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Cover photographs. Front: *Aechmea* 'Filip Van Onsem', one of the hybrids developed at the Research Station of Ornamental Plant Growing at Melle, Belgium. Text begins on page 120. Photograph by G. Samyn. Back: *Vriesea garlippiana.* This painting won first place in the first International Bromeliad Illustration Contest promoted by the Sociedade Brasileira de Bromélias. Painting by Jenerova Searight. Text begins on page 99.

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A New Ornamental *Vriesea* from Brazil

Elton M. C. Leme **Photography by the Author**

In August 1995, Jenerova Searight, a participant in the first International Bromeliad Illustration Contest promoted by the Sociedade Brasileira de Bromélias – SBBr, submitted a painting of an amazingly colorful *Vriesea* then identified as *V. pastuchoffiana* (back cover).

The identification conflicted with the description of that species, so we began a search for more information, but met with little success. By coincidence, many months later, two members of SBBr, Giorgio Croce and Jorge Gastin, took me to visit a private preserve owned by Elisabeth Garlipp, another member of the SBBr, where the same ornamental *Vriesea* was found on the summit of a forested hill. After analysis of living material I have concluded that it is an undescribed species.

***Vriesea garlippiana* Leme, sp. nov.** (figures 1-3).

TYPE: Brazil: Rio de Janeiro, Nova Friburgo, Macaé de Cima, Faz. São João, Morro de São João, ca. 1,700 m high, 10 Nov. 1996, *E. Leme 3582, G. Croce & J. Gastin,* fl. cult. Feb. 1997. (Holotype: HB. Paratype: *E. Leme 3583, G. Croce & J. Gastin*) fl. cult. Feb. 1997 (HB).

A. V. *altimontana* E. Pereira & Martinelli, cui affinis, inflorescentia bipinnata, bracteis floriferis late elliptico-ovatis vel suborbiculatibus, inflatis, obtuse carinatis, sepalorum altitudinem brevioribus, sepalis minoribus, petalis basi ligulis binis irregulariter denticulatis ornatis differt.

Plant epiphytic or terrestrial, flowering 120–140 cm high. **Leaves** ca. 20, rosulate, suberect, forming a broad and dense funnelform rosette. **Sheaths** inconspicuous, ovate, 15–17 × 11–12 cm, dark castaneous toward base, densely and minutely brown-lepidote. **Blades** linear, 35–55 × 8–9 cm, not narrowed at base, thin-subcoriaceous, green with conspicuous dark green, wavy transverse lines, bearing a single, large, round, black spot at apex adaxially, glabrescent, apex acute to subobtuse and minutely apiculate. **Scape** stout, ca. 45–60 cm long, 1–1.5 mm in diameter, erect, green to red, glabrous. **Scape bracts** basal ones subfoliaceous, the upper ones ovate, 5–8 × 3–4.5 cm, erect, red, lustrous, glabrescent, apex acute and apiculate, completely enfolding the scape, equaling to surpassing the internodes. **Inflorescence** paniculate, laxly bipinnate, 50–60 cm long, ca. 25 cm in diameter, erect. **Primary bracts** acute and apiculate, red, lustrous, glabrescent, suberect, shorter than the sterile bases of the branches, the basal ones broadly ovate, 5–7 × 3–4.5 cm, the upper ones near orbiculate, 3–4 × 3–3.5 cm. **Branches** 12–16 in number, the lateral ones 15–22 cm long, suberect, apex slightly ascending, densely flowered at anthesis, with 9–14 flowers,

peduncle 4.5–9 cm long, ca. 0.5 cm wide, complanate, red, glabrous, the basal ones bearing 3 sterile bracts, the upper ones bearing 1 to 2 sterile bracts, the terminal branch not much distinct from the lateral ones, rhachis 3–4 mm in diameter, flexuous, angulose, reddish, glabrous. **Floral bracts** suberect, very slightly when secund with the flowers, densely imbricate before anthesis, broadly elliptic-ovate to suborbiculate, apex obtuse and slightly incurved, 25–30 × 20–25 mm, exceeded by the sepals, convex and inflated, thin, nerved, mainly the basal ones obtusely carinate, red, inconspicuously lepidote inside, glabrous and lustrous outside. **Flowers** distichously and densely arranged, anthesis apparently diurnal (in cultivation, the corolla started to open at night and began to close in the first hours of the afternoon), odorless, strongly downward secund at anthesis, ca. 54 mm long (including the long exserted stamens), pedicels quite slender, 7–9 mm long, 4–5 mm in diameter, green, glabrous. **Sepals** elliptic, apex obtuse-emarginate, 21–23 × 11–12 mm, inconspicuously white-lepidote inside, subrigid, ecarinate, greenish near the base, yellow toward apex. **Petals** sublinear-elliptic, apex narrowly emarginate, 33 × 7 mm, strongly recurved near the apex at anthesis, distinctly exceeding the sepals, yellow, bearing 2 oblong, truncate and irregularly dentate, 5 x 2 mm basal appendages. **Stamens** exserted for at least 10 mm. **Filaments** subfree, not thickened toward apex, yellow. **Anthers** linear, 7 mm long, base and apex obtuse, fixed near the base. **Stigma** convolute-bladed, ca. 1.5 mm in diameter, densely papillose, yellow. **Ovules** long-caudate.

According to the key for species provided by Smith & Downs (1977), this new species comes close to V. *hydrophora* Ule and to V. *pastuchoffiana* Glaziou ex Mez. However, despite close resemblance to these two species in habitat and in structure of their inflorescences (Leme, 1995), they are members of *Vriesea* section *Xiphion* (E. Morren) E. Morren ex Mez. While, *V. garlippiana* is a typical member of the section *Vriesea,* due to its odorless flowers, narrowly tubular

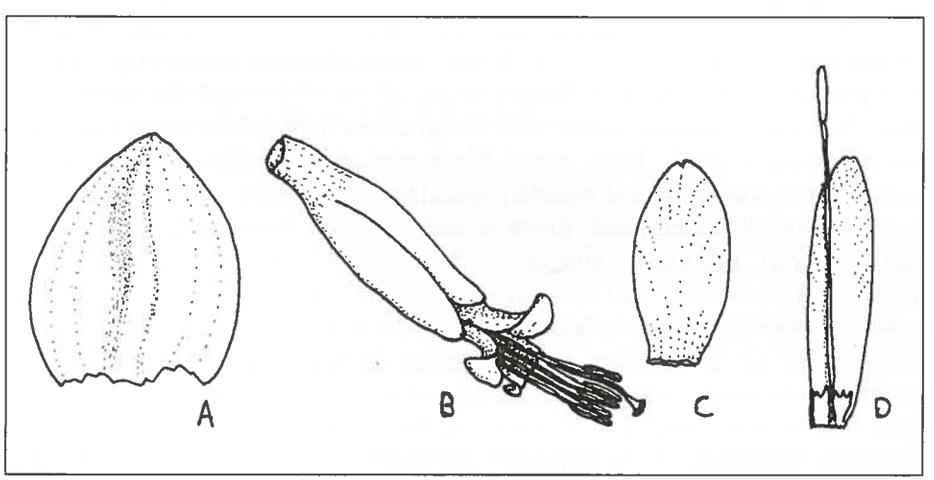

Figure 1.
Vriesea garlippiana (*Leme 3582,* Croce & Gastin)
A, floral bract; B. flower; C, sepal; D, petal.

Figure 2.
The holotype of *Vriesea garlippiana* flowering in cultivation.

Figure 3.
Close up of the branches of *Vriesea garlippiana.*

corolla, long-exserted stamens, and diurnal anthesis. The closest relative of this species is *V. altimontana,* which is a member of section *Vriesea* and inhabits an ecologically similar area in northern Rio de Janeiro State. Thus, *V. garlippiana* can be distinguished from its closest relative by its bipinnate inflorescence, by floral bracts broadly elliptic-ovate to suborbiculate, inflated, obtusely carinate, distinctly shorter than the sepals, by its shorter sepals, and by the petals bearing two basal appendages with irregularly denticulate apex.

This species is named after Elisabeth Garlipp, a bromeliad and orchid lover closely involved in preservation of the area where *V. garlippiana* was found.

ACKNOWLEDGMENTS

I thank the Sociedade Brasileira de Bromélias (SBBr) for the photo of the Jenerova Searight's painting and for permission to reproduce it. I also thank Giordio Croce, Jorge Gastin and Elisabeth Garlipp, who made it possible for me to study this new species in its native habitat.

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Old Photographs Needed

The JOURNAL would like to borrow old photographs taken prior to the 1960's showing scenes of spanish moss being harvested and processed. We are especially looking for photographs of derrick boats, retting piles, moss gins (ginnery), drying kilns, or wagon loads of moss. The photographs will be used to illustrate an article on the spanish moss industry during the first half of the twentieth century.

Anyone willing to lend photographs to the JOURNAL can mail them to Chet Blackburn at 720 Millertown Road, Auburn, CA 95603. Good care will be taken of them.

Tillandsia colganii, a New Species

Renate Ehlers **Photography by the Author**

In July 1993, Australian grower Len Colgan collected a previously unknown *Tillandsia* species while on a trip to Bolivia.

***Tillandsia colganii* R. Ehlers, sp. nov.** (figures 4-6).

Typus. Bolivia. Dept. of Santa Cruz, Prov. Mendez: fauce Paichu inter pagos Cana Cruz et Coral Grande 2700-3000 m s. m. leg. Feb. 5, 1995, *R. Ehlers EB951002,* (holotypus, WU); loco citato 3000-3200 m, Feb. 6, 1995, leg. *R. Ehlers EB951101,* (paratypus, WU).

A *T. friesii* Mez caule breviore, bracteis florigeris magis nervatis apice lepidotisque, sepalis paulo longioribus et petalis violaceis differt.

Type. Bolivia. Dept. of Santa Cruz, Prov. Mendez: Paichu-Canon, between Cana Cruz and Coral Grande. July-August 1993: *Len Colgan #23; (Heger #51),* Coral Grande - Cana Cruz, 2700-3000 m s.m. Feb. 5 and 6, 1995 Paichu-Canon, 3000-3200 m s m. *Ehlers EB 951002,* and 2700-2900 m s m. *Ehlers 951101,* (holotype and paratype, WU)

Plant saxicolous, pulvinate, often branched, with stout, branched, light brown roots, flowering 10–15 cm high. **Stem** longer than the rosette, short to 13 cm long caulescent, to 7 cm in diameter, sometimes slightly secund. **Leaves** 12–14in number, polystichous, 3–7 cm long, the lower ones reduced and with short acuminate blades, the sheaths erect or suberect, the blades spreading or recurved, coriaceous-subsucculent, with asymmetric keel, green-grey, covered with appressed cinereous scales, looking grey, abaxially strongly nerved and looking striped, the margins with asymmetric trichomes. **Sheaths** 2–3 cm long, 1–1.8 cm wide, ovate, merging imperceptibly into the blades. **Blades** 1–1.5 cm wide at base, triangular, attenuate, subulate, channeled. **Scape** erect, short and stout, from practically none to 1–2 cm long, nearly hidden in the rosette, imbricately concealed by few scape bracts, the lower ones foliaceous, lepidote and attenuate, the apical ones like the floral bracts, acute, red, becoming more and more glabrous. **Inflorescence** terminal, simple, exceeding the rosette, 3–4 cm long, 5–8 (–10) mm wide, lanceolate acute, subterete, composed of few (2–3) distichous, sessile odorless flowers plus 1 sterile bract at the base, rhachis nearly straight, 4-angled, green, glabrous. **Floral bracts** imbricate, the rhachis at anthesis not exposed, 1.6–2.5 (–2.8) cm long, exceeding the sepals, 8–10 mm wide, ovate-triangular, acute or cuspidate, submembranaceous, ecarinate, adaxially nerved, abaxially sublustrous wine-red, glabrous, the apical 4–6 mm finely grey lepidote. **Sepals** 1.4–1.6 cm long, 4.5–6 mm wide, narrowly elliptic, acute, free, membranaceous, the posterior ones carinate, thickened along the keels, greenish with pink tips. **Petals** 3.6–4 cm long, the blade 5 mm wide, obtuse, the margins entire not serrate, claw 3 mm wide at base, forming an erect tube with open throat, their tips spreading to strongly revolute, aster-violet, white

Figure 4.
Tillandsia colganii

Figure 5.
Tillandsia colganii,
closeup of flower

at base. **Stamens** barely included and visible, as long as the pistil, stigma 2–12 mm exserted from the throate of the corolla. **Filaments** 2.5–3 cm long, 0.8 mm wide, flat, thin towards the base, straight or once transversely plicate, anthers 4–5 mm long, 0.5 mm wide, linear, acute, basifixed, yellow. **Pollen** lime-yellow. **Style** 2.5–3 cm long, 1 mm wide at base and white, 0.7 mm wide at apex and yellowish, surpassing the stamens, stigma 4 mm long, 3 mm wide, lobes spreading, narrow, papillose, yellowish. **Ovary** 4 mm long, 2.5 mm wide at base, ovate, light green.

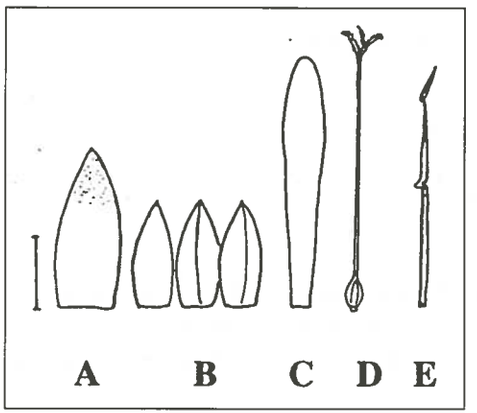

Figure 6.
Tillandsia colganii
A, Floral bract; B, Sepals;
C, Petal; D Style; E, Filament.

Distribution: Bolivia. Dept. of Santa Cruz, Prov. Mendez: Paichu-Canon, 2700-3200 m. The plant is currently known only from the type location. It was collected for the first time in July, 1993 by Len Colgan from Australia, Ewald Heger, Wolfgang Krahn, and Helmet Alber from Germany. It was re-collected in March, 1995 by Frank Hae, Elward Heger, Lotte Hromadnik and Renate Ehlers.

The plants grow in large clumps on the rock walls of the Paichu-Canon accompanied by *Tillandsia* aff. *lorentziana, T. sphaerocephala, Blossfeldia sp?,* and *Puya* sp?

Tillandsia colganii appears to be related to *T. friesii* Mez and *T. hegeri* R. Ehlers, but differs by the following characters:

From *T. friesii* Mez:
Stem shorter, inflorescence subterete, distichously arranged floral bracts stronger nerved and lepidote at apex, sepals longer, petals violet not red.

From *T. hegerii* R. Ehlers:
Plant caulescent, the rosette narrower, only to 7 cm in diameter, leaves shorter and more stout, inflorescence narrower (at most, half as wide), less complanate, subterete, composed of fewer flowers, floral bracts smaller and much narrower, (8–10 not 14–16 mm wide), lepidote towards the apex, ecarinate, sepals shorter and only half as wide, petals narrower, the margins entire not serrate, the tips revolute and sometimes twisted, stigma exposed.

Tillandsia colganii is dedicated to its discoverer Len Colgan, from Adelaide, South Australia, who discovered the plant during a trip to Bolivia in July, 1993. Mr. Colgan is the President of the South Australian Bromeliad Society and an

avid bromeliad grower who, through many years of contact and cooperation, has become a good friend.

ACKNOWLEDGEMENT

Our thanks to Dr. Walter Till, University of Vienna, for his cooperation and for the Latin diagnosis.

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Where's My JOURNAL?

While the Internet has provided an important new mode of communication and access to tons of information, it does have a few drawbacks. One drawback has been that it has increased the number of premature calls concerning JOURNALS that have not yet been delivered.

The JOURNALS are mailed all at once in a single day, but they do not arrive at their destinations all on the same date. Their arrival is often spread out over a six-week period. People who pay additional fees for first class postage, for example, will receive theirs before most other subscribers. The Journals going out under bulk mail and overseas surface mail are not only slower, their arrival seems to be completely unpredictable. Sometimes they arrive quickly to every location and other times they filter out slowly to different parts of the world. Speaking from my own experience, last year I received the November-December issue the day before my September-October issue arrived. Generally speaking, subscribers in Florida will receive them before those in California...but not always.

In this age of instant communication, when someone discusses an article from the most recent JOURNAL on the internet, not all subscribers may have received their copies yet. That does not necessarily mean that it is not on the way. Please allow about six weeks from the date of the issue (e.g., May-June issue, wait until mid-June) before asking for a replacement copy.

Sometimes the JOURNAL will be late getting into the mail. We try to keep those instances to a minimum, but it is sometimes unavoidable for a variety of reasons.

If, after the six week period mentioned above, you still haven't received your JOURNAL you should contact the membership secretary, not the editor. She

[Continued on page 117]

The Discovery of *Tillandsia colganii*

Len Colgan

In July and August 1993, I was honored to be invited to join three imminent German cactus enthusiasts on a five-week camping and discovery trip covering an extensive area in Bolivia. I clearly understood that this was primarily a cactus-oriented expedition to study species in habitat. Nevertheless, the other members were extremely considerate and I was able to gather tillandsias from fifty locations during the trip. It is relevant to know that Ewald Heger, Helmut Alber, and Wolfgang Krahn not only have a number of cactus species named after them, they have also discovered individually some *Tillandsia* species, including *T. hegeri, T. alberi,* and *T. krahnii.*

We travelled through the Andes at altitudes varying from a snow-covered 4700 m ranging down to a temperate 1500 m. However, most of the time was spent in the mid range around 3,000 m. The main hindrances were the bad roads and tracks, and the suffocating dust. It soon became obvious that cactus devotees have searched Bolivia thoroughly, but there are still many new opportunities for *Tillandsia* enthusiasts. Just after the trip's mid point, we arrived back in Iscayachi, in southern Bolivia. Our detailed map showed a trail heading due north, but we could not find an access, as we were blocked by either deep trenches or a wide river. After multiple versions of advice from numerous sources, we eventually found a ford to cross. Surprisingly, the road was not nearly as bad as it had been for most of the rest of our trip in Bolivia. The first excitement came when the German collectors thought they might have found a new cactus variety, as well as some rare *Blossfeldia* species. Photographs were taken and details recorded.

This increased the likelihood that new *Tillandsia* discoveries might lie ahead even though the only bromeliads seen were *Puya* and *Deuterocohnia* species. Eventually we inched down a steep section, getting covered in layers of dust in the process, after which we were able to find and collect clumps of a fascinating *Tillandsia* growing on rocks. The plants were covered with a dense white layer of trichomes, giving it a distinct appearance. They keyed out to be somewhere between *T. lorentziana* and *T. zecheri,* having a single spike with red bracts and blue flowers. Further on we found another group of tillandsias. At first glance I knew this was something new. The only other species that seemed similar was *T. hegeri,* which we had collected some weeks earlier, but with which there were significant differences. To proceed further we had to drive in a river bed up the Peichu Canyon, where we discovered more plants of the same two species. This location was more moist than the previous ones. Beyond that, I recall one photograph of six different attractive Cactus species growing together. We experienced several more tire punctures, due mainly to the dangerous branches of thorn bushes hidden under layers of dust. When we eventually returned to Iscayachi, there was no doubt that this two day detour had been

rewarding for all of us. The second of these two tillandsias found that day is now named *T. colganii,* and I thank Renate Ehlers for that honor. She went to the same location in early 1995, in a group also led by Ewald Heger, and collected the same species that she has since described and generously named after me.

Adelaide, South Australia

Honorary Trustees

The title of Honorary Trustee has been established to recognize and honor those individuals whose contributions over the years have significantly advanced knowledge about bromeliads, whether on a scientific or horticultural front.

The names of all Honorary Trustees are familiar to people long involved with plants in general and bromeliads in particular. The Board of Directors, at their annual meeting in 1991, directed that a listing of those so honored be printed annually in the JOURNAL. Living honorary trustees are listed on the last page of each issue of the JOURNAL but are repeated here along with the names of those who are deceased. The year they were named as honorary trustee is also indicated.

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Book Reviews: Bromeliad Books From the Former Soviet Union

Jason R. Grant

Most modern books on bromeliads are written in English, German, Spanish, or Portuguese. However, a few relatively unknown works from the former Soviet Union have been published in recent years in their own languages. Following is a brief overview of two such books, one Moldovian (written in Russian), and one Russian. Copies of each of these books are found at the U.S. Library of Congress, Washington, D.C.

Bromelievye. [The Bromeliad Family], by V.I. Shestak. Kishinev, Moldova, U.S.S.R.: Shtiintsa, 1989. 61 pages, 9 color photographs, introduction, bibliography, index; illustrated soft cover, 17 cm.

This book was written when Moldova was a member state of the former Soviet Union. Moldova has since gained national statehood and exists independently. The book is written in the Russian language, not Moldovian. This is a basic guide to the Bromeliaceae in which bromeliads in their natural environments, their usefulness to man, and their methods of cultivation are discussed. Morphological characteristics of the entire family as well as of common species and hybrids are provided. The photographs were taken at the Botanic Gardens of the Academy of Science of the Moldovian Republic. The book may be useful for readers of Russian and intriguing for the serious collector, but no information is presented that may not be more easily found in English or German language bromeliad books.

Bromelii v prirode i kulture. [Bromeliads in nature and culture], by S.E. Korovin & V.N. Chekanova. Moscow: Science Press, 1984. 167 pages, 59 photos, introduction, bibliography, index, illustrated hard cover, 21 cm.

This book surveys the cultivation of bromeliads of the Central Botanic Garden of the Academy of Science of the U.S.S.R. in Moscow and discusses problems encountered while growing such members of the tropical and subtropical flora. Systematic, morphological, and biological characteristics of representative taxa of the family are given, and the conditions necessary for cultivation are described. This is a much more thorough and detailed account of bromeliads than the Moldovian, and may serve as the primary source of information on bromeliads in the Russian language.

University of Alaska Museum
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Fairbanks, Alaska 99775

Xeric Bromeliads[1]

Ana Rousse **Photographs by the Author**

In the family Bromeliaceae there are many species that are particularly important because they are spread throughout arid areas where the potential for evaporation of water is higher than the rain fall average. The xeric bromeliads represent approximately one-fourth of all known bromeliads and can be found in all three subfamilies, the Bromelioideae, the Tillandsioideae and the Pitcairnioideae.

Bromeliads are an important element in both the ecology and economy of arid and semiarid areas of tropical and subtropical regions. They not only provide a source of food and shelter for wildlife, but also provide food and useful products for people living in the area. Some species, such as *Ananas* and *Bromelia* (pineapples and maya respectively) produce edible fruits. Others, such as *Ananas* and *Neoglaziova* produce fibers which are used in some regions for the fabrication of hammocks, ropes and other useful products. The xeric bromeliads play another important role in ecology by acting as a biological barrier on the earth's surface and reducing the hydric and eolic erosion of soils in arid and semiarid areas.

This article has been especially developed for bromeliad growers, ecologists and landscape architects, with its main purpose being the promotion of cultivating xeric bromeliads and inspiring additional study in their use in high-sun-radiation areas with sparse rainy seasons and little water availability.

The term Xerophyte means "plant of dry places". Xeric bromeliads, apart from growing in dry places, are also exposed to high levels of radiation from the sun. In other words, they are plants that survive with minimum amounts of water and will tolerate maximum sun radiation. They coexist in arid areas with Cactaceae, Euphorbiaceae and thorny scrub vegetation. The general characteristics of these xerophytes is their low density and sparse foliage.

MORPHOLOGY AND PHYSIOLOGY

Xeric bromeliads possess certain morphological characteristics in common. A great number of them possess spines on the borders of their leaves which orient themselves to the apex or to the sheaths of the plant's leaf. The consistency of the leaves can be hard, rigid, thick or juicy. One special characteristic is the display of the foliage in an open or nearly closed rosette while some form rudimentary tanks. Bromeliads can be terrestrial, epiphytic or saxicolous. In terrestrial bromeliads, the root system is well developed. These roots are fibrous, adventitious and functional such as those found in *Cryptanthus, Orthophytum* and

[1] See also Xeric Bromeliads, Ana Rousse, J. Brom. Soc 44(2):77-79

Hechtia. The epiphytic species have rudimentary roots that help them to fasten the plants on to trees, such as those of the genus *Tillandsia.* The saxicolous bromeliads (e.g. *Deuterocohnia*) are a small group with rudimentary but strong roots that allow them to attach to rocks.

Xeric bromeliads that have only rudimentary roots perform the functions of nutrition and water absorption through a system of highly developed moisture-absorbing trichomes located on the surface of the leaf, and which causes the leaf to have a silvery appearance. This dense layer of trichomes reflects sunlight and prevents water evaporation, thereby helping the plant endure long droughts. This group of tillandsias are generally known as the atmospheric tillandsias.

Their leaves have bulky epidermal cells that help accumulate water. They are also covered with a thick cuticle that retards evaporation and acts as insulation material when strong temperature changes take place.

Photosynthesis in these plants is the same as in others, taking CO_2 through pores or stomata during the day and incorporating sugars through the reduction of carbon with the substances that derive from the absorption of sun radiation.

In many xeric bromeliads one may find an inverse stomatic rhythm; the pores open at night and CO_2 is enzymatically fixed and accumulated in the form of malic acid. During the day the accumulated malic acid is oxidized and the liberated CO_2 is incorporated in the normal photosynthetic process. This inversion of the rhythm of esthomatic openings is called CAM metabolism, and helps reduce the loss of water during the day. This physiological characteristic adapts this type of bromeliad to arid regions.

By using a marker such as carbon thirteen (C_{13}) and measuring the concentration of this product in the leaf of the bromeliad, it can be determined whether a bromeliad is xeric when the concentration of this element is found in portions less than -20%.

GEOGRAPHIC DISTRIBUTION

The family Bromeliaceae is native to the American continents. Xeric bromeliads are distributed from 37°N between Mexico and the United States up to 40°S in the center of Chile and Argentina. Altitude can range from 0 to 3,000 m. They can be found both on coasts and in tropical savannahs. These tropical savannahs are located from 15° to 20° latitude in both hemispheres and are seasonally dry. In these regions are found genera such as aechmeas (figure 8), *Ananas, Bromelia* (figure 9), and *Dyckia* that occupy certain ecological niches in which they can survive adverse climatic conditions. The Mexican tableland is surrounded by high mountains extending north to the border of the United States. Its climate is that of a desert with annual rainfall of 250-500 mm. The prototype of xeric bromeliads found in this region is the genus *Hechtia,* which is also found in Central America.

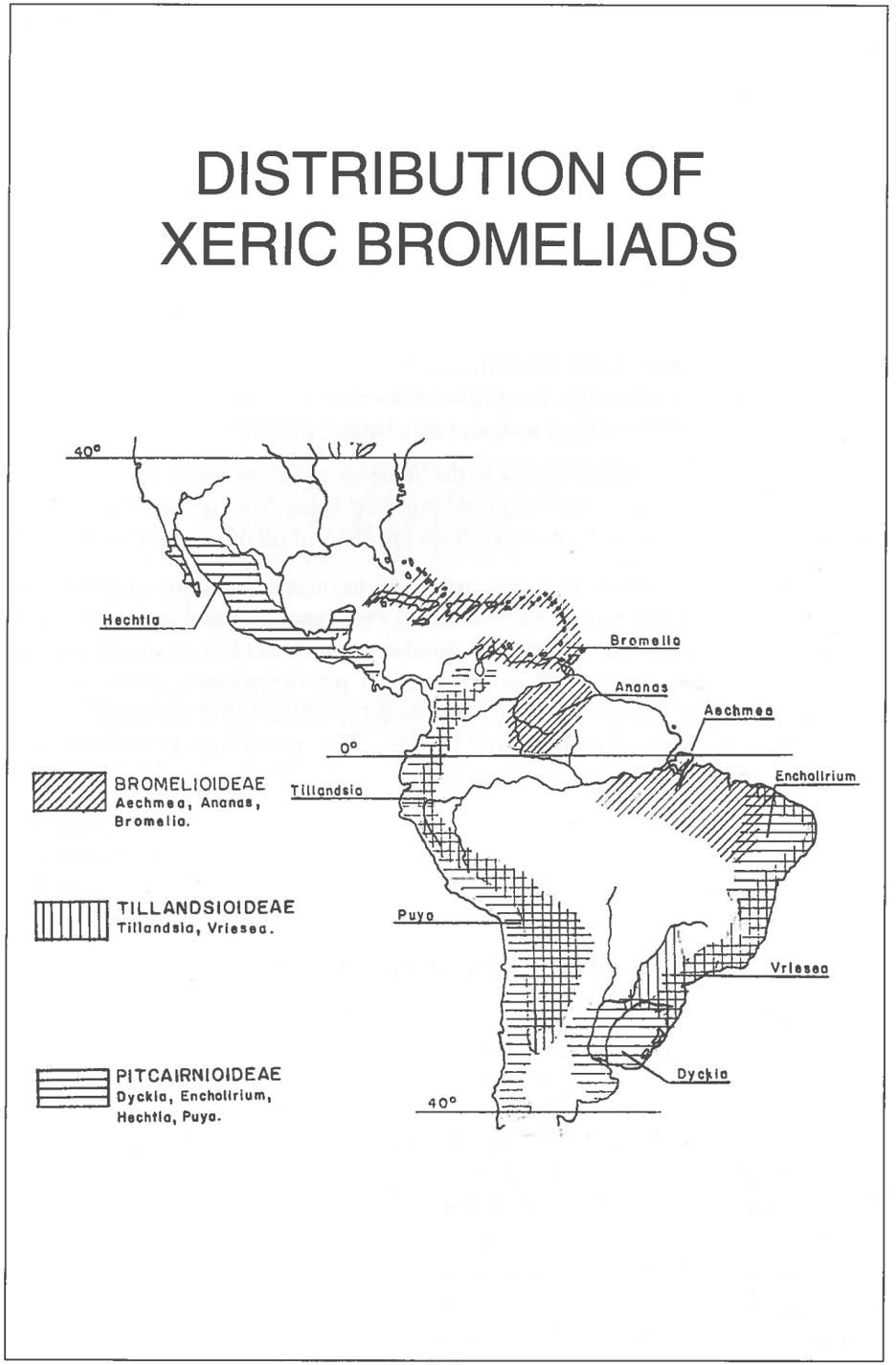

Figure 7.
Distribution of xeric bromeliads.

The Andean tableland in Bolivia extends to Peru in the north and south to Argentina. The climate can be cold and precipitation scarce from October to March. The Altitude reaches 3,000–4,000 m. In this region endemic forms of *Deuterocohnia* and *Puya* (figure 10) can be found. A few also grow at sea level.

The Caatinga is a semiarid region occurring in the northeastern states of Brazil and the state of Minas Gerais. They characteristically have sandy, clay or stony soils. The dry season last up to nine months.

The Brazilian Restinga is represented by sandy coasts. It receives high sun radiation, strong winds, and the soils are well drained. *Dyckia, Cryptanthus* (figure 11) and *Encholirium* species are found here in endemic forms.

The Chaco is a territory located in northeastern Argentina and in Paraguay. The climate is warm and precipitation is approximately 700 mm per year. Bromeliads are infrequently found although xeric tillandsias do occur.

CLIMATE

The combination of drought with high sun radiation determines xerophytism. The limiting factor is rainfall. In xerophytic regions, rain can vary from an average 100 to 700 mm annually. In different dry regions, rain distribution changes throughout the year. The number of days with precipitation can range from 10 to 50 per year. In some places, months or even years can go by without any rainfall at all.

Temperatures vary considerably. High temperature alone does not determine xerophytism, but low rain levels do. Xerophytism is often found in hot places; as for example along coasts. Temperatures can raise to more than 40°C during the day with changes to 15°C during the night. Xerophytism also occurs in high mountains where temperatures during the night can be 0°C. Bromeliads survive in these mountains in spite of drought, high sun radiation, strong winds, frosts and snowfalls. Examples of this type of bromeliad are found in the genus *Deuterocohnia* which has been found under snow in Bolivia.

CULTIVATION

Xeric bromeliads are very durable plants. Those most suitable for cultivation in full sun are those that have silvery-colored leaves, such as found in some species of *Tillandsia,* or those with stout, thorny leaves. Watering must be at intervals of once or twice a week. They tolerate long drought periods and in some instances have even survived fire. The cultivation medium must drain well and provide stability for the plant. Cultivation is possible in plastic or clay pots with holes in the sides or base.

Many xeric bromeliads are large and are ideal for placement directly into the ground in open places in direct sun. They have a high ornamental value and can be used for landscape design in parks, streets and coastal gardens without major requirements of watering or rain.

Figure 8.
Aechmea beeriana
(= *Streptocalyx poeppigii*)
from the lowlands of Colombia

Figure 9.
Bromelia plumieri in the north
coastal region of Venezuela

Figure 10.
Puya laxa from the Andean tableland

Figure 11.
Cryptanthus warasii from Brazil

Listed below is a representative sampling of bromeliad species that have been grown in xerophytic gardens. It is not an all-inclusive list. There are other species as well as numerous hybrids that can be grown in this manner.

GENUS	SPECIES
	SUBFAMILY BROMELIOIDEAE
Acanthostachys	*strobilacea*
Aechmea	*aquilega, blanchetiana, lingulata, longifolia, nudicaulis var. nudicaulis, nudicaulis var. aequalis, beeriana, recurvata*
Ananas	*ananassoides, bracteatus, comosus, lucidus, parguazensis*
Androlepis	*skinneri*
Araeococcus	*flagellifolius*
Billbergia	*porteana, vittata*
Bromelia	*antiacantha, balansae, binotii, chrysantha, humilis, macedoi, pinguin, plumieri, serra*
Cryptanthus	*caracensis, warasii, warren-loosei*
Hohenbergia	*castellanosii, catingae*
Neoregelia	*compacta, cruenta, bahiana*
Orthophytum	*amoenum, burle-marxii, foliosum, glabrum, lemei, saxicola*
Pseudoananas	*sagenarius*
	SUBFAMILY TILLANDSIOIDEAE
Tillandsia	*gardneri, neglecta, paraensis, streptocarpa, xerographica*
Vriesea and	*edmundoi, itatiaiae, neoglutinosa, penduliflora Alcantarea*
	SUBFAMILY PITCAIRNIOIDEAE
Deuterocohnia	*brevifolia, lorentziana, longipetala*
Dyckia	*brevifolia, dawsonii, distachya, dissitiflora, encholirioides, ferox, floribunda, fosteriana, frigida, leptostachya, macedoi, maritima, marnier-lapostollei, minarum, niederleinii, odorata, pulquinensis, remotiflora, tuberosa, velascana*
Encholirium	*erectiflorum, patens, sazimae, spectabile*
Hechtia	*argentea, caerulea, capituligera, desmetiana, elliptica, epigyna, glomerata, glabra, undelliorum, macdougallii, marnier-lapostollei, montana, podantha, rosea, schottii, stenopetala, texensis, tillandsioides*
Puya	*alpestris, berteroniana, chilensis, coerulea, coriacea, dyckioides, ferruginea, flocossa, laxa*

ACKNOWLEDGEMENTS

I thank Dr. Ernesto Medina and Harry Luther for corrections to this paper and Edith Steinbuck for her comments. Thanks also to Tom Lineham for his enthusiastic support. Many thanks go to Selby Botanical Gardens staff Edna Sieff, Margaret Lowman, Paul Rivero, Bob Stickney and others, who helped me as a volunteer in the Research Department. I would also like to express my gratitude to Claudio Grigorescu and Gustavo Moreno for the transcription of this manuscript, and to Vicente Castro for the map.

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Extra Color Photographs in this Issue

Thanks to the generosity of the Caloosahatchee and Hawaii Bromeliad Societies, there are several additional color photographs in this issue. Their recent donations to the color fund is hereby acknowledged and our thanks go out to them on behalf of all JOURNAL readers.

Where's My JOURNAL?

[Continued from page 106]

has the most current information on membership status and she can often determine why you didn't get yours from her records. As often as not, the reason is that the subscriber has recently moved or has inadvertently let their subscription expire...situations that are easily corrected so that next month's issue won't go astray as well. The membership secretary has additional copies of the current JOURNAL that she can mail as replacements when needed.

Thanks for your patience.

A Showy New *Fosterella* from Bolivia

Harry E. Luther

Until this time, a "showy" Fosterella would have seemed to be an oxymoron considering that all of the species thus far described produce small white blossoms of minimal attractiveness, at least to human observers. All of the 17 species treated in the latest revision of the genus (Smith & Read, 1992) have small (less than 10 mm long), white, presumably entomophilous flowers.

***Fosterella spectabilis* H. Luther, sp. nov.** (figures 12-13).

Type. Bolivia. Santa Cruz: near Angostura, elev. ca. 1700 m, Aug. 1993, *D. Cathcart B-17 legit.;* flowered in cult. SEL 95-415, 12 Mar. 1996. *H.E. Luther s.n.* (Holotype SEL; Isotypes LPB, WU, NY, HB, US, MO).

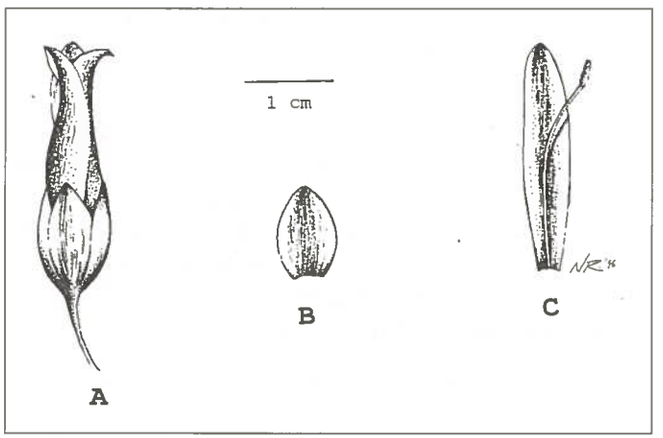
A *F. penduliflora* (C.H. Wright) L.B. Smith affinis sed flores perlongioribus rubentibusque differt.

Plant a terrestrial or lithophyte, 0.7–1.0 in diameter flowering 0.7–0.9 m tall, spreading by 1–2 cm long, stout basal or interfoliar stolons. Leaves densely rosulate, spreading, entire, 35–50 cm long, 25 to 30 in number. Leaf sheaths broadly ovate, 15–20 cm × 35–50 mm, pale or tinged or spotted reddish. Leaf blades narrowly lanceolate, narrowed towards the leaf sheaths, acute to acuminate, 25–38 mm wide, thin-coriaceous but with a somewhat succulent central channel that becomes pale when dried, the margins somewhat undulate, glabrous adaxially, inconspicuously appressed lepidote and somewhat paler abaxially, green but tinged or spotted reddish toward the leaf sheaths abaxially. Scape erect to ascending, 30–40 cm × 3–6 mm, green, more or less glabrous. Scape bracts erect,

Vern Sawyer

Figure 12. A portion of the inflorescence of *Fosterella spectabilis* flowering at the Marie Selby Botanical Gardens.

imbricate but not entirely concealing the scape, elliptic, attenuate, green tinged or spotted reddish abaxially. Inflorescence laxly bipinnate with 5 to 12 branches, 30–55 × 15–40 cm. Primary bracts like the upper scape bracts, becoming gradually smaller toward the apex of the inflorescence, shorter than to equalling the sterile bases of the branches. Branches at first arcuate then subsecund spreading, 10–30 cm long, laxly secund-flowered. Floral bracts ovate to elliptic, acute to attenuate, 10–12 × 4–8 mm, thin, nerved, reddish-green. Flowers with a slender 10–15 mm long pedicel, pendent, opening during the day and producing a conspicuous quantity of sweet nectar. Sepals elliptic, broadly acute, 8–9 mm long, somewhat glaucous, pale green tinged reddish. Corolla semitubular, spreading only at the apex at anthesis, becoming somewhat twisted but remaining erect (not coiling) postanthesis. Petals ligulate, obtuse, 22–24 mm long, unappendaged, reddish to coral-orange. Stamens nearly equalling to slightly exceeding the corolla. Anthers basifixed, 2 mm long, bright yellow. Filaments very slender, 15–19 mm long, translucent white, the epipetalous filaments adnate to the petals for ca. 3 mm from their base, the antesepalous filaments free. Stigma simple erect. Fruit a dry capsule 7–8 mm long. Seeds bicaudate, 1–1.5 mm long.



Nicole Rosseland

Figure 13. *Fosteralla spectabilis* A, Flower at anthesis; B, Sepal; C, Petal with stamen. Nicole Rosseland

This new species differs from all known species of *Fosterella* by having much longer flowers with a semi-tubular (not spreading) corolla that is reddish or coral-colored (not white or cream-colored) This suite of characters along with abundant nectar production suggests that *F. spectabilis* is an ornithophilous species, a novelty in an otherwise rather stereotyped genus.

ACKNOWLEDGMENT

I thank Dennis Cathcart for providing the collected plant, Vern Sawyer for the photography, and Nicole Rosseland for the illustration.

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Mulford B. Foster Bromeliad Identification Center
Marie Selby Botanical Gardens
Sarasota, FL 34236

Thirty Years of Bromeliad Breeding at the Research Station of Ornamental Plant Growing at Melle, Belgium

G. Samyn & F. Thomas[1]

Some time ago, we were invited to write two papers about the Belgium's significance in the history of bromeliad culture in Europe. In earlier articles we scanned through the history of bromeliad cultivation from Morren and Marechal through Dutrie to the actual breeders who still continue today to search for new cultivars to expand the inventory of new and exciting plants available to the trade.

The station of Ornamental Plant Growing was only casually mentioned in the previous articles, as it was our intention to discuss its activities in a separate third article. The Research Station claims to continue the long and rich Belgian tradition as a pioneer in many aspects of bromeliad cultivation. In that regard it was possible to obtain official grants at a moment when bromeliad cultivation in Belgium had declined to a very low point. These grants stimulated the resurgance of bromeliad culture which turned it into an actual success story.

Now the time is right to write about the Research Institute itself since Francis Buysse, the technician involved in making numerous successful crosses over the years, will retire in 1997. Today he can look back with pride on a lot of his hybrids that have become well-known to bromeliad enthusiasts worldwide.

Different scientists succeeded each other in our bromeliad section, each with their own objectives. The crosses, however, were always performed by one person. This stability in one section, the hybrid section, is quite exceptional, so we can draw on his many years of experience for much of the information used in the paper.

The Start

The Research Station of Ornamental Plant Growing was officially founded in 1946. After the disaster of the Second World War, the Belgian Government stimulated scientific research and aimed at increasing the efficiency of horticultural production including breeding. Several sections were assigned specific plant groups to study: tuberous begonias, azaleas, roses, ornamental nursery stock and hothouse plants. It was not long before experimentation began on flower induction in bromeliads, but it wasn't until 1964 that breeding came to the forefront. In fact, on October 21st of that year, young Francis Buysse was recruited by the station and began producing orderly mandated crosses, and undoubtedly produced some of his own choice as well.

[1] Research Station for Ornamental Plant Growing, Centre of Agricultural Research, CLO-Ghent, Caritasstraat 21,B-9090 Melle, Belgium

Before this date, he had worked for a while with the firm of Van Hecke near Ghent. This was one of the nurseries where bromeliads were still held in high esteem though it now is no longer in existence. He still remembers the big lots of splendid *Vriesea* x Poelmanii plants of the original unbranched type, and *V.* X Viminalis-Rex, probably acquired from Dutrie, was still present. Of course his most important responsibility involved Aechmea fasciata.

The first trials

Since 1964, all crosses made were accurately recorded. At that time it was not really easy to build up a collection of valuable parent stock. Much had been lost during the war, and direct importation from America was still quite difficult. For this reason, during the earlier years it was possible to do breeding with only a limited number of genitors. However, conditions improved during the sixties and the seventies until today only the best of the best is considered for commercial production and naming. This wasn't always the case in the past. A lot of crossings were first performed producing nice cultivars, but only for restricted culture. While perhaps not as spectacular as today's hybrids, some were interesting enough to still be found in the BSI's Bromeliad Checklist. We hope to be able to add to information known about them.

V. Mira:	V. malzinei X V. heliconioides "var polysticha"	1976	RvS
V. Ingrid:	V. x poelmanii X V. saundersii	1965	RvS
V. Natasha:	V. x poelmanii X V. fenestralis (From this cultivar a chimaeric sprout was selected as V. Elfi.)	1970	Rvs
V. Fernanda:	V. x vigeri X V. malzinei	1976	RvS
V. Dede:	V. x poelmanii X V. x vigeri	1970	RvS

Other hybrids were merely curiosa, perhaps suited for further crossings, but most were discontinued.

To a more scientific Direction

As can be normally assumed in a scientific environment, not all investigations were directed to developing beautiful plants via classical crossings exclusively. More fundamental problems were investigated by the researchers as well.

Thanks to his day to day experience Francis was soon able to help researchers in different situations. An experienced hybridist can very quickly evaluate the success of a fertilization or the evolution of a fertilized flower under different environmental conditions. One example of this was that in the past, using *A. chantinii* as a parent in crossings had almost always met with failure. He developed a system which reversed the day and night cycle in a growth chamber covered by a black plastic foil.

Figure 14.
Francis Buysse working at his daily occupation; a job where the success of today's work cannot be determined until a few years later.

Figure 15.
Vriesea 'Mira': One of the first planned and deliberately developed hybrids; the heliconioidal direction was however soon abandoned.

A. chantinii could now be fertilized under artificial evening conditions. This was sufficient to soon obtain a considerable number of seedlings. One of them was *Aechmea* Filip Van Onsem (*A. chantinii* X *A. fulgens* var. *discolor*; 1979), closely resembling the *Aechmea* 'Fia'. This is the plant depicted on the cover of this issue of the JOURNAL. *Aechmea* 'Fia' was obtained later by Deroose from a new cross and commercialized successfully.

Figure 16.
Aechmea 'Festival'; one of the most recently introduced hybrids.

Since the beginning of the sixties a gamma-beam became available at the station and was used for irradiation and inducing mutations in breeding of ornamentals. A lot of interesting new cultivars of different ornamentals were obtained this way, though success was not universal. The results with bromeliads proved not to be very exciting. Some apparantly beautiful mutations were unfit for commerical purposes due to a greatly reduced growth rate. A mutant from *Guzmania* 'peacockii' called G. 'Edith' can be cited as an example.

Intergeneric crosses were also created. Of course, such combinations can be exciting to the imagination, but experience has shown that success is only rarely encountered (see also J. Bromeliad. Soc. 42(6)).

Recent results

Breeding success comes slowly at first, but it is normal that successes follow more frequently in time. A more profound knowledge of the crossing partners and the presence of already interesting crosses constituted the basis of new results. In the eighties some targeted plants were obtained. A cross between *A. fendleri* and *A. tillandsioides* 'perumazon' produced promising seedlings. Finally the lightest colored (least dark) type was commercialized as *Aechmea*

'Romero'. It is probably not an exaggeration to claim that A. 'Romero' has became a real success story. In only 10 years, this hybrid is now to be found in catalogues all over the world. Some years later, during the Ghent Floralies of 1990 another *Aechmea* hybrid was presented to the public and introduced into commerce: *Aechmea* 'Mona' (*A. fasciata* X *A. dichlamydea*). This cultivar, perhaps too large for European homes, forms a good comparison of the American range.

Francis had the opportunity to visit the USA in 1994 on the occassion of the World Bromeliad Conference in Orlando. During his trip throughout the country he was able to see both hybrids in several nurseries. It was surely a marvelous testament to him and a reason for a satisfied restrospective view. Another *Aechmea* obtained by "Bussy" was recently edited: *Aechmea* 'Festival' (*A. fulgens* x *A. araneosa*). This type is completely different from others, forming berries and an inflorescence of very good longevity. This survey could be completed by a number of recent hybrids of a certain importance: *A.* 'Regine de Ligne' (*A. servitensis* var. *exigua* x *A. leucocarpa*) suitable for local cut flower production, or different small and compact neoregelias to be marketed in mixed boxes. When Buysse retires he will leave a mass of young seedlings, produced by his latest crosses. His impact will be felt for years to come as new interesting cultivars continue to show up from these seedling batches.

Further prospects

Our breeding programme in the future will be directed to other characters such as resistence to fusariose. For environmental reasons, the use of fytophharmaceutic compounds is becoming more and more restricted. Problems such as fusariose on *A. fasciata* can be suppressed, but require regular treatments. *A. fasciata* is very sensitive to *Fusarium,* but other Bromelioideae, even other *Aechmea spp.* are not.

So attention now turns to the development of *Fusarium* resistant or tolerant hybrids. That should be possible, since we know by experience that *Aechmea* 'Romero' shows such characteristics. The only problem is sterility, which is already appearing in the first generation. That means utilizing other programmes such as embryo rescue again.

As this article concerns history we should restrain ourselves from predicting the future. However, if hybridizing continues evolving at the same speed and in the same directions as it has in the past, it would be impossible to predict what our bromeliad hybrids will look like in the year 2030 with any certainty, but almost anything seems possible...something to think about by our young readers.

Melle, Belgium

Aechmea dealbata, Worth Cultivation but Sometimes Misunderstood

Elvira Gross **Photograph by the author**

Aechmea dealbata belongs to the subgenus (or genus, depending upon the taxonomist you talk to) *Platyaechmea,* which is characterized by sessile flowers surrounded by pouch-forming floral bracts. The taxonomy of the *Aechmea* species is in a state of flux. In 1989 L.B. Smith and W.J. Kress elevated the subgenera of the genus *Aechmea* to the genus level in PHYTOLOGIA 66(1):70-79. A year later (PHYTOLOGIA 69(4):271-274) the genera *Podaechmea* and *Platyaechmea* were described as invalid. The current name of the present species is either *Platyaechmea dealbata* (Baker) Smith & Kress or *Aechmea dealbata* Baker.

Another well known example from this group is *Aechmea fasciata,* which is very common in cultivation. This species has dominated ornamental plant production among bromeliads for decades. In Germany it is sold under the name "Lanzenrosette" (lance-rosette). Today only selected forms or hybrids are being sold that have been developed for compact growth, a nice leaf design, and long-lasting inflorescences.

Aechmea fasciata is the closest relative of *A. dealbata.* For many years *A. dealbata* was considered a form of *A. fasciata* by Lyman B. Smith until a painting by Eduard Morren convinced him that *A. dealbata* was really a separate species.[1]

Even so, the existence of *Aechmea dealbata* has sometimes been overlooked. Gross and Rauh described *Aechmea esseri* in 1986,[2] which is undoubtedly *A. dealbata.* That means that *A. esseri* is synonymous with *A. dealbata.* Surprisingly, until the plant described as *A. esseri* was collected in northeast Paraguay, *A. dealbata* had only been known from Guanabara Brazil, so reducing *A. esseri* to synonymy with *A. dealbata* has provided another locality and a range extension for that species.

Many features attest to the close relationship of *A. fasciata* and *A. dealbata,* but naturally there are also differences. The funnelform rosettes of both species are formed of few leaves, and the white trichomes in bands along the leaves make the plant very interesting in the vegetative state as well.

In *Aechmea fasciata* the rosette is formed by about 20 leaves, the leaf blades are rounded and cuspidate, the white bands are very distinct and occur mostly on both sides of the leaves. The rosette of *Aechmea dealbata* is formed with fewer leaves, the plant has rounded acuminate leaf blades, the bands beneath the leaf are not as distinct and the leaves are uniformly green above.

[1] J. Bromeliad. Soc. 35(5):196.
[2] Tropische und subttropische Pflantzenwelt 58:53-55

Both species are very attractive at flowering time. The upper scape bracts of both are crowded beneath the inflorescence, forming a kind of involucrum. *In A. fasciata* these involucral bracts spread nearly horizontally and often become glabrous so that the pink elementary color becomes visible. In contrast, the involucral bracts of *A. dealbata* are nearly erect and mostly remain densely white lepidote, their dark wine-red color is not visible. Both species have different inflorescences: that of *A. fasciata* is compound and broadly cone-shaped, that of *A. dealbata* has mostly simple, narrow cone-shaped inflorescences, sometimes one or two little lateral spikes are developed. Like the scape bracts, the floral bracts of *A. fasciata* are pink, are lanceolate or ovate and acuminate. *A. dealbata* has broadly ovate, acuminate floral bracts that are wine-red in color, but the color is covered by the remaining white scales. Both species are characterized by an interesting color change of the flowers. At anthesis, if the flowers are open and ready for pollination, the petals are shining purplish-red to mauve. Then they close together and become coral-red. In *A. fasciata* this change of flower color has long been known, because this species has been in cultivation since the year 1826. In some literature the flower color is incorrectly described as red at anthesis .

Figure 17.
Aechmea dealbata

Both species need identical growing conditions in cultivation. A day temperature of 22°C is desirable and it should not drop below 20°C at night. In winter the night temperatures can fall to 12°C to 15°C but 18°C would be a more desirable minimum. The plants should be grown in bright locations, (full sun in cooler climates) to light shade. It is advisable to fill the center of the leaf rosette with water but otherwise, the plants do not need heavy watering. Vegetative propagation takes place by offsets, which are developed on short rhizomes. With good care the offsets will flower within two years.

Heidelberg, Germany

Growing Cryptanthus

Marcelo de Senna Dias Cândido

Growing plants of the genus *Cryptanthus* is a different experience from that of raising other bromeliads. These plants are always from terrestrial or saxicolous habitats, that is, they are not epiphytes. This fact alone indicates that the root system of these plants is important for absorbing nutrients, in contrast to that of most epiphytes which serves mainly to fix the plant to its substrate. Another important consideration when growing cryptanthus is that this genus is quite widely distributed and is therefore found in a variety of environments, from sandy coastal plains to grasslands on rocky soils, and while some plants do very well at sea level, others may shrivel up and die at low altitudes. Therefore, the natural habitat of a species should be investigated before an attempt is made to grow it, and this environment should be recreated as much as possible at the growing site.

Cryptanthus plants need space to develop roots, the main nutrient-uptake organ, and this should be taken into consideration at planting time. The roots usually fan out below the surface and do not grow very deeply into the soil. For this reason, they should be planted in wide pots that are not very tall. It is important to keep the potting mixture rather moist so the roots will not dry out. Plastic pots are recommended because they keep the mix moist for a longer period of time. Growers use several kinds of potting mixes, any of which should be rich in nutrients. Nutrients may also be supplied through artificial fertilization, as will be seen below.

Artificial fertilization of *Cryptanthus* is not absolutely necessary if a soil mix is used that supplies enough nutrients. However, if maximum plant growth is desired, adding fertilizer is a must. Some growers have gotten excellent results by adding chicken manure to the growing medium. Others prefer slow-release chemical fertilizers such as Osmocote (14-14-14), or small doses of liquid fertilizers applied weekly; or even daily when the plant is watered. The dose recommended by the manufacturer should be reduced to a fourth, or more, depending upon the frequency of application.

In the wild, *Cryptanthus* plants grow in full sunlight as well as in shade. A home-grown plant should be raised in an environment as similar as possible to that where it occurs naturally. More delicate species such as *C. pseudoglaziovii* Leme, prefer moist, shady habitats, while more resistant species such as *C. bahianus* L. B. Smith can withstand greater exposure to the sun and drier soils. As a general rule, *Cryptanthus* species and hybrids do well when shaded by screens of the Sombrite type and screening should be adjusted for local conditions. For example, a reduction of 50-70% is often used in the city of Rio de Janeiro. The best way to find out if the correct light regime is being used is to

examine the plants daily. Plants with long, dark green leaves in a loose rosette are growing in too shady an environment, while plants that turn yellow, with typical sunburned splotches are being exposed to too much sunlight.

The genus *Cryptanthus* is Brazilian, found along the Atlantic seaboard from Rio de Janeiro to Rio Grande do Norte, and inland to the state of Goias. Therefore, the ideal temperature range lies between 20°and 38°C. The altitude at which these plants are found is also important since species growing at higher elevations tend to be exposed to greater daily fluctuations in temperature than those that grow at middle or low elevations (table 1). Altitude is sometimes a limiting factor in raising *Cryptanthus* because species from sites over 1000 m are hard to grow near sea level, and vice versa. A probable explanation for this is the smaller daily temperature fluctuations occuring at sea level. The plants that live naturally under these conditions are very sensitive to abrupt changes in temperatures and especially to cold breezes.

Table 1.
Altitude ranges and regimes of Cryptanthus species.

Species	Altitude (meters)	Light preference
C. acaulis	0-300	mesophilic
C. bahianus	500	heliphilous
C. beuckeri	0-300	mesophilic
C. bivittatus	?	mesophilic
C. bromelioides	0-300	mesophilic
C. burle-marxii	?	mesophilic
C. capitatus	200	mesophilic
C. caracensis	1000	heliophilous
C. colnagoi	1000	mesophilic
C. coriaceus	200	heliophilous
C. correia-araujoi	500-800	mesophilic
C. delicatus	0-300	mesophilic
C. dianae	570	?
C. dorothyae	0-300	mesophilic
C. exaltatus	300-700	mesophilic
C. fosterianus	350	mesophilic
C. glaziovii	1400-1600	heliophilous
C. incrassatus	0-300	heliophilous
C. lacerdae	?	mesophilic
C. latifolius	0-300	mesophilic
C. leopoldo-horstii	1000	heliophilous
C. marginatus	600-800	mesophilic
C. maritimus	0-300	heliophilous
C. minarum	1500	?
C. odoratissimus	500-800	mesophilic
C. osiris	0-300	mesophilic
C. pickelii	0-300	?
C. praetextus	?	?
C. pseudoglaziovii	700-900	mesophilic
C. pseudopetiolatus	0-200	mesophilic
C. pseudoscaposus	500-800	mesophilic
C. roberto-kautskii	700-800	mesophilic
C. ruthae	0-100	mesophilic
C. scaposus	500-800	mesophilic
C. schwackeanus	700-1000	heliophilous
C. seidelianus	?	heliophilous
C. sinuosus	0-300	mesophilic
C. vexatus	300	mesophilic
C. warasii	1000	heliophilous
C. warren-loosei	400-500	heliophilous
C. whitmanii	700-800	mesophilic
C. zonatus	?	mesophilic

When they are grown correctly, these bromeliads usually do not have problems with disease, but they sometimes become infested with scale insects (Homoptera) that may weaken or even kill less resistant plants. Several species of scale insects attack *Cryptanthus*. Treatment involves applying an insecticide, preferably one of a systemic nature that is absorbed by the plant from the soil and reaches all parts of the plant through the sap, killing insects more efficiently. One should keep in mind however, that these products are very toxic and constitute a risk for those who are not duly advised of this fact. Spraying mineral oil on the plant is also effective, but often does not reach insects at the base of the leaf sheaths or on the roots. This can be achieved by applying the oil directly or by using a systemic insecticide. The advantage of mineral oil is that it is not toxic to plants if applied at the recommended dosage, and it is readily available on the shelves of stores dealing with farm products. A less toxic option would be a pyrethrum-based insecticide which is marketed as an aerosol or spray.

Fungi may also wreak havoc in a cryptanthus collection, for once a fungus becomes established, it is very difficult to get rid of. The best remedy is prevention through good lighting and good air circulation. Removal of all affected plant parts plus spraying with a fungicide such as Benlate™ may keep the fungus at bay. These chemicals may require permits for purchase in some locations. If pests do not respond to these simple treatments, a specialist should be consulted.

Cryptanthus is most easily propagated through vegetative offshoots, thus preserving the characteristics of the mother plant, especially in the case of hybrids. Sexual reproduction by seed should be used, especially for production of hybrids, although cross pollination in *Cryptanthus* does not always work.

Apparently, a species may be compatible with some, but not all, congeners. Not all attempts to reproduce hybrids will result in viable seed.

Stoloniferous species (*C. sinuosus* L.B. Smith, *C. delicatus* Leme, *C. burle-marxii* Leme) may reproduce through buds on the stolon that give rise to new plants, a fact that contributes to *in vitrio* reproduction of these species.

After the offshoot is removed from the mother plant, it should be left for a day so that a scar can form over the severed point. It is then planted in a potting medium similar to that used for the adult plant and it should be kept moist. Roots are produced in a short time, the duration of which may be shorter in summer and longer in winter, and dependent upon temperature.

ACKNOWLEDGEMENTS

I would like to thank my friends Elton Leme, Rafael Faria, Rubem Ramalho Rangel, Andréa Costa, Pedro Nahoum, Luiz Felipe Nevares de Carvalho, Roberto Menescal, Renato Bello and Alberto Mofati, for their encouragement and exchange of information and ideas that produced this article, as well as to all those who directly or indirectly contributed to this work.

Reprinted in part from BROMELIA 3(1):33-37.

Bromeliad Roundup

Odean Head

The state of Texas is well known for its historic cattle roundups. Next year it's going to be known for rounding up bromeliads as well. Our goal is to round up the most beautiful bromeliads and most enthusiastic bromeliad people in the world for a huge gala to be held in Houston in July of 1998. The occasion is the BSI's 13th World Bromeliad Conference hosted by the Bromeliad Society, Houston Inc. and the Southwest Bromeliad Guild.

The conference will be held at the Wyndham Greenspoint Hotel from July 1-5, 1998. Mark those dates on your calendar now. While holding the conference over the July 4th weekend may have some drawbacks, we feel the advantages gained (lower room costs, more facilities available) will offset them.

The Wyndham Greenspoint is the same hotel that those who attended the 1990 conference will remember for its spacious facilities and cooperative atmosphere. We expect no less this year. The hotel is located near the Greenspoint Mall at 12400 Greenspoint Drive, Houston, TX 77060-1998.

The theme, "Bromeliad Roundup" should provide some interesting display and artistic opportunities while the western hospitality that Texans are noted for should provide the opportunity to produce another set of pleasant memories to go along with all the others gathered at previous conferences.

Our plans call for keeping the registration fees as low as possible to encourage attendance. For the first time, there will be a ten dollar discount available to BSI members. Registration forms will appear in the next issue of the JOURNAL. Information about the conference will also be posted on BSI's web page for the benefit of web surfers. Other details will appear in future issues of the JOURNAL.

Houston, Texas

REGIONAL REFLECTIONS

Florel Facts

At the February meeting of the Bromeliad Society of South Florida Nat De Leon provided the following information for those thinking of using the flower forcing chemical Florel.

- Florel is a carcinogen, use it with care. Wash with soap and water if you spill any on skin or clothes.
- The plant should be at or close to flowering size. Treating an immature plant could result in a distorted inflorescence.
- Although not essential, Nat suggests dumping the water from the cup before adding the solution.
- Use 1 teaspoon of Florel to 1 gallon of water.
- Fill the cup with the solution.
- Place the plant where it will not be watered for 24 hours.
- It is not necessary to dump the solution after 24 hours.
- Store Florel concentrate in a dark place at a cool temperature.
- Wait for a beautiful inflorescence to appear.

Reprinted in part from the March, 1997 issue of The BROMELIADVISORY, *the newsletter of the Bromeliad Society of South Florida*

Microtips: Dividing Terrestrials

Robert Kopfstein

For those of us who love to grow the bromeliad terrestrials (hechtias, puyas, dyckias, deuterocohnias, etc.), one of the more unpleasant chores is dividing the plants when they pup. An old butcher knife will work, but often that requires **lots** of arm work. What works better is a drywall saw: it is cheap (under three dollars) and readily available at any home improvement center.

Reprinted from the February 1997 issue of PUP TALK, *the newsletter of the Saddleback Bromeliad Society*

Luther's Brom Article

Carlo A. Balistrieri

Check the current issue of Horticulture magazine for an article by Harry Luther on your favorite family of plants—with lots of nice pictures!

Reprinted from the newsletter of the Bromeliad Guild of Tampa Bay, Inc., February, 1997.

Navia

Patricia O'Dea

The genus *Navia* was discovered in 1820 by the German botanist Karl von Martius and named by Martius and Schultes in 1830 to honor Bernard S. von Nau, a student of natural history and physics.

Navia falls into the subfamily Pitcairnioideae. Schultes called it the "quaintest and most singular of the bromeliad genera". The genus range extends from Venezuela south to Surinam and northern Brazil and east to Colombia. Its home range has been described as "a bewildering and tantalizing maze of isolated sandstone mountains of grotesque shapes arising out of impenetrable jungles and sandy savannahs".

Close to a hundred species have now been gathered and described. Many of these are only of botanical interest but some are very beautiful and worthy of a place in collections.

Navias are either terrestrial (growing in the ground) or saxicolous (growing on rocks). They seem to be found in many growing conditions. Some grow in the cool moist areas along the banks of streams, or are found bathing in the misty spray of waterfalls. Some grow in open scrub savannahs, while others prefer clinging to cliffs and rock crevices where it may be either moist or dry.

Mostly they are stemless plants, often forming large colonies and rosettes varying in size from several inches to several feet in diameter. The flowers may be sessile or stalked on a stem deep in the rosette, or in a series of small clusters spaced along the stem. Navias display great versatility. This versatility leads one to believe that at least some of them would grow quite well in cultivation.

This has been proven by Josef Bogner, who several years ago collected *Navia splendens* and *N. arida* and brought them to the Botanical Garden in Munich, Germany. They eventually acclimated and became established, receiving the same care as that given to the other bromeliads in the collection.

They are a most interesting group of plants about which very little is known. Because of the inaccessibility of their homelands, they are almost unobtainable.

Victoria Padilla, in her book "Bromeliads" mentions two Navias adaptable to cultivation, *Navia fontoides* L.B. Smith, which she called the "Fountain Navia" and *Navia nubicola* L.B. Smith. *Navia fontoides* forms a rosette of long, thin, gracefully arching leaves and forms an orange or scarlet center while *N. nubicola* is a medium-sized symmetrical rosette with long, narrow, pointed leaves that are reddish at the base. The petals are white. It is found in moist soil or on rocks in forests in Venezuela at elevations up to 5100 feet (1700 m).

Navia splendens is native to Venezuela and Guyana where it grows at 3000 feet (1000 m) on vertical cliffs. It has also been found at the foot of Angel Falls. It is a lovely species. The dark green, slightly-fleshy foliage makes a fine foil for the colorful inflorescence with its orange-red flowers. This species does not like to have water kept in its center cup. In its natural habitat (steep cliffs) the water drains from the plant immediately.

Reprinted in part from the March-April 1996 issue of Bromeliaceae, the newsletter of the Bromeliad Society of Queensland.

Reasons to Repot Bromeliads

Kenneth Stokes

Reasons for repotting new acquisitions would include:

- To check for the existence or development of roots.
- To correct the type of mix.
- To check for insects or other pests.
- To prevent the introduction of pests.
- To have uniformity of pot type.
- To remove unwanted time-release fertilizer.
- To open clogged drain holes or provide for drainage.
- To allow room at the top for dressing.
- To containerize bare root or previously mounted plants.

Reasons to repot plants already existing in your collection:

- To separate a clump or to remove pups.
- To lower or raise the plant in the pot.
- To center the plant in the pot.
- To groom the lower portion of some plants.
- To place the plant in a more appropriately-sized container.
- To place it in a more decorative container.
- To replace deteriorating potting mix.
- To replace damaged pots.
- To clean terra cotta pots.

Reprinted in part from the March, 1997 newsletter of the Sarasota Bromeliad Society.

Letters to the BSI

Discovery of *Guzmania bismarckii*

I refer to the article "The Discovery of *Guzmania bismarckii*" by Lee Moore in the Journal of the Bromeliad Society Volume 45 number 4, July-August 1995. I have just obtained a copy of the article published by the Bromeliad Society Bulletin in 1962, Volume 14 pages 33-37 in which Mr. Moore claims documentary proof of his finding *Guzmania bismarckii,* and in which he claims that Dr. Lyman Smith, an Honorary Trustee of the Bromeliad Society and one of the most respected authorities in his field "mistook" the herbarium material sent to him, a serious accusation against such a renowned man.

Mr. Moore, in his 1962 article, publishes a diary kept on a collecting trip to Oxapampa in which he says he found *Guzmania bismarckii* on the 29th of June "on the way down the mountain to the lower valley I found a giant bromeliad that looked like *G. lindenii* but it is epiphytic, whereas *Guzmania lindenii* is terrestrial."

May I draw your attention to several points:

1. *Guzmania lindenii* is both epiphytic and terrestrial as substantiated by several sources, "Bromeliads" by Victoria Padilla being one.
2. *Guzmania bismarckii* is only found in the Amazon jungle at an altitude of 400 m, and not in Oxapampa which is an inter-Andean valley lying at 1800 m, where Mr. Moore says he found it in his article in 1952. The two areas are over 350 miles apart.
3. I am sure had Dr. Lyman Smith been in possession of complete herbarium material with the relevant information, i.e. place of discovery, the altitude and growing habits there would have been no question of mistaken identity as the difference is so obvious. Photographic material is not accepted for plant identification.

In view of the above points, I think a correction would be in order, as an article accusing Dr. Lyman Smith of such a mistake should not be allowed to pass. I am surprised that Mr. Moore's article was published without being checked, as I was informed each article is double-checked by members of the editorial advisory board. I would appreciate you publishing this letter to correct any erroneous impression created.

Klaus Von Bismarck
London

(The letter was addressed to President Jerry Raack, who asked Harry Luther, Director of the Bromeliad Identification Center to comment on it. The following are Harry's comments.)

"I had Dr. John Kress at the Smithsonian Institute check the general herbarium for specimens from Mr. Moore which had been sent to Dr. Lyman Smith, but none could be located. It is a fact that Mr. Moore mentioned two distinct kinds of *Guzmania lindenii* in his early catalogs. It is possible that one of these may have been *Guzmania bismarckii.* The two species are very similar when not in bloom, and could easily be mistaken for each other; especially if the material presented for identification were not in excellent condition. As far as I know, *Guzmania lindenii* grows as an epiphyte or terrestrial at higher altitudes, while *Guzmania bismarckii* grows only as a terrestrial at lower altitudes in swampy conditions.

Harry Luther, Director
Bromeliad Identification Cente
Marie Selby Botanical Gardens

Pineapple Postage

I wanted to call your attention to the fact that the United States Postal Service has recently issued a booklet of stamps which features a bromeliad. The booklet contains images of two separate species of plants, one of which is the pineapple. It is probably the first time that a bromeliad has been depicted on a U.S. postage stamp.

According to the information on the back of the booklet, it was issued in celebration of women artists. Artist Maria Sibylla Merian travelled to Surinam in 1699 where she painted various living subjects including insects, birds and plants. The stamps depict two of more than seventy images she created during the trip.

Jeremy Rhine
Cazadero, California

ERRATA: E-mail Address Correction

In volume 47 number 2 (March-April 1997) of the JOURNAL, members with e-mail addresses that they wished to be included in the next directory were given an incorrect e-mail address. The address should have been BSI@nervm.nerdc.ufl.edu.

Recent Gifts to the Society

We are happy to acknowledge gifts from the following members and friends of the BSI who have contributed to the Color Fund, to the BSI general fund, or to the Bromeliad Identification Center.

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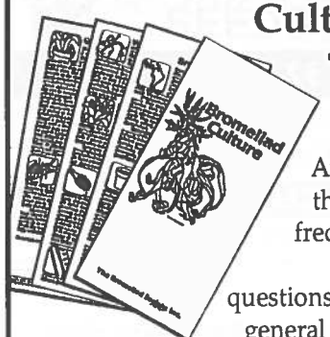

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Painting of *Vriesea garlippiana* by Jenevora Seabright. Photo reproduction by permission of the Sociedade Brasileira de Bromélias - SBBr.
Text begins on page 99.

Calendar

17-18 May	The Bromeliad Society of South Florida annual show and sale; Fairchild Tropical Gardens, 10901 Old Cutler Road, Miami, FL. Contact: Moyna Prince 305-251-5289
23-25 May	Bromeliad Society/Houston 29th annual show and sale: Houston Arboretum & Nature Center. Hours 1 PM to 6 PM Friday, 9 AM to 5 PM Saturday, & 11 AM to 4 PM Sunday. Contacts: David Whipkey 281-255-6154 or Allyn Pearlman 713-772-7831
7-8 June	Saddleback Valley Bromeliad Society annual show and sale: University of California at Irvine Arboretum, one mile west of the 405 freeway on Jamboree at Campus Intersection. Show 11 AM to 5 PM Saturday, 10 AM to 5 PM Sunday. Sale 10 AM to 5 PM on both days. Contact: Juhl Floyd 714-964-6491
7-8 June	San Francisco Bromeliad Society show and sale at San Francisco County Fairgrounds, 9th & Lincoln. Hours 9 AM to 5 PM both days. Contact: Roger Lane 949-4831
21-22 June	Greater New Orleans Bromeliad Society 25th annual show and sale; Lakeside Mall, Metairie, La. Hours are 1 PM to 6 PM Saturday, 11 AM to 6 PM Sunday. Contact: Carol Hertz 504-486-8190
28-29 June	Sacramento Bromeliad Society annual show and sale; Shepard Garden and Arts Center, 3330 McKinley Blvd., Sacramento, CA. Hours 10 AM to 5 PM both days. Contact: Keith Smith 916-823-0203