

# A Survey of the Fruiting Plants and Their Insect Parasites in the Forests of Western New York

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## Introduction

- Invasive species and native species of fruiting plants are distributed in a mosaic of habitats. This distribution may influence the susceptibility of these plants to their insect parasites (Keane et. al, 2002).
- Positioning of the host plants within a forest could have an influence on the parasites’ selection of the host (Kautz et al. 2016).
- We predict that forests bordering farms will act as reservoirs for parasitic insect larvae, providing habitat when cultivated fruits are not in season. If so, effective management of these pest species on farms may also need to include reducing the abundance of alternate host plants in neighboring forests.

## Methods

- Study sites: The Estes Farm in Caledonia, NY and Hurd Orchards in Holley, NY
- GIS software (Qgis.org, 2024) was used to determine the position of 25 sampling points across the forests of 2 farms.
- Sampling was conducted throughout October. The decrease in fruit abundance and species diversity was noted, along with the decrease in insect activity.
- Both farms had similar diversity values based on the Simpson’s Diversity Index (Hurd: D = 0.72, Estes: D = 0.77); however the composition of fruiting species differed (Jaccard’s similarity = 0.23).
- At each sampling point I recorded plant species, current fruiting status and number of fruits per plant , and collected any fruits present for further analysis in the lab.
- In the lab, I recorded the length, width and presence of parasite exit holes for each fruit. I then dissected the fruits to look for larvae and count the number of seeds.
- Statistical analyses were conducted with the R Programming Environment (R Core Team 2024). Logistic regression test (lme4, Bates et al. 2015) used to determine the effect of each factor on the instance of parasitism. The logistic regression model was fit with fruit size, sampling point richness, distance from the sampling point to the edge of the forest and the number of seeds.

# Glossy Buckthorn May be Parasitized at Higher Rates Than Other Species Late in the Fruiting Season

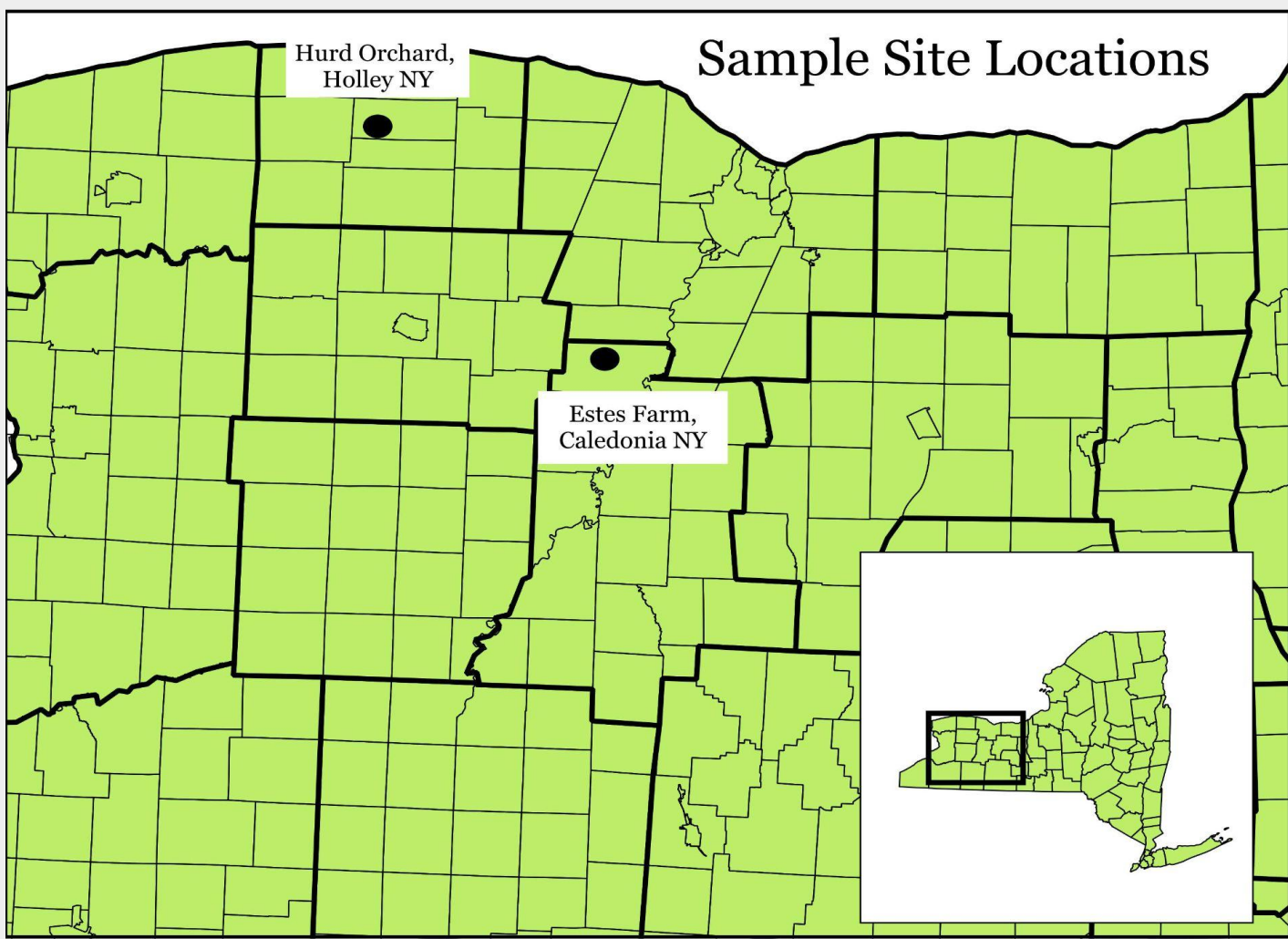


Figure 1. Approximate locations of sites sampled.



Figure 2. Larva, dissected from fruit, presumed to be a beetle



Figure 3. Example of an insect larva being dissected from a Glossy Buckthorn fruit.

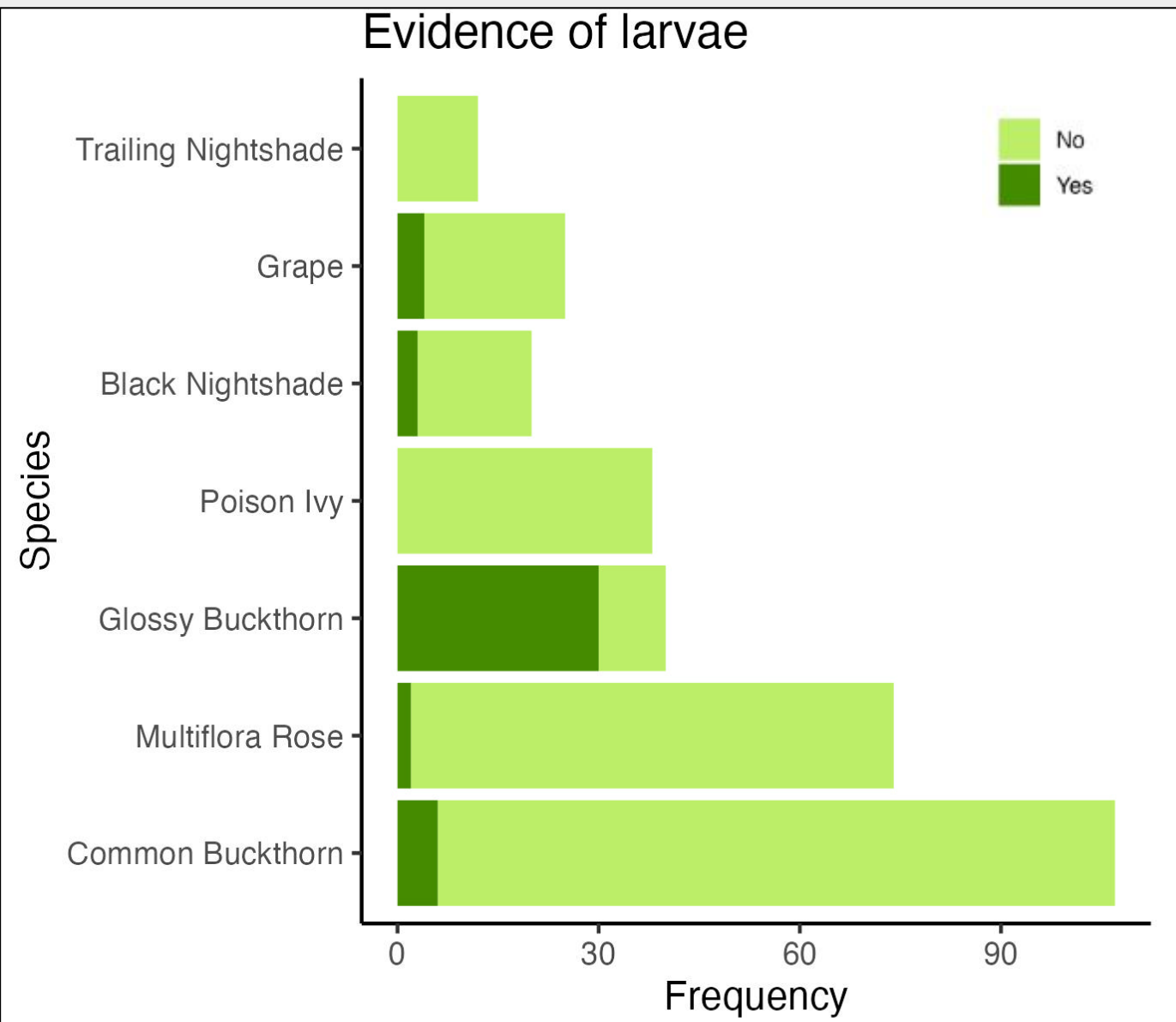


Figure 4. Occurrence of larvae and total fruits sampled per species. Glossy Buckthorn was responsible for over half of the evidence.

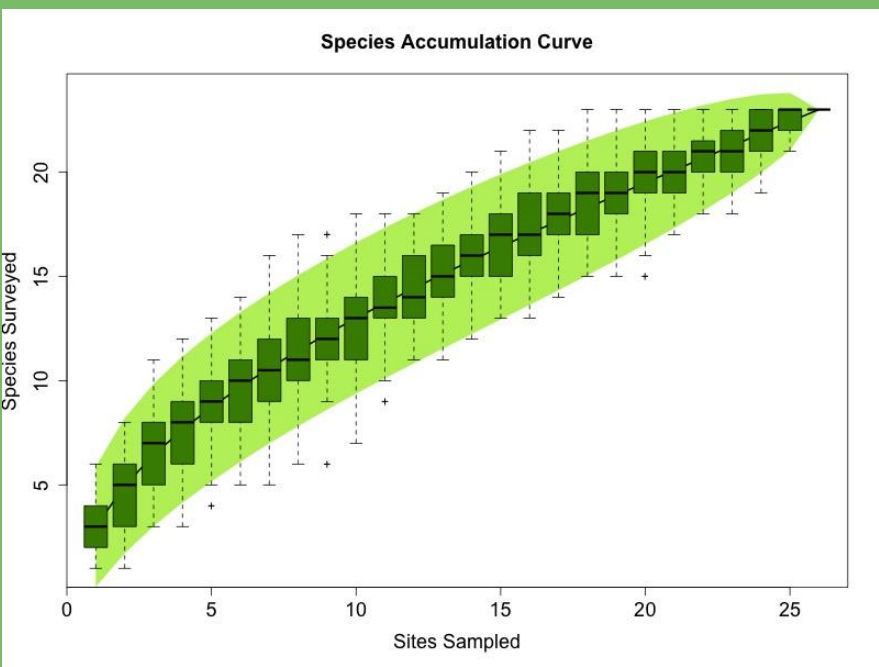


Figure 8. Species accumulation curve of all points sampled.

## Discussion

- With sampling occurring during the late fall, the interactions that we observed could be different from the interactions that take place during the summer and early autumn.
- Late season sampling decreased the number of fruits available and the relative abundance of possible hosts. With the decrease of host options parasites could be driven into forests where there are more fruits available.
- Larvae activity may also decrease in late autumn due to the decrease in temperatures leading to a decrease in the metabolic rate of insect larvae (Smit et al. 2021).

## Future Directions

- We plan to increase our sample size this summer, allowing us to gain further insight into the geographical distribution of these parasites.
- Identification of larvae allows us to investigate host specificity and preference.

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## Citations

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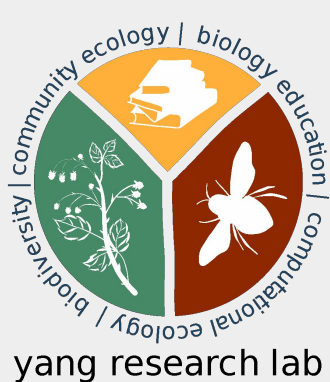
Figure 5. Fruits being collected from the Estes farm.



Figure 6. Map of sample points from the Estes farm



Figure 7. Map of Sample points from Hurd Orchard



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