The other exotic mangrove: *Bruguiera gymnorrhiza* at Kampong National Tropical Botanical Garden

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On a morning in March 2014, a group of Everglades Cooperative Species Management Area (ECISMA) partners visited the Kampong Tropical Botanic Garden. After a brief meeting in the living room of what was once David and Marian Fairchild’s home, Kampong curator David Jones and Harvard Professor Emeritus and mangrove expert Barry Tomlinson led the group outside and down the slope of the backyard on Biscayne Bay to a small strip of land between two man-made boat basin canals where in 1940, two specimens of the non-native mangrove species *Bruguiera gymnorrhiza* were planted.

*Bruguiera gymnorrhiza* is native to the diverse mangrove forests of East Africa, Asia, Australia and the Western Pacific. The two specimens came from a collection made in Sulawesi, Indonesia. In his memoirs, David Fairchild wrote that he hoped his *Bruguiera* trees would eventually fruit and spread along the coast line, brightening it with their red flowers.

In 2008, after *Lumnitzera racemosa*, another species of exotic mangrove, was found to be invading the native mangrove forests of Fairchild Tropical Botanic Garden and neighboring Matheson Hammock County Park, a review of the records of the other non-native mangrove species planted at both Fairchild and Kampong Botanical Garden prompted an inspection of their collections.

Of the fourteen documented exotic mangroves that were planted at Fairchild, five remained. Interestingly, out of a total of 14 *Bruguiera gymnorrhiza* trees planted there between 1952 and 1971, none remained.

Of the two *Bruguiera* trees that were planted at the Kampong, one was found to be alive and well, along with at least 86 more of them in the understory. A local survey was carried out and a 21 by 21 meter research plot was established around the remaining mature tree to determine the seedling density and rate of spread of the population. As the group walked along the pathway in the middle of the forested peninsula, they were able to spot the specimen tree, which was almost 75 years old, pretty quickly. The bark was very dark and the structure of the tree reminiscent of a mature sweet bay magnolia.

*Bruguiera gymnorrhiza* is a close relative of the native red mangrove, *Rhizophora mangle*, and it took a while for the group to be able to distinguish the smaller *Bruguiera* from red mangroves of the same size. Their foliage is strikingly similar and when they are seedlings and saplings, they look a lot alike.
The leaves of Bruguiera have much more prominent drip tips. The petioles (leaf stalks) and buds have a distinctive reddish color. The propagules of the two species are similarly shaped but unlike the smooth exterior of red mangrove propagules those of Bruguiera are subtly ribbed, appearing a bit like okra.

As the group became better at identifying Bruguiera, they flagged the ones they came across that did not bear tags from the 2008 plot. During the survey, the ECISMA group was able to verify that Bruguiera persists in the three separate polygons where they were originally mapped.

The group felt somewhat relieved that Bruguiera gymnorrhiza population at the Kampong did not appear to be as aggressively invasive as the other exotic mangrove, Lumnitzera racemosa. After the survey, the ECISMA group and David Jones committed to reconvening in April to resample the 2008 plot and do a much more exhaustive survey at the Kampong and along the coastline in the vicinity, especially in the pockets of mangroves to the north.

It is reasonable to expect that the original tree has been reproductive for at least half a century and that the inshore current has potentially carried away many Bruguiera propagules over the years. Bruguiera seedlings are remarkably shade tolerant and it is possible that they could have established over time in the dark interior of native mangrove stands if high tides and storm events were repeatedly able to deposit enough of them there.

The ECISMA partners who have participated in the five-year-long effort to eradicate Lumnitzera racemosa are understandably wary of exotic mangrove species. They had hoped to be able to declare Lumnitzera gone, but after hundreds of man-hours and tens of thousands of dollars spent by the Florida Fish and Wildlife Conservation Commission, surveyors are still finding thousands of seedlings per acre per year at Matheson Hammock, four years after it was believed that the last reproductive tree was removed. Those involved in the ongoing effort agree that it is very fortunate that the Lumnitzera infestation is the result of an introduction from a single site.

For most invasive species, there is a “lag phase,” a period of time between introduction and “critical mass,” when an invasive species population explodes and begins to impact ecosystem composition, structure and function. For some species like Lumnitzera, that period is short.

Certainly other related mangrove species have proven to be invasive, including the native red mangrove, Rhizophora mangle. In 1902, red mangroves from South Florida were planted on Molokai in the Hawaiian Islands, which, because of their remoteness, never had any endemic mangrove species. By 1917, it was recorded on neighboring Oahu and now it has been documented throughout the archipelago, negatively impacting native plant and animal communities and proving very difficult to control. At least five other mangrove species were introduced to Hawaii during the early 20th Century. While none of those have spread like red mangrove, two of them have developed into self-sustaining populations. One is another south Florida native, buttonwood, Conocarpus erectus. The other species is Bruguiera gymnorrhiza.


For everything you always wanted to know about mangroves * but were afraid to ask, download the United Nation’s Food and Agriculture Organization paper “The world’s mangroves 1980 – 2005” http://bit.ly/everythingmang