches** subsessile, 2-flowered. **Floral bracts** elliptic, obtuse, 12-15 mm long, sparsely-lepidote, thin, nerved, pale green. **Sepals** 14-15 mm long, 2/3 connate, thin-coriaceous. **Corolla** tubular with spreading lobes. **Petals** 45 mm long, white.

This appears to be an uncommon natural hybrid between the very rare and sporadically distributed *Guzmania kraenzliniana* and the locally abundant *G. longipetala*, both of which are sympatric in extremely wet sites in Carchi and Esmeraldas provinces in N.W. Ecuador.

***Guzmania* ×*litaensis* H. Luther, hyb. nat. nov.** (Figure 6)

Type: Ecuador. PROV. ESMERALDAS, west of Lita, 5-600 m, *J. Kent legit.* Flowered in cultivation, Jan. 1992. J. *Kent s.n.* (Holotype: SEL).

Hybrida naturalis ex *G. rosea* L.B.Smith et *G. testudinis* L.B. Smith & R.W. Read var. *splendida* H. Luther inter parentes medias, inflorescentia bipinnata, bracteae florigerae 18-37 mm longae, sepala 25-28 mm longae, petala 35 mm longae.

Plant flowering to 65 cm tall. **Leaves** rosulate, spreading, 60-75 cm long, inconspicuously appressed brown punctate-lepidote throughout. **Leaf sheaths** elliptic, 6 × 8 cm. **Leaf blades** ligulate, broadly acute and apiculate, 35-45 mm wide, dark green. **Scape** erect, 35 cm × 8mm, red. **Scape bracts** erect, densely imbricate, elliptic, acute to acuminate, green to red. **Inflorescence** depauperately compound, bipinnate, 30 × 12 cm, branching only in the lower 1/4. **Primary**

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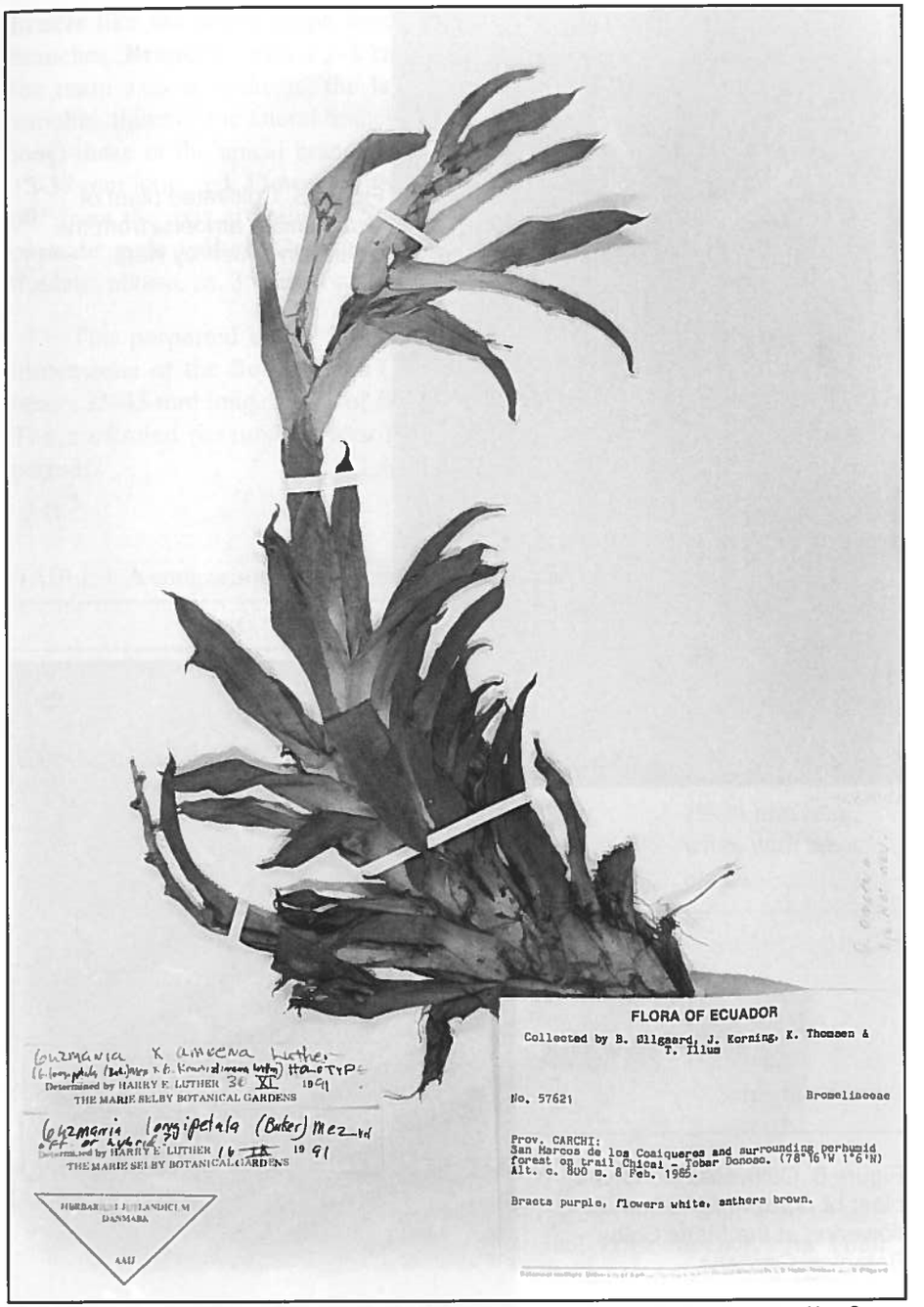

Vern Sawyer

Figure 4. Holotype specimen of *Guzmania* ×*amoena* conserved at Aarhus University.

Figure 5. Cultivated plant of *Guzmania* ×*amoena* from the collection of Jeffrey Kent.

Vern Sawyer

Figure 6. Cultivated clonotype plant of *Guzmania* ×*litaensis* flowering at the Marie Selby Botanical Gardens.

Vern Sawyer

bracts like the upper scape bracts, exceeding the naked sterile bases of the branches. **Branches** with a 1-2 cm long sterile base, spreading at ca. 45° from the main axis at anthesis, the lateral branches 5-10-flowered. **Floral bracts** variable: those of the lateral branches broadly elliptic to ovate, obtuse, 14-17 mm long; those of the apical branch elliptic to ovate, obtuse to acute and attenuate, 15-37 mm long, red. **Flowers** with a 2-4 mm long stout pedicel, spreading at 30-60° from the axis at anthesis. **Sepals** elliptic, obtuse, 25-28 mm long, 2/3-3/4 connate, pale yellow. **Corolla** tubular with slightly spreading lobes. **Petals** ligulate, obtuse, ca. 35 mm long, cream.

This purported hybrid is noteworthy due to the extreme variability of the dimensions of the floral bracts (14-37 mm long). *Guzmania rosea* has floral bracts 35-45 mm long. Those of *G. testudinis* var. *splendida* are 10-14 mm long. The presumed parents are absolutely sympatric with overlapping flowering periods.

TABLE 1. A comparison of some characters of *G.* ×*amoena* and its purported parents.

	G. longipetala	*G.* ×*amoena*	*G. kraenzliniana*
Primary bracts	5-25 × 2-3 cm, red and yellow	6 -12 × 1-2 cm, purple to rose	8-12 × 1 cm, rose
Sepals	14-15 mm long	14-15 mm long	8-12 mm long
Petals	50-60 mm long, white with recurving blades	45 mm long, white with recurving blades	19-24 mm long, white with erect blades

ACKNOWLEDGMENTS

I thank the collectors for bringing these two interesting plants to my attention.

Sarasota, Florida

BSI Judges School at WBC 2002

The BSI Judges School sign up is still open to those who wish to take School One on Wednesday at the World Bromeliad Conference... the Point Scoring class of the Judges School. Those wishing to join it must email or call Betty Ann Prevatt, JCC Chair as soon as possible so plan can be made to include them. We must know by May 1.

This is a Conference sponsored activity originally set up to assist Internationals and others who had little hope of attending a Judges School. It is only open to Registrants to the Conference.

Water Pollution in Bromeliad Tanks - An Experimental Approach

James Burgess[1], Edward Burgess[2], Margaret Lowman[3], and Saul Lowitt[4]

Bromeliads are important epiphytes in many ecosystems including Florida hammocks, sub-tropical and tropical rain forests, and cloud forests (Benzing 1990). Many epiphytic bromeliads form a rosette structure that holds a tank of water that comprises a mini-ecosystem in the forest canopy. These aquatic ecosystems house many economically important insects (e.g. Diptera, Coleoptera) as well as other organisms, most of which are very poorly studied. Bromeliad tanks have been reported to contain ants, beetles, mosquitoes, spiders, millipedes, centipedes, slugs, snails, frogs, salamanders, lizards, snakes, birds' nests, rats, mice, and opossums (Neill 1951). Some organisms are visitors and some are residents.

Due to the logistic difficulties of accessing tropical canopies, many bromeliad tanks have never been examined or surveyed (Lowman and Nadkarni 1995; Lowman 1999). In addition to the difficulties of access to epiphytes in tree canopies, bromeliad tank ecosystems are doubly difficult to survey because the removal of the aquatic water medium may lead to mortality of the plant. It is almost impossible to extract the organisms and water from a bromeliad without physically removing the plant from its phorophyte and turning it upside down. Such destructive harvesting of bromeliads in a rain forest canopy could lead to the depletion of localized bromeliad populations, and is not advised. An experimental design that involved the creation of artificial bromeliads was used, since containers that simulate tanks have been utilized in other phytotelm studies (e.g. Frank 1986).

The impact of air and water pollution on bromeliads has been suggested (Benzing and Bermudes 1991), and consequently the affects of such airborne contaminants may also affect the health of the tank ecosystems as well as the host plants. Common types of water pollution in Florida include salinity, acid rain, detergents, fertilizers, herbicides and insecticides. Such airborne contaminants most likely drift even to the most remote tropical rain forest canopies as well.

This research project tested the effects of different types of water pollution on bromeliad tank ecosystems in Florida. In addition, we developed an artificial bromeliad for our experimental design that can be replicated for many different situations where students, classrooms, or scientists need to set up studies on

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phytotelms (i.e. aquatic habitats such as tank bromeliads, tree holes, or leaf pockets in *Heliconia* and others) (Macguire 1971). Recently, the Jason Project for Education used our artificial bromeliad design to examine the diversity of organisms in artificial bromeliad tanks between tropical and temperate latitudes (Lowman 1998).

METHODS

Forty-five cups (12 ounce, green opaque plastic) were labeled and filled with 125 ml of bottled water (pH = 7.0). Five pollution treatments were compared: 1. salt water (as when salt spray infiltrates bromeliads along coastal Florida); 2. fertilizer (Miracle-gro added to the water tanks); 3. detergents (liquid soaps added to water tanks); 4. acid rain (vinegar added to water as a mild form of acid rain); and 5. control which comprised water alone in the tank. The cups were placed in the canopy of a live oak (*Quercus virginiana*) at a height of 6 meters that is representative of the canopy height in Florida hammocks.

Approximately three cups of each treatment were harvested after 2 weeks, 4 weeks, and 6 weeks, so that we could observe what organisms settled into the bromeliad tanks over time as well as how the pollutants affected both the abundance and the diversity of the tank inhabitants. When the cups were harvested, their contents were poured into a bowl, and observed under a microscope. Each cup was tallied separately, and the three replicates averaged for each harvest. Our hypothesis was that the pollution of the bromeliad tanks would result in a decrease in diversity of organisms residing there.

RESULTS

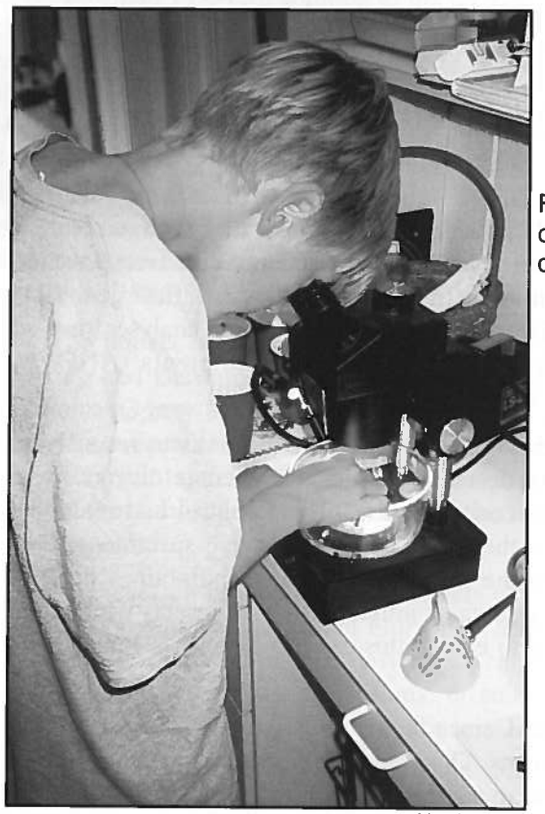
The abundance of arthropods in artificial bromeliad tanks ranged from a high of thirty-seven individuals to a low of zero. Insects per cup averaged 5.66 individuals. Averages per treatment were (from highest to lowest): detergent 9.11; control 6.56; acid rain 5.44; fertilizer 3.67; salt 3.5. Statistical analyses showed that there was no significant difference between the treatments (ANOVA, $F=2.11$), but there was significant difference over time ($F=4.09$).

In terms of diversity, the highest number of species ($N=11$) was recorded in a cup with detergent treatment. In decreasing order, the average diversity was detergent, acid, fertilizer, salt, and control. Although the control had relatively low diversity, it did however have the highest number of live specimens. This suggests that pure water may be the most successful to maintain a healthy ecosystem over time, whereas the pollutants initially attracted insects which then died in the contaminants. We need to extend this experiment over a longer time period to test this.

Our hypothesis was not upheld, since the controls did not have the highest abundance and diversity of organisms. This may be due to the time-scale of the experiment. Over such a short time (6 weeks) the artificial bromeliads may have

Meg Lowman

Figure 7. Using a canopy walkway in live oaks to set up artificial bromeliad tanks for the experiment.



Meg Lowman

Figure 8. Identifying the contents of bromeliads tanks with a dissecting microscope.

Bromeliad Tanks

	Time 1		Time 2		Time 3		
Control							
0-1	**12**	0-4	**0**	0-7	**13**		
0-2	**4**	0-5	**0**	0-8	**7**		
0-3	**22**	0-6	**x**	0-9	**1**		
Total	**38**	+	**0**	+	**21**	=	***59***
Average	**12.67**		**0.00**		**7.00**		
Salt							
1-1	**6**	1-4	**5**	1-7	**2**		
1-2	**5**	1-5	**x**	1-8	**1**		
1-3	**5**	1-6	**2**	1-9	**2**		
Total	**16**	+	**7**	+	**5**	=	***28***
Average	**5.33**		**3.50**		**1.67**		
Fertilizer							
2-1	**5**	2-4	**3**	2-7	**2**		
2-2	**4**	2-5	**5**	2-8	**5**		
2-3	**2**	2-6	**6**	2-9	**1**		
Total	**11**	+	**14**	+	**8**	=	***33***
Average	**3.67**		**4.67**		**2.67**		
Detergents							
3-1	**4**	3-4	**1**	3-7	**37**		
3-2	**4**	3-5	**8**	3-8	**8**		
3-3	**6**	3-6	**5**	3-9	**9**		
Total	**14**	+	**14**	+	**54**	=	***82***
Average	**4.67**		**4.67**		**18.00**		
Acid							
4-1	**6**	4-4	**4**	4-7	**4**		
4-2	**6**	4-5	**5**	4-8	**14**		
4-3	**9**	4-6	**0**	4-9	**1**		
Total	**21**	+	**9**	+	**19**	=	***49***
Average	**7.00**		**3.00**		**6.33**		
Col. Total	**100**		**44**		**107**	=	***251***
Col. Avg.	**6.67**		**3.17**		**7.13**	=	***16.97***

attracted visitors but not resident insects. The fact that only the control housed live insects suggests that this may be the case, and that the pollutants attracted insects via smell that only ended up falling to their deaths in the polluted cups.

Seasonality may also have affected our results. The abundance of organisms may be lower due to the fact that this experiment was conducted during autumn and winter. We hope to repeat this experiment during spring and summer, and possibly over a longer time period.

Bromeliad tanks represent important centers of biodiversity in forests, and they have not been adequately studied. It is likely that airborne pollutants will play a major role in the health of bromeliad tank ecosystems, and we advocate further studies on these ecological interactions.

ACKNOWLEDGEMENTS

The authors are grateful to the volunteers who assisted with harvesting: Michael Brown, Ed Lowman, Beth Weatherby, Phil Wittman, David Yotsuda; and to the Research Department at Selby Botanical Gardens for assistance with identification of organisms.

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Two new *Guzmanias* from the Cordillera del Cóndor of Ecuador.

José M. Manzanares[1]

In June 1999, Betty Patterson, Eduardo Cueva and I were on an expedition to the Cordillera del Cóndor. We collected two terrestrial bromeliads in a swampy area near the military camp Cóndor Mirador that proved to be new species. These two *Guzmanias* have remarkably beautiful red-yellow inflorescences.

***Guzmania brackeana* Manzanares sp. nov.** (Figures 9-11)

Type. Ecuador, ZAMORA-CHINCHIPE: Cordillera del Cóndor, near the military camp Cóndor Mirador, 2000 m, Jun. 1999, *J. M. Manzanares, B. Girko & E. Cueva 6859* (Holotype: QCNE).

A Guzmania marantoidea (Rusby) H. Luther *characteribus sequentibus differt: ramorum primariorum basis cum bractea sterilis; spicae breviores, densae ante anthesin, subdensae post anthesin, internodia rhachidis breviora (3-4 vs. 10 mm); bracteae florigerae longiores (2 vs. 1.5 cm), longiores quam sepala, carinatae, apiculatae; sepala elliptica, acuta et carinata. A G. undulatobracteata (Rauh) Rauh habitu minori, caulescente, bractea sterile in base ramorum primariorum, spicis densioribus, bracteis florigeris margine non undulatis et sepalis brevioribus recedit.*

Plant terrestrial in swampy areas, 100 cm tall with the inflorescence extended, plant with an elongated stem to 60 cm. **Leaves** numerous forming a funnelform rosette 65 cm in diameter. **Leaf sheaths** 8 × 3 cm, ovate, light brown with dark brown appressed scales abaxially, castaneous and densely gray-lepidote adaxially. **Leaf blades** 35 × 2.4 cm, narrow-lingulate, attenuate at apex, green, slightly nerved, glabrous. **Scape** erect, 50 cm long, 5 mm in diameter, equaling the leaves, glabrous, red. **Scape bracts** foliaceous, densely imbricate, 13-36 × 1.2 cm, lingulate, apex attenuate, glabrous, green, amplexicaule, longer than the internodes. **Inflorescence** 34 × 15 cm, erect, laxly tripinnate, pyramidal; with 15-18 spikes, the lowers ones tripinnate, with simple flowers at the apex; rachis red, axis slender, glabrous. **Primary bracts** 2-7 × 1.2 cm, the lower ones attenuate and longer than the branches, the uppers ones ovate, acuminate and shorter than the spike, bright red, glabrous. **Primary branches** with a short flattened peduncle, the lower ones with a sterile bract. **Secondary bracts** 3 × 2.5 cm, elliptic, acuminate, carinate, shorter than the branch, strongly nerved abaxially, finely appressed lepidote adaxially, red. **Spikes** 2.5 × 1.3 cm, ovate, complanate, distichously 5-6 flowered, short stipitate, sterile bracts at the apex, dense before anthesis, sub-dense after anthesis; rachis, sinuose, red and

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quadrangular. **Floral bracts** 2 × 1.1 cm, elliptic-ovate, apex obtuse and apiculate, longer than the sepals, carinate near the apex, nerved, glabrous, the lower ones red-yellow, the upper ones yellow. **Flowers** yellow, short pedicellate. **Sepals** 1.2 × 0.3 cm, connate 2 mm, elliptic, acute, nerved, sparsely lepidote, the posterior ones carinate, yellow. **Petals** 2.4 cm long. **Stamens** and **style** included.

The name honors Karine Bracke from Belgium, for her continuous help during the last 16 years in studying the Bromeliaceae of Ecuador.

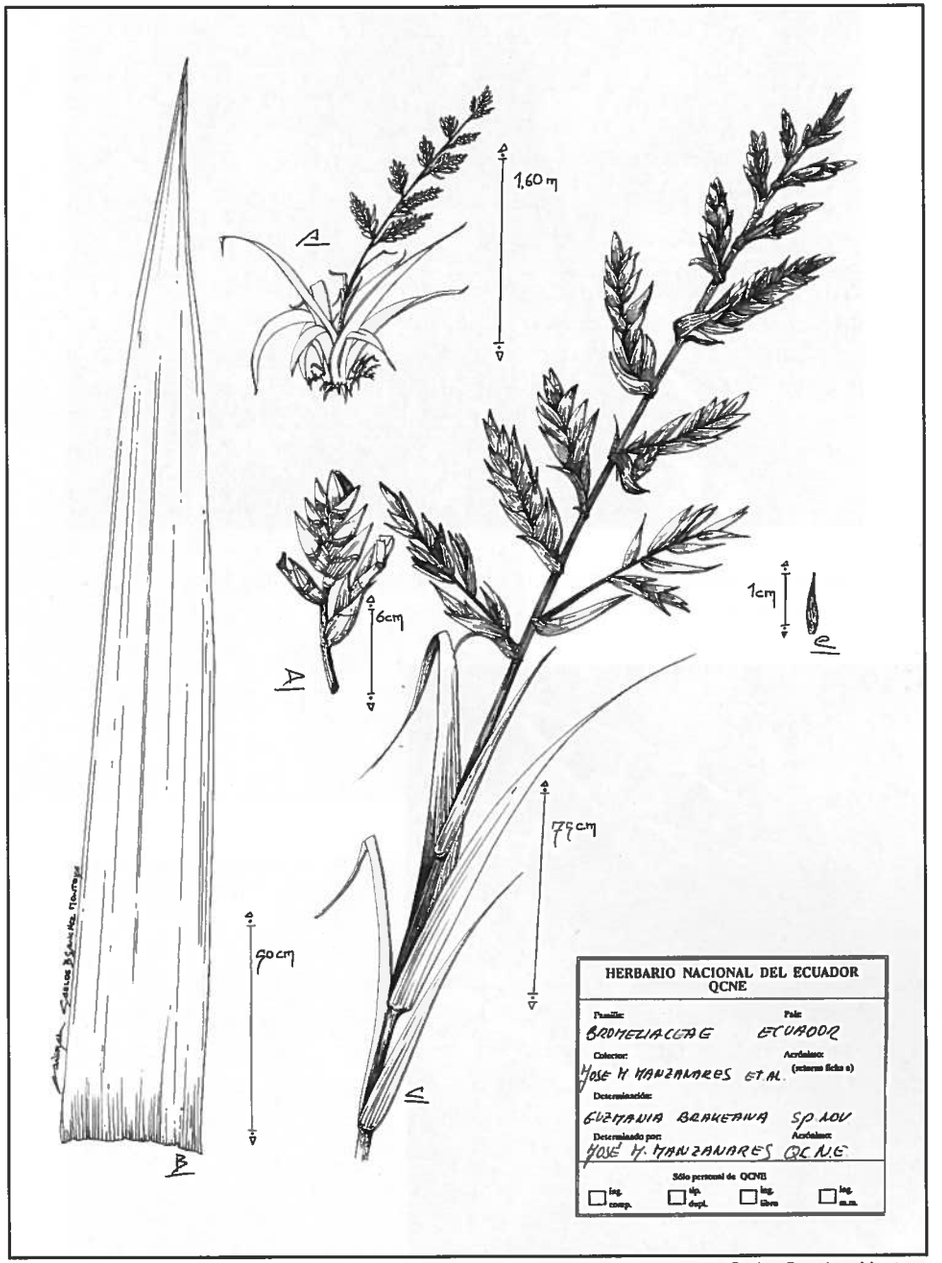
This beautiful *Guzmania* together with the *G. undulatobracteata* (Rauh) Rauh[2] and *G. marantoidea* (Rusby) H. Luther (Figure 5), are the only *Guzmania* species with a distichous arrangement of the flowers. It is distinct by being a smaller plant with a shorter scape and inflorescence, the spikes are smaller and more densely flowered, the floral bracts are imbricate and do not have an undulate margin.

Guzmania pattersonae **Manzanares sp. nov.** (Figures 12-13)

A G. weberbaueri Mez, *cui similis, bracteis primariis orbicularibus et inflatis, bracteis florigeris 2 cm longis, apiculatis et recurvatis, longioribus quam sepala et sepalis 1,4 cm longis, acutis, symmetricis recedit. A Guzmania rauhiana H. Luther scapi bracteis erectis, vix imbricatis, bracteis primariis brevioribus, ramis brevioribus, bracteis florigeris brevioribus apice divaricatis, sepalis brevioribus et petalis longioribus differt.*

Type. Ecuador. ZAMORA-CHINCHIPE: Cordillera del Cóndor, near the military camp Cóndor Mirador, 2000 m, Jun. 1999, *J. M. Manzanares, B. Girko & E. Cueva 6857* (Holotype: QCNE; Isotype: SEL, WU).

Plant terrestrial or epiphytic, 100-150 cm tall including inflorescence, with elongated stems. **Leaves** numerous forming a funnelform rosette of 85 cm. **Leaf sheaths** 12 × 6 cm, ovate, light brown with dark stripes abaxially, pale castaneous and densely brown-lepidote adaxially. **Leaf blades** 43 × 2.8 cm, narrowly lingulate, acute, somewhat plicate, green with a reddish apex, nerved, glabrous. **Scape** 40 cm long, erect, 6 mm in diameter, shorter than the leaves, laxly lepidote, reddish. **Scape bracts** the lower ones foliaceous, densely imbricate, 8-15 × 2 cm, sheaths ovate, blade lingulate, glabrous, green with reddish apex, longer than the internodes. **Inflorescence** 21 × 5.8 cm, erect, laxly bipinnate, cylindrical, with 15 horizontal polystichous spikes, rachis sparsely lepidote. **Primary bracts** 3-5 × 3 cm, orbicular, the lower long acuminate, the upper ones acuminate, the basal ones longer than the upper ones equaling the spike, horizontal, inflated, bright-red at the base, bright-yellow in the upper part, sparsely brown lepidote on both sides, strongly nerved adaxially. **Spikes** 2.5 × 1.3 cm, horizontal, cylindric, short, stipitate, yellow, 5-6 flowers polystichously arranged. **Floral bracts** 2 × 1.1 cm, elliptic, apex obtuse, apiculate and recurved, longer than the sepals, carinate near the apex, strongly nerved, glabrous, yellow. **Flowers** yellow, short pedicellate. **Sepals** 1.4 × 0.3 cm,



Carlos Sanchez Montoya

Figure 9. *Guzmania brackeana* Manzanares: A. Habitat; B. Leaf blade; C. Inflorescence; D. Spike; E. Sepals.

José Manzanares

Figure 10. *Guzmania brackeana* in habitat in a swampy area of the Cordillera del Cóndor.

José Manzanares

Figure 11. *Guzmania brackeana* detail of the inflorescence.

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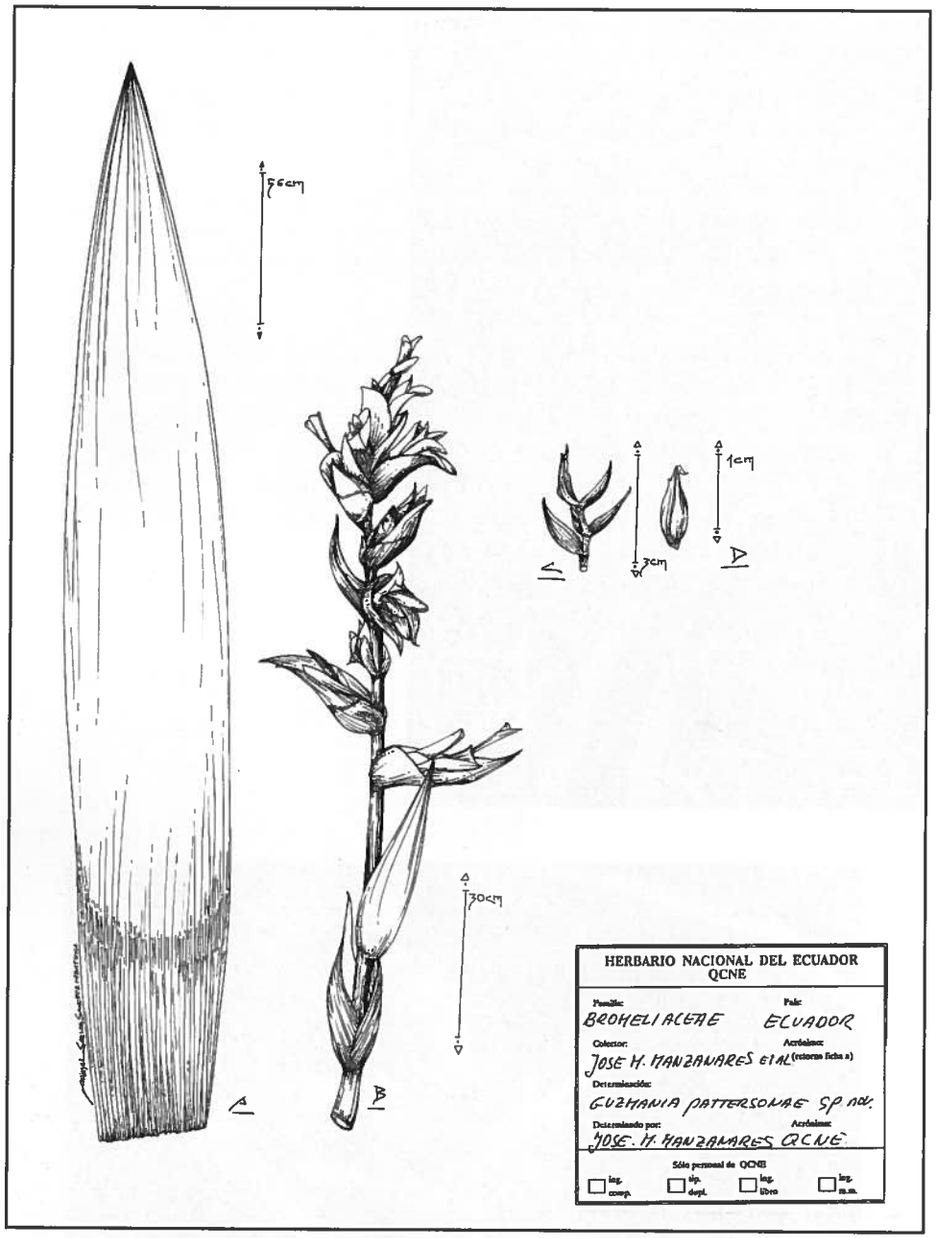
Figure 12. *Guzmania pattersonae* in habitat in a dense forest of the Cordillera del Cóndor.

José Manzanares

Figure 13. *Guzmania pattersonae* close up of inflorescence.



Carlos Sanchez Montoya

Figure 14. *Guzmania pattersonae* Manzanares: A. leaf; B. Inflorescence; C. Spike; D. Sepals.

connate 3 mm, elliptic, acute, strongly nerved, glabrous, yellow. **Petals** 4 cm long, the obtuse apex recurved, 2 cm white basally and 2 cm yellow apically. **Stamens** and **style** included.

The name honors Betty Patterson, Vice-president of the Bromeliad Society of Dallas, and an enthusiast of the Bromeliads of Ecuador.

This new species is similar to *Guzmania rauhiana*[3] H. Luther which differs by having the scape bracts erect and scarcely imbricate; the primary bracts and the branches shorter; the floral bracts shorter with spreading apex; the sepals shorter and the petals longer. The habitat of *G. pattersonae* is in the Cordilleras del Cóndor and Huaracayo at the border with Perú in the Amazon area, whereas *G. rauhiana* is found in primary forest near the border of Colombia on the Pacific Ocean side of the Andes in the Choco area. It is also related to the *Guzmania weberbaueri*[4] Mez but can be distinguished by its dense inflorescence; primary bracts being orbicular and inflated; flower bracts (2 vs.1 cm long), apiculate and recurved, longer than the sepals; sepals (1.4 ×1.9 cm long), acute and symmetric. *Guzmania garciaensis* Rauh also grows in the same area but can be distinguished by the smaller spike, the flower bracts being longer; the sepals shorter with acute apex and flowers not secund at anthesis.

ACKNOWLEDGMENT

I thank Dr. Walter Till[5] for the Latin diagnosis and comments about the two species, and Harry Luther[6] for the corrections and comments to the original descriptions.

The botanical exploration in the Cordillera del Cóndor in Ecuador was supported by grants from Corn Bak, Betty Patterson and Ed Doherty. We would like to express our gratitude to General José Gallardo Román, Ecuadorian Minister of Defense, for his invaluable and unconditional support of the Bromeliaceae of Ecuador expedition, and to Coronel Alberto Molina Flores, Executive Director of the Ecuanatura Foundation, for his help in organizing the logistical support. We are equally grateful to the Ecuadorian Army, especially to the 4th Division "Amazonas", and to the soldiers who accompanied us in the field. We thank David Neill for reviewing earlier drafts of this paper.

3 Photographs in the J. Bromeliad Soc. 38(3): 104-106. 1988.
4 Photographs in the J. Bromeliad Soc. 29(3): 144. 1979.
5 Herbarium, Institut für Botanik, Universität Wien, Wien, Austria.
6 Director, Bromeliad Identification Center, The Marie Selby Botanical Gardens, Sarasota, FL 34236 USA.

Bromeliads of the Condor

José M. Manzanares[1]

Introduction

As Director of Investigations for the Ecuanatura Foundation, I proposed the initiation of a project to the administrators of the foundation to be called "Bromeliads of the Cóndor". It was approved with the help of the foundation president, Dr. Edgardo Ruiz, and the executive director, Coronel R. Alberto Molina. However, it could never have succeeded without the excellent help provided by General José Gallardo Román, Minister of Defence.

The project was supported by the Ecuanatura Foundation of Ecuador and The Dallas Fort Worth Bromeliad Society. The expedition members included: Eduardo Cueva, Ecuadorian Forest Engineer; Betty Patterson of the Dallas Fort Worth Bromeliad Society; Gustavo Tapia; and the author, José M. Manzanares of the Ecuanatura Foundation and the National Herbarium of Ecuador (QCNE). Without the logistical support provided by the Ecuadorian Military, the expedition and resulting scientific investigation would have been impossible.

José M. Manzanares

Figure 15. Cordillera del Cóndor. Most of the forest has been unexplored for many years due to the conflict between Ecuador and Peru.

[1] Curator of the Bromeliaceae in the Herbarium QCNE, Museo National de Ciencias Naturales, Casilla Postal 17.07.9584, Quito, Ecuador. E-mail: manzanar@impsat.net.ec

José M. Manzanares

Figure 16. *Guzmania glaucophylla* in the summit of Pica Urdiales.

José M. Manzanares

Figure 17. *Guzmania devansayana* in the primary forest in Cóndor Mirador.

History

The Minister of Defense and the Ecuadorian military realize the importance of scientific investigations in the Cóndor Mountains. In 1993 they helped an earlier botanical expedition conducted by RAP, The Rapid Assessment Program, directed by North American botanist Alwyn H. Gentry. The expedition studied the flora and fauna of the Cóndor Mountain Range near the military camps at Achupalla, Banderas, Coangos and Miazi. Miazi is in the southernmost part of the Nangaritza River basin. Results were published in "The Cordillera del Cóndor Region of Ecuador and Peru: A Biological Assessment" published by the Rapid Assessment Program.

With this background, I proposed the expedition "Bromelias del Cóndor" to explore the highest summits of the Cóndor and produce an inventory of the bromeliads that existed in the different habitats of the mountain range.

The Cordillera del Cóndor

The Cóndor range is one of the few areas in the world that survive intact from the Pleistocene era, the period in which glaciers covered the world, leaving here some remnants of ice age plants and animals.

Without doubt the Cóndor range is one of the most extensive in the Andes, with summits dominated by plateaus of sandstone. Scattered marshes are also formed from the heavy precipitation allowing organic material to collect and decompose to become the source of the black water found in some of the nearby rivers.

These sandstone plateaus are geologic shield formations similar to those found in the Guayanas and Brazil. Nevertheless, the vegetation is more varied and richer because of the different habitats due to the changing topography of the land.

Study sites

The sites selected for study were near established military camps. The three sites studied were:

1. Pica Urdiales (Camp Quimi): This camp was established on the farm of Sr. Urdiales at 980m. The first trek at this camp took us to a primary forest on the slope of the Cristalino River, where we reached an altitude of 1190 m. On the second day we reached a plateau at the summit of the Cordillera at 2092m.

2. Cóndor Mirador is a military camp situated on the summit of the range. The watershed of the Cenepa valley could be seen toward the west and the Tundayme River to the east.

3. Nangaritza River basin (Camp Miazi and Camp Shaime): To arrive at Miazi, the Nangaritza River had to be navigated upriver from La Punta de Guanza (Pachicutza) at 870m. Continuing past Miazi, at 942m, we had to pass through a canyon with vertical walls and many waterfalls before arriving at Camp Shaime.

Results:

Pica Urdiales (Camp Quimi)

The trail begins in a lower area where the uneven terrain is crossed by the Quimi river. This is a zone of cultivated pasture. A few fruit trees, palms, trees used for lumber, and some ornamental trees and shrubs are scattered in the surrounding pastures. Fruit trees such as lemon trees are grown on the most fertile soil. In these trees are found great numbers of bromeliads, among them *Aechmea aculeatosepala, Guzmania acuminata, G. asplundii, Tillandsia confinis, T. fendleri, T. maculata* and *Vriesea heterandra*. As the trail begins to climb, the subtropical forest begins. The canopy of the forest can reach altitudes of 25-30m. Below the canopy are understorey trees ranging in height from 8-15m. Numerous bromeliads, ferns and mosses grow in the undergrowth. Many plants also can be found growing on the trees and bushes. The canopy and sub canopies are woven together with many lianas and vines with their aerial roots sometimes reaching the ground. Most of the species of bromeliads here are night bloomers pollinated by bats, such as *Guzmania radiata, G. coriostachya, G. retusa* and *G. confusa*. The inflorescences are green and the flowers either cream or green that emit an intense fragrance. We also collected three species that had red inflorescences: *Guzmania claviformis, Mezobromelia pleiosticha* and *Tillandsia rhodosticta*. These are pollinated by Hummingbirds.

At 1750m the cloud forest begins, resulting in colder temperatures and lower clouds. The canopy is between 10-15m. As we climbed higher, the trees became rounder and smaller and their branches were completely covered with moss, lichens, orchids and bromeliads. The trees and shrubs are 5-8m in size. The undergrowth is made up of herbaceous plants and ferns. *Guzmania conifera* was the dominant species encountered here. This species grows both on the trunks of the trees or in the soft ground. The forest floor is composed of many roots covered with a dense layer of leaves and mosses. In the more moist areas and near small streams grow dense masses of *Pitcairnia hirtzii*. The branches of the trees are full of *Racinaea schumanniana, R. tetrantha, Tillandsia fendleri, T. truncata* and *Vriesea limonensis*. Many hummingbirds live in this zone and the majority of bromeliads here are seen with a red inflorescence and yellow flowers

From 1900m the way becomes steeper with vertical walls and dense vegetation in the flat zones. The vegetation changes rapidly, with trees disappearing and thick shrubs and herbaceous plants becoming abundant. These thickets are composed of small trees and shrubs no higher than 5m. The majority of bromeliads found here have a stem that permits them to emerge from among

Betty Patterson

Figure 18. *Racinaea undulifolia* is very abundant between the summit and Cóndor Mirador

Betty Pattersone

Figure 19. Right to left: Eduardo Cueva, Betty Patterson and José Manzanares in the Military Camp Cóndor Mirador.

José M. Manzanares

Figure 20. *Aechmea (Chevaliera) strobilacea* during the anthesis close to the river Nangaritza.

José M. Manzanares

Figure 21. *Guzmania foetida* at anthesis (during night).

the thickets, *Guzmania* sp. Nov. aff. *dalstroemii* and *G. garciaensis* are the predominant species. In between the vegetation can be seen patches of the sandstone rock characteristic of the high plateau. Bromeliads are abundant and varied in this area because of the different habitats formed by each of the steep walls with their many small waterfalls and rivulets. Outstanding in this zone is *Puya* sp. (Achupalla). Sadly we could not find one in flower. Between the abundant *Sphagnum* mosses appear *G. gracilior* and many small plants of *G. garciaensis*. This type of environment provides an ideal habitat for seed germination.

The summit, at an altitude of 2092m, is a plateau of sandstone, totally covered with thickets and herbaceous plants. There are open zones with exposed sandstone rocks interspersed with marshes covered with *Sphagnum*. Each of the areas mentioned becomes the habitat for different species of bromeliads. Because there are so many different habitats this area may have more diversity in bromeliads than any other place in Ecuador. The sandstone ground is covered with a thick covering of humus and decomposing materials

The clumps of herbaceous vegetation are no higher than 1 meter. These areas are dominated by clones of *Guzmania coriostachya, G. garciaensis, G. gracilior, G. glaucophylla, G. mosquerae, G. squarrosa* and *Pitcairnia dodsonii*, all with long stems that permit them to rise up through the orchids and other herbaceous plants.

Between the thickets, herbaceous plants and open areas fissures occur in the rocks and they are sometimes hidden by roots, moss and grasses, making them potential death traps for unwary hikers. You must also be careful also not to get mired down in the marshy areas.

In the branches of the small trees and shrubs are found *Racinaea dielsii, R. penlandii, Vriesea lutheri* and *V. fragrans*, species that are characteristic of the Andean forest in the Province of Loja. Particularly outstanding is *Tillandsia stenoura*, a species seen in the high Andean forest from CaÒar to Loja.

In this area rich in endemic species, *Guzmania glaucophylla* was seen for the first time. Its 60 cm stem permits it to extend its foliage above the lower growing vegetation to reach the light. The scape reaches 100 cm with a simple 12 cm red inflorescence emerging from the surrounding grasses.

Cóndor Mirador

Cóndor Mirador is a military camp situated on a summit of the mountain range. To the west you can see the Cenepa valley and to the east the Tundayme valley. The trail we took was toward army observatory # 1 at 2066m. It crossed a marshy cloud forest and then heads up to the flat sandstone plateau. The trees here are no more than 15m high and the branches completely covered with moss, lichens, ferns, orchids and bromeliads. Especially outstanding is *Tillandsia confinis* var. *caudata*.

Below the canopy are a great number of shrubs between 3 and 6m that form dense groups. In this area we also found a great number of bromeliads growing in indirect light. Here we found two new species known to us as *Guzmania* sp. nov. aff. *marantoidea* and *Guzmania* sp. nov. aff. *weberbaueri*. The most common species is *Guzmania devansayana* with its leaves having longitudinal red stripes. The inflorescence is lateral, inferior to the red foliage, and possesses white flowers. Another beautiful species is *Racinaea undulifolia*, which has leaves with wavy margins. The inflorescence contains 3-5 hanging orange spikes. In the highest branches dense clumps of *Guzmania* sp. nov. aff. *tarapotina* are to be seen.

Of the bromeliads in the understorey that have stems that permit them to compete with the great number of low-growing plants, the most common is a *Guzmania sp.* with a red inflorescence and yellow spikes. The numerous and frequently seen hummingbirds pollinate the yellow flowers.

Continuing on the path we reach 1800m where the Andean forest begins. The characteristic bromeliad is *Guzmania pearcei*, a species very common in the Cordillera del los Huacamayos. Its long stems hang from the trunks and branches of trees. The beautiful inflorescences of *G. garciaensis* are also found in the understorey.

The trail continues to climb upwards and gets steeper and more difficult to negotiate between the roots and granite rocks. The vegetation grows shorter as you climb. Great masses of Sphagnum grow between the granite rocks. Growing in the sphagnum is *Pitcairnia cf. biflora*, with tough leaves that are covered with grey trichomes. The maturing fruit remains red. Before arriving on the plateau you must climb over some very large rocks that create a habitat for *G. gracilior*, a species that forms huge populations and is predominant near the edge and in the ravines found on the plateaus. Between the shrubs grow *G. paniculata*, with a bright red inflorescence and yellow sepals and petals..

We finally arrived at the summit of the plateau at 2066m. Fortunately the sky cleared and we could see the beautiful Cenepa valley with an unexplored forest full of new species.

Camp Shaime and Miazi

The military camps of Shaime and Miazi are in the Nangaritza River basin in the southern most part of the Cóndor. Camp Shaime is at the junction of the Numpatakaime and Nangaritza rivers. The Numpatakaime is a black water river originating in the high plateaus from the decomposing material. The Nangaritza is a white water (silt-laden) river.

Going up the Nangaritza by canoe we pass through narrow canyons consisting of low vegetation, and vertical walls covered with bromeliads and many waterfalls. Here we found *Guzmania condorensis, G. gracilior* and *G. lingulata* with yellow flowers covered with a gelatinous substance, *Pitcairnia* sp.

nov. aff. *andreana* and *Pitcairnia* sp. nov. aff. *pusilla* are also found. In the crevices behind the waterfalls we were surprised to find *Vriesea chrysostachys* and *Vriesea* cf. *ospinae*.

The vegetation is abundant and has the feel of a tropical forest. The trees of the canopy are 30m or more, especially in the flat areas. The understorey is between 8-20m. There is a great diversity of species that grow scarcely a few meters from each other. The understorey is full of smaller trees and shrubs to 8m, totally covered with moss, ferns and all types of herbaceous plants. It forms a dense tangle consisting of vegetation and fallen trunks and branches.

Because of the dense shade formed by the thick forest, bromeliads grow in the canopy or on the trunks of the trees that are exposed to the most light. On the trail from Shaime to the summit we found species of *G. confusa* in fruit in the lower areas. The characteristic species in this area is *Vriesea zamorensis*, with red and yellow spikes and *G. conifera* with a large cylindrical inflorescence composed of hundreds of red floral bracts with yellow tips. The real surprise was finding *Tillandsia wagneriana* and *Neoregelia tarapotoensis*, which had heretofore been known only from Perú.

Continuing up the trail limestone rocks began appearing, predominately on the summit where an observation post is situated. We found *Guzmania* sp. nov. aff. *brasiliensis* growing in the limestone rocks. The inflorescence, which opens in the late afternoon, is green and the flowers cream. It is pollinated by small bats that live in the crevices and caves in the limestone

Anther area explored was a long trail from the Central Shuar of Miazi to the PAC Miazi. In spite of its short distance in a straight line separating it from the area of Shaime from Miazi, the vegetation is totally distinct with a great many different species. Prior to arriving at the school of the central Shuar Miazi we found a marvellous example of *Aechmea strobilacea* in full flower growing in the understorey. Its leaves exceeded 2m in length and protected the central inflorescence of intense red from which emerged yellow flowers. The flowers were being pollinated by a small hummingbird. Passing by the school we found *Neoregelia myrmecophila* and its symbiotic ants, *Aechmea woronowii* and *Billbergia brachysiphon* var. *breviflora*, the only example of this genus found during the expedition.

ACKNOWLEDGMENTS

All members of the expedition wish to thank the Minister of Defence, General José Gallardo Román, for his unconditional support with this project, and to Comandante General del Ejercito, Gral. Telmo Sandoval and Comandante for the IV D.E, "Amazonas" Gral. Nairo Velasco.

The studies made at Pica Urdiales "Camp Quimi" and in Cóndor Mirador were made possible due to the logistical support provided by T. Crnl. León from the Batallon Selva 63 stationed in Gualaquiza. The camps at Shaime and Miazi would not have been possible without the coordination of T. Crnl. Bonilla from the Batallon Selva 62 based in Zamora.

At the same time we would like to thank the officials and the members of the military who provided valuable assistance at each camp we visited, especially: Suboficial Ernesto Vallejo and Cabo Dario Zambrano from the Camp Shaime; Sargento segundo Prospero Ordonez and Cabo segundo Jorge Arguello from the Camp Miazi; Cabo Luis Loja Zaruma from the BS 63 in Gualaquiza; Sargento primero Leonidas Miraba from the Camp Tundayme; and Sr. Juan José Urdiales who was our guide for Pica Urdiales "Camp Quimi" and Cóndor Mirador.

My special thanks to Betty Patterson for her assistance and support during the trip and for the translation of the Spanish manuscript, and Ed Doherthy and Corn Bak for providing financial support.

Results of Regional Membership Drive Contest

Carolyn Schoenau

The membership contest announced in Volume 51(4) of the Journal (Jul-Aug 2001) has concluded. The Florida Region finished first with a percentage increase of 11.5% (44 new members). The number of new members joining between September 1 through February 28 is shown below.

PERCENTAGE OF INCREASE FOR 2001-2002 MEMBERSHIP DRIVE

REGION	BASE	Sept	Oct	Nov	Dec	Jan	Feb	% increase as of December
AUS	80	0	0	0	0	0	1	1.2%
CA	242	0	1	2	6	3	4	6.7%
CNTRL	104	1	0	0	0	4	0	4.8%
FL	382	8	8	7	7	8	6	11.5%
INTNL	318	7	0	4	3	0	4	5.7%
LA	70	0	0	0	1	0	0	1.4%
NE	99	0	1	1	0	2	0	4.0%
SO	74	0	0	0	1	2	0	4.1%
TEXAS	138	1	0	1	1	0	1	2.9%
WEST	78	4	0	1	1	1	0	9.0%
	1585	21	10	16	20	20	16	

Thanks to everyone who participated.

Affiliates in Action
Gene Schmidt

The Bromeliad Society International is pleased to announce the impending affiliation of the Boca Raton (FL) Bromeliad Society from documents submitted by Mark Havlik, current President of the BRBS. This enthusiastic society was founded June 15, 1995, and is also a current member of the Florida Council of Bromeliad Societies, Inc. Officers for 2001/2002 include John Irvine, Vice-President; Carol Esser, Treasurer; Tammy Marks, Secretary; and Beth Hesselton, Corresponding Secretary. For meeting times and places please access the Boca Raton Bromeliad Society web link at the BSI web page at bsi.org, whose current web master is Ken Marks, also a member of the BRBS. We all wish them many years of success.

Another society expressing interest in BSI affiliation is the Sunshine Coast Bromeliad Society of Queensland, Australia. Bob Paulsen writes in the annual report of the Bromeliad Society of Queensland, Inc. that the Sunshine Coast Bromeliad Society had its origins as a result of a conversation by some delegates on the train to Cairns for Bromeliads X in August 1999. The inaugural meeting was held at the home of Grace Goode in Alexandra Headlands followed by a public meeting on the November 20 that attracted 22 people. Meetings were held at the homes of members during the year and featured talks and demonstrations by experienced growers from SE Queensland. A regular bi-monthly newsletter is published and a small lending library established. Membership has grown to 66 persons with meeting attendance averaging 28. *(Bromeliaceae, Vol. XXXIV, No.4, July/August, 2001, Bromeliad Society of Queensland, Inc.)*

Tom and Nancy Steinmetz had the pleasure of attending "Bromeliads in Bloom," a special event sponsored by the Miami Beach (FL) Botanical Garden, on October 6, to celebrate the launching of their new bromeliad collection. Laurie Davidson, event organizer and member of the Bromeliad Society of South Florida, did a super job of coordinating the programs with help from Garden volunteers and BSSF members. She led a tour of the site where the bromeliad garden will be planted in the near future. Craig Allen of Fairchild Tropical Garden is designing the space and will soon have a list of plants to be included. If anyone would like to donate plants, join the Garden, or contribute money, please contact Laurie Davidson at ldavidson@thebeach.net. There is a matching grant that will match money contributions 50/50. *(The Bromeliadvisory, Vol. 44, No. 10, November 2001, Bromeliad Society of South Florida)*

President Don Ryan, of the Central Coast New South Wales (AUS) Bromeliad Society, announced that Ruby Ryde has accepted the position of Society Patron. Ruby and her husband, Keith, are foundation members dating back to 1982. Her contributions of knowledge, practical presentations, and

resident information center for bromeliad nomenclature are incalculable. The society is indeed fortunate in having as a Patron a member who is internationally recognized as an authority on bromeliad culture. Patron is the highest accolade of the society's esteem. Congratulations! *(Bromelia Post, September 2001, Central Coast NSW Bromeliad Society, Inc.)*

The Fifteenth World Bromeliad Conference, presented by the BSI and hosted by the Florida West Coast Bromeliad Society of Clearwater/St. Petersburg, FL., will be an opportunity for your affiliated society to participate in this bromeliad showcase. We look forward to honoring new affiliated societies at the banquet, and plan again to have a newsletter editors/affiliated society representatives meeting. All societies are encouraged to create exhibits to bring to the conference, and should contact Roland Schnabel, Chairman of Affiliate Displays, at 5106 E. 127th Avenue, Tampa, FL, 33617-7046, for display information. Donations are also encouraged to help support the costs of the scientific seminars and the standard bromeliad show, or perhaps your society wishes to honor or remember a friend by placing an ad in the conference program. Don Garrison, BSI treasurer, will accept all donations and credit them to the requested area with all gifts being acknowledged in the conference program.

Eileen Bennett writes in the members' update of the Bromeliad Society of Australia, Inc. of a new award, named after Marjory McNamara. Some years ago, Marjory was an instigator of the competitions at the monthly meetings. Points were awarded for place getters, resulting in a grand total at year's end to decide the Points Score Winner for the year in Open and Novice Sections. The competition has been a popular part of the meetings, as not only are the plants judged and commented on by the judge of the day but members are also invited to vote in the "popular vote." Now, Marjory, as an extra incentive and reward, has kindly donated a cash prize for the next three years for the winner of the points score each year. The BSA has decided to match Marjory's kind offer dollar for dollar, and the first of these awards will be presented at the end of the next full competition year. Good luck to all. *(Bromeletter, Vol. 39, No. 5, Sept/Oct, 2001, Bromeliad Society of Australia, Inc.)*

At the January meeting of the Bromeliad Society of Central Florida, members approved the Board's recommendation of Ed and Nancy Hall of Maitland, FL, as Life Members of the BSCF. Life Members receive this special recognition because of long-standing and significant contributions to the society. Ed and Nancy moved to Florida in 1969 and joined the BSCF in 1975. During 27 years of service they have held every office plus those of Editor, Librarian, and have assisted on countless committees. They continue to be active today. They have served as Chairman of the Florida Council four times and have been responsible for the garden tours in two BSI World Conferences. Congratulations on this fine honor. *(Orlandiana, Bromeliad Society of Central Florida, Feb. '02, Vol. 23, #2)*

The Bromeliad Society of Central Florida also hosted the 2001 Bromeliad Extravaganza in October. Eloise Beach writes that it will be remembered as one of the best ever staged. The big effort spent on publicity through live radio spots and the support of local and statewide papers really brought out the general public. The membership drive brought in eight new members for the BSCF and one new member for the BSI. The Home and Garden TV Network sent a crew from Canada to film the Extravaganza, Leu Gardens, and some BSCF members' gardens. Look for it in the future. *(Florida Council of Bromeliad Societies Inc. Newsletter, Vol. 22, Issue 1)*

The February meeting of the Central Coast New South Wales Bromeliad Society (AUS) marked the 20th Anniversary of the Society. The words of the original constitution are as relevant now as they were 20 years ago. In Part: To provide the facilities and environment for social contact between members and their friends; To promote and enhance knowledge of Bromeliaceae culture, history, cultivation, hybridization, and to distribute such knowledge amongst members and the public at large; and to promote fellowship among members of the Society. We congratulate them on their accomplishments and wish them another twenty years of success. *(Bromelia Post, Central Coast NSW Bromeliad Society, Feb. '02)*

In News from the President, Graham West of the Bromeliad Society of New Zealand writes of a very successful year in 2001. Membership as of January totaled 508, up from 405 at the same time last year. There have been 100 or more members attending the monthly meetings (is there another bromeliad society anywhere in the world that can beat that?). Andrew Flower is once again producing the Journal of the BSNZ, to contact him by e-mail his address is: andrew@anwyl.com. *(Journal of the Bromeliad Society of New Zealand, Inc., Jan. '02, Vol. 42, No. 1)*

Initial reports of the 11th Conference of Australian Bromeliad Societies all speak of a very enjoyable and positive experience. The conference was organized by the Illawarra Bromeliad Society and was entitled "Brom-a-warra". The main speaker for the event was Dr. Eric Gouda of the Utrecht (The Netherlands) Botanic Gardens. New Zealand will host the next conference in March 2003, with the Bromeliad Society of Queensland conducting the event in 2005. A job well done by the Illawarra Bromeliad Society and President Graham Bevan. Also from Australia comes news of the disastrous brushfires that plagued them during their summer months. Bob Gray, one of the more popular members of the Bromeliad Society of New South Wales, lost his house when the fires raced through Helensburgh. Bob is safe, but has lost everything including his plants and fish collection. Friends of Bob have worked many long hours in an attempt to salvage some of Bob's plants but it will be some time before it is known if they have been successful. Our thoughts are with you, Bob. *(Bromeliad Newsletter, Bromeliad Society of New South Wales, Inc., Jan. '02, Vol. 20, No. 1)*

The Inaugural Tillandsia Participation Event, Easter 2000

Chris Larson

The idea of a Tillandsia Participation Event came about as a result of a discussion with Maurice Kellett in which he suggested that tillandsia growers from around Australia should exchange notes on growing methods, taxonomy, etc. The Australian Bromeliad Conference provides a great forum for presenting lectures on bromeliads, but due to its size becomes impractical to have a general discussion, so numbers had to be limited. It was generally agreed that 8 to 15 people would be the optimum number of participants.

We contacted those who had expressed interest in earlier discussions with Maurice or myself. The numbers grew as others heard of our plans and more people expressed an interest to attend. All participants were required to at least lead one 1/2 hour session and those that agreed were welcomed. The participants came from as far away as Cairns, New Zealand, and Adelaide, to the amazement of the hotel staff that kept bringing extra staff (while delivering coffee) to look at the strange plants (and people?). Topics covered in the 20 sessions included pests, seed raising, rare plants from Peru, the CAM process, growing the green stuff, *T. tectorum*, & the *T. capitata* complex. It was considered a success by all involved. It was unanimous that we meet again with the same format, over Easter, 2002.

Oakleigh, Victoria, Australia

Dr. Lou Wilson

Tom Wolfe

Dr. Louis (Lou) Wilson of Punta Gorda, Florida lost his long struggle with cancer on January 30, 2002. Lou was a former director of the BSI, a contributor to the *Journal*, a former officer of the Southeast Michigan Bromeliad Society, and an active member of the Caloosahatchee Bromeliad Society. He had moved to Florida after a long career as a Professor of Forestry and Entomology at the University of Michigan for many years. He was the author of a colorful and popular paperback book published in 1977 entitled *Bromeliads for modern Living*.

Lou was a fun loving guy known as much for his wit and sense of humor as his interest in and knowledge of bromeliads. He is survived by his wife, Diane, who supported Lou in his avid interest in bromeliads and his collecting trips to Central and South America.

All who knew him will miss him.

WBC 2002: Last Minute Details

There are still rooms available at the Hilton, St. Petersburg. 1-888-843-6929.

John Attlee, Raffle Chairman reports that we have some wonderful items that have been donated for the raffle table. If you have anything you would like to donate, you may bring it to the conference or get it to Kathy Risley or Hattie Lou Smith.

Since a beautiful judged bromeliad show is an important part of the conference, please bring your entries on Wednesday, May 15. Maureen Frazel [954-474-1349] is accepting artistic arrangement entries in the afternoon. There are three exciting categories but it is important to reserve a pedestal. A show schedule will be sent, if requested by those planning to enter.

The Bromeliad Identification Center receives the proceeds from the rare plant auction. This is exciting fun but we need beautiful, interesting, and /or rare bromeliads or bromeliad related items to make it a success.

Inez Dolatowski is extending tour signups for a while longer. If interested in an optional tour, please let her know, for there may still be room on your favorite tour. For information visit BSI.ORG and click on Upcoming Conference. The tours for the WBC2002 that the Dolotowski's have put together are a wonderful mix of fun and beauty. These begin on Monday, May 13, with a tour of the world famous Florida Aquarium. Tuesday's tour is an all day affair beginning with a private garden, then on to Marie Selby Botanical Gardens in Sarasota, the home of the Bromeliad Identification Center. Lunch is included. Then on Monday, May 20, a repeat of the Selby visit and a special treat, a trip to Tropiflora, home of the Cargo Report is planned. Tours ranging from a full day at the beach, complete with cook-out, to a half-day shopping trip in Historic Dunedin, are all available in this is comprehensive package designed to present the full Florida Experience. Even native Floridians have seldom taken the time to enjoy the variety of beautiful gardens and sight seeing opportunities that will be available.

When it is completed, a full list of the gifts to the WBC2002 will be published in the *Journal*. Without the generosity and personal involvement of our members, the conference would not be possible. The WBC2002 Committee is indebted to everyone who has contributed time, energy and donations.

Bring casual clothes [and a light sweater - air conditioning can be chilly] and join us for a Bromeliad Beach Party to remember!

Hattie L. Smith	941-694-1135	Ssmith1613@aol.com [General Information]
Kathy Risley	727-442-5491	kathy.risley@gentiva.com [General Information]
Inez Dolatowski	941-748-2120	ldolatow@tampabay.rr.com [Tours]
Carolyn Schoenau	352-372-6589	bsi@nersp.nerdc.ufl.edu [Registration]
Hilton Reservations	1-888-843-6929	[Mention WBC2002]

A "Double Bill" Day

Seth Napel

For a plant collector, one of life's greatest joys is acquiring new plants, especially those that had long been sought. Equally exciting is to come across a nursery that is a bit out of the ordinary. I maintain a large collection of bromeliads at a public garden called Lotusland, and look forward to "nursery hopping" trips to add to the collection. It was on one of these ventures that I came across one of my most pleasant discoveries, California Gardens in Reseda, California. Bill Baker is the owner of the nursery and specializes in growing quality bromeliads, succulents and bulbs.

On this particular trip, my eight-year old son Genesis accompanied me to the nursery. His love for plants started with growing succulents and he now cares for his collection like a seasoned veteran. The journey was made even more memorable because I was to stop in Camarillo and pick up my friend and well-known grower and collector, Bill Paylen. The time on the road simply flies by when traveling with Bill as he recounts wonderful stories of his life's adventures, many of which involve three of my favorite topics; travels to far off lands, collecting bromeliads and most importantly, being happy about yourself and your current situation.

The high wall surrounding the Baker's property gives no hint of the botanical wonders residing just inside its gate. Bill has owned the property since 1979, and has devoted most of his two-acre parcel to the cultivation of ornamental plants. His nursery consists of a series of well-kept, professionally constructed greenhouses, shade houses, open benches, and propagation beds brimming with rare and unusual treasures. It was difficult to decide in which direction to head first.

While Bill Paylen wandered off to look at some of Mr. Baker's exotic bulbs, Genesis and I headed straight for the terrestrial bromeliads and immediately came upon a plant I had long coveted, the giant form of *Dyckia marnier-lapostollei*. The species itself is common in the trade, but the giant form is nearly impossible to find. It was the first plant on a pile that continued to grow as we roamed the pathways through lath-houses, greenhouses and outdoor benches, pulling out assorted dyckias, tillandsias, neoregelias and vrieseas as we ambled along.

Later, over lunch in a cool shaded area of the property, both Bills, Genesis and I leisurely discussed plants, growing techniques and life as we know it. It was an experience so pleasant that not even the arrival of the third "bill", the invoice for the plants for which I had considerably overspent my budget, failed to dampen my spirit. It was one of those days that make plant collecting the wonderful hobby that it is.

Santa Barbara, California

Watering Atmospheric Tillandsias

Bob Reilly

Growers are sometimes given conflicting advice on the best time of the day to water atmospheric, or gray-leafed, tillandsias. The conflicting advice centers on whether or not to time your watering so the plants are dry at night.

One issue to consider in this debate is when these tillandsias actively absorb carbon dioxide from the atmosphere. In turn, this enables them to produce the stored energy (mainly in the form of starches) that they need to survive.

Carbon dioxide is absorbed through tiny pores (stomata) in the plants' leaves. However, if the leaves are wet, the stomata are closed and the plants cannot absorb carbon dioxide. Unlike most other bromeliads, the grey-leafed tillandsias absorb carbon dioxide at night. A detailed explanation if this phenomenon is given in Flower (2001).

So what does this mean for watering atmospheric tillandsias?

First, these plants sometimes experience rainfall or misty conditions which last all night in nature. Obviously they can sometimes be wet all night without suffering any adverse effects.

Second, as long as the plants' leaves are dry for most of the night, they can absorb the carbon dioxide they need. Based on my experience, a nighttime temperature likely to exceed 15 degrees Celsius (59°F) combined with a humidity of less than 70% will enable the plants to dry out from a late afternoon watering, by mid evening.

If these weather conditions are unlikely to exist, it may be best to avoid late afternoon waterings. (This will also minimize the chance of rot occurring).

Toowong, Queensland, Australia

BIBLIOGRAPHY

Flower, A (2001), *Vampires, Tillandsias...Things That Go Suck In The Night*, Bromeliad Society International Website BSI.ORG.

Time to Re-evaluate Billbergias

L.D. Stewart III

Prospects for the genus *Billbergia* to continue to gain in popularity look promising. Still, for many growers it's somewhat akin to the people living in Texas who say, "I don't gamble or play the Lotto", then sneaking over to Louisiana to party hearty. Growers are quietly adding billbergias to their collections, but they still mostly continue to brag about their aechmeas, vrieseas, neoregelias, cryptanthus, and guzmanias. They probably don't like to admit that they like them, or even own them, but they do.

Why? Partly because they are so easy to grow that the grower cannot brag about his/her cultivation skills, and partly because *Billbergia* in the last twenty years has gone from a genus of somewhat ho-hum, dull, plain bromeliads into beautiful, colorful, foliage plants well worthy of anyone's admiration. Hybridizers have been pecking away at the genus quietly, transforming it into a work of art. The one person who has done the most to elevate the status of billbergias has been Don Beadle, who has over 70 Billbergia hybrids under his belt. His spectacular hybrids are worthy of being in any collection. Who knows how many more hybrids he has made but not registered or made available to the public?

I, for one, hope that he never tires of bromeliads or hybridizing. He has brought the genus *Billbergia* into the spotlight in recent years. In my own assessment, the genus *Vriesea* would rank number 1 in overall beauty for its foliage and long lasting inflorescences. I would rank *Aechmea* in the second spot for the same reasons but *Billbergia* would rank number three, mostly because the inflorescences are not as long-lived as the other two genera. If hybridizers can ever produce billbergias with long-lasting inflorescences, their popularity would surely soar. If one looked only at the beauty of the bloom, *Billbergia* should take full number one honors, as there is no flower prettier. Look close at a Billbergia flower the next time it is in bloom. A *Billbergia* flower almost looks fake because it just doesn't seem possible for a plant to have a bloom as pretty, dainty and delicate as that. The drawback though, is that they don't last long. You have maybe a week of blooms, then you have to wait another year - but it's worth the wait! Foliage color in billbergias is becoming more spectacular as well. The colors, patterns, shades and color combinations are awesome. Some colors appear to glow in the light, such as those of *Billbergia* 'Hallelujah". This is one hybrid that is magnificent.

Billbergia hybridizing is not a crowded field. I hope that as a beginning *Billbergia* hybridizer, I can achieve even a fraction of the success that Don Beadle has had. I'm sure going to have fun trying!.

Houston, Texas

A new *Werauhia* from Southeastern Ecuador

Harry E. Luther

***Werauhia dalstroemii* H. Luther, sp. nov.** (Figures 22-23)

TYPE: Ecuador. Prov. Pastaza, along the Río Puyo, north of Puyo, 1100 m, 27 Feb. 2001, *S. Dalström & L. Jost 2515-A*. Fl. in cult., 6 Feb. 2002, *H.E. Luther* s.n. (Holotype: SEL; Isotype: QCNE).

A *Werauhia viridiflora* (Regel) J.R. Grant affinis et similis sed inflorescentia erectus minoribusque differt; a *W. panamaensis* (E. Gross & Rauh) J.R. Grant similis sed sepalis minoribus obtususque differt.

Plant an epiphyte, flowering to 60 cm tall, vegetatively reproducing by a single offset near the base of the inflorescence. **Leaves** 10-15 in number in a semi-erect rosette, 25-30 cm long, thin-coriaceous, green. **Leaf sheaths** elliptic, 6-7 × 3-4 cm, punctate-lepidote throughout especially adaxially, slightly castaneous toward the base but otherwise nearly concolorous with the blades. **Leaf blades** ligulate, acute and apiculate, scattered punctate-lepidote throughout, 27-30 mm wide. **Scape** stiffly erect, 42 cm × 3-4 mm, sparsely pale-lepidote. **Scape bracts** erect, densely imbricate; the lowest subfoliaceous and attenuate, the upper broadly acute and apiculate; pale punctate-lepidote, green drying tan. **Inflorescence** semi-erect to spreading, 6-8 cm long, 6-8-secund-flowered. **Floral bracts** broadly elliptic; the lowest acute to acuminate, the upper broadly acute; 25-35 × 10-14 mm, slightly nerved and verrucose apically, secund with the flowers and somewhat enfolding them at anthesis, thin-coriaceous, punctate-lepidote, green drying tan, all much exceeding the sepals in length. **Flowers** with a stout 3-5 mm pedicel, secund-spreading, opening at night and producing a somewhat fruity odor. **Sepals** fleshy in life, 19-21 mm long, broadly acute to obtuse, ecarinate, pale punctate-lepidote, green. **Corolla** zygomorphic with spreading lobes. **Petals** broadly elliptic, broadly acute, 30 mm long, each with two cupped basal appendages, pale cream. **Androecium** zygomorphic, shifted dorsally, forming a hood over the stigma. **Pistil** shifted dorsally next to stamens; **stigma** cupulate.

Werauhia dalstroemii seems most closely related to the widespread *W. viridiflora* known from Central America, northern South America and the Pacific slopes of the Andes in Ecuador. This generally much larger species has a spreading and ascending inflorescence and floral bracts that are only slightly if at all longer than the sepals; also the inflorescence is usually longer and 10-25-flowered with a pale-green corolla. The Panamanian endemic *W. panamaensis* appears similar but has longer (25 mm vs. 19-21 mm) acuminate (vs. obtuse) sepals.

The name honors the collector, photographer, and illustrator, Stig Dalström of the Marie Selby Botanical Gardens.

S. Dalström

Figure 22 *Werauhia dalstroemii* inflorescence; note hooded stamens and cupulate stigma.

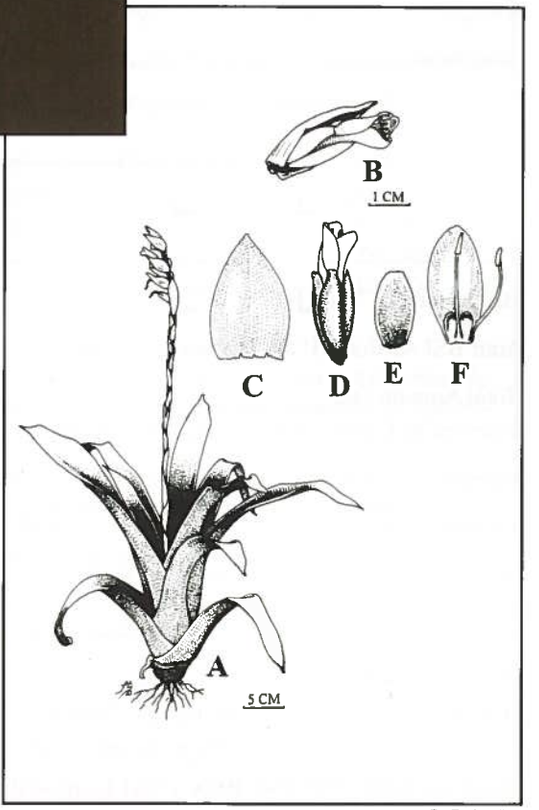


Figure 23 *Werauhia dalstroemii* A. Habit. B. Flower and bract. C. Floral bract. D. Flower. E. Sepal. F. Petal with two of six stamens

S. Dalström

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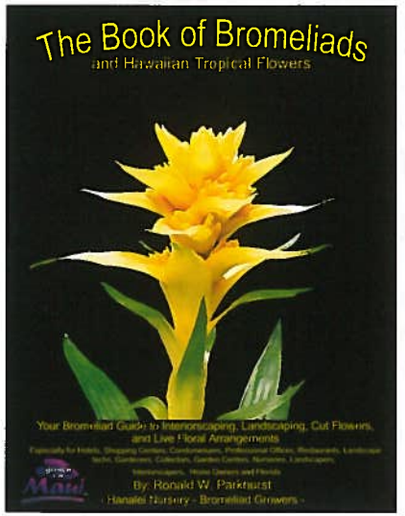

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The Bromeliad Society International

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.

Tillandsia flabellate Baker

Photograph by Marcel Lecoufle

This variable species is found growing in mountainous areas from southern Mexico to El Salvador. It forms a dense spreading rosette of long arching leaves from which a conspicuous compound red inflorescence emerges. The long tubular violet blue flowers have exserted yellow stamens. There are large forms and small forms of both the green and red leafed varieties. Easily grown, it has long been a favorite in Tillandsia collections.

Calendar

26-28 April The Sarasota Bromeliad Society will hold its 22nd annual Show and Sale at Selby Gardens in Sarasota, Florida. The show will be open to the public from 10 to 4 on April

27 and 28. Plant sales will be open from 10 to 5 on Friday & Saturday, and from 10 to 4 on Sunday. There is no charge for the show other than the regular admission fee to Selby Gardens. Contact: Bill Timm, 2030 Leryl Ave, North Port, FL. 3428. PH: 941-426-1133

4-5 May The La Ballona Bromeliad Society and the Sunset Succulent Society will be holding their combined show and sale at the Veteran's Memorial Auditorium, 4117 Overland Ave. (corner of Overland & Culver Blvd.) in Culver City. The hours are 10 to 4:30 on Saturday and 10 to 4 on Sunday. For information call Fred O'Connor, 310-230-4262.

10-12 May The Bromeliad Society of Central Florida will hold its 27th Annual Mother's Day Show & Sale at The Florida Mall, 8001 S. Orange Blossom Trail, Orlando, FL. Hours for this BSI judged event are 10 a.m. to 9 p.m. May 10-11 and Noon to 6 p.m. May 12. Admission is free. Contact: Eloise Beach, 407-886-8892, FloridaPRO@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.