There goes the neighborhood: Reproductive success of *Bletia patula* when *Spathoglottis plicata* moves in

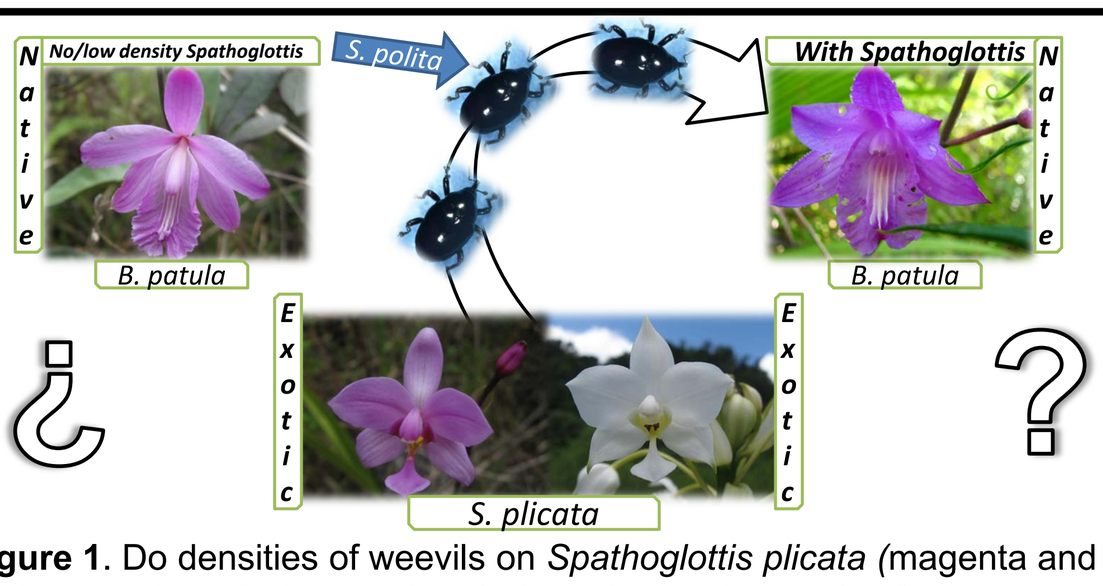

Figure 1. Do densities of weevils on *Spathoglottis plicata (*magenta and white variants) affect sympatric *Bletia patula* in Puerto Rico?

Abstract

Naturalized exotic species are homogenizing the earth's biota and are increasing densities of pests in newly colonized areas. When exotics change ecosystems and affect native species, then they are invasive. Do high density populations of *Spathoglottis plicata* (a naturalized orchid) affect populations of *Bletia patula* (a native orchid) through a common florivorous, orchid specialist weevil, *Stethobaris polita*. We will determine the effect of *S. plicata* on the reproductive success of *B. patula* when *S. plicata* is present at variable densities. In addition, we will determine the florivory preference of weevils between *S. plicata* and *B. patula*. Finally, we will create a distribution model map for both orchid species, to predict the localities where both species may be interacting.

Introduction

Spathoglottis plicata a naturalized exotic orchid dominates a vast area where native orchids such as *Bletia patula* live. The two species are attacked by a common florivorous weevil, *Statobaris polita*, a native beetle that specializes on orchids. Herbivory is often density-dependent and in some cases may affect reproductive success directly or indirectly. The purpose of this study is to determine if *Spathoglottis plicata* densities affect the reproductive success of *Bletia patula* through the presence of *Stethobaris polita*. We will also assess the current and potential distributions of the two orchid species.

Objectives

•Assess the effects of high density populations of *S. plicata* on the reproductive success of *B. patula*.
•Create maps of distribution models for the orchids in study.

Hypothesis

If high density populations of *S. plicata* harbor weevils and these weevils interact with *B. patula* then this will adversely affect the reproductive success of *B. patula.*

Methods

➢Study Site

Figure 2. The orange stars on the map represent our study areas

Puerto Rico is part of the West Indies and our study site for creating the distribution models. Data is being gather at Rio Abajo and Guajataca Forest Reserves (Figure 2). Both areas are part of the north karstic region of the island. Rio Abajo study site is located along Rt. 10 and Guajataca study site is along Rt. 4446.

➢Determining the reproductive success of *B. patula* when *S. plicata* is sympatric

The reproductive success of *B. patula* (n = 60) is determined in the absence and presence of *S. plicata*. Our variables are the number of buds, flowers, fruits, weevils, ants and the damage done by *S. polita* to the fruits, flowers and buds of the studied plants. We also are measuring the distance of the studied plants to their three nearest neighbors of *B. patula* and *S. plicata*.

➢Choice experiments

We are determining the weevils' flower preferences by exposing 3 weevils to *B. patula* and *S. plicata* (white or magenta variants) (Figure 3). We are measuring flower damage every 24 hours for two days. Each choice experiment is replicated. The choice experiment will be done monthly.

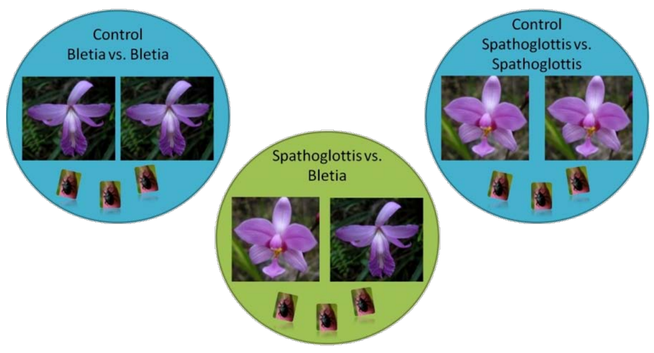

Figure 3. Diagram of the choice experiments. The blue circles represent the control groups and the green circle represent the choice.

➢Potential distribution of B. patula and S. plicata in Puerto Rico

Potential distribution will be done using the Maxent algorithm, with at least 30 occurrence points for each species. Maxent will predict places that shares similar environmental factors as the occurrence points (Figure 4). Thus, we will determine the possible places where the two species could be present and we should reveal the potential zones of overlap.

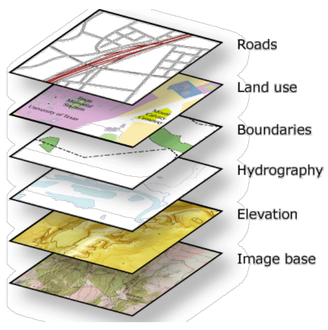

Figure 4. Diagram of the layers need it to create the map of distribution.

Preliminary Results

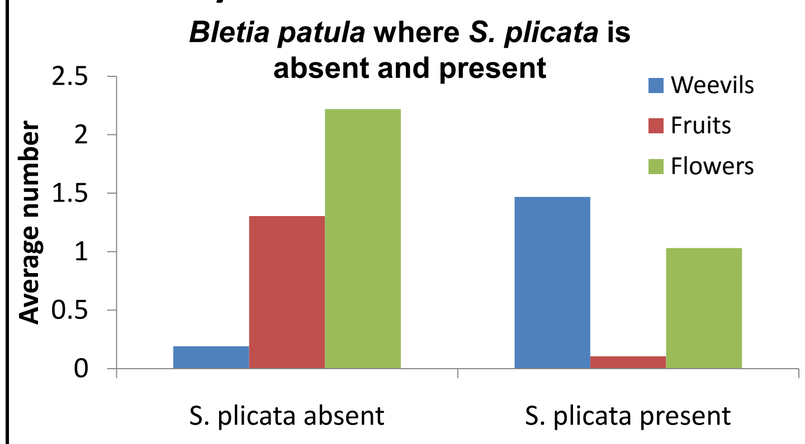

Figure 5. *Bletia* variables in the presence and absence of *S. plicata*. Average number of weevils (Z = -1.948, p = 0.05), fruits (Z = 1.851, p = 0.06), and flowers (Z = 2.155, p = 0.03).

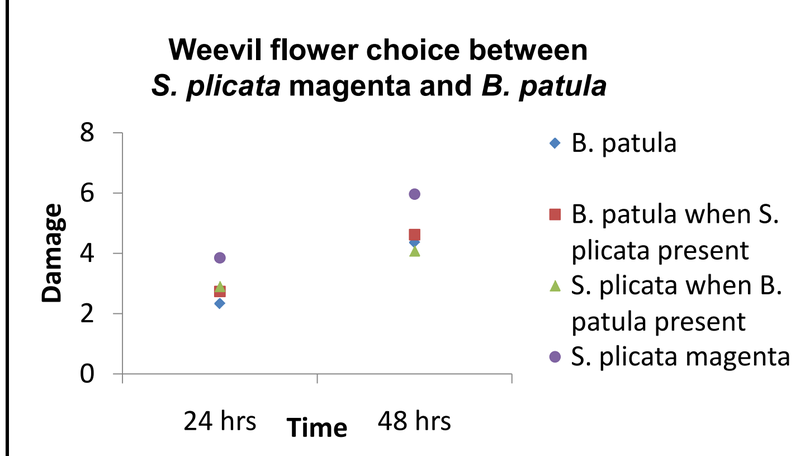

Figure 6. Choice experiments. Weevils of *S. plicata* magenta with flowers of *B. patula* and *S. plicata* magenta. The damage scale: 0 = no damage and 10 = completely damaged.

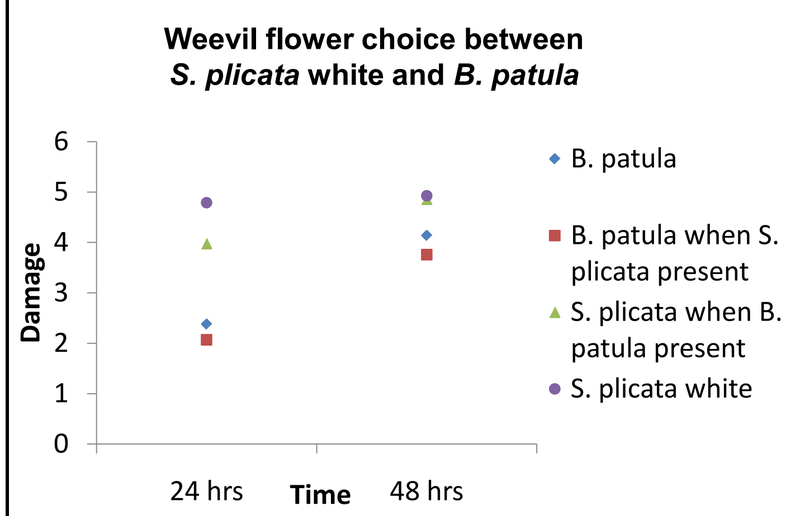

Figure 7. Choice experiments. done to weevils of *S. plicata* white with flowers of *B. patula* and *S. plicata* white. The damage scale: 0 = no damage, and 10 = completely damaged.

Acknowledgments

For all the help you have given us in the field work; Ricardo Arriaga, Alvaro Bravo, Paul CaraDonna, Isamalish Espino, Wildelina González and Carlos Vega.

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Funded by National Science Foundation, HRD #0734826
and University of Puerto Rico, Central Administration
and Río Piedras Campus