S.F.V.B.S.

SAN FERNANDO VALLEY BROMELIAD SOCIETY

AUGUST 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** Sunshine Chair: **Georgia Roiz,** Refreshments: **vacant** Web: **Mike Wisnev,** Editors: **Mike Wisnev & Mary K.,** Snail Mail: **Nancy P-Hapke**

next meeting: Saturday August 5, 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* *Dave Bassani*

"Landscaping with Bromeliads"

David said Bromeliads are one of several plants that are underused in landscapes. The presentation will feature design, watering, plant choices, lighting and he suggested imagination. He said "I have never seen a blank slate but nod politely when I'm told that I have one".

Serendipity is the word David thinks would best describe his professional life. As a youngster he daydreamed a lot and now in his professional life he uses his imagination to dream up approaches to situations in and around the garden. He aims to please; his business has done well based on word of mouth. In a way David considers his approach to the garden like that of a commission painter.

The art of the garden is only possible by having the practical knowledge of having apprenticed for five years to learn contracting, plants and planting techniques, ponds, fences, walkways, lighting, etc. In David's words "I know what I know. I know what I don't know. I know who to ask to find out necessary information; hence my membership in many plant societies."

Mr. Bassani has a varied professional background. He taught school for six years, was Founder's liaison with the L. A. Philharmonic from 1979-1984 and worked as an Insurance Agent until 1992 when his wife said "what are you waiting for?" So many business associates were calling upon him for free gardening advice that his wife urged him to quit the insurance job and start charging for his gardening knowledge. It was a serious decision to leave a regular job with two small children and a wife to consider, but he took her advice and hasn't looked back. Landscape Architect, Greg Toland, recommended David to Mr. & Mrs. Frank Wells to assist with her Malibu home landscaping. Mr. Wells was President of Disney at that time. Within a few months he had landed work for some of the next door neighbors with their homes and their businesses in Beverly Hills and the list goes on.

David and his wife Sue are certified judges for the American Rose Society. They joined SFVBS almost 10 years ago. In 2010 David accepted an acting position of President and was elected and served two more years thru 2012. <>

11:15 - Refreshment Break and Show and Tell: Will the following members please provide refreshments this month: ***Chris Rogers, Georgia Roiz, Joyce Schumann, Carole Scott, Jane Shultz, Raquel Smith, Peter Speciale, 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.

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 <>

Maryk is taking a look back at last month……..

Last month we put out a request for raffle and auction plant donations and we had a very nice response. Thanks to Duke, Richard, Maryk, Bryan, Chris, Michael Matsumoto, Steve, Nancy, Georgia, John M. and Tom Lucero. I tried to confirm names on the attendance sheet but was unable to. Hope I didn't miss anyone. Hope I didn't miss anyone. Tetsuya, a guest from Japan, was very impressed by the great Show-N-Tell plants brought in by Steve, Bryan, Leni, Maryk, J. Martinez, Richard and Mike. Robert Kopfstein, our speaker gave a very nice program after a slow start; there were problems with operation of the laptop and projector. When all seemed lost, a very nice lady by the name of Trina --- a visitor no less, stepped in to save the program. We are very grateful, hope she comes back. Thanks to those who contributed to the nice refreshments.

Last month I failed to mention some people who were important to our June show and sale. We especially want to say thanks to Bryan Chan who was the general show chair, in charge of sales and Leni Koska who was responsible for the inside display. Bryan put together a list of other participants and we hope we don't leave off any names this time. We are a small club so everyone and every little contribution is important. The fees we pay to participate in the festival have become so enormous that often we question whether or not we will participate. We have, however, been a part of this event since the first LACSS show so we will probably be there again in 2018. Financially John Martinez and Kathleen Misko were a big help this year by donating a speaker program on our behalf which reduced our festival cost significantly. Kathleen wasn't at the July meeting when the club thanked John so now we are sending her a Big Thank You.

Other members who contributed for our club:

Set up - *Bryan, Leni Koska, Richard Kaz, Mary Chan, Steve Ball and MaryK.*
Plant Sales - *Bryan, Richard, Mary, Nancy, Mike Wisnev, Ana Wisnev, Steve, Nels Christianson*
Display Plants - *Bryan, Richard, Leni, Joyce, MaryK, Mike, Nancy, Steve, Leni, Richard and Live Art Nursery*
Worked inside educating visitors *Leni, Peter Speziale, Mary Chan, Maryk,*
Breakdown Show & Sales – *Bryan, Leni, Peter, Richard, Mary, Steve, Maryk, Mike and Ana.*
Sale Plant Donations – *Bryan, Mike, Steve and Joyce Schumann.* **Treasurer Duties** – *Bryan & Mary Chan*
Interesting Note: The June show and sale were a success due to all those listed above. We have a membership of almost 50, a fourth of the membership helped (12) in some way.

Announcements

Happy August Birthdays – *Bob Friedman 5th, John Martinez 16th, Steve Ball 29, Mary Chan*

- ***We need raffle plant donations*** - Bring 2 bromeliad pups, plant related items or even 2 succulents. Surprising how fast the succulents were selected last month --- nice response; let's do it again
- ***Auction Plants*** - we plan to have about a dozen plants,
- ***Cristy Brenner our September Speaker is special*** – don't miss that meeting

- ***Photos from the 2017 Show*** in case you didn't make it to the Festival, there are a few photos of our display on the last page of this newsletter. *Photos by Mary Chan* on page 20 -26
- ***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
- ***Directions to South Bay Bromeliad Show & Sale*** on **Sat & Sun August 5 & 6** at Rainforest Flora Inc., (RFI) 19121 Hawthorne Blvd. in Torrance. Directions from Sepulveda Garden Center: (approx. 25.5 miles & 30 min.) East on 101 Fwy. / South on 405 Fwy. towards Santa Monica / Exit # 42A at Hawthorne Blvd. It is a very nice, Judged show. https://www.facebook.com/pages/Rainforest-Flora-Inc https://www.youtube.com/watch?v=oTLOMjRS3FE
- ***Mosquitoe warning*** – At 80 degrees water becomes stagnant in about 4 days. Stagnant water means Mosquitos are breeding. They live in the same tropical environments as the outdoor growth of bromeliads and die off when temperatures drop below 50. Flush bromeliads or add fresh water every 3 or 4 days.
- ***Web and Facebook*** - Thanks to Kim Thorpe, our Web page is up and running again. We need someone to volunteer for facebook. That would mean listing meetings and maybe some photos from the last meeting or shows. Also we need all our members to ocassionally look at and like what we have posted. Every time you type like the page is forwarded to your facebook friends which translates to free advertising.

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 & Sunday August 5 & 6	So. Bay Bromeliad Show & Sale
Saturday September 2	Cristy Brenner
Saturday October 7	Pam Koide
Saturday November 4	Nels Christianson
Saturday December 2	Holiday Party
Saturday January 6, 2018	***STBA***

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 – *The Ronnbergia Alliance – Aechmea, Hohenbergia and Wittmackia – Part 2*

By Mike Wisnev (mwisnev@gmail.com)

San Fernando Valley Bromeliad Society Newsletter –August 2017

Part 1 described the early *Ronnbergia* research of Julian Aguirre – Santoro. There are three different morphological groups for species of that genus, to which various *Aechmea* species likely belonged. Preliminary DNA studies supported this, but without sufficient strength to break up the genus.

Drawing on his earlier work, and that of others such as Sass and Specht who had established a likely relationship among *Ronnbergia*, the *Aechmea lingulata* complex and *Hohenbergia* subgenus *Wittmackiopsis*, new DNA studies included most species of those three groups and more DNA markers. Aguirre-Santoro J, Michelangeli FA, Stevenson DW. 2016. Molecular Phylogenetics of the *Ronnbergia* Alliance (Bromeliaceae, Bromelioideae) and insights into their morphological evolution. Molec Phylogen Evol 100:1–20.

Ronnbergia deleonii photo by D Cathcart

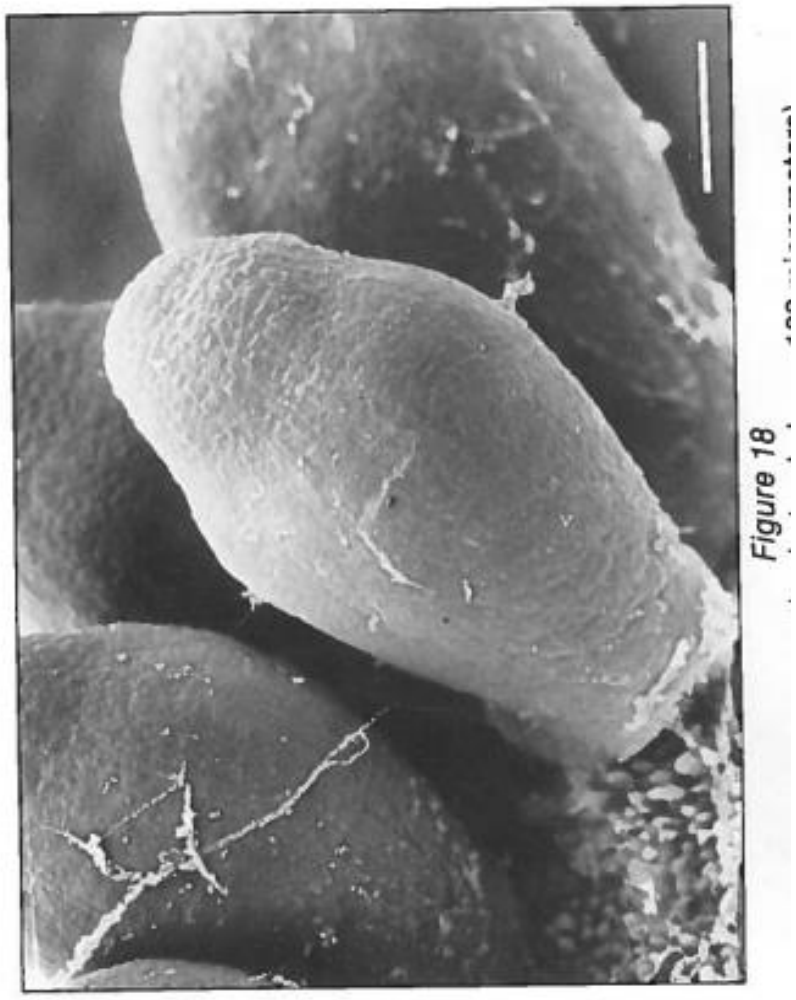
Ronnbergia explodens

photographed by **Werner Rauh**.

Based on these new studies, Aguirre-Santoro published another paper that revised the *Ronnbergia* genus and resurrected an old one, *Wittmackia*. Aguirre-Santoro J. 2017. Taxonomy of the *Ronnbergia* Alliance (Bromeliaceae: Bromelioideae): new combinations, synopsis, and new circumscriptions of *Ronnbergia* and the resurrected genus *Wittmackia.* Plant Syst Evol. DOI 10.1007/s00606-017-1394-y ("2017 Paper").

The 2017 Paper states that the *Ronnbergia* alliance is "recognized by the combination of their sessile flowers, tubular and apically spreading corollas, and chalazal ovule appendages absent or rudimentary." For more on chalazal, see the next article below.

Fruiting speciman of *Ronnbergia petersii.* Both photos by Werner Rauh. 41 BSI 175 (1991).



Obtuse ovules of *R. petersii.*

Recall Aguirre-Santoro initially broke *Ronnbergia* into two geographical regions. The first, which he calls the Pacific clade, is an interconnected group in Central America and northwestern South America. This is the revised *Ronnbergia* genus. The new study, with additional *Hohenbergia* and *Aechmea* species, changed the second group which was in Brazil. Specifically, the Brazilian group extended north along the coast and into the islands of the Caribbean, although there is a large areas with no species. This is the Atlantic clade, which is the resurrected *Wittmackia* genus.

Revised *Ronnbergia* genus. The 2017 Paper stated "The first lineage, also called the Pacific clade, included species of *Aechmea* and *Ronnbergia* endemic to the forested regions from Costa Rica to central Peru. This clade can be roughly identified by the combination of simple inflorescences, long corolla tubes, and pigmented petals (except green)."

Figure 4
Two plants recently re-collected in Ecuador by Wally Berg and Dennis Cathcart are shown here for the first time in color: *Aechmea involucrata* André (above), and *A. fraseri* Baker (below).

Ronnbergia (previously ***Aechmea)***
involucrata. 41 BSI 200 (1991).
Photo by Berg.

The northern members of the Pacific clade grow in rainforests, and the southern in semi-deciduous to humid forests. This makes it likely they grow a lot better in Florida than California, at least the San Fernando Valley. As to the plants shown so far, *R deleonii* grows in Columbia, *R petersii* in Panama and *R explodens* from Panama to Peru. The last was given its name since its seeds explode at the slightest touch.

Ronnbergia (previously ***Aechmea)***
fraseri. 41 BSI 200 (1991). Photo by Berg.

This Pacific clade is now the revised *Ronnbergia* genus, with 26 members (10 prior *Ronnbergia* species, 12 former *Aechmea* species and four new (but not yet named) species). They include the ten *Ronnbergia* shown in subgroups 1 and 2 in last month's article, and most of the *Aechmea* (except *A mariae-reginae*) listed as potential members.

The former *Aechmea* species include 9 former subg. *Pothuava* members and three from subg. *Chevaliera*. He noted the latter three were rather different "because of their strobiliform inflorescences covered with broad and rigid floral bracts, and strongly compressed flowers." Id. See the picture below.

Ronnbergia veitchii - one of the more unusual new *Ronnbergia* species, previously *Chevaliera veitchii*, then *Aechma veitchii*, in subg. *Chevaliera*. **Belgique Hort. 28: 177, pl. 9. 1878.**

Resurrected *Wittmackia* genus. The second group, the Atlantic clade, is now the resurrected *Wittmackia* genus. Before continuing, a diversion may be helpful. *Wittmackia* has been mentioned briefly in the Newsletter articles on *Aechmea* and their history. That series of articles discussed other genera that were merged into *Aechmea* over time. However, it didn't discuss *Wittmackia* in any detail, other to note it was created by Mez, and Smith later merged it into *Aechmea* since its differences weren't significant enough. Since Mez wrote in Latin, someone else will have to take a look to see why Mez created the genus. The genus had five species in 1934 – *W. lingulata, odora, glaziovii, patentissima and poeppigii*. The first *Aechmea* described (in 1703) was *A. lingulata*, though then considered a *Bromelia*.

Left is ***Wittmackia lingulata*** in Bot Mag t.8056. 1906. Originally considered a *Bromelia*, it has been considered an *Aechmea, Billbergia* and *Hohenbergia*, among others. Leme and Filho grouped a number of *Aechmea* with this species in the *A lingulata* complex.

These *A. lingulata* complex species are all now considered *Wittmackia*.

Most of us are familiar with at least a few *Hohenbergia*. However, that genus has been controversial. It consists of two subgenera. Species in subgenus *Hohenbergia* are found mainly in Brazil, and have yellow, green or blue flowers and apiculate to caudate ovules. In contrast, subg. *Wittmackiopsis* are mainly in the Caribbean and Greater Antilles and have mostly white flowers and obtuse ovules. Like *Ronnbergia*, other DNA studies have suggested that the two subgenera don't belong together, although each subgenus is monophyletic. Also like *Ronnbergia*, it seems the species in subg. *Wittmackiopsis* are rarely cultivated, at least in our neck of the woods.

The name *Wittmackiopsis* means resembling *Wittmackia,* so it might come as no surprise that there is some similarity between the two groups. Again, Mez created the subgenus, so someone needs to read Latin to tell us. It appears that both have obtuse shaped ovules or placenta.

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Wittmackia inermis,
previously *Hohenbergii.*
Photo by **Kerry Booth Tate.**

This is an example of a paniculate inflorescence, that is, it has branches. Most of the former subg. *Wittmackiopsis* species have compressed flowers with white acute petals. However, not all *Wittmackia* have these characteristics.

Aechmea subintegerrima **photo by Elton Leme**

Wittmackia brasiliensis,
shown above, as *A subintegerrima*.

This species was described as a *Ronnbergia* in 1985, but later transferred (and renamed) to *Aechmea* by Leme due to its similarity to members of the *A lingulata* complex. Leme, E.M.C. (2011) New species and a new combination of Brazilian Bromeliaceae. Phytotaxa 16: 1–36. Now both it, and members of the *A lingulata* complex are considered *Wittmackia*.

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Returning to the 2017 Paper, Aguirre-Santoro has proposed that the species in the Atlantic clade be moved to the resurrected *Wittmackia* genus. This genus has two disjunct areas, the first primarily in Bahia Brazil and extending north and the second in Jamaica and some of the Greater Antilles. They "inhabit a wide variety of environments from hygrophilous mountainous forests to dry habitats in semideciduous forests and tropical dry forest." Id.

The *Wittmackia* genus has 44 members – four former *Ronnbergia* species, the so called *Aechmea lingulata* complex members, and the former species of *Hohenbergia* subg. *Wittmackiopsis*.

The new genus and the old one described by Mez both share the lack of ovule appendages, but not the lack of petal appendages. "The most distinctive characters that separate *Ronnbergia* from *Wittmackia* are its generally longer flowers ([20–]25–50 mm vs. 9–20[–37] mm long), longer corolla tubes ([6–]11–27 mm vs. 2.5–7 mm long), frequently pigmented flowers (vs. white, rarely green), and petal appendages arising from the base of the petal, when present (vs. above 2 mm or more from the petal base, when present)." Id.

Hohenbergia penduliflora photo by Francois Marquis

ergia penduliflora photo by Francois Marquis

***Wittmackia penduliflora*, previously *Hohenbergia penduliflora in subg. Wittmackiopsis*. Photos by Francois Marquis.**

Figure 3.
Aechmea bicolor

Figure 4.
Aechmea burle-marxii, the closest relative of *A. bicolor*

Two other *Wittmackia* that had been considered *Aechmea*. Photos by Elton Leme. From Rediscovering *Aechmea bicolor* by Leme. 47 JBS 8-10 (1997). *A. bicolor* is sister to the clade containing former members of *Hohenbergia* subg. *Wittmackiopsis*, yet differs considerably with its simple inflorescence and erect and obtuse petals (vs. reflexed and acute.) In fact, it may be the only species in the *Ronnbergia* Alliance with erect petals.

photograph by E. Leme
JBS 53(2).2003

Above is ***Wittmackia* (formerly *Ronnbergia*) *silvana***, photo by **Leme** in cultivation. It grows in Bahia Brazil.

For those interested, the article has a technical description of each genus, as well as key for the species and synopsis of each species. There is a lot of information, which undoubtedly took an enormous amount of time to compile. But Aguirre-Santoro did earn a Ph.D. for his dissertation on this topic.

For the hobbyist, these changes can be difficult to digest (or would be if not for the species are rarely cultivated). One problem for the hobbyist is that there aren't easy identifiable features to identify the new genera. The 2017 Paper says the *Ronnbergia* Alliance is "recognized by the combination of their sessile flowers, tubular and apically spreading corollas, and chalazal ovule appendages absent or rudimentary." It is the combination of these features that is the key, not any of them individually. And almost no hobbyist can tell if there are chalazal appendages.

The distinctions between the two genera are also difficult – basically longer and pigmented flowers for *Ronnbergia*. Wittmackia species generally have acute and white petals and paniculate inflorescences, but there are exceptions. All *Ronnbergia* have simple inflorescences, but some *Wittmackia* species also have them.

Wittmackia (formerly *Ronnbergia*) *neoregeliodes*, from Michael's Bromeliads.

As best as I remember, this is the only *Ronnbergia* or *Wittmackia* I have actually seen.

In part this stems from the rapidly evolving nature of the bromeliad family, especially this particular subfamily. While a clade may originally start with some common features, some members soon evolve with different ones.
There are some clades whose species show significant similarity. For example, the species formerly assigned to *Hohenbergia* subg. *Wittmackiopsis* generally have compressed flowers and strobilate spikes, as well as long sepal mucros and short corolla tubes, while the others in the Atlantic clade have laxer spikes and non-compressed flowers. (The Hohenbergia subg Hohenbergia species also have compressed flowers and stobilate spikes, but they have ovule appendages and generally pigmented flowers.) However, at this time the DNA evidence did not support breaking *Wittmackia* into subgenera, although future studies may provide such support. (As a technical matter, all of the former *Hohenbergia* species fell on one clade, but the rest of the species fell on more than one clade.)

Most, but not all, of the *Ronnbergia* species that had been *Ronnbergia* before also have identifiable features. The easiest to see are the leaf petioles that characterize this group.

Photographs by L.O.F. de Sousa.

Figure 26. A: Young inflorescence of *Aechmea turbinocalyx*. Note the sepal apex turned to the left (arrow), placing the apiculus horizontally. B: Detail of open flowers of *A. turbinocalyx*. Besides the apices turned to the left, the lateral wings are rolled to the same side (arrow).

Refer J. Brom. Soc 54(6): 279-284. 2004

For those truly curious, below are the new lists of the two genera as reported by Prof. Eric Gouda and Derek Butcher in *The new Bromeliad Taxon list. http://botu07.bio.uu.nl/bcg/taxonList.php*

If anyone has any of these, it would be great if you bring one in to the meetings or send a photo so we can see it.

RONNBERGIA E.Morren & André (22)

Ronnbergia aciculosa (Mez & Sodiro) Aguirre-Santoro
Ronnbergia allenii (L.B.Sm.) Aguirre-Santoro
Ronnbergia brasiliensis E.Pereira & I.A.Penna => Wittmackia brasiliensis
Ronnbergia campanulata Gilmartin & H.Luther
Ronnbergia carvalhoi Martinelli & Leme => Wittmackia carvalhoi
Ronnbergia columbiana E.Morren
Ronnbergia deleonii L.B.Sm.
Ronnbergia drakeana (André) Aguirre-Santoro
Ronnbergia explodens L.B.Sm.
Ronnbergia fraseri (Baker) Aguirre-Santoro
Ronnbergia germinyana (Carriere) Aguirre-Santoro
Ronnbergia hathewayi L.B.Sm.
Ronnbergia involucrata (André) Aguirre-Santoro
Ronnbergia killipiana L.B.Sm.
Ronnbergia maidifolia Mez
Ronnbergia marantoides L.B.Sm. => Lymania marantoides
Ronnbergia morreniana Linden & André
Ronnbergia neoregelioides Leme => Wittmackia neoregelioides
Ronnbergia nidularioides H.Luther
Ronnbergia petersii L.B.Sm.
Ronnbergia silvana Leme => Wittmackia silvana
Ronnbergia subpetiolata (L.B.Sm.) Aguirre-Santoro
Ronnbergia tonduzii (Mez & Pittier ex Mez) Aguirre-Santoro
Ronnbergia veitchii (Baker) Aguirre-Santoro
Ronnbergia viridispica (Aguirre-Santoro & Betancur) Aguirre-Santoro
Ronnbergia weberbaueri (Harms) Aguirre-Santoro
Ronnbergia wuelfinghoffii (E.Gross.) Aguirre-Santoro

WITTMACKIA Mez (44)

Wittmackia abbreviata (L.B.SM. & Proctor) Aguirre-Santoro
Wittmackia altocaririensis (Leme & L.Kollmann) Aguirre-Santoro
Wittmackia amorimii (Leme) Aguirre-Santoro
Wittmackia andersoniana (Leme & H.Luther) Aguirre-Santoro
Wittmackia antillana (Mez) Aguirre-Santoro
Wittmackia bicolor (L.B.Sm.) Aguirre-Santoro
Wittmackia brasiliensis (E.Pereira & I.A.Penna) Aguirre-Santoro
Wittmackia burlemarxii (E.Pereira) Aguirre-Santoro
Wittmackia canaliculata (Leme & H.Luther) Aguirre-Santoro
Wittmackia carvalhoi (Martinelli & Leme) Aguirre-Santoro
Wittmackia caymanensis (Britton ex L.B.Sm.) Aguirre-Santoro
Wittmackia distans (Griseb.) Aguirre-Santoro
Wittmackia eriostachya (Mez) Aguirre-Santoro
Wittmackia fawcettii (Mez) Aguirre-Santoro
Wittmackia froesii (L.B.Sm.) Aguirre-Santoro
Wittmackia glaziovii Mez => Wittmackia patentissima
Wittmackia gregaria (Leme & L.Kollmann) Aguirre-Santoro
Wittmackia incompta (Leme & H.Luther) Aguirre-Santoro
Wittmackia inermis (Mez) Aguirre-Santoro
Wittmackia ituberaensis (Leme & L.Kollmann) Aguirre-Santoro
Wittmackia jamaicana (L.B.Sm. & Proctor) Aguirre-Santoro
Wittmackia laesslei (L.B.Sm.) Aguirre-Santoro
Wittmackia laevigata (Leme) Aguirre-Santoro
Wittmackia limae (Leme) Aguirre-Santoro
Wittmackia lingulata (L.) Mez
Wittmackia lingulatoides (Leme & H.Luther) Aguirre-Santoro

Wittmackia linharesiorum (Leme) Aguirre-Santoro
Wittmackia maranguapensis (Leme & Scharf) Aguirre-Santoro
Wittmackia mesoamericana (I.Ramirez, Carnevali & Cetzal) Aguirre-Santoro
Wittmackia negrilensis (Britton ex L.B.Sm.) Aguirre-Santoro
Wittmackia neoregelioides (Leme) Aguirre-Santoro
Wittmackia odora (Miquel) Mez => Wittmackia lingulata
Wittmackia patentissima (Mart. ex Schult. & Schult.f.) Mez
Wittmackia penduliflora (A.Rich.) Aguirre-Santoro
Wittmackia pendulispica (Leme & L.Kollmann) Aguirre-Santoro
Wittmackia pernambucentris (J.A.Siqueira & Leme) Aguirre-Santoro
Wittmackia poeppigii (Baker) => Wittmackia lingulata
Wittmackia polycephala (Baker) Aguirre-Santoro
Wittmackia portoricensis (Mez) Aguirre-Santoro
Wittmackia rohanestyi (Proctor, Aguirre-Santoro & K.Campbell) Aguirre-Santoro
Wittmackia silvana (Leme) Aguirre-Santoro
Wittmackia spinulosa (Mez) Aguirre-Santoro
Wittmackia sulbahianensis (Leme, Amorim & J.A.Siqueira) Aguirre-Santoro
Wittmackia tentaculifera (Leme, Amorim & J.A.Siqueira) Aguirre-Santoro
Wittmackia turbinocalyx (Mez) Aguirre-Santoro
Wittmackia urbaniana (Mez) Aguirre-Santoro
Wittmackia viridostigma (Leme & H.Luther) Aguirre-Santoro

Some technical terms – Chalazal.

This was a new word for me. It is the part of the ovule that is attached to the funicle. The ovule is part of the ovary, and is connected to ovary by the funicle. The ovule turns into the seed, while the ovary turns into the fruit. More technical words. Rather than try to explain, I have copied some information from the web, which may or may not be correct!

The figures below appear in *Aechmeas* from Seed to Seed, by Arla Rutledge and Harvey Kendall, in 27 BSI 100 (1977). Item D shows the fruit and seed within it, but this also is more or less the same as the ovary with the various ovules within them.

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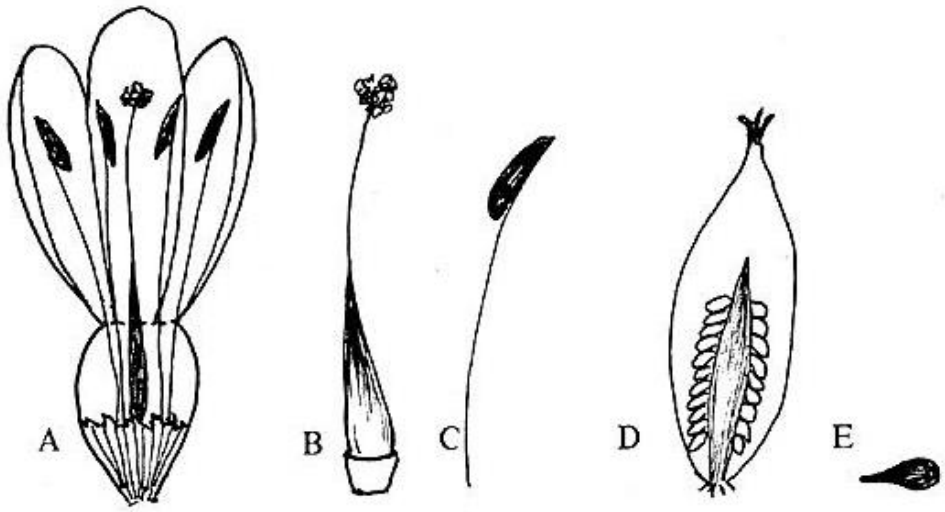

A. Petals, showing pistil and stamens.
B. Pistil, stigma and ovary.
C. Stamen, showing pollen.
D. Fruit, showing arrangement of seed.
E. Aechmea seed.

“ **chalaza:** *the part of an ovule to which the end of the stalk (funicle) is attached. Fig. 21. adj. chalazal.*

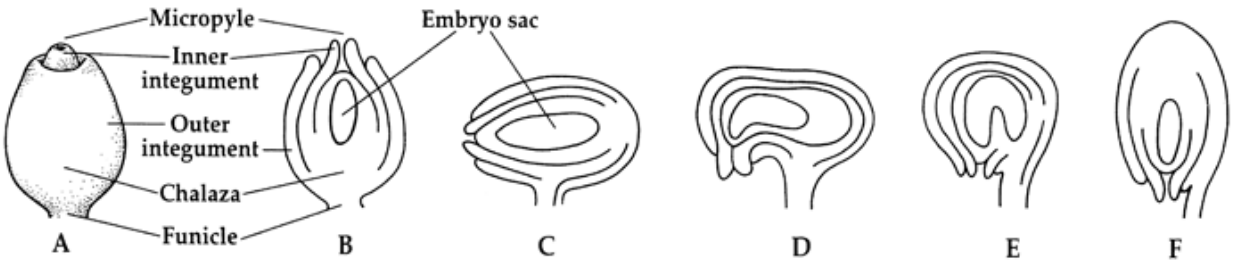

Fig. 21. Ovules. *A, orthotropous ovule; B–F, ovules in longitudinal section: B, orthotropous ovule; C, hemitropous ovule; D, campylotropous ovule; E, amphitropous ovule; F, anatropous ovule. “*

Above taken from New South Wales Flora Online. http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&glossary=yes&term=chalaza&ill=Fig.+21+

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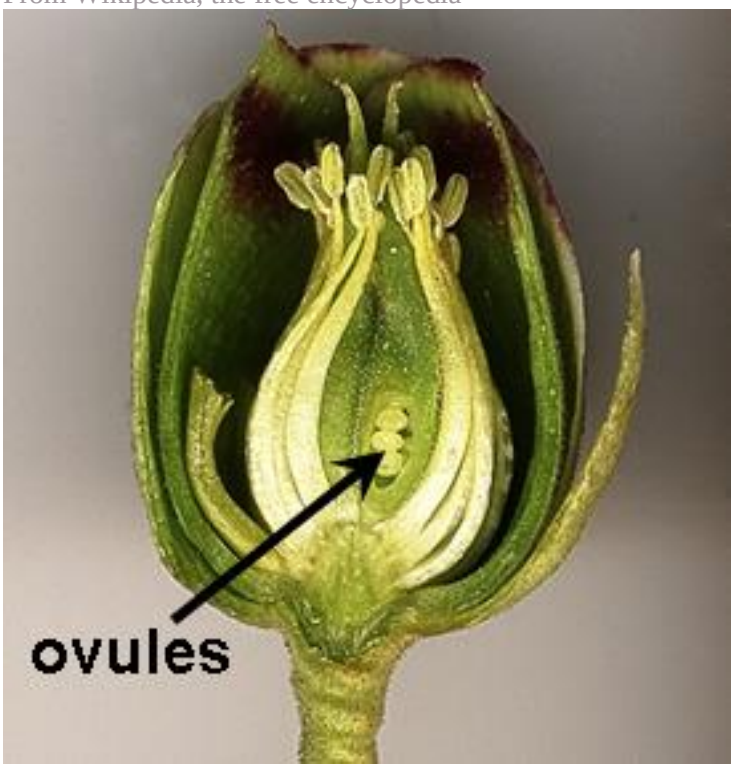
Below is more technical information from Wikiwand. *http://www.wikiwand.com/en/Ovule*

“Ovule

Connected to:
GametophyteMegasporeSeed

From Wikipedia, the free encyclopedia



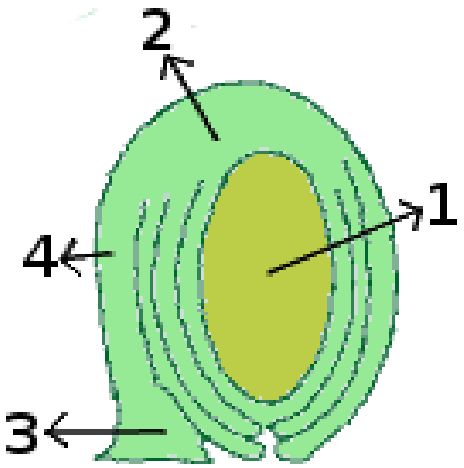
Location of ovules inside a *Helleborus foetidus* flower

In seed plants, the **ovule** ("small egg") is the structure that gives rise to and contains the female reproductive cells. It consists of three parts: The **integument(s)** forming its outer layer(s), the **nucellus** (or remnant of the megasporangium), and female gametophyte (formed from haploid megaspore) in its center. The female gametophyte—specifically termed a *megagametophyte*—is also called the **embryo sac** in angiosperms. The megagametophyte produces an egg cell (or several egg cells in some groups) for the purpose of fertilization. After fertilization, the ovule develops into a seed.

Location within the plant

In flowering plants, the ovule is located inside the portion of the flower called the gynoecium. The ovary of the gynoecium produces one or more ovules and ultimately becomes the fruit wall. Ovules are attached to the placenta in the ovary through a stalk-like structure known as a **funiculus** (plural, funiculi). Different patterns of ovule attachment, or placentation, can be found among plant species, these include:[1]

- **Apical placentation**: The placenta is at the apex (top) of the ovary. Simple or compound ovary.
- **Axile placentation**: The ovary is divided into radial segments, with placentas in separate locules. Ventral sutures of carpels meet at the centre of the ovary. Placentae are along fused margins of carpels. Two or more carpels. (e.g. *Hibiscus*, *Citrus*, *Solanum*) [Note- According to the Illustrated Handbook of Succulents: Monocotyledons, Urs Eggli (editor), bromeliads have an axile placentation.]
- **Basal placentation**: The placenta is at the base (bottom) of the ovary on a protrusion of the thalamus (receptacle). Simple or compound carpel, unilocular ovary. (e.g. *Sonchus*, *Helianthus*, Compositae)
- **Free-central placentation**: Derived from axile as partitions are absorbed, leaving ovules at the central axis. Compound unilocular ovary. (e.g. *Stellaria*, *Dianthus*)
- **Marginal placentation**: Simplest type. There is only one elongated placenta on one side of the ovary, as ovules are attached at the fusion line of the carpel's margins . This is conspicuous in legumes. Simple carpel, unilocular ovary. (e.g. *Pisum*)
- **Parietal placentation**: Placentae on inner ovary wall within a non-sectioned ovary, corresponding to fused carpel margins. Two or more carpels, unilocular ovary. (e.g. *Brassica*)
- **Superficial**: Similar to axile, but placentae are on inner surfaces of multilocular ovary (e.g. *Nymphaea*)

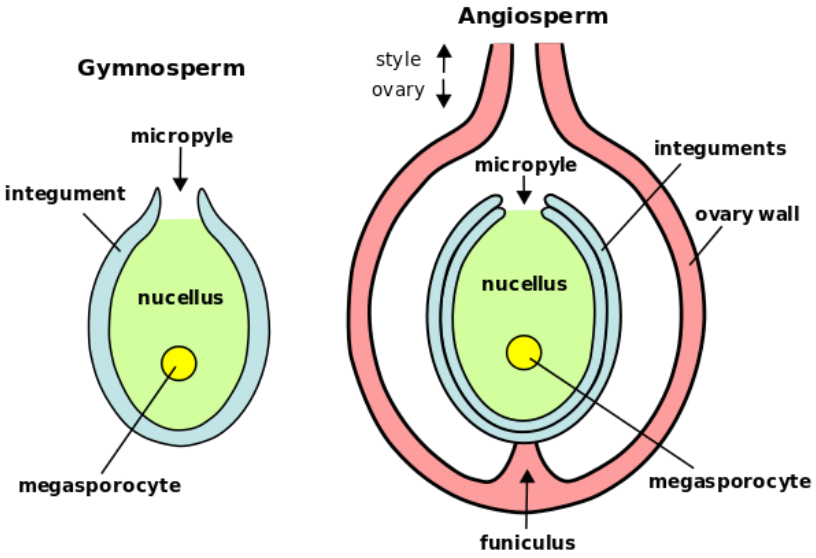


Ovule structure (anatropous) 1: nucleus 2: chalaza 3: funiculus 4: raphe

Ovule orientation may be **anatropous**, such that when inverted the micropyle faces the placenta (this is the most common ovule orientation in flowering plants), **amphitropous**, **campylotropous**, or **orthotropous**.

In gymnosperms such as conifers, ovules are borne on the surface of an ovuliferous (ovule-bearing) scale, usually within an ovulate cone (also called megastrobilus). In some extinct plants (e.g. Pteridosperms), megasporangia and perhaps ovules were borne on the surface of leaves. In other extinct taxa, a cupule (a modified leaf or part of a leaf) surrounds the ovule (e.g. *Caytonia* or *Glossopteris*).

Ovule parts and development



Plant ovules: Gymnosperm ovule on left, angiosperm ovule (inside ovary) on right

The ovule appears to be a megasporangium with integuments surrounding it. Ovules are initially composed of diploidmaternal tissue, which includes a megasporocyte (a cell that will undergo meiosis to produce megaspores). Megaspores remain inside the ovule and divide by mitosis to produce the haploid female gametophyte or megagametophyte, which also remains inside the ovule. The remnants of the megasporangium tissue (the nucellus) surround the megagametophyte. Megagametophytes produce archegonia (lost in some groups such as flowering plants), which produce egg cells. After fertilization, the ovule contains a diploid zygote and then, after cell division begins, an embryo of the next sporophyte generation. In flowering plants, a second sperm nucleus fuses with other nuclei in the megagametophyte forming a typically polyploid (often triploid) endosperm tissue, which serves as nourishment for the young sporophyte.

Integuments, micropyle and chalaza

An integument is a protective cell layer surrounding the ovule. Gymnosperms typically have one integument (unitegmic) while angiosperms typically have two (bitegmic). The evolutionary origin of the inner integument (which is integral to the formation of ovules from megasporangia) has been proposed to be by enclosure of a megasporangium by sterile branches (telomes).[2] *Elkinsia*, a preovulate taxon, has a lobed structure fused to the lower third of the megasporangium, with the lobes extending upwards in a ring around the megasporangium. This might, through fusion between lobes and between the structure and the megasporangium, have produced an integument.[3]
The origin of the second or outer integument has been an area of active contention for some time. The cupules of some extinct taxa have been suggested as the origin of the outer integument. A few angiosperms produce vascular tissue in the outer integument, the orientation of which suggests that the outer surface is morphologically abaxial. This suggests that cupules of the kind produced by the Caytoniales or Glossopteridales may have evolved into the outer integument of angiosperms.[4]
The integuments develop into the seed coat when the ovule matures after fertilization.

The integuments do not enclose the nucellus completely but retain an opening at the apex referred to as the **micropyle**. The micropyle opening allows the pollen (a male gametophyte) to enter the ovule for fertilization. In gymnosperms (e.g., conifers), the pollen is drawn into the ovule on a drop of fluid that exudes out of the micropyle, the so-called pollination drop mechanism.[3] Subsequently, the micropyle closes. In angiosperms, only a pollen tube enters the micropyle. During germination, the seedling's radicle emerges through the micropyle.
Located opposite from the micropyle is the chalaza where the nucellus is joined to the integuments. Nutrients from the plant travel through the phloem of the vascular system to the funiculus and outer integument and from there apoplastically and symplastically through the chalaza to the nucellus inside the ovule. In chalazogamous plants, the pollen tubes enter the ovule through the chalaza instead of the micropyle opening."

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http://www.biologydiscussion.com/plants/top-6-types-of-placentation-with-diagram-plants/34013

"Top 6 Types of Placentation" (With Diagram) | Plants

Article Shared by Khusboo Jain

The following points highlight the top six types of placentation in a plant. The types are: 1. Marginal 2. Parietal 3. Axile 4. Free-central 5. Superficial or Laminar 6. Basal.

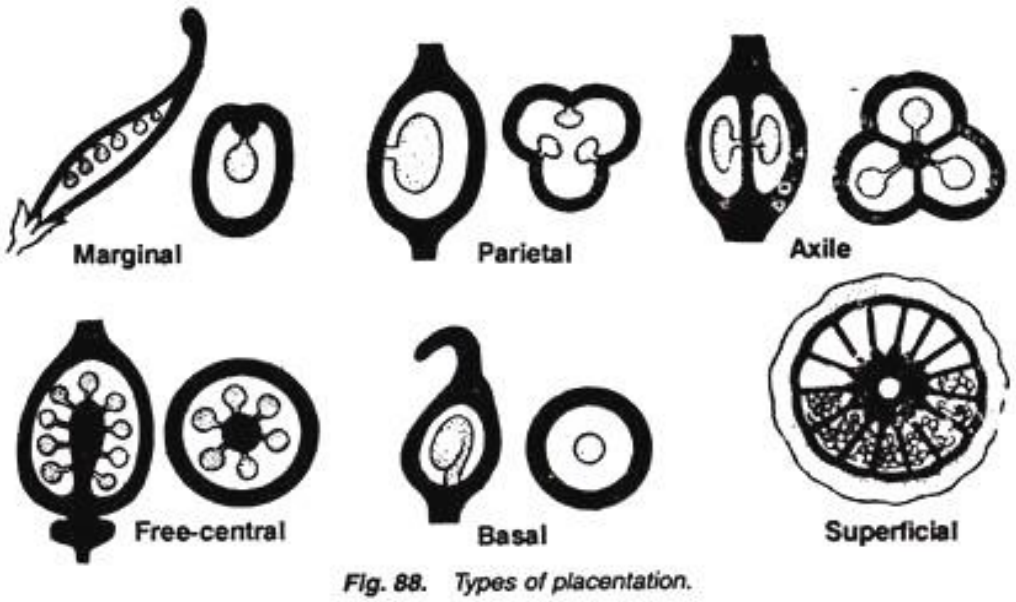

Fig. 88. Types of placentation.

2017 Festival Bromeliad Display

Photos by: Mary Chan


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