

Christmas Tree Promotion Board

Final Research Report

CTPB Project Number: 19-07-PSU

Project Title: Spotted Lanternfly: A New Exotic Pest Threatening the Mid-Atlantic Christmas Tree Market

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Institution: Penn State University

Final Report

1. Technical report – A comprehensive technical report to include Introduction, Methods, Results, Discussion, Tables, and Figures.

INTRODUCTION

Spotted Lanternfly (SLF), (*Lycorma delicatula*) is a new invasive planthopper native to China, India, and Vietnam (Figure 1). It was first discovered in Berks County, Pennsylvania in 2014 and has since spread to much of the Commonwealth, and counties beyond the original quarantine zone (Figure 2). This insect has the potential to greatly impact agricultural crops such as grapes, tree-fruit, hops, nursery industries, and hardwoods, which collectively are worth nearly \$18 billion to the Pennsylvania's economy. It is also reducing the quality of life for people living in heavily infested areas.

SLF attacks a wide variety of woody plants, using its piercing-sucking mouthparts to feed on the sap in trunks, branches, twigs and leaves. These oozing wounds will leave a greyish or black trail along the bark of the plant. As it digests the sap, the insect excretes a substance known as honeydew that, along with sap from these weeping wounds, can attract bees and other insects. There may be a buildup of this sticky fluid on infested plants and on the ground below. The honeydew and sap also provide a medium for growth of fungi, such as sooty mold, which can cover leaf surfaces and stunt growth. Plants with heavy infestations may not survive.

Limited research-based information is available relating to adult SLF direct feeding and egg laying on common eastern U.S. Christmas tree species, as this is a relatively new pest. Additional information is also needed to understand the fate of SLF egg masses that may hitchhike into consumer homes on the trunks of cut trees during the display season. Anecdotal evidence and Christmas tree grower experience suggest that adult spotted lanternflies do not appear to feed on conifer species commonly used for cut Christmas trees. These species, namely Fraser fir, Douglas-fir, Canaan fir, Balsam fir, and Concolor fir and Colorado spruce also do not appear to be desirable locations for SLF egg laying, making the likelihood of egg hatch during display an extremely rare event.

Despite this anecdotal evidence, negative media reports during Fall 2018 and 2019 indicated that SLF was a concern for homeowners bringing cut Christmas trees into their homes. For example, the press release “*Now there’s a Christmas tree-infesting bug that hatches eggs inside your house*”:

https://www.nj.com/news/index.ssf/2018/10/christmas_tree_threat_invasive_bug_spotted_lantern.html (October 14, 2018 / New Jersey Real Time News), contained a number of unverified claims relating to home infestations by SLF via cut Christmas trees, and suggested that this could be a likely scenario.

This journalistic sensationalism resulted in customers choosing artificial products in lieu of real Christmas trees during the 2018 season, according to numerous Pennsylvania Christmas tree growers in the SLF quarantine area. Who knows how many customers made the switch to fake trees based upon this undocumented fear?

To compound the problem, the issue of SLF spread via Christmas trees has also become politicized, potentially affecting the interstate trade and movement of Christmas trees. U.S. Senator Chuck Schumer (D – NY), raised concerns about Pennsylvania-grown Christmas trees entering New York, in the article: “*Spotted Lanternfly, a Christmas tree superbug, could destroy New York parks*”:

<https://nypost.com/2018/12/16/spotted-lanternfly-a-christmas-tree-superbug-could-destroy-new-york-parks/>

Inaccurate reporting and negative media portrayal of agricultural issues is nothing new. Recall the the 1989 “Great Apple Scare”, where the growth regulator Alar was demonized in the media a serious health threat to anyone eating apples, especially children. Apple sales plummeted. The US government had to spend millions to prevent the apple industry from collapsing under its over 100 million dollar loss. Within a few months, before further testing could be carried out, Alar’s manufacturer went out of business, supermarkets boycotted Alar containing products and schools took apples out of their cafeterias. Subsequent scrutiny of Alar’s active ingredient daminozide largely concluded that there “was no risk to health”.

The Alar scare, as well as the current situation with SLF, illustrate the need for rational and accurate reporting of perceived agricultural-related public health threats based upon non-biased research and information from a variety of sources. For the consuming public to receive timely and factual information, coordination among multiple public and private sector actors is necessary.

Penn State University College of Agricultural Sciences and the Pennsylvania Department of Agriculture are actively addressing the SLF problem on a number of fronts, mobilizing substantial resources. Many of these activities however, while necessary and useful, do not address concerns specific to the Christmas tree industry. As the range of SLF spreads, this scenario will likely only get worse without a coordinated response based in part on research findings.

The goal of this project was to develop, present and disseminate fact-based SLF educational material to media outlets, growers, and public officials. Educational meetings specifically for Christmas tree growers were developed and delivered within the SLF quarantine zone as well as in surrounding states. Sureveys of Christmas tree farms and retail outlets within the SLF quarantine zone were also conducted to assess the presence of SLF egg masses on cut Christmas trees.

Specific project objectives included:

Objective 1: Function to liaise with the P.S.U. College of Agriculture, P.S.U. Dept. of Entomology, Dept. of Plant Science, and the Pennsylvania Department of Agriculture, in order to better coordinate and assist with SLF research, educational activities and public outreach specifically in support of the Christmas tree industry.

Objective 2: Develop and disseminate research-based information specific to SLF and Christmas trees.

Objective 3: Evaluate the incidence of SLF egg masses on cut Christmas trees within the quarantine zone during the 2018-2019 sales seasons.

METHODS

This project included coordination and assistance with SLF research, educational activities and consumer outreach specifically in support of the Pennsylvania and regional Christmas tree industry. Specific activities and deliverables included:

- 1) Development of presentations and educational material specifically designed for Christmas tree growers detailing SLF biology, potential impact and control measures.
- 2) Proactive efforts to engage regional media with factual SLF information and data during Fall 2019, in an effort to reduce and/or buffer the Christmas tree industry from media sensationalism.
- 3) Research to improve documentation and understanding of the relationship between SLF and primary conifer species used as cut Christmas trees in Pennsylvania and surrounding areas.

This project did not have a specific focus on particular Christmas tree species, however it did address most species common to the mid-Atlantic region that may potentially serve as potential SLF hosts or sites for egg laying. This project was designed to address the potential impact of SLF on Christmas tree producers of all farm sizes and locations.

Christmas tree inspections were conducted between November 15 and December 20, in 2018 and 2019. Inspection site locations included wholesale Christmas tree farms, choose-and-cut farms, temporary tree sales outlets (ex. fundraising groups selling trees), garden centers, and larger 'big box' stores representing national chains. Wholesale and choose-and-cut farms were surveyed first, usually during Nov. 15-30, and the other outlets were surveyed during December. Survey locations were limited to Berks, Bucks, Philadelphia, Delaware, Lancaster, Lebanon, Carbon, Chester, and Lehigh counties. In addition to informal interviews, survey activities focused on cut tree inspection, in order to locate and verify SLF egg masses.

RESULTS and DISCUSSION

Activities and deliverables for this CTPB-funded project fell under four broad areas: educational resource development and distribution, grower education, direct inquiry response, and cut Christmas tree field surveys:

1) Educational Resource Development and Distribution: In cooperation with the Christmas Tree Promotion Board (CTPB), state Christmas tree associations, and other key stakeholders in the industry, a Spotted Lanternfly fact sheet was developed for distribution to media outlets, Christmas tree growers, state Christmas tree associations and the public (Appendix A). This publication was, in part, an answer to a prevalence of inaccurate reporting by various media outlets indicating that SLF egg masses could easily make their way into the homes of consumers during the holiday season. The fact sheet provided consumers with nonbiased facts about SLF interaction with Christmas trees, pointing out that Christmas tree species are not a preferred host of SLF, and the likelihood of SLF egg masses hitchhiking into homes was an extremely unlikely scenario. During the 2019 Christmas tree sales season, growers and key individuals within the CTPB, state grower associations, and universities monitored media outlets for press releases relating to Christmas trees and SLF. In the event of inaccurate reporting on the topic, efforts were made to provide the media outlets with factual information on SLF and Christmas trees, including distribution of this fact sheet.

In addition to the fact sheet development, other SLF extension publications and educational resources were collected, and adapted for use with the Christmas tree industry, as appropriate. PowerPoint presentations were also developed in collaboration with Julie Urban and Heather Leach, Penn State University, Entomology. These educational resources were made available to key stakeholders and distributed as necessary. For example, Penn State SLF resources were sent to Mr. Chal Langren, Oregon State University, in order to update Pacific Northwest Christmas tree growers and the SLF situation.

2) Grower Education: Over the past two years (7) presentations have been made to Christmas tree growers from Pennsylvania and the mid-Atlantic regions. These in-person presentations reached approximately 245 growers, and addressed topics such as SLF biology and life cycle, impacts on agricultural commodities, SLF control, research updates, and information specific to SLF and Christmas trees.

3) SLF Coordination and Direct Inquiry Response: During the past two years, Dr. Bates has maintained contact with key actors responsible for Pennsylvania's ongoing response to SLF. These liaison activities have involved the Pennsylvania Dept. of Agriculture, Penn State University, the Pennsylvania Christmas Tree Growers Association, the Christmas Tree Promotion Board, as well as individual Christmas tree producers and other key stakeholders. The focus of activities have largely been to update and share information, coordinate educational activities and to share research findings and educational material as appropriate.

Over 75 individual consultations were conducted with Christmas tree growers in Pennsylvania and the mid-Atlantic region. Farm visits were also made with Pennsylvania Christmas tree growers within the SLF quarantine area. SLF questions from growers in NY, NJ, OH, MD, DE and VA were fielded on a regular and on-going basis.

4) Cut Christmas Tree Field Surveys: To date, there has been very little evidence of SLF egg masses on cut Christmas trees during the holiday season. However, according to the NJ Department of Agriculture, 2 egg masses were found on a concolor fir in New Jersey. The tree was purchased on December 2nd, 2017 in PA and nymphs were reported on January 27th, 2018. 6 nymphs are believed to have hatched over a period of a couple days. In order to provide additional documentation of the incidence of SLF egg masses on cut Christmas trees offered to the public for sale, surveys were conducted in 2018 and 2019. Between November 15 and December 20, 2018 and 2019, forty-two site visits were made to Christmas tree farms and other sales outlets. Inspection sites included wholesale and choose-and-cut Christmas tree farms, garden centers/nurseries, seasonal fundraising retail lots, and 'big box stores' representing national chains. In total, over 1475 cut trees were inspected for SLF egg masses. A total of 0 SLF egg masses were discovered on inspected trees. Though not part of the survey count, several praying mantis egg cases were discovered on cut tree branches.

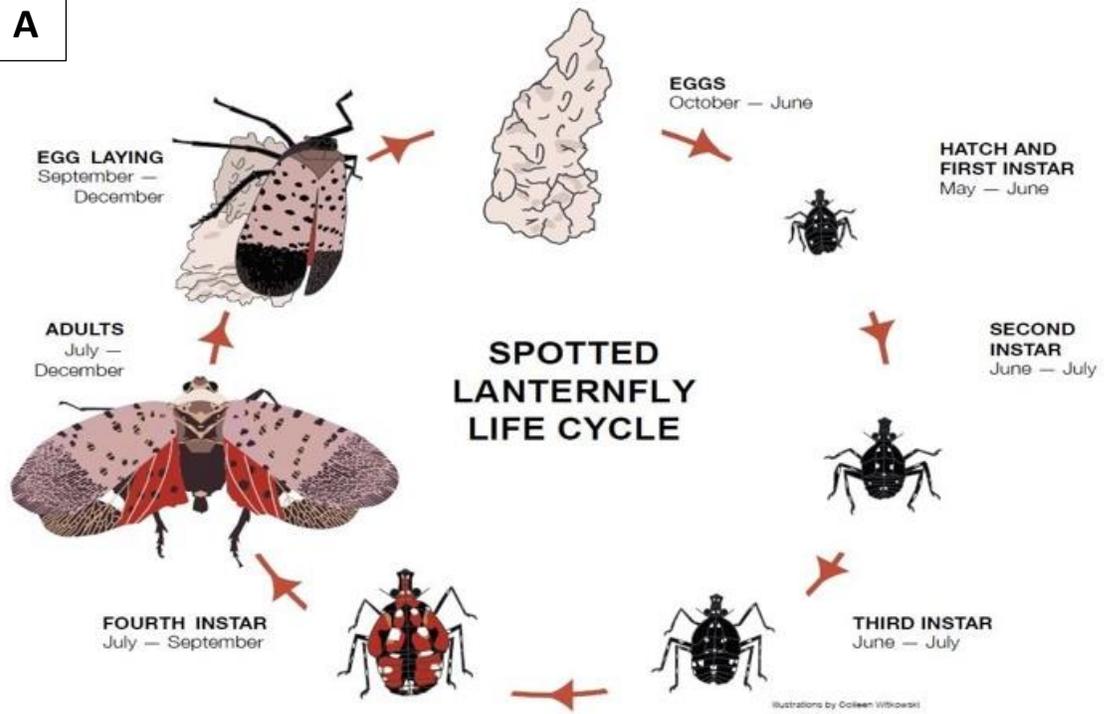
CONCLUSIONS:

There are valuable lessons that have been generated from this project thus far. In the current environment of web-based information, reporters are sometimes compensated based upon the number of "hits" their articles receive. This has led to the use of sensational headlines that sometimes do not represent reality. This appears to be the case with SLF and Christmas trees in Pennsylvania. The reality is that this pest does not appear to prefer conifer species for feeding or egg laying. And documentation of egg masses on cut trees is a very rare event. This was the case in 2017, and was further supported with the survey research described here in 2018 and 2019. Observation also suggests that the number of sensationalized news stories related to SLF and Christmas trees decreased in 2019, compared to 2017-2018. Monitoring will continue in 2020, but this may indicate that interest in this SLF-Christmas tree 'non-issue' has finally begun to wane.

This project also illustrates the need for a quick response when issues arise that may potentially damage the reputation of an entire industry. SLF likely will not be the last scenario raised by the media that could potentially cast the use of real Christmas trees in an unfavorable light. With this SLF and similar situations, it is necessary to inform and educate the public with unbiased factual information. This needs to occur quickly, and in a coordinated fashion. As modeled in Pennsylvania with SLF, cooperation between numerous key actors is necessary.

This project will continue through the 2020 Christmas season, with funding from the Christmas Tree Promotion Board.

A



B



Figure 1. The Spotted Lanternfly (*Lycorma delicatula*) life cycle (A), and adult (B).

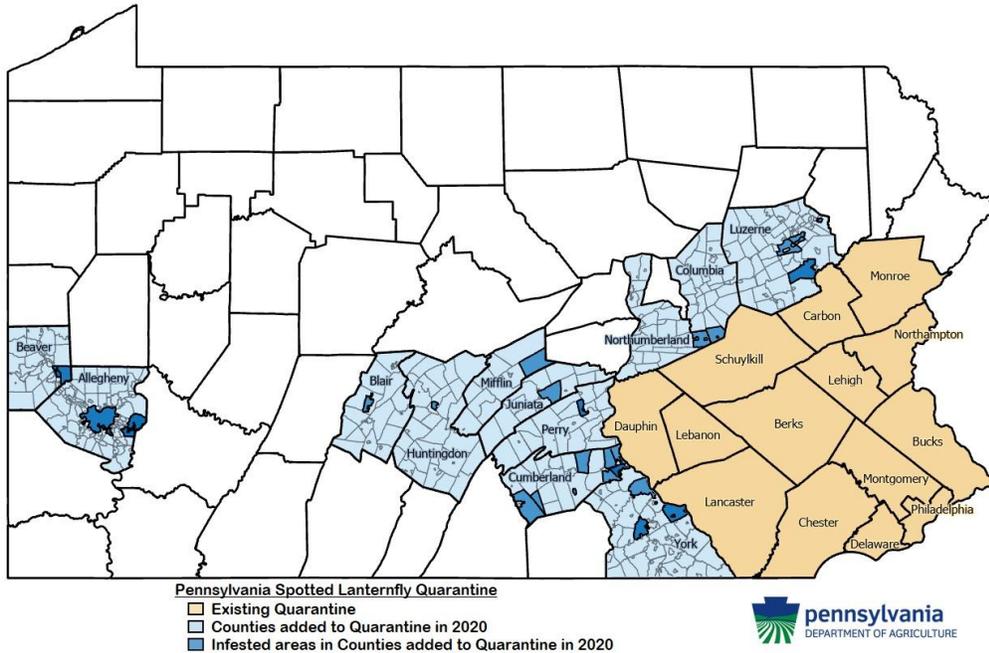


Figure 2. Spotted Lanternfly quarantine zone in Pennsylvania, including original zone, counties added in 2020, and infested areas within newly included counties.

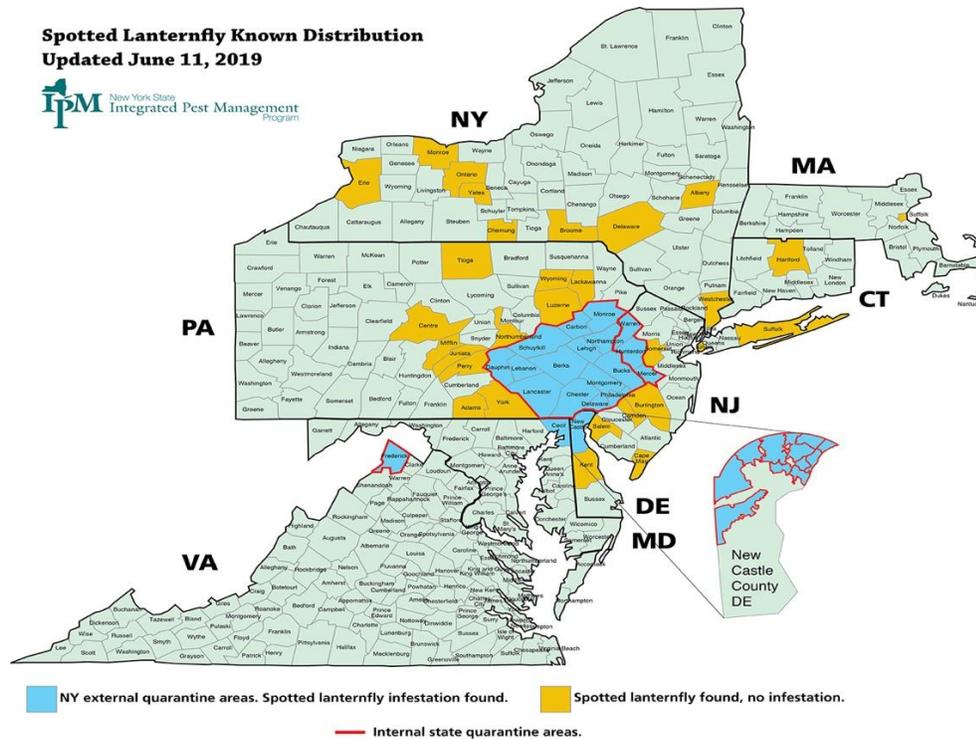


Figure 3. Spotted Lanternfly distribution beyond original Pennsylvania infestation.

APPENDIX A: Spotted Lanternfly Fact Sheet



SPOTTED LANTERNFLY FACT SHEET

About the Spotted Lanternfly

- The spotted lanternfly was initially detected in the United States in Berks County, Pennsylvania in 2014 and has since spread throughout 13 counties in southeastern Pennsylvania. More recently, the spotted lanternfly has also been found in Delaware, New Jersey, New York and Virginia.
- The spotted lanternfly is a threat to agriculture, potentially causing serious damage to grapevines, tree fruit and woody ornamentals (i.e. deciduous small trees and shrubs used in landscaping).
- The spotted lanternfly is not a threat to humans, animals or homes.
- To slow or stop the spread, several of the above-mentioned states have imposed quarantines regulating the movement of plants, plant-based materials and outdoor household items out of the quarantine area.
- For specific details on the quarantine areas within these states, please visit: <https://www.northeastipm.org/working-groups/spotted-lanternfly/spotted-lanternfly-quarantine-and-reporting-information/>

Spotted Lanternfly and Christmas Trees

- Christmas trees are not a preferred host for spotted lanternflies. It is unlikely that a spotted lanternfly would inhabit or lay eggs on a Christmas tree.
- Although it is unlikely that a spotted lanternfly or its eggs will be on a Christmas tree, if this were to happen it is important to remember that the pest poses no threat to humans, animals or homes and will die quickly.
- Christmas tree growers in the states in which the spotted lanternfly has been detected are working closely with the state departments of agriculture to ensure that spotted lanternfly quarantine requirements are met prior to the sale of Christmas trees, including participating in training sessions designed to educate growers about how to minimize the threat of this pest.
- Christmas tree growers in all states follow integrated pest management practices to minimize such threats.
- If consumers are concerned, they are encouraged to inspect the tree prior to purchase. Spotted lanternfly egg masses are visible on the bark if present and can be [easily removed](#).

For more information about the spotted lanternfly, please visit the following resources:

- extension.psu.edu/spotted-lanternfly
- https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/Entomology/spotted_lanternfly/Pages/default.aspx

2. Summary of Research Report for Public Release by CTPB- Summary should be suitable for non-scientific audience and should not exceed one page. In addition, photograph(s) of research aspects suitable for publication are requested.

Penn State University scientists and staff in the departments of Plant Science and Entomology will develop and conduct educational meetings and programming to address the Spotted Lanternfly and in particular, its impact on the regional mid-Atlantic and northeast Christmas tree industry.

The Spotted Lanternfly (SLF), *Lycorma delicatula* (White), is an invasive planthopper native to China, India, Vietnam. It was first discovered in Pennsylvania in Berks County and has spread to other counties in the southeast portion of the Commonwealth. This insect has the potential to greatly impact agricultural crops such as grapes, hops, and hardwoods. It is also reducing the quality of life for people living in heavily infested areas. SLF does not appear to prefer conifer species commonly used for cut Christmas trees. These species, namely Fraser fir, Douglas-fir, Canaan fir, Balsam fir, and Concolor fir and Colorado spruce also do not appear to be desirable locations for SLF egg laying. Despite this anecdotal evidence, negative media reports during Fall 2018 indicated that SLF was a concern for homeowners bringing cut Christmas trees into their homes.

The goal of this project is to develop, present and disseminate fact-based SLF educational material to media outlets, growers, and public officials. Educational meeting specifically for Christmas tree growers will be developed and delivered within the SLF quarantine zone as well as in surrounding states. Research will be conducted to document the gestation period from egg laying to hatch in order to gauge and document the potential threat of introducing the pest into homes during Christmas tree display.

3. List of all Publications related to this Research Grant
 - Published papers (include citation or journal/date of submission)
 - Published and projected abstracts (include meeting name(s) and date(s))
 - Projected manuscripts (include target journal name and estimated submission date)

- Please attach copies to this report

Note: all publications should acknowledge the funding source as "Christmas Tree Promotion Board"

There are currently no papers, abstracts, or manuscripts associated with this research project.

4. Financial Expenditure Report