



# A New Pest: The Spotted Lanternfly

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Forest Health Manager

Virginia Department of Forestry

# JOIN THE BATTLE. BEAT THE BUG.



VIRGINIA DEPARTMENT  
OF AGRICULTURE AND  
CONSUMER SERVICES



## Virginia Cooperative Extension

Virginia Tech • Virginia State University



**pennsylvania**  
DEPARTMENT OF AGRICULTURE



**PennState Extension**



# A new pest: the spotted lanternfly

- Distribution
- Biology and identification
- Hosts and damage
- Monitoring and Treatment
- Quarantines
- How you can help



# Distribution

- Native to Asia
- Detected as an exotic species in South Korea in 2004
- Discovered in North America in 2014



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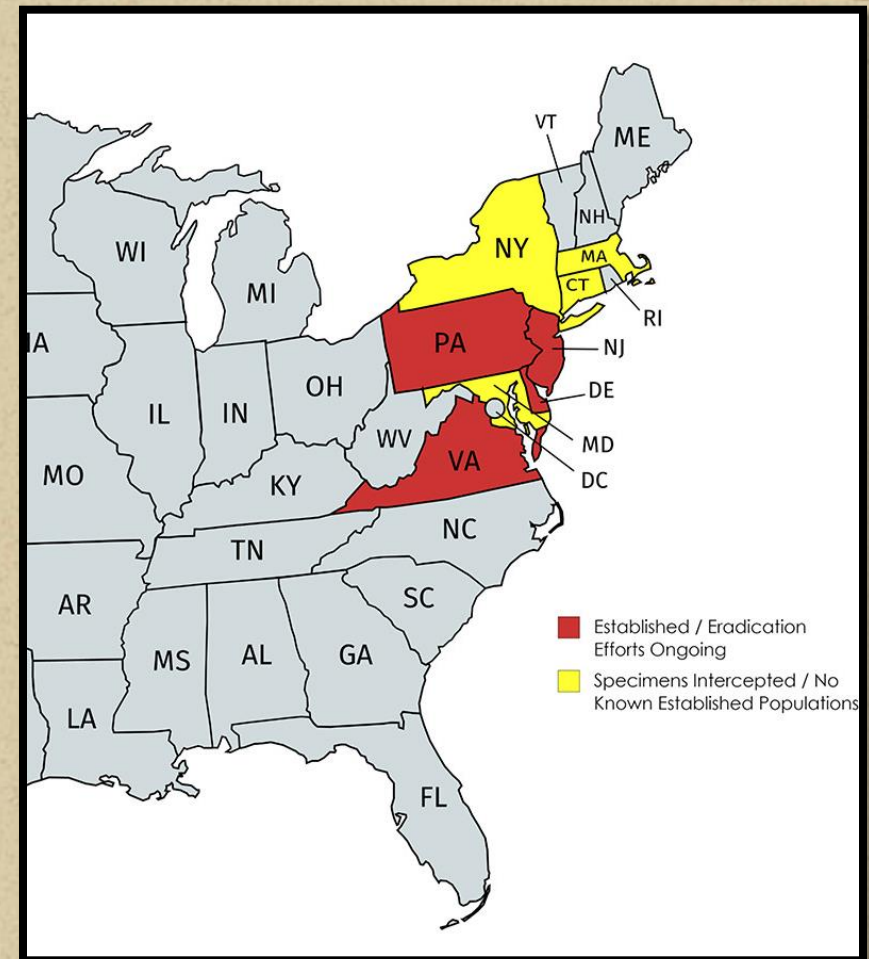
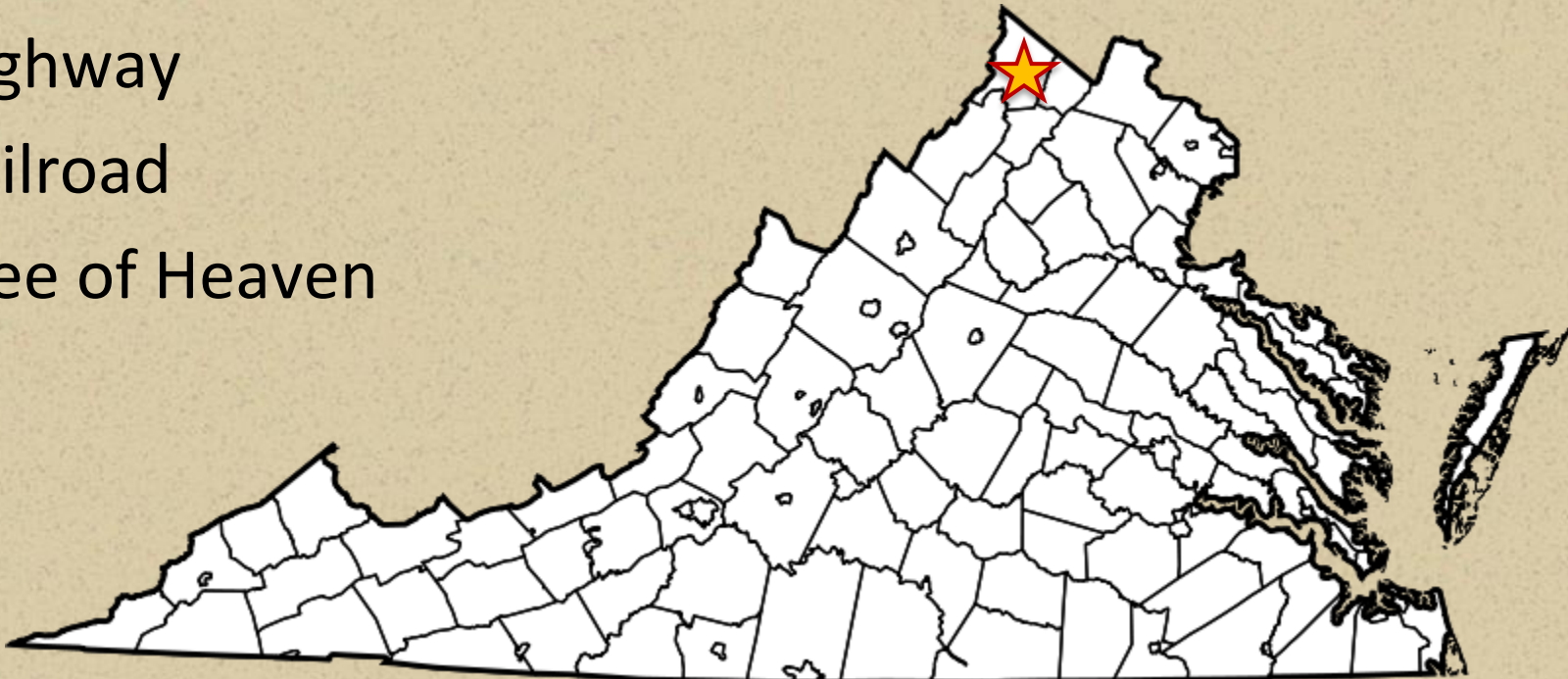


Figure: Lee, Doo-Hyung & Park, Yong-Lak & Leskey, Tracy. (2019). A review of biology and management of *Lycorma delicatula* (Hemiptera: Fulgoridae), an emerging global invasive species. *Journal of Asia-Pacific Entomology*. 22. 589-596



# Distribution

- Frederick County and City of Winchester
- The “Perfect” site
  - ◆ Highway
  - ◆ Railroad
  - ◆ Tree of Heaven





# Spotted Lanternfly

■ *Lycorma delicatula* (White) (Hemiptera: Fulgoridae)



Egg  
Mass



Hatched  
Nymph



Developed  
Nymph



Adult Spotted  
Lanternfly



# SLF Eggs





# SLF Eggs



## Egg Masses

- 1½ inch long, flat and gray
- laid on smooth surfaces





# SLF Eggs



Photo credit: [Emelie Swackhamer, Penn State University, Bugwood.org](https://www.bugwood.org/)

## Possible Spotted Lanternfly Egg Mass Look-alikes in Virginia

Theresa Dellinger and Eric Day, Dept. of Entomology, Virginia Tech

Egg masses of the spotted lantern fly, *Lycorma delicatula* (White), are usually covered with a smooth tan to gray colored coating when fresh. This coating may crack and fall off with age, exposing eggs laid in vertical rows underneath. Some egg masses are laid with only some or no covering at all. Here are a few other insect egg masses found in Virginia to help you recognize those of the spotted lantern fly. Sizes not to scale.



5539470

Spotted lanternfly egg mass  
Kenneth R. Law, USDA APHIS PPQ, Bugwood.org



5539457

Spotted lanternfly eggs without covering. Kenneth R. Law, USDA APHIS PPQ, Bugwood.org



5550961

Gypsy moth egg masses covered with brown hairs. Karla Salp, WA State Dept. of Ag, Bugwood.org



5565685

Chinese mantis egg case Whitney Cranshaw, CO State Univ., Bugwood.org



UGA5019077

Cankerworm eggs PA Dept. of Conservation and Natural Resources - Forestry, Bugwood.org



UGA1455176

Eastern tent caterpillar eggs Whitney Cranshaw, CO State Univ., Bugwood.org



Lichen on bark  
Eric Day, Virginia Tech



USAR5206045

Wheel bug eggs and nymphs Johnny N. Dell, Bugwood.org

2018

ENTO-276NP



# SLF Nymphs



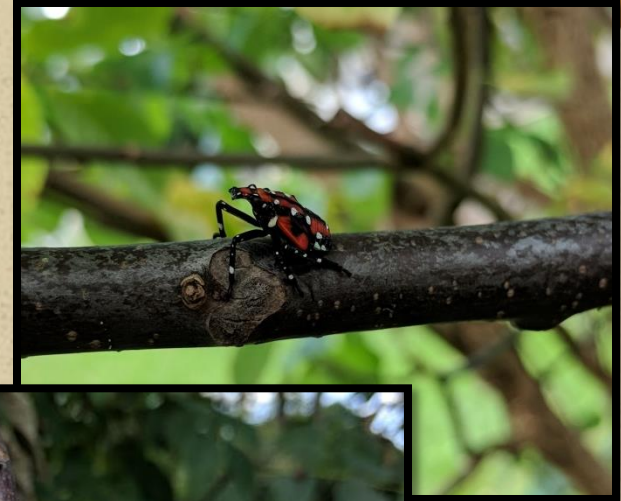


# SLF Nymphs





# SLF Nymphs



## Possible Spotted Lanternfly Immature Look-alikes in Virginia

Theresa Dellinger and Eric Day, Department of Entomology, Virginia Tech

Immature spotted lanternfly, *Lycorma delicatula* (White), are black with white spots when young. They turn red and black with white spots when older. A few other insects in Virginia have similar color patterns, but a close look will show that immature spotted lanternflies are easily recognizable. Sizes not to scale.



Young spotted lanternfly nymph  
*Berks Co. Conservation Dist.*



Older spotted lanternfly nymphs  
*Eric Day, Virginia Tech*



Wheel bug nymph  
*Susan Ellis, Bugwood.org*



Oak treehopper nymphs  
*Southern Forest Insect Work Conf.,  
Bugwood.org*



Assassin bug nymph  
*Susan Ellis, Bugwood.org*

2018 ENTO-278NP

# SLF Adults



## Possible Spotted Lanternfly Adult Look-alikes in Virginia

Theresa Dellinger and Eric Day, Department of Entomology, Virginia Tech

The adult spotted lanternfly, *Lycorma delicatula* (White), has a very distinctive appearance with black spots and bars on the upper wings and red, black, and white on the hindwings. Adults measure about 1" long and 0.5" wide. A few other insects in Virginia have similar color patterns, but a close look will show that spotted lanternfly is easily recognizable. Sizes not to scale. Upper left photo: Eric Day. All others: Bugwood.org



Spotted  
Lanternfly  
Eric Day, Virginia Tech



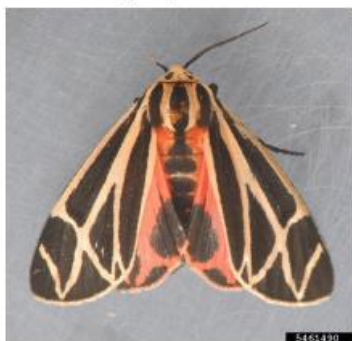
Spotted lanternfly,  
wings extended  
Lawrence Barringer, Pennsylvania  
Department of Agriculture



Ornate bella moth  
Lesley Ingram, Bugwood.org



Ailanthus webworm  
David Cappaert, Bugwood.org



Tiger moth  
Mark Dreiling, Bugwood.org



Oak treehopper  
Larry R. Barber, USDA Forest  
Service, Bugwood.org



Buck moth  
Gerald J. Lenhard  
Louisiana State University, Bugwood.org



Leopard moth  
Negün Almassi, Forest Preserves  
of Cook County, Bugwood.org

# Spotted Lanternfly Life Cycle in Virginia

The Spotted Lanternfly (SLF) overwinters in an egg mass (gray bars) that begins shiny gray but quickly turns to a dull brownish gray. The eggs hatch in early May and the nymphs (red bars) are present until late July when they become adults (yellow bars). Adults start to lay eggs in September. The life stages can overlap and, depending on the time of year, multiple stages can be found at the same time.



Multiple egg masses



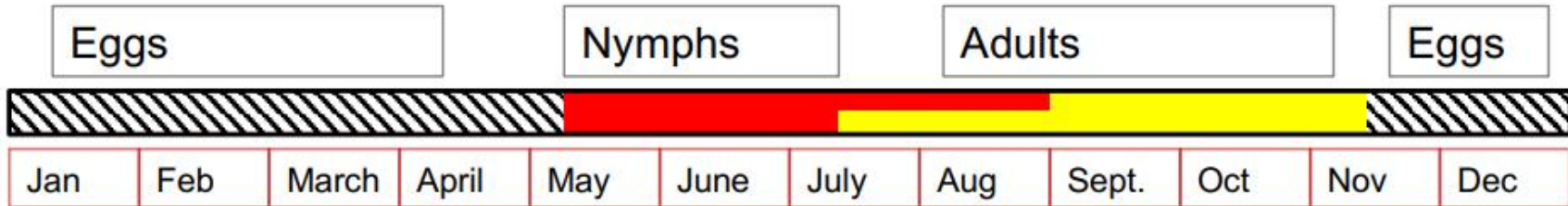
Young nymphs



Mature nymphs



Adult



Prepared by Eric Day, Doug Pfeiffer, Theresa Dellinger and Mark Sutphin. Photos left to right: Cluster of 5 egg masses; nymphs, showing black with white spots coloration for 1<sup>st</sup>-3<sup>rd</sup> stages; red 4<sup>th</sup> stage; and adult. (Photo of eggs by Mark Sutphin, photos of nymphs and adult by Eric Day)



# Hosts

- 65 host plants worldwide
- Prefer Tree-of-Heaven, *Ailanthus altissima*
- Grape, apple, stone fruit
- Have been observed feeding on oak, poplar, walnut, maple, and pine



# SLF Host Range Virginia 2018

Family	Common name	
Aceraceae	Boxelder	Pinaceae
	Silver maple	White pine (eggs only)
	Red maple	
Anacardiaceae	Poison ivy	Rosaceae
	Smooth sumac	Wild cherry
		Multiflora rose
Araliaceae	English ivy	Crab apple
Caprifoliaceae	Bush honeysuckle	Simaroubaceae
Fabaceae	Japanese honeysuckle	Tree of heaven
	Black locust	
Juglandaceae	Honey locust	Ulmaceae
	Black walnut	Elm
Moraceae	White mulberry	Hackberry
		Vitaceae
		Wild grape
		Table grape
		Virginia creeper



**Virginia Cooperative Extension**

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[www.ext.vt.edu](http://www.ext.vt.edu)

# SLF Host Range Virginia 2018



## Pinaceae

White pine (eggs only)

## Rosaceae

Wild cherry

Multiflora rose

Crab apple

## Simaroubaceae

Tree of heaven

## Ulmaceae

Elm

Hackberry

## Vitaceae

Wild grape

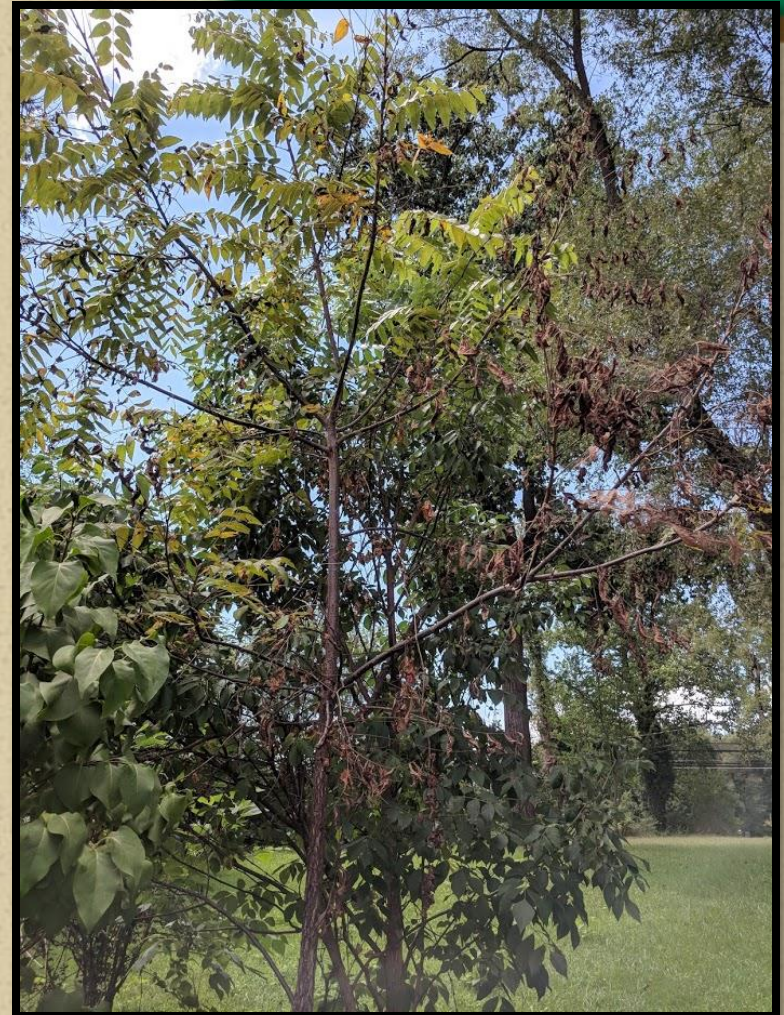
Table grape

Virginia creeper



# Damage

- Phloem feeders
- Yellowing and browning of foliage
- Branch dieback





# Damage

- Phloem feeders
- Yellowing and browning of foliage
- Branch dieback
- May reduce grape and tree fruit crop yield

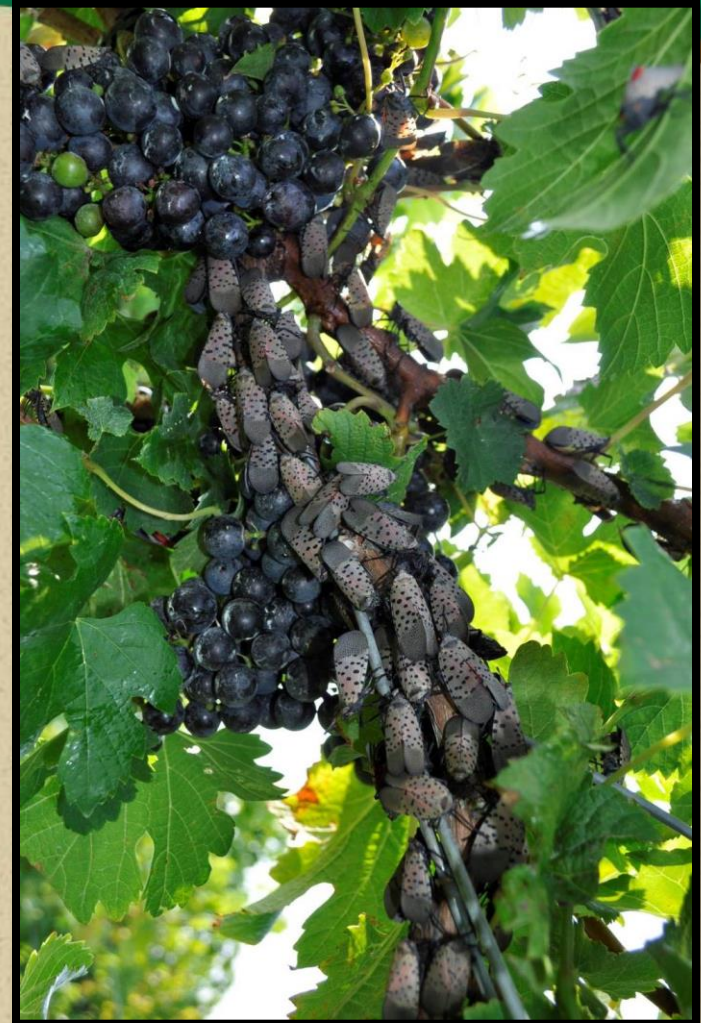


Photo credit: Erica Smyers, Penn State



# Damage

- Produce honeydew on which sooty mold develops
- White yeast patches
- Vinegar smell





# Damage

## ■ Nuisance pest!!



[Photo credit: Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org](#)

5563434



# Monitoring and Treatment

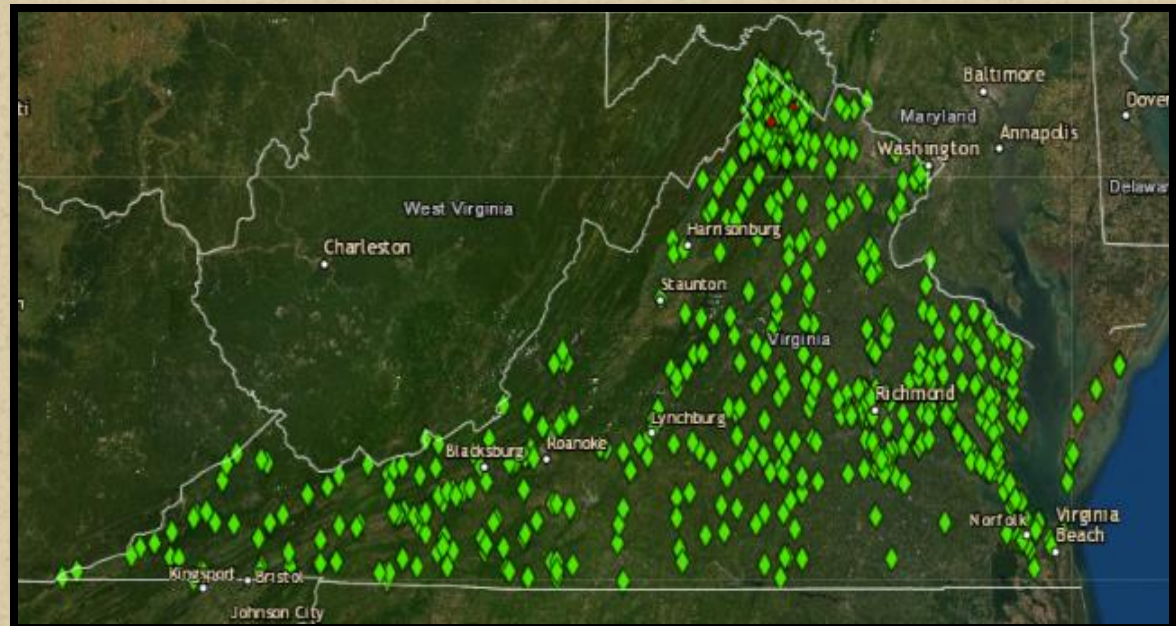


# Surveys

- Va Dept. of Ag and Consumer Services (VDACS) immediately conducted surveys to delimit infested area
- Tree banding to monitor population May through August
- Egg mass surveys in the fall and winter

## VDACS Survey

April 2018 to April 2019





# Tree Banding

- Only Tree of Heaven >5 inches
- Within and near infested area and high risk sites throughout state
- Citizen scientist program





# Tree Banding


## ■ Citizen Scientist Tree Banding Program



slf2019va Sign Out

### Spotted Lanternfly Survey

Spotted Lanternfly Survey



This survey documents activities associated with the Spotted Lanternfly survey in Virginia.

- Surveyor Info
- Spotted Lanternfly Questions
- Add Photos
- Location Notes
- Contact Info

Submit



# Treatment

- Conducted by USDA/ APHIS contractor
- Only Tree of Heaven

**<6" DBH  
Herbicide**



**>6" DBH  
Insecticide**





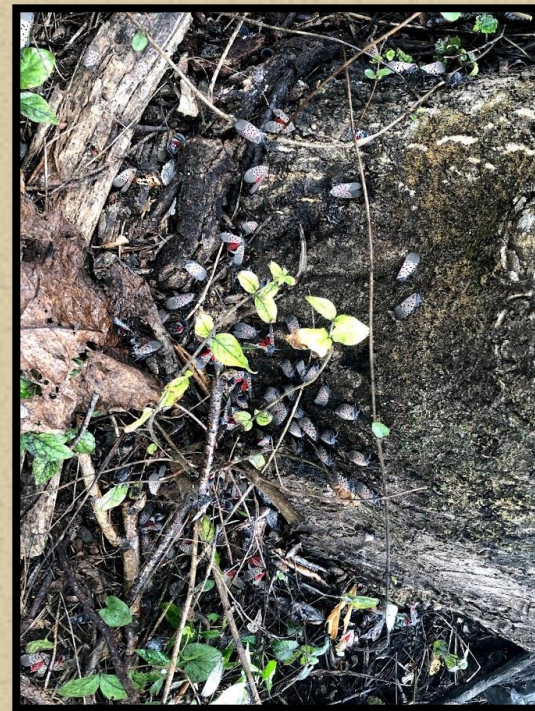
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Herbicide**



**>6" DBH  
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# Treatment

- Management Recommendations:



# Treatment

## ■ Management Recommendations

Late September – May:

- ◆ Look for egg masses
- ◆ If found, scrape with plastic card or other hard surface into container with with alcohol, diluted clorox (10%) or hand sanitizer.



Photo credit: PA Department of Agriculture

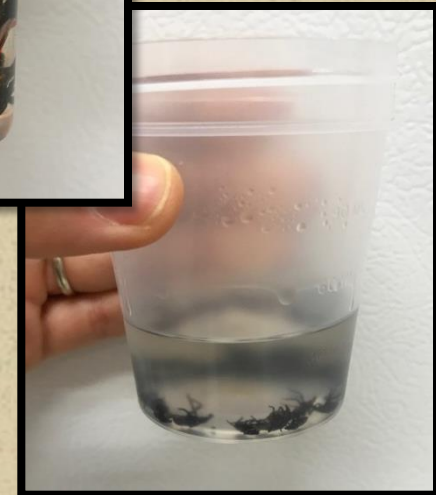


# Treatment

## ■ Management Recommendations

May - November:

- ◆ Kill nymphs and adults
- ◆ If numbers are low they can be crushed or placed in a container of alcohol
- ◆ Larger populations can be treated with a contact or systemic insecticide
- ◆ Homeowners encouraged to hire certified pesticide applicator





# Treatment

## ■ Management Recommendations

### Remove/Treat Tree of Heaven:

- ◆ Destroy tree of heaven with basal bark spray or hack-n-squirt
- ◆ Beware of re-sprouting after cutting!!
- ◆ After removing tree of heaven, SLF may move to other plants → recommend leaving trap trees



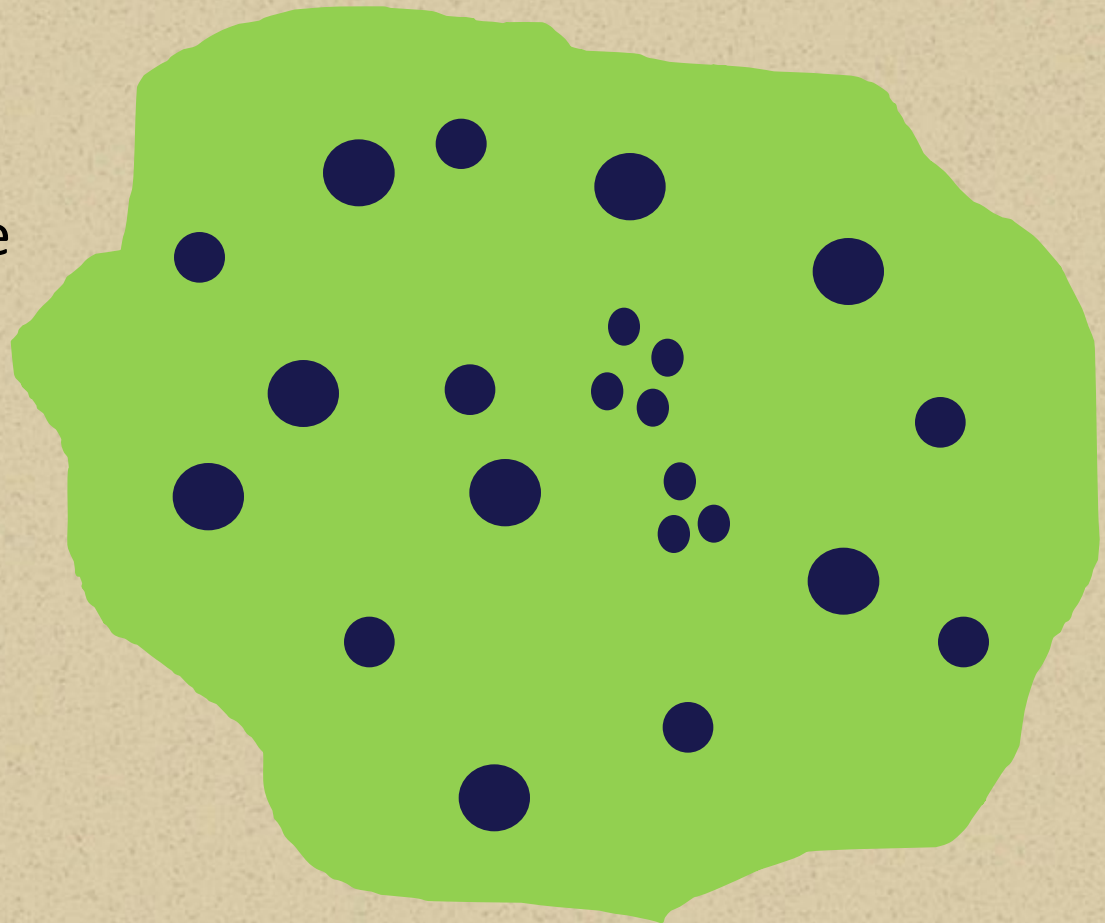


# Treatment

## ■ Management

### Recommendations:

- ◆ Remove 90% of all Tree of Heaven on your property and use the remaining 10% as trap trees. Treat the remaining 10% with a systemic insecticide.



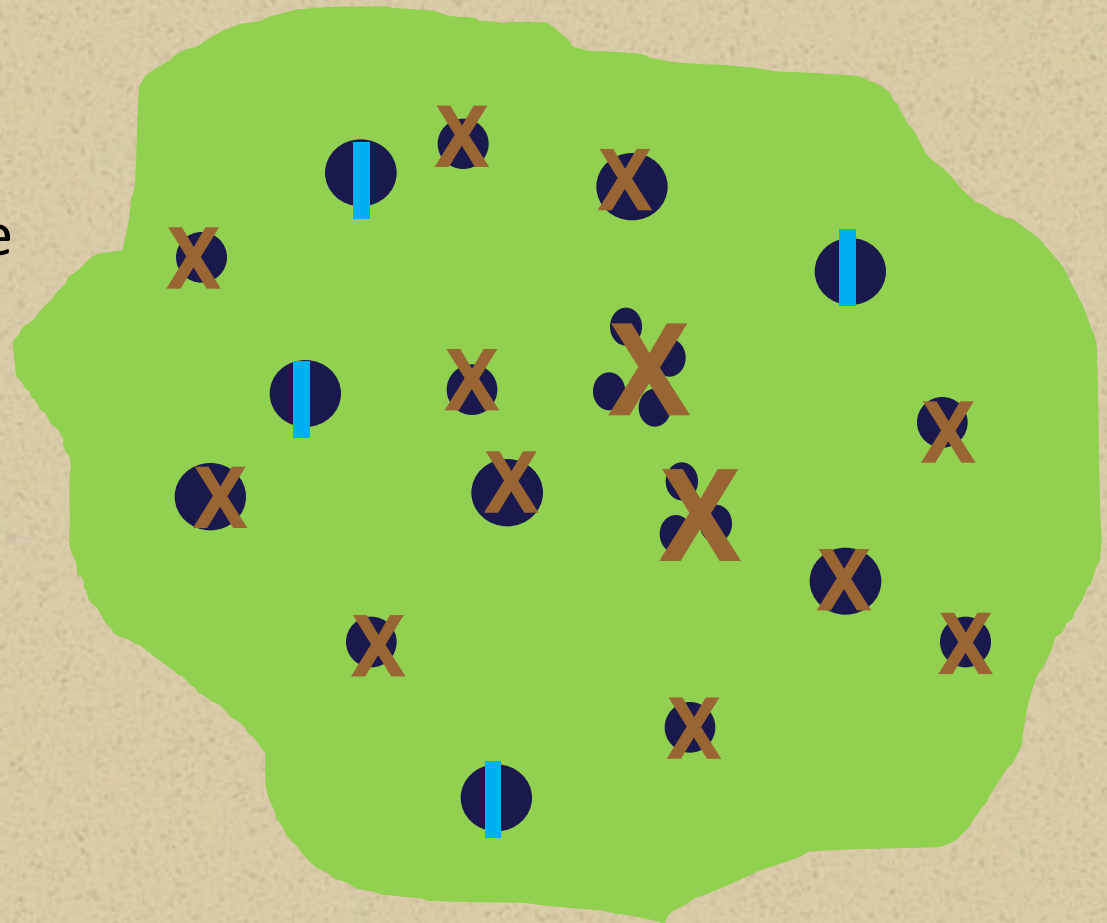


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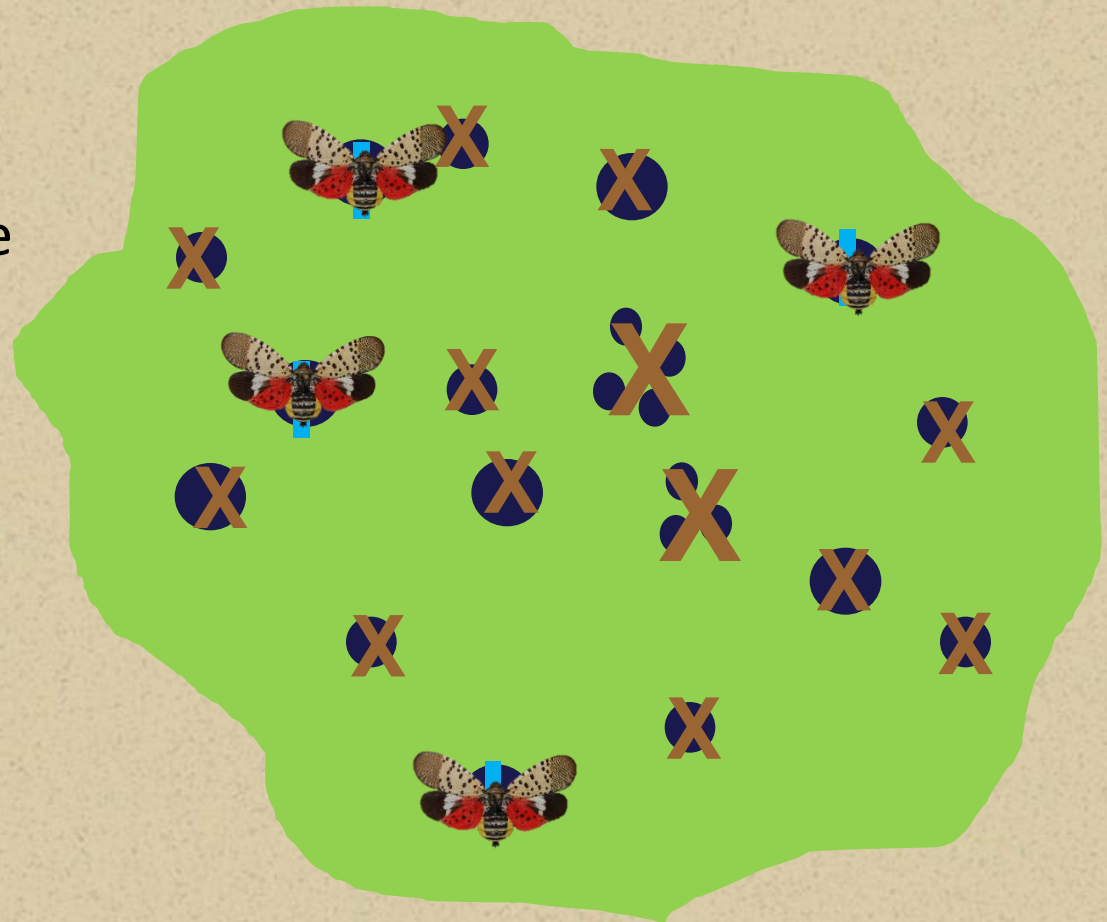


# Treatment

## ■ Management

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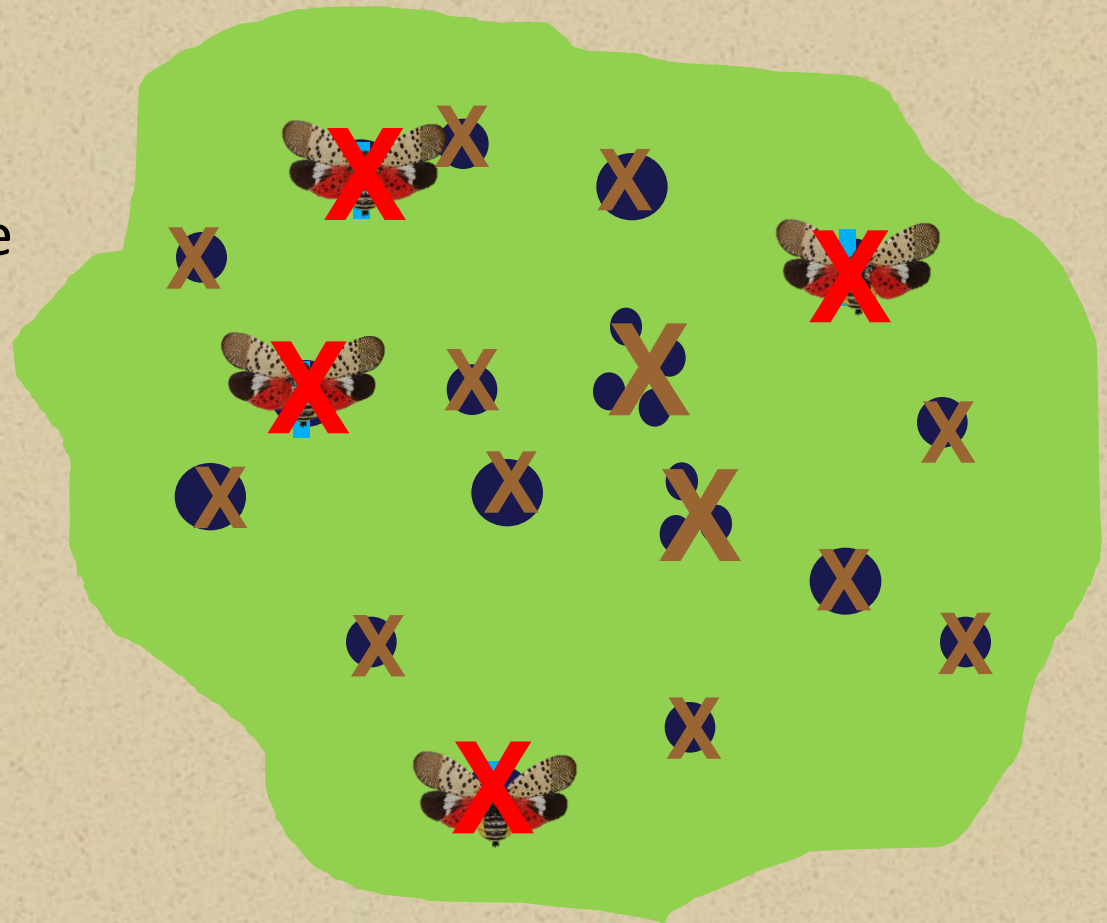


# Treatment

## ■ Management

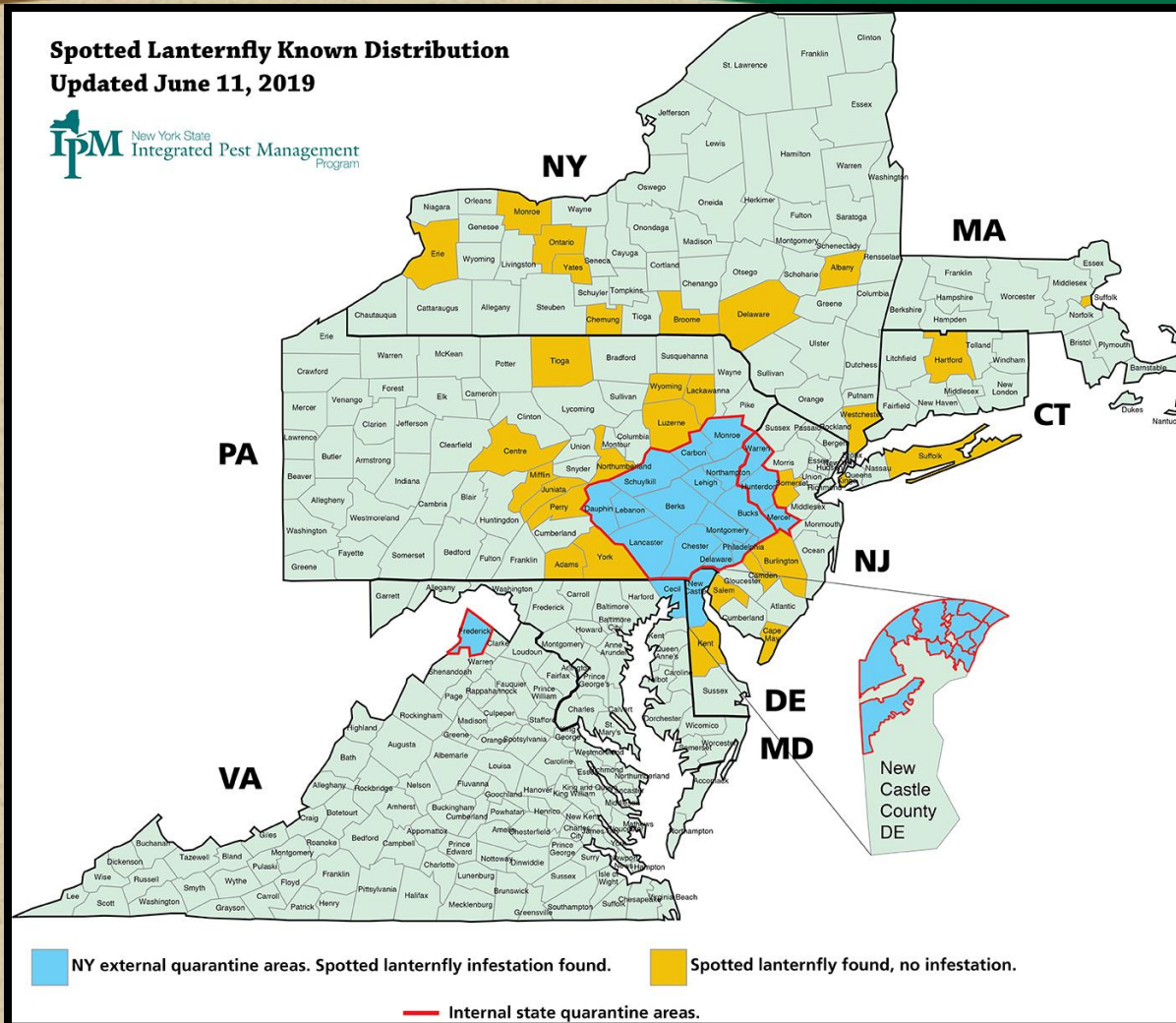
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# Quarantine





# Quarantine

- Any life stage of the Spotted Lanternfly, *Lycorma delicatula*.
- **All plants** and plant parts including, but not limited to, all live or dead trees, nursery stock, green lumber, firewood, logs, perennial plants, garden plants and produce, stumps, branches, mulch, and composted and uncomposted chips, bark, and yard waste.
- Outdoor industrial and **construction materials and equipment**, concrete barriers or structures, stone, quarry material, ornamental stone or concrete, construction, landscaping and remodeling waste.
- **Packing materials**, such as wood crates or boxes.
- **Outdoor household articles** including, but not limited to, recreational vehicles, lawn tractors and mowers, grills, grill and furniture covers, tarps, mobile homes, tile, stone, deck boards, **any equipment, trucks or vehicles not stored indoors**.
- Conveyances of any type, whether utilized for movement of the materials previously listed or **personal use, vehicles, and any trailers**, wagons or other equipment attached thereto.
- Any other article or means of conveyance when it is determined by an inspector that it presents a risk of spread of Spotted Lanternfly.



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**Anything that is outside**

## INSPECTION STATEMENT FOR BUSINESSES SPOTTED LANTERNFLY - STOP THE SPREAD

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. Start inspecting for spotted lanternfly today.

By signing this checklist, I am confirming that I have inspected, equipment, and material for Spotted Lanternfly.

Signature: \_\_\_\_\_ Address: \_\_\_\_\_ Date: \_\_\_\_\_

### Record your self-inspection:

#### Life stages of the spotted lanternfly



Egg mass  
Sept.-June



Hatched nymph  
April-July



Developed nymph  
July-Sept.



Adult  
July-Dec.

#### Before you load products that were stored outside check for spotted lanternfly on:

- Pallets
- Containers
- Exposed surfaces of products
- Christmas Trees

#### Before you leave your company lot or work site, check for spotted lanternflies on your vehicles:

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

#### Check these items stored outside for pests before moving them to a new location:

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

#### When you find an egg mass:

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

#### When you find a nymph or an adult:

- Squash it

Report any spotted lanternflies you see to the Virginia Cooperative Extension Service: <https://ext.vt.edu/agriculture/commercial-horticulture/spotted-lanternfly.html>

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

Businesses may move regulated articles in Virginia after getting a permit and performing a self-inspection

Online training for permit

Check-list for inspection





# How YOU can help

- Learn how to identify SLF and always be vigilant
- Always inspect vehicles and outdoor equipment before leaving infested area
- Do not park or store items near trees





# How YOU can help

- Don't move firewood
- Kill any SLF you find
- If you have SLF on your property
  - ◆ Scrape egg masses
  - ◆ Remove tree of heaven
  - ◆ Apply insecticides when appropriate





# Current Research

- Do they require tree of heaven?
- Most effective chemical control
- Non-target effects of pesticides
- Biological control
- Fungal pathogens and bioinsecticides
- Long term impact on tree health
- Traps and lures

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<https://ext.vt.edu/spotted-lanternfly>

<https://extension.psu.edu/have-you-seen-a-spotted-lanternfly>



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