Guidelines for the Control of Spotted Lanternfly

THE GUIDELINES BELOW ARE DESIGNED FOR CORTROL OF SPOTTED LANTERNFLY AND TREE OF HEAVEN AND REFERENCE THE USE OF PESTICIDES. WHEN USING ANY PESTICIDE, READ THE PESTICIDE LABEL FOR DIRECTIONS, APPLICATION RATES, APPLICATION METHODS, AND APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT. THESE GUIDELINES DO NOT CONSTITUE AN ENDORSEMENT OF ANY PRODUCT OR PESTICIDE PRODUCER. THE PESTICIDES REFERENCED HAVE NOT BEEN TESTED ON SPOTTED LANTERNFLY, SPECIFICALLY AND THEIR EFFICACY AGAINST THIS PEST IS UNKNOW.

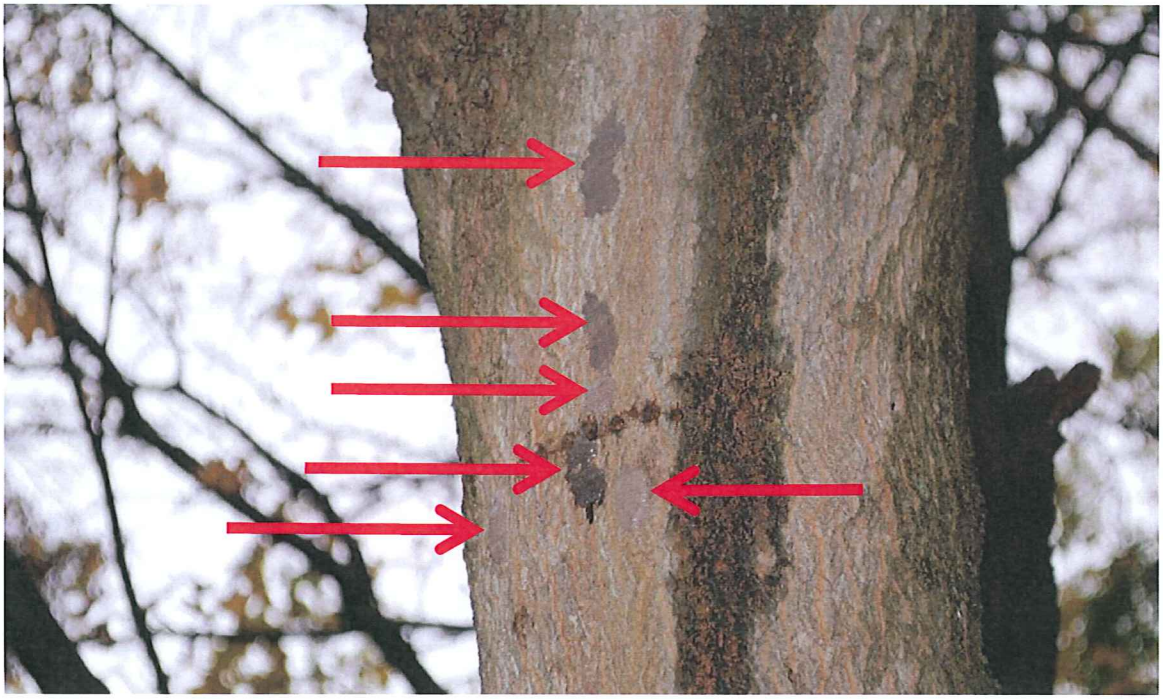
Property owners can help contain and control spotted lanternfly (SLF) by implementing a management strategy using a combination of mechanical control, host reduction, and chemical control. These guidelines have been developed for use by the Pennsylvania Department of Agriculture (PDA) Spotted Lanternfly Eradication Program. The guidelines target SLF at different stages of its lifecycle, and may lead to dramatic reduction in SLF populations where implemented.

Mechanical Control: October - July

Mechanical control includes egg mass scraping and tree banding.

Egg Mass Scraping:

SLF adults lay eggs starting in October and will continue to lay eggs through the first few hard frosts. SFL eggs are laid on many surfaces including trees, rocks, and manmade objects which are stored outside. Egg masses contain an average of 30-50 individual eggs, and are covered with wax. The wax, when it is first deposited, is light gray, but it takes on the appearance of mud as it dries. Property owners can scrape egg masses whenever encountered. This can be done using any hard or rigid tool such as a stick, a putty knife, or credit card. It is unknown if eggs scraped onto the ground can survive, so the best advice is to scrape egg masses in a downward direction into a container with rubbing alcohol or hand sanitizer.



Arrows indicating location of spotted lanternfly egg masses on a tree

Tree Banding:
SLF nymphs emerge from the egg masses in early May and pass through four nymph stages. The nymphs crawl up and down trees to feed each day. Though the nymphs can be found on many types of plants, they strongly prefer tree of heaven (*Ailanthus altissima*) and banding these trees with an adhesive trap is effective in capturing the first three nymphal stages. The PDA Spotted Lanternfly Eradication Program can supply volunteers with tree bands for their property. Bands can also be purchased from private vendors. Research from Korea indicates that brown colored adhesive bands are most effective. Starting at the end of April bands should be placed on tree of heaven that are at least six inches wide at chest height. The adhesive portion of the tree band should be facing away from the tree surface and cut so that the edges of the band overlap each other by an inch. Push pins can be used to help secure the band. Bands should be replaced every two weeks until the last few weeks of July.

Spotted lanternfly nymphs captured on a tree band

Host Tree Reduction: All Year

NOTE: PDA DOES NOT RECOMMEND TREE OF HEAVEN REMOVAL UNLESS ACCOMPANIED WITH AN HERBICIDE APPLICATION

Although SLF will feed on other trees and plants, all life stages strongly prefer tree of heaven, and adult SLF seem to require a meal from these trees prior to laying eggs. This provides an opportunity to concentrate the SLF population on a property by performing host tree reduction. This method involves removal or killing of most tree of heaven on an infested property while leaving a few to serve as trap trees.

Tree of Heaven Control Methods:
Control of tree of heaven requires suppression of the regenerating root system of this species. Because of this, many tree of heaven infestations require multiple treatments to control a population with continued monitoring for regrowth. Various methods of treatment may have to be utilized for complete control. Establishing a native or non-invasive groundcover may help in control of sprouts and seedlings following herbicide treatments.

Foliar sprays:
A foliar spray with a recommended herbicide is the most common control for tree of heaven. The spray should cover the leaves and shoots that are at an attainable height. Foliar sprays are effective for control of sprouts and suckers, and are best if used with a surfactant to obtain better coverage and absorption into the leaves. Optimal time for treatment with a foliar spray is June to September.

Basal bark spray:
Basal bark sprays can be an effective means of control for young tree of heaven that are less than four inches in diameter. Spray the recommended herbicide with an oil carrier on the lower twelve to eighteen inches of the stem, until the bark is wet, but not running off. This treatment works well for control of smaller trees in summer and late winter, as it chemically girdles the stem where applied.

Stump treatments:
Applying a recommended herbicide to a freshly cut stump is **essential** to deter sprouting and suckering. Herbicide treatment should be made immediately after the cut so that it may be absorbed into the roots. This method works best during the active growing season of the tree from June through September.

Hack and Squirt:
Hack and squirt treatment is an effective treatment for control of tree of heaven and is made by making a series of downward cuts into the bark with an axe or machete. The cuts which form small cups and are approximately chest height are made evenly around the tree. Herbicide is then applied to each cut where it is taken up into the tree. Hack and squirt does not girdle the stem as there is spacing between the cuts, which allows the herbicide to be transported through the trees conductive system. Best results occur during the June to September growing season.

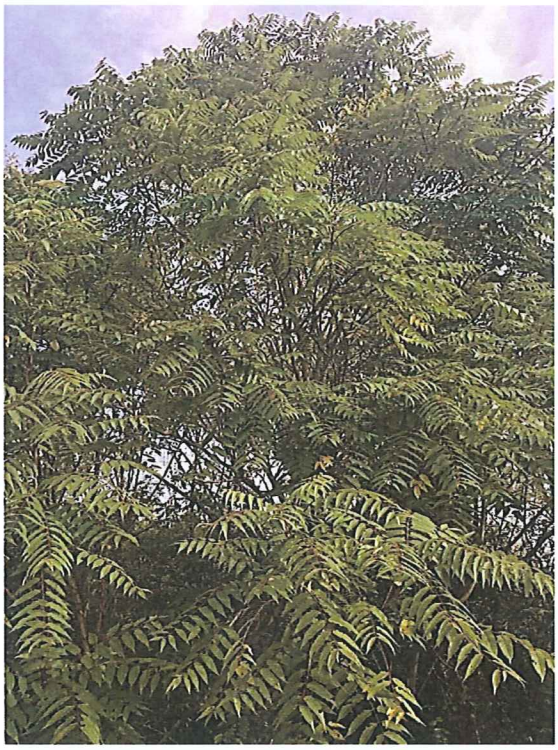
Tree treated with hack and squirt method

Chemical Control: Mid-May through August

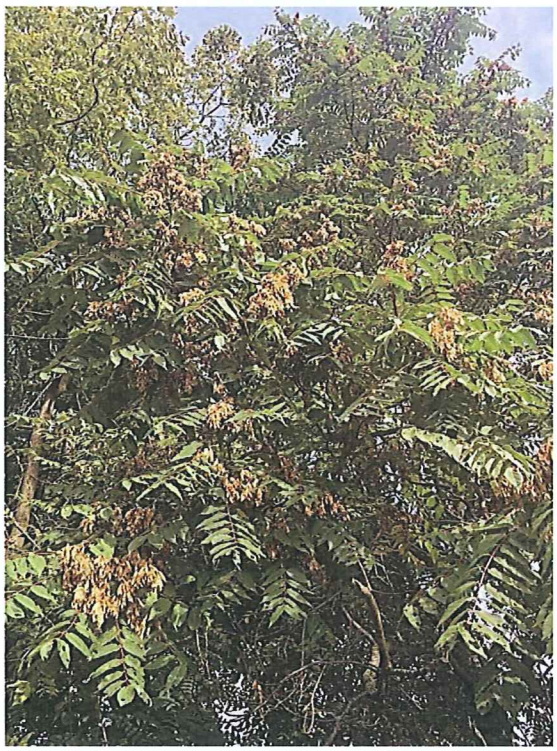
Though many insecticides appear to be effective against SLF, it is difficult to deliver the insecticide to the pest throughout much of their life cycle. Many of the egg masses are deposited in hidden protected areas, and research from Kutztown University has shown that nymphs spread out and can be found almost anywhere on a property through the last nymphal instar. Starting around mid-July late instars and adults start to actively seek tree of heaven. It is at this point in their life cycle that a property manager can concentrate the population and deliver an effective insecticide application. This tactic is also known as an "attract and kill" approach. It is recommended that host tree reduction is done in conjunction with insecticide application.

Trap Trees:

Due to the fact adult SLF must feed on tree of heaven starting in mid-July, an effective method for the delivery of insecticide to SLF on a property is the establishment of trap trees. Trap trees are created by leaving a small number of live tree of heaven on a property after host tree reduction has been done. Because most tree of heaven have been removed, when the late instar and adult SLF start looking for tree of heaven to feed on, they are only left with the trap trees as an option. Ideal trap trees should be at least 10 inches wide, and be male trees. Tree of heaven has both male and female trees. Male trees are preferred as trap trees because the females produce seed which can repopulate the property.



Male tree of heaven without seeds



Female tree of heaven with seeds

Control of SLF is achieved by treating the trap trees with a systemic insecticide. No efficacy data currently exists for any of the available systemic insecticides. PDA has elected to use a bark spray application of Dinotefuran due to the targeted application method and active ingredient delivery mechanism (Insects must feed on tree of heaven to be exposed). Because very few other organisms

feed on tree of heaven, exposure of non-target organisms is kept to a minimum. The insecticide is applied prior to the SLF becoming adults from mid-May through August. New adult SLF seek out the trap trees, feed on them, and this results in mortality. Currently the number of trap trees needed per property has not been determined. The application of insecticide to the trap trees will need to be repeated each year until no SLF are detected on a property.

Spotted lanternfly adults attracted to trap trees and killed by systemic insecticide