S.F.V.B.S.

SAN FERNANDO VALLEY BROMELIAD SOCIETY

MARCH 2017

P.O. BOX 16561, ENCINO, CA 91416-6561
sfvbromeliad.homestead.com sanfernandovalleybs@groups.facebook.com

Elected OFFICERS & Volunteers

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

next meeting: Saturday March 4, 2017 @ 10:00 am

Sepulveda Garden Center 16633 Magnolia Blvd. Encino, California 91316

AGENDA

9:30 – ***SET UP & SOCIALIZE***

10:00 ***- Door Prize – 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* *Andy Siekenen*

Program: **"Tillandsias"**

Don't miss this meeting! <>

TIME TO RENEW ?**.....**

11:15 - Refreshment Break and Show and Tell: Will the following members please provide refreshments this month: ***Gloria Vargas, Ray Van Veen Andrea Wareham, Mike & Ana Wisnev , Bob Wright, Barbara Wynn, Colleen Baida, Steve Ball, Wesley Bartera, 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.

Questions about refreshments? Call Mary K. (818-705-4728) Leave message - she will call back.

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 <>

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

Announcements

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. We realize not everyone has pristine show plants but each of us certainly have unidentified plants that can be brought in. Each member, please bring one plant

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 2017 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 April 1	Bryan Chan – Getting your Plants Show Ready	
Saturday May 6	Roxie and Jim Esterle – Baja Plant Adventure	
Saturday June 3	David Bassani – Designing with Bromeliads (tentative)	
Sat & Sun - June 10&11,	**SFVBS Bromeliad Show & Sale**	
Saturday July 1	STBA	
Saturday August 5	STBA	
Saturday September 2	STBA	
Saturday October 7	STBA	
Saturday November 4	STBA	
Saturday December 2	Holiday Party	

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** <>

Aechmea, its subgenera and history - how does taxonomy work? – Part 5 -

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

Before getting sidetracked by the Tillandsioideae study, Parts 1-2 of this series discussed the early history of *Aechmea*. Parts 3 and 4 continued with the discussion of how these various genera and subgenera are distinguished. This Part 5 completes that discussion and then addresses how the current taxonomic process differs from more traditional ones.

Streptocalyx. This is one more former genus that was merged into *Aechmea* – in 1992. There were about 20 *Streptocalyx* species, few of which are ever seen in cultivation. In ***Streptocalyx biflorus,*** J Brom. Soc. 35(2) 70-1. 1985, Werner Rauh stated "although most streptocalyx species have very attractive inflorescences they are not found frequently in collections because the leaves form big, very spiny rosettes. The most colorful species is the Ecuadorian *S. biflorus* with its bright red inner rosette leaves providing a beautiful color contrast with the orange-yellow primary bracts and the pale blue flowers."

Both Baker and Smith had maintained it as a separate genus, apparently on the basis of having no petal appendages. So it seems *Streptocalyx* don't have appendages, *Cheveliera* have rudimentary ones, and the rest of *Aechmea* have full appendages.

The adoption of different genera and subgenera based on this tiny feature is pretty amazing. It is even more amazing considering that Baker and Smith were very skeptical about their importance. While Baker maintained the genus, he said they were "scarcely worth separating." Smith also had serious concerns.

The type plant was *Streptocalyx poeppigii*, now called *Aechmea vallerandii*. It grows in Columbia and the Amazon in Brazil. Certainly looks like one that would be worth having. !

Aechmea vallerandii Photo by Bromeliario Imperialis.

More on the Taxonomic Process. *Streptocalyx,* which was created by Beer in 1856, may well have been the first genus to be created based on the lack of an appendage. Over the next century, more genera were recognized more or less solely due to the lack of an appendage. Was there sort of a domino effect - if the absence is critical to distinguish A and B, then it is also good for C and D, and E and F etc.

Consider *Streptocalyx*. In 1992, Smith and Spencer reduced it to synonymy with *Aechmea*. There was a one paragraph discussion, which more or less said that this genus was distinguished based on the absence of an appendage, but "more recently, petal appendages have proven unacceptable as a delimiting generic character … where groups of closely related species are segregated solely on the basis of this character." They then quoted Baker and his view that the two were scarcely worth separating and then said *Streptocalyx* was merged into *Aechmea*. It appears the change has been accepted.

I was curious about this statement that "petal appendages have proven unacceptable as a delimiting generic character" in certain cases. Proven is a pretty strong word in botany. How could someone prove it anyway? Or did some botanist just decide that this feature wasn't so important, and others followed.

Aechmea biflora, formerly *Streptocalyx biflorus*. Photoe by E. Gross, J Brom. Soc. 35(2) 90.

In fact, there is one rather compelling article on this topic back in 1992, the same year Smith and Spencer merged *Streptocalyx* into *Aechmea*. See Brown and Terry, Petal Appendages in Bromeliaceae, Am J of Bot 79(9) 1051. They reviewed all of the work in the area, and concluded that using this feature to distinguish bromeliad genera was

"probably unwarranted," especially for the Tillandsioideae subfamily. So perhaps I am only quibbling with Spencer and Smith over their then use of the word "proven." Of course, the recent Tillandsioideae study shows they are right!

Below is *Aechmea biflora*, photo by Ian Hook, http://www.bromeliad.org.au/pictures/Aechmea/biflora_i.jpg

It is also worth noting that the re-merging of the various genera with and without appendages is not only based on the perceived importance of an appendage (or lack thereof), but also that it seemed to be the sole basis of distinguishing the various genera. I suspect that by 1990 most botanists didn't think genera should exist based on one feature – it is desirable to have many distinguishing features before creating different

genera, or even species. As noted earlier, petal color isn't even enough to create a different species under current thinking.

At least until the last half century or so, one could argue that these type of across the board changes were desirable, in that they brought some consistency to taxonomy, which is often sorely lacking. Without some contrary reason, it arguably didn't make sense to treat petal appendages as critical for one set of genera, but not another.

Other classification systems. Basically, the species currently treated as *Aechmea* were originally placed in about ten different genera before 1890. At that time, Baker kept one of them, *Ortgesia*, moved all the rest of them into *Aechmea,* and treated most of the earlier genera as *Aechmea* subgenera. Smith later redefined some of these subgenera.

However, the above chronology ignores the other monographs by Mez, as well as one by Harms. I don't know how Mez's original monograph treated *Aechmea,* but his final one in 1934 -5 differed from Baker's. In addition to creating the *Wittmackia* genus, Mez also created the *Gravisia* genus, and this name comes up from time to time currently. Unlike Baker, Mez treated *Cheveliera* as a genus, not a subgenus as Baker did. Conversely, he treated *Ortgesia* as a subgenus, not a genus.[1]

[1] Mez had 9 *Aechmea* subgenera. As noted above, he treated *Cheveliera* as a genus, and he did not have a subgenus *Aechmea*. He did have the other six used by Smith (which Baker also had). He also had three more, called *Holophytum, Euachmea, and Purpurospadix.*

Aechmea kentii

Formerly Streptocalyx kentii, Photo by Bromeliario Imperialis. Named in 1991 by Harry Luther for Jeff Kent of Kent's Bromeliads who first collected it in 1989 in Ecuador.

As noted before, it seems many agreed with Mez's work. Thus, the genera of *Gravisia, Cheveliera and Wittmackia* lived on for decades after Baker had reduced them to subgenera. Finally, Smith's Notes on Bromeliaceae XXXIV state that he lumps *Witmackia, Gravisia* and *Cheveliera* into *Aechmea* "because their supposed distinctions proved inadequate or illusory."

The overall point is that not only is any particular system likely to be confusing, but there are often different systems. Even today, various botanists disagree on a variety of genera

and species. There is no governing board to decide which is right. It may turn out that most Americans follow one individual's work, while Germans or Brazilians follow someone else.

Aechmea floribunda

Formerly *Streptocalyx floribundus*. Photo by Bromeliario Imperialis. For example, to complete the historical overview of *Aechmea*, Smith and Kress wrote an article elevating the eight subgenera to genera. Since most botanists disagreed with it, this has pretty much been ignored.

Gravisia. Mez's taxonomic system incorporated the use of pollen in addition to other factors. He created a new genus, called *Gravisia* (in honor of a Belgian botany professor) in 1891, which was distinguished on the basis of having pollen with more than five pores, and sessile flowers. Smith says later studies showed some *Aechmea* also have this kind of pollen, and the correlation with inflorescence no longer exists, so in 1970 he moved the eleven species of this genus into *Aechmea,* subgenus *Aechmea*. See Notes on Bromeliaceae, XXX. Gravisia are large Aechmea species with yellow-petaled, polystichously flowered, much–branched inflorescenses. You can read more about *Gravisia* in the January 2016 Newsletter.

Traditional methodology. I don't know what caused Smith and others to worry that the *Aechmea* subgenera might be artificial. I expect his voluminous Studies on Bromeliaceae or Notes on Bromeliaceae discuss it somewhere. One concern was that the simulators from other genera could be placed on the *Aechmea* keys. Perhaps they also thought that some of the plant features used to distinguish them weren't all that important.

The fact that some subgenera show up twice in the key may also be part of the concern. Too many of the features used to distinguish them show up in different subgenera in different combinations. Taken together, as a matter of logic, these overlapping patterns likely mean that some of these features evolved more than once[2] and aren't valid distinguishing features, at least not unless combined with other features.

We have also seen how the process can work over time. Early botanists created new genera based on various plant features. Later some of these were combined as it was recognized these genera had common features. As more studies and information comes light, the boundaries and descriptions of the various taxa can change again.

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[2] For example, assume the first *Aechmea* had a simple inflorescence and sessile flowers. Next one evolves from the first with pedicellate flowers. Still later another one evolves from the first one to have a compound inflorescence. If we know we also have pedicellate flowered one with a compound inflorescence, that means either the compound feature or the pedicellate feature had to evolve twice. No matter how you order them, something either evolved more than once, or something evolved once and then was later lost. How many times this happened is rather important for some current analyses.

Despite this progress, the real problem of traditional classification is that it is simply impossible to know which features or combination of features are important. Even with complete and accurate descriptions, who can say which features are critical. Admittedly, the greater the number of distinguishing features, the more likely you have a different taxa. But in situations like *Aechmea*, where you seem to have all combinations of features, it is probably impossible to tell how to group the plants.

Another way to say this – traditional classification systems have been inherently subjective. One botanist can focus on one set of features and create three different genera, while another focuses on different features and creates two different ones. While the thinking gets more refined, proof has remained elusive.

Current Classification goals. The current goal of classification is to group plants that are genetically related, focusing primarily on DNA testing. This is actually called the study of **phylogenetics**. While the current state of testing might not be considered proof by some, it is much more objective than traditional analysis. And with more analysis, it may rise to the level of proof.

The DNA studies create a kind of evolutionary tree in which the species are placed along the different branches and sub-branches of the tree based on the changes in their DNA. Each branch, along with the sub-branches off of it, is considered to be a clade. A genus is considered valid (monophyletic) if all its members of a genus fall on one clade, and there are no other species of a different genus on that clade. If other members show up, some type of corrective action is needed, liked moving that species from one genus to another. But if there are too many mix-ups, more drastic action may be needed.

Most important, all of the studies have shown the bromeliads are monophyletic. If this weren't the case, we might have to change our club name!

In other cases, like *Aechmea*, it is about as bad as it can get. Basically, the studies show that various plant features used in the past to distinguish taxa evolved separately many times, and may also have been lost several times in different branches. *Aechmea* show up in different clades all over the tree, mixed in with other genera and species.

To solve this problem, it is necessary to either (1) lump all these other mixed in genera and species into *Aechmea*, (2) break *Aechmea* up into many separate genera, some of

which would have species from other genera, (3) break *Aechmea* into even more genera, most of which would be very small genera, or (4) some combination of these. In this particular situation, the decision to use one or another also impacts how other genera are handled.

How do botanists handle proceed when faced with these alternatives. Generally, botanists try to look to see if the different clades contain plants that have certain common features, even if these features are different than the features used before for classifying that genus. If the clade has certain unifying plant features, new classifications are proposed that correspond to the clade.

In many cases, the DNA results still don't seem to mesh very well any apparent plant features, at least without more studies, and no changes are proposed. This is more or less where we stand with *Aechmea*. Botanists are pretty sure now that *Aechmea* are not monophyletic and some action needs to be taken, but the details of the studies are not always consistent and the results don't mesh well with plant characteristics. So, while *Aechmea* is almost certainly not a good genus, botanists don't yet know how to fix it. Like all scientific processes, more studies and knowledge are needed.

It is also quite possible that the consistency in the treatment of plant characteristics is not possible. It might turn out that the presence or absence of a petal appendage is a valid distinction to separate some genera, but isn't for others. In addition, some genera may in fact be distinguished based on only one feature, while others are distinguished by many different features .

Does this mean the new system is not consistent? Actually, it is much more consistent than before. But the consistency takes a different form – each genus will be consistent with each other one by virtue of being a monophyletic clade where the species are most closely related, based on DNA, with the other species in that particular genus. This is why botanists consider this new methodology more objective – it is hoped there will be no room for argument – DNA testing is the key.

In some cases, this process might lead to groups where the unifying theme of a clade is completely different than plant morphology and can't be readily observed. For example, the group may be defined by virtue of having a different bio-chemical process than others – in this case, the hobbyist would have no way to identify an unknown plant without

sending it to a laboratory to see if it has this process. While not satisfactory to most of us, nature may be much more complex than we would like.

It actually could be even worse from the hobbyist's perspective. Currently, the large DNA strands have portions that correspond to different proteins or traits, but also large amounts that have no seeming connection to anything. Some recent studies are showing this filler is more important than realized in some cases. It may turn out, however, that some genera are linked solely by virtue of certain changes in this filler and that this particular filler really has no function.

For these same reasons, it might not even make sense to name some of these groups. As noted at the outset, taxonomy is in large part designed to communicate meaningful information. If a group of plants is in fact monophyletic, but we can't identify any meaningful plant characteristics to identify them, why bother to give that group a name?

Here is another example. Suppose you have a clade consisting of 4 different species in two different Aechmea subgenera, one *Billbergia,* one *Androlepsis,* one *Hohenbergia* and two *Ursulea*. The only common denominator is they all are found in Central America. Do you recognize it as a genus, or even bother to name it. This clade was in fact found in one study.

Finally, recall that taxonomy has two parts – how to group plants, and how to rank these groups, that is, is the group a family, subfamily, genus, subgenus etc. While it is hoped the first part is answered by DNA testing, the second will not be, and most likely will never be. It will remain subjective. This ties in well with the point made in the preceding paragraph.

As a purely hypothetical example, it may turn out that there is a clade of *Aechmea* that all have spiked wooly inflorescences, yellow flowers and unarmed sepals, and that this clade consists of three smaller clades. But the three smaller clades are only distinguished by each having different amino acids. One approach is to treat each of the three smaller clades as its own genus. A different approach is to combine all three into a single genus. A third is similar to the second – combine the three in a single genus, but treat each smaller clade as a subgenus.

DNA testing can't tell answer this choice. It has provided the fact that there is a clade consisting of three smaller clades. What humans decide to call this clade or smaller clades is subjective.[3] For that reason, it is likely that even with DNA testing, there will still be lumpers and splitters.

[3] Some have even argued that the concepts of genus and family etc should be abandoned for this reason – everything is a clade that belongs to a larger clade, and it is meaningless (or at least semantics) to call some genera or subgenera or families. While this may not ever happen, some clades may not ever be given names.