# Plant-Insect Interactions: Do herbivores restrict the reproductive output of *Spathoglottis plicata?*



**Figure 1A: Undamaged flower; Figure 1B: Damaged caused by herbivory by beetles.**

## Introduction

Many exotic plants have naturalized in Puerto Rico, some of which may pose a threat to native species. One such exotic is *Spathoglottis plicata,* an orchid native to Southeast Asia. Popular as an ornamental, this orchid has thrived in disturbed areas in many parts of wet tropics. In Puerto Rico, *S. plicata* likely escaped from gardens and nurseries, and now thrives in two flower color variations, white and magenta.

Exotic species often lack natural predators, often giving the plants an advantage over the native flora. However, we found that beetles feast on the flowers and fruits of *Spathoglottis plicata*, which affects reproductive success of the orchid. Ants also visit inflorescences but feed on the extra floral nectar produced by developing flower buds. Ant—plant interactions involving native species often are mutualistic: energy for protection. We have occasionally observed ants attacking the beetles on the inflorescence. Here we ask whether the beetles significantly alter reproductive success of *S. plicata* and if the ants, when present, are effective beetle deterrents.

## Objectives

- Assess beetle damage and monitor the production of fruits and flowers of *S. plicata.*
- Evaluate the effects of each insect group on the reproductive success of *S. plicata.*

## Hypothesis:

We expect fruit set to be the following: Total exclusion = Beetle exclusion > Ant exclusion = No exclusion.

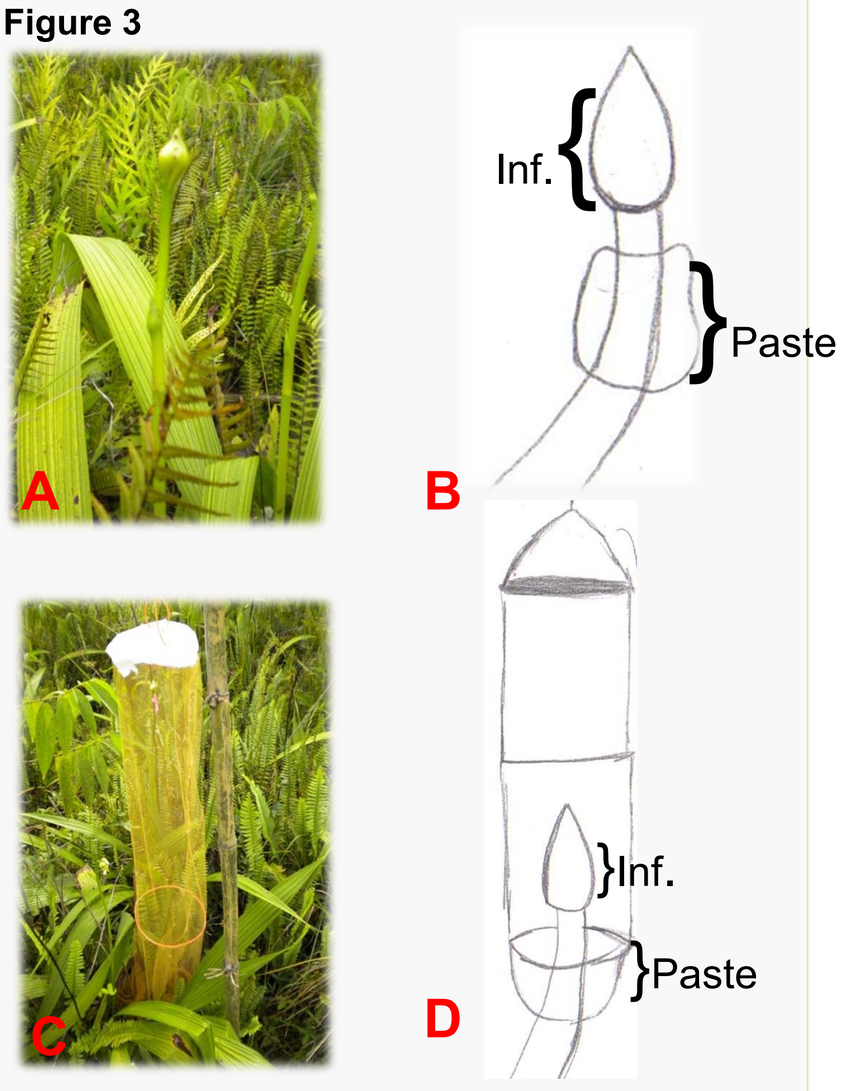
## Experimental Design

We established 4 treatments groups (see table on the right). Each group will have a minimum of five plants, each with a developing inflorescence. These will be monitored weekly. To evaluate the individual effects of each insect group, ants will be excluded applying Tangle Trap paste to the base of each inflorescence. Beetles will be excluded placing a fine-mesh net bag over the inflorescence (Inf.).

**Figure 2**
**Ants attacking a beetle.**

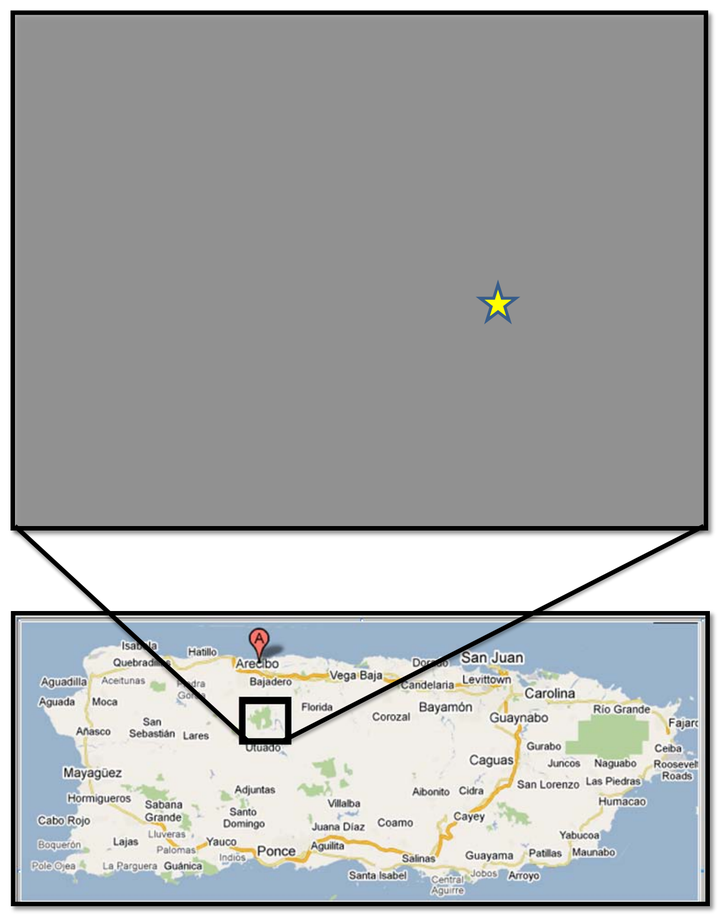
## Exclusion Treatment

**Figure 3**




| Figure 3 | Name | Excluded Factor | Type of Treatment |
|---|---|---|---|
| A | No-Exclusion | None | None |
| B | Ant-Exclusion | Ants | Tangle Trap paste |
| C | Beetle-Exclusion | Beetle | Net |
| D | Total Exclusion | Ants & Beetles | Tangle Trap paste & Net |

- Dependent variables will be flower & fruit damage, and fruit set
- Data will be analyzed using ANOVAs




## Study Site

The study site is in north-central Puerto Rico, along side Route 10, km 72.9 and 73.3. The area is known as the "Mogotes", characterized by limestone "haystack" hills. Highest altitude is 300 m above sea level, with an annual temperature of 25 C.

## Reference

Stephenson, A.G, 1982. The Role of Extrafloral Nectaries of *Catalpa Speciosa* in limiting herbivory and increasing fruit production. Ecology Vol. 63, No. 3. pp. 663-669

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