Montgomery Botanical News

Fall/Winter 2025 Volume 33, Number 2

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Advancing Research, Conservation, and Education through Scientific Plant Collections

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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11901 Old Cutler Road
Coral Gables, Florida 33156
Phone 305.667.3800

www.montgomerybotanical.org

Edited by Tracy Magellan

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From the Executive Director

Dear Friends,

Montgomery continues forward! While these pages only include a few highlights, I am delighted to share and celebrate our progress and momentum with you. I detail our work on Palmyra Atoll (pages 6 and 7), and Larry Noblick – Palm Biologist Emeritus – shares his last palm search on behalf of Montgomery on pages 4 and 5.

I remain very grateful for the ways that Larry developed our leadership in palms, and now he passes the torch to María José Sanín, our new palm expert (page 11). María has *hit the ground running* with tremendous enthusiasm and passion for palm research. Already María is a leading voice in how science can advance our understanding and protection of these amazing plants (page 10).

While our work on distant shores and remote mountains continues to bear fruit, the majority of our efforts remain much closer: this year we planted hundreds of palms and cycads grown from these travels, each one deliberately and carefully sited to complement and enhance our landscape, all according to a strategic landscape plan and unified vision for the garden (see pages 8 and 9). All our work to study and collect plants, document botany, and educate students has its roots in this place of compelling beauty, such as shown on the facing page. I am deeply thankful for the way you share our vision and support our progress – Thank you!

MPGriffith

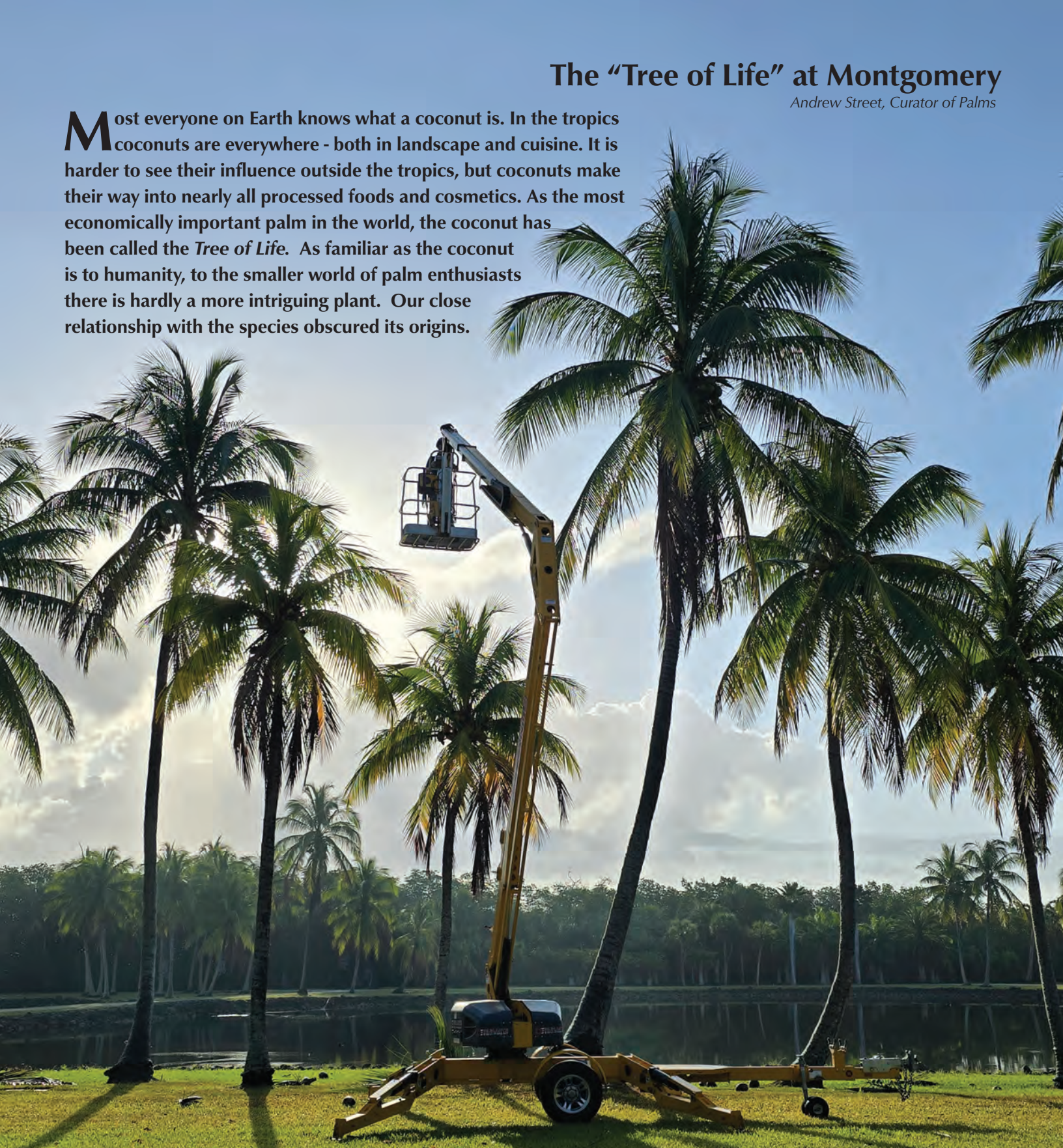
Pictured: Dr. Griffith leads a panel at the 11th International Congress on Education in Botanic Gardens in Seoul, South Korea.

On the Cover: A giant coconut specimen from Fern Island, Palmyra Atoll (see pages 6-7); these coconuts grow up to 18 inches long.

The "Tree of Life" at Montgomery

Andrew Street, Curator of Palms

Most everyone on Earth knows what a coconut is. In the tropics coconuts are everywhere - both in landscape and cuisine. It is harder to see their influence outside the tropics, but coconuts make their way into nearly all processed foods and cosmetics. As the most economically important palm in the world, the coconut has been called the *Tree of Life*. As familiar as the coconut is to humanity, to the smaller world of palm enthusiasts there is hardly a more intriguing plant. Our close relationship with the species obscured its origins.



Given all of this interest and importance, Montgomery grows a significant number of these palms,169 plants of 12 different cultivars and varieties. The plants pictured here on the shore of Coconut Lake (see pages 8-9 and page 12) are "Maypans", a deliberate hybrid made to resist Lethal Yellowing Disease. In the photo, we are using a lift to collect and examine the flowering structures for research. Besides scientific interest, these palms provide an unsurpassed tropical aesthetic to our landscape.

Classic Techniques for a Mysterious Palm

Larry Noblick, Palm Biologist Emeritus

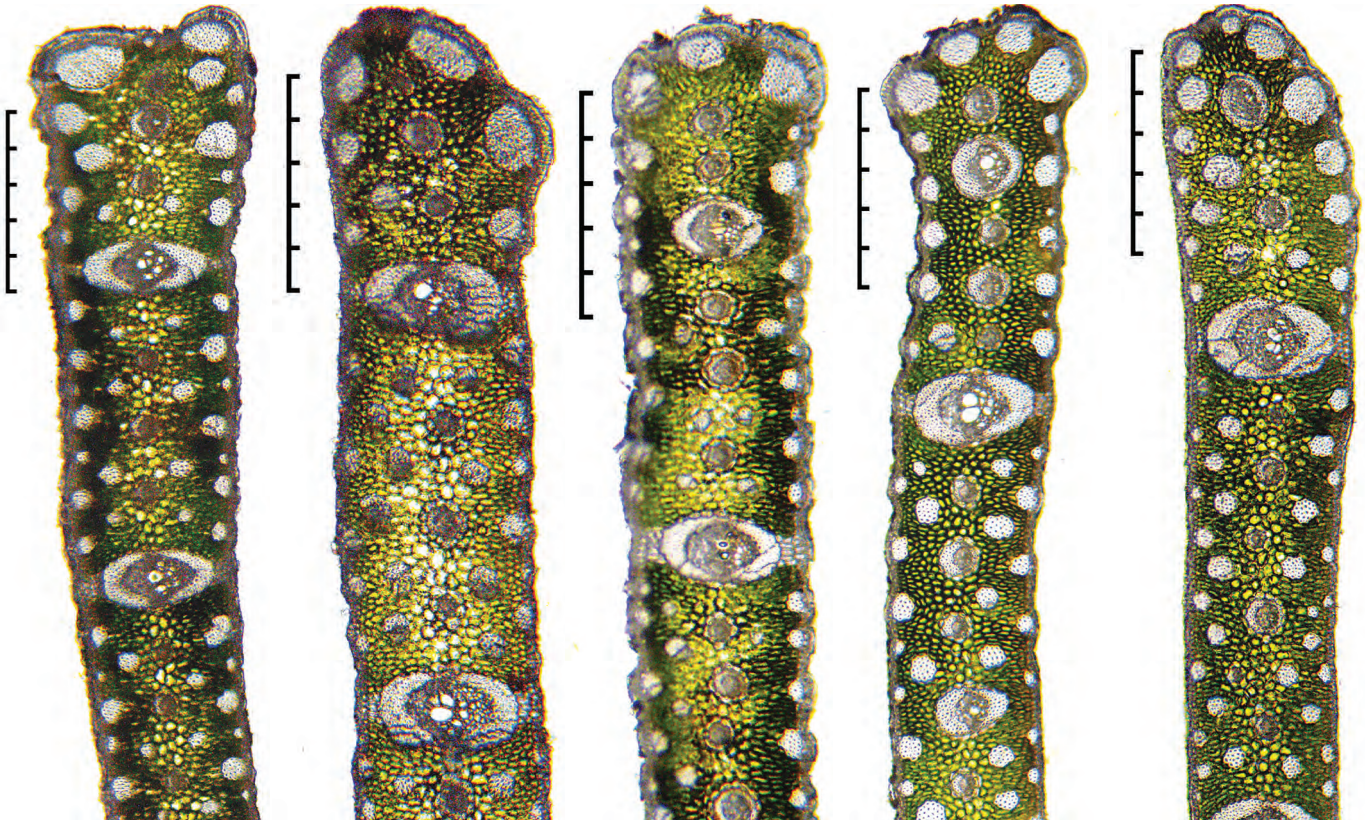
Larry with a large *Phoenix atlantica* in Sal, Cabo Verde.

Cape Verde (Cabo Verde) is a group of nine islands off the West Coast of Africa. Four of these islands, Santiago, Maio, Boa Vista and Sal, are home to *Phoenix atlantica*. The numerous DNA studies that have included this species have placed it close to the common date palm, *Phoenix dactylifera,* or even go so far as to say the Cabo Verde palm is just a feral date palm. The commonly cultivated Middle Eastern *P. dactylifera* spread to Western Africa in antiquity and then mysteriously jumped to these four islands either before or after Portuguese sailors first landed on Cape Verde in 1458.

Last November, Isildo Gomes and I collected seed for Montgomery and Cape Verde to preserve this special palm, not entirely knowing how very special it was. Isildo and I collected seeds and leaflets from all four islands. Many palm specialists have had difficulty distinguishing *P. atlantica* & *P. dactylifera* based on morphology, and have thus resorted to the 21st century process of grinding up its leaflets to compare their DNA.

Instead, Isildo and I decided to use 17th century technology – microscopy -- to look at their internal leaf anatomy. After examining the anatomy of all species of *Phoenix* growing at MBC and several date palms planted around Miami-Dade County, I was not encouraged that we would find any differences, but I was wrong; not only was *P. atlantica* significantly different from *P. dactylifera*, but *P. atlantica* was different from every other *Phoenix* species studied to date, with numerous fibers embedded in the middle of its leaflet margins forming a unique pattern.

Larry collecting fruit of *Phoenix atlantica*.



Leaflet cross sections of *Phoenix atlantica* from the four islands where it is native.

The Wildest of All Coconuts

M. Patrick Griffith, Executive Director

A remote shipwreck in 1802 eventually returned with a brief report, "*abundant cocoa nuts of very large size*" on this specific atoll with "*no inhabitants*." That little-known atoll ultimately took its name from that vessel, the Palmyra. And that one offhand line may have stood out to any botanist with access to those papers, but another century passed before these remote palms received any scientific scrutiny.

It was not until 1913 that Joseph Rock sailed from Hawaii with the goal of documenting Palmyra's flora. Of the numerous plant specimens Rock made, he only gathered four gigantic coconuts – no leaves or flowers – which he mailed to Florence for study by Oduardo Beccari, then the world expert on palms. Naming them *Cocos nucifera* var. *palmyrensis*, Beccari called them the "*largest and finest coconuts*" ever seen. No other specimens were made of this intriguing palm for yet another century. Of those four fruits, only two survive as specimens.

These scant, incomplete reports and descriptions were very compelling, so in November of 2024 I put together a team of experts in search of this living treasure. Rumor was that the number of palms on the atoll were being reduced, so time was tight.

We were delighted to confirm that the Giant Palmyra Coconut still thrives, but unfortunately is threatened by exotic introduced coconuts. Our colleagues in the US Fish and Wildlife Service are diligently working to restore the site. The living collections and specimens we returned with – the first such specimens in over 100 years – now provide a fuller record of these poorly known plants, and give some assurance against extinction. Our findings show that these long-fruited, small-seeded coconuts closely match with the archetypal 'wild type' coconut predicted by past authors, a fruit that may have sailed the blue waters of the Pacific well before any voyagers.

Some of the massive *Cocos nucifera* var. *palmyrensis* fruits with a much smaller feral coconut for comparison. We are grateful to the USFWS for their diligence in removing exotic coconuts to help preserve the unique native variety.

Riccardo Baldini, Fred Stauffer, Patrick Griffith, Kevin McLaughlin and Jason Gerrish on the original runway from 1941. Access to Palmyra is by approved watercraft or aircraft only. We saved weeks of time by traversing the 1,000 miles between Honolulu and this very basic airstrip via this small jet.

The team searching for giant coconut specimens. Given the large fruit and remote location, helmets were mandatory.

This study was conducted at The Nature Conservancy's (TNC) remote Pacific preserve and research station on Palmyra Atoll, within the United States Fish and Wildlife Service (USFWS) Palmyra Atoll National Wildlife Refuge, further protected by the Pacific Islands Heritage Marine National Monument. We are deeply grateful to TNC and USFWS for permission, guidance, and support. This project was funded by Montgomery Botanical Center's Plant Exploration Fund and the Department of Biology of the University of Florence and carried The Explorers Club Flag # 186.

Montgomery maintains over 6 acres of salt water lakes, which rise and fall with the tides, and connect to the mangroves of Biscayne Bay via culverts. These lakes support a variety of wildlife, but the main function here is to provide vistas that enhance the landscape. Like the open fields they were before dredging in the 1930s, these lakes now provide a distance from which to appreciate the plant collections, and on still days the reflection provides a stunning scene.

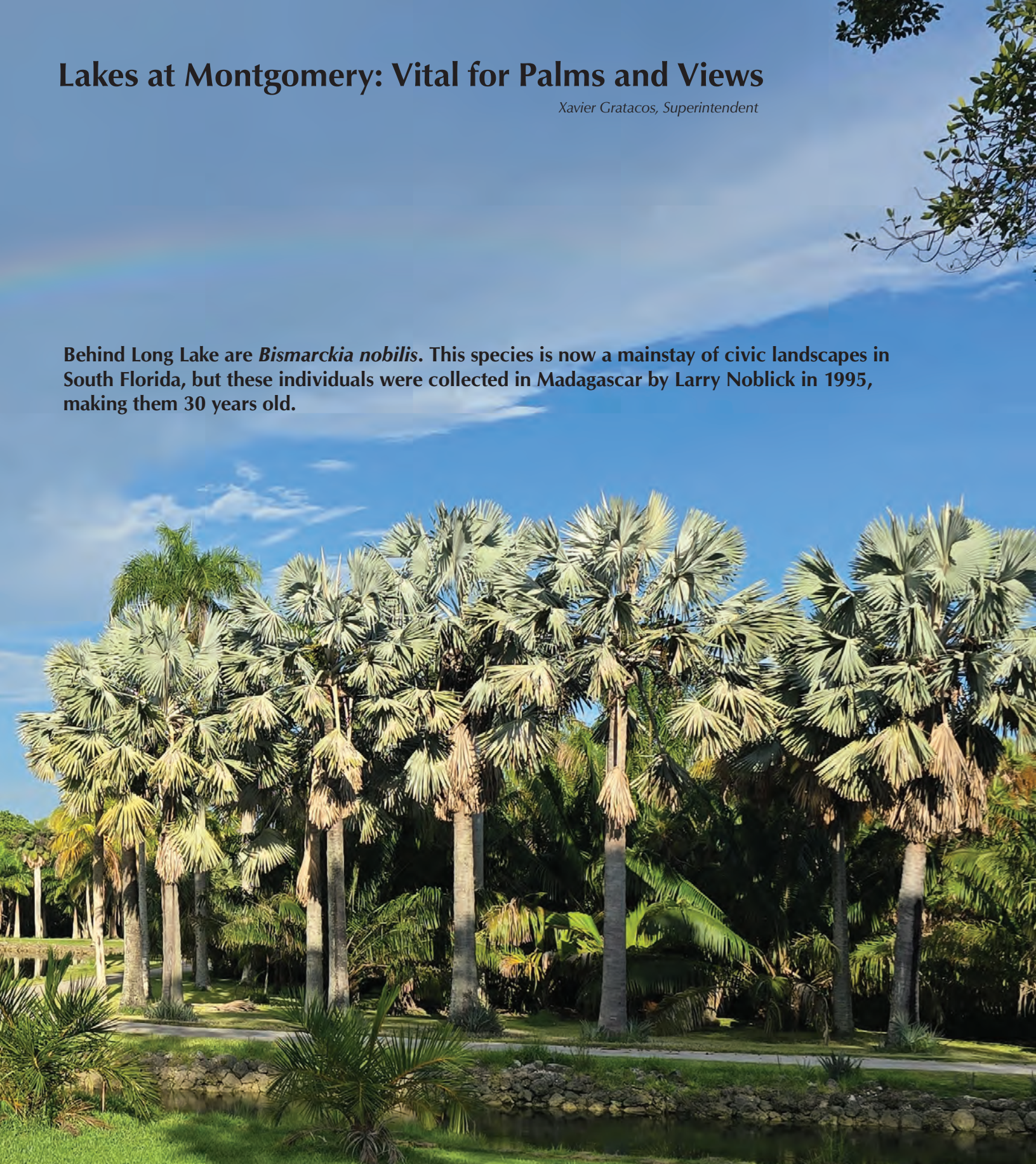
At the center of our water features is Coconut Lake, which takes its name from the extensive *Cocos nucifera* plantings along its shores (see pages 3 and 12), and is separated from Royal Lake by a causeway that dates back to 1938.

Each of these *Cocos* were added to the landscape as part of a deliberate architectural layout, framing the lake and its adjacent vistas, and adding a compelling grace and a tropical aesthetic to Montgomery. Coconut Lake and its adjacent plantings are a primary viewshed for the lowland palmetum. Next year's Palmyra Coconut plantings (see pages 6 and 7) will also be integrated according to that vision and plan.

Lakes at Montgomery: Vital for Palms and Views

Xavier Gratacos, Superintendent

Behind Long Lake are *Bismarckia nobilis*. This species is now a mainstay of civic landscapes in South Florida, but these individuals were collected in Madagascar by Larry Noblick in 1995, making them 30 years old.



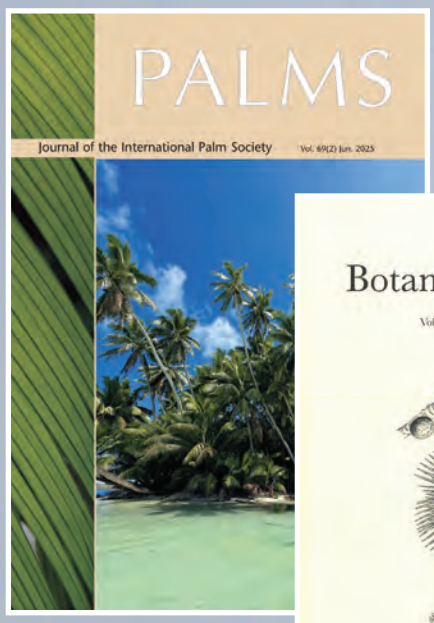
Long Lake lies in the foreground and runs parallel to the Silver Bluff Escarpment. The young palms planted on its shore are *Raphia australis*, a palm species that dies after flowering. These individuals, germinated in 2021, are the offspring of the original palms collected in South Africa in 1999, which 23 years later flowered and perished.

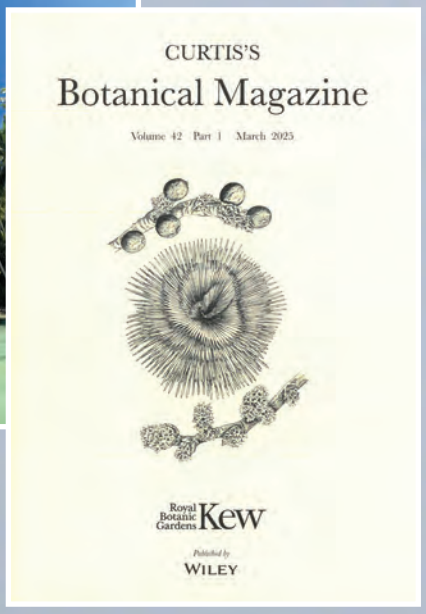
Research Updates

Montgomery continues to advance knowledge of palms and cycads through studies in field and lab.

✳ María José Sanín (see facing page) supervised a study of *Geonoma undata* (background image) and its relatives in the Northern Andes, where these palms are in the process of separating into new species. Using Genomic data, María's student, Carmen Webster, identified the genes that help the divergence of these palms. The paper appears in Genome Biology and Evolution.

✳ A letter in Nature Reviews Biodiversity envisioned how these kinds of studies must be greatly expanded in the tropics in particular. María was joined by her colleagues in New York and Los Angeles in this call to action.





✳ Two studies of iconic palms and cycads in the latest issue of Curtis's Botanical Magazine involved Montgomery: a profile of *Encephalartos woodii* coauthored by Michael Calonje, and an in-depth history of and treatment of *Copernicia macroglossa* written by Javier Francisco-Ortega. Both papers feature original art, and the latter paper was featured on the cover of the March issue.

✳ Patrick Griffith and his colleagues present their findings from Palmyra (see pages 6 and 7) in the latest issue of Palms. The paper provides a full botanical description of the distinct palm variety known from that atoll, based on the first specimens collected in over 100 years. The paper was also featured on the cover.

For more information see our website montgomerybotanical.org.

Team News


Kayla


Alice


McKenzie


Laura


Meredith

This summer we welcomed three new East Carolina University students - **Kayla Heaton**, **Alice Furman**, and **McKenzie Perry** - with expertise in GIS who worked on updating our mapping and database system. Our Honorary Member Lyman Dickerson made a generous donation to support these students and also to improve our GIS hardware, allowing for modern training capabilities for the students.

Laura Diaz Cedeño, our Robert K. Zuck & Peter R. Jennings Intern, is working on surveying the nodulation of palm roots and leaf traits that inform functional ecology. **Meredith Molinari**, our Peter R. & Stuart Y. Jennings Intern, is grafting *Cycas hongheensis* on *Cycas revoluta* rootstock and also quantifying tomentum density and functional significance in the *Dioon* genus. We are grateful to our Honorary Member Peter Jennings for endowing these internships, which provide bespoke training in plant sciences for early-career botanists.

We are excited to announce that our new Palm Biologist, **Dr. María José Sanín**, joined the Montgomery Team in May. Since coming aboard she has already collected numerous palm seeds from Colombia which are germinating and developing in our nursery, and has published some cutting edge papers (see facing page). María's expertise in genomics, population ecology and conservation perfectly augment and complement our work. Plans are developing for many future palm projects!

María José Sanín with *Attalea butyracea* in Valle del Cauca, Colombia. She is working on population genetics / phylogeography of the different forms of this widespread species and generating a new whole genome reference.


María José Sanín

MONTGOMERY BOTANICAL CENTER
11901 Old Cutler Road
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FROM THE
MONTGOMERY ARCHIVE

Coconut Lake, Early 1930s

This photograph shows our Founder, Nell Montgomery, sitting with her collection of coconut palms. Coconut Lake takes its name from the broad collection of coconut varieties planted here, started by Colonel Montgomery in 1932.

Given the importance of the plant (see page 3), Montgomery's *Cocos* collection grew from the input and care of many experts over the years. Nell planted a number of experimental hybrids from the Florida Division of Forestry's "Miami Coconut Seed Orchard" in the 1980s. After Hurricane Andrew, our Board consulted with David Romney of the Jamaican Coconut Industry Board to plant newly developed varieties around the lake. Alan Meerow of USDA's Chapman Field Station provided genotyped Fiji Dwarf Coconuts in the early 2000s. All of these palms were widely used to teach plant science, most memorably by Barry Tomlinson who chainsaw-dissected at least one entire coconut palm annually for his tropical botany class. Our recent fieldwork in Palmyra (see pages 6-7) builds upon that long history of coconut collecting and study.