

Biology and management of spotted lanternfly



PennState Extension

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What is a spotted lanternfly (SLF)?

Planthopper insect

Native to Asia, found
in southeastern PA in
2014

Also invasive in Korea
(2004) and Japan
(2009)

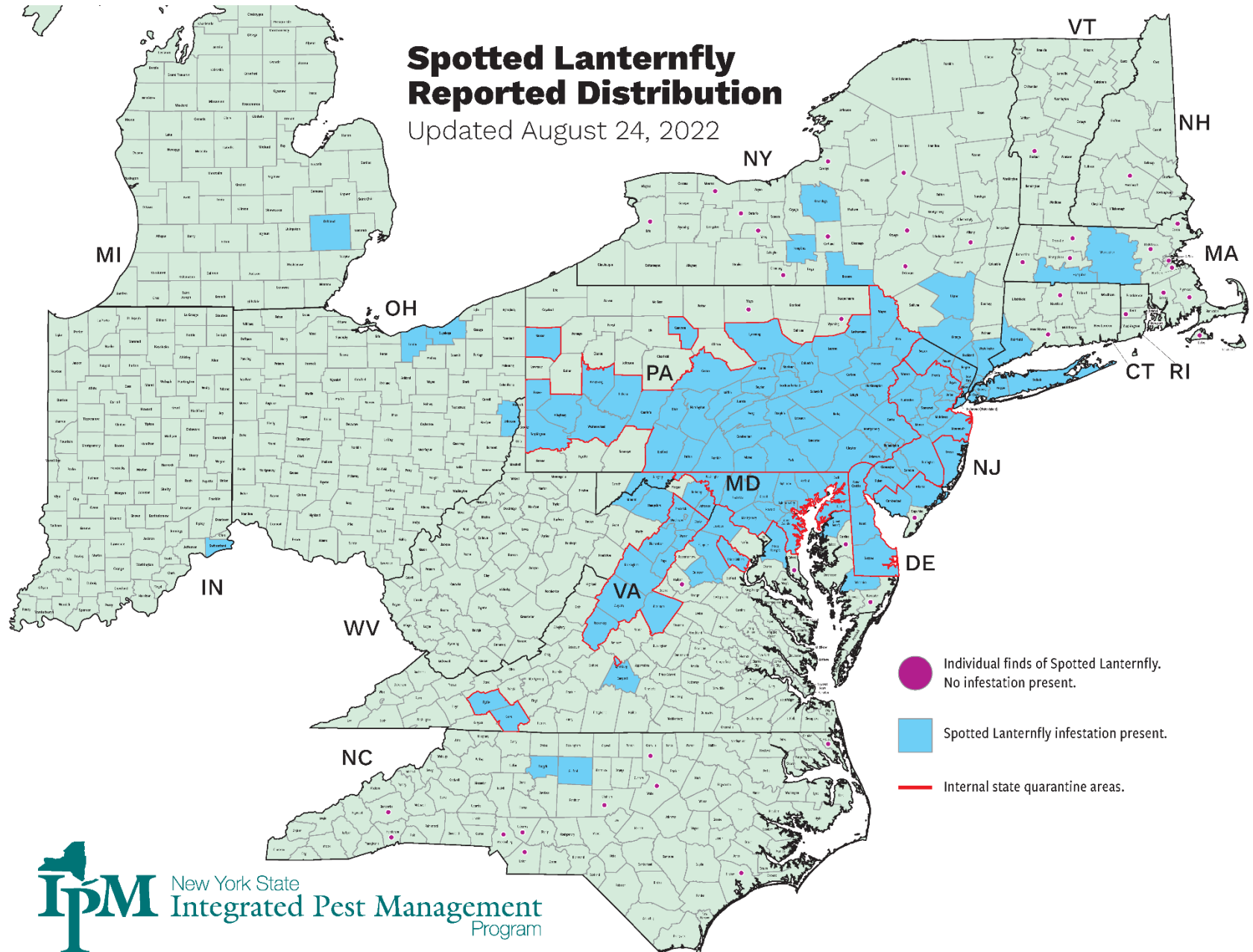


PennState

Current distribution

Spotted Lanternfly Reported Distribution

Updated August 24, 2022



SLF life stages



E. Swackhamer



PA Department of Agriculture



PA Department of Agriculture



PA Department of Agriculture



PA Department of Agriculture

- A. Egg masses
- B. Early nymph
- C. Late nymph
- D. Adult, wings closed
- E. Adult, wings open



What's on the
SLF menu?



SLF is successful as an invasive species
because of its large host range of over 70
different plant species!

Host selection appears to be dependent on:

- (1) proximity** (*what else is in the landscape?*)
- (2) seasonality** (*what time of year is it?*)

...However, SLF does have a few **favorite**
hosts.

What's on the
SLF menu?

Nymph favorites:

Rose (cultivated, multiflora)
Grape (wild and cultivated)
Tree-of-heaven
Black walnut
Styrax

Adult favorites:

Grape (wild and cultivated)
Tree-of-heaven
Red/silver maple
Black walnut
Styrax
River birch
Willow
Sumac



What *isn't* on
the SLF menu?

Very few plants are not fed on by SLF. Plants not typically a host may suddenly become the host if it's the best option for SLF in the landscape.

Generally speaking, these hosts are not preferred as food by SLF (note that eggs may still be deposited, however):

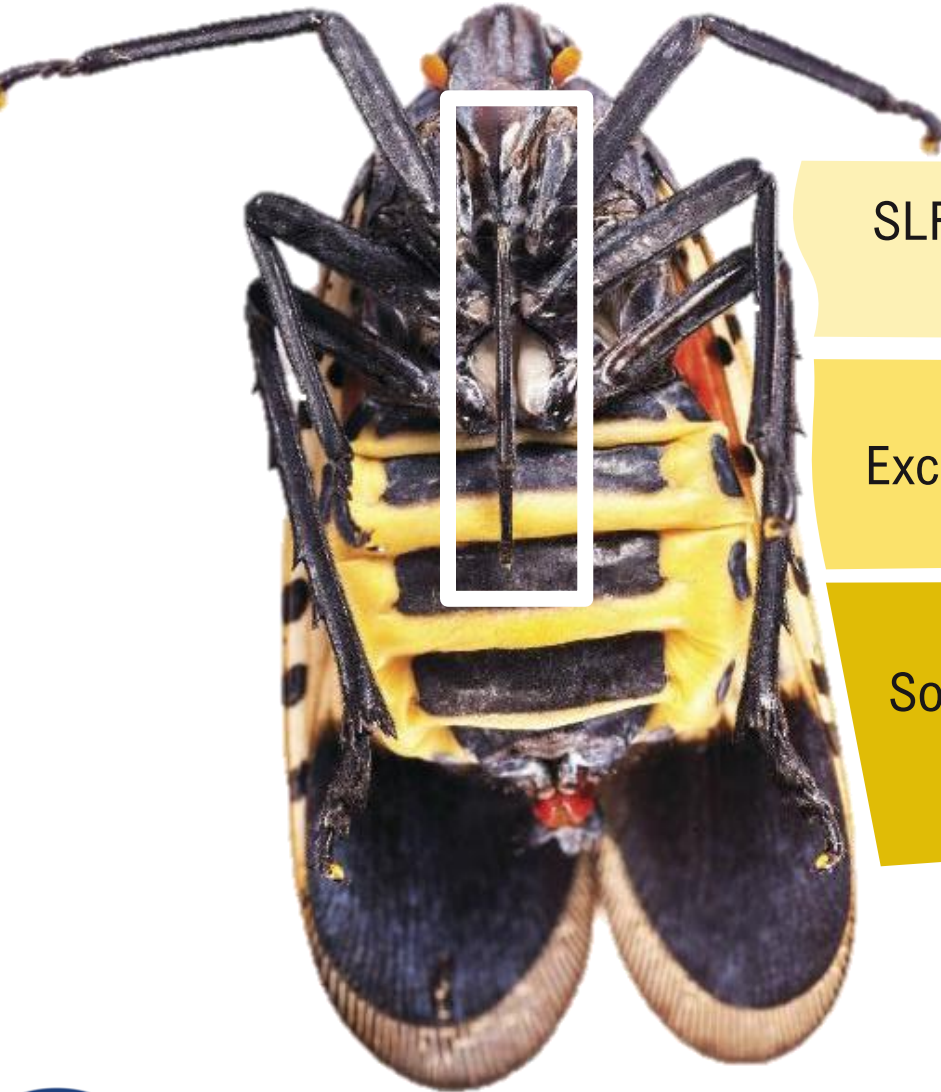
Conifers

Pears (e.g. Callery pear)

Cherry (e.g. Black cherry) (*popular for eggs!)

We are actively researching what makes certain plants better hosts than others for SLF – stay tuned!

How does SLF cause plant damage?



SLF feeds on plant sap through a **piercing-sucking mouthpart**

Excretes **honeydew** (sugar water) as it feeds

Somewhat reliant on turgor pressure of the plant (needs the sap to be flowing!)

How does SLF cause plant damage?



SLF is a **PLANT STRESSOR**

PLANT STRESSORS can include plant diseases, weather (flooding/drought), imbalance of nutrients, and insect feeding

To date, SLF has **not been observed to kill** plants except for tree-of-heaven, small tree saplings, and grapevines

SLF may **increase plant sensitivity to other stressors** including diseases or unfavorable weather conditions. This could then cause reduced growth, dieback, or eventual death

Why does honeydew matter?

With many SLF feeding, honeydew builds up on and around the plants



Heather Leach

Why does honeydew matter?

Sooty mold grows on anything, including cars, furniture, and decks, making it a **nuisance**. Trees that overhang your backyard, deck, parking areas, etc. may be problematic for this reason!



Barbara Bowen



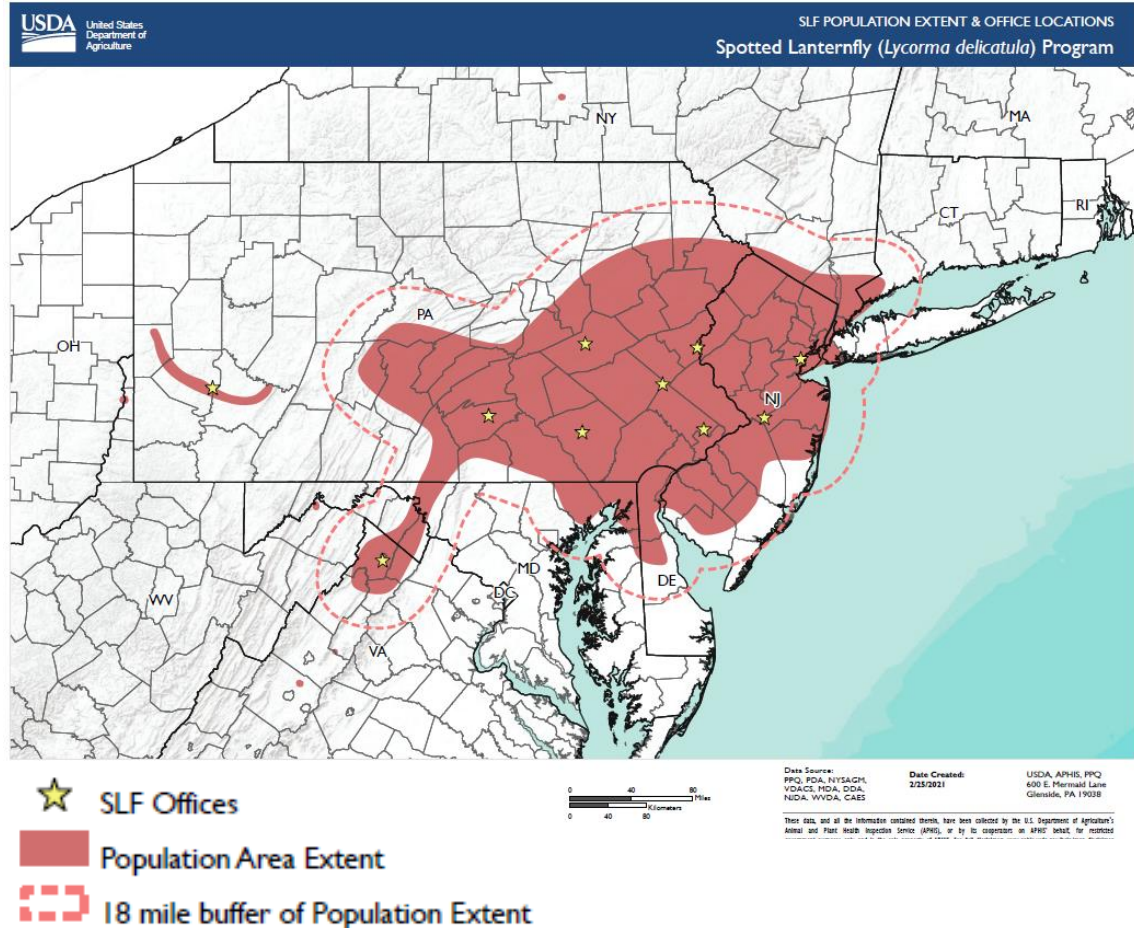
Emelie Swackhamer, Penn State

What is being done to control SLF?

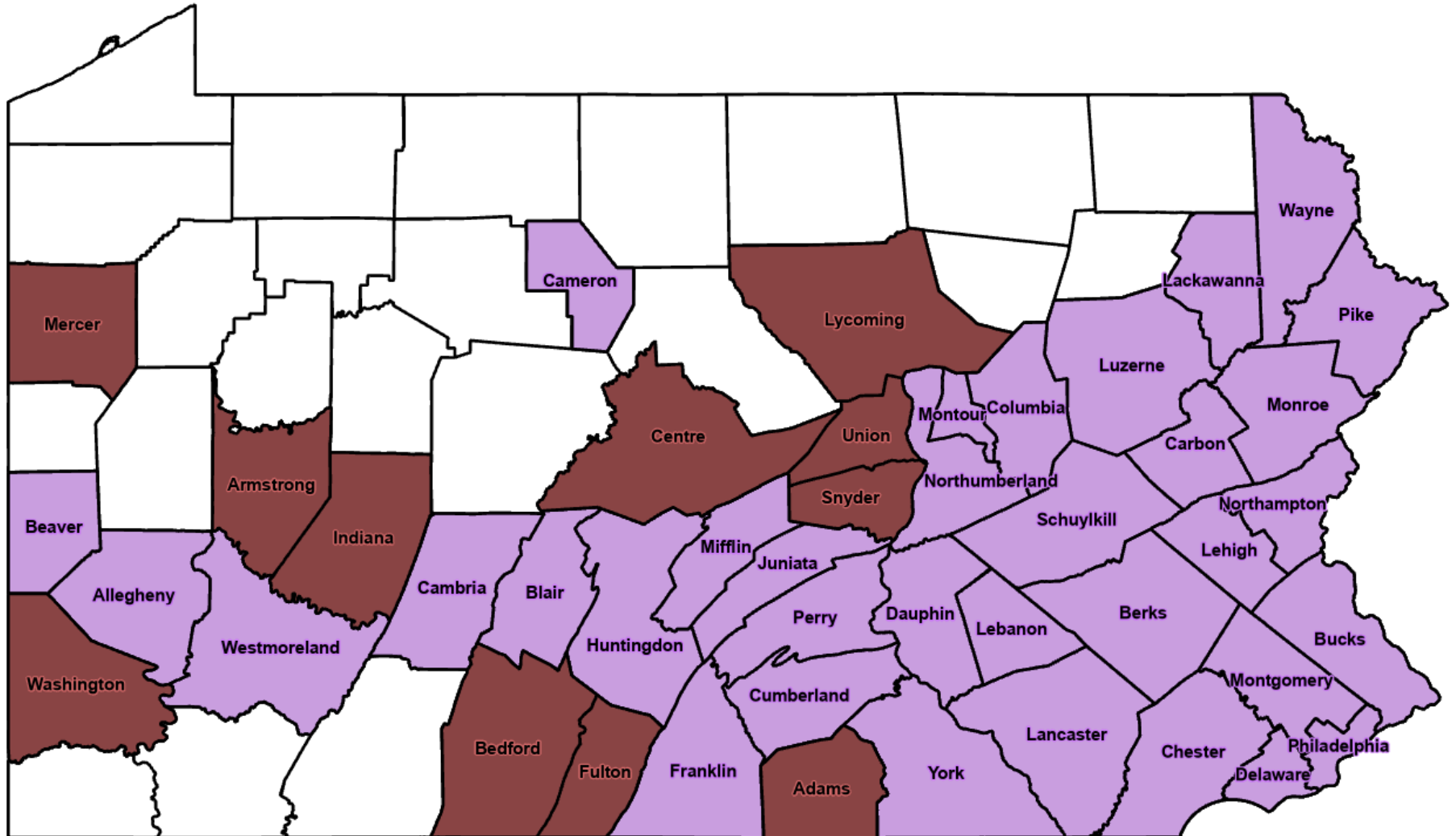
USDA and the PA Department of Agriculture have partnered to help control SLF

Control efforts are focused in areas of high-risk for future spread, including rail lines, ports, and highways

If new detections occur out of the currently infested area, USDA and PDA operations crew are also sent to those locations for potential eradication



SLF quarantine



Pennsylvania Spotted Lanternfly Quarantine

- Existing Quarantine
■ Counties added to Quarantine in 2022

What does the quarantine mean?



No one may intentionally move
viable life stages of SLF

Examples of regulated items:

Outdoor items

Vehicles

Equipment

Trailers

Recreational vehicles

Hardgoods

Stone, Tile

Decorative materials

Firewood

Nursery stock

Questions about Quarantine Compliance?

Contact SLFPermit@pa.gov or 717-787-5674

Stopping the spread

Everyone should inspect their vehicles before moving, camping, etc.

Use the *Checklist for Residents* to help you identify SLF and areas they might be present

SPOTTED LANTERNFLY

Checklist for Residents

Help keep spotted lanternfly from spreading. Before you travel or move any items stored outdoors within or out of the quarantine area, check for and remove all stages of spotted lanternfly. Use the guide below to know which items to check.

LIFE STAGES

EGG MASS
FOUND SEPT-JUNE



EARLY STAGE NYMPH
FOUND LATE APRIL-JULY

ACTUAL SIZE: 1/8"-1/4"
H → H



LATE STAGE NYMPH
FOUND LATE JULY-SEPT

ACTUAL SIZE: 1/2"



POTENTIAL EGG MASS LOCATIONS

Spotted lanternfly egg masses can be laid on any surface and need a careful eye for inspection! Below are some examples of egg masses on outdoor objects.



Brandon Zimmerman



Jenny Armstrong Powell

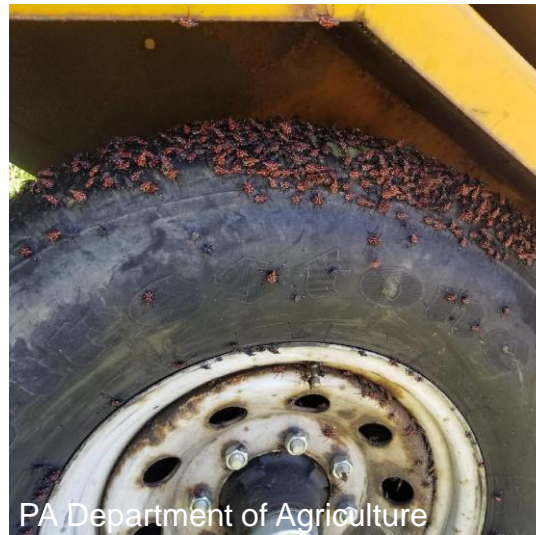


SLF permit for businesses, organizations



Businesses and organizations conducting business in the quarantine zone **must have permits** to move vehicles, equipment and goods within and out of the zone.

Take the permit test at:
<https://extension.psu.edu/spotted-lanternfly>



PA Department of Agriculture



PA Department of Agriculture

Resources

<https://extension.psu.edu/spotted-lanternfly-management-resources>



MANAGEMENT TIMELINE FOR SLF

| Control Options | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Don't move SLF | | | | | | | | | | | | |
| Scrape/smash eggs | | | | | | | | | | | | |
| Use tree traps | | | | | | | | | | | | |
| Contact insecticides (after hatch & bloom) | | | | | | | | | | | | |
| Systemic application of imidacloprid (after bloom) | | | | | | | | | | | | |
| Systemic application of dinotefuran (after bloom) | | | | | | | | | | | | |

Scrape & smash egg masses

Use a plastic card or putty knife to scrape eggs downward into a bottle or bag. **Submerge them permanently** in alcohol (rubbing alcohol, hand sanitizer)

OR

Smash the eggs with a hard flat surface. Smash all eggs evenly (you will see the eggs burst!)



STOP THIS INVADER!

Spotted
Lanternfly

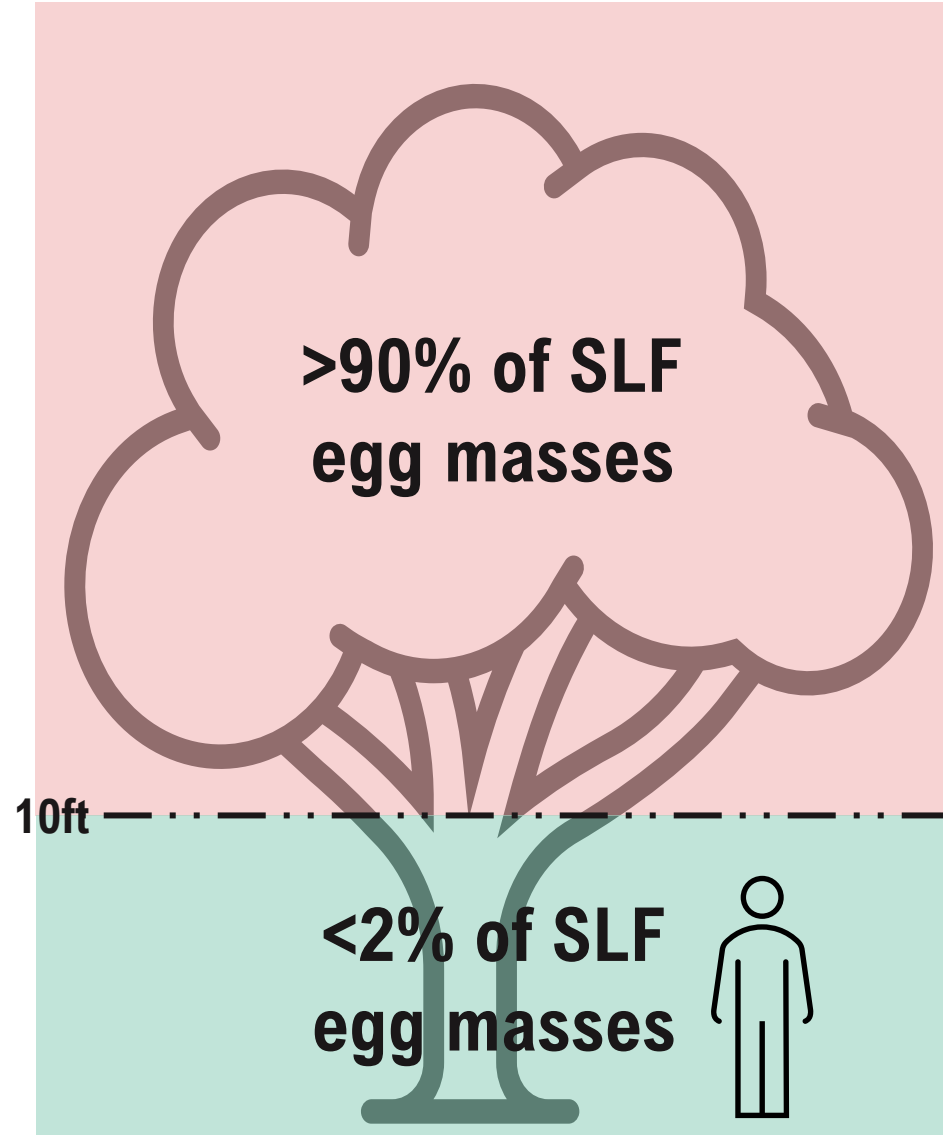
This invasive, destructive pest poses a significant threat to Pennsylvania's businesses and economy! Egg masses are laid in the fall and contain 30-50 spotted lanternflies.

HELP US STOP THEM BY SCRAPING THEIR EGG MASSES!

Scrape & smash ...HOWEVER

On average, <2% of eggs are laid at a reachable distance (0-10ft) on the tree, leaving 98% of the egg masses above reach.

You will not be able to reach all of the egg masses, so be prepared to potentially take additional management actions in the summer.



TREE TRAPS: SLF nymphs and adults **walk upwards** on tree trunks to feed higher in the tree. Traps capture them as they walk up the tree.



CIRCLE TRAPS: The most effective trap is a “circle trap” (similar to a funnel minnow trap) which can be purchased or made yourself

Homemade



Emelie Swackhamer

Commercial



Heather Leach

STICKY BANDS: You can also use sticky bands, however it can capture other animals (pollinators, birds, etc.). A wildlife barrier must be used with a sticky band to prevent this.

We recommend fine mesh screening, such as window screen material, and using push pins to pleat a wildlife barrier over the top.



Beth Finlay

NOTE: There is no way to prevent SLF from moving on to your property, and using tree traps alone may not eliminate SLF.



How to Build a New Style Spotted Lanternfly Circle Trap

It is almost time to use traps to protect your trees from spotted lanternflies. Get ready now so you can trap lots of spotted lanternflies safely.



Circle trap secured to a tree. Photo: Emelie Swackhamer, Penn State

The spotted lanternfly (SLF) is an invasive insect that feeds on grapevines and trees. There are a variety of options for SLF management, but one way to kill a lot of SLF without using insecticides is to trap them. The immature lanternflies (called nymphs) are often blown out of the canopy of the trees where they are feeding. Nymphs then walk to the trunk of trees and climb back up to start feeding again. We can take advantage of this predictable behavior of the nymphs by using traps to catch them as they climb up trees.

Many people in SLF infested areas have been using sticky bands wrapped around trees to capture nymphs. While this method can successfully capture many SLF nymphs it can also unfortunately occasionally capture birds and other creatures. If you are planning to use sticky bands this year, you should build a raised guard of wire or screening around the band to prevent other creatures from getting stuck on them. Penn State Extension has a short video that shows how to properly use sticky bands.

Recent research has shown that an entirely different kind of type of trap is also very effective and can dramatically reduce the chances of capturing other creatures. This new style trap is made of plastic-coated insect screening and does not use any sticky material at all. It is basically a tunnel that SLFs walk into. When they move upward in the trap, they end up in a dead-end collection container where they die. Currently, you can purchase this type of trap made specifically for SLF from one commercial source. Some people have been modifying similar commercially available traps designed for other insects to catch SLF. Other people have been making their own SLF traps from scratch.

This type of trap was originally designed to collect pecan weevils that also climb up the trunks of trees. They can be purchased commercially (search for circle weevil traps.) Pecan weevils are quite small, and the design of the pecan weevil trap can be modified to include a larger collection container to allow capture of high numbers of SLF. The collection container can be a repurposed item such as a clean peanut butter jar or even a sturdy plastic bag. A sturdy plastic bag that can be removed and replaced with a fresh one is a good way to go because you do not have to empty a container of rotting, stinky, dead insects. It also allows you to replace the old, dirty bag with a clean bag that will transmit daylight. SLF tend to move upward towards the light. Additionally, bags will begin to tip over as they get full, moving captured insects away from the entry port, which keeps the area free so more SLF can crawl in.

Some creative people have built similar traps and have devised a range of methods that work. Building these traps is a good project for anyone who wants to destroy SLF, save money by using materials they might already have on hand and practice their engineering skills.

You can use the trap on any infested tree. Nymphs of SLF are often found on *Ailanthus altissima*, commonly known as tree

How to Create a Wildlife Barrier for a Spotted Lanternfly Sticky Band Trap

Many residents attempt to control spotted lanternflies by placing sticky bands on tree trunks. This method of trapping should never be used without a wildlife barrier.

ARTICLES | UPDATED: JULY 1, 2021



Photo credit: Penn State Extension

The spotted lanternfly (SLF) is an invasive insect first detected in the United States in 2014. Its feeding habits threaten Pennsylvania's natural ecosystems, landscapes, and agriculture—including the grape, tree-fruit, hardwood, and nursery industries.

Trapping Spotted Lanternfly

There are a variety of options for SLF management, but one way to kill a lot of SLF without using insecticides is to trap them. The immature lanternflies

(called nymphs) are often blown out of the canopy of the trees where they are feeding. Nymphs then walk to the trunk of trees and climb back up to start feeding again. We can take advantage of this predictable behavior of the nymphs by using traps to catch them as they climb up trees.

Wildlife Barriers a Necessity with Sticky Band Traps

Sticky bands placed around tree trunks have been found to trap both spotted lanternfly nymphs and—to some extent—adult spotted lanternflies. Trapping unintended targets, including songbirds and beneficial insects, is a major drawback to this method of control. If a resident decides to use a sticky band trap, they should use a wildlife barrier, which greatly reduces the chances of catching non-target wildlife. A wildlife barrier will not completely eliminate the possibility of a sticky band capturing an animal or beneficial insect, but it may reduce the likelihood and using a wildlife barrier is a good practice. (Circle traps are an alternative to sticky bands and are less likely to capture birds and some other creatures.)

Insecticide control

There are **two main types of insecticides**: Systemics and Contacts

Contacts are when the insecticide is sprayed on the insect, or on a surface that the insect is exposed to (i.e. where it walks/feeds). Contact insecticides generally offer control for a shorter period.

Systemics mean the insecticide is absorbed into the plant and kills the insect when they feed on the treated plant. Systemic insecticide use can be more complicated, but they tend to offer control for longer.

Contact insecticides

| Active Ingredient | Toxicity to Birds | Toxicity to Fish | Toxicity to Bees | Activity Against SLF | Residual Activity |
|--|-------------------|------------------|------------------|----------------------|-------------------|
| Bifenthrin | M | H | H | Excellent | Excellent |
| Beta cyfluthrin | S | H | H | Excellent | Excellent |
| Carbaryl | S | N | H | Excellent | Good |
| Zeta-cypermethrin | S | H | H | Excellent | Poor |
| Malathion | M | H | H | Excellent | Poor |
| Natural pyrethrins ¹ | N | H | M | Excellent | Poor |
| Tau fluvalinate + tebuconazole | H | H | N | Excellent | Poor |
| Neem oil ¹ | — | H | H | Good | Poor |
| Insecticidal soaps ¹ | N | N | N | Good | Poor |
| Essential/botanical oils ^{1, 2} | — | — | — | Good | Poor |
| Paraffinic oil or horticultural spray oil ¹ | — | — | — | Good | Poor |
| Spinosad ¹ | S | S | H | Variable | Poor |
| <i>Beauveria bassiana</i> | N | N | S | Under evaluation | Poor |

N = nontoxic; **S** = slightly toxic; **M** = moderately toxic; **H** = highly toxic; **—** = data not available.

1. Some products allowed for organic production.

2. There are many products containing essential oils which vary widely for efficacy against SLF. The two products tested against SLF were “SLF Killer 2” and “Purely Green.”

Note: The listing of any products in this table is not an endorsement or specific recommendation of the product or the company. Other products with the same active ingredient should also work in the same way, but they may have different rates or formulations. For use in Pennsylvania, be sure the product is registered for the site and purpose of use (e.g., vegetable garden versus ornamental trees). This table is based on the experiments we have done to date and should not be considered final or complete.

Systemic insecticides

| Active Ingredient | Toxicity to Birds | Toxicity to Fish | Toxicity to Bees | Application Method | Recommended Timing | Activity Against SLF | Residual Activity |
|-------------------|-------------------|------------------|------------------|--------------------|----------------------|----------------------|-------------------|
| Dinotefuran | — | — | H | Soil drench | July to September | Excellent | Excellent |
| Dinotefuran | — | — | H | Trunk spray | July to September | Excellent | Excellent |
| Dinotefuran | — | — | H | Trunk injection | July to September | Excellent | Excellent |
| Imidacloprid | M | M | H | Soil drench | After flower to July | Variable | Variable |
| Imidacloprid | M | M | H | Trunk injection | July to September | Good | Excellent |

N = nontoxic; **S** = slightly toxic; **M** = moderately toxic; **H** = highly toxic; **—** = data not available.

Note: This table is based on the experiments we have done to date and should not be considered final or complete.

Deciding what action to take for SLF management

- (1) There is no silver bullet treatment for SLF
- (2) There is no “one size fits all” management plan

LIKELIHOOD OF IMPACT: what plants are present?

SEVERITY: how many SLF are present?

| | Low (occasional egg masses, nymphs, or adults) | Tolerable (few egg masses, nymphs, or adults) | Undesirable (many egg masses, nymphs, adults, and sooty mold present) | Intolerable (heavy levels of adult and nymph feeding, extensive amounts of sooty mold) |
|--|--|---|---|---|
| Few SLF favorite plants (maples, willow, birch, tree-of-heaven) | Low risk | | | |
| Many SLF favorite plants (maples, willow, birch, tree-of-heaven) | | | | |
| Plants under stress (weather, diseases) | | | | |
| Proximity to vulnerable plants (young plants, vineyards, etc.) | | | | High risk |

The STEPS of SLF management

CHEMICAL CONTROL

Use EPA registered chemicals as contact or systemic applications, including dinotefuran, bifenthrin, zeta-cypermethrin, and carbaryl. These have longer residual.

REDUCED-TOXICITY CHEMICAL CONTROL

Start with the least toxic options first, including insecticidal soaps, neem and botanical oils, pyrethrum. These have very little residual.

BIOLOGICAL CONTROL

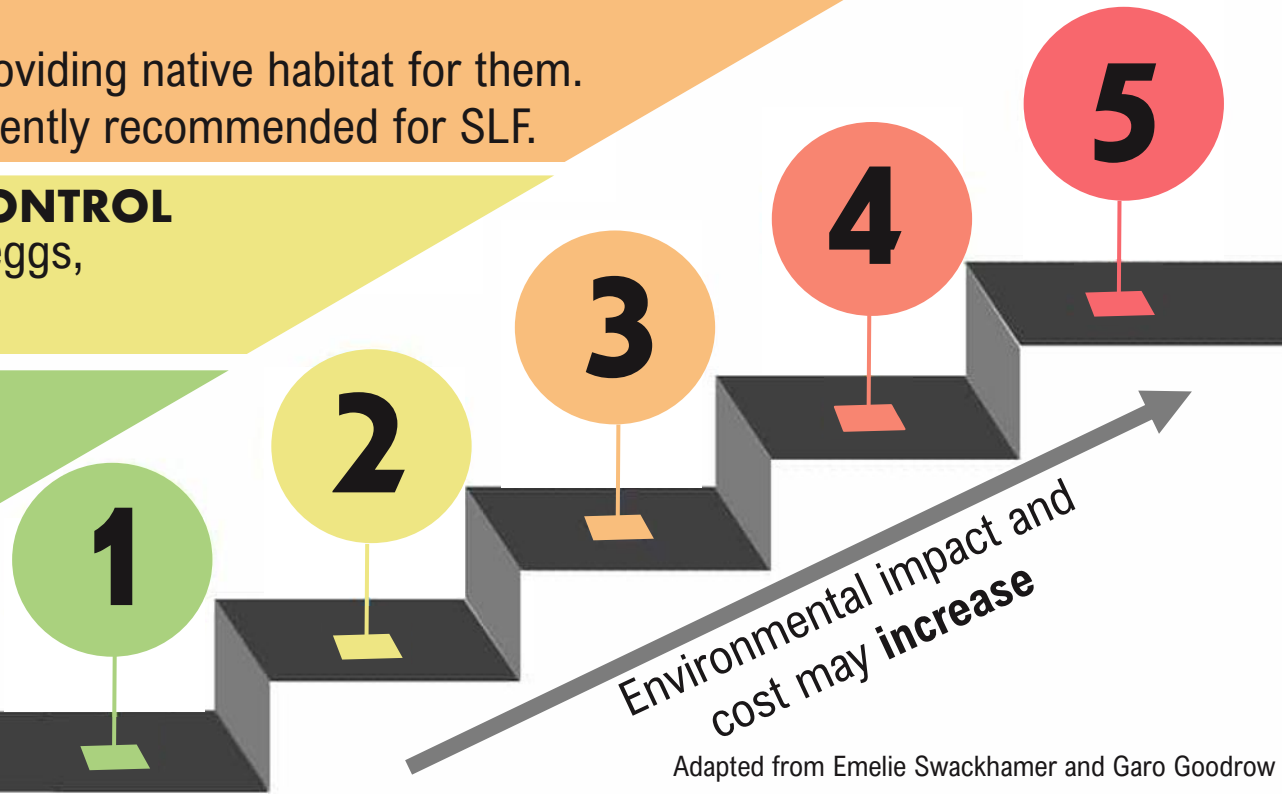
Support natural enemies by providing native habitat for them. Releasing predators is not currently recommended for SLF.

PHYSICAL/MECHANICAL CONTROL

Use tree traps, scrape/squash eggs, swat/stomp nymphs and adults

CULTURAL CONTROL

Promote plant health, remove favored SLF hosts. Don't assume all damage is from SLF.



Do not use home remedies to control SLF

Home remedies may be **unsafe** for humans, pets, and plants, and illegal

They don't have information on:

- (1) how to use them
- (2) how to store them
- (3) how they might be toxic to your family, pets, beneficial insects, and the plants in your backyard



IMPORTANT REMINDERS ABOUT PESTICIDE SAFETY

1

Protect yourself



Avoid overreacting to the situation and

teach others not to overreact

Protect yourself using **PPE** (personal protective equipment) from insecticide exposure

Only use **registered insecticides** to kill SLF

Read the label and follow all directions



Use the right amount

Avoid using the same insecticide all the time

2

Apply correctly

3

Protect the environment

Protect pollinators, streams, wetlands, and water sources



Choose the **least toxic** insecticide that is effective





For more information



Lycorma delicatula, commonly known as the spotted lanternfly (SLF), is an invasive insect pest present in Pennsylvania and some other eastern states. SLF threatens grape production and tree health, and it is a nuisance in landscapes.

Residents living in the infested area are using a variety of methods to control spotted lanternfly, including destroying egg masses (extension.psu.edu/how-to-remove-spotted-lanternfly-eggs), trapping them with sticky bands (extension.psu.edu/using-traps-for-spotted-lanternfly-management), eliminating one of their favorite host trees (extension.psu.edu/tree-of-heaven), or by using insecticides.

Avoid overreacting to the situation

The SLF quarantine enacted by the Pennsylvania Department of Agriculture (PDA) says property owners are responsible for controlling or eliminating SLF on their property. Residents should choose the least toxic management method that will work. Many people are fearful of SLF and worry it may

If you decide to use an insecticide to kill SLF, there are some important safety measures and pesticide rules to follow. Before using any pesticide product, always read the label and be informed to be safe.

Only use registered insecticides to kill SLF

Recipes for homemade sprays made from cleaning, automotive, cooking, or other household products might be more harmful to the environment or your plants than people realize. Insecticides that are registered with the Environmental Protection Agency (EPA) have been tested for safety and efficacy. The label includes important information, including directions for safe mixing and use and precautions to protect pollinators and the environment.

In Pennsylvania, the site where you plan to use an insecticide must be listed on the product label. For example, if you want to spray an insecticide on an ornamental tree to kill SLF, the product label has to say that it is registered for use



If you have **tree-of-heaven** on your property, this is a good place to first focus SLF management

- (1) **Removing** tree-of-heaven
- (2) **Treating** tree-of-heaven

Removing tree-of-heaven

Removing tree-of-heaven may help reduce a “hot spot” area on your property.

Don't expect this to eliminate SLF from your property, however.

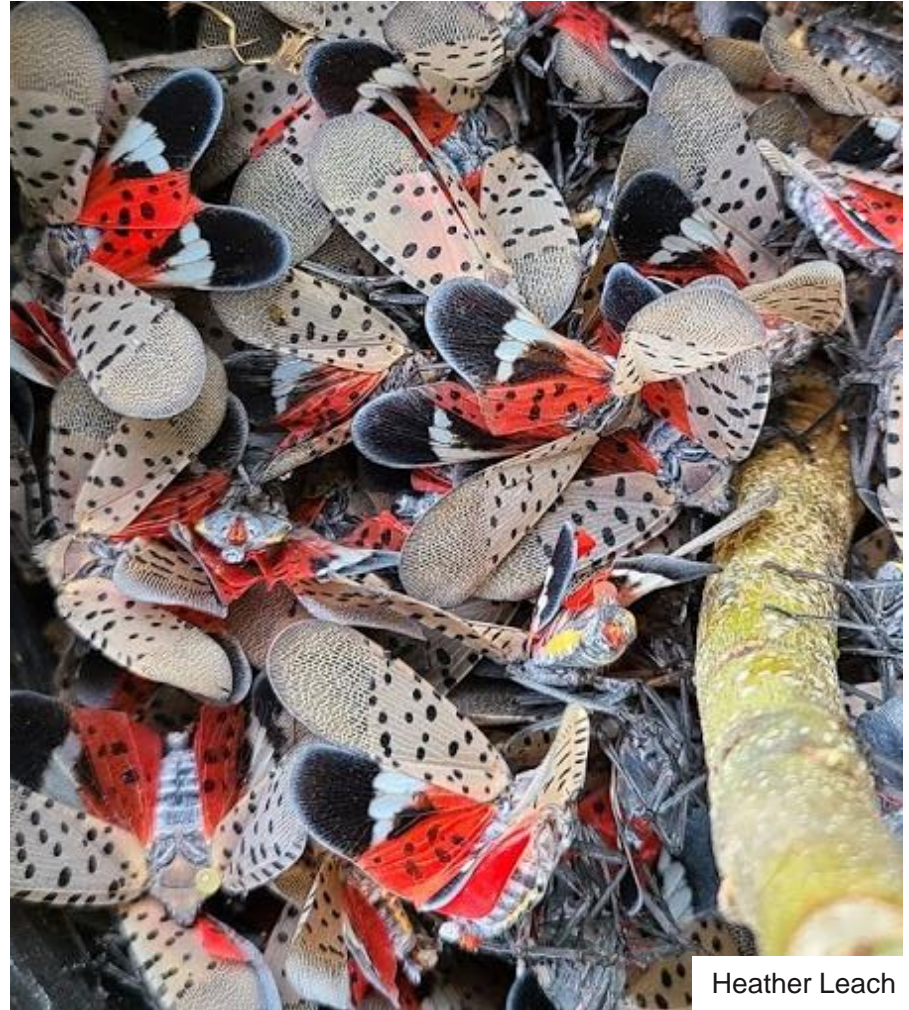
Removal of tree-of-heaven must include an herbicide!



Treating tree-of-heaven

Tree-of-heaven can be treated with a systemic insecticide to act as a “trap tree” for SLF

Correctly applied systemic insecticide (dinotefuran) stays active for several weeks, killing the SLF that feed on the tree



Heather Leach

Management Calendar for tree-of-heaven

Management Calendar

The management calendar for tree-of-heaven emphasizes late season treatment to maximize control of the roots.

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|-----------------------------|------|------|-------|-------|-----|------|------|------|-------|------|------|------|
| Bud Break | | | | | | | | | | | | |
| Flowering and Seed Ripening | | | | | | | | | | | | |
| Foliar or Stem Treatment | | | | | | | | | | | | |
| Cutting after Treatment | | | | | | | | | | | | |

For more information



Background

Tree-of-heaven, commonly referred to as *Ailanthus*, is a rapidly growing deciduous tree native to a region extending from China south to Australia. It was first introduced into the United States in the Philadelphia area in 1784. Immigrants later introduced tree-of-heaven to the West Coast in the 1850s. It was initially valued as an urban street tree and was widely planted in the Baltimore and Washington, D.C., area. From these areas, tree-of-heaven has spread and become a common invasive plant in urban, agricultural, and forested areas.

Description

Size: Tree-of-heaven has rapid growth and can grow into a very large tree, reaching heights of 80 to 100 feet and up to 6 feet in diameter.

Bark: The bark of tree-of-heaven is smooth and green when young, eventually turning light brown to gray, resembling the skin of a cantaloupe.

side. One leaf can range in length from 1 to 4 feet with anywhere from 10 to 40 leaflets. The leaflets are "lance" shaped with smooth or "entire" margins. At the base of each leaflet are one to two protruding bumps called glandular teeth. When crushed, the leaves and all plant parts give off a strong, offensive odor.

Twigs: The twigs of tree-of-heaven are alternate on the tree, stout, greenish to brown in color, and lack a terminal bud. They have large V- or heart-shaped leaf scars. The twigs easily break to expose the large, spongy, brown center, or pith.

Seeds: Seeds on female trees are a 1-to-2-inch-long twisted samara, or wing. There is one seed per samara. The samaras are found in clusters, which often hang on the tree through winter.

Dispersal

Tree-of-heaven is dioecious, meaning a tree is either male or female, and typically grows in dense colonies, or "clones." All trees in a single clone are the same sex. Female trees are prolific



PennState

Action Steps

Visit the PDA Spotted Lanternfly website:

https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/Entomology/spotted_lanternfly/Pages/default.aspx

Spotted Lanternfly management and Tree of Heaven management on municipal properties

Access to Spotted Lanternfly management resources

- Penn State Extension Spotted Lanternfly website:
<https://extension.psu.edu/spotted-lanternfly>
- Report new sightings via the PDA hotline at 1-888-422-3359 or the PDA online reporting tool via the Penn State Extension website
- Stop the Spread signage (posters, yard signs) at public events/parks
- Access to traps or trap materials – e.g. City of Harrisburg
(<https://harrisburgpa.gov/spotted-lanternfly-traps-available-free-harrisburg-residents/>)
- Demonstrate proper trap installment on tree(s) at public park
- Website, social media, mailings, meetings, etc.

Visit us online for more information, sign-up for e-newsletters!

extension.psu.edu/spotted-lanternfly



Report



Identify

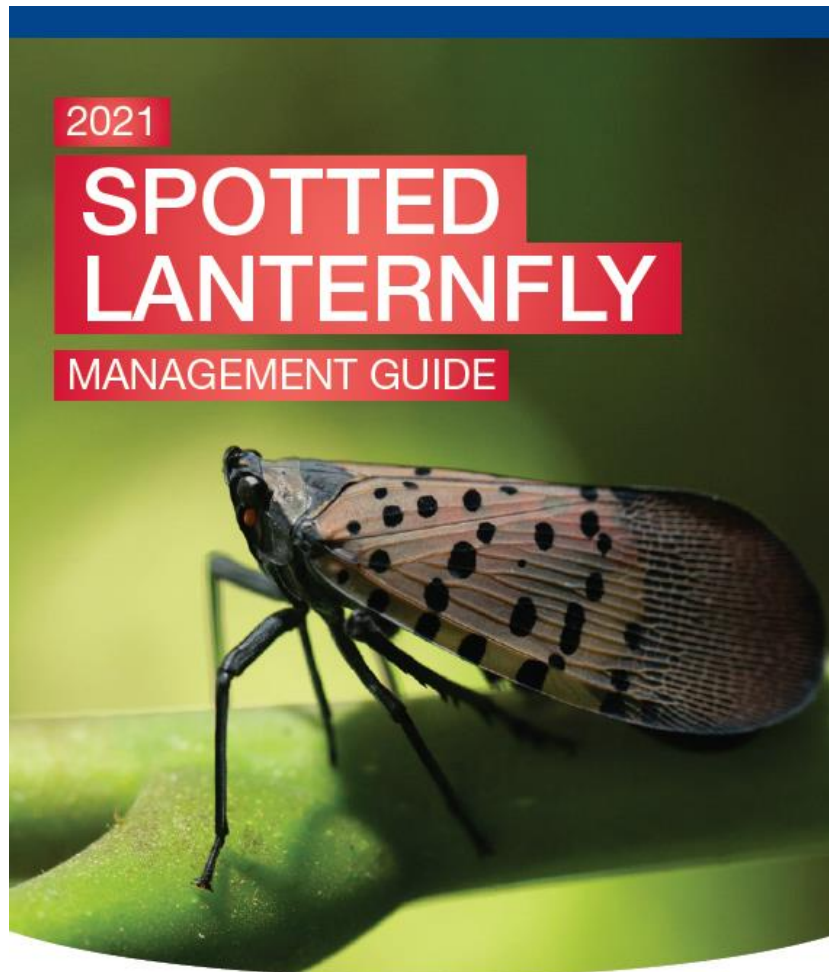


Manage

Be the first to know. Sign up for spotted lanternfly news, updates, and alerts.

Resources

<https://extension.psu.edu/spotted-lanternfly-management-resources>



The invasive spotted lanternfly has been found in counties in southeastern Pennsylvania. We are trying to contain and control this pest with the goal of future eradication. A quarantine order is in place that prohibits the movement of any living life stage of this insect to areas outside the quarantined area. For information about identifying the spotted lanternfly, where it is known to exist, the quarantine order, and compliance, go to extension.psu.edu/spotted-lanternfly.

Learn how to identify spotted lanternfly and report it. Report any capture, photos, or sightings of this insect to extension.psu.edu/spotted-lanternfly or 1-888-4B4D-FLY (1-888-422-3359).

Know which counties are included in the quarantine order. Additional counties will be added if new discoveries occur. Check extension.psu.edu/spotted-lanternfly for the current quarantine map.

Avoid moving this insect on woody plant debris (e.g., fallen trees or branches and tree trimmings) and any living plants, equipment, building materials, or other objects. Businesses may avoid possible fines by obtaining a spotted lanternfly permit through the Pennsylvania Department of Agriculture (PDA). To obtain a permit, complete the training online at extension.psu.edu/spotted-lanternfly. This is a "train the trainer" course to train designated employees (usually an owner, manager, or supervisor) within a company on how to comply with the quarantine regulations. The designated employee must then train fellow employees. Plant nurseries, nursery stock dealers, and mulch producers

should contact their plant inspector for compliance information. In-person training and questions may be directed to SLFPermit@PA.gov.

Inspect yard waste and other items and destroy egg masses. Destroy egg masses by scraping and covering them in alcohol, crushing them, or burning them.

Noncommercial residents should use the compliance checklist when moving items from within the quarantined area to outside areas (see extension.psu.edu/spotted-lanternfly).

When working in the quarantined area, if possible chip all woody debris on-site to no larger than 1-inch pieces in each of two dimensions. Even within the quarantined area, moving chips is a better practice than moving larger woody debris. Movement of fallen leaves is not regulated under the spotted lanternfly quarantine, but please check for and destroy any egg masses on leaf bags and containers.

If you can, leave all chips or woody debris on-site. The next best option is to take chips or debris to an organic materials recycler within the quarantined area.

To kill viable insects or eggs in chipped material, the composting procedure below must be followed before moving material out of the quarantined area:

1. Compost piles must be a minimum of 200 cubic yards.
2. Internal temperature at a depth of 18 inches must reach 140°F (60°C) for four continuous days.
3. After the interior of the pile is successfully heat treated, the exterior of the pile needs to be rotated to the center. Using a front-end loader or a bulldozer, remove the outer layer of the compost pile to a depth of 3 feet.
4. Start a second compost pile using the recently removed cover material as a core.
5. Cover this second compost pile by moving the core material from the first compost pile as a cover at least 3 feet deep.
6. Allow the second compost pile to remain undisturbed until the temperature reaches 140°F (60°C) for at least four continuous days.
7. After the chips have been successfully composted according to these directions, the resulting composted material meets compliance requirements.
8. Mulch being offered for sale and moved out of the quarantined area must be certified by PDA. Contact your regional plant inspector for information.

Prepared by Emelie Swackhamer, horticulture extension educator.
extension.psu.edu



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Resources for Residents

Learn how to identify and safely manage spotted lanternfly throughout the year using the following resources:

Factsheets

- [Spotted Lanternfly Management Guide](#)
- [Spotted Lanternfly Management and Pesticide Safety](#)
- [How to Build a New Type of Spotted Lanternfly Trap Called a Circle Trap](#)
- [Choosing a Qualified Pest Management or Lawn Care Company](#)
- [Checklist for Residents Living in Spotted Lanternfly Quarantine Areas](#)
- [Prevent Spotted Lanternfly from Spreading: A Checklist for Travelers](#)
- [Tips for Handling Yard Waste in Quarantined Areas](#)
- [Deciding If and When to Treat for Spotted Lanternfly on Ornamentals](#)
- [What to Do About Spotted Lanternfly on Ornamental Trees and Plants in Residential and Public Landscapes](#)
- [What Should You Do With Spotted Lanternfly Egg Masses?](#)
- [How to Create a Wildlife Barrier for a Spotted Lanternfly Sticky Band Trap](#)

Quick Reference Videos

- [An Introduction to the Invasive Spotted Lanternfly](#)
- [Control Options for the Spotted Lanternfly](#)
- [Spotted Lanternfly Research Updates](#)
- [Spotted Lanternfly Management and Pesticide Safety for Homeowners](#)
- [How to Remove Spotted Lanternfly Eggs](#)
- [Spotted Lanternfly Banding 2020](#)
- [Spotted Lanternfly Circle Trap](#)
- [One Minute for Spotted Lanternfly: Don't Panic!](#)
- [Spotted Lanternfly Population Fluctuations Over Time](#)
- [Research Update of Spotted Lanternfly in Grape](#)

Resources for Agriculture / Industry Professionals

Learn how to identify and manage spotted lanternfly in agricultural, green industry, and other commercial operations.

Factsheets

- [How You Can Comply with the Spotted Lanternfly Quarantine Regulations](#)
- [Spotted Lanternfly Management for Landscape Professionals](#)
- [Spotted Lanternfly Management in Vineyards](#)
- [Spotted Lanternfly Webinar in Forest Ecosystems](#)
- [Does Your Business Need a Spotted Lanternfly Permit?](#)
- [Take the Permit Training](#)
- [Spotted Lanternfly Survivorship and Damage to Specialty Agricultural Crops 2021](#)

Videos

- [Spotted Lanternfly Management for Nurseries and Christmas Tree Growers](#)
- [Spotted Lanternfly Management for Landscape Professionals](#)
- [Spotted Lanternfly Webinar in Forest Ecosystems](#)
- [Ailanthus Control and Spotted Lanternfly Trap Tree Approaches](#)

Spotted Lanternfly Management for Landscape Professionals

PA Department of Agriculture

Introduction

Spotted lanternfly (SLF), *Lycorma delicatula*, is an invasive planthopper that was first detected in North America in 2014 in southeastern Pennsylvania. It is native to parts of Asia. As of April 2021, SLF is found in Pennsylvania, New Jersey, New York, Connecticut, Virginia, West Virginia, Maryland, Delaware, and Ohio. SLF has also been detected in Massachusetts, Maine, Michigan, Oregon, California, and North Carolina, although established populations are not known to exist in these states.

SLF feeds voraciously on many economically important crops like grapevines, hops, ornamental nursery plants, and several tree species. Heavy SLF feeding has contributed to the death of grapevines, the invasive tree *Ailanthus altissima* (tree-of-heaven, or TOH), and black walnut saplings. While SLF feeding can stress plants and cause localized branch damage, it has not been seen to directly kill other plants. SLF feeding is considered a plant stressor and may contribute to the long-term weakening of established plants and trees. It is currently considered to be primarily a nuisance pest in ornamental landscapes.

To protect vulnerable plants and industries, it is important to avoid spreading SLF to new areas. Many affected states have enacted quarantine orders to prevent accidental human-assisted spread of SLF. The quarantine orders require any items being moved from known infested areas be inspected and SLF destroyed before shipment. The quarantines affect all residents and businesses. All businesses conducting operations in Pennsylvania are required to get an SLF permit (see <https://extension.psu.edu/spotted-lanternfly>). Complying with the quarantine

requires businesses to document their inspections and actions to prevent accidental spread. Additional costs associated with controlling SLF in plant production nurseries, vineyards, shipping facilities, and other businesses, in combination with costs to inspect items being shipped, have been identified as being significant by many business owners and operations managers.

Life Cycle and Identification

There is one generation of SLF per year in Pennsylvania (Figure 1, on page 2). The eggs are laid in the fall (September to November) and hatch in the spring (late April to June; 50 percent hatch at ~225 GDD at base temperature 10.4°C; see <https://tools.cef.psu.edu/slf/>). Egg masses are laid on many surfaces (trees, decks, houses, outdoor equipment, rocks, etc.) and protected with a mud-like covering. Each egg mass contains an average of 35 to 40 individual eggs. After hatching and before reaching adulthood, SLF goes through four nymphal stages called instars. Newly hatched nymphs are small (~1/8 inch) and can be hard to find, often being mistaken for small ticks or spiders. With each molt to the next instar, the nymphs roughly double in size. The first three instars are black with white spots. The last (fourth) instar is red with white dots and black stripes and roughly 1/2 inch long. SLF nymphs and adults are strong jumpers. In Pennsylvania, SLF adults begin to emerge in July (50 percent at ~1,100 GDD at base temperature 10.4°C) and remain active as adults until they are killed by the first hard freeze in the late fall. Adults are the most obvious and easily detectable stage because they are large (about 1 inch) and highly mobile. Adults have black bodies. Their forewings are gray with black spots, and the tips are black with gray veins, while their hind-

Take-home messages

You can help **slow the spread** of SLF by checking your belongings before you move and educating others about SLF.

Do what you can to manage SLF (including stomping/smashing), but avoid overreacting to the situation and if using insecticides, do so safely.

SLF can't be prevented from coming onto your property and may require repeated management efforts to keep populations down.

Stay connected with us!



THANK YOU!

