

Pseudophoenix Sargentii: Searching for Seeds on Elliott Key

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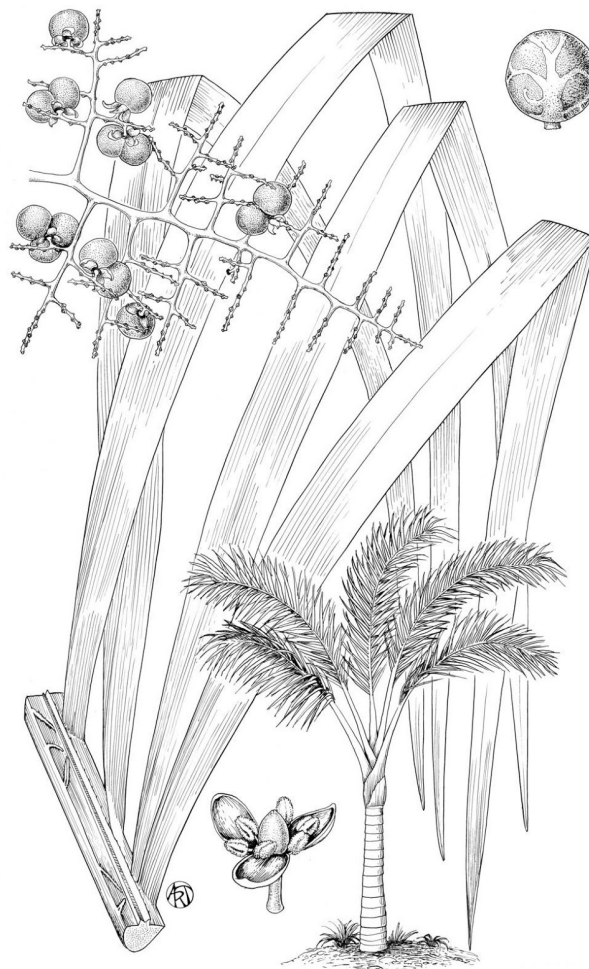
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Located in one of our nation's most ecologically unique national parks, Florida's only native wild population of *Pseudophoenix sargentii* H. Wendl faces extinction on Elliott Key. It is often referred to as the Florida Cherry palm, due to their bright red fruit, and/or Buccaneer palm, after the pirate legends that sailed through the upper keys in the 18th and 19th centuries. *Pseudophoenix sargentii* is considered critically imperiled in South Florida, but globally vulnerable (Institute of Regional Conservation 2016).

Pseudophoenix sargentii is an island species primarily scattered throughout the Caribbean with isolated populations found in the Yucatan and Central America (Zona 2002). Described as a small to medium sized palm with pinnate-leaves, its height ranges between 4 to 8 meters (Read 1968). In the U.S, *Pseudophoenix sargentii* was originally found on Long Key, Sand Key, and Elliott Key. The populations on Long and Sand Key are now extinct with the remaining wild U.S. population found only on Elliott Key (Lippincott 1995).

Located about 11 miles off the coast of Florida, directly east of Homestead, Florida, Elliott key is

nestled between Biscayne Bay and the Atlantic ocean. To the north sits Sands Key, and to the south, Old Rhodes Key, all of which are located above Key Largo (Klein 1970).



Alice Tangerini, "*Pseudophoenix sargentii* (Arecaceae). tree, leaf segment, inflorescence, flowers" 1977, ink on paper. U.S. National Herbarium, Department of Botany, National Museum of Natural History, Smithsonian Institution

The island itself is about 7-8 miles long with a width that ranges from 1 mile to just below half a mile. The average elevation throughout the island is about 3 feet with some areas reaching up to 5-8 ft of elevation mainly along Spite Highway, a road that runs longitudinally through the center of the island (Klein 1970).

After a history that involved the Tequesta, Ponce de Leon, and pirates, the Sweeting Family were some of the first homesteaders to establish themselves on Elliott Key in 1882. Once there, they developed 30 acres of their homestead into a pineapple, key lime, sapodilla, and tomato farm (Niemic 1996).

Despite hurricanes and other natural disasters that affected life and business for these original homesteaders, Elliott Key remained under the ownership and use of the

Sweetings and their neighbors until the great depression of the 1930s. Eventually, financial difficulties forced the original owners to vacate the island

and their land was subsequently purchased to build vacation homes (Niemic 1996).

In the 1960s, developers planned to build a highway, luxury homes, and even oil refineries on Elliott Key and the surrounding islands, which sparked a battle with environmentalists. In an attempt to derail environmental preservation efforts, the developers cleared a wide thoroughfare through the center of the island which would later be called Spite Highway. Despite their efforts, environmentalists succeeded and Elliott Key became part of what is now Biscayne National Park (Niemic 1996).

It is to no surprise that with the frequency of hurricanes, storm surges and the land's high permeability, the plants must be adaptable to the occasional rush of high salinity in order to survive. When walking through the coastal hammock that characterize the untamed areas of the island, you see mostly native plants such as *Agave decipiens*, *Bursera simaruba*, *Caesalpinia major*, *Chiococca alba*, *Coccoloba uvifera*, *Conocarpus erectus*, *Eugenia axillaris*, *Laguncularia racemosa*, *Metopium toxiferum*, *Nectandra coriacea*, and *Thrinax radiata*.

The discovery of *Pseudophoenix sargentii* H. Wendl is directly linked to the origins of the genus itself. On April of 1886, C.S. Sargent and associates arrived on Elliott key at the Pineapple plantation of one Henry Filer. There the company noticed a small pinnate-leaf palm, which at first, Sargent believed to be a Royal palm until further inspection. Sargent sent a specimen of the palm to his colleague Dr. Hermann Wendland in Germany who concluded the specimen was not just a new species but that it belonged to an entirely new genus! Wendland dubbed the new genus as *Pseudophoenix* meaning "False-date palm" because of the resemblance between the two (Small 1922, Tasker 2014).

At the time, Sargent had documented there only being six palms on the island (Magellan and Griffith 2017). While more recent documentations have noted a higher population, this only reinforces the fact that *P. sargentii* has had a historically low population on Elliott Key. Decline of the population could also have been a result of habitat destruction by plantation farming and developing lands.

In 1990, Dr. Carol Lippincott, spearhead an ex-situ conservation effort by Fairchild Tropical Botanical Garden and Biscayne National Park to repopulate the island with seedlings germinated from wild seeds collected in the 1980's. During this time, it was documented that there were only 47 wild palms on Elliott Key. In 1992, Florida experienced one of the strongest hurricanes recorded to date, Hurricane Andrew. Data following the hurricane, revealed that there we only 28 living *Pseudophoenix sargentii* remaining on the island (Lippincott 1995).

Following a period of active cyclonic activity in the early 2000s (NOAA 2018), an expedition in 2012 found that there were only eight wild adults of the 28 previously noted (Fotinos, et al. 2015). In 2015, Tracy Magellan, accompanied by Jeremy Schnall, sailed out to Elliott Key to survey the status of the remaining palms and collect seeds. This initiative was supported by Montgomery Botanical Center (MBC) with the intention of collecting seeds to add to the genetic diversity of their current collection of *Pseudophoenix sargentii*. Though MBC had specimens from five different countries throughout their native distribution, the genetic population from Elliott Key was not represented. The result of the 2015 expedition noted that there were only three remaining wild adults, demonstrating the wild palm's further decline. It is unknown if the impact of Hurricane Sandy in 2012 contributed to that loss. Unfortunately, their efforts to collect viable seeds were unsuccessful (Magellan and Griffith 2017). Four years later, MBC Conservation Horticulture



Figure 1. First palm being crushed by adjacent fallen tree.

Fellows, Christina Chavez, Daniela Noblick, and Eliza Gonzalez conducted another status and seed collection investigation. After chartering a boat from Biscayne National Park, they arrived on Elliott Key on April 1, 2019 at 8:30 a.m. Once on the trail, they were quickly surrounded by a relentless and ever-present swarm of mosquitoes. Arriving at the GPS coordinates they were quick to notice the first adult palm was being crushed by an adjacent fallen tree (Fig.1). The full weight of the tree was pressing down on the crown of the palm, severely damaging the apical meristem. What would otherwise have been a healthy reproductive adult, has little to no chance of recovery. Although there were dried infructescence branches still attached to the dying palm, no seeds were found. After a quick reprieve, they were unsuccessful in locating the second palm on the first day.



Figure 2. Remaining stump of the third palm.

On April 2, 2019, they searched for the third palm with the intention of backtracking to locate the second individual missed on the previous day. The

third palm was located at 11 a.m. and was found dead with its degraded fronds decomposing nearby. After collecting the necessary data they were able to locate the second individual just a short trek away. This palm was found to be alive, however, no seeds were found. Much like the first, it also had old infructescence branches still attached. The habitat surrounding the second adult palm was overrun with *Thrinax* spp.



Figure 3. Second palm was found alive, the last remaining wild adult *Pseudophoenix sargentii* on Elliott Key.

In summary, the 2019 expedition to Elliott Key found only one living wild adult *Pseudophoenix sargentii*, one in irreversible decline, and no available seeds to collect. This shows a drastic decline from the 2015 expedition conducted by Tracy Magellan and Jeremy Schnall, and in a span of nearly 30 years, the entire wild population has nearly perished. The root cause of this drastic decline is unknown, but it can be speculated that a period of hurricane frequency and severity, rising tides affecting salinity, disease, or natural senescence could be to blame.

In the surrounding area of the first palm it was ob-



Figure 4. Seedling growing at the base of older Fairchild planting near first palm.

served that one of the taller Fairchild plantings had a smaller seedling growing at the base of its trunk. Given its proximity and height, it could be assumed that the seedling was not an intentional planting, but may be evidence that either the wild palm or one of the older Fairchild reintroductions, was able to produce viable seeds.

Around the third palm, the majority of the seedlings were surviving, however, a few were being afflicted by an unknown disease that was specifically attacking the crown and fronds.

Regardless, the level of success of the Fairchild plantings in the visited areas is notable and demonstrates the importance of ex-situ conservation for the survival of endangered plants. Not only does it make representative genetic diversity available in a botanic garden setting, it also allows for those specimens to be available to aid in future restoration projects (Fotinos, et al. 2015, Lippincott 1995). Though the future of the last wild adult is uncertain, the care, interest, and education about Florida's

only native *Pseudophoenix sargentii* will be crucial for this vulnerable palm's survival.

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Figure 5. Seedlings from the Fairchild repopulation affected by unknown disease or pest around third palm.

Literature Cited

- CARR, Bob, and Perez Art Museum Miami. "Lecture: Bob Carr on the Ancient Tequesta." PAMM Portraits. PAMM Portraits, 17 May 2019, Miami, Perez Art Museum Miami (PAMM), pammportraits.org/2018/01/29/lecture-bob-carr-on-the-ancient-tequesta/.
- DE BRAHM, John William Gerar. The Atlantic Pilot. Boston Public Library, 1772. <https://archive.org/details/atlanticpilotcardebr/page/10>. Accessed 17 May 2019.
- DE BRAHM, John Gerar William, Approximately 1799, and Peter Andrews. The Ancient Tegesta, now Promontory of East Florida. [London; Printed for the author by T. Spilsbury, and sold by S. Leacraft, 1772] Map. Retrieved from the Library of Congress, www.loc.gov/item/73694436/.
- FOTINOS, T.D, S. Namoff, C. Lewis, M.P. Griffith, J. Maschinski, E.J.B. Von Wettberg. 2015. Genetic evaluation of a reintroduction of Sargent's Cherry Palm, *Pseudophoenix sargentii*. Journal of the Torrey Botanical Society. 142(1). 51-62.
- INSTITUTE OF REGIONAL CONSERVATION: *Pseudophoenix sargentii* status © 2001-2016. <https://regionalconservation.org/ircs/database/plants/PlantPage.asp?TXCODE=Pseusarg>
- KLEIN, H. Preliminary evaluation of availability of potable water on Elliott Key, Dade County, Florida. U.S. Geological Survey in cooperation with the U.S. National Park Service, 1970. U.S. Geological Survey Archive. archive.usgs.gov/archive/sites/sofia.usgs.gov/publications/ofr/70-010/ofr-70010.pdf. Accessed 16 May 2019.
- LIPPINCOTT, Carol.1995. Reintroduction of *Pseudophoenix sargentii* in the florida keys. Principes 39(1):5-13.
- MAGELLAN, T.M. and M.P. Griffith. 2017. Status of *Pseudophoenix sargentii* on Elliott Key, Florida. Palms 61 (1):41-44.
- MASCHINSKI, Joyce. "Good news for the ENDANGERED SARGENT'S CHERRY PALM in the Florida Keys". The Tropical Garden. Spring 2008:24-27. Print.
- MCCARTHY, Kevin M. African American Sites in Florida. Pineapple Press, 2007, Google Books, books.google.com/books?id=A_bZhe4no8UC&pg=PA155#v=onepage&q&f=false.
- NIEMIEC, Peg. "The Sweeting Homestead on Elliott Key." *Tequesta : The Journal Of The Historical Association Of Southern Florida*, vol. 56, 1996, pp. 24-45, FIU Libraries Digital Collection. digitalcollections.fiu.edu/tequesta/files/1996/96_1_02.pdf. Accessed 15 May 2019.
- NOAA. "Detailed List of Continental United States Hurricane Impacts/Landfalls 1851-1960, 1983-2017." Atlantic Oceanographic and Meteorological Laboratory of the National Oceanic and Atmospheric Administration (NOAA), National Oceanic and Atmospheric Administration (NOAA), May 2018, www.aoml.noaa.gov/hrd/hurdat/USHurrs_detailed.html. Accessed 23 May 2019.
- READ, R.W. 1968. A study of *Pseudophoenix* (Palmae). Gentes Herb. 10: 169-213.
- SMALL, J.K. 1922. The Buccaneer-palm [sic]. Jour. New York Bot. Gard. 23: 33-43
- ROMANS, Bernard. *A Concise Natural History of East and West Florida*. Pelican Publishing, 1776.
- TASKER, Georgia. "What's in a Name: 11 Florida Native Palms." *The Tropical Garden*. Fall 2014:51-52.Print.
- TRUE, David O. "Pirates and Treasure Trove of South Florida." *Tequesta : The Journal Of The Historical Association Of Southern Florida*, vol. 6, 1946, pp. 3-13, FIU Libraries Digital Collections. digitalcollections.fiu.edu/tequesta/files/1946/46_1_01.pdf. Accessed 15 May 2019
- ZONA, S.2002.A Revision of *Pseudophoenix*. Palms 46 (1):19-38.