



S.F.V.B.S. NEWSLETTER **DECEMBER 2016**

SAN FERNANDO VALLEY BROMELIAD SOCIETY

P.O. BOX 16561, ENCINO, CA 91416-6561

sfvbromeliad.homestead.com

sanfernandovalleybs@groups.facebook.com

Elected OFFICERS & Volunteers

Pres: **Mike Wisnev** V.P.: **John Martinez** Secretary: **Leni Koska** Treasurer: **Mary Chan** Membership: **Joyce Schumann**
Advisors/Directors: **Steve Ball, Bryan Chan, Richard Kaz –fp, Mary K. Carroll** Sunshine Chair: **Georgia Roiz**,
Refreshments: **Gisela Miller**, Web: **Mike Wisnev**, FaceBook: **Roger Cohen** Editors: **Mike Wisnev & Mary K.**, Snail Mail: **Nancy P-Hapke**

next meeting: Saturday Dec. 3, 2016 @ 10:00 am

Sepulveda Garden Center 16633 Magnolia Blvd. Encino, California 91316

ANNUAL HOLIDAY BRUNCH

SATURDAY DECEMBER 3rd

9:00 – Set-Up and Deliver all food dishes (Coffee & Donuts)

10:00 – meeting starts with drawing

10:15-11:15 – Program: 'Show-N-Tell'

11:30 – Pot Luck Brunch served

12:30 – Member Gift Exchange and Club Holiday Plant drawing

(Normal \$1.00 plant raffle will resume in January)

1:00 – 2:00 – Clean up; we will need all hands

RSVP to Adrienne 818-833-9757 or Gisela zentarra5683@yahoo.com

Taking a look back at last month.....attendance was good for Woody's program. Participation was great. Food contributed by Ana, Steve & Maryk, Leni, Nancy, Bob W. and Adrienne. Raffle plants contributed by Nancy, Joyce, Richard Morse, Steve & Maryk. Special thanks to Bob Wright for his donation to the mini-auction. We had many members contribute to the Show-N-Tell like Chris, Bryan, Mike, Steve, Leni, Bob W. and Nancy. Please welcome ***Steve & Barbara***, our newest members.

Announcements

- **Holiday Plant Gift Exchange** – Please bring a wrapped plant (a bag will be okay) or plant related item to the party. Give something of quality, something you would like to be on the receiving end of. If you don't have something decent you want to part with, you don't have to participate in the gift exchange.

**We wish you and your family a
Happy, Healthy and Safe Holiday season**

SPECIAL

SPECIAL

SPECIAL

The **SFVBS** is pleased to offer a special show of appreciation for all members who renew their membership before or at our **Annual Holiday Party on Sat., Dec 3, 2016.**

All early renewals will be entered in a special drawing at the Party for a special Bromeliad.

You must be present to win. If you mail your renewal to our *P.O. Box 16561, Encino, CA 91416-6561* - Be sure to add **SFVBS** as recipient. If you use a person's name, the letter will be returned to sender.

DID I SAY THIS IS SPECIAL?

• **Nominations for 2017 Officers are:**

- President:** Bryan , Carole
- V-President:** John Martinez
- Secretary:** Leni, Carole, Gisela
- Treasurer:** Mary Chan
- Membership:** Joyce Schumann
- Advisor/Directors:** Bryan, Richard, Nels & Steve

We are pleased with volunteer suggestions

- Editor is:** M. Wisnev
w/ Nancy P-Hapke to continue snail mail
- Raffle:**
- Refreshments:** Susan Novicks
- Sunshine Chair:** Georgia Roiz
- Facebook :**
- Webmaster :** Mike Wisnev
- Librarian:** Joyce Schumann

Participation Rewards System – (Normal \$1.00 plant raffle will resume in January)

- *No free participation raffle tickets this month; there won't be any \$1.00 raffle plants.*

Please pay your 2017 Membership Dues

NEED TO RENEW ?.....

Pay at the meeting to: Membership Chair – Joyce Schumann or Treasurer - Mary Chan

or Mail to: SFVBS membership, P.O. Box 16561 - Encino, CA 91416-6561

Yearly Membership Dues \$10.00 for a single or couple

Please Put These Dates on Your Calendar

Here is our 2016 Calendar. As our schedule is always subject to change due to, please review our website and email notices before making your plans for these dates.

Saturday Dec 3, 2016	<i>Holiday Party</i>
Saturday Jan 7, 2017	Speaker – <i>Ray VanVeen</i>
Saturday Feb 4, 2017	Speaker – <i>Tom Glavich</i>

STBA = Speaker To Be Announced

Speakers Let us know if you have any ideas for Speakers about Bromeliads or any similar topics? We are always looking for an interesting speaker. If you hear of someone, please notify

John Martinez johnwm6425@gmail.com <>

Menu Suggestions for 2016 Holiday Brunch Sat. December 3rd

Call Adrienne with your contribution. Listed below are some suggestions of dishes we had in past years. Call if you need a suggestion. We have suggestions for the non-cooks. We are a small group so we don't need 10 desserts. You are welcome to bring your favorite beverages. **Contact Adrienne at 818-833-9757 or Gisela at zentarra5683@yahoo.com or MaryK at 818-705-4728 or rango676@aol.com.**

Appetizers 9:30 – 10:30

Asst. Cheeses - **Gisela**

Asst. Fresh Fruit - **Mardy**

Scones -

1 dz. Donuts – **Peter**

1 dz. mini-Muffins - **Steve**

Main Course 11:30 – 12:30

Turkey – **Bryan**

Stuffing – **Carole Scott**

Gravy - **Steve & Maryk**

Ham –

Chicken Enchiladas – **Joyce & Rose**

Salad

Ambrosia -

Green Salad – **Pat Colville**

Side Dishes

Quiche – **Dave & Sue Bassani**

Green Vegetable – **Nancy**

Macaroni & Cheese - **Georgia**

Broccoli – **Jeantte**

Mashed Potatoes – **Steve & Maryk**

Sweet Potato Casserole - **Adrienne**

Cranberry Sauce Jelly (2 cans) **Maryk**

Cran. Sauce w/ Berries (2 - **Adrienne**

Squash – **Nels**

Bread & Butter

Fresh Baked Bread – **Mike & Ana**

Desserts

Chocolate Cake – **Bob Wright**

Lemon Cake -

Pumpkin Pie - **Gisela**

Apple Pie -

Pecan Pie –

Coconut Cream Pie – **Chris Rogers**

Pizzelle Waffle Cookie – **Richard K.**

Beverages needed

1/2 gal. Reduced Fat Milk –

Orange Juice –

Cranberry Juice -

1 ea. 6 Pk. Soda –Reg & Diet– **James J.**

1 ea. 6 Pk. Soda –Reg & Diet –**Bill & Sue**

6 Pk. Can Sodas – Reg -

6 Pk. Can Sodas – diet -

Small Bottled Water - **James Johnson**

1/2 gal. Eggnog – **Barbara & Steve**

Ice Cubes – **1 large Bag -**

Write in Dishes

Tillandsioideae Revisions – Part 1

By Mike Wisnev, SFVBS President (mwisnev@gmail.com)

San Fernando Valley Bromeliad Society Newsletter –December 2016

Last month briefly discussed new Tillandsioideae revisions based on DNA testing. In a very lengthy article, the genera *Tillandsia* and *Vriesea* have been revised significantly. Barfuss, M.H.J.; Till, W.; Leme, E.J.C.; Pinzón, J.P.; Manzanares, J.M.; Halbritter, H.; Samuel, R. & Brown, G.K. (2016) *Taxonomic revision of Bromeliaceae subfam. Tillandsioideae based on a multi-locus DNA sequence phylogeny and morphology. Phytotaxa* 279 (1): 001–097. From here on, this will be called the 2016 Study.

A bit of history. The last major monograph of the bromeliad family by Smith and Downs in 1977 listed all of six genera in the Tillandsioideae subfamily. Three are very well known – *Tillandsia*, *Vriesea* and *Guzmania*, while three are not – *Catopsis*, *Mezobromelia* and *Glomeropitcairnia*. By far, most of the species were in the first three genera; for that matter, *Tillandsia* has more species than any other bromeliad genus, and the other two are probably among the top five.

“The diagnostic morphological characters used in certain combinations to differentiate among these genera include ovary position, development and mature form of seed appendages, flower disposition, degree of petal connation/conglutination, and the presence/absence of petal appendages, exactly as they had been used in the monographs of Mez.” Id at 3. In a simplified sense, *Tillandsia* and *Vriesea* have free petals (the former have no petal ligules, while the latter do). In contrast, *Guzmania* and *Mezobromelia* have joined petals, and the former have no ligules while the latter do.

Not all that much has changed until the 2016 Study. In 1977, there had been seven *Tillandsia* subgenera. While it was recognized that these were unlikely to survive DNA studies, six remained. As to the seventh, in 1993,

Michael A. Spencer & Lyman B. Smith created a new genus, called *Racinaea*, for one of the subgenera of *Tillandsia*. *Phytologia* (February 1993) 74(2):151-160. They briefly discussed the history of these plants, and then stated:

The unique set of characters that readily distinguish *Racinaea* from other tillandsioid genera are distichous, small and inconspicuous flowers; asymmetric sepals which are broadest towards the apex and free or nearly so; stamens and pistil that are included in the corolla; and a short and stout style. Id at pp 151-2.

Smith & Downs broke *Vriesea* into two subgenera – subg. *Vriesea* and subg. *Alcantarea*. Jason Grant proposed that the latter be elevated to a genus called *Alcantarea*. In the same 1995 article, Grant moved 66 species from *Vriesea* subgenus *Vriesea* section *Xiphion* to *Werauhia*. These two genera are discussed in more detail later.

These three new genera have generally been accepted by taxonomists. Another proposal by Grant met with more resistance. Grant proposed that 26 xeric *Vriesea* be transferred to *Tillandsia*. *True tillandsias misplaced in Vriesea (Bromeliaceae: Tillandsioideae)*. *Phytologia* 75: 170-175 (1993). Drawing on the prior study, Grant also noted that other genera, like *Puya*, have some species with ligules and some without them. He concluded that if ligules were not considered in distinguishing *Tillandsia* and *Vriesea*, these 26 species, including *V. espinosae*, would be *Tillandsia*.

Similarly, another proposal by Espejo to move six *Tillandsia* species with dark green petals into a new genus called *Viridantha* has not been generally accepted.

From a macro standpoint, very little else changed in the Tillandsioideae subfamily until the 2016 Study.

2016 Study. The new study recognized six of the nine “already widely accepted genera (*Alcantarea*, *Catopsis*, *Glomeropitcairnia*, *Guzmania*, *Racinaea*, and *Werauhia*) and [split] three existing genera (*Mezobromelia*, *Tillandsia*, and *Vriesea*) into smaller groups.” Id at 31.

The study involved about 195 species and infraspecific taxa, most of which had been studied before in larger studies by some of the same authors. A number of DNA sequences were used, as were various morphological traits. “The main goals are to provide a stable classification based on monophyletic established genera, and new taxa (genera and subgenera) using new synapomorphic combinations of diagnostic morphological characters, provide a key for generic identification, and a comprehensive nomenclature for the accepted genera, including full synonymy.” Id at 4.

These DNA studies basically produce a figure called a cladogram that can be likened to a branching tree. Groups on the same branch are more closely related than groups on other branches. In a simplified sense, problems with current classifications exist if species of different genera fall on the same branch, or species of the same genus fall on different branches.

The good news is that all species tested that were not Tillandsioideae fell on separate branches, and all the Tillandsioideae species fell on another branch, that has lots of sub-branches. This means that Tillandsioideae is a valid sub-family.

The Tillandsioideae family has two major branches. The first branch is called the non-core Tillandsioideae group. It consists of two genera – *Catopsis* and *Glomeropitcairnia*.

Not surprisingly, the other branch is called the core Tillandsioideae group, which consists of what used to be seven different genera. Most of these have been reshuffled in some fashion.

Non-Core Group. As to Tillandsioideae, the first branch to break off was called the non-core Tillandsioideae group. It consists of two genera – *Catopsis* and *Glomeropitcairnia*. Some of us have *Catopsis* species, but *Glomeropitcairnia* seems very rare in cultivation – there are only two species. Does anyone have one?

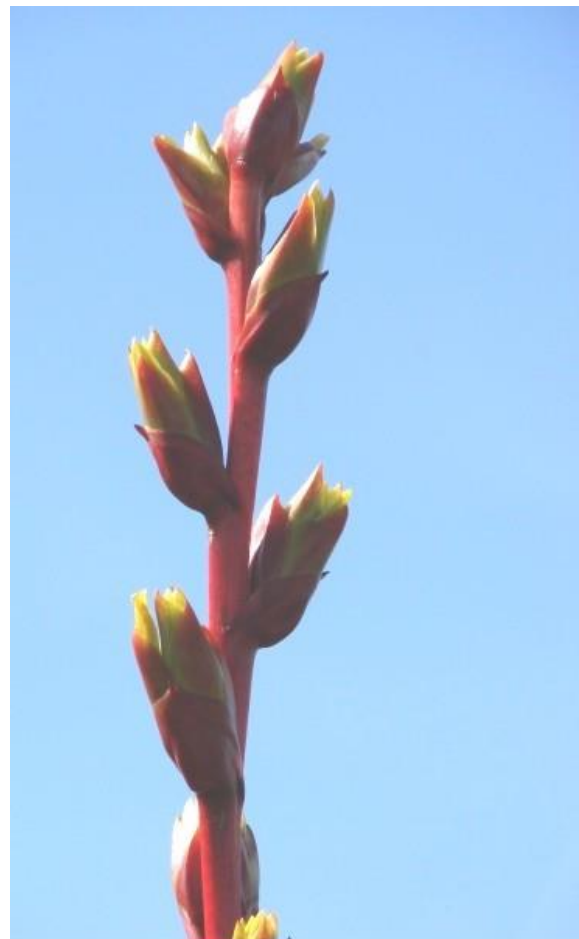
Remember that the leaves of *Tillandsioideae* species don't have spines. Seeds of Tillandsioideae species differ from other subfamilies; they have tufts of hair that allow them to be carried in the wind, like dandelions. Most species have hairs at the base of the seeds, but *Catopsis* differ in having hairs at the apex, often with hooks and folds in them. *Glomeropitcairnia* differ in that they have tufts of hair on both ends of the seed.

Below is *G. erectiflora*, photo by Matthias Asmuss.



Some of the bromeliad subfamilies differ in part by the position of the ovary – it is either above (superior) or below (inferior) the base of the petals of the flower, or partially above and below the petal base. Traditionally, most Tillandsioideae were considered to have superior ovaries, but other recent studies found that it is semi-inferior for most species. In fact, most *Tillandsioideae* have an ovary which is about 1/8 to 1/2 inferior, which means at least half is above the base of the petals. However, *Glomeropitcairnia* have ovaries which are mostly inferior- - over half of it is below the base of the petals. They also have an unusual stigma type and their seeds have long appendages on both ends unlike other members of the subfamily.

Having never heard of this genus, I was surprised to see what they look like! The two species seem aptly named since one has an erect inflorescence, as seen on the right, and the other has a pendulous one as seen on the next page.



Glomeropitcairnia erectiflora
photo by Gabriela Keller



Glomeropitcairnia penduliflora

photo by Bruce Dunstan

Catopsis are also unusual in that their ovary is superior or less than 1/8 inferior. It is interesting that the two genera in the non-core group have ovaries at the opposite end of the spectrum for the subfamily: *Catopsis* are the most superior while *Glomeropitcairnia* are the most inferior. They also have an unusual type seed and pollen for this subfamily (simple sulcate). Other than tufts of hair on the apex of the seeds, it wasn't immediately clear what morphological (as opposed to DNA) features these two genera shared,

if any, that distinguish them from the core group. Both have spirally arranged flowers, unlike most, but not all, other species in the subfamily.



Another rather unusual feature of *Catopsis* is that they can have perfect flowers (with both male and female parts) or functionally unisexual flowers like *Hechtia*. Some species have plants with perfect flowers while others have unisexual flowers, although this is not entirely clear. In one case, the unisexual flowered *C. berteroniana* plants were later treated as a new species, *C. occulta*. Some *Catopsis* species grow in Florida.

Core Group. All seven other genera in the subfamily are considered core Tillandsioideae. In an overview, the 2016 Study states:

“Core Tillandsioideae splits into two subclades, both strongly supported ...and mostly corresponding to the tribes Vrieseae and Tillandsieae. The two tribes are not monophyletic when previous taxonomic concepts are applied, as members of *Vriesea* are nested within the Tillandsieae, and *Tillandsia* species are nested in Vrieseae.

The clade containing most Vrieseae species is divided into two main lineages. The first ...contains a monophyletic genus *Alcantarea* ... in sister position to a clade composed of ...nearly exclusive eastern Brazilian *Vriesea*... The second lineage ... includes mesomorphic Andean/northern South American/Central American/Caribbean *Vriesea* and *Werauhia* species, four *Tillandsia* species, and some *Mezobromelia* species.

The first non-core Tillandsieae clade that branches at the earliest node within the clade containing most Tillandsieae species consists of *Mezobromelia hutchisonii* and *M. fulgens* The second clade ... splits into two lineages, one being exclusively composed of *Guzmania* species ...and the other displaying mostly the species-rich genus *Tillandsia* in the sense of Smith & Downs ..., but containing also the genus *Racinaea* and all xeromorphic Andean and two mesomorphic Central American/Mexican *Vriesea* species. “ Id at 19.

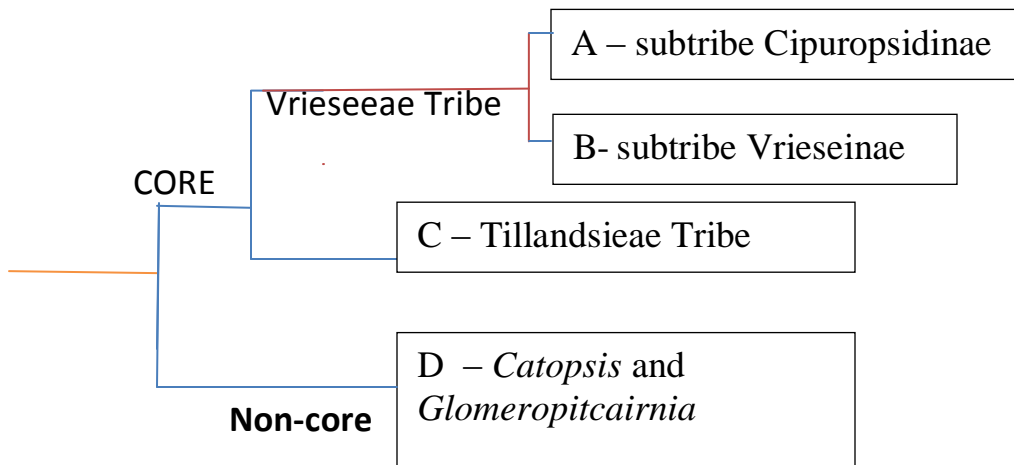
This last clade is extremely complex with many groups of *Tillandsia* species.

Besides the fact that *Tillandsia* and *Vriesea* are not monophyletic, perhaps the most surprising part, to me, is that *Guzmania* fell on the Tillandsieae clade. They look a lot more like *Vriesea*.

Tribe Vrieseae. As noted above, the core group in turn has two major branches – the Vrieseae tribe and the Tillandsieae tribe. This month we will discuss the Vrieseae tribe. For more on an introduction to *Vriesea*, see the Jan. – June 2015 Newsletters. The Vrieseae tribe is rather complicated, though not as complicated as the Tillandsieae tribe. According to the 2016 Study,

“Tribe Vrieseae splits into an eastern Brazilian lineage, subtribe Vrieseinae, and an Andean/Central American/Caribbean lineage, subtribe Ciporopsidinae. Vrieseinae currently comprises the morphologically well-defined genera *Alcantarea* and *Vriesea* s.str., and the new genus *Stigmatodon*. Tribe Ciporopsidinae is more diverse and comprises seven distinct clades in our phylogeny: *Werauhia*, the new genera *Goudaea*, *Jagrantia*, *Lutheria*, and *Zizkaea*, and the *Ciporopsis-Mezobromelia* complex. The latter alliance includes the difficult mesomorphic northern Andean ‘*Vriesea*’ (*Ciporopsis*) species, together with northern Andean/Caribbean *Mezobromelia* (sensu typo). The *Ciporopsis-Mezobromelia* complex is now correctly placed in tribe Vrieseae (see Barfuss et al. 2005a), but is not yet treated taxonomically.” Id at 32.

Let’s see what this all means. Below is a diagram of the Tillandsioideae subfamily. Groups A, B and C constitute the core Tillandsioideae group. Groups A and B are the two subtribes of the Vrieseae tribe.



In turn, the Vrieseinae subtribe consists of three different genera.

1. **Genus *Alcantarea*.** This genus is essentially unchanged from before. In 1995, Prof. Jason Grant moved a number of former *Vriesea* species into this genus. “Grant (1995) re-established the genus *Alcantarea*, after excluding two taxa from Central America and the West Indies that present distinct floral and seed morphology. Characters that were used by Grant (1995) to resurrect *Alcantarea* to the generic status are the linear-long (ca. 10–15 times longer than wide), ephemeral, distinctly flaccidescens, and spiralescent petals, and seeds with both basal and apical comas. Also, in Grant’s (1995) circumscription, *Alcantarea* has a narrower geographical range, being restricted to the Northeastern (Bahia) and Southeastern (Espírito Santo, Minas Gerais and Rio de Janeiro) states of Brazil. Recently, the genus was rediscovered in the state of São Paulo... ” Versieux, Barbará, Wanderley, Calvente, Fay, and Lexer (2012). Molecular phylogenetics of the Brazilian giant bromeliads (*Alcantarea*, Bromeliaceae): implications for morphological evolution and biogeography. *Molecular Phylogenetics and Evolution* 64:177–189, p 178. They have conduplicate-erect or conduplicate patent stigma .



Alcantarea

imperialis. Photo by Bruce Dunstan.

2. New genus *Stigmatodon*, which includes the plant previously known as *Vriesea harrylutheri*. They tend to grow on vertical, bare granite, and have lepidote, often triangular acuminate leaves. It appears that they warrant a different genus than *Vriesea* primarily due to the fact they have a unique stigma type (the tubo-laciniate type) that has tooth like margins at the top. Perhaps of greatest interest, they have nocturnal fragrant flowers. I don't think any are commonly cultivated around here. It now has some 18 species –



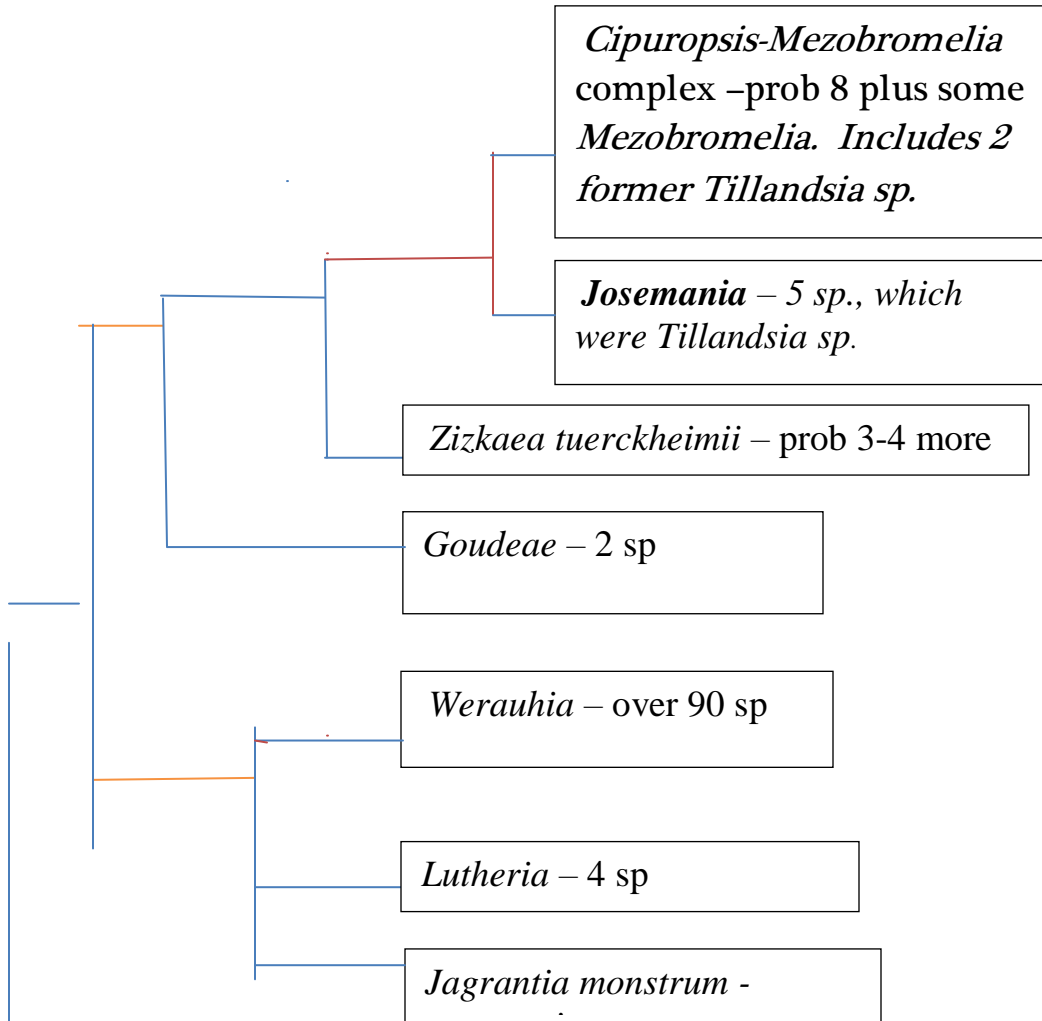
Vriesea harrylutheri photo by Herb Plever

Stigmatodon (formerly *Vriesea*) *harrylutheri**

3. Genus *Vriesea*, which is now primarily eastern Brazilian plants, but extending to Argentina, Bolivia, Venezuela and the Greater Antilles, and perhaps Peru. *Vriesea* species in the study include *platynema*, *jonghei*, *pabstii*, *longicaulis*, *saundersii*, *scalaris*, *psittacina*, *carinata* and *maxoniana*. There are now about 210 members of this genus – down from over 260 before the study. It keeps getting smaller as other genera are created. They have convolute blade II stigma types. It is too soon to tell if the subgenera, *Xiphion* (included stamens, dull bracts) and *Vriesea* (exserted stamens, bright bracts), will survive in any fashion. Of the 9 species studied in the new *Vriesea* genus, the two branches correspond to

the subgenera with one exception. However, it appears the *Xiphion* name can't be used for other reasons.

Below is an overview of the Vrieseae tribe



Above is subtribe Cipuropsidinae.

Below is subtribe Vrieseinae

Alcantarea and *Werauhia* remain unchanged. The other new genera generally consist of former *Vriesea* species, except that *Josemania* consists of former *Tillandsia* species. The complex at the top consists of *Mezobromelia* species, former *Vriesea* species, and two former *Tillandsia* species. *Vriesea* also remains a good genus, but it smaller than before due to the transfer to the above genera, as well as the transfer of some species to the Tillandsieae tribe.

This diagram also shows the relationships among these groups. Groups on the same branch are more closely related than other groups. So *Stigmatodon* are most closely related to *Vriesea*; both are more closely related to *Alcantarea* than other groups. Similarly, despite the fact that *Lutheria* and *Jagrantia* were considered *Vriesea*, they are now more closely related to *Werauhia* than *Vriesea*.

The Cipunropsidinae subtribe consists of two clades, one with three groups and one with four groups. With the exception of *V. splendens* (and perhaps a few others), virtually all the former *Vriesea* species in this subtribe were from sect. *Xiphion* (included stamens, dull bracts) and all the former *Tillandsia* species in this subtribe were from subg. *Allardtii* (also included stamens but almost as long as the petals, with slender styles).

The first clade consists of the following

1. **Genus *Werauhia*.** This genus is essentially unchanged from before. Grant previously moved 66 species from *Vriesea* subgenus *Vriesea* section *Xiphion* to *Werauhia*. They generally grow in Mexico, Central America, and Antilles extending to Ecuador and Bolivia. *Werauhia* differ from *Vriesea* in a number of ways, including the fact they flower at night and are generally dully colored. They also have other distinctive features such as the shape of their stigmas and ligules, and

their zygomorphic flowers.



2. **New genus *Lutheria*.** Named in honor of Harry Luther, this is a new small genus with perhaps the most well-known former *Vriesea* species, *V splendens*. There are three other species in this genus including the fairly well known *L. glutinosa*. The other two are *L. soderstromii* and *bi-beatricis*. The main difference from *Vriesea* seems to be that they have conduplicate-spiral stigmas and a different

pollen grain. They grow in north-eastern South America.



Vriesea splendens var splendens
photo by M Asmuss

Lutheria (formerly *Vriesea*) *splendens*.

3. New genus *Jagrantia*. This monotypic new genus is named in honor of Jason Grant. Its sole member is the former *Vriesea monstrum*. It is apparently very unique due the fact it has deciduous floral bracts that are three times longer than the sepals. Like *Lutheria*, it has a conduplicate-spiral stigma. It grows from Costa Rica to Columbia.



Vriesea monstrum photo by S Pierce

Jagrantia (formerly *Vriesea*)

monstrum.

As you might have gathered from the above descriptions, the 2016 Study said the "most powerful super-specific new diagnostic character for taxonomy in Bromeliaceae subfam. Tillandsioideae (and most probably for the whole family) is stigma morphology (initially emphasized by Brown & Gilmartin 1984) ...). Other important characters used to circumscribe genera are e.g., leaf, sepal, petal and stamen morphology, inflorescence architecture and micromorphology of ovules, pollen and seeds." Id at 28. For more on stigma types, see the May 2015 Newsletter. The 2016 Study identified six new stigma types, in addition to the ten previously identified, many by Brown and Leme.

The second clade has the following 4 groups, consisting generally of some *Mezobromelia* species, some *Tillandsia* section *Allardtii* species and some *Vriesea* sect. *Xiphion* species.

4. New genus *Goudaea*. Named in honor of Eric Gouda, this new genus has only two species, *G. ospinae* and *G. chrysostachys*. The former is a well known striped species with an unusual matte finish. The two species have simple – erect stigma which is unusual. The petals are also unusual in that they hardly open and are tubular. The two grow in Colombia and Peru.



Goudaea

ospinae, photo by Wisnev.

5. New genus *Zizkaea*. Named in honor of Georg Zizka, this genus includes *V. tuerckheimii* and probably a few others from Greater Antilles. It is characterized by stigma of the urceolate type and seeds with appendages at both ends.



Vriesea tuerckheimii Photo by Eric Gouda

Zizkaea

tuerckheimii

6. New genus *Josemania*. Named in honor of Jose Manuel Manzanares Vilaplana, this genus has five former *Tillandsia* species. Its leaves are unusual in that they are grey when dry. Their petals are joined at the bottom. Like *Goudaea*, they have simple erect stigma. Members include *J. asplundia*, *delicutula*, *pinnata*, *singularis* and *truncata*. They grow in Costa Rica, Panama, Colombia, Ecuador and Peru.

7. The new *Cipuropsis-Mezobromelia* complex remains unclear. Most grow in the northern Andes, and some in the Caribbean. First, it includes some *Mezobromelia* species, like *M. capituligera*, *bicolor* and *pleiosticha*, and probably two more. These are generally densely flowered, and the less densely flowered members of this genus fall in the Tillandsieae Tribe. This new complex also includes some former mesomorphic *Vriesea* species like *dubia*, *rubra*, *zamorensis*, and *elata*; *V. altomayoensis*, *duidae*, and *subandina* are also probably in the group. . Finally *Tillandsia schimperiana* and *amicorum* are in the group, the former falling within *Mezobromelia* and the latter within *Cipuropsis*.



Tillandsia truncata photo by B Dunstan

Josemania truncata above. *Cipuropsis amicorum* below



Tillandsia amicorum photo by M Asmuss

Ule apparently named a new genus *Cipuroopsis* in 1907, for *Cipuroopsis subandina*. This plant can no longer be located, but the authors suspect it belongs in this group, and resurrected the genus name. While not yet certain, it appears that the former *Vriesea* species and *Tamicorum* will become members of the *Cipuroopsis* genus. The members of this provisional genus share partially connate petals (about $\frac{1}{4}$) and agglutinated filaments. They have simple erect stigma.

Treatment of the *Mezobromelia* species is unclear. They are similar, though they have dense flower fascicles, have about $\frac{1}{2}$ connate petals and other minor differences.

Mezobromelia pleiosticha. Photo by Eric Gouda



Already noted is that *Tillandsia amicornum* and *schimperiana* now fall in the *Cipuroopsis*-*Mezobromelia* complex and that *Josemania* consists of five former *Tillandsia* species. . So far, it doesn't appear that other *Tillandsia* have been moved to the Vrieseae tribe.

However, it appears that two groups of former *Vriesea* are now in the Tillandsieae tribe. The first is not all that surprising – it represents the xeromorphic usually grey leaved *Vriesea* species that Grant had previously proposed be moved into *Tillandsia*, such as *Vriesea espinosae*, *cereicola*, *tequendamae* and *appenii*. These are now considered members of *Tillandsia* subgenus *Pseudovriesea*, along with *T. spathacea*, *myriantha* and *barthlottii*. There are now 49 species in this subgenus.

The other former *Vriesea* are less well known. *Vriesea heliconioides* (Central/northern South America) and *malzinei* (Mexican) fall into the same small clade that is sister to *T. hildae* and *ferreyrae* (both from Peru), which are in turn adjacent to *T. paniculata*. (Caribbean). This group is now part of subgenus *Tillandsia*.

Below is *Tillandsia* (formerly *Vriesea*) *malzinei*. Photo by Bromeliario Imperialis.



Other macro diagnostic features. Before concluding, let's look at how the major groups are defined. As to the Tillandsioideae subfamily itself, the article states: "Diagnostic characters:—Leaves entire. Pollen mostly sulcate or rarely inaperturate, exine usually reticulate or rarely non-reticulate. Fruit a septicidal capsule; seeds with hairs or hair-like appendages forming a flight apparatus, wind dispersed." Id at 37.

As to the two major tribes, Tillandsieae and Vrieseae, the diagnostic characters are very similar. One primary difference is that they generally have different stigma types. The former have "stigma mostly of the conduplicate-spiral type or simple-erect type, occasionally of the simple-truncate type, the simple-patent type or the convolute-blade I type, rarely of the convolute-obconic type, the coralliform type, the conduplicate-pinnatisect type, or the simple-pinnatisect type." Id at 39. In contrast, Vrieseae have "stigma mainly of the convolute-blade II type and cupulate type, occasionally of the conduplicate-patent type, tubo-laciniate type, simple-erect type, conduplicate-spiral type, conduplicate-erect or urceolate type." Id at 50.

However, there is yet another difference discussed in one of the earliest Newsletters – petal ligules. Vrieseae usually have these petal appendages, but rarely don't, while Tillandsieae usually don't have them, but occasionally do. Finally, in some cases, they have different types of pollen.

It also appears that the nature of the leaves isn't determinative. While by far most Vrieseae tribe species and genera have mesomorphic leaves, *Vriesea* rarely have semi-xeromorphic leaves, and *Stigmatodon* have semi-xeromorphic to xeromorphic leaves. Most Tillandsieae tribe genera also have mesomorphic leaves, though that is not true of most species in the tribe since most *Tillandsia* species are xeromorphic (occasionally mesomorphic or semi-xeromorphic). *Wallisia* are semi-xeromorphic as are most *Lemeltonia* (rarely xeromorphic or mesomorphic), and *Racinaea* are rarely semi-xeromorphic.

The last matter is how the two Vrieseae subtribes differ. Many of their features are similar, but there are some differences. Interestingly, subtribe Vrieseinae usually propagates by basal axillary shoots, and its inflorescence is rarely twice branched. In contrast, Cipuropsidinae has sub-terminal axillary shoots and is often twice branched. They also have different stigma types. Finally, it appears that subtribe Vrieseinae has

distinctly appendiculate ovules that are rarely obtuse, while subtribe Cipuropsidinae has obtuse ovules that are rarely appendiculate.

Most Vrieseinae are in eastern Brazil (but not all), while Cipuropsidinae general are found elsewhere such as the Central America, the Caribbean, northern Andes, Venezuela, Peru, Columbia, Ecuador, Panama, and northeastern S. America.

Next month will continue with the Tillandsieae Tribe.