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INFORMATION BULLETIN ON SPOTTED LANTERNFLY (SLF)

19 August 2022

1. The intent of this updated bulletin is to provide current information about the spotted lanternfly (SLF) (*Lycorma delicatula*) and facilitate proactive management and communication among pest management, natural resource and other installation stakeholders, encouraging networking across installations currently or potentially impacted by this invasive insect.
2. The SLF is a highly invasive insect native from East Asia likely arriving in imported goods to the United States. First detected in Pennsylvania, this insect is rapidly spreading with detections occurring at military installations in the northeastern US and could easily be spread to the Midwest, Mid-Atlantic or Pacific Northwest. For current distribution, see: <https://nysipm.cornell.edu/environment/invasive-species-exotic-pests/spotted-lanternfly/>.
3. Immatures and adult SLF's prefer to feed on the invasive tree-of-heaven (ToH, *Ailanthus altissima*) but also feed on a wide range of high value crops and plants, including grapes, apples, hops, walnuts and hardwood trees. The insects pierce plant tissue and suck sap, which can cause stunted growth, reduced yields and even plant death. They also leave behind a sugary, sticky excrement called honeydew that attracts other insects, has a foul odor, and promotes sooty mold growth, which is slippery and damages anything underneath and near the infestation. Figures 3 and 4 show the SLF life cycle and adult photo, respectively.
4. Spotted lanternfly is an easily transported hitchhiking pest where adults and nymphs readily cling to clothing, cargo, automobiles, etc. in and near infested areas and have cryptic, well camouflaged overwintering eggs deposited on most surfaces, including landscaping, vehicles, cargo, household goods, construction material, etc.
5. **Issuances:** Per DoDI 4150.07, "DoD Pest Management Program," Components shall comply with regulations, including Executive Orders 13112 and 13751, requiring Federal agencies, subject to availability of appropriations, to use relevant programs and authorities to prevent the introduction of invasive species and detect and respond rapidly to and control populations of such species using IPM techniques.
6. Spotted lanternfly early detection and rapid response (EDRR) is critical. Detection and control requires cooperation between multiple installation stakeholders to include pest management, natural resources, ground maintenance, public affairs, transportation, aerial ports, logistics, security forces and operations. Integrated pest management efforts for SLF may include any or all of the following: surveys, egg mass scraping, sanitation, tree-of-heaven removal and treatment, herbicide and insecticide applications. In many cases, and depending on regional priorities, supplemental resources (e.g. tree surveys, pesticides, traps) may be available from the state or USDA APHIS.

7. There are a growing number of continually updated SLF resources including distribution, best management practices, and quarantine references available from Federal, State and academic sources. Some of these are listed later in this document.
8. While DoD is not required to follow specific state quarantine regulations, it is recommended that installations follow the "spirit" of these quarantines to reduce the risk of spread, especially for military materiel destined for SLF free areas.
9. What to do if your installation finds spotted lanternfly:
 - a. Due to the variability in state quarantine requirements, DoD does not currently have a uniform policy for addressing SLF. If SLF's are found on your installation, best advice is to follow your chain of command, and contact your state department of agriculture via the National Plant Board (<https://nationalplantboard.org/membership/>) who generally maintain SLF reporting procedures and/or the State USDA APHIS office (https://www.aphis.usda.gov/aphis/ourfocus/planthealth/ppq-program-overview/CT_SPHD). One or both of these offices may be able to provide advice on how best to proceed and may provide resources such as TOH surveys/treatments or SLF survey/treatments.
 - b. Since SLF quarantine operations require participation from multiple offices, affected installations must organize a response meeting attended by stakeholders listed in paragraph 6.
 - c. For installations that either have or do not yet have SLF, recommend that personnel working at commercial gates require drivers to show state SLF certificates/licensing when delivery trucks arrive from quarantined counties. Most states with quarantine restrictions require business owners and/or designees that move regulated articles (goods and vehicles) within or out of SLF quarantine areas to complete state SLF quarantine certification training with tests intended for business owners or designated employees (drivers). Businesses not based in the state, complete SLF permit training and testing for the state in which the business is based. Upon passing the SLF tests, the business owner or designated employee are expected to train other employees moving regulated articles within or out of the SLF Quarantine Areas.
 - d. For installations that are already located in a quarantined county and have confirmed SLF populations, it is extremely important that outbound materiel are inspected to limit SLF spread and any potential public relations, blame and mitigation expenses associated with spreading the pest to a previously SLF free area.
 - e. Quarantined states, often via state cooperative extension services or state departments of agriculture generally produce posters and informational trifold brochures containing surveillance, inspection, training / certification, identification and other biological information useful to installation tenants, visitors and reservists. If not, installation public affairs should be able to tailor the abundant state and federal SLF materials to meet installation and military needs to include visiting reservists. Posters and trifolds should be placed in guard stations, billeting, food courts, BX/PX and other high-visibility areas most likely to be seen by as many personnel as possible.

Gate guards and personnel working commercial entrances and shipping arrival areas and storage areas need to be especially vigilant and be able to inspect and recognize hitch-hiking SLT.

- f. The state will generally have mandatory training for vendors moving potentially infested materials. Transport risk varies by season and SLF lifecycle, but moving egg masses in fall, winter and spring and hitch-hiking adults in late summer and fall are the most common ways to transport SLF.
- g. Affected installations must develop customer advisories advising commercial shippers and cargo transportation entities on policy and procedures for inbound and outbound military materiel.
- h. Equipment, cargo and conveyances found in and around rail yards, seaports and outdoor storage areas are of particular concern. These areas are commonly located in and around disturbed natural areas where the preferred SLF host, tree-of-heaven are likely to be located.
- i. A few simple best management practices for units and individuals can help minimize the spread. These include not parking near vegetation, keeping windows rolled up, checking vehicles for hitchhikers, checking yourself and others getting into vehicles to make sure they are free of hitch-hiking SLF and so forth.
- j. It is highly recommended that installations in or near SLF quarantined areas coordinate efforts and learn from one another's experiences in how to handle and implement quarantine policies and procedures.

10. Basic Tree-of-Heaven (ToH - the preferred host) Management - Mention of trade names does not infer endorsement by the Department of Defense

Managing ToH as part of the overall SLF management effort is possible and highly recommended. The process is challenging and expensive. Control measures, vary by season, life state and location. Recommend SLF control measures focus on both the ToH preferred host and various SLF life-stages with emphasis on controlling the spread, particularly off installations to unaffected areas. Your state department of agriculture, cooperative extension service and local USDA APHIS office and personnel are often the best source of management and surveillance information on SLF and preferred host tree-of-heaven. For POC links, see paragraph 9a above. AFPMB wishes to acknowledge the timely ToH and SLF control recommendations provided by Matthew A. Travis, USDA APHIS PPQ Spotted Lanternfly Multi-State Coordinators, and Gregory R. Parra, Staff Scientist, USDA APHIS PPQ, Science and Technology.

Depending on the availability of local resources, state or USDA APHIS may have assets available to some military installations for ToH or SLF surveys and control. Various ToH control herbicide products / formulations and application timing and techniques (e.g. foliar, basal bark treatments, cut surface / hack and squirt) are described briefly below and can be found in linked publications below. For military installations (control, active duty or civil service), please coordinate with your senior pest management professional (see personnel list at end) to insure pesticides are approved for used and recorded as required.

TOH control is challenging. Treatment of ToH requires follow up monitoring for sprouting and seedlings for up to two years after herbicide application to ensure control. Control of female trees will reduce the seed bank and potential for spread by seed and allow the use of male trees for systemic insecticide treated “trap trees”. Note that determining male and female ToH can be difficult, especially with smaller trees. Treatment at non-optimal timing depending on the method can result in the death of above-ground portions but little to no control of roots, leading to resprouts or root suckering. A few notes on herbicide treatments below.

Herbicides are the most effective tool for controlling *A. altissima*, providing the quickest way to kill the root system and to prevent re-sprouting of cut trees. Timing of applications to optimize results from herbicide applications should be during the summer and early fall. Triclopyr and glyphosate are two herbicides that provide control of *A. altissima*. Imazapyr is also recommended for control of *A. altissima*. During the fall of the year, dicamba products provide better results than other products.

Late spring and early summer applications (April 15-June 1, Mid-Atlantic), when plant fluids are moving upwards to support new growth, may not be optimal. Application during the summer to early fall (June 1-September 15, Mid-Atlantic) is optimal. Fall to mid-winter applications (October-January) has provided poor results. Treatment recommendations specific to Pennsylvania encourage herbicide applications from July 1st until leaf color change in the fall (October).

Foliar application of trees. Foliar applications are useful for younger or low growing trees that can be covered with a spray application on fully expanded leaves. Foliar application is the most effective method on trees less than 10 feet tall, and for treating small infestations or isolated trees. Timing is critical and can limit this application. Applications from June to September provide the best results.

Hack-and-squirt applications or injection methods are very effective and minimizes sprouting and suckering when applied during the summer. Root suckering will be an increasing problem with applications made with this method in the fall, winter and spring.

Basal Bark Applications. The basal bark method is generally used for trees that are less than 6 inches in diameter. There is a difference of opinion on the tree diameter limit as research has shown that very large trees can be killed with basal bark applications. The application should be applied up to a height of 24 inches on the bark of the tree. Follow-up foliar herbicide application to basal sprouts and root suckers may be necessary. Besides Garlon, imazapyr (e.g., Chopper®, Stalker®) has been shown to be effective for basal bark control of *A. altissima*. This is sometimes used in a combination with triclopyr at a concentration of 15% Garlon® 4 and 5% Stalker® in 80% oil dilutant.

Although this treatment can be made at any time of year, applications during late winter/early spring (Feb to April) and during the summer have provided better results, with summer (June to September) being the most effective time. Dormant season applications during fall to mid-winter (Oct – Jan) have given poor results. Basal bark application are one of the easiest and most effective methods of control, and when used during optimum times can reduce the number of resprouts.

Cut stump application. Concentrated herbicide must be applied to the surface within 5 minutes of felling a tree. This method is likely to be most successful during the growing season, with diminishing success through the early fall. Dormant season applications may prevent resprouting from the stump itself, but will do little to inhibit root suckering. The mixture may be painted on with a paint brush or sprayed on using a spray bottle or backpack sprayer. As compared to other trees species, herbicide movement from *A. altissima* cut stumps to roots is not as great, resulting in shoots emerging from the roots following treatment.

A mixture of 20% Garlon® 4 plus 80% oil dilutant, may be used this for this treatment with the whole stump surface and sides to the ground being sprayed. Another option is to use Garlon® 3A at 100%, treating only the outer 1/3 of the stump surface. Follow-up with a foliar application the next year to control any stump sprouts or root suckers which emerge.

ToH control practices are likely to change as applicators gain experience as to best management practices. For more ToH control guidance, see your state department of agriculture, state cooperative extension service and see National Park Service's Plant Conservation Alliance document:

<https://safe.menlosecurity.com/doc/docview/viewer/docN3D9C448D1552d9aee33f03fa8ecbc72d9af356fb78c18fb821ac1c8ec0974d641ba7c3cfec4>

11. Basic Spotted Lanternfly Management

Like ToH management, managing SLF is challenging and expensive and varies by season and insect life stage. When practicable, all efforts should be made to control these pests on military installations with emphasis on controlling the off installation spread to unaffected areas. A SLF seasonal management chart is shown in Figure 1, followed by suggested integrated pest management / control tactics seasonally aimed at nymphs, adults and overwintering egg masses shown in Figure 2.

Insecticides are used to kill SLF when feeding on ToH or other host plants. Foliar applications of bifenthrin, β -cyfluthrin, carbaryl or other labeled insecticides using backpack or other low volume sprayers can be used to control nymphs and adults on infested trees or other substrates. Systemic insecticide applications to ToH (preferably male trees) using dinotefuran (soil drench, trunk spray or trunk injections, July to September) or imidacloprid (soil drench, after flowering to July or trunk injection July to September). Check state extension service for recommended dates and application methods. On installations where efforts to remove or reduce ToH stands are being conducted, save a few male (non-seed producing) trees to use as treated trap trees to attract and kill SLF nymph and adults. See: <https://extension.psu.edu/spotted-lanternfly-management-guide>

MANAGEMENT OPTIONS	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Don't move any life stage of SLF												
Scrape and destroy eggs												
Spray eggs with dormant rate of horticultural spray oil												
Use circle traps												
Contact insecticide applications (after hatch and avoid bloom)												
Systemic application of imidacloprid (after bloom)												
Systemic application of dinotefuran (after bloom)												

Figure 1. Management options for spotted lanternfly throughout the year. Reposted from [Penn State Cooperative Extension](#)

Method	Sub Method	Spray Targets	Chemical Options	Site Type	Population Density	Life Stage	Timing of Application (Months)	Treatment Frequency
Ground-based broadcast apps	Contact Sprayer (Insecticide)	Non-Specific Treeline, Structures	Bifenthrin, β -Cyfluthrin, <i>B. bassiana</i>	All	Moderate to high	Nymphs, Adults	Mid April to freeze	1 to 3X yearly
Mist Blower		Non-Specific Treeline	Bifenthrin, β -Cyfluthrin <i>B. bassiana</i>	Easily Accessible Areas, Transportation Corridors	Low to High	Nymphs, Adults	Mid April to freeze	1 to 3X yearly
Individual Tree trts	Contact Sprayer (Herbicide)	Ailanthus altissima	Triclopyr, Imazapyr, Metsulfuron-Methyl, Glyphosate	Limited Access	Low to High	N/A	Mid April to freeze	Once seasonally ₁
	Contact Sprayer (Insecticide)	Ailanthus altissima	Dinotefuran	Limited Access	Low	Nymphs, Adults	Mid April to ToH senescence	Once seasonally ₁
	Mechanical Removal	Ailanthus altissima	N/A	Limited Access	Low to High	N/A	All Year	Once seasonally ₁
Egg Mass Treatments	Scraping	N/A	N/A	All	Low to Moderate	Egg	Mid Sept to May	Once seasonally
	Contact Sprayer (Insecticide)	All Trees	Golden Pest Spray Oil	All	Moderate to high	Egg	Mid Sept to May	Once seasonally
Mass Trapping	Circle Traps Sticky bands	N/A	N/A	Generally Infested Area	High	Nymphs, Adults	Mid April to freeze	Weekly to monthly monitoring

Figure 2. Insecticidal and surveillance options for spotted lanternfly throughout the year. USDA APHIS PPQ guidance.

12. Please contact the AFPMB Environmental Biologist, Dr. Doug Burkett at douglas.a.burkett.civ@mail.mil or (301) 295-8304 for further information and questions.

Resources

Federal

United States Department of Agriculture (USDA) APHIS state offices
(https://www.aphis.usda.gov/aphis/ourfocus/planthealth/ppq-program-overview/CT_SPHD)

United States Department of Agriculture (USDA)
Animal and Plant Health Inspection Service: <https://www.aphis.usda.gov/aphis/resources/pests-diseases/hungry-pests/the-threat/spotted-lanternfly/spotted-lanternfly>

USDA – Useful printable pamphlet:
<https://www.aphis.usda.gov/hungrypests/slfbiz/slf-driver-checklist-eng-sp.pdf>

USDA-APHIS Environmental Assessments:
https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/sa_environmental_assessments/ct_slf

National Invasive Species Information Center:
<https://www.invasivespeciesinfo.gov/profile/spotted-lanternfly>

State

State Departments of Agriculture – POCs via National Plant Board
<https://nationalplantboard.org/membership/>

Connecticut
Connecticut Department of Energy and Environmental Protection:
https://www.ct.gov/deep/cwp/view.asp?a=2697&q=608416&deepNav_GID=1631

Delaware
Delaware Department of Agriculture: <https://agriculture.delaware.gov/plant-industries/spotted-lanternfly/>

Illinois
Illinois Department of Agriculture:
<https://www2.illinois.gov/sites/agr/Insects/Pests/Pages/Spotted-Lanternfly.aspx>

Indiana
Indiana Department of Natural Resources: <https://www.in.gov/dnr/entomolo/>

Kentucky
Office of the State Entomologist:
http://www.uky.edu/Ag/NurseryInspection/pests/spotted_lanternfly_info.html

Maryland
Maryland Department of Agriculture: <https://mda.maryland.gov/plants-pests/pages/spotted-lantern-fly.aspx>

Massachusetts

Massachusetts Department of Natural Resources:

<https://massnrc.org/pests/pestFAQsheets/spottedlanternfly.html>

Michigan

Michigan Department of Natural Resources: https://www.michigan.gov/dnr/0,4570,7-350-79136_79237_81077-476236--,00.html

Minnesota

Minnesota Department of Agriculture: <https://www.mda.state.mn.us/plants-insects/spotted-lanternfly>

New Jersey

New Jersey Department of Agriculture:

<https://www.nj.gov/agriculture/divisions/pi/prog/spottedlanternfly.html>

New York

New York Department of Environmental Conservation:

<http://www.dec.ny.gov/animals/113303.html>

Pennsylvania

Pennsylvania Department of Agriculture:

https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/Entomology/spotted_lanternfly/Pages/default.aspx

Virginia

Virginia Department of Agriculture and Consumer Services:

<https://www.vdacs.virginia.gov/plant-industry-services.shtml>

West Virginia

West Virginia Department of Agriculture:

https://agriculture.wv.gov/divisions/plantindustries/Documents/New%20Docs/spotted_lanternfly%201.pdf

Academia

Cornell University: <https://nysipm.cornell.edu/environment/invasive-species-exotic-pests/spotted-lanternfly/>

Pennsylvania State University Extension: <https://extension.psu.edu/spotted-lanternfly>

University of Maryland Extension: <https://extension.umd.edu/hgic/topics/spotted-lanternfly>

Virginia Cooperative Extension: <https://ext.vt.edu/agriculture/commercial-horticulture/spotted-lanternfly.html>

West Virginia University Extension: <https://extension.wvu.edu/lawn-gardening-pests/pests/spotted-lanternfly>

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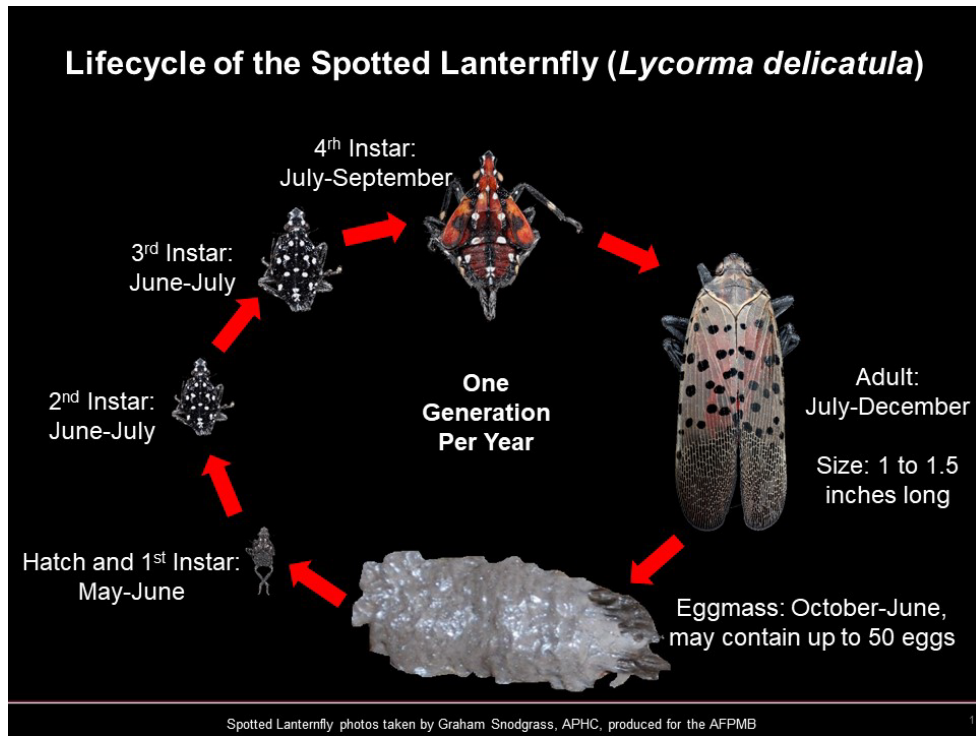


Figure 3. Spotted lanternfly lifecycle. G. Snodgrass



Figure 4. Spotted lanternfly adult measures about one inch. DA Burkett