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Cover photographs. Front: *Aechmea dealbata*, from Brazil, is flocked with snow and replete with bright ornaments. Photograph by Phil Nelson from a plant cultivated at the Marie Selby Botanical Gardens. Back: Harry Luther provides information on another misnamed bromeliad, *Aechmea candida*. Photograph by Vern Sawyer.

FEATURE ARTICLES

BROMELIAD SOCIETY BUSINESS AND NEWS

SPECIAL WORLD BROMELIAD CONFERENCE SECTION

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Exploration for Parasitoids of Bromeliad Weevils in Mesoamerica

Ronald D. Cave[1], J. Howard Frank[2], Barbra C. Larson[2] and Michael Owen[3]
Photographs by the Authors

Intensive efforts have been made to find one or more parasitoids[4] of the Mexican bromeliad weevil, *Metamasius callizona* (Chevrolat), since its detection in Florida in 1989. This neotropical weevil is destroying populations of native bromeliads in Florida. *Tillandsia utriculata* L. and *T. fasciculata* Sw., once ubiquitous throughout the southern half of the state, are now officially listed as endangered (Florida Administrative Code 2000). The larva of this pest bores into the meristematic tissue of the plant or into the flower spike, eventually killing the plant. The history of this pest's invasion in Florida and detailed descriptions of its life cycle and the damage it causes are discussed by Frank and Thomas (1991, 1994).

At this time there is only a single species of parasitoid known to attack weevils in bromeliads. An undescribed species of parasitic fly in the genus *Lixophaga* (Diptera: Tachinidae) was discovered in Honduras in 1993 (Cave 1997 as *Admontia*). Living in cool, moist high elevation cloud forests, this natural enemy parasitizes up to 60% of the larvae of *Metamasius quadrilineatus* Champion which bore into the stems of several species of bromeliads (Alvarez del Hierro and Cave 1999). Numerous attempts have been made, and continue to be made, to establish a laboratory colony of the fly. However, success has been difficult due to the very precise conditions the adults require for mating and locating and parasitizing hosts; these conditions have yet to be determined.

Due to the difficult nature of reproducing *Lixophaga* n. sp. in the laboratory and that the fly originates from an ecosystem with environmental parameters very different from those found in south Florida, the search for other parasitoids of bromeliad weevils continues. Frank and Thomas (1994) surveyed the states of Veracruz and Oaxaca in Mexico in 1992 but obtained no parasitoids. Nor did exploration in Panama in 1994 by J.H. Frank yield any parasitoids. In this article we describe the recent exploratory trips made to Guatemala, Belize and Mexico (FIGURE 1) in the search for additional parasitoids of bromeliad weevils.

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[4] A **parasitoid** is an organism in which only the larval stage lives parasitically in or on the host, is often only slightly smaller than the host and, unlike a predator, uses only a single host during its development and, unlike a parasite, always kills the host. Most parasitoids are wasps and flies.

GUATEMALA (by BCL)

Vaurie (1966) cites one record of *Metamasius callizona* from Guatemala, collected in San Juan, Alta Verapaz, and one record of *M. quadrilineatus*, collected in Purulhá, Baja Verapaz. The arthropod collection of the Universidad del Valle de Guatemala in August; (UVG) contains three specimens of *Metamasius*: 1) collected in Senajú, Baja Verapaz the immediate west., 2) collected in San Antonio, Izabal in August; and 3) collected in Sierra Caral, Izabal in July. Based on this information, I traveled to Guatemala from June 19 to August 11, 2000.

Figure 1. Location of bromeliad weevil exploration sites (black squares) in Mexico (site names are given), Guatemala and Belize.

My search focused on the department of Alta Verapaz, where sufficient bromeliad populations were most likely to be found, according to earlier records and suggestions from biologists at UVG. The search was concentrated around Cobán and included the mountains immediately surrounding the city and villages to the south and east. Searches were also conducted in 18 other localities in the departments of Alta Verapaz and Baja Verapaz (TABLE 1).

In all locations searched, local guides were contracted to point out known bromeliad populations and assist with the searching. Pine or mixed pine-oak forests were the predominant habitats, and bromeliad populations were generally healthy in all searched areas (FIGURE 2). In several cases, we arrived at areas where guides had remembered large bromeliad populations, only to find them eliminated by recent deforestation. Habitat destruction is a major threat to Guatemala's bromeliads. A lesser threat is harvesting of bromeliads from native habitats. Approximately 75 flowering bromeliads being sold by roadside vendors in Purulhá were examined on several dates in July and early August, none of which showed any signs of weevil damage. The plants had been collected in the mountains to the immediate west.

Figure 2. Bromeliads in the mountains around Cobán.

In each location visited, forests with bromeliad populations were hiked while the ground was searched for fallen bromeliads. Since so few fallen plants were found, bromeliads in trees were inspected for damage as well. An estimated 2,500 plants were examined during 7 weeks. Approximately 2% of examined bromeliads had weevils present. There were few plants with weevil damage that did not contain weevils (8 in total). A total of 56 bromeliad weevil larvae, 4 eggs and 3 adults were collected, most of them in and around Cobán (TABLE 1). Weevil larvae were collected and reared in individual rearing cups. Larger larvae were reared on pineapple fruit and on a commercially available artificial black vine weevil diet (BioServ, Inc., Frenchtown, NJ), while smaller larvae were reared on small plants of *Tillandsia* spp. and *Catopsis* spp. Surviving larvae were brought to the quarantine facility at the Florida Department of Agriculture and Consumer Services, Division of Plant Industry in Gainesville for continued rearing.

Figure 3. *Tillandsia guatemalensis* in the mountains on the south side of Cobán.

Metamasius callizona was not found at any of the locations, but three other species of bromeliad weevils were confirmed: *M. dimidiatipennis* Jekel (larva collected in Cobán); *M. rugipectus* Champion (adult collected in *Tillandsia guatemalensis* Smith in Chiritsaj); and *M. quadrilineatus* (2 adults collected in Cobán, 7 reared to adult from larvae collected July 21 in Cubil, 3 reared to adult from larvae collected July 7 in Vuelta del Triunfo). *Metamasius rugipectus* has not been previously recorded from Guatemala.

Weevils were most commonly found in *Tillandsia guatemalensis* (FIGURE 3). Other species in which weevils were found included *Catopsis hahnii* Baker, *C. wangerinii* Mez and Wercklé, *T. multicaulis* Steudel, *T. polita* L.B.

Smith, *T. brevifolia* Mez and Wercklé, and *C. morreniana* Mez (identified by staff of the Herbarium of UVG). Bromeliads examined but in which no damage or weevils were found included *Werauhia werckleana* Mez (J.R. Grant), *Tillandsia lampropoda* L.B. Smith, and *Tillandsia lucida* E. Morren ex Baker.

From a weevil larva collected July 7 from *Catopsis hahnii* in a pine forest approximately 5 km south of Cobán (on a hillside locally named Vuelta del Triunfo) emerged 5 puparia of a tachinid fly on July 17, from which adults emerged August 6. The adult specimens were later identified as the same undescribed *Lixophaga* species previously found in Honduras (the current potential biological control agent for Florida [Cave 1997]).

No other natural enemies were found, and weevil populations were low. Searching at other times of the year might produce more weevils and natural enemies. Although the dry season is not as pronounced in the Cobán area as in other parts of the country, the end of the rainy season (fall months) would probably be the best time. Other areas that could have bromeliad weevil populations include Sierra de las Minas (a protected area covering the southeastern part of the department of Alta Verapaz, the northern part of the department of Zacapa, and the western part of the department of Izabal) and the eastern part of Izabal, including Cerro San Gil and areas near the Honduran border. The lack of concentrated bromeliad populations outside of protected areas, largely due to extensive deforestation, makes finding a natural enemy of *Metamasius callizona* in Guatemala increasingly difficult.

BELIZE (by RDC)

Julio Torres, a field assistant from the Panamerican School of Agriculture in Honduras, and I spent the last 4 days of October and the first 4 days of November 2002 visiting 6 sites in the Cayo Department of western Belize (TABLE 1). We first obtained a collecting permit from the Department of Forestry, Conservation Division in Belmopan. Afterwards we then proceeded to Central Farm where we met with Orlando Sosa of the Belize Agricultural Health Authority (BAHA), who told us there are many bromeliads in the Mountain Pine Ridge. Since it was already late afternoon, we explored 16 km of road stretching south of Georgeville, towards the Mountain Pine Ridge, but saw no bromeliads in the trees. While going to San Ignacio to locate a hotel, we saw five large trees along a pasture fencerow near Sta. Elena (17°10.95'N, 89°01.52'W). The trees held several *Tillandsia* which we examined; we found one large weevil larva in *T. utriculata*.

On October 29, Julio and I traveled to the Mountain Pine Ridge to explore. The area is an extensive pine forest severely damaged by the southern pine beetle, *Dendroctonus frontalis* Zimmermann. Other than dead pines, the vegetation was mostly small oaks, miscellaneous shrubs and grass. We traveled south and southeast on the Cooma Cairn Road, where we observed a few small bromeliads, but found no larvae. Forty-seven km south

TABLE 1. Sites in Guatemala, Belize, and Mexico that were searched for bromeliad-feeding weevils in 2000 and 2002 and weevil numbers and stages taken from each site.

LOCALITY	ELEVATION (m)	DATE(S)	No. WEEVILS COLLECTED
GUATEMALA (2002)			
Purulhá	2007	July 4-5, 9, Aug. 2-5	3 larvae
Cobán	1327	July 6,10, 27, Aug. 10	1 egg, 3 larvae, 2 adults
Vuelta del Triunfo, Cobán	1325	July 7-8, July 25	5 larvae
Chiripec	600	July 11-12	0
Rio Sachichá, 25 km N of Cobán	900	July 12	1 larva
Tamahú	1407	July 13	0
Tucurú	461	July 13	0
La Tinta	85	July 13	0
Chiritsaj	1250	July 14	3 eggs, 13 larvae, 1 adult
San Pedro Carchá	1274	July 15	14 larvae
Cubil	500	July 17-18, 21, Aug. 8	10 larvae
San Juan Chamelco	1389	July 19, 26, Aug. 9	2 larvae
Finca Arragón, Cobán	1300	July 20	1 larva
Montaña Tres Puntos, Cobán	1250	July 24	0
Santa Cruz	1800	July 27	0
Tactíc	2162	July 28	0
Lanquín	591	July 29-31	0
Río Cahabón, Semuc Champey	700	Aug. 1	2 larvae
Las Pacayas	1312	Aug. 6	0
San Cristóbal Verapaz	1460	Aug. 6-7	2 larvae
TOTAL			**4 eggs, 56 larvae, 3 adults**
BELIZE (2002)			
Santa Elena	72	Oct. 28, 30	1 larva
Cooma Cairn Rd., Mtn. Pine Ridge	700-820	Oct. 29, 31	69 larvae, 1 pupa, 1 adult
Chaa Creek	100	Oct. 30	0
Chiquibul Rd., Mtn. Pine Ridge	700-800	Nov. 1	16 larvae
Macal River, Chiquibul Forest	425	Nov. 1, 3-4	92 larvae
Las Cuevas Research Station	590	Nov. 2	1 larva
TOTAL			**179 larvae, 1 pupa, 1 adult**
MEXICO (2000)			
Oluta-Texistepec	400	Oct. 14	0
Uxpanapa	600	Oct. 14	0
Reserva Ecológica La Mancha	5	Oct. 16	3 larvae, 1 adult
Reserva Rancho Santa Gertrudis	400-600	Oct. 21-22	0
El Deseo near Las Trancas	1,122	Oct. 24-26	2 larvae, 2 pupae, 2 adults
Rancho Loma Iguana	50	Oct. 27	2 larvae, 4 adults
TOTAL			**7 larvae, 2 pupae, 7 adults**

of Georgeville I took a picture of a flowering *Tillandsia streptophylla* Scheid. on a pine (FIGURE 4), after which Julio opened the plant and discovered a weevil larva inside. A few cm above this plant, on the same pine, was a *T. bulbosa* Hooker (FIGURE 5), which also contained a weevil larva. During the remaining daylight hours we searched along this road (from 16°55.85'N, 88°53.65'W to 16°59.08'N, 88°51.68'W), collecting additional weevil larvae and 1 pupa from approximately 120 plants of both species of *Tillandsia*. Also encountered was a single adult *Metamasius flavopictus* (Champion) in *T. streptophylla*. We returned to the Cooma Cairn Road 2 days later and collected more weevil larvae. Ants were in many of the bromeliads. I did see two fly puparia in one damaged plant, but the adult flies had already emerged.

Figure 4. *Tillandsia streptophylla* in the Mountain Pine Ridge, Belize.

Figure 5. *Tillandsia bulbosa* in the Mountain Pine Ridge, Belize.

The next day we returned to the Sta. Elena area and found 5-6 species of bromeliads in large, isolated legume trees located in pastures. Lying on the ground under the trees were many fallen bromeliads and these were examined. Several bromeliads in the trees were reachable and these also were examined. We saw one plant with damage, but no weevil larvae. In the afternoon we went on to Chaa Creek Macal River Camp (17°07.12'N 89°04.55'W) and spent the afternoon hunting for bromeliads in the lush tropical jungle near this lodge. We examined 10-12 plants, including the very large *Aechmea bracteata* (Sw.) Griseb. (FIGURE 10, p. 262), but none showed damage or contained weevil larvae.

On November 1 we traveled the Chiquibul Road, south through the western side of the Mountain Pine Ridge towards the Chiquibul forest. At several stops along this road (from 17°00.18'N 88°58.27'W to 16°52.90'N, 89°00.87'w), we examined individuals of *Tillandsia*, some of which contained weevil larvae. Late in the afternoon on the north side of the Macal River we came upon an oak forest (16°52.10'N, 89°02.50'W) with an extensive population of *T. bulbosa* and few numbers of other bromeliad species. We collected 9 weevil larvae before nightfall obligated us to continue on to the Las Cuevas Research Station (LCRS), which is owned and operated by The Natural History Museum (London, UK).

At the LCRS (16°43.98'N, 88°59.17'W) in the Chiquibul Forest the following day, we walked along two trails in the lush tropical forest, examining small bromeliads and very large *Aechmea bracteata*. I found a single larva in a *Tillandsia festucoides* Brongn. ex Mez (FIGURE 11, p. 263). There were hundreds of individuals of this species 50-70 m up in the trees but we could not get at them; very few were on the ground.

During the next two days we returned to the oak forest next to the Macal River and collected many more weevil larvae. Nearly all larvae collected at this site were taken from *Tillandsia bulbosa*, although there were 4 or 5 other bromeliad species in this area, including *T. utriculata*.

Overall, 179 weevil larvae, 1 pupa and 1 adult were collected (TABLE 1) in four habitats: pastureland (1 larva), open pine forest (85 larvae), oak forest (92 larvae) and rain forest (1 larva). As the larvae were collected they were placed in small plastic cups containing artificial black vine weevil diet and kept in an ice chest with ice. On November 5, Julio and I obtained from the Forestry Division in Belmopan the export permit for the collected insects. We then returned to Central Farm to obtain the Phytosanitary Certificate from BAHA. The weevil larvae were taken to quarantine in Gainesville on November 6 where they were transferred individually to plastic deli containers (6 cm height x 10 cm top diameter, with small holes cut in the lids) containing both fresh diet and pineapple and *Tillandsia utriculata* leaves. Diet and leaves were replaced twice per week. Four adult weevils were reared

See Cave et al., continued on p. 261

Highlights of the 2003 BSI Board of Directors Meeting

Rusty Luthe[5]

Following is a summary of items discussed or action taken at the Bromeliad Society International Board of Director's meeting held at the Westin O'Hare Hotel, Rosemont, Illinois on June 14, 2003.

The meeting was called to order by the President Tom Wolfe at 9:05 a.m. The President recognized Rei Irizarry and Wally Fox as visitors to the meeting. The following board members were in attendance:

Michael Andreas - Florida
John Atlee - Membership Secretary
Terrie Bert - Florida
Joyce Brehm - Nominations Chair
Greg Brown - Western Region
Ed Doherty - Treasurer
Martha Goode - Central
Bruce Holst - Editor
Gloria Irizarry - Southern Region
Roger Lane - California
Rusty Luthe - Secretary
Ken Marks - Florida
David McReynolds - NE Region
Jack Percival - California
Jack Reilly - Vice President
Rick Richtmyer - Texas
Fred Ross - Louisiana
Tom Wolfe - President

Unable to attend: Luiz Felipe Carvalho - Brazil, Gary Gallick - Texas, Larry Giroux - Florida, Peter Waters - New Zealand, Geoff Lawn - Australia, Hiroyuki Takizawa - Japan.

ITEMS DISCUSSED - ACTIONS TAKEN

1. Changes to the minutes from the last BSI Board meeting held in St. Petersburg on May 14, 2002 include: Hattie Lou Smith was listed as Vice President when in fact she wasn't on the Board, so her name was removed. Also, Joyce Brehm, Nominations Chair was not nominated by the President, but was in fact elected by the Board.
2. The President extended a welcome to the new Board members, Michael Andreas, Terrie Bert, Larry Giroux, Rick Richtmyer, Geoff Lawn, David McReynolds, Greg Brown, Gloria Irizarry, Jack Percival and Roger Lane. He also mentioned Marthe Goode, Peter Waters and Louis Philippe Carvalho. He also thanked and expressed the Boards appreciation to Ed Doherty and Bruce Holst for stepping in and taking over the jobs of Treasurer and Editor respectively.
3. The President read a letter written by Susan Jarzen, assistant to Meg Lowman, CEO of Selby Botanical Gardens. This letter discussed the fundraising activity for their expansion project of Selby Gardens, which included increased space for the BSI Headquarters, space for consolidated libraries and offices to house an expanded Bromeliad research program. Further discussion followed regarding the BIC and Selby activities.

[5] BSI Secretary

4. A discussion took place on finding volunteers to work at the World Bromeliad Conference.
5. The secretary reported that there was a vote taken for the office of Membership Secretary. John Atlee was elected Secretary. There were no changes made to the By-Laws
6. The new treasurer, Ed Doherty reported that most of the accounts have been transferred to him from Don Garrison.
7. The membership secretary reported that, in response to the volume of inquiries regarding payments, a database has been set up to track membership payments, amount, and purpose. She also noted that the use of Visa/MasterCard payments for international members to directly transfer funds to the Treasurer has worked quite well as has the transfer of domestic funds.
8. The Editor explained the need for a cable Internet connection to receive and send large files such as photos and Journal layouts to the publisher. The cost of the monthly fee for a cable modem was approved. The funding for the binding of old volumes of the BSI Journal was also approved. After discussing software packages and the requirements of producing a more digital friendly Journal, up to $600 for the Editor to purchase equipment and/or software needed to produce the Journal was approved. The Editor also discussed efforts at trying to get the Journal publishing up to date. He proposed an allowance to the Editors of $600, (the already approved $500 allowance plus $100, provided the issues have been brought up to date). He also expressed the need for more articles of all types for inclusion in the Journal.
9. A discussion took place regarding the constraint of requiring officers of local societies to be members of the BSI. A motion was passed to change the wording of Standing Rule #2 1.c in the Bylaws.from 'require' to 'encourage.'
10. John Utley will be the new Conservation Committee chair. It was noted that this is a very important chair for the BSI.
11. There was discussion on how to get better participation in the registration of cultivars. The idea of having a gallery posted of plants available for naming with your choice of names for a fee was presented. The goal is to get the hybridizers involved in contributing plants and also generate some funds for the BSI. It was decided that Derek Butcher should follow up this idea in contacting the hybridizers and try to get something set up either in the Journal, the Website, the WBC, or perhaps all three options.
12. There was discussion about getting a list of certified judges by district to be ready for the Board by the Chicago WBC.
13. There was discussion regarding the importance of the auction at the WBC to raise funds for the BIC. There was also discussion about methods of funding for the Scientific Seminar speakers.

14. Greg Brown mentioned that he has received glass slides from Lyman Smith's collection. It was decided that the plates and Dr. Smith's notes should be sent to Harry Luther for evaluation and then sent to the archivist for scanning and archiving. These items have too much historical value to be auctioned off and should ultimately be placed in the archives.
15. Ken Marks, the webmaster is working on a searchable by keyword database of the 50 Year Index. Membership directory and the Binomial list are now online and password protected. A motion was passed to establish an associate membership at a cost of $15 to allow for access to the members only sections of the website, but not have the full membership privileges, e.g. the Journal and discounts for the WBC.
16. There was discussion on finding an auditor to fill the current vacancy. The Archive vacancy has a potential candidate. Joyce points out that there will be the need to fill 6 director positions in the coming year and asks the Board to help find candidates.
17. Terri Bert volunteered to take a look at the WBC conference handbook to try and organize it.
18. Joyce and Herb Plever have worked over the past year revising the Cultural manuals to include more indoor culture information along with updated/corrected information.
19. The committee to devise a system for the equitable distribution of donated publications to the BSI dissolved and was unable to make any recommendations. Discussion followed, and it was decided to ask the Publications Chair (G.Allaria) to make a list of all available donated publications for resale. This list then will be made available on the web prior to every World Bromeliad Conference and any rare books would then be sold at the rare plant auction.
20. There was discussion on how best to make the 50 Year Index available. Putting this on the BSI website as well as other content such as the Binomial list that is already available, will enhance the website for the members-only areas thus making it more appealing and useful. It was also decided that hard copies should still be produced for sale at the WBC and through BSI publications.
21. There was discussion on the need to bring the Research Grant into line with the job description defined in the Bylaws.
22. There was talk of how Derek Butcher was getting few entries into the Cultivar Registry. It was hoped that a dedicated award for Hybridizer of the Year would encourage people to register their plants. A motion was passed to establish a BSI Bromeliad Cultivar Registrar Award to be chosen by the Registrar prior to the WBC, for a trial period of one conference cycle (Chicago WBC). The President mentioned that Derek is doing an excellent job in chasing down and sorting through very confusing information to get plants registered. Many in the room echoed the praise.

23. M. Andreas showed a new format of the Cultivar Registry and pointed out the problems of continually printing updated versions. There are currently 1200 new entries added since the last printing of the document. John Atlee has volunteered to have a look at the document and determine costs of printing, binding, etc.
24. The President felt that a new committee chair for the Wally Berg Distinguished Service Award (*The Journal of the Bromeliad Society*, 51:6) would ensure the criteria for the award would be published in the Journal. Discussion followed about the specifics of the Journal announcement, and Terri Bert volunteered to work with the Editor, B. Holst, on getting the criteria published and act as curator of the nominations. The President suggested that a new Standing Rule be established with a heading 'Special Awards.' It was noted that such a change was a Bylaws change and must follow the procedure for changing the Bylaws.
25. Joyce Brehm gave a report on the BSI Cultural Manual. She pointed out the use of photos from various international shows as well as some of the original photos from the old manual. A motion was passed to print 10,000 copies of the manual.
26. A motion was passed to keep the BSI Journal cover title as is but change the logo to include 'International.'
27. A motion was passed that the logo on the BSI website home page shall be used as the official BSI color logo.
28. A motion was passed to accept the affiliation of the South East Queensland Bromeliad Society with BSI.
29. Ken Marks brought up the topic of a Virtual Bromeliad Society - domain bromeliad.org. The current owner of the domain name 'bromeliad.org' is offering the name, free of charge except for a $5 fee to register, the name to the BSI, for the use by the BSI.
30. The President stated that the Research Grant Committee and the Slide Library Committee have dropped into inaction, and that these chairs should be turned back to the Nominations Committee to find replacement candidates and the President will pursue the resignations from the current chairs. A motion was passed to nominate Terri Bert as the new Nominations Committee chair.
31. Wally Fox gave a presentation regarding the WBC schedule, as well as the various committees and the need to fill in some of the openings. Terri Bert suggested that Wally write up a synopsis of his presentation for publication purposes in local society newsletters and other venues such as orchid society meetings and newsletter. Also, there is a need for a sponsor for the International Reception. In addition, it was mentioned that it was a responsibility of the Board members to work at WBC.

BSI 2002 Financial Report

Ed Doherty[6]

INCOME	2002 Approved	2002 Actual	2003 Approved
Advertising-Journal	1,500	600	1,000
BSI Building Fund	0	100	0
Color Fund	3,000	2,074	4,000
Donations to BIC	0	21,055	2,000
Donations to BSI	1,000	821	1,000
Interest	5,000	3,349	7,000
Medallions & Ribbons	3,400	614	500
Memberships	40,000	41,962	41,000
Life Memberships	0	800	0
Prepaid Postage	6,000	614	3,400
Publications	8,000	9,883	10,000
Scientific Seminar 2002	0	1,045	0
Scientific Seminar 2004	0	140	0
Seed Fund	300	1,262	450
Slide Program	100	75	200
Deficit/Profit	0	-13,655	0
WBC 2002	50,000	67,148	0
WBC 2004	0	9,495	14,500
TOTALS	**$118,300**	**$147,383**	**$85,050**

EXPENSES	2002 Approved	2002 Actual	2003 Approved
BIC	0	13,590	12,000
Credit Card Charges	2,500	3,841	1,000
Director/BSI Mtg	400	1,333	800
Grants	2,000	3,000	2,000
Journal - Allowance	3,000	2,500	3,000
Journal Envelopes	0	0	1,500
Journal - Mail Service	9,000	9,939	13,500
Editor's Expenses	900	661	900
Journal - Printing & Photos	33,000	28,149	33,000
Judges Certification - Exp	100	403	100
Life Membership	0	2,020	1,800
Medallions & Ribbons	3,200	2,100	600
Membership - Contract	4,800	4,800	4,800
Membership - Expenses	4,000	2,401	2,500
Merrill-Lynch Charges	600	300	0
Miscellaneous	0	767	0
Nomination Committee	100	128	100
President Expense	100	0	100
Publications	5,000	5,091	5,000
Publications Storage	0	231	0
Scientific Seminar 2002	0	3,838	0
Secretary Expense	100	0	100
Seed Fund	0	681	100
Slide Program200050			
Treasurer Expense	200	1,645	100
Web Site	1,500	240	500
WBC 2002	47,600	43,008	0
WBC 2004	0	15	1,000
California Sales Tax	0	246	500
Florida Sales Tax / Illinois	0	7,992	0
FWCBS / BSGC	0	8,466	0
TOTALS	**$118,300**	**$147,383**	**$85,050**

Moving?

If your address is changing, even if your move is a temporary or seasonal one, you should notify the BSI Membership Secretary four to six weeks in advance. Even when you are temporarily away, your bulk mail is either discarded by the Post Office or, as in the case of your JOURNAL issue, is returned to us at a postage due cost of .99 cents within the USA.

If you are moving, or have recently moved, please send your name, the old and new addresses, and the effective date to: John Atlee, BSI Membership Secretary, 1608 Cardenas Dr. NE, Albuquerque, NM 87110 or by e-mail to membership@bsi.org.

Bromeliads as a Keystone Resource for the Scorpion *Tityus neglectus* in Eastern Rio Grande Do Norte State, Brazil

Roberto Lima Santos[7], Maria das Graças Almeida[1], José Valmar Nunes[1], Leonardo David de Souza Tinoco[8], and Luciano Barreto Martins[2]

In eastern Rio Grande do Norte State, the scorpions *Bothriurus asper* Pocock 1893 (Bothriuridae) and *Tityus neglectus* Mello-Leit„o 1932 (Buthidae; FIGURE 6) have been recorded in terrestrial bromeliads (Almeida 1997, Varela-Freire 1997). *Bothriurus asper* is usually found in leaf-litter deposits in forested areas, and its single record by Almeida (1997) may be considered accidental.

Further daytime surveys carried out by the authors in xeric, coastal *restinga* and *tabuleiro* habitats in eastern Rio Grande do Norte State, found *Tityus neglectus* only within the leaf crown of water-holding, terrestrial *Aechmea aquilega* (Salisb.) Griseb., *Aechmea lingulata* (L.) Baker (FIGURE 7) and *Hohenbergia ramageana* Mez, usually within the basal space between the outer leaf sheaths. Handling the host bromeliad did not cause the scorpion to leave its shelter. Specimens of *T. neglectus* were dislodged only when the host bromeliad was held upside down and heartily shaken. Usually only one, rarely two, adult scorpions were found in each host bromeliad.

The authors hypothesize that water-holding bromeliads, by providing an exclusive daytime shelter for *Tityus neglectus*, represent a keystone resource for the conservation of this species. The keystone role of phytotelm bromeliads as hunting ground, nursery area and shelter against predation and dessication has also been proposed for the tarantula *Pachistopelma rufonigrum* Pocock 1901 and the gecko *Briba brasiliana* Amaral 1935 (Santos et al. 2002, Dias and Brescovit 2003, Santos et al. 2003).

The specimens of *Tityus neglectus* show morphological characteristics such as dorso-ventral compression of prosoma, elongate metasomal segments, and slender, compressed legs, which are characteristic of lithophile scorpions, which do not burrow but seek refuge in crevices in rocks (Polis 1990). Likewise, these traits may aid specimens of *T. neglectus* move about the narrow spaces between the bromeliad leaf sheaths. Dorso-ventral compression of the body is also characteristic of other bromeliad specialists such as the crab *Metopaulias* depressus Rathbun 1896 (Grapsidae) endemic to Jamaican highlands (Rathbun 1918, Chace and Hobbs 1969, Diesel, 1989) and the tarantula *Pachistopelma rufonigrum* (Theraphosidae) (Dias et al. 2000, Santos et al. 2002, Dias and Brescovit, 2003).

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The authors consider that the conservation of *Tityus neglectus* depends thus on the preservation of wild populations of water-holding or phytotelm bromeliads, which are threatened by habitat destruction and fragmentation caused by urban encroachment and indiscriminate collection of wild bromeliad specimens (Ara˙jo and Lacerda 1987, Leme and Marigo 1993, Souza and Couto 2001, Rocha et al. 2003). Collecting terrestrial bromeliads in their native habitat and bringing them into home gardens may also account for envenoming cases assigned to *T. neglectus* in urban areas in northeastern Brazil (Lira da Silva et al. 1997, Lima 2003).

Although the number of envenoming cases caused to *Tityus neglectus* in eastern Rio Grande do Norte state for the period 2001-2002 was negligible (only 0.08% of the total scorpion envenoming cases reported, compared to 99.92% cases assigned to *Tityus stigmurus* (Thorell 1876)), at least one case of *T. neglectus* envenoming involving a child required intensive medical care for 12 hours (Lima 2003). It is thus advisable, both for the sake of wildlife conservation and public health, that tank bromeliads should not be collected in the wild and used in landscaping.

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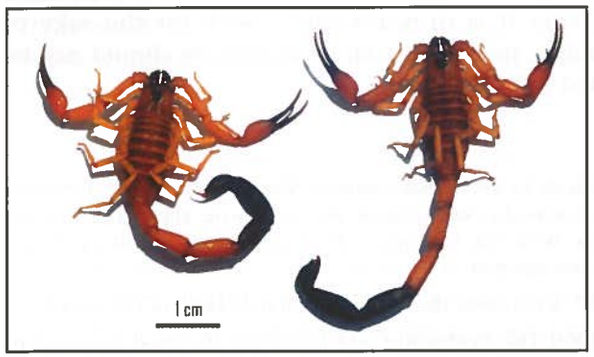

Figure 6. Adult specimens of *Tityus neglectus* collected in *Aechmea aquilega* in Pitangui restinga. Note the elongate metasoma and dark metasomal segments typical of this species.

Figure 7. The bromeliad *Aechmea lingulata*, common in fragments of coastal tabuleiro vegetation near the Pitimbu river (Natal municipality), is a typical habitat of *Tityus neglectus*.

My Life With Bromeliads

Ana Rousse[9] **Photographs by the Author**

I have known the joy of bromeliads most of my life, even in times of sorrow. These special plants have remained eternal companions since my youth. We used to spend vacations in a colonial hacienda on my father's coffee plantation, high on a mountain of Uria, Miranda, facing the Caribbean Sea. The big trees had strange plants that hung like ornaments in clusters from the trunks. These were aechmeas and hohenbergias. Later, I collected and grew small tillandsias such as *Tillandsia flexuosa*, *T. bulbosa*, and *T. usneoides* together with small orchids from the Avila Mountain, north of Caracas.

In 1962, during my postgraduate year in Europe, I visited Kew Gardens and the botanical gardens of Copenhagen and Amsterdam. The greenhouses were full of bromeliads and orchids, among other tropical plants. At that time, 40 years ago, I became involved in bromeliads forever.

Figure 8. Ana's bromeliad garden in Venezuela.

Figure 9. The result of Ana Rousse's cross between *Alcantarea regina* and *A. imperialis*.

[9] Caracas, Venezuela

My collection started in La Trinidad near the capital with imported plants from Belgium and Holland, such as *Neoregelia* 'Tricolor Perfecta,' *Neoregelia marmorata*, *Vriesea X poelmanii*, *Ananas bracteatus* "variegated" and many others. My garden is located on a steep hill, and its five roads lined with tree ferns are adorned by bromeliads. Bromeliads are also attached to other trees, planted in the soil, and some are placed in pots (FIGURE 8). They have thrived in the open spaces as well as in palms and on fruit trees in partial shade. It is an incredible tropical garden full of color enhanced by heliconias, gingers, cordylines, strelitzias, and scented vines. The garden is splashed with butterflies, birds, bees, and bats all the year-round.

South of the Orinoco River in the Amazon basin, we collected pepinias such as *P. breweri* in the crevices of Iron and Aluminum Mountains in Pijiguaos, Bolivar We found guzmanias and vrieseas in deep forest on the slopes of Waramasan Tepui, close to the west border with Brazil and many xerophytic species from the littoral region of Venezuela such as *Bromelia pinguin, B. chrysantha, B. goeldiana*, and *B. plumieri*.

Almost fifteen years ago I became a member of the BSI and Cryptanthus Society, attending meetings in Lafayette, Louisiana; Tulsa, Oklahoma; San Diego and San Francisco, California; and Houston, Texas, among others. About 8 years ago, I worked as a volunteer in the herbarium at the Marie Selby Botanical Gardens in Sarasota, Florida, working on photographing their type specimens.

My publications include the book *Bromelias - Manual Práctico de Cultivo*; Editor, Tropykos, 1993, which was dedicated to students and growers, as well as many articles in the Journals of the Bromeliad Society and the Cryptanthus Society. I have given lectures for local bromeliad societies, some of which I was a founding member, and have also judged in their shows. At last I became an International Judge for the BSI in 1998. My hobbies also include photography, botanical printing and pressing, and growing small cryptanthus.

Through years of work and contemplation, I have learned to appreciate my silent bromeliad family, composed of thousands of plants of species and hybrids of multiple genera. I especially remember a cross I did between *Alcantarea regina* and *A. imperialis* ten years ago (FIGURE 9). They produced a grex of more than 30 huge plants standing like solitary giants waiting to flourish.

Growing bromeliads has also been a family affair that has lasted a lifetime and has brought our generations together. My parents were, and my son and daughter are, bromelholics too. I can highly recommend a life with bromeliads for all people, because it helps to relieve stress and makes living so much more pleasant.

Acknowledgements

I thank my son, Pierre Rousse and my grandson, Eduardo Moreno for suggesting corrections.

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from the 179 larvae collected: one *Metamasius sellatus* Champion taken from T. bulbosa at the junction of Chiquibul Road and Anderson Road in the Mountain Pine Ridge and a specimen each of *M. sellatus*, *M. flavopictus* (FIGURE 12) and *M. nudiventris* Champion taken from *T. bulbosa* at the oak forest on the north side of the Macal River. To our dismay, no parasitism was detected in the weevil larvae.

MEXICO (by JHF and MO)

The extent of the range of *Metamasius callizona* in southern Mexico is unknown. It exists at least in the states of Veracruz and Oaxaca, but likely occurs almost throughout southern Mexico (a very large land area), or at least where suitable host plants occur abundantly. Abundant populations of *Tillandsia* spp. must, of course, be restricted to wooded areas, but not all wooded areas are equal. Some are protected reserves, for which collecting permits are necessary. A Federal Mexican permit allowing collection of the weevils was obtained before the visit. Additional time and expense was required in country to obtain a Federal Mexican permit to export collected weevils from Mexico. Acting on suggestions and invitations from Mexican botanists to narrow the search, six sites (TABLE 1) were visited by JHF and MO, accompanied by Hector Cabrera, a Mexican entomologist.

Oluta - Texistepec area, southeast of Acayucan (Veracruz) 17°51.18'N, 94°51.49'W - Guided by a local agricultural extension agent, we saw a few bromeliads on shade trees at edges of pastures, and an occasional fallen tree with bromeliads, but we found few fallen bromeliads, and no weevil larvae.

Vicinity of Uxpanapa (Veracruz) 17°16.53'N, 94°30.35'W - A road runs northeast from Boca del Monte to Cuauhtémoc in the state of Oaxaca, then becomes unpaved and runs onward, crossing the river Chalchijapa and the state border, and continuing into the southern extreme of the state of Veracruz. We were told that the area was primary forest until fairly recently, and that we might expect to find good populations of epiphytic bromeliads. What we found, however, was that bromeliad populations were low, except for cultivated bromeliads in a few locations. These cultivated bromeliads are *Aechmea magdalenae* André (variously called locally "ixtle", "pita", "cardón" or "piñuelo" or even "maguey" [not to be confused with an agave species which also is called maguey but is grown in areas of low rainfall]) and their longest leaves (spiny and over 2 m long) are harvested. From the leaves is extracted a fine fiber used for making fishing nets, belts, and parts of saddles. We examined hundreds of these plants, but the only unhealthy ones seemed to have a fungal infection of the leaves. These plants are grown in deep shade provided by rubber (*Hevea brasiliensis* Willd. ex A. Juss.) trees. We found no evidence of *Metamasius callizona*.

Figure 10. The senior author next to *Aechmea bracteata*, Chaa Creek Macal River Camp, Belize

Reserva Ecológica La Mancha (Veracruz) 19°35.45'N, 96°22.82'W - This coastal reserve is owned by the Instituto de Ecología (a Mexican Federal research institute near the city of Xalapa), which gave us permission to visit and collect weevils in it. It is not a large land area, but includes mangrove swamp and coastal dunes, part of the latter vegetated with hardwood trees and bushes which provide anchorage for 3 *Tillandsia* species: *T. paucifolia* Baker and *T. concolor* L.B. Smith [which produced *Metamasius callizona* adults or larvae (TABLE 1)] and *T. ionantha* Planchon (which did not do so). The area occupied by these fallen bromeliads was little more than about 300 m². Once we had searched the fallen bromeliads of this small area, there was no other suitable habitat to check.

Vicinity of Isla (Veracruz), **Loma Bonita and San Bartolo** (Oaxaca) 18°00.83'N, 96°53.36'W - A field day at the INIFAP research station at Papaloapan gave the opportunity to talk with pineapple growers, the major agricultural industry in the area. *Metamasius callizona*, locally called "picudo negro", is an occasional pest of pineapple. Outbreaks of damage seem to be restricted to the vicinity of woodland edges and are typically dealt with by application of harsh chemical pesticides. Three growers admitted to problems with this insect in the past few years, and they invited visits. Unfortunately, the pineapple fields we were shown were devoid of the pest, and searches of adjacent woodland showed evidence of very few epiphytic bromeliads, none of them (fallen, or that we could reach) with weevils.

Figure 11. *Tillandsia festucoides*, Chiquibul Forest, Belize, from which a single bromeliad-eating weevil was taken

Figure 12. Adult *Metamasius flavopictus* reared from larva collected from *Tillandsia bulbosa* in Belize. Photo by J. Lotz, Florida Department of Agriculture and Consumer Services, Division of Plant Industry

Reserva Rancho Santa Gertrudis (Veracruz) 19°50.54'N, 96°34.78'W - This ecological reserve is at the head of a valley in the hills west of the village of Santander. It is owned by the Vega family and designated as a reserve in Mexican Federal archives. It has been the site of faunal and floristic studies (*e.g.* birds, trees) by students and faculty of Mexican universities. Once part of a working ranch (this part at one time grew coffee), it is heavily wooded. We hired a guide to show us the trails, explaining to him that we wanted to find epiphytic bromeliads (locally called "tenchos"), especially fallen ones. Unfortunately, we found epiphytic bromeliad populations to be very sparse. We were shown two small patches of *Aechmea magdalenae*, one in the reserve and one in part of the working ranch, but no evidence of infestation by weevils, either in those plants or in a few fallen epiphytic bromeliads along miles of trails in the hills.

Coffee plantations at El Deseo near Las Trancas in the vicinity of Coatepec (Veracruz) 19°27.03'N, 96°53.15'W - This location was the highest in elevation of those investigated. Coffee trees occupy many thousands of acres and are grown under the shade of large, native hardwood trees which support populations of epiphytic bromeliads, mainly *Tillandsia* but including relatively few *Catopsis* and *Aechmea*. Not all of the epiphytic bromeliads there are suitable for development of *Metamasius callizona* - many are too small: either they belong to species that do not grow large enough, or they are individuals (of otherwise suitable species) that have not yet grown large enough. Among the bromeliad species that can and have grown large enough, all are not equal: the species producing broader leaves (especially *T. limbata* Schlecht., *T. multicaulis, T. lucida,* and *T. utriculata*) are more infested by weevil larvae than the narrower-leaved species such as *Tillandsia juncea* (Lopez & Pavón) Poiret, *Tillandsia punctulata* Schlecht. & Cham. and *T. fasciculata*). We collected dead and live adult, pupal and larval *M. callizona* during two days of search (TABLE 1). It is evident that *M. callizona* is present, but it occurs at such low densities that a small army of people would be necessary, dispersed over thousands of acres, to make a collection of hundreds of *M. callizona* larvae in any reasonable period of time. We spent a few hours farther west, searching in coffee plantations between the towns of Coatepec and Xico, with no useful result.

Rancho Loma Iguana (Veracruz) 19°14.89'N, 96°18.63'W - This working ranch to the southwest of the town of La Antigua has some wooded areas, especially along the banks of a creek. It is owned by the Rebolledo family. Larval and adult *Metamasius callizona* were found (TABLE 1) in *Tillandsia concolor* on a fallen tree. No other weevil specimens were found with further searching. Evidently, the weevil occurs on this ranch, but apparently not in high numbers.

We were not successful in our attempt to bring scores of *Metamasius callizona* larvae from Mexico. The 7 larvae, 2 pupae and 7 adult weevils we found (TABLE 1) were *M. callizona*, and none produced parasitoids. We added a few sites to the known range of *M. callizona*. Despite our initial attempt to save time by using the knowledge of Mexican botanists to find areas with lots of fallen epiphytic bromeliads and *M. callizona*, none of them identified such a place. Of course, none of them has been concerned with *M. callizona*. Botanist José García (Instituto de Ecología) told us that we might find denser bromeliad populations at much higher elevations than the site at El Deseo, but we did not wish to explore at high elevations because of the climatological mismatch with Florida.

Conclusions

We were unfortunate to not find any new parasitoids of bromeliad weevils as a result of our exploration. Overall, our exploration harvested 4 eggs, 242 larvae and 3 pupae representing 6 species of *Metamasius* collected from at least 14 bromeliad species. Rearing of larvae on an artificial diet led to high rates of mortality in the laboratory, possibly killing any individuals stressed by parasitism. Exploration continues to be carried out in Mexico, but in the meantime we are also setting our sights on exploring lowland areas of South America, such as Bolivia and Paraguay.

Acknowledgements

We thank Charles O'Brien for identifying the weevil specimens from Guatemala and Belize; Monty Wood for identifying the tachinid fly from Guatemala; Ana Lu de MacVean for identifying bromeliad species from Guatemala; Enio Cano for help in obtaining collection and export permits from Guatemala; Jack Schuster and Michael and Margaret Dix for providing advice on searching and information from the arthropod collection of the Universidad del Valle de Guatemala; Oscar and Fredy Archila of Cobán for identifying bromeliads in the area; F.E. Vasquez for field assistance in Guatemala; and several people in the state of Veracruz, Mexico, especially the Vega and Rebolledo families of Rancho Santa Gertrudis and Rancho Loma Iguana, and the Cabrera family of Veracruz city. We gratefully express our appreciation to the Florida Council of Bromeliad Societies for partially financing BCL's trip to Guatemala and to the Florida Park Service (contract #RP-509) for financing JHF's trip to Mexico and RDC's trip to Belize. This paper was approved for publication as Florida Agricultural Experiment Station Journal Series No. R-09975.

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Costa Rica, the Cradle of a New Pineapple.

Gaby Teufel-Kyriss[10] **Photographs by the Author**

Reprinted with permission from the Tico Times January 9, 2004

Chester Skotak aims to revolutionize the pineapple world! Not pleased with the look of the current pineapple, the Costa Rican bromeliad expert started hybridizing a new variety ten years ago.

"What I really want to change is the aesthetic appearance of this fruit," Skotak, a renowned specialist, says. "By the time pineapples arrive at their ultimate market they look liked they were used as bowling balls in the packing house." Originally from the United States, Skotak has lived in Costa Rica since 1978 and runs Dura Flor nursery in the Western Central Valley town of Palmares (T.T. Weekend, July 7, 2000). The 51-year-old has been working with bromeliads for more than thirty years and currently owns twenty-two patents worldwide.

The Queen of Fruit, scientifically known as *Ananas comosus*, belongs to the large, diverse family of *Bromeliaceae* - nearly all of them endemic to the New World. Skotak has traveled extensively in South America, searching for wild varieties of pineapple to work with. He eventually chose the *Ananas lucidus* variety, a plant found in Brazil, because of its beautiful colour and resistance to mealybugs and nematodes.

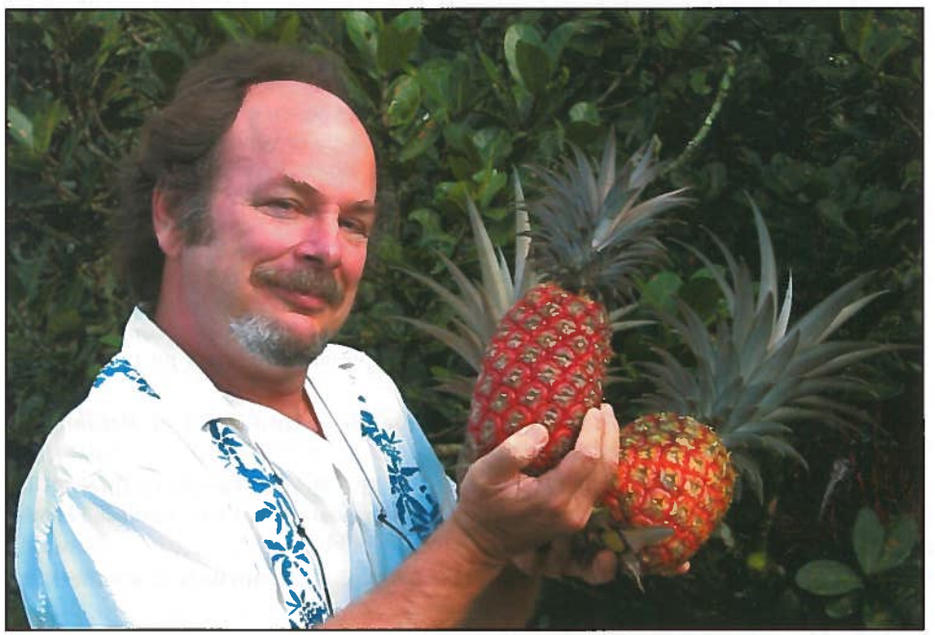

Figure 13. Chester Skotak displays the results of some of his hybridizing efforts with pineapples.

[10] P.B. 107, 4013 Atenas, Costa Rica.

"Our commercial hybrids will be radically different from the varieties seen today," Skotak stresses. "This new pineapple with its dark-leafed spineless crown is very eye appealing; its pulp is bright yellow and its skin dark, almost black-purple in colour, which turns a burgundy-red upon ripening. The fruit is high in sugar and low in acid and does not require refrigeration for transport, lowering shipping costs."

Curiosity and the need to know gave Skotak enough reason to work with *Ananas*, which by far is the most important economic plant in the bromeliad family. Because 70% of the world production and 90% of canned pineapples stem from one variety, the 'Smooth Cayenne', there is room for knowledgeable horticulturists to create hybrids with superior quality and appearance.

"Plant breeding is interesting work," Skotak explains. "We know which genes are dominant or recessive and are responsible for certain characteristics we see in our hybrids."

Pineapples suffer the never ending problems of mealybugs and nematodes, currently worked out through gene technology. Even if these methods are going to be successful, a need will always exist for new varieties better adaptable to different climates and soil types. According to this expert breeding is only a small part of the process. After the initial variety is made, numerous field tests are necessary, to check for growth habits and vulnerability to diseases.

Figure 14.
"This new pineapple with its dark-leafed spineless crown is very eye appealing; its pulp is bright yellow and its skin dark, almost black-purple in colour, which turns a burgundy-red upon ripening."

"It would be nice to have a pineapple that needs less agro-chemicals and has better qualities than the fruits currently cultivated," Skotak informs us. "Our pineapple is not ready for marketing yet, but we are getting close. We do many crosses and expect some good results by this time next year." DURA FLOR, he explains, produces at least 5000 pineapples in various hybrids for selection per year and is not associated with commercial pineapple growers, research institutions or public funding of any kind.

The international fresh pineapple market is dominated by Costa Rica, the Philippines and Ivory Coast. At present, the hybrid called 'Sun Gold' or 'Extra Sweet' - developed by Del Monte Fresh Produce Hawaii Inc. - is successfully cultivated and exported in Costa Rica. In 2003, revenues from pineapple exportation ($210 million) exceeded those from coffee ($180 million).

"The Sun Gold is a great pineapple and now overwhelming the Costa Rican market," Skotak says. "I'm fairly sure, there are not enough young plants here to fill the plantations of the new investors."

Skotak was once told by a botanist, that if he came up with a commercial hybrid of *Ananas*, it would be luck. But he knows, it is also hard work, a lot of patience and thought.

"You see," he concludes humorously, "there always seems to be more people on the dock than on the boat."

For more information, email Chester Skotak at: duraflor@racsa.co.cr

Pineapple History and Trade

In 1493, the Italian navigator in Spanish service, Christopher Columbus, discovered the pineaapple on his second trip to the New World. Apparently centuries before his arrivaal, this ultimate exotic fruit waas widely distributed and domesticated throughout the tropical lowlands of the Americas by Indians. They called the herbaceous plant ananna or "excellent fruit," highly regarded for its intense sweetness and a staple of their fests and rites. The native Americans had also developed a profound knowledge of it's agronomy, including its production cycle. In addition to the fresh fruit, they used it for the preparation of alcoholic beverages, production of fibre and medicinal purposes. Later, European sailors called it "pineapple," because of its resemblance to a pine cone — and since the great voyages of the Spanish and Portuguese during colonial times, the genus Ananas has become pantropical.

Once a symbol of friendship and a commodity for kings, the pineapple is now the third most important tropical fruit crop in the world. It is high in vitamin C and the only source of bromelian, a complex enzyme used in pharmaceutics. Major pineapple products are canned, sliced, chunks, juice and eaten fresh.

International trade is dominated by a few multinational companies that have developed the infrastructure for processing and marketing. However, five additional centuries of work by horticulturists and modern plant breeders have not added significantly to the excellent variety of pineapple types, once domesticated by the native Americans.

Chicago: A Great Bromeliad Experience

Charlie Birdsong[11]

For the past four years I have had the distinct privilege of judging the annual bromeliad show of the Chicago Bromeliad Society. They have come a very long way with their growing and grooming show plants and their show presentation. As with many societies there is a small core of dedicated workers and growers who support the show each year. The intrepid growers come from the small townships that make up the Chicago suburbs and from as far away as Southern Illinois. In addition to the annual show and monthly meetings at the Chicago Botanic Gardens they come together to exhibit and sell plants at the Chicago Navy Pier exhibition, which attracts thousands of visitors over several days. This exposure and the educational opportunities with the public are certainly important aspects of our Society's mission.

I have grown bromeliads for over 30 years and would never trade my occasional freeze or hurricane in South Louisiana for the annual conditions these growers face, such as low light, cold, snow, cold, hail, cold, and the need for artificial inside conditions from the end of September through early May. They overcome these conditions every winter to grow plants with color, symmetry and even conformation. I don't know how they do it. They have to work at it and not just let Mother Nature take over as we do in the warmer climes.

This group of enthusiastic growers has now taken on the formidable task of inviting all of us to the 2004 World Conference. I have attended and judged conventions in the past and look forward to a great time next year. There may not be any large commercial bromeliad growers in the area but there are other inviting botanical attractions such as the Chicago Botanic Garden and the Garfield Park Conservatory as well as several cactus and succulent nurseries and many well-known orchid growers.

The hospitality shown me and my fellow judges by the Chicago Bromeliad Society has been second to none. There is a hunger to learn about the plants from seed growing to having enough light to assure a bloom. These folks are anxious to show us a good time and a great "Bromeliad Experience." The commercial growers will be there with plants galore. There will be new introductions and "just gotta haves." Bring a few show plants and come looking for a really great sale and auction, as well as meeting old friends and making new ones.

The Chicago Bromeliad Society supports the BSI with memberships, Directors, and VP's. They have taken on the Conference and we need to support their efforts and be in Chicago in 2004.

See you there!

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[11] Baton Rouge, LA

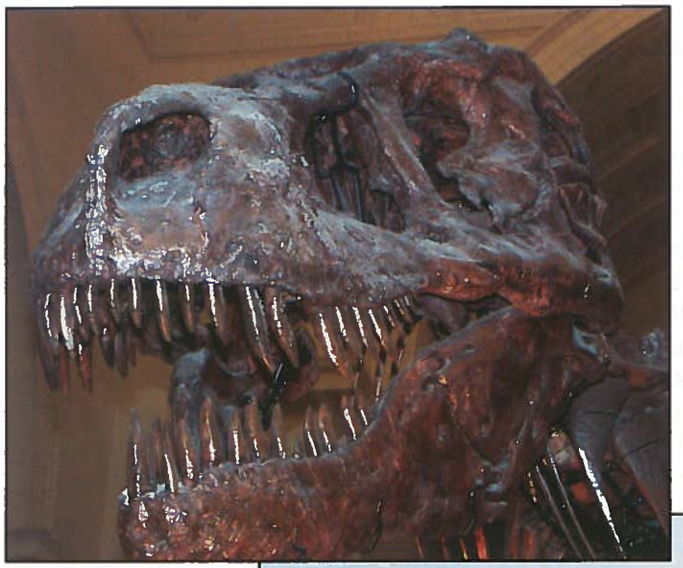


Figure 15. Sue the T. rex is one of many dinosaurs on display at the Field Museum of Natural History. The Field Museum also boasts a fascinating plant hall (look for a story about this by Ken Marks in an upcoming issue). Photograph by Bruce Holst

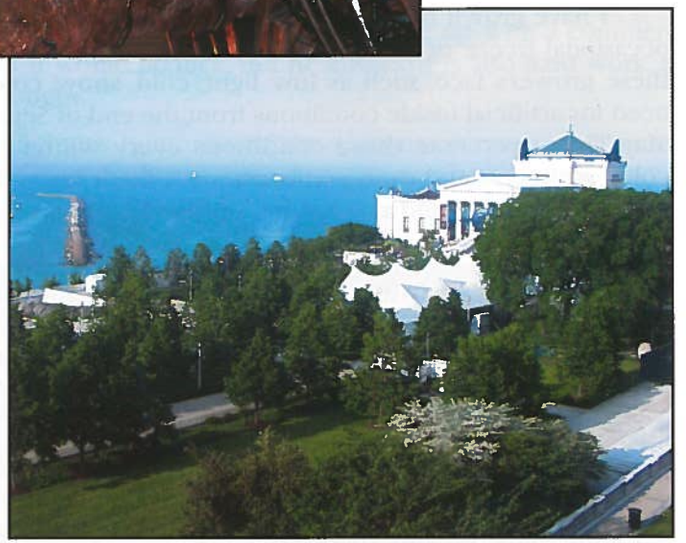


Figure 16. The Shedd Aquarium, as seen from the Botany Department floor of the Field Museum, is the largest indoor aquarium in the world. Photograph by Bruce Holst

Figure 17 & 18. The Garfield Park Conservatory houses yet more dinosaurs, as well as bromeliads. Photographs by Jack Reilly.

Register Now For the Sixteenth World Conference of The BSI in CHICAGO, Your Kind of Town!

Hosted by the BROMELIAD SOCIETY OF GREATER CHICAGO
August 10 – 15, 2004
To be held at
The Westin O'Hare
Rosemont (Chicago), Illinois

$130.00	July 1, 2003 to May 1, 2004
$155.00	After May 1, 2004 (and at the door)

Registration Rates: Add $15.00 per registrant if you are not a BSI voting member. That is if you do not currently pay dues to and receive The Journal of the Bromeliad Society. No refunds will be issued except in cases of illness or death.

Please print or type (We want to be able to reach you).

Name(s) _____

Address _____

City _____ State _____ Country _____ Zip _____

Telephone _____ FAX _____ e-mail _____

Name(s) on Badge _____

BSI Member? Yes ❑ No ❑

Your BSI Affiliate (if applicable) _____

Total Amount Due _____

Payment by Check: Make check in US Dollars payable to WBC 2004

Payment by Credit Card: Visa MasterCard (circle one)

Account Number _____ Expiration Date? _____ MM/YY

Your name as it appears on your CARD (Print) _____

Signature _____

Send to: WBC 2004 1608 Cardenas Dr. NE, Albuquerque, NM 87110. Or, register online at www.bsi.org.

World Bromeliad Conference 2004 Preliminary Schedule

Jack Reilly

Following is a glimpse at the diversity of events being held during the World Conference. See the BSI web site for more information.

Tuesday, Aug. 10

8:00AM - 5:00PM	Set Up Hospitality & Raffle
9:00AM	BSI Board Meeting
12:00PM	BSI Board Luncheon
1:00PM	BSI Board Meeting

Wednesday, Aug. 11

8:00AM-11:00AM & 1:00-5:00PM	Scientific Seminars
11:00AM	Lunch on own
8:00AM - 5:00PM	Judges School, Hospitality, Raffle, Set up Show, Entries for Show
6:00PM	Set up Sales
6:00PM - 7:30 PM	International Reception
7:30PM - 9:00PM	Harry Luther Presentation

Thursday, Aug. 12

8:00AM - 9:00AM	Judges Cont. Bkfst.
8:00AM & 1:00PM	Tours
8:00AM - 7:00PM	Set up Exhibits and Sales
8:00AM - 5:00PM	Show Judging, Hospitality, Raffle
12:00PM - 1:00PM	Judges & Registrants Luncheon
5:30PM - 9:00PM	Cash Bar
7:00PM - 9:00PM	Opening Sales Conf. Registrants

Friday, Aug. 13

8:00AM & 1:00PM	Tours
8:00AM - 5:00PM	Show, Sale, Hospitality, Raffle, Seminars
5:30PM	Cash Bar & Preview of Rare Plants
7:00PM	Rare Plant Auction

Saturday, Aug. 14

8:00AM & 1:00PM	Tours
8:00AM - 5:00PM	Show, Sale, Hospitality, Raffle
9:00AM	Seminars, Packing rm. & Dept. Agr.
1:00PM	Cash Bar, Preview Cryptanthus Auction
2:00PM	Cryptanthus Auction
5:30PM	Cash Bar, Entertainment
7:00PM	Banquet

Sunday, Aug. 15

8:00AM	Cryptanthus Board Meeting
8:00AM - 5:00PM	Show, Sale, Hospitality, Raffle
9:00AM	Seminars
10:00AM	Affiliates & Newsletter Forum
5:00PM	Show & Sales close

A Note from the Editors

Bruce Holst & Susan Murphy[12]

With this issue, we mark one year of our duties as editors. We hoped to have caught up with the schedule by this time, but have not. A hard disk crash was especially cruel during the preparation of this issue (our mantra now is: backup, backup, backup). We are not giving up, however, and will make a greater push in 2004 to bring the Journal back to the appropriate timeline. Your submissions of articles and photographs will be of great help to us in achieving that goal. Please consider sharing your bromeliad experiences with other members, whether it be providing tips on bromeliad culture, your experiences with bromeliads in the wild, experimentation and observation of bromeliads anywhere, and of course, cutting edge science if that is your interest. See the inside front cover for our contact information.

Don't forget to register for the BSI World Bromeliad Conference in Chicago, August 10-15, 2004. See in this issue for more information or visit the BSI web site (www.bsi.org).

Call For Nominations for the Office of BSI Director, 2005-2007 Term

Theresa M. Bert[13]

The regions for which vacancies occur are as follows:

Florida - 2	International - 1	Texas - 1

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 society 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; (5) agree to serve as a director if elected.

Procedure for nominating: (1) obtain the consent of the prospective nominee and verify compliance with the qualification criteria; (2) mail or e-mail nominations to the chairman of the Nominations Committee by April 15, 2004; (3) supply with each nomination the full name, address and telephone number of the nominee, the position for which the nomination is being made, the local society affiliation, and a brief biography of the nominee.

Send nominations to: Theresa M. Bert, BSI Nominations Chair, 9251 13th Ave. Cir. NW, Bradenton, FL 34209. USA. By phone: 941-795-6012 (you will need to follow up with hard copy) or by e-mail: nominations@bsi.org

[12] BSI Editors
[13] BSI Nominations Chair

50 Years Ago in the Journal....

Bromeliad Society Bulletin, Nov.-Dec. 1953 3(6): 59.

In Good Form

M.B. and R. Foster

A few days ago, in our Bromelario, a visitor from the north, as she viewed the many beautiful forms of plant growth, especially in the bromeliads, exclaimed, "How peaceful and restful are these plants, even when they are not in bloom." She looked over at the orchid plants and said, "Yes, they need flowers. But the bromeliads, no, they have beauty without a flower."

She continued, "I have never realized it before, but they are easier to live with the year 'round as house plants than the many plants whose main attraction is the bloom."

"Flowers are exciting. Our shrubbery up north has a quick, exciting flash of color in the spring, then we live with them the rest of the year with a lovely, quiet change of green. I am afraid we would tire of them if they had flowers all the time.

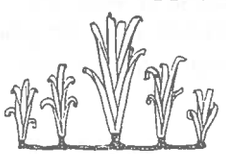
Even though a bromeliad may produce a flower of short duration, if it has beautiful form and rhythm it is desirable. One doesn't expect a Philodendron or a Sansevieria to bloom, and they are possibly the most used decorative plants on the market today. We feel that if in bromeliads there was nothing else to rave about, their form alone should give complete satisfaction to even the most critical eye. When the flowering period comes-that's just an extra dividend!

Orchids are grown almost exclusively for their flowers and are not generally grown for their decorative plant form. Bromeliads, on the other hand, are grown for their plant form and color plus their unique inflorescences which become a decorative feature of the plant, often for months.

Contemporary décor stresses simple structural form and color. A quiet, reserved beauty with individuality. Our daily life is so keyed up with the modern acivity, jet propelled and streamlined, that we need the quiet, simple forms in living greens for the more restful moments in the home.

By contrast, in the days of rococo decoration, grandma had, almost exclusively, flowering plants in her home because she didn't get around as much as grandma does today; she stayed home and therefore needed a bit more excitement and company which the flowers could give her.

In our busy modern life we require a greater percentage of plants which will give us the quietude of simple form and rhythm-as well as plants that take a minimum amount of care. Bromeliads, happily, fulfill these requirements.



In Memorium: Audrey McCrory, 1922-2003

Karen Andreas[14]

Audrey McCrory, long-time BSI member, Life Member in the Bromeliad Society of Central Florida (BSCF), and co-founder of Boggy Creek Bromeliad Nursery in Kissimmee, Florida, died on May 19, 2003.

Audrey and her husband Bill came to Florida in 1952 from Chicago. A friend gave her a bromeliad, and thus her passion for bromeliads was born. Soon afterwards, Ed and Dot McNulty told Audrey and Bill about a bromeliad society that was forming; Audrey and Bill accompanied them to their first BSCF meeting, beginning a life-long commitment to the society and to bromeliads.

Audrey and Bill started selling bromeliads at arts and crafts shows all over the Orlando area. In 1978, realizing they needed more room for their growing enterprise, they bought land in Kissimmee. Bill built the greenhouses, and they opened Boggy Creek Bromeliad Nursery. Known mainly as a nursery for collectors, they specialized in *Aechmeas* and *Neoregelias*.

Audrey was a tireless promoter of bromeliads, speaking at bromeliad societies and garden clubs everywhere. Many Boggy Creek bromeliads were donated to Cypress Gardens; Disney used Boggy Creek bromeliads in their displays and flower shows. Audrey also volunteered at Leu Gardens, Orlando, and taught bromeliad mounting classes there. She held every BSCF office except for treasurer and for years, with Dot McNulty, planned all the society's holiday parties. Audrey worked in all of BSCF's shows; Audrey was show chairman for most of the shows, until poor health limited her participation. She worked as the Entries Chairman for the BSI World Bromeliad Conference in Orlando in 1980 and was an active participant in the Florida Council of Bromeliad Societies.

Audrey and Bill's children share their parents' passion for bromeliads. Daughter Betsy took over the primary operation of Boggy Creek Bromeliads about six years ago and continued the McCrory tradition of promoting and selling bromeliads at arts and crafts shows. Son Buddy started McCrory's Sunny Hill Nursery in the 1980s with *Aechmea* seeds given to him by his parents. His children, Georgia and Evan, are familiar faces at BSCF sales and functions. Several bromeliads have been named for Audrey, including *Neoregelia* 'Audrey' and *Guzmania* 'Audrey.'

Audrey leaves behind a legacy of her love for bromeliads, her passion to promote them, and her tireless efforts at volunteering and supporting BSCF and the BSI. She will be missed.

[14] Orlando, Florida

JOURNAL OF THE BROMELIAD SOCIETY INDEX
Volume 53, 2003

Covers, (unnumbered pages) are listed as if numbered. Page numbers in **bold face** refer to photographs. New species or those with status change are shown under the appropriate genus in both *italics* and **bold face**.

Bromeliads: A Cultural Manual

Bruce Holst, BSI Editor

After almost three years of writing, editing, photographing, and proofreading, the revised and updated cultural manual is available for sale. Edited by Herb Plever and Joyce L. Brehm, and with cover illustration by Kitti Wenzel, the revised version updates the Cultural Manual published by the BSI in 1992, which was edited by Mark A. Dimmitt and based on cultural information from a host of world-class growers. Published by the BSI, the updated version has been revised to include the conditions most favorable for inside culture as well as outside growing. Herb Plever, long time Bromeliad Society member and accomplished indoor grower, wrote the text for this publication. Herb also is a great photographer and many of the new pictures included are from his collection and his many trips to World Conferences. Joyce Brehm contributed many hours in overseeing the production and editing of the manual from beginning to end. Ken Marks, BSI Webmaster, and Harry Luther of the Bromeliad Identification Center assisted with fact-checking. Thanks to the generosity of a small but professional printer in San Diego, (Planet Printers, Ink) prices have been raised only slightly above that of the previous publication. 1-10 copies are $3.50 each, 11-50 are $3.00 each, 51-149 are $2.50, and a case of 150 can be purchased for $250. Prices include postage for all orders. Orders may be sent to Publications Chair, George Allaria via the BSI web site (www.bsi.org) or by writing to BSI Publications, 2265 W239th St., Torrance, CA 90501, USA. Look for a review of the Manual in a future issue of the Journal.

Events Calendar

Mar. 27-28, 2004. *LEU GARDENS ANNUAL PLANT SALE*, Bromeliad Society of Central Florida and Tropiflora will be selling many interesting Bromeliads. Leu Gardens. Harry P. Leu Gardens, 1920 N. Forest Ave., Orlando, FL 32803. 9-5 both days. For more information, contact Eloise Beach 407-886-8892; FloridaPRO@aol.com.

Apr. 3-4, 2004. *BROMELIAD SHOW AND SALE*. River Ridge Bromeliad Society. Clearview Mall, Metairie, Louisiana. Show - Saturday 1-9, Sunday 12-5; Sale - Sat. 10-9, Sun. 12-5. For more information, contact Bryan Windham, Brykool69@yahoo.com.

Apr. 17-18, 2004. *HERITAGE PARK PLANT AFFAIR*, Bromeliad Society of Broward County will have a booth. Peters Road, Plantation, FL. For more information, contact Bud Hendrix 954-583-8636 or Polly Pascal 954-962-0018.

Apr. 24-25, 2004. *BROMELIAD SOCIETY OF NSW AUTUMN SHOW*, Large display of massed bromeliads, demonstrations, competition, sales, etc. Bromeliad Society of New South Wales. Senior Citizens Centre, 422 Lyons Road, Five Dock, Sydney, Australia.. Sat. 9am-5pm, Sun. 9am-4pm. Admission free. For more information, call (02) 9971.6183 or email info@bromsocnsw.org.au.

May 1-2, 2004. *JEWELS OF THE JUNGLE - ANNUAL MAY SHOW AND SALE*. Greater New Orleans Bromeliad Society.

May 7-9, 2004. 29th Annual Bromeliad Society of Central Florida Show and Sale. The Florida Mall, 8001 S. Orange Blossom Trail, Orlando, Florida. Fri & Sat. 10-9:30, Sun. 11-6. Exhibitors compete for awards, hundreds of colorful & unusual plants for sale, free information and advice.

May 29-30, 2004. *BROMELIAD SOCIETY OF AUSTRALIA AUTUMN SHOW*. Begins 10:00 a.m. at Burwood RSL Club, 96 Shaftesbury Road, Burwood, NSW. Highlights of the show include utilising members' plants in a magnificent display and also large numbers of competition plants benched. Also, plants, books and pots will be for sale. For enquiries ring the Membership Secretary on (02) 9675 6527.

June 17, 2004. *BOCA RATON BROMELIAD SHOW*. Boca Raton Bromeliad Society. For more information, contact www.bsi.org/webpages/ boca_raton.html.

June 25-27, 2004. *SARASOTA BROMELIAD SOCIETY SHOW AND SALE*, Marie Selby Botanical Gardens, US 41 and S. Palm Ave. in downtown Sarasota.. 10-5 each day. Plant sale all three days. Show only on Saturday and Sunday. Banquet and rare plant sale Saturday night. Admission to show and sale included with regular admission to Gardens. For more information, contact Rob Branch 941-358-4953, or Inez Dolatowski idolatow@tampabay.rr.com.

Aug. 10-15, 2004. *WORLD BROMELIAD CONFERENCE*. Bromeliad Society International/Bromeliad Society of Greater Chicago. Rosemont, Illinois, USA. See www.bsi.org for more information.

Aug. 11, 2004. *SCHOOL II OF THE WORLD CONFERENCE BROMELIAD JUDGES SCHOOL SERIES*. World Bromeliad Conference, Chicago, IL. 8:00AM - 5:00PM. There is a nominal fee and you must be registered for the school one week prior to the conference. For more information, contact Betty Ann Prevatt, 2902 Second St., Ft. Myers, FL 33916. Phone 239-334-0242 or e-mail bprevattpcc@aol.com.

The Bromeliad Society International

The purpose of this nonprofit corporation is to promote and maintain public and scientific interest in the research, development, preservation, and distribution of bromeliads, both natural and hybrid, throughout the world. You are invited to join.

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Misnamed Bromeliads 20: *Aechmea candida*

Harry Luther, Mulford B. Foster Bromeliad Identification Center

Aechmea candida E. Morren ex Baker has been a mystery plant to North American horticulturists-it has been primarily a name in the literature. However, it seems to have persisted in Europe for a time. In 1962 Walter Richter illustrated and described it in *Zimmerpflanzen von heute und Morgan: Bromeliaceen*. Perhaps his plant was even a clonotype descending from Professor Morren's collection at Liege from the 1880's. At any rate, until recently all living examples that I have seen have been misidentified; all were something else. I even speculated that *A. candida* might be an albino (white-flowered) *A. caudata*.

Recently, Karl Green from Miami, Florida presented the research collection of the Marie Selby Botanical Gardens with a specimen of *Aechmea candida*, originally obtained from Elton Leme. The pictured plant is easy to grow but does not self-seed and is rather stingy with offsets.

Figure 19. *Aechmea candida* flowering at the Marie Selby Botanical Gardens; note the white corolla. Photograph by Vern Sawyer