Spotted Lanternfly Eradication via Mechanical Rotating Trap
Team: *Cornellian Capybaras*
Clients: Cornell CALS Extension / E&J Gallo Winery / National Grape

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Problem Statement: The New York Grape industry is suffering from a new invasive pest, the Spotted Lanternfly (SLF). SLF are swarming vineyards, weakening and killing grapevines. The *Spotted Lanternfly Mechanical Grape Harvester: Initial Study* counted an average of 22.9 SLF per vine (about 510 SLF per 100-foot row). Furthermore, any SLF that gets into the harvest bins is considered foreign matter, raising issues with the FDA. The industry is looking for ways to remove SLF from the vines and eliminate their matter from the harvest. Two obvious solutions to preventing SLF contamination are spraying insecticide shortly before harvest and removing/killing the SLF during harvesting. These present a few issues: Using mass pesticides might cause environmental problems, and pesticide use involves a complicated set of Food Safety Requirements from the USDA. Killing while harvesting potentially would incur damage to the grape crops while being harvested.

Impact: Removing the SLF would dramatically increase rates of grape production, leading to increased overall sales, improved harvesting efficiency, and lower costs of grape products.

Proposed Concept: Rotation Trap
A small device that would lure SLF within a 1m radius into a container using some attractant (food, tree of heaven sap). It would trap the SLF using a rotating mechanism that would push lanternflies into small one-way slits at a constant frequency. Soapy water within the container would kill the SLF. The devices can be tiled along the vineyard for a large area of effect, and can be maintained manually by cleaning the water and SLF matter as needed.
Improvements beyond the Status Quo: Once put into place, the user no longer needs to put more effort in beyond cleaning and resetting. Also, the device works without any supervision, allowing for more time to be spent working.
EOS proof-of-concept: A plastic to-scale prototype of the trap with demonstrated functionality in the rotation, clean-up, and monodirectionality to simulate the implementation in the field.

Key Risks / Unknowns:
1. The device may not be effective in our predicted radius; test by researching
2. The SLF is too large to be trapped in large quantities; test by using a similar-sized dummy.
3. The device may wear out over time; test against weather + field environment conditions

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Questions for the Client:
1. How sensitive are SLF to a slight touch from the device?
   Decision affected: How fast the device will rotate to push the SLF inwards.
2. How many SLF do you usually see daily when out on the farm?
   Decision affected: How large a container should be on the bottom of the device?
3. What portion (%) of the SLF needs to be killed/removed to have a significant impact?
   Decision affected: Size of implementation of the proposed device

References:

- https://nygpadmin.cce.cornell.edu/pdf/impact_ny/pdf92_pdf.pdf
- https://youtu.be/LCnp9H1SIX8?si=DDxwivgtdUjEOsPg