

## Planting the Plants

Letter from the Executive Director  
Terrence Walters, Ph.D.

*Each year at MBC, we plant an average of 750 palms and 300 cycads, as well as a number of tropical flowering dicot trees, which provide shade and wind protection for the young palms and cycads. Moving plants out of the nursery and onto the grounds is a 12-month-long project that begins anew each October. The first step in the process has Nursery Horticulturist Barbara Judd, palm scientist Dr. Larry Noblick, and cycad scientist Dr. Terrence Walters surveying the nursery for plants that are mature enough to be transferred to the grounds. As potential plants are chosen, Barbara moves them from the shadehouses to the full-sun area, thus preparing the young plants for the environmental conditions out on the property.*

*As cycads are being chosen, Terrence and Cycad Horticulturist Eric Shroyer plan the new beds that need to be constructed in the Cycad Walk. In January, Eric and Assistant Horticulturist Stella Cuestas begin developing these cycad beds. With the support of Hostilio Torres and his backhoe loader, the area for each bed is raised approximately 4 to 6 feet with various blends of boulders, ballast-stone, sand, and soil. The relative percentages of these substrate materials depend on the particular species planned for the bed. Eric, Terrence, and Property Manager Lee Anderson evaluate the final topographic design of each bed before Hostilio performs the final grading. Terrence then chooses and marks the specific site where each cycad will be planted. He evaluates each species' environmental requirements, such as its preferred mix of sun and shade and the amount of drainage it needs. He also considers the visual appearance of each plant when mature in the context of the entire collection to be planted in the bed and of the surrounding beds.*

*In January, the Irrigation Team of Ansel Thomas and Marino Valcourt begin expanding MBC's irrigation system into those areas where new palm and cycad plantings are planned, so that the new collections can receive water immediately after being planted. When the planting plan requires expansion of the collections into large non-irrigated areas, Lee hires an irrigation contractor to undertake the expansion.*

*Unlike the cycads, most palms don't require special beds. Consequently, palm planting doesn't begin until late spring. In March, MBC's Directors approve the annual planting plan*

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### Planting—continued from page 1

produced by Sasaki Associates, Inc. and the MBC staff in January. With the plan in hand, Larry and Terrence flag the exact planting site for each palm. Palm Horticulturist Laurie Danielson and Facilities Supervisor Jack Bauer check each flag to see if there are electric or irrigation lines that could be damaged when the hole is dug. Laurie and Jack use quadrant maps generated through the software programs BG-MAP and BG-BASE by Database Supervisor Sue Katz and Field Supervisor Barbara Bohnsack. These maps document the exact positions of all MBC underground support systems. If irrigation is directly under the new planting site, the irrigation team comes in and relocates the piping. Laurie and Assistant Horticulturist Vickie Murphy then re-check the microhabitat qualities of each site. Will the particular species survive and grow well at the proposed site? Is there enough sun or shade for the young plant to mature into a healthy specimen? Will the Grounds Team have to undertake different digging procedures because of the existing substrate? If Laurie is not satisfied with the site, she, Larry, and Terrence evaluate other potential sites on the property for the plant.

After Laurie approves the site for planting a particular palm, Grounds Supervisor Orlando Coy coordinates the digging crew of Hostilio, with an auger attached to a skid-steer, and Willie Dye, Willie Payne, and Jessie

Pender, wielding shovels and rakes. At MBC, most of the holes end up being dug through solid limestone. The digging team drills five holes for each palm, essentially in the shape of a four-leaf clover with a large center. Laurie and Vickie then lower the young palm into the ground. Planting is followed by a final mulching of the area around the palm.

While the palms are being planted, Eric and Stella are planting 75 to 125 cycads into each new bed in the Cycad Walk. Ansel and Marino install drip irrigation systems in the beds, so that each plant has a drip-emitter associated with it. The Landscaping Team of Willie Dye, Willie Payne, Jessie, Mario Borroto, and Randy Russ then mulch the entire bed. Bordering each bed are turf access paths, which must be graded, supplied with irrigation, and then sodded.



At the end of each week of planting, Eric and Laurie submit to the Collections Development Department a list of the plants they transplanted. Sue and Barbara Bohnsack survey the exact location of each plant, adding the coordinates, as well as other information concerning the relocation of the plant, to the database. Volunteer Bob Hutchinson engraves permanent labels, which are then attached to the plants by Barbara.

By September, thanks to the efforts and commitment of many individuals on the MBC Team, the annual process of planting the plants has been completed.

## www.MontgomeryBotanical.org

In our continuing quest to inform scientists, students, and educators about the opportunities and resources at MBC, we are now on-line at [www.MontgomeryBotanical.org](http://www.MontgomeryBotanical.org). Thanks mainly to the efforts of Tom Andres and Michael Torres, MBC's web site became available to the world's internet community this past June. Visitors to the site can learn about how our institution began in the late 1950s, the various programs we have in place (e.g., the volunteer and seedbank programs), the recent expeditions undertaken to obtain scientifically valuable plant material, statistics concerning our tropical plant collections, and recent research and educational projects using the collections. Most importantly, one can search our collections database to determine if particular species or plants from a specific country are available for study.

During the next few years, our plans are to increase the amount of data available for each of our plants on the web site. We will include phenological data, horticultural information, and images showing the growth and development of our plants from seed to reproductive plant. Thanks to a \$3,200 grant from the Central Florida Palm & Cycad Society and a \$1,500 grant from the South Florida Palm Society, MBC recently purchased a digital camera with zoom and macro lenses as well as high capacity storage capabilities, a multi-feed 35mm slide scanner, and a flatbed scanner. These three items will allow us to pictorially document growth rates, growth forms, reproductive cycles, and horticultural experiments.

# Honoring Arthur Montgomery

by Terrence Walters, Executive Director

**D**r. Arthur Montgomery, long-time friend, colleague, and supporter of MBC and Fairchild Tropical Garden (FTG) passed away in Albuquerque, New Mexico on December 31, 1999 at the age of 90.

Dr. Montgomery was one of the original five founders of MBC in 1959. He served as Director and Vice-President for the organization from its inception until his death. With his strong belief in encouraging tropical botanical education and research, he was instrumental in creating and funding the Montgomery Research Fellowship Program. He also created the Robert H. Montgomery Science Lecture Series at FTG, and provided financial support for numerous research positions for palm and cycad scientists at both MBC and FTG.

My relationship with Arthur Montgomery dated back to 1990, when I was a research scientist with FTG. His letters were always full of support and encouragement for my cycad research projects and expeditions. He was especially interested in learning the details about my two-month collecting trip to China in 1992. When I became MBC's Executive Director in November of 1994, I received a very special letter from Arthur. He told me how pleased he was that I had accepted the position, and that he believed MBC would have a wonderful future with the current Board of Directors and me as Executive Director. I treasured his support.

On November 24, 1996, I visited Arthur at his home in Albuquerque. My objective was to update him on the progress at MBC and to complete a taped interview with him concerning his family lineage and his activities with MBC since 1959. The taped interview was later transcribed, and both the tape and document are permanently filed in the Montgomery Archive.

During my visit, I learned that the scientist in Arthur had deep roots. A boyhood fascination with minerals led to two degrees in Geology—a Bachelor's from Princeton University in 1931 and a Ph.D. from Harvard University in 1951. He was an avid prospector, mining several rare minerals (e.g., microlite and spodumene) that were greatly needed for the WWII effort. From the 1950s until his retirement in the 1970s, Arthur taught geology at Lafayette College, Pennsylvania. The remainder of his life was dedicated primarily to the service of his



*Arthur's high school graduation portrait.*

Christian beliefs through spartan living and helping others. And, his continued interest in tropical botany kept him in contact with activities at MBC.

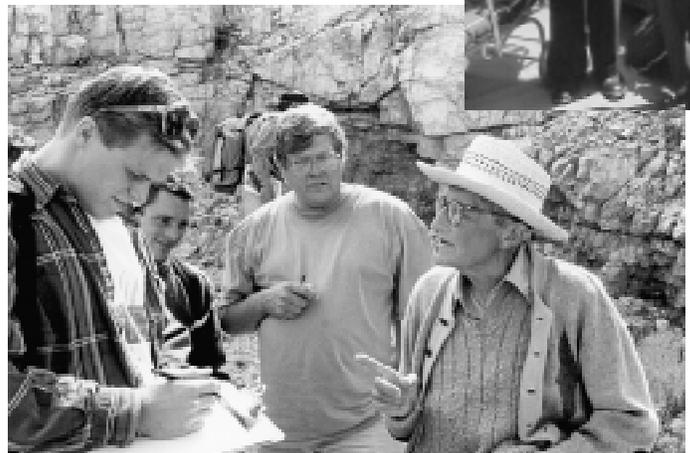
After his death, I learned more about Arthur through two wonderful individuals, Jay and Paula Lininger. The Liningers are the editors and publishers of *Matrix*, a *Journal of the History of Minerals*. Jay had known Arthur since the 1970s and had the greatest respect for his accomplishments as a mineralogist. Jay decided to pay a tribute to Arthur's life in a recent issue of *Matrix*. The 112 pages of Volume 8, Number 2 (Summer 2000) is completely devoted to Arthur's life. Jay made extensive use of the material he found in MBC's Archive for the production of the issue, especially with respect to the part of Arthur's life as the son of Robert Montgomery and stepson of Nell Montgomery Jennings, and to his interest in botany.

In 1997, Matrix Publishing had published *Reminiscences of A Mineralogist: Minerals, Localities, and Mineralogy*, which was written by Arthur. This 82-page book blends case

histories of mineralogical research, describing each mineral's unique discovery and history. Both the *Matrix* issue and Arthur's book can be purchased through Matrix Publishing Company, P.O. Box 129, Dillsburg, PA 17019 (telephone: 717-432-7201). These publications are outstanding tributes to the focused and committed life of a special person.

To further honor Arthur's accomplishments in science, and particularly his commitment to education and research at MBC, MBC's Board of Directors created the "Arthur Montgomery Visiting Botanist Fellowship" award on November 4, 2000. The Fellowship provides travel and associated expenses for a scientist to spend two to four weeks at MBC, during which time the scientist can interact with the South Florida Botanical Community, annotate MBC's living plant collections, learn about MBC's plant databases, and when appropriate, initiate a research project on MBC's collections.

The Directors are pleased to announce the first recipient of the Arthur Montgomery Visiting Botanist Fellowship—Joko Witono of Bogor Botanic Garden in Indonesia. Joko's visit to MBC is scheduled for May 2001. We anxiously await his arrival, as a living reminder of the legacy of a great scientist—Dr. Arthur Montgomery.



*Above: Arthur (right) with geology students during a 1994 Harding Mine tour. Upper right: Arthur (left) with his father, Robert Montgomery. Photo taken in Cos Cob, Connecticut in the 1940s.*

# RESEARCH & EDUCATION

Research use of MBC's plant collections includes projects performed on- and off-site with MBC material. One of the on-site projects, which is being conducted by Dr. Andrew Henderson, is explained in the article below entitled "Height vs. Width." His wife, graduate student Flor Chavez Henderson, is performing her research off-site. For her study of palm germination and seedling morphology, we sent germinating seeds of *Nypa fruticans* to New York Botanical Garden in November. These seeds were hand pollinated several months earlier by her husband and MBC's Judy Kay. *Nypa* is also of interest to Dr. D. Edwards of Cardiff University in Wales, United Kingdom. FTG's Dr. Jack Fisher collected and shipped sections of *Nypa* petioles for Dr. Edwards's paleobotanical studies late last summer. Another off-site investigation is being performed by the Institute of Botany within the Academia Sinica in Taiwan. Taiwanese researchers are extracting DNA from MBC cycads in order to understand the evolutionary relationships among cycad genera.

Not all research at MBC involves particular plants or species. Scientists from



MBC's Lee Anderson (right) and Parrot Jungle's Director of Horticulture, Jeff Shimonski, on the set of WLRN's television series *Tropical Treasures*.

the University of Florida (UF) reviewed MBC's procedures for composting in July. MBC is also working with UF in their "Florida Lake Watch Program." Samples from our lakes are sent to Gainesville for analysis on a quarterly basis.

On the educational front, Drs. Javier Francisco-Ortega and David Bogler (Florida International University and FTG) photographed MBC's *Phoenix* collection for a lecture they gave on the genus in the Canary Islands last summer. At the International Palm Society Conference in New Caledonia, MBC's Dr. Larry Noblick gave a lecture entitled "From the Field to the Garden." Database Supervisor Sue Katz gave two lectures on MBC's collections and mapping databases to the Royal Botanic Garden in Edinburgh, Scotland. Eric Shroyer gave a one-hour lecture to the South Florida community on cycad horticulture at MBC on September 29. Later in the fall, Property Manager Lee Anderson and MBC volunteer Larry Kraus were guest speakers on the WLRN Public Television Show "Tropical Treasures." Lee discussed tropical ethnobotany, while Larry spoke on cycads.



## Height

versus

## Width

Growers of palms often notice that some species form their final stem diameter before the stem begins aerial growth, while others increase in girth as the palm grow upwards. This latter type of growth is typical of dicotyledonous trees, which expand in diameter thanks to a cell-producing lateral cambium. However, monocotyledons, including palms, do not have a lateral cambium. In those palms where stem diameter expansion proceeds with upward growth, stem girth increases by cell expansion rather than by cell division. Botanists call this process sustained primary growth.

In 1999, New York Botanical Garden scientist Dr. Andrew Henderson began a three-year project to measure stem width expansion during vertical plant growth in various types of palms. His goal was to discover which species undergo sustained primary growth and which do not, and to see if there is any taxonomic basis for the phenomenon. He decided that



MBC was an ideal place to do this kind of study because of the thousands of young, wild-collected, and documented palms that have recently been planted in the ground here.

In 1999, Dr. Henderson measured the height and diameter of 123 palms at MBC, and then remeasured them a year later. Preliminary results indicate that the arecoid palms had the greatest stem diameter increment. For example, trunks of *Wodyetia bifurcata* enlarged an average of 6.1 cm in diameter over a one-year period. The trunks of other palms experienced more modest amounts of girth expansion, but still have very high vertical growth rates. The champion in this respect was *Syagrus botryophora*, whose trunks increased in height an average of 1.5 m in one year!

More measurements are planned for 2001. A research update will be available in 2002.

# OUTREACH & EVENTS



**B**ringing plant-loving people together is a central tenet of MBC's philosophy. Some gatherings are serious meetings where minds come together to determine what's best for the future of tropical botany. Recent congregations of this type at Montgomery include the Cycad Society Board of Directors Meeting in late September. The seven-hour session was held in the Nixon Smiley

Meeting Room, and was followed by a tour of MBC's collections given by Eric Shroyer. In early November, the MBC Board of Directors Meeting also met in the Nixon Smiley conference center. Part of the agenda was a presentation by Botanical Consultant Dr. John Popenoe on the horticultural status of our collections. Landscape designer Joe Hibbard gave a slide show reviewing the progress of the master site plan over the past eight years. And, Michael Torres presented MBC's new web site to the directors. A tour of the property with Joe Hibbard and a cocktail reception at the Walter Haynes Overlook followed the day-long meeting.

Other gatherings have a more social bent, bringing individuals together in a relaxed and festive atmosphere. At these get-togethers, important information can be exchanged and decisions and alliances made.

One of the recent social gatherings at MBC was held by the Members of the Dade County Chapter of the Florida Nurserymen & Growers Association (FNGA). On November 28, they celebrated the end of

2000 with a wonderful evening event by MBC's pool. The event included a tour by Dr. Walters, a cocktail social hour, a sit-down dinner, and a lecture by Dr. Van Waldell. FNGA has supported our Seedbank Program for the last three years and has provided funding for a fourth year. Judy Kay, our Seedbank Coordinator, is quite pleased!

On January 20, 2001, we welcomed back the Members of the Central Florida

Palm & Cycad Society (CFPCS). The last time they toured our property was in 1999. This year, they were joined by members of the Palm Beach Palm & Cycad Society. Dr. Noblick gave everyone a tour of MBC's property and collections. Following the tour, our visitors had an opportunity to stroll through the collections and have lunch at one of the many scenic spots on the grounds.

On January 26, MBC's Executive Director acknowledged the staff and volunteers for the many successes of 2000 by having a luncheon on the back patio of Nell's House. An enjoyable afternoon was had by all.



*Above: Members of the Cycad Society Board of Directors took time out from their meeting at MBC to tour the property with Cycad Horticulturist Eric Shroyer. Left: Joe Hibbard of Sasaki Associates (at left in back) discussing design plans for the Palm Walk with MBC Board of Directors during the November board meeting. Below: FNGA Members enjoyed dinner poolside during their year-end celebration at MBC.*



*Russell Adams (left) giving Dr. Robert Dressler a cycad that was collected by Russell and Dr. Dennis Stevenson (NYBG) during MBC's Panama 2000 Expedition. The species, *Zamia dressleri*, honors Dr. Dressler.*

## Sumatran Whips

by Terrence Walters, Executive Director

After four years of developing numerous collaborative programs through emails, letters, and faxes with the world-famous Bogor Botanic Garden in Indonesia, I was able to visit this magnificent garden and meet the individuals with whom I had been corresponding in August of 2000. I also conducted an expedition with the garden's staff to the Indonesian island of Sumatra. The primary objective of the expedition was to obtain wild, thoroughly documented population samples of as many rattan palm species as possible.

Rattans are slender palms that climb onto other plants, often by hooks on long whip-like structures called cirri and flagella. Rattans are usually armed with dangerous spines on their primary stem and leaves. Well over 650 rattan species, represented by 13 genera, occur in the Old World tropics. They are, however, poorly represented in preserved or living collections because the plants are difficult to handle. They are also not grown under cultivation because of their aggressive climbing habit, fierce armature, great length, and unwieldy and intractable nature. Consequently, little is known about rattan cultivation, and most canes used in manufacturing are obtained from the wild.

Joko Witono organized and led the Sumatran expedition. Two other Bogor staff, Samsu Sujahman and Enday Sudarso, joined us on the one-month trip to collect herbarium specimens and seeds of rattans. On August 2, the four of us began our adventure by taking the ferry from populous Java to wild Sumatra.

Twenty-three palm genera are native to Sumatra. During the expedition, which was

spent mainly within two National Parks—Bukit Tigapuluh and Kerinci Seblat—we found representatives of 21 of the 23 genera. As our time was limited and political conditions in the north were unsettled, our field work concentrated on 10 localities in five southern Sumatran provinces, just south of the equator.

Sadly, the majority of National Park sites we visited contained only secondary forests; the once magnificent primary rainforests of Indonesia had been removed decades ago for rubber plantations. However, rattans appear to grow extremely well and reproduce prolifically in secondary forests. In fact, at some localities, most of the understory species were rattans.

It was not until we started climbing the steep mountains thick with an understory of rattan canes that I truly appreciated why no one bothers with rattans. During the first few days, my hands became torn and bloody as I grabbed onto the closest plant, which always seemed to be an armored rattan, to keep from falling down the steep wet clay paths. I soon learned to look before I grabbed.

When we saw through binoculars what looked like mature fruits on the higher reaches of a rattan cane, the process of pulling the vine down out of the thick forest canopy began. It would often take two or three of us a half hour or more to pull the 20–30-m-long vine free of other vegetation. After each tug,

we had to remove the dense spines from a new section of the stem so that we could pull on the vine again. When we finally were able to reach the fruits, we usually found that the seeds were not yet mature. Nevertheless, after so much work, we proceeded with the hour-long task of making multiple herbarium



Terrence (front left) and Samsu (front right) with three local park guides enjoying a much needed break after climbing for three hours through a dense rattan forest in Sumatra.

specimens, each specimen including part of the stem, leaves, and reproductive parts (e.g., flowers, fruits). If the fruits were mature, we would also collect 100 or more of them.

Many of the species we collected had 5–10-m-long whips (i.e., flagella) coming off of the main stem. These whips were covered with recurved barbs which tear at your clothes and skin if you move just slightly in the wrong direction. I soon learned to sense when these whips grabbed me as I walked. Immediately, I would back up to release the recurved barbs and detach the whip.

At the end of the expedition, which was a great success thanks to the commitment, hard work, and unending energy of Joko, Samsu, and Enday, we returned to Bogor to clean the seeds, place the herbarium specimens in dryers, and then divide the collection between our institutions. We collected 89 seed accessions representing 13 palm genera. Of these, 20 were accessions of rattans. One full set of herbarium specimens was deposited at the herbarium at Bogor, and a duplicate set was sent to the Kew Herbarium in London for name verification.

MBC recently designated a large tract of land in the southwestern corner of our 120-acre property for the development of a scientific and educational rattan collection. The South Florida Chapter of the International Palm Society contributed funds to MBC to purchase and plant large trees that will ultimately provide support for the rattans. In three to five years, young vines produced by the Sumatran seeds will be transplanted to this area, where they will scale their arboreal supports, reaching for the Miami sky.



One of those unfriendly rattans (*Daemonorops* sp.) directly in our walking path. At least this plant had mature fruits to collect.

## Where is New Caledonia?

by Larry Noblick, Collections Manager

Located 1,200 km off the east coast of Australia and 1,500 km NNW of New Zealand is large island with a fascinating history. About 65-75 million years ago, a small mountainous sliver of land about 400 km long and 50 km wide separated from Australia and drifted into the subtropics, carrying with it a sampling of the ancient flora. Australia in the meantime suffered serious droughts that devastated and greatly modified its plant communities. But the amiable environment of the drifting island of New Caledonia preserved the original species, which continued to diversify.

For years, the richness of the New Caledonian flora, with its ancient tropical gymnosperms and awesome giant tree ferns, has attracted botanists. Its 37 endemic palm species are noteworthy and appear to have diversified from three types of palms. Unfortunately, most of the palms have retained a slower-than-slow growth rate. Many have beautifully colored, textured crownshafts hugging the stems just below their crowns. It is the uniqueness of these palms that motivated me to stay on New Caledonia for three weeks after an International Palm Society meeting to do some serious collecting for MBC.

Had I landed on New Caledonia 150 years ago, the Kanak tribesmen (black-skinned Melanesians) would have invited me to a meal in which I would have been their main course. The Kanaks were still eating each other and newcomers when the first French missionaries arrived and convinced them to stop. In 1849, the rich mineral deposits (especially nickel) motivated France to claim New Caledonia as one of its possessions. This French notion of ownership has never “sat well” with the Kanaks. Today, the island remains somewhat divided, with those who are descendents of the early white French and penal colonists populating the southern half of the island and those who are primarily of Kanak descent in the north. Politically, they are divided, which makes getting permits for plant collecting a double challenge.

My most memorable palm collecting day

was October 19, when I and palm enthusiasts Freddy Nothis, Roger Lemesle, and Jean Paul Tivoliea travelled with Eddy Vico, a New Caledonian of mixed French/Kanak descent. Eddy is French in his thinking and lifestyle, with a Kanak complexion.

Eddy guided us to the Foret Pwaala (Pwaala Forest) where we saw *Veillonia alba*, *Burretio kentia hapala*, and *Alloschmidia glabrata*. We drove over very bad jeep trails to get there. It had rained the night before, so the road was still soft and slippery. At one point we left Freddy's 4x4 Chevrolet and we



**Above:** Freddy looking up into a *Veillonia alba* in the Foret Pwaala. **Right:** Trying to get the Land Rover up a muddy slope.

all piled into Eddy's Land Rover. The road immediately worsened as we crossed a small stream and headed up a steep, deep muddy slope. We all had to get out and use the wench and cable to pull the vehicle up the hill. In the end, the Foret Pwaala was well worth the effort. Not much was in fruit except for *Veillonia alba*, but we managed to find and collect seedlings of the other species. The valley was filled with individuals of “kaori”, a giant tropical, broad-leaved gymnosperm

species (*Agathis* sp.). The valley frequently floods and the violent currents viciously pound the trunks of these kaori with big rocks. The injured trunks ooze large amounts of resin, which seals the injuries and provides a source of resin used in many homemade cures. The New Caledonians collected a “brick” or two of the resin to take home.

We returned to the 4x4 Chevrolet and headed to the top of Mt. Mandjélia (800 m altitude), close to the town of Pouébo. Unlike most of the New Caledonian peaks, there is a road (albeit a bad one) to the top where there is a communication tower. The day was clear and the view was magnificent. The light and deep bluish-colored hues of the lagoon and ocean beyond contrasted with the dark green mountainous “backbone” of the Panié Massif. Eddy was able to locate fruit of an unusual form of *Basselina gracilis* (called “Pencil Form”), with its very thin stems and irregular leaf shape. He also boosted me up a palm stem to collect *Burretio kentia vieillardii* fruits. It turned out to be the best seed and seedling collecting day of the entire trip.

On the return to Ouégué, we ran into an armed police roadblock. Luckily, they were looking for unlicensed hunters of animals, not plants. I had all the proper permits, but encounters with police are always a bit nerve-racking. We finally arrived at the hotel tired and hungry, and what better way to finish off the day than to dine on a plate full of fruit bats cooked in a fine wine sauce. An exotic dish for an exotic island adventure!



# To a Long & Healthy Life

by Lee Anderson, Property Manager

I have always believed that an effective fertilization regimen is a vital element in any successful horticultural program. Although tossing out a couple bags of 6-6-6 purchased from the local discount hardware store once or twice during the year is better than no program at all, a well-organized and efficiently executed plan is beneficial in so many ways.

Most obviously, healthy plants growing in a healthy landscape have an aesthetic appeal to both the professional and amateur horticulturist. One only has to observe the pitiful condition of many palms and dicots planted along public right-of-ways throughout the county to realize the negative impact of a poor (or nonexistent) fertilization program. Beyond aesthetics, however, an effective fertilization program results in stronger plants that are less susceptible to pathogens—insect-vectored diseases, fungal attacks, the entire potpourri of blights, rusts, wilts and rots that seem to be a major factor in the world of sub-tropical horticulture. Additionally, an effective fertilization program is essential in maintaining a viable flowering–fruiting–seed production cycle.

The fertilization program at MBC can be broken down into two major components: macro-fertiliza-

tion and micro-fertilization. Three times a year—early spring, mid-summer, and late fall—the palm and cycad horticulturists, assisted by several landscapers, put out around 16,000 pounds of “Palm Special,” an 8-4-12 (nitrogen-phosphorus-potassium) ratio product that also contains a full range of minor elements such as calcium, magnesium, manganese, iron, copper, zinc, etc. Because of the quantity of product used and the high ratios of the three major elements, this is considered macro-fertilization. Every palm and cycad on the property is treated, as are the younger dicot trees that haven’t established themselves yet. Additionally, much of the turfgrass acreage that is directly associated with the specialized collections is treated with the 8-4-12 mixture.

Micro-fertilization takes place year round, on an “as needed” basis. MBC has a wide variety of palm and cycad specimens and all seem to have varying nutritional requirements. Also, there is a wide range of soil types here, from rich, well-draining sandy loam to rocky, impervious “soils” (using the term very loosely in this case!) almost totally bereft of any sort of organic material. Constant vigilance on the part of the specialty horticulturists is needed to spot the symptoms of various micro-nutrient deficiencies and to treat these deficiencies before they advance to a stage that would be detrimental to the plant. Leibig’s classic 1840 law of the minimum (“crop health is determined by the



*In August, after six months of root pruning, we relocated one of Colonel Robert Montgomery’s original Copernicia palms.*

quantity of the element that is present in the least abundance”) is still true to this day.

Just as there is a wide variety of deficiencies, there is also a wide variety of delivery systems to treat these deficiencies. Horticulturists employ liquid root drenches, specific granular applications, and foliar sprays in their attempts to deliver the right nutrients as efficiently as possible.

As the scientific collections at MBC expand by hundreds of plants each year, the horticultural staff is constantly looking for more effective and cost-efficient fertilization regimens to incorporate into the existing program. This year, for example, we plan to start an in-depth study of the use of slow-release products that kick in a response mechanism when environmental conditions favor plant growth and development. Ultimately we hope to be able to see a more efficient uptake of nutrients coupled with the economic advantage of fewer labor-hours spent in the application process. Additionally, we now have the equipment and training to monitor the chance of phosphate-nitrate run-off into the water bodies at MBC, again allowing us to determine the efficiency of nutrient uptake into the plant cell system.



*Above: Macro-fertilization of palms by Stella Cuestas. Right: Eric Shroyer applying a foliar spray on a cycad with micronutrient deficiencies.*



# TEAMWORK

School is always in session for the MBC Team. Learning opportunities off- and on-site keep the staff in touch with the latest and the best.

During the heat of the summer, Orlando Coy, Stella Cuestas, and Juan Serrano received “General Standards Training” and “Pesticide Application Training” through the University of Florida Extension Service. Orlando also joined Lee Anderson and Barbara Judd at a workshop entitled “Pruning Trees for Hurricane Season.” In September, Lee, Stella, Barbara, and Eric Shroyer attended the “Cycad Short Course 2000” sponsored by the University of Florida. Meanwhile, Eric, Barbara, and Laurie Danielson learned more about the care of palms and cycads by touring two major private collections in east-central Florida.

In the relative cool of the winter months, Jack Bauer, Juan Corona, Ansel Thomas, and Marino Valcourt attended the Miami International Construction Trade Show. Judy Kay attended a five-day class, “Technical Workshop on Seed Conservation of Tropical Plant Species,” in support of the development of our Seedbank Program. The Collections Development Department received advanced on-site training on MBC’s database program, BG-BASE. Michael O’Neal, co-developer of the program, spent three days in January with Larry Noblick, Barbara Bohnsack, and Sue Katz.

Staff cross-training is an important aspect of MBC’s on-site educational program. In the fall, Administration Manager Evelyn Young spent two days with Judy Kay learning about

*At right is a snapshot of the MBC staff taken last June. Since that time, we’re pleased to welcome two new employees, Landscaper Abbie Dasher and Dicot Horticulturist Scott Massey (shown below). Scott’s responsibility is to care for the thousands of non-palm flowering trees on MBC’s property. That’s a lot of pruning!*



cycad pollination, seed collecting, cleaning, and distribution. (See picture on page 10). During the winter, MBC’s Grounds Team received training from the Collections Development Department on surveying the collections and underground utilities and on entering and retrieving plant data from the collections database.

*In 2000, we started “Members Workday”. Once every two months, MBC Members can get their hands dirty, planting, weeding, or clearing brush at MBC. Two active families have been the Manzes, Sally and David, and the Smileys. Below, from left to right, Mark, Karl, and Scott Smiley are shown during a workday. Karl, who is MBC’s President, was not out-done by his hard-working sons.*



## STAFF FOCUS—The Collections Development Team



In the winter of 2000, the Collections Development (CD) Department was re-organized to better meet MBC’s needs. The CD Team (shown from left to right in photo) consists of Sue Katz, Dr. Larry Noblick, Judy Kay, Michael Torres, and Barbara Bohnsack. Sue Katz is MBC’s Database Supervisor. She oversees the input, accuracy, completeness, and retrieval of all plant data in our computer database. Field Supervisor Barbara is responsible for all field-related activities associated with the property and collections. Her activities include label production; monthly cycad and palm phenology; annual plant inventory; surveying of all support systems and plants; downloading survey data into the mapping database; and producing maps from this database. Michael is now MBC’s Computer Consultant and Web Master. Judy Kay continues to develop the Seedbank Program and Pollen Bank. Larry manages the CD Team, while continuing to focus his energies on enhancing the scientific and educational quality of MBC’s palm and cycad collections.

# Spotlight on the Seedbank Volunteers

by Evelyn A. Young, Volunteer Coordinator

Volunteering has been described as the backbone of a thriving botanical garden. In this issue, our spotlight focuses on the dedicated volunteers of the Seedbank Program—Beth Evans, Jef Morris, Vivian Jordan, and Larry Kraus. Under the direction of Seedbank Coordinator Judy Kay, the volunteers spend untold hours pollinating palms and cycads, and then collecting, cleaning, and processing the seeds for distribution. With a beautiful 120-acre palette of plants at their disposal, their difficult job is neverending, but fulfilling.

There are over 3,000 palms in the ground at MBC. Some are hand-pollinated and the rest are allowed to be pollinated naturally, either by insects or wind. Judy and her volunteers must constantly evaluate these plants for mature seeds, both for use in MBC's collection and for distribution to other gardens and botanical organizations.

The prickly cycads at MBC number more than 2,000 and are generally lower in stature



*Evelyn Young (right) cross-training with volunteer Vivian Jordan (left) and Seedbank Coordinator Judy Kay on how to pollinate cycads.*

than the palms, which helps when it comes to hand pollination. The Seedbank team collects pollen from the cones of male cycads and freezes it until the female cycad cones are receptive. Hand pollination, requiring perfect timing, is done with either wet (mixed with water) or dry pollen. Again, it takes diligent evaluation of the plants to know when they are ready for pollen collection and for fertilization.

Without her very dedicated volunteers—always here, always ready—Judy would not have enough hours in her day to accomplish this mighty job of seed production. Seed production not only guarantees that MBC will have palms for future planting. Distribution of the germplasm ensures that the species will survive in other parts of the world as well. If you're interested in learning more about seed production, Judy would love to add you to her team. We also have other volunteer positions open—just give us a call!

## Thanks for Your Support in 2000!

### Financial Contributions

Arnold, Lyle  
Baltin, Lee  
Beaty, John T., Jr.  
Bellamy, Jeanne  
Besse, Libby & Byron  
Bills, Alan  
Brown, Edwin III  
Brusberg, Marian Jennings  
Byrholdt, Katherine  
Central Florida Palm & Cycad Society  
Curtis, Mary & Alan  
Cycad Society  
Dadeland Garden Club  
Davis, Joan  
Decker, Sonya & Donald  
Delevoryas, Theodore  
DeMott, John (Redland Nursery)  
Dennis, Lilian & Samuel  
DeVille, Jo  
Evans Parker, Judith  
Florida Nurserymen & Growers Association  
(Dade Chapter)  
Fraunfelder, Harriet Sweeney & Eric  
Garrigo, Victoria & Joe  
Gex, Isabelle & Virgil  
Goldweber, Seymour  
Gregory, Timothy  
Gross, Patrick (for Walter Haynes Overlook)  
Hall, Nancy & Edward  
Haynes, Marion  
Haynes, Walter  
Hemmes, Don  
Hibbard, Joseph  
Hicks, Patricia & Scott  
Howard, Richard  
International Aroid Society  
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Johnson, Beverly  
Kelly Foundation, Inc.  
Knapp, Ellen



Kurth, Donald  
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Manz, Sally & David  
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Palm Beach Palm & Cycad Society  
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Roberts, Susan & Alfred  
Sacher, Dorothy & Charles  
Schneider, Cecelia & George  
Shelley, Evelyn  
Smiley, Charlotte & Karl  
Smiley, Evelyn  
Smith, Pamela  
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Swetland, Jean Thomas  
Thorne, Mae & Robert  
Whitelock, Eva & Loran  
Zierer, Frances Ross

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National Tropical Botanical Garden  
Perry, Michael  
Plastic Components



Powell, Bill  
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Spurling, George (Spurling Nursery)  
Stark, Jean  
Whitelock, Loran (Cycad Gardens)  
Williamson, Eddie

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Ironmonger, Bruce & Suzi (The Cycad Center)  
Mahaffey, Libby  
National Tropical Botanical Garden  
Nicholson, Rob (Smith College Botanical Garden)  
Perry, Michael (Cycad Haven)  
South African Palm Society  
Vorster, Piet  
Whitelock, Eva & Loran (Cycad Gardens)  
Williamson, Eddie



### On-Site Support (Volunteer Team)

Aronson, Larry  
Asher, Renae  
Baltin, Lee  
Bellamy, Jeanne  
Biggane, Jackie  
Brown, Joan  
Bryholdt, Katherine  
Copp, Janet  
Covington, Chris  
Cowen, Chris  
Cuestas, Stella  
Dire, John



Dire, Sharon  
Downum, Julie  
Evans, Elizabeth  
Goldstein, Joy  
Gottlieb, Linda  
Govier, Becky  
Griffis, Judy  
Hames, Steve  
Harte, Marietta  
Haynes, Walter  
Hicks, Patricia  
Hutchinson, Bob  
Hutchinson, Mayna  
Jordan, Vivian  
Kambour, Mike  
Kelly, Loyd  
Kelly, Nick  
Kern, Steve  
Kraus, Larry  
Lane, Keith  
Mahaffey, Libby  
Maidman, Katherine  
Manz, David  
Manz, Peter  
Manz, Sally  
Marquardt, Oralea  
Morris, Jeff  
Noblick, Daniela  
Phang Sang, Chris  
Renshaw, Merilyn  
Rispler, Sheldon  
Sacher, Charles  
Smiley, Karl  
Smiley, Mark  
Smiley, Scott  
Starck, Ann  
Stark, Jean  
Thomas, Jo Beth  
Van Vuren, Natascha  
Whitney, Brenda

# 2000 Review of MBC's Plant Collections

## *Plant Inventory Statistics*

	<i>Planted in the Ground</i>	<i>Growing in Our Nursery</i>	<i>Total in Collection<sup>3</sup></i>
<b>PALMS</b>			
Taxa <sup>1</sup>	334	255	489
Accessions <sup>2</sup>	1,726	567	1,972
Plants & Seeds	4,597	2,446	7,043
<b>CYCADS</b>			
Taxa <sup>1</sup>	157	136	219
Accessions <sup>2</sup>	1,127	552	1,164
Plants & Seeds	2,046	2,734	4,780
<b>OTHER</b>			
Taxa <sup>1</sup>	647	26	662
Accessions <sup>2</sup>	2,023	57	2,037
Plants & Seeds	2,611	194	2,805

<sup>1</sup> Species, varieties, etc.    <sup>2</sup> A collection of seeds from one source or one locality.

<sup>3</sup> A taxon or accession may be represented in both the Ground and Nursery.

## *Countries from which MBC Received Germplasm in 2000*



# Who We Are

Terrence Walters, Ph.D.  
Executive Director

Lee Anderson  
Property Manager

Jack Bauer  
Facilities Supervisor

Barbara Bohnsack  
Field Supervisor

Mario Boroto  
Landscape

Juan Corona  
Equipment Specialist

Orlando Coy  
Grounds Supervisor

Stella Cuestas  
Assistant Cycad Horticulturist

Laurie Danielson  
Palm Horticulturist

Abbie Dasher  
Landscape

Willy Dye  
Landscape

Barbara Judd  
Nursery Horticulturist

Sue Katz  
Database Supervisor

Judith Kay  
Seedbank Coordinator

Marta Lagos  
Housekeeper

Scott Massey  
Dicot Horticulturist

Vickie Murphy  
Assistant Palm Horticulturist

Larry Noblick, Ph.D.  
Collections Manager

Willie Payne  
Landscape

Jessie Pender  
Landscape

Randy Russ  
Landscape

Juan Serrano  
Spray Technician

Eric Shroyer  
Cycad Horticulturist

Ansel Thomas  
Irrigation Specialist

Hostilio Torres  
Equipment Operator

Marino Valcourt  
Maintenance Assistant

Evelyn Young  
Administration Manager/  
Volunteer Coordinator

## The Montgomery News

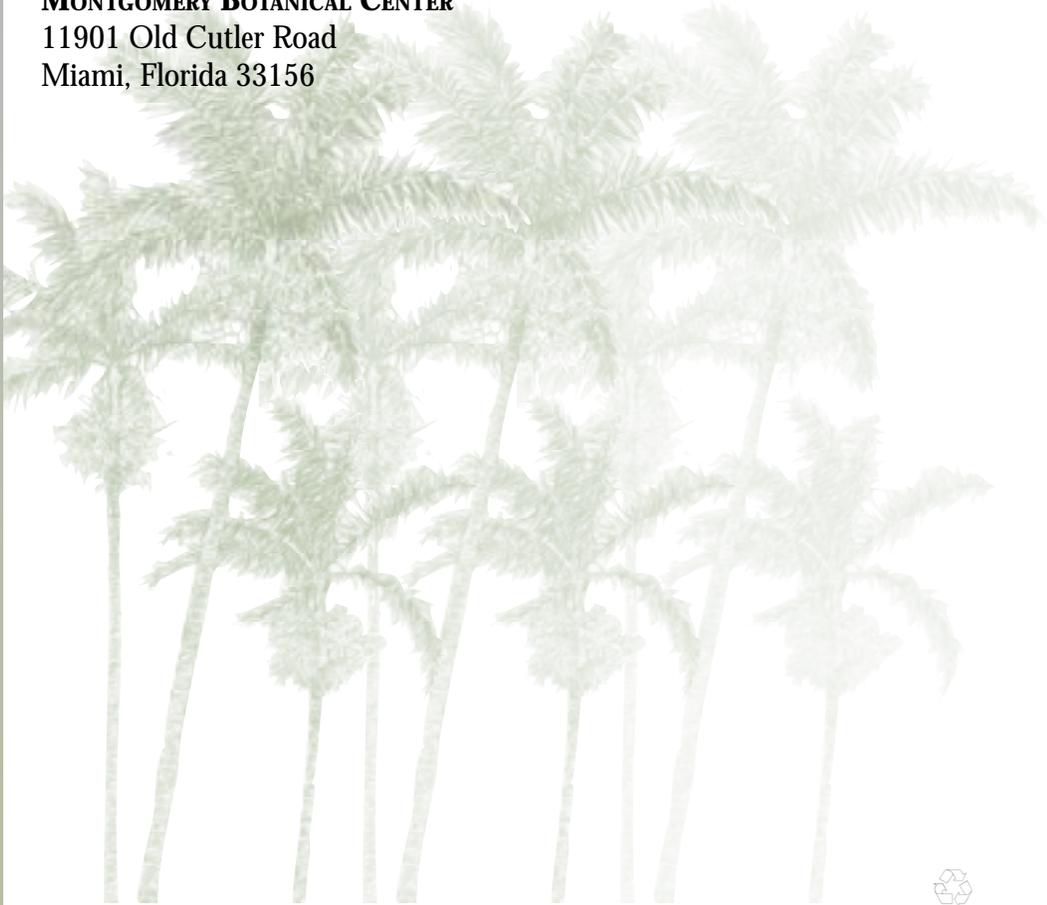
Deena Decker-Walters, Ph.D.  
Publications Coordinator, Editor

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## MONTGOMERY BOTANICAL CENTER

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*From the Montgomery Archive comes this November 1945 image of Robert and Nell Montgomery at the base of one of the three staircases at their estate. Designed by architect Robert Fitch Smith in 1931, each staircase was created to change its nature hourly as the sun clarifies one line and obscures another.*

