



United States Department of Agriculture

30th USDA Interagency Research Forum on Invasive Species



Urban Island Invasion

Annapolis, MD | January 14-17, 2020



US Forest Service

Forest Health Assessment
& Applied Sciences Team

FHTET-2020-01
August 2020

PREDATION OF SPOTTED LANTERNFLY (*LYCORMA DELICATULA*)

Anna Kuhn¹, Su Kim¹, Michael Raupp², Holly Martinson¹

¹Department of Biology, McDaniel College

²Dept. of Entomology, University of Maryland, College Park, MD 20742

ABSTRACT

By the necessity of evolution, most prey organisms have specialized methods of defense against predation. However, when a prey organism is introduced to a new environment with previously unfamiliar predators, their defense mechanisms may or may not be effective. Should the prey organism's defenses be effective against the predators of its new environment, this may contribute to the spread and abundance of the new organism. Spotted lanternfly (*Lycorma delicatula*; Hemiptera: Fulgoridae, SLF) have striking aposematic coloration, a powerful jumping reflex, and have been reported to contain alkaloid chemical defenses in their native environment in China. These organisms have spread rapidly in Pennsylvania since their introduction, feeding on trees and bushes and causing significant issues in Pennsylvania's agriculture and forestry. Native predators, save for a select few, have not been observed to be interested in preying upon these insects, and it is unknown if defenses of the SLF are truly preventing predation. Understanding the defenses of SLF could provide a new perspective in developing methods of preventing the spread of SLF. Three studies were conducted to examine the defenses of SLF: (1) plasticine models were used to examine aposematic coloration, (2) samples of SLF examined through Thin Layer Chromatography were used to identify ajmalicine and ailanthone, cytotoxins that SLF reportedly contained in the Chinese and Korean populations respectively, and (3) mesocosm predation experiments were used to identify the impact of SLF jumping reflex and other unknown defenses. The plasticine models contained markings consistent with avian predation, the Pennsylvania population was found to not contain ajmalicine, and green lacewing larvae and Chinese mantises did consume SLF nymphs in mesocosm experiments. This research demonstrates that the effectiveness of prey defenses may change with species introductions, a phenomenon that could be potentially exploited by targeted management interventions of problematic species in their introduced ranges.

Thank you to the McDaniel College Biology Department, Mrs. Jean E Richards, and Dr. Susan Richards McKay for funding this research. This research could not have happened without guidance and suggestions from Dr. Holly Martinson and Dr. Michael Raupp. An additional thanks to Welkeinweir Estate and Sandi Yanisko for access to the field sites.