

A Totally Inconspicuous Bag

Team: Friday AM MAE 2250 ODP Final Project Team Table One (FAMMAE2250ODPFPTT1)

Client(s): Cornell CALS Extension / E&J Gallo Winery / National Grape

Problem Statement:

Spotted lanternflies (SLF), are an invasive pest damaging grape farms along the U.S. East Coast. Their instars and adults feed on grapevine sap, while honeydew from late-stage SLF causes sooty mold making crops unmarketable. Even one to two SLF in a 22-ton harvest can cause rejection, and untreated vines may host about 22.9 SLF each. Mechanical separation of SLF from harvests is ineffective due to their small size (~1 inch) and does not prevent crop damage. Insecticides are costly, ranging from \$53.63 to \$147.85 per acre every 3 to 5 days, and often fail to fully control infestations.

Impact:

Our solutions aim to prevent SLF from reaching grapevines, preventing vineyard deterioration and the inconveniences associated with harvest contamination.

Concept Solutions:

Concept A (Primary): A Totally Inconspicuous Bag

What it is: A mesh bag that will be attached to the tree with a funnel opening at the bottom with a sugary solution, pheromones, light sources, and vibrations inside to help attract and trap spotted lanternflies [Figure 1].

How it would be used: (1) The bag can be adhered on trees or other tall objects surrounding a vineyard. (2) Trapped SLF will emit pheromones that attract more SLF. (3) Trap must be emptied every 2-3 days to prevent bad odors which may deter SLF.

Why it's better than the status quo: (1) This trap takes advantage of typical SLF behaviors that include: Attraction to tall structures, pheromones, sugary compounds, vibrations, and light. (2) The product is inexpensive to manufacture and easy to install and clean.

End-of-semester proof-of-concept:

We can field test our traps in areas known to have SLF and record how many are captured over time compared to the average number of SLFs in other trees within the same area.

Risks:

- Effectiveness – The solution's effectiveness at removing SLFs is unknown, once we have a working prototype, we hope to be able to get a real field test with SLFs to assess its effectiveness.
- Scalability – The amount of our product to be effective is so large such that it becomes logically infeasible. Testing will be conducted to measure the m^2 effectiveness of one unit of our product.
- Collateral - Our product may unintentionally trap native and environmentally beneficial insects in addition to SLF. Testing will be conducted to quantify the amount and species of non-SLF captures.

Questions:

1. How effective does the trap need to be in order for it to be a solution they pursue?
This answer doesn't affect us immediately but does create a goal for our trap to reach when we are able to field test it.
2. What locations on or near vineyards attract the most SLFs?
Affects where we do our testing and where we anticipate designing our trap for.
3. What are the budgeting constraints placed on our solution? This will affect the materials we use (ex. Whether we make our trap bags disposable or reusable).
4. What environmental constraints should we consider when making our product, such as potential damage from weather or other animals? This will affect the materials we use.

Works Cited

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Figures

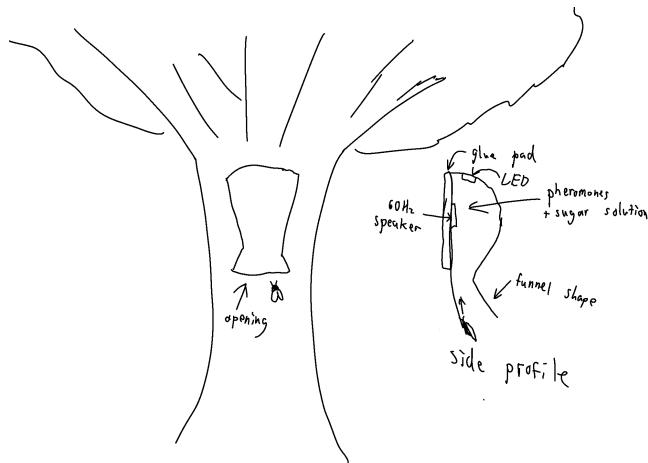


Figure 1: Mesh bag attracts lanternflies inside and traps them.