Spotted Lanternfly Survey Protocol

Background:
Spotted Lanternfly (*Lycorma delicatula*) is a sap-feeding, leaf-hopping insect native to China and other parts of Southeast Asia. It was first detected in Pennsylvania in 2014 and has since spread to other eastern states. Spotted Lanternfly is currently listed under Michigan's "watch list" and has been detected in areas of Oakland County. The insect causes direct damage by sucking sap from its host plants and secreting large amounts of honeydew. This honeydew, and the resulting black sooty mold, can kill plants and foul surfaces. SLF feeds on at least 70 species of trees, as well as vines and shrubs, including fruit trees, hops, grapevines, and several hardwoods. Their preferred food source is the invasive Tree-of-Heaven (*Ailanthus altissima*), with grapes, black walnut, river birch, willow, sumac, and red maple as alternate food sources. Their ability to predate a broad range of tree and plant species could have implications for Michigan's vineyard, orchard, and forestry industries.

Spotted Lanternfly females can lay their eggs on nearly any surface, including vehicles, firewood, trees, outdoor equipment, and bricks, rock, and patio furniture. This means that SLF can be easily spread to new locations when people accidentally transport eggs or other life stages to new areas. Thus, quarantines have been established to prevent their further spread by moving infested materials. With this in mind, it is important to check vehicles and any outdoor items for egg masses or other life stages before leaving areas where SLF has been reported.

Life Cycle, ID, and Symptoms:
SLF completes one generation per year (Figure 1). Eggs are laid in a mass coated in an off-white or grey substance, which cracks and darkens to a greyish-brown over time. Egg masses resemble a small patch of mud or seed pods (Figure 2A). Eggs hatch in the spring and the small black nymphs with white spots begin feeding. SLF will complete 4 stages, or instars, as immature nymphs before becoming adults. First, second, and third instar nymphs are black with white markings. Fourth instar nymphs are reddish-orange with black and white markings. The nymphs develop into adults, which is the only stage with wings. Adults are about an inch long and a half inch wide, with grey forewings with black spots and red, white, and black striped hindwings. A few adults may appear in mid-summer, but they are most common in late summer and fall. After mating, adult females lay eggs, usually beginning in September, and continuing throughout November and early December. Eggs overwinter until the following April or May, when the first instar nymphs hatch and begin feeding.

Symptomatic plants:

- Plants that are oozing, weeping, and have a fermented odor
- Buildup of honeydew (sticky fluid) on plants and on the ground underneath infested plants
- Sooty mold on infested plants

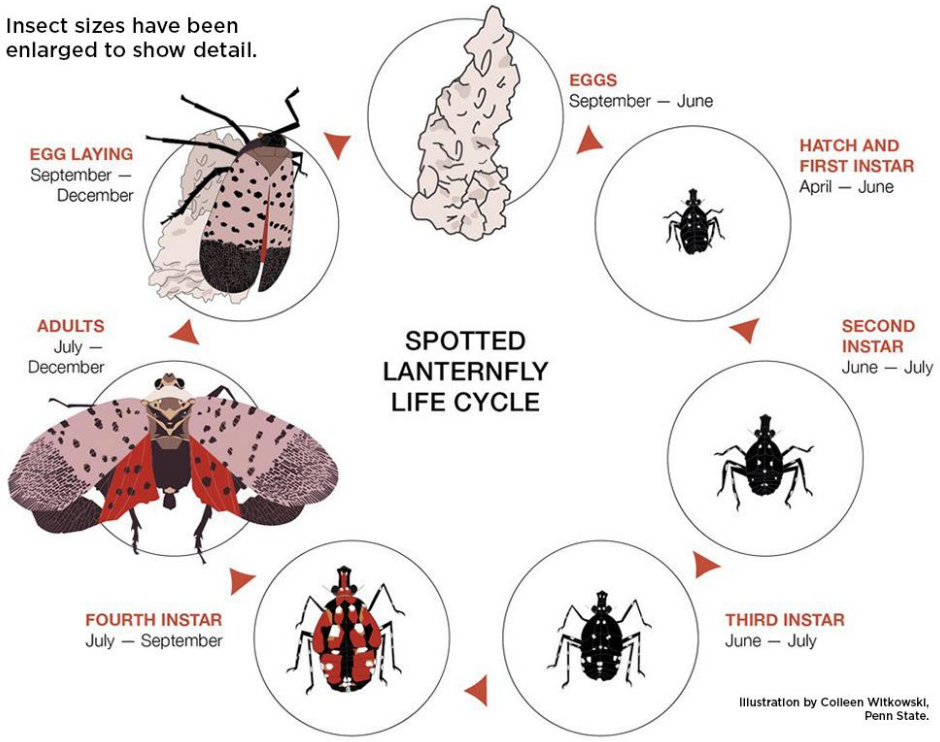

Figure 1: Life Cycle of Spotted Lanternfly

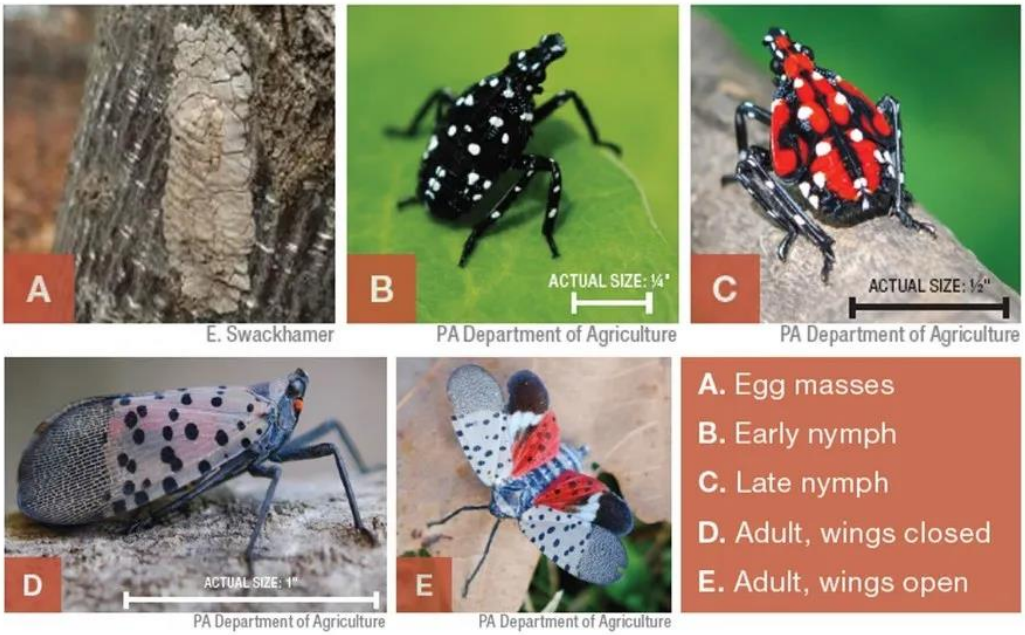

Figure 2: Spotted Lanternfly Instar Variations

Survey Protocol:

Seasonality affects surveying protocol.

In fall and winter, check outdoor items for lanternfly egg masses, including those items that you may bring indoors. Inspect trees (paying close attention to Tree-of-Heaven in particular), bricks,

stone, and other smooth surfaces for egg masses. Egg masses that are accessible can be scraped off and destroyed, eliminating insects that would otherwise hatch and feed. Use a stick, plastic card, or putty knife or similar tool to scrape eggs into a container filled with alcohol to kill the eggs. Simply mashing the eggs is often not entirely effective.

In spring and summer months, inspect trees and plants for signs of this pest, particularly at dusk and at night when the insects tend to gather in large groups on the trunks or stems of plants. Insects should be smashed or otherwise eliminated to reduce their spread. In addition to examining trees for egg masses and hatched insects, inspect tree health by looking for accumulation of honeydew, oozing and weeping trees, or sooty mold accumulation.

If you suspect that you have found SLF take photographs of notable symptoms or the insect, fill out the survey form, and notify Lindsey Dolinski (ldolinski@naturecenter.org). KNC staff will report confirmed observations to the MISIN state-wide database.

References:

https://www.aphis.usda.gov/aphis/resources/pests-diseases/hungry-pests/slf/spotted-lanternfly
https://www.michigan.gov/invasives/id-report/insects/spotted-lanternfly
https://www.canr.msu.edu/resources/spotted-lanternfly-a-colorful-cause-for-concern
https://extension.psu.edu/spotted-lanternfly-what-to-look-for

Volunteer Monitoring Surveys

Supplies needed: smartphone, plastic bag for collecting egg masses or insect specimens, map of survey points

Step 1: Go to a survey point on the map. Upload digital map into Avenza for seeing yourself in the field. Note points are not marked in the field, general area is fine.
Step 2: Look around the area (up to 100 ft circle), inspecting trees (particularly Tree of Heaven) and structures for any signs of spotted lanternfly egg masses, insects, or infected tree characteristics. Take photos to submit.
Step 3: If any egg masses or insects are detected follow the protocol to dispose of them. Scraping egg masses into a plastic baggy to be treated with alcohol or smashing any insects found. Notify Lindsey Dolinski of any specimines found.

Step 4: Submit a Survey123 form while standing at the detection point using the URL: https://arcg.is/TGy9z (or scan the QR code) *If no eggs or insects are detected, please still fill out the form for that point location and mark “clear, no detections”.