

Vermont Agency of Agriculture, Food and Markets
Division of Public Health and Resource Management
Plant Health Section 2023 Annual Report

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Summary of 2023 Activities

2023 Plant Health Annual Report Snapshot
113 nurseries (13 counties) surveyed for state and federal pests
24 federal and state pests surveyed
756 total trap samples screened for target pests
34 trap locations in 10 counties
132 individual traps
144 tissue samples collected for <i>Phytophthora ramorum</i> national survey from 10 counties
2 Federal phytosanitary certificates issued (1 Canada, 1 Switzerland)
3 state plant pests detected (Pale swallowwort, mile-a-minute, porcelain-berry (FPR))
2 state Compliance Agreements issued
Confirmation of Elm Zigzag Sawfly
106 emailed insect identification requests answered
2 SLF live interceptions reported by members of the public
3,000+ trees at 2 Vermont Christmas tree farms were inspected and certified for interstate tree sales
1 media interview

Boards, Councils and Committees

National/Eastern Plant Board
National Cooperative Agricultural Pest Survey Committee
Northeast Cooperative Agricultural Pest Survey Committee
Urban and Community Forestry Council
Food, Agriculture & Veterinary Defense Program
Invertebrate Species Advisory Group, Vermont Endangered Species Committee
Forest Pest Advisory Committee, ad hoc committee
VT Invasive Exotic Plant Advisory Committee

Overview of the year 2023 in Plant Health

In 2023, Vermont continued to experience a high number of invasive pest species threats. The Agency of Agriculture, Food and Markets' (VAAFMM) Plant Health Division worked closely with partners at USDA-APHIS-PPQ, UVM Extension, Forests, Parks, and Recreation (FPR) and at the Department of Fish and Wildlife (F&W) to address these invasive plant and insect species. To coordinate these efforts and Department of Forests, Parks, and Recreation and VAAFMM codified their joint approach to addressing forests and agriculture insect and plant pests with a memorandum of understanding (MOU), which was signed in 2023.

There continues to be public concern about the invasive species jumping worm, detected in all 14 counties, and the potential for introduction and establishment of the spotted lanternfly. Two federally regulated elm pests previously unseen in the state were confirmed in Vermont: the elm zigzag sawfly and black sawfly. The persistent spread of the emerald ash borer continues throughout the state, and Plant Health supported the state response led by FPR. Some areas of insect pest identification activity were lighter in 2023 in part due to the collapse of the spongy moth outbreak. The subsequent reduction in media coverage resulted in a decrease in insect identification requests.

Plant Health staff partnered with ANR's Departments of FPR and F & W to address the detection of two invasive plant species: Pale swallowwort and Mile-a-minute vine. A third invasive plant (porcelain-berry) was detected and eradicated by FPR personnel.

The Secretary appointed members to the Vermont Invasive Exotic Plant Committee (VIEPAC) as outlined in the Noxious Weed Quarantine rule. VIEPAC completed numerous pest risk assessments and recommended adding several invasive plant species to the Noxious Weed Quarantine rule.

The Agency engaged in several Federal trace forwards. for Ralstonia, Rose mosaic virus and Tomato Brown Rugose Fruit Virus only 1 of which affected VT.

The VAAFMM insect collections were enhanced by the addition of a Carabid beetle and comprehensive bee collection. UVM led a Vermont Collections Network connecting VT institutions that have invertebrate and other collections.

A total of 24 pests of federal and state concern were surveyed by the Cooperative Agricultural Pest Survey (CAPS). No federal pests were detected in any of the 5 surveys conducted. 2023 CAPS surveys included the following surveys: Nursery Pests, Christmas Tree Pests, Pine Commodity Pests, Asian Defoliators and Phytophthora ramorum.

Cooperative Agricultural Pest Survey (CAPS):

The Cooperative Agricultural Pest Survey (CAPS) is a federally funded pest detection program that supports the USDA-Animal and Plant Health Inspection Service (APHIS)-[Plant Protection and Quarantine](#) as it works to safeguard U.S. agricultural and environmental resources by ensuring that new introductions of harmful plant pests and diseases are detected as soon as possible. Early detection often reduces the likelihood of these pests causing significant damage. The program conducts science-based national and state surveys targeted at specific exotic plant pests, diseases and weeds identified as threats to U.S. agriculture and/or the environment. Surveys conducted through the CAPS program represent a second line of defense against the entry of harmful plant pests and weeds. These surveys enable the program to target high-risk hosts and commodities, gather data about pests specific to a commodity, and establish better baseline data about pests that were recently introduced in the United States. The mission of the CAPS program is to provide a survey profile of exotic plant pests in the U.S. deemed to be of regulatory significance through early detection and surveillance activities.

The CAPS program also facilitates the Plant Protection Act funded surveys for Vermont. In addition to submitting survey proposals for VAAFM’s Plant Health Team, plant health also works with UVM- extension’s plant diagnostic clinic to identify and support supplemental pest survey proposals that are managed by UVM. Plant health works closely with the director of the plant diagnostic laboratory to select federal pests to survey for, ensure lure and trap orders are placed for those surveys, and to enter and upload survey results into the required federal database, [NAPIS](#).

Federal and State 2023 Pest Surveillance Target Species

*For more information about target pests please visit the national CAPS [website](#)

Scientific Name	Common Name	Survey Methodology	Associated Survey(s)
<i>Adelges tsugae</i>	Hemlock woolly adelgid	Visual	Nursery
<i>Anoplophora chinensis</i>	Citrus longhorned beetle	Visual	Nursery
<i>Anoplophora glabripennis</i>	Asian longhorned beetle	Visual	Nursery
<i>Fiorinia externa</i>	Elongate hemlock scale	Visual	Nursery
<i>Lycorma delicatula</i>	Spotted lanternfly	Visual	Nursery
<i>Tobamovirus Tomato Brown Rugose Fruit Virus</i>	Tomato Brown Rugose Fruit (ToBRFV)	Visual	Nursery
<i>Lissachatina fulica</i>	Giant African Snail (GAS)	Visual	Nursery
<i>Litylenchus crenatae mccannii</i>	Beech leaf disease (BLD)	Visual	Nursery
<i>Agrilus biguttatus</i>	Oak splendor beetle	Trap	Nursery
<i>Cydalima perspectalis</i>	Box tree moth	Trap	Nursery
<i>Trichoferus campestris</i>	Velvet longhorned beetle	Trap	Nursery/EWBB
<i>Monochamus urussovii</i>	Black fir sawyer	Trap	Nursery/Christmas Tree/Pine/EWBB
<i>Hyllobius abietis</i>	Large pine weevil	Trap	Nursery/Christmas Tree/Pine/EWBB
<i>Ips sexdentatus</i>	Sixtoothed bark beetle	Trap	Christmas Tree/EWBB
<i>Ips typographus</i>	European spruce bark beetle	Trap	Christmas Tree/EWBB
<i>Tetropium castaneum</i>	Black spruce beetle	Trap	Christmas Tree/Pine/EWBB
<i>Tetropium fuscum</i>	Brown spruce longhorned beetle	Trap	Christmas Tree/Pine/EWBB
<i>Panolis flammea</i>	Pine beauty moth	Trap	Pine
<i>Phytophthora ramorum</i>	Sudden Oak Death	Trap	<i>Phytophthora ramorum</i>
<i>Lymantria umbrosa</i>	Hokkaido gypsy moth (HGM)	Trap	Asian Defoliator
<i>Lymantria postalba</i>	Ryukyu gypsy moth (RGM)	Trap	Asian Defoliator
<i>Lymantria dispar japonica</i>	Japanese gypsy moth (JGM)	Trap	Asian Defoliator
<i>Lymantria dispar asiatica</i>	Asian gypsy moth (AGM)	Trap	Asian Defoliator
<i>Lymantria albescens</i>	Okinawa gypsy moth (OGM)	Trap	Asian Defoliator

Nursery and Retail Plants Pest Survey

The 2023 CAPS Nursery Survey, a survey with visual and trapping components, was conducted to determine the presence / absence of 13 pests of federal and state concern. In addition to the visual surveys for target pests, 8 high volume nurseries agreed to participate in a trapping survey targeting 5 federal pests. Nursery locations were distributed through 8 counties. No target pest species were identified.

Pine Commodity Pest Survey

The pine commodity survey was conducted to determine the presence / absence of 5 federal pests in 8 mixed pine stands in 8 counties. Locations were selected based on the risk of pest introduction. Pine stands situated near places with large numbers of out-of-state visitors, such as state parks and campgrounds, were chosen for this survey. Results were negative for all target pests.

Christmas Tree Farm Pest Survey

The Christmas tree pest survey was conducted at 8 tree farms to determine the presence / absence of 6 federal pests. Farm locations were distributed through 8 counties. The results were negative for all target pests.

Exotic Wood Boring/Bark Beetle (EWBB) Survey-Plant Protection Act

The EWBB survey was conducted at 8 locations in different counties. The national EWBB survey is a plant protection act funded pest survey and is designed to detect or delimit an infestation of exotic wood-boring or bark beetles in the United States. Seven target insects were surveyed at locations identified as 'hotzones' based on pathway and risk analyses. The survey results were negative for target pests.

National *Phytophthora ramorum* Survey -Plant Protection Act

The purpose of this survey was to determine whether *Phytophthora ramorum* (Ramorum blight, Sudden Oak Death), a pathogen that poses a serious threat to the nursery industry as well as to the natural landscape, is present in Vermont. Nursery and greenhouse products are important agricultural commodities in Vermont, and the key host genera for *P. ramorum*, are a significant part of that business. VT nurseries receive a significant amount of susceptible stock from out of state, including from nurseries that have in the past tested positive for *P. ramorum*, putting these businesses at continual risk for the introduction of this pathogen.

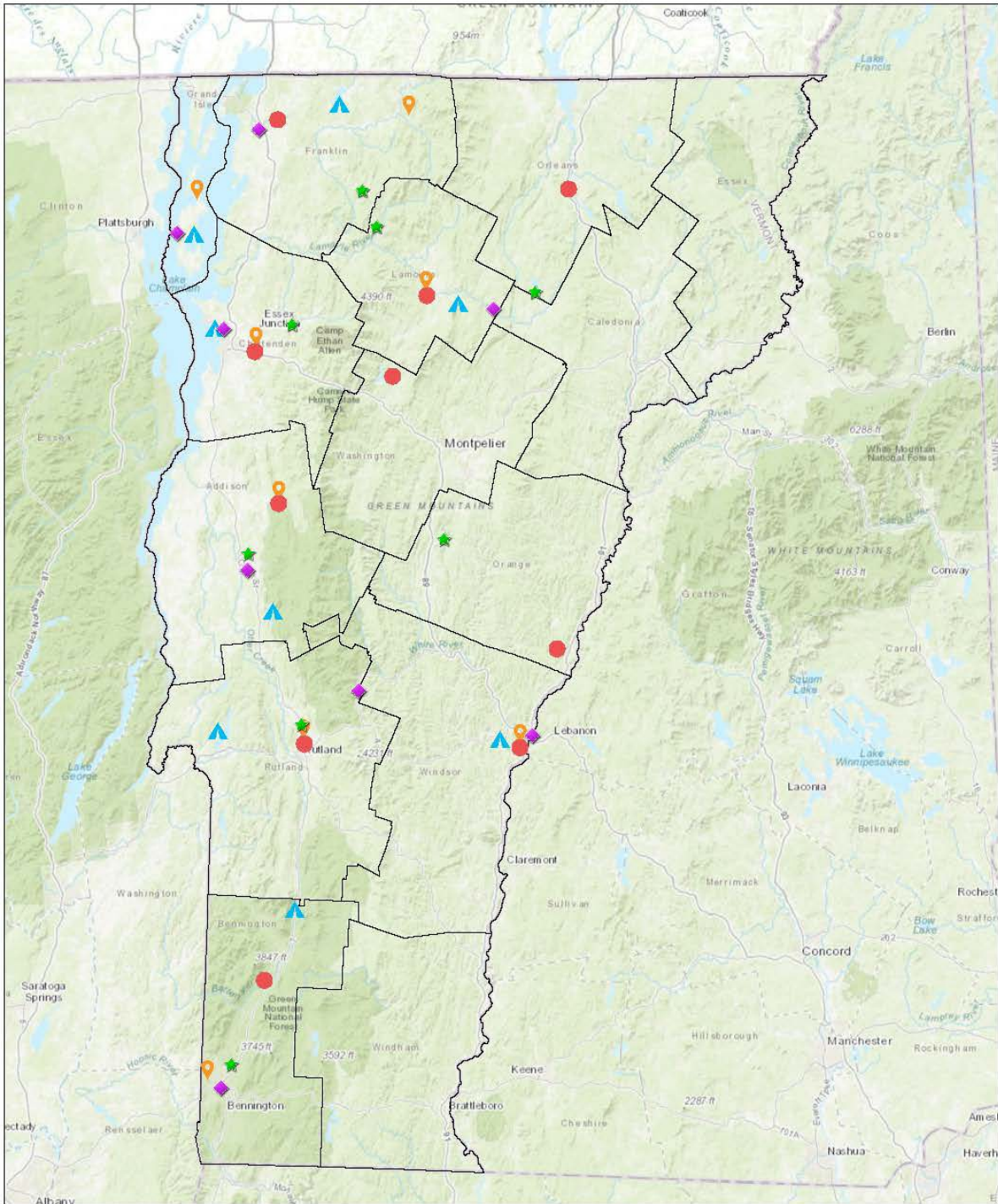
During the survey tissue samples were collected from host plants for this pathogen, including *Rhododendron spp.*, *Viburnum spp.*, *Pieris spp.*, *Syringa vulgaris* and others at 15 nurseries distributed throughout 10 counties. A total of 144 samples were processed and sent to the Pennsylvania Department of Agriculture's Plant Pathology laboratory where molecular testing was conducted to determine the presence or absence of the pathogen.

None of the tissue samples collected tested positive for *P. ramorum* in 2023. In the fall of 2022, one *Rhododendron* tissue sample did test positive for *P. ramorum* and a disinfestation procedure was put into place. Monitoring of the 2022 positive nursery continued into the growing season of 2023; however no *P. ramorum* symptoms were observed.

Asian Defoliator Survey -Plant Protection Act

The Asian Defoliator survey targeted detection of five different invasive spongy moth species in the *Lymantria* genus. Milk carton traps were set at 20 different locations around the state and collected every two weeks. Molecular analysis was carried out on all moths collected in the traps; no target species were found.

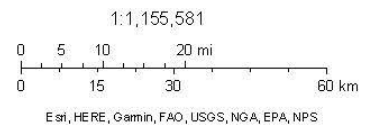
CAPS / PPA survey locations 2023



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- P. ramorum survey
- ★ Christmas Tree Farm
- ◆ Exotic Wood Boring Beetle
- ▲ Nursery
- ▲ Pine Commodity
- VT_Data__County_Boundaries (1)



Nursery Report

Inspection of Vermont's plant nurseries is a critical way of protecting our landscape and the horticultural industries. Inspection also ensures compliance with State Statutes (6 V.S.A., Chapter 206 & Chapter 84) and provides an opportunity for outreach to nursery managers. There are 539 registered nurseries in the state (this includes conservation districts and grocery stores, etc.). During the 2023 field season, Plant Health staff carried out 113 nursery inspections, primarily in the months of June through September.

Inspections were conducted in 13 of 14 counties in the state with Chittenden and Washington counties having the greatest number of inspections (Essex co. has no registered nurseries).

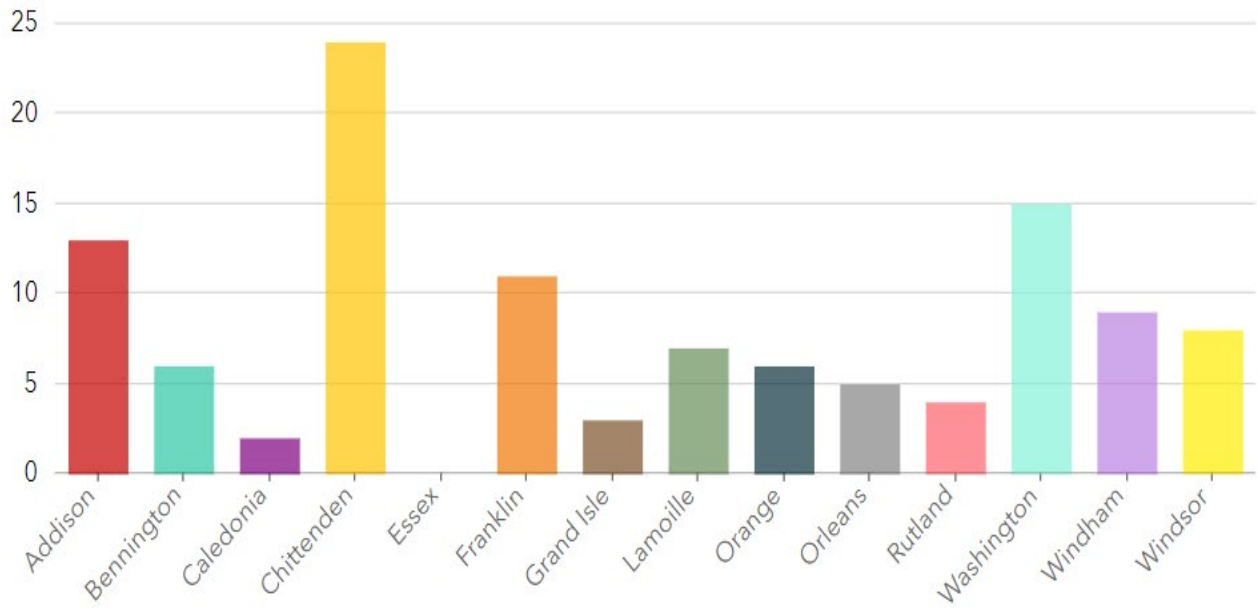
Pest and Disease Observations

During 2023, Vermont experienced a range of weather events that made for a very challenging growing season. Spring started off very dry with a continuation of the drought from the past few years. On May 17th there was a major late frost event with some areas dipping into the low 20s. This caused widespread damage to many fruit tree flowers and young leaves of less hardy landscape plants: especially hydrangea, boxwood, redbud, rhododendron, and oaks. Then in early July there was catastrophic flooding throughout the state. Some nurseries were flooded directly, but most primarily experienced oversaturation of the soils and standing water. The rest of the growing season was much wetter than average with significant rain falling each week. The excessive moisture in nursery plants along with tissue damage from frost resulted in high incidence of fungal leaf spotting, mildews, and root rots. *Phytophthora* symptoms were often observed in Rhododendrons, but there were no cases of *P. ramorum*. Interestingly, cedar-apple rust had a lower prevalence than in previous years; this was likely due to the very dry spring which reduced infection from the alternate host (cedar).

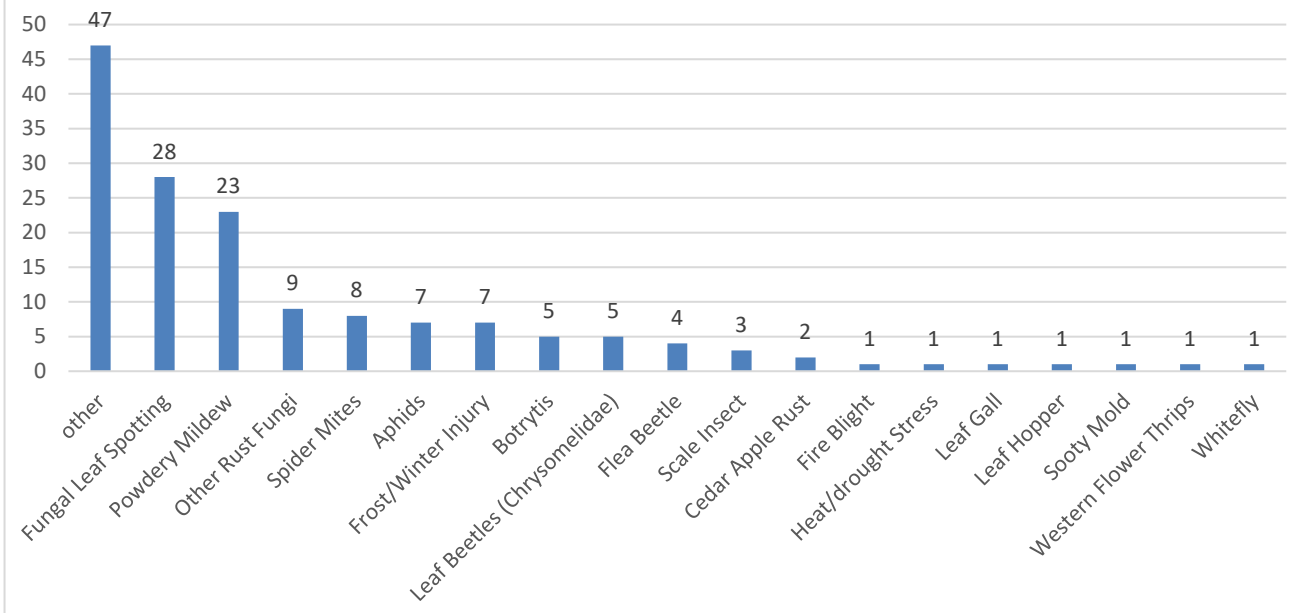
A variety of arthropod pests impacted horticultural crops during 2023. There were heavy spider mite infestations on roses, house plants, and perennials (Echinacea, hollyhock, butterfly bush, mallow, etc). Aphids, leaf beetles, thrips, and flea beetles were present at nurseries but not in unusual numbers. There were also a few incidences of unique scale insects, including one fairly significant infestation on arborvitae (Northern white cedar) early in the summer. No state or federally regulated pests were found to be established at any Vermont nurseries. No spotted lanternfly (SLF) were confirmed at any nursery in 2023. SLF is a major threat to Vermont's green industries and nursery stock coming from heavily infested states has a high risk of being an SLF vector; Plant Health staff distributed SLF outreach to most nurseries they visited.

Jumping worm is another invasive pest that continues to be of concern for the Plant Health team and growers. Jumping worms were observed at several nurseries across the state, usually in the leaf litter at the edge of growing areas or in the mulch surrounding balled & burlap trees. Jumping worms can deplete organic matter in nursery substrates and customers may be concerned about purchasing plants that have infested root balls. The Plant Health Team focuses on education/outreach to nurseries and the public to stop the spread of this pest. Plant Health participated in several webinars, created brochures/wallet cards, and developed a list of [best management practices](#) for nurseries/ landscapers to reduce jumping worm populations and limit spread to other locations.

Number of Nursery Inspections by County



Pest/Disease Incidence at Nurseries



Enforcement and Violations

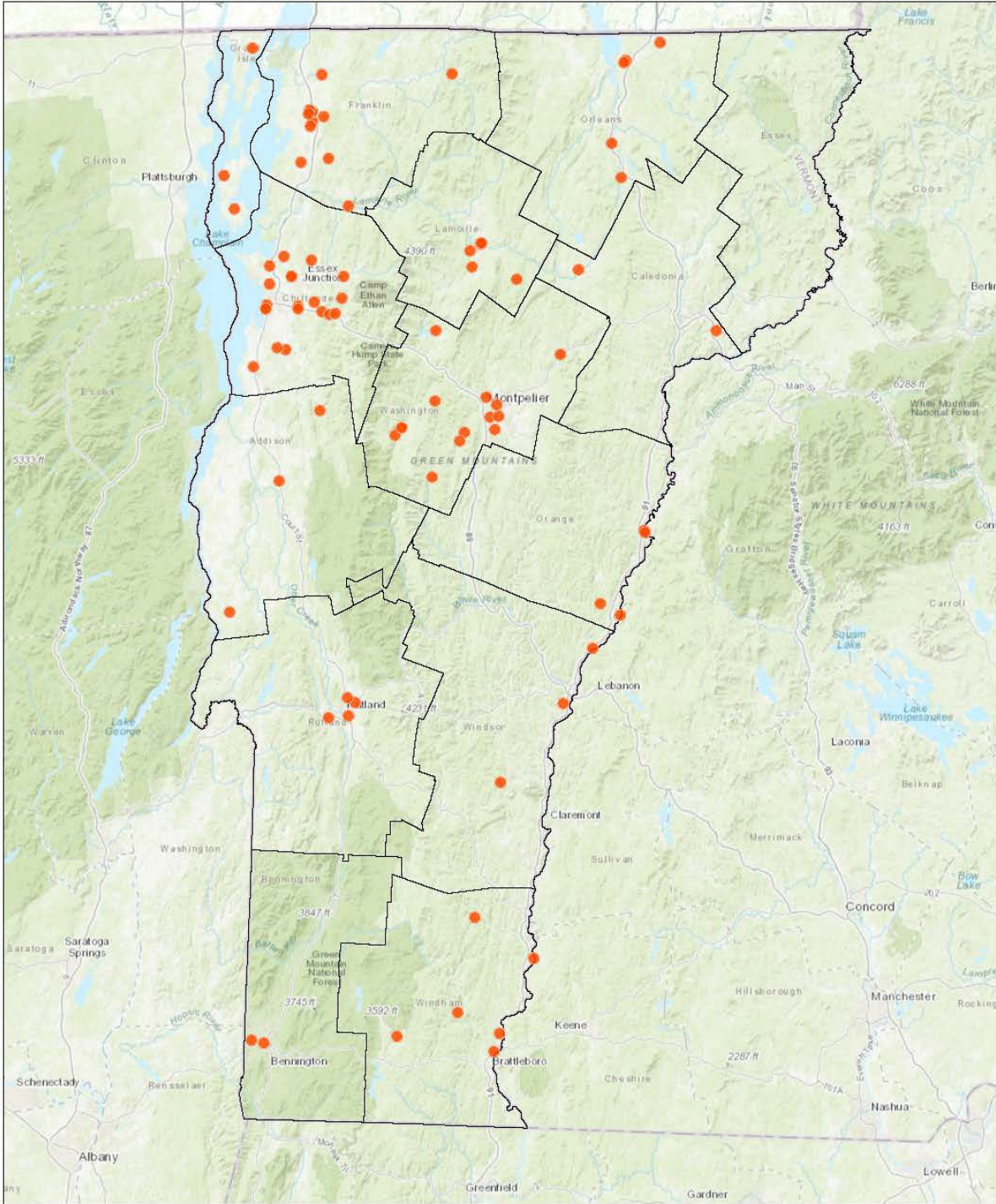
Vermont Statute requires that all businesses selling more than \$1000 of plant stock maintain a nursery growers or dealers license (6 V.S.A., Chapter 206). During the 2023 season, three unlicensed nurseries were discovered. These nurseries were given a copy of the nursery rule and the registration form to become licensed; Plant Health will follow up to ensure they are licensed by spring of 2024.

Nurseries are also subject to administrative orders if they are selling banned noxious weeds or plants infested with pests (6 V.S.A., Chapters 84 and 206). One stop-sale was issued to a nursery found to be selling noxious weeds, namely a Norway maple hybrid called 'Crimson Sunset' (*Acer platanoides x truncatum*). In this case, the owners opted to destroy the trees on site by cutting them at the base and chipping/ composting.

Plant Health staff also issued five stop-sales for plant stock that was heavily diseased/ infested with pests and was unfit for sale. Two of these stop-sales involved plants at box stores that were infested with spider mites; the managers opted to have these plants destroyed rather than treated. The other three stop-sales were for disease issues due to fungi or water molds. In some cases, the plants needed to be destroyed and for others it was possible for the grower to apply a treatment (e.g. pruning, pesticide) to isolate the disease.

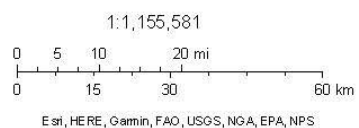
No fines or penalties were imposed on any nurseries during the 2023 season other than late registration fees.

Nursery Inspections 2023



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- Nursery locations 2023
- VT_Data__County_Boundaries (1)



Plant pest survey, detection, and management

Title 6, Chapter 84 establishes the authority for the Agency of Agriculture to conduct pest survey, detection, and management. The Plant Health Section actively engages in the survey, detection, and management of plant pests in addition to the surveys conducted through the CAPS program.

Sharing responsibility for pest detection and emerging threats

In May 2023, the Agency of Agriculture, Food and Markets (AAFM) and the Department of Forests, Parks and Recreation (FPR) established a memorandum of understanding (MOU) and outlines agreed upon shared roles and responsibilities in managing forest pests, encompassing various activities such as suppression and eradication projects, pest survey efforts, and public outreach initiatives. The authority for this collaboration is in 6 V.S.A. Chapter 84, which delineates the respective jurisdictions of AAFM and FPR in managing agricultural and forest pests. Despite the statutory mandate for cooperation, the precise mechanisms for collaboration were not explicitly outlined. The MOU recognizes the Forest Pest Advisory Committee (FPAC) as the primary advisory body responsible for guiding AAFM and FPR in identifying and responding to emerging plant pest threats. The MOU delineated the specific roles and responsibilities of AAFM and FPR in executing jointly developed Forest Pest Action Plans (FPAP), thereby enhancing the effectiveness of their collaborative efforts in safeguarding Vermont's agricultural and forest resources from pest infestations.

Export certification and compliance agreements

VAAFM and USDA-APHIS-PPQ cooperate as described in a Memorandum of Understanding between the two organizations. The MOU allows state of Vermont Plant Health personnel to serve as authorized certification Officials (ACOs) to sign federal compliance agreements and export certificates. Two compliance agreements (CAs) were issued in 2023 for two Christmas tree farms. Two phytosanitary certificates were issued through the PCIT system for international trade, including seeds to Switzerland and daylilies to Canada.

Federal Pests

The State Plant Regulatory Official (SPRO) helps coordinate the state's initial emergency response if an exotic pest is detected. The VT SPRO actively engaged in the National Plant Board (NPB) and the regional Eastern Plant Board (EPB). The National Plant Board raised concerns about the Box Tree Moth, especially regarding its impact on New York State. The Box Tree Moth has not been found in Vermont. The SPRO reviews project proposals for funding under the Plant Protection Act, and contributes to various regional and national committees including EPB's Japanese Beetle State Status Update Committee, and the National CAPS Committee (NCC). Vermont is set to host the 2024 EPB Annual Meeting. Representing the EPB, the SPRO attended the fruitful NCC annual meeting in Baton Rouge, LA.

Federal regulatory incidents in the period comprised three trace forwards involving *Ralstonia* and Rose mosaic virus, which fortunately did not spread to VT. However, plants originating from nurseries infected with Tomato Brown Rugose Fruit Virus did make it to Vermont and were destroyed. The presence of the elm zigzag sawfly was confirmed in Franklin, Grand Isle, and Chittenden Counties in VT.

Hemlock woolly adelgid (HWA), elongate hemlock scale (EHS), emerald ash borer (EAB), and Elm zigzag sawfly are the primary established pests of concern in Vermont. The Asian longhorned beetle (ALB) and Spotted Lanternfly (SLF) are the threats of greatest concern that are not established in the state.

The Vermont HWA quarantine remains in effect; all live hemlock entering the state require a phytosanitary certificate and are subject to inspection. As of November 2021, hemlocks from infested counties may be brought into the state if they have been effectively treated and are inspected upon arrival. Savannah Ferreira of the Forest Biology Lab has confirmed the presence of hemlock scale in VT. FPR has developed a comprehensive management plan for hemlocks.



Figure 1. Elongate hemlock scale, *Fiorinia externa*, in VT

A total of three live reports of SLF were received in 2023. One was an unconfirmed report which was not investigated as we require a photo or specimen for further investigation. The USDA APHIS PPQ staff stationed in VT investigated the first of the two confirmed reports of SLF, which was in Springfield, VT. The individual who reported this sighting had killed the SLF adult. PPQ found no additional life stages at that site. Plant Health staff investigated the second confirmed report, which had been posted on the internet community science website and database iNaturalist concerning a detection in Windsor VT. No life stages were found at the site by Plant Health staff and the reporter was contacted and confirmed killing the adult.

National distribution of SLF can be seen in the map below:

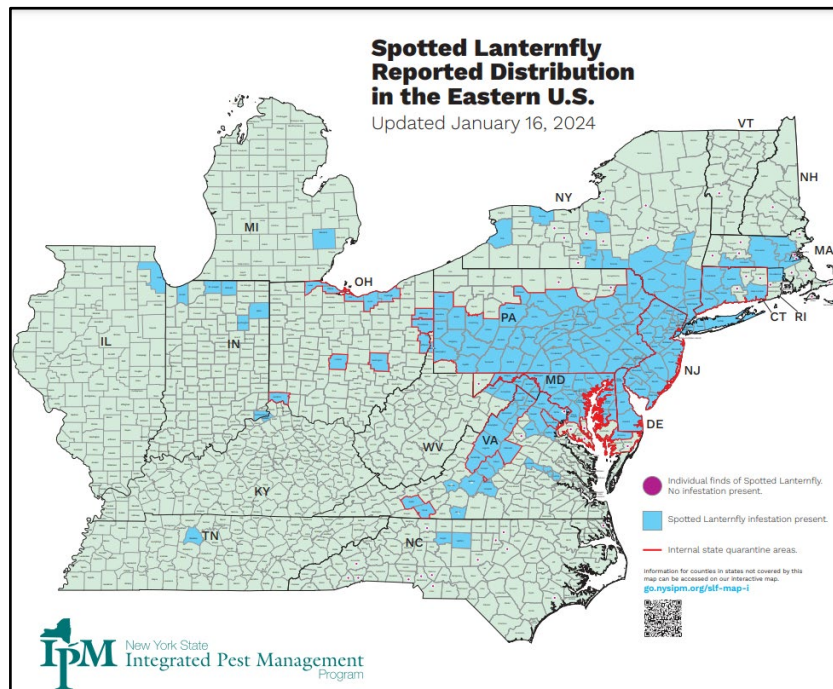


Figure 2: Current map of SLF infestation in the US. Map updated 16 January 2023, courtesy of NYS Integrated Pest Management Program

Emerald ash borer (EAB) is widespread in VT and has been found in all counties except for Essex County. In 2023, EAB was found in 19 new towns around the state.

VAAFM Plant Health staff continue to work with the Agency of Natural Resources Forest, Parks and Recreation staff on confirming the presence of EAB in new towns. FPR is deploying bio-control agents and studying the effects of these controls. USDA APHIS PPQ provides the biocontrols agents to FPR as part of the federal government’s goal to release EAB biocontrol agents (BCA’s) into every EAB infested county in the US.

The map of known EAB infestations below indicates density of EAB populations (red is most dense) and location.

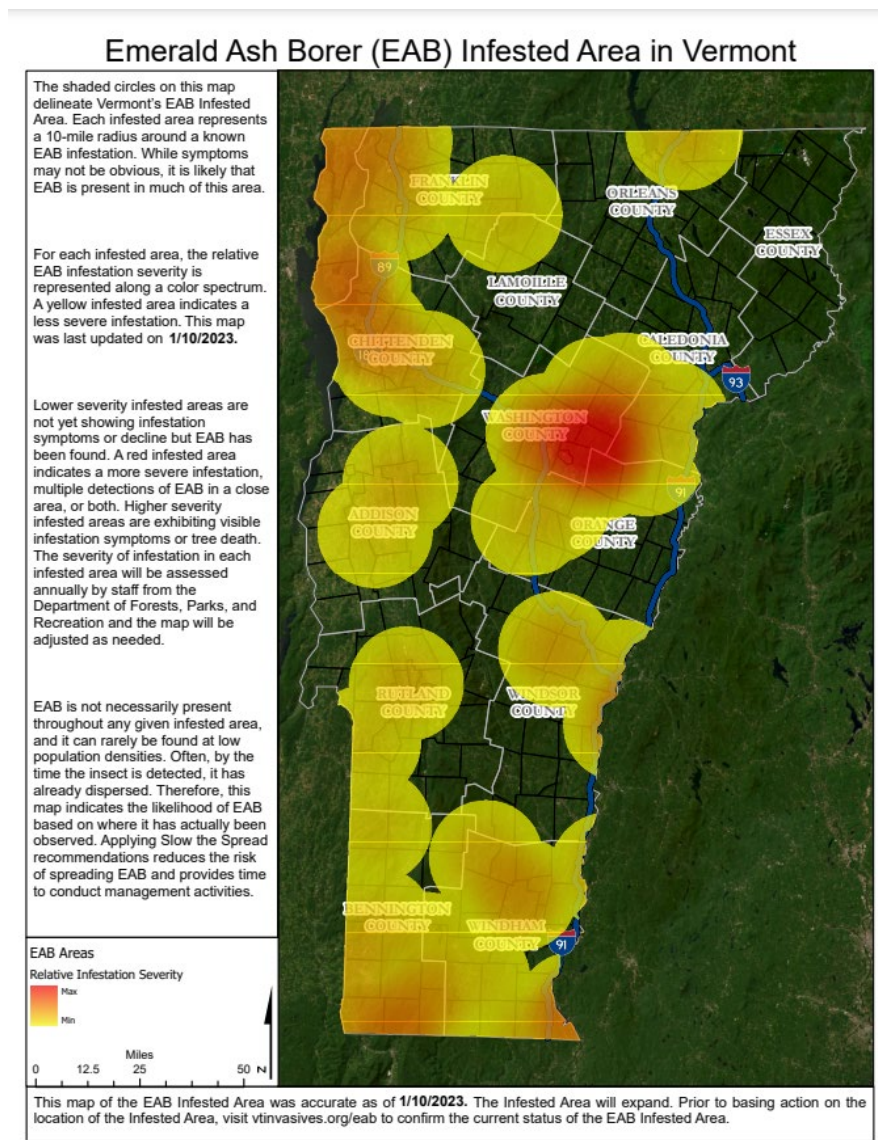


Figure 3: Current map of Emerald ash borer infestation in VT (Map courtesy of Vermont Agency of Natural Resources, FPR)

Noxious Weed Quarantine Rule

The Noxious Weed Quarantine, authority to adopt rules is in Title 6, Chapter 84, regulates the importation, movement, sale, possession, cultivation and/or distribution of certain plants known to adversely impact the economy, environment, or human or animal health.

In 2023, Plant Health collaborated with FPR, and Vermont Fish and Wildlife to address the detection of two invasive plant species listed in the Quarantine. Pale swallowwort is listed as a Class A noxious weed, and the State confirmed its presence in Chittenden County. A survey to determine its spread revealed that the infestation was extensive, and eradication was unfeasible. The State focused its efforts on public outreach and education initiatives on identifying and preventing the spread of this invasive plant. A strategic partnership was formed with the City of Burlington, prioritizing a targeted outreach campaign encompassing a press release, public service announcement, coverage on the local news and social media efforts to raise awareness about pale swallowwort and its management.

Additionally, another concerning species, mile-a-minute vine, was discovered in two locations in 2023. Mile-a-minute grows up to six inches per day creating dense mats that have the potential to block sunlight to other naturalized or cultivated plants, which may cause stress, weaken, and kill the smothered vegetation. Despite not being officially listed as a noxious weed, Plant Health staff, in collaboration with the FPR and F & W recognized the significant threat posed by this plant to Vermont's landscape. Efforts, again, were made towards slowing the spread. The State plans to monitor the locations where mile-a-minute was found. FPR successfully eradicated a second mile-a-minute infestation.

VT Invasive and Exotic Plant Advisory Committee

Vermont's Noxious Weed Quarantine Rule designates the Vermont Invasive Exotic Plant Advisory Committee (VIEPAC) to advise the Secretary of the Vermont Agency of Agriculture, Food and Markets on matters related to the addition and deletion of plant species to the noxious weed list.

The Vermont Invasive and Exotic Plant Advisory Committee, comprised of 15 members appointed by the Secretary in 2023, represents the perspectives of state and federal agencies, UVM, nongovernmental organizations, and the private sector. Their first organizational meeting took place in March, establishing a quarterly meeting schedule to undertake responsibilities outlined in the Noxious Weed Quarantine. During these meetings, VIEPAC engaged in substantive discussions to make recommendations to the Secretary to add plant species to the Noxious Weed Quarantine. The advisory committee recommended the addition of *Rosa multiflora* to the Class B noxious weed list and to include Bohemian knotweed as an addendum to Japanese knotweed on the same list. These species may be added through an amendment to the Quarantine. If added to the quarantine, VAAFM will incorporate how to identify these invasive species into training materials for the Category 14 pesticide applicator certification which will allow treatment by applicators as part of the terrestrial invasive plant control permit outlined in the Vermont Rule for the Control of Pesticides.

Ginseng Certification

The Agency of Agriculture regulates the harvesting of wild American ginseng (*Panax quinquefolius*) under the authority granted the Secretary in 6 V.S.A. sections 1, 4029 and 4031. Regulations outlined in the ginseng rule includes licensing of collectors and dealers in Vermont wild ginseng, including wild-simulated ginseng, certification of roots prior to sale, and monitoring the overall health of Vermont's wild ginseng population. Vermont's ginseng program is conducted in cooperation with the US Fish and Wildlife Service, in accordance with the Convention on International Trade in Endangered Species (CITES). Without the state program, harvesting and trade in wild ginseng would be prohibited in Vermont.

Four ginseng certificates were issued in 2023, for a total of 10904.36 gm (24.24 pounds) of green ginseng root and 7495 gm (27.55 lbs) of dry ginseng roots.

Entomology and insect collections

The VAAFM insect collections have been enhanced by two additional specialized collections. Declan McCabe from St. Michael's College donated beetle expert Jonathan Leonard's Carabid collection. And Spencer Hardy and Kent McFarland from the Vermont Center for Ecostudies (VCE) donated Leif Richardson's extensive bee collection, which has been labelled and digitally recorded.

The dynamic new curator at the UVM insect collection, Sarah Helms Cahan, has organized a group of stakeholders to create the Vermont Collections Network, with the goal of inventorying and possibly digitizing state of Vermont insect collections. The group is applying for a National Science Foundation Research Coordination Network Undergraduate Biological Education grant that would facilitate this goal.