



The Pennsylvania Department of Agriculture (PDA) Entomology Program is responsible for the regulation of insect plant pests, which includes survey, laboratory analysis, and control/mitigation of new invasive insects when warranted. In 2017, the Entomology Program either conducted or actively participated in 13 invasive insect pest surveys across the Commonwealth. The laboratory received and processed 12,089 different insect samples and identified 65,505 specimens from these samples. All samples were screened for Cerambycidae, Buprestidae, Scolytinae, Siricidae, Vespidae, Bombus, Fulgoroidea and other select species like *Phytomyza gymnostoma* (Allium leafminer), *Sirex noctilio*, *Larinus turbinatus*, *Adelges tsugae* (Hemlock Woolly Adelgid), and *Pyrhalta viburni* (Viburnum Leaf Beetle). In addition, several other non-targeted species were identified if they were unfamiliar to staff taxonomists. 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 general public.

SPOTTED LANTERNFLY (SLF):

The cooperative response to eradicate SLF by the community, local governments, individual property owners, businesses, state agencies, researchers, and the federal government has been a rewarding experience. The Entomology Program extends a sincere thank you to everyone who has dedicated time, expertise, and resources this effort.

On September 22, 2014 an educator with the PA Game Commission submitted a report detailing damage to *Ailanthus altissima* (tree of heaven) and the presence of an unknown insect associated with the damage in Eastern Berks County. An inspection by PDA staff resulted in the collection of a pest new to North America, *Lycorma delicatula* (spotted lanternfly). A brief delimiting survey indicated a population that was limited in distribution, and a quarantine was established late in 2014 to contain the pest in its known area. Efforts to research the pest, delimit its distribution, and begin an aggressive control strategy were first undertaken in 2015. Information gathered in 2015, confirmed that SLF makes use of many plant species for the majority of life cycle, but is highly focused on tree of heaven from late July through October. Data indicated that egg mass scraping was an effective means for population reduction, and that use of adhesive tree bands was of limited use, capturing only the 1st through 3rd instar SLF. Starting in December of 2015, a targeted attract-and-kill control strategy was implemented at 20 properties in the core infested zone. The strategy was continued and expanded in 2016 and 2017. In 2017, PDA was awarded emergency Farm Bill funding to attempt eradication of SLF, and cooperators were awarded funding for research and outreach. To adapt to the changing infestation, and changing needs of the program, PDA hired a full-time program coordinator, forester, and purchasing agent. In addition, a seasonal field crew coordinator and ten field employees were hired in 2017. PDA also leased a centralized office to stage SLF crews and offer space for cooperating researchers to work on biological control, impact studies, treatment efficacy, and other spotted lanternfly research.

The program targets were slightly altered in 2017 to band fewer trees and switch focus to the attract and kill control work in the core zone. Additional funding was received from the USDA in September 2017 and the program was asked to switch treatment work priority to high-spread pathway and leading-edge properties. The combined number of trees banded by volunteers and PDA SLF Crews was 1,007, which resulted in the

death of 494,827 SLF. Combined mortality totals for tree banding is 1,065,258 SLF. After SLF started to deposit egg masses, the crews and volunteers switched from banding and active capture to egg mass scraping, and this effort resulted in the death of an additional 279,160 SLF. When combined with egg mass scraping mortality from 2015-2016 a total of 1,681,680 SLF have been killed by egg mass scraping. Considering that there is little to no equipment need for this control tactic, an enhanced effort to train volunteers to scrape egg masses will be employed going forward.

Using band count numbers to select properties with high levels of infestation, a control method combining host tree removal with trap tree establishment was implemented. Research by Kutztown University indicated that late instar and new adult *Lycorma* were almost exclusively feeding on *Ailanthus* starting in late July prior to dispersing for egg laying. The attract-and-kill method removes most of the "required" host and leaves a few male trees that are 10 inches or more in diameter on each property as a trap crop. The removed trees



Dead spotted lanternflies beneath trap tree.

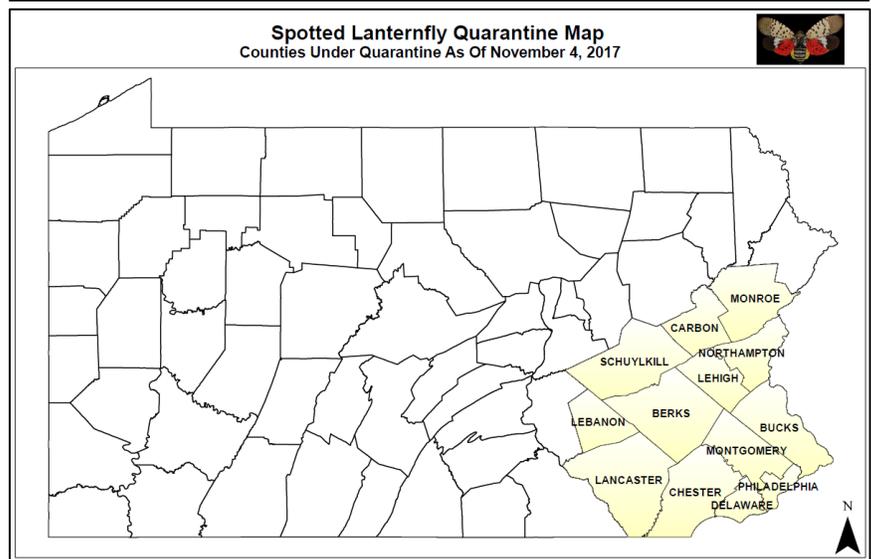
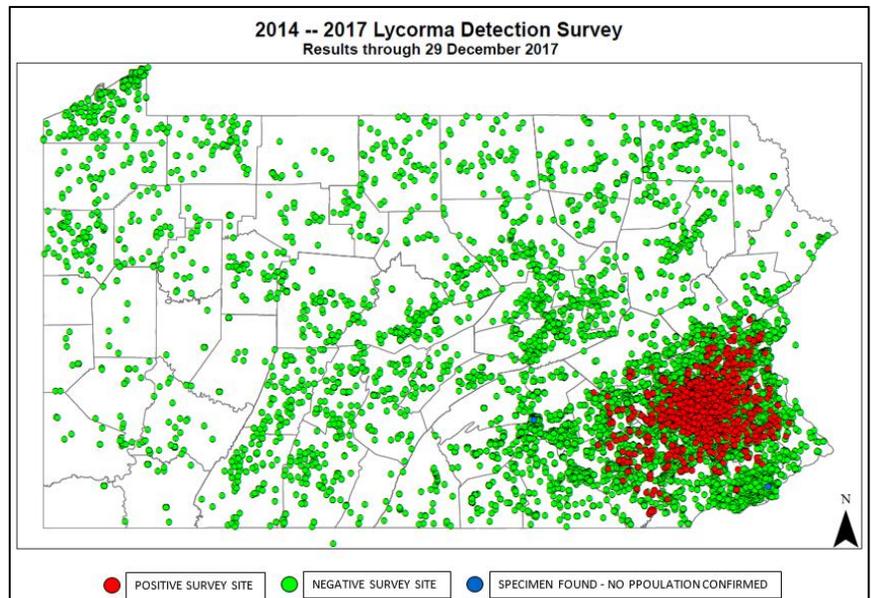
have the stumps treated with herbicide (Triclopyr) to prevent sprouting. The trap trees are treated with a systemic insecticide (Dinotefuran). The adults and late instars concentrate and feed on the trap trees and die. Though this method targets the adults, the method also kills some larvae and the impact on adults is dramatic. It is difficult to assess the effectiveness of this method during operations. Though the visual evidence is obvious, actual population counts are difficult to achieve. In 2017, PDA removed or killed 33,839 tree of heaven and established 292 trap trees. Overall the program has removed or killed 47,359 tree of heaven and established 483 trap trees on 104 properties.

New SLF behaviors were observed in 2017. Though SLF was noted on multiple plant species in previous years, no real damage was documented. In 2017, reports and photographs of SLF damaging multiple hosts were received by PDA. These included reports of damage to hops, sweet basil, horseradish, alfalfa, soy, cucumber, squash, milkweed, and yarrow. Observations of heavy feeding and damage to black walnut, hickory, northern red oak, and black cherry were made. Trees displayed flagging, dieback, and buildup of sooty mold which resulted from the honey dew expelled by SLF. Vineyards and apple orchards experienced a large influx of adult activity around the time of harvest. Activity included feeding, deposition of honeydew, and dispersal. One grower experienced high losses in grapes and had loads of apples refused due to adults being found in the product. PSU is compiling control recommendations for release to growers in the spring of 2018. SLF populations in the orchards and vineyards were so high that individuals standing in the area would have

multiple adults landing on them constantly. This highlighted the need for increased personal bio-security and new safeguarding practices to be developed.

Outreach for spotted lanternfly is coordinated through a separate Farm Bill project, but works in concert with the eradication program. PDA, in cooperation with PSU cooperative extension, presented outreach at 33 events attended by 8,881 in 2017. Events included talks on biology, regulatory information, and training for volunteers and cooperating agencies. PDA has held monthly community update conference calls with affected municipalities, and continues to reach out to the effected community. In 2018, PSU and PDA will continue to work together to disseminate control information to appropriate audiences as it becomes available.

Outreach is a key factor in the detection of spotted lanternfly in new areas. In 2017, PDA elected to employ a paid Facebook campaign. This strategy had not been used previously by PDA to encourage pest reporting. A short video was produced and used in a campaign which started on August 1, 2017 timed to coincide with the presence of the adult life stage massing on tree of heaven. The ad was tremendously effective in prompting public reports of spotted lanternfly. In the previous ten years, a total of 3,500 reports had been received pertaining to all invasive pests. After release of the ad, e-mail reports soared to 120 per day, and telephone reports to an average of 60 per day. Though we anticipated an increase in public reports we were not staffed to respond to the approximately 15,000 reports that were generated from this campaign by the time it was concluded. Visits to the PDA SLF web sites also more than doubled. Web analytics indicated we reached over 1,800,000 viewers. Even more astonishing was the benefit to SLF survey that this provided. The majority of new detections in more remote locations were the direct result of reports generated by the ad. Full credit goes to PDA's Digital Director, Emily Demsey for suggesting this strategy and arranging the ad campaign.



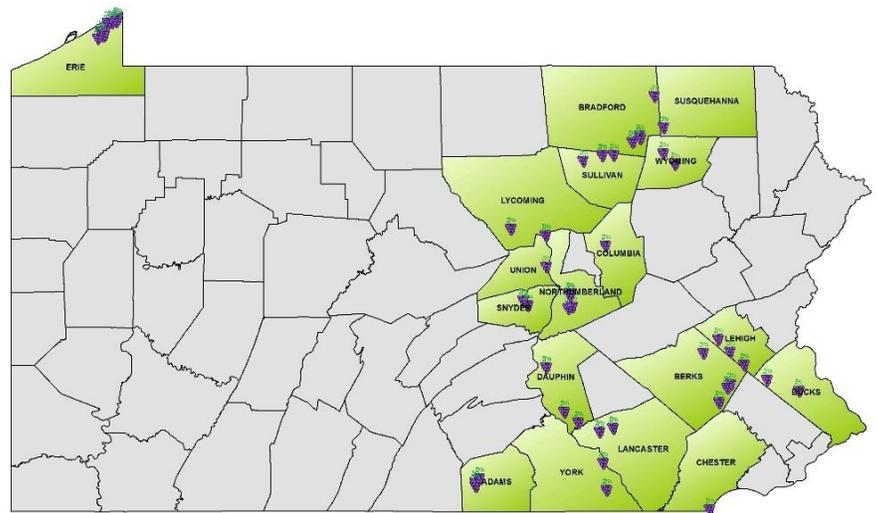
Efforts to survey for SLF across the state by the SLF crews, PDA Plant Inspectors, PDA Apiary Inspectors, and volunteers helped to identify many new infested areas over the course of 2017, which led to the expansion of the quarantine and a better understanding of the scope of the infestation. The public is extremely effective and helpful for reporting new locations. Combined survey efforts led to the discovery of infestations in 13

counties. By the end of 2017, SLF was known from 1,726 properties in 74 municipalities. The heaviest infestations are centered around the initial point of detection, and most of the remote populations in new townships and counties are comprised of only a few specimens. The quarantine restricting the movement of SLF life stages and conveyances has been extended to 13 Pennsylvania Counties.

Efforts by PDA partners like PSU, Kutztown University, local government, the USDA, and the PA Department of Conservation and Natural Resources (DCNR) helped to keep the community informed, provide for much needed training, and help answer questions about SLF. PSU provided the community with outreach materials, fielded calls from the community, and arranged for training and public meetings. PSU is in the process of hiring a full-time outreach specialist dedicated to spotted lanternfly. The DCNR continues to work with the USDA to develop biological control strategies. The local DCNR forest district provided tree identification training for SLF crews and will be hiring a technician to do spotted lanternfly control on state-owned lands. The USDA has worked with PDA and PSU to test insecticide efficacy in trap trees and investigate potential plant volatile and insect pheromone attractants. Kutztown University has helped to characterize what plants SLF are feeding on and at what point in their life cycle they use certain plants. In 2017 Kutztown undertook a study to test non-target effect of program trap trees. PSU continues to research impacts to grapes and is developing control strategies. The community has provided feedback on program operations, pest movement, and reported damage to new hosts like hops. Working together, the community, government agencies, and the research community are making a stand against this new pest.

GRAPE COMMODITY PEST SURVEY:

PDA first implemented a grape pest survey in 2010, using Farm Bill money from the USDA. This survey has been continued through 2017. The survey was run from April until the end of June 2017, completing the 2016 project. The 2017 grape commodity pest survey started on July 1st and ran until the end of October. The 2017 project will resume in April of 2018 and conclude on June 30. Target pests for 2017 included *Lobesia botrana* (European grapevine moth), *Autographa gamma* (silver-"Y" moth), *Epiphyas postvittana* (light brown apple moth), *Spodoptera littoralis* (Egyptian cottonworm), and *Lycorma delicatula* (spotted lanternfly). In the spring of 2017, survey crews established 451 sites in 18 PA counties at locations supporting wine and juice production. The PDA lab received and processed 1,595 samples, which contained 1,735 specimens. Only one target was detected in 2017. Surveys identified 54 specimens of spotted lanternfly at sites in the zone already quarantined for this pest. Surveys did also detect 47 specimens of the genus *Autographa* which were not *Autographa gamma*. This survey will resume in April of 2018.



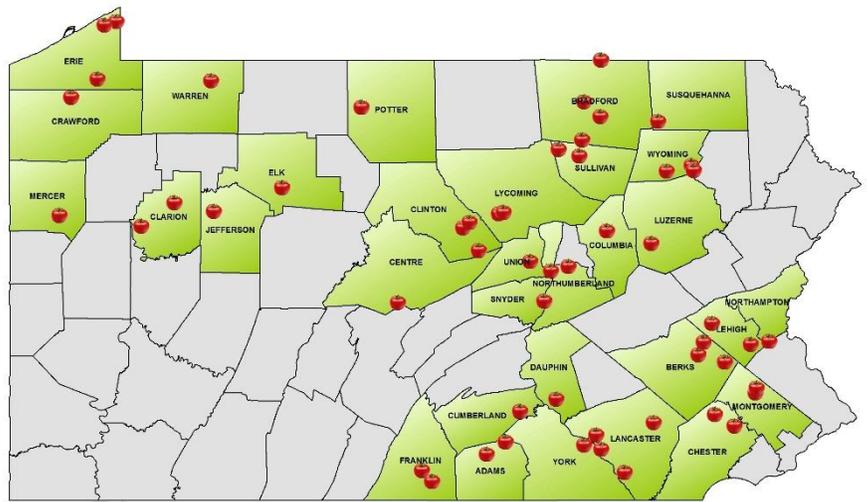
ASIAN LONGHORNED BEETLE (ALB):

The pest *Anoplophora glabripennis* (Asian longhorned beetle) continues to be a high priority for eradication if detected in Pennsylvania. ALB was declared eradicated from portions of New York, New Jersey, and Ontario in 2013. Unfortunately, new populations of ALB were discovered in New York and Ontario in the past few years. Pennsylvania continues to screen all wood destroying insect samples for ALB, all of which were

negative in 2017. In addition, ALB visual surveillance is performed as part of Pennsylvania’s Cooperative Agricultural Pest Survey. PDA also responds to a number of public reports for ALB each year. In 2017 PDA performed visual survey at 248 sites where ALB was not detected. PDA intends to continue sample screening and visual surveillance for ALB in 2018.

TOMATO COMMODITY PEST SURVEY:

Due to numerous new detections of the tomato pest *Tuta absoluta* (Family Gelechiidae) in Europe, a small survey for this pest was conducted through the PDA IPM program in 2010. In 2011, PDA received Farm Bill money to implement an official tomato commodity pest survey in PA and this was continued through 2017. Like the grape commodity survey, the tomato survey runs from July 1st, through the end of October, and resumes from April through the end of June the following year. The 2017



project target pests were *Tuta absoluta* (tomato leaf miner), *Chrysodeixis chalcites* (golden twin spot moth), *Spodoptera litura* (Cotton Cutworm), *Helicoverpa armigera* (old world bollworm), and *Bactericera cockerelli* (tomato/potato psyllid). Seasonal surveyors deployed 417 sites in 31 counties at tomato-processing facilities, retail food distribution centers, as well as at some tomato production sites. Throughout the 2017 season, surveyors submitted 2,608 samples which contained 3,728 specimens, all of which were negative for the target pests. Traps did collect 11 specimens of Spotted Lanternfly at sites inside the quarantine zone. This survey will resume in April of 2018.

EMERALD ASH BORER (EAB):

2017 marked the ten-year anniversary since the Buprestidae beetle *Agrilus planipennis* (emerald ash borer) was discovered in Butler County, and the seventh year since the removal of the in-state quarantine which had restricted the movement of materials from known infested areas to non-infested areas. It was also the seventh year of bio-control efforts by our cooperating agency (DCNR), and the sixth season of the tropical ash rearing project to support the production of bio-control agents.

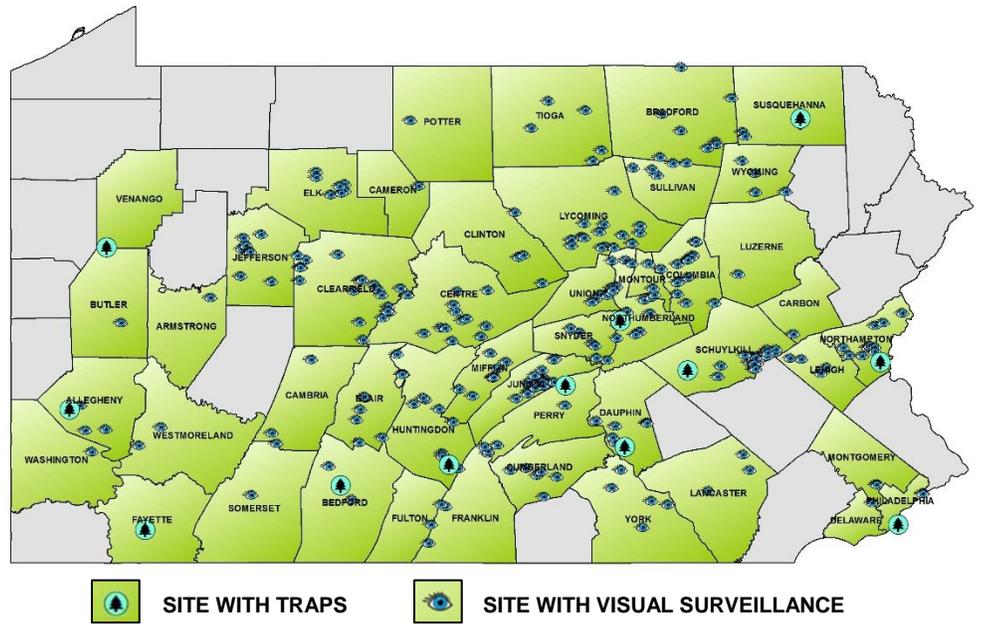


At the beginning of 2017 there were 62 counties with confirmed populations of EAB known in PA, and no official survey work was performed by PDA in 2017. In 2017, official samples were obtained from Chester, Delaware, Monroe, Pike, and, Wayne counties, by cooperating state agencies providing confirmation of EAB in all 67 PA counties.

In July of 2011, more than 350 *Fraxinus uhdei* (tropical ash) were started from seed in PDA greenhouses to support the rearing of EAB biological control agents at the National Rearing Lab in Brighton, MI. Ash leaves are required year-round to grow EAB to feed to biological control agents for this pest. Germination and initial growth of the seedlings continued through December of 2011. In 2012, the ash trees were cut back and an initial shipment of 400 leaves and a number of tree boles were sent to Michigan in May. Starting in November of 2012, regular shipments of leaves were made and this program has continued through 2017. In 2017, regular shipments were made each week starting January. PDA shipped 10,370 leaves and 63 boles to Michigan, and transferred 152 bare root trees to Florida to support the biological control efforts. In 2017 an automatic watering system was installed in the greenhouse where the ash trees are grown so that staff would not need to report for watering on weekends.

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 it also adds species of state concern. 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.



Surveys are carried out in accordance with national survey guidelines. Pests of state concern can be surveyed in a more flexible manner. In 2017, insects affecting oak, sassafras, conifers, and other Northeastern hardwoods 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 have a limited 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 96 variously baited traps. In addition, traps using general Cerambycidae lures and Callidiellum lures were hung at some sites. Risk was determined by pathway analysis, cooperation with USDA-APHIS and input from the PA state CAPS committee. Traps were run from April through the end of October. Each trap is serviced every two weeks, which generated a total of 1,356 samples and 25,165 specimens. No CAPS targets were trapped in 2017 surveys. Detections of note include 15 specimens and one new county record for the longhorned beetle *Callidiellum rufipenne* (Japanese Cedar Longhorned Beetle) in Perry County and 35 specimens of the ambrosia beetle *Cnestus mutilatus* (Camphor Shot Borer). The *Callidiellum* lure also trapped some native longhorned beetles that had never been collected before in PDA surveys. These included *Callidium texanum* and 57 specimens of *Dryobius sexnotatus*. In addition, four specimens of *Callidium attenuatum* were also collected. This species had not been collected in PDA surveys since 1938.



Blackhorned Pine Borer- *Callidium attenuatum* NEWMAN 1838

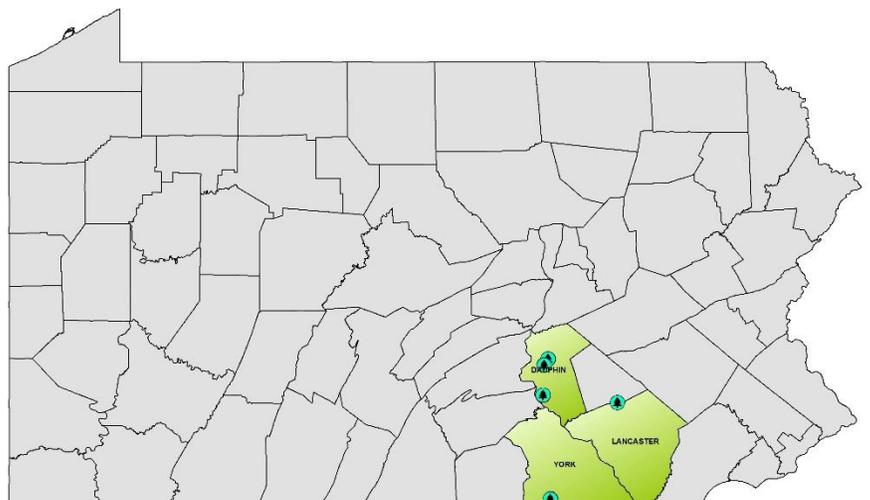


Dryobius sexnotatus LINSLEY 1957

Visual survey points were taken at all sites and several additional locations, totaling 269 visual survey sites in 47 counties for pests that are visual survey only. All visual surveys were negative for target pests. This survey will be implemented again 2018, targeting different pests and new high-risk locations.

OTIS TRAP EFFICACY SURVEY:

PDA has assisted the USDA-APHIS Otis lab with the development of traps for several years. In 2017, PDA received funding to run traps sites to test new trap designs and their ability to trap two-lined chestnut borer, *Agilus bilineatus*. As part of the agreement PDA was also asked to process trap efficacy samples from sites in Massachusetts, Louisiana, Utah, and New York for this study. In PA, 20 traps were established at sites in three counties on or near oak trees. Sites were run from May through the end of September, and serviced every two weeks. A total of 155 samples containing 1,362 specimens were received and processed by PDA from traps in Pennsylvania. An additional



1,683 samples containing 16,148 specimens were processed from surveys in the other states. Identifications for surveys done in other states will continue through the first part of 2018. In PA, the species *Agrius smaragdifrons* was trapped for the second consecutive year. This Southeast Asian species which was first reported from PA in 2016, and appears to be associated with tree of heaven, and seems to be established based on trap results from multiple seasons. There is no evidence that this species is acting in an invasive manner at this time. Data from Otis studies are used to help the USDA in determining approved trapping methods for national surveys. Evaluation of the traps and their efficacy will be performed by the lead researchers from the USDA Otis laboratory.



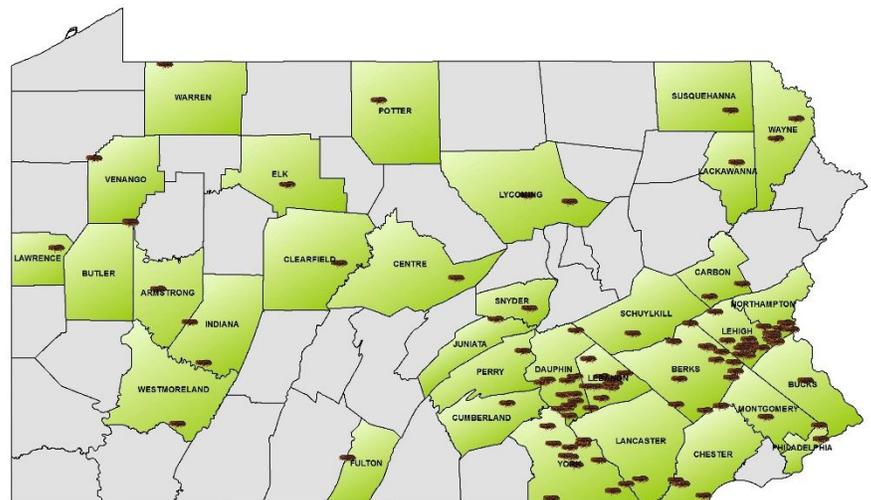
Allium leaf miner Larva in onion, Lebanon County, Photo by Mr. Baase



Allium leaf miner adults on wild onion, Dauphin County

WALNUT TWIG BEETLE (TCD):

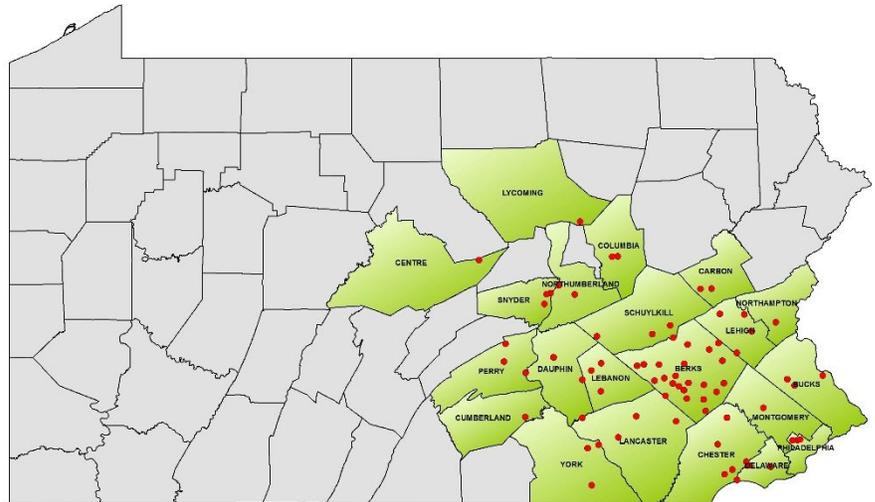
In August of 2011, Penn State Cooperative Extension in Bucks County obtained a sample of dying black walnut. The cause of the dying walnut was confirmed as Thousand Cankers Disease, a disease complex caused by a twig beetle, *Pityophthorus juglandis*, (walnut twig beetle) and the fungus it vectors. Trees at the initial detection site were voluntarily removed and destroyed by the property owner in February of 2012, and PA started a state-wide trap survey for the beetle. PA received Farm Bill



support to run a 100-trap survey for the beetles starting in July of 2012, and this survey continued through 2017. PDA seasonal and permanent staff deployed 111 traps in 33 counties in 2017. PDA focused on un-infested counties and had higher concentrations of traps in counties adjacent to known positive counties. In addition, PDA placed and monitored a few traps in the quarantined counties of Bucks, Chester, Montgomery, Philadelphia and Lancaster to gauge walnut twig beetle activity. The state of MD requested assistance with

the processing of samples from MD which PA agreed to identify. In all, PDA received and processed 995 samples containing 2,609 specimens. Two specimens of *Pityophthorus juglandis* were collected in 2017 in PA from known positive sites in Chester and Bucks Counties. The quarantine was not expanded, but remains in effect for Bucks, Chester, Delaware, Lancaster, Montgomery, and Philadelphia Counties. PA will resume this project in April of 2018.

ALLIUM LEAF MINER: In late December 2015, PDA was contacted by PSU Extension from Lancaster County for confirmation of a pest causing 100% mortality of Allium crops on an organic community supported agriculture farm. The pest was confirmed as *Phytomyza gymnostoma* (Allium leaf miner) which was a "First in Nation" detection. The Agromyzid fly is native to Asia and is a serious pest of Allium crops in Europe. In 2016, a delimiting survey and state-wide survey was



conducted by PDA and PSU extension. PDA Plant Inspectors established traps at 371 sites in 43 counties, from April through early June 2016 and again from late August through the end of October 2016. PSU extension submitted suspect samples to PDA throughout the year. These efforts yielded 1,470 samples containing 573 specimens. Of these, 551 were identified as *Phytomyza gymnostoma*, and 12 were identified as *Phytomyza plantaginis*, a native Agromyzidae fly that looks similar to *Phytomyza gymnostoma*. The majority of specimens were hand-collected. Positive records were obtained from yellow onion, white onion, purple onion, garlic, chive, spring onion, wild onion, leek, and ornamental onion. By the end of 2016, Allium leaf miner had been detected in 17 PA counties. Due to the results of the survey and detections in neighboring states, it was determined that the pest would not be quarantined, and that PSU would take the lead on research and development of grower recommendations. PDA continues to report detections in new areas as they are submitted. In 2017 PDA received official reports from four additional counties, and PSU is reporting positives in an additional seven.

For more information on Allium leaf miner, please visit the PSU web site at:

<http://ento.psu.edu/extension/vegetables/pest-alert-allium-leafminer>

APIARY PERMITS ISSUED:

The Pennsylvania Department of Agriculture (PDA) issued 39 Certificates of Inspection to process export permits for beekeepers requesting permission to allow honey bees and/or used equipment to leave PA. There were two import permits issued to allow honey bees and/or used equipment to enter PA from other states. Queen producer/nuc-selling permits were issued to 114 beekeepers enabling them to sell queens and nucleus colonies in Pennsylvania in 2017.

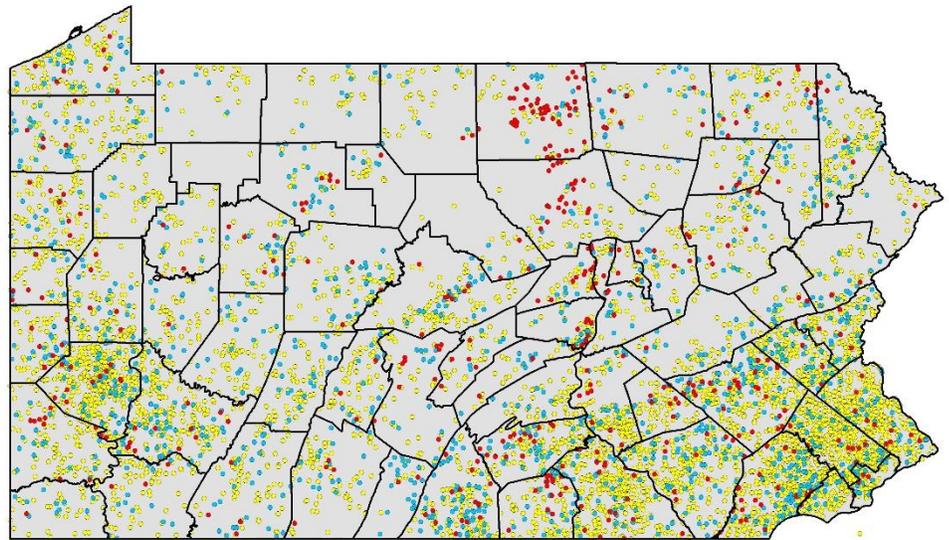
APIARY INSPECTION PROGRAM:

The value of the apiary industry in Pennsylvania in 2017 was estimated at more than \$76 million. Much of this value is attributed to increased yield 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 5,000 registered beekeepers manage over 54,000 colonies in approximately 7,500 bee yards. The majority of these beekeepers care for 0-5 hives. There were 5,818 registered bee yards with 5 or fewer colonies. There were 1,341 registered bee yards with 6-15 colonies present, and 523 registered bee yards with 16 or more colonies present.

As seen on the map, 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 the end of April until the end of October, there were six full-time seasonal Apiary Inspectors working across Pennsylvania, as well as the State Apiarist, located in Harrisburg. The Apiary Inspectors conducted 1,094 inspections in 2017.

2017 APIARY YARDS REGISTERED IN PENNSYLVANIA



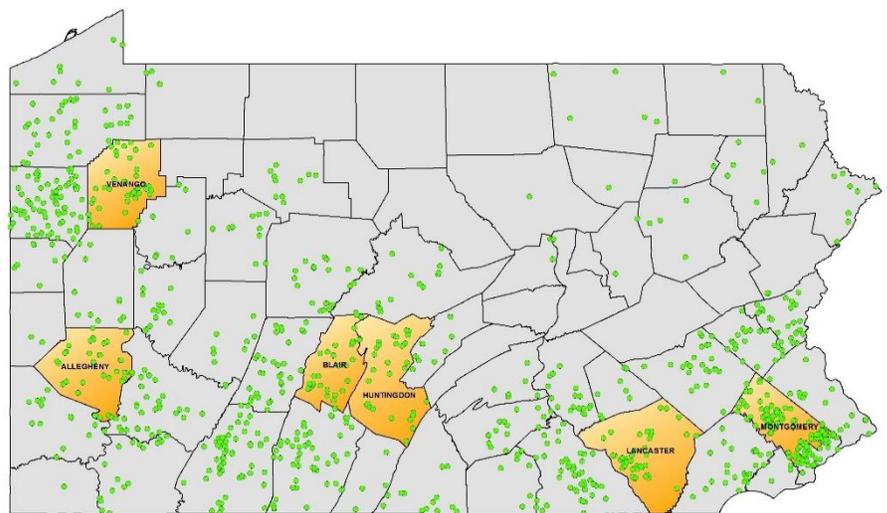
● Yards with 0-5 colonies ● Yards with 6-15 colonies ● Yards with over 15 colonies

HONEY BEE DISEASES AND PESTS:

Ten cases of American Foulbrood (AFB), a highly contagious disease affecting honey bees, were detected in eight bee yards in six PA counties in 2017. 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 laboratory tested at the PA Department of Agriculture or sent on to the USDA, Beltsville, Maryland to confirm the diagnosis and to screen for Oxytetracycline hydrochloride, (trade name Terramycin) resistance. Six of

the AFB strains were susceptible, and therefore the symptoms are treatable with the antibiotic Oxytetracycline HCL. Four were resistant to Oxytetracycline HCL. Resistant strains of AFB may be treated with the veterinary antibiotic tylosin (trade name Tylan) or irradiated. Two strains showed inconclusive results. Many beekeepers chose to burn the infected hive(s) since the antibiotics do not kill the bacterium causing

2017 APIARY INSPECTIONS AND AMERICAN FOULBROOD IN PENNSYLVANIA



● Apiaries inspected in 2017 ■ Counties with American foulbrood in 2017

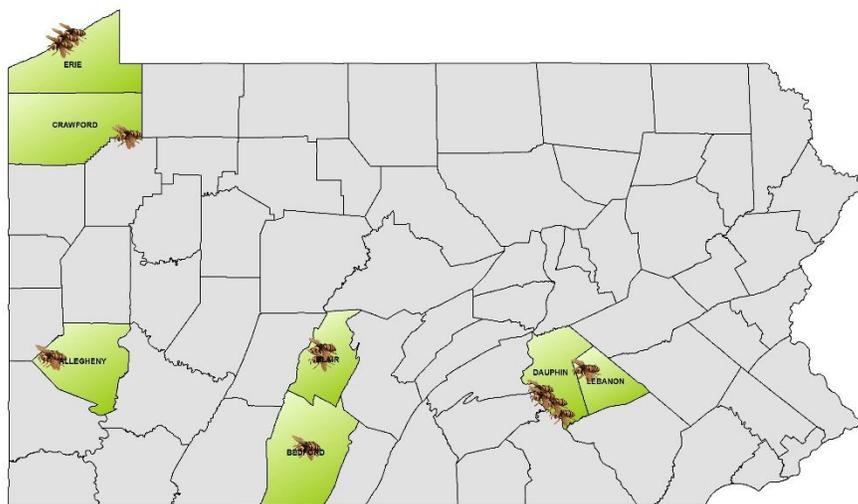
AFB. Beekeepers wishing to treat honey bees with an antibiotic (Oxytetracycline and/or tylosin) must now work with a veterinarian to obtain a prescription or veterinary feed directive (VFD). The Varroa mite, *Varroa destructor*, continues to be found throughout Pennsylvania and most areas of the world. These insect pests of the honey bee are a serious concern to beekeepers because they vector viruses causing diseases and can weaken a colony enough to cause the bees to abscond or die. Small hive beetles continue to spread throughout Pennsylvania. They are more prevalent in the southern and central areas of the state.

NATIONAL HONEY BEE SURVEY:

This was the seventh year that Pennsylvania was able to participate in the USDA/APHIS National Honey Bee Disease Survey (NHBS). The objective of this survey is to determine the diseases, pests, and parasites present, or absent, in various types of honey bee operations throughout the United States. The diseases, pests, and parasites include: American Foulbrood, European Foulbrood, Sacbrood, Chalkbrood, Parasitic Mite Syndrome, *Nosema sp.*, Lake Sinai Virus-2 (LSV-2), Acute Bee Paralysis Virus (ABPV), Chronic Bee Paralysis Virus (CBPV), Kashmir Bee Virus (KBV), Israeli Acute Paralysis Virus (IAPV), Slow Bee Paralysis Virus (SBPV), Deformed Wing Virus, Black Shiny Bees, Small Hive Beetles, Wax Moths, *Varroa* mites, *Apis cerana*, and *Tropilaelaps* mites. The survey also records the status of the queen. Live bee samples are sent for virus testing. In 2017, ten samples of wax will be tested for pesticide residue. As of December 2017, 14 of the 24 apiaries have been sampled. The remaining 10 will be completed in the spring of 2018.

EXOTIC HONEY BEE PEST SURVEY:

Asian Giant Hornet, *Vespa mandarinia*, (AGH) gained national notoriety when it was featured in a Discovery Channel program in which it was portrayed as a significant threat to apiaries and a human health threat. AGH made international news in 2013 when conditions in China led the insect to cause 42 deaths. A review of PA regulatory authority identified that there was a gap which might not allow for rapid response should the pest be introduced in North America. In 2015,

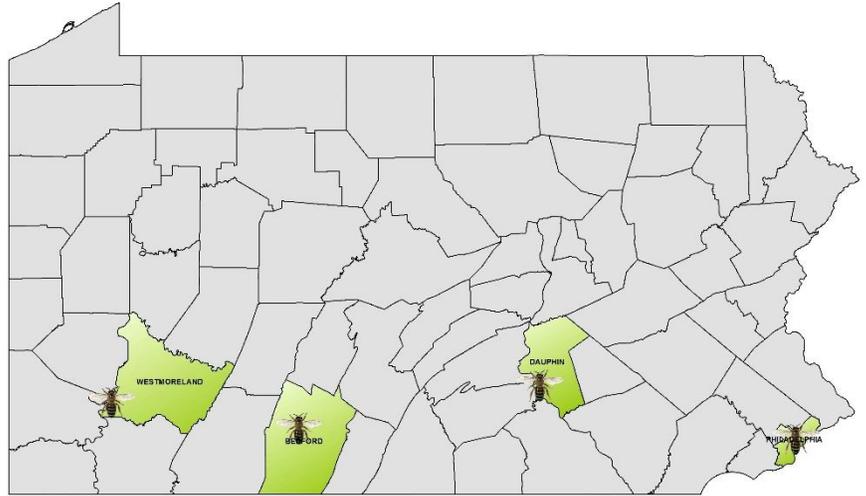


PA was awarded a Farm Bill grant to survey for AGH in PA and to develop a response strategy should the pest be detected. The effort was expanded to include other pests in 2017.

In 2017, 49 high risk sites, including international airports, ports, shipping, rail, and truck transportation hubs were established in seven counties. Traps were established and monitored April through November by six apiary inspectors and the State Apiarist. White, translucent, one-gallon jug traps and blue vane traps were established with various bait combinations. Traps yielded 362 samples containing 7,990 specimens in target groups. No Asian Giant Hornets or other exotic pests were identified in 2017, but traps did collect 597 *Vespa crabro* (European hornet) which is often mistaken for AGH. Due to the proposed listing of *Bombus affinis*, PDA also screened these samples for all *Bombus* species. Traps captured 673 *Bombus* specimens, none were *Bombus affinis*. Presentations have been made about the AGH survey at the annual PA State Beekeepers Association meeting and at the meetings of local beekeeping groups. A draft of PDA's response plan should an AGH be detected has been completed.

NATIVE BEE SURVEY:

Native bee surveys were conducted in Pennsylvania from 2008 through 2013. Due to the listing of the species *Bombus affinis*, a scaled-back version of the PA Native Bee Survey (PANBS) was revived in 2017. Four apiary Inspectors established a site for the season, placing 5 yellow and 5 blue cups for 8 or more hours, every two weeks. A total of 89 native bee specimens were trapped, including four specimens of *Bombus impatiens*. This survey will be repeated in 2018. We will be working with the Penn State Pollinator Research Center and sharing the information from these surveys.



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. This has created valuable partnerships and networks between those interested in helping. The plan is divided into an Introduction and four chapters, including Best Practices for Forage and Habitat; Best Practices for Pesticide Use; Best Practices for Beekeepers; and Recommendations for Research, Policy and Communication. The fifth chapter was written after receiving comments and information from many different people, and includes ideas and possible future goals. Readers can go to an area of interest, learning more about a topic by clicking on links to additional information. The goal is to have a factual and accurate pollinator plan which is able to help educate everyone.

The P4 will be housed on the Penn State Center for Pollinator Research's website, with links from PDA and numerous other websites. We hope that this P4 will be of great value to the citizens of Pennsylvania and will help to educate and provide ideas and information to everyone, including farmers, pesticide applicators, beekeepers, gardeners, and landscapers.

To read the Pennsylvania Pollinator Protection Plan, please visit:

<http://ento.psu.edu/pollinators/research/the-pennsylvania-pollinator-protection-plan-p4>

SPECIAL SURVEYS AND ACTIVITIES:

In 2016, a single specimen of *Trichoferus campestris* (Velvet longhorn Beetle) was trapped at a site in Carbon County. A site investigation yielded no additional specimens or infested host material. As a precaution, a ten-grid survey around the detection site was established the first week of June 2017 by Region Three PDA plant inspectors. Ten cross-vane panel traps baited with *Trichoferus* lure were deployed and serviced every two weeks until the first week of August 2017. No additional Velvet Longhorn Beetles were trapped.

In 2016, furniture from China infested with *Callidiellum villosulum* (Brown Spruce Longhorn Beetle) was intercepted from locations in multiple states including Pennsylvania. Brown spruce longhorn beetle is an early season beetle that attacks coniferous hosts. One location in Luzerne County had furniture with live specimens that had been stored in an open garage. The furniture had exit holes and the beetles that emerged could not be accounted for. As a precaution, a visual survey of the area was conducted, and five panel traps baited with *Callidiellum* lure were placed on or above the few suitable host trees in the immediate area. Traps were established the second week of April and serviced every two weeks until the last week of May. The traps were negative for *Callidiellum villosulum*, but did trap two specimens of *Callidiellum rufipenne* (Japanese Cedar Longhorn Beetle), which constituted a new county record.

In mid-May of 2016, *Rhagoletis cerasi* (European cherry fruit fly) was confirmed for the first time from Ontario, Canada. The fruit fly is native to Europe and can cause 100% crop loss in cherry. PDA was asked by the USDA and received funding to provide screening services for this new pest for traps being run in New York State in 2017. In addition, the USDA ran 13 traps in Erie County, PA. New York had 451 traps deployed in Niagara County and one trap deployed in Monroe County. Traps yielded a total of 883 samples with 586 target specimens. A total of 558 specimens from the genus *Rhagoletis* were identified. Of these, 50 specimens, all from Niagara County, NY, were the target pest *Rhagoletis cerasi*. This constitutes a new National record and poses a significant threat to cherry production. PDA has requested funding to implement survey in 2018.

PLANT DIAGNOSTIC SAMPLE REPORTS (PDSR):

In support of the PDA Plant Merchant Program, the Entomology Lab identifies Plant Inspector collected samples from routine plant merchant inspections where a pest of regulatory concern is suspected. In addition, plant inspectors are asked to target certain pests of concern during their inspections. In 2017, Plant Inspectors were asked to look for spotted lanternfly, Allium Leaf Miner, and Lily Leaf Beetle. A total of 88 samples were submitted in 2017. The most notable PDSR sample submitted in 2017 and was a record of mites potentially damaging pitcher plants at a commercial facility. The specimens were identified as *Sarraceniopus* sp. (Family Histiostomatidae). The mites are commensal and feed on the fungi and bacteria that accumulate inside the pitchers of these plants. The mites do not feed on the pitcher plant and do it no harm.

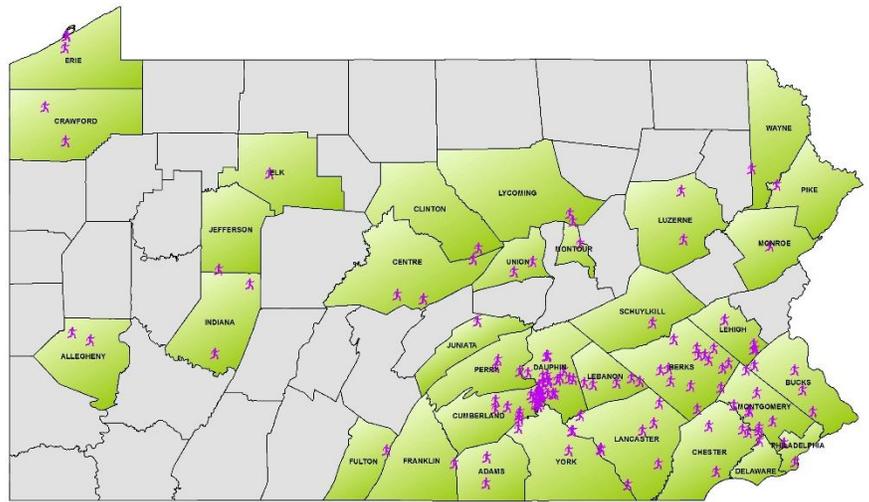


GENERAL SURVEY SAMPLES AND OTHER DETECTIONS OF NOTE:

In addition to regulatory and funded surveys, the PDA Entomology program also receives samples from cooperative extension, private industry, and the general public. Entomology records these samples as GENERAL SURVEY samples. The majority of these types of samples are submitted by commercial pest control companies and Cooperative Extension. Samples from this survey can lead to important detections of new pests that have not yet established in PA.

In 2017, PDA recorded 184 samples totaling 2,189 specimens from 33 counties in Pennsylvania. The general survey yielded only one notable detection in 2017. The snail *Cathaica fasciola* (A Bradybaenid Land Snail) is widely distributed in China and causes significant losses to economic crops. It has been intercepted and eradicated multiple times at an importer in Berks County. The company and port of entry have received training on this pest/pathway, but again in 2017 a shipment contained live specimens of the snail. Unlike in previous years, the shipment also contained a live specimen of a new stink bug pest, originally identified by PDA and later confirmed as *Erthesina fullo* (yellow marmorated stink bug). This pest is native to Southeast Asia and has been recorded to cause damage to Paulownia trees, poplars, ya (also known as Chinese white pear), peaches, nectarines, apple, pine trees, some hardwood trees, and Chinese cinnamon. Decisive action by both the importer and the USDA wiped this invader before it had a chance to make PA its home. All survey samples from the site of this interception will be screened for presence of this species in 2018 as a precaution.

Cooperators at the DCNR, Bureau of forestry and the PDA Region One plant inspector submitted samples of *Adelges tsugae* from Erie County for the first time.



Yellow Marmorated Stink Bug, *Erthesina fullo* (THUNBERG)

A single specimen of *Bombus rufocinctus* (the red-belted bumble bee) which is likely a new state record, was trapped in a *Helicoverpa* trap in Erie County. This discovery led PDA seasonal taxonomist Martin Mikulas to learn a technique for preparation and mounting of bee specimens from Sam Droege of the United States Geological Survey that greatly improves the quality of the voucher specimens. The technique will be used to prepare future voucher specimens for the PDA permanent reference collection.

PDA INSECT REFERENCE COLLECTION:

The PDA Entomology program maintains an active and growing collection of insects of agricultural importance. This collection serves as a reference tool for identification and a resource for historical information on insects in Pennsylvania such as *Bombus affinis*. The collection seeks to improve its holding in areas of agricultural significance as well as areas that have not seen recent improvement. This year the collection added 2,469 new specimens, with particular emphasis on planthoppers (Fulgoroidea), treehoppers (Membracidae) and wood-destroying beetles. This was the second largest increase in the past eight years. A substantial portion of the material added includes specimens from Utah and Louisiana, broadening the representation of material outside of Pennsylvania. The collection also acquired substantial holding of species of agricultural interest. Allium Leafminer (*Phytomyza gymnostoma*), *Agilus smaragdifrons* (Buprestidae), and the Hog Louse (*Haematopinus suis*) are three species that were underrepresented in the collection prior to this year. Loans of treehoppers and bees returned this year totaled over 1,500 specimens with updated identifications.

INVASIVE SPECIES HOTLINE AND E-MAIL REPORT SYSTEM:

In 2017, the invasive species hotline and badbug e-mail account generated 13,576 contacts to report possible invasive insects, and the Entomology Program received an additional 1,205 reports from direct mail, telephone calls, and other modes of contact. Of the 14,781 contacts, 3,299 were to the toll-free automated invasive species line, and 10,277 were to the badbug e-mail. The majority of public contacts were to report or ask about Spotted Lanternfly after a Facebook campaign launched in August which generated several thousand reports during its 75-day run.

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Bureau of Plant Industry, Division of Entomology, February 6, 2017



Red-belted bumble bee, *Bombus rufocinctus* CRESSON 1863