

Team Lighthouse

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SLF Lure Pitch

Problem Definition:

Spotted lantern flies gather on grape vines, but they also gather on other plants that we don't harvest, like the Tree of Heaven. How can we leverage this unique quality and lure spotted lantern flies to specific locations away from the vineyards to be exterminated?

Why it Matters

Spotted lantern flies have been an invasive species and have destroyed hundreds of grape harvests. If we can limit their destruction, we can save farmers thousands of dollars and reduce food waste.

Proposed Direction:

Concept Solution 1) Decoy tree-like lure

- Humidifier is a part of this structure or attached to a Tree of Heaven
- The humidifier will spray attractive fumes and poisonous fumes/insecticides at a to be determined rate
 - Grape Berry Moth Spray
- Another possibility is to incorporate the poison as an artificial sap for the humidifier
 - The diffused scent could attract the SLFs and bait them to drink the sap and be poisoned
- End-of-semester proof-of-concept: We can build the fumigator attachment that will be added to tall poles, and we can design a linkage that can attach to a standard pole or tree.

Concept Solution 2) High Frequency Hotspot Fence

- Wrap wires around a fence with decoy grape vines etc. that's not too close in vicinity to the grapes
- Attach wires to a speaker that plays a signal at exactly 60 Hz

Minimum Viable Product

Our minimum viable product is a humidifier and linkage design made to attach to any standardized telephone pole.

Potential:

- We have research on different things the SLFs are attracted to
 - Electric Frequencies (60 Hz) from Power Lines
 - Scent of Tree of Heaven, organic compounds diffused by the tree
 - Tall, vertical, and dark, warm, or humming objects
 - "drawn to their own "honeydew" (a sugary, sticky, liquid waste) excreted by other nymphs or adults already feeding"

Since we have research on what SLFs are already attracted to, we can use what we know and work closely with the entomologists and research to implement them rather than starting from scratch.

- Cheaper to create one lure tool to attract SLF and kill them all in one location = Scalable
Rather than creating a tool that spans an entire field, we can make an object that only needs to be placed at a certain location making it material-wise cheaper
- Doesn't interfere with day to day field/harvest operations
Due to not spanning across the field itself, the placements of the lures can simply be placed such that it wouldn't interfere with the existing operations.
- Can be for both adults and nymphs

Key Risks/Unknowns:

- SLFs might invade the lured regions and become a problem in a different industry/environment
- Requires more manpower to kill when they're trapped and need to be extracted
Each lure/trap will need to be maintained since they can't hold infinite amounts of SLFs.
- Don't know how attracted they will be to grapes vs. chemicals/ decoy
It will take research to see if and how effective a lure actually is since we don't know how strongly they would value the lures over grapes.
- Catching other bugs/animals
The pheromones and chemicals might attract different insects/animals and so if we implement an insecticide to kill the SLFs, then we might hurt other species unnecessarily.

Questions:

- 1) How would you rank the effectiveness of each luring factor we have in our idea (electric frequency, scent of organic compounds, honeydew, scent)?
- 2) What are different bugs that may be affected by catching spotted lanternflies and what are things we can do to prevent this?
- 3) Would it be harmful to the grape vines to plant Trees of Heaven in a nearby vicinity?

References

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