



S.F.V.B.S.

SAN FERNANDO VALLEY BROMELIAD SOCIETY

NOVEMBER 2017

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** Secy: **Leni Koska** Treas: **Mary Chan** Membership: **Joyce Schumann**
Advisors/Directors: **Steve Ball, Bryan Chan, Richard Kaz –fp** Sunshine Chair: **Georgia Roiz**, Refreshments: **vacant**
Web: **Mike Wisnev**, Editors: **Mike Wisnev & Mary K.**, Snail Mail: **Nancy P-Hapke** Face Book: **vacant**

next meeting: Sat. November 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 is Pam Koide Hyatt

Topic: "Diversity of Tillandsia Species in Mexico"

Pam is one of the leading *Tillandsia* experts and gives great talks. She has given presentations all over North, Central and South America as well as Singapore and Australia. We are lucky she could fit us into her schedule so don't miss this meeting.

She is the owner of Bird Rock Tropicals and has graciously agreed to give club members a 20% discount on plants ordered and paid thru her website. A \$50 minimum (before discount) per order is required. To place an order, go to this link, <https://www.birdrocktropicals.com/>, and hit the Shop button at the top. Enter two coupons below before completing your order:

- **ShipFree** - will remove the shipping charges
- **SFVBS20** – which will apply the 20% discount

continued....

You must place your orders by midnight Wed. Nov 1 - the coupons will expire at that time. The coupons can be used more than once, but each order must be at least \$50. All plants ordered with these coupons will be brought to the Nov. 4 meeting.

Many thanks to Pam, and to Pat B. for arranging this deal for SFVBS. for additional information... Pamela Koide Hyatt Bird Rock Tropicals pam@birdrocktropicals.com (760) 436-3088 www.birdrocktropicals.com blog.birdrocktropicals.com **New Tillandsia App for iPhone & iPad at [tilli-cards.com](https://itunes.apple.com/us/app/tilli-cards-lite/id1038131970?ls=1&mt=8)** <https://itunes.apple.com/us/app/tilli-cards-lite/id1038131970?ls=1&mt=8> <>

11:15 - Refreshment Break and Show and Tell: Will the following members please provide refreshments this month: **Nels Christianson, Patty Colville, Mohamed El-Tawansy, Larry Farley, Ken Foster, Wendie Fische, Mardy Graves 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.

continue page 2....

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 <>

Mary K Taking a look back at last month.....

Our own member, Nels Christianson, was our speaker and the program on Bromeliads of Brazil was enjoyed by all. Since *Bryan Chan* retired, he has become an excellent cook. *Bryan and Mary* prepared most of the food for the October meeting. Others who brought **refreshments** were *Tom Lucero, Nancy Pyne, Barbara Wynn, Pat Byrne, Steve B and Maryk, Ana Wisnev and Wendie Fischer. Pat Colville* made those dynamite Oatmeal cookies. **Show-n-Tell participants** were *Maryk, Leni Koska, Nancy, Bob Wright, Peter Speziale and Steve B.* Member **donations for our Raffle** is an important function and a special thank you goes out to *Dave Bassani, Maryk, Duke and Kaz, Tom L., Nancy, Chris Rogers, Peter Sp., Mike Wisnev, Steve B. and Georgia Roiz.* And a big thank you goes to *Alan Levy* from the LaBallona club who donated a couple dozen raffle plants. *Bryan and Mary Chan* also hosted a backyard picnic at their home and everyone said the food was fantastic and as usual his plants were all show ready.

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 2018 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

Put These Dates on Your Calendar

Here is

our 2017-2018 Calendar. As our schedule is always subject to change due to, please review our newsletters, website and email notices before making your plans for these dates.

Saturday November 4, 2017	Pam Koide Hyatt
Saturday December 2, 2017	Holiday Party
Saturday January 6, 2018	STBA
Saturday February 3, 2018	STBA
Saturday March 3, 2018	STBA
Saturday April 7, 2018	STBA
Saturday May 5, 2018	STBA
Sat & Sun June 9 & 10, 2018	Bromeliad Show & Sale

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

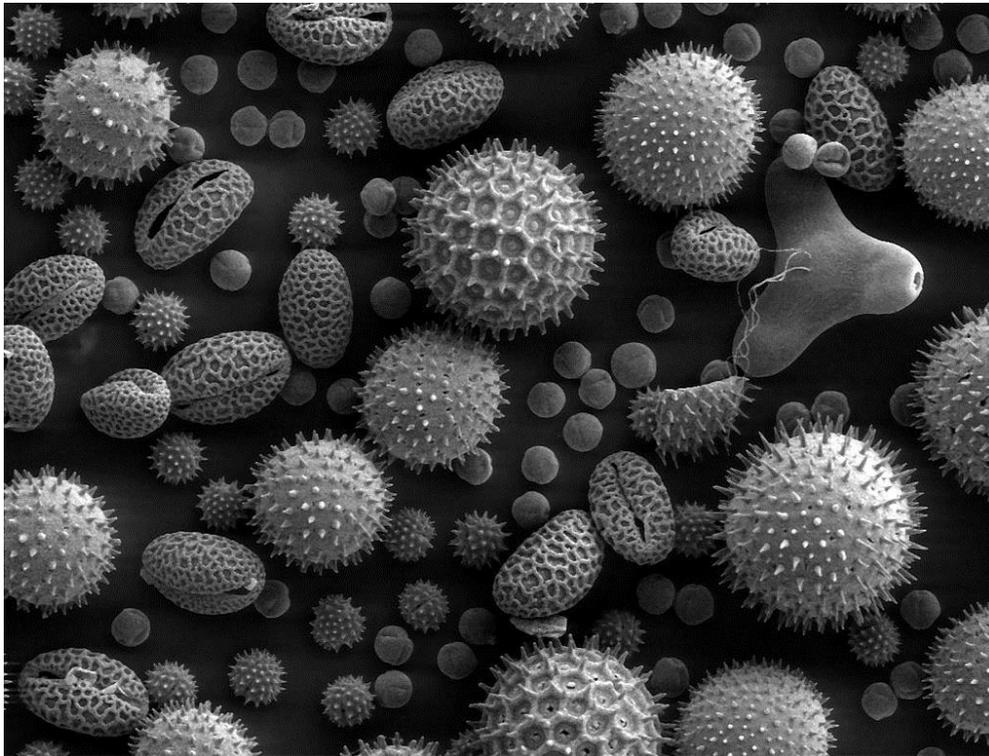
John Martinez johnwm6425@gmail.com <>

Taxonomic Tidbits – *Pollen – Part 2* (*Gravisia, Portea, Canistrum and Wittrockia*)

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

San Fernando Valley Bromeliad Society Newsletter –November 2017

Last month covered the basics of pollen. This month covers how pollen is used in taxonomy.



Pollen has all sorts of sizes and shapes and odd features. Here is Pollen from a variety of common plants: sunflower (*Helianthus annuus*), morning glory *Ipomoea purpurea*, hollyhock (*Sidalcea malviflora*), lily (*Lilium auratum*), primrose (*Oenothera fruticosa*) and castor bean (*Ricinus communis*). The image is magnified some x500, so the bean shaped grain in the bottom left corner is about 50 μm long. This work has been released into the **public domain** by its author, Dartmouth College Electron Microscope Facility.

Taxonomy. Taxonomy is basically the science of classifying taxa into larger groups. The current approach is to rely primarily on DNA studies, and try to see if other plant characteristics support the clades found by DNA.

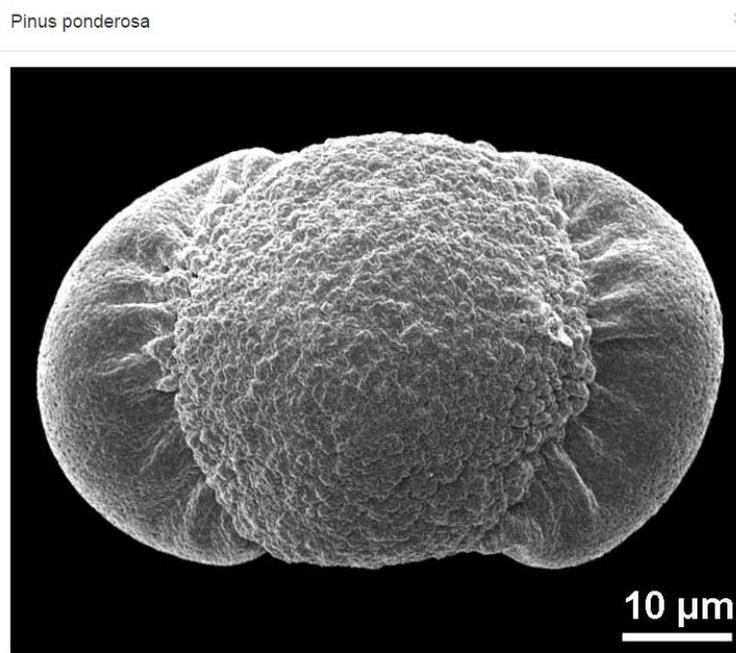
Traditionally, plant characteristics were used to group plants.

As such, virtually any plant feature might prove useful to group plants. The type of inflorescence, sepal characteristics, petal appendages or other characteristics all have been discussed in earlier articles. Other features are more surprising, like stigma types discussed in connection with the Tillandsioideae subfamily. There are a number of scientific articles about leaf anatomy for different genera or subgenera. Different chemical process might be considered.

Here's another different shape, the ponderosa pine.

The above photo, and all photos of pollen were taken by Dr. Heidemarie Halbritter. See the Palynological Database operated by the University of Vienna. <https://www.paldat.org/>

Actually, nothing is off limits. A botanists who observes that some plants of a genera have a different feature than another is likely to look further to see if this feature plays a more important role than previously thought.



Pollen in Taxonomy The advent of the electron microscope has led to lots of studies of pollen. As seen above pollen can differ from genus to genus, and even from species to species. Botanists have often used these different pollen features to group various species into genera etc.

Dr Carl Mez. Historically, pollen has played a greater role in Bromeliad taxonomy. Most surprisingly, one of the earliest monographs, that of Dr. Carl Mez, relied on pollen types extensively. The first time I saw this, I also learned it was no longer considered so useful. The four paragraph preface to the third volume of Smith and Down's Monograph in 1979 states that "Mez's system of classification based primarily on pollen has been abandoned simply because there is not enough information to make it workable. Even if the information were available, we know already that is faulted because two types of pollen can occur in a single anther." Smith instead used petal appendages extensively.

Mez wrote a complete monograph in the 1890s and updated it with more information for the next 40 years. His final complete Monograph was published in 1934-5. They are in Latin, so of no use unless you read Latin, or an article discusses them.

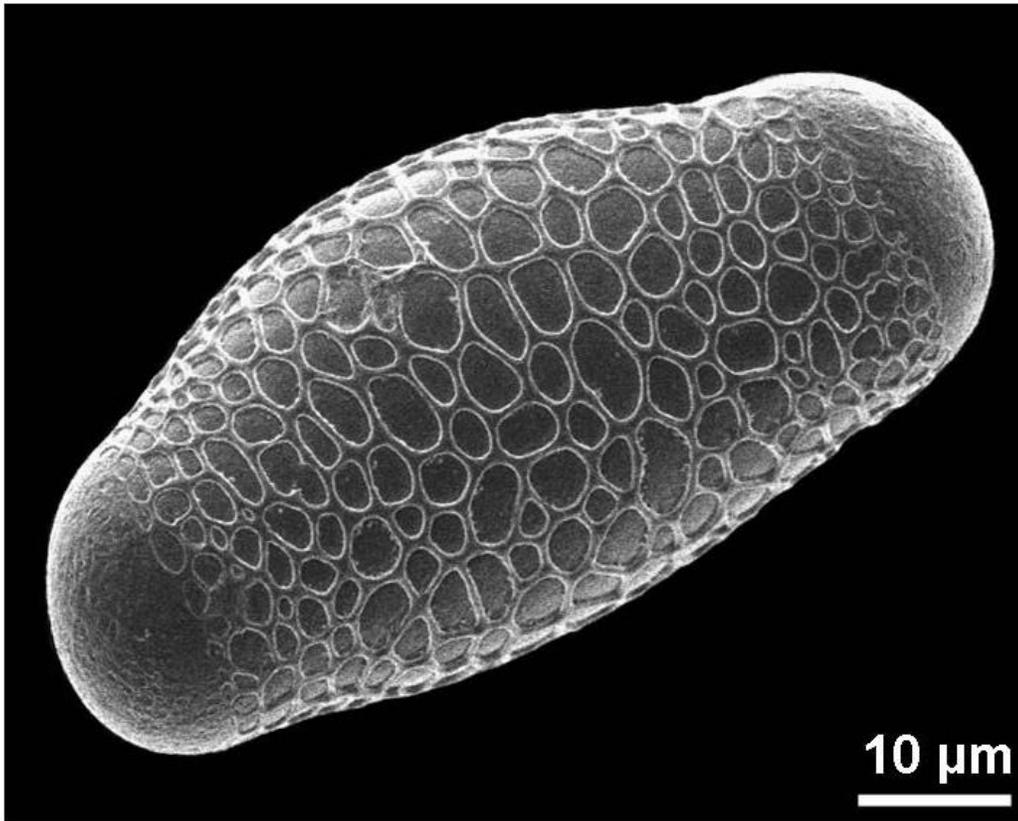
A recent article¹ on the relationship between *Gravisia* and *Portea* said that Mez divided the Bromelioideae subfamily into three groups, based on "the possession of I) inaperturate (without any visible aperture), II) sulcate (one, long elongated aperture) or III) porate pollen (various number of round apertures)." Id at 719.

¹Heller, Leme, Schulte, Iseppon, and Zizka. Elucidating Phylogenetic Relationships in the *Aechmea* Alliance: AFLP Analysis of *Portea* and the *Gravisia* Complex (Bromeliaceae, Bromelioideae).. Systematic Botany (2015), 40(3): pp. 716–725

Most of the pictures in Part 1 showed porate pollen. Here is one with two pores, called diporate.

Quesnelia lateralis

x



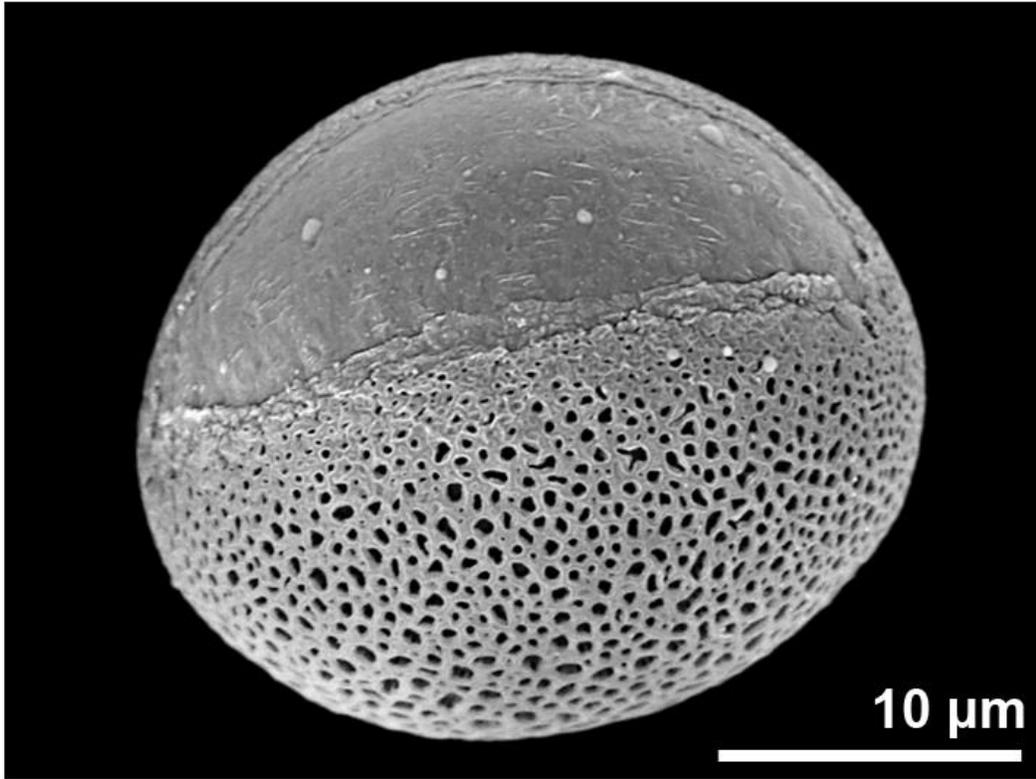
While I can't read Latin, based on the above, one can figure out which genera have the different kinds of pollen. Mez had three tribes of the Bromelioideae subfamily:

1. Tribe *Poratae*, with porate pollen (“pollinis granula aut poris”) – includes *Nidularium*, *Canistrum*, *Aechmea*, *Orthophytum*, *Hohenbergia*, and *Portea*.-Most of the photos so far have showed porate pollen.

2. Tribe *Sulcatae*, with sulcate pollen (“pollen sulca unica longitudinali”) – includes *Billbergia* and *Ochagavia*. Below is an example of sulcate

Brocchinia reducta

x



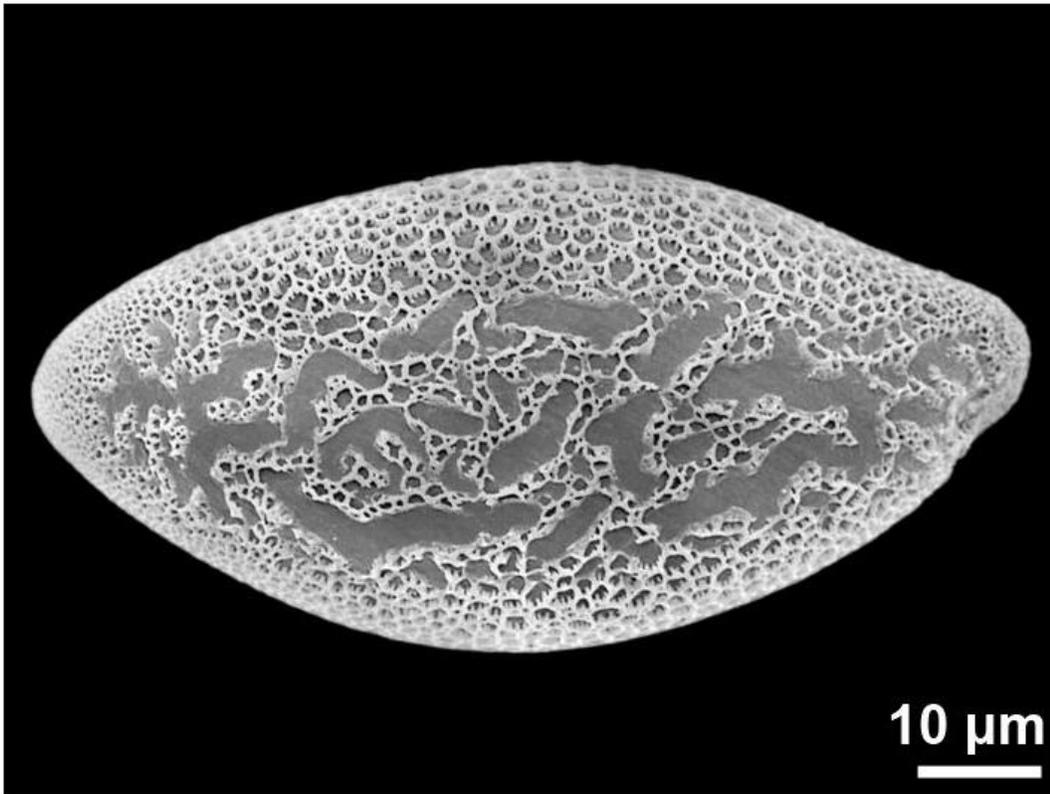
pollen.

oblique polar distal view / Photographer: Halbritter, Heidemarie

Mez considered *Billbergia* in this Tribe as well. Below is *Billbergia amoena* pollen. Note it doesn't have one long furrow but a series of them.

Billbergia amoena

x



polar distal view / Photographer: Halbritter, Heidemarie

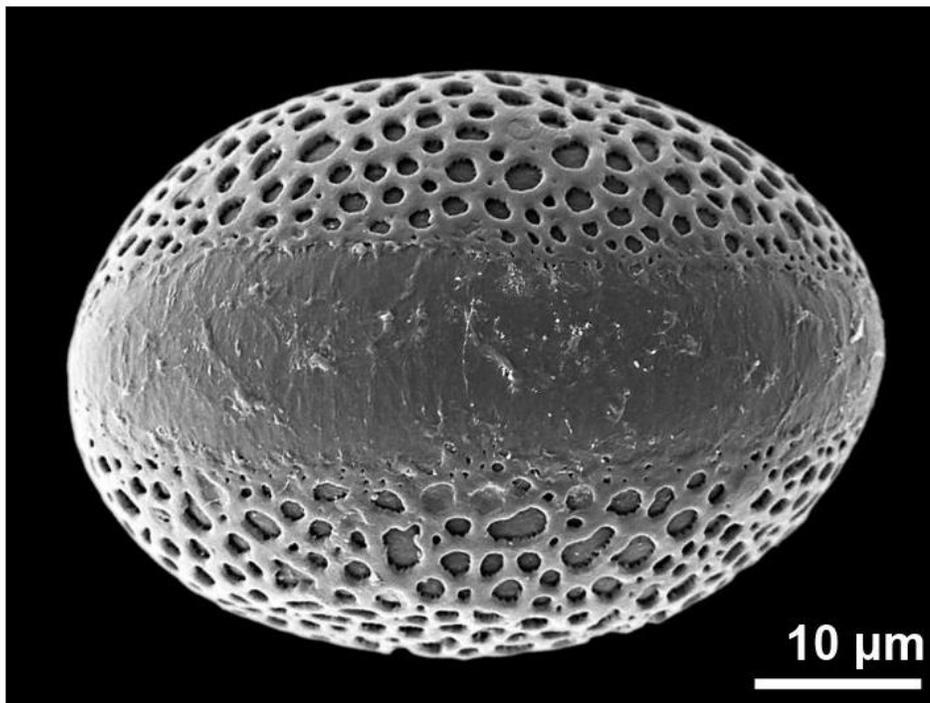
3. Tribe *Integrae* –with no pores and not sulcate (“pollinis granula nec porata nec sulcate” – includes *Bromelia* and *Cryptanthus*. The pictures on PalDat for these two genera seem to show sulcate photos. Maybe the electron microscope showed features not visible before. Most of the pollen shown in the first photo in Part 2 appear to show pollen with no pores or sulcate structures (called inaperature).

As noted, Smith found this system unworkable. But the importance of pollen in classification is making a comeback.

One interesting study² was designed to study the relative importance of pollen features and petal appendages. The study found that sulcate pollen was the earliest type of pollen for Bromeliads. In fact, it appears that porate pollen evolved at least twice. The study “underlined the taxonomic value of pollen characters in Bromelioideae.” *Portea/Gravisia* Study at 719.

The PalDat site only had 4 *Neoregelia* pictures, and three had porate pollen. This one, however, is sulcate. Interestingly Leme has treated this species as belonging to its own subgenus.

Neoregelia longisepala



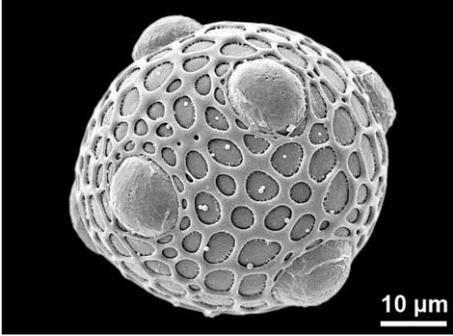
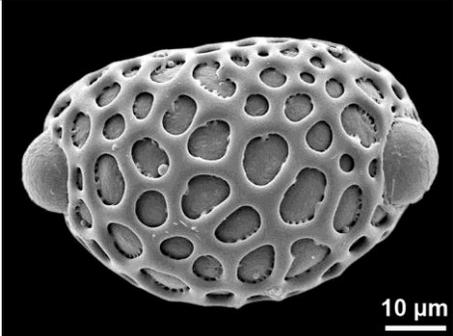
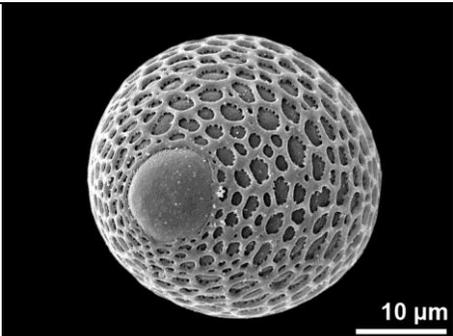
polar distal view / Photographer: Halbritter, Heidemarie

Canistrum and *Wittrockia*. Leme and Luther distinguished *Wittrockia* from *Canistrum* based on a variety of plant features, including pollen. See Genus *Wittrockia*, J Brom Soc 60(3): 103-114. 2010.

²Schulte, K. and G. Zizka. 2008. Multi locus plastid phylogeny of Bromelioideae (Bromeliaceae) and the taxonomic utility of petal appendages and pollen characters. *Candollea* (Genève) 63: 209–255.

How does the pollen of these two genera differ? *Wittrockia* pollen is “diporate with small porous and reticulate exines,” in contrast to the “heterogenous pollen in *Canistrum*, mainly in the type species *C aurantiacum*, which is polyporate, and in *C. auratum* Leme (subgenus Cucullatanthus Leme) having large pores.”

Rather than look these words up, here are some pictures that look like they are out of a science fiction movie.

Species	Picture of Pollen	Comment
<p><i>Canistrum aurantiacum</i> (hydrated pollen grain)</p>		<p>The large structures are pores, showing a polyporate pollen grain. Polyporate means many more than five pores.</p>
<p><i>C. sandrae</i> (polar distal view)</p>		<p>This appears to have two pores, and is “diporate.”</p>
<p><i>Wittrockia superba</i> (equatorial view)</p>		<p>This shows one of two pores, but also the “small porous and reticulate exines” Exine means the outer coating of the pollen grain.</p>

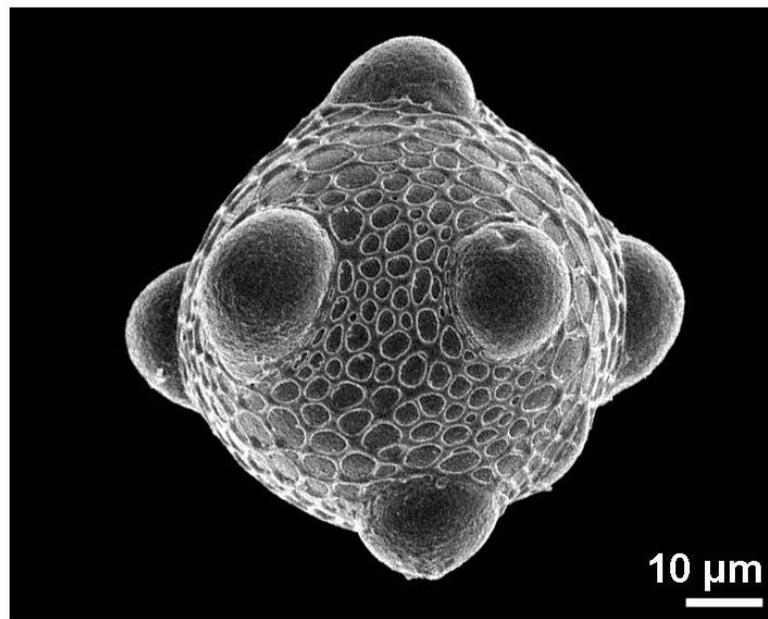
Portea and *Gravisia*. The *Portea/Gravisia* article states that “Mez united the species with polyporate pollen (more than five pores) and sessile flowers in

Gravisia. The latter feature distinguished it from *Portea*, the morphologically closest genus with similar pollen morphology but pedicellate flowers.” A different article says *Gravisia* generally have about “8 pores distributed more or less regularly over the whole surface, with a broadly reticulate exine.” Leme in J Brom Soc 60(4): 151-157. 2010. Smith later eliminated the genus, and moved its species into *Aechmea* subgenus *Aechmea*.

Based on DNA, the study found that all 32 of the sampled species with polyporate pollen were on one clade, consisting of all 20 *Gravisia* samples, all 6 *Portea* samples, 3 *Canistrum* and 3 other *Aechmea*.³ For more about *Gravisia* see the January 2016 Tidbits article.

Canistrum aurantiacum fell into clade. So did *Aechmea rubrolilacina*. Compare its pollen to that of *C aurantiacum* on the prior page.

Aechmea rubrolilacina



The authors stated that

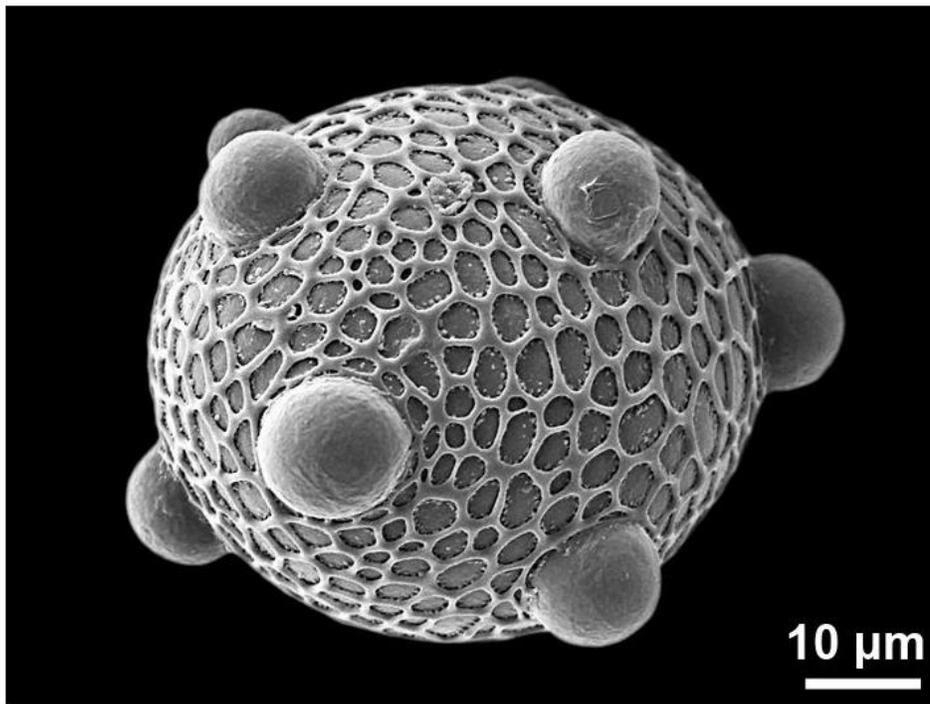
³The 3 *Canistrum* were *C alagoanum*, *aurantiacum* and *pickelii*. The other *Aechmea* were *A bahiana*, *marauensis* and *rubrolilacina*, and were on the *Portea* clade.

“These results support the view that pollen characters are of taxonomic value in Bromelioideae, as proposed more than a century ago by Mez (1891) and recently supported by DNA sequence data (Schulte and Zizka 2008). According to the latter study, sulcate pollen represents the ancestral state within the subfamily. In the core bromelioids, porate pollen prevails, but several reversals to sulcate pollen occur and also inaperturate pollen evolved several times independently. Our AFLP study provides the first molecular evidence that polyporate pollen evolved only once within Bromelioideae and therefore constitutes a valuable taxonomic character state.” Id at 721.

Portea also fell into this clade.

Portea petropolitana

x



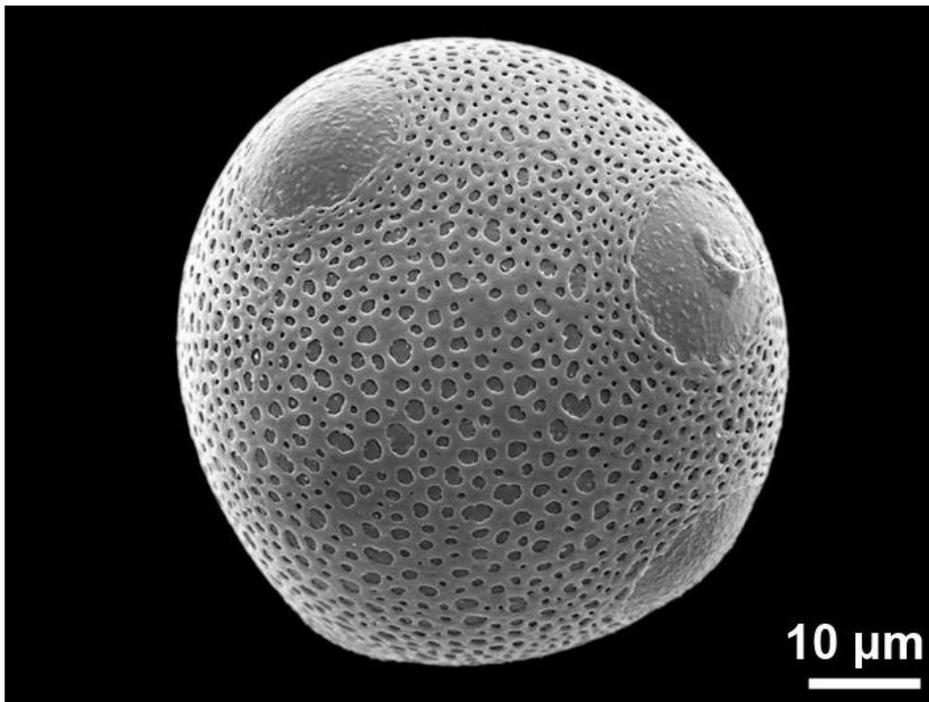
hydrated pollen grain / Photographer: Halbritter, Heidemarie

For various reasons, including the low resolution as to whether *Gravisia* and *Portea* should be kept separately, the authors did not suggest any actual changes, so all the *Gravisia* are still *Aechmea*.⁴

Most of the *Aechmea* that were sampled that didn't fall into the *Gravisia/Portea* had 3 or 4 pores, like this species.

Aechmea fulgens

x



hydrated pollen grain / Photographer: Halbritter, Heidemarie

It seems doubtful that pollen will ever play as large a role as that proposed by Mez. However, as seen above, it continues to play an important role in Bromeliad taxonomy. As DNA studies become more sophisticated, it will be intriguing to see how much variation exists in the pollen of closely related species.

⁴ It wasn't clear that the authors addressed Smith's concerns that many *Aechmea* have polyporate pollen. However, the *Gravisia* complex, as currently constituted, is much larger than *Gravisia* in 1970 and I suspect the study just included many of the *Aechmea* that Smith said were polyporate.