



Invasive Species Alert: Pennsylvania's Spotted Lanternfly Problem

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ENVS 301: Environmental Case Studies



ABSTRACT

This case study will examine the spotted lanternfly (SLF), an invasive insect species that is now seen everywhere in Philadelphia. Spotted lanternflies is a valuable case study to examine because it highlights many of the challenges brought on by invasive species, including economic damages, remediation issues, and prevention efforts. This case study will analyze the spotted lanternfly by examining the stakeholders affected and discussing short and long term solutions to address the invasive species issue.

BACKGROUND

History

- The spotted lanternfly is a planthopper indigenous to Asia
- The first SLP in North America was found in 2014 in Pennsylvania
- It is believed to have arrived on shipments of stone from China
- As of 2021, SLF has been detected in 11 eastern states (Connecticut, Delaware, Massachusetts, Maryland, North Carolina, New Jersey, New York, Pennsylvania, Virginia and West Virginia)
- Several of these states have issued quarantine orders

How They Spread

- SLF's preferred host is tree of heaven, but can also live on more than 100 species causing stress, infections, and pests to the plant
- Tree of heaven is also an invasive species first brought from China to the US in 1784, which can colonize disturbed areas quickly and resprouts vigorously when cut, making removal difficult
- Problems include swarming public areas and eating the sap of crops and plants

Environmental Impact

- The SLF attacks grapevines, maple trees, walnut trees, and dozens of other plants that are important to natural ecosystems
- The SLF excretes a residue known as "honeydew" that can turn into mold and drip onto cars and patios, which can cause safety issues and impair plant growth
- Honeydew can also attract stinging insects, making it dangerous for people with allergic issues

Economic Impact

- SLFs threaten PA's grape, fruit tree, and logging industries due to their host affinity to the trees
- Many vineyards were unable to produce fruit due to the feeding and sap loss from SLFs
- A 2019 economic impact study estimates that SFLs could cost the state \$324 million annually and more than 2,800 jobs
- The wine industry brings in \$4.8 billion dollars annually to PA
- PA is the nation's largest producer of hardwood timber products, bringing in ~\$5 billion dollars annually

DETAILS & DATA

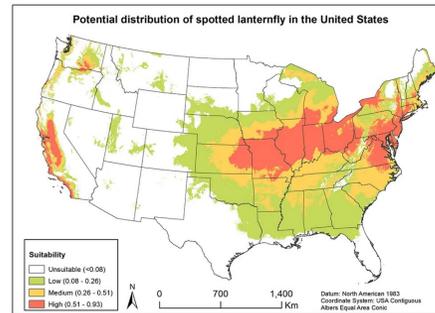


Figure 1: Potential distribution of spotted lanternflies in the US from Unsuitable to High suitability environments. Copied from Entomology Today, 2019.

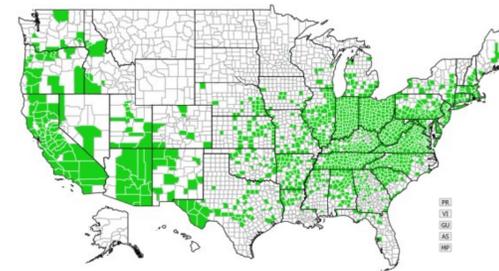


Figure 2: Country level distribution of tree of heaven in the United States. Copied from University of Georgia – Center for Invasive Species and Ecosystem Health, 2014.

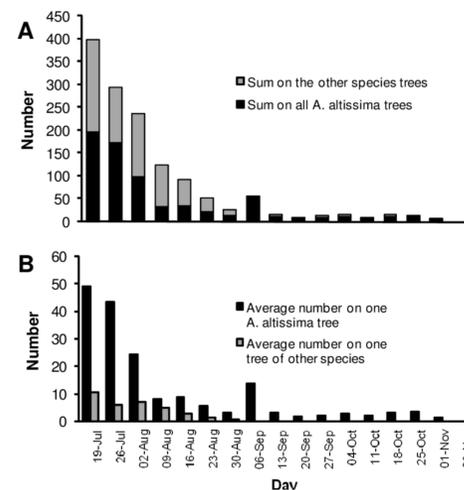


Figure 3: Number of spotted lanternflies on tree of heaven compared to other tree species from July to November. Copied from Journal of Insect Behavior, 2011



Picture of tree of heaven

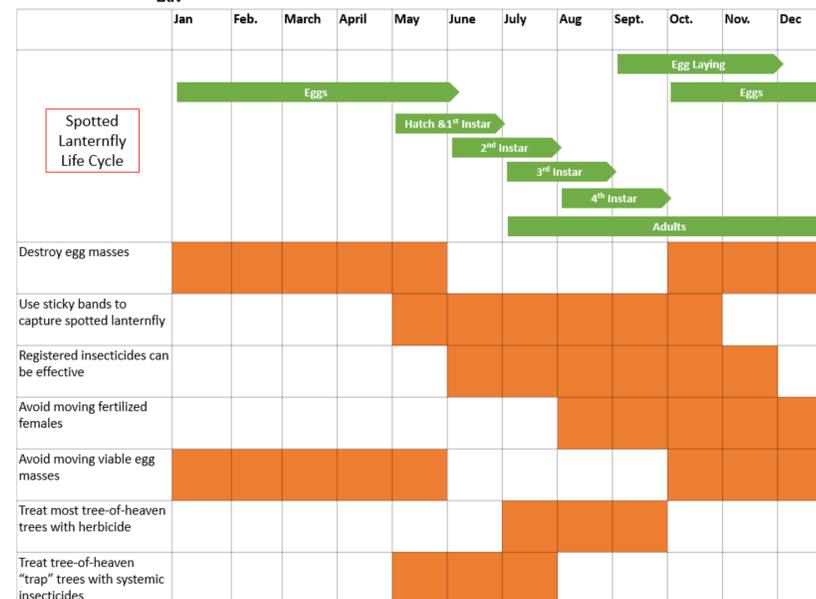


Figure 4: Spotted lanternfly life cycle and best months to use specific management practices to treat spotted lanternflies. (Top) Taken data from Willistown Township Parks & Recreation. (Bottom) Modified from Cornell College of Agriculture and Life Sciences.

STAKEHOLDERS: Government

- PA's Department of Agriculture (1)
- US Department of Agriculture (1)

STAKEHOLDERS: Non-government

- Researchers / environmentalists (4)
- Farmers (3)
- Arborists (3)
- Vintners (3)
- Citizens of PA (4)
- Economists (4)

ANALYSIS, DISCUSSION & CONCLUSION

- While different stakeholders exist, students should recognize that they are all trying to work towards the same goal of removing the pest
- The distribution of spotted lanternflies matches the distribution of tree of heaven, suggesting that removal of the tree of heaven is necessary
- Whether other tree species that host lanternflies should be cut down or just treated is up for debate given financial and ecological costs
- Different treatment methods (destroying eggs, insecticides, etc) should be employed depending on the month due to the SLF's life cycle
- Each stakeholder should bring in their own solution to the problem that relates to their stakeholder. For instance, residents should propose spreading awareness about killing SLF's on sight
- The Potential of lanternflies to spread to other parts of the US is alarming and indicates the need for government intervention at both the local, state, and federal level

TEACHING THE CASE STUDY

READ: Part A of case study, 1 research paper on spotted lanternflies, 1 article about stakeholders.

PRE-CLASS:

WRITE: Answer Qs. Choose stakeholder, write short statement with potential solutions based on stakeholder.

PRESENT: Professor makes brief presentation

IN CLASS:

SHARE: Students compare statements with their stakeholder group

MERGE: Students form groups with one representative from each stakeholder.

PLAN: Each group comes up with a joint set of solutions and pitches their statement to the government

Q&A: Government will ask questions to each group

DECISION: The government will choose whichever group had the best ideas as the winner of this case study.