



Recommended Best Management Practices for the Tree Fruit Industry: Preventing Spread of Spotted Lanternfly

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Note: *This document will be modified and adapted as research is done and our knowledge base evolves relating to this invasive pest. This document was last revised on: **April 18, 2018***



Purpose of this Document

The tree-fruit production industry in Pennsylvania is committed to doing everything possible to minimize the threat of and reduce the risk of spreading **Spotted Lanternfly (SLF)** during the course of normal operations in our industry. All members of the tree-fruit production industry in Pennsylvania are strongly encouraged to voluntarily comply with the following best management practices – both within and outside the quarantine areas. These practices have been developed by a work group of the industry in conjunction with Penn State Extension, Research Scientists and PDA.

For all businesses operating within and interacting with the commercial tree-fruit production industry in PA, it is vital that we work together to assure that all persons are knowledgeable about and able to identify Spotted Lanternfly egg masses, nymphs (all instars) and adults. Additionally, training regarding the removal of egg masses and viable processes to minimize the movement of living insects during the summer and fall are essential. Employees should be trained to watch for signs at their place of work but also at their homes and in the community. Finally, all persons should feel empowered and obligated to report any sign or suspicion of this pest.

Anyone that comes into contact with SLF or who needs further training should contact PDA or Penn State Extension to request information and aid from available staff to assist in training.

BMPs for Company Management

- Take SLF and any invasive insect threat seriously. If your operation becomes infested with SLF, it could have serious economic impact and severely restrict your ability to operate.
- If your Business is in a quarantine zone, or moves in and out of the quarantine zone, you must secure an SLF permit in order to comply with the SLF Quarantine Order. In some situations, a compliance agreement may be needed.
- If your operation becomes infested with swarming SLF, it may require limiting production operations for periods of time. It is imperative that egg masses not be moved and the likelihood of moving adults and/or egg masses becomes much greater when high populations are present.
- Demonstrate to the public, all employees and all persons interacting with your business that you take SLF BMPs seriously.
- Train all employees to look for signs or the presence of SLF including egg masses and various life stages of the insect. Require them to report any sign of the insect to company leadership. Additionally, empower them to teach others who are less knowledgeable about the insect.
- Inform all outside companies with whom you work that you expect them both to have and to comply with all safety BMP protocols.

- Communicate with your customers your dedication to a safe product and your commitment to ship only products that are SLF-free.
- Communicate with PDA of your company's decision to implement these BMPs for SLF. This information will be extremely helpful to demonstrate the strong commitment of the tree-fruit industry in Pennsylvania to USDA and other states as additional quarantines are considered if conditions worsen.

BMPs for Land/Orchard Owners

- Monitor information about SLF in your county and neighboring counties, especially if your property is in or adjacent to a quarantine area.
- Work with PDA and the PSU Extension community in knowing the predicted emergence, egg hatch and life stage maturation of the insect each year.
- Understand the SLF life cycle, learn to identify its egg masses and watch for potential egg masses on any surface in, on or around your property. If found, remove and destroy all egg masses if possible and alert PDA.
- Remove all female Ailanthus trees from property. This dioecious species is easy to identify in the late summer when the seed clusters can be easily seen clinging to the female trees. These trees are generally located along the tree line of forested areas or highway rights of way where the soil has been disturbed. These trees must be chemically killed as any other means rarely succeeds at getting all plant tissue out of the ground. Treatment information for herbicide and insecticide applications may be found at www.agriculture.pa.gov/spottedlanternfly.
- Reduce populations of and monitor male Ailanthus trees for early signs of SLF.
- Consider banding or treating with insecticide remaining male Ailanthus trees and/or banding other high risk trees (Maple, Walnut, Apple) with adhesive tree bands – May to August. This is an excellent monitoring tool for SLF and can kill all walking-life stages in infested areas.
- If new populations of SLF are discovered on your property, in addition to alerting the authorities, consider using any and all means of communication to alert neighbors, businesses and the public at large – including social media, Penn State extension and verbal communication in public forums.
- Make sure all employees under your leadership understand and comply with the industry's BMPs.

BMPs for Field Supervisors

- Talk with the business owner/supervisor about the presence of SLF in the state, county and area.
- Understand the SLF life cycle, learn to identify its egg masses and watch for potential egg masses on any surface in, on or around the property. If found, remove and destroy all egg masses where possible and report to the property owner and alert PDA.
- Educate employees under your supervision about:

- The SLF life cycle and how to identify and differentiate each stage.
- The significance of this pest and *why* it's important to understand it and inform their supervisor about it if seen.
- The importance of them feeling empowered to take action – either directly or through channels within the company to limit the spread and mitigate the presence of this invasive species.
- Understand how the SLF life stage present at any given time impacts the jobs being performed throughout the year.
 - Egg laying begins in the fall and continues until an extended freeze kills the adults and ends the egg-laying period. For this reason, supervisors must be “keyed-in” to detecting the presence of both adults and egg masses in the course of daily work during this period.
 - If either adults or egg masses are seen, in addition to notifying the authorities, rapid, clear communication with the farm owner/manager is necessary so decisions can be made to apply insecticides to kill the adults present. Egg masses must be destroyed.
 - Special attention must be placed in the following locations:
 - Every surface of bulk bins being filled in the field. Each and every bin surface must be examined prior to filling throughout the entire egg-laying time frame.
 - General awareness in and around the orchard to trellis posts, fence posts, woods borders and equipment.
 - Egg hatch occurs in the spring. Nymphs go through 4 instars before finally maturing into winged adults in July/August in PA. As nymphs, the insects seem to walk up and down trees every day. They also become strong hoppers.
 - Monitoring and awareness in the orchard is essential at this time. Nymphs can be easily controlled with insecticides when detected.
 - Know where Ailanthus trees are on the property. Begin scouting there.

BMPs for Field Workers

- Talk with your supervisor about the presence of SLF in the state, county and area.
- Understand the SLF life cycle, learn to identify its egg masses and watch for potential egg masses on any surface in, on or around the property. If found, remove and destroy all egg masses if possible and report to your supervisor.
- Understand:
 - The SLF life cycle and how to identify and differentiate each stage.

- The significance of this pest and *why* it's important to understand it and inform your supervisor about it if seen.
- They should feel empowered to take action – either directly or through channels within the company to limit the spread and mitigate the presence of this invasive species.
- Understand how the SLF life stage present at any given time impacts the jobs being performed throughout the year.
 - Egg laying begins in the fall and continues until an extended freeze kills the adults and ends the egg-laying period. For this reason, workers must be “keyed-in” to detecting the presence of both adults and egg masses in the course of daily work during this period.
 - If either adults or egg masses are seen, rapid, clear communication within the organization is necessary so decisions can be made to apply insecticides to kill the adults present. Egg masses must be destroyed.
 - Special attention must be placed in the following locations:
 - Every surface of bulk bins being filled in the field. Each and every bin surface must be examined prior to filling throughout the entire egg-laying time frame.
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 - Egg hatch occurs in the spring. Nymphs go through 4 instars before finally maturing into winged adults in July/August in PA. As nymphs, the insects seem to walk up and down trees every day. They also become strong hoppers.
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BMPs for Tractor/Equipment Operators

- Confirm if orchard workers or supervisors in the field have seen any signs of any stage of SLF.
 - If SLF have been observed, inspect equipment and all containers before removing from the field and/or loading them on the truck to be sure living insects and egg masses are removed and destroyed.
 - If none have been witnessed, inspect the bins/containers for signs of egg masses or insects.
- Visually inspect any equipment every day before heading to or coming from the orchard – especially when the same equipment is used on non-contiguous farms.
- If any SLF are found – of any life stage – immediately contact your supervisor. Never travel or transport equipment where live specimens have been found.

- After the season, work with your supervisor and local extension agents to confirm that adult SLF have stopped egg-laying. After that time, pressure wash *all* surfaces of any tractor/equipment used on the farm. This will eradicate any egg masses present.

BMPs for Farm Truck Drivers

- Confirm if workers or supervisors on site have seen any signs or any stage of SLF.
 - If SLF have been observed, inspect the truck and all containers before loading them on the truck to be sure living insects and egg masses are removed and destroyed.
 - If none have been witnessed, inspect the bins/containers a second time for signs of egg masses or insects.
- If you see or know of Ailanthus nearby, inspect those trees for signs of SLF. If SLF are seen, inform the field supervisor and farm manager immediately.
- If you see any life stage of living SLF on the property, do not transport any product off the property until you know that permitting has been completed and proper stamps are on the required paperwork.
- Do not move trucks or containers from the property if high populations or swarming activity is observed.
- Inspect your truck tires and truck body for egg masses or other life stages before leaving a site and be sure you are not moving SLF inside the cab of the truck. Take whatever time is necessary to assure that you are moving safe, pest-free bins and equipment.
- Check your own clothing and body for SLF before leaving the area. Be sure to kill all SLF.
- After the season, work with your supervisor and local extension agents to confirm that adult SLF have stopped egg-laying. After that time, pressure wash *all* surfaces of any truck used on the farm. This will eradicate any egg masses present.



BMPs for Direct Marketers

Products Produced on Your Farm

- Educate all employees on how to identify all stages of the Spotted Lanternfly, what to look for and actions to be taken if live insects or egg masses are found.

- Place harvested fruit and produce in cold storage. (As of this writing, research is underway but is not to a point that it can give recommendations on temperatures or times required to kill nymphs and adults.)
- Keep doors to packinghouse, packaging storage areas closed during season that live insects may be moving.
- Find indoor storage for crates/bins and other packing materials for product that will be shipped or sent to market.
- Check pallets to be used for shipping or carrying produce to market for egg masses before using. Remove/destroy any egg masses before the pallet is used.
- Keep pallets of product that will be shipped or sent to markets indoors before loading.
- Visually inspect interior and exterior of trucks before loading with product and leaving farm. During season check for both live insects and egg masses. At other times, check for egg masses. If live insects are found, kill them. If egg masses are found, remove and destroy them.
- If possible, display and sell products in a fully enclosed building and keep the doors on the building closed except for entering and exiting.
- When moving product in or out of the quarantine zone, consider using closed or covered trucks, where practical.

Products Bought From Others for Resale

- Know where the products you are purchasing originated. Was product made or stored in the SLF quarantine zone? If so, does supplier have a permit and BMPs in place for SLF? Are pallets or other packing materials free of SLF egg masses?
- If there is any risk of SLF presence, place purchased products in cold storage as soon as shipment is received, to kill live insects.
- If not possible to refrigerate, inspect newly arrived products for adults. Kill any adults that are found.
- Inspect pallets and packaging materials for egg masses. Remove and destroy any egg masses found or destroy pallets/packaging. (Don't just throw packaging with egg masses away. Decontaminate first, or burn.)
- Instruct drivers not to stop (other than following normal traffic patterns) in a quarantine zone. Stopping for meals or rest breaks in a quarantine zone should be avoided if possible.

Consumer Education

- Use the interaction you have with customers to help spread the word on the gravity of the situation when it comes to SLF and what they can do to help prevent its spread.
- Tell customers the steps you are taking to help combat the pest.

- Post signs or utilize PSU/PDA Fact sheets or cards to give to customers.
- Utilize social media as much as possible in communicating to customers.

Pick-Your-Own Operations

- July through harvest, be prepared to monitor blocks and treat adult populations as needed and where needed.
- Utilize official posting placards as well as more light-hearted, simple displays and signs to make public aware of Spotted Lanternfly.
- Encourage customers to keep vehicle windows and doors closed while on the farm.
- Encourage customers to remove and destroy any insects that may have entered vehicle.
- Encourage customers to check clothing for SLF before leaving the area.
- Make certain that all farm-provided picking containers are free of egg masses.





Spotted Lanternfly Truck Inspection

Shipping Company _____

Shipping point address _____

Product loaded on date & time _____.

Designated inspector _____

Truck Company _____

Trailer License number _____

The exterior of the truck cab and trailer have been visually inspected for presence of adult Spotted Lanternflies. The interior of the trailer has also been visually inspected.

There were no visually detected Spotted Lanternfly _____

There were observed adult Spotted Lanternflies. The Lanternflies were removed from the truck cab/ trailer _____

Inspector _____

SLF EGG MASS IDENTIFICATION



Egg-laying begins in September and continues until an extended freeze kills the adults and ends the egg-laying period. The egg masses can be found on smooth surfaces such as tree bark; fence posts; outdoor equipment such as ATVs, trailers, boards, lawn tractors, grills and covers, etc.; pool covers and tarps; tile; smooth stone; deck boards; and rusty metal or siding. They are often laid in protected spots, such as underneath peeling bark or in crevices between rocks.

The egg masses resemble 1-2 inch long gray mud smears with 30-50 brown eggs beneath the gray matter. They often appear waxy. Later the egg masses will turn dark brown and appear cracked and scaly or like dried mud. The young nymphs will hatch in the spring (May) and feed on various plants. It is imperative that egg masses be removed whenever you see them and properties should be inspected early winter and again in early spring before the eggs hatch.

In the photo to the left you can see:

- Covered Egg Mass
- Adult Spotted Lanternfly
- Uncovered Egg Mass

Here is an example of an unfinished egg mass.

Note: You can see seed-like eggs in loose columns poking out the top.

The Spotted Lanternfly lays columns of eggs side by side. There can be as many as 30 to 50 eggs per mass. The eggs are then covered in a grey putty-like covering.

The covering is slightly tacky and will wear away over the course of the year.



This is an egg mass from the previous season. You can see that the Spotted Lanternfly will lay several vertical rows of eggs.

The grey putty like covering you see on fresh egg masses is missing. A few eggs are also missing.

The overall length of an egg mass is about 1 inch.

For Egg Identification Tips go to:
http://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/Entomology/spotted_lanternfly/program-information/Pages/default.aspx

TO REMOVE and DESTROY EGG MASSES:

Scrape egg masses into a plastic bag from trees and other surfaces with a knife, credit card, or egg mass scraper (provided by the Department of Agriculture). You should double bag the eggs and throw away in the garbage. You may also place them in alcohol or hand sanitizer to kill the eggs.



You may identify trees that have been infested with SLF, and more likely to have egg masses, from honeydew and fungus covering the trunk or ground near the tree. The fungus is a mold that grows on any surface, feeding on the sweet excrement of the insects. The mold will be dense enough to not allow sunlight to the leaf or ground.

http://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/Entomology/spotted_lantern_fly/program-information/Pages/default.aspx

FOR MORE INFORMATION:

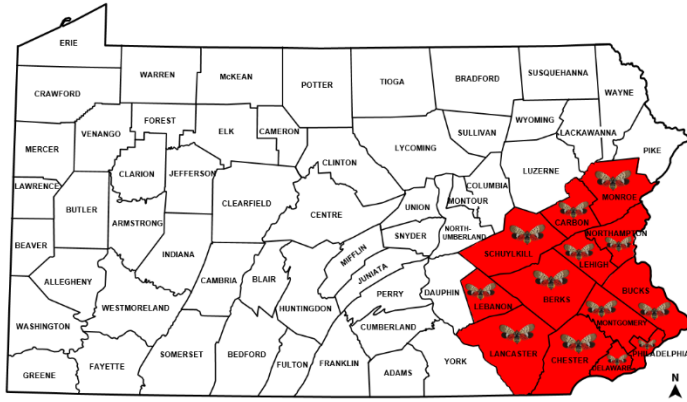
Penn State Extension: <https://extension.psu.edu/spotted-lanternfly>

PA Department of Agriculture: agriculture.pa.gov/SpottedLanternfly

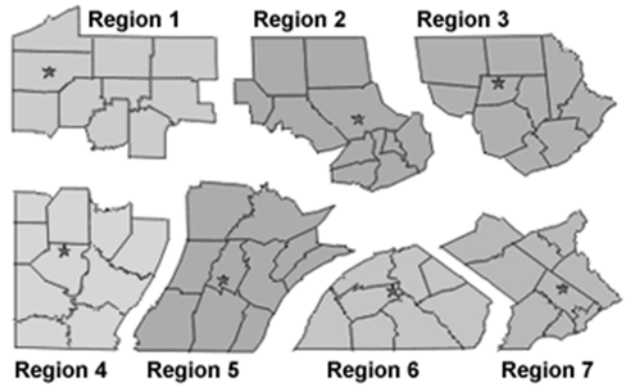


For a Permit or Compliance Agreement:

For information and questions regarding permits related to Spotted Lanternfly, please contact your Pennsylvania Department of Agriculture Regional Office and speak with the Bureau of Plant Industry Supervisor (listed below).



Current SLF Quarantine includes all counties in red.



PA Department of Agriculture Regions

Region 1: Clarion, Crawford, Elk, Erie, Forest, Jefferson, McKean, Mercer, Venango, and Warren

Lisa K. Candelore Phone: (814) 332-6890

Region 2: Cameron, Clinton, Columbia, Lycoming, Northumberland, Montour, Potter, Snyder, Tioga, and Union

Jay P. Bagley Phone: (570) 433-2640 ext. 206

Region 3: Bradford, Carbon, Lackawanna, Luzerne, Monroe, Pike, Sullivan, Susquehanna, Wayne, and Wyoming

Richard J. Malak Phone: (570) 836-2181 ext. 111

Region 4: Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Indiana, Lawrence, Washington, and Westmoreland

Lisa K. Candelore Phone: (724) 832-1073 ext. 125

Region 5: Bedford, Blair, Cambria, Centre, Clearfield, Fulton, Huntingdon, Juniata, Mifflin, and Somerset

Abbie Clark Phone: (814) 793-1849 ext. 216

Region 6: Adams, Cumberland, Dauphin, Franklin, Lebanon, Lancaster, Perry and York

Jeff Miller Phone: (717) 772-5206

Region 7: Berks, Bucks, Chester, Delaware, Lehigh, Montgomery, Northampton, Philadelphia, and Schuylkill

Howard Walker Phone: (610) 489-1003 ext. 108

