

Montgomery Botanical NEWS

Advancing Research, Conservation, and Education
through Scientific Plant Collections

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MBC AND USDA STUDY RARE CYCADS OF JAMAICA

The “Caribbean zamias” are a group of related plants occurring in Florida and Georgia, the Bahamas, Puerto Rico, Cuba, Hispaniola, the Cayman Islands, and Jamaica. They share several features including subterranean clumping stems, smooth petioles, and the same basic chromosome number. They are also taxonomically controversial. Over 40 scientific names have been published for Caribbean zamias, but currently between one to six species are accepted by experts. Included in this group is a zamia that grows wild on MBC’s property, commonly known as the “Coontie” but called many different names, including *Zamia pumila*, *Z. integrifolia*, and *Z. floridana*.

Caribbean zamias are a primary focus for Montgomery Botanical Center’s (MBC) *ex situ* research and conservation collection: they are poorly understood plants, highly threatened by habitat destruction and over-collection. As South Florida is within the Caribbean basin, MBC has the optimal environmental conditions to cultivate them. MBC has led expeditions to collect Caribbean zamias in The Bahamas (2002), Puerto Rico (2003), and Florida (2005).

From February 8-13, 2008, we had the unique opportunity to participate on collaborative research in Jamaica with botanist Andreas Oberli of the Plant Conservation Centre in Kingston, Jamaica. Along with Dr. Javier Francisco Ortega of Fairchild Tropical Botanic Garden and Dr. Dennis Stevenson of New York Botanical Garden (NYBG), we are conducting

DNA studies of the Caribbean zamias. Results of this research will increase understanding of genetic variation within the group and help develop conservation priorities.

FIELDWORK

During the Jamaica 2008 expedition, we visited five populations of *Zamia* comprising three different forms. One form is a large plant with long narrow leaflets known in cultivation as the “Jamaican Giant.” The only population of this form known prior to this expedition was visited in 2003 by Sabra Turnbull for her Ph.D. research with NYBG. She reported that development was occurring throughout the population, and mature plants were being illegally harvested from the area. Exactly five years after her report, we found all large plants in the population had been removed. Only immature plants or small

male plants remained. Fortunately, we discovered another large, actively reproducing population of this form with several thousand plants.

We also visited two populations of *Zamia amblyphyllidia*, a clumping plant with wide leaflets. This species is probably the most threatened in Jamaica, as it is very sparse along the western coast of Jamaica and is highly threatened by tourism development. The few plants we found were far apart from each other and reproduction was very low, with many female cones failing to set seed.



Ripe cones of narrow-leaflet *Zamia* surrounded by seedlings

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The last form we visited had slightly narrower leaflets and longer leaves than *Z. amblyphyllidia* and was well separated geographically. Interestingly, these plants rarely clumped, and often produced aerial stems up to 50 cm tall. If this characteristic remains in cultivation, it would be unique among Caribbean zamias. This population is the only known population of this form, with fewer than 600 plants, too scattered for reproduction to be effective. Many seedlings from this population lack pigment, which may indicate inbreeding depression.



Narrow-leaflet zamia ("Jamaican Giant")
Alan Meerow (foreground) and Andreas Oberli

CONSERVATION AND RESEARCH

With the exception of the single, large population of the "Jamaican Giant", the *Zamia* populations we visited were small, sparse, and highly threatened by habitat destruction and illegal harvesting, which we witnessed first-hand. The Jamaica 2008 expedition extended our biogeographic knowledge and understanding of Jamaican zamias, and secured valuable germplasm and genetic samples for scientific research and *ex situ* conservation at MBC and the USDA National Germplasm Repository. We are grateful to the National Environment and Planning Agency of Jamaica for granting us permits. Genetic analysis will uncover more information about *Zamia* populations, how these populations are related to each other, and where they fit within the *Zamia pumila* complex. Seeds collected during this trip have sprouted and are now healthy one-leaf seedlings at MBC's nursery.



Andreas Oberli with
arborescent zamia

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MBC RESEARCH HIGHLIGHTS

- *Assembling the Tree of Life* (AToL), a large scale NSF-funded project, is making extensive use of the MBC collections. **Dr. Damon Little** and **Dr. Dennis Stevenson** of the New York Botanical Garden have collected cycad material from almost every species at MBC; **Dr. Sarah Matthews** of Harvard used many of the Tropical Conifer collections; Dr. Stevenson, **Dr. Wendy Zomlefer** of the University of Georgia, and **Dr. Jerry Davis** of Cornell collected from our palms.

- Recent M.S. graduate **Ian Cole** performed a phytochemical study on *Nypa*, investigating metabolic differences over time. Ian has begun doctoral study at The New York Botanical Garden this fall.

- **Dr. John Dowe**, Montgomery Botanical Research Fellow and Scientist at the Australian Centre for Tropical Freshwater Research studied biogeographic variation in palms, and collected data from *Sabal* populations in Florida, in collaboration with **Dr. Larry Noblick**.

- The *Attalea* collections were recently studied by **Jason Schonmann**, doctoral student at The University of Texas at Austin. Jason is investigating how *Attalea* species are related. UT graduates Lee (Marine Science, 1973) and Patrick (Botany, 1998) were happy to hear about how plant sciences are going in Austin.

- The MBC team also published a study on hurricanes and natural selection in palms. **Dr. Patrick Griffith**, **Dr. Larry Noblick**, **Dr. John Dowe**, **Chad Husby** and **Michael Calonje** authored the work, which appears in a recent issue of *Annals of Botany*. Among the conclusions: Caribbean palms are more tolerant of high winds than other palms.