On September 22, 2014, the Entomology Program of the Pennsylvania Department of Agriculture received a report from an educator from the Pennsylvania Game Commission.

The report detailed damage to Ailanthus altissima (Tree of Heaven) on private property in Eastern Berks County, PA being caused by an unknown insect.
The spotted lanternfly is native to Asia and is found in China, Bangladesh, Vietnam. It was introduced to Japan, South Korea, and Pennsylvania. In South Korea, it is considered an invasive pest and impacts grapes and peaches.
Current Distribution
2014 -- 2017 Lycorma Detection Survey
Results through 12 October 2017

Spotted Lanternfly Presence
- Positive
- Negative
Spotted Lanternfly makes use of over 70 different plant species, but strongly prefers the invasive “Tree of Heaven”.

Tree of Heaven Distribution-USDA PLANTS Database
Look Alikes

Black Walnut

Sumac
What Is At Risk for Pennsylvania?

Current Values of Some Commodities Affected

- Forest Products: $16.7 billion
- Grapes: $28 million
- Apples: $87 million
- Peaches: $19 million
- Nursery and Landscape: $944 million

Unable to Estimate Value of Losses

- Property Values
- Tourism at PA parks and Game Lands
- PA Ecosystems
- New Business Initiatives
  - Port of Philadelphia
  - PA Preferred Brew
Spotted Lanternfly Biosecurity

Life Cycle
One Generation Per Year

Autumn
Adults: July 24-December

Egg Laying:
September - November

Eggs: Late September-June

Winter

Fourth Instar:
July - September

Hatch and 1st Instar:
Late April-June

Spring

Second Instar: May - June

Third Instar: June - Mid-July
Egg masses have on average between 30-50 eggs and can be laid on trees or any smooth surface.
Egg masses contain between 30-50 eggs, are laid on many different objects, and are often well hidden.
All life stages can hitchhike to new areas, but eggs and adults pose the greatest risk for movement
Adults begin to appear in late summer, feed preferentially on Ailanthus, mate, and lay eggs.

Males and females mate multiple times.
Impact:

Adult clustering, swarming and Honeydew accumulation can impact quality of life.
Impact: Damage to grape, hops, orchards, hardwood, and nursery industries.

Damage comes from feeding on plant waste (honeydew), which turns into sooty mold.
Spotted Lanternfly in Pennsylvania
Spotted Lanternfly in Pennsylvania
Impact: Heavy Feeding on Walnut, Red Oak, Maple, and Hickory resulted in flagging and dieback.
Impact:

Flagged Walnut branches had several spotted lanternflies feeding.
Impact:
Presence on other crops, alfalfa, soy, corn with reports of reduced yield on alfalfa. No feeding documented.
Other Impacts:

Damage reported on basil, blueberry, cucumber and horseradish in 2017
As the population of spotted lanternfly grows, and the insect adapts, new threats to multiple industries emerge.

It is clear that more help is needed to contain this pest.

Everyone needs to work to control the insect.
Swarming adults present a biosecurity challenge, and can impact trade.

-Video, Erica Smyers, PSU
Automobiles, Construction Equipment and Signs, Storage Pods, Yard Waste, Trains, Horse Trailers, Nursery Stock, Dog Crates, Pallets, Boats, Hunting Equipment, Campers, and any other object stored outside can all harbor Spotted Lanternfly life stages.
You can prevent the spread of this unwanted pest by practicing biosecurity basics.

**First** - Know the life stages of the pest and when they are likely to be a threat

**Second** - Be aware of when you are in an infested area

**Third** - Follow biosecurity best practices

**Fourth** - Go the extra mile when you know you are exposed to Spotted Lanternfly
Basic biosecurity for insect pests: Short Term

If you live on an infested property or visit infested properties for work, be mindful that you, your vehicle, and your equipment are the potential pathways for the insect to hitchhike.

Whenever possible, do not park under trees or tree lines.

Avoid leaving vehicles open, shut windows, trunks, hatches, and tailgates if possible.

Tuck pant legs into socks to prevent adults from crawling inside your clothing, and check to ensure that none are resting on you before entering your vehicle.

In heavy infestations, insects may swarm, and preventing them from entering your vehicle can be a challenge, so take a moment to scan the interior of the vehicle and kill any specimens found before leaving the area.
Basic biosecurity for insect pests: Short Term

Equipment for the transport of live animals presents a special challenge. Horse trailers, dog crates, and bear traps are all open and exposed to easy entrance by swarming adults. When not in use, animal carriers should be stored so as to prevent insect entry and inspect them prior to use if in an infested area.

Avoid storing these items in tree lines

Consider screening or tarping if practical

After use, inspect for hitchhikers and kill any found
Basic biosecurity for insect pests: Long Term

From Mid-September through spring Spotted Lanternfly egg masses are the number one way this pest can move.

Equipment and materials stored outside can be a surface for egg laying.

Avoid parking equipment or stacking materials near tree lines.

Ensure that trimmed woody debris is chipped.

Before moving equipment or supplies from an infested area, inspect for and destroy any egg masses.
SLF Control

• SLF Requires Multiple Approaches
  • Scraping Egg Masses
  • Banding Trees
  • Mechanical Removal and Processing
• Ailanthus Control
• Pesticide Applications
  • Herbicide
  • Systemic
  • Contact
Scraping Control

- Scraping egg masses is something everyone can do
- PSU Extension has a video on proper techniques
- Removes 30-50 eggs per mass
- Eggs laid on more than wood products.
Egg masses that can be seen or reached are easily controlled by scraping.

https://www.youtube.com/watch?v=WoFp_MbDiE8
Immature stages migrate up trees/plants each day and are easily caught on sticky tree bands.
Banding Control

1\textsuperscript{st} set of sticky bands very effective on 1\textsuperscript{st}- 4\textsuperscript{th} instars

Uses known behavior of nymphs going up trees each day against the insect

Target Ailanthus if they are in the area

No pesticides used with tree bands
2nd generation bands produced in NJ.

Glue is able to capture adults

Always check bi-catch, sometimes birds going after insects for easy meals may end up on glue

Volunteer banding program has about 34 volunteers. Extension will oversee
Mechanical Control

- Physical removal
- Exclusion from conveyances
- Swatting/Squishing
- Chipping
  - Study shows chipping disrupts egg masses and prevents hatching
Predators

• Limited Observations of native predators
  • Praying Mantis
  • Wheel Bug/Assassin Beetle

• Parasitic Wasps
  • Ooencyrtus kuvanae

• Development of new bio control
Insecticide Application

**How to Eliminate or Control Spotted Lanternfly Adults:**

If you find Spotted Lanternflies in a municipality where they are known to exist, you should try to kill them.

The most effective way to eliminate these insects is to disrupt their favorite food and hang-out. In late summer and fall, Spotted Lanternflies prefer feeding on Ailanthus altissima, commonly known as the "Tree of Heaven." They can be found feeding on other plants and trees, but Ailanthus altissima is their favorite host. Here's an excellent resource to help you identify the tree: https://extension.psu.edu/ailanthus

If you have Ailanthus on your property: please consider reducing the number of Ailanthus trees, then treat remaining "tree trees" with insecticides. This is a longer-lasting solution than simply spraying insects you see.

More detail about this process can be found at the following websites:

http://www.pestmanagement.org/pest/ailanthus

If you want to kill Spotted Lanternflies without controlling Ailanthus:

When there are only a few insects, you can kill spotted lanternflies by swatting or crushing them. For large populations, two kinds of insecticides are widely available that will kill Spotted Lanternfly adults. Contact insecticides kill spotted lanternflies when the chemical contacts the insect directly. Systemic insecticides are absorbed by the tree and kill insects feeding on it. ALL insecticides must be used as directed on the label. Take the time to read the label carefully and follow the directions. This increases your safety, the safety of the environment, and the effectiveness of the insecticide.

Pennsylvania law requires that pesticide labels list the site where a pesticide (such as an insecticide) may be used. In Pennsylvania, insecticide labels do not have to specifically list the targeted insect. There are insecticides labeled for use on ornamental trees and around buildings. These products are legal to use on the sites listed in order to control Spotted Lanternflies in Pennsylvania.

Penn State Extension is currently testing to determine which insecticides are most effective in controlling adult spotted lanternflies. Preliminary results show insecticides with the active ingredients dinotefuran,硫磷, carbofuran, and bifenthrin are effective at controlling the spotted lanternfly. Neem oil and insecticidal soap provided some control, but results varied, and insects sometimes took several days to die.

September 2017
Insecticide Application

Things to remember

• In PA pesticide applications are based on site location

• Pesticide efficacy are currently underway by PSU Extension

• Multiple insecticide products may be needed.
  • Systemics for long term control
  • Contact for population increase control

• Always read the label for rates and application procedures
Insecticide Application

Not Viable Options

• The life cycle not conducive to aerial applications
• Fire and standing trees not a good combination
• Homemade mixtures
Insecticide Application

Educate Community

• Help businesses and residents understand the need for multiple approaches
• Make sure people understand what the spotted lanternfly does not harm such as humans and pets
• Spotted lanternfly do not over-winter in houses
• Utilize licensed pesticide applicators
• Ailanthus altisima is considered an invasive weed
• Reproduces by seed and also root graft
• If not properly treated with herbicide, multiple shoots/trees can arise from one cut tree
• Treatment recommendations found on the Spotted Lanternfly webpage
Removal-Trap Tree Method
Most Ailanthus are removed or killed with herbicide
Incorporate in Vegetation Management Plans
Host Reduction

Remove Most Ailanthus

Leave a few male trees and treat with systemic insecticide
Trap trees

July-September
4th Instar and Adults

SLFs concentrate to feed on Tree of Heaven with insecticide and die
Impact on Adults is Dramatic
SPOTTED LANTERNFLY NUMBERS THROUGH 2017

10,589 Trees Banded, Killing 1,065,258 Lycorma
Egg mass scraping killed 1,681,680 Lycorma

47,359 Ailanthus killed / 483 Trap trees established
South Korea at 38,622 sq. miles is slightly smaller than Pennsylvania at 46,055 sq. miles

South Korea completely infested in 3 years with 3 introductions

PA still contained to small area, 1 introduction
Quarantine

Covers all life stages and conveyances

Limits movement of commodities and home articles

May allow continued interstate and international trade.

Requires inspection and safe movement from the quarantine

Slows processes and trade down, but does not completely stop trade

Wood recycling can still be completed, but may need think about how is done

Lumber harvest may still be made, but may need timelines
Quarantine

Working with Business

- Risk Assessment
- Education/Training
- Phytosanitary Certificate
- Permit
- Compliance Agreement
- Verification
Quarantine

• Phytosanitary Certificate
  • Limited use

• Permits – Coming Soon
  • Working within the quarantine
  • Lower risk

• Compliance Agreement
  • Moving in and out of the quarantine
  • Interstate/International businesses
  • Higher risk for movement
For Compliance Agreements & Permits for Spotted Lanternfly Quarantine

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

**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) 852-1073 ext. 125

**Region 5:** Bedford, Blair, Cambria, Centre, Clearfield, Fulton, Huntington, 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
The Spotted lanternfly program relies on cooperation.

Local officials and state agencies lead the organizational charge and have drafted a response plan for PA Extension, Universities, the USDA, and growers research new methods to deal with this pest.

PDA crews, USDA Crews, volunteers, property owners, local municipalities, and businesses must work in concert.
PUBLIC REPORTING IS YOUR FRIEND
Since August 1, 2017: 18,000 Public reports 98% report accuracy
Everyone is Threatened

- We must work together to control
- Integrated Pest Management
  - Ailanthus control
  - Insecticide Application
  - Banding
  - Egg Mass Scraping
  - Look Before You Leave

- Educate the community residents and businesses
  - Spotted Lanternfly will not “eat” buildings
  - Spotted Lanternfly does not suck blood or bite people or animals
  - Licensed Professionals for control
THANK YOU
http://www.agriculture.pa.gov/spottedlanternfly