Influence of Host Plants on the Immunology of the Fall Webworm (*Hyphantria cunea* Drury)

Audrey Mitchell, Dhaval Vyas, and Shannon M. Murphy
Department of Biology, University of Denver, Denver, CO

Introduction

✧The generalist insect herbivore fall webworm (*Hyphantria cunea*) is a moth species found in Colorado, and its larvae have been found to have considerable variance in their performance (survival, number of offspring) when reared on different host plants[1].

✧One study found that larvae reared on low-quality host plants suffered reduced fitness in terms of development time (took longer to grow) and pupal mass (lower growth rate led to smaller adults)[1].

✧I proposed to investigate if the fall webworm immune system is affected by larvae being reared on different host plants that vary in quality.

Hypotheses

✧Higher quality host plants will give stronger immune response due to improved nutrition which leads to an increased number of hemocytes in the larvae.

✧Lower quality host plants will give stronger immune response because larvae will invest more energy into defense mechanisms due to slower growth.

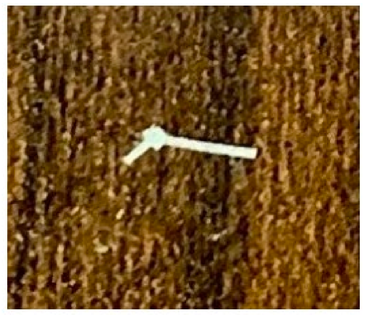
Materials and Methods

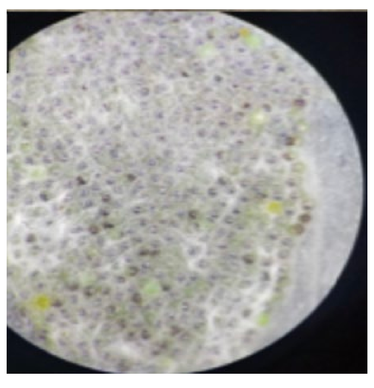
✧4 different host plants: 2 higher quality and 2 lower quality

✧Inserted filaments into fall webworm larvae; filaments remained inserted for 24hrs before being removed

✧Counted number of hemocytes before filament insertion and after insertion

✧Analyzed filaments for melanization using computer software program

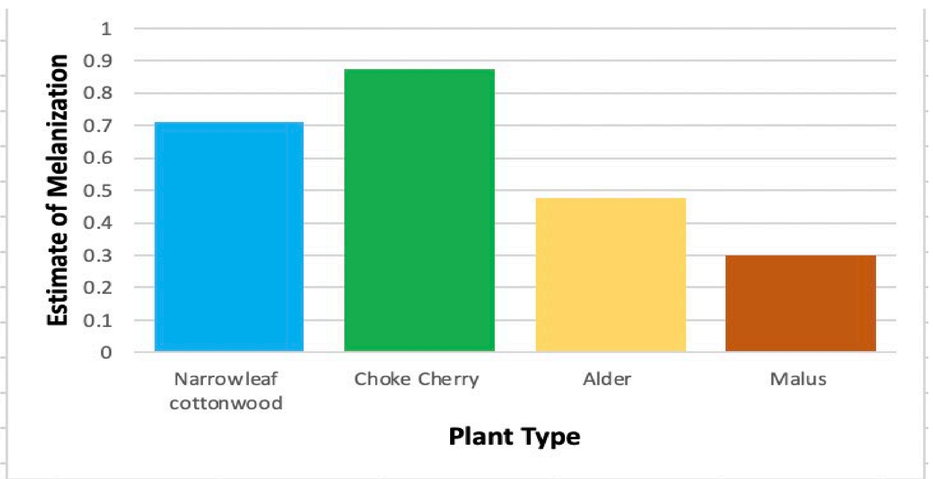


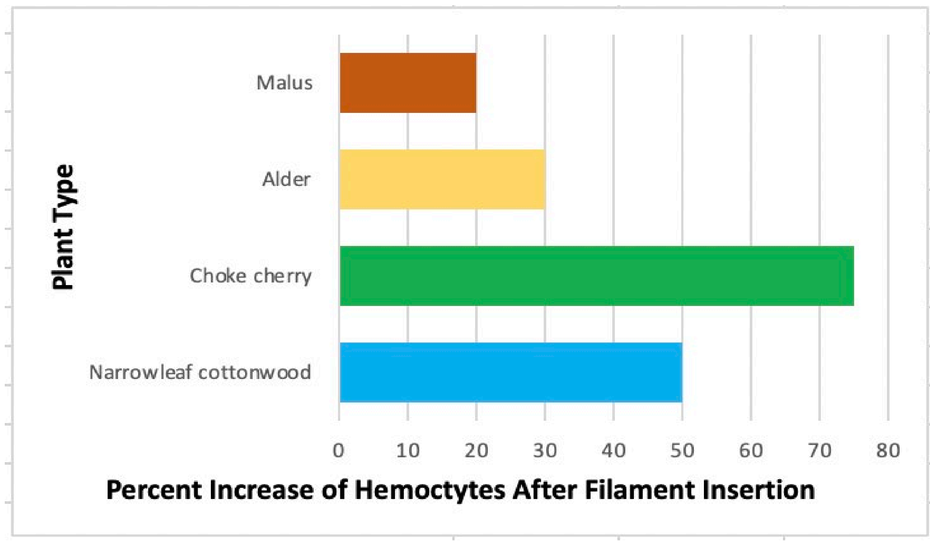


Objectives

To determine if host plant quality affects the immune response of fall webworm and to establish a relationship between quality of host plant and immune response.

Predicted Relationships





Significance and Conclusions

✧Studying generalist herbivores is important because differences in the identity of host plant species and variation in the number of host plants used by an herbivore can drive high levels of diversification in herbivorous insects.[2]

✧My project will help us to understand if variation in host plant use is related to immune response on different host plants.

✧I was able to learn new laboratory techniques as well as co-author a publication detailing protocols for rearing fall webworm.

Literature Cited
1. Murphy, S.M. & Loewy, K.J. (2014) Trade-offs in host choice of an herbivorous insect based on parasitism and larval performance. *Oecologia,* **179,** 741-751.
2. Vidal, M.C., Lill J.T., Marquis, R.J., & Murphy, S.M. (2020) Geographic variation in performance of a widespread generalist insect herbivore. *Ecological Entomology*, **45**, 617-625.

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