

Spotted Lanternfly



Lori Spears, PhD
Invasive Species Survey Coordinator
Utah State University

Spotted Lanternfly (*Lycorma delicatula*)

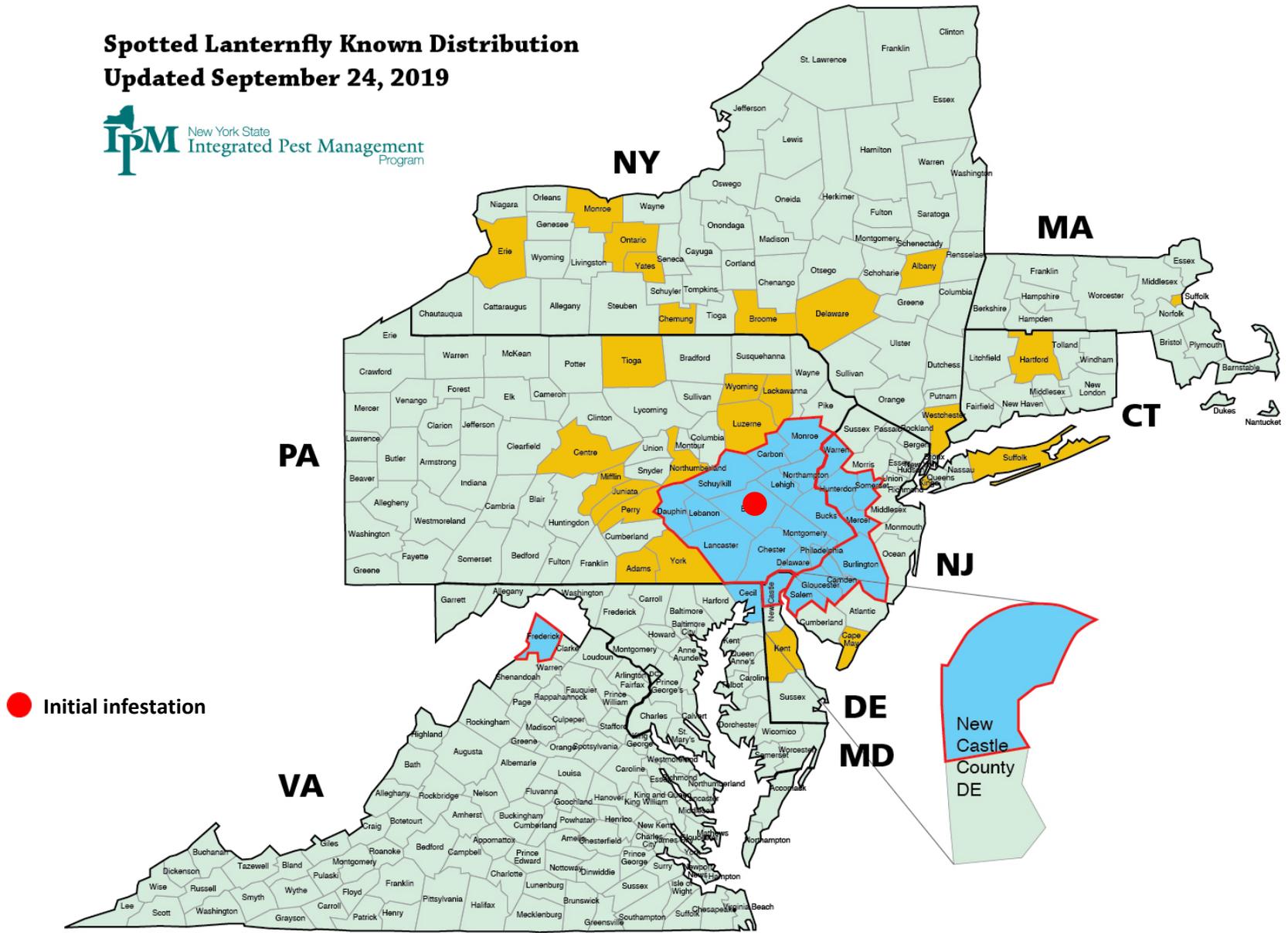
- Native to China, Taiwan, and Vietnam; has invaded Korea (2004) and Japan (2009)
- First discovered in Berks County, PA in September 2014
- Probably arrived to the U.S. in shipments of stone infested with eggs from China in 2012



Emelie Swackhamer, Penn State University, Bugwood.org

Spotted Lanternfly Known Distribution

Updated September 24, 2019



● Initial infestation

NY external quarantine areas. Spotted lanternfly infestation found. Spotted lanternfly found, no infestation.

Internal state quarantine areas.

Host Plants

- Feeds on > 70 plant species, > 20 plant families
- Strong preference for *Ailanthus altissima* (tree-of-heaven)
- Fruit trees, grapevines, hops, hardwood trees, ornamentals



Feeding

- Swarm feeders
- Uses a piercing-sucking mouthpart to feed on phloem
- Sugary excrement (“honeydew”) coats plant surfaces and attracts other pests (e.g., wasps, sooty mold)
- Highly infested plants may ooze sap and wilt; leaf curling, dieback
- Decline in crop quality and yield



Erica Smyers, Penn State University



Pennsylvania Department of Agriculture, Bugwood.org



Lawrence Barringer, Pennsylvania
Department of Agriculture, Bugwood.org



Eric R. Day, Virginia Polytechnic Institute and State University, Bugwood.org



Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org



Kenneth R. Law, USDA APHIS PPQ, Bugwood.org



Emelie Swackhamer, Penn State University, Bugwood.org



14x more
insecticide sprays
in affected
vineyards!



Spotted lanternfly is a nuisance pest



Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org



NYSIPM Staff



Barbara Bower, Homeowner

Identification - Adults

- Males are $\frac{5}{6}$ inch long; females are 1 inch long
- Head and legs are black
- Abdomen is yellow with broad black bands
- Forewings are brownish-gray with black spots; wing tips show a network of veins
- Hindwings are black and white anteriorly, and red and black posteriorly



Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org



USGS Bee Inventory and Monitoring Lab from Beltsville, Maryland, USA [Public domain]



Identification - Nymphs

- 1st-3rd instars are black with white spots
- $\frac{1}{8}$ to $\frac{3}{4}$ inch long



Ekkehard Wachmann

- 4th instar is red and black with white spots
- $\frac{3}{4}$ inch long



Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org

Be aware of lookalikes



Elizabeth Benton, University of Georgia, Bugwood.org



Herb Pilcher, USDA Agricultural Research Service, Bugwood.org



Whitney Cranshaw, Colorado State University, Bugwood.org

Identification - Eggs



Emelie Swackhamer, Penn State University, Bugwood.org



Emelie Swackhamer, Penn State University, 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 lanternfly, *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 lanternfly. Sizes not to scale.



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



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



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



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



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



Lichen on bark Eric Day, Virginia Tech



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



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

2018

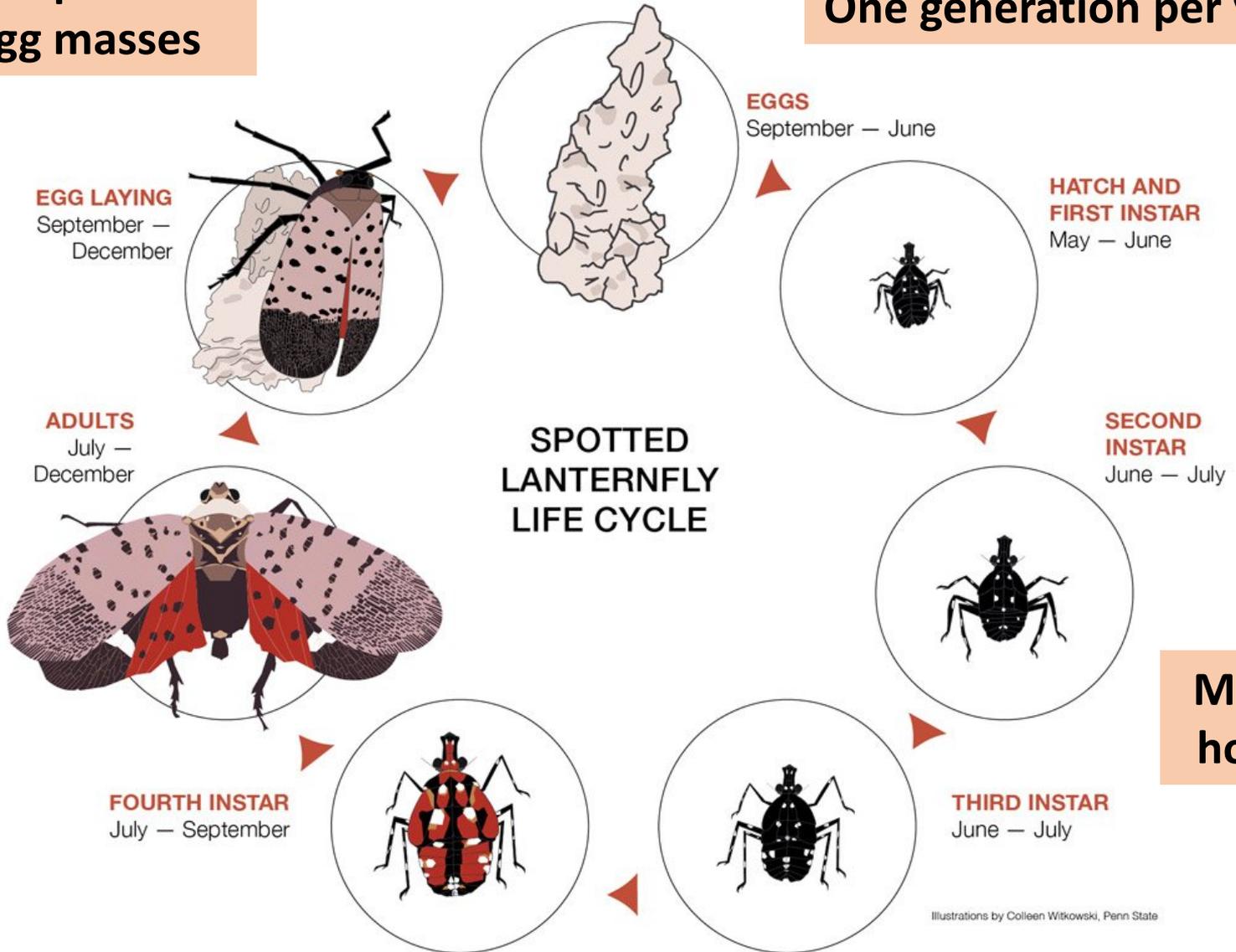
ENTO-276NP

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Overwinter as eggs

**Females produce
1-2 egg masses**

One generation per year



**Few
hosts**

**Many
hosts**

Pathways of Spread

- SLF can move 3-4 miles a year on their own
- Common hitchhikers at all life stages; adults and egg masses are the most common
- Pathways include landscaping stones, vehicles, construction materials, machinery, plant materials, including firewood





Monitoring for Spotted Lanternfly

- Sentinel plant surveys
- Sticky tree bands



James Gaither



1.800.379.9677
www.bugbarrier.com

BugBarrier bands
caught more SLF,
fewer non-targets!

Non-Chemical Control

- *Ailanthus* removal; herbicide application may be necessary
- Scrape, smash, or burn egg masses (Sept-May)
- Chipping of egg-infested wood



PA Department of Agriculture



Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org



Biological Control



Parasitoids

- *Ooencyrtus kuvanae*: Asian egg parasitoid (GM); 7% parasitism
- *Anastatus orientalis*: high egg parasitism rates in China (30% egg masses, 40% eggs); in quarantine
- *Dryinus browni*: attacks 2nd-3rd instar nymphs; 40% parasitism reported in China; in quarantine

Biological Control

Fungal Pathogens: *Beauveria bassiana*, *Batkoa major*





Chemical Control

- Ovicides
 - JMP Stylet Oil
- Contact Insecticides
 - bifenthrin
 - carbaryl
- Systemic Insecticides
 - Tree injection: dinotefuran or imidacloprid
 - Bark sprays: dinotefuran
 - Soil drenches



Spotted Lanternfly Management for Landscape Professionals

Introduction
 Spotted lanternfly (SLF), *Lycorma delicatula*, is an invasive planthopper, native to Asia, that was first detected in 2014 in southeastern Pennsylvania. As of May 2019, SLF is now found in Pennsylvania, New Jersey, Virginia, and Delaware. Detections of SLF have been reported in New York, Connecticut, Massachusetts, and Maryland, although established populations are not yet known in these states. It feeds voraciously on many plants, including economically important crops like fruit trees, grapevines, hops, hardwood trees, and ornamentals. While SLF can cause significant damage to plants, it is mostly considered a nuisance pest in the ornamental and landscape industries.

Life Cycle and Identification
 There is one generation of SLF per year. The eggs are laid in the fall (September to November) and hatch in the spring (late April to June). Egg masses are laid on many surfaces (trees, decks, houses, outdoor equipment, rocks, etc.) and protected with a mudlike covering. Egg masses average around 30 to 40 eggs each. After hatching and before reaching adulthood, SLF goes through four nymphal stages called instars. Nymphs are small (¼ to ½ inch) and can be hard to find. The first three instars are black with white spots. The last instar is red with white dots and black stripes (Figure 1). SLF adults begin to emerge in July and are active until they are killed by the first hard frost in late fall. Adults are the most obvious and easily detectable stage because they are large (about 1 inch) and highly mobile. Adults have black bodies. Their forewings are gray with black spots, the tips are black with gray veins, while their hindwings are red, black, and white. Only the adults have wings and can fly. However, because SLF adults hop more than fly, their wings often remain closed, leaving only the forewings visible (Figure 1D).

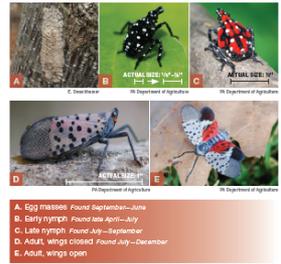


Figure 1. Life stages of spotted lanternfly.

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

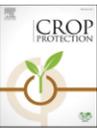
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Evaluation of insecticides for control of the spotted lanternfly, *Lycorma delicatula*, (Hemiptera: Fulgoridae), a new pest of fruit in the Northeastern U.S.

Heather Leach^{*}, David J. Biddinger, Greg Krawczyk, Erica Smyers, Julie M. Urban

Department of Entomology, Pennsylvania State University, PA, USA



Trap Trees



Trap Trees



Are trap trees the best option?

- *Ailanthus* is a valuable tool for monitoring low-level populations
- Will TOH removal send SLF to other, more desirable plants?





Thank you!

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Original article

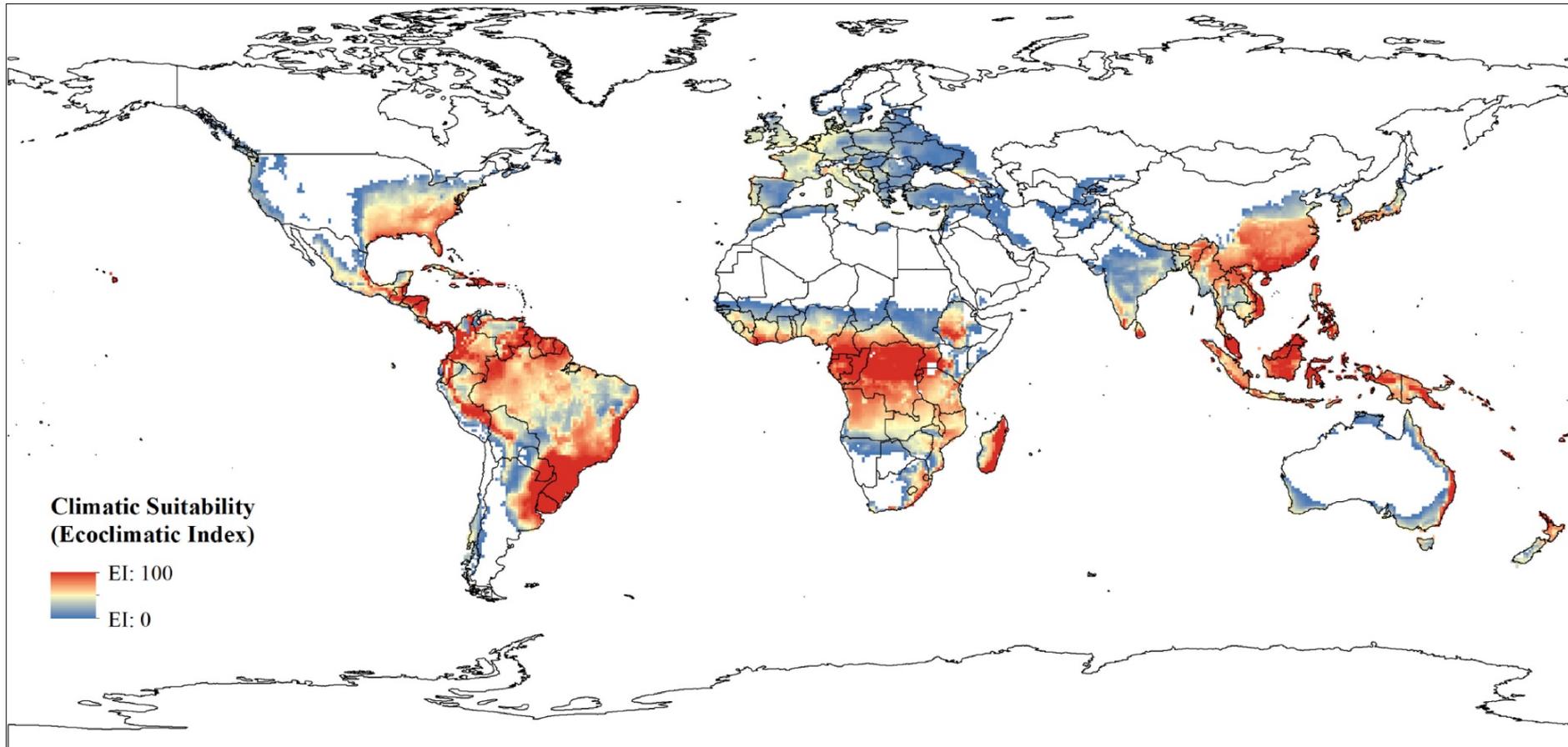
Model-based prediction of potential distribution of the invasive insect pest, spotted lanternfly *Lycorma delicatula* (Hemiptera: Fulgoridae), by using CLIMEX

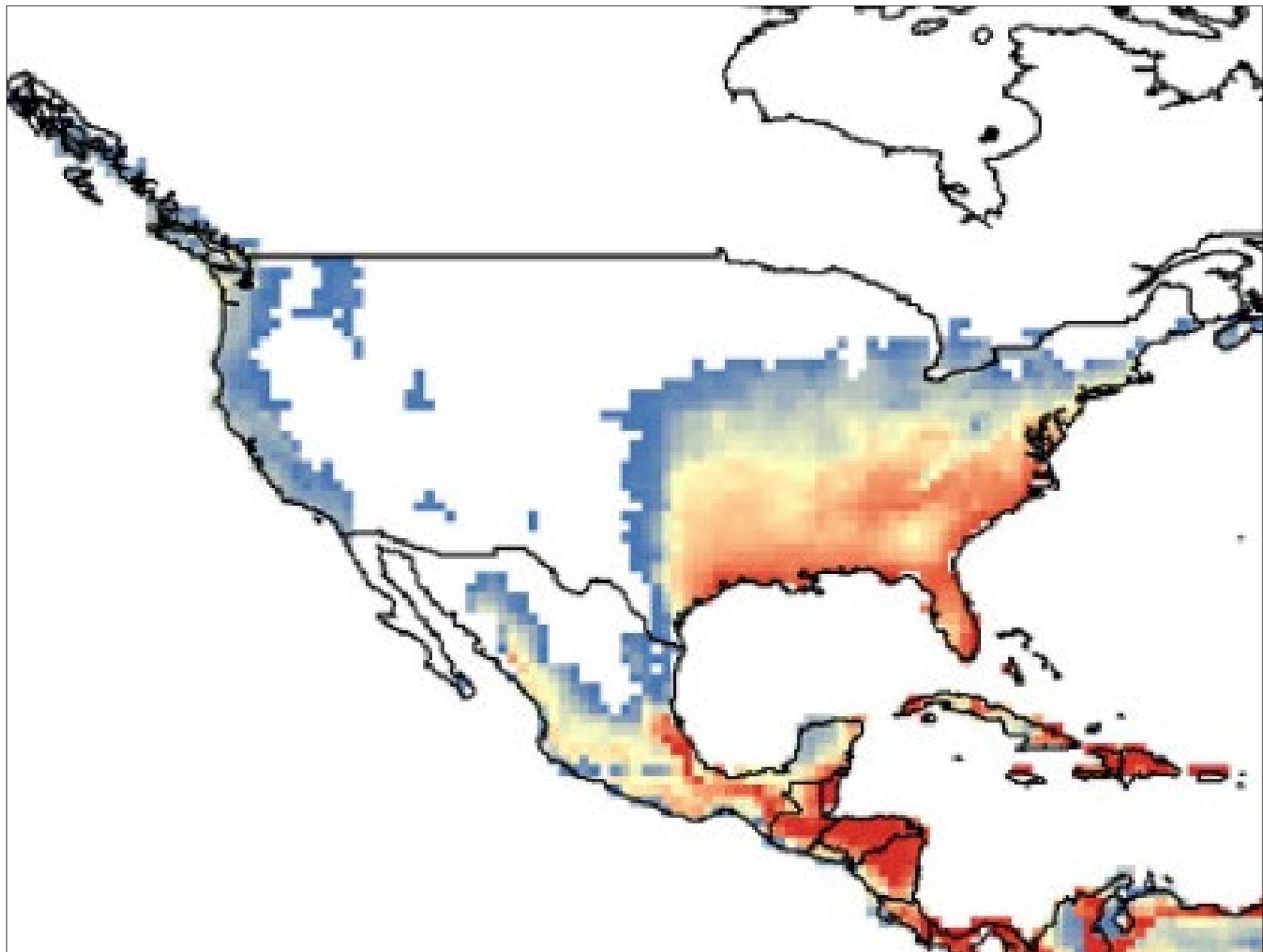


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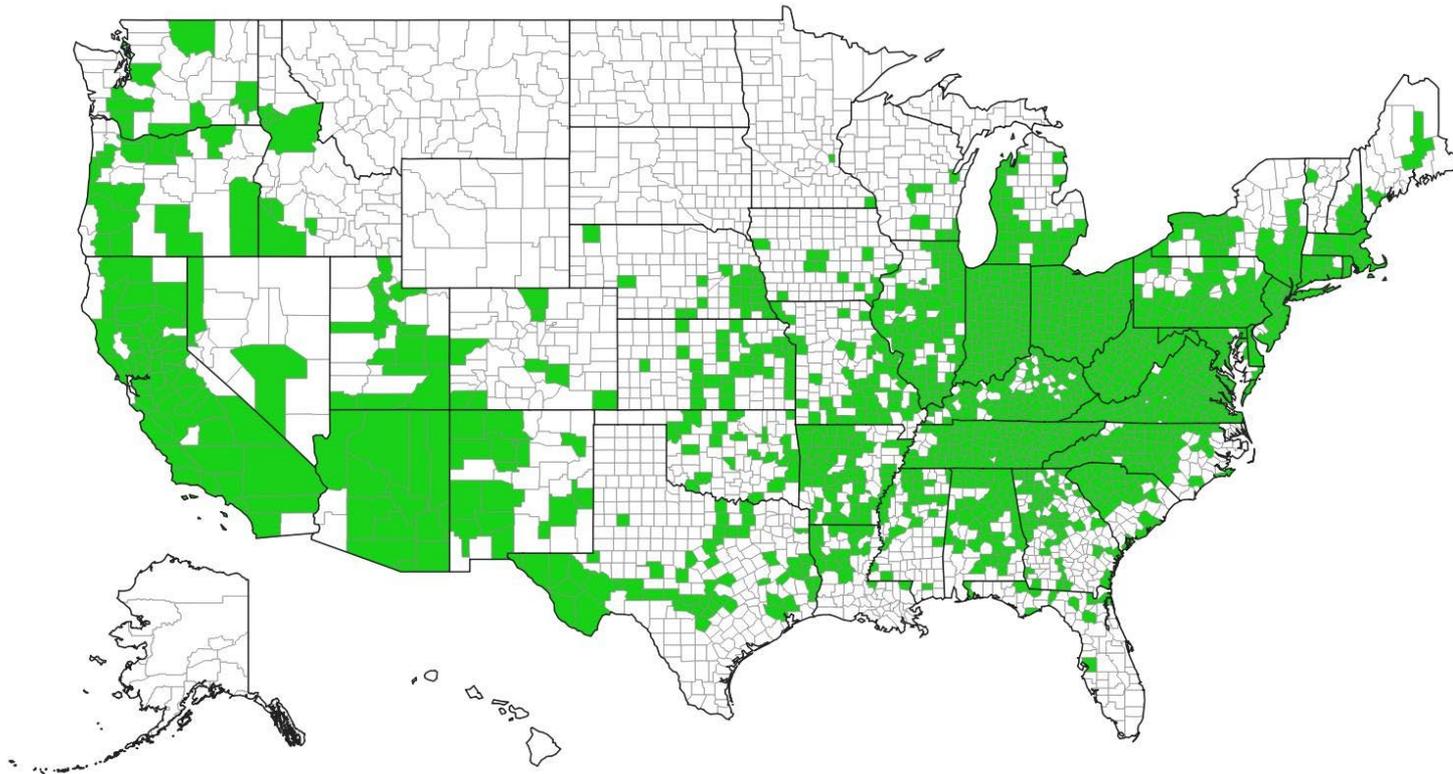
Potential Range





Tree of Heaven, Zones 4-8

EDDMapS



Legend

- No Data
- Species Reported