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Front Cover. *Orthophytum triunfense* is featured starting page 264. Photo by *Alan Herndon*.

Back Cover. Part of a *Tillandsia* display at 2014 World Bromeliad Conference in Honolulu. See page 240. Photo by Mike Michalski.

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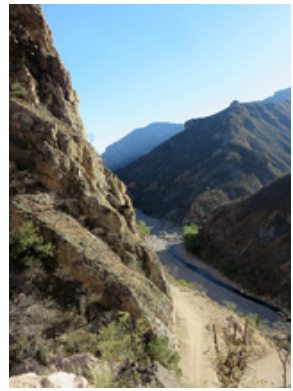

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Dr. Steven Reynolds

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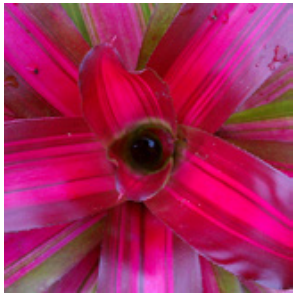

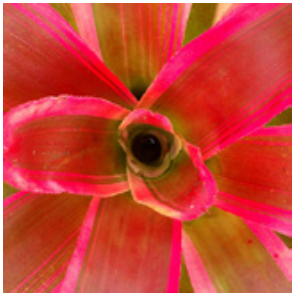

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Tillandsia deppeana (Bromeliaceae), an endangered species in Cuba

Lucia Hechavarría-Schwesinger[1], Julio León Cabrera*** and *Maikel Cañizares Morera**

Tillandsia deppeana Steud. (Fig.1), although recently reported as endemic to Mexico (Espejo et al 2004), is the single species, among currently known Cuban bromeliads (11 genera and 58 spp.), found only in Mexico and Cuba (Till 1999). [editor's note: for a recent review of *Tillandsia* species known from Cuba, see Lucia Hechavarría-Schwesinger. ***Tillandsia* L. (Bromeliaceae) in Cuba: an overview.** Journal of the Bromeliad Society 56(6): 246-252. 2006.]

The first Cuban collection of *Tillandsia deppeana* dates from 1929, when J. G. Jack (1861-1949), a Canadian Botanist and Dendrologist at Arnold Arboretum (Stafleu & Cowan1979) collected the specimen Jack 7293 in Buenos Aires, Trinidad Hills, Central Cuba, when he was visiting the Atkins Tropical Botanic Garden in Cienfuegos. Since then, the specimen has been subject to a long list of misidentifications. In 1931, when revising the Cuban specimens of La Salle Herbarium, L. B. Smith (1904-1997) (Stafleu & Cowan 1985) determined it as an uncertain variety of *Tillandsia rubra* Ruiz & Pav. Carabia, with his revision of Bromeliaceae for Cuba, disagreed with the application of the name *T. rubra* to the specimen, consequently he identified the specimen as a new species and named it *T. smithiana* Carabia (1941), to honor the world specialist of the family (Bromeliaceae) Lyman B. Smith. Nevertheless, Smith (1956) not convinced with Carabia's determination, checked again the specimen and compared it with the Mexican *T. paniculata* Schltdl. & Cham., a species that was renamed by Steudel as *T. deppeana* and reduced to synonymy of *T. rubra* by Mez (1896, 1935). Smith, in his revision of *Tillandsia* for his monumental monographic work on the family Bromeliaceae (Smith & Downs 1977), follows the authority of Mez and erroneously places *T. smithiana* in the synonymy of *T. fendleri*, something very understandable if we keep in mind that for him *T. paniculata* Schltdl. & Cham., and *T. smithiana* Carabia were synonymous with *T. rubra* Ruiz & Pav., a species considered synonymous with *T. fendleri* at the time. The mystery of *T. smithiana* was solved by Till (1999) who compared the lectotype of *T. paniculata* (= *T. deppeana* Steud.; *Schiede & Deppe* 1008, LE), and the holotype of *T. smithiana* and noticed the great resemblance of both species placing *T. smithiana* consequently under the synonymy of *T. deppeana* Steud.

In Cuba, flowering *T. deppeana* plants can reach 60 cm tall. The species is characterized by a water-holding, funnelform rosette, of several dark green membranaceous leaves, with purple or brown dots of variable size and randomly distributed on blades; sheaths ovate-lanceolate, inflated (15 X 5 cm); blades ligulate, flat with acute apex (30-40 cm long), covered by a waxy layer with scattered trichomes embedded. The inflorescence

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Figure 1. A blooming plant of *Tillandsia deppeana*, growing on *Cinnamomum montanum* at the northern crest of Pico San Juan, Cienfuegos, Central Cuba. Photo by Maikel Cañizares Morera.

is erect, green-reddish, once-branched, subdigitate, with 6-16 spikes arranged in a spiral around the main axis. Spikes linear, complanate, 15-35 x 0.8-1.4cm with 15-25 flowers per spike. Scape erect, short and stout, completely concealed by leaves, with triangular, foliose, imbricate bracts (20-30cm long). Primary bracts membranaceous,

reduced to widely ovate sheaths with filiform blades and apex acute, 10 cm long, shorter than spikes, green. Floral bracts are lanceolate (2 cm long), papyraceous, nerved and carinate, apiculate, partially imbricate, shorter than the sepals. Flowers sub-sessile, 6.5 cm long. Corolla lilac. Stigma and stamens exserted (Fig. 2). The fruit is capsular, 4 cm long. The species grows in rainforest habitats and blooms from February to June.

Figure 2. An open flower of Cuban *Tillandsia deppeana*. Photo by Maikel Cañizares Morera.

All Cuban *T. deppeana* herbaria specimens have been collected from Pico Potrerillo (863m altitude) and the Pico San Juan region (1140m altitude), the highest mountains of Guamuhaya, the mountainous massif of Central Cuba (Fig. 3). Nevertheless, recent expeditions looking for populations of the species in Guamuhaya carried out by the authors from 2006 through 2014, recorded its present day occurrence only in the Pico San Juan region growing on trees and limestone of the cliffs.

The population growing in the crests of Pico Potrerillo could have been extirpated when hurricane Dennis devastated the forests in 2005. In the Pico San Juan region, the species has a small population at Pico Mandulo (989m a.s.l.), SW of Pico San Juan. In this population, no more than 20 individuals, all juveniles, occupy just 50m^2, growing on limestone.

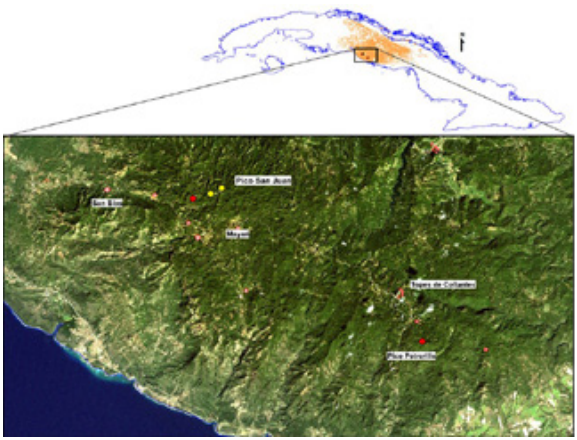

Figure 3. Historic (red dots) and current (yellow dots) distribution of *T. deppeana* in Central Cuba. Pink dots of varying sizes show the location of settlements in the region. Figure prepared by Maikel Cañizares Morera.

The species also has an epiphytic population, with mature plants, on the northern crest of Pico San Juan (1113m a.s.l.; Fig. 4). Here, fewer than 10 individuals are found, growing on *Cinnamomum montanum*(Sw.) J. Presl. (Lauraceae) trees.

Due to its local distribution in the highest mountains of Central Cuba, reduced to a small surface and its scarcity (total less than 50 individuals) and fragmented populations it is considered a critically endangered

Figure 4. Pico San Juan, the region of highest peaks in Guamuhaya, the mountainous massif of Central Cuba. Photo by Maikel Cañizares Morera.

species in Cuba (CR [C2a(i);D]; IUCN 2010). The known population status of the species is a reason to consider *Tillandsia deppeana* as a conservation target in the flora conservation program in the operative management plan of the Ecological Reserve Pico San Juan. In order to protect the species a monitoring protocol to update current population structure, as well as the study of the related fauna and flora, and environmental educational activities involving local communities are some of the tasks now being carried out in the area.

Acknowledgements

We are very grateful to the Rufford Small Grant Foundation for providing funds for studying the species under the framework of the projects "The vascular epiphytes of Guamuhaya Mountainous Massif, Central Cuba: management strategies for its conservation in natural and agro-ecosystems" and "Implementing conservation action plan for vascular epiphytes of Guamuhaya range, Central Cuba: current local knowledge diagnosis and environmental education". A special thanks to: the staff of National Park Topes de Collantes and the Ecological Reserve Pico San Juan for lodging support and guidance. We are also very grateful to reviewers of the manuscript: Pam Koide-Hyatt and Alan Herndon, for suggestions to improve the paper.

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Growing *Pitcairnia andreana* Linden

*Eric J. Gouda**

Pitcairnia andreana (Fig. 1) was first published by Linden in L'Illustration horticole 20: 146. t. 139 (1873) from a plant in his garden (evidently no type specimen was preserved, but the species is well typified by the original description and plate, see Fig. 2). L.B. Smith (1974: 348) notes "known from the type collection only, but widely cultivated" and under Type he mentioned an isotype at Kew, Choco, Colombia, without locality. La Croix Hortus s.n. It has not been collected since, but at MO two other (unveri-

Figure 1. *Pitcairnia andreana* in flower at the University of Utrecht Botanic Gardens. Photo by Eric Gouda.

*University of Utrecht Botanic Gardens, Budapestlaan 17, 3584 CD Utrecht, Netherlands (e.j.gouda@uu.nl)

Figure 2. Plate accompanying the original description of *Pitcairnia andreana* in the 19th century horticultural journal *l'Illustration horticole*.

Figure 3. This clump of offsets formed around the base of a single rosette that flowered earlier. The tendency for all offsets to flower at once provides a spectacular display in bloom. Photo by Eric Gouda.

fied) collections are listed, one from Colombia: without locality, Jul 1941. Barry, D. s.n. and a doubtful one from Bolivia: Dept. La Paz, Nor Yungas, Yolosa, 16.5 km hacia Unduavi, Alt. 2450 m. 27-11-1980. Beck, S.G. 3750 (LPB), but it was not mentioned in the checklist of Bolivian Bromeliaceae (Krömer et al. 1999). [editor's note: MO is an acronym used to identify the herbarium at Missouri Botanical Garden in St. Louis, Missouri.]

So the Isotype is probably preserved from a specimen in La Croix Hortus, originated from Linden. But where does this widely cultivated material come from? Are these plants all originated from the same Linden collection. Anyway, we are growing clones from several Botanic Gardens (all tracing their origin to plants in cultivation) and all are quite similar. They always have soft and pale green leaves with undulate margins that often become yellowish at the margins – even to the point of looking unhealthy. The abaxial (lower) side of the leaves are densely white lepidote with trichomes that scrape off easily. It is an easy plant to grow in warm humid conditions and typically forms several new shoots around any shoot that has flowered. Most of those new shoots will flower at the same time with its beautiful orange yellow corolla, making it an attractive species for cultivation (Fig. 3).

Figure 4. Close-up of two open flowers from the clump of flowering rosettes. The flowers are slightly zygomorphic. The petals are twisted so all of their tips form a hood above the anthers and stigma rather than being symmetrically arranged. Photo by Eric Gouda.

One plant produced 8 shoots after flowering the first time- and these offsets are now all flowering at the same time, even though the offsets have not grown equally. The larger offsets produce larger inflorescences than the smaller ones.

As in many *Pitcairnia* species, the flowers of *Pitcairnia andreana* are slightly zygomorphic (Fig. 4)

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Announcements

The BSI would like to acknowledge the generous donations recently made by the South Bay Bromeliad Associates for the Color Fund and website maintenance, by the New Zealand Bromeliad Society for bromeliad research activities, by the Florida Council of Bromeliad Societies for the Harry Luther International Scholar Fund, and by the Seminole Bromeliad and Tropical Plant Society for the Harry Luther International Scholar Fund, Archive and General Funds. It's through donations like these from the affiliates that your organization is able to maintain its activities and fund education, research and conservation. Thank you South Bay, New Zealand, Florida Council and Seminole societies! *-- Jay Thurrott*

BSI has lost several important members during the past year.

Edgar L. Smith, of Dallas, Texas, passed away in April 2014. An avid plant collector with a special fondness for bromeliads, he served as BSI President from 1986 through 1988.

Dorothy Berg of Sarasota, Florida was lost in September 2014. Best known as the wife of Wally Berg, Dorothy was a mainstay of the Sarasota Bromeliad Society for many years. She was also gracious hostess to the unending stream of bromeliad enthusiasts who passed through their home to admire the plants Wally brought back from his collecting expeditions and talk about a shared love for bromeliads.

Luiz Felipe Nevares de Carvalho of Rio de Janiero, Brazil was serving as a BSI Regional Director for the International Region when he died at the end of October 2014. An engineer by training, he headed Somax Ambiente, a business supplying designs and equipment for ventilation, pollution control and noise abatement projects in industrial settings. He was also one of the few Brazilians who developed and maintained a large collection of bromeiads. He was a founder of Sociedade Brasileira de Bromelias.

Nat DeLeon, Honorary Trustee, BSI President 1983-1985 and winner of the 2014 Wally Berg Award, passed away in late January 2015. He helped found and actively participated in the activities of the Bromeliad Society of South Florida and the Florida Council of Bromeliad Societies.

A Note on the Journal

This issue completes Volume 64 of the Journal of the Bromeliad Society with a total of 4 issues and 288 printed pages. Publication of Volume 65 will be in 4 issues of 72 pages each. A make-up issue to complete Volume 63 is also being prepared.

Call For Nominations For BSI Officers, 2015-2017 Term

Dr. Larry Giroux

Periodically as determined by the BSI Bylaws, the BSI Nominations Chair asks BSI members to nominate BSI Officers to serve or be re-nominated to serve on the BSI Board of Directors. If more than one candidate is nominated for a position, the BSI Board of Directors (which consists of the officers and directors of the Society) vote on the nominees. Below is the list of BSI Officers' positions up for election or re-election. Instructions regarding who can be nominated and how to nominate follow.

Treasurer for 2015-2017

Any new nominees for the Treasurer's position will be running against incumbents Ben and Kay Klugh.

Editor for 2015-2017

Any new nominees for the Editor's position will be running against the incumbent: Alan Herndon

Webmaster for 2015-2017 (NB:No nominations for this position are being accepted at this time.)

The Webmaster's position is vacant and nominations for this position are on hold while changes concerning this position are currently being discussed.

The following are excerpts from the BSI Bylaws concerning BSI Officers and their election.

1. Enumeration. The officers of this society shall be the President, the immediate Past President, the Vice-President, the Editor, the Membership Secretary, the Secretary, Webmaster and the Treasurer. They shall be elected by a majority vote of the Board of Directors (the board) at its annual meeting or as provided otherwise.

2. Eligibility requirements. Each candidate for office shall be a member in good standing of BSI and agree to remain in good standing during tenure if elected. Candidates for the offices of President and Vice-President shall have served at least one term as director.

3. Nomination and election.

a) The chairman of the Nominations Committee shall ascertain the individual membership status of the candidates from the membership secretary and make the nominations to the board 30 days before the annual meeting of the board. Any director may nominate from the floor at that meeting.

b) Elections shall be by ballot. If there is only one nominee for an office, a voice vote shall suffice.

4. Terms of office.

   a) The President and Vice-President shall serve three years or until their successors are elected. Their tenures shall begin at the conclusion of the meeting at which elected. Neither may serve more than two terms in those offices.
   b) The immediate Past President shall serve for a one-year term.
   c) Other officers shall serve two year terms or until relieved by the board of their duties either at their own request or by the board for cause.

Who may nominate? Any voting member of the BSI. Who may be nominated? A nominee must have the following credentials: (1) be a voting member of BSI and agree to remain in good standing during tenure if elected. (2) for President or Vice-President--have served a least one term as a director. (3) agree to being nominated; and (4) agree to serve as an Officer if elected and to remain a member of the BSI for the duration of his/her term.

Procedure for nominating: (1) obtain the consent of the prospective nominee and verify compliance with the qualification criteria; (2) mail or email nominations to the Chairman of the Nominations Committee beginning January 1, 2014. Nominations must reach the Chair of the Nominations Committee by 30 days prior to the Annual Board Meeting. In 2015 they need to be received by August 26 to be presented at the Board Meeting scheduled for September 25, 2015). Nominations by telephone will also be accepted, but must be confirmed in writing within two weeks; (3) supply with each nomination the full name, address and telephone number and e-mail address, if applicable, of the nominee, the position for which the nomination is being made, the local society affiliation, the nominee's BSI membership number and a brief "bromeliad biography" of the nominee.

Please mail nominations to:

Larry Giroux, BSI Nominations Chair
3836 Hidden Acres Circle N
North Fort Myers, Florida 33903 USA
239-997-2237/ 239-850-4048 or email to: nominations@bsi.org or
DrLarry@centurylink.net

Call For Nominations For BSI Directors, 2014-2017, and 2015-2018 Terms

Dr. Larry Giroux

Each year as Directors' terms expire, the BSI Nominations Chair asks BSI members to nominate eligible BSI members to serve as BSI Board of Directors representatives from their respective regions. If more nominations are made than are open positions for a region, the BSI members in that region are asked to vote on the nominees. The first important step is to nominate people for the directors' open positions. Below is the list of open positions for the 2014-2017 three-year term (per a change in the Bylaws, terms for Directors and Officers begin at the end of the Annual Board Meeting). If you are a member of a district with an open position, please help your district by finding a willing person to be nominated for your district's open Directorship. If you have questions about nominating an individual or wish to be nominated, please call the Nominations Committee Chair, Dr. Larry Giroux. His contact information is listed below. In addition there are listed Vacant Director positions, which were not filled at the time their positions became vacant. Nominations are open for these positions; these openings will be filled by appointments by the BSI President from eligible candidates submitted to the Nomination Committee. Instructions regarding who can be nominated and how to nominate follow.

At the end of 2011, the Board reassigned the States and Territories of the US Regions. Although members may be in a new region, their overall representation has remained the same. The current assignment of the Regions and the number of Directors allowed by the September 2014 BSI Membership Census are as follows:

AUSTRALIA 2 Directors

INTERNATIONAL 3 Directors

NEW ZEALAND 1 Director

US CENTRAL STATES 3 Directors

US Central States: Arkansas, Arizona, Colorado, Idaho, Kansas, Louisiana, Minnesota, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah and Wyoming.

US EASTERN STATES 1 Director

US Eastern States: Alabama, Connecticut, Delaware, Georgia, Iowa, Illinois, Indiana, Kentucky, Maine, Massachusetts, Maryland, Michigan, Mississippi, New Hampshire, New Jersey. New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, Vermont, West Virginia, Wisconsin and District of Columbia

US SOUTHERN STATES 5 Directors

US Southern States: Florida, Puerto Rico; All US territories and possessions in the Atlantic and Caribbean areas.

US WESTERN STATES 3 Directors

US Western States: Alaska, California, Hawaii, Oregon, Washington, all United States territories, possessions, and trust territories in the Pacific area.

The Regions for which Directors are up for re-election or there are vacancies and the numbers of directors for the vacant 2013-2016, 2014-2017 or the 2015-2018 terms are as follows:

International 1 Director Vacancy is available (for the 2014-2017 term.)

Australian 1 Director Position for the 2015-2018 term is up for election to replace outgoing 2nd term Director Peter Tristram.

US Eastern States 1 Director Vacancy is available (for the 2014-2017 term) to replace Paul Wingert who is moving into the position of BSI Secretary.

US Western States 1 Director up for re-election for the 2015-2018 term.

The BSI By-laws require that all positions up for re-election be advertised in the Journal and a vote be taken in Regions where there are opposing nominees for these positions. If there are one or more nominees, there will be an election between the new nominees and the incumbent (if there is an incumbent seeking another term).

Australian Director for 2015-2018

If there is more than (1) new nominee for the (1) Australian Director position there will be an election between the nominees.

International Director for 2014-2017 (Vacancy)

Eligible Nominees for the Vacant 2014-2017 International Director's position will be evaluated by the BSI President and he will make the necessary appointment.

US Eastern States' Director for 2014-2017 (Vacancy)

Eligible Nominees for the Vacant 2014-2017 US Eastern States Director's position will be evaluated by the BSI President and he will make the necessary appointment.

US Western States' Director for 2015-2018 (Re-election)

If there are any new nominees for the (1) US Western States' 2015-2018 position there will be an election between the nominees and the incumbent Andy Siekkinen.

Nominations to serve on the BSI Board of Directors for the three-year 2015-2018 term opens January 1, 2015 and closes August 15, 2015. Nominations for open vacancies may be made at any time up until the position is filled by the President.

Serving on the BSI Board is both fun and interesting. The Board makes decisions that influence the direction and activities of the BSI. Board meetings are held annually, usually sometime during the northern hemisphere's summer or on alternate years at the BSI's WBC. Board members, except International Directors, are expected to attend these meetings and do so at their own expense. The cost need not be prohibitive because Board members can share hotel rooms. One of the Board's activities is to actively participate in the semiannual World Bromeliad Conferences. All BSI members are encouraged to participate in the nomination and election process for Board members.

Who may nominate? Any voting member of the BSI who resides in a region for which there is an opening may nominate a candidate for an opening in that region.

Who may be nominated? A nominee must have the following credentials: (1) be a voting member of BSI and have been a voting member for the three consecutive years prior to nomination; (2) reside in the region for which he/she has been nominated; (3) not have served two consecutive terms as a director immediately preceding nomination; (4) agree to being nominated; and (5) agree to serve as a director if elected and to remain a member of the BSI for the duration of his/her term.

Procedure for nominating: (1) obtain the consent of the prospective nominee and verify compliance with the qualification criteria; (2) mail or email nominations to the Chairman of the Nominations Committee between January 1, 2015 and August 15th, 2015 inclusive. Phone nominations will be accepted, but may be rejected if confirmation of qualifications in written form are not received by the deadline. (3) supply with each nomination the full name, address and telephone number and e-mail address, if applicable, of the nominee, the position for which the nomination is being made, the local society affiliation, the nominee's BSI Membership number, and a brief "bromeliad biography" of the nominee. If you have not heard from the Chairman within 48hrs, please confirm with him that your nomination was received.

Please mail nominations to:

Dr. Larry Giroux, BSI Nominations Chair
3836 Hidden Acres Circle N
North Fort Myers, Florida 33903 USA
239-997-2237/ 239-850-4048 or email to: nominations@bsi.org,
DrLarry@comcast.net or DrLarry@centurylink.net

Changes to the BSI Website

Annette Dominguez

To improve the level of security on the BSI website, the process for establishing a user name and password to access the BSI Member's Only pages has recently changed. Access codes published in earlier issues of the Journal will no longer work..

To obtain a new personal password, you must register as an existing member on the BSI website. The following link:will take you to the Members Only home page where you will be invited to register.

http://www.bsi.org/new/members-only/

If you prefer, you can reach this same page by clicking the Members Only button at the top of the BSI Home Page. Clicking on the highlighted invitation to register will take you to the registration page where you will be asked to enter information that will be used to verify your membership. You can enter a username of your choosing. Dual members may register individually with separate passwords, but each must use a different email address. Once the information has been accepted, an email containing your password will be automatically sent to you. The password, however, will not be valid until the webmaster sends a confirmation. Validation may take up to 24 hours. Once you have a valid password, you may sign in using the Member Signin link under the Members Only button or use the Member Signin button.

Thank you for your patience and understanding as we convert to this new method. The change is absolutely necessary to provide the level of security we need for the BSI website.

If you continue to have problems with your login, please contact

Webmaster@bsi.org

Also, to ensure that you continue to receive your BSI Journals without delay please send any address changes to:

membership@bsi.org

Or mail them to:

Annette Dominguez
BSI Membership Secretary
8117 Shenandoah Drive
Austin, TX 78753-5734

A Note on Dues

Annette Dominguez

From the Membership Secretary:

If you are still unable to access the Members Only pages after going through the process outlined on the facing page, your dues are likely not current. This may have occurred for reasons that were no fault of yours. I was catching up with our renewals, during a period when we had some mail thefts, external to the US Postal Service, here in Austin, Texas. Although we are certain that only about $1000.00 of renewal checks were stolen in route from the Membership Secretary to the BSI Treasurer, (then Ed Doherty), we are unable to verify how many renewal letters were involved.

Thank you for your generous understanding and patience as we work ro correct our records. To ensure that you continue to receive your journals without any lapses in membership and that you retain continuous access to rhe information on the Members Only pages, please check your renewal date. Your renewal date (month and year) is the last entry on the line above your name in the mailing address portion of your BSI Journal envelope. You may address renewals most promptly through renewal on the BSI website, via PayPal at http://www.bsi.org/new/membership-options-page/. This site has recently been made even more secure. You may also mail renewals to the address below. If you think your renewal date is incorrect or have other questions , please feel free to email me at: membership@bsi.org or call me at 512-619-2750 (and please leave a message if we don't connect directly). Thank you again for your kind consideration.

Sincerely,

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2014 World Bromeliad Conference

Alan Herndon

A small, enthusiastic group of bromeliad lovers in Hawaii organized and ran our most recent World Conference. Headquartered in Honolulu on the island of Oahu, the Hawaiian Bromeliad Society, especially conference chair Lynn Wageman, with major assistance from Bonnie Boutwell (BSI Vice President), put together a conference with enough activities to keep all participants occupied for several days. The Hawaiian society also provided most of the workers who kept the Registration and Hospitality tables staffed, and provided security, throughout the week.

Major conference activities were held in the Ala Moana Hotel. For those who became oversaturated with bromeliads during the conference, the Hotel was next door to a large shopping mall and a nearby public beach. Waikiki Beach was only a few miles away and Pearl Harbor was also nearby. For the more adventurous, the entire island of Oahu was readily accessible by car.

Figure 1. A planting bed along the street with less shade than usual. Photo by Mike Michalski.

Streets in Honolulu were surrounded by large flowering trees and lushly planted beds of meticulously maintained foliage plants. Weeds were surprisingly rare. Most of the trees were species or cultivars that are commonly grown in Southern Florida, but the specimens in Hawaii were much larger than I am used to seeing. Bromeliads were featured in a few of the planted beds (Fig. 1 & 2), but Hawaiians also love a great number of plants other than bromeliads, and a majority of the planters (in the vicinity of the hotel, at least) did not contain any bromeliads. Still, a small number of well-known nurseries specializing in bromeliads give Hawaii a dis-

Figure 2. A closer view from above of the striking *Neoregelia* hybrid seen in Fig. 1. Photo by Mike Michalski.

Figure 3. A magnificent carved horse anchored the center of the display by the Hawaii Bromeliad Society. Photo by Urszula Dudek.

Figure 4. A section of a large *Tillandsia* display by Peter DeMello. Specimen plants in bloom are featured. Photo by Urszula Dudek.

Figure 5. Another section of the large *Tillandsia* display put up by Peter DeMello. Plants in the foreground are on the table. In the background, you can see the lower part of a tall piece of wood displaying many more *Tillandsia* species Photo by Urszula Dudek.

Figure 6. A display prepared by the Hawaii Cactus and Succulent Society. Photo by Urszula Dudek.

Figure 7. *Vriesea* 'Hawaiian Goddess', exhibted by David Shiigi. Recognized with a 'Best of Vriesea Award'. Photo by Urszula Dudek.

proportionate influence in the bromeliad world.

There was no judged Bromeliad Show at this WBC. The State of Hawaii greatly restricts the shipment of plant material, both incoming and outgoing, in order to minimize the introductions of new pests, and it aggressively advertises these restrictions. This effectively discouraged anyone from other countries, or the continental US, from volunteering to enter their prized possessions. Fortunately, Hawaii already contains many beautiful bromeliads in the hands of dedicated growers, so we were treated to wonderful displays by the both individuals and groups around two sides of the sales room (Figs. 3-6).

David Fell, Sharon Peterson, David Shiigi and Lisa Vinzant, widely known amongst bromeliad aficionados for their hybrids, participated in a display of individual plants that were informally judged. David Shiigi was given two Best of Vriesea awards - one for *Vriesea* 'Hawaiian Goddess' (Fig. 7) and one for *Vriesea* 'Red Samurai' (Fig. 8). As you see from the photographs, both of these hybrids have inherited the narrow, wavy

Figure 8. *Vriesea* 'Red Samurai' exhibited by David Shiigi; also recognized with a 'Best of Vriesea Award'. Photo by Urszula Dudek.

Figure 9. *Neoregelia* 'Cat's Pajamas': a 'Best of Neoregelia' award winner exhibited by Lisa Vanzant. Photo by Urszula Dudek.

Figure 10. *Vriesea* 'Gold Fellow' exhibited by David Fell, judged to be the best plant on display ('Best of Exhibits' winner). Photo by Urszula Dudek.

green bands seen in the species *Vriesea fosteriana*. Both also have leaf blades suffused with a delicate color not seen in species.

Lisa Vinzant won a 'Best of Neoregelia' award for the strikingly marked *Neoregelia* 'Cat's Pajamas' (Fig. 9). The evenness of the broad brown crossbars on the leaves of this plant is remarkable, as well as the fact that the crossbars remain mostly solid from one side of the leaf across to the other.

Vriesea 'Gold Fellow' (Fig. 10), exhibited by David Fell, was judged to be the most outstanding plant in the display, and was given the 'Best in Exhibit' award. The striking golden stripe down the center of the leaf blade is the result of incomplete variegation.

Figure 11. *Neoregelia* 'Hawaiian Beauty', a 'Best of Neoregelia' winner exhibited by Sharon Peterson. Photo by Urszula Dudek.

In most cases, there are several layers of chlorophyll-containing (green) cells within a leaf. If the ability to produce chlorophyll was lost in all of those layers, the stripe would appear white. In this case, some, but not all of those layers lost the ability to produce chlorophyll, creating the golden tone in the stripe.

Neoregelia 'Hawaiian Beauty' (Fig. 11-12) from Sharon Peterson was also awarded 'Best of Neoregelia' and *Neophytum* 'Ecstasy' (Fig. 13) from the same grower won Best of Other Genera. *Neoregelia* 'Hawaiian Beauty' is notable for the number of leaves it is holding. From above (Fig. 11), you can see a perfect picture of

Figure 12. Side view of *Neoregelia* 'Hawaiian Beauty' showing the many layers of leaves. Photo by Urszula Dudek.

symmetrical growth. This sense of symmetry is enhanced by the wide leaves and the progressive shortening of the leaves from the bottom of the rosette to the top. From the side (Fig. 12) you can see how densely the leaves are layered.

Of course, the last thing on the minds of attendees anxiously waiting in line (Fig. 13-14) for the sales room to open was plants on display. This group was aimed straight at the sales tables.

Hawaii's restrictions on plant movement also affected plants available for sale at this WBC. Continental US vendors who appear at every WBC were nearly absent. Only Pam Koide-Hyatt of Bird Rock Tropicals brought plants in for sale. There are,

Figure 13. This *Neophytum* 'Ecstasy' was judged the Best of Other Genera. Exhibited by Sharon Peterson. Photo by Urszula Dudek.

Figure 14. Tables piled high with bromeliads for sale in the Sales Room. Photo by Mike Michalski.

Figure 15. A sample of the other plants available in the Sales Room. Photo by Mike Michalski.

Figure 16. "The First Three". (right to left) Michelle Cameron, Jose Bueno Colon & Antonio Arbelaez waiting for the Sales Room to open. Photo by Mike Michalski.

however, several local bromeliad nurseries that provided plenty of choice plants for shoppers to spend their money on (Fig. 14). In addition, to the widely known growers featured in the display of individual specimens, Peter DeMello, a local grower with a strong interest in *Tillandsia*, provided buyers with large numbers of species in this favorite genus. Pam Koide-Hyatt sold a select group of *Tillandsia* species and hybrids for the advanced collector. There were, as usual, also tables containing artistic offerings

for sale, and, in deference to local tastes, some vendors selling plants other than bromeliads (Fig.15).

Michelle Cameron (Australia), Jose Bueno Colon (Puerto Rico) and Antonio Arbelaez (Miami) were the first three registrants to form a line awaiting the opening of the Sales Room (Fig. 16). The line did not stay short for very long; by the time the doors to the Sales Room opened, the hallway was full (Fig. 17).

Figure 17. As the time for opening of the Sales Roon drew near, the line of eager buyers became much longer. Photo by Mike Michalski.

The Rare Plant Auction was, again, largely composed of plants donated by local growers and nurseries. These growers did not hold back, providing many stunning plants (Fig. 18). Several of the plants in the Show Display were included in the Auction. Sharon Peterson included naming rights in some of her contributions. The successful bidder not only got the plant, but also was able to choose the cultivar name the plant would be registered under.

On another note, one bromeliad collector from England donated his sizeable col-

Figure 18. One of many beautiful plants donated to the BSI for the Rare Plant Auction by David Fell. Other growers from the Islands were equally generous, making the auction a success. photo by Mike Michalski.

Figure 19. Contingent from the Houston Bromeliad Society, hosts of the 2016 World Bromeliad Conference, take the stage during the Banquet. Photo by Mike Michalski.

lection of bromeliad books to BSI for the auction. These were sold through the Silent Auction, with several of the more elusive volumes selling for hundreds of dollars. Among the books was the first book by Elton Leme (Bromeliads in the Brazilian Wilderness. 1993). This is a book I would be interested in having myself, but the bids far exceeded my limit very quickly in the bidding period. Plants held their own, with several new hybrids from David Fell, Sharon Peterson, David Shiigi and Lisa Vinzant commanding bids from $200 to $600 each. Proceeds from the Auction are earmarked for use in BSI programs supporting Reseach, Education and Conservation. At this time, the BSI/ Harry Luther Bromeliad Scholar Program is supported by proceeds from these auctions.

Our WBC banquet preceded the Rare Plant Auction. The long-awaited announcement that the Bromeliad Society of Houston would host the 2016 World Bromeliad Conference was accompanied by presentation of a large delegation from the Houston society (Fig. 19).

Invited speakers educated the attendees on a variety of topics during the Wednesday sections. This started out with a plea by Nigel Thompson to fertilize bromeliads regularly in order to achieve superior growth and appearance. Geoff Lawn discussed the Bromeliad Cultivar Registry and his attempts to impose order on the naming of bromeliad hybrids in the face of an avalanche of newly generated plants every year. Andy Siekkinen gave a talk on his explorations in Mexico, searching primarily for *Hechtia* and *Tillandsia*. Pam Koide-Hyatt introduced the listeners to the world of *Tillandsia*

Figure 20. Sharon Peterson's nursery on Oahu. **upper photo:** an overview of a greenhouse filled with *Neoregelia* species and hybrids. **lower:** Closer view of some *Neoregelia* hybrids. Photo by Mike Michalski.

hybrids in the wild.

On Friday a discussion on the recent history and future development of the BSI Journal and BSI Website was held. Following this, a panel of Hawaiian growers (Peter DeMello, David Fell, Sharon Peterson, David Shiigi and Lisa Vinzant) gave brief overviews of bromeliad hybridization in Hawaii. The educational programs concluded with Heidi Leianuenue Bornhorst discussing the history and effects of pineapple cultivation in Hawaii.

Figure 21. Area of Sharon Peterson's nursery where small plants of *Alcantarea imperialis* have claimed dominance over the otherwise ubiquitous *Neoregelia*. Photo by Mike Michalski.

Among the non-bromeliad activities available during the Conference were an evening luau, a tour of Honolulu, a visit to the Polynesian Cultural Center and an all too brief visit to the Lyon Arboretum. Actually, the Lyon Arboretum contained a bromeliad garden maintained by the local hobbyists. The most spectacular plants, however, were the huge specimens of tropical flowering trees and the massive tree ferns

Additional bromeliad adventure was provided by trips to local collections and nurseries. These included trips to see Sharon Peterson's nursery and David Fell's Oahu nursery. Sharon Peterson is best known for her *Neoregelia* hybrids, and a plethora of *Neoregelia* species and hybrids dominate in her greenhouses (Fig. 20). Part of her growing area, however is reserved for *Alcantarea imperialis*. In Fig. 21, small plants are given space within the greenhouse. These are later grown to large size outside (Fig. 22) for use in landscaping.

Figure 22. Patty Gonzales enjoying the outside growing area at Sharon Peterson's where plants of *Alcantarea imperialis* are grown to specimen size. Photo by Mike Michalski.

On Sunday, after the conference was concluded, an all day trip was arranged to the Big Island for a pilgrimage to the nurseries of David Fell and David Shiigi and a visit to Hawaii

Islands Volcano National Park.

David Fell (Fig. 23) is known primarily for his hybrids of large-growing foliage *Vriesea* species. Species in this group, including *Vriesea fosteriana*, *Vr. fenestralis*, *Vr. gigantea* and *Vr. hieroglyphica,* have interesting patterns on their leaves in the wild state. In hybrids, he tries to enhance or otherwise modify the leaf patterns found in natural populations (Fig. 24) as well as bring out colors that are only hinted at in the wild-collected plants. Also, when growing large numbers of plants from seed, he greatly increases his chances of finding plants with new and spectacular variegation. He also grows many plants from genera other than *Vriesea* (see the large number of *Neoregelia* hybrids present in Fig 23 and a commercial crop of *Guzmania* in Fig. 25). Of course, many of the plants in the nursery were unnamed hybrids still in the evaluation phase.

Figure 23. Conference participants going through one of David Fell's shade houses during the Sunday trip to the Big Island. Photo by Mike Michalski.

Figure 24. An example of a *Vriesea* hybrid where the uniformity of the cross-bands and their contrast is emphasized at David Fell's nursery. Photo by Mike Michalski.

Next stop on the tour was the nursery of David Shiigi, who is also known for his hybrids. Large *Vriesea* hybrids with colorful foliage, including variegated forms, are an important part of his business, but he has also spent much time working with *Neoregelia*, and has produced some very fine hybrids. In more recent years, he has found another passion in the large-spined, dark-leaved *Dyckia*

Figure 25. A commercial crop of *Guzmania* at David Fell's nursery. Photo by Mike Michalski.

Figure 26. Conference attendees in a *Vriesea* greenhouse at David Shiigi's nursery. Photo by Mike Michalski.

hybrids. The particular goal in this group is to grow a plant with very dark, shiny leaves and large marginal spines densely covered by light-reflecting trichomes. Such contrast can be seen in Fig 28. Reaching this level of perfection, of course, requires many, many attempts. Evidence that the search still goes on at the Shiigi nursery is provided by the large number of *Dyckia* seedlings being grown (Fig. 29).

Figure 27. A small group of *Neoregelia* hybrids at David Shiigi's nursery. Photo by Mike Michalski.

This trip was more than fully booked, and provided a perfect example of how things can go wrong despite the most meticulous planning. On the way to the final destination, one of the tour buses carrying the WBC group lost not one, but two tires while headed to Hawaii Volcanos. To be clear, the tires did not do anything so mundane

Figure 28. *Dyckia* 'Brittle Star' x *D. dawsonii*. *Photo by Mike Michalski.*

Figure 29. A small part of a row of *Dyckia* seedlings being grown at David Shiigi's nursery. Photo by Mike Michalski

as to go flat – they separated from the bus entirely. The entire group had to sit by the side of the road for about an hour before another bus arrived to take them to their destination. Being bromeliad people, the group endured with good humor (Fig. 30) and managed to make their visit to the volcano.

A full report on the finances of the Hawaiian WBC is not yet available, but initial fears that the remote location could limit the ability of BSI to make money with the event were dispelled. There were about 100 fewer registrants at this WBC than in recent conferences due to the travel distance involved and the lack of a large local concentration of bromeliad enthusiasts to register. Still, more than enough attendees showed up to fill the allotment of hotel rooms; proceeds of the Rare Plant Auction were in line with those of recent World Conferences and the plant sales were also robust enough to provide some profit to both the BSI and the Hawaiian Bromeliad Society.

Figure 30. Bromeliad people making the best of a delay in their exploration of the the Big Island. Photo by LM Tropicals.

Finally, in addition to noting the efforts of Lynette Wageman and Bonnie Boutwell, we would like to acknowledge the efforts of Susan Andrade, Raleigh Ferdun, Karen Gollero, Teresa Leber,Tessie Labra, Karen Rohter, Stanley Schaub and all other members of the Hawaii Bromeliad Society who made this conference possible and so very enjoyable.

More plants displayed in the sales room at the 2014 World Bromeliad Conference in Hawaii. clockwise from upper left: *Dyckia goehringii* (David Shiigi), *Vriesea* hybrid (V07-78 , David Fell), *Neoregelia* 'Majestic Purple' (Sharon Peterson), *Neoregelia* 'Golden Idol' (Sharon Peterson) and *Neoregelia* 'Melanie' (Lisa Vinzant). Photos by Urszula Dudek.

Two more *Vriesea* hybrids encountered at David Fell's nursery on the Big Island. Photos by Mike Michalski.

Two spectacular *Vriesea* hybrids seen in the nursery of David Fell on the Big Isand. Photos by Mike Michalski.

More plants seen at the nursery of David Shiigi.
upper: *Werauhia* 'Edna Shiigi' (a smaller plant was also seen in the Show Display.
lower: a very attractive form of *Vriesea ospinae gruberi*.
Photos by Mike Michalski.

Two *Vriesea* hybrids encountered at David Shiigi's nursery. Photos by Mike Michalski.

An Ethnobotanical Note: *Hechtia edulis*

Robert Kopfstein

During the past five years Andy Siekkinen and I have journeyed more than 28,000 miles throughout the Republic of Mexico searching out the various identified and unidentified species of *Hechtia*, a genus which is restricted almost exclusively to that country. From the northern border states of Sonora and Chihuahua to the southern border state of Chiapas we have traveled every kind of road from superhighway to dirt and gravel secondary tracks through villages and wilderness.

Our most recent excursion in late May had as its objective the recently named *Hechtia edulis* which is found at the bottom of Copper Canyon in Chihuahua. Originally found in 1978 by Robert Bye, a well-known ethnobotanist, the plant was officially described and named by Ramirez Morillo, Espejo-Serna, and Lopez-Ferrari in 2011 (Novon 21(3):362-367) from specimens collected by Romerey and Corevali in 2007, near La Bufa not far from the town of Batapilas.

We began our descent into the canyon complex, which in total area is five times larger than the Grand Canyon in Arizona (Fig. 1). My memories of the route descending the canyon, from more than 20 years ago, were of a well graded two lane gravel road. However, today it is virtually all asphalt, until you get close to the bottom.

Work on the road is still in progress and one cannot help but marvel at the engineering of the myriad of switchbacks. What even the engineers cannot control however is

Figure 1. Descent into Copper Canyon. The vertical drop from the rim of the canyon to the bottom is approximately 5000'. Photo by Andy Siekkinen.

Figure 2. A common sight on the roads in Copper Canyon; a landslide (or 'Derrumbe' covering part of the paved road. Photo by Andy Siekkinnen.

Figure 3. Andy Siekkinen with Ramon and his son. Photo by Robert Kopfstein.

the geology of the terrain. In the newly paved sections of the road there are several landslides with boulders the size of houses lying atop the new pavement. Navigating around these "derrumbes" was sometimes a challenge.

When we finally arrived at La Bufa it did not appear to be particularly promising *Hechtia* habitat. But soon a person appeared, curious about what two "gueros" were doing parked by the side of the road. He wore the traditional dress of the Raramuri (the Spanish word for these people is Tarahumara): a sarong, a brilliant red blousy shirt, and a heavy duty pair of rubber beach thongs as footwear. He extended his hand, smiled and said, "Me llamo Ramon."

We asked him if he knew anything about a plant locally called **chikana** and we showed him some photos of *Hechtia*. Not only did he know the plant but he knew where it grew and how his grandmother used to prepare it. But we would have to wait for him to show it to us; he was on his way to the river nearby for a bath.

When Ramon returned he said we had to go to his aunt's house to ask her permission because the *Hechtia* grew on her land. The dirt road to the rancho was improbably steep and impossibly narrow, but at the top a small cluster of houses and a small church were on relatively level ground. Walking the last hundred yards or so to the house we encountered the aunt who is nearly 100 years old as well as two younger women and children. All were dressed in the colorful traditional dresses of the Raramuri. As we sat in the yard under a tree the conversation was all in the Raramuri language; Ramon told us the ladies spoke no Spanish but they seemed amused that we were interested in **chikana**.

Getting even remotely close to the *Hechtia edulis* colony proved to be our biggest obstacle. After our visit to the ladies, Ramon pointed out where the plants grew: on

Figure 4. Ramon heading up a barren rock ridge on his way to the *Hechtia edulis* population. Photo by Andy Siekkinen.

the edge of a very steep incline that ended in a sheer hundred plus foot drop to the river. There would be no way to get to them without a rope. So we had to drive up the main road to the house of Ramon's father.

Ramon told me to stop at a place in the road where there was a cliff on one side, the canyon on the other – "We're here," he pointed to the cliff to our right. Really? Then I saw the inches wide trail up the face of the steep 60 foot road cut. Going up was difficult, coming down was an acrophobe's nightmare. The path, barely wide enough to put one foot in front of the other, crossed the sheer embankment at a 45 degree angle, a subtle scar across its face.

With the rope in hand we then went to Ramon's house (also at the top of a steep road cut) to get more rope and his seven year old son. All of us then drove to the site of the *Hechtia*.

We watched—or tried to watch—as Ramon navigated first a canyon, and then a long and precipitous ridge. He tied a rope to a small tree and around his waist and gingerly worked his way down to the clumps of precariously perched *Hechtia*. The goal was to get seed if possible and close up photos of the plants.

Figure 5. Ramon close to the population of *Hechtia edulis*. He has taken off his red shirt, so you now see his blue undershirt. Photo by Andy Siekkinen.

Figure 6. *Hechtia edulis* in habitat. The only soil available for roots is in the pits and cracks on the eroded rock surface. Photo by Andy Siekkinen.

Figure 7. Another photo of *Hechtia edulis* in habitat. Photo by Andy Siekkinen.

The mission was a success, and Ramon made it look simple. He was able to traverse the slopes strewn with loose boulders as if he were strolling through a park.

Talking afterward, we discovered Ramon had other talents as well. He is a professional violin maker, trained in Cremona, Italy, a center for violin making since the 17th century, and he has spent time in Paris and Rome. His shop is in the city of Chihuahua because there is no electricity in La Bufa to run the machines, so he commutes back

and forth between the cosmopolitan city and the remote bottom of Copper Canyon, two vastly different worlds.

So how exactly is **chikana** eaten? Apparently the leaves can be eaten raw after the numerous wicked marginal spines are removed. The taste is slightly acidic and the leaves have more fiber than a celery stalk. An alternative is to cut off all the leaves at the base, remove the roots, cook the remaining "bola" (a "ball" comprised of stem tissue and the still-attached, softer leaf bases) and mash it in a mortar and pestle, combining it with chili pepper and salt. This mixture is then eaten with tortillas, not unlike eating mashed eggplant and garlic (baba ganoush) on pita bread in a middle eastern restaurant. Fortunately for both *Hectia edulis* and the people gathering them, this is a food only for special occasions; the plants are somewhat protected by being so inaccessable and gathering them entails arduous if not life-threatening labor.

It should not be a surprise that this species of the genus *Hechtia* is used as a food source; it apparently is not the only one that is so used (Felger 2000, Hornung-Leoni 2011). Certain species have also been documented for use as folk medicine, especially for respiratory problems (Kopfstein 2005, Hornung-Leoni 2011). In my own garden I have to protect the *Hechtia* from marauding rabbits who will pass up seemingly more tasty and certainly less spiny and more succulent plants to devour the heavily spined leaves of *Hechtia*, plants that require any gardener to wear heavy leather gloves just to handle them without losing inordinate quantities of blood.

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Introducing *Orthophytum triunfense*

Alan Herndon

Orthophytum triunfense J.A.Siqueira & Leme (Siquiera Filho & Leme. Fragments of the Atlantic Forest of Northeast Brazil. 2007) was described from the vicinity of Triunfo in the state of Pernambuco. Karl Green obtained plants from Elton Leme's collection in 2006 and introduced it into cultivation in southern Florida. After approximately 2 years of adjustment to their new environment, the plants began to grow and, ultimately, thrive. Unfortunately, an incorrect label was attached to the plant by the time I received it, and it is no longer possible to determine what collection this plant represents.

Figure 1. A specimen of *Orthophytum triunfense* exhibited in the 2012 Bromeliad Society of South Florida show by Karl Green. This plant does not have open flowers yet, but tips of the floral bracts can be seen sticking out of the leaf axils near the top of the above-ground stem. Photo by Lynne Fieber and Michael Schmale.

Figure 2. A cluster of offsets formed around the below-ground stem of a mother plant. Photo by Alan Herndon.

It soon became apparent that this was a superior plant. Like most *Orthophytum* species, it responded well to consistent applications of both water and fertilizer and, despite being a terrestrial, it grows well under those conditions in a potting medium suitable for most epiphytic bromeliads. Both sides of the leaves are densely covered with light-reflecting trichomes, giving the plant a silver appearance. In addition, these trichomes are quite tightly held against the plant surfaces and do not rub off easily. With a little care, you can have a blooming plant for show with a perfectly smooth cover of trichomes (Fig. 1).

Orthophytum triunfense belongs to the *O. disjunctum* complex of Leme, although it is not closely similar to any other species of that complex I have in cultivation. It has a compact growth form and more-or-less erect growth compared to most species in the complex. A large basal rosette with gracefully curved, shallowly channeled, stiff leaves is produced first (Fig. 2). In a shallow 8" pot, the leaves in this rosette can be 30 cm (12") long and 5 cm (2") wide near the

Figure 3. Variation in plant size at flowering. All offsets are from the same original parent plant. On the left, an offset in a 4" pot has lower leaves less than twice as long as produced by an offset in an 8" pot (right) and very little evident elongation of internodes in the above-ground stem. Photo by Alan Herndon.

Figure 4. Close-up of a flower cluster with one open flower. Photo by Alan Herndon.

base of the blade. This plant reached a height of 45 cm (18"). Offsets from the same source grown in smaller pots were correspondingly smaller (Fig. 3).

Blooming is preceded by the formation of an 'above-ground' stem that elongates unevenly but usually results in the internodes (distance between 'leaves') increasing sufficiently for the stem to be visible. Flower clusters appear in the 'leaf' axils almost as soon as the stem starts to elongate (Fig. 6). Flowers are large, with spreading white petal lobes (Fig. 4-5). I have never seen any offsets formed at the tips of flower clusters in this species, although they may occur under rare circumstances. Offsets are produced on the underground stem. In plants I have grown, these offsets are usually attached directly to the stem, but occasionally the offsets are attached by stolons that reach several centimeters in length.

This clone is evidently able to produce seeds without any outside pollinator. All available fruits mature and produce seed. Unfortunately, our local ants show a great fondness for these seeds, and will rapidly remove them from any plant that is not protected.

Other cultivated species of the *Orthophytum disjunctum* complex also have leaf surfaces covered by trichomes dense enough to make the plants appear silvery. In species I grow that have silvery leaves: *O. disjunctum*, *O. magalhaesii*, *O. gurkenii* 'Warren Loose' and a species sold by Tropiflora in recent years as *O.* '*leprosum*', the above-ground stem elongates much more, so the 'leaves' are much further apart, and the first flower clusters are formed at nodes at least 10 cm above the basal rosette, and the elongating stems are usually much taller than seen on any plant of *O. triunfense* (Fig. 6-9).

In the commonly cultivated species of the *Orthophytum disjunctum* complex,

Figure 5. Portion of an above-grround stem with clusters of flower buds and the first flowers open. Tips of the floral bracts are straight or only slightly curved. Photo by Alan Herndon.

Figure 6. (left) Above-ground stem of *Orthophytum triunfense* with first flowers. Flower buds are visible in the lowest leaf that is distinctly separated from the basal rosette. Compare to other species in Fig. 7-9. Photo by Alan Herndon.

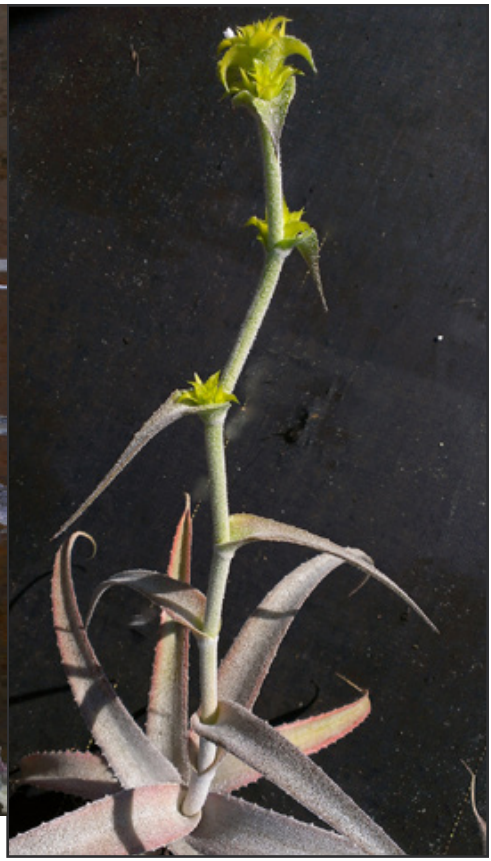

Figure 7. Flowering plant of *Orthophytum magalhaesii*. The leaves are much more widely separated. Photo by Alan Herndon.

such as *O. gurkenii* and *O. magalhaesii*, the floral bracts are thick and have stiff, strongly recurved tips (Fig. 10-12). Unlike these 'cones' found in most species of the *disjunctum* complex, *O. triunfense* has comparatively thin floral bracts that lack recurved tips (Fig. 5-6). All of the species, other than *O, triunfense* also normally produce offsets at the ends of flower clusters as well as around the underground stem. Further differences can be seen in the basal rosettes (Fig. 13-15) and upper

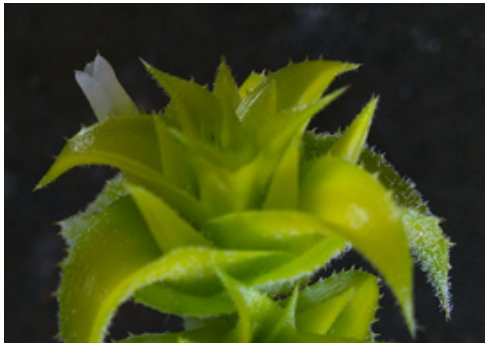

Figure 10. Uppermost flower clusters on *Orthophytum magalhaesii*. Tips of the floral bracts strongly recurve as they mature. Photo by Alan Herndon.

Figure 8. *Orthophytum 'leprosum'* with elongated stems but no flower buds. Photo by Alan Herndon

Figure 9. *Orthophytum gurkenii* 'Warren Loose'. Photo by Alan Herndon.

Figure 11. Tips of floral bracts starting to recurve on *Orthophytum 'leprosum'*` . Photo by Alan Herndon.

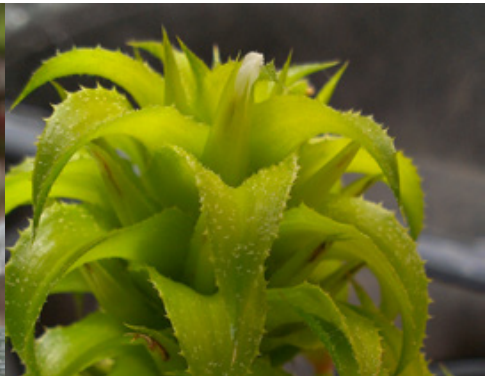

Figure 12. Uppermost flower clusters of *Orthophytum gurkenii* 'Warren Loose'. Photo by Alan Herndon.

Figure 13. Basal rosette of *Orthophytum triunfense (Elton Leme collection) showing the uniformity of surface color possible on this species. Photo by Alan Herndon.*

Figure 14. Basal rosette of *Orthophytum disjunctum* (a clone with dark leaves, Elton Leme collection number 6642). Photo by Alan Herndon.

Figure 15. Basal rosette of *Orthophytum gurkenii* 'Warren Loose' showing a concentration of light-reflecting trichomes along the edges of the leaves, especially the bases of the spines. Photo by Alan Herndon.

leaf surfaces (Fig. 16-20).

In cultivation, *O. triunfense* is very different from the plant originally found in the wild. It is a much larger plant with different proportions and differences in offset production. Fortunately, these changes make it a much more attractive plant. With relatively easy culture (although below-ground stems are susceptible to rotting when highly stressed), it is truly a great addition to our collections.

Figure 16. Leaf surface of *Orthophytum triunfense*. Compare the smooth appearance of this species with other 'silver' species in Fig.17-20. Photo by Alan Herndon.

Figure 17. Upper leaf surface of *Orthophytum disjunctum* (clone with dark leaves, Elton Leme collection number 6642). There are scattered gaps between the trichomes that show up as dark lines. Photo by Alan Herndon.

Figure 18. Upper leaf surface of *Orthophytum magalhaesii* (Elton Leme collection number 5590). The trichomes have finely divided edges that look like loose, twisted hairs. Photo by Alan Herndon.

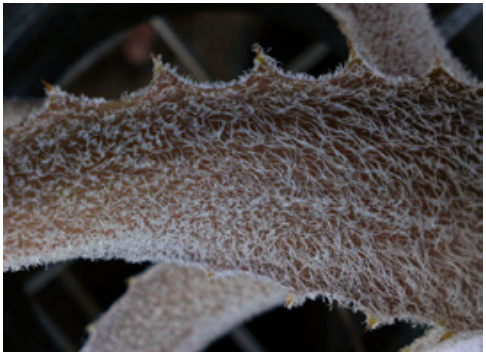

Figure 19. Upper leaf surface of *Orthophytum gurkenii* 'Warren Loose' from the Bob Whitman collection. Again, small gaps between the trichomes appear scattered throughout the surface. Photo by Alan Herndon.

Figure 20. Upper leaf surface of *Orthophytum 'leprosum'* from Tropiflora. Trichomes are widely separated on this species, but the leaf still has a silvery appearance when viewed from any distance. Photo by Alan Herndon.

The *Neoregelia compacta* complex

Alan Herndon

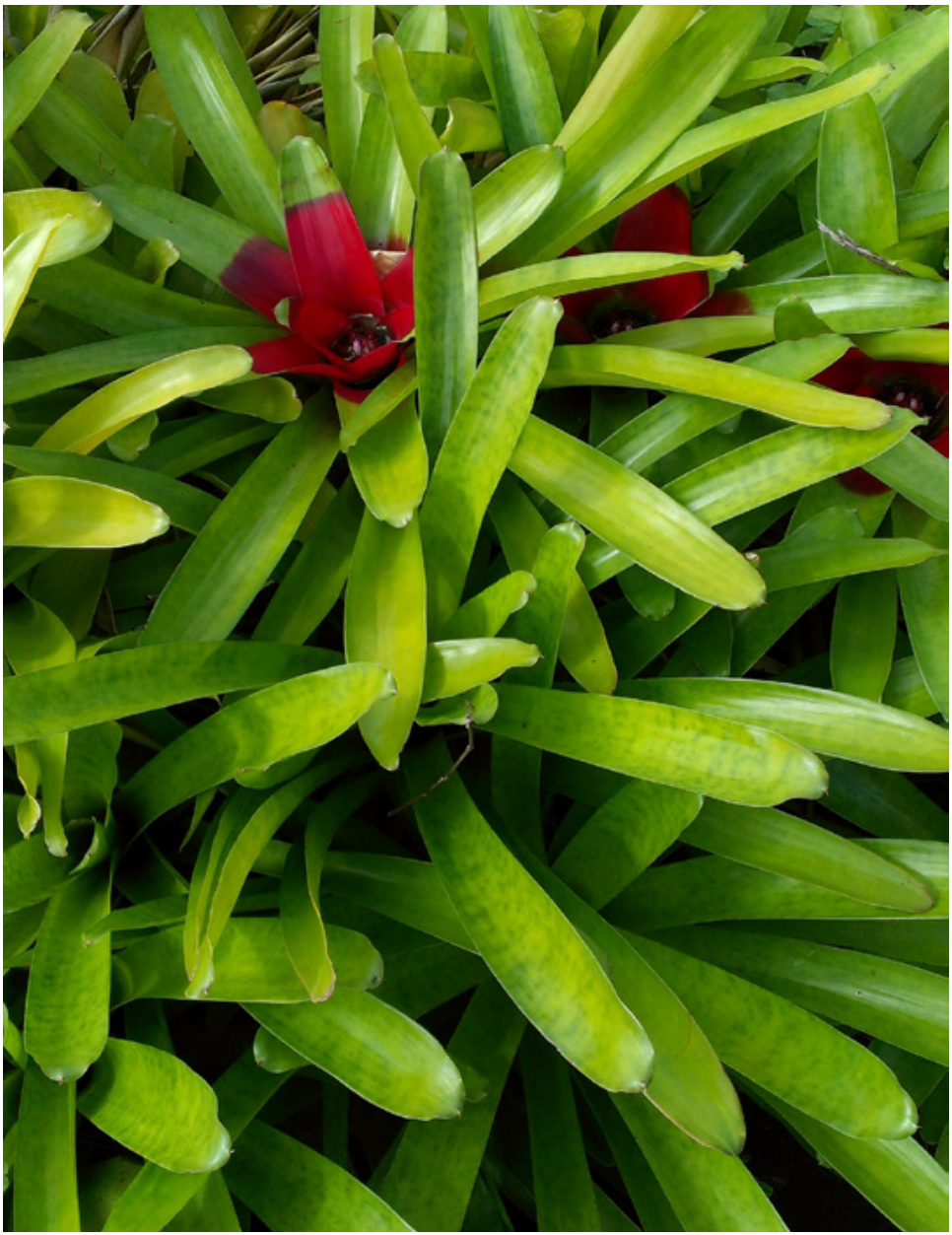

Figure 1. A clump of *Neoregelia macwilliamsii* growing happily with no care beyond the occasional watering.. These clumps have both good plant spacing and good surface coverage. Photo by Alan Herndon.

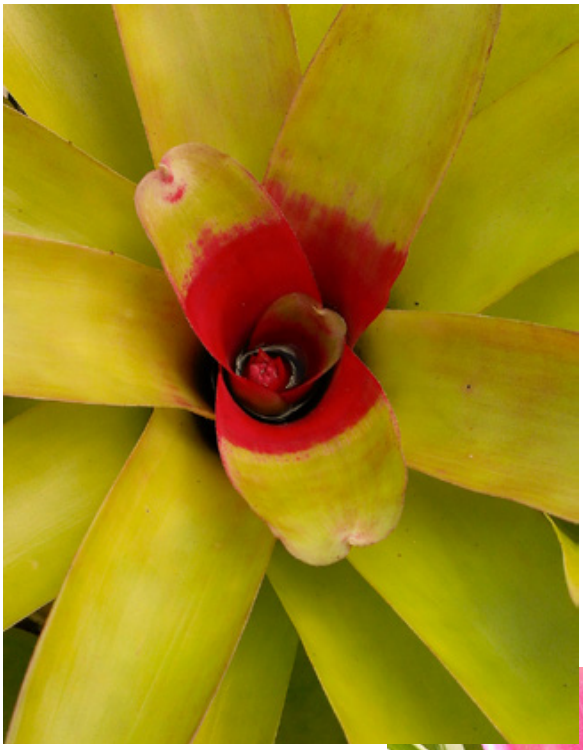

Figure 2. Large clone of *Neoregelia compacta* in late bud. Photo by Alan Herndon.

Members of the *Neoregelia compacta* complex are used extensively in bromeliad collections and gardens due to their friendly nature, easy culture and rapid growth rates under less than ideal conditions (Fig. 1). They may be recognized by their shallow funnelform rosettes, broadly rounded, or slightly emarginate, apiculate leaf tips; straight, robust stolons that often exceed half the length of the leaf blade and can support the weight of a fully grown offset; inconspicuous marginal leaf spines; a red ring surrounding the inflorescence produced by bands of color at the bases of the inner leaf blades; bright orange-red involucral bracts, the innermost extending beyond the sepals; pink sepals; and fruit becoming a bright red-orange when maturing after successful pollination. Unfortunately for growers in most of the world, this last character is only seen when the flowers have been cross-pollinated by hand.

The group is comprised of *Neoregelia compacta* (Fig. 2, Fig. 5), with two forms found in cultivation - the smaller form reaches only about half the size

Figure 3. Flowering plant of *Neoregelia* 'Bossa Nova'; Photo by Alan Herndon.

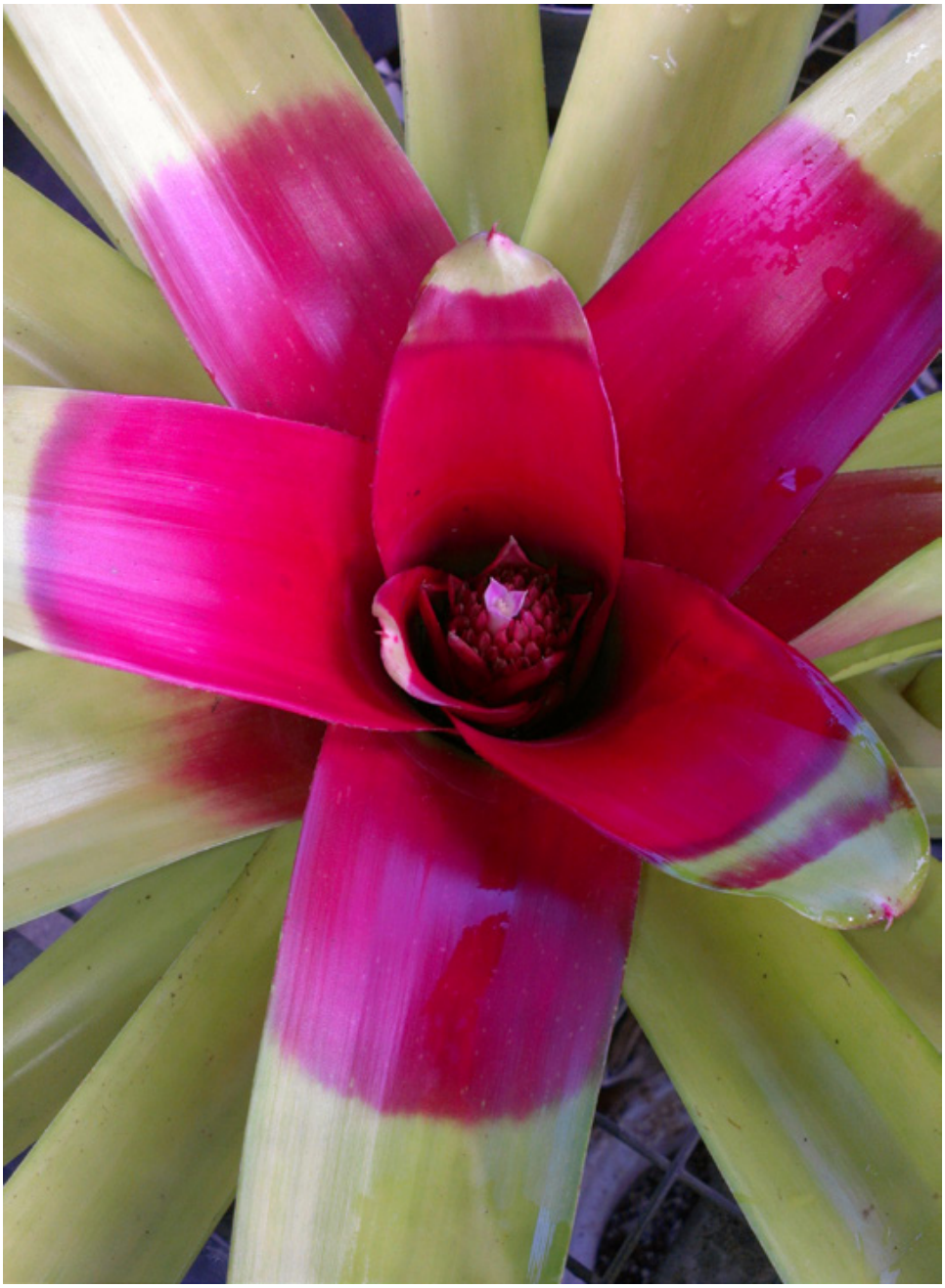

Figure 4. Flowering plant of *Neoregelia macwilliamsii*. Photo by Alan Herndon.

Figure 5. Close-up of *Neoregelia compacta* inflorescence. Photo by Alan Herndon.

of the more robust form; *Neoregelia macwilliamsii* (Fig1, Fig. 4); and the albomarginate cultivar, *Neoreglia* 'Bossa Nova' (Fig. 3, Fig. 6)) that is traditionally regarded as an offshoot of *Neoregelia compacta*.

All plants in the complex will produce precocious offsets (offsets that can grow to mature size, and sometimes flower, before bloom has been initiated in the mother rosette) and the relatively long stolons ensure rapid expansion while the many-leaved rosettes provide quick coverage of new areas. Cultivated clones of *Neoregelia compacta* and *N. macwilliamsii* have concolorous green leaves and are frequently grown as hanging basket plants to take advantage of their stoloniferous nature. Where they can be grown outdoors, they are also used as a high ground cover to take advantage of their rapid growth and spread rates. When used as ground cover around trees, they also show an unexpected ability to climb into the trees (Fig. 7). In both of these species, leaf color depends on the nutritional status of the plants. When well-fed, the leaves are a bright green; once food supplies have diminished

Figure 6. Close-up of *Neoregelia* 'Bossa Nova' inflorescence. Photo by Alan Herndon.

Figure 7. Plants of *Neoregelia* 'Bossa Nova' planted at the base of a Gumbo Limbo tree *(Bursera simarouba)* have climbed the trunks of the trees despite an exfoliating bark thought to have evolved to discourage epiphyte attachment. Photo by Alan Herndon.

and the growth rate of the plant slows, leaf color moves much more towards yellow (see Figs. 2 & 3). In any color, the leaves appear shiny. Inconspicuous, peltate trichomes are scattered across both surfaces of the leaf blade in *N. compacta*, but they do not influence the color of the leaf because the edges of the trichome cap that scatter light so effectively in other *Neoregelia* species are very small, stick very close to the leaf surface and scatter very little light. Trichomes are more densely scattered on the leaves of *N. macwilliamsii*, with neighboring trichomes usually touching on the lower leaf surface, but again, they have very under-developed edges that scatter very little light.

All of the plants in the complex flower freely and vegetative offsets typically flower within a year. In southern Florida, flowering is most common during the winter months. You can see individual rosettes blooming during any month of the year, but in winter you will usually see many rosettes in flower at once.

Neoregelia compacta (Mez) L.B.Smith was first described as *Nidularium compactum* Mez (1891). When I first learned about *N. compacta* during the 1970's, there were two distinct clones in cultivation. A large clone grew to about twice the size of the small clone under similar conditions. Neither of these clones has been given a cultivar name that I am aware of. Later, the still larger, albomarginate *N.* 'Bossa Nova' was introduced as a sport of *N. compacta* by Renato Bello at the 1988 World Bromeliad Conference. This plant is 3-4 times larger than the original small clone. I also have a plant under the obviously incorrect name of *Neoregelia* 'Malibu' that may be another different clone of *N. compacta.* This plant appears identical to *N. compacta* vegetatively except it stays smaller than the small clone, and consistently has light violet striations on the leaves when growing slowly. I have not been able to compare the inflorescence.

Neoregelia macwilliamsii L.B.Smith (Fig. 8) was described in 1969. It was only

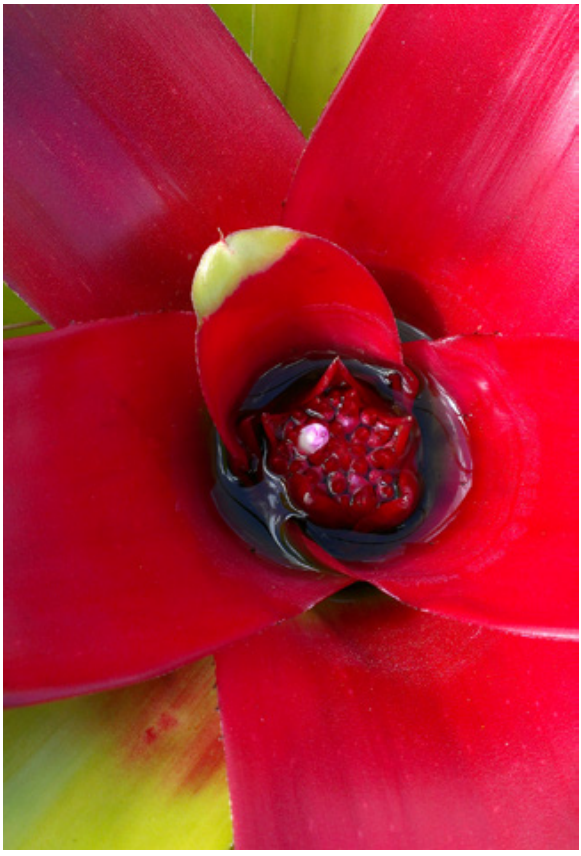

Figure 8. Close-up of *Neoregelia macwilliamsii* inflorescence. Photo by Alan Herndon.

even greater size differentials. For example, the largest clone of *Aechmea pineliana* has leaves about 8 times longer than those in *Aechmea pineliana minuta*. A similar difference exists between the largest and smallest cultivated clones of *A. disjuncta* (formerly *Hohenbergia disjuncta*) and between clones of *A. wittmackiana.*

Further comparison between the two species is possible by examining the inflorescence in detail. This requires sacrificing ` known from the type collection at the time of collection and, so far, I have only encountered a single clone in cultivation. It differs from *N. compacta* in size; in having dark, larger (though still small), spines at the base of the leaf blade (Fig. 9); a relatively narrower leaf blade and in having the inner involucral bracts that extend further above the sepals. In Smith and Downs (1979), the pedicels are described as slender - at variance with observations made in this article - so we may be dealing with a misnamed plant.

One of the persistent mysteries surrounding this group is the lack of any non-variegated clones in cultivation of *Neoregelia compacta* similar in size to N. 'Bossa Nova'. A non-variegated clone of this size would not be exceptional. There are examples within the Bromelioideae of species with

Figure 9. Close-up of marginal leaf spines on *Neoregelia macwilliamsii* near the base of the leaf blade. These spines only appear intermittently. Photo by Alan Herndon.

Figure 10. Inflorescence of *Neoregelia compacta* with almost all leaves removed. The lowest leaf-like structure is considered to be a true leaf because it has green pigment near the apex, and a rounded leaf tip. It is also larger than the lowermost structures interpreted as peduncle bracts with acute tips and red color. Photo by Alan Herndon.

Figure 11 (above). *Neoregelia compacta* inflorescence with a few more leaves removed. Tips of the bracts bend slightly away from the center near top. Photo by Alan Herndon.

Figure 12 (above right). *Neoregelia macwilliamsii* with tips of bracts straight and strongly exceeding sepals. Photo by Alan Herndon.

Figure 13 (right). *Neoregelia* 'Bossa Nova' inflorescence with involucral bracts. The innermost involucral bracts far exceed the sepals as in *N. macwilliamsii*, but also flare out slightly near the tips as in *N. compacta*. Also note that the albomargination is seen on the bracts. Photo by Alan Herndon.

Figure 14. Large form of *Neoregelia compacta.* At the time the inflorescence is rising above the water in the bromeliad cup, tips of the innermost involucral bracts form a sharp spire. Photo by Alan Herndon.

Figure 15. Inflorescence of *Neoregelia 'Bossa Nova'* with involucral bracts and a few of the outermost floral bracts removed. Outer floral bracts slightly exceed the sepals. The pedicel supporting the ovary is narrowly elliptical in cross-section and quite sturdy. Photo by Alan Herndon.

some plants since most of the inflorescence is hidden within the water-holding tank and totally inaccessible without pulling all of the leaves off the plant. When you do this, the first thing you find is that the exact point of transition between the vegetative growth of the rosette and the start of the inflorescence is not so easy to define (Fig. 10). Once the leaves that have blades visible from above are removed, a number of small structures that appear to be leaves with broadly rounded tips cover the lower part of the column that supports the inflorescence. Above these, bracts covering the inflorescence stalk (usually called peduncle bracts in descriptions from the past 15 years, but more often called scape bracts in earlier literature) become distinguishable with their pointed tips and ted coloration.

Bracts that form an involucre around the flowers are very similar in all of the plants within the complex (Figs. 11-13). Unfortunately, only the tips of these bracts are visible on intact plants; most of the bright orange-red color remains hidden within the cup of the flowering plant. These bracts are wide, and totally surround the developing

Figure 16. *Neoregelia compacta* with involucral bracts removed. The outermost floral bracts do not reach the tips of the sepals. Otherwise, pedicel, ovary and sepals very similar. Photo by Alan Herndon.

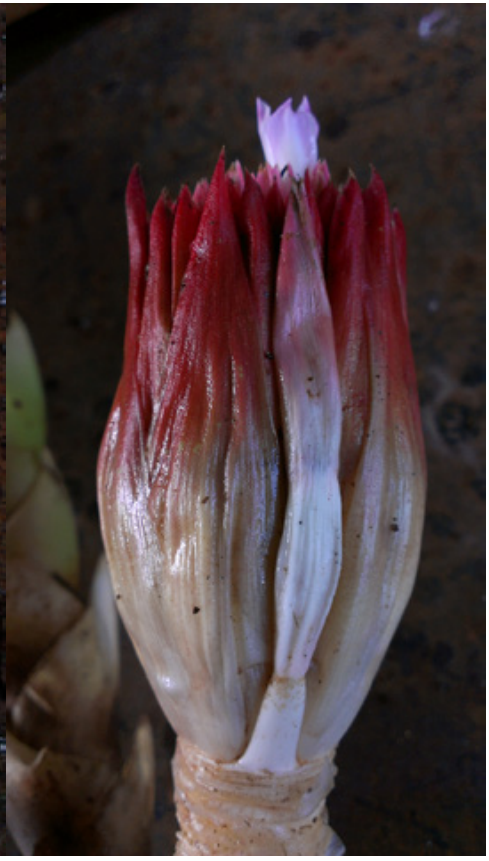

Figure. 17. Inflorescence of *Neoregelia macwilliamsii* with outermost floral bracts slightly exceeding the sepals. Pedicel, ovary and sepals again very similar. Photo by Alan Herndon.

flower buds in the inflorescence until they are almost fully mature. The bracts narrow gradually to an acute tip, and the timing of inflorescence development is such that the innermost involucral bract tips are wrapped into a tight spire when they rise out of the water held in the cup of the plant (Fig. 14). At flowering the involucral bracts extend beyond the tips of the sepals - only slightly so in *Neoregelia compacta* and to a greater degree in *N.* 'Bossa Nova' and *N. macwilliamsii*. The outermost floral bracts exceed the sepals, at least slightly, except in *N. compacta* (Figs. 15-17).

An advantage in occasionally tearing apart plants is that you will at times see something you missed previously. A plant of *Neoregelia macwilliamsii* had two offsets although only one was obvious at the beginning. A second offset, just starting to elongate, was still hidden within the sheath of the subtending leaf. On this younger offset, bracts on the stolons were found on opposite sides of the stolon axis (Fig. 18). At a

Figure 18. New stolon starting to elongate on *Neoregelia macwilliamsii*. At this point, the bracts are arranged distichously (on opposite sides of the stolon). Photo by Alan Herndon.

Figure 19. By the time the stolon emerges from behind the leaf sheath in *Neoregelia macwilliamsii*, the bracts are spirally arranged. Photo by Alan Herndon.

slightly later stage of growth, the bracts transition to a spiral arrangement on the stolon (Fig. 19). The same pattern apparently holds with *N. compacta* and *N.* 'Bossa Nova'. However, these lower bracts do not live long on any of these plants; they usually die and separate from the stolon before the offset has appeared above the leaf sheath and the distichous arrangement is no longer obvious. The interesting question, is whether the same pattern can be found in any other stoloniferous species of *Neoregelia*.

A final note of interest. *Neoregelia* 'Fireball', the as yet undescribed species that is so common in cultivation, shares several characters with members of the compacta complex. It has straight stolons that can support the weight of a fully-grown offset, inconspicuous marginal leaf spines and a red ring around the inflorescence during bloom (this is not as obvious when the leaves are red, but is easily seen on an actively growing plant with green leaves, as in Fig. 20). Differences are also abundant: flowering is notoriously infrequent in *N.* 'Fireball', the involucral bracts have no color (Fig. 21), never fully cover the developing flower buds and lack the long tips seen in the compacta complex. The innermost involucral bracts are also significantly shorter than the green sepals.

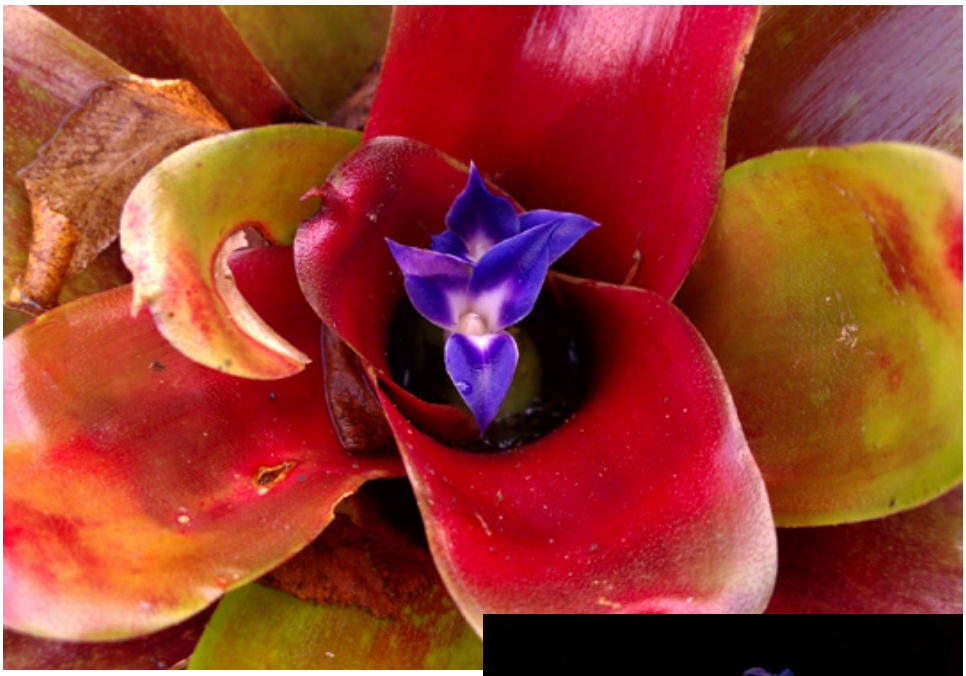

Figure 20 (above). Flowering plant of *Neoregelia* 'Fireball'. Photo by Alan Herndon.

Examination of the inflorescences suggests *Neoregelia* 'Bossa Nova' may be more closely related to *N. macwilliamsii* than *N. compacta* but the strength of the case is uncertain. Other characters suggest the opposite conclusion, and there is some lingering doubt about the true identity of the plant we call *N. macwilliamsii*.

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Figure 21. Inflorescence of *Neoregelia* 'Fireball' with green involucral bracts that are well short of sepals. Photo by Alan Herndon.

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