Montgomery Botanical NEWS

Advancing Research, Conservation, and Education through Scientific Plant Collections

Spring/Summer 2018

Volume 26, Number 1

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To advance science, education & conservation of tropical plants, emphasizing palms and cycads, Montgomery Botanical Center grows living plants from around the world in population-based, documented, scientific collections in a 120-acre botanical garden exemplifying excellent landscape design.

Montgomery Botanical Center is a tax-exempt, nonprofit institution established by Eleanor "Nell" Montgomery Jennings in memory of her husband, Colonel Robert H. Montgomery, and his love of palms and cycads.

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Edited by Tracy Magellan

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Dear Friends,

Montgomery is looking great! I write this message to you eight months after the hurricane, and our recovery is <u>amazing</u>. Please let me give equal credit to people and plants – our team has been working exceptionally hard, and our plants worked overtime to push new fronds, leaves, cones and flowers. The results are incredible! Several visitors, looking down the vistas, have asked "...did you have any damage here?" Yes – quite a lot in fact, but it is wonderful what work, time, and nature can accomplish.

One lesson re-learned – plants are not permanent, gardens are not static; that is one of the great things about our work. Seeing growth and change over a season, a year, or a decade demonstrates life and vigor. The photos on the back cover show the same story. So, on the facing page, please see a longer term view of what to expect going forward.

Another lesson from that assessment: we cannot slow down our fieldwork. Thus, plant exploration is ongoing! Michael relates his recent studies of Cuban cycads on page 4, and Xavier recounts our efforts to conserve one of the most unique palm species on page 7. I am so grateful to our international colleagues for their expertise and enthusiasm for these projects. More studies are being scheduled as I write.

Last year your generous support moved us out of a tangle of downed trees and back into our proper form – but we advanced even further past that great recovery! Pages 8, 9, 10 and 11 show how your support keeps growing our garden. With all this great news, it certainly feels like spring. The season was highly anticipated, and I am glad to see it arrive – I also see a great year ahead for our plants, our people and our work. Thank you for helping us grow beyond the storm!

MPGRUPFAL

Pictured: Dr. Griffith on the Silver Bluff Escarpment, Montgomery. **On the Cover:** Patrick Griffith, Pedro Toribio, Teodoro Clase, Jose Manuel, and Xavier Gratacos with *Pseudophoenix ekmanii* (see page 6-7).

Montgomery in 100 years – Will we weather the climate?

Last year's storm made us think about the future. Losing hundreds of trees in one day prompts the question: *can a botanic garden weather the climate?* To consider that future, a look back was helpful. The truth is that our collection kept growing through major challenges: freezes, cyclones, and lethal yellowing – all of which took a toll, but despite them Montgomery thrives today.

New threats are *literally* "on our horizon" – higher tides than ever. So can we adapt and thrive with global changes? To study that climate conundrum, a team of Montgomery experts and other garden leaders measured the scope of future threats, analyzed turnover in our collection, and projected how our landsite might change in the next century.

"Cautious optimism" captures our results with regard to the landsite. Some acres may become part of Biscayne Bay, suitable only for *Nypa* and mangroves – but many more acres stay high and dry, given Colonel Montgomery's wise choice of location.

Our optimism needs *no caution* with regard to the plant collection! We found, amazingly, that our *entire collection of 14,000 plants* has a median age dating to 2005. We analyzed the numbers many ways, with always the same result: the entire holdings at Montgomery have a "half-life" of 13 years!

This turnover leads to three conclusions. The first: in 100 years, we will replace 99% of our plants. Our second conclusion reinforces the value of big, old trees – our cherished Veteran Trees, "RM Originals," and STATE CHAMPIONS are so important because they are so rare! Our third conclusion highlights a critical, overlooked value of living plant collections – gardens can survive global changes better than natural environments. Gardens have the great luxury of choosing their plants carefully!

So, *will Montgomery weather the climate?* YES – through careful planning and by acquiring the right new plants. A favorite old quote seems more relevant than ever:

"The garden exists between the expedition and the mulch pile – only through the input of labor and resources."

ACKNOWLEDGEMENTS We are grateful for the support of the Institute of Museum and Library Services (MA-05-12-0336-12, MA-30-14-0123-14, MG-30-16-0085-16) and the National Science Foundation (DBI 1203242, DBI 1561346, DBI 1762781) for supporting collections stewardship and collections recovery.



Citation: Griffith, M.P., G. Barber, J. Tucker Lima, M. Barros, C. Calonje, L.R. Noblick, M. Calonje, T.M. Magellan, M. Dosmann, T. Thibault, and N. Gerlowski. 2017. Plant Collection "Half-life:" Can Botanic Gardens Weather the Climate? Curator the Museum Journal 60(4): 395-410.

We were glad to be featured on the cover of this important journal! This open access study is available free of charge on the CURATOR website – just follow the link from www.montgomerybotanical.org!

Montgomery is once again back in its green glory – This photo from April 2018 shows our garden growing and thriving. The future looks bright for these trees!

INSTITUTE o

Exploring the narrow-leaflet zamios of Eastern Cuba

In the summer of 2017, I teamed up with several Cuban colleagues for our <u>fifth</u> expedition studying *Zamia* in Cuba as part of a broader effort to gain a better understanding of the distribution, conservation status, and genetic relationships of the genus throughout the entire Caribbean region. On this trip we visited populations in southeastern Cuba, and focused on species with narrow leaflets, endemic to this region.



Zamia stricta in habitat on the Meseta de Santa María de Loreto, its only known locality.

These "narrow leaflet zamias" of Eastern Cuba are the least understood and most taxonomically controversial among Caribbean zamias. Although at least five species of narrow leaflet zamias are described based on Cuban plants, they are all lumped into two species: (1) *Zamia stricta*, occurring at a single locality, and (2) *Zamia angustifolia*, a species originally described from the Bahamas. However, these populations are highly variable and several distinct morphotypes can be found.

Narrow leaflet zamias occur in several distinct populations throughout the Sierra Maestra mountain range in southeastern Cuba. All occur in very dry habitats and often co-occur with other narrow leaflet plant species similarly adapted to dry climates such as *Plumeria filifolia* and *Senna angustifolia*.

Considerable morphological variation is found between populations, with great differences in cone color, leaflet width, and new leaf flush color. We hope that the herbarium specimens, morphometric data, photographs, living material and DNA samples collected throughout our Cuban fieldwork of the past few years will help clarify the complex taxonomic situation we observed with these narrow leaflet zamias as well as with Caribbean *Zamia* populations as a whole.

Acknowledgements

I was honored to collaborate in this endeavor with colleagues Ramona Oviedo from the Instituto de Ecología y Sistemática (IES) and Gabriel Brull and Ramiro Chaves from the Empresa Nacional para la Protección de Flora y Fauna (ENPFF) of Cuba along with staff from Cuban botanic gardens and protected areas. *Zamia stricta* photographs were kindly provided by Lian Cabrera-Astraín.

MBC is deeply thankful to colleagues and institutions supporting this amazing project. We thank the ENPFF and the IES for collaboration, permission, and logistics. The fieldwork in Cuba, initially facilitated by Javier Francisco-Ortega of FIU and FTBG, was funded by The National Geographic Society, Charles and Dorothy Sacher, and Dr. Lin Lougheed. Raul Verdecia and the Flora y Fauna protected areas staff provided invaluable field support. Lisbet Gonzalez Oliva (IES) assisted with specimen preparation and morphometric measurements.



Michael Calonje, Cycad Biologist michaelc@montgomerybotanical.org

Background: The mountains of Southeastern Cuba provide great variation in habitat, with many sites favorable for zamias and palms. This view looking south from the Sierra Maestra looks over seasonally dry forest out onto the Caribbean Sea.



Cone color variation: Cuban narrow leaflet zamias show some striking differences in cones between the various populations. These differences were largely ignored in early species descriptions which were primarily based on leaf characteristics. This new information, combined with a careful look at habitat, geography and DNA data may help bring order to this group.



Expedition Team: Zamia angustifolia is often found on dry, upland habitats in areas inaccessible by most conveyances. Much of this fieldwork required hiking up and down steep eroded slopes.



The narrowest leaflets of all: Southeastern Cuba is home to many thin-leaflet zamias, but this population was especially striking for its needle-like foliage. Perhaps this leaflet shape is adaptive for these dry windy habitats, where plumeria, cactus and thornscrub thrive.

The Cacheito Nalm

A Remote Botanical Treasure



Pedro and Patrick collecting a specimen of Cacheito. DNA data from these leaf samples will help botanic gardens to determine the best ways to conserve this living treasure.

This unique species is only known from the southern Dominican Republic. A close relative of Florida's Buccaneer Palm, the Cacheito was officially listed as Endangered in the Red List of the Dominican Republic, due to its restricted range and ongoing reduction in its population size.

6

ur recent joint expedition with Jardin Botanico Rafael Moscoso - the National Botanical Garden of the Dominican Republic – sought to collect seeds and DNA samples of wild Pseudophoenix ekmanii. Though we focused on these scientific specimens, this work also gave us the unique opportunity to see first-hand the current state of this endangered species. Like Pseudophoenix sargentii, its Florida native counterpart, this slow growing, uniquely beautiful palm has been reduced to small numbers. My role on this expedition included being an interpreter – I admit I was worried about whether I was up to that task, but I could not pass up the opportunity to see these palms in the wild.

Pseudophoenix ekmanii – also known as Cacheo de Oviedo or Cacheito – is a rare palm from the southern peninsula of Hispaniola. Growing to 20 feet tall on dogtooth limestone, its dark green



leaves produce strong contrasting leaf scars along the pale gray stem (see photo, Acknowledgements), which swells broadly towards the top before thinning out near the crownshaft – truly a unique look!

Our team consisted of Pedro Toribio Lopez (Jardin Botanico Nacional), Teodoro Clase Garcia (Jardin Botanico Nacional), Jose Manuel (Park Ranger from Parque Nacional Jaragua), Patrick Griffith (Executive Director of Montgomery Botanical Center), and myself. We based our work in Pedernales, a remote town on the Haitian border. After eating breakfast, procuring water and heading out at dawn, Pedro turned the truck south along a limestone track, slowing from time to time to load and unload hitchhikers. After a time, we parked at a ranch to continue on foot.

I thought as a youth working in the Florida climate and in an outdoor career would prepare me for the hike – but by the end of the day I was humbled after descending and climbing a series of steep plateaus for many miles. Any exhaustion I felt was overshadowed by the good news that we were extremely fortunate enough to find palms with viable seeds early in the day. Over the course of two days we collected about 240 DNA samples and as many seeds, spending the evenings cataloging, cleaning and preparing these botanical treasures.

The Cacheito is endangered from poaching, and I was constantly reminded of this while we looked for them on our second day afield. The deeper we hiked into the parque, the more palms we found with trunks freshly carved to obtain sap – a fatal harvest. As a point of reference, these poachings were many miles from the road, showing how motivated the sap hunters were. The cut palms were often many decades old; sadly all of that growth was ended for some money and wine.

If nothing else, this realization shows just how important these conservation expeditions are and how much we can gain from them. We were fortunate enough to collect information, seeds, and samples from this imperiled palm, which can provide knowledge and protective cultivation. Spreading the word about the plight of Cacheito can help ensure its long term survival in this wild and remote corner of the Caribbean.



Xavier Abel Gratacos, Assistant Superintendent xavierg@montgomerybotanical.org

Acknowledgements

This plant exploration was generously funded by DR. LIN LOUGHEED. We thank our great colleagues at the Jardin Botanico Rafael Moscoso –

TEODORO CLASE, PEDRO TORIBIO, FRANCISCO JIMENEZ, RICARDO GARCIA, BRÍGIDO PEGUERO, YULEY ENCARNACIÓN PIÑEYRO and LEMUEL FAMILIA –

for permitting, supporting, and participating in this collaborative field project, which supports IMLS National Leadership Grant # MG-30-16-0085-16.

Putting in the Miles – a Gift from our Treasurer

A garden starts with plants – bringing together green forms, arranged on the land for study and appreciation. But, how do we get out to where those plants are? Thinking about thoroughfares is important, and our very first Master Plan at Montgomery (1961) emphasized circulation through the acreage. People, equipment, plants and vehicles require access to do what they do, and this must be balanced with the look and feel of the landscape.

Walter Haynes, MBC Treasurer,

brings a deliberate appreciation for Montgomery's roadways – supporting numerous projects over recent years. Working in close collaboration with Joe Hibbard, our Landscape Architect, and Mark Smiley, our Engineer, Walter put forth his vision for an improved route through our palm collection – ATTALEA ROAD – and generously gave to make that vision a reality.

From its prior condition as a muddy track, Attalea Road is now truly an "improved surface!" With a carefully considered curve, an ample crown, and a long view forward, the traveler is drawn to the gentle slope of the escarpment and the upward trajectory of the palms.

Please join me in thanking Walter. Roads – sometimes thought beneath one's feet – are truly vital to experience this garden. Walter's generous gift reminds us: *it is not the destination but the journey*.

> M. Patrick Griffith, Executive Director patrick@montgomerybotanical.org

Attalea Road gently curves through the eastern Palm Walk before climbing the Silver Bluff Escarpment

Team News

Always lots of enthusiastic work by our great group at Montgomery! Here are some new developments on the team: **Xavier Gratacos** was recently promoted to Assistant Superintendent. Xavier's new responsibilities include leading the horticulture and landscape team, managing contractors, and implementing special projects (example, page 7). Xavier's promotion follows six great years of increasing responsibility – beginning with a FELLOWSHIP IN CONSERVATION HORTICULTURE (see page 11). **Vanessa Sanchez**, an MSc graduate of the Florida International University (FIU) Biology department, has been hired for her expertise in genetic research, as part of Montgomery's Institute of Museum and Library Services (IMLS) National Leadership Grant. This is the second Montgomery conservation genetics project in which Vanessa has participated. **Leandra Gonzalez** and **Imeña Valdes**, FIU Agroecology and Biology students, were hired as Research Assistants through Montgomery's recent National Science Foundation award to help with post-hurricane restoration of the palm collection. Leandra and Imeña provided much needed help saving our invaluable living scientific collection – uprighting, caring for, assessing and saving damaged palms. **Kristin Boyd** is our recent Tropical Conservation Intern, from the FIU International Center for Tropical Botany. Kristen brought great enthusiasm and hard work to her project of assessing the ecosystem service value of Montgomery's trees – demonstrating just how much the plant collection can help purify the air, stop erosion, and protect our environment.













Nell Montgomery Jennings, Al Jennings, and Marion D. Haynes at the wedding of Nell and Al, 1956.



Marion D. Haynes's 100th birthday photo!

Remembering Marion D. Baynes

On April 28, 2018, Marion D. Haynes passed away at age 104. Marion was our oldest connection to the Colonel and Nell Montgomery. When they were engaged in 1935, Tex Haynes took Marion to Greenwich to introduce her to the Montgomerys. After their marriage in 1936, on their honeymoon, they stopped in to see the Colonel and Nell at their home Elanar in Florida. Tex and Marion remained very close friends of the Colonel and Nell and visited often. When Nell married Al Jennings after the Colonel died, Nell asked Marion to be her matron of honor. We will all miss her – we are fortunate that their names are now attached to the Marion and Tex Haynes Patio between the Guesthouse, where they often stayed, and the Tyson Building.



Margaret Martin volunteering in the nursery at MBC.

Would you like to volunteer? To help Montgomery contact Tracy Magellan or Vickie Murphy at tracym@montgomerybotanical.org vickiem@montgomerybotanical.org

Thank You to Our 2017 Volunteers

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Mir, Gabriella Moore, Dakota Nghiem-Phu, Lan Noblick, Daniela Noguiera, Alejandra Park, Lane Quintana, Cecilia Restrepo, Laura Rodriguez, Luz Sabatino, Elaine Sandoval, Nicolle Selim, Marah Shurman, Bryn Smiley, Karl Dr. Thornton, Cecilia Turner, Gary Tyson, Chris UM Magic of Service Day Whitworth, Alexander

MONTGOMERY BOTANICAL CENTER 2017 COLLECTION INVENTORY

	PALMS	CYCADS	OTHER		PALMS	CYCADS	OTHER
Total Taxa	438	254	551	TOTAL PLANTS	9,744	7,746	2,554
in ground	380	228	536	IN GROUND	6,346	5,349	2,490
in nursery	119	84	29	IN NURSERY	3,398	2,397	64
TOTAL ACCESSIONS	2,320	1,928	2,104	20,044 PLANTS !			
IN GROUND	2,009	1,710	2,066				
IN NURSERY	373	364	43				

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Montgomery apologizes for any omissions or errors in accuracy

Remembering Christopher Tyson - A Gift for Education

Christopher G. Tyson, a gentleman and an expert engineer, passed away in late 2017. Mr. Tyson was known for his tireless good cheer, his passions for travel and chess, and the way he valued and promoted education and knowledge. Montgomery was honored to host a celebration of Christopher's life this Spring, bringing together friends and family to share their memories of Christopher.

To honor the memory of her late husband, Christiane Tyson gave very generously to support Montgomery's Fellowship in Conservation Horticulture, providing training for early-career horticulturists – building the talent pool for this critical work. Christiane's gift meets a Challenge Grant from the Batchelor Foundation – allowing Montgomery to *double the reach* of this very successful program.

"While I am the gardener in the family, Christopher always enjoyed the outdoors and visiting Montgomery, and he had a lifelong affinity for education and educators," Christiane Tyson said. "I am glad to support the training of young horticulturists in Memory of Christopher."

Montgomery is better for having known Christopher, and we are deeply grateful for the generous support of Christiane Tyson and the Batchelor Foundation in support of horticulture education.



Unrestricted Financial Contributions and Hurricane Recovery Support

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FROM THE MONTGOMERY ARCHIVE

EARLIEST KNOWN COLOR PHOTOS OF MONTGOMERY FOUND AT UNIVERSITY OF MONTREAL

Brother Marie-Victorin, a Canadian professor and botanist, was the founder of the Montreal Botanical Garden and made significant scientific contributions to the botany of Cuba. Returning from Cuba to Montreal in March 1939, he stopped over in Miami and spent some time at the Coconut Grove Palmetum (now Montgomery Botanical Center). As a result of this visit Marie-Victorin made four 2"x 2" Kodachrome slides - the first known color photos of Montgomery. The photos are part of the archives of this famous botanist, housed at the University of Montreal. Landscape features such as the Royal Palm Colonnade remain, but many of the individual plants have changed (see page 3).

Prof. Javier Francisco-Ortega

Honorary Member of Montgomery Botanical Center. Dept. of Bio. Sciences (FIU) with an appointment at Fairchild Tropical Botanic Garden



Photo credit: Courtesy of Division de la gestion de documents et des archives, Université de Montréal.