

Introduction

Host plants often vary in their nutritional value to the organisms that eat them. The larvae of the Silver-Spotted Skipper butterfly, *Epargyreus clarus*, is an insect that can be found on a wide variety of native and invasive legume species, which offer a range of nutritional benefits that affect growth and development. Moreover, the identity of the host plant a particular caterpillar feeds on can influence its risk of mortality from its natural enemies (predators and parasitoids). Previous work with predatory insects has shown that diet can strongly influence levels of aggression (Grover et al. 2014)

Preliminary studies of the defensive behaviors of *E. clarus* caterpillars suggest wide variation, ranging from immobility to active biting and vomiting. The goal of this project is to explore the source(s) of this variation, focusing on two likely candidates: the developmental stage of the caterpillar (early vs. late instars) and the identity of the host plant it has been reared on. Host plant-mediated changes in defensive behaviors are likely to be caused by some combination of altered development and overall 'vigor'.

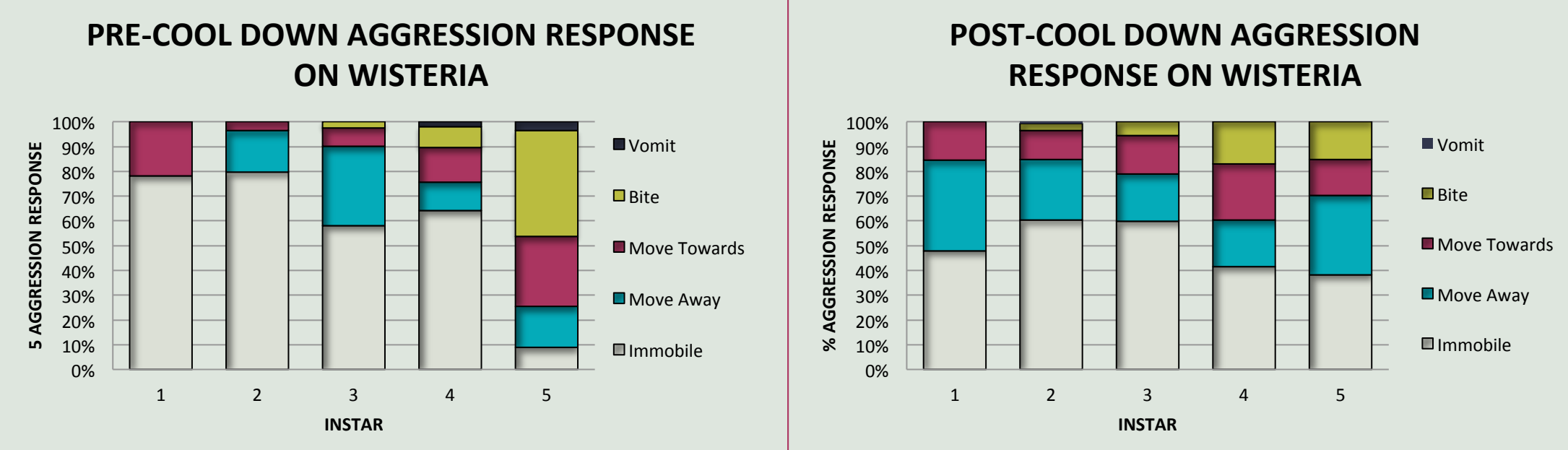
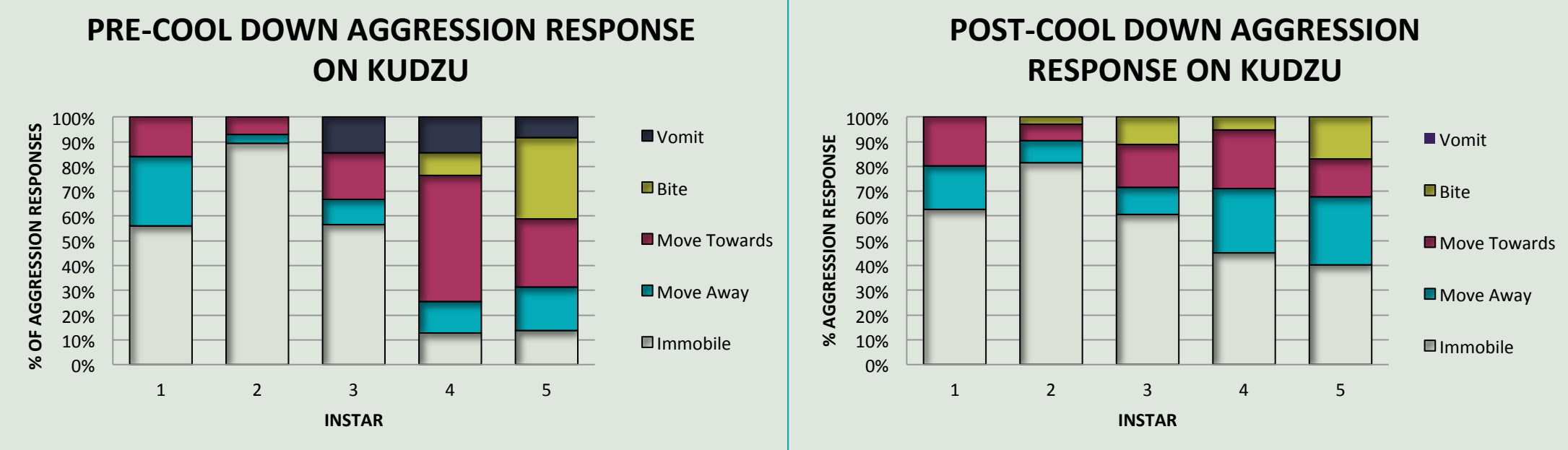
Materials and Methods

Caterpillars are reared on kudzu and wisteria, with trials occurring either two or five times a week.

Trials are conducted first by opening the shelters that the caterpillars build out of their host plant. This act is considered the "Pre-Cool Down Response." Caterpillars are then given five minutes to cool down and then are poked with a wooden toothpick around every ten seconds for a minute.

Results

When poked, the caterpillars' response was noted. Responses were categorized as being part of five distinct categories: immobile, moving away from stimulus, moving towards stimulus, biting, or vomiting. The post-cool down test was actually a series of stimuli, but there was not a significant desensitization over the minute of repeated stimuli, so those responses were each counted in the post-cool down responses.



Discussion

- Caterpillars on both host plants were much more active when responding to their shelter being opened than repeated stimulus after the destruction of the shelter.
- Vomiting was a response that almost exclusively was used as a defense when the shelter was being opened. Only one individual vomited to defend against the repeated stimulus after the destruction of the shelter.
- Kudzu caterpillars started vomiting at an earlier instar, but wisteria caterpillars started utilizing biting as a defense before their kudzu counterparts.
- Kudzu caterpillars were more likely to move away from the stimulus as first instars, whereas caterpillars raised on wisteria were more likely to move towards the stimulus as first instars.
- Immobility as a defense was most often used when caterpillars were second instars, both pre- and post-cool down.

Epargyreus clarus



Photo by Yurika Alexander

Future Direction

Predator trials are being conducted to test what defensive strategies are effective against different types of invertebrate predators, including two species of paper wasp (*Polistes dominulus* and *Polistes fuscatus*) and the Chinese Mantis (*Tenodera sinensis*). These trials are using a variety of instars on all three host plants.

Acknowledgements

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References and data are available upon request