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Spotted Lanternfly in Virginia Vineyards: *Lycorma delicatula* (White) (Hemiptera: Fulgoridae)

Photos of spotted lanternfly nymphs and adults by Doug Pfeiffer

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Origin & Distribution: Spotted lanternfly (SLF) was found in southeastern Pennsylvania in 2014, its first occurrence outside of Asia. After several years of continuous spread in Pennsylvania, SLF was first found in Winchester, Virginia in January 2018. The initial infestation zone (Spring 2018) included about 1 square mile; by November 2018 it had expanded its range to about 18 square miles. It is highly invasive and spreads rapidly when introduced to new areas. This is attributed to its wide host range (more than 70 host plant species) and a lack of effective natural native enemies. SLF has great potential to impact the state's grape, orchard, logging, tree- and wood-product, and green industries. Natural spread is estimated to be about 10 miles per year; there is great risk of spread by hitch-hiking on vehicles.

Description: The first three nymphal stages are black with white spots on the body and legs. The fourth and final nymphal stage is mostly bright red, with black and white markings. All nymphal stages are active hoppers.

Adult SLF are approximately 1" long and ½" wide. Its forewings are light-brown/grey with black spots and the wings tips are reticulated black rectangular blocks outlined in grey. The hind wings are marked with scarlet red with black spots.

SLF egg masses contain 30-50 eggs, are 1-1.5" long and ½-¾" wide, grayish-brown in color, and covered with a grey, waxy coating (newly laid masses are somewhat shiny).

Life Cycle: SLF has one generation and overwinters as eggs. Eggs hatch in late April-early May. Nymphs develop until adults appear in July, becoming abundant in August. Adults begin laying eggs in mid-September and continue until winter begins to kill off any remaining adults. For a life cycle calendar for our area, see https://www.pubs.ext.vt.edu/ENTO/Ento-268/ENTO-268.html.

Signs & Symptoms: Nymph and adult SLF typically gather in large numbers on host plants, including tree-of heaven (TOH) and grapevines. Adult SLF are found on tree trunks, stems, and sometimes near leaf litter at the tree base. They can fly, and can disperse among host plants by walking. While more than 70 host plants are attached, grape is the crop at greatest risk. In the fall, adult SLF focus on TOH as a host for feeding and egg laying, although not exclusively. Adults will lay eggs on other smooth-trunked trees or any smooth surface, natural or manmade.

Both nymphs and adults are phloem feeders—they suck sap from young stems and leaves, which can cause withering of whole trees. This reduces photosynthesis, weakens the plant, and eventually contributes to the host plant's death. If the vine is not killed outright, winter mortality is increased. Feeding can also cause the plant to weep or ooze, resulting in

a fermented odor. Wounds will leave a grayish-black trail along the trunk.

The insects excrete large amounts of a sugar-rich fluid called “honeydew”, covering the stems and leaves of trees as well as the ground beneath infested plants. This supports the growth of sooty mold that can reduce photosynthesis and weaken the plant.

Impact in Vineyards: To date, our knowledge of impact in vineyards is based on experience in Pennsylvania, where yield reductions of 80-90% have been reported from current year feeding once populations become established. Heavy feeding has resulted in death of most vines, with surviving vines failing to set fruit. Insecticide applications in affected vineyards increased from 4.2 applications in 2016 to 14.0 in 2018 (insecticide costs increasing from $54.63/acre in 2016, to $147.85/acre in 2018). Each of these vineyards reported spraying an insecticide every 3-5 days during peak SLF activity.

Top photo of spotted lanternfly nymphs on a grapevine in Virginia by Doug Pfeiffer. Bottom photo of killed grapevines in Pennsylvania by Julie Urban.

Quarantine & Status:

SLF can readily hitchhike on human conveyances, such as motor vehicles or trains. This would enable rapid movement of hundreds of miles, a much faster spread than possible naturally. In order to limit such spread, Virginia Department of Agriculture and Consumer Services (VDACS) has instituted a quarantine. Businesses must inspect plants and plant products, vehicles and equipment that have been outside before they are moved from the quarantine zone (currently Winchester and Frederick County).

Management Approaches:

An eradication program managed by the Virginia Department of Agriculture and Consumer Services (VDACS) should lead to lowered local populations. The components of this program include a trap-tree approach, tree-banding and egg scraping.

Chemical control: It is likely that individual vineyards will need insecticide applications targeted against SLF, especially once adults become active. Trials on potted grapevines in Pennsylvania have provided preliminary efficacy data. When populations have become established locally, repeated applications may be necessary. While resistance will be slowed with only a single generation, and many immigrants from outside the vineyard, it is still wise to rotate modes of action.

Insecticides (E=Excellent, G=Good): Pyrethroids: Brigade (bifenthrin) (E), Mustang Maxx (zeta-cypermethrin) (G). Neonicotinoids: Actara (thiamethoxam) (E), Scorpion (dinotefuran) (E), Admire Pro (imidacloprid) (G). Carbamates: Sevin (carbaryl) (E).

Cultural control: Numbers may be reduced locally by removal of most TOH in a trap tree approach. Trees less than 6 in DBH should be killed by slashing and treating with a herbicide. This may be done by a professional. Larger trees are treated with dinotefuran, to kill returning SLF. During winter, eggs found in the vineyard should be destroyed to lower populations of nymphs in the following season.

Biological control: There are no effective natural enemies at this time.

Additional information, and reporting suspected SLF: Various resources on SLF are posted at https://ext.vt.edu/agriculture/commercial-horticulture/spotted-lanternfly.html. Included is a link to report suspected SLF with the ability to upload photos. In addition, you may contact Doug Pfeiffer (dgpfeiff@vt.edu), Eric Day (idlab@vt.edu), or your local Virginia Cooperative Extension office.