

BROMELIAD SOCIETY OF

SAN FRANCISCO

NOVEMBER 2014



Meeting Specifics

When: Thursday, November 20

Time: 07:30 PM

Recreation Room

Where: San Francisco County Fair

Building

9th Avenue at Lincoln Way

San Francisco

Terrie will be bringing bromeliads for sale. Her prices and varieties are always an incentive to spend more than you want.



Growing Uncommon Bromeliad Genera

Dr. **Terrie Bert** will be visiting us again this year. Her last visit was in 2012. She will discuss the ecology and cultivation of uncommon bromeliad genera. She will interweave ecology in the wild and cultivation tips about the 45 genera that are not typically raised by most bromeliad enthusiasts. Some genera can be grown in USA climates; others need special care, and some cannot be cultivated at all. This will be a preview of the presentation she will give next spring at the Australian Bromeliad Conference in Sydney, Australia.

Terrie's day job is in marine biology for the Florida Fish and Wildlife Conservation Commission. In addition to her passion for bromeliads (she grows approximately 2000 different bromeliads in 24 genera), her hobbies also include making quilts and SCUBA diving.

It is likely that some of her plants will make it onto our raffle.

Cid Young is the only person who signed up for refreshments this month. Any additional refreshments will be appreciated.

Vriesea simplex, endemic palm in Columbia, and *Guzmania conifera*.



October Meeting

Ron Parsons surprised us with a presentation on the orchids and bromeliads of Columbia.

Last month, **Ron Parsons** spoke to us on the orchids and bromeliads of Columbia. Ron is an expert on the orchid family and is noted for his photography and published books on orchids. His scheduled topic was to be on the orchids and bromeliads of Ecuador, but at the meeting he switched to a show on a spring trip he took to Columbia this spring.

Columbia is renowned for its orchids and Ron has unique contacts there in the orchid world. He visited national parks that contained many endemic species of orchids and plants from many other families. These parks were in the cloud forest part of Columbia and many of the orchids were true miniatures that Ron had never seen and may not be found in cultivation. For a photographer like Ron, it

was a dream come true. Because he was a guest of the people who manage these parks, he had access and many additional eyes to spot the miniature plants because they were in flower.

In addition to the orchids that comprised the bulk of his show, Ron saw many other plants including bromeliads. Columbia has one of the highest

Here is the photographer posing for a photo.

rates of species diversity in the world. We saw slides of several gesneriads, heliconias, Passifloras, and magnolias.

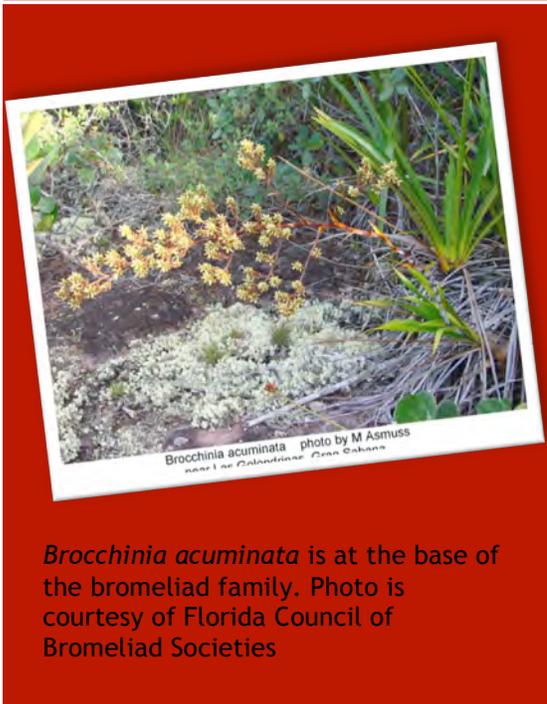
Among the bromeliads that Ron saw, most were Guzmanias - probably *Guzmania conifera*. He also saw some *Vriesea simplex* in flower.

Our plant table was large and colorful as usual. **Wes Schilling** brought in a very special clone of *Vriesea ospinae* v. *gruberi* that he purchased at the recent World Bromeliad Conference in Honolulu. This plant was created by Hawaiian Sunshine nursery from selfing the plant



variety. It was huge.

Reclassification of the Bromeliad Subfamilies



Brocchinia acuminata is at the base of the bromeliad family. Photo is courtesy of Florida Council of Bromeliad Societies

At each world bromeliad conference (WBC) “An Alphabetical List of Bromeliad Binomials” is published and released by the BSI and the Selby Botanical Gardens. This book lists all the valid species in the bromeliad family. The late Harry Luther created and edited the book. At the WBC in Honolulu this year the 14th edition was released. This first edition to be published since Harry passed away was edited by Bruce Holst. If you are interested in the book, it is available on the BSI website.

This volume is also the first to officially list the reclassification of the bromeliad family into 8 subfamilies. The reclassification is based on DNA analysis done in 2007 by members of the Department of Botany at the University of Wisconsin. This article is based on the research paper describing the results of the analysis. First, let us look at the breakdown into 3 subfamilies that we have been used to for years. Some of the genera have been newly described; some subgenera have been elevated to a genus’ But the subfamilies have remained the same.

TRADITIONAL BROMELELIACEAE			
Bromelioideae		Tillandsioideae	Pitcairnioideae
<i>Acanthostachys</i>	<i>Greigia</i>	<i>Alcantarea</i>	<i>Brewcaria</i>
<i>Aechmea</i>	<i>Hohenbergia</i>	<i>Catopsis</i>	<i>Brocchinia</i>
<i>Ananas</i>	<i>Hohenbergiopsis</i>	<i>Glomeropitcairnia</i>	<i>Connellia</i>
<i>Androlepis</i>	<i>Lymania</i>	<i>Guzmania</i>	<i>Cottendorfia</i>
<i>Araecoccus</i>	<i>Neoglaziovia</i>	<i>Mezobromelia</i>	<i>Deuterocohnia</i>
<i>Billbergia</i>	<i>Neoregelia</i>	<i>Racinaea</i>	<i>Dyckia</i>
<i>Bromelia</i>	<i>Nidularium</i>	<i>Tillandsia</i>	<i>Encholirium</i>
<i>Canistropsis</i>	<i>Ochagavia</i>	<i>Vriesea</i>	<i>Fosterella</i>
<i>Canistrum</i>	<i>Orthophytum</i>	<i>Werauhia</i>	<i>Hechtia</i>
<i>Cryptanthus</i>	<i>Portea</i>		<i>Lindmania</i>
<i>Deinacanthon</i>	<i>Pseudaechmea</i>		<i>Navia</i>
<i>Disteganthus</i>	<i>Pseudananas</i>		<i>Pepinia</i>
<i>Edundoa</i>	<i>Quesnelia</i>		<i>Pitcairnia</i>
<i>Eduandrea</i>	<i>Ronnbergia</i>		<i>Puya</i>
<i>Fascicularia</i>	<i>Ursulaea</i>		<i>Sequencia</i>
<i>Fernseea</i>	<i>Wittrockia</i>		<i>Steyerbromelia</i>

The DNA research determined that the plants in the Tillandsioideae and Bromelioideae subfamilies are descended from a common ancestor or ancestor group and will maintain their current configuration. But the Pitcairnioideae subfamily elements are descended from different ancestors or ancestor groups and require the description of 6 new subfamilies.

Based on DNA sequencing in 1997 it was determined that *Brocchinia acuminata* occupies a position at the base of the family. Tillandsioideae form the next branch. The Pitcairnioideae species of *Dyckia*, *Encholirium*, *Fosterella*, *Pitcairnia*, and *Navia* form a new clade or subfamily. The *Puya* genus is related to the Bromelioideae subfamily but was assigned to a separate subfamily. Unfortunately, this study was not comprehensive because most of the genera were not sampled.

Additional DNA studies in 2000, 2003, and 2004 with more plant material made additional refinements but the 2007 study included representatives of all 3 subfamilies and all but 2 of the pitcairnioid species including those endemic to the Guayana Shield.

Results of the 2007 research support the genera of the Bromeliaceae and the division into 8 subfamilies. *Brocchinia* is the earliest genus of 20 species restricted to wet infertile habitats of the tepuis and sand plains of the ancient Guayana Shield.

The second subfamily is *Lindmania*, a genus of about 20 species limited to the tepuis of the Guayana Shield.

The next 2 subfamilies are Tillandsioideae and the xerophytic genus *Hechtia* from Central America and Mexico.

The fifth major clade or subfamily includes 3 taxa restricted to the Guayana Shield - *Brewcaria*, *Navia*, *Brocchinia serrata* as well as the monotypic *Cottendorfia* from the Brazilian Shield.

The sixth clade or subfamily includes 4 highly xeromorphic genera (*Deuterocohnia*, *Dyckia*, *Encholirium*), sister to *Fosterella* (native to dry valleys at mid elevations in the northern Andes and Central America, and the large *Pitcairnia* genus (native to Amazon basin, northern Andes, Guayana Shield, Central America, the Caribbean, and tropical West Africa.

The final subfamily consists of plants in the large genus *Puya* (about 120 species) centered in southern Andes but extending northward into Central America and the

Guayana Shield. This genus is the closest relative of the subfamily Bromelioideae.

This study also has drawn conclusions on the age of the Bromeliaceae: they arose about 69.5 million years ago (Mya) and “50 million years elapsed between the rise of the bromeliad stem group and divergence among the crown group of surviving lineages 19 Mya. Extant lineages of *Brocchinia-Ayensua* began to diversify roughly 17 Mya. *Brocchinia* arose at low elevations and then evolved adaptations to carnivory (ant-fed) that depended on acquiring the tank habit. *Lindmania* is restricted to the tepuis and arose 16 Mya.

“The nesting of two lineages endemic to the Guayana Shield - *Brocchinia - Ayensua* and *Lindmania* - at the base of the Bromeliaceae implies that the family arose there.” The study describes how the various subfamilies evolved in relationship to the changing geography and other evolution (e.g. hummingbirds).

A summary of the results of this study is

1. the embedding of *Ayensua* within *Brocchinia* at the base of the family.
2. The placement of the tepui endemic *Lindmania* as the next-divergent clade.
3. The hard polytomy formed by Tillandsioideae, *Hechtia*, and all remaining bromeliads.
4. A new clade forming the next branch after this polytomy including *Navia*, *Brewcaria*, *Cottendorfia* and *Brocchinia serrata*.
5. The placement of *Abromeitiella* and *Deuterocohnia* sister to each other and together sister to *Dyckia* and *Encholirium*.
6. Confirmation of *Fosterella* as the sister group to this clade of four highly xeromorphic genera. The two species of *Pitcairnia* subgenera *Pepinia* are sister to each other in our analysis.
7. The traditional subfamily Pitcairnioideae is paraphyletic and that Tillandsioideae and Bromelioideae both evolved from within it.

Based on the results of this study, the Tillandsioideae and Bromelioideae subfamilies remain the same as in the traditional breakdown shown in the table on the first page of this article. However, the Pitcairnioideae subfamily is now organized into 6 subfamilies as shown in the following table.

Brocchinioideae	Lindmanioideae	Hechtioideae	Navioideae	Pitcairnioideae	Puyoideae
<i>Brocchinia</i>	<i>Connelia</i> <i>Lindmania</i>	<i>Hechtia</i>	<i>Brewcaria</i> <i>Cottendorfia</i> <i>Navia</i> <i>Sequencia</i> <i>Steyerbromelia</i>	<i>Deuterocohnia</i> <i>Dyckia</i> <i>Encholirium</i> <i>Fosterella</i> <i>Pepinia</i> <i>Pitcairnia</i>	<i>Puya</i>

If you are interested in reading the study report that this article is based on, you may google the report title: "Phylogeny, Adaptive Radiation, and Historical Biogeography of Bromeliaceae Inferred from ndhF Sequence Data "

SOME UNUSUAL BROMELIADS THAT YOU MAY NOT GROW



Deinacanthon urbanianum



Lymania smithii



Edmundoa lindenii



Fosterella spectabilis

The BSSF is a non-profit educational organization promoting the study and cultivation of bromeliads. The BSSF meets monthly on the 3rd Thursday at 7:30 PM in the Recreation Room of the San Francisco County Fair Building, 9th Avenue at Lincoln Way, Golden Gate Park, San Francisco. Meetings feature educational lectures and displays of plants. Go to sfbromeliad.org for information about our meetings.

The BSSF publishes a monthly newsletter that comes with the membership. Annual dues are single (\$15), dual (\$20). To join the BSSF, mail your name(s), address, telephone number, e-mail address, and check payable to the BSSF to: Harold Charns, BSSF Treasurer, 255 States Street, San Francisco, CA 94114-1405.

OFFICERS and DIRECTORS

President	Carl Carter	carl.m.carter@sbcglobal.net	510-318-2379
Vice President	Dan Arcos	darcos@pacbell.net	415-823-9661
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BROMELIAD SOCIETY INTERNATIONAL

The Bromeliad Society International publishes the Journal bimonthly at Orlando, Florida. Subscription price (in U.S. \$) is included in the 12-month membership dues. Please address all membership and subscription correspondence to Membership Secretary Annette Dominiquez, 8117 Shenandoah Dr., Austin, TX 78753-5734, U.S.A. or go to www.bsi.org.

Roger Lane

551 Hawthorne Court
Los Altos, CA 94024