

JOIN THE BATTLE. BEAT THE BUG.

The spotted lanternfly is an invasive insect that is putting American agriculture and forests at risk. Join us. Together, we can stop the spread of this destructive pest.

DRIVER'S CHECKLIST

Life stages of the spotted lanternfly



Egg mass
Sept.-June



Early nymph
April-July



Late nymph
July-Sept.



Adult
July-Dec.

Before you leave your company lot or work site, check for spotted lanternflies on your vehicle's:

- Doors and sides
- Grill
- Bumpers
- Wheel wells
- Roof
- Cargo

Remember to park away from trees when possible, and close windows to keep spotted lanternflies out.

Check items stored outside for the pest before moving them to a new location:

- Propane tanks
- Outdoor machinery
- Wooden pallets
- Shipping containers

When you find an egg mass:

- Scrape it into a plastic bag or container that contains rubbing alcohol or hand sanitizer.

When you find a nymph or an adult:

- Squash it.

If you drive outside the quarantine* area, report any spotted lanternflies you see to:

extension.psu.edu/spotted-lanternfly
888-4-BADFLY

Comply with permitting requirements for businesses. Learn more at agriculture.pa.gov.

* Find out if you're in the state quarantine area at agriculture.pa.gov





Spotted Lanternfly Management for Homeowners

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Introduction

Spotted lanternfly (SLF), *Lycorma delicatula*, is an invasive planthopper, native to China, that was first detected in 2014 in southeastern Pennsylvania. It feeds voraciously on many plants, including economically important crops like fruit trees, grapevines, hops, hardwoods, and ornamentals. If you think you have SLF, do not panic! First, make sure the insect you are seeing is the spotted lanternfly. Second, learn about its life cycle and habits. Third, determine what plants it is infesting and what it is not. Fourth, employ management strategies at the proper time of the year.

Identification and Life Cycle

There is one generation of SLF per year. The eggs are laid in late fall and hatch in the spring. Egg masses are laid on hard surfaces (trees, decks, houses, outdoor equipment, rocks, etc.) and protected with a mud-like covering. Each egg mass contains 30–50 eggs. After hatching and before reaching adulthood, SLF goes through four nymph stages. Nymphs are small (¼ to ½ inch) and hard to find. The first three stages (instars) are all black with white spots, and the last instar is red with white

Quick Facts

- SLF is a **destructive invasive pest**, threatening agricultural, timber, and ornamental industries, and the plants in your backyard.
- SLF is currently under **quarantine** in 13 counties in Pennsylvania.
- SLF **does not bite or sting**.
- **Stop the spread** of SLF by checking your car and any outdoor equipment (grills, mowers, firewood, etc.) when going in and out of the quarantine zone.
- Manage SLF on your property by **scraping eggs, banding trees**, removing the favored host (**tree-of-heaven**), and using **chemical control** when appropriate.

dots and black stripes (Figure 1). SLF adults emerge in July and are active until winter. This is the most obvious and easily detectable stage because they are large (~1 inch) and highly mobile. Adults have black bodies with brightly colored wings. Only the adults can fly. Because SLF adults jump more than fly, their wings often remain closed. SLF wings are gray with black spots, and the tips of the wings are black with gray veins.

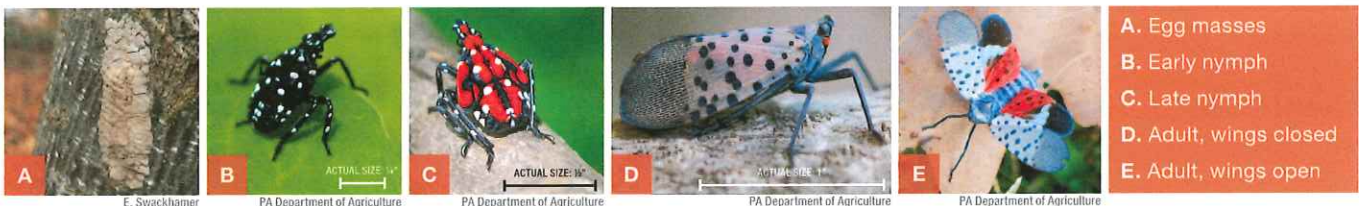


Figure 1. The life stages of SLF, including an egg mass on a tree.

Current Distribution and Reporting

An SLF quarantine is currently in effect for 13 counties in Pennsylvania (Figure 2). If you are located outside the quarantine zone and find a spotted lanternfly, collect and report it immediately with our online reporting system at extension.psu.edu/spotted-lanternfly or by calling 1-888-4BAD-FLY. SLF found within the quarantine zone does not need to be reported.

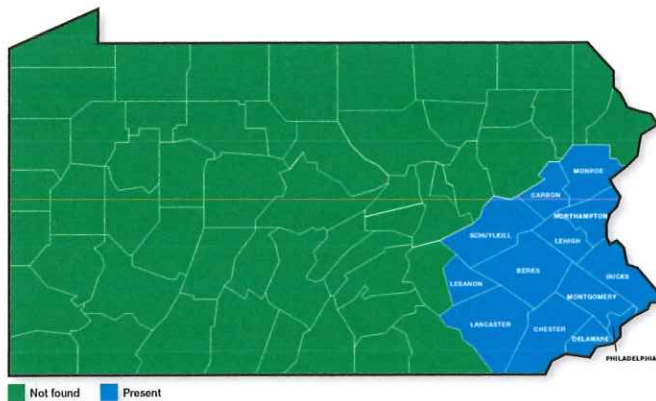


Figure 2. The distribution as of June 20, 2018, of SLF in Pennsylvania, indicated in blue. Check the Pennsylvania Department of Agriculture's website for updated distribution information.

Feeding Damage

SLF is capable of causing serious damage to its host, including oozing sap from the trees, wilting, leaf curling, and even death. SLF feeds using a piercing-sucking mouthpart tapped into the plant like a straw. When SLF feeds, it also excretes honeydew, or sugary water. This creates a sticky surface on and around plants that encourages the growth of black sooty mold. This mold is harmless to people but can cause damage to the plant. If you see black sooty mold or sticky areas on a plant or tree, it may be infested by SLF, but it could also be aphids, leafhoppers, planthoppers, or scale insects. Therefore, it is important to identify the cause of the mold, as control measures may differ for pests other than SLF. There is no way to prevent SLF from moving onto your property. Be aware that SLF is very mobile and management actions must be continuous to keep them off your property.

Management

Stop the Spread

When you travel in and out of the quarantine zone, check your car and outdoor equipment (grills, outdoor furniture, landscaping supplies, mowers, etc.). Check for SLF egg masses from late fall to early spring. Remember that egg masses may

Steps of Spotted Lanternfly Management

- 1 Stop the spread
- 2 Scrape eggs
- 3 Band trees to catch nymphs
- 4 Remove tree-of-heaven
- 5 Apply insecticides

be underneath your car or in your wheel well. During all other times of the year, check for nymphs and adults, and keep your windows rolled up when you park. Don't store things or park under infested trees, and don't move firewood.

Egg Scraping

Walk around your property to check for egg masses on trees, cement blocks, rocks, and any other hard surface. If you find egg masses on your property from September to June, you can scrape them off using a plastic card or putty knife (Figure 3). Scrape them into a bag or container filled with isopropyl alcohol or hand sanitizer.

This is the most effective way to kill the eggs, but they can also be smashed or burned. Remember that some eggs will be laid at the tops of trees and may not be possible to reach.



Figure 3. Scraping SLF egg masses from a tree.

Tree Banding

When the nymphs first hatch, they will walk up the trees to feed on the softer new growth of the plant. Take advantage of this behavior by wrapping tree trunks in sticky tape and trapping the nymphs.

Any tree can be banded, but we recommend specifically banding tree-of-heaven, the preferred host, or trees where you see a lot of egg masses or nymphs (Figure 4). Special tape for this purpose can be purchased, though duct tape wrapped backward and tight to the tree also works well. Push pins can be used to secure the band. Adult SLF will avoid tape, so it is essential to band trees in the spring when there are nymphs. Be advised that birds and small mammals stuck to the tape, while rare, have been reported. Check and change traps every other week.



Figure 4. A banded tree with SLF nymphs stuck at the bottom.

Host Removal

Tree-of-heaven (*Ailanthus altissima*) is an invasive plant, but it is common in landscape plantings, agricultural areas, and along the sides of roads. This is the preferred host for SLF and current management efforts are focused on removing this tree. This involves applying an herbicide to the tree and cutting it down from July to September. Failure to apply herbicide will result in new growth from the stump; even when treated, multiple applications may be necessary over time to completely kill the tree. These trees can get very tall, so seek the help of a tree care service if necessary. Tree-of-heaven is named because of its rapid growth, which can reach up to 100 feet tall and 6 feet in diameter. The bark of tree-of-heaven is similar to the outside of a cantaloupe. When crushed, the leaves put off a foul odor that many describe as rotten peanut butter. There are both male and female trees, and only female trees produce seed. They spread by seed and will also produce “clones” by their roots. This tree can be mistaken for other native species, including black walnut, hickory, and staghorn sumac. For help identifying and treating this plant, visit extension.psu.edu/spotted-lanternfly. While tree-of-heaven is a preferred host, SLF feeds on a large variety of plants, including many of the trees in your backyard. Removing these may not be preferred; refer to the next section for further guidance.

Chemical Control

Insecticides can be contact, systemic, or both, and may vary greatly in the length of control after application (i.e., residual activity). Contact insecticides kill SLF when the chemical contacts the insect as a direct spray to the adult or nymph, or when the pest walks over a surface with pesticide residue on it. Systemic insecticides are absorbed by the tree through sprayed leaves, roots, and or woody tissue and are moved by its vascular system to other parts of the tree. SLF is killed as it feeds on any part of the tree, even if it was not sprayed directly (e.g., spraying the lower part of the tree will protect the tree tops). Systemic insecticides work best when applied in the spring and early summer, before the more mobile adults emerge. However, they can protect the tree and kill adults depending on the application timing and type. Systemic products will often give contact activity when sprayed directly to live SLF, but contact activity from surface residues is often relatively short as the product is absorbed into the tree.

There are four main methods to apply insecticides: **tree injection** and **bark sprays** (applied by professional applicators), and **soil drench** and **foliar sprays** (can be applied by homeowners). The Pennsylvania Department of Agriculture and the United States Department of Agriculture are currently using the systemic insecticide dinotefuran as injections or

Active Ingredient	Mode of Exposure	Example Products
acetamiprid (neonicotinoid)	systemic/contact	Ortho Flower Fruit & Vegetable Insect Killer
azadirachtin* (botanical)	contact	Neemix 4.5 Insect Growth Regulator
bifenthrin (pyrethroid)	contact	Ortho Bug-B-Gon Insect Killer for Lawns & Gardens, The Anderson's Turf Products Duocide Insect Control, Bug Blaster II Turf Ornamental Insect Control
carbaryl (carbamate)	contact	The Anderson's Turf Products Duocide Insect Control, Sevin Bug Killer, Bayer Complete Insect Killer for Gardens, Ortho Bug-Geta Plus Snail Slug & Insect Killer
dinotefuran (neonicotinoid)	systemic/contact	Ortho Tree & Shrub Insect Control, Zylam Insecticide, Safari Insecticide, Transtect Insecticide
imidacloprid (neonicotinoid)	systemic/contact	Ortho MAX Tree & Shrub Insect Control, Ferti-Lome Tree & Shrub Systemic Insect Drench, Bayer Tree and Shrub Insect Control, Bonide Annual Tree & Shrub Insect Control with SYSTEMAXX
thiamethoxam (neonicotinoid)	systemic/contact	Ambrands AMDRO Quick Kill Lawn & Landscape Insect Killer
soaps*	contact	Concern Insect Killing Soap C, Ortho Elementals Insecticidal Soap, Safer Insect-Killing-Soap

*Organic product

Note: This product list provides an example of products with these active ingredients. It is not an endorsement or specific recommendation.

bark sprays on tree-of-heaven to kill SLF. Both methods work well and have residual activity that lasts from several weeks to several months. These application types, however, can only be applied by certified pesticide applicators, including tree care professionals, and can be costly.

Some insecticides available at your local garden or hardware store can be used as either soil drenches or foliar sprays. Be sure the product is meant for this type of application by reading the product label. Foliar sprays with contact insecticides are applied to surfaces where SLF feeds and walks, which includes the base of a tree, such as tree-of-heaven, where spotted lanternflies are abundant. They can also be applied directly to SLF nymphs and adults. Foliar sprays with systemic insecticides are best applied to leaves and green tissue of trees. This does not need to be the entire tree and can be leaves within your reach. While systemic insecticides can be applied to the bark of trees (bark sprays), they require special penetrants (only available to certified pesticide applicators) to effectively move them into the tree and kill SLF. Systemic insecticides on the leaves of trees will readily move throughout the rest of the tree. Systemic insecticides applied to foliage will be taken up by the tree quicker than systemic insecticides applied with soil drenches.

Soil drenches with systemic insecticides and water are applied into the soil around the trunk of the tree. The insecticide is taken up by the roots and moved into the rest of the tree. Ideally, soil drenches are best applied in the spring to trees such as tree-of-heaven or other favored hosts that have had high SLF populations in the past and are likely to have them again. Soil drenches may take several days or weeks to move into the tree. They should not be used to kill high numbers of SLF as you see them. Depending on the product and rates used, soil drenches have the advantage of longer residual activity (several weeks to several months) over foliar applications.

Currently suggested active ingredients for homeowners, their mode of exposure, and example products are provided in the table. Please note that most products currently available are not registered for use on SLF. These products and their companies are not liable for results when used on SLF. Research is ongoing to find the insecticides that are most effective on SLF, but that are safe to humans, pets, beneficial insects, and the environment. More detailed field trials are being conducted with a wider range of insecticides on SLF in summer 2018 to better understand direct efficacy and the residual activity of various products available to homeowners. We have not yet evaluated nontarget effects of listed products on beneficial insects, including pollinators. We do not recommend treating your entire property because these products are not specific to SLF and beneficial insects may be affected as well. Only treat areas where SLF is abundant.

These recommendations are current as of June 20, 2018, and may change as we learn more. We encourage you to stay up to date by visiting our website. Check the version of this fact sheet (listed below following the publication code number) and always look for the most up-to-date information. When using any pesticide, follow the pesticide label for directions, application rates, methods, and appropriate protective equipment.

Summary

Spotted lanternfly is a destructive invasive pest, threatening agricultural, timber, and ornamental industries, and the plants in your backyard. Together, we can take action to limit the spread and damage from this pest.

- If you find SLF outside the quarantine zone, report it! extension.psu.edu/spotted-lanternfly or 1-888-4BAD-FLY
- Don't let SLF spread. Check your car, outdoor equipment, etc., for SLF eggs, nymphs, and adults when moving in and out of the quarantine zone. Don't move firewood.
- Help us reduce SLF populations by scraping egg masses from trees, houses, and anywhere else you find them.
- Band trees to trap and kill nymphs in the early spring.
- Remove tree-of-heaven, the preferred host for SLF.
- If needed, protect your trees by applying insecticides using foliar or soil drench methods or consult a local tree care service. Always follow label instructions when applying any pesticide.
- Keep in touch and stay up to date! Sign up for our newsletter and find new information on SLF at extension.psu.edu/spotted-lanternfly.

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