

## **Understanding the Genetic Diversity of *Scaevola taccada* and *Scaevola plumieri* on Vieques, Puerto Rico**

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The genus *Scaevola* of the family Goodeniaceae consists of 130 species of tropical flowering shrubs. Though the genus originates from Australia, 40 species have dispersed and reached areas such as Hawaii, Polynesia, Puerto Rico and other islands in the Pacific and Atlantic Oceans (Howarth et al. 2003). Dispersal events gave rise to two of the most widespread species outside of Australia, *Scaevola plumieri* and *Scaevola taccada*. Both occur on the islands of Puerto Rico, though *S. plumieri* is the endemic species and *S. taccada* is an invasive species thought to have been introduced as an ornamental plant for commercial businesses. Previous studies done to understand the relationship between these two species observed the disruption of the natural growth of *S. plumieri* due to comparatively more successful seed dispersal by *S. taccada*, as its seeds are able to float (Finkle and Elliott 2011).

The introduction of new non-native species to islands impacts biological and genetic diversity of established native species (Paulay 1994). Island species are especially sensitive to introductions of non-native species (Finkle and Elliott 2011). Some non-native species may be invasive, meaning they can cause habitat destruction, the extinction of native species, and the loss of biodiversity (Hejda et. al, 2009). Invasive species not only lack predators, parasites, and competitors, they are also able to spread quickly and out-compete native species (Finkle and Elliott 2011). Studying the genetic diversity in island plants, especially between native and recently introduced non-native populations, is important in understanding the influence of introduction events on endemic species.

Studies done to assess the impact of invasive species on biodiversity often utilize microsatellite simple sequence repeats (SSRs) to produce quantifiable measurements of genetic diversity to characterize how vulnerable a species may be to extinction (Abdelkrim et al., 2009). Analysis of SSRs aids in the management of invasive species and the conservation of the organisms they affect by indicating genetic variation, variability between and among populations, inbreeding, and modes of reproduction (Ellis and Burke, 2007). Microsatellites are short tandem repeats of DNA ranging from 1 to 6 nucleotides long that are capable of repeating between 5 to 40 times in a single sequence (Selkoe and Toonen 2006). The amplification of microsatellite regions allows for the analysis of variability between and among both individuals and whole populations. Data from microsatellites produces peaks representing the different fragment lengths or alleles from the amplified region. The analysis of the data collected from both *S. plumieri* and *S. taccada* on Vieques will allow us to understand the variation across the sampled populations. As a result, it will be possible to determine the genetic diversity present in *Scaevola* on Vieques and whether it correlates to geographic distance.

This research explores the genetic diversity of two coastal shrubs of the genus *Scaevola* that may be found on Puerto Rico and its surrounding islands. Plants in this genus are distributed

across many tropical islands in both the Pacific and Atlantic Oceans (Finkle and Elliott 2011). On the island of Vieques, Puerto Rico, the native species *Scaevola plumieri* co-occurs with an invasive species, *Scaevola taccada*, that is thought to have originated from the Indo-Pacific region. Since its introduction to Vieques, *S. taccada* has begun to encroach on many *S. plumieri* populations across the island and threatens to out-compete it. Previous research has shown the ability of *S. taccada* to prosper in the presence of *S. plumieri* and disrupt the growth of the native species (Finkle and Elliott 2011). The purpose of this research is to understand the genetic variation and diversity in, among, and within the populations of *S. plumieri* and *S. taccada* on Vieques, Puerto Rico. Additionally, the distances between beaches at which sampling took place are taken into account to determine whether genetic diversity has any correlation to distance. It was hypothesized that the native *S. plumieri* would be more diverse than its invasive counterpart *S. taccada* because of its longer inhabitation on the island of Vieques.

## **Literature Cited**

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