

Spotted Lanternfly Pest Control

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Background

The spotted lanternfly is an invasive pest native to Asia, that has been seen in Pennsylvania since 2014. Spotted lanternflies are planthoppers that feed on the sap of trees, as well as many crops. Ornamental species and agricultural crop populations have been decimated by Spotted Lanternfly (*Lycorma delicatula*), which can be estimated to cost the state of Pennsylvania up to \$324 million each year. The current method used to control this pest is citizen based (encouraging residents to kill lanternflies on their property) and insecticides, which cause many harmful effects. There are also quarantine measures in place for the 34 infested Pennsylvania counties to stop the spread of flies. This quarantine stops the export of stone, plant, wood and outdoor products. The aim of this study is to introduce a natural predator to aid in the control of the spotted lanternfly and minimize damage to natural communities and the economy of Pennsylvania.

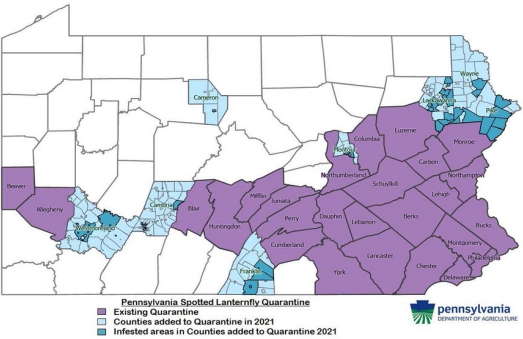


Figure 1. Counties under quarantine for spotted lanternfly control in the state of Pennsylvania. Photo from psu.edu/spottedlanternfly

Objectives

Evaluate the effects of introducing a natural predator, the egg parasitoid *Anastatus orientalis*, of the spotted lanternfly to natural areas of Pennsylvania. Spotted lanternfly pest control is often found to harm other insects, birds, fish and harm waterways as well as soil. This method would allow for less destruction to the environment by controlling the damage done to agricultural and ornamental plants while preserving natural wildlife communities. This is the first time a predator will be imported to Pennsylvania to attempt to control spotted lanternfly populations. This study will provide insight on how the parasite will affect other native wildlife, as well as set a precedent for future widespread use of egg parasitoids as lanternfly elimination.

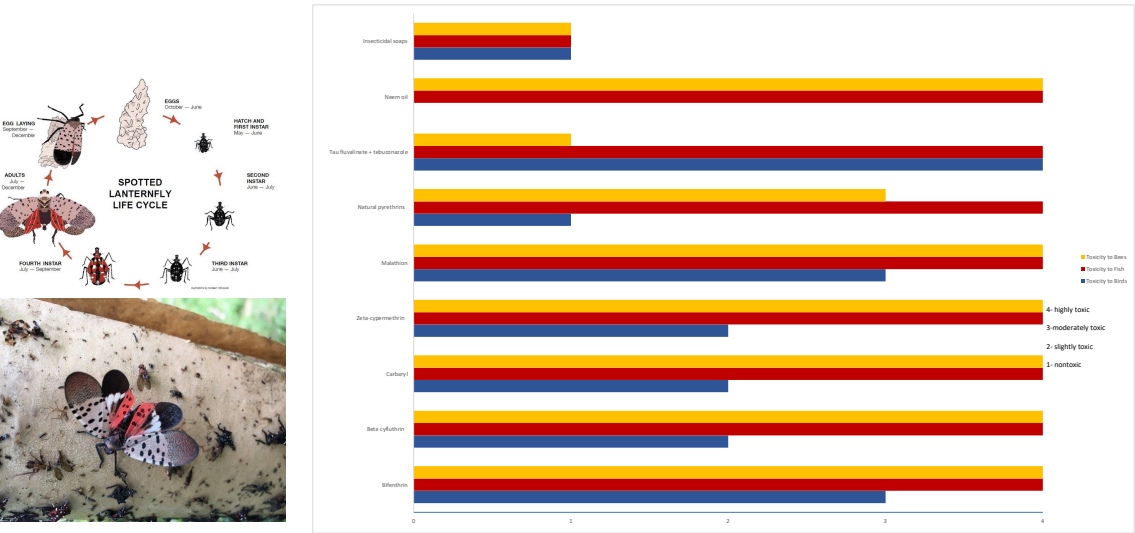


Figure 3. Graph of insecticides used for (SLF) and the ecological impacts of those insecticides



Figure 2. Spotted lanternfly image and life cycle. Photo from psu.edu/spottedlanternfly

Study Design

Independent Variable: Presence of predator to lantern fly (control group has no introduced natural predators, experimental group has introduced natural predators).

Dependent Variable: Population of Spotted Lanternflies

Experiment

We will section off two five-acre forested areas in the same county in Pennsylvania, both infested with spotted lanternflies, with an at-least-two-acre buffer between them to prevent the spread of parasitoids to the control group. Initial lanternfly populations will be counted using quadrats, assuming random distribution. Then, the egg parasitoid will be planted in the treatment block. The blocks will be analyzed at the end of each season to recount the populations of spotted lanternflies. This is so we can assess the impact of the parasitoid and determine if it is a viable long-term treatment option for limiting spotted lanternfly damage.

Timeline

This experiment will occur over the course of three seasons, which will take roughly three years. Parasitoids will only be added the first season to observe their ability to persist (or not persist) in the spotted lanternfly populations.

Intended Analysis

- We hope to see a statistically significant difference between spotted lanternfly populations after three years for control and experimental groups. Ideally, a T-test on the treatment vs. control groups will give a p-value <0.05, supporting the alternative hypothesis that introduction of egg parasitoids will limit spotted lanternfly populations, with the possibility of eventually eradicating them completely.
- As the first time importing a natural predator of the spotted lanternfly to the US, this study will provide a blueprint for further studies on the impacts and usefulness of *Anastatus orientalis* as spotted lanternfly population control. Studies using this parasitoid have only been conducted in China so far.
- There are currently studies underway at Penn State University to engage the natural predators of spotted lanternflies that already exist in the US, such as birds. This study will serve as contrast to those studies to see whether it is more efficient to import predators or train existing predators.

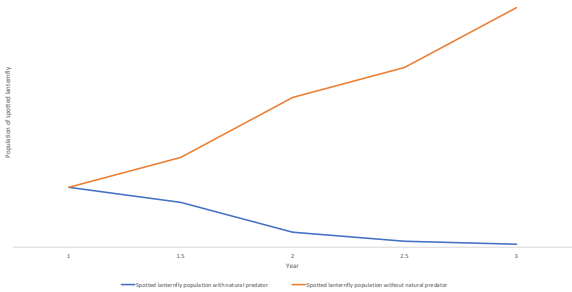


Figure 4. Expected population trend of spotted lanternfly before and after introduction of *Anastatus orientalis*.

Literature Cited

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