



MONTGOMERY BOTANICAL CENTER

*Advancing Research, Conservation, and Education
through Scientific Plant Collections*

FUNDING REPORT

PREPARED FOR THE ASSOCIATION OF ZOOLOGICAL HORTICULTURE
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MBC Conservation Horticulture Project:
Zamia prasina in Belize | August-September 2008



Cycad Conservation Horticulture Project

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Zamia prasina is found in a very specialized habitat in limestone sinkholes. This attractive cycad species may have great horticultural potential, especially for use with living animal collections.

SUMMARY

The 2008 Belize Cycad Conservation project surveyed native cycad populations in Belize, obtaining valuable phytogeographic, botanical, and demographic data. Germplasm for *ex situ* horticultural conservation was obtained, and voucher specimens were deposited in Belize and in the United States. The project represented collaborative efforts between Montgomery Botanical Center and Green Hills Botanical Collections, Belize. Generous support of the Association of Zoological Horticulture (AZH) enabled the project.

INTRODUCTION

The country of Belize has a tropical to subtropical climate, with great variation in rainfall, a great diversity of habitat types, and a low population density relative to other nearby areas of Central America. These factors intersect to support abundant botanical diversity. Forty-four taxa of Arecaceae (palms) and four cycad species are known to occur in Belize (Balick *et al.*, 2000).

The 2008 Belize Cycad Conservation project, funded by the AZH, enabled fieldwork in support of *ex situ* conservation, and basic botanical research, focused around a Belizean endemic cycad, *Zamia prasina*.

Information on *Zamia prasina* is very scarce, and it has been collected very few times in the last 120 years. *Zamia prasina* is considered endemic to remote areas of the Maya Mountains, in southwest Belize, Toledo District. Previous MBC-supported work (Janovec, 1999; Janovec and Neill, 2003) located and collected from two very limited populations, and this information has been used for conservation assessments (Donaldson, 2003). The



IUCN assessment noted that populations were trending towards decline, and that less than 100 plants were known. The low reported population, reported decline, and rarity motivated MBC to act to conserve this species.

FIELDWORK

Fieldwork to study and collect *Zamia prasina* was conducted in August and September of 2008. The Project Team was able to devote 6 full days of field survey and collecting work for *Zamia prasina*, not including time for travel, permitting, coordination, and specimen processing. Due to the generous support of the AZH, we were able to explore limestone mountains in the far southwestern Toledo District, including two large, remote sinkhole systems.



Female cones of *Zamia prasina*.

COLLABORATION

This project was designed, planned, and achieved through direct collaboration. Montgomery Botanical Center is deeply grateful for the generous assistance of the AZH for providing major support for the project. Additionally, we are very grateful for the participation and support of the following individuals and organizations:

- * Jan Meerman of Biodiversity & Environmental Resource Data Systems of Belize provided botanical expertise, and facilitated efficient planning of fieldwork.
- * Green Hills Botanical Collections donated significant in-kind support by providing lodging, equipment, and work infrastructure.
- * Geoff Hoese of Austin volunteered his time, providing expert guidance on cave and sinkhole systems, and collecting field data.
- * Valentino Tzub of Toledo District provided expert guidance for the most remote field sites, and coordinated camp logistics and pack train.
- * The Belize Forest Department granted permission and provided herbarium infrastructure for preservation of voucher specimens. Special thanks to Chief Forest Officer Wilber Sabido and Herbarium Curator Hector Mai at the Belmopan Forest Department Headquarters for assistance with permitting.
- * Edam Cal, Mariano Ack, and Julio Ico provided guidance for field sites.

OUTCOMES

This work expanded our understanding of the distribution, ecology, habitat, and demographics of *Zamia prasina*. New collaborative research will be forthcoming, and this information will be used for updating conservation assessments.



Specific conservation and research outcomes include:

1. *Zamia prasina* germplasm for *ex situ* conservation collections, divided between Green Hills Botanical Collections, Belize Botanic Garden and MBC.
2. Extensive documentation of demographic, morphometric and ecological data on *Zamia prasina* populations
3. Voucher specimens deposited at BRH (Belize Forest Department) and FTG (Fairchild Tropical Botanic Garden). Duplicate specimens will be deposited at other major herbaria in the U.S.
4. Specific outcomes related to the NABGSPC (see Appendix A).



Members of the project team (Valentino, Patrick, and Michael) gathering data on *Zamia prasina*.

REFERENCES

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FUTURE OUTCOMES

This project has laid the foundation for further research and conservation work:

- *Botanical research publications are forthcoming.
- *As germplasm develops and is further propagated, seed will be made available widely to botanic gardens, zoological gardens, and other conservation-based organizations.

APPENDIX A: NORTH AMERICAN BOTANIC GARDEN STRATEGY FOR PLANT CONSERVATION OUTCOMES

A goal of AZH-funded work is to advance the (2006) North American Botanic Garden Strategy for Plant Conservation (NABGSPC). This project's outcomes support the NABGSPC as detailed below:

A. Understanding and Documenting Plant Diversity

A1. The current project responded directly to this target. MBC collected extensive and detailed field data, photographs, and herbarium specimens during this project. The resulting collections will continue to be documented through horticultural, phenological, and life history data, to further increase the conservation and scientific value of the *ex situ* collection. All these data are inputted into MBC's database and GIS applications and are available to researchers and conservation institutions throughout the world.

A2. MBC staff, which includes members of the IUCN Cycad Specialist Group, contribute data acquired during expeditions to update cycad conservation assessment databases by the Species Information System (SIS) of the IUCN.

B. Conserving Plant Diversity

B2. MBC's plant collections set a high standard for *ex situ* conservation collections, due to: (1) extensive data associated with each accession; (2) populational structure of collections, which maximizes capture of genetic diversity, and; (3) long-term commitment to *ex situ* population conservation collections as an undiluted focus of the institution.

B6. MBC's research activities are fully integrated with its *ex situ* conservation operations. This collecting expedition included phytogeography as an integral component of the conservation mission. Collections-based research and assessments at MBC contribute to the strategic implementation of conservation methods in the botanic garden community.

C. Using Plant Diversity Sustainably

C1. Subtarget 3: MBC is committed to rigorous compliance with all sovereign and international laws regarding permitting, exportation, and importation, including CITES, USDA, and other applicable regulations. This work was conducted under Belize Forest Department permit CD/60/3/08(45), and CITES certificate of Scientific Exchange # 06US792094/9.

D. Promoting Public Education and Awareness About Plant Diversity

D1. With MBC's primary focus on population-based, *ex situ* conservation and research collections, all visitors to MBC are made aware of the primary importance of plant conservation and populational diversity.

E. Building Capacity for Conservation of Plant Diversity

E6. MBC shares its expertise in *ex situ* conservation approaches and methods as widely as possible, to national and international collaborators. MBC views its collecting expeditions as part of a longer term partnership in support of botanical research and conservation. Publication resulting from this project will be jointly authored among collaborators in Belize and the United States.

F. Supporting the North American Strategy

F1. The current project demonstrates MBC's support of the above areas of the North American Strategy.

