

BROMELIAD SOCIETY OF SAN FRANCISCO

November 2013



Meeting Specifics

When: November 21

Time: 7:30 PM

Recreation Room

Where: San Francisco County Fair
Building

9th Avenue at Lincoln Way

San Francisco

Kelly will be bringing bromeliads and related plants for sale. He always brings nice plants, so bring your checkbook.



Discovering the Bromeliads of Cuba

This month **Kelly Griffin** will give us a slide show on a recent trip that he made to Cuba where he spoke at the International Organization for Succulent Plant Study. Although this country is opening up to more tourism, probably very few of us have ever been to Cuba. Kelly is an inveterate traveler and has explored plants all over the world. His day job is plant research and development manager for Altman Plants, the country's largest producer of succulents. Kelly also co-owns Xeric Growers, a wholesale and mail order succulent nursery near San Diego. For many years he has been immersed in producing magnificent hybrids of Aloes and Agaves. You probably own one of his hybrids even if you don't know Kelly. On Tuesday, 19 November, Kelly will also be giving a talk to the San Francisco Succulent and Cactus Society on the flora and fauna of Madagascar.

November Refreshments

Dan Arcos, Jon Dixon, and Nick Soumie signed up for refreshments this month. Anyone else should feel free to also

Vriesea ospinae v. *gruberi*, map of Columbia, *Aechmea corymbosa*



October Meeting

Guillermo Rivera showed us the results of his scouting trip for Columbia plant tours

Last month Guillermo Rivera visited us again. He has gotten interest from previous travelers on his plant tours to have him provide a tour to Columbia. His slide show summarized his scouting trip for a Columbia tour.

As in most countries, on your first visit, you discover that the data on plant locations is invalid. Agriculture often has

wiped out much of the plant material. Guillermo did find this, but also was slowed down on his research because of several strikes in towns that he was visiting or going through on the way to other destinations.

Many of the plants Guillermo showed us are not common or perhaps even available in cultivation (plants in above photos are available). One of his

stops provided the greatest group of plants in just a few hundred yards. And these plants were growing near the road. Columbia does have many national parks abundant with plants that Guillermo was unable to visit because of the strikes. He is planning a tour in Columbia and if you are interested, contact any of the society officers for more info.

Cryptanthus Black Mystic



This article by Gregory K. Brown and Randall G. Terry from the Department of Botany at the University of Wyoming is reprinted from the November 1991 *Cryptanthus Society Journal*

Chromosome Numbers in *Cryptanthus*

The genus *Cryptanthus* is unique in several respects. Consider the fact that of the nearly 50 genera of bromeliads currently recognized, only *Cryptanthus* has a society dedicated to its culture and study. Now, research at the University of Wyoming has suggested that *Cryptanthus* may be more different from other members of the bromeliad family than was previously thought.

An ongoing survey of chromosome numbers in the Bromeliaceae has shown that all genera, except *Cryptanthus*, are characterized by having a somatic chromosome number of 50. This means that every living cell (with some exceptions) in a typical *Tillandsia*,

Aechmea or Pitcairnia, for example, contains 50 chromosomes. Half of those chromosomes (i.e., 25) came from the female parents (i.e., egg) and the other half came from the male parent (i.e., sperm via pollen). The members of Cryptanthus, on the other hand, are unique within the Pineapple family in having a somatic chromosome number of 34. This is a major departure from other members of the family.

A long-term goal of the research in my lab is to study and identify the evolutionary relationships within and between genera in the Bromeliaceae. In this light, how can the anomalous chromosome number for Cryptanthus be reconciled? What is the relationship between Cryptanthus and the remainder of the Bromeliaceae, which is characterized by having 50 chromosomes? A model for chromosome number evolution has been proposed (Brown & Gilmartin, 1989) that addresses these questions. This model states that the typical bromeliad chromosome number of 50 is the result of a phenomenon known as polyploidy, and that 50 represents a hexaploid condition. Polyploidy, or the existence of multiple complete sets of chromosomes in an organism, is quite common in flowering plants, and hexaploid refers to a cell or organism that contains six complete sets of chromosomes. This hexaploid state can be abbreviated by "6n". In the case of the modern bromeliads, the existing chromosome number of $6n=50$ is thought to have evolved by the combination of chromosome sets present in ancestors that hybridized with one another. In this scenario, ancestor-1 ($2n=16$; $2n$ indicates two complete sets of chromosomes) hybridized with hypothetical ancestor-2 ($2n=18$) to produce ancestor-3 ($4n=34$; i.e.,

$2n=16 + 2n=18$ equals $4n=34$). Ancestor-3 ($4n=34$) then hybridized with an ancestor having the same chromosome number as ancestor-1 ($2n=16$) to produce all modern-day bromeliads, with the exception of Cryptanthus, at $6n=50$, (i.e., $4n=34+2n=16$ equals $6n=50$). It is interesting to note that all Cryptanthus species thus far examined have a chromosome number of 34, and we hypothesize that the genus Cryptanthus may correspond to an ancestor-3-like group in terms of the chromosome evolution scenario above.

One characteristic of polyploidy complexes is that they naturally tend to occur in even-numbered intervals; two sets of chromosome being diploid ($di=2$), four sets being tetraploid ($tetra=4$), six sets being hexaploid ($hexa=6$), eight sets being octaploid ($octa=8$)...etc. Cultivated wheat serves as an example of a well-studied polyploidy complex, with known diploid, tetraploid (macaroni wheat) and hexaploid (flour wheat) conditions. Odd numbered ploidy levels (e.g., three sets – triploid, five sets – pentaploid...etc.) typically do not persist naturally because of very low levels of fertility in egg and sperm cells. The cultivated pineapple is a good example of a sterile triploid that persists only via vegetative propagation and not seed. Many of the so-called seedless fruits are triploids.

Where does Cryptanthus fit into this hypothetical scheme for bromeliad chromosomal evolution? Unfortunately, the answer to this question is not yet clear. There are, however, two explanations that appear likely, and these are being tested in greenhouse and laboratory experiments. The first explanation places Cryptanthus as the only living representative of an ancient tetraploid lineage (i.e., $4n=34$) that

evolved before the hexaploid level (i.e., 50) was possible. An alternative explanation invokes a long series of single, individual chromosome losses (phenomenon known as descending aneuploidy). In other words, over evolutionary time the lineage that lead to modern-day Cryptanthus lost individual chromosomes in a stepwise manner (i.e., $50 \rightarrow 49 \rightarrow 48 \rightarrow 47 \rightarrow 46 \rightarrow 45 \rightarrow 44 \rightarrow 43 \rightarrow 42 \rightarrow 41 \rightarrow 40 \rightarrow 39 \rightarrow 38 \rightarrow 37 \rightarrow 36 \rightarrow 35 \rightarrow 34$) totaling 17 individual descending aneuploidy events.

Is Cryptanthus an ancient tetraploid or is it derived from the hexaploid level by 17 single chromosome-loss steps? What are the taxonomic ramifications for these alternative explanations? In answer to the first question, we don't know yet. However, research is underway which we hope will provide data to support one explanation over the other. What are the taxonomic ramifications? If Cryptanthus is determined to represent an ancient tetraploid, it may be necessary to establish a fourth subfamily in the Bromeliaceae, the Cryptanthioideae, to accommodate Cryptanthus. If Cryptanthus is determined to be the product of multiple chromosome-loss steps, it would be best to maintain it in the subfamily Bromelioideae as a very distinctive and isolated genus.

LITERATURE CITED

Brown, G.K. and A.J. Gilmartin. 1989. Chromosome Numbers in Bromeliaceae. *American Journal of Botany* 76 657-665.

Editor's Edict

This article by Editor Larry Giroux is reprinted from the August 2005 newsletter of the Caloosahatchee Bromeliad Society in North Fort Myers, Florida

This past week I had a visitor from one of the northern "M" states. With today's politically correct" mentality and not knowing if there is an organization who polices these things I'm about to talk about, I'd rather not mention locations or names. Let's just call my visitor, Mary. After my conversation with her about the care of plants during the cold season in northern climates, I have developed a new attitude toward my own plants. I'm inclined to dismiss my plants' complaints as trivial: I'm too hot! I'm too cold! I'm too cramped! I want food! I want a drink! Get these spots off me! I want more sun! I'm getting burned! I wanna be fanned! My feet are wet! I don't like my neighbor! Get that animal away from me! I am sure you hear the same complaints and demands from your plants year-round here in southwest Florida. Yeah, sure – I may keep them a little cramped in winter; maybe give them a cold shower prior to a cold wave; cover them with blankets for a day or two and maybe occasionally over-water or forget to water as needed. But this nothing compared to what their northern cousins have to put up with.

Mary is a good person and from the quality of her plants, she's a good grower. She has two passions: one is for cats and the other for her plants, which are mostly the semitropical plants like bromeliads, orchids, and hibiscus. To indulge in these hobbies she's made a lot of sacrifices. She has no children; her Saturdays and most of her Sundays are devoted to caring for her cats and watering the numerous plants. Her one vacation a year has to be carefully planned and is limited in duration. Life is slightly easier from June until September – but for the plants' survival they must give up the fresh air, the pure rainwater, the warm natural sunlight and their nearly unlimited space to coexist for nine months with Mary's numerous cats. Competition for the paucity of sunrays and space on the shelves near the windows is fierce. Mary now eats standing up for the next nine months while chairs, breakfast table, the dining room table, counters and shelves accommodate the cats and the plants. Her life is no longer her own. This is real devotion...and from her pictures, I know the flora and fauna appreciate her sacrifices.

I met this other northern grower, who I will call Peter, while helping groom his entries for the last World Bromeliad Conference in Chicago. Not only were his plants in excellent condition, they seemed to glow; they were almost anxious to show their best for their owner, like dogs do at a dog show. Peter was showing species and cultivars as well as several crosses he made himself. The numerous awards his plants took home attested to their quality and to the care they had been given. I was shocked to hear from Mary that these same plants weren't living the good life back at home – especially during the fall/winter/spring seasons. Peter only lives a few miles from Mary. And like Mary's plants, Peter's bromeliads can live the high life for only three months of the year. But still, with such beautiful plants, Peter must have an immense greenhouse to keep them over the long winter. No way! For nearly nine months, all of Peter's hundreds of plants are crammed into a greenhouse less than 6 x 10 feet. Temperatures as low as minus 30 degrees and a foot of snow on the glass is their usual lot. Nevertheless, they appreciate what they have and make the most of it and come summer and show time, they make their owner proud.

Now I know that you probably won't believe this one, if you have never lived up North, but Mary assured me that it is true. I'll call this person Art. He gave up a respected job in horticulture to grow his favorite plants: bromeliads. He also has beautiful plants. During the summer he devotes most of his spare time to their care. In return, they give him beauty and perform quite well at shows. Come winter, however, Art has to put them into hibernation. He really doesn't have much choice; he doesn't have a greenhouse. Out come the cars from the garage and in go the plants. Saddam Hussein had a luxurious suite compared to the "cell" these plants have to endure. At least Hussein had water, food and got out of his hole occasionally for light and exercise. After their long rest, Art hoses them down and they are waiting for their master's orders.

So the next time you hear whining from your leafy wards or while you're driving to a show, they complain they don't like their top dressing, relay these stories about all the poor, cold, starving, dehydrated broms who are not as fortunate as they are, and tell them to SHUT UP and SHINE!

Fertilizer 201 (the next level after 101) for the Homeowner



One of the biggest problems I see in horticulture – at least throughout this area – is plant malnutrition. I realize our soil conditions are poor. Hence, all the better reason to add some sort of fertilizer to your care regimen.

The issue of “feed or not to feed” is a longstanding debate; but, I have some hefty evidence that better quality and more weather-resistant plants come as a result of better-fertilized plants. If you don’t believe me, stop in at Pinecrest Gardens to see a wide variety of well-fertilized plants. See if you like the look, as opposed to the half-yellow, tired looking plants you see on so many boulevards and parks in the county.

Healthy plant diets are surprisingly easy to come by. And, even more surprisingly, healthy plants are obtained by purchasing items that are cheaper than you might think.

There are some people who feel that if we choose only native plants, we’ll never need to worry about feeding them in the landscape. Therefore, a whole landscape made out of native species needs no care, right? Most commercial growers will readily tell you that these species have adapted to living in low-fertility soils, but that doesn’t make them **intolerant** of fertilizers.

We have several dozen native species here at Pinecrest Gardens and they thrive under a regular fertilizer program. The same holds true for many bromeliad growers, where the case is a little stronger for a low-fertility diet in order for the plants to color up as much as possible. I would say this idea will produce a VERY slow growing crop of plants, and you will have reduced care for your landscape: the so-called “zero-scape” model. You’ll also have reduced plants.

In the home landscape, though, a solid case can be made for a regular (not the same as frequent) fertilizer program. I’ve spoken widely on this topic, and can suggest a one-step program for success. Here it is folks, the **Semi-Famous One-Step Program for Overall Landscape Success**: Feed your entire landscape, evenly and wall-to-wall, (except for concrete, your home, and the pool), with 12-4-12 Improved Palm fertilizer, every 3 months, at the rate of 1 pound of fertilizer for every 100 square feet.

Pretty simple, yes? This regime is capable of feeding grass, trees, fruit trees, bromeliads, palms, and annuals. I wouldn’t suggest you use this much fertilizer on tree ferns, but overall this recommendation covers most landscape plants. This idea follows recommendations about overusing high-nitrogen fertilizers, like turf fertilizers. You don’t have to feed your grass with the 29-5-3 stuff from that really popular grass fertilizer company with the great TV ads. The 12-4-12 Palm fertilizer will capably grow what you need to grow and will actually slow down the grass growth.

For those of you with orchid or epiphyte collections, liquid fertilizer is okay too; but, the same suggestions apply about using lots of nitrogen. My own favorite choice is Peters Excel 15-5-15 Cal-Mag, an excellent all-purpose fertilizer that’s a little tough to find. Liquid fertilizer can be a great tactic for boosting the color of plants, or for feeding epiphytes mounted to trees. Many off-the-shelf fertilizers like Miracle-Gro and Miracid all work, but are heavy on nitrogen, leading to a lot of foliage and not much else.

This article is by Craig Morell, the horticulturist at the Pinecrest Gardens in Pinecrest, Florida. The article is excerpted from August 2010 newsletter of the Bromeliad Society of South Florida. The article is written about Florida landscaping but might be applied to our region.



The BSSF is a non-profit educational organization promoting the study and cultivation of bromeliads. The BSSF meets monthly on the 3rd Thursday at 7:30 PM in the Recreation Room of the San Francisco County Fair Building, 9th Avenue at Lincoln Way, Golden Gate Park, San Francisco Meetings feature educational lectures and displays of plants. Go to the affiliate section of the BSI webpage for information about our meetings.

The BSSF publishes a monthly newsletter that comes with the membership. Annual dues are single (\$15), dual (\$20). To join the BSSF, mail your name(s), address, telephone number, e-mail address and check made payable to the BSSF to: Harold Charns, BSSF Treasurer, 255 States Street, San Francisco, CA 94114-1405.

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