

Spotted Lanternfly

Management Guide

A Reference for Protecting Trees and Properties





PHOTO: Adobe Stock, Licensed with Permission

This new pest caught both homeowners and professionals by surprise when it first appeared in the United States

SPOTTED LANTERNFLY

A Sticky Situation

In the spring of 2015, arborists in eastern Pennsylvania first began getting calls about a new pest on their client's trees and they didn't know what to think. Alarmed homeowners were saying that a strange but curiously beautiful creature was congregating by the dozens or even hundreds on the trunks of their trees. While this new pest attacked many different types of plants, it seemed to have a preference for Tree-of-Heaven (*Ailanthus altissima*) trees. Admittedly, most calls tree and landscape professionals get regarding Tree-of-Heaven are for removing them, not for protecting them.

To make matters worse, the property owners were reporting a sticky mess covering everything under the trees - from patio furniture, to pool decks, to garages, it was as though someone had attacked their yard with a spray bottle filled with maple syrup. It was clear this was going to be a new kind of tree problem.

New Research Needed

Rainbow Treecare Scientific Advancements has since conducted numerous field research trials across the east coast and performed in-depth data analysis in order to develop a new management protocol.

We partnered with universities and industry scientists to look at application methods, active ingredients, timing, rates, and how best to improve operational efficiencies. The recommendations included in this guide represent the latest in scientific research and practical experience for controlling this difficult-to-manage pest. We continue to do research and will keep you informed on the latest and best management practices.

RAINBOW'S SPOTTED LANTERNFLY RESEARCH PARTNERS:†

Lehigh Agricultural & Biological Services, Inc.



PennState



**PennState
Extension**



pennsylvania
DEPARTMENT OF AGRICULTURE



OVERVIEW

An Invasive Pest

Native to China, India, and Vietnam, the spotted lanternfly (*Lycorma delicatula*) was introduced to the Eastern United States in September 2014. Since that time, the insect has spread from Pennsylvania to New Jersey to Delaware to Virginia and is believed to still be on the move.

Within the insect's native range, predators and natural population checks such as pathogens keep the spotted lanternfly from being a marquee tree pest. In the US, however, the lack of these checks as well as an abundance of preferred host plants have allowed populations of spotted lanternfly to reach unprecedented levels. This has led to significant damage to trees, a growing threat to agricultural crops and a nuisance in the landscape.



The spotted lanternfly is native to Asia and was introduced to the US in 2014



PHOTO: Adobe Stock, Licensed with Permission

Sticky wrap traps can quickly fill with unsightly spotted lanternfly adults and nymphs as they attack the tree

A Nuisance to People

Along with the physical damage these insects cause, they secrete a sticky substance (called 'honeydew'), which spreads over anything underneath the attacked tree. Surfaces covered by the honeydew will subsequently be covered in a black sooty mold, resulting in a dirty appearance to patio furniture and other infrastructure as the mold grows.

In addition, the adults will disrupt outdoor activities as masses of the insects fly through an area.



PHOTO: Barbra Bowen, Penn State Uni.

Stickiness and sooty mold are common occurrence under trees attacked by spotted lanternfly

Threat to Trees and Crops

Adults and nymphs feed by sucking sap from the leaves and stems of their host plants. This feeding creates oozing wounds and leaves a foul odor. Weakened plants are open to attack from other pests and diseases, which can further stress or kill the plant. On Tree-of-Heaven, its preferred host, trees can die within 2-4 years after initial attack.

Most trees are able to withstand small groups of spotted lanternfly feeding, but populations quickly build to the point where an individual tree can easily be covered by hundreds or thousands of insects. When the insects have depleted enough sap from the tree that the pressure drops to the point where it no longer sustains them, the insect move on to another tree.

Once thought to be a pest of only the ailanthus tree, it is now clear that spotted lanternfly has a wide host range that includes many high value economic crops as well as ornamental trees.

Known Hosts Include:

- Tree-of-Heaven
- Red Maple
- Black Walnut
- Grapes
- Hops
- More than 70+

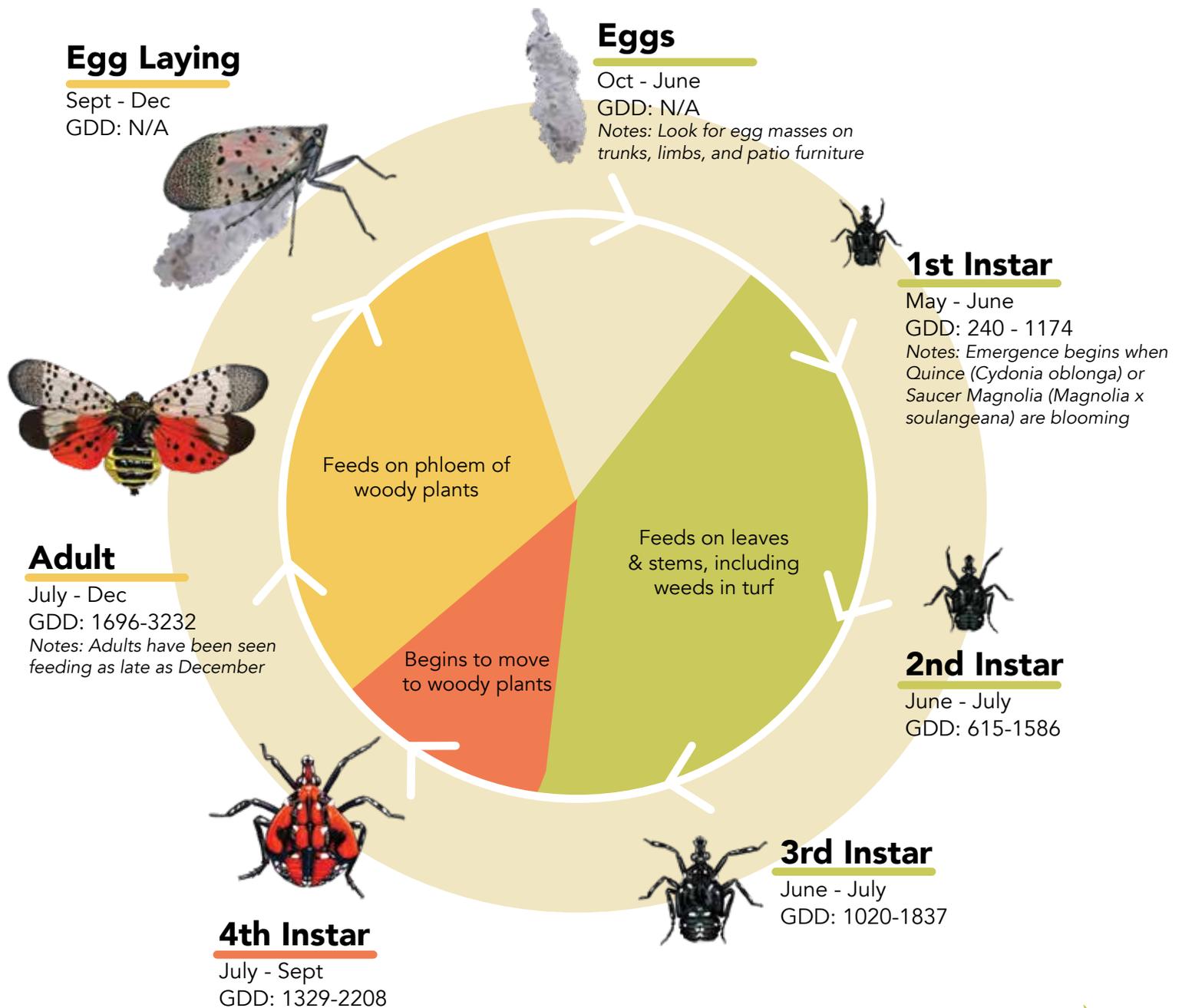


PHOTO: Adobe Stock, Licensed with Permission

Spotted lanternfly feeding on a peach tree

Biology and Life Cycle

Knowing the life cycle is important. It determines where you will find the pest during different times of the season. As the insect develops, it prefers different plants. You can use Growing Degree Days (GDD) as a guideline for spotted lanternfly development to help determine where and when treatments should be targeted.



QUICK-REFERENCE

GLOSSARY OF TERMS

Instar

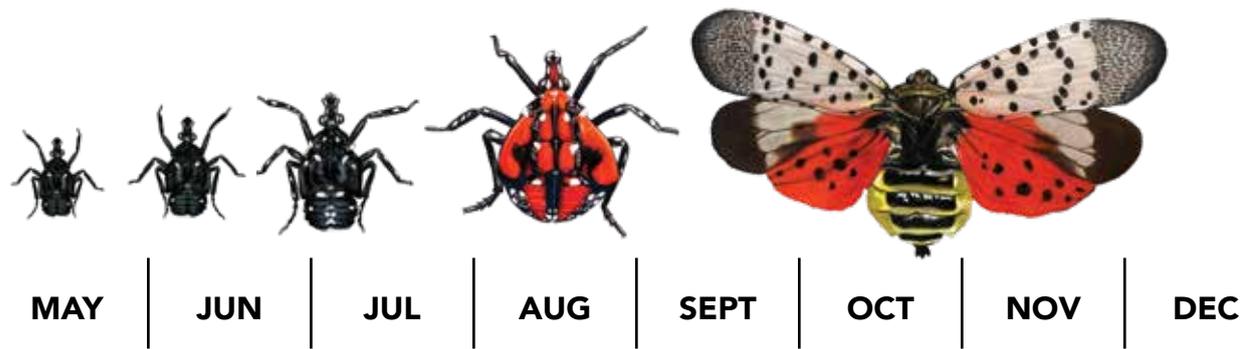
Insects molt their exoskeleton to get larger. The time between molting is known as an instar.

Growing Degree Days (GDD)

GDD measures 'accumulated heat' for the season and is used to predict when certain phenomena like egg hatching or instars are likely to occur. Contact your local Extension service for GDD info in your area.

A Seasonal Diet

Spotted lanternfly is an opportunistic feeder that attacks just about any plant species available. However, it does have certain species that it prefers to feed on if they are present. As spotted lanternfly goes through the various stages of their lives, their feeding habits change. Early in the season, they are commonly found on understory plants, feeding on the soft stems and leaves of rose, grapes, and even weeds in the yard. As they progress into their Fourth Instar and Adult phases, they prefer to feed on woody trunks and branches, sucking the sap directly out of the phloem with their piercing mouthparts. As fall progresses, adults shift their feeding to the tree species that are last to senesce for the year.



Preferred Hosts:

- Roses
- Grapes
- Weeds
- Sumac
- Tree-of-Heaven

Preferred Hosts:

- Tree-of-Heaven
- Walnut
- Birch
- Willow

Preferred Hosts:

- Tree-of-Heaven
- Walnut
- Birch
- Willow
- Silver Maple
- Red Maple

Additional Known Hosts:

- Apples
- Plums
- Cherries
- Peaches
- Nectarines
- Apricots
- Almonds
- Pine
- Oak
- Hops
- Poplar
- Sycamore
- Hickory
- Elm
- Japanese Snowbell
- Tulip Poplar
- Ash
- Dogwood
- Others



PHOTO: Virginia Tech Dept. of Forestry

FURTHER RESEARCH NEEDED

Spotted Lanternfly & Tree-of-Heaven

While the exact relationship between spotted lanternfly and Tree-of-Heaven remains unclear, it appears that there is a connection. Some studies have suggested the spotted lanternfly requires the Tree-of-Heaven tree to complete their life cycle, while other studies suggest the tree is just a preference, not a requirement. Regardless, field experience has shown that removing Tree-of-Heaven can significantly reduce the presence of the insects on a property.

Management Distinctions

There are different management approaches depending on the time of year. Understanding the life cycle of the insect and the different vegetation that they attack at different times can be crucial for establishing a predictable spotted lanternfly control plan.

APRIL - JULY



Reducing Populations

Scraping egg masses from trunks and branches is beneficial for reducing spotted lanternfly. This can be a tedious and time-consuming effort. In addition, the egg masses can be high up in the canopy making them inaccessible for scraping.

Early in the season, spotted lanternfly nymphs are feeding on weeds, shrubs, and understory plants. Look for insects on roses, grapes, sumac, and Tree-of-Heaven, then target populations with a contact insecticide (see Page 10) to control these first instars and help reduce the number of feeding adults later in the season.



Removing egg masses may help reduce local populations, but can be a time-consuming task



1st-3rd instars are commonly found feeding on roses, grapes, and understory plants



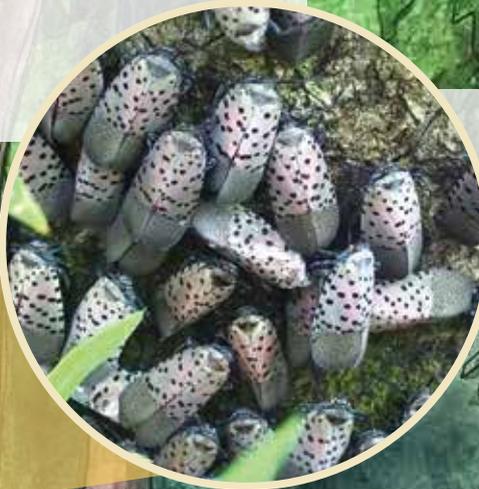
JULY - NOV



Reducing Honeydew

As the insects begin to move to woody plants and trees, the honeydew and swarms of insects on the trees become a significant issue.

Treat susceptible trees with a systemic bark spray application of **Transtect** (see Page 10) for rapid and long lasting control. Use **Transtect Infusible** or **Xytect 10%** for trees requiring an injection application. A cover spray of contact insecticide may be warranted in high-infestation situations.



Spotted lanternfly adults congregate in large swarms on trunks and branches of susceptible tree species

Removing Tree-of-Heaven

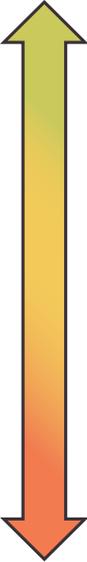
Eliminating Tree-of-Heaven trees can reduce the impact of spotted lanternfly, but it is a difficult tree to remove as the stumps are prone to suckering into new trees. It is recommended to treat fresh-cut stumps with Sightline™ (triclopyr) herbicide to avoid the proliferation of more Tree-of-Heaven trees.



Treat fresh cut stumps with herbicide to prevent sprouting

Working with Clients

A successful spotted lanternfly management program might look very different depending on the type of property, the location and prevalence of susceptible trees, and the client's own comfort level with the damage or nuisance that occurs. Here are some tips for determining the best way to manage different clients and properties:



High Tolerance *Client or property is not affected by the presence of insects or the accumulation of sticky honeydew. Focus is on protecting high value trees.*

Med Tolerance *The property has trees or areas that require protection, but the client does not want or need every susceptible tree in every area treated.*

Low Tolerance *Client is highly adverse to seeing masses of insects and/or the stickiness of the honeydew is unacceptable around the property.*

GAUGING THE CLIENTS' TOLERANCE

With many tree health treatments, the goal is to save the tree, thus the conversations with the tree owner are often around the value of the tree compared to the cost of treatment and/or removal. As spotted lanternfly treatments are more about reducing a nuisance than saving valuable trees, it is important to establish the client's relative tolerance level to determine the best management plan.

Example questions that can help you gauge tolerance:

- How bothered are you (or your spouse, or your property managers) by the sight of the insects?
- What areas on your property have the highest pedestrian traffic or use?
- Are there areas where honeydew is unacceptable such as decks, sidewalks, or parking lots?

Residential Property

A homeowner may be the most sensitive client when it comes to masses of swarming insects and the resulting stickiness on items below. Homeowners want to be able to enjoy their outdoor activities without the nuisance created by spotted lanternfly.

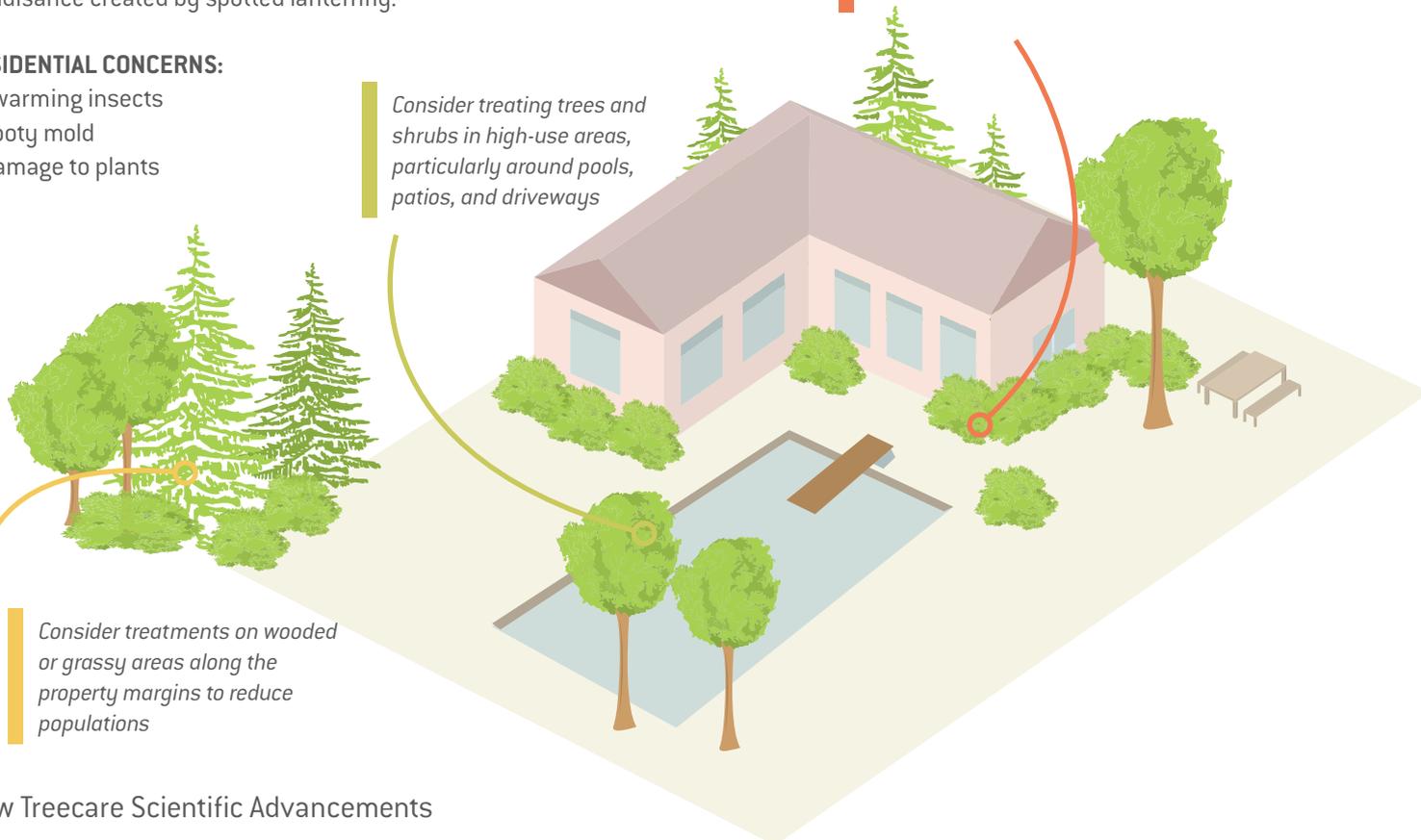
Treat for nymphs with foliar sprays in spring-early summer. Protect larger trees with bark spray treatments in the summer

RESIDENTIAL CONCERNS:

- Swarming insects
- Sooty mold
- Damage to plants

Consider treating trees and shrubs in high-use areas, particularly around pools, patios, and driveways

Consider treatments on wooded or grassy areas along the property margins to reduce populations



Homeowner Association

Associations can be tricky clients to navigate as there are many different expectations to manage. Often the property managers, Board of Directors, and, of course, the homeowners all have their own version of 'the right way.' It can be a challenge to communicate, educate, and set specific outcomes. It is important to learn not just what your contact person's tolerance level is, but where the other stakeholders fall on the spectrum as well.

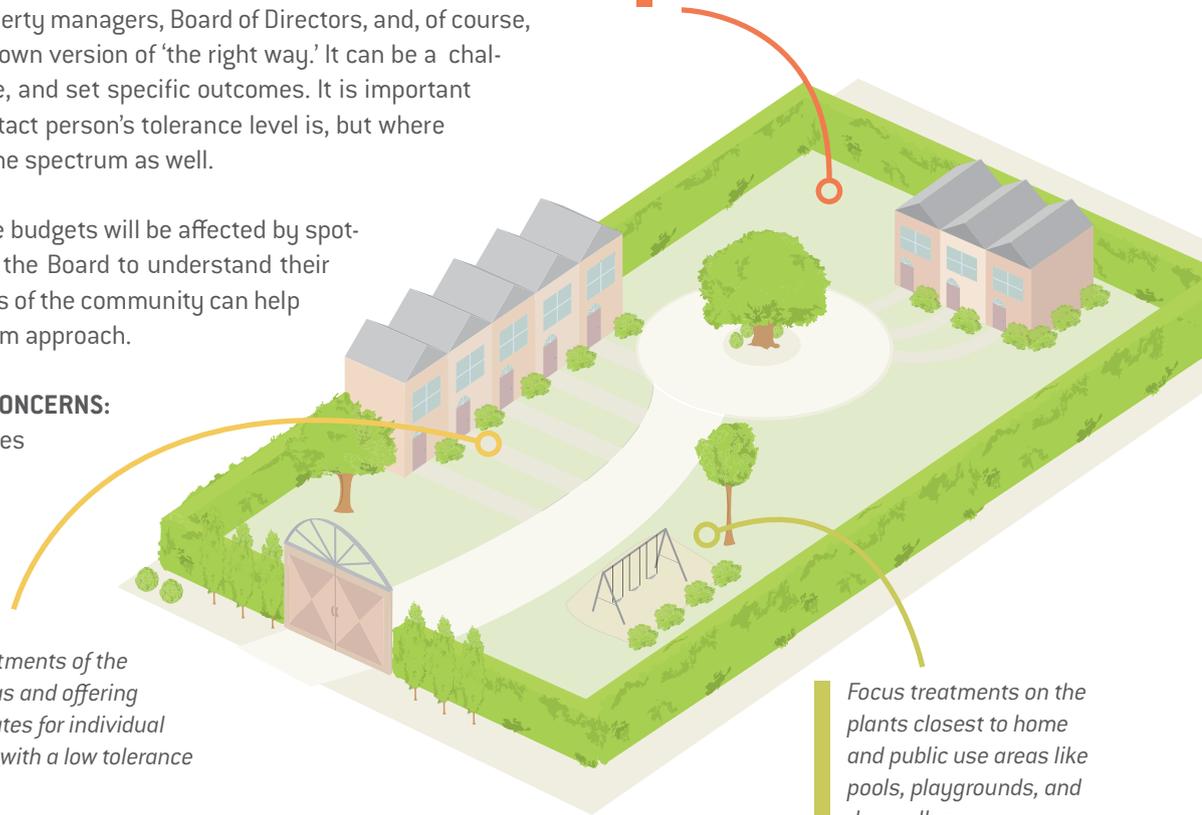
Annual landscape maintenance budgets will be affected by spotted lanternfly. Partnering with the Board to understand their planning process and the needs of the community can help establish a successful, long term approach.

HOMEOWNER ASSOCIATION CONCERNS:

- Protecting communal spaces
- Maintaining uniformity
- Predictable budgeting

Consider treatments of the common areas and offering discounted rates for individual homeowners with a low tolerance

Remove all Tree-of-Heaven from the property. Begin foliar treatments in late spring and continue to monitor high-traffic areas for infestations



Focus treatments on the plants closest to home and public use areas like pools, playgrounds, and dog walk zones

Commercial Property

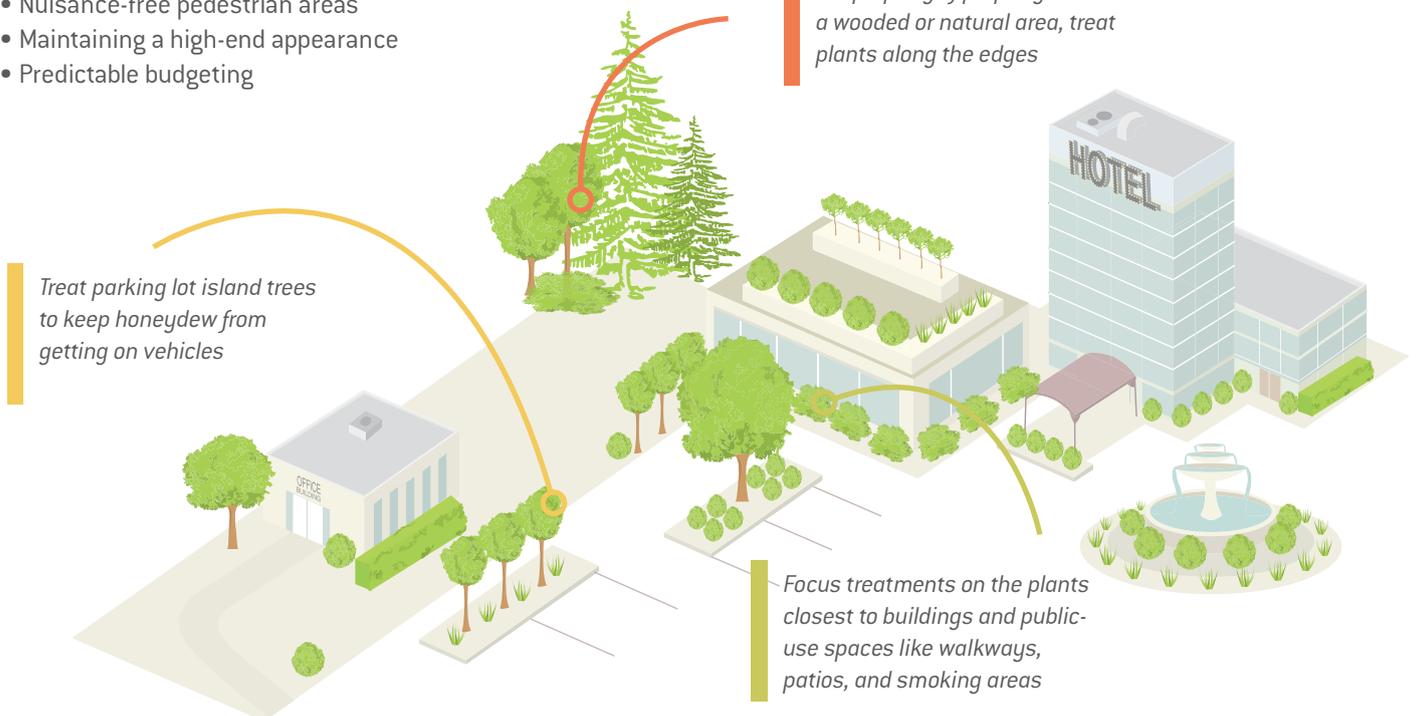
Whether it is a retail space or a Class A business park, the goals of spotted lanternfly management on a commercial property will differ from the plan around residential areas. The plan may focus more on eliminating the nuisance of the insects and honeydew from high-traffic areas rather than the protection of an individual tree. Trees lining walkways, trees and shrubs near buildings, and trees in parking lot islands should be considered for treatment.

COMMERCIAL PROPERTY CONCERNS:

- Nuisance-free pedestrian areas
- Maintaining a high-end appearance
- Predictable budgeting

Treat parking lot island trees to keep honeydew from getting on vehicles

Remove all Tree-of-Heaven from the property. If property borders a wooded or natural area, treat plants along the edges



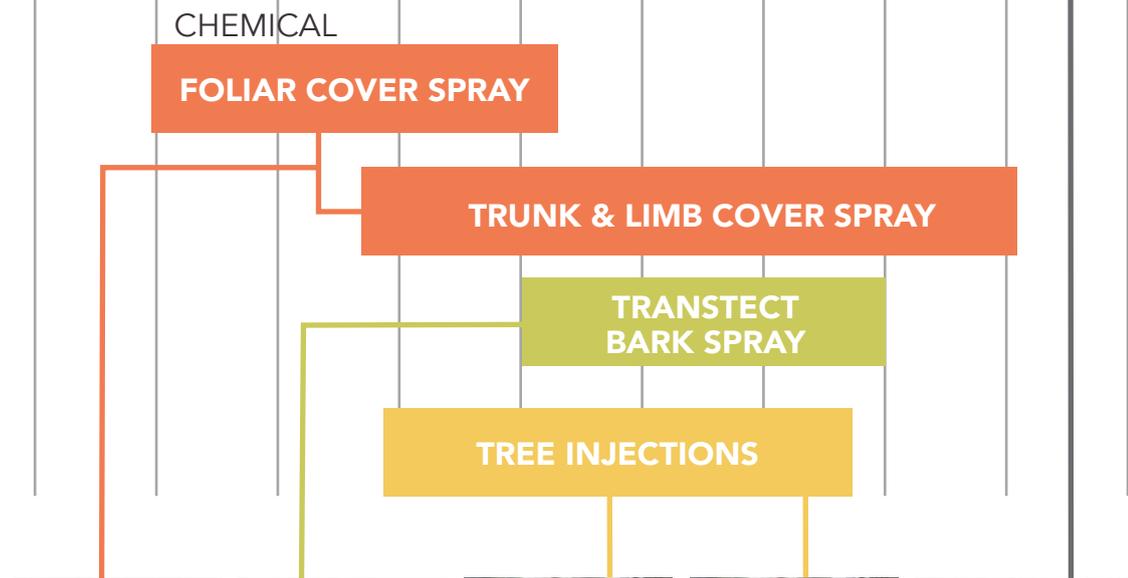
Focus treatments on the plants closest to buildings and public-use spaces like walkways, patios, and smoking areas

Treatment Plan

Effective management of spotted lanternfly is a multi-pronged approach with physical, environmental, and chemical control measures. When used in conjunction with monitoring and understanding the clients tolerances (see Page 8-9), a treatment schedule can be established.



JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
PHYSICAL											
SCRAPE EGGS			STICKY BAND TRAPS						SCRAPE EGGS		
ENVIRONMENTAL											
REMOVE TREE-OF-HEAVEN AND OTHER SUSCEPTIBLE SPECIES											



BIFEN XTS



Transtect™



**Transtect™
Infusible**



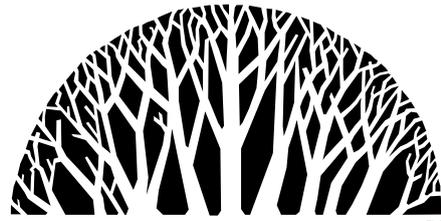
Xytect 10%



SIGHTLINE

A.I.	Bifenthrin 23.4%	Dinotefuran 70%	Dinotefuran 22.5%	Imidacloprid 10%	Triclopyr 61.6%
Application	Spray	Systemic Bark Spray	Micro-Injection	Micro-Injection	Spray/Paint-on
Situations for Use	Target nymphs feeding on foliage Trunk & limb spray for quick kill of adults	Fast control Long-lasting protection Best choice for trees	Areas near water ways or wells Option for staying within lbs/acre limits of other treatments	Areas near water ways or wells Option for staying within lbs/acre limits of other treatments	Prevent Tree-of-Heaven stumps from sprouting into new trees

When managing flowering plants, use insecticides that minimize the impact to pollinators.

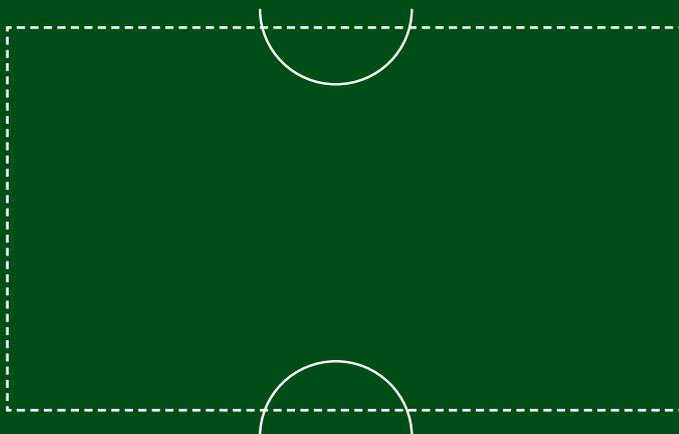


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Rainbow Treecare Scientific Advancements is an employee-owned company founded in science. Our mission is to bring proven products with predictable results to the plant healthcare market. Partnering with our sister companies, **Rainbow Treecare, Rainbow Lawncare, and Rainbow Pest Experts**, gives us a unique position of combining 40 years of practical operational experience with cutting edge research and development.



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