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# Journal of The Bromeliad Society

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# Journal of the Bromeliad Society



Vol. 51, No. 1 January–February, 2001

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

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

**Cover photographs. Front:** *Tillandsia leiboldiana*, a variable species ranging from S. Mexico to Costa Rica. Photograph by Marcel Lecoufle. **Back:** *Neoregelia johannis* growing in ground at Marie Selby Botanical Gardens. Photograph by Vern Sawyer.

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# Notice of Annual Meetings, Call for Budget and Other Business Items

You are hereby notified that the **annual general meeting** of the Bromeliad Society International will be held at the Marie Selby Botanical Gardens, 811 South Palm Avenue, Sarasota, Florida at 9 a.m. on May 26, 2001 to consider such business as may be brought to the attention of the BSI Board of Directors. All business matters must be sent in writing to the president at least 60 days before the meeting (Bylaws, Art. VII, part 2). The **annual meeting of the Board of Directors** will be held immediately after the general meeting. The following schedule applies:

1) 90 days before the meeting: Officers, directors, and committee chairmen shall send budget requirements and financial accounting to the treasurer.(Standing Rules 3 and 6).

2) 30 days before the meetings: Officers, other directors, and committee chairmen shall submit annual reports to the president and send copies to each officer and director. (Standing Rules 3 and 6). Annual reports are due by April 26, 2001. Agenda items that would require a vote by the board of directors should be submitted to the president by March 26, 2001 for inclusion in the agenda.

3) 30 days before the meetings: the president will mail the agenda to each officer and director. (Standing Rule 3,par. 2g).

Chairmen of the standing committees are elected by the Board of Directors. Nominations may be made by any member of the society in writing at least 30 days before the annual meeting. Nominations may also be made from the floor.

Any BSI member who has an issue or issues that they wish to be brought before the board, may either attend the general members meeting preceding the Board of Directors meeting or convey those issues to their local director who is a member of the board. A list of all directors, the regions they represent, and their current addresses can be located on page 47 of this issue of the JOURNAL.

*Thomas W. Wolfe, President,*
*5211 Lake Le Claire Road,*
*Lutz, Florida, 33549*

# *Pitcairnia (Pepinia) leopoldii*, Lost for 48 Years, Rediscovered in Venezuelan Amazonia

**Francisco Oliva-Esteve**[1]

After going uncollected for 48 years the small extraordinary *Pitcairnia leopoldii*[2] W. Till & S. Till has been encountered again by Dr. Charles Brewer-Carias and Fanny Brewer of Caracas in northwestern Amazonas State, Venezuela.

The type specimen was collected by S.M. Roi Leopold III, King of Belgium, in 1952, near the Autana and Sipapo rivers in northwestern Amazonas State. King Leopold visited Venezuela at the invitation of the Secretary of the Belgian Embassy in Caracas, Napoleon Dupuy, and his friend Frank Risquez-Iribarren. Among other activities, he was taken to view the famous landscapes and sunrises in the area known as Los Llanos (The flat-lands). It is said that at a precise time of the year, the sun and moon can be seen at the same time, creating an unsurpassed combination of sunrise and moonset of extraordinary beauty.

Francisco Oliva-Esteve

Figure 1. *Pitcairnia leopoldii.*

[1] E-mail: Olivae@telcel.net.ve

[2] Taylor and Robinson (1999), in Harvard Papers of Botany 4(1):203-217, reduced *Pepinia* to synonymy with *Pitcairnia* again. The reduction has not yet been universally accepted so the plant is still known as *Pepinia leopoldii* by some botanists.



Francisco Oliva-Esteve

Figure 2. *Pitcairnia leopoldii* in adult stage.

Francisco Oliva-Esteve

Figure 3. *Pitcairnia leopoldii* inflorescence.

An extension of that trip was an expedition into a dense jungle where plants were collected for scientific purposes. Among the plants collected was this extraordinary *Pitcairnia*, samples of which were sent to the Belgian Herbarium (BR) in Meise.

The plant was recently collected again in the middle of the jungle on the shores of Paraka-Wachoi Lake, Amazonas, 12 kilometers north of Cerro Autana, during a helicopter expedition sponsored by a Venezuelan foundation. At first glance this plant was thought to be a species of *Navia*. However, Paul Berry, of the University of Wisconsin, here in Venezuela on a research project for a few weeks, used Smiths & Downs Key to the Pitcairnioideae to determine that it was *Pitcairnia leopoldii*. On learning this, I contacted Drs. Walter Till and Susanne Till of the University of Vienna, who originally described the species, to send me the full botanical description, published in BROMÉLIA, the Journal of the Brazilian Bromeliad Society[3].

In the description Dr. Till stated that the species resembled a *Navia* because the ovules are similar to those of the genus *Navia* in *Pitcairnioideae*. He further noted that the presence of petaloid appendages clearly shows that the species belongs to either *Pepinia* or *Pitcairnia*, depending on whether one accepts the criterion presented by G.S. Varadarajan and A.J. Gilmartin, respectively. Subsequently, Dr. Till asked the Belgian Herbarium (BR) in Meise, for some botanical specimens to review unidentified species of plants. Among the undescribed species was this striking *Pitcairnia* that was obviously named after the King.

ACKNOWLEDGMENT

I want to thank Professor Stephen S. Tillett of the Universidad Central de Venezuela for the English corrections.

*Caracas, Venezuela*

[3] BROMÉLIA. 1(3):6. 1994



# Cultivar Corner

## Derek Butcher

### Cryptanthus 'Rainbow Star'

On page 78 of the October-December 2000 issue of the CRYPTANTHUS SOCIETY JOURNAL, Harry Luther pointed out that the plant that we have been growing for many years as *Cryptanthus bromelioides* is in all probability *Cryptanthus osiris* Weber. The true *Cryptanthus bromelioides* has been re-discovered in Brazil by Ivón Ramírez.

This brings up the question of the widely spread variegated plant known as *Cryptanthus bromelioides* var. *tricolor* that Harry left in limbo in his article. This plant should never have been given botanical varietal status because it is a sport, which puts it into the realm of a cultivar.

If we refer to the *Bromeliad Cultivar Registry* (1998) we will see this plant goes under at least three disguises, namely 'Rainbow Star', 'Wendy Variegata', and 'Seaborn's Leather Leaf'. As luck would have it, this plant is known in the general plant trade as the "Rainbow Bromeliad." Therefore, I believe the most logical name to use is 'Rainbow Star'

It is a very unstable variegate with almost every offset turning out different from the parent plant, so that each could be considered a separate sport! What will never be proven is whether the other allied cultivar names in the BCR occurred by sporting from the plant that is now *Cryptanthus osiris* in exactly the same way that Foster reported his *Cryptanthus bromelioides* var. *tricolor* in 1953. Was more than one clone of the non-variegated form in circulation, or were all of them offsets from the same plant? Were all sporting variegated offsets selected for vigor or were the runts allowed to grow on too? An intriguing situation!

In the same way that it has been accepted that *Cryptanthus bromelioides* var. *tricolor* could vary, I will be treating all sports of this kind under the same name 'Rainbow Star' and will make note in the Bromeliad Cultivar Registry accordingly.

### A new nothogenus - *xNeobergiopsis*

A few months ago I received information from Western Australia that there was a *Hohenbergiopsis guatemalensis* being grown in Australia that had no scape to the inflorescence. This bothered me at the time because *Hohenbergia* and *Hohenbergiopsis* have rather tall inflorescences. In fact the only real difference I can find between these two genera is that *Hohenbergiopsis* does not have appendages at the base of the petals. With the current view that petal appendages are not an important diagnostic at genus level is it possible that *Hohenbergiopsis* may yet disappear? You cannot really tell the difference without a bit of poking about amidst the petals!

Derek Butcher

Figure 4. *Cryptanthus* 'Rainbow Star'

Derek Butcher

Figure 5. × *Neobergiopsis* 'Pinegrove'



On a trip to Queensland in August 2000 I found this *Hohenbergia guatemalensis* that didn't have a scape but the owner must have been forewarned that I was coming. Olive Trevor was convinced that a *Neoregelia* must have supplied the pollen for her seedling, now grown up! She had obtained seedlings from Pinegrove Nursery in New South Wales and had even sold a few before they flowered. Clearly a *Neoregelia* had supplied pollen when it was thought that self pollination had occurred. This combination is unique and we will need to think up a new nothogenera to accommodate this rarity. The rules that apply for naming such nothogenera restricts us to a rather cumbersome *xNeobergiopsis*.

To remind us of its origins we decided to call it *xNeobergiopsis* 'Pinegrove' As an aside, I have friendly rivalry on the Internet as to who grows the proper *Hohenbergiopsis guatemalensis* and so far the Californians are ahead with a somewhat depauperate specimen. I am keen to be in a winning position so if anyone has a photo of the real plant I would be eternally grateful.

## Cultivar Registry update

The Cultivar Registry has now been added to the BSI Web site. This is the most current version of the Registry and may be viewed and searched online. Check it out at the BSI Web site (http://www.bsi.org). Click on the cultivar corner link under bromeliad info and you will find information about the Cultivar Registry and the link to the online cultivar database.

The printed version of the Bromeliad Cultivar Registry (1998) is available through BSI Publications. If you already have the 1998 registry, you will now need the 2000 update as well. If you purchase the Cultivar Registry, the 23-page update is automatically included when shipped. Those of you who live within the U.S. who have already purchased the Cultivar Registry may receive the update at no additional cost by simply sending a large, self-addressed, stamped envelope to George Allaria, BSI Publications, 2265 W. 239th St., Torrance, CA 90501, USA.

The update is also available to be downloaded from the BSI Web site, which provides another way of obtaining it. Indeed, for those living outside the U.S., it is the best way to obtain it. If you don't own a computer, ask a friend who does to download a copy for you. Otherwise, contact George to make arrangements for receiving a copy.

*Fulham, South Australia*

# World Conference Update:
## Kathy Risley

The 15th BSI World Bromeliad Conference will be held at the Hilton Hotel in St. Petersburg, Florida from May 14 through May 19, 2001. St. Petersburg is located on the Gulf Coast of the Florida Peninsula, near Tampa and it's traveler friendly International airport. The sun shines on St. Petersburg, framed by lush green waterfront parks, towering palm trees, sailboat masts and a spellbinding collection of museums, galleries, cultural attractions and major league baseball. This hotel will accommodate all conference activities and is convenient to nearby beaches, with alternatives for dining, shopping and sightseeing within walking distance. We have negotiated a favorable room rate of $99 with the Hilton that should allow all attendees to use this central location for pre and post conference tours and events.

The theme of a "Bromeliad Beach Party" will be well suited to usual weather in May, which is traditionally warm and sunny with daily temperatures in the range of 65- 85 degrees F. BSI and its co-host, the Florida West Coast Bromeliad Society, are already busy planning many fun filled activities. Details and a tentative schedule will be mailed to registrants. The newly revamped Web site (BSI.org) will be updated regularly with Conference events and information. If you have not already registered, save money and do so now! For more information on conference planning or to volunteer for assisting with the conference contact either Hattie Lou Smith, e-mail Ssmith1613@aol.com, telephone 941-694-1135; or Kathy Risley, e-mail at Kathy.risley@gentiva.com, telephone 727-442-5491, fax 727 562- 0471. Registration forms are available in the BSI JOURNAL or via the BSI Web site.

*Clearwater, Florida*



# Ruby and Keith Ryde Awarded BSA Life Membership
## Felicity Begg and Jeeva Chapman

The Bromeliad Society of Australia Inc. recently conferred the honor of life membership on Ruby and Keith Ryde in recognition of their 24-year commitment to bromeliads and to the society.

They have been a conspicuous presence in the Australian bromeliad community ever since a family membership was taken out by Ruby in May-June, 1976. Keith joined the society in December of the same year. Between them they have contributed 52 articles (Ruby 37, Keith 15) and 38 reports (Ruby 29, Keith 9) to BROMELETTER[1] . They have presented, either individually or in conjunction with others, at least seven workshops. They have given at least 20 talks at society meetings, not including the countless number of times Ruby and Keith, have presented and discussed many of their special broms at "Show & Tell" for our members' benefit. Ruby is regularly asked to judge "Plant of the Month" and on every occasion gives the reasons for her judging decisions. Ruby was a guest speaker at the 1987 and 1991 Australian Bromeliad Conferences.

Both Ruby and Keith are known for their willingness to share their considerable knowledge about bromeliads and the cultivation of them. The enthusiasm they display for bromeliads has inspired interest by others in both growing the plants and joining the society. They have both held official positions in the Society. Ruby became a committee member in 1977 and held the position for two years (1977-1978). She then assumed the role of Show Secretary and held that position from 1979-1980 inclusive. The next position undertaken by Ruby was that of Society Librarian for a term of three years (1981-1983 incl.). In 1985 she was elected president of the society and was re-elected in 1986, 1987 and 1988, a position from which she resigned in September 1988. All in all, Ruby has held key positions within the society for 11 years. Additionally, Ruby contributed three chapters to the society's publication, *Growing Bromeliads*, namely those entitled *Aechmea, Dyckia* and *Hechtia* and "Lesser Known Genera." She also assisted others in the writing their chapters.

Keith, too, has held many official positions within the society. He became a committee member in 1978 and was elected president in 1979. He was re-elected president in 1980, 1981, 1982 and 1983, a term of almost 5 years. As president, he was Convener of the Broms II Australian Bromeliad Conference in 1983. Keith was elected as vice president in 1985, 1986, 1987 and 1988. In 1986 and 1987 he concurrently held the position of publicity officer until his resignation from both offices in September 1988. For a number of years, Keith has held the

[1] BROMELETTER, the newsletter of the Bromeliad Society of Australia, Inc. published bi-monthly at Sydney, Australia.

position as Honorary Auditor. He is currently the chairman of the show committee, a member of the cash register team and as a contact person for our shows. Keith has held official positions with the BSA for a total of 17 years.

Ruby and Keith have also been very involved in the promotion of bromeliads outside of society circles. Ruby has often been the front-person giving talks to various garden clubs, at garden expositions and shows and she has appeared on television programs to promote growing bromeliads. During all, Keith has supported her by acting as projector operator, driver, and all-around backup person. They are an omnipresent team assisting with the setting up and dismantling of public displays and greeting the general public to talk about the cultivation and care of bromeliads.

Ruby and Keith's willingness to donate plants is greatly respected and appreciated. They visited Dubbo to promote both the BSA's first national conference and bromeliads in general. On this occasion they donated a carload of plants to help promote interest in the plant family. Ruby and Keith are extremely generous in both the number of plants and the frequency of their donations at monthly meetings where plants are raffled to raise funds for the Society. If they happen to win a plant in the raffle it is immediately donated to a new member.

Grace Goode, an esteemed Life Member, said, "No other two people have done more to further the cause of bromeliads in Australia. Their dedication and love of these plants is well known. Long may they live to enjoy their Life Memberships, which they so richly deserve".

They are truly ambassadors for bromeliads and the Bromeliad Society of Australia.

ACKNOWLEDGMENT

The authors would like to thank the many members, non-members and organizations who contributed information, comments and time to assist in the preparation of this article.

*Mosman, New South Wales, Australia*



# Adventures of the Husband of an Avid Bromeliad Collector

## Keith Ryde

My wife, Ruby, began collecting Bromeliads over 30 years ago. She joined the Bromeliad Society of Australia in the 70's and I followed her lead six months later. During this six- month period, I would watch the local cricket or tennis match while Ruby attended the meeting at the host member's home. Slowly I got nearer to the house in question, waiting in the car outside or sitting in the garden reading a book. When I finally got around to attending my first meeting, I was shanghaied into the Presidency - no constitution, no vote, barely even a "Hello, how are you?"

Over the next few years we built the meeting attendance up from 12 to 100, reaching our peak when Graham Ross was our guest speaker. Soon over 50 people started attending meetings at the Ryde household, a situation that resulted in enlisting our helpful neighbors in frantically boiling jugs of tea for the onslaught. We were still unable to keep up so eventually we had to move the meetings into a hall.

My job as president consisted primarily of being Ruby's chauffeur. On a couple of occasions we went to Allan Seale's home at Beecroft and then on to Channel 2 television where Ruby was guest on his show "In Your Garden". On other occasions we went to St. Ives Show Ground where Ruby was guest speaker at Allan's "Garden Spectacular". Then it was on to the Daily Telegraph Garden Show at the show ground where Ruby was again guest speaker, this time with the late Valerie Swane.

When a camera crew and Fiona MacDonald visited our home for "Burke's Backyard," I recall Ruby saying that she remembered proudly telling her friends, "I have 13 different bromeliads!" That has now multiplied hundreds of times over. Meanwhile, I was learning something about bromeliads myself, if only by association. I was certainly not in Ruby's class when it came to knowledge about them. However, I did manage to fit in Convener of the Second National Conference in 1983, hosted by the Bromeliad Society of Australia, during my term as President.

I recall an occasion when I took up an offer from John Walton of Amazon Nursery at Mona Vale to collect welded mesh with wooden borders before it was thrown out. We loaded up the trailer and headed for home. It was not a wide load but it was a high load, too high, as it turned out. You've guessed it. While traversing the busiest shopping center in town the whole damn lot toppled over, much to the bemusement of the onlookers. However, when I mentioned to one of the bystanders that the load was for my wife's bromeliad house, understanding husbands started appearing from everywhere to assist in reloading. "Poor bugger,

I know the feeling" was the general sympathetic comment, as we loaded back up and limped along our way.

By this time Ruby was into seed raising (but that's another story). Suffice to say that one day she sprouted a *Puya raimondii* at which point I exclaimed, "I know that one. I've read about it! It grows to 30' and traps birds in its inflorescence!"

"But Darling, it only flowers every 100 or more years". Then, with the infectious optimism I've come to know all to well, she added, "But it might be quicker in the garden!"

Over the years Ruby has managed to turn a flat suburban battleaxe block into an Argentinean Savannah, a Guatemalan lowland, an Andean foothill, a desert area and a forest floor. On one of my safaris into the far corner of the now-huge bromeliad garden, I had an unfortunate confrontation with a *Bromelia balansae*.

Now this is an interesting plant, gorgeous when in bloom, but most affectionate, with barbs, one going one way and then alternatively the other. Clad only in shorts, I was soon ensnared, and realized that a calm calculated approach was going to be required to escape the clutches of the plant. However, my affectionate friend was loath to let me go. Reasoned calmness turned first to frustration, then panic and finally to anger.

"I don't care if you tear my *?*@*! leg off you +?*@%!!!" I raged, and with an almighty and most excruciatingly painful heave, I wrenched myself clear of its clutches only to stumble directly backwards into an *Aechmea distichantha*, the needle sharp pointed leaves of which bayoneted me right up the backside.

Then there were the overseas expeditions. On one of them, when collecting in the wild was permitted, I stumbled upon a cluster of interesting nidulariums and set about to collect several. Unfortunately the clump was residence for a colony of Brazilian fire ants that were intent on resisting eviction, and boy, do these babies I know a thing or two about inflicting pain!

On another collecting trip, this time to Argentina, this intrepid adventurer shinnied up a decaying tree after spotting an interesting collection of bromeliads about 30 feet above the ground. There were anxious cries of' "Cuidado!" coming from below. I now know that to mean "Take care! Be Careful!", but at the time I blithely thought they were simply words of encouragement and waved back in acknowledgement from my precarious perch. Then our guides added "Tengo una grande bolsa" ("I have a big bag"). Whether he meant it was available for use for me or for the plants, I never really found out.

Suffice it to say, that when I returned to the safety of *terra firma*, I proudly said to Ruby "What do you think of these beauties?" to which she replied, "Oh, while you were up there I found some growing on the rock just behind you!" Then on seeing how crestfallen her Sir Galahad was she added in her



compassionate way, "But it might be a different clone…"

I eventually realized that for traveling around in South America, a working knowledge of Spanish was essential. I did the rounds of language classes at Bankstown High, Sydney University and the Spanish Club. In an effort to make use of my newfound language skills I sent an Easter card to an Argentinean family (who later became our in-laws) living here in Australia, but instead of writing *Feliz pascuas* (Happy Easter) I wrote *Feliz paraguas* (happy umbrellas).

As my Spanish improved and Steve's mother-in-law's English improved as well, I came to appreciate her ready wit. One day I wished to phone Alberto (Steve's father-in-law) and when their phone was answered I said " Puedo hablar con el jefe de la casa de Blumhagen?" (Can I speak to the boss of the Blumhagen household?). The laughing voice of Herninda replied "Hablando"!! ("Speaking"!)

I look forward to my next adventure.

*Bass Hill, New South Wales, Australia*

# World Conference Judges School

## Betty Ann Prevatt, JCC Chairman

This is a call for anyone interested in attending the judges school at the 2002 World Bromeliad Conference. School number 4 is scheduled for the conference. However, due to the work and cost involved, there will be a minimum of 5 students needed in order to conduct the school. There is also a minimal fee to attend. If you have not attended any school before this, you may start with this one. The school is provided at the WBC for those who always attend the conferences but cannot travel at other times when schools are in progress. The conference dates are May 14-19, 2002 at the Hilton Hotel, St. Petersburg, Florida. The school is presently scheduled for Wednesday, May 15, 2002. Anyone interested may contact me at 941-334-0242 or write to me at 2902 Second Street, Fort Myers, Florida 33916.

# Use of RAPD Markers for Identification of Bromeliaceae

**M. De Proft, R. Deroose, E. Parton, N. Van Stallen & I. Vervaeke** **Illustrations by the authors**

## Abstract

Genetic polymorphisms, generated by the use of RAPD (Random Amplified Polymorphic DNA) markers, were studied for their efficiency on hybrid testing. RAPD analysis was performed on *Aechmea fasciata*, *Aechmea chantinii* and their $F_1$ offspring. Several decamer primers (OPERON) were tested. The RAPD technique was also used for the identification of different bromeliad species.

## Introduction

The Laboratory of Plant Culture of the University of Leuven (Belgium) has been doing physiological and genetic research on bromeliads since 1995. This research was mainly focused on fundamental cross incompatibility problems. In breeding ornamental crops up to now, interspecific hybridization is the most important source of genetic variation. Interspecific and intergeneric hybridization allows creating phenotypes with new combinations of plant forms and colors. Often desirable sexual crosses are not successful due to genetic, environmental and geographical barriers. The phenomena underlying crossing barriers can be divided into pre- and postfertilization barriers. Prefertilization barriers originate from the inability of pollen grains to germinate on the stigma or from inhibition of pollen tube growth at the style and/or ovary level. When after fertilization no viable seeds are formed, a postfertilization barrier is present.

## Results

Over the last few years crossings between different kinds of bromeliads were carried out successfully in the lab. It was found that while well-developed crossing barriers prevent hybridization between some species, others hybridize artificially quite easily. During 3 years, crossings were made between *Aechmea chantinii* and *Aechmea fasciata* as a model to study flower physiology. The natural habitat of *Aechmea fasciata* is restricted to the Atlantic rainforest (700-1300 m) of the State of Rio de Janeiro in Brazil. *Aechmea chantinii* grows in lowland and mountain forests (100-1160 m) and extends from Colombia to Peru and Amazonian Brazil. Breeding of these species in the greenhouse excludes all geographical barriers. Every time *Aechmea chantinii* was used as mother plant a low number of viable seeds was obtained. The reciprocal cross only produced seeds once out of 3 crossing years, and these seeds did not germinate. This is an indication of a postfertilization barrier.



Morphological study of *Aechmea chantinii* × *fasciata* also supported the hybrid origin by intermediate characteristics of leafs and inflorescence of the hybrids (Figures 6-8). All hybrids had sterile pollen. This means that pollen did not germinate on an artificial medium as described by Parton *et al.* (1998). The hybrid nature of the crossing product was confirmed by RAPD analysis.

A method adapted from the CTAB extraction method described by Murray and Thompson (1980) was used to extract total DNA from *Bromelia* seedlings and flowers. Fresh plant material was used. Concentration and degradation of DNA were determined on a 0.8% agarose gel using a standard concentration range of λ DNA.

DNA amplifications were performed in a volume of 25 µl, containing ± 25 ng of template DNA, 0.2 µM decamer primer (Operon Technologies, Almeda, Calif.), 200 µM dNTP (Perkin Elmer), 0.5 mM MgCl2 and 0.5 units Taq DNA polymerase (Appligene). Amplifications were performed in an automated thermal cycler (model 7900; Perkin Elmer) programmed for 35 cycles of 30 sec at 92° C, 1 min at 60° C and 1 min at 72° C. An initial step at 92° C for 1 min was applied before cycling and amplification was ended with a final extension at 72° C for 5 min. Amplified products were size fractioned by electrophoresis in 1.8 % agarose gels (Tris-Boric acid-EDTA buffer pH 8.0) and DNA bands were visualized by ethidium bromide staining.

*Identification of the hybrid nature*

As shown in Figure 9, the hybrid of *Aechmea chantinii* (♀) and *A. fasciata* (♂) has DNA fragments originating from both parent species. Therefore we can conclude that the F1-hybrid we obtained is a true hybrid and that RAPD is a valuable technique for hybrid testing. Since RAPD can be applied on young seedlings, it is possible to know in an early stage of seedling development (often 2 to 3 months), if the crossing product is a true hybrid. Still hybrid plants need to be grown and put into bloom before full morphological characteristics of the hybrid plant can be evaluated.

*Identification of different species*

In Figure 10 the banding patterns of four different bromeliads with one Operon primer are given. The level of polymorphisms in the tested plants is very high. Based on this one primer the four species could be identified unambiguously. Almost every primer tested leads to DNA patterns that can distinguish these four bromeliads. The RAPD patterns obtained from seedlings were highly reproducible starting from flower petals.

Our results indicate that the RAPD technique can be used to provide evidence for the hybrid nature of a plant. Since this technique can be applied on seedlings, it is possible to prove in an early stage the hybrid character of the crossing product. Recognition of bromeliads is possible with the same type of technique.

Figure 6. *Aechmea chantinii*

Figure 7. *Aechmea fasciata*



Figure 8.
$F_1$ hybrid between
*A. chantinii* and *A. fasciata.*

Photograph by Ellen Baskerville

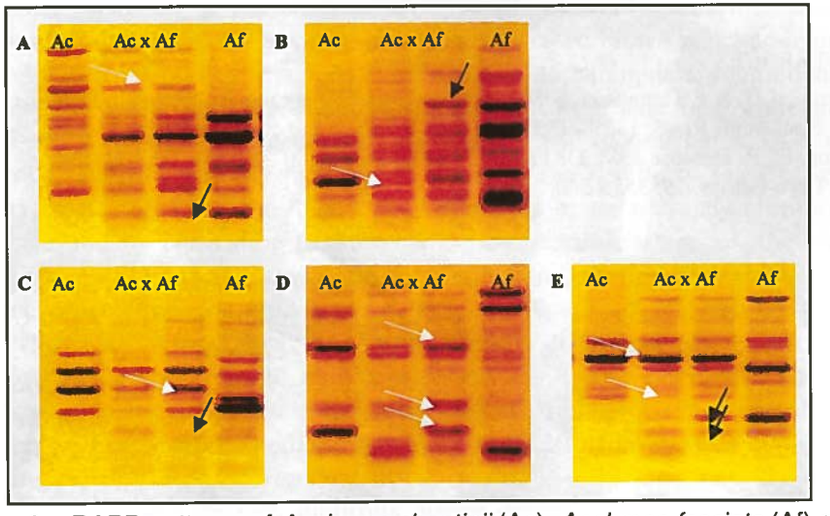


Figure 9. RAPD patterns of *Aechmea chantinii* (Ac), *Aechmea fasciata* (Af) and *Aechmea chantinii* × *fasciata* (Ac × Af) with five different Operon primers (A, B, C, D and E). White arrows indicate DNA fragments originating from *Aechmea chantinii*, black arrows those from *Aechmea fasciata* in the hybrid DNA.

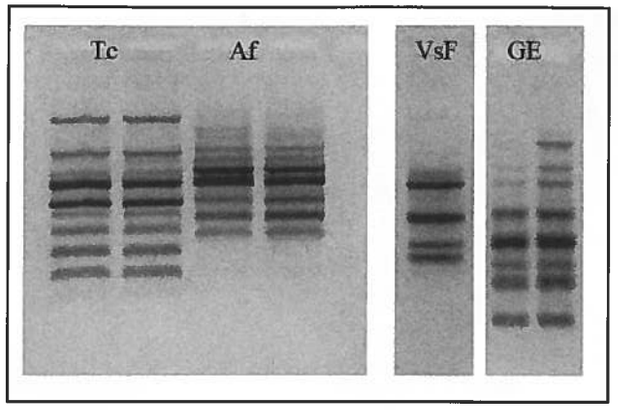


Figure 10.
RAPD patterns for *Tillandsia cyanea* (Tc), *Aechmea fasciata* (Af), *Vriesea splendens* 'Fire' (VsF) and *Guzmania* 'Empire' (GE).

## Conclusion

Our results indicate that the RAPD technique can be used to provide evidence for the hybrid nature of a plant. Since this technique can be applied on seedlings, it is possible to prove in an early stage the hybrid character of the crossing product. Recognition of bromeliads is possible with the same type of technique.

ACKNOWLEDGMENT

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*Department of Applied Plant Sciences*
*Laboratory of Plant Culture*
*Catholic University of Leuven*
*W. De Croylaan 42*
*B-3001 Leuven, Belgium*
*Fax: + 32 16 32 29 66*



# A New *Guzmania* Species from Eastern Ecuador

**Harry E. Luther**[1]

### *Guzmania farciminiformis* H. Luther, sp. nov. (figures 11-15)

TYPE: Ecuador. Napo: Reserva Ecológica Antisana. Comunidad Shamato. Entrada por km 21-Shamato. Plot #1. 00°43'S, 77°49'W, 1700 m, 24 April 1998, *J.L. Clark, E. Narvaez, & T. Pauchi 5134* (Holotype: MO; Isotype: QCNE). PARATYPES: Ecuador. Pastaza: Mera, 1160 m, 26 Dec. 1958, *G. Harling 3696* (S); At Puento Santana, 20 km along Río Pastaza SSE of Shell-Mera, 01°39'S, 78°02'W, 9 June 1968, L. *Holm-Nielsen & S. Jeppesen 509* (AAU); Rio Tigre, vic. Mera, 20 Mar. 1969, *H. Lugos 863* (GB); Mera, 23 April 1973, *H. Lugos 3815* (GB); Morona-Santiago: East of Macas, 02°18'S,78°07'W, 1160 m, 25 Feb. 1986, *M.A. Baker 6659* (NY, QCNE); Zamora-Chinchipe: Nangaritza Canton Pachicutza, Cordillera del Cóndor, 04°07'S, 78°37'W, 1000-1100 m, 19 Oct. 1991, *W. Palacios, G. Aymard & E. Freire 8326* (MO, QCNE); Peru. Amazonas: Prov. Condorcanqui, Cordillera del Cóndor, Puesto de Vigilancia Alfonso Ugarte (PV3), 03°54-6'S, 78°25.5'W, 1200-1300 m, 16 July 1994, *H. Beltran & R. Foster 828* (SEL, USM).

A *Guzmania devansayana* E. Morr., cui similis, scapus longioribus, petalis albus, non luteus, differt.

**Plant** a clustering epiphyte, flowering 50—70 cm tall. Leaves rosulate, 20 to 30 in number, erect to spreading, 5—5 cm long, thin-coriaceous. **Leaf sheaths** elliptic, 8—10 × 5—6 cm, castaneous especially abaxially, somewhat reddish striate toward the blades especially abaxially, appressed brown punctate-lepidote throughout. **Leaf blades** very narrowly triangular to subligulate, long attenuate 15—30 mm wide, somewhat reddish striate toward the base or overall green, appressed punctate-lepidote throughout. **Scape** erect 40—60 cm × 3—5 mm, glabrous, reddish, nearly equaling to exceeding the rosette of leaves. **Scape bracts** erect, imbricate, the lowest foliaceous, the upper narrowly elliptic and attenuate, mostly concealing the internodes, the sheaths castaneous, the blades green or reddish striate, scattered appressed punctate-lepidote throughout. **Inflorescence** simple, strobilate to cylindric 3—10 × 2—5 cm, polystichously-many-flowered. **Floral bracts** ovate to broadly elliptic, acute to apiculate, imbricate 25—35 × 15—20 mm, thin-coriaceous, even to somewhat nerved, glabrous to scattered punctate-lepidote, lustrous, red, dark red or purple red. **Flowers** with a 2—5 mm pedicel, spreading at ca. 30° from the axis at anthesis, opening during the day. **Sepals** elliptic, acute, 15—17 mm long, 2—4 mm connate, somewhat nerved, glabrous, green drying castaneous with a paler margin. **Corolla** with spreading lobes. **Petals** oblanceolate, broadly acute, 3 cm

[1] Director, Mulford B. Foster Bromeliad Identification Center, 811 South Palm Avenue, Sarasota, FL 34236 USA

Vern Sawyer

Figure 11. *Guzmania farciminiformis* H. Luther from Napo Province, Ecuador at Marie Selby Botanical Gardens.

Vern Sawyer

Figure 12. *Guzmania farciminiformis* flowering at the Marie Selby Botanical Gardens.



Wally Berg

Figure 13. *Guzmania devansayana* from Zamora-Chincipe Province, Ecuador

Greg Brown

Figure 14. *Guzmania coriostachya* from Napo Province, Ecuador

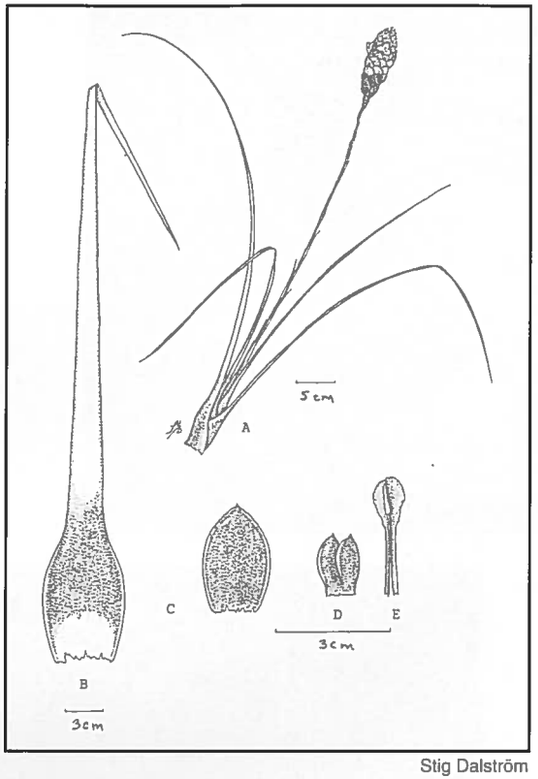



Figure 15. *Guzmania farciminiformis*: A. Habit. B. Leaf. C. Floral bract. D. Two of three sepals. E. Petal and one of six stamens.

Stig Dalström

long, conglutinated into a tube for ca. 15 mm, white or cream. **Stamens** and **style** included.

*Guzmania farciminiformis* seems most similar to *G. devansayana* but differs by having the scape of the inflorescence much longer in relation to the rosette of foliage and cream or white not yellow petals. In addition, in life the floral bracts of *G. devansyana* are somewhat spreading at anthesis; in *G. farciminiformis* they remain tightly imbricate.

From *G. foetida* Rauh, this new species differs by having a larger, brightly colored inflorescence. From the complex of *G. coriostachya* (Griseb.) Mez, G. *farciminiformis* differs by having relatively longer and narrower leaves and colorful (not green or brown) floral bracts. Both *G. foetida* and *G. coriostachya* have nocturnal anthesis unlike *G. farciminiformis* which is diurnal.

ACKNOWLEDGMENTS

I thank Stig Dalström for preparing the illustrations.

*Sarasota, Florida*



# Observations of Hummingbird Visits to Bromeliads in the Cerro Jefe Cloudforest, Panama.

**Simon Pierce[1] and Richard A. Gottsberger[1]**

Although bromeliads are a common sight in the Neotropics, their pollinators are far more rarely seen (see Smith and Downs, 1974; Benzing, 2000). Observations of bromeliad pollination involve not only finding the plant itself, but also sitting quietly for hours and hoping that the appropriate bat, bird or insect will be caught in the act. Due to the scarcity of such observations Benzing (1980) urged the recording and publication of any such events, recognizing this journal as an excellent means of communication amongst the bromeliad community. Here the authors report on a number of visits to bromeliads by hummingbirds which occurred during July/August 2000 at the Cerro Jefe cloudforest, central Panama (this habitat has previously been described in detail; Pierce and Aranda, 2000). We did not set out specifically to observe pollination, although our long-term work on plants in this cloudforest has enabled us to make frequent chance observations, often with a camera close to hand.

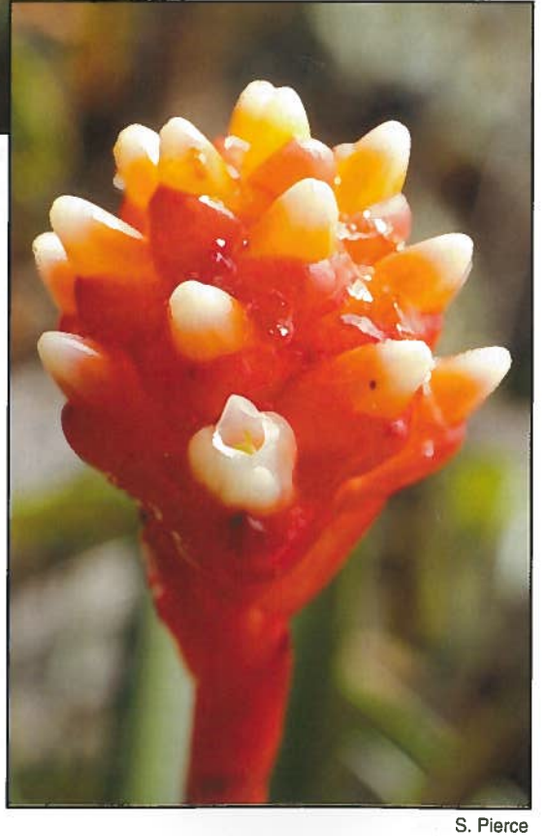
The cloudforest at Cerro Jefe, covering the hilltop to its peak at 1007 m, is home to a large range of bromeliads, including *Pitcairnia valerioi* STANDLEY and *P. arcuata* (ANDRÉ) ANDRÉ (Pitcairnioideae), *Aechmea dactylina* BAKER and *Ronnbergia explodens* L.B. SMITH (Bromelioideae), and the far more commonly encountered tank-forming Tillandsioideae *(Catopsis, Guzmania, Vriesea* and *Werauhia species)*. One of the most unusual of these tillandsioid species, *Guzmania calamifolia* ANDRÉ EX MEZ var. *calamifolia*, does not form a tank but has a well-developed root system, grows mainly terrestrially, and with its long, thin plicate leaves resembles a tall grass, at least until flowering (see also Grant, 1998). The authors observed a Crowned Woodnymph *(Thalurania colombica venusta)* visiting the flowers of this bromeliad on several occasions (Figure 16). This hummingbird was seen to perch on convenient leaves whilst feeding, apparently preferring to rest rather than hover (hummingbirds will actually spend most of their time resting on a nearby perch when not feeding, and will perch whilst feeding whenever possible; G. Angehr, pers. comm.).

Also present at Cerro Jefe is *Guzmania musaica* (LINDEN & ANDRÉ) MEZ var. *concolor* L.B. SMITH, the flowers of which have white petals contrasting with a background of red bracts (Figure 17). A Rufous-tailed hummingbird (*Amazilia tzacatl tzacatl*; Wetmore, 1968) was observed visiting the flowers of four plants, pictured in Figure 18 (the event itself was unfortunately not captured on film). This medium-sized hummingbird (Figure 19), with its green plumage and characteristic rust-colored tail, is very common in the

[1] Smithsonian Tropical Research Institute, P. O. Box 2072, Balboa, Panama City, Republic of Panama.

R.A. Gottsberger

Figure 16. A Crowned Woodnymph visiting *Guzmania calamifolia.*



S. Pierce

Figure 17. Inflorescence of *Guzmania musaica* var. *concolor.*



S. Pierce

Figure 18. Inflorescences of G. *musaica* stand out well amongst the jumbled understory.

R.A. Gottsberger

Figure 19. A Rufous-tailed hummingbird visits a feeder in Panama City.

lowlands (for an account of its natural history in Panama see Skutch, 1931).

*Guzmania calamifolia* and *G. musaica* have inflorescences that are typical of bird-pollinated bromeliad species; red bracts highlighting the tubular yellow or white petals and, as most birds do not have a sense of smell, the flowers are not scented. In other hummingbird-pollinated bromeliads the petals alone may be colorful. For example, the red petals of *Ananas ananassoides* (BAKER) L.B. SMITH from Brazil attract the hummingbird *Phaethornis pretrei*, and the orange-red petals of *Dyckia leptostachya* BAKER attract *Chlorostilbon aureoventris* (G. Gottsberger and I. Silberbauer-Gottsberger, pers. comm.). Indeed, bird-pollinated species from a variety of plant families have flowers that usually include the color red.

The relationship between bird-pollination and the coloration of flowers is not as simple as it may at first seem. Evidence suggests that hummingbirds do not have an innate preference for the color red, but learn to associate particular colors, shapes and locations of flowers with sources of good quality (sugary) nectar. When these nectar supplies run out hummingbirds will search amongst flowers of various colors and in different locations (Goldsmith, 1980; McDade, 1983). Some species are apparently capable of associating new flowers with nectar within a single visit (Bené, 1945), and using landmarks to remember the positions of flowers (Miller *et al.*, 1985). If flowers of particular colors possess better quality nectar rewards, then these will be preferred over red flowers (Melendez-Ackerman *et al.*, 1997). Indeed, Wagner (1945) suggests that hummingbirds learn to recognize different flowers seasonally, as the flowers of different plant species reach anthesis. Thus hummingbirds exhibit sophisticated learning behavior whereby they acquire a 'food search image' (Araujo *et al.*, 1994) which is a flexible aid to finding food, and changes with the availability of nectar.

At Cerro Jefe, a Garden Emerald hummingbird (*Chlorostilbon assimilis*) was observed on a number of occasions to feed from an arboreal plant species (*Palicourea tubuliflora* J.D. DWYER: Rubiaceae) possessing tiny pale green flowers, with no hint of any other color (N.B. P. *rigida* H.B.K. in south eastern Brazil is pollinated by *Colibri serrirostris*; G. Gottsberger and I. Silberbauer-Gottsberger, pers. comm.). Thus, although larger and more colorful flowers are easily recognized as food sources, hummingbirds will also find and take advantage of other sources of nectar, not relying absolutely on any single floral characteristic as a guide. It is therefore possible that *any* flower may be investigated opportunistically by hummingbirds, should more usual sources of nectar not be available at the time.

Indeed, variations on the typical bird-pollination syndrome are apparent. On several occasions a Garden Emerald and a Little Hermit (*Phaethornis longuemareus*) were observed to visit *Aechmea dactylina* at Cerro Jefe (Figure 20). This bromeliad does have red scape and primary bracts, but the extensive inflorescence is characterized by pale green floral bracts, each surrounding a



very small and inconspicuous white flower. Each flower is remote from the red bracts and with respect to size and shape does not conform to the usual bird-pollination syndrome. Unlike the two *Guzmania* species mentioned above, the flowers of *A. dactylina* are too small to deliver pollen to the forehead or throat of a hummingbird (although pollen is transferred on the hummingbird bill during pollination of *Ananas ananassoides* and *Dyckia leptostachya* mentioned above; G. Gottsberger, pers. comm.). However, in common with other bird-flowers no discernible scent was produced and *A. dactylina* was not observed to attract insect pollinators (although cockroaches and crickets were observed at night eating any flowers remaining outside the protection of the floral bracts). In Brazil, *Aechmea bromeliifolia* (RUDGE) BAKER, which has green/yellow petals with remote red/pink scape bracts, *A. distichantha* LEMAIRE, (purple/blue petals with red bracts), and *Acanthostachys strobilacea* (SCHULTES F.) KLOTZSCH (yellow petals with red bracts) are also visited by hummingbirds, detailed by Sazima and Sazima (1999). Along with *Aechmea nudicaulis* (L.) GRISEBACH, these species are also pollinated by the perching-bird *Coereba flaveola* (Snow and Snow, 1971; Sazima and Sazima, 1999). Thus the red bracts of these Bromelioideae are apparently part of a bird-pollination syndrome which has similarities to that of tillandsioid *Guzmania* species.

These observations show that white and yellow[2] are important colors recognized by hummingbirds and used as a guide to the precise source of nectar, with red bracts apparently disclosing the position of the inflorescence over longer distances (see also Benzing, 2000). Further examples include *Vriesea carinata* WAWRA, *V. ensiformis* (VELLOZO) BEER, and *V. incurvata* (GRISEBACH) R.W. READ, which possess yellow petals and red bracts, and are pollinated exclusively by the hummingbird *Ramphodon naevius* in Brazil (Araujo *et al.*, 1994). White may be particularly effective in guiding hummingbirds as they can see ultra-violet light (UV; Goldsmith, 1980); UV usually being reflected from white objects along with the full spectrum of visible colors. Indeed, the range of colors visible to hummingbirds also extends to near infra-red at the other end of the color spectrum, and so hummingbirds literally do not see flowers in the same light as we do[3].

The large range of colors visible to birds, and the sophisticated behavior and manner in which different colors may be associated with food sources, has fuelled on-going debate amongst ornithologists for decades. This is embodied in the question: 'if birds can associate different colors with food sources, then why are so many bird-pollinated flowers red?'. The traditional explanation is that red

[2] Also, as this article was being written, a Rufous-tailed Hummingbird visited the authors' balcony, where it investigated a yellow piece of rope supporting a hammock. This hummingbird has also been seen flying in circles around yellow and orange food packaging.

[3] Within the eyes of mammals, the lens and cornea act as filters to the higher-energy UV light, which would otherwise damage the sensitive rod and cone cells of the retina. Along with some amphibians, reptiles and many other birds, hummingbirds are thought to possess a more selective UV filtering system, in the form of oil droplets over individual cone cells in the retina. Some apparently more robust cone cells remain unfiltered and are able to detect the UV light.

S. Pierce

Figure 20. Little Hermit and Garden Emerald (inset) hummingbirds visiting *Aechmea dactylina* after a thunderstorm.

S. Pierce

Figure 21 *Guzmania circinnata* at Cerro Jefe, showing the homology between red bracts and leaves.



is not visible to bees and is visible to birds, which are large enough to actually achieve pollination (Grant and Grant, 1968); in this way bees are excluded from effectively stealing nectar. However, recent evidence shows that bees can see the color red, although blue and green color-perception is markedly better (Chittka and Waser, 1997). Red can attract bees over short distances, and larger flowers or inflorescences nearby can also be detected by pattern and apparent movement against a background as the bee flies. Indeed, there are many examples of bee-pollinated flowers which are red (see Chittka and Waser, 1997), and therefore bees are not excluded from visiting red flowers. However, as bees have a harder time perceiving red it may be that this color is simply more easily detected over longer distances by birds than it is by bees. When combined with a lack of scent - the usual long-distance advertisement to insects - this overall bird-syndrome will not be as attractive to insects as it is to birds (a weak version of the traditional hypothesis).

In the case of many bromeliads the situation is perhaps a little different from other flowering plants, as the petals may possess coloration other than red; apparently it is the bracts of these bromeliads that perform the function of attracting bird-pollinators over longer distances. Indeed, although *G. musaica* is often hidden amongst the dense understory at Cerro Jefe, the bright red inflorescences stand clear and are highly noticeable (Figure 18). To suggest a possible explanation for the presence of red bracts in many bromeliads the probable course of evolution of these plants and hummingbirds must be outlined:

The closest relatives of hummingbirds (family Trochilidae; order Apodiformes) are the swifts (family Apodidae; Austin, 1961; Wetmore, 1968). Time-calibrated molecular data indicates that hummingbird evolution diverged from that of swifts in the early Miocene epoch (starting ~23 million years ago; Bleiweiss, 1998a), an event which took place somewhere in the neotropical lowlands (Bleiweiss, 1998b). There is a lack of equivalent precise data concerning bromeliad evolution. However, cladistic analysis suggests that the initial appearance of bromeliads possibly took place much earlier than hummingbirds, possibly around the start of the Tertiary period (~66 million years ago; Varadarajan and Gilmartin, 1988; Emiliani, 1992) shortly after the continents of Africa and South America began their drift apart.

Approximately 17 million years ago the forest-dwelling hermits (hummingbirds with downward-curving bills) diverged from the remaining hummingbirds. Further hummingbird lineages appeared in the Andes and North America approximately 12 and then 6 million years ago (Bleiweiss, 1998a), presumably under the influence of mountain-forming processes, which created new habitats. Bleiweiss (1998b) states that due to the complexity involved in the evolution in this manner of over 330 hummingbird species (and re-invasion of old habitats by recently formed hummingbird species) it is not possible to directly link the co-evolution of individual hummingbird species with particular bird-flowers.

However, some generalities concerning bromeliad and hummingbird evolution are apparent. In common with their relatives the swifts, hummingbirds have wings with unusually well developed primary feathers, allowing fast, maneuverable, but energetic flight. In hummingbirds the wing is almost entirely composed of this outer portion of the wing which, unusually for birds, flexes primarily at the shoulder in a pattern permitting hovering and backwards flight. Also in common with swifts, hummingbirds eat insects and spiders (Wetmore, 1968), often catching insects on the wing by circling around swarms, or hunting by hovering underneath leaves (hummingbirds must supplement their diet of carbohydrate-rich nectar with protein and fat, and baby hummingbirds are fed almost entirely on insects). Thus, key to the evolution of hummingbird flight is their original insect-hunting behavior. It is thought that hummingbirds originally encountered nectar when hunting insects on flowers.

The bracts of bromeliads are undoubtedly homologous with (derived from) leaves. In monocotyledonous plants there is a wealth of morphological and physiological data indicating this origin of inflorescence bracts in the general monocot growth-form (Ong *et al.*, 1978; Bell, 1991; Pierce *et al.*, 2000; Pierce, Stirling and Baxter, unpublished data), also indicating that these inflorescence structures in monocots probably pre-date the evolution of Bromeliaceae. The homology between leaves and bracts is perhaps most obvious in Tillandsioideae such as *Guzmania circinnata* RAUH, in which the upper leaves become brighter red during anthesis, showing very little difference from the smaller bracts (Figure 21). Red pigmentation (anthocyanins) produced in the leaves of bromeliads has many roles, depending on the species and location (summarized by Benzing, 1980). The most frequent functions appear to be either the protection of the leaves from too much light in exposed situations or, where the plant has a 'discolor' form with red under-surfaces, helps to reflect light back up into the leaf in shaded situations. Thus many bromeliads may have a red coloration to the leaves and, being derived from leaves, the bracts may possess these pigments too.

It is conceivable that hummingbirds visiting bromeliad flowers would eventually come to associate reddish-leafed species with food; plants with brighter red upper leaves or bracts would subsequently stand a greater chance of being noticed, pollinated and setting seed. Thus, the consistency with which red is found in certain bromeliad bracts may ultimately be due to two things: (a). the wide-spread use of red pigments in the leaves of bromeliads, and (b). the good color vision, learning behavior and ability of hummingbirds to hover (which ultimately stems from their insect-hunting behavior), allowing them to feed from flowers that are not as attractive to insects.

*Panama City, Republic of Panama*



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www.hummingbirds.net
http://hummingbirdwebsite.com

*Watch hummingbirds via live webcams:*
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# A True Story

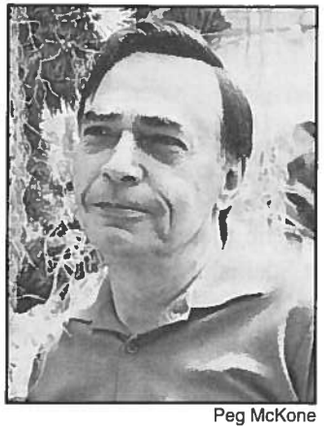
## Lynne Fieber

A few years ago, before the native bromeliads display became a regular part of our annual BSSF show, a member would reliably bring in a clump of *Tillandsia usneoides* for educational purposes. It would lie there on one of the tables during the show and lay people would learn that Spanish Moss was also a bromeliad. One year I noticed during my trip to the classification session that there was as yet no *T. usneoides* among the plants. Wishing to avoid a second round trip from Key Biscayne to Fairchild, I seized my directory upon arriving home and started calling local people. Eventually I reached Clara Kouchalakos who agreed to grab an armful of *T. usneoides* out of her backyard tree on the way to the show with her entry plants. "We must have that plant at our show," she said.

*T. usneoides* was there in its usual educational role that year, but that's not all. Whether due to confusion or the lateness of the hour when Clara arrived at classification that night, the words "Exhibit Only" were accidentally omitted from the plant's label.

It won a blue ribbon.

*Miami, Florida*



Peg McKone

Figure 22. Harold Wideman

# Dr. Harold Wiedman

## Lee Kavaljian

Hal Wiedman, a member of the Bromeliad Society International for more than 40 years, passed away on December 8, 2000. Hal was a Professor of Biological Sciences at Cal State University, Sacramento for several decades. He was also a founding member of the Sacramento Bromeliad Society, formed in 1970, and from its inception, had been one of its most active and influential members.

Hal will be remembered in BSI circles as co-editor of the Journal of the Bromeliad Society during 1982 and 1983. He was elected vice-president of the BSI in 1985 and held that office through 1988. He was a member of the BSI Board of Directors from 1973 through 1976 and was re-elected to a second term from 1976 through 1979.

For years Hal traveled to many parts of the world and shared his botanical experiences with many affiliates of the Society. His trips involved studying the floras of Brazil, Ecuador, Panama, Guatemala, Costa Rica and Mexico, but he also traveled extensively in Asia and Australia.

Growing plants from collected seed was one of his particularly strong interests. Toward the end of his career as a Professor of Botany at CSUS, he became especially interested in the plant life of South East Asia and assisted a Royal Thai Foundation with various horticultural projects. In recent years, he became interested in the activities and plantings of the Quail Botanical Gardens in Encinitas, California. It gave him great pleasure to become a benefactor of the Gardens. He will be remembered for his enthusiasm and generosity in sharing his considerable knowledge, both botanical and horticultural, of bromeliads.

*Sacramento, California*



# Judges Handbook Changes

## Betty Ann Prevatt[1]

The Judges Certification Committee has been working on revising the Judges Handbook. It is our hopes to simplify this book so that it is a simple guideline for staging a BSI Standard Show. There will still be the basic requirements.

In the January-February 2000 issue of the JOURNAL OF THE BROMELIAD SOCIETY, the first changes were published. The following changes were voted on at the world conference in San Francisco, June 2000. All of these changes are now in effect. I suggest you make a photocopy of both articles and place them in your Handbook in the appropriate place. When the first section of the handbook, which will include the show requirements, guideline/suggestions and judges information is completed, it will be printed in entirety and furnished to all judges and affiliates. You will be able to remove old pages and insert the new in your present Handbook cover.

Handbook - Page 1 - DISTRICT NAME CHANGE

The judging districts will now be:

WESTERN JUDGING DISTRICT - formerly CA-OR-IL, etc.
CENTRAL JUDGING DISTRICT - formerly TX-OK-LA
EASTERN JUDGING DISTRICT - formerly FL-GA
INTERNATIONAL JUDGING DISTRICT - Australia and any others outside the US in the future.

Handbook - Page 10 & Page 27 #13 - NEW DESCRIPTION OF STANDARD POT

"A standard pot is a container, that will hold potting medium, that does not add to or detract from the entry."

NOTE: The JCC suggests that each society can set any further standards they deem necessary. Once a society has set their requirements for a standard pot, it is recommended they maintain them from year to year to avoid confusion. ALSO, any special requirements from the society must be printed in their show schedule.

Handbook - Page 10 - SAMPLE SCHEDULE - SECTIONS "A" and "B"

The sample schedules on pages 10 and 11 suggest Section A - blooming, and Section B - foliage. Many people have asked why Section B can't be for Blooming and Section A for foliage? Well, it can! This is an affiliate option.

[1] Judges Certification Committee Chairman

Handbook - Page 39, 40 & 59C - SCALE OF POINTS

The word "RARITY" is eliminated. The 10 points will apply only to Difficulty of cultivation.

Handbook - Page 60 - RECOMMENDATONS

Upgrading must be done by a panel of 3, *not* by an individual judge. Also, The panel must *properly re-evaluate the entry using the proper judging procedure.*

Handbook - Page 75 - JUDGES TOUCHING OR MOVING PLANTS DURING JUDGING.

This will be a society option. Whether they do, or do not, want the judges touching or moving entries, the show schedule must state this and the judges chairman should include this in the judges briefing.

Handbook - Page 77 and 78 - BROMELIAD EXPERT

The definition of a bromeliad expert will be: "one who is bromeliad knowledgeable, but has no formal BSI training in judging."

Handbook - Page 81- JUDGES CREDIT

Judges will get credit for attending SEMINARS. "One (1) judging credit may be earned per 3 year term by attending a seminar." Ribbon credits may only be earned by entering bromeliads in a BSI show.

This concludes the most recent changes or additions to the Handbook but the JCC will continue to work throughout the year. We realize that there are a lot of opinions as to how the judging is or should be done and we welcome suggestions or comments. These are discussed by the JCC and voted on, so please don't think you won't be heard.

If you have any questions or comments regarding the Handbook revision or judging matters, please contact your District Registrar, or you may contact me at 2902 Second Street, Fort Myers, FL 33916. Telephone 941-334-0242.

*Fort Myers, Florida*



# Miscellaneous Musing

## Chet Blackburn

### And yet another beautiful book!

Francisco Oliva-Esteve has just released the English version of his new book *Bromeliads*. And what a beautiful book it is! I have always been partial to photographs of bromeliads in habitat and the new book offers that in abundance. There are hundreds of photographs not only of bromeliads in cultivation, but shots of them growing on forest floors, dangling from tree branches and clinging to cliffs. Interspersed with the photos of the plants themselves are some incredible photographs of sweeping vistas, lonely landscapes, tumbling waters, deep chasms, and slow-moving streams that paint a portrait of the wilder parts of Venezuela that would inspire anyone to want to hop the next plane to Caracas. Jason Grant reviewed this book in volume 50 (5):203-204 of the JOURNAL.

The fact that bromeliads are so photogenic has been a budget buster for enthusiastic growers in recent years. Ulrich and Ursula Baensch's *Blooming bromeliads*, Elton Leme and Luiz Claudio Marigo's *Bromeliads in the Brazilian Wilderness*, Elton Leme's three volume *Bromeliads of the Atlantic Rainforest* featuring *Canistrum, Canistropsis* and *Nidularium*, and Ron Parkhurst's *The Book of Bromeliads and Hawaiian Tropical Flowers* are all "must have" books filled with beautiful photographs and have all been released over the last few years. Add to this another "must have", David Benzing's *Bromeliaceae: Profile of an Adaptive Radiation*, and there goes the kids' inheritance!

### Bromeliads from the wild

And speaking of bromeliads in habitat, the day is probably not far off when collecting bromeliads from the wild will be a thing of the past. At least legally, it already is a thing of the past in many countries. Those of us who have been around for a while have already seen significant changes ranging from the total destruction of favored collecting sites (more from other human activities than from collecting) to a stronger emphasis on growing from seed in commercial establishments. When I first became involved with bromeliads, there were more species available on the market than hybrids, and probably more bromeliad retailers around than wholesale growers. It was a market dependent upon collected and imported plants. That situation has reversed today. In fact, it is difficult to find a commercial source today with a good selection of species other than *Tillandsia* species. The popularity of bromeliads will continue to grow, but it will be fed by mass produced hybrids along with a few of the more spectacular species grown from seed. That is a good thing.

But where does that leave the wild species? In the May-June 2000 issue of the JOURNAL [Volume 50 (3):128] Dr. Ed McWilliams of the Horticultural Sciences Division of Texas A & M University proposed a bromeliad population monitoring network. That is a good idea and one that the BSI as an organization should become involved with. Wouldn't it be great if, as part of our conservation effort, we were even eventually able to go further and participate financially in efforts to preserve prime bromeliad habitats through organizations like the Nature Conservancy? But first there is a need to identify where the best unprotected sites exist.

Even without collecting them, seeing bromeliads in their natural environment is an exciting experience, and one that future generations should be able to have as we have. I know of no grower who doesn't salivate at the thought of seeing bromeliads growing in the wild. Perhaps someday we will be creating "life lists" much as the Audubon people do, instead of collecting plants.

### First online membership

Julian Kaposta of Houston Texas became the first individual to join the BSI through cyberspace. Since the capability of joining the BSI through the BSI Web site was added earlier this year, nine new members have used that service to join the BSI.

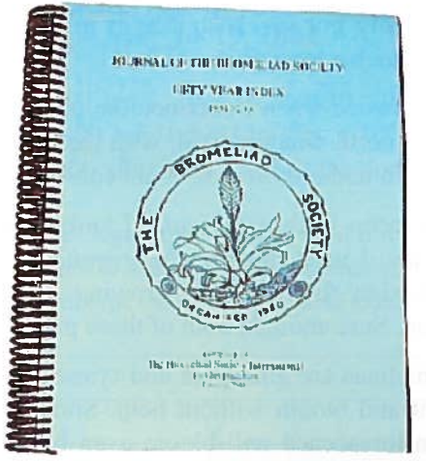
### Correction to e-mail address for Brom-a-Warra.

In the last calendar event listing the 11th Australian Bromeliad Conference, I managed to spell both Brom-A-Warra and Wollongong correctly and then incorrectly spell the name of the person to contact for the event, Eileen Killingley (not Killingsley as stated). Unfortunately, Brom-A-Warra and Wollongong were not part of the e-mail address and Killingley was. The correct address to contact for the conference is john.killingley@det.csiro.au.



## Fifty-year Index now Available

The 50-year index to articles published in the Journal of the Bromeliad Society is now available for sale through BSI Publications. It covers the period between January-February, 1951, the date when the first issue was published, through November-December, 2000. During this period more than 10,000 pages and more than 5,000 photographs (about 2/3 of which are in color) have been published. Designed to be as user friendly as possible, the index is divided into three color-coded sections: *plants, people* and *titles and topics*. The index is spiral bound and 384 pages in length (counting the title page and foreword).




The price of the 50-year index is $30 (U.S.) plus postage. To help you determine how much postage to send, a sampling of rates from around the globe are shown below:

| | |
|---|---|
| **UNITED STATES** | **AUSTRALIA, JAPAN, MEXICO** |
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| First Class $5.15 | Air $17.60 |
| **EUROPE** | **BRAZIL, PHILIPPINES** |
| Surface $ 7.50 | Surface $ 9.40 |
| Air $15.70 | Air $19.05 |

The index may be ordered through BSI Publications, 2265 W. 239th St., Torrance, CA. 90501 or through the BSI web site at BSI.ORG.

# My Results Using Ethylene Pills

## Veronica Saddler

I bought some ethylene pills when they first became available at a meeting of the New York Bromeliad Society. I immediately used 5 pills on an *Aechmea fasciata* that was 4 years old, had never flowered and had several pups. It was growing in relatively low light in a northern exposure window.

I treated it in the hope that the center was still growing, and I was rewarded after about 3 weeks when I spotted the beginning of an inflorescence deep down in the cup. It grew slowly but surely and as it grew to full bloom. It was a spectacular vision after such a long wait.

I was a complete novice when I obtained the plant or I wouldn't have tried to grow *A. fasciata* in a north window. Still, with the help of the ethylene pills, I managed to induce bloom under those poor light conditions.

Spurred by my success with *A. fasciata*, I looked around for other mature plants to treat with pills. I used them on *Neoregelia spectabilis* and *Aechmea orlandiana* 'Reverse Ensign' that had been growing in a southeast window that was partially obstructed. Sure enough, both of these plants went into bloom.

Most of my bromeliads are guzmania and vriesea hybrids. They grow very well in moderate light and bloom without help. Sometimes the pups on those plants with a spent inflorescence will bloom even before I can separate them from their parents. But I have one small guzmania that I bought from Woolworth's and a vriesea I obtained in Chinatown that that were both 3 to 4 years old and had been growing well, had even pupped, but had not flowered. So I dropped 3 pills in each cup and, yes - you guessed it - within a few weeks an inflorescence appeared in each cup.

From this personal experience you can see that the ethylene pills have been 100% successful in inducing flowering for me. I think they are the best growing aid to the home grower that has come along in a long time. If our conditions are not right to flower our plants, it gives us an easy remedy at hand.

*New York, New York*

*Reprinted with minor alterations from Bromeliana, the newsletter of the New York Bromeliad Society, 37(4):2. (April 2000).*



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# The Bromeliad Society International

The purpose of this nonprofit corporation is to promote and maintain public and scientific interest in the research, development, preservation, and distribution of bromeliads, both natural and hybrid, throughout the world. You are invited to join.

Photograph by Vern Sawyer

A very fine form of *Neoregelia johannis* growing in full sun in the bayside garden at the Marie Selby Botanical Gardens.

## Calendar

| | |
|---|---|
| 7-8 Apr | The Bromeliad Society of Broward County will hold its annual show and sale the Fishing Hall of Fame & Museum, 300 Gulfstream Way, Dania Beach Florida. Hours are 9 to 5 both days. Contact: Ann Schandelayer 954-583-1124 |
| 27-29 Apr | 21st annual Sarasota Bromeliad Society Show and sale, "2001 A Bromeliad Odyssey", to be held at the Marie Selby Botanical Gardens, 811 S. Palm Ave., Sarasota, FL. Exhibits, sales, food & rare plant auction are all on the agenda. Show and sale hours 10-4 on Saturday & Sunday. The plant sale will also be open on Friday. Contact: Rob Branch 941-358-4953 or 1dolato@tampabay.rr.com. |
| 11-12 May | The La Ballona Bromeliad Society will be holding their annual show and sale on Saturday, May 12 from 10 a.m. to 4:30 p.m. and Sunday May 13 from 10 a.m. to 4 p.m. at the Veteran's Memorial Auditorium, 4117 Overland Ave. at the corner of Overland Ave. and Culver Blvd. in Culver City. For information phone 310-230-4262. |
| 11-13 May | The Bromeliad Society of Central Florida will hold it's 26th annual Mother's Day show and sale at the Florida Mall, 8001 S. Orange Blossom Trail, Orlando, FL. The hours are 10 a.m. to 9 p.m. on Friday & Saturday & noon to 6.p.m. on Sunday. Contact: Eloise Beach, 407-886-8892 or by e-mail at FloridaPRO@aol.com |
| 19-20 May | The Greater New Orleans Bromeliad Society's Spring Show and Sale will be held on Saturday and Sunday, May 19-20, 2001. The show will open at 1 p.m. on Saturday and be open from 10 to 4 on Sunday. Use the Veterans Highway entrance to Lakeside Mall in New Orleans. For info contact Carol Hertz, 418 S. Soloman St., New Orleans, LA 70119-6741 or Fred Ross, 1123 Cadiz St., New Orleans LA 70115. Phone 504-891-9301 |