

MAE-2250: Spotted Lanternfly Device

Collaborators:

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Proposed Solutions for Managing Spotted Lanternflies in Vineyards

Team: Lanternfly Bye-Bye **Client(s):** Cornell CALS Extension / E&J Gallo Winery / National Grape

Problem statement

Since 2014, spotted lanternflies (SLF) have permeated the northeast, feeding on produce such as grapes and infecting over 70 plant species, threatening agriculture and biodiversity. The economic impacts of this invasive species have been estimated at \$324 million annually.

Impact

In 2025, the National Association of American Wineries valued New York's wine industry at \$16.81 billion. This high-value industry depends on a narrow 2-3 month harvest window, but the presence of spotted lanternflies can result in yield loss and reduced quality, costing the vineyards millions of dollars.

Proposed direction

Our team has ideas for two products to either manage the lanternfly population or deter them from vineyards. However, each approach has its own potential and risks, so we would appreciate any feedback on the viability of our ideas.

Concept A: Poisonous Tree of Heaven

What it is: Our first idea focuses on managing the population of spotted lanternflies using a decoy tree of heaven. Our team would design a small container and fill it with a mix of tree of heaven sap and a toxin.

How it would be used: Attracted by the sap, the lanternflies will dig into the container and ingest the toxin. A brief search found that some have used milkweed to varying degrees of success. However, there is currently no research on its toxicity. Otherwise, the container can be equipped with a weight-activated nozzle that would douse the lanternflies in a toxic mix, similar to what many households currently use.

Why it's better than the status quo:

- The decoys are easily scalable and stackable - When placed in vineyards, will attract the flies away

from the harvesters - Is able to protect the harvesters from the bugs and work to reduce the fly population

End-of-semester proof-of-concept:

By the end of the semester, our goal is to have a finalized trap and, ideally, have tested it in a real environment to see its effectiveness.

Concept B: Essential Oils

What it is: Our second proposal attempts to prevent the spotted lanternflies from entering the vineyard by deterring them with essential oils. **How it would be used:** These flies are naturally deterred by essential oils such as lavender or eucalyptus. By creating individual diffusers to place around the vineyard, the flies will not enter, and the plants will remain unharmed. Ideally, this idea could be developed to include a way to harm the lanternflies as well as deter them in order to help control the population and further protect the vineyard.

Why it's better than the status quo: - Non toxic to plants and other animals - Does not require much maintenance - Protects the harvesters from the lanternflies

End-of-semester proof-of-concept: By the end of this semester, our team's goal is to create and test a final prototype.

Key risks / unknowns

- Placement of the products is crucial. Because we are using a two-step solution, including attraction and detraction, we want to make sure we detract the flies into the attraction termination sites and not the other way around. Ideally we would conduct a study to see how far the scents travel and in what direction, but we do not have the budget nor time for that so we will have to rely on secondary research and data such as wind speed and direction.
- Location of egg masses. Because spotted lanternflies lay their eggs anywhere, we have to assume that there will already be SLF within the vineyard during spring. As a result, any product must have a way to deal with the starting population.
- Plant-safe compounds. Both of our proposed solutions involve liquid compounds to deter and remove lanternflies. The compounds used in the final solution will need to be safe for the grapes and approved by the FDA.
- Attracting SLF. A decoy would be most effective if it contained the sap or chemical signals that naturally draw SLF to the Tree of Heaven. This might be difficult to obtain and replace.

Questions for the client

1. Have you found anything that is effective at killing spotted lanternflies? *Decision affected: What component we add to reduce the population. For example, deciding between toxins or sprays and the concentration of them.*
2. Are spotted lanternflies deterred by other factors such as locations of the vineyards or human presence? *Decision affected: What location or factors should we examine when deciding how to implement our product*
3. Are there any parts of our plans that raise concerns for you? *Decision affected: Future Steps*

References

- “New York Wine Industry - WineAmerica Economic Impact Study.” 2025. WineAmerica. WineAmerica Mobile. May 29, 2025. <https://wineamerica.org/economic-impact-study-2025/new-york-wine-industry-2025/>.
- “Spotted Lanternfly Reported Distribution Map.” 2017. CALS. 2017. <https://cals.cornell.edu/integrated-pest-management/outreach-education/whats-bugging-you/spotted-lanternfly/spotted-lanternfly-reported-distribution-map>.
- “Spotted Lanternfly in Perspective (U.S. National Park Service).” n.d. Wwww.nps.gov. <https://www.nps.gov/articles/000/slf-in-perspective.htm>.