



Pennsylvania
Department of
Agriculture
Entomology
Program Report
2021

The Pennsylvania Department of Agriculture (PDA) Entomology Program is responsible for the regulation of insect pests of plants, which includes survey, laboratory analysis, and control/mitigation of new invasive insects when warranted.

For surveys conducted by PDA, all samples were screened for Long-horned beetles (Cerambycidae), Jewel beetles (Buprestidae), Bark beetles (Scolytinae), Horntail wasps (Siricidae), wasps in the family Vespidae, Bumblebees (*Bombus*), Spotted Lanternfly (*Lycorma delicatula*) and other select species depending on the survey. Entomology surveys are carried out by permanent and temporary PDA staff, as well as cooperating government and non-government collaborators. Insect samples are also submitted through cooperative extension, private industry, and the public.

SPOTTED LANTERNFLY

The Pennsylvania Department of Agriculture works on multiple fronts to combat *Lycorma delicatula* (Spotted Lanternfly, or SLF), including focus on Survey and Treatment, Quarantine Compliance, and Communications. PDA is aided in this battle by its partners, the United States Department of Agriculture (USDA), Penn State University and Extension, County Conservation Districts, and sister Pennsylvania State Agencies.

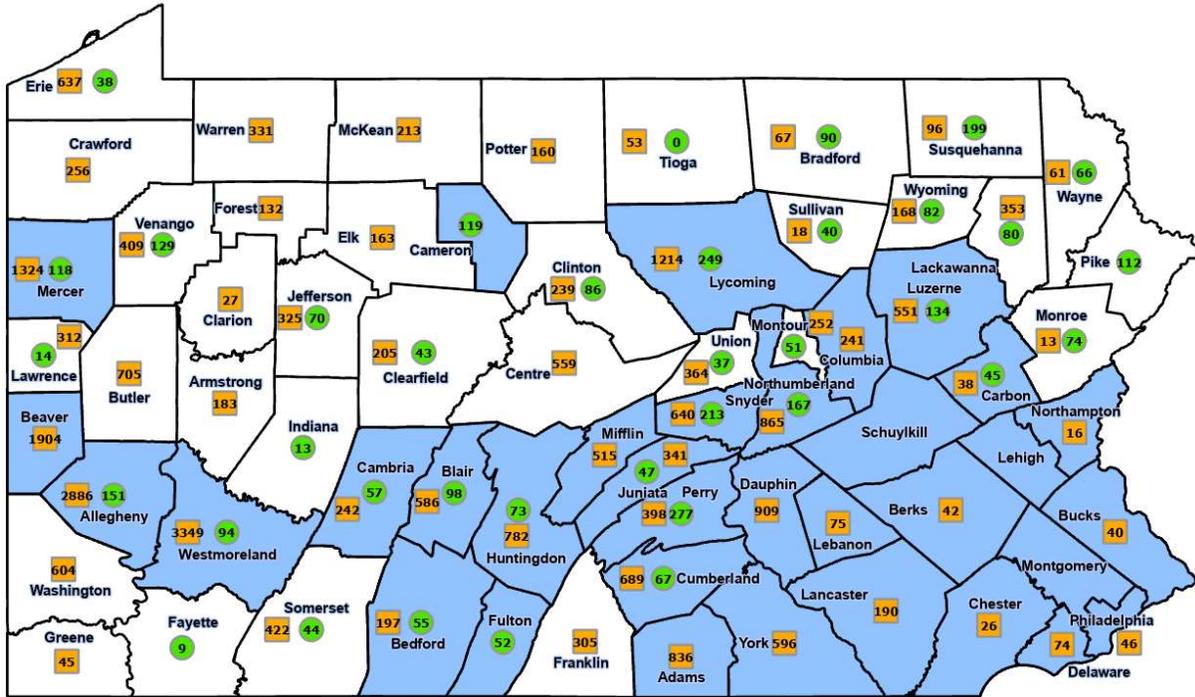
SPOTTED LANTERNFLY SURVEY AND TREATMENT OVERVIEW

Since the first detection of Spotted Lanternfly on September 22, 2014 by an agent of the PA Game Commission, PDA has surveyed and treated properties across Pennsylvania in an effort to understand, control and contain this invasive pest.

Survey work has occurred in each of Pennsylvania's 67 counties and occurs in two main ways: the setting of traps for on-going monitoring and early detection of SLF and through visual surveillance of all life stages from egg through adult.

In addition to survey work, PDA began treatment of properties infested with SLF in 2015, with treatment strategies and goals evolving over the subsequent years. In 2021, PDA's primary goal was to limit the long-distance transport of the pest by conducting treatments on heavily infested properties adjacent to major transportation corridors. Treatments included the application of herbicides to reduce Tree of Heaven populations, a preferred host, and both contact and systemic insecticide applications to reduce SLF population sizes. Treatments were conducted by qualified contractors and PDA certified pesticide applicators. In total, 45,906 Tree of Heaven were treated with a systemic insecticide, 1,482 acres of infested vegetation were treated with a contact insecticide and 7,722

Tree of Heaven were treated with an herbicide. Additional control was achieved through egg mass removal.



Spotted Lanternfly: PDA and USDA Treatment and Surveys 2021

- Treatment for Spotted Lanternfly
- Visual Surveys
- Trapping Surveys



SPOTTED LANTERNFLY CIRCLE TRAP SURVEY

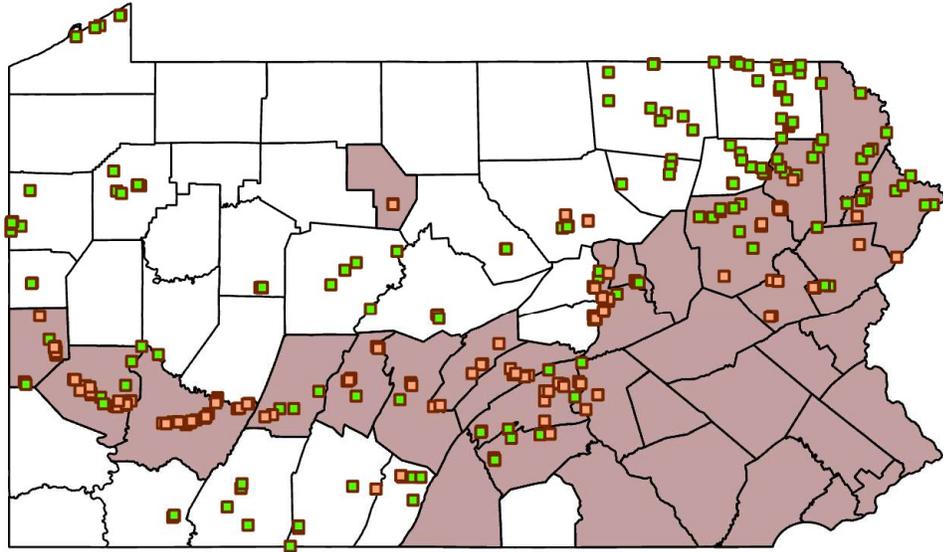
Survey performed 12 April 2021 through 20 December 2021

457 Circle Trap sites in 41 counties (6 Regions)

3,547 Services

159 Positive Circle Trap Locations (555 positive services)

12,466 SLF reported killed



PDA Spotted Lanternfly Circle Trap Survey 2021

■ Negative Trap ■ Quarantine Area
■ Positive Trap □ Non-Quarantine Area



SPOTTED LANTERNFLY VISUAL SURVEY

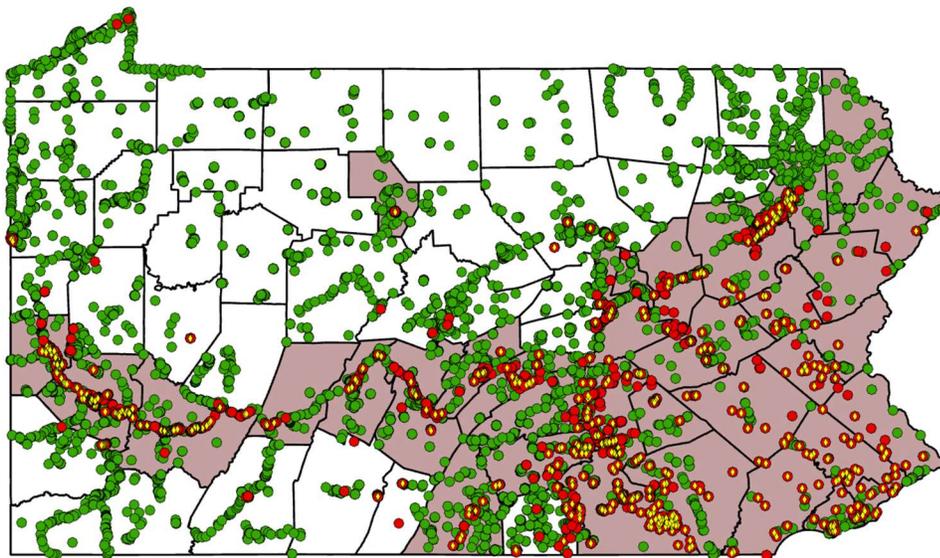
Visual survey often leads to the destruction of egg masses identified. Identification of a nymph or adult does not necessarily indicate an established population. In many cases, inspection indicated that specimens were transported with a shipment or package delivery. For example, the map below shows two positive locations in Erie County (Northwestern-most county), but no populations are currently known from Erie County.

Survey performed 5 January 2021 through 1 December 2021

26,492 Visual Surveys in 67 Counties (7 Regions)

57,272 SLF reported killed

27,716 SLF egg masses scraped



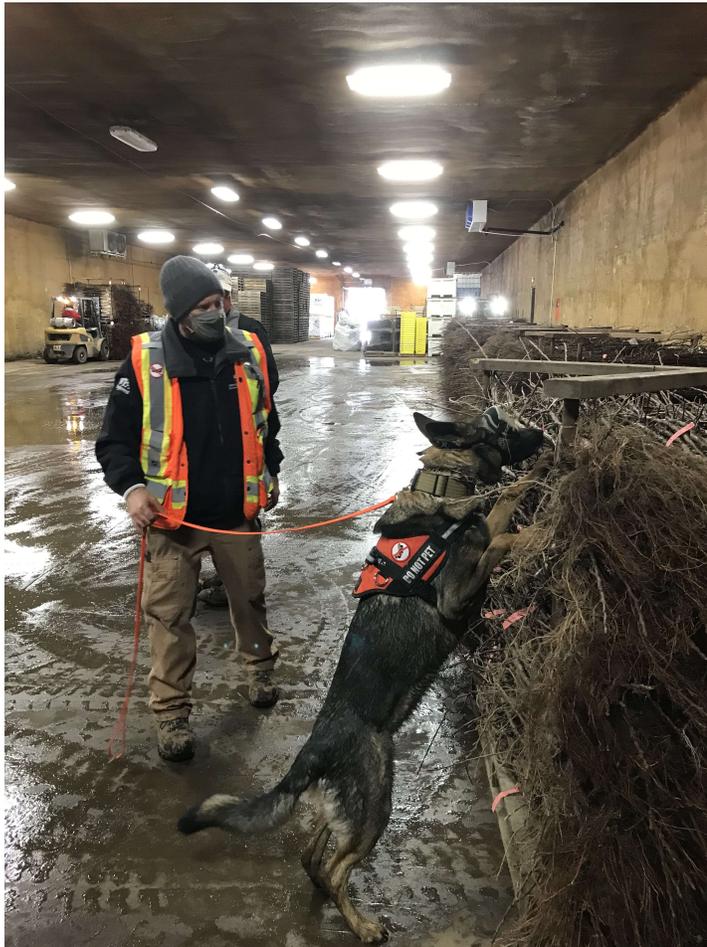
PDA Spotted Lanternfly Lyco (Visual) Survey 2021

- Negative Survey
- Positive Survey
- ◆ Positive Scrape
- Quarantine Area
- Non-Quarantine Area



SPOTTED LANTERNFLY QUARANTINE COMPLIANCE

On November 1, 2014, the Pennsylvania Department of Agriculture issued a quarantine with the intent to restrict the movement of SLF. While these restrictions slowed the spread, the pest continued to expand its range with quarantine expansions leading to 34 quarantined counties across PA by the end of 2021. To date, PDA has issued over 1.1 million regulatory permits to employees in over 28,000 companies in the U.S. and Canada. PDA regulatory inspectors were active in 2021 assisting businesses in complying with the quarantine order. The team held numerous permit trainings for businesses across the state and performed hundreds of inspections. In addition to assisting businesses, regulatory officials inspected transportation vehicles at truck stops in cooperation with the Pennsylvania State Police. Assisting with inspections was a detector dog by the name of Lucky, who has been trained to detect the scent of SLF egg masses and can locate egg masses that are difficult for inspectors to detect visually.



Regulatory specialist and dog handler, Shane Philipps, instructing Lucky, a detector canine, to search for Spotted lanternfly egg masses.

SPOTTED LANTERNFLY COMMUNICATIONS AND OUTREACH

PDA has teamed up with the communications offices of both Penn State University and the United States Department of Agriculture to share accurate SLF information to all Commonwealth citizens. These messages are disseminated through various means, including social media posts, press releases, news interviews, public events, informational brochures, instructional videos, newsletters, billboards, signs for parks and other public places, and advertising in newspapers and on public transportation.

PDA has partnered with members of local government and businesses to create SLF-specific Community Taskforces, which meet periodically to discuss the efforts and needs of the community.

PDA also collaborates with Penn State University on a large-scale public reporting tool for recording sightings of SLF by the public. The ability to report is available either online via a web application or through contacting a call center, staffed by Penn State employees. Reports from outside of the known infested areas are followed up by PDA staff across the state, where reporters are contacted and visited to confirm sightings and to quickly discover and control emerging populations. In 2021, more than 42,000 reports of SLF were made by Commonwealth citizens. Public reports continue to be an extremely valuable tool in tracking the expansion of SLF.

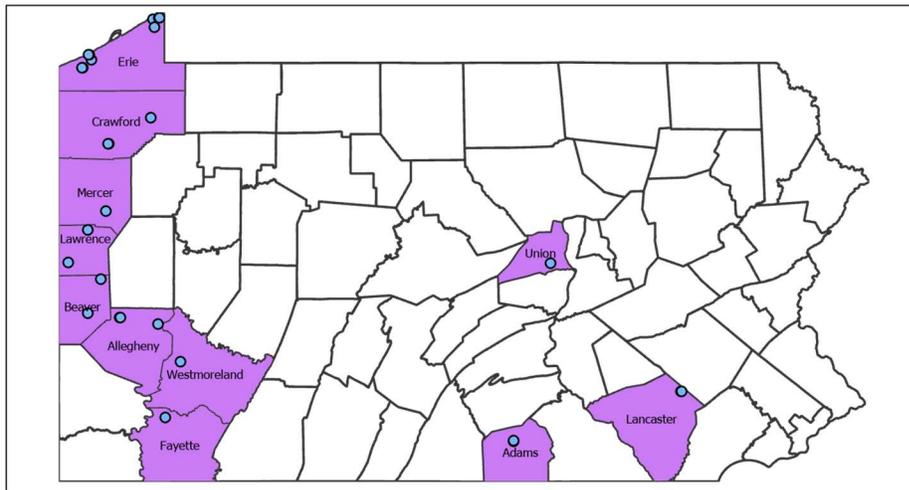
FEDERAL ASSISTANCE

USDA has supported PDA efforts by supplying funding to support surveillance and control activities. USDA and PDA staff work jointly to effectively survey and control SLF both in quarantined and non-quarantined counties.

STONE FRUIT SURVEY

The objective of this project was to survey for three exotic pests of cherry and other stone fruits, the European Cherry Fruit Fly (ECFF) *Rhagoletis cerasi*, European grapevine moth *Lobesia botrana*, and summer fruit tortrix moth *Adoxophyes orana*. The survey was conducted by PDA in the following counties: Adams, Allegheny, Beaver, Crawford, Erie, Fayette, Lancaster, Lawrence, Mercer, Union and Westmoreland. PDA staff placed traps in cherry orchards or on bush honeysuckle situated along wooded edges or fence rows near produce markets. Traps were serviced every two weeks and then sent to the PDA laboratory to be screened for the target pests. A total of 20 sites with 160 traps were established and a total of 985 samples were processed. No target exotic stone fruit pests were identified.

20 trap sites in 11 counties
160 trap locations
985 samples
7 specimens identified
0 target pests identified



Stone Fruit 2021

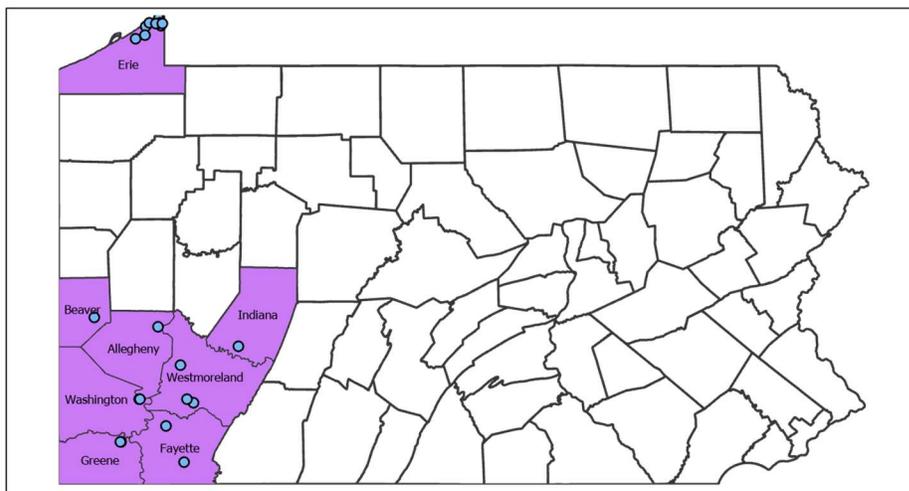
- Stone Fruit Survey Sites
- Stone Fruit Survey Counties



GRAPE COMMODITY PEST SURVEY

PDA first implemented a grape pest survey in 2010, using Farm Bill (now called PPA section 7721) funds from the USDA. This survey has been continued through 2021. The survey was run from June until the end of October 2021. Target pests for 2021 included *Lobesia botrana* (European grapevine moth), *Cryptoblabes gnidiella* (Christmas berry webworm moth), and *Lycorma delicatula* (Spotted lanternfly). In the spring and summer of 2021, survey crews established 120 trap locations in 8 PA counties at locations supporting wine and juice production. The PDA lab received and processed 348 samples, from which 433 specimens were identified. No target species were detected in 2021.

20 trap sites in 8 counties
120 trap locations
348 samples
433 specimens identified (lab)
0 target pests identified (field or lab)



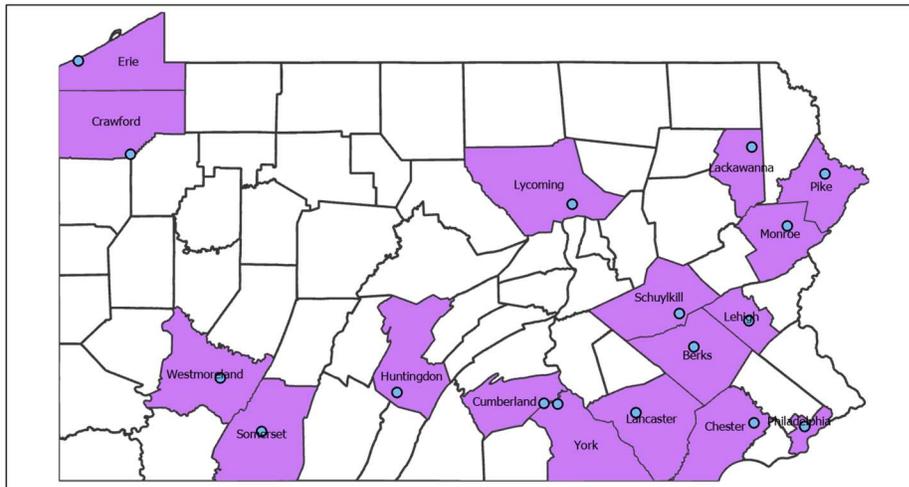
Grape Commodity Survey 2021
● Grape Commodity Survey Sites
■ Grape Commodity Survey Counties



BOX TREE MOTH SURVEY

In response to the detection of box tree moth (*Cydalima perspectalis*) in Toronto, Ontario, Canada in November 2018, PDA conducted a first ever box tree moth survey in Pennsylvania in 2020. This survey was continued in 2021. Survey crews established 16 trap locations and 1 visual survey location, at locations supporting boxwood nursery stock or boxwood ornamental plantings, beginning in the spring of 2021. Crews collected trap samples until the end of October 2021. A total of 164 samples were submitted to the PDA lab, from which 263 specimens were identified. No box tree moths were detected in 2021.

17 survey sites in 17 counties
16 trap locations
164 samples
263 specimens identified
0 target pests identified



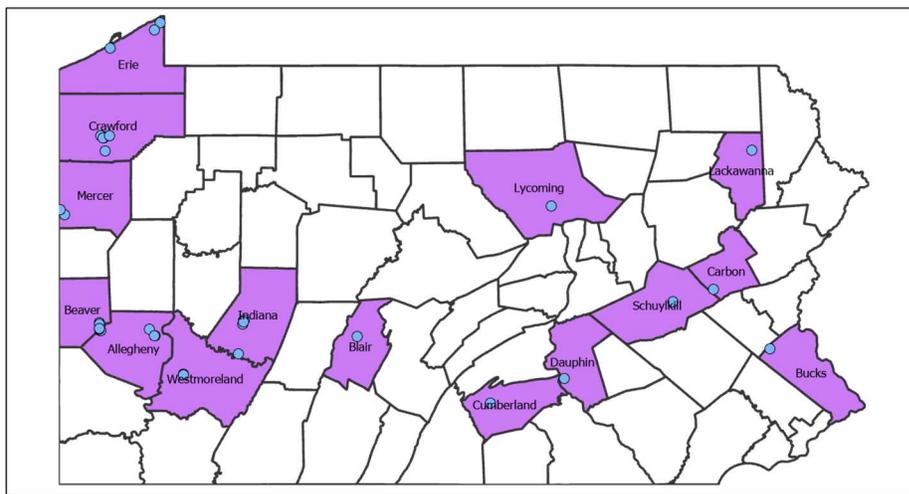
Box Tree 2021
● Box Tree Survey Sites
■ Box Tree Counties 2021



ASIAN DEFOLIATOR SURVEY

The objectives of this project emphasize the early detection of Asian defoliator pests of hardwoods (*Lymantria dispar asiatica*, *L. dispar japonica*, *L. albescens*, *L. postalba*, and *L. umbrosa*). PDA deployed seasonal survey crews and inspection staff to establish and monitor 27 sites in 15 counties, at which 46 milk carton traps, baited with *Lymantria* lures, were run beginning in May or June 2021. Surveys took place in Allegheny, Beaver, Blair, Bucks, Carbon, Crawford, Cumberland, Dauphin, Erie, Indiana, Lackawanna, Lycoming, Mercer, Schuylkill, and Westmoreland Counties. Traps were serviced every two weeks through September. Samples contained 8,533 specimens tentatively identified morphologically as *Lymantria dispar*. These were shipped to the USDA APHIS FPM lab in Buzzards Bay, Massachusetts where genetic analyses on a subset of the specimens were conducted. Of the 1,091 specimens for which molecular results were obtained, none were target species or subspecies. All were determined to be *Lymantria dispar dispar* (the European subspecies which is well established in Pennsylvania).

27 sites in 15 counties
46 trap locations
238 Samples
8533 Tentative *Lymantria dispar* identifications
0 Target Pests Identified



Asian Defoliator Survey 2021

- Asian Defoliator Survey Sites
- Asian Defoliator Counties

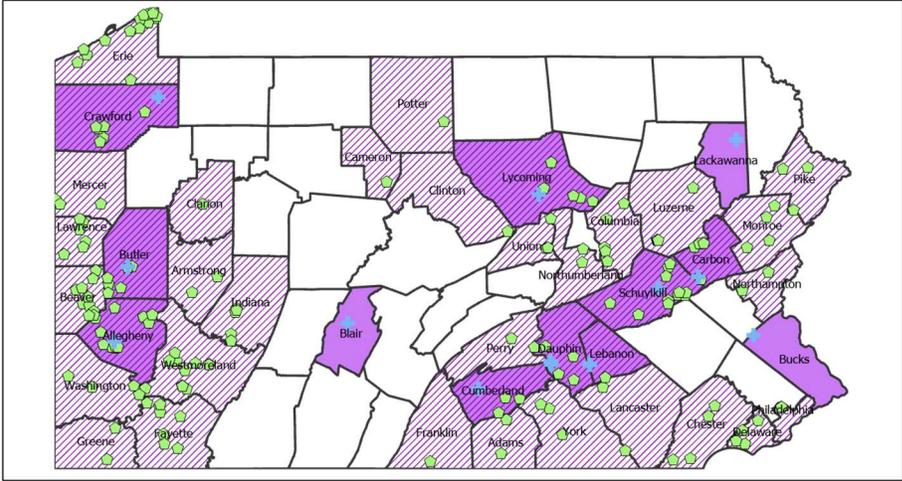


COOPERATIVE AGRICULTURAL PEST SURVEY (CAPS) EXOTIC WOOD BORING BEETLE SURVEY (EWBB)

The Cooperative Agricultural Pest Survey is a federally funded survey that targets pests of specific national concern to agriculture. Though the EWBB survey targets species of national concern, species of state concern are added to the target list. Due to the extreme economic impact caused when non-native wood destroying insects are introduced to PA, PDA runs some form of this survey each year. Surveys are carried out in accordance with national survey guidelines. Pests of state concern can be surveyed in a more flexible manner. In 2021, insects affecting oak, maple, walnut, other Northeastern hardwoods, and conifers were selected as target species. This included pests like oak splendor beetle, Asian longhorned beetle, oak ambrosia beetle, spruce engraver, bamboo borer, citrus longhorned beetle, and many other pests not known to occur in PA or with a very limited PA distribution. Information from the interception of pests at ports provided by the U.S. Customs and Border Patrol, European pest alerts, and NAPIS are used to help refine the list of target pests for PA. Protocols for the surveillance of many of these pests require visual surveillance, while others call for pheromone or plant volatile-baited traps.

For pests that are trapped, 12 sites were established at sites deemed high-risk for exotic pest introduction with 6 variously baited traps for 72 total traps. Traps were run from April through the end of October. Each trap was serviced every two weeks, which generated a total of 969 samples and 18,530 specimens. Three specimens of a target pest, *Trichoferus campestris* (Cerambycidae), were collected in traps in Lebanon County.

Visual survey points were taken at all sites and several additional locations, totaling 172 visual survey sites in 39 counties for pests that are visual survey only. All visual surveys were negative for target pests. This survey will be conducted again in 2021, targeting high priority potential pests and new high-risk locations.



CAPS EWBB 2021

- + CAPS EWBB Traps
- CAPS VISUAL SURVEY Sites
- CAPS Visual Counties
- CAPS Counties



WALNUT TWIG BEETLE SURVEY

In 2011, Penn State Cooperative Extension received a sample of dying black walnut from Bucks County. The cause was determined to be Thousand Cankers Disease, a disease complex caused by the interactions of a bark beetle *Pityophthorus juglandis* (walnut twig beetle) and the fungus it vectors. Trees at the initial detection site were voluntarily removed and destroyed by the property owner in February of 2012, and PA initiated a statewide trapping survey for the beetle. In 2021, PDA performed its final survey for this beetle to support the quarantine order. The quarantine was repealed on January 15, 2022, ending the quarantine order for the state. Survey is expected to continue in the following years to ensure the long-term health of *Juglans* spp. in the state. In addition, taxonomic support was provided for the state of Maryland in their work with this pest. A total of 263 specimens of *Pityophthorus juglandis* were collected from Maryland, with none being detected from Pennsylvania.

5 trap sites in 5 counties

5 trap locations

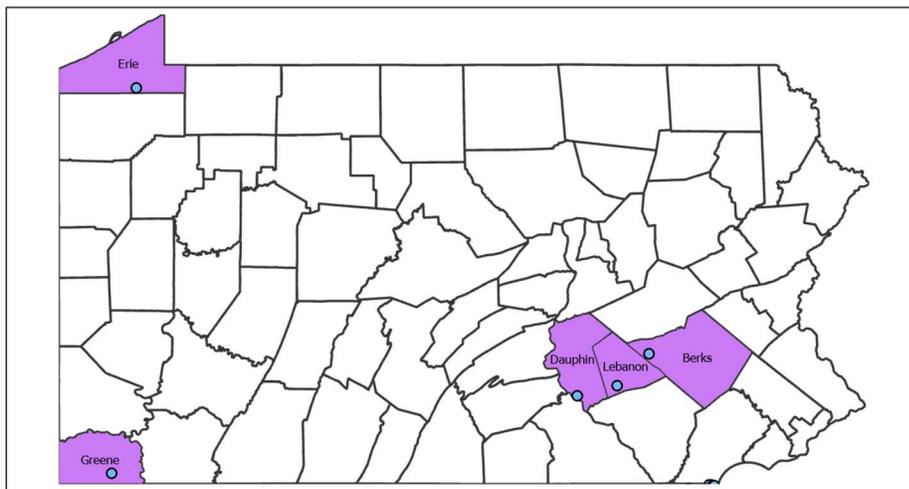
27 samples

112 specimens identified

0 target specimens identified

490 samples (Maryland)

601 specimens identified, including 263 target specimens (Maryland)



Walnut Twig Beetle 2021

- WTB Survey Site
- WTB Counties



APIARY PERMITS ISSUED

The Pennsylvania Department of Agriculture (PDA) issued 41 Certificates of Inspection to process export permits for beekeepers requesting permission to allow honey bees and/or used equipment to leave PA. All hives and equipment leaving PA were also inspected for Spotted Lanternfly (SLF) whether the bee yard was in a quarantined county or not. The beekeepers were instructed on what to look for and how to kill any SLF they saw on equipment and/or vehicles. Many also have taken the online permit training and testing to increase their awareness of SLF.

There were 2 Certificates of Inspection for honey bees being shipped to California to provide pollination as part of California's voluntary ant certification. California does not want to allow shipments which could contain red imported fire ants to enter their state without inspection.

There were 169 permits issued to beekeepers wishing to raise, produce, and/or sell queen honey bees and/or nucleus colonies within Pennsylvania.

APIARY INSPECTION PROGRAM

The value of the apiary industry in Pennsylvania in 2021 was estimated at more than \$76 million. Much of this value is attributed to increased yield and quality in crops partially or completely dependent on honey bees for pollination. In 2007, it was estimated that each honey bee colony provided \$1,659.21 to Pennsylvania's economy.

Since the onset of Colony Collapse Disorder (CCD) in 2006, more people worldwide have become interested in becoming beekeepers and helping native pollinators. Currently in PA more than 6,000 registered beekeepers manage over 61,000 colonies in approximately 8,600 bee yards. The majority of these beekeepers care for 1-10 hives.

Managed honey bee colonies can be found almost everywhere in the Commonwealth from roof tops in urban areas to towns, suburbs, farms, and undeveloped land. From early April until the first week in July, there were seven full-time seasonal Apiary Inspectors working across Pennsylvania, as well as the State Apiarist, located in Harrisburg. In July, the Apiary Inspector in Region 5 retired. A new Apiary Inspector has been hired for the 2022 season. The Apiary Inspectors conducted approximately 954 inspections in 2021, inspecting over 11,930 colonies, approximately 19.5% of the honey bee colonies registered in PA.

Concerns and restrictions due to the COVID19 pandemic did affect the apiary program in 2021. The inspectors were able to do apiary inspections, following safety protocols. Fortunately, the season went well, and we were pleased that we could continue with our program

HONEY BEE DISEASES AND PESTS

American Foulbrood (AFB), a highly contagious disease affecting honey bees, was detected in 3 colonies (one case was a “regular” and the other case was a double hive which counts as 2 colonies) located in two bee yards in two PA counties in 2021 (Chester and Susquehanna Counties). The PA Department of Agriculture continues to focus on detection and treatment of AFB. All suspect cases of AFB were submitted to Harrisburg and then sent on to the USDA, Honey Bee Research Lab, Beltsville, Maryland to confirm the diagnosis and to screen for resistance to antibiotics. The antibiotic Oxytetracycline hydrochloride (trade name Terramycin) has been used for many years and some AFB strains have developed a resistance. In some cases, these resistant strains of AFB may be treated with the veterinary antibiotic tylosin (trade name Tylan). Most beekeepers choose to burn the infected hive(s) since the antibiotics do not kill the spores which cause AFB. Beekeepers wishing to treat honey bees with an antibiotic (Oxytetracycline and/or tylosin) must work with a veterinarian to obtain a prescription or veterinary feed directive (VFD).

The Varroa mite, *Varroa destructor*, continues to be found throughout Pennsylvania and most areas of the world. These insect pests of the honey bee are a serious concern to beekeepers because they vector viruses causing diseases and feed on the honey bee’s fat bodies. This can weaken a colony enough to cause the bees to abscond or die.

Small hive beetles, *Athina tumida*, are found in most areas of Pennsylvania. They are more prevalent in the southern and central areas of the state. This pest was first found in North America, in Florida, in 1998 and has been spreading since then. The small hive beetles can cause vulnerable, weaker colonies to collapse. They ruin the stored honey.

NATIONAL HONEY BEE SURVEY

This was the eleventh year that Pennsylvania was able to participate in the USDA/APHIS National Honey Bee Disease Survey (NHBS). The 2021 National Honey Bee Survey had three goals: 1) early detection of potentially invasive pests such as the exotic mite *Tropilaelaps*, problematic *Apis* species such as *A. cerana*, and viruses; 2) continuation of an epidemiological survey that will meet the goal of developing a long-term overall baseline picture of colony health, and 3) identification of risk and protective factors that predict colony health and operational success by connecting honey bee health measures over time and annual colony losses.

The 2021 National Honey Bee Survey (NHBS) began in July 2021 and ends in June 2022. The survey divides the sampling into two sections, longitudinal sampling of 5 beekeepers, and 14 general survey surveillance samples. The longitudinal sampling was conducted twice a season, with bee bread samples taken to be analyzed for 199 known pesticides.

In Pennsylvania, 18 samples and 8 bee bread samples were collected from 14 apiaries from throughout the Commonwealth from July through October 2021. The apiaries represented a cross-section of operation types and sizes. Each of the 14 apiaries had a minimum of 8 colonies in the apiary.

We were able to complete 3 longitudinal surveys of a stationary, honey producers (6 surveys, 6 bee bread samples) in Crawford (1) and Chester (2) Counties. We completed 1 longitudinal survey (2 surveys, 2 bee bread samples) in an apiary used for honey production and research in Philadelphia. One longitudinal survey will be finished in spring 2022 in a stationary, honey producer apiary in Cambria County.

The remaining completed surveys included:

4 Stationary apiaries used for honey production

2 Migratory apiaries used for honey production

1 Migratory apiary used for honey production, nuc production and pollination

1 Stationary apiary used for research

1 Stationary apiary belonging to a local beekeeper organization used for teaching and honey production

These apiaries were located in 7 counties spread out across Pennsylvania and covered a good cross-section of rural, suburban and urban environments. The counties included: Allegheny (1), Elk (1), Columbia (1), Dauphin (3), Jefferson (1), Luzerne (1), and Mifflin (1).

Targeted pests, parasites and pathogens noted in this survey through visual inspection are: American Foulbrood, European Foulbrood, Sac Brood, Chalkbrood, Parasitic Mite Syndrome (PMS)/Snotty Brood, Deformed Wing Virus, Black Shiny Bees, Small Hive Beetle larvae and adults, and Wax Moth larvae and adults. The status of the queen was also noted on the data sheet.

Honey bee and “frame tapping” samples from each apiary are taken and preserved in alcohol. They were sent to University of Maryland where they were examined for *Varroa* mites load, *Nosema* spore count, and the presence of *Tropilaelaps* mites and *Apis cerana*.

Live honey bee samples were taken from each apiary for molecular and visual analyses. The molecular and visual analyses include the following: Lake Sinai Virus-2 (LSV-2), Acute Bee Paralysis Virus (ABPV), Chronic Bee Paralysis Virus (CBPV), Deformed Wing Virus (DWV), Kashmir Bee Virus (KBV), Israeli Acute Paralysis Virus (IAPV), and Varroa Destructor Virus/Deformed Wing Virus-B (VDV/DWV-B).

Each longitudinal sampled apiary had two bee bread samples taken. These samples were frozen until shipped to University of Maryland.

Sample collection and apiary inspection was begun on May 17, 2021 and completed for the calendar year on October 25, 2021 with 18 total apiaries

sampled. The six remaining samples, including one bee bread sample, will be completed and shipped by June 14, 2022.

NATIVE AND NONNATIVE BEE AND WASP SURVEY

Asian Giant Hornet, *Vespa mandarinia*, (AGH) gained national notoriety when it was discovered in Canada and Washington state late in 2019. This discovery emphasizes the importance of being prepared for the arrival of invasive insects.

The objectives of this project are to develop an inexpensive, user-friendly surveillance survey for early detection of exotic wasps and bees, by creating a trapping system that can be deployed in various locations and to gather information on wild native bees and wasps.

Over 10 states participated in this survey by following a standardized exotic wasp and bee survey system which involved a trapping trial which tested the efficacy of the commercially available and commonly used blue vane traps and white plastic 1-gallon jug traps. Each volunteer selected three locations of their choice. There were two blue vane traps and one jug trap at each location. (Each received a total of 9 trap - 3 jug traps and 6 blue vane). The traps were baited using the appropriate amounts of a dark brown sugar and water solution (1 cup packed dark brown sugar added to 1 gallon of water). One of the blue vane traps also had 1 teaspoon of yeast added to the brown sugar solution to see if the increased fermentation affected the catch. If, as we suspect, these traps are successful for surveying for bees and wasps, the combined trap can be deployed as part of an inexpensive surveillance trapping system in subsequent years

We are still identifying samples, but of those identified, there were over 3,400 trap visits from January 2021 through December 2021. There were over 130 sites (traps) set up. A total of 15,134 insects have been identified so far. Of these, 13,529 were in the Hymenoptera order, with specimens in the following families: Andrenidae, Apidae, Halictidae, Megachilidae, and Vespidae. In Pennsylvania, we established 43 traps sites at high locations sites including international airports, ports, shipping, rail, and truck transportation hubs in 6 counties. The counties included: Allegheny, Crawford, Dauphin, Erie, Lebanon, and Westmoreland counties. We continue to receive samples collected in 2021 from other states and there are insects which are not identified yet, so these numbers will increase.

NATIVE BEE SURVEY

Native bee surveys were conducted in Pennsylvania from 2008 through 2013. Partly due to concerns about the Rusty Patched Bumble Bee, *Bombus affinis*, a scaled-back version of the PA Native Bee Survey (PANBS) was revived in 2017 and has continued through 2021. Apiary Inspectors established a site for the season and placed 5 yellow and 5 blue small cups, for 8 or more hours, every two

weeks at that site. These traps contained water and a drop of Dawn dish soap. A total of 281 Hymenoptera were collected, including insects from the following families: Andrenidae, Apidae, Halictidae, Megachilidae, and Vespidae.

PENNSYLVANIA'S POLLINATOR PROTECTION PLAN (P4)

In 2014, the Environmental Protection Agency (EPA) directed state agencies to develop pollinator protection plans to mitigate risk to honey bees and other pollinators. This was one part of the federal government's plan to help pollinators. While the guidelines for the state pollinator plans are voluntary and not regulatory, the P4 has several goals, including increasing knowledge and communication between farmers, pesticide applicators, beekeepers, and the public about pollinators. While pollinator protection plans were originally geared to managed pollinators, PA and many other states realized the value of native pollinators and expanded the plans to include all pollinators.

Dr. Christina Grozinger, Director of the Center of Pollinator Research at Penn State University worked with PDA to organize a task force and advisory groups to contribute to the plan, editing the input from more than 36 individuals representing 28 state organizations, national organizations, and stakeholder groups. The P4 is housed on the Penn State Center for Pollinator Research's website, with links from PDA and numerous other websites. Various members of this task force continue to meet in-person and/or virtually to work on and update P4 goals.

BEE CHECK

Pennsylvania beekeepers and specialty crop growers can now register online on the Bee Check (beecheck.org) and Drift Watch sites (driftwatch.org) (Field Watch). These websites serve as a voluntary communication tool for crop producers, beekeepers, and pesticide applicators to work together to protect specialty crops and apiaries using mapping programs.

ASH TREE PROGRAM-BIOLOGICAL CONTROL ASSISTANCE

Emerald Ash Borer, EAB, is an exotic insect that was first detected in North America in Michigan in 2002. It was first documented from Pennsylvania in 2007. In 2011 Pennsylvania began assisting the national EAB parasitoid rearing laboratory in Michigan by growing tropical ash trees, *Fraxinus udii*, in existing PA Department of Agriculture greenhouse space. Leaves from these trees are used to maintain the production of EAB biocontrol insects which are reared at the USDA facility.

The tropical ash trees were started from seed in July 2011. New trees have been started periodically. Usually, 100-200 leaves are harvested and shipped overnight to Michigan, on a weekly basis.

Other notable specimens that passed through the lab were *Phaenops obtusa* (Coleoptera: Buprestidae) and *Palonica viridia* (Hemiptera: Membracidae). These specimens represented state records for Massachusetts and Utah respectively, published in *Insecta Mundi*. A couple of peculiar specimens were also pulled as bycatch from our samples: *Pterodontia westwoodi* (Diptera: Acroceridae) and *Stigmatomma pallipes* (Hymenoptera: Formicidae). The fly gets its name for a character on the male, a tooth (dontia) on the wing (Ptero), giving the leading of the wing a very distinctive look. The 2nd specimen was a queen of a reclusive group of ants, known as Dracula ants. These ants are known for their habit of hunting centipedes and sucking them dry.



Figure 1 *Phaenops obtusa*



Figure 2 *Palonica viridia*



Figure 3 *Pterodontia westwoodi*



Figure 4 *Stigmatomma pallipes*

The Department also worked on finding a new species of sawfly introduced into Pennsylvania. The Elm Zigzag sawfly (*Aproceros leucopoda*), native to Asia, was first detected in North America in Quebec, Canada in 2020. The sawfly was then confirmed in 2021 in Virginia. An inatuarlist.org report of this pest's feeding damage, characterized by the zigzag feeding patterns of the larva in elm leaves, led the department to surveying and trapping in the area. The department was able to recover several pupae from elms but were unable to rear any to adulthood. They were able to be compared to material graciously donated by Virginia Tech's Entomology Extension Program. The presence of this species in Pennsylvania is strongly suspected but unconfirmed at this time. The USDA is continuing to evaluate the pest status of this species.



Figure 2 *Aproceros leucopoda*

PDA INSECT REFERENCE COLLECTION

The PDA Entomology program maintains an active and expanding collection of insects of agricultural importance. This collection, dating back to when the Department of Agriculture was enacted, serves as a reference tool for identification and a resource for historical information of Pennsylvania and the surrounding mid-Atlantic states. The collection strives to improve its holding in both areas of agricultural importance as well as improving holdings in other taxa.

The collection added over 2,800 new specimens to the collection in 2021. There was particular emphasis on adding bees (Apoidea) from our cooperative surveys with other states. This gives the collection a broader breadth of diversity outside of Pennsylvania. Another large addition was expanding the collection synoptic set, an inhouse subset of the collection used by staff to verify identifications quickly and to train new staff. The synoptic set allows new staff to quickly appreciate and learn the variation seen within and between species.

A couple of beetles added also stood out. Specimens of *Saperda obliqua* (Coleoptera: Cerambycidae) were added to the collection, making for the fifth and sixth specimens added in the collections over 100 years.



Figure 3 *Saperda obliqua*

The lab also took part in an intercontinental project examining fungal symbionts in bark beetles in their native and invaded ranges. The project, headed by Dr. Davide Rassati of the University of Padova, Italy, put out a call for the collection of a suit of bark beetles across the world. The beetles' fungal symbionts needed to be collected in a method that preserved the fungus and limited contamination from other beetles. This trapping method was very similar to PDA's current methods and only took slight modification. Instead of using Lindgren funnels filled with propylene glycol, paper towels soaked in ethanol were placed in collection cups. These traps were set in the morning on PDA's campus in Harrisburg and serviced the next day, not the typical two weeks later. PDA was able to provide the targeted number of *Cnestus mutilatus* as well as several other bonus targets, which were sent to Italy for analysis in their lab. Hopefully we will have some news to report on this in 2022's yearend report.



Figure 4 *Cnestus mutilatus*

INVASIVE SPECIES HOTLINE, SLF REPORTING APP, AND E-MAIL REPORT SYSTEM (BADBUG@PA.GOV)

In 2021 the invasive species hotline (1-866-253-7189), the public reporting email badbug@pa.gov, and the SLF reporting tool (<https://services.agriculture.pa.gov/SLFReport/>) generated a total of 45,027 reports for all insects. The majority of reports were related to either SLF or Asian Giant Hornet. This was the third year PDA Entomology utilized the online reporting tool to track SLF, which accounted for 41,537 reports. 94.5% were made directly by the public with the remaining being entered by PSU Extension staff from additional sources (phone calls, voicemails, walk-ins, etc.). The reporting tool can provide immediate resources to reporters in interested, providing as much service as possible in one stop for the public.



Figure 5 *Vespa crabro* Jim Baker, North Carolina State University, Bugwood.org

The hotline received 972 voicemails in 2021, a small increase over 2020. The majority of reports again were related to Asian Giant Hornet, just as it was in 2020. Badbug@pa.gov received 3,112 contacts split between SLF and AGH. For both resources August through September were the busiest months with SLF reaching adulthood and becoming very visible and European Hornet (*Vespa crabro*) numbers at their highest. May also saw a peak as another common look alike, the cicada killer (*Sphecius speciosus*) is common.

