



ENCHANTED BY FERNS ON LA ISLA DEL ENCANTO

BY JENNIFER POSSLEY

PHOTOS BY JAMES LANGE AND JENNIFER POSSLEY

One of the many perks of being a botanist in subtropical South Florida is that we reside in the sweet spot between temperate and tropical zones, and much of our flora has biogeographical roots in the West Indies. If you learn to identify the native species in Miami, then you are also learning to identify many West Indian species, or at least their close relatives. This is one reason why we look forward to using our experience with Miami's ferns to promote fern conservation throughout our region.

And so it came to pass that in early 2016, Fairchild Field Biologist Jimmy Lange and I found ourselves in western Puerto Rico for 11 days, at the invitation of U.S. Fish & Wildlife Service (USFWS) biologists. This was the South Florida Conservation Team's second visit to the area in recent years, and we were once again dedicating half of our trip to Puerto Rico's endemic, federally endangered ferns (the rest of our time was spent on the endemic flora of the Sierra Bermeja region, which was profiled in Dr. Joyce Maschinski's summer 2015 article in *The Tropical Garden*).



1. *Danaea elliptica*
2. *Pleopeltis polypodioides*
3. View of mountains near Yauco
4. *Odontosoria aculeata*

Our pteridological (fern-related) goals on this excursion were many, but first and foremost was to locate federally endangered fern species and collect material for propagation. The fern species we sought included *Tectaria estremarana*, *Polystichum calderonense*, *Cyathea dryopteroides*, *Adiantum vivesii*, *Thelypteris yaucoensis* and *Elaphoglossum serpens*.

By the end of this second trip, we had succeeded in collecting spores from four of these six species. From our bounty of spores, Fairchild’s horticulturist, Mike

Freedman, set about developing spore propagation protocols. We reported Mike’s results to USFWS, which will use them to inform its endangered species recovery plans. Some of the ferns Freedman has grown will be displayed at Fairchild; others will be kept in our nursery until they are ready to ship to our Puerto Rican colleagues. In the meantime, when these ferns reach maturity, we will collect their spores to send to long-term storage at the U.S. Department of Agriculture, further safeguarding their germplasm.



A new goal introduced for this recent trip was to collect tissue and herbarium specimens for taxonomic research. Fern taxonomy can be complicated, stemming from the fact that ferns are notorious for hybridization as well as extreme variability in form. Many of our target species have outstanding taxonomic questions whose resolution will be extremely important for their recovery. One might be a hybrid, while another might be a geographic variant of a more common species. USFWS needs to know these details so that they can best protect each species.

To untangle these taxonomic knots, we sought out two experts in fern genetics: Dr. Emily Sessa from the University of Florida, and Susan Fawcett from the University of Vermont. Lange and I may have had the fun part of the job, collecting the material, but Sessa and Fawcett's work has the potential to change Puerto Rican fern taxonomy. In order to obtain enough material for Sessa and Fawcett, we collected pieces of fern fronds from the target species and also from close relatives (Sessa says this helps her to build a phylogeny, which shows how species are related to one another). This



- 5. *Adiantum pyramidale*
- 6. *Thelypteris hildae*
- 7. *Neurodium lanceolatum*
- 8. *Polystichum calderonense*
- 9. *Diplazium* sp.
- 10. *Dicranopteris pectinata*
- 11. *Asplenium erosum*

meant that Lange and I needed to learn to recognize a good deal more than just our six target species, which we eventually did with the help of George Proctor's book "The Ferns of Puerto Rico and the Virgin Islands," as well as help from Puerto Rican botanists, and by studying specimens in the University of Puerto Rico herbarium. By the end of our trip, we had collected 50 tissue samples for Sessa and Fawcett, learned many new (to us) species, and (most humbly) realized how much more we still had to learn.

EDITOR'S NOTE

All collections were covered by a permit from the Puerto Rico Department of Natural and Environmental Resources; and all activities were coordinated with U.S. Fish and Wildlife Services Caribbean Ecological Services Field Office (CESFO) and the Puerto Rico Department of Natural and Environmental Resources (PRDNER). Thank you to our partners in these efforts to conserve endangered endemic ferns of western Puerto Rico, including Omar Monsegur, Xiomara Labiosa, Iván Llerandi Román, JP Segarra, Jen Valentín and José Cruz Burgos (USFWS, CESFO); Emily Sessa (University of Florida, Department of Biology); Susan Fawcett (University of Vermont, Department of Plant Biology); Jeanine Velez, Carlos Santos Flores, Benjamin Van Ee and Eugenio Santiago (University of Puerto Rico); and Jose Sustache (PRDNER).

Working with the ferns of western Puerto Rico is especially rewarding for us, in part because we love visiting our familiar Miami ferns in a truly tropical Caribbean setting. Additionally, this work has put us in touch with collaborators from a wide range of backgrounds, all of whom share a passion for rare fern conservation. We are thrilled that we have received funding to return to western Puerto Rico in winter 2017 to continue this work. I hope that some of our photos included here convey the beauty and diversity of these plants, as well as the commitment of those of us who are working to save them. 