

National Pest Alert

Spotted Lanternfly

Lycorma delicatula (White, 1845) (Hemiptera: Fulgoroidea: Fulgoridae)

Origin and Distribution

The spotted lanternfly is an invasive sap-feeding planthopper, first discovered in the United States in Berks County, Pennsylvania in 2014. Field observations indicate that the tree of heaven, *Ailanthus altissima*, is an important host plant; however the spotted lanternfly is known to feed on a wide range of hosts including wild and cultivated grapes, stone fruits, willow, and various hardwoods. This species is thought to be native to China, and has spread to other Asian countries. In 2004, it was first detected in Korea, where its populations expanded and it became an economically important pest of grapevines and fruit trees. In Korea, it damaged plants directly by phloem feeding, but also caused indirect damage due to mold that grew on honeydew excretions deposited on the leaves and fruits of host plants. It was recorded utilizing 67 host plant species in Korea, many of which also occur in the U.S. Given the wide range of hosts it feeds upon, the spotted lanternfly poses a serious economic threat to multiple U.S. industries, including viticulture, fruit trees, ornamentals and timber.

Life Cycle and Identification

The spotted lanternfly population overwinters as egg masses and has a one year life cycle. In Pennsylvania, the first nymphs hatch in late April to early May and are less than ¼ inch long. Nymphs develop through four stages, all of which are wingless and incapable of flight. The first three nymphal stages are black with white spots and appear “tick-like.” Fourth instars develop red patches on the body and are over ½ inch long. Adults begin to appear in mid-July and are approximately one inch long and ½ inch wide, with wings folded. The forewing is gray with black spots near the base, and the tips are black with a dense series of lighter gray crossveins. The hindwings are bright red at the base, and have an adjacent region that is black

with a white band. The abdomen is yellow with black bands down the center.

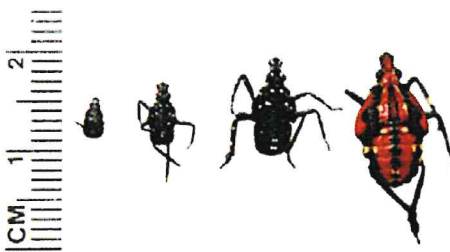
Third and fourth instars and adults migrate to tree of heaven as a preferred host. Adults mate in late summer to early fall in Pennsylvania and form large congregations. Although these have been observed on grapevine, willow, maple, and other tree species, they most commonly occur on tree of heaven. Females lay eggs from late September through October and dozens of egg masses can be found near adult aggregations. Eggs are deposited on tree trunks, limbs, and loose bark as well as any smooth surface, including stone, vehicles, trash barrels, outdoor furniture, and other man-made structures. Newly laid egg masses have a gray, mud-like covering, which can become dry and cracked over time. Old egg masses appear as four to seven columns of seed-like eggs, 30–50 eggs in total, approximately one inch long.



Early instar nymphs (1st through 3rd) feeding on grape



Profile of adult SLF on grape



Four nymphal instars of *L. delicatula*



Egg masses of *L. delicatula* covered by waxy deposits



United States Department of Agriculture

National Institute of Food and Agriculture

Regional IPM Centers



Erica Smyers, Pennsylvania State University

Sooty mold growing on the surface of a grape leaf



Erica Smyers, Pennsylvania State University

Three adult spotted lanternfly



Erica Smyers, Pennsylvania State University

Adults aggregating/feeding on a tree of heaven

Potential Spread and Impact

Given that egg cases are deposited on such a wide variety of surfaces, this is the life stage that may have the greatest potential for spread via accidental transport to new areas. As of December 2016, the spotted lanternfly has been detected only in the southeastern region of Pennsylvania, specifically in areas surrounding Berks County.

Nymphs are flightless and may pose less of a threat for spread. However, they have been observed feeding upon over 30 species of host plants in Pennsylvania, demonstrating the spotted lanternfly is mobile and capable of dispersing to some degree as immatures. The primary host, tree of heaven, is itself an introduced invasive species that occurs throughout much of the U.S. It is considered an edge species and grows quickly in disturbed sites, including along roadways and powerline corridors. As such, corridors of tree of heaven may provide opportunities for spotted lanternfly to spread.

Although adults are capable of flight, they are relatively weak flyers, relying instead on strong jumping to evade danger. Mated females pose a high risk for establishing new populations by accidental transportation on vehicles, such as open bed trucks, and introduce their offspring to new areas. Infested municipalities are under a quarantine that covers all living life stages of the pest and its conveyances.

Trees of heaven fed upon by congregations of adults may exhibit weeping of sap along the trunk as well as build ups of honeydew excrement. Black sooty mold fungus grows on the honeydew on the tree as well as on surrounding soil and understory plants. Weeping sap and/or honeydew build ups attract ants, bees, wasps, hornets, and flies.

Management

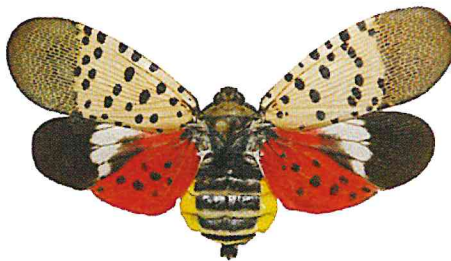
Management efforts are targeted at multiple life stages of the spotted lanternfly. Egg masses can be scraped off of surfaces where they are found. Brown sticky bands are effective in catching nymphs on trees. Adults are controlled using a combination of *Ailanthus* host

reduction and establishment of trap trees treated with systemic insecticide, which has shown to be capable of removing significant numbers of adults in the population.

Reporting

Early detection is vital to the control of spotted lanternfly. If you find an insect or egg case that you suspect is a Spotted Lanternfly, you should collect it and immediately report it to authorities. Place the insect or egg case into a container of alcohol to kill and preserve it. Egg cases can also be collected into a ziplock bag and killed with hand sanitizer. It is important to record where you found the insect and include the following information for each sample collected: date; substrate found on (e.g., species of tree, or for egg case, structure it was found on); collector's name; phone number; collection location including state, county, and address or nearest intersection; GPS coordinates, if available.

To report the finding in Pennsylvania, report it to the Pennsylvania Department of Agriculture by emailing to: Badbug@pa.gov. Outside of Pennsylvania, call the Invasive Species Hotline: 1-866-253-7189, report to Badbug@pa.gov or contact your local Extension office.



Pennsylvania Department of Agriculture

Adult spotted lanternfly

For more information on this pest, its management and quarantine in Pennsylvania, please see agriculture.pa.gov/protect/plantindustry/spotted_lanternfly/ or ncipmc.org/action/alerts/spotted_lanternfly.php.

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CONTROLLING SPOTTED LANTERNFLY

MECHANICAL

- ✗ Egg masses can be scraped from surfaces from October through June.
- ✗ Young nymphs can be killed with brown adhesive tree bands from May through August.

HOST REDUCTION AND TRAP TREES

- ✗ Spotted Lanternfly adults must feed on Tree of Heaven before laying eggs.
- ✗ Trap trees are created by removing most Tree of Heaven from a property but leaving a few alive. The live trees are treated with a systemic insecticide before July. In late July when the adults feed from the only remaining Tree of Heaven, they are exposed to the insecticide and die, as seen on the picture above.

More information about host removal and trap trees can be found at:
http://www.agriculture.pa.gov/Protect/PlantIndustry/spotted_lanternfly



pennsylvania
DEPARTMENT OF AGRICULTURE

Bureau of Plant Industry
Hardwoods Development Council
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WHAT IS THE SPOTTED LANTERNFLY?



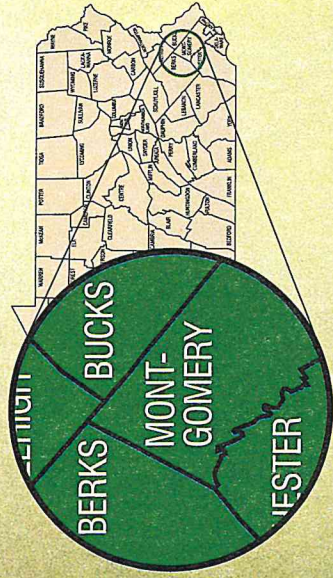
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pennsylvania
DEPARTMENT OF AGRICULTURE

The Spotted Lanternfly (*Lycorma delicatula*) is an exotic insect pest native to China, India, and Vietnam. Already established as a pest in Korea since 2004, Spotted Lanternfly (SLF) was first found in Berks County in Pennsylvania in 2014. Currently restricted to eastern Pennsylvania, SLF is subject to control and eradication efforts. Risks of SLF movement come from transportation of firewood, outdoor equipment, timber, and woody debris.

An up-to-date map of SLF distribution can be found on the Department of Agriculture website, www.agriculture.pa.gov/Protect/PlantIndustry/spotted_lanternfly.



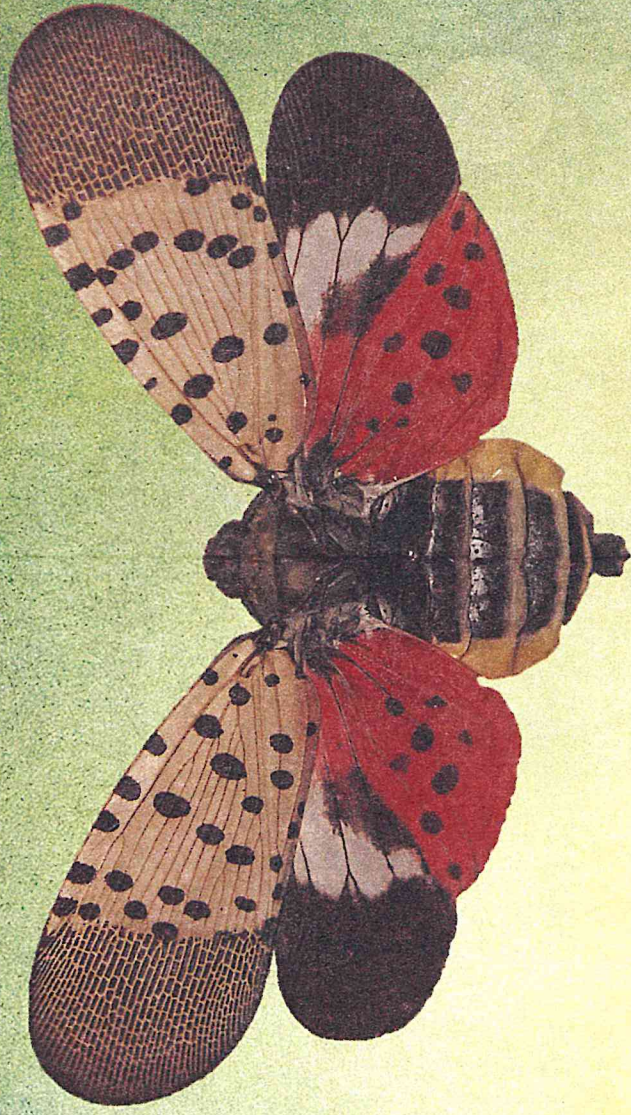
HOSTS

The Spotted Lanternfly can feed on a variety of 70+ plants. Plants such as grapes, cherries, maples, stone fruits, and Tree of Heaven are preferred hosts. As nymphs, SLF will feed on a variety of native and introduced plants. As they approach adulthood, feeding preferences switch to Tree of Heaven and other high-sugar-content sap trees. Feeding damage from large numbers of this pest has the potential to weaken or kill plants, and reduce crop yields in orchards and vineyards.

LOOK-A-LIKES

Several other insects such as the Giant Leopard Moth and the Virgin Tiger Moth may be confused with the Spotted Lanternfly due to their appearance. When in doubt ... **REPORT IT!**

Email: badbug@pa.gov



SIGNS OF SPOTTED LANTERNFLY



Signs of an infestation vary depending on the time of year. During fall/early winter, the egg masses ① are laid—sometimes in excess of 150 on a single tree in heavily infested areas—on smooth surfaces such as tree bark; fence posts; outdoor equipment such as ATVs, trailers, and boats; and smooth rocks. The egg masses ① resemble 1- to 2-inch-long gray mud smears with 30–50 brown eggs beneath.



In the spring, the egg masses ② turn dark brown and appear cracked and scaly. Young nymphs ③ hatch in spring (May) and feed on various plants. As the nymphs grow ④ they



develop red coloration and more prominent spotting. In July, adults appear and start moving to Tree of Heaven and other trees to suck out sap, causing wounds and sap trails ⑤.



Nymphs and adults can be found in both forest and backyard settings. During late summer, large groupings can be found feeding on trees ⑥.



Checklist for Residents

Living in Spotted Lanternfly Quarantine Areas

IMPORTANT: Before you move outdoor items from the quarantine area, check for spotted lanternfly egg masses, adults, and nymphs. Make sure all items are pest free before you move them. Help keep this pest from spreading.

Check before you move

Recreational or Camping Items

- | | | |
|--|--|--------------------------------|
| <input type="checkbox"/> Backpacks | <input type="checkbox"/> Ice chests | <input type="checkbox"/> Tarps |
| <input type="checkbox"/> Basketball backboards | <input type="checkbox"/> Motorcycles | <input type="checkbox"/> Tents |
| <input type="checkbox"/> Bicycles | <input type="checkbox"/> Motor homes | <input type="checkbox"/> Other |
| <input type="checkbox"/> Boats/Boat trailers | <input type="checkbox"/> Recreational vehicles | |
| <input type="checkbox"/> Campers | <input type="checkbox"/> Snowmobiles | |

Outdoor Household Items

- | | | |
|--|---|---|
| <input type="checkbox"/> Barrels | <input type="checkbox"/> Propane or oil tanks | <input type="checkbox"/> Storm/Screen doors and windows |
| <input type="checkbox"/> Cardboard or wooden boxes | <input type="checkbox"/> Trash cans | <input type="checkbox"/> Window awnings |
| <input type="checkbox"/> Outdoor poles | <input type="checkbox"/> Refrigerators/Freezers | <input type="checkbox"/> Outdoor furniture |
| <input type="checkbox"/> Plant containers | <input type="checkbox"/> Storage sheds | <input type="checkbox"/> Other |
| <input type="checkbox"/> Firewood | <input type="checkbox"/> Shutters | |

Building Materials

- | | | |
|---|--|--|
| <input type="checkbox"/> Bricks/Cinder blocks | <input type="checkbox"/> Roofing materials | <input type="checkbox"/> Skidsters/Forklifts |
| <input type="checkbox"/> Cement mixing tubs | <input type="checkbox"/> Tools and toolboxes | <input type="checkbox"/> Pipes |
| <input type="checkbox"/> Lumber | <input type="checkbox"/> Workbenches | <input type="checkbox"/> Other |

Yard and Garden Items

- | | | |
|---|---|---|
| <input type="checkbox"/> Dog houses, rabbit sheds, chicken coops, etc | <input type="checkbox"/> Garden tillers | <input type="checkbox"/> Signs and posts |
| <input type="checkbox"/> Barbecue grills | <input type="checkbox"/> Yard decorations | <input type="checkbox"/> Storage sheds |
| <input type="checkbox"/> Carts | <input type="checkbox"/> Garden tools | <input type="checkbox"/> Tractors and trailers |
| <input type="checkbox"/> Cold frames | <input type="checkbox"/> Backhoes | <input type="checkbox"/> Trees, shrubs and plants |
| <input type="checkbox"/> Fencing | <input type="checkbox"/> Lawnmowers | <input type="checkbox"/> Other |

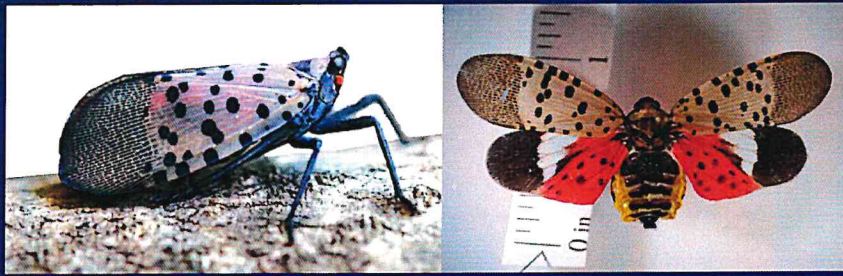
Children's Playthings

- | | | |
|---------------------------------------|---|--------------------------------|
| <input type="checkbox"/> Play houses | <input type="checkbox"/> Bicycles, scooters | <input type="checkbox"/> Other |
| <input type="checkbox"/> Kiddie pools | <input type="checkbox"/> Sandboxes | |

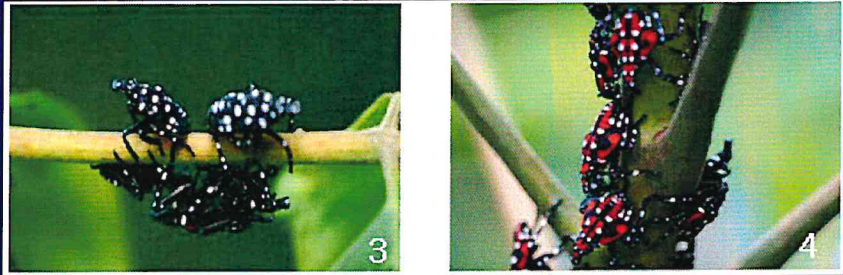
Checklist for Residents Living in Spotted Lanternfly Quarantine Areas

IMPORTANT: Before you move outdoor items from the quarantine area, check for spotted lanternfly egg masses, adults, and nymphs. Make sure all items are pest free before you move them. Help keep this pest from spreading.

If you find any of these life stages of the Spotted Lanternfly, remove, devitalize, place in a sealed bag, and dispose of bag in the garbage.



Adult Spotted Lanternfly, present in autumn months.



Spotted Lanternfly nymphs, present in spring and summer months. (Images from Park et al. 2009)

Fresh Spotted Lanternfly egg mass (outlined in red). Egg masses are present in autumn and winter months, blending in with their surroundings.



By signing this checklist, I am confirming that I have inspected my vehicle and those items I am moving from the Spotted Lanternfly quarantine area, and do not see any egg masses or insects in or on anything I am moving.

Signature _____ Address _____ Date _____

Please sign, date, and keep this checklist in your vehicle with you – use it each time you need it.

For more information, visit the Pennsylvania Department of Agriculture website:
www.pda.state.pa.us/spottedlanternfly