BROMELIANA

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Genus *Neoregelia*

by Herb Plever

The program for February will be a video of the species and cultivars of *Neoregelia,* a genus with only 110 species but **3,643** registered hybrids. This number should tell you that neos are without doubt the most widely grown bromeliads, at least among those who grow outdoors or in greenhouses in Florida, Louisiana, Texas, California, Central and South America, Australia and New Zealand.

The reason for that popularity becomes plain to us when we visit those areas with direct, overhead sunlight, and we see neos with brilliant colors, intense markings and compact conformations that make them esthetically attractive. Species with high color and markings also attract as pollinators bees, butterflies etc. in habitat. This evolutionary strategy was improved for many green leaved neos when they evolved the ability to turn the inner halves of their leaves to brilliant red, purple, yellow etc. as they begin to flower.

Neoregelia pendula var. brevifolia

But even in those sunny places growers have to discern by trial and error which plants are safe to grow in open sun and those that need more shade (albeit good light). We have to do the same trial and error testing indoors to see what neos will color up for us. The video can present only a representative sampling of the different neoregelias, with emphasis on those that are most suitable in size and light responsiveness for indoor culture.

Two subgenera of *Neoregelia* are presently recognized: subgenus *Hylaeaicom* (High-lee-ai-cum) and subgenus *Neoregelia.* They differ botanically in that the flower petals of *Hylaeaicum* are free (not connected to each other), whereas the petals in subgenus *Neoregelia* are connate (connected to each other in part or for most of their length).

Species of genus *Neoregelia* found in the Amazon forests of Peru, Ecuador, Venezuela, Columbia and Amazonian Brazil are all in subgenus *Hylaeaicum.* This small subgenus, with a dozen or so species, is closely related to *Aechmea,* subgenera *Aechmea* and *Lamprococcus.* Former *Neoregelia aculeatosepala* has already been placed in *Aechmea* as *A. aculeatosepala* by Elton Leme, and it is likely more changes will follow as these plants are now being closely studied and analyzed. *Hylaeaicum* has been shakily and temporarily kept in genus *Neorgelia* while these clarifications take place. I suspect that *Hylaeaicum* will soon be elevated to genus status as proposed by Harry Luther (Director of the Bromeliad Identification Center at Selby Gardens).

Plants in *Hylaeaicum* are mostly small and they propagate by long stolons. They all grow epiphytically and not terrestrially. The inflorescence is a dense cluster of white petaled flowers, deeply sunken into the center. The leaves are coriaceous

NEXT MEETING - Tuesday, February 6th , 2007 promptly at 7:00 P.M. at the SLC Center, 352 Seventh Avenue, between 29th & 30th Streets, 16th floor in the large room D4.
GENUS NEOREGELIA - a video of *Neoregelia* with habitat descriptions and cultural needs. If weather permits, please bring in plants for Show & Tell and for our plant sale table.

(leathery). Typical species in this subgenus are *Neoregelia eleutheropetala* and *N. pendula var. brevifolia* (see photo on page 1).

The many species of subgenus *Neoregelia* are found along coastal southern Brazil. They vary in size from small to large, petal colors and many come with colored bars, blotches or stripes; those with plain green leaves will brightly color up the center part of the leaves.

Neoregelia carolinae cv. 'Meyendorfii' albomarginated

They come in two basic forms or shapes: 1. A many leaved, open rosette like *Neoregelia carolinae* (see photo). 2. A few leaves forming a funnel (cylindrical below and flaring out on top in a rosette) or mostly cylindrical/tubular with little flaring out at the top. The plants with this conformation are small and they clump by sending out new plants on stolons. A typical species of this type is the very variable *Neoregelia ampullacea.* (See photos this page, courtesy of www.fcbs.org .)

Most neos need a goodly amount of direct sunlight to grow compactly and color up (if that is their bent), but some are reasonably responsive or sensitive to light. We have discovered that many neos can attain decent conformation and color when grown in an unobstructed east-southeast, south or west facing window or close to fluorescent lights like Vitalite or Verilux. For a number of years we have tested neoregelias for light responsiveness by trial and error and have reported the results in these pages. Culturally, we recommend giving neos the exposure with the highest available light you have, and under fluorescent lights you should grow them close to the tubes.

As a rule I don't fertilize them as this has been found to wash out color and markings (especially foliar feeding). But I am now starting to test-fertilize some neos with a formula of 5 parts (nitrogen)-11 (phosphorus)-26 (potassium) on the theory that the low nitrogen may not affect the markings or compactness, and the high potassium may give them a boost in color.

We have found the following plants to be reasonably light responsive to be grown indoors: *Neoregelia ampullacea* (and its many forms and cultivars), *N. carolinae forma tricolor* (and the host of its cultivars), *N.* 'Alley Cat', *N.* 'Devroe', *N.* 'Galaxy', *N.* 'Gespacho', *N.* 'Hannibal Lector', *N.* 'Clarice' (a cultivar of 'Hannibal Lector'), *N. lilliputiana*, *N.* 'Little Rose', *N.* 'Midget', *N.* 'Milagro', *N.* 'Morado', *N.* 'Passion', *N.* 'Pemiento', *N.* 'Pepper', *N.* 'Small World', *N.* 'Screaming Tiger', *N. smithii, N.* 'Spot On', *N. tigrina*, *N. tristis* and *N. zonata.* There are hundreds of others we will be able to grow.

In selecting new neos to place on our past plant orders for testing, I tried to avoid cultivars with a parent I know requires very high light to color up, such as *Neoregelia* 'Fireball' and *N. punctatissima.* 'Fireball' grows a brilliant red in the open sun in the south, but when grown outdoors or in the greenhouse in the north it turns green by mid-September and remains that way until June or July. However, I have been able to get good color and markings on *N.* 'Alley Cat' (*N. punctatissiama* x ?) and *N.* 'Hannibal Lector' (*N. punctatissima* x *N.* 'Tiger'), both of which have *N. punctatissima* as a parent. ('Tiger' is said to be a cultivar of the large *N. carcharodon.*

N. punctatissima should have yellow-green leaves with red stripes, but when I grew the plant it stayed green with faint markings. I concur with its reputation that it requires strong light, but that genetic character may not be dominant when it is crossed with plants like *N.* 'Tiger', as yet unregistered by the talented Chester Skotak. In the cross that produced *N.* 'Hannibal Lector' my guess is that the small *N. punctatissima* brought down the size of the hybrid, but 'Tiger's' genes produced both its

Neoregelia ampulacea

N. ampulacea red form


N. ampulacea dark form

stripes and increased light responsiveness.)

A recent experience growing *N.* 'Galaxy' has persuaded me to retest *N.* 'Fireball' and *N. punctatissima* under my fluorescent light unit. I bought *N.* 'Galaxy' in our spring order and its leaves were not well marked and were pink-green with a faint pink center. I had expected it would have the marbling of its seed parent *N.* 'Marble Throat' shown by Chet Blackburn's photo of *N.* 'Galaxy' on fcbs.com, but it didn't. I concluded it was not a good indoor plant.

Neoregelia 'Galaxy after 6 weeks under lights

At the beginning of December, I decided to place *N.* 'Galaxy' in the middle of my light setup, close to the lights. Now after six weeks the center leaves are a strong pink on top; the leaves are red below and along the margins, and they are covered with lime, yellow and red spots and some red and lime blotches. (See photo on this page.) There are small, faint cream blotches on a new inner leaf, but no large areas of marbled cream elsewhere. I will wait to see if the new growth will be marbled. It may be that *N.* 'Galaxy' is unstable, or perhaps the plant I got was a less marked F1 offspring which slipped by as the marbled cultivar, a not infrequent problem with hybrids.

Why should a fluorescent light spectrum with a near-the-sun color temperature of about 6,000° Kelvin have more punch than what I think is higher lumen light from my unobstructed south window? I suspect it is a combination of growing very close to 6 tubes for 15 hours of fairly strong light and the effect of ultra-violet light (which is blocked by the window panes at my window sill.

The February video will show you many gorgeous, "eat your heart out" neoregelias, and we will advise which plants are available to be bought on our plant order. Make notes and let me know which plants you are interested in purchasing so they can be included in the order. Out of about 700 available neos, we'll select many for you to test in our spring plant order. Order some and join the fun. □

MEMBERS' CORNER

Submitted by George Axiotakis:

"*Bromeliaceae*, the bromeliad family, is divided into three sub-families: *Pitcairnoidea, Bromeliodea* and *Tillandsioidea.* Sub-family *Pitcairnodea (Dyckia, Hechtia, Pitcairnia, Puya,* etc.) is considered the most primitive, and has the fewest epiphytes. In the *Bromelioidea* (*Ananas, Aechmea, Bilbergia, Cryptanthus, Neoregelia* etc.) we find more epiphytes. Sub-family *Tillandsiodea*, (*Guzmania, Tillandsia, Vriesea*, etc.) is the most advanced and is where we find the most epiphytes and the most diversity of form. Many bigeneric hybrids have been produced in cultivation, such as X *Cryptbergia* and *X Guzvriesea.* However, it is impossible to produce a cross between members of two different subfamilies such as, for example, crossing an Ananas with a Guzmania.

As such, it would seem that the three sub-families are, in fact, three distinct CLADES (groups that share a definite common ancestor). This begs the question of whether "bromeliads" are in fact a natural group. With this in mind has anyone seriously proposed dividing up the family *Bromeliaceae* into three separate (albeit closely-related) plant families?"

Editor's Response:

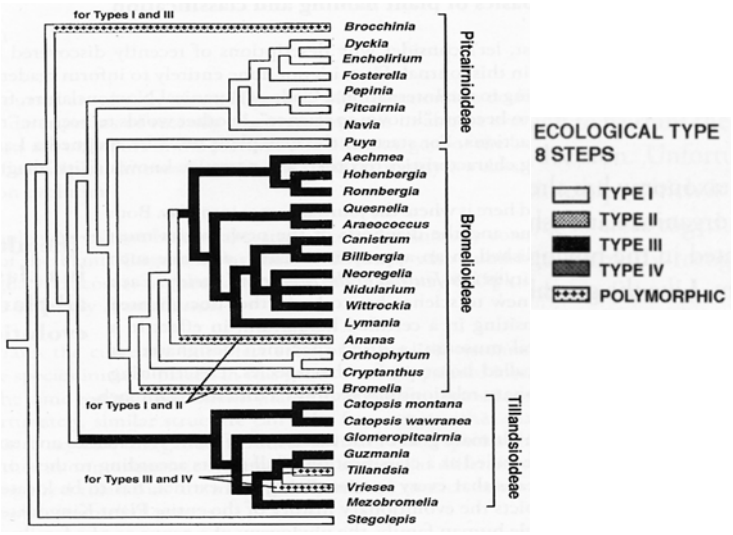
George's provocative question raises issues that for several decades have been and still are undergoing intense DNA sequencing research by molecular biologists. Despite many contradictions and complications, a reasonable if only approximate picture of the evolutionary history of the bromeliad family has emerged as a consensus among scientists. (Members who are interested in learning more about this topic should read "*Bromeliaceae*: Profile Of An Adaptive Radiation" by Dr. David H. Benzing, Cambridge University Press, 2000; and "What Is It That Taxonomists Do", an excellent article by Dr. Benzing in the July-August, 2006 BSI Journal.)

George states that the genera in each group share a common ancestor; thus each of the three sub-families are separate clades. For this reason he asks whether bromeliads are a natural group sufficient to justify family status. He suggests considering dividing *Bromeliaceae* by elevating each of the sub-families as a separate family (in effect eliminating the family status

for the bromeliads). Although they are separate clades, the sub-families still can be part of a larger family group, and George's assumption about *Pitcairnioideae* is not wholly accurate. Some of the DNA results indicate that sub-family *Pitcairnoideae* is polyphyletic (including genera with more than one ancestor). The new data indicates *Bromelioideae* is a monophyletic (genera with a common ancestor) group within *Pitcairnioideae*. (This stuff is complex. We are trying to shed light on aeons of the evolutionary history of plants which were and are highly adaptive in response to the changes, sometimes cataclysmic, in their climate and environment. Through mutation and natural selection they changed, evolved and then radiated and spread to survive in new and still changing conditions.)

Bromeliad family ancestry probably involved a relationship between an ancient form of *Brocchinia* (the modern Brocchinia is currently in sub-family *Pitcairnioideae*)and *Stegolepis*, a genus of the *Rapataceae* family, probably in the very early Tertiary era about 60 to 65 million years ago. It is likely that *Bromeliaceae* and *Rapataceae* had a common ancestor; some species of *Rapataceae* exhibit epiphytism and absorptive trichome leaf covering. Epiphytism, however, is not a valid marker to distinguish the sub-families, as it has appeared, disappeared and then reappeared again several times in the evolutionary history of the bromeliads.

As to splitting the family, the evidence strongly supports a contrary conclusion: that *Bromeliaceae* is indeed a valid family group. Research shows "unusually close intrafamilial relationships among bromeliads...that are family rather than gene specific."



A phylogenetic tree (cladogram) showing relationships among representative genera and all three of the sub-families. (Benzing, BSI Journal, July, 2006.)

(Benzing, at pg. 540.) Moreover, in salient support of that family status, consider the fact that every bromeliad flower, whether pitcairniod, bromelioid or tillandsioid, has three floral bracts, three sepals, three petals, six stamens, and a three-celled ovary. Such a combination of floral characters, retained through aeons of change, exists only in *Bromeliaceae* and in no other plant family.

Brocchinia, now designated within sub-family *Pitcairnioideae*, is at the top of the DNA tree (see cladogram below) and is distant from the rest of its sub-family. *Brocchinia* seems more closely related to *Tillandsioideae* (that evolved last) at the base of the tree, with similar photosynthesis, water tank structure (phytotelma) and absorptive, radial trichomes.

The DNA genetic research to date has shown the three sub-families lining up within family *Bromeliaceae*. That a cross between two of the sub-families has not yet been made does not make it "impossible", nor is it necessarily pertinent to their taxonomy. Each sub-family has different ovary positions and seed structure than the others, but the blockage from this problem, if any, may be overcome.

NEWS and NOTES

2007 MEMBERSHIP DUES of $20.00 are now payable. (New members who joined in the fall are deemed paid up for 2007). A Bromeliana subscription is $8.00; overseas it is $12.00. Mail your check payable to N.Y. Bromeliad Society to Barbara Lagow, 54 W. 74th St. N.Y.C. 10023 or pay it at the next meeting.

CORRECTION! - Michael Kiehl was incorrectly identified in the January issue as the hybridizer of X *Pukia* 'Sparkle', a/k/a *'Dyckipu* 'Sparkle'. That bi-generic cross was produced and named by Jack Poland.

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