

Abstract

Understanding the mechanisms responsible for the formation and maintenance of species boundaries is a central goal of evolutionary biology. Hybridization – successful mating between individuals of different species - is widely recognized as an important means of speciation in many groups of plants, especially ferns. Still hybrid formation in the ferns is poorly understood, due to the difficulty of observing fern breeding systems. Although there have been a number of recent gametophyte studies, only a few have addressed interspecific gametophyte interactions, or hybridization events, and the isolating mechanisms limiting success of interspecific crosses remain poorly understood despite their relevance to the evolutionary history of the group . Using DNA sequence data from maternally inherited chloroplast DNA, researchers have noted a difference in the frequency of hybridization between reciprocal crosses in hybridizing species pairs, with one parent preferentially serving as the maternal of the resulting hybrid. While these studies have demonstrated that a “gender bias” exists in some fern hybrids, they have failed to link these patterns to observations of the reproductive biology of the hybridizing species. In this study we will generate data from chloroplast DNA sequence analysis of two closely related fern species in the genus *Polypodium*, and their hybrid, to determine if there is a “gender bias” in hybrids from sampled populations. Gametophytes of the parent species will also be cultured to observe their growth, sexual development and how these may be affected by hormones. Breeding trials will be organized to determine intraspecific breeding strategies and simulate conditions for hybrid formation with interspecific crosses. Comparing the gender bias found in natural hybrid populations to observations of the ferns’ breeding systems and sequence data collected from artificial hybrids will help to determine the extent to which the reproductive biology of the two parental species results in gender bias hybrid formation.