

## Pollinator-Prey Conflict with Carnivorous Plants in the New Jersey Pine Barrens

Monmouth University





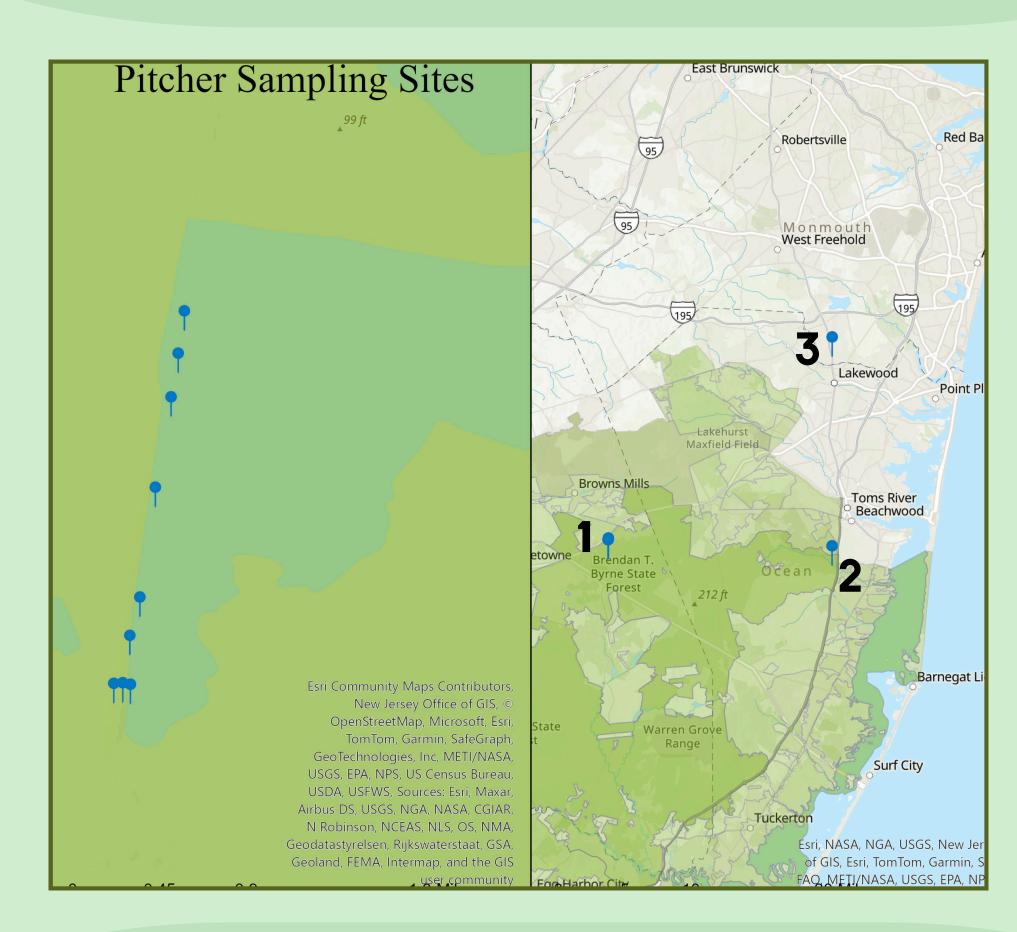
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#### **Abstract**

Pitcher plants are a carnivorous species that have evolved to trap insects to obtain nutrients in areas where they are lacking. Pitcher plants with access to a sufficient amount of nutrients, such as nitrogen, will grow larger phyllodia to perform photosynthesis; however, when pitcher plants do not have access to a sufficient amount of nutrients in the soil, they begin to grow larger pitchers to catch more prey for their needed nutrition. Recent work has examined the carnivory of pitcher plants but has not thoroughly investigated their pollination, leaving the remaining question: how do pitcher plants avoid trapping the insects they need for pollination?



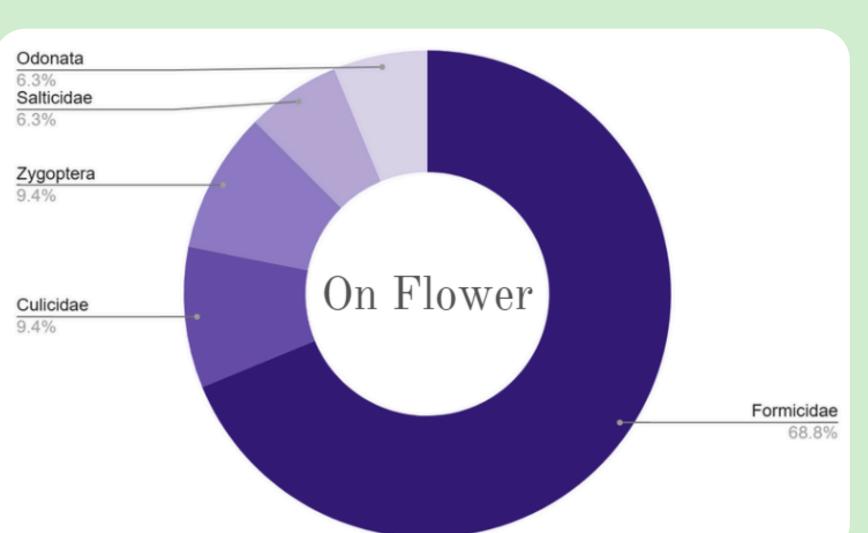
#### Sampling Sites

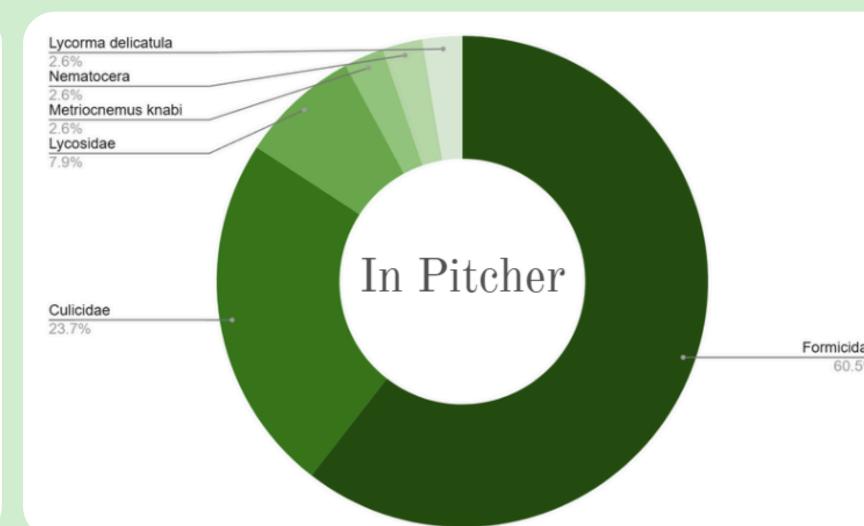
- 1. Brendan T. ByrneState Forest2. Double Trouble StatePark
- 3. Manasquan Reservoir





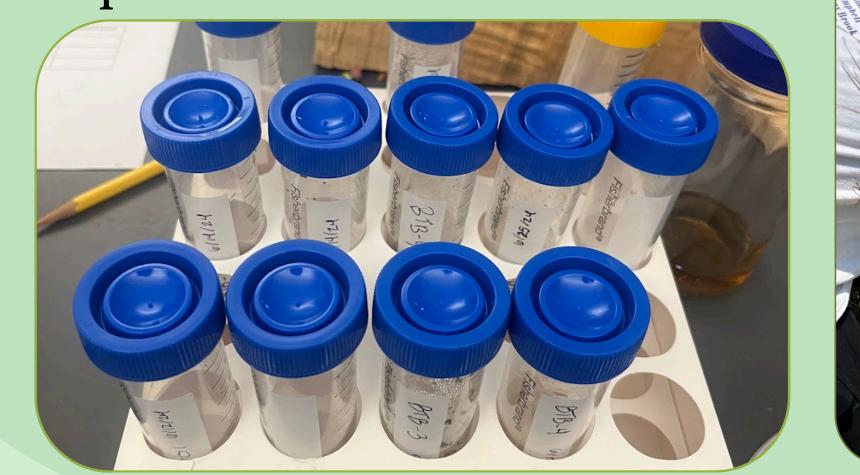
GoPro footage of a jumping spider (Salticidae) and dragonfly (Odonata)





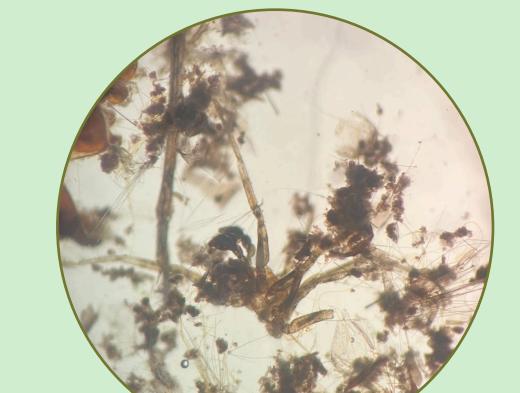
#### Methods

13 total sites were sampled with 6 sites being filmed using a GoPro to collect data on the visitations of the pollinators to the flowers. The remaining 7 sites were visually observed. A data sheet was filled out for each site containing information such as weather, location, number/size of flowers. number/size of pitchers, type of insect, and the duration of their visit. Pitcher fluid samples were taken from each site and analyzed under a dissecting microscope to identify organisms present in the pitchers.



(Metriocnemus knabi). Salticidae have been known to feed on pollen found in the flowers of the S. purpurea (Nyffeler et al. 2016). The results confirmed that Formicidae are often prey for the S. purpurea. Other arthropods found were spotted lanternflies (Lycorma delicatula), pitcher plant midge (Metriocnemus knabi), mosquitos (Culicidae), and gnats (Nematocera); however, there were not enough individuals identified to determine whether they were

pollinators or prey







### Introduction

The New Jersey Pine Barrens, an ecosystem unlike any other found in the world, has unique conditions that support highly specialized plants such as orchids and carnivorous plants. Purple pitcher plants (*Sarracenia purpurea*) are the only species in the *Sarraceniaceae* genus that have been known to inhabit the East Coast from the Gulf of Mexico to Canada (Newman et al. 2000). *S. purpurea* have been known to secrete nectar from their peristome and contain an iridoid, sarracenin. The secretion of the nectar and sarracenin have the possibility to aid in the attraction and trapping of pollinators and prey (Jaffé et al. 1995). Sarracenin is typically only found in the leaves and flowers of the plant, not in the pitchers themselves (Newman et al. 2000). Pollen can be found inside the flower and away from the pitchers, which can be a method to separate their pollinators from their prey.

(Zygoptera), and dragonflies (Odonata)

while the suspected prey are black ants

(Formicidae), wolf spiders (Lycosidae),

spiders (Salticidae), damselflies

and pitcher plant mosquitos