



Spotted Lanternfly Management and Pesticide Safety

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Lycorma delicatula, commonly known as the spotted lanternfly (SLF), is an invasive insect pest present in Pennsylvania and some other eastern states. SLF threatens grape production and tree health, and it is a nuisance in landscapes.

Residents living in the infested area are using a variety of methods to control spotted lanternfly, including destroying egg masses (extension.psu.edu/how-to-remove-spotted-lanternfly-eggs), trapping them with sticky bands (extension.psu.edu/using-traps-for-spotted-lanternfly-management), eliminating one of their favorite host trees (extension.psu.edu/tree-of-heaven), or by using insecticides.

Avoid overreacting to the situation

The SLF quarantine enacted by the Pennsylvania Department of Agriculture (PDA) says property owners are responsible for controlling or eliminating SLF on their property. Residents should choose the least toxic management method that will work. Many people are fearful of SLF and worry it may affect the health of their trees. From observations in previous years, we believe that a few SLF feeding on a large, healthy tree are unlikely to cause permanent damage. On the other hand, thousands of SLF might weaken a tree, but to date, no one has quantified how many will harm a tree or how badly the tree will be affected. Consider destroying SLF on individual trees by trapping or swatting them instead of using a lot of insecticides.

If you decide to use an insecticide to kill SLF, there are some important safety measures and pesticide rules to follow. Before using any pesticide product, always read the label and be informed to be safe.

Only use registered insecticides to kill SLF

Recipes for homemade sprays made from cleaning, automotive, cooking, or other household products might be more harmful to the environment or your plants than people realize. Insecticides that are registered with the Environmental Protection Agency (EPA) have been tested for safety and efficacy. The label includes important information, including directions for safe mixing and use and precautions to protect pollinators and the environment.

In Pennsylvania, the site where you plan to use an insecticide must be listed on the product label. For example, if you want to spray an insecticide on an ornamental tree to kill SLF, the product label has to say that it is registered for use on ornamental trees. If you want to spray an insecticide on a grape vine to kill SLF, the product label has to say that it is registered for use on grapes. In Pennsylvania, the insecticide does not have to list SLF on the label to use it legally, but the site does have to be on the label.

You must use the rate and application method that corresponds with the site use.

Read the label and follow all directions

Plan to spend time reading the label. You can find labels for insecticides online and read them before you buy anything. Read the label, figure out how much of the product you will need to do the job, and then you will know how much you need to buy. Some labels are formatted as booklets that are taped onto the side of the product container. Peel back the tape and read all the information before using the insecticide. Use a highlighter to mark the specific directions for the way that you will use the product. This also makes it easier to go back and find the right section the next time you use it.

Protect pollinators

Avoid spraying plants that are flowering or are about to flower. Follow all the directions on the label to protect pollinators and other beneficial insects.

Protect streams, wetlands, and water sources

Be careful when using insecticides, so they do not contaminate our water resources or harm aquatic creatures. Follow all the label directions to be safe.



Some product labels are formatted as booklets that are taped onto the side of the product container. Peel back the tape and read all the information before using the insecticide.

Avoid using the same insecticide all the time

Some insects have developed resistance to specific insecticides that have been used repeatedly to kill them. When this happens, that insecticide has little effect on the insect. We have not seen resistance occur in SLF yet, but it is best to rotate between different groups of insecticides to reduce that risk (edis.ifas.ufl.edu/pi121).

Choose the least toxic insecticide that is effective

Results from scientific experiments have been compiled into lists of effective insecticide options for home gardeners (extension.psu.edu/spotted-lanternfly-management-for-homeowners), landscape professionals (extension.psu.edu/spotted-lanternfly-management-for-landscape-professionals), and commercial fruit (extension.psu.edu/updated-insecticide-recommendations-for-spotted-lanternfly-on-tree-fruit) and grape growers (extension.psu.edu/updated-insecticide-recommendations-for-spotted-lanternfly-on-grape). Experiments are being conducted to test additional insecticides for their usefulness against SLF.

Pesticide toxicity

How can you find out how toxic different insecticides are to humans or pets? You can check these three things:

1. Some insecticides that are lower in toxicity include a logo from the Organic Materials Review Institute (OMRI) on their label (www.omri.org). According to the website, OMRI is “an international nonprofit organization that determines which input products are allowed for use in organic production and processing. OMRI Listed® products are allowed for use in certified organic operations under the USDA National Organic Program.” If the insecticide you choose to control SLF has the OMRI logo on the label, you will know that a panel of experts have determined that it meets the standards for organic production.
2. Another way to compare toxicity between insecticides is to look for the signal word, which is required to be prominently displayed on the front of most insecticide product labels. Most insecticides have one of three signal words on the label. “Caution” appears on insecticides with lower mammalian toxicity. “Warning” appears on insecticides that have medium toxicity. “Danger” appears on insecti-

cides with the highest toxicity or greatest risk to eyes or skin. Some insecticide labels display “Danger Poison” and a skull and crossbones symbol because they are extremely toxic.

There are some insecticides with extremely low toxicity, and these are not even required to have a signal word on the label because they are classified as “reduced-risk” by the EPA. Some insecticides made from essential oils from plants are included in this category. So far two “reduced-risk” insecticides have effectively killed SLF in experiments by Penn State researchers (extension.psu.edu/spotted-lanternfly-management-for-homeowners).

3. The third piece of information you can look for is the amount of the insecticide that will kill 50 percent of a group of test animals, usually lab rats. This value is known as the lethal dose 50 (LD₅₀). Insecticides with high LD₅₀ values are less toxic; it takes more of the product to kill 50 percent of the rats. Insecticides with low LD₅₀ values are more toxic; it takes less of the product to kill 50 percent of the rats. You can find LD₅₀ values for many insecticides listed online by Penn State Extension (extension.psu.edu/toxicity-of-pesticides), or check the safety data sheet (SDS) for the product. The LD₅₀ values reflect the toxicity to mammals, but other factors should also be considered, such as potential effects on beneficial insects and water sources.

Protect yourself from insecticide exposure

When you use an insecticide, the risk depends on the toxicity and also on how much you are exposed to it. If you use a highly toxic pesticide, you can reduce your risk by limiting your exposure. If you use a less toxic pesticide but experience a high amount of exposure, your risk increases. Follow the label directions and use safe practices. Use appropriate, properly functioning application equipment. Wear the recommended protective clothing and gear. Wash your protective clothing separately from your other laundry (nasdonline.org/1749/d001727/pesticide-contaminated-clothing-laundrying.html).

Use the right amount

Using more than the labeled amount of an insecticide is not a good idea, and it is illegal. The goal is to effectively kill SLF and not release any more insecticide into the environment than necessary. Using more than what is listed on the label also wastes money.

Which insecticide you use depends on your unique situation and capability

If you decide to use an insecticide to control SLF, there are two types to choose from, contact and systemic insecticides. Be informed about how each type works to make the best choice for your situation.

Contact insecticides

Contact insecticides kill the insect when they contact the insect’s body. You can use a contact insecticide to kill clusters of SLF within a few hours or days. Less toxic contact insecticides require thorough coverage of the insect’s body and tend to work for a short period. Other contact insecticides persist longer in the environment and can kill SLF that move into the area even after the spray has dried. These persistent contact insecticides tend to be more toxic.

Contact insecticides are usually sprayed onto SLF nymphs or adults that are feeding on trees or other plants. How many will be killed depends on how thoroughly you can cover them or the part of the plant where they are feeding. What kind of spray equipment will you use? Spray bottles and pressurized tank sprayers with wands are useful for SLF that you can reach. Avoid using ladders to reach higher into trees. If you decide you need to reach high areas, consider hiring a qualified professional to do the job (extension.psu.edu/choosing-a-qualified-pest-management-or-lawn-care-company).

When SLF are sprayed, they often jump to get away from the spray. Protect yourself. Consider wearing additional protective clothing and a face shield to prevent sprayed insects from contacting your skin.

Systemic insecticides

Systemic insecticides are absorbed into the roots or bark of the tree and move through the tree. When SLF feeds on a tree that contains a toxic level of systemic insecticide, they will die. You can use a systemic insecticide to provide weeks or months of protection for important trees. The longevity of the effectiveness will vary depending on which product was used, how much was applied, what time of year the application was made, and environmental factors.

Several systemic insecticides are available. You do not need to have a pesticide applicator’s license to purchase many systemic insecticides, but in some cases, small amounts that are affordable for home gardeners are not available. Currently, the systemic insecticides that are recommended to protect trees

from SLF contain either imidacloprid or dinotefuran as their active ingredient. The active ingredient is the part of the pesticide that kills the pest.

Do the math. Success with systemic insecticides depends on following the directions on the product's label. There are different application methods to treat trees, but not all methods are used with every systemic insecticide product. Read the label first to decide which method you will use. Before you apply a systemic insecticide, you must measure the tree(s), and calculate the amount of product to use AND the amount of water to use for the application. Have someone double-check your math to make sure it is right. You do not want your application to fail because of a math error.

If you want to protect your trees with a systemic insecticide but do not have the ability or equipment to do the treatment, consider hiring a qualified professional to do the job (extension.psu.edu/choosing-a-qualified-pest-management-or-lawn-care-company).

The most commonly used methods for applying systemic insecticides to trees are:

- **Soil drench**—Pour a solution containing the insecticide into the soil around the base of the tree.
- **Soil injection**—Use proper equipment designed to inject the soil around the base of the tree with a concentrated solution of insecticide.
- **Trunk spray**—Spray the bark of the tree trunk, and the insecticide will penetrate the bark and move into the tree.
- **Trunk injection**—Use proper equipment designed to

inject the base of the trunks of trees with a concentrated solution of the insecticide.

People who want to effectively and safely kill SLF with insecticides must carefully follow directions and plan ahead. Every situation is different; no one method will work for everyone. Remember, all insecticides present safety risks, and you need to use them carefully.

Call the Penn State spotted lanternfly hotline at 1-888-4BAD-FLY (1-888-422-3359) with questions about spotted lanternfly management or to report a sighting. You may also report a spotted lanternfly sighting on our spotted lanternfly website (extension.psu.edu/have-you-seen-a-spotted-lanternfly).

For more information about the spotted lanternfly

Penn State Extension Spotted Lanternfly website:
extension.psu.edu/spotted-lanternfly

PA Department of Agriculture Spotted Lanternfly website:
www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/Entomology/spotted_lanternfly/Pages/default.aspx

USDA Spotted Lanternfly website:
www.aphis.usda.gov/aphis/resources/pests-diseases/hungry-pests/slf/spotted-lanternfly

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