The Bromeliad Blade

Newsletter of the San Diego Bromeliad Society

January 2017

VOLUME LII NUMBER 1

President's Corner

By Scott Sandel

2017: Happy New Year Bromeliad Friends!

Here's to, the New Year will bring us good health, happiness and prosperity. Almost as important, we can hope our bromeliads have good vigor, fantastically-developed blooms and a prodigious amount of offsets. As of New Year's Day, we have received a fair amount of precipitation, so that is a good start.

For me, the year 2016 was a good one. I just returned from a 3-weeks of traveling through South Florida, starting in the Tampa area and driving through the Everglades to the Florida Keys and ending the trip in Miami. I was invited to and attended the December holiday meeting of the Florida West Coast Bromeliad Society in Pinellas Park near Tampa. I recognized a few familiar faces – folks who I saw at the 2016 World Bromeliad Society Conference in Houston. I got a chance at the microphone to plug the 2018 conference in San Diego, and several people said they were either already registered or are planning on attending. Jim and I were treated to some good pot-luck food – almost as delicious as the fare at the San Diego holiday meetings! Yes, there were trips to awesome bromeliad nurseries, including Tropiflora and Michael's. Additionally, I contacted and met a few backyard growers who more than graciously sold me a few offsets from their collections. Some choice plants were purchased and shipped, and our recent rainfall has perked up my new plants. Some of the new additions to the collection have fun, fantastic hybrid names, such as Neoregelia 'Lucifer', Neoregelia 'Bad Boy Brian' and Billbergia 'Freek A Zoid'.

A round of applause goes out to our 2015 society officers who did a great job: Robert Kopfstein as President; David Kennedy as Vice-President; Ruth Contino as Secretary; Al Evans, Jr. as Treasurer; Juliana Raposo as Newsletter Editor; and Robert Vitacco as Past-President. Another round of applause should be heard for last year's board members: Nancy Groves (our host for board meetings); Lucia Velazquez, and Bob Walters. Further thanks and acknowledgement goes out to members of the club who volunteered and gave valuable time participating in various events and activities that the club engages in. Robert Kopfstein did an outstanding job as president and fearless leader of our club in 2016. Particularly, I enjoyed reading his President's Corner column every month.

As we head into a new year, we can look forward to some fun club activities and (thanks to the speakers committee) some interesting talks at our monthly meetings. If you have any suggestions for day trips, meeting activities or other club stuff – or if you would like to participate in preparations for the upcoming 2018 World Bromeliad Conference, feel free to drop me a line by email at sandel-marich@cox.net. I'd love to hear from you.

Editor's Notes

by Juliana Raposo

This year is shaping up to be a good one for plant lovers. Look at all this rain! I can't get enough of admiring the plants colors in a rainy day.

A big hug to those of you who opened your homes for a visit from your newsletter editor. If you weren't visited in 2016, consider inviting me over this year and show how you grow your broms!

Looking forward, 2017 will certainly be a year of learning for bromeliad lovers. A giant taxonomic revision is coming into effect, so just about every other bromeliad name you painstakingly learned has changed. The changes reflect new discoveries on how bromeliads evolved. Although memorizing the new names is not fun, knowing that there is a joint scientific effort under way to study and understand our beloved broms is certainly exciting. The article by our New York colleague Herb Plever is an excellent primer (See page 12).

Little slice of my backyard under rain. A mix of colors and textures, including Hohembergia correia-araujoi in bloom.

I want to thank the whole club for helping with our monthly newsletter. I am delighted to receive your contributions, from pictures of your broms to articles so well written that they could fit in the National Geographic. 2016 was the year I got to know many of you better and share in your love for plants. It means a lot to me! Thanks to all my "serial" contributors for sending material constantly even though you have no obligation!

A special thanks goes to Robert Kopfstein and his uncanny literary talent. I was eager to read his President's Corner every month and be amazed at how he combined plant knowledge and a good read - again, and again.

On a different note, please add my email julianadraposo@gmail.com to your contact list if you haven't already. Bounced emails are a recurring problem and we had a record number of "delivery failures" last month. If I'm not on your contacts, some email providers will categorize our monthly blast as spam! In case you already saved my email address but haven't been receiving newsletters, call or text me at 858-349-1405.

Thank you and Happy New Year!

Time to Renew your SDBS Membership!

It's that time of year again for membership renewals. Check the latest membership directory that was sent by email to see when your membership is due. If it doesn't say 2017 or 2018, your dues are due in January. I publish the 2017 membership directory in March so your dues need to be paid by that time to be included.

1 year - $13 single / $17 dual
2 years - $22 single / $30 dual

Also, dues can be paid at the meeting or sent to my address at 2601 Palace Drive, San Diego 92123 or the SDBS address at PO Box 83996, SD 3996.
Thanks,

Al Evans, membership chairman

Upcoming Events

Highlighted Meetings

January 14, 2017 at 10 AM
SDBS Monthly Meeting
Balboa Park, Casa del Prado, room 104
www.bsi.org/webpages/san_diego.html

February 11, 2017 at 10 AM
SDBS Monthly Meeting
Balboa Park, Casa del Prado, room 104
www.bsi.org/webpages/san_diego.html

Save The Date!

World Bromeliad Conference, San Diego
May 29 – June 3, 2018

Register at:
http://www.bsi.org/new/conference-corner/

Monthly Meetings

1st Tuesday, 6:30 PM
San Diego Orchid Society
Balboa Park, Casa Del Prado, Room 101
www.sdorchids.com

2nd Saturday, 10 AM
San Diego Bromeliad Society
Balboa Park, Casa Del Prado, Room 104
www.bsi.org/webpages/san_diego.html

2nd Saturday, 1 PM
San Diego Cactus and Succulent Society
Balboa Park, Casa Del Prado, Room 101
www.sdcss.net

2nd Monday, 5:45 PM
San Diego Horticultural Society
Congregation Beth Israel (CBI)
9001 Towne Centre Drive
San Diego, CA 92122
www.sandiegohorticulturalsociety.org

SDBS Bromeliad Christmas Tree

The SDBS Christmas tree at the Balboa Park December Nights was a wild one!

Every year, our club and several other plant society decorate 30 trees as part of the most beloved Christmas celebration in San Diego.

This year, the theme was the 100th anniversary of the San Diego Zoo, and the SDBS tree decorated with broms also had stuffed animals and a zebra print ribbon. The toys used in the tree decoration were donated to Toys for Tots by SDBS.

Thanks to Nancy Groves, Bob Vitacco and Bob Walters for decorating the tree.

SDBS 2017

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Holiday Party

The Christmas party was great fun. I tried to take a picture of everyone who came. As usual we had a potluck, a plant raffle and auction of the Christmas tree, finalizing with a gift exchange.

Thanks to all that were able to come!

THE BROMELIAD BLADE

SAN DIEGO BROMELIAD SOCIETY
Established 1965

Newsletter of the San Diego Bromeliad Society

Juliana Raposo, Editor

Ph: 858-349-1405

To send material for publication, please contact Juliana at julianadraposo@gmail.com

Make sure to submit your contribution before the 20th of the month for inclusion in the next newsletter.

SDBS MEETING

The club meets on the second Saturday of the month at 10am in Balboa Park, Casa del Prado, room 104.

SDBS WEBPAGE

www.bsi.org/webpages/san_diego.html

January Meeting

The talk

"Growing Uncommon Bromeliad Genera"

Only eight of the 55 bromeliad genera are commonly cultivated by bromeliad hobbyists throughout the world. A few of the other 47 genera can't be cultivated; but most can, at least in some environments. Some are relatively easy to grow; bur not widely cultivated for various reasons. In this presentation, we'll take a look at those 47 genera.

We'll characterize the environments they grow in naturally, learn about the cultivation conditions they need, and find the reasons they aren't widely cultivated. Along the way, we'll look at beautiful examples of each genus. You may come away with a deeper enthusiasm about trying to grow some species of these uncommon genera.

Dr. Terrie Bert is a longstanding member of the Sarasota Bromeliad Society (SBS) and the Caloosahatchee Bromeliad Society and has held multiple offices in the SBS. She also served the Florida Council of Bromeliad Societies (FCBS) as a representative and officer for eight years and has authored articles for the FCBS Newsletter. For the Bromeliad Society International, she has been a Florida Director, chaired several international committees, and contributed articles to the BSI Journal. Currently, she is Librarian, Curator of the Wally Berg Award of Excellence, and a Master Judge. Terrie has given over 150 presentations on bromeliads to numerous U.S. and international bromeliad societies and other groups and at international bromeliad conferences. She cultivates more than 2,000 different bromeliads in 30 genera. She's won multiple top awards in local bromeliad shows and BSI world conferences. Terrie has a Ph.D. in marine biology and recently retired from being a research scientist for the Florida Fish and Wildlife Conservation Commission.

Opportunity Table

by Al Evans

January's plant table will be provided by our speaker, Terrie Bert. There is quite a selection with Billbergia, Neoregelia, Aechmea, Nidularium, Cryptanthus, Quesnelia, Portea, Hohenbergia, and Pitcairnia all represented. In addition, there are some more uncommon plants such as Acanthostachys, Fosterella, Alcantarea regina, Araeococcus and Lymania azurea. Hope to see you there.

May 29 – June 3, 2018

World Bromeliad Conference, San Diego

The latest and greatest

By Scott Sandel & Nancy Groves, Co-Chairs

You may have noticed that on-line registration is now available on the BSI website. If not, check out the Conference Corner section of the bsi.org website where you will see a rundown of the registration fees and what your hosts, the San Diego Bromeliad Society, have planned for possible tours. Early in 2017, we will have the events, speakers and pre/post-conference tours more finalized. Our venue for 2018 is the resort of Paradise Point. We really snagged a great venue for 2018. The resort is on a 44-acre island in Mission Bay, and it features bungalow-style rooms amidst lush, tropical gardens, tranquil lagoons, and one mile of sandy beach. At Conference Corner you will see a map and photos of Paradise Point. There are five swimming pools, five dining venues and beach bonfire pits. Maybe we'll roast some marshmallows on the beach!

Note that there are tiered registration fees, and registration fees increase at the end of February, 2017!

As this year progresses, committees will become active. Past experience has shown that breaking down the tasks into focused committee efforts is an effective and fun way to go.

If you would like to join in on the fun of organizing and shaping this event, give us a phone call or email; our contact information is below. Some of the committees (and I might be missing 1 or 2) are as follows:

- Plant Show & Judges
- Plant Sale
- Speakers/Lectures
- Conference Garden Bus Tour
- Conference Main Bus Event
- Post-Conference Tour/Event
- Resort Liaison (and Banquet)
- Welcome Packages & Decorations

Contact one of the co-chairs:

Scott Sandel
(619) 937-5262
sandel-marich@cox.net

Nancy Groves
(858) 453-6486
nancygroves@me.com

The container is suspended, about six feet off the ground, from a branch of a tree that provides shade in summer and allows the low winter sun to bathe it in light all day. That arrangement works fine because both leaf coloration and flowering occur in wintertime. Flowering continues for months, each rosette using its own time schedule. With this staggered sequencing and because the inflorescences are partially hidden by the leaves (photo on the left) the floral display is never dramatic.

However, the plant provides color all winter and seems to attract small birds, such as finches and hummers, to inspect it as a possible move-in site. The rent is quite reasonable.

The plant came to me at one of our monthly meetings five years ago as a single rosette. It was labelled 'Till. Eric Knobloch'. Judgement based on a single rosette is liable to be uncertain and that identification becomes less likely as time goes by. Comparing the inflorescence area with one that appears at the BSI registration site (top left of page) some similarities are apparent but but the rosette size and continued vigor of this plant without any fertilizer applied seems to say that this is not the true Eric K. Maybe it's another result of the brachycaulos x streptophyla cross.

If you've thoughts on this I'd appreciate hearing them.

Could not bring this in

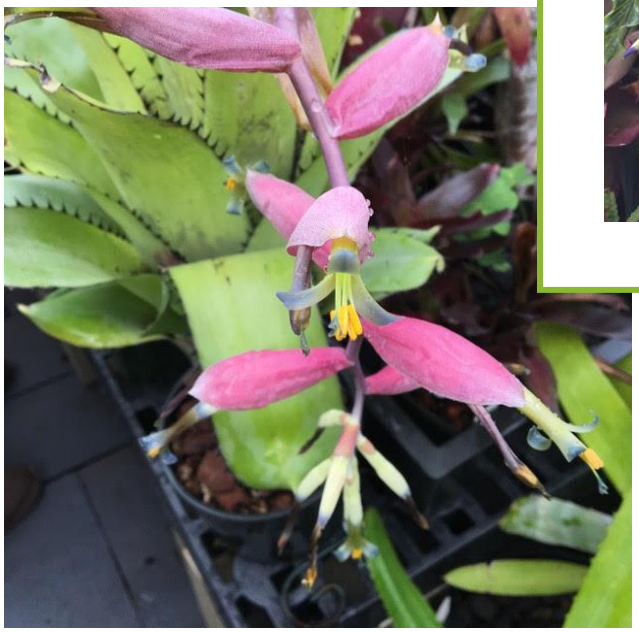
by Andrew Wilson

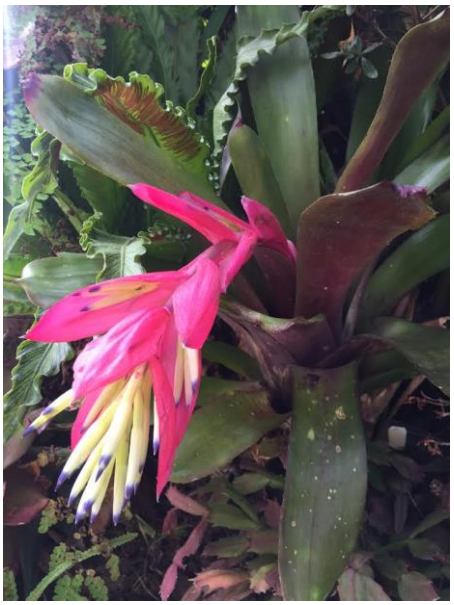
Tillandsias are the easiest plants to bring to our meetings, usually very compact and with no pot to worry about. Occasionally, they do not follow those rules. Here is one of them. It is quite large, several feet across, and is growing in a wide, open wire container that you can barely see in this shot. Quite stable where it sits, the overlapping rosettes are easily disturbed if it is moved.

What's blooming

by Dan Kinnard

Billbergia sanderiana has a great splash of color for this time of year. It is easily grown, blooms readily, with great dark spines showing against the lighter leaves. One of our favorites.

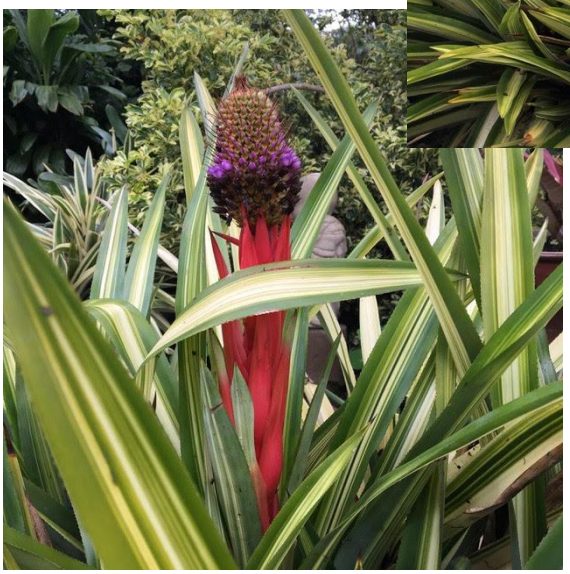




My Billbergia C'est Bon is blooming too! The inflorescence is a cascading beauty and the hummers adore it. It will be double the size in a couple days! This was a gift from Dan & Eloise, seems to be still in synch with the relatives in Vista.

- Juliana

Aechmea ornata var. nationalis is showing the first blooms ever for us. We've grown this particular plant since 1999. The bloom is almost worth the wait against the variegated foliage. There is also an albomarginate form that hasn't ever bloomed. We've grown this species for ages (almost literally) with not ever a bloom. It would be good to find out what triggers it. The plant is easy to grow in a 7-gallon pot and sits in almost full sun on a retaining wall with some water about once a week. The spines at the ends of the leaves deserve respect.



Scott in Northern Peru, Part 3:

Puya and High Elevation Habitats

by Scott Sandel

Scott and unidentified Puya near Karajia

Detail of inflorescence

During our travels in northern Peru, I obtained a better appreciation for the bromeliads in the genus Puya. This was in part due to the fact that Puyas were blooming across many different parts of the region and at different altitudes in September. Shown below is a sampling.

The last week of our 3 1/2 weeks in northern Peru was spent in and around the high mountains of the Cordillera Blanca. This mountain range in the Andes is very high, with several peaks over 6,000 meters and 722 different glaciers. On our first day trip in the mountains near Huaraz, we were picked up at the airport and driven up into the dry high mountains of the neighboring range called the Cordillera Negra. Here, we were in search of the largest of the bromeliads, *Puya raimondii*. This species, the most magnificent of bromeliads, was named for 19th-century Italian-Peruvian scientist Antonio Raimondi, who immigrated to Peru and made 18 significant botanical expeditions to different parts of Peru.

When in San Diego and doing my planning, I found it difficult to research the best places to see *Puya raimondii* in the region of Ancash. We arranged to fly into Huaraz, a small town that services the mountainous region. Intel and help came from the UK-expat owner of Llanganuco Lodge, Charlie Good. Charlie knew a local guide who would pick us up at the airport in Huaraz, take us to see the Puyas and then drop us off at the lodge. This was a logistics home-run. Our guide was happy that we were so enthusiastic to see the natural world of his home, and we were able to stop anywhere we saw something interesting, even at roadsides with dusty, dry Tillandsias. Along the way we also saw different species of weird cacti and native Bougainvillea growing as multi-stemmed trees. We rode up and up for quite a while, past a couple of small towns (pueblos) and past some dry-weather (no irrigation) farms.

At one stretch along an unpaved, windy road of switchbacks, our driver hit a long straight section of road, and he hit the accelerator. Dust flew. As I looked out the window, I realized that along this stretch of dusty road, the gentle hill faced just the right aspect to collect mist and fog from the coast, and the shoulder-high shrub scrub was literally covered with all manner of Tillandsia. We stopped (again) so that we could get out and explore all these plants that were thriving, despite being caked with a solid dusting of brown sand. It was at the very end of the dry season, and all the plants, including the Tillandsias, were mostly not in bloom and instead were in full seed production mode. This Tillandsia garden stretched for 3-4 kilometers where the density of xeric Tillandsias was staggering. In the thorny scrub of now-leafless shrubs, Jatropha and cacti, I counted well over a dozen different species of Tillandsia, including the ubiquitous *Tillandsia latifolia divaricata.*

1- Tillandsia latifolia 2- Close-up of unidentified Puya near Tajopampa 3- Indigo blue flowers, Puya at Tajopampa 4- Puya at Cordillera Negra (approx. 3,600 m) 5 - Detail of inflorescence

Further UP the road, we saw a couple of interesting Puyas, and they were in flowering mode. The flower petal colors of Puyas are extremely beautiful and interesting. Some are a blend of green, turquoise and chartreuse. Others have petals in shades of blue-green and indigo blue.

As we got up to the 4,000 meter mark, we saw the unmistakable silhouettes of giant *Puya raimondii*.

We got out and walked across the sloped terrain to get a closer look. As you get close to the plants, you notice how huge they are. Most of the spiny-leaved rosettes are higher than eye-level. And the tall flower inflorescences are way up there. But the camera catches them.

This species of Puya is unlike any other bromeliad and even unlike any other Puya. This species lives and grows for easily 30 years or more.

The trunk is massive, as is the rosette of hundreds of leaves. As you can see from the photos, each inflorescence holds thousands and thousands of individual blossoms. The habitat here is not only extremely high in altitude, but it is quite arid, and rains are infrequent. So *Puya raimondii* has evolved a bold strategy of sending thousands and thousands of seed out into the landscape with the hope of a few seeds to germinate. To facilitate this master plan for survival, *P.*

raimondii has evolved with a very special pollinator. With so many flowers present, we saw several of the world's largest hummingbird, *Patagona gigas,* in action. As our luck would have it, in the last week of September, 2016, it seemed that we hit the peak flowering period of these incredibly large bromeliads, the Queen of the Andes.

Puya raimondii; P. raimondii habitat on the slopes of Cordillera Negra; Close-up of inflorescence; Patagona gigas perched on P. raimondii

Taxonomic Changes in Subfamily Tillandsioideae

by Herb Plever, *Bromeliana*, NY Bromeliad Society, Jan. 2017

Did you become unhinged a few years ago, when I reported a proposal by scientists for a major revision in the number of sub-families in family Bromeliaceae from three to eight? We were used to the three: ***Pitcairnioideae, Bromelioideae*** and ***Tillandsioideae***, and now ***Pitcairnioideae*** has been split into six subfamilies - ***Brochinioideae, Lindmanioideae, Hechtioideae, Navioideae, Pitcairnioideae*** and ***Puyoideae***.

These changes were made by a group of cooperating molecular biologists and taxonomists from many countries around the world. The molecular biologists are doing phylogenetic DNA sequencing on Bromeliad species to determine their evolutionary and biogeographical history and relationships. The study of the morphology of the Bromeliads has been sharpened with closer looks at their habitats, physical (anatomical) structure and parts: leaves, presence or absence of a central tank, presence or absence of petal appendages (nectar scales), position of the ovary, different shapes of corollas (20), stigmas (18) and pollen (9), ovules and seeds and absence or presence of ovule and seed appendages. (See photos next).

When conclusions based on DNA sequence data agree with morphological data, it is possible to make more confident proposals that will work taxonomically. Lyman Smith's Monograph (1974-77) included text and graphics of many of these anatomical characters, but recent morphological studies have resulted in new, more extensive and critical data, particularly the stigma

Lutheria splendens, (formerly *Vriesea splendens).*

morphology that has been advanced by Gregory Brown.

Now - hold on to your hat - new, important reclassifications have been proposed for subfamily ***Tillandsioideae*** based on a multi-locus DNA sequence phylogeny and morphology by Michael H. Barfuss, Walter Till, Elton M.C. Leme, Juan P. Pinzón, José M. Manzanares, Heidemarie Halbritter, Rosabelle Samuel & Gregory K. Brown. It was recently published in PHYTOTAXA (279-1) P. 1-98. (The phylogeny referred to above is a classification based on DNA clades that indicate the evolutionary relationships between the tribes, genera and species.) The main goals are: "to provide a stable classification based on monophyletic established genera, and new taxa (genera and subgenera) using new synapomorphic combinations of diagnostic morphological characters, provide a key for generic identification, and a comprehensive nomenclature for the accepted genera..." (A monophyletic genus is a group of species which form a clade of plants that have a recent common ancestor and all its descendants, and thus it will provide a stable classification for taxonomy. Synapomorphic characters are traits that the species in a DNA clade have in common which distinguish the clade from other clades.)

The data from the DNA sequencing shows when and which species have a common ancestor. The genera ***Mezobromelia, Tillandsia*** and ***Vriesea*** were polyphyletic - (they had common characters, but descended from two or more ancestors); the authors propose to reclassify them to create new monophyletic genera. (Unfortunately, it is necessary for me to use scientific jargon to properly describe and summarize the proposals.

The authors have succeeded in attaining those stated goals: There is a new, workable key to the genera of subfamily ***Tillandsioideae*** with many physical characters listed to define each genus. The key will be refined and amended as data from on- going research becomes available. (There are many species that have not yet been analyzed.) By creating new sub-tribes, genera and sub-genera, and reclassifying species anomalies, a more or less stable classification "based on monophyletic established genera" has been created. The following is a brief summary of the key conclusions and important changes:

1. The heretofore recognized four tribes: ***Tillandsieae, Vrieseeae, Pogospermeae*** (now called ***Catopsideae***), and ***Glomeropitcairnieae*** are supported by the data. Vrieseeae has been split into 2 sub-tribes called ***Vriesinae*** and ***Cipuropsidinae***.

2. Eleven new genera have been created, raising the total of supported genera in sub-family ***Tillandsioideae*** to Eighteen. (The data suggested the possibility that the species *Vriesea subandina* could be moved to a new, single species genus to be called ***Cipuropsis***, but it was too weak to justify such a move at this time.) The genera are: ***Racinaea*** (78 species), ***Tillandsia*** (772 species), ***Barfussia*** (3 species from ***Tillandsia***), ***Lemeltonia*** (7 species from ***Tillandsia***), ***Pseudoalcantarea*** (3 species from ***Tillandsia***), ***Wallisia*** (5 species from ***Vriesea***), ***Guzmania*** (219 species), ***Gregbrownia*** (4 species from ***Mezobromelia***), ***Mezobromelia*** (5 species), ***Josemania*** (5 species from ***Vriesea***), ***Werauhia*** (92 species), ***Goudaea*** (2 species from ***Vriesea***), ***Jagrantia*** (1 species from ***Vriesea***), ***Lutheria*** (4 species from ***Vriesea***), ***Zizkaea*** (1 species from ***Vriesea***), ***Stigmatodon*** (18 species from ***Vriesea***), ***Vriesea*** (238 species) and ***Alcantarea*** (41 species).

3. A new subgenus ***Pseudovriesea*** has been added to genus ***Tillandsia***, (I assume) as a place to transfer the xeromorphic, grey-leaved former Vrieseas as proposed by Jason Grant. But only 4 of the 41 species are named in the report.

4. The following is a short list of popularly grown Tillandsioids in which changes have been made.

Some former ***Vriesea*** species are now: *Tillandsia andreettae, T. barclayana, T. cereicola, T. espinosae, T. heterandra, T. hitchcockiana, T. malzinei, T. tequendamae, T. heliconioides T. tillandsioides*.

Some former ***Vriesea*** species are now: *Goudaea chrysostachys, G. ospinae, G. ospinae var. gruberi, Jagrantia monstrum, Lutheria glutinosa, L. splendens, Stigmatodon goniorachys, Zizkaea tuerckheimii*,

Wallisia cyanea (formerly *Tillandsia cyanea).*

Some former ***Tillandsia*** species are now: *Barfussia laxissima, B. platyrhachis, B. wagneriana, Lemeltonia dodsonii, L. monodelpha, L. narthecioides, L. triglochinoides, Pseudoalcantarea grandis, Ps. viridiflora, Racinaea dyeriana, R. hamaleana, R. venusta, Wallisia anceps, W. cyanea, W. lindenean*a (a new name for former *T. umbellata*), *W. pretiosa*.

Some former ***Mezobromelia*** species are now: *Gregbrownia hutchisonii, Gregbrownia lymansmithii.*

5. Complexes - Some genera are similar in appearance and are closely related biogeographically and/or in their evolution. Similarly, groups of species similar in appearance can be identified as sub-complexes. They may have physical characters in common, but each has its own unique characters to justify retaining a genus or a species rank. These species complexes are a useful taxonomic tool, especially when supported by DNA sequencing.

For example, in his seminar at the Monocots V Conference in 2013 Elton Leme identified and described a *Cryptanthoid Complex* consisting of three related genera: *Cryptanthus, Orthophytum* and *Lapanthus*, because they shared habitats and some important physical characters.

The 2016 DNA results support the classification of species complexes, and this report identifies the following: *Tillandsia biflora* (136 species), *T. australis* (4 species), *T. disticha* (2 species), *T. dodsonii, T. gardneri* (17 species), *T. lindenii, T. purpurea* (6 species), *T. plumosa, T. rauhii* (3 species), *T. sphaerocephala* (6 species) and *T. wagneriana.*

Racinaea dyeriana (formerly *Tillandsia dyeriana).*

6. These many important changes will likely rattle our readers, but just think of the headache the changes have created for Geoff Lawn, our BSI Cultivar Registrar, and his colleagues Eric Gouda and Derek Butcher, who

maintain and keep the BCR current. Not only do they have the enormous job of correcting cultivar names to conform to newly created genera and changes in genera, but they have to invent new bigeneric names for cultivars where one or both parents are in changed genera. For example, the parents of *xVrieslandsia* 'Pink Magic' (Arden) are former *Tillandsia laxissima* (now *Barfussia laxissima*) and *Vriesea* 'Redondo Beach'. They will have to create a new bigeneric name from *Barfussia* and *Vriesea*. I am happy to inform you that Geoff, Eric and Derek are already hard at work making those changes.

I have expanded this issue to photos of plants from different habitats and different corollas and stigmas), and to present in its entirety the new key to the genera of subfamily ***Tillandsioideae***. (See next). It is too soon to ascertain the assessments of the report by other leading biologists and taxonomists. Some understandable confusion has resulted from the placement of morphologically disparate species in subgenus ***Tillandsia***, based apparently on "weakly supported" DNA data. This and other issues will likely be revisited by the authors. An incomplete, complex system for Tillandsioids cannot be totally neat and tidy.

The bromeliad world owes a debt of gratitude to the authors of this 2016 report and to their colleagues, researchers, lab assistants etc. for this major advance in bromeliad taxonomy.

Editor' Note: Due to formatting limitations, photo descriptions and key to subfamily Tillandsioideae were placed in the next pages →

HABITAT OF SELECTED TILLANDSIOIDEAE

FIGURE 1. Habit of selected Tillandsioideae. Habit (adult): m = mesomorphic, sx = semi-xeromorphic, x = xeromorphic. Central tank (adult): a = absent, p = present. A. *Catopsis hahnii* (Leme 2482; m, p). B. *Barfussia wagneriana* (Takizawa s.n.; m, p). C. *Guzmania kareniae* (Leme 3439; m, p). D. *Josemania singularis* (Leme 2838; m, p). E. *Lemeltonia dodsonii* (Leme 2523; sx, a). F. *Pseudalcantarea viridiflora* (Takizawa s.n.; m, p). *G. Racinaea pugiformis* (Leme 5180; m, a). H. *Tillandsia geminiflora* (Leme s.n.; sx, a). I. *Racinaea hamaleana* (Leme 7319; m, p). J. *Tillandsia fasciculata* s.l. (Leme 4833; x, a). K. *Goudaea chrysostachys* (Leme 2509; m, p). L. *Mezobromelia capituligera* (Leme 5111; m, p). M. *Lutheria glutinosa* (Leme 2525; m, p). N. *Werauhia nephrolepis* (Leme 3955; m, p). O. *Vriesea psittacina* (Leme 7075; m, p). P. *Alcantarea imperialis* (Leme 304; m, p). Q. *Stigmatodon euclidianus* (Leme 5712 sx, p)

COROLLA TYPES IN TILLANDSIOIDEAE

FIGURE 2. Corolla types in Tillandsioideae. A. *Catopsis hahnii* (Leme 2482; urceolate). B. *Catopsis pisiformis* (Leme 2410; urceolate); C. *Gregbrownia lyman-smithii* (Leme 4655; tubular with spreading petal blades); D. *Barfussia laxissima* (Takizawa s.n.; salverform); E. *Guzmania patula* (Leme 4062; tubular with recurved petal blades); F. *Guzmania kareniae* (Leme 3439; tubular with spreading petal blades); G. *Guzmania cylindrica* (Leme 4586; tubular with enlarged, erect, slightly divergent petal blades); H. *Guzmania sanguinea var. comosa* (Leme 3253; tubular with cucullate petal tips); I. *Guzmania musaica* (Leme 3538; tubular with cucullate petal tips). J. *Pseudalcantarea viridiflora* (Takizawa s.n.; tubular with spreading, helicoiform petal blades). K. *Racinaea hamaleana* (Leme 7319; salverform); L. *Racinaea crispa* (Leme 2437; urceolate). M. *Tillandsia malzinei* (Leme 361; tubular with recurved petal blades). N. *Tillandsia xiphioides* (Takizawa s.n.; salverform). O. *Tillandsia incurva* (Leme 7299; tubular with divergent petal tips). P. *Tillandsia fasciculata* s.l. (Leme 4833; tubular). Q. *Tillandsia usneoides* (Leme 306; tubular with spreading petal blades). R. *Tillandsia graomogulensis* (Leme 1489; salverform). S. *Tillandsia geminiflora* (Leme s.n.; tubular with spreading petal tips). T. *Tillandsia tectorum* (Takizawa s.n.; tubular).

COROLLA TYPES IN TILLANDSIOIDEAE CONTINUED

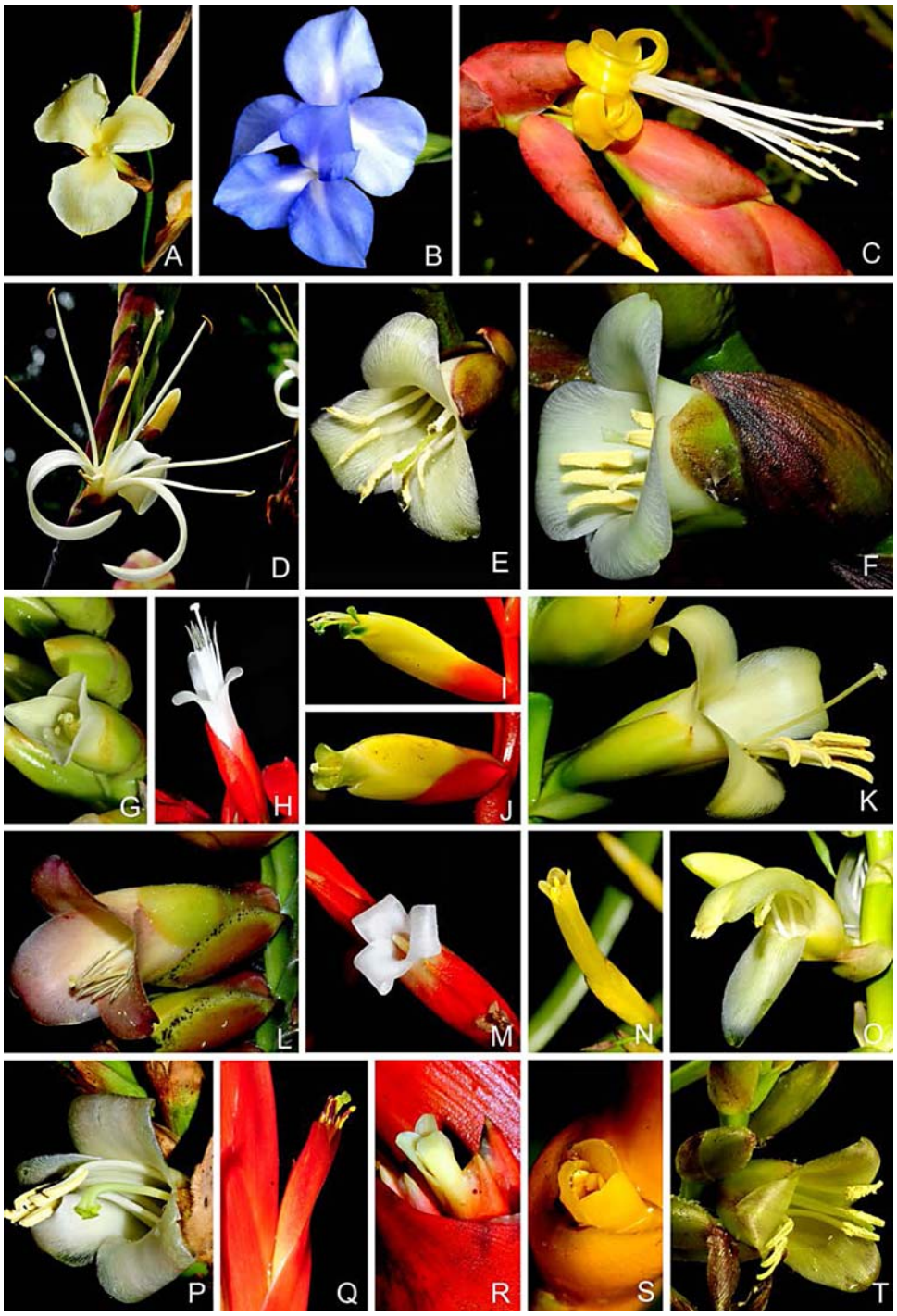


FIGURE 3. Corolla types in Tillandsioideae (continued). A. *Lemeltonia dodsonii* (Leme 2523; salverform). B. *Wallisia lindeniana* (Barfuss s.n.; salverform). C. *Alcantarea farneyi* (Leme 1910; tubular with strongly recurved petal blades). D. *Alcantarea robertokautskyi* (Leme 3866; tubular with strongly recurved petal blades). E. *Stigmatodon plurifolius* (Leme 6997; campanulate). F. *Stigmatodon apparicianus* (Leme 7379; campanulate). G. *Stigmatodon amadoi* (Leme 5953; campanulate). H. *Vriesea flammea* (Leme 5471; tubular with spreading petal tips). I. *Vriesea psittacina* (Leme 7075; tubular). J. *Vriesea platynema* (Leme 1670; tubular). K. *Vriesea saxicola* (Leme 5236; campanulate). L. *Vriesea pseudoatra* (Leme 3917; campanulate). M. *Vriesea ('Cipuropsis') elata* (Leme 743; tubular with recurved petal blades). N. *Vriesea breviscapa* (Leme 8235; tubular). O. *Werauhia nephrolepis* (Leme 3955; cupshaped base and one petal blade spreading, the other two forming a hood). P. *Werauhia gladioliflora* (Leme 3967; campanulate). Q. *Lutheria glutinosa* (Leme 2525; tubular). R. *Mezobromelia capituligera* (Leme 5111; tubular). S. *Goudaea chrysostachys* (Leme 2509; tubular with cucullate petal tips). T. *Zizkaea tuerckheimii* (Gouda s.n.; campanulate).

STIGMA TYPES IN TILLANDSIOIDEAE

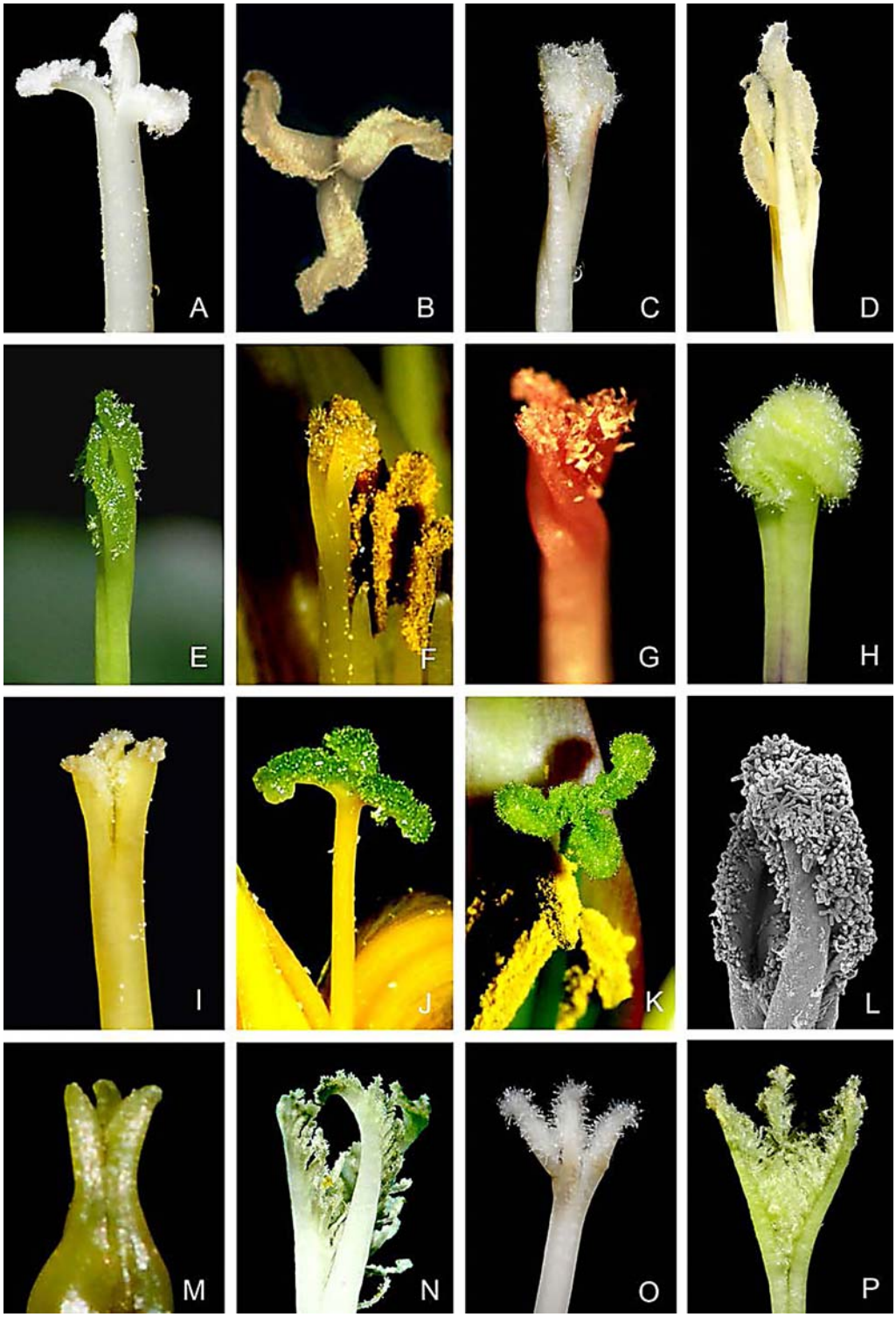


FIGURE 4. Stigma types in Tillandsioideae. Conduplicate and simple types (Table 5). A. *Alcantarea heloisae* (Leme 8055; cp, lateral view). B. *Alcantarea heloisae* (Leme 8055; cp, top view). C. *Alcantarea extensa* (Leme 1942; ce, early anthesis). D. *Alcantarea cerosa* (Leme 8551; ce, late anthesis). E. *Pseudalcantarea viridiflora* (Leme 2835; ce). F. *Gregbrownia lyman-smithii* (Leme 4655; cs). G. *Tillandsia gardneri* (Leme s.n.; cs). H. *Tillandsia fasciculata* s.l. (Leme 4833; cs). I. *Goudaea chrysostachys* (Leme 2509; se). J. *Guzmania sprucei* (Leme 3551; sp). K. *Tillandsia malzinei* (Leme 361; sp). L. *Guzmania musaica* (spi). M. *Catopsis floribunda* (Leme 8101; se). N. *Wallisia anceps* (Till et al. 15046; cpi). O. *Guzmania wittmackii* (Leme 2520; spi). P. *Wallisia lindeniana* (Leme2406;cpi).

STIGMA TYPES IN TILLANDSIOIDEAE CONTINUED

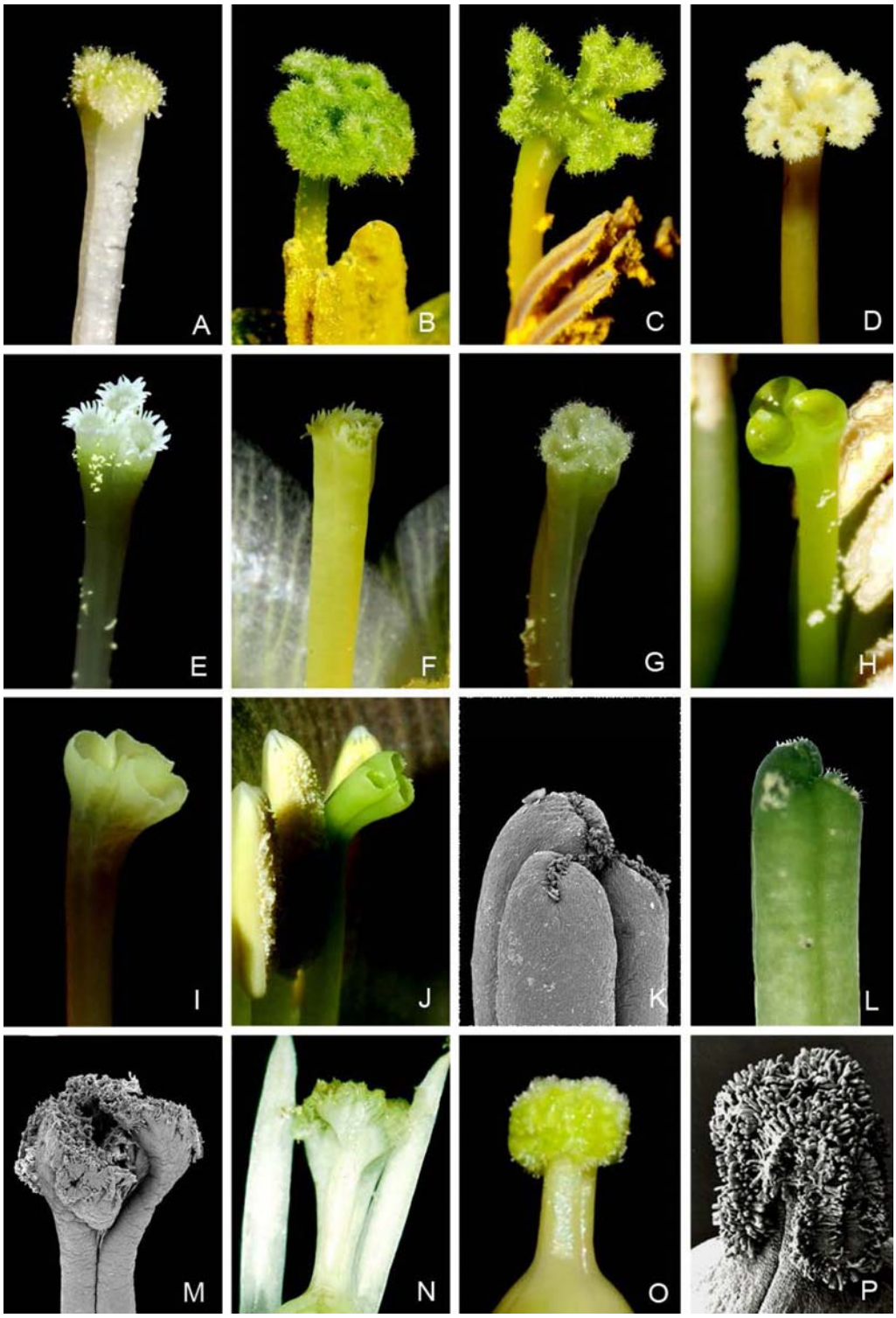


FIGURE 5. Stigma types in Tillandsioideae (continued). Convolute, coralliform, cupulate, tubo-laciniate and urceolate types (Table 5). A. *Guzmania patula* (Leme 4062; cbI). B. *Vriesea gradata* (Leme 5738; cbII). C. *Vriesea psittacina* (Leme 7075; cbII). D. *Vriesea jonghei* (Leme 2189; cbII). E. *Stigmatodon bifidus* (Leme 7368; tl). F. *Stigmatodon funebris* (Leme 7976; tl). G. *Stigmatodon rosulatulus* (Leme 8621; tl with papillae). H. *Werauhia pedicellata* (Leme 7320; cup). I. *Werauhia subsecunda* (Leme 2561; cup). J. *Werauhia sp.* (Leme 3987; cup). K. *Zizkaea tuerckheimii* (W. Till 17055 & Hromadnik 25033; urc). L. *Zizkaea tuerckheimii* (W. Till 17055 & Hromadnik 25033; urc). M. *Barfussia platyrhachis* (Belvedere s.n.; co). N. *Barfussia platyrhachis* (Belvedere s.n.; co). O. *Racinaea venusta* (Leme 2590; cf). P. *Lemeltonia dodsonii* (MSBG 1981-0055; cf).

KEY TO THE GENERA IN SUBFAMILY TILLANDSIOIDEAE

1. Ovary about 1/2–2/3 inferior; stigma of the convolute-umbrella type; fruit a partly septicidal capsule; seeds with appendages of the Glomeropitcairnia type, long appendaged on both ends.—Flowers spirally arranged; petals bearing basal appendages ..... ***Glomeropitcairnia***
- Ovary less than 1/2 inferior or superior; stigma not of the convolute-umbrella type, if resembling a convolute type, then of the convolute-blade I type (Fig. 5A) or the convolute-blade II type (Figs. 5B–D) or of the convolute-obconic type (Figs. 5M, N); fruit a septicidal capsule; seeds with appendages of the Catopsis type or the Core Tillandsioideae type, usually long appendaged only on one end, but the appendage at the apical end sometimes well developed.—Flowers spirally or distichously arranged; petals bearing or without basal appendages..... 2.
2. Ovary superior to about 1/8 inferior; seeds with appendages of the Catopsis type, with a plumose flight apparatus formed at the apical end by multicellular hairs folded at maturity, and a multicellular, undivided plume at the basal end.—Flowers spirally arranged; sepals strongly asymmetric; petals without basal appendages..... ***Catopsis***
- Ovary more than 1/8 inferior, but not more than 1/2 inferior; seeds with appendages of the Core Tillandsioideae type, with a plumose flight apparatus formed at the basal end, appendage at the apical end lacking, short and usually undivided, or rarely long and occasionally somewhat divided, not folded at maturity.—Flowers spirally or distichously arranged; sepals usually symmetric or subsymmetric, if occasionally asymmetric, then flowers distichously arranged; petals bearing or without basal appendages..... 3.
3. Petals conglutinated/connate into a tube for more than 1/4 of their entire length; filaments partially agglutinated/adnate to the conglutinated/connate portion of the petals.—Flowers usually spirally, rarely distichously arranged; petals white, yellow, or green (Figs. 2C, E–I); seeds without a distinct appendage at the apical end ..... 4.
- Petals free or sometimes conglutinated/connate into a tube shorter than or equalling about 1/4 of their entire length; filaments free, conglutinated/connate, or short agglutinated/adnate to the petals.—Flowers usually distichously, rarely spirally arranged; petals violet, pink, red, orange, yellow, green, white, and rarely bicolored (Figs. 2D, J–T, 3A–T); seeds usually with a distinct appendage at the apical end usually up to the length of the seed proper, occasionally longer..... 6.
4. Petals without basal appendages.—Stigma of the convolute-blade I type (Fig. 5A) or the simple-erect type, occasionally of the simple-patent type (Fig. 4J) or simple-pinnatisect type (Fig. 4L, O) ..... ***Guzmania***
- Petals bearing basal appendages.—Stigma of the simple-erect type or the conduplicate-spiral type (Fig. 4F) ..... 5.
5. Inflorescence compound, once or rarely twice branched, with branches composed of dense flower fascicles (Fig. 1L); petals about 1/3–1/2 of their entire length conglutinate/connate into a tube, tips slightly divergent (Fig. 3R), bearing linear and entire basal appendages, highly adnate to the conglutinated/connate portion of the petals; stamens and style included within the corolla; anthers united into a tube surrounding the stigma, not versatile; stigma of the simple-erect type ..... ***Mezobromelia***
- Inflorescence compound, twice or rarely triple branched, a laxly flowered panicle; petals more than 1/2 of their entire length conglutinate/connate into a tube, blades spreading (Fig. 2C), bearing crenulated basal appendages adnate for less than 1/3 of the conglutinated/connate portion of the petals; stamens and style exserted from the corolla; anthers not forming a tube around the stigma, versatile; stigma of the conduplicate-spiral type (weakly spiral) (Fig. 4F) ..... ***Gregbrownia***
6. Stigma of the conduplicate-patent type (Figs. 4A, B) or conduplicate-erect type (Figs. 4C–E); petals linear, forming a tubular corolla with strongly recurved and coiled, or spreading and +/- coiled, or spreading and spirally twisted blades.—Stamens and style much exserted from the corolla (Figs. 2J, 3C, D); ovary 1/3–1/2 inferior.....Stigma usually not of the conduplicate-patent type or the conduplicate-erect type, if rarely resembling the conduplicate-patent type, then corolla tubular; petals forming a urceolate, campanulate, salverform or tubular corolla, usually with spreading or recurved blades or tips only (Figs.2D,2K–T,3A–T).—Stamens and style included within or exserted from the corolla; ovary usually up to 1/3, very rarely up to 1/2 inferior ..... 8.
7. Petals light green, spreading and spirally twisted (helicoiform; Figs. 1F, 2J), without basal appendages; ovules appendiculate, shorter than or equalling the ovule proper; seeds with an appendage at the basal end distinctly longer than the seed proper, appendage at the apical end short, about half as long as to equalling the seed proper, undivided; stigma green (Fig. 4E)
- Petals white, cream, pale to bright yellow, rarely pale wine-castaneous or dark wine, recurved or coiled (Figs. 3C, D), bearing well-developed basal appendages; ovules distinctly appendiculate, longer than the ovule proper; seeds with an appendage at the basal end rather short, about equalling the seed proper, appendage at the apical end distinctly larger than the seed proper, sometimes somewhat divided; stigma white (Figs. 4A–D) ..... ***Alcantarea***
8. Stigma of the cupulate type (Figs. 5H–J) ..... ***Werauhia***
- Stigma not of the cupulate type, if occasionally resembling a cupulate type, then of the urceolate type (Figs. 5K, L) or tubo-laciniate type (Figs. 5E–G) ..... 9.
9. Stigma of the urceolate type (Figs. 5K, L)..... ***Zizkaea***
- Stigma not of the urceolate type..... 10.
10. Stigma of the tubo-laciniate type (Figs. 5E–G)..... ***Stigmatodon***
- Stigma not of the tubo-laciniate type ..... 11.

11. Stigma of the convolute-blade II type (Figs. 5B–D).—Leaves mesomorphic or rarely semi-xeromorphic, usually forming strongly to moderately impounding rosettes (Fig. 1O); petals usually bearing basal appendages ..... ***Vriesea***
- Stigma not of the convolute-blade II type, if rarely resembling a convolute type, then of the convolute-obconic type (Figs. 5M, N) or the convolute-blade I type, the latter with xeromorphic, densely lepidote leaves, not forming impounding rosettes, and petals without basal appendages..... 12
12. Filaments conglutinate/connate at least at the base but sometimes for nearly the whole length, free from the petals; stigma of the coralliform type (Fig. 5P).—Leaves narrowly triangular; inflorescence simple, petals white or rarely yellowish with enlarged, spreading blades (Fig. 1E) .....***Lemeltonia***
- Filaments free from each other, but sometimes partially agglutinated/adnate to the petals; stigma usually not of the coralliform type, if rarely resembling the coralliform type (Fig. 5O), then filaments free from each other, leaves lingulate, and inflorescence usually compound (Fig. 1I) ..... 13.
13. Stigma of the conduplicate-pinnatisect type (Figs. 4N, P); leaves mostly conspicuously longitudinally reddish (-brown) striped near the base ..... ***Wallisia***
- Stigma not of the conduplicate-pinnatisect type; leaves not longitudinally reddish striped near the base ..... 14.
14. Stigma of the convolute-obconic type (Figs. 5M, N).—Leaves mesomorphic, lingulate, forming an impounding rosette (Fig. 1B) ..... ***Barfussia***
- Stigma not of the convolute-obconic type, if rarely resembling a convolute type, then of the convolute-blade I type and leaves xeromorphic and narrowly triangular, not forming impounding rosettes ..... 15.
15. Sepals usually distinctly asymmetric, free, and stigma of the simple-erect type or of the conduplicate-spiral type (weakly spiral); rarely sepals subsymmetric and stigma resembling the coralliform type (Fig. 5O) ..... ***Racinaea***
- Sepals usually symmetric or subsymmetic, the adaxial ones often connate (and therefore appearing asymmetric); stigma not of the coralliform type, usually of the simple-erect type (Fig. 4I) or conduplicate-spiral type (Fig. 4G, H), rarely of the simple-truncate type, the simple-patent type (Fig. 4K), the conduplicate-patent type or the convolute-blade I type ..... 16.
16. Floral bracts deciduous along a basal transversal line after anthesis when dry, 3 times the length of the sepals, laterally strongly compressed and sharply carinate..... ***Jagrantia***
- Floral bracts persistent when dry, maximally 2 times the length of the sepals, rounded in transversal section even if carinate .....***Tillandsia p.p.***
19. Leaves xeromorphic to occasionally semi-xeromorphic, usually densely lepidote; leaf blades narrowly triangular.—Petals usually violet, rarely green (Fig. 2O) or yellowish, often bicolored with contrasting margins, sometimes with crenulated margins; ovules appendiculate, shorter than or equalling the ovule proper ..... ***Tillandsia p.p. (T. subg. Pseudovriesea p.p.)***
- Leaves mesomorphic, not densely lepidote; leaf blades lingulate.—Petals white, greenish-white, or yellow, rarely red or deep pink, margins always entire; ovules obtuse or rarely appendiculate ..... 20.
20. Corolla unilaterally bent, slightly zygomorphic (Fig. 2M, 3Q); petals free; stamens and style exserted from the corolla; stigma of the conduplicate-spiral type or simple-patent type..... 21.
- Corolla actinomorphic (Fig. 3M, S); petals short connate at the base for < 1/4 of their entire length or about 1/4 of their entire length conglutinated/connate into a tube; stamens and style included within the corolla; stigma of the simple-erect type (Fig. 4I)..... 22.
21. Stigma of the conduplicate-spiral type; petals red, deep pink, or yellow, tips straight or slightly divergent (Fig. 3Q)..... ..... ***Lutheria***
- Stigma of the simple-patent type (Fig. 4K); petals white or greenish-white, the adaxial one straight, the two abaxial ones recurved (Fig. 2M) ..... ***Tillandsia p.p. ('Vriesea' sect. Cylindrostachys)***
22. Petals short connate at the base for < 1/4 of their entire length, tips cucullate, forming a hardly opened corolla (Fig. 3S), petal appendages spathulate; anthers free; floral bracts ecarinate..... ***Goudaea***
- Petals about 1/4 of their entire length conglutinated/connate into a tube, tips straight or recurved, petal appendages linear; anthers united into a tube surrounding the stigma, not versatile (Fig. 3M); floral bracts carinate .... ***Cipuropsis and mesomorphic northern Andean 'Vriesea'***