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Cover photographs. **Front:** *Quesnelia imbricata* L.B. Sm., from southeastern Brazil, is pictured here in flower at the Marie Selby Botanical Gardens. It is not common in cultivation due to the short-lived, though attractive, inflorescence. Photograph by Phil Nelson. **Back:** Attractive inflorescences from southern South America. Upper left, *Puya molles* from Bolivia. Photograph by Len Colgan. Lower right, *Ochagavia littoralis* from Chile. Photograph by Patricio Novoa.

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Chicago. Our Kind of Town!

Karen Andreas¹

Photographs by Michael Andreas

The sixteenth World Bromeliad Conference was held in Chicago in August. This conference was hosted by the Bromeliad Society of Greater Chicago, whose members proved that Chicago is a friendly, hospitable and fun place to be.

Early in the week, the BSI Board of Directors met in an all-day session, attending to the business of the society. They managed to finish their work in time for an evening trip to the Navy Pier where everyone had a great time on the rides, and some took advantage of the dinner cruise on the lake.

Harry Luther, director of the Bromeliad Identification Center at Selby Botanical Gardens in Sarasota, Florida, once again hosted the Scientific Seminars, held the day before the official opening of the conference. The speakers covered a range of topics: Dr. Brad Bennett, Uses of Bromeliaceae by Traditional Cultures in the Americas; Dr. Thomas Givnish, Origin, Adaptive Radiation and Geographic Diversification of the Bromeliads, New Insights from Molecular Data; Dr. Thorsten Krömer, Diversity and Ecology of Epiphytic Bromeliads Along an Elevational Gradient in the Andes of Bolivia; Claudia Hornung Leoni, Uses and Pollination of the Giant Bromeliad *Puya raimondii*; Bruno Rezende Silva, Systematic Studies in *Aechmea* Subgenus *Chevaliera*, *Ananas*, and *Pseudoananas*. In the evening, Harry gave a great presentation on "Aechmea and Its Satellites: The Garbage Can Overflows."

The conference got into full swing Thursday, with judging and the installation of exhibits and sales. While the judges, clerks and volunteers were hard at work, conference registrants enjoyed a fine buffet at the Welcome Luncheon. After everyone spent the day settling in, they were ready for the cash bar and the sales area to open. The conference was off to a great start. Tours to area gardens, museums and parks were offered. The hotel was located conveniently close to the train so it was easy to get downtown and enjoy one of the cleanest and friendliest cities anywhere.

There were moments of drama on Friday as the conference attendees from Florida awaited news on Hurricane Charley as it bore down on their state. Several people had to return to Florida early to prepare for the storm while the remaining Floridians found support and sympathy from the non-Florida registrants. After a tense day of waiting, the news came that everyone's families were safe with only minor damage to their homes and lots of yard mess to clean up.

The judged show opened on Friday. This year's conference, in addition to the fabulous bromeliads entered, featured a array of both artistic entries and art, including quilts, water colors, stained glass and creations in wood. Congratulations were in order for all those who entered in this impressive show.

¹ Orlando, Florida



Figure 1. Division VI. *Aechmea correia-araujoi*, Tom Wolfe



Figure 3. Division III. *Catopsis morreniana*, George Aldrich.



Figure 5. Division IV. *Dyckia* 'Brittle Star', George Aldrich.



Figure 2. Best *Neoregelia*, shown by Paul Wingert. 'Pimiento' x (*carolinae* x 'Painted Lady') x (*Takemura princeps* x *myendorffii*).



Figure 4. Best Multiple. *Cryptanthus* 'John Judge', Carole Richtmyer



Figure 6. Division I. Section award. *Guzmania sanguinea*, Barb Temchuk.



Figure 7. Division II. Commercial. *Vriesea* 'Kilauea', David Shiigi



Figure 8. Best Decorative Container. *Cryptanthus* 'Spotlight', Carole Richtmyer



Figure 9. Best of Show. *Tillandsia mooreana*, Frank Hayden.



Figure 10. Best of Show. Commercial. *Guzmania* 'Olive', Reginald DeRoos

For two and a half days, a series of interesting seminars were offered. David Shiigi presented a program on Bromeliad Friends with poignant memories of so many of those who have died; Larry Giroux provided a fascinating overview of the genus *Cryptanthus*, with a particular focus on the many people who have contributed to the diversity in *Cryptanthus* hybrids; Michael Dillon discussed Bromeliad Diversity in the Harshest Place on Earth; Betty Patterson shared Land of the Shuar - Flora of the Condor Mountains; Bob Hudson offered insight on Growing from Seed in Tropical Northern Australia while Jack Reilly discussed Growing Bromeliads in Tropical Illinois; Gene Schmidt lectured on Growing Bromeliads in the Northland and Jerry Raack presented Growing Bromeliads in Cold Climates; Reginald Deroose presented Dealing with Breeding, Breeders and Tissue Culture in the Bromeliad World; Penrith Goff discussed A Place for Bromeliads in the Northern Garden; David Christiano offered Bromeliads in Greenhouse: Non Cultural Considerations; Maurice DeProft discussed The Fertilization Process in *Aechmea* Species; Dana Field handled Lithophytic Bromeliads (Life on the Edge) for Dennis Cathcart, another Floridian who returned home because of Charley.

On Friday night, the raucous and lively John Anderson Rare Plant Auction was held. Named in memory of the *Aechmea* grower extraordinaire, the auction started with a moving tribute to John on film. There wasn't a dry eye in the house as everyone visited with John this last time and echoes of his trademark "Am I right or Amarillo" could be heard throughout the crowd at the end. Following the movie, the auction got underway with returning and new talent. Many remembered Australian auctioneer Len Trevor from the St. Petersburg conference and all welcomed professional auctioneer Mary Wittemore who brought both a saucy and maternal style to the proceedings. With lots of volunteer help, the auctioneers boosted bids, egged on bidders and raised more than \$10,000 to benefit the Bromeliad Identification Center. One of the more hotly contested entries for the auction was a white chocolate *Cryptanthus*. Larry Giroux won that edible *Cryptanthus* and offered bites of it to *Cryptanthus* Auction participants the next day. That second auction was quite a successful event for the *Cryptanthus* Society. *Cryptanthus* 'Menescal,' *Cryptanthus* 'Steven Hoppin,' and *Cryptanthus lacerdae* were big draws; art, crystal, and quilts were also offered. Australian great Grace Goode contributed two fabulous rugs, one to each auction. It was the most successful auction for the *Cryptanthus* Society, raising more than \$5000.

The banquet on Saturday night was a marvelous, warm event. David Shiigi and Rusty Luthe entertained with guitars and foot tapping good music before dinner. The party was in full swing when the doors opened and everyone was invited in. On every table were bromeliads and the most gorgeous pineapples in the center. Later, Steve Goode explained that Chicago is the candy capital and that the pineapples were made of white chocolate! A Frank Sinatra look-alike crooned to the audience with a repertoire ranging from Sinatra's own to Tony Bennett. After dinner, Jack Reilly, the Conference chairman, served as master of ceremonies. BSI president Tom Wolfe thanked

the members of the Bromeliad Society of Greater Chicago for their hard work and then addressed everyone as president for the last time. He handed over the office to Joyce Brehm who is serving her first term.

Awards were presented after dinner. The Wally Berg award was presented to Nelwyn Anderson in honor of her late husband, John. The Cultivar Registration Awards were presented for the first time, recognizing excellence in the hybridization as well as for registering the new bromeliads. The recipients of this award were: John Arden, California; Sharon Petersen, Hawaii; and Vic Przetocki, Australia. Wally Fox handed over The Book of World Conference Information to Mary Whittemore, who accepted on behalf of the San Diego Bromeliad Society, which will host the 2006 conference.

On the last day of the conference, people were still busy with bromeliad business. The *Cryptanthus* Society held its annual meeting in the morning, followed by the Newsletter Editors/Affiliates Meeting. Then it was time for goodbyes as the members of the BSI bid each other farewell, thanked the hard working volunteers who put on this wonderful conference, and promised to meet again in San Diego in two years.



Figure 11. Nelwyn Anderson and the Wally Berg Award given to her late husband, John.



Figure 12. The Frank Sinatra look-alike crooned some tunes



Figure 13. Auctioneer Mary Whittemore



Figure 14. David Shiigi and Rusty Luthe provide entertainment before the banquet

Figure 15. BSI Board of Directors. Left to right: David McReynolds, Rusty Luthe, John Atlee, Peter Waters, Rick Richtmyer, Joyce Brehm, Michael Andreas (kneeling), Bruce Holst, Keith Smith, Wally Fox, Fred Ross, Tom Wolfe, Larry



Giroux, Ed Doherty, Martha Goode, Ken Marks, Geoffrey Lawn, Gloria Irizarry, Hiroyuki Takizawa.



Figure 16.
Head table.



Figure 17. Morris Henry Hobbs award. 'Let's Set the Town on Fire', Jackie Johns
Tillandsia juncea, *Vriesea poelmanii*.



Figure 18. Billbergia in Wood, Phil Speer



Figure 19. *Navia arida* watercolor, Johanna Kitson

In Remembrance of Gene McKenzie

July 3, 1927 -- August 30, 2004

Larry Giroux, BSI Board, Florida

Gene McKenzie who was best known by many in the bromeliad world as "Ma Caloosa" succumbed after a brief illness to heart failure on August 30, 2004. A memorial service was held on September 19, 2004 at the Lee County Garden Council Building in Fort Myers, Florida at the regularly scheduled meeting of the Caloosahatchee Bromeliad Society. In attendance were CBS friends and members who she considered her children. It was appropriate that members filled the room with Bromeliads as we paid our tributes to this great lady.

For the last 25 years, it seemed that the life energy of Gene McKenzie was funneled toward one goal. And that purpose for her life was to enlighten the world about Bromeliads.

In 1980 in spite of doubts from friends and relatives that Fort Myers was too small a city to support a local chapter devoted to bromeliads, through word of mouth and announcements in a weekly gardening column in the local newspaper, 12 charter members were assembled at Gene's home in April 1980 for the first meeting of the Caloosahatchee Bromeliad Society. The rest is history. The Society has grown to include over 150 members. For a BSI Affiliate Society, its Shows and Sales are the largest in the state of Florida and possibly in the country. The reputation of the CBS for its contributions and volunteer work at WBCs and other bromeliad events is indisputable.

The month following the first meeting, Gene wrote and published a two-page newsletter, which was to become the Meristem, the Newsletter of the Caloosahatchee Bromeliad Society. It bore the signature of Gene McKenzie with her personal comments about bromeliad news, information about the CBS as well as the members and original articles about bromeliads. Although the format of the Meristem has changed over the years, Gene made sure that it met its goals of informing, educating, and entertaining its readers. Each month more than 140 colorful copies are mailed to members' households and over 20 copies to Society Editors throughout the United States in an exchange program.

In 1996 at the WBC in Orlando, Florida, Gene convinced the WBC organizers to provide space and time for a Newsletter Editors' Meeting. Since that highly successful gathering of local, national and international bromeliad society newsletter Editors, these meetings have now evolved into the Affiliates and Newsletter Forum and are sponsored by the BSI at each WBC.

Gene was involved with Bromeliads on many levels. Locally she served a variety of officer and chairmanship positions for her Society and in shows and sales. She sought out new members and generously gave of her time and

plants to encourage their interest in bromeliads. She was a BSI Master Judge and enjoyed traveling to other societies to judge shows and to interact with other bromeliad enthusiasts. She was a member of the Cryptanthus Society, the Florida Council of Bromeliad Societies, and the BSI where she served on the Judge's Certification Committee.

Not only did she encourage the dissemination of knowledge about bromeliads, but also encouraged the distribution of the plants. As a final gesture she willed her library of books, her pineapple memorabilia, and her superb collection of tillandsias and other bromeliads to the CBS for eventual distribution to its members through gifts, auctions, and sales.

With the passing of Gene McKenzie, her life has been taken from us, but her life's work has not. We will not forget the gifts of her time spent educating and entertaining us, of the encouragement she gave to all of us and her generosity in sharing her plants and herself. But most of all we will never forget her devotion to the "children" of her Society.



Figure 20. Gene McKenzie.

Call for Nominations for the Office of Director 2006-2008 Term

Theresa M. Bert, BSI Nominations Chair

The regions for which vacancies occur are as follows:

Australia - 1 director

California - 1 director

Central - 1 director (Arkansas, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, Ohio, South Dakota, and Wisconsin)

Florida - 3 directors

International - 3 directors (all areas other than Australia and the United States)

Northeast - 1 director (Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont; the District of Columbia; Puerto Rico; all United States territories and possessions in the Atlantic and Caribbean Areas)

South - 1 director (Alabama, Georgia, Kentucky, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia)

West - 1 director (Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming; all United States territories, possessions, and trust territories in the Pacific area)

Who may nominate? Any voting member of the society 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 (1) be a voting member of the 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. Incumbent directors who have served one term on the BSI Board of Directors may be nominated for a second term. The eligible director(s) for each region can be obtained from the BSI Nominations Chair.

The procedure for nominating is as follows. (1) Obtain the consent of the prospective nominee and verify compliance with the qualification criteria. (2) Mail nominations to the chairman of the Nominations Committee between January 1, 2005 and March 18, 2005, inclusive. (Nominations must reach the chairman of the Nominations Committee by March 20, 2005.) Nominations by telephone or email will be accepted through March 15, 2005, but nominations by telephone must be confirmed in writing. (3) Supply with each nomination the full name, address, telephone number, and email address of the nominee; the position for which the nomination is being made; the local society affiliation; and a brief summary of the nominee's qualifications for the position. The person who submits the nomination should also provide his or her email address with the nomination so that the BSI Nominations Chair can acknowledge receipt of the nomination.

Send nominations to: Theresa M. Bert, BSI Nominations Chair, 9251 13th Ave. Cir. NW, Bradenton, FL 34209. (941) 795-6012 E-mail: nominations@bsi.org

Nurserymen's Names

Derek Butcher, BSI Cultivar Registrar

These are names given by Nurserymen and others using the minimum of effort to indicate a form which is different from the norm. No attempt is made to register these differences with any authority, but the purchaser knows they are buying something different especially when looking at a catalogue. Sometimes they are only temporary names.

Examples of these epithets which are linked with species names are 'nova', rubra, virida, variegata, etc., which for some reason are latinised and can erroneously suggest that the plant has been formally described by a taxonomist. They can also be anglicised such as 'Red Leaf', 'Stoloniferous', 'Variegated', etc. which indicates a Cultivar form but will never be registered under that title to appear in the Cultivar Register. However, these forms may be given a proper Cultivar name and can then be in the Register where links to the species name are provided by what is called a Cultivar Group.

You may remember my writing about the use of the word 'Sport' as a temporary epithet for an offset that is clearly different to the parent plant but has not yet stabilised. This could, of course, include variegated offsets. I have always wondered how we can deal with variegated Cultivars that lose their variegation, and Dennis Cathcart of Tropiflora has come up with a solution. Some of these plants that have reverted can have a beauty of their own but there is always the possibility they can revert back. I have suggested that we use the epithet 'Novar' meaning the NOT VARiegated form! One plant that readily does this is *Vriesea* 'Gunther' so that the non-variegated form could be called 'Gunther Novar'. There are also many of the newer variegated *Neoregelia* hybrids that do this. A purchaser or owner of such a plant would know that variegation was hidden somewhere in the genes!

The advantage of this is that it is short and understandable and could mean the difference between a plant being rejected on the show bench for being incorrectly identified and a prize!

The disadvantage is that it can be confused with the Latin 'nova' but it would be part of the Cultivar name even though not listed in the Cultivar Register. The Bromeliaceae is perhaps the only plant family where variegation is widespread AND sought after and as such is not covered by the ICNCP rules, so we have to think up our own solutions to these sorts of problems.

The epithet 'Novar' will appear for posterity in BSI.org in Cultivar Corner under 'Sports', and in the various future editions of the Bromeliad Cultivar Register.

Events Calendar

January 8 - April 3, 2005. *THE FLOWERING AMAZON*, Margaret Mee Original Watercolors Exhibition. Marie Selby Botanical Gardens. Museum of Botany and the Arts, Marie Selby Botanical Gardens. 10-5 daily. Admission \$12 adult, \$6 children 6-11 yrs; free for Selby Gardens members. For more information, contact Marilyn Shelley (941) 366-5731 x 239. E-mail: mshelley@selby.org.

March 18-20, 2005. *BROMELIADS AND ALL THAT JAZZ*, A BSI judged show and sale. Bromeliad Guild of Tampa Bay. Tampa Garden Club Center, 2629 Bayshore Blvd., Tampa, FL. March 18, Show open 1-5; March 19, 9-5; March 20, 10-4. Open to the public. Banquet & Rare plant auction, Saturday, March 19th, at 6:30 PM. Reservations required for banquet. For more information, contact Tom Wolfe, Show Chairman, (813) 961-1475. E-mail: bromeliadsociety@juno.com.

April 30, 2005. *BSI JUDGING SCHOOL*. A BSI Judging school in California is scheduled to hold its second session covering Class II. This class will be held in Balboa Park in San Diego, Ca. A nominal fee will be charged and registration must be made by April 15th, 2005. New students are welcome and may start this class and make up class I at a later date. For further information please contact Roger Lane (Ca. registrar) rdodger@pacbell.net, Robert Kopfstein (Ca. Judges instructor) kkopfstein@aol.com.

April 30-May 1, 2005. *GREATER NEW ORLEANS BROMELIAD SOCIETY SHOW*. Lakeside Mall, Metairie, Louisiana, USA. Noon-4. For more information, contact Carol Hertz (504) 486-8190 or Fred Ross (504) 891-9301.

Oct. 14-17, 2005. *BROMELIADS XIII - AUSTRALIAN CONFERENCE*. The Bromeliad Society of Queensland, Inc. Brisbane, Australia. The conference will include lectures, tours, sales, displays, and an auction and show. For more information, contact Bromeliads XIII Conference Committee, c/o Bromeliad Society of Queensland Inc., PO Box 565, Fortitude Valley, Queensland, 4006 Australia. E-mail: secretary@bsq.org.au. Web site: <http://www.bsq.org.au/conference.html>.

June 6-11, 2006. *WORLD BROMELIAD CONFERENCE*, Large show and sale, judged competition, lectures, social events, and more. Bromeliad Society International and the San Diego Bromeliad Society. Town and Country Resort Hotel, Mission Valley, San Diego, California, USA. Hotel rates are \$124 per night. The rate is good for any three days during the Conference. For more information, contact BSI Membership Secretary, 1608 Cardenas Dr. NE, Albuquerque, NM 87110, USA. E-mail: membership@bsi.org; www.bsi.org.

Fundación Amigos de la Naturaleza (FAN) is a private non-profit organization, founded in 1988, to conserve the biodiversity and natural resources of Bolivia. Included amongst its varied activities are

- The responsibility for the joint administration of the Noel Kempff Mercado National Park in the extreme north-east of the country, bordering Brasil
- Ecoregional conservation planning, using Geographic Information System Tools
- Execution of a Climate Action Project in the Noel Kempff Mercado National Park, mitigating CO2 emissions
- Maintaining a substantial living plant collection which specialises in orchids, bromeliads and cacti species, etc
- Publication of scientific documents and books about Bolivian biodiversity in order to promote conservation
- Undertaking community projects that promote social participation.

The botanists associated with FAN have discovered and described over 65 new species for science, including a number of bromeliads. Pierre Ibisch and Roberto Vasquez, in particular, were involved in the publication of the CD-ROM *Illustrated catalogue of the Bromeliaceae of Bolivia*. FAN has also recently published a massive tome *Biodiversity: The Richness of Bolivia; State of Knowledge and Conservation*.

My last trip to Bolivia in 1993 was spent mainly in the high Altiplano between La Paz and the Argentine border (BSI Journal, 1997, pp 103-108). But, in July 2004, there was an opportunity between semesters to return for a brief two week expedition. July is the coldest but driest month of the year. As it eventuated, we experienced very pleasant weather, with clear blue skies on most days. Except for the very high altitudes in La Paz province, we needed to remove our pullovers as the sun came out.

Knowing that South American countries have significantly strengthened control over their native flora and have restricted access for plant collectors, I decided to approach FAN to assist with the arrangements for my sponsoring a collecting trip. The first stage of the process was to formulate a submission to the relevant Bolivian government department, Dirección General de Biodiversidad (DGB), for permission to collect native flora, specifically bromeliad species, in habitat. An agreement of cooperation for scientific studies was formulated involving myself (representing the Bromeliad Society of South Australia), the Botanical Gardens of Adelaide, FAN, and the Herbario Nacional de Bolivia. As far as the national herbarium is concerned, I must thank the eminent botanist Dr. Stephan Beck for his support.

¹ Ailsa Avenue, Warradale, South Australia 5046, Australia.

The plan was to travel from Santa Cruz westward to La Paz. One advantage of this strategy involved the systematic and gradual acclimation to the high altitude. I wanted to travel along some minor routes that were, perhaps, not previously investigated by bromeliad enthusiasts, even though this would be at the expense of other regions that I knew were rich in bromeliad species. The main objectives of the expedition were to document, study and photograph plants in habitat, to increase substantially the bromeliad collection maintained by FAN at Santa Cruz, to create herbarium specimens, and hopefully to receive eventual permission to export some terrestrial bromeliads for the Botanical Gardens of Adelaide (which already had a renowned collection and display of such plants), as well as some tillandsias for myself and my local society.

The chosen route would contain a myriad of tillandsias, puyas and deuterocohnias, as well as the wide-spread *Aechmea disticantha* and species of *Bromelia*. The dominant tillandsias included *Tillandsia streptocarpa*, *T. tenuifolia*, *T. sphaerocephala*, *T. cardenasii* and various small species from the ubiquitous subgenus *Diaphoranthema*.

Our vehicle was a Toyota Landcruiser. I was privileged to be escorted on the trip by two ideal persons from FAN. Firstly, there was the athletic, English speaking botanist Juan Carlos, who was also the driver, guide and translator. The second member was the bright young student Vicente, who excelled in climbing, spotting plants and, not the least, packing the roof of the vehicle. With new digital cameras and global positioning system (GPS) devices, we set out from Santa Cruz towards the picturesque village of Samaipata.

It is amazing that *Tillandsia samaipatensis* was not described before Walter Till performed the honour in 1996. With their one metre long yellow pendent inflorescences, they were impossible to ignore. Not only were many flowering plants adorning the cliff faces on the opposite side of the river, but there were many overhanging the main road, within reach. They shared the cliffs with *Deuterocohnia longipetala* (FIGURE 21). We took a detour to see the massive sculpted hilltop rock outcrop of El Fuerte. Although this is, most likely, a pre-Inca ceremonial site, it gained notoriety when Erich van Daniken incredibly proclaimed that it was a takeoff and landing ramp for ancient spacecraft. The cliff faces around El Fuerte displayed more *Tillandsia samaipatensis*, but this time accompanied by *Puya nana*.

Heading westward from Postrervalle, we entered a damp mountain cloud forest. Although bromeliads were not to be seen, it was a joy of nature featuring the most spectacular passion-flowers I could imagine. Then, abruptly, after passing over a ridge, we were in a dry inter-Andean valley. (Similar sudden changes were to occur later, west of Comarapa.) We found a number of *Puya nana* in full flower, and one entire inflorescence (FIGURE 22) was removed to provide a herbarium specimen for the Herbario Nacional de Bolivia. Near Pucar, we spotted a colony of grey hard-leaved tillandsias high up on a cliff face, but frustratingly beyond our access. Perhaps, in the future, FAN might return with adept climbers to discover their identity.

The road north from Vallegrande to Mataral was notable for all of the terrestrial bromeliads and flowering tillandsias. We collected, but could not identify, a species of *Deuterocohnia* which propagated using one metre long stolons. There was an inestimable number of *Tillandsia streptocarpa* and *T. duratii*, seemingly all in flower. These are the common forms with fragrant flowers displaying pale lavender and white petals. However, I did not predict what was in store regarding *T. streptocarpa*. For the next week, they dominated our route as we passed from one dry inter-Andean valley to another, but we did not see a single plant of this standard form in flower again until we arrived in the Sud Yungas. Millions of this species had dry inflorescences, indicating that their flowering period is considerably out of phase. An investigation into the reasons could provide an interesting project for a botany student.

West of Mataral, at 1548 m altitude, we walked alongside a stream that featured the richest variety of bromeliads I had experienced. The tillandsias included a huge cliff-dwelling green-leaved species I could not identify, as well as *Tillandsia lorentziana*, *T. vernicosa*, large *T. duratii*, *T. krukoffiana*, *T. didisticha*, *T. tenuifolia*, *T. streptocarpa*, and numerous diaphoranthemas. The puyas included *Puya laxa*, while the most interesting deuterocohnia was the small and rare *D. scapigera* subspecies *sanctae-crucis*, which would once have been regarded as a large *Abromeitiella*.

Approaching Moro Moro, we collected *Tillandsia violascens*, as expected, but we were surprised to find flowering *T. calochlamys*, as this is a considerable distance from the type location in a different province. Diego, a cousin of Juan Carlos, guided us along a new track from Moro Moro down to the Rio Mizque. Along the way, he directed us to a tree in a dry area where he recalled a large tillandsia growing. The funnel-shaped offsets grew on short stolons and had rich purple-coloured leaves. I did not recognise it, but made sure I collected an offset. But this general location yielded a much more amazing surprise. We collected three flowering *T. streptocarpa* plants from a single tree. At first, I thought that the different coloured petals merely indicated that the three plants were at different stages of the flowering process. But then I realised that all three were at anthesis. The plants had, respectively, pure white petals, dark violet petals, and peach-coloured petals (FIGURE 23). Moreover, on the neighbouring tree, other plants of the same species had white petals with a yellow centre, or peach-coloured petals with a yellow centre, all at anthesis. Who can explain such an amazing discovery?

In 1993, I found *Tillandsia lotteae* at five widely separated locations, ranging from Villa Abecia in the south of Bolivia up to Omereque. Now, around Saipina, we rediscovered this desirable species at four separate different habitats. We took a return day-trip to Pasorapa, unsure of what we might find. Initially, it was only more and more *T. sphaerocephala* and *T. cardenasii*, and some interesting miniature puyas. We then found ourselves in a dry forest with the trees covered with flowering *T. comarapaensis* (FIGURE 24). Further on, we stopped at 2522 m altitude, to view the panorama. Below us, hanging on a sheer cliff, was a large tillandsia. With Vicente and myself hold-

ing onto him securely, Juan Carlos reached down to remove two offsets. They had leaves with a violet tint, and grew on thick, 80 cm long stolons. Perhaps something interesting, or perhaps something common?

Rather than taking the main route from Saipina to Comarapa, we opted for a more rugged way, thereby enabling two worthwhile discoveries. We spotted a colony of tillandsias on a high cliff face. I reached them well after the other two, to determine they were a form of *Tillandsia sphaerocephala*. However, these were the only plants of this species seen growing on rocks rather than in trees, and the scapes of the inflorescences were crimson. I knew about this form, but this was the first time I had seen it in habitat. Further on, as dusk approached, we entered another cool mountain forest. I did not expect to see again so many flowering *T. calochlamys* (FIGURE 25). During the next morning, just east of Comarapa, we collected a number of large *T. streptocarpa* with flowers in shades of yellow. Or are they small *T. duratii*?

We headed towards the provincial capital of Cochabamba. Passing through another damp mountain forest at 2552 m near El Churo, we stopped to collect some specimens of a tank tillandsia with violet spotted leaves and a pendent orange inflorescence (FIGURE 26). It is likely to be *Tillandsia ionochroma*, but it was too damp to investigate in situ.

The last part of the expedition involved passing over the high mountains at above 4500 m into the Sud Yungas, noting some high altitude puyas in flower, most likely *Puya mollis* (FIGURE 54 on BACK COVER). Beyond Quime, at 2724 m, we collected green tillandsias growing on the rocks overhanging the road. They had spectacular large tripinnate purple inflorescences with dark blue flowers. Their identity is still a matter of conjecture, with *Tillandsia carnosae* var. *boliviana* the most popular suggestion. The small town of Inquisivi is surrounded by vast imported eucalyptus forests, and is perched high up on the side of a mountain. However, with various routes converging nearby, it is an ideal place to use as a base to collect tank tillandsias and fosterellas, and to explore the richly diverse forests of the southern part of the Sud Yungas. Perhaps, in the future, I might spend an extended time further north, enjoying what is certainly a paradise for tillandsia and orchid enthusiasts.

As I flew out of La Paz, I had the satisfaction of knowing that a substantial number of interesting plants would be added to the collection of FAN in Santa Cruz. The plants earmarked for Australia would be cared for by FAN while we presented a submission to the Bolivian government for permission to export. Sadly, four months later (as this is being written), we are still awaiting a determination from the DGB. Bureaucracy moves slowly in Bolivia, but at least we have not received a definitive refusal.

If you are a lover of rich biodiversity, and can tolerate dusty, rocky roads, high altitudes and basic accommodations, then Bolivia awaits you. A similar arrangement for travel could be negotiated with FAN. An approach can be made by contacting Inka Montero whose e-mail is imontero@fan-bo.org, or else by visiting their web site www.fan-bo.org.



Figure 21.
Tillandsia
samaipatensis and
Deuterocohnia
longipetala.



Figure 22. Inflorescence of *Puya*
nana removed for specimen.



Figure 23. Different coloured
Tillandsia streptocarpa
from a single tree.



Figure 24.
Tillandsia
comarapaensis,
north of
Pasorapa.

Figure 25.
Tillandsia
calochlamys
west of
Comarapa.



Figure 26. *Tillandsia*
ionochroma, El Churo.

Ochagavia: Very Attractive Chilean Endemics

Georg Zizka¹ & Patricio Novoa²

Introduction

The genus *Ochagavia* is endemic to Chile and was recently revised in the course of the treatment of the family for "Flora de Chile" (Zizka et al. 2002). The intention of this paper is to add some information on the habitats, ecology and conservation status of these species and - last but not least - document the very attractive plants in their habitats with some coloured photographs. Some short information on the Chilean bromeliads was given here before (Zizka 2003). *Ochagavia*, a genus described 1856 by the Chilean botanist Rodolfo A. Philippi, comprises the 4 species *O. andina* (Philippi) Zizka, Trumpler & Zoellner, *O. carnea* (Beer) L.B. Smith & Looser, *O. litoralis* (Philippi) Zizka, Trumpler & Zoellner, and *O. elegans* Philippi. They occur in Chile from 31°33' to 38°14'S (FIGURE 27). The distribution of *O. elegans* is quite "exotic", as it is found on Robinson Crusoe Island, Juan Fernández archipelago, app. 650 km west of the coast of Central Chile. Interestingly Isla Robinson Crusoe has been reached by two Bromelioideae species (*O. elegans*, *Greigia berteroi*), whose seeds or fruits probably haven been dispersed by birds. Nevertheless, these two species did not manage to make one step further: They are not found on Isla Alejandro Selkirk, app. 180 km further west.

Ochagavia belongs to subfamily Bromelioideae. The plants are caulescent, rosulate terrestrials and have succulent leaves with spinose-serrulate blades. Although the rosette is quite dense, the plants do not form tanks that hold water. The terminal inflorescence is simple, globose to ovoid or subcorymbose and shortly pedunculate, with scape 1.5-17.5 cm long, and from (7-)10 to over 50 flowers. The flowers are (3.5-)4-7.9 cm long and brightly coloured. Noteworthy is the epigynous tube, which is extraordinarily long in *O. elegans* (1-1.9 cm long).

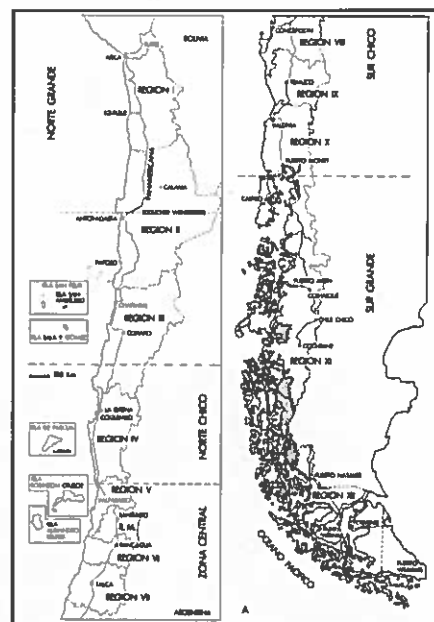


Figure 27. Map of Chile, showing numbered zones from North to South. Map source: Grau & Zizka (1992). Drawing by Hermann Schäfer. Reprinted with permission.

Ochagavia litoralis and *O. elegans* have the ability to form dense mats on rocky, steep slopes (FIGURES 28, 29, 31, 55 on BACK COVER).

Conservation status of Ochagavia

Important information about the conservation status of *Ochagavia* was provided by Hoffmann & Flores (1989). Due to the problematic identification of species at that time, it is not quite clear to which groups of *Ochagavia* these authors refer.

The information given here is based on field observations by the authors, those of P.N. being by far the most recent ones. *Ochagavia elegans* is restricted to Robinson Crusoe island, occurring there abundantly on rocky cliffs (FIGURES 28-30). These habitats appear not to be endangered by the introduced plant and animal "weeds" of the archipelago. Nevertheless, due to the fragile ecology of the island, the classification of the species as "vulnerable" by Hoffmann & Flores (1989) appears appropriate. *Ochagavia litoralis* occurs in Continental Chile from region IV to region VI. It forms dense stands there on coastal cliffs and was observed to be abundant in the area near Valparaíso in the 1990's (FIGURES 31, 32, 55 on BACK COVER). Recent observations by P.N. confirm this.

Less information is at hand for *Ochagavia carnea*, which has the widest distribution of the genus, reaching from region V to region IX and from 200-1000 m elevation. This species is found in the coastal cordillera as well as on the western slopes of the Andes. Although the species can be easily discerned from the other species by the size of its leaf blades [(38-)50-80-(120) cm long] and caulescent growth (FIGURES 33,34), there is very little information at hand about its abundance. P.N. has observed the species in region V today being restricted almost exclusively to the area between Colliguay in the south, Quebrada Escobar in the north and Quebrada Alvarado in the east. This area comprises approx. 11,200 ha, where *O. carnea* can be found at the base of ravines in the shadow of gallery forests formed by *Persea lingue* and *Cryptocarya alba*, or *Beilschmiedia miersii* (FIGURE 33). These ravines usually have temporary streams, maintaining a certain amount of humidity even in the dry season. In the region of Valparaíso, the species is found between 400 and 800 m elevation growing also in ravines from the bottom to 30-40 m up the slopes. The plants are usually found in the shade of trees, where it forms up to 40 m². They rarely grow in sunny, open habitats. *Ochagavia carnea* is often associated with *Puya chilensis* and *P. berteroniana* (Bromeliaceae), *Crinodendron patagua* (Elaeocarpaceae), *Persea lingue* and *Cryptocarya alba* (Lauraceae), *Eryngium paniculatum* (Apiaceae), *Senecio yegua* (Asteraceae), *Azara sp.* (Flacourtiaceae), *Ortholobium glandulosum* (Fabaceae), *Chusquea cummingii* (Poaceae), *Proustia pyrifolia* (Asteraceae), *Neoporteria curvispina* (Cactaceae), *Adiantum sulphureum* (Adiantaceae) and *Chloraea chrysanthra* (Orchidaceae).

Each individual produces numerous rosettes, but less than 1% of them is flowering and fruiting per year. Generally, the species seems to be restricted to remote habitats with subtropical climate where its speciation might have

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Figure 28. *Ochagavia elegans*. The steep cliffs of Isla Robinson Crusoe are the typical habitats of this species.

Photograph by Georg Zizka.

Figure 29. *Ochagavia elegans*. Population on the cliffs near El Camote, Isla Robinson Crusoe. Note the introduced *Rubus* specimen in the background, a threat to the native flora of the island.

Photograph by Georg Zizka.



Figure 30. *Ochagavia elegans*. Fruiting specimens from El Camote, Isla Robinson Crusoe.

Photograph by Georg Zizka.

Figure 31. *Ochagavia litoralis*. Large population on Playa Ancha cliff near Valparaiso.

Photograph by Patricio Novoa.



Figure 32. *Ochagavia litoralis*. Fruiting specimen, the berries reach a size of 2-3.2 x 1-1.7cm.

Photograph by Patricio Novoa.

Figure 33. *Ochagavia carnea*. Population at "Los Perales", growing under the shade of Belloto (*Beilschmiedia miersii*, Lauraceae).

Photograph by Patricio Novoa.

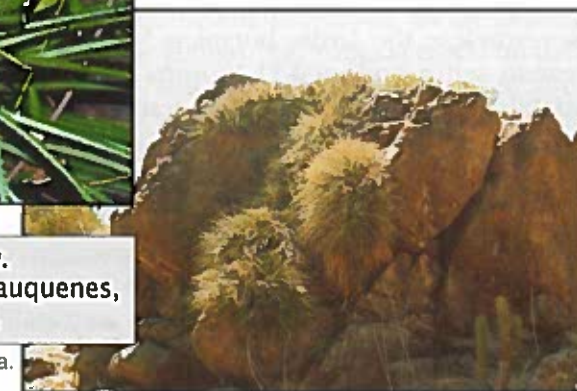


Figure 34. *Ochagavia carnea*. Flowering shoot; the species can be easily recognized by its long leaves and well developed stem.

Photograph by Patricio Novoa.

Figure 35. *Ochagavia andina*. Population near Baños de Cauquenes, east of Rancagua, VI region.

Photograph by Patricio Novoa.



taken place. Its conservation status is regarded here as "vulnerable", although the category "rare" might be also taken into account. Considering the few known populations, the rare fruiting stage and the danger of destruction of the habitats by aridification the category "vulnerable" appears the more

appropriate one. Moreover, the habitats are presently affected by various road construction projects that are intended to improve access to remote areas.

Information is very scarce about *Ochagavia andina*, which can be found from region VI in the north to region VIII in the south from 700-2500 m elevation. Additional collections and field observations are needed in order to judge its conservation status. The photograph shown here (FIGURE 35) is the first one known to be published for the species.

Ochagavia in cultivation and as a neophyte

It is likely that all *Ochagavia* species can be cultivated outdoors in Western Europe. *Ochagavia carnea* has become naturalized on Trese, Isles of Scilly, off the SW coast of Great Britain (Stace 1997). *Ochagavia carnea*, *O. litoralis*, and *O. elegans* are cultivated in botanic gardens, usually together with succulents (Wilkin 1996, Zizka et al. 2003). Although the plants do not flower as easily as *Fascicularia* in cultivation, the flowers and inflorescences are brighter and more attractive. The plants are quite robust in cultivation, *O. litoralis* and *O. elegans* endure more intensive sunlight than *O. carnea* but appreciate the high humidity of their natural habitat in form of coastal clouds. To our knowledge, *O. andina* is not in cultivation at the moment. From our experiences with the plants in the Palmengarten Frankfurt, the *Ochagavia* species can be well recommended for cultivation together with cacti and other succulents.

The vegetatively similar *Fascicularia bicolor* is probably found more often in cultivation in Europe and appears to be hardier than *O. litoralis* and *O. carnea*. As soon as the plants flower, the two genera can be easily discerned: Flowers (petals) are blue in *Fascicularia*, with the stamens included, while the stamens are exerted in *Ochagavia* and the sepals bright rose (FIGURE 55 on BACK COVER).

In Chile, ochagavias are at present not grown as ornamentals. Nevertheless, the Jardín Botánico Nacional at Viña del Mar has started this year to sell propagated *O. litoralis* to public visitors which might help to establish this species as an ornamental.

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Diversity and Ecology of Epiphytic Bromeliads Along an Elevational Gradient in the Bolivian Andes

Thorsten Krömer¹

Photographs by the Author

The number of bromeliad species known from Bolivia has increased in recent years from 281 (Krömer et al. 1999) to ca. 310 due to many new species discoveries (e.g., Krömer & Gross 2001, Ibisch et al. 2002, Vásquez & Ibisch 2003). The total number of 400 estimated species (Ibisch et al. 2001) still ranks below the published numbers for Ecuador (440; Jørgensen & León-Yáñez 1999), Peru (410), Colombia (391), and Venezuela (364) (all Holst 1994). Nevertheless, the number of genera (21) is second only to Venezuela reflecting the unique biogeographical position of Bolivia at the meeting point of the humid northern and central Andes, the dry southern Andes, Amazonia, the Gran Chaco, and the Brazilian Shield.

About 45% of Bolivia's bromeliad species are endemic to the country. This high percentage is largely due to the high number of endemic terrestrial taxa in the genera *Fosterella* and *Puya*, which have their centers of diversity in Bolivia (Ibisch et al. 2001, 2002) and can be found mostly in azonal habitats such as steep ravines, rock faces, and roadsides (Kessler 2002). Only *Tillandsia* has a similar high percentage of endemic species, which is mainly represented by atmospheric species adapted to the dry conditions of the Chiquitano and inter-Andean forests. Overall, diversity of bromeliads is highest in the humid montane forests ("Yungas") of the Andes (Ibisch et al. 2001), where mainly epiphytic tank bromeliads in the subfamily Tillandsioideae (e.g., *Guzmania*, *Racinaea*, *Tillandsia*) and Bromelioideae (e.g., *Aechmea*, *Billbergia*) abound.

Diversity

A study of the diversity of epiphytic bromeliads along an elevational gradient in the Yungas of La Paz (Prov. Nor Yungas, Sud Yungas) based on data of Krömer et al. (1999), Krömer (2003a), and Bach (2004) yielded a total of 54 species in 10 genera and showed great differences in species numbers and composition within three vegetation belts (TABLE 1). The lower montane forest (500-1500 m elevation) harbors the highest number of species (29) and genera (10) with *Aechmea*, *Billbergia*, *Catopsis*, and *Weraubia* occurring only in this belt. The upper montane forest (1500-2500 m) follows with 25 species in 6 genera, with especially high species numbers in *Guzmania*, *Racinaea*, and *Tillandsia*. Species richness in the cloud forest belt (2500-3500 m) decreases drastically to 14 species in 4 genera.

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When the altitudinal belts are divided into intervals of 500 m, however, the diversity of epiphytic bromeliads does not decrease linearly with increasing height. Instead, the species number in the lower and upper montane forest is relatively constant (FIGURE 36). Between 2000-2500 m there is a small peak, while above this level the epiphyte diversity strongly decreases due to occasional night frosts. On the other hand, the large genera *Guzmania*, *Racinaea*, and *Tillandsia* clearly show hump-shaped curves with maximum species numbers in the very humid mid-elevations. With a total of nine species *Tillandsia* contributes considerably to the high diversity between 2000-2500 m. The high total species richness in the warmer and less humid lower montane forest is due to the occurrence of many different genera, though relatively few species.

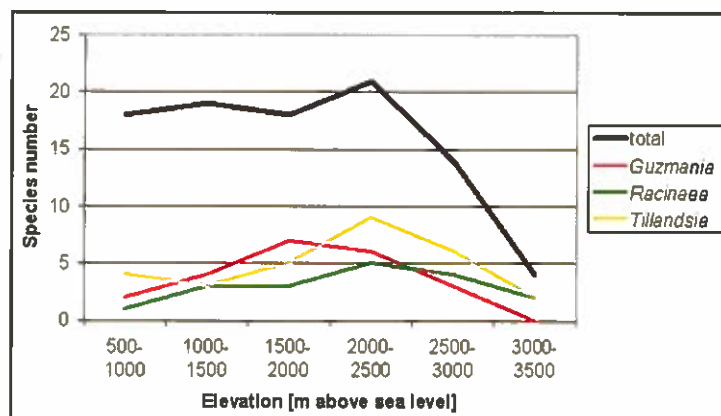


Figure 36. Elevational patterns of species richness of epiphytic bromeliads in the Yungas of La Paz.

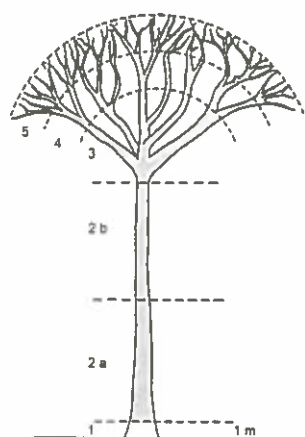


Figure 37. Subdivision of the tree into vertical zones after Johansson (1974).

Figure 38. Big tank bromeliad *Mezobromelia pleiosticha* and other epiphytes (e.g., ferns, orchids, peperomias) on a large vertical branch of a canopy tree.



Figure 39. Small night blooming flowers of *Guzmania calothyrsus*.



Figure 40. Bell-shaped night blooming flowers of *Werauhia gladioliflora*.

Figure 41. Bell-shaped night blooming flowers of *Werauhia sanguinolenta*.



Six species, all from the genera *Racinaea* and *Tillandsia*, display an especially wide elevational range (> 1000 m), but only *Racinaea schumanniana* occurs in all three altitudinal belts, while *Tillandsia fendleri* has the maximum range with 1400 m. However, the majority of the species with several records show an intermediate distribution range of 500-1000 m. Only one voucher each exists for ten species found within the relatively well sampled study area, with *Guzmania madisonii*, *Tillandsia platyrachis*, *T. wurdackii*, and *Vriesea tequendame* being the first records for Bolivia. This fact implies a need for further botanical collecting expeditions.

	Lower montane forest 500–1500m	Upper montane forest 1500–2500m	Cloud forest 2500–3500m
<i>Aechmea</i>	4	-	-
<i>Billbergia</i>	2	-	-
<i>Catopsis</i>	1	-	-
<i>Guzmania</i>	6	7	3
<i>Mezobromelia</i>	2	1	-
<i>Pitcairnia</i>	1	1	-
<i>Racinaea</i>	3	6	4
<i>Tillandsia</i>	5	9	6
<i>Vriesea</i>	3	1	1
<i>Weraubia</i>	2	-	-
Total	29	25	14

TABLE 1: Species numbers of different genera within three vegetation belts in the Yungas of La Paz.

Vertical distribution

Epiphytes do not occur randomly on the trees but often occupy very specific niches which can be divided into five zones (FIGURE 37) according to Johansson (1974). For example, the trunk base is zone 1, where mainly ferns and bryophytes occur. Lower branches of the canopy (zones 3–4) are “epiphyte paradise,” with a high diversity and abundance of all epiphyte groups, including big tank bromeliads (FIGURE 38). Outer canopy twigs (zone 5) harbor small twig epiphytes, especially orchids. Because the epiphyte flora on shrubs and treelets in the forest understory is usually different from that on the large canopy trees (Gradstein & Krömer 2003), I recently proposed the understory as the additional zone U (Krömer 2003a).

Epiphytes can be classified into three ecological groups based on their vertical distribution on the tree (Acebey et al. 2003). **Generalists** occur in more or less all tree zones and also in the shady understory, while specialists can be divided into **sun** exposed and **shade** tolerant **epiphytes**, both occurring only in a limited number of zones. Most epiphytic bromeliads in the Yungas of La Paz show a wide ecological flexibility and are able to grow in shady as well as in sunny habitats such as, e.g., *Racinaea spiculosa* (FIGURE 42). Fewer species have a special habitat preference and occur mostly in the canopy like the sun epiphytes *Guzmania roezlii* and *Mezobromelia capituligera* (FIGURE 42), while shade-loving epiphytes are somewhat lacking.

Flower ecology

Bromeliads are known to have a wide range of pollinators, including birds, bats, and a variety of insects, and also include autogamous taxa

(Benzing 2000). Most bromeliads in Bolivia are bird-pollinated and provide one of the most important food sources for hummingbirds (Kessler & Krömer 2000). Pollination by bats has been studied in much less detail, although it is an important pollination mode, especially in the genus *Guzmania* (Krömer 2003b). In the Yungas of La Paz, six out of 12 *Guzmania* species are very likely pollinated by small nectar-feeding bats (Phyllostomidae: Glossophaginae). Their floral syndrome includes small, night blooming flowers with brown or green bracts, greenish to whitish petals (FIGURE 39), and most have a specific smell (e.g., garlic-like odor in *Guzmania sphaeroidea*).

Other bat-pollinated (chiropterophilous) bromeliads are found in the genera *Billbergia* (*B. robert-readii*) and *Weraubia* (*W. gladioliflora*, *W. sanguinolenta*). Furthermore, two terrestrial species that occur in the study area (*Pitcairnia crassa*, *Puya ferruginea*) are bat-pollinated (Krömer 2000). All these, in contrast to *Guzmania*, show large and nectar-rich flowers which indicates bigger bat species as pollinators. Both species of *Weraubia* are characterized by bell-shaped (campanulate) flowers (FIGURES 40, 41, p. 219) that fit like a “head-mask” on the elongated rostrum of the nectar-feeding bat. *Weraubia gladioliflora*, a relatively frequent species in the lower montane forest, shows a vertical distribution focused in the understory and the trunk area, where its flowers are projected into the open air. This exposure, similar to cauliflory, provides space for wing movements of the bat during hovering.

Acknowledgements

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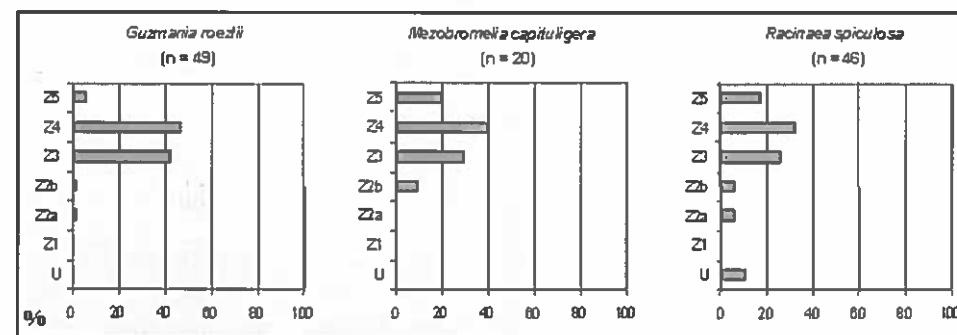


Figure 42. *Guzmania roezlii*, *Mezobromelia capituligera*, and *Racinaea spiculosa* shown as percent of the total number of records (n) within the vertical zones.

Birds and Bromeliads in Costa Rica

Moyna Prince¹

Photographs by the Author

In December 2003, my husband, Ed, and I flew to Costa Rica, hoping to visit the Wilson Botanical Garden in the southern part of the country. An earlier trip had been thwarted by a nation-wide strike that had truck drivers blocking all the main roads. This time there was no unrest.

Our vacation had an auspicious beginning at the Hotel Bougainvillea in San Jose. This hotel has extensive gardens which have been landscaped by the late John Hall III. John used to live in the Orlando area and was among the earliest Florida bromeliad pioneers. His knowledge of birds, butterflies, and bromeliads made him a sought-after travel companion in Central America. He was also an outstanding artist and he used his talents to create a beautiful garden for the Hotel Bougainvillea. The bromeliads had been supplied by DuraFlor, Chester Skotak's nursery, and we identified many of the showy plants on display. There was an eye-catching *Aechmea mexicana* albomarginata, developed by Deroose, that was five feet across and had a lot of red in the leaves. A pair of large *Neoregelia cartharodon* 'Tiger' were in bloom with white flowers. Near the door was a bed of albomarginated *Neoregelia concentrica* showing intense color. This hotel was a wonderful introduction to our Costa Rican vacation.



Figure 43. *Aechmea mexicana* at the Hotel Bougainvillea in San Jose.

Figure 44. *Vriesea castaneobulbosa*, in the mountains at Savegre. Picture is a bit blurry because it was taken through a telescope.



¹ Miami, Florida.

We had planned an ecotour in addition to the pilgrimage to Las Cruces, home of the Wilson Garden. The tour started with a trip to Tortuguero National Park on the Caribbean coast. A bus takes you part of the way, then the rest is by water. Tortuguero is made up of a network of canals and rivers. As we floated along, we had tantalizing views of epiphytes high in the trees and reptiles much closer in the water and on the banks. We passed a flock of colorful roseate spoonbills, and the guide pointed out toucans, parrots, swallows and humming birds.

Our next stop was Quepos on the spectacularly beautiful Pacific coast, where we met up with Mike Michalski and Patty Gonzalez, also members of the Bromeliad Society of South Florida. Large green bromeliads were growing in the trees, and spent inflorescences suggested they were *Weraubia sanguinolenta*. Close to the water we spotted both crested and yellow headed caracara, and a beautiful little blue and white swallow.

After two days in Quepos, we were driven over terrible roads to San Gerardo de Dota, located at 7,000 feet elevation (2100 m), where we stayed at the Savegre Hotel. The Savegre is famous for its birdwatching, and the Chacon family owners have humming bird feeders outside the windows for



Figure 45. *Alcantarea imperialis* at the Wilson Garden.



Figure 46. *Nidularium innocentii* bed at the Wilson Garden.



Figure 47. *Alcantarea imperialis* albomarginata at DuraFlor.



Figure 48. Typical bench at DuraFlor with hybrids that Chester Skotak is working with.

close-up viewing. There are dozens of different hummers on the feeders all day, and the Chacon brothers can identify them all. On a bird-watching walk we spotted several quetzels and a toucanet. A *Vriesea castaneobulbosa*, with beautiful yellow flowers, bloomed high in a tree in the same area. More bromeliads are used in the landscaping at the hotel.

From Savegre we travelled to San Vito, home of the Wilson Garden. Bob and Catherine Wilson used to live in Miami and owned a famous nursery, Fantastic Gardens. They also wrote the book "Bromeliads In Cultivation, Vol. I," published in 1963. Volume II was never written. The Wilsons moved to Costa Rica and settled there permanently, growing tropical plants in their garden which became a mecca for tropical plant enthusiasts. After their deaths, the property was acquired by the Organization for Tropical Studies. Now anyone can stay overnight in the comfortable cabins and share the meals prepared for visiting scientists and botanists.

The property is on steeply sloping ground and consists of many beds of bromeliads bordered by zig-zag paths. Waterproof boots are provided, a necessity in this damp, muddy environment. *Nidularium innocentii* was in bloom and looking spectacular. Huge *Alcantarea imperialis*, many in different shades of purple, were used as focal points in beds. There were beds of *Neoregelia* 'Catherine Wilson' and *Neo*. Fireball. In addition to the bromeliads, there were large plantings of heliconia, palms and ferns.

Our stay at the Wilson Garden was a bit cold and wet, but our final destination, Chester Skotak's nursery in Palmares, was warm and dry. Chester's *Guzmania* hybrids leave you goggle-eyed. The shade houses are a mass of yellow, orange, purple, red and every shade in between. These *Guzmanias* and *Vrieseas* are the hybrids being developed for the trade. On a lesser scale, Chester creates his *Neoregelia* hybrids, which get true bromeliad aficionados excited. His albomarginated crosses continue to delight, but he is also working on hybrids using the famous (infamous?) *Neo*. 'Hannibal Lecter,' with its strong chocolate barred leaves. *Neo*. 'Norman Bates' will be coming soon, and several more not yet named crosses will continue the theme.

We identified about 70 birds new to us during the trip, and some interesting animals: two- and three-toed sloths, coatimundis and four different kinds of monkeys. For me, the most exciting sight was a tayra that crossed my path at the Wilson Garden. This is a black, furry creature that, at first glance resembled a long-limbed cat with a very long neck and small head. It's actually in the *Mustelidae* family, and related to weasels, stoats and otters.

Bromeliads in captivity won out over the wild kind. The plants we saw at the hotel in San Jose and later at DuraFlor nursery required several dozen pictures, and a vow to return sometime in the future and see them yet again.

Acknowledgments

Thanks to Dennis Cathcart, Curtis F. Dowling and Chester Skotak, for providing help and identification of plants.

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New BSI Director... Joyce Brehm

The BSI is fortunate to have another president with years of dedication and service to the Society, and the desire to do more. Joyce has been affiliated with the San Diego Bromeliad Society since 1976, where she held all of the offices, including President, Vice President, Secretary, Treasurer, Sunshine Committee, Hospitality, and News Letter editor.



Figure 49. Joyce Brehm.

A member of the BSI since 1978, Joyce served on the BSI Board first as Secretary from 1995 to 2000, and then as California Director from 1999 to 2004. She served as BSI Nominations Chair in 2002. She enjoyed the challenge of being World Bromeliad Conference (WBC) Chair for the San Diego Bromeliad Society Conference in 1994, and then served as co-chair for WBC 2000 and was in charge of conference sales at WBC 2002 and 2004 where she helped to implement a bar-code system.

As an accredited Master Bromeliad Judge, Joyce has traveled extensively within the United States to judge shows. She judged the 2003 New Zealand/Australian Conference Bromeliad show and has been Chair of the San Diego Bromeliad show 6 times, and Judges Chair numerous times. As a grower, she has won Best of Show Horticulture (Mulford Foster) both on the local level and at a World conference. Her artistic flair has garnered her three Best of Show Artistic (Morris Henry Hobbs) plaques.

She participates in the activities of the BSI by assuming the editing of the Cultural Manual first published by Mark Dimmit in 1991. Along with Herb Plever, Joyce rewrote, edited, and published this manual with an emphasis on indoor growing of bromeliads. It is now available for purchase on the BSI website Online Store.

Joyce has given programs for the San Diego Bromeliad Society, the Saddleback Bromeliad Society and the Chicago Bromeliad Society. She has traveled extensively to visit other Bromeliad Societies and has formed working relationships with many of the Committee Chairs.

Between bromeliad activities, Joyce is a registered nurse who works full time as a research consultant. She audits medical record data for many pharmaceutical companies throughout the United States. She is the mother of two sons and has been blessed with 5 grandchildren.

There is little doubt that Joyce will work tirelessly to fulfill the vision of the Bromeliad Society International.

The BSI gives a big thanks to retiring President, Tom Wolfe, for his many years of dedicated service to the Society.

A Great Big Thank You to Chicago!

The Bromeliad Society International wishes to thank the Society for hosting the World Bromeliad Conference 2004. They proved it really is "our kind of town". The work this small society put into the conference was remarkable. The seminars were great, the food outstanding, and the hospitality out of this world. The special pineapple chocolate centerpieces and individual chocolate souvenirs were a sweet tooth's delight.

Who says they don't grow Bromeliads in Chicago. The show room proved differently. There were eleven members of the Bromeliad Society of Greater Chicago entered into the show. And what a show it was! There were 309 entries and several of the BSGC members were on the head table. Thank you Bromeliad Society of Greater Chicago for hosting us. We all appreciate your great big effort.

Joyce Brehm, President BSI

World Conference 06 Update... Fully Refundable Deadline Extended until March 31, 2005

If you register for the World Conference (San Diego, 2006) any time before March 31, 2005, you will still receive the guarantee of having your registration 100% refunded should you need to cancel before May 1, 2006. Details as follows...

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or see the registration form on the following page of this Journal.

New BSI Board Member... Keith Anderson

Dear Board Members, It gives me great pleasure to tell you that Keith Anderson has volunteered to complete my term as a Director from California. Keith as many of you know has helped with the last three world conferences in sales. He is an avid grower and has always "stepped up to the plate" when California Societies or the BSI needs help. Please welcome him. California is working very hard to bring it's percentage up to the requirements for a 3rd director. Hopefully Keith's association with the BSI has just begun.

Joyce Brehm, President BSI



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Kick Me... Hurricane Magnets, Exploding Heaters, and Tar Water

Ken Marks, BSI Webmaster

It's been an exciting year—a bit too exciting for those of us residing in Florida. Maybe it is a sign of things to come as Global Warming starts making its effects more and more visible or maybe was just bad luck. Whatever the cause it really felt like Florida had a big "Kick me" sign stuck on its back during this year's hurricane season.

Things started out relatively uneventful. The forecasters had said that this year was going to be a busy hurricane season. But then again they seem to say that every year. I guess this year the Soothsayers of Storms, Prophets of Precipitation, and Harbingers of Hurricanes were spot on—even a broken clock is right twice a day. (This will make sense to people who can remember back to when clocks had hands.)

For us Floridians the show began when Charley snuck through the Caribbean and turned into a hurricane south of Cuba. I was in Chicago with many other BSI members at the World Conference in mid-August when Charley turned its eye on Florida. The normal topics of conversation at a World Conference were inter-mixed with discussions containing some new phrases: "cone of probability," "wind speed," and "landfall." A number of attendees had to abandon the World Conference and return to Florida to prepare for the impending storm. Charley was poised for a direct hit on Sarasota, the home of Marie Selby Gardens (and the Bromeliad Identification Center) as well as the shade houses of Tropiflora, but by the time it came ashore it had turned south and sped up to a category 4. As Charley swept across the center of Florida it did quite a bit of damage. Homes were destroyed, power lines downed, and I'm sure quite a number of shade houses and bromeliad collections were affected as well.

I made calls from Chicago to my neighbor back in Florida to enquire about conditions in my area during Charley. To my relief, I was informed that it was only lightly breezy and without even a drop of rain. Normally, a near miss like this (for me anyway) would have been the end of the story for the season. However, three weeks later we were home and staring at hurricane Frances as it crept ever so slowly toward the east coast of Florida. The southern edge of the eye wall came ashore in the West Palm Beach area and we were pummeled with the hurricane-force winds from the inner band. We lost power and cable-TV and had quite a few trees and branches go down. Luckily we sustained no structural damage but only had a Frances-induced re-landscaping.

Amazingly none of the bromeliads that were mounted to trees came off. Although there were cases when trees (full of native tillandsias) came crashing down. The only bromeliads that I lost were those I took down from the fencing material that I have mounted inside my pool screen enclosure. Some 250 species were loaded into trays and boxes and herded into my

garage to sit in my truck bed along side two fruiting *Ananas bracteatus* var. *tricolor* in huge Mexican pots that had been taken in from either side of my driveway. During the next 5 days these plants sat in a hot, stuffy garage while I worked on higher priority cleanup tasks. Many of the less robust species suffocated or rotted while being "protected" from the storm.

My bromeliads finally made it back outside. I took this opportunity to clean up and remount the tillandsias that had pulled through their mistreatment in the garage. All the while we kept an eye on the next storm in the chute. This one, Ivan, followed a similar track to Charles but moved even lower through the Caribbean. Ivan turned at the last minute just missing the island of Bonaire in the southern Caribbean where a hurricane has not struck for the last 127 years. Other islands like Grand Cayman were not as lucky. For some time this storm looked like it might run through the Keys and up through the peninsula of Florida. As we checked each hurricane update it became apparent that this storm was going farther and farther to the west. This time it was the folks from the Panhandle of Florida who got a visit from the Weather Channel's field reporters.

With this storm passed, the coast finally looked clear. That was until Jeanne did a pirouette after it looked like it was going to move out into open water after causing severe damage to Haiti. This is the point where I started believing the rumors that someone had energized a big hurricane-attracting magnet in Florida. Jeanne doubled back and headed along a similar path to Frances. With incredible precision (and incredibly bad luck) Jeanne came ashore within miles of where Frances had made landfall.

Once again we lost power and cable but we were getting all too good at fueling up generators and running extension cords. The utility companies seemed to have benefited from all this recent practice as well as it only took them two days to get our power back this time.

Having learned my lesson from Frances, none of my tillandsias came inside this time and, surprisingly, only one fell off its perch by the next morning after the storm had passed. Cleanup after this storm was much quicker too. Most of the trees and branches that were going to fall did so during Frances leaving little additional damage for Jeanne to do.

It has taken nearly a month but we have finally returned to some semblance of normality around here. The huge piles of hurricane debris that formed a wooden mountain in the cul-de-sac in front of my house are gone. The tropics seem free of depressions at the moment. I have been able to turn my attention once again to computers and have traded a chainsaw for a keyboard.

While spending some time converting old BSI Journals to an electronic form so that they may be included in the Online Journals section of the Members-Only area of the BSI website, I came across an interesting account of other improbable ways of losing bromeliads that had nothing to do with cataclysmic tropical storms. This is a story that is in one sense foreign to my circumstances and yet somehow I can identify with their loss.

The article is called "THROUGH FIRES AND WATERS OF AFFLICTION" by W. B. Charley of Bilpin, N. S. W., Australia and appeared in the September-October 1967 issue of the BSI Journal (or Bromeliad Society Bulletin as it was then known). Here it is in its entirety:

THE NECESSITY TO HEAT GLASSHOUSES in many localities in Australia in winter calls for, in many cases, kerosene heaters. These are not without their dangers, as we ourselves found out. Mrs. Small of Greenacres, New South Wales, heated her 20-foot glasshouse with such a unit. In this house was a valuable collection of the best bromeliads procurable.

One night the heater blew up, and the intense heat scorched every bromeliad, burned all the labels, and completely blackened the pots, the stands, and the walls. The plastic sheet roofing buckled, and no doubt the roof would have gone too, but this type of corrugated roofing, known as P.V.C., is hard to burn although it will squirm under intense heat. After such a disaster most folk would have given up, but not Mrs. Small. She cleaned all the pots, took the leaves off the scorched plants, leaving only the butts of each plant level with new pot mix.

It took 18 months for new growth to appear from the burned butts, but appear it did, although for the 18 months it seemed that the lot were finished or had been cooked to death. Mrs. Small is now rewarded for her long period of waiting, but to look over her plants is now a pleasure and one would never know of the blackened tragedy she had viewed one morning. Surely, this is a real testimony to the hardiness of these wonderful plants. Mrs. Small has just one problem left: she has to await the correct naming of her broms until they show up their character.

From the disaster of fire, we turn to the disaster of water. Because our water rights from a spring on the mountain had been taken away, we were forced to install another system, which called for new storage tanks. These were painted inside to prevent corrosion from the acid water. It was several weeks before we could drink the water, as it had a bad taste from the bitumine paint, but eventually after several fillings of the tanks, the water came clean.

It did not occur to us that during this time our nursery plants were also finding this water unpalatable, and it was months later that the trouble started to show up. Bromeliads started to curl their leaves and die from the base, but first their leaves showed striking color. We threw out many of our precious plants, particularly most of the neoregelias, which took it the hardest, as well as many aechmeas and a few of the other varieties. The oil scum from the paint was the killer. We were not as lucky as Mrs. Small: the plants had been killed to the roots and so did not sucker. Our loss was complete.

This may not be the only recorded case of exploding space heaters or tar poisoning but I can honestly say that I had never heard of such things before. This is but one of the many interesting stories buried in the annals of the Journal of the Bromeliad Society.

Bromeliads: Believe it, or Not!

Susan Murphy, Co-editor

The elusive Spanish Moss Man (FIGURE 50) was recently observed and photographed in central Florida, outside of its normal canopy habitat. Readers are urged to remain calm, yet vigilant, and report any sightings directly to Bromeliad Society authorities. SMM is considered to be non-parasitic, though has been recognized as a nutritional pirate (Benzing & Seeman 1978). He may, or may not, provide you with a very brief moment of levity.

Acknowledgments

Several young children are thanked for reporting this recent sighting.

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Figure 50. Spanish Moss Man (*Tillandsia usneoides* var. *alienus*).

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Dear Editor...

Approximately 10 years ago my friend, Mrs. Zelia Stoddart, gave me an *Alcantarea regina*, which she brought to Caracas from Brazil. The plant had a diameter of about 8 inches. Over the years the plant grew and I had replanted several times. By 1995, it was as you can see in the enclosed photograph of that year. The plant went on growing so much that I had to set it on the ground. At the time it measured 32 inches wide. Later on, it grew to 5 feet in diameter and 32 inches high, and then for several months stopped growing. Last January, I observed the plant and seeing it was going to bloom, I started to photograph it in order to follow carefully the entire cycle. In the photographs from three months of January, February, March, and April, you can see the spectacular inflorescence develop. The *alcantarea* reached a height of almost 7 feet tall and was full of white flowers. It was a wonderful sight. Last month I cut the inflorescence and the plant has not produced seeds or pups, but I hope with time I will get some because the *alcantarea* still seems to me to be very healthy.

Maria Teresa Ribas de Vega
Caracas, Venezuela



Figure 51. Maria Teresa Ribas de Vega and her prized *Alcantarea*.

Report on Bromeliads at Monocots III Symposium, Ontario, California, 2003

Jason Grant¹

The symposium "Monocots III" was held at the Ontario Convention Center, Ontario, California from March 31-April 4, 2003. This was the Third International Conference on the Comparative Biology of the Monocotyledons, and Fourth International Symposium on Grass Systematics and Evolution, hosted by the Rancho Santa Ana Botanic Garden, Claremont. See: <http://www.monocots3.org/>

The major news of the conference was the announcement of the new placement of monocot families within orders. The new results differ slightly at the family level from the first publication by APG I (Angiosperm Phylogeny Group, 1998. An ordinal classification for the families of flowering plants. *Ann. Missouri Bot. Gard.* 85: 531-553. 1998). In this publication, the bromeliads were identified as 'commelinoid,' but were unassigned to an order. In an update to the APG I classification, APG II. *Bot. J. Linn. Soc.* 14: 399-436), the Bromeliaceae have been placed within an expanded Poales. This means that recent DNA studies have shown that bromeliads are related to grasses (Poaceae), sedges (Cyperaceae), cattails (Typhaceae), and rapats (Rapateaceae). Bromeliads have always been recognized as a distinct family, yet finding the most closely related family to the bromeliads has been problematic, and has shifted significantly over the years. Previously, the Bromeliaceae has been recognized within its own monotypic order (Bromeliales). See the Angiosperm Phylogeny Website: <http://www.mobot.org/MOBOT/Research/APweb/welcome.html>



The Bromeliaceae session, chaired by Jason Grant, featured five speakers who largely discussed the systematics and taxonomy of the Bromeliaceae based on DNA data. The speakers and the titles of their talks were: Michael Barfuss (University of Vienna, Austria) "Phylogenetic relationships in sub-family Tillandsioideae (Bromeliaceae) based on evidence from plastid trnL

Figure 52. Some participants at Monocots III. Standing from left to right: Dylan Wade (U. Wyoming), Tim Evans (Hope College), Georg Zizka (speaker), Michael Barfuss (speaker), and Simon Pierce (speaker). Kneeling from left to right: Tom Givnish (speaker), and Jason Grant (Organizer of Bromeliaceae session).

¹ Fontaine-Andre 30, Neuchatel 2000, Switzerland. E-mail: jason.grant@bota.unine.ch

intron, trnL-trnF intergenic spacer, atpB-rbcL intergenic spacer, rps16 intron, partial 5, and 3, trnK," Tom Givnish (University of Wisconsin - Madison) "Origin, adaptive radiation, and biogeographic diversification of Bromeliaceae inferred from ndhF sequences," Simon Pierce (Department of Animal and Plant Sciences, Sheffield, UK) "The jeweled armour of *Tillandsia* - multifaceted or elongated trichomes photoprotect atmospheric Bromeliaceae," M.G. Sajo (São Paulo) "Floral anatomy and systematics of Bromeliaceae, with particular reference to the evolution of epigyny in commelinid monocots," and Georg Zizka (Senckenberg Center for Biodiversity Research, Frankfurt, Germany) "Systematics of Bromelioideae (Bromeliaceae) - molecular, anatomical, and morphological studies." The scientific papers presented at Monocots III are scheduled to be published in the summer of 2005 in the journal *Aliso*.

Epiphytism of *Aechmea lingulata* (Bromeliaceae) on *Pilosocereus* sp. (Cactaceae) in Tabuleiro Woodland, Northeastern Brazil

Roberto Lima Santos, Maria das Graças Almeida & Maria Solange¹

The bromeliad *Aechmea lingulata* (L.) Baker is a water-holding or phytotelm species occurring from Central America and the Caribbean to northeastern Brazil (Smith and Downs 1979). In eastern Rio Grande do Norte State (Northeastern Brazil), this species was observed in coastal areas with Mata Atlântica (Brazilian Atlantic Coastal Rainforest) and *tabuleiro* woodland. In these areas, phytotelm bromeliads such as *A. lingulata*, are considered a key-stone resource for some species of the local fauna (Santos et al. 2002, 2003).

Mostly terrestrial specimens of *Aechmea lingulata* were observed in these areas. However, in the *tabuleiro* habitat near the Pitimbu River (Natal municipality, Rio Grande do Norte State), the authors observed large specimens of *A. lingulata* growing epiphytically on the columnar cactus *Pilosocereus* sp., locally known as *facheiro* (FIGURE 53). The genus *Pilosocereus* occurs from Mexico, Guatemala and the West Indies south to Brazil and Peru (Zappi 1994). In Rio Grande do Norte, the authors observed specimens of *Pilosocereus* in coastal *restinga* and *tabuleiro* as well as in the semi-arid *caatinga* woodland. The coastal *tabuleiro* woodland occurs in eastern Brazil in association with the Barreiras Geologic Formation and is similar to the *cerrado* vegetation but with plant species typical of sandy, coastal areas (Rizzini 1997).

Hohenbergia ramageana Mez was also found in the *tabuleiro* habitat near the Pitimbu River, but epiphytism was observed only in specimens of *Aechmea lingulata*. The authors remark that *A. lingulata* was found epiphytic only on *Pilosocereus*, despite the availability of other possible host plants or phorophytes in the area. Epiphytism on columnar cactus has also been

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reported in the genus *Tillandsia*, e.g., *T. birta* W. Till & L. Hromadnik at 2600 m elevation in Cochabamba, Bolivia (FCBS 2004).

In eastern Rio Grande do Norte State, the occurrence of bromeliad epiphytism in general was absent in the restinga areas surveyed and very rare in the Natal Dune State Park (Natal municipality), where a significant remnant of the Mata Atlantica rainforest is preserved. In the latter case, the only epiphytic bromeliad was also *Aechmea lingulata*.

The authors consider this unique case of bromeliad epiphytism on columnar cactus another example of the ecological versatility of *Aechmea lingulata* in Brazil, where this species is also considered polymorphic, showing different foliage architecture according to the habitat it colonizes, be it the Mata Atlantica rainforest, coastal *restinga*, xeric *caatinga* and *tabuleiro* woodlands and even mangrove areas near restinga habitats (Leme and Marigo 1993).

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Photograph by Roberto Lima Santos.

Figure 53. *Aechmea lingulata* growing epiphytically on the columnar cactus *Pilosocereus* sp. in *tabuleiro* woodland near the Pitimbu River (Natal municipality), NE- Brazil. Note terrestrial specimens of *A. lingulata* growing near the cactus.

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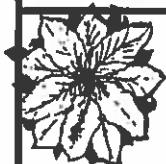
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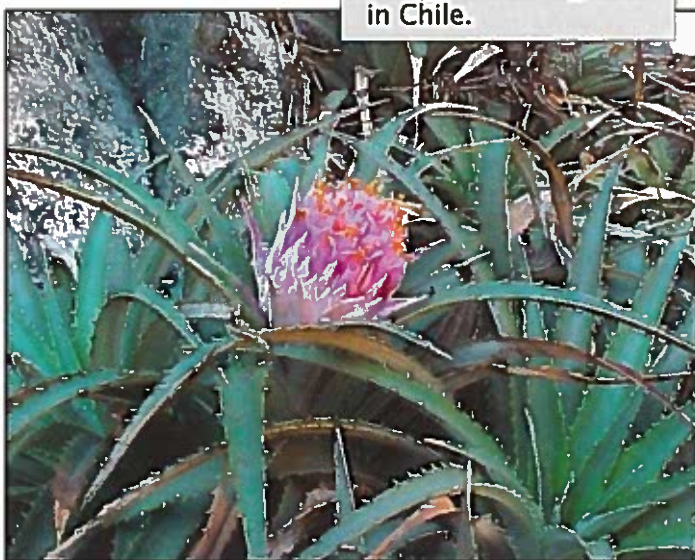
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Photograph by Len Colgan.

Figure 54. *Puya mollis*, near Quime. See in this issue for the full article by Len Colgan on exploring for bromeliads in Bolivia.

Figure 55. *Ochagavia litoralis*. Although the inner leaves of a flowering rosette are not as brightly coloured as in *Fascicularia bicolor*, the flowering plants are very attractive due to the rose sepals and the densely scaly, whitish-rose outer bracts. Note the clearly exserted stamens. See in this issue for the full article by Georg Zizka and Patricio Novoa on the genus *Ochagavia* in Chile.



Photograph by Patricio Novoa.