



# S.F.V.B.S.

## SAN FERNANDO VALLEY BROMELIAD SOCIETY

### JULY 2018

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

sfvbromeliad.homestead.com

sanfernandovalleybs@groups.facebook.com

#### Elected OFFICERS & Volunteers

Pres: **Bryan Chan & Carole Scott** V.P.: **John Martinez** Sec: **Leni Koska** Treas: **Mary Chan** Membership: **Joyce Schumann**  
Advisors/Directors: **Steve Ball, Richard Kaz -fp, Mary K.,** Sunshine Chair: **Georgia Roiz** Refreshments: **vacant**  
Web: **Mike Wisnev,** Editors: **Mike Wisnev & Mary K.,** Snail Mail: **Nancy P-Hapke** Instagram & Twitter & FB: **Felipe Delgado**

## next meeting: **Saturday July 7, 2018 @ 10:00 am**

Sepulveda Garden Center 16633 Magnolia Blvd. Encino, California 91436

#### AGENDA

**9:30 – SET UP & SOCIALIZE**

**10:00 - Door Prize drawing – one member who arrives before 10:00 gets a Bromeliad**

**10:05 - Welcome Visitors and New Members. Make announcements and Introduce Speaker**

**10:15 –Speaker – Ernesto Sandoval**

**Subject: Plant Hormones: Knowing and Managing Them for Better Results**



Have you ever wondered why your plant has a sudden burst of growth after transplanting? Or how the plant "knows" to grow new parts when pruned or how a cutting knows to make roots? Maybe you've even wondered about how a banana knows to ripen or why leaves all of a sudden turn

yellow when you bring a plant home? Find answers to these questions and others about why your plants grow the way they do during this informative yet not so technical presentation by Ernesto Sandoval, Director of the UC Davis Botanical Conservatory.

Ernesto Sandoval has been wondering and seeking questions to why plants grow and look the way that

they do since a young age. Now he explains and interprets the world of plants to a variety of ages and experiences from K-12 to professionals and Master Gardeners. He regularly lectures to a variety of western Garden Clubs throughout the year. Ernesto thoroughly enjoys helping gardeners to understand why and how plants do what they do.

When he was about 13 he asked his dad why one tree was pruned a particular way and another tree another way. His dad answered bluntly "because that's the way you do it." Since then he's been learning and teaching himself the answers to those and many other questions by getting a degree at UC Davis in Botany and working from student weeder/waterer to Director over the last 24 years at the UC Davis Botanical Conservatory. He has immersed himself in the world of polyculture and biodiversity by managing and supervising the growing of several thousand types of plants at the UC Davis Botanical Conservatory. Several of his favorite projects involved converting lawns to drought tolerant and diversity filled gardens! He likes to promote plant liberation by encouraging gardeners of all sorts to grow more plants in the ground when possible. He loves the technical language of Botany but prefers to relate information in more understandable methods of communication! By helping people to understand the workings of plants he hopes to help us better understand how to and why our plants do what they do and how we can maximize their growth with less effort. <>

See page 2

### 11:15 - Refreshment Break and Show and Tell:

Will the following members please provide refreshments this month: **Cristy Brenner, Mary Chan, Nels Christianson, Pat Colville, Gail Cottman, Jennifer Culp, Felipe Delgado, Mohamed El Tawansy** and anyone else who has a snack they would like to share. If you can't contribute this month don't stay away.... just bring a snack next time you come.

#### Feed The Kitty

If you don't contribute to the refreshment table, please make a small donation to ([feed the kitty jar](#)) on the table; this helps fund the coffee breaks.

**11:30 - Show and Tell** is our educational part of the meeting – Members are encouraged to please bring one or more plants. You may not have a pristine plant but you certainly have one that needs a name or is sick and you have a question.

**11:45 – Mini Auction:** members can donate plants for auction, or can get 75% of proceeds, with the remainder to the Club

**12:00 – Raffle:** Please bring plants to donate and/or buy tickets. Almost everyone comes home with new treasures!

**12:15 - Pick Up around your area**

**12:30 –/ Meeting is over—**Drive safely <>

### *President's Message*

Now that we are post Drought Tolerant Plant Festival, it is time to do a bit of reflection. Our display and club sales booth both went well. We had an active participation from many of our members in both areas. There is much thanks and appreciation for all these efforts. May they be minor or major contributions (we had a few large contributions) all efforts push our society forward into a positive light. I am grateful to have had an opportunity to have been part of this society's effort. I am looking forward to seeing and talking with all of you at our future meetings. **Bryan Chan**, Co-President

### Announcements

**Congrats** to Peter Speziale and Bryan Chan for their show plants at the recent San Diego World Show. Peter received the Morris Henry Hobbs Best of Show Artistic for his fantastic presentation, and Bryan received Best Dyckia. John Martinez also get kudos for his Dyckia picture that appeared in the Los Angeles Times a week before LA Cactus and Succulent Drought Tolerant Festival (where we had our Club show and sale). Several festival and WBC Photos by Mary Chan are posted on page 29.

- **Happy Birthday** to Duke Benadom - July 1, Mike Wisnev - July 3, Carole Scott - July 7, Georgia Roiz - July 11, Wesley Bartera - July 23, Ana Wisnev - July 30 and Wendie Fischer

- **Instagram & Twitter & Face Book accounts for SFVBS-**

**Felipe Delgado** - has opened Instagram and Twitter accounts for the club. He is accepting friends and followers. He will post meeting pictures and club info without using member names or photos unless he has permission. Felipe is also a monitor for the SFVBS Face Book page. Questions can be directed to [fdelgado70@gmail.com](mailto:fdelgado70@gmail.com) 818-523-4488.

**Instagram is sfvbromeliadsociety** - can be searched from within Instagram typing @sfvbromeliadsociety

**Twitter is sfvbromsociety-** can be searched from within Twitter by typing @sfvbromsociety

**Facebook -** [sanfernandovalleybs@groups.facebook.com](mailto:sanfernandovalleybs@groups.facebook.com)

For members who are challenged by social media – you can google instructions and or **See Felipe for assistance**

*continued on page 3*

- **Library** - Our Library is growing by leaps and bounds!!! At the beginning of 2018 we had several BSI Journals and one book. Now we have **two** more Journals and **two** more books!! We have more than doubled our inventory!

The BSI Journals are the Volume 66 (4) which is the basis of the SFVBS June Sale display. Other topics include a new Bromeliad species, two new *Tillandsia* species, Submarine Spiders and a memorial for Francisco Oliva Esteve. The second BSI Journal is Volume 67 (1) January-March 2017. My favorite articles in this issue are the *Tillandsioideae* Safari in Ecuador and the flowering of *Sincoreaea* species. (Two later Journals are available online and on their way to us. They are catching up.)

Keeping in mind the reordering of the Bromeliad family created five new sub-families, some of the taxonomy in older books will not include the new information but the plant descriptions, habitats, cultivation needs, etc remain unchanged. Therefore, I think you will be pleased to know that one of our new books is ***BROMELIACEAE III*** by Francisco Oliva-Esteve. This was also a source of information for our display. You already know the plants but you may also be interested in the first chapter “*Bromeliads: A Short Historical Review of the First Explorers.*” The remainder of the book contains plant descriptions and many incredibly beautiful photos. This is a good reference for beginners and advanced collectors. ***The second book*** will be offered at the August meeting so stay tuned. See you soon. – **Joyce**

- **Participation Rewards System** – This is a reminder that you will be rewarded for participation. Bring a Show-N- Tell plant, raffle plants, and Refreshments and you will be rewarded with a Raffle ticket for each category. Each member, please bring one plant <>

### ***Taking a look back at last month.....***

Hope you all were able to attend the LACSS Festival last month to hear Bryan’s presentation on Sunday morning as well as pick up some of the great sale plants in the club booth. The Bromeliad display inside was great again and a special thanks goes out to Leni, Bryan and Steve who each placed more than 20 plants in the display. And Joyce created an outstanding Bromeliad Educational display with help from other members. I don’t have names of all SFVBS members who participated in the festival but many others contributed plants and labored in other ways. We considered not using names to say thanks, fearing we would offend, but we hope to have a full list of member participants for posting by the next newsletter.

## **Please Put These Dates on Your Calendar**

Here is our 2018 Calendar. Rarely does our schedule change..... however, please review our website and email notices before making your plans for these dates. Your attendance is important to us

Saturday July 7, 2018	<b><i>Ernesto Sandoval</i></b>
Saturday August 4, 2018	<b><i>STBA</i></b>
Sat. & Sun. August 4 & 5, 2018	<b><i>South Bay Bromeliad Show &amp; Sale</i></b>
Saturday September 1, 2018	<b><i>Cristy Brenner</i></b>
Saturday October 6, 2018	<b><i>STBA</i></b>
Saturday November 3, 2018	<b><i>STBA</i></b>
Saturday December 1, 2018	<b><i>Holiday Party</i></b>

### **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 or Bryan Chan.



## Member photos..... by Mary Chan

**Peter Speziale** was the **Best of Show** winner last month at the **World Bromeliad Conference** in San Diego. He won with the artistic entry shown below. The entry had a motion sensor which played music whenever someone got close enough. Peter is a special young man who belongs to all three L. A. area Bromeliad clubs; he joined SFVBS approx. 2 years ago. Here he is shown with his entry and while being presented his award by Robert Kopfstein, the 2018 WBC director.



additional Festival and WBC photos  
can be seen on page 29



Member photos/article..... submitted by Mike Wisnev.

## Bromeliads in Ecuador; courtesy of Jerry Raack.

Jerry Raack is a long-time bromeliad enthusiast (about 50 years!) who recently posted some great habitat photos he took in Ecuador. See <http://botu07.bio.uu.nl/Brom-L/>. He graciously allowed his pictures and emails to be used in the Newsletter. Thanks so much to Jerry for sharing these photos.

This is *Tillandsia naundorffiae*. It was identified by Jose Manzanares, who has written two books on the Ecuadoran bromeliads.







Jerry said: “All plants grew epiphytically in the trees in rather large clumps. Size: approximately 30 to 35 cm wide by 45 cm tall with inflorescence. Very beautiful mottled foliage.” He found the plant shown above “on the road from Los Encuentros into the Condor at about 1600 meters elevation” and this one and the one below on the “old road from Loja to Zamora, province of Zamora at an elevation of approximately 1350 meters.”





**Tillandsia duratii and Tillandsia streptocarpa by Len Colgan**

Most keen *Tillandsia* collectors would be familiar with *Tillandsia duratii* and *Tillandsia streptocarpa*, as both species are readily available through nurseries in the USA. Their natural habitats involve Bolivia, Brasil, Argentina and Paraguay. Depending upon where you draw the line between *Tillandsia paleacea* and *Tillandsia streptocarpa*, the latter species also occurs in Peru.



*T. streptocarpa* is mainly found growing in trees and on cacti, whereas *T. duratii* is also found growing on the ground. In fact, I found a giant form of *T. duratii* in the Yungas, Bolivia, which was two metres long and a metre across, spread along the ground. In some cases it is difficult to decide which of the two species correctly describes a collected plant because there are specimens that seem to key out midway between. In general, both of these species have blue-purple flowers which are distinctly fragrant. *T. streptocarpa* is usually a smaller plant with the spikes on the inflorescence closer together. *T. duratii* is usually a larger plant with the spikes spread out along the inflorescence, and with curling leaves.





The authoritative references also list a desirable form of *T. streptocarpa* with yellow flowers as *T. streptocarpa* var *aureiflora*.

The habitat is listed as between Comarapa and Santa Cruz in Bolivia. As these towns are a considerable distance apart, this hardly provides useful information for anyone wishing to collect this variety.

There has been some speculation as to whether this might even be a yellow flowering form of *T. duratii* rather than *T. streptocarpa*.

In July 2004, I undertook my third expedition to Bolivia, this time venturing to some less-visited places between Santa Cruz and La Paz. My companions were a botanist and a student from Fundación Amigos de la Naturaleza (FAN). A more thorough account can be found in pages 206-211 of Volume 54(5), 2004, of the BSI Journal.

The dominant tillandsias along our route were *T. sphaerocephala*, *T. lorentziana* (both white and blue flowered forms), *T. tenuifolia*, *T. cardenasii*, as well as the typical blue-purple flowering forms of *T. streptocarpa* and *T. duratii*.

In Moro Moro, we were directed to follow a new track down towards the Rio Mizque to seek a mysterious large purple-leaved tillandsia, with funnel-shaped offsets on stolons, growing in a tree. I could not identify it. But this general location yielded a much more amazing surprise. We collected three flowering plants of *T. streptocarpa* (and/or *T. duratii* ?) from a single tree. At first, I thought that the different coloured petals merely indicated that the three plants were at different stages of the flowering process. But then I realized that all three were at anthesis. The plants had, respectively, pure white petals, dark violet petals, and peach coloured petals. Moreover, on the neighbouring tree, other plants of the same species had petals with even further colour variations. All were fragrant.



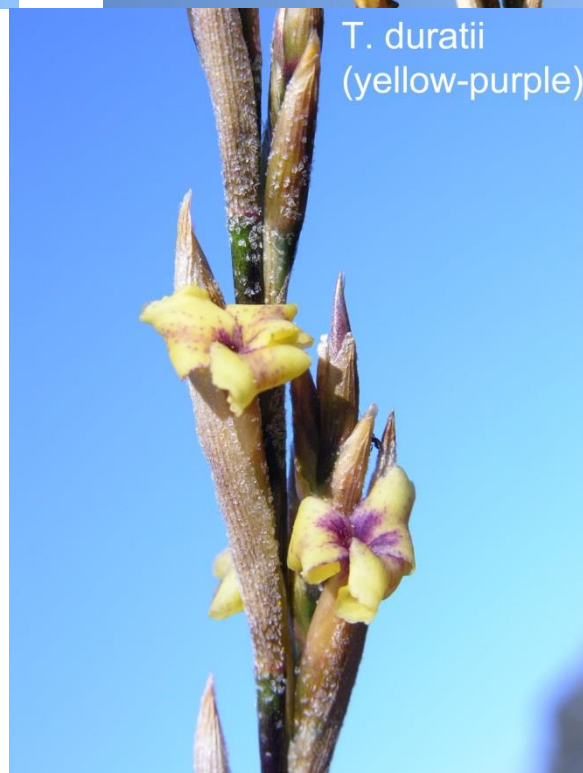
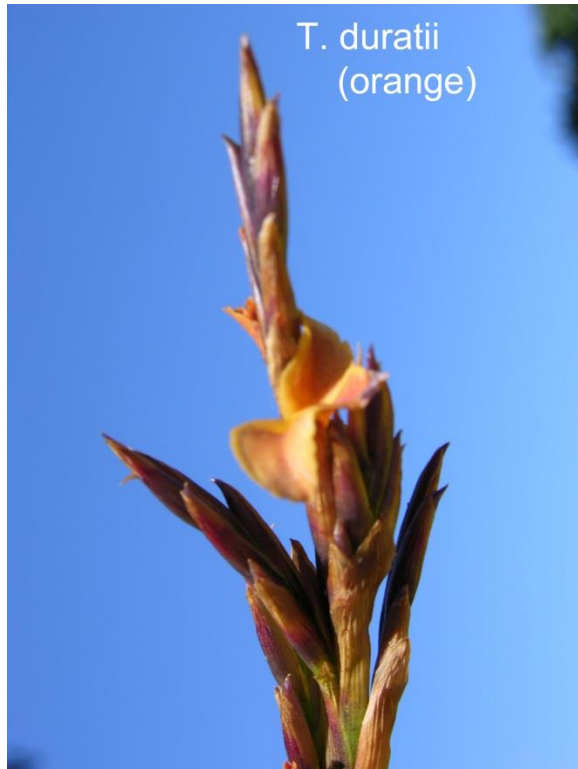


Who can explain such an amazing discovery? I will let the experts argue whether they are *T. streptocarpa* or *T. duratii*.

Later in our expedition, on the way to Comarapa, we set out to see if we could find the location of *T. streptocarpa* var *aureiflora*. Fortunately, we had been given fairly accurate information of a place of interest. But, again, this turned out to be beyond my wildest dreams. There were a number of separate plants having flowers with petal colours in the yellow-orange-brown range.



Some plants from this location later flowered in my collection in Adelaide, South Australia. Shown are four examples of different coloured petals.



The last one, in particular, is quite beautiful, with a purple centre. All are fragrant.



# Taxonomic Tidbits:

## *Canistrum, Wittrockia, Edmundoa and more – Part 1*

By Mike Wisnev, SFVBS Editor ([mwisnev@gmail.com](mailto:mwisnev@gmail.com)) Photos by Wisnev unless noted.

San Fernando Valley Bromeliad Society Newsletter – July 2018

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In 2012, I got a spectacular plant labelled *Wittrockia x leopardinum* from Live Art. A few months later I saw another one, or so I thought, at a sale and show. But it was labelled *Edmundoa lindenii*. Having never heard of that genus, I asked one of our more knowledgeable members about it. He said it was indeed an *Edmundoa*, that *Wittrockia* were different and that these species had been moved around various genera over the years and had various differences. It turns out that both had been considered *Canistrum* before.

This article was intended to explain the differences between these three genera. It became clear it was premature to explain the differences without learning about the genera themselves. In turn, it became apparent that other genera were related. So the article has become a bit longer than anticipated.

**Elton Leme.** The expert in this area is Elton Leme. Leme is a Brazilian botanist who has published at least five books on bromeliads. He is an expert on the Cryptanthoid complex, Nidularioid complex and perhaps all Brazilian bromeliads. On the Encyclopedia of Bromeliads, it says:

“On weekends and holidays, Judge Elton Leme travels to hard-to-reach places with little or no infrastructure. His goal, however, is not just to relax, away from the bustle of the metropolis, but to explore forests seeking new Bromeliad species. As a self-taught botanist who works for the Tribunal of Justice of Rio de Janeiro, he has searched for plants since adolescence and made his first description of a new bromeliad species at the age of 19. In an on-going process, he has already described about 500 new species and it seems that he is far from finished. Elton has written several books about bromeliads - 'Bromeliads in the Brazilian wilderness' (1993 as first author), his 3 volume series '[Canistrum](#)' (1997), '[Canistropsis](#)' (1998), '[Nidularium](#)' (2000) and '[Fragments of the Atlantic Forest of Northeast Brazil](#)' (2007 as coauthor). His work has encouraged many young

botanists to begin a career in researching bromeliads.”

<http://botu07.bio.uu.nl/bcg/encyclopedia/brome/brome.php?action=showFriend&id=Elton>



*Canistrum fosterianum*.

Photo by Leme. This species was described in 1952 by Lyman Smith and is one of many named after Mulford Foster who found it. Foster was the first president of the BSI, and was instrumental in making bromeliads popular.

Leme says this species has a tubular rosette, sparse cross bands and relatively large white flower (4cm) for the genus. Apparently many plants with this label in cultivation may be hybrids.

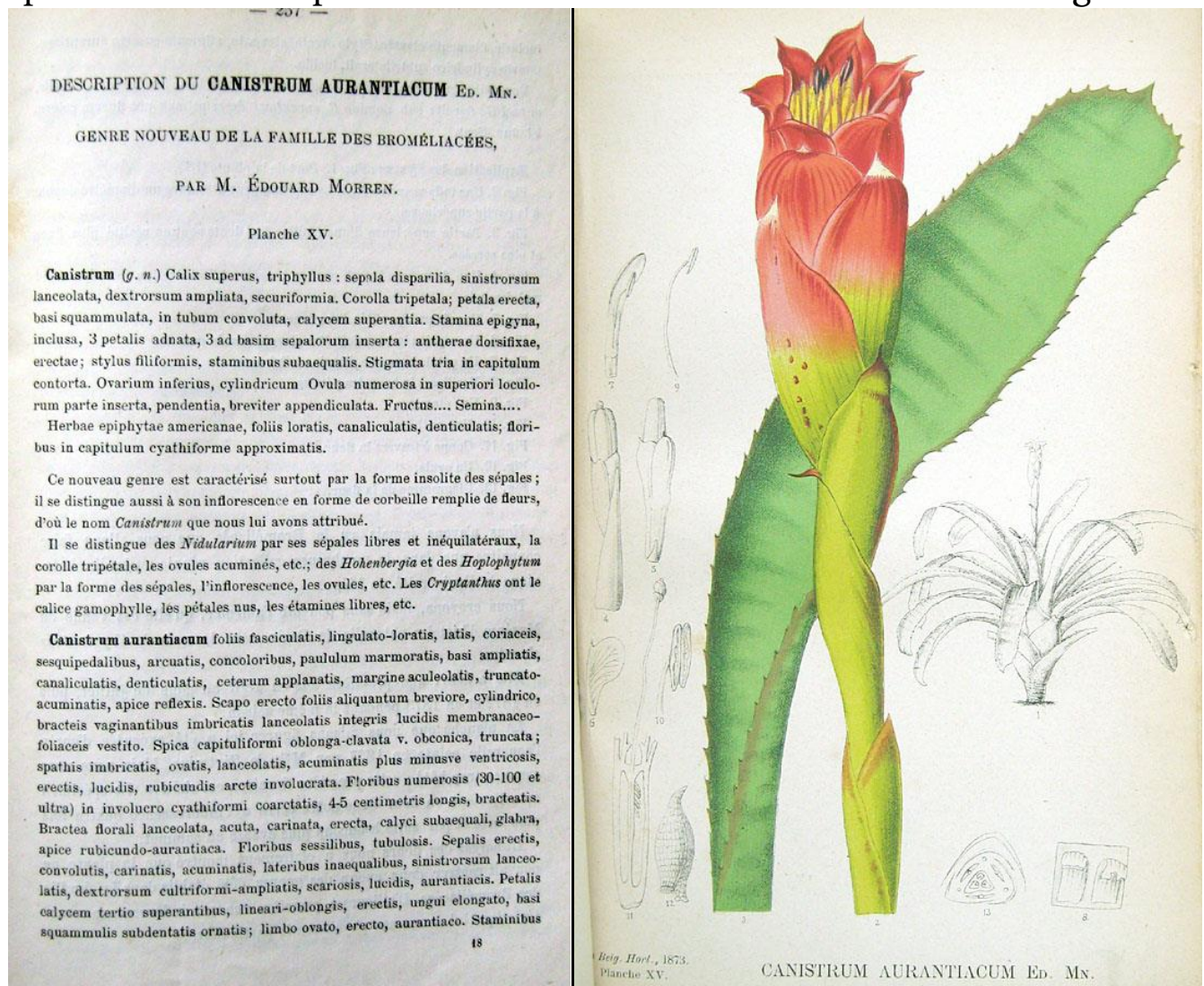
You can see the inflorescence is quite different from most of the bromeliads grown around here. Like most *Canistrum*, it has an involucrum, defined as large scape and/or primary bracts that are longer than the branches of the inflorescence and thus form a cup or similar shape.

The “Nidularioid complex” includes *Canistrum*, *Wittrockia* and *Edmundoa*, as well as *Canistropsis* (which means like *Canistrum*), *Nidularium*, and *Neoregelia*. The easy part is that all these genera are members of the *Bromelioideae* subfamily that generally grow in humid areas of the Atlantic rain forest and have some common morphological features – in particular, a similar inflorescence. Other than that, well it isn’t so easy. As is often the case, differences lie in fairly small flower parts.



The Nidularioid complex is “characterized by a nest-like inflorescence lying within the leaf rosette. These taxa have been amply defined and differentiated on the basis of pedicellate or sessile flowers, free or connate sepals and petals, and the presence or absence of appendiculate petals.” Leme, *Canistrum* – Bromeliads of the Atlantic Forest (1997) (“*Canistrum* Book”) at 12-13.

***Canistrum* basics.** *Canistrum* generally grow in north Brazil, primarily in Bahia. Some grow to the north in Alagoas and Pernambuco, while one species grow to the south in Espírito Santo. *C aurantiacum* is the type species -the first species described when Morren described the genus.



1873

original publication of *Canistrum aurantiacum* in *Belgique Horticole* by Edouard Morren. “A total of 35 volumes were produced from 1851-1885 by the Morrens, father and son. Charles François Antoine was director of the Jardin botanique de l'Université de Liège and professor of botany and his son, Charles Jacques Édouard, was also director of the Jardin botanique de l'Université de Liège and

specialist on Bromeliaceae.”

[http://botu07.bio.uu.nl/bcq/Belgique%20Horticole/page\\_33.htm#1873](http://botu07.bio.uu.nl/bcq/Belgique%20Horticole/page_33.htm#1873). As required until very recently, the botanical description is in Latin.

*Canistrum* are generally found in northeastern Brazil and are

distinguished by flashy and ornamental capitate and involucrel inflorescences, with upper scape bracts and primary bracts disposed in a cup-shaped format. Its flowers are bird-pollinated and it has distinctly asymmetrical mucronate to spinescent sepals. J. A. Filho and Elton Leme. An Addition to the Genus *Canistrum*: a new Combination for an old Species from Pernambuco and a new Species from Alagoas, Brazil. 52 J. B. S. 105 (2002.) (“Filho & Leme Article.”)

Here is Bryan Chan’s lovely specimen of *Canistrum triangulare*.



It has striking foliage and, like just about every one of Bryan’s plants, is beautifully grown. The orange involucrel bracts hide most of the flowers, so we can’t see if the sepals are sharp. One piece of good news is that the



inflorescence is clearly different from those of most genera we see – it clearly isn't a *Billbergia*, Neo, or an *Aechmea*

This particular species differs from others in its genus in at least two respects: it has triangular leaves, and is located in Espírito Santo, outside the range of the other *Canistrum*. It will be interesting to see if DNA studies show it is a bit different than the others.

**History.** As noted earlier, Morren first described the genus in 1873. Most subsequent authors recognized the genus, although John Baker treated *Canistrum* as a subgenus of *Aechmea* in his 1889 monograph. The most significant changes in the genus over the years are that a number species have been moved between *Canistrum* and *Wittrockia*, a genus described in 1891 by Lindman. Five years later Mez treated *Wittrockia* as a subgenus of *Canistrum*, where it remained until Smith reinstated it as a genus in 1945.



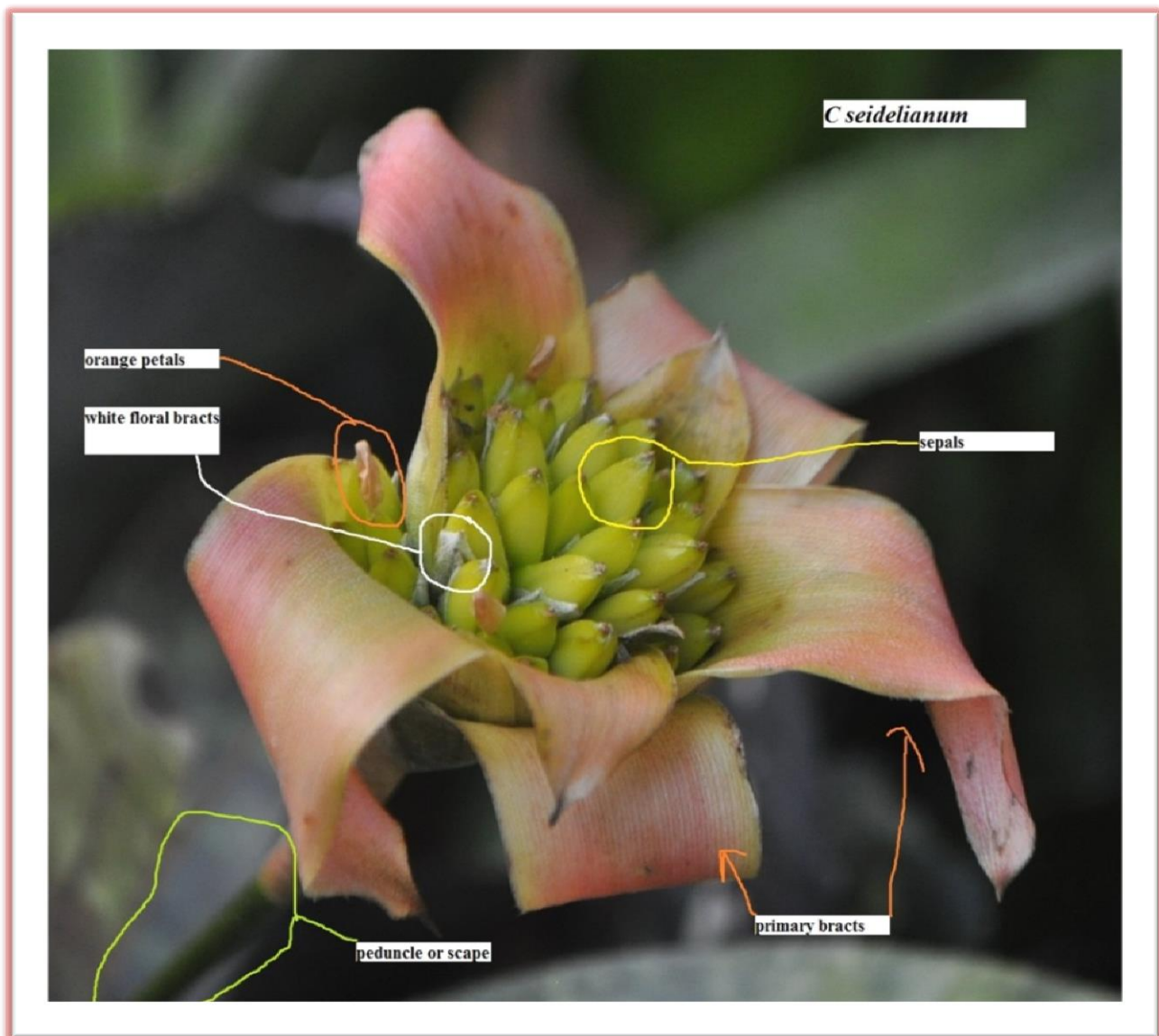
*Canistrum montanum* photo by D Cathcart

*C. montanum*  
differs from the similar *C. fosterianum*, *seidelianum* and *auratum* by its

leathery and spiny leaves and “rounded apex due to the prominence of the flowers, while in the rest of the species ..., the flowers are more deeply inserted in the cup...” *Canistrum Book* (p35). Unlike many others, it also has distinctly leathery leaves.

In Smith & Down’s 1979 monograph, the genus only had seven species. Four of them have since been moved to *Edmundoa* or *Wittrockia*. The other three were *Canistrum. aurantiacum* (the type species), *triangulare* and *fosterianum*. Leme listed four more in his 1997 book entitled *Canistrum – Bromeliads of the Atlantic Forest* (“*Canistrum Book*”). Six more have been described since then, all by Leme or Leme and a co-author, bringing the current total to thirteen species.

**Inflorescence.** The *Canistrum* inflorescence looks much like *Nidularium*.





The entire structure shown above is called the inflorescence, though it is dominated by the large orange leaf-like and overlapping primary bracts. This is referred to as an involucre. *Canistrum* generally have a cup-like involucre. There are about 20-25 flowers, each of which consists of a white flower bract, 3 sharp tipped yellow sepals and 3 orange petals. Unfortunately, I never got a good shot of the orange petals. Finally, if you look closely, you can also see the entire head is supported by a green, thin and long peduncle. You can see a peduncle (and peduncle bracts) better on the picture below on the left.



Figures 14-16. Some colorful species of the genus *Canistrum*.  
 Figure 14 (above).  
*Canistrum montanum*.  
 Figure 15 (above right).  
*Canistrum lanigerum*.  
 Figure 16 (right).  
*Canistrum seidelianum*.



6. Bradenton, Florida.

Photos by Phil Nelson. 55(6) JBS 263 (2005)

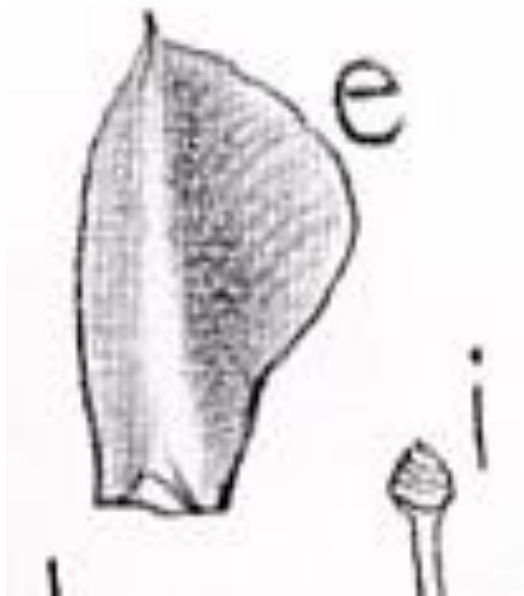
Generally, inflorescences in the Nidularioid complex are capitate, that is they form a head like structure. This is easy to see. But you can't tell that the inflorescence is actually branched without dissecting it. In any case the branches are quite short. You also can't tell whether it is subcorymbose

or subumbellate, which is whether the flowers arise at different levels on the inflorescence or the same level. Finally, you can't tell that the flowers are bunched in groups known as fascicles. According to its description, *Canistrum seidelianum* is bipinnate (which means the inflorescence has branches, though bipinnate is again used incorrectly in the bromeliad world) and has around 5 "somewhat complanate" fascicles.

The BSI site has a page on the derivation of names of genera. The names of these two genera are derived from "the Greek "*kanistron*" (a kind of basket carried on the head)" and "the Latin "*nidus*" (nest) and "*arius*" (pertaining to)." Unfortunately, in the bromeliad world, the inflorescence is often incorrectly used to exclude the peduncle, which is usually (again incorrectly) referred to as a scape. Leme used this definition in his books, so the Newsletter probably uses them as well in most cases.

**Differences from other similar genera.** According to Leme, Morren distinguished this genus from *Nidularium* (which has a similar involucre inflorescence) based on its free petals and free and asymmetric sepals.

Drawing of the sepal (left) and stigma of *Canistrum aurantiacum*  
Leme 567 from *Canistrum* Book, p100)



*Canistrum* have asymmetric sepals, unlike most other species in the Nidularioid complex. You can see how one side is much larger than the other – in fact, one side has a "wing," which makes it asymmetric. You can also see the point, or mucro, at the top.

The figure on the right shows the swirled stigma.

In contrast, Mez separated these two genera on the basis that *Canistrum* have free sepals and petal appendages. Within *Canistrum*, subg. *Wittrockia* had connate petals, while subg. *Eucanistrum* had free ones.





## *Canistrum*

*seidelianum*. This is probably the prettiest of the species, at least out of flower.

While *Canistrum seidelianum* was described in 1986, Leme says it was in cultivation well before 1986, and mistakenly identified as *C. fosterianum*. *C. seidelianum* has more spreading (Leme refers to it as elongated and crateriform, rather than tubular) and more distinctly well marked leaves. It also has smaller flowers with yellow/green sepals rather than white ones.

Smith's 1979 key distinguished *Canistrum* from other genera in the Nidularioid complex by virtue of their compound inflorescence with sessile flowers (unlike *Neos*), appendaged petals (unlike *Nidularium*) and free petals (unlike *Wittrockia*).

Leme's key to this Nidularioid complex in his book titled *Canistropsis – Broms. Alt. Forest* (p17 1998) states that *Canistrum* (and *Neoregelia subg. Hylaeaicum* and *Aechmea subg. Aechmea* (p p)) are distinguished from other genera in the complex by the following:

“Sepals distinctly asymmetrical, with one side clearly more developed to bearing a large lateral membranaceous wing which usually equals or exceeds the apex, the posterior sepals often alate-carinate, with keels decurrent on the ovary; sepal apex mucronulate to spinescent, usually rigid; inflorescence usually well elevated above the leaf-rosette; if nidular, then inflorescence not immersed in accumulated water in the leaf rosette and distinctly exceeding the length of the leaf-sheaths; petals remaining suberect to erect after anthesis, not strongly spirally twisted nor involute-twisted; ovules to caudate.”

Among those members of the *Bromelioideae* subfamily with asymmetric sepals, *Canistrum* can be distinguished by its combination of distinct ovaries, sessile or subsessile flowers, petals with well-developed appendages, sharp tipped sepals, and an inflorescence that is involucrate with large upper scape and primary bracts

**Subgenera.** There are now two subgenera of *Canistrum*. Leme described the second one, subg. *Cucullatanthus*, in his *Canistrum* Book. According to Leme’s key (p.25), this group has ellipsoid to tubular rosettes, and petals that are “sublinear to spatulate, obtuse-cucullate, erect at anthesis.” In the picture of *C. triangulare* above, you can see that the petals are erect and cucullate, which means hooded. *C. fosterianum*, *montanum*, *seidelianum* and *auratum* are also in this subgenus. *C. auratum* is also in this subgenus, and has bright yellow primary bracts, and yellow petals. Its pollen is closer to the *Nidularium* genus.

In contrast, subg. *Canistrum* is characterized by “Leaf rosette funnelform; petals narrowly lanceolate (except for *C. guzmanoides*), acuminate or acute, suberect at anthesis; ovules apiculate.” Id. at 25. Its members can have yellow, white or purple to rose colored flowers. Leme’s *Canistrum* Book listed two members – *C. aurantiacum* (the largest species in the genus) and *C. camacaense*. The latter species is found with *Nidularium innocentii* in the lower layers of the forest habitat, while *C. montanum* grows in the same habitat in the upper layers.

**Leme’s *Canistrum* book.** Leme discusses the Nidularioid complex, as well as *Canistrum*, *Edmundoa* and *Wittrockia* in his *Canistrum* Book. It adds quite a bit to what was noted in last month’s Newsletter. His approach is instructive as to how taxonomy has changed the last 30 years. In particular



he noted that morphological features, such as “pedicellate or sessile flowers, free or connate sepals and petals, and the presence or absence of appendiculate petals ... were always used independently and regarded as absolute.” Id. at 12-13.



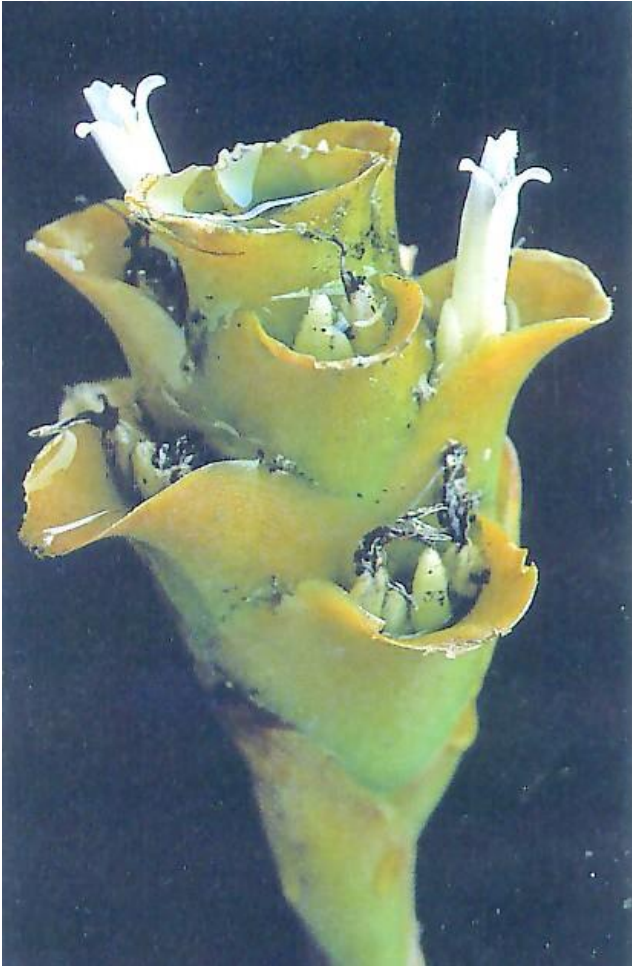
*C. lanigerum* and *sandrae* are related species with wooly inflorescences. The former is much woolier with a shorter inflorescence. The latter has almost no spines and red tipped floral bracts.

Advances in the last couple decades of last century, together with Leme’s extraordinary field work and observation of live plants, led Leme and others to realize these features weren’t absolute. Some taxa in a genus have unusual features, and others had features of more than one genus. This raises issues as to whether they should be moved to different or new genera, or the descriptions of the genera should be changed. Leme’s conclusion is that genera are best recognized by a suite of characteristics, none of which are necessarily absolute in nature.

Subsequent DNA studies have shown Leme was generally correct in these important taxonomic decisions. Many plant features have evolved (or

disappeared) more than once, sometimes four or more times. While a genus might be characterized by certain different features than it relative, a newly described species might not have all these features. Depending on its placement in the phylogenetic tree, and the botanist's views on the importance of the feature, this may lead to a new genus, and/or also may require the old genus to be split up into different ones. An alternative is to revise the description of the genus to accommodate the odd species.

**More species.** In 2002, Filho and Leme moved *Portea pickellii* to *Canistrum*.



*Canistrum pickellii*. 52(3) JBS 115 (2002). photo by Leme.

It is the only member of subgenus *Canistropsis* with white petals – the others are yellow-orange or shades of blue/violet. The petals are pointed and open up a bit (suberect), as opposed to the hooded flowers of subg.

*Cucullatanthus*. The truncated yellow primary bracts are quite striking.

This plant apparently has a long history – it was first considered a *Quesnelia*, then a *Wittrockia*, then a *Portea* and now *Canistrum*.

**Why was it moved to *Canistrum*?** In the Filho & Leme Article, they state

the taxon in question fits the genus *Canistrum*. This is because it possesses corymbose, involucre and multiutriculate inflorescences, with large brightly colored rosulate and imbricate primary bracts, which impound some amounts of water for several days. In fact, the reasonable ability of the inflorescence of this species to store water is greater than in all the other species of *Canistrum*. 52 JBS. 105 at 110 (2002).





E. Leme

Figure 13. Population of *Canistrum pickellii* in Pedra do Cruzeiro, Jaqueira, Pernambuco, where the plants are exposed to the full sun and are generally more compact.

Photo by

Leme. 52(3) BSJ at 114. You can see the more open rosette of this species.

The Filho & Leme Article also provides a lot of information comparing the two genera. The primary difference is that *Canistrum* inflorescences form a “flashy and ornamental” cup, while those *Portea* don’t form a cup. There are significant differences between the sepals of the two, but I won’t bore you with them. The article notes that the “nocturnal flowers ... have protruded corollas which are distinctly longer than the primary bracts at anthesis” and have “an unusual capacity to hold rainwater for several days, which is comparable to *Nidularium* species only.” Interestingly, nocturnal flowers are quite rare in the Bromelioideae subfamily – it states there is only one other member, *Aechmea kleinii*, that flowers at night.

Why did Lima and Smith place the species in *Portea*? Filho and Leme suggest it “was probably because of the obscurely pedicellate flowers. Flowers with pedicels were excessively valued at the time, as having absolute diagnostic importance, which distanced the taxon from the other

phylogenetically related taxa.” Id at 110. (Note that Smith’s key to genera in 1979 placed the two on different branches based on whether the flowers are “pedicellate” vs. “sessile or subsessile.”)

In the same article, Leme and Filho also described a new species, *Canistrum alagoanum*, shown below.



Id at 118-9. Both photos by Leme.

This species is similar to *Canistrum pickelii* and both are in subgenus *Canistrum*. It differs in the colors of its flowers, which open in the daytime and which don’t extend nearly as far beyond the bracts. The second picture above shows a close up of the colorful orange-red inflorescence of the holotype. While its flowers are shorter, the pedicels and sepals are longer. Interestingly, it has petal appendages, while *C. pickelii* doesn’t (or has



rudimentary ones). In an earlier time, this may have placed them in different genera.

Finally, this comprehensive article addresses the two subgenera of *Canistrum* in connection with *C. pickelii*. It states:

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Despite its intermediate positioning, the general traits of *C. pickelii* permit its inclusion in the typical subgenus, which is: funnelform leaf rosette (not ellipsoid or tubular), petals suberect-recurved to slightly reflexed near the apex at anthesis (not erect), and caudate ovules (not obtuse). On the other hand, a certain proximity of *C. pickelii* to the *Cucullanthus* subgenus derives from its bipinnate inflorescence (not tripinnate) and sublinear-lanceolate petals, with a narrowly obtuse apex (neither lancelolate, acuminate or acute as in subgenus *Canistrum*, nor sublinear or spatulate and obtuse-cucullate as in subgenus *Cucullatanthus*). Id at 111.

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In his *Canistrum* book, Leme recognizes that *Canistrum* seems closer to *Aechmea* than the other genera of the Nidularioid complex. Leme noted that the cuplike inflorescence associated with the Nidularioid complex is a derived trait shared with other species in both *Aechmea* and *Guzmania*. However, its asymmetric sepals with a mucro distinguish it, and in fact place it closer to *Aechmea*. If not for the problematic status of *Aechmea*, Leme states he would have moved *Canistrum* back into it, as Baker had done over a century ago. Instead, he maintained it, reduced the number of species, and revised its description.

*Canistrum guzmanioides*, which resembles *Guzmania lingulata* (which grows in the same area) is also intermediate between the two subgenera, as it has a funnelform body and bipinnate inflorescence with sublinear suberect petals. The description by Leme in 1999 says the leaves are entire, which means they have no spines.

*Canistrum guzmanioides* is related to the three newest described species. All four of these species similar colored petals: a white base with a darker apex - rose (*guzmanioides*), purple-rose (*lanigerum*), lilac rose (*sandrae*), and lilac (*improcerum*). Leme states they “are exclusive to the Atlantic forest of Bahia, south of the Sao Francisco River, forming a natural

complex of morphologically and ecologically very similar taxa.” Leme and Siqueira, J.A. , Fragments of the Atlantic Forest of Northeast Brazil (2007) at 268-70.

Leme also asserts that these south Bahia *Canistrum* species “forms an important conceptual bridge between *Canistrum* subgen. *Canistrum* and the so-called southern Bahia complex of *Aechmea* (Leme, 1997) composed of *A. echinata* (Leme) Leme, *A. weberi* (E. Pereira & Leme) Leme, *A. paradoxa* (Leme).” Id. at 70.



If you told me *A. paradoxa* was a *Canistrum*, I wouldn't argue, especially when you compare it to the picture of *C. lanigerum* above. In fact, this species had first been described in 1997 as a *Wittrockia*, and as noted earlier for a considerable period of time, *Wittrockia* had been considered a subgenus of *Canistrum*. Frankly, I don't recall seeing (in person) other *Aechmea* with an inflorescence like this.



**Update - Latest Taxonomic Studies.** As discussed in considerable detail last month in the Newsletter, recent DNA studies show most of the Bromelioideae genera are a mess. At least three other major studies (discussed last month) have found *Canistrum* is paraphyletic and thus should be broken up. These will be referred to as the *Aechmea* Study<sup>1</sup>, the 2014 Study<sup>2</sup> and the 2015 Study<sup>3</sup>. Each had two or more *Canistrum* species that weren't grouped together.

There is also a study that sampled 12 out of 13 species *Canistrum* species. The study is actually about *Portea* and *Gravisia*, which is a complex of *Aechmea*.<sup>4</sup> I will call it the *Portea/Gravisia* Study. It is discussed at length in the January 2016 Newsletter. While no changes were proposed, the overall results are that *Portia* and *Gravisia* are grouped together, and *Canistrum* is not a good genus.

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Here are the details from the *Portea/Gravisia* Study.

1. As currently constituted, *Canistrum* is not a good genus. They fell into four different groups. The only way to include them altogether is to include all the *Gravisia* and *Portea*, as well as some other *Aechmea* and *Hohenbergia*.
2. Remember *Canistrum pickellii* above –it was the much travelled species that was first considered a *Quesnelia*, then a *Wittrockia*, then a *Portea* and finally, in 2002, a *Canistrum*. The study shows it is in the *Portea/Gravisia* clade, and sister to *Portea*. (The 2015 Study had it with *Gravisia*.) The *Portea/Gravisia* group all had polyporate pollen, and generally grew in the same area.

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<sup>1</sup> Sass, C. and C. D. Specht. 2010. Phylogenetic estimation of the core Bromelioids with an emphasis on the genus *Aechmea* (Bromeliaceae). *Molecular Phylogenetics and Evolution* 55: 559–571

<sup>2</sup> Silvestro, D., G. Zizka, and K. Schulte. 2014. Disentangling the effects of key innovations on diversification of Bromelioideae (Bromeliaceae). *Evolution* 68: 163–175

<sup>3</sup> Evans, T.M., R. Jabaily, A.P. de Faria, L.O.F. de Sousa, T. Wendt, and G.K. Brown. 2015. Phylogenetic Relationships in Bromeliaceae Subfamily Bromelioideae based on Chloroplast DNA Sequence Data. *Systematic Botany*, 40(1):116-128.

<sup>4</sup> Heller, Leme, Schulte, Benko-Iseppon, and Ziska, Elucidating Phylogenetic Relationships in the *Aechmea* Alliance: AFLP Analysis of *Portea* and the *Gravisia* Complex (Bromeliaceae, Bromelioideae. 2015. *Systematic Botany*, 40(3), pp 716-25.

3. The type species, *C. aurantiacum*, showed up with the *Gravisia*. (The Aechmea Study and 2014 Study also found this same result.) *Canistrum alagoanum*, which was supposed to be “very closely related” to *C. pickellii*, was also in this group.
4. Recall there are two subgenera of *Canistrum*, subg *Canistrum* and Subg *Cucullatanthus*. All three of the *Canistrum* so far were in subg. *Canistrum*. Four other members of that subgenus were all grouped together, as part of a larger group that included *Aechmea ramosa* (which some of you probably have) and two *Hohenbergia*. (The study didn’t include *Aechmea mollis* or species that Leme noted were similar to the south Bahia *Canistrum* complex.) The 2014 Study also showed a *Canistrum* as sister to a *Hohenbergia*.
5. All five species of subg. *Cucullatanthus* were grouped together, but this group included three *Aechmea* – *A. fosterianum*, *bambusoides*, and *distichantha*.
6. As Leme had anticipated, none of the *Canistrum* showed up on the Nidularioid clade! [The other studies had the same results, but with limited sampling this is less surprising.] Another study of ovary anatomy also found that *Canistrum* differed from the other genera in the Nidularioid complex, but it only studied one species in each of the six genera in the complex.

As noted, the *Portea/Gravisia* Study did not propose any changes, suggesting instead that further work was needed including a “revision of the genus concept for the whole subfamily.” Nonetheless, it seems likely that *Canistrum* will be broken up, and won’t remain in the Nidularioid complex.

Nomenclature. The nomenclature rules are long and complex, with lots of new terms. Let’s assume that the results of the *Portea/Gravisia* Study are confirmed in the future and the two are made into a single genus, along with *C. aurantiacum*. As I understand the rules, the new group would all become *Canistrum*! This is because *C. aurantiacum* is the type for *Canistrum* and was described earlier than *Gravisia* or *Portea*. Any other *Canistrum* that weren’t in this group would need to be renamed.



Member photos..... by Mary Chan

There will be additional photos next month.....



Joyce Schumann is shown here beside her outstanding Educational Display of Bromeliads

Leni on the right and Teresa – June 2018 Festival

