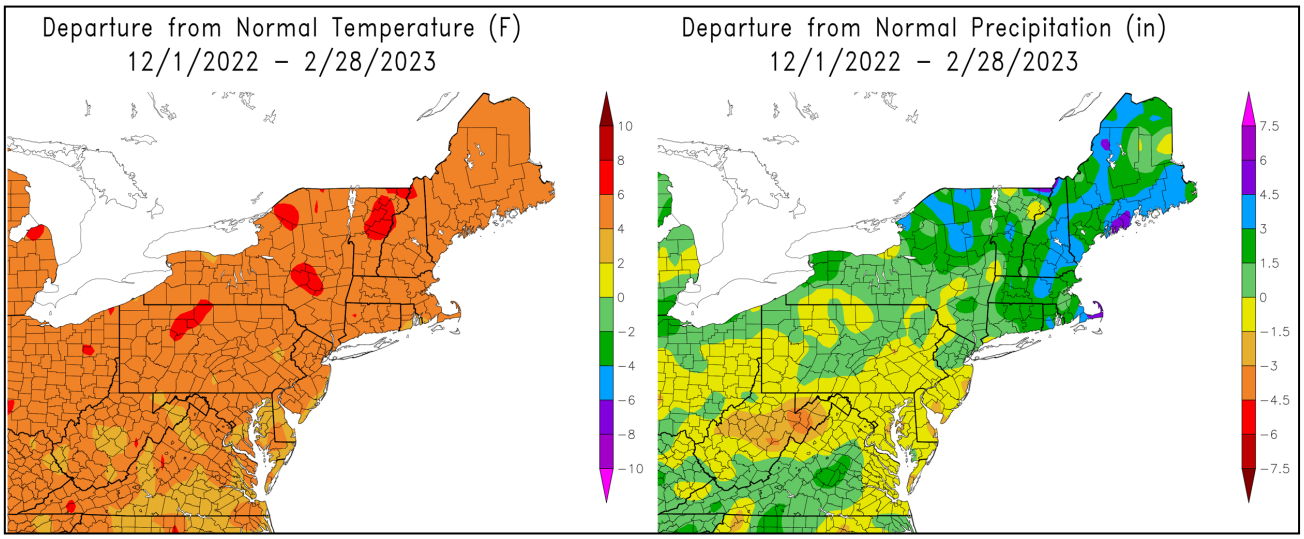
Vermont Forest Health

Insect and Disease Observations — March 2023

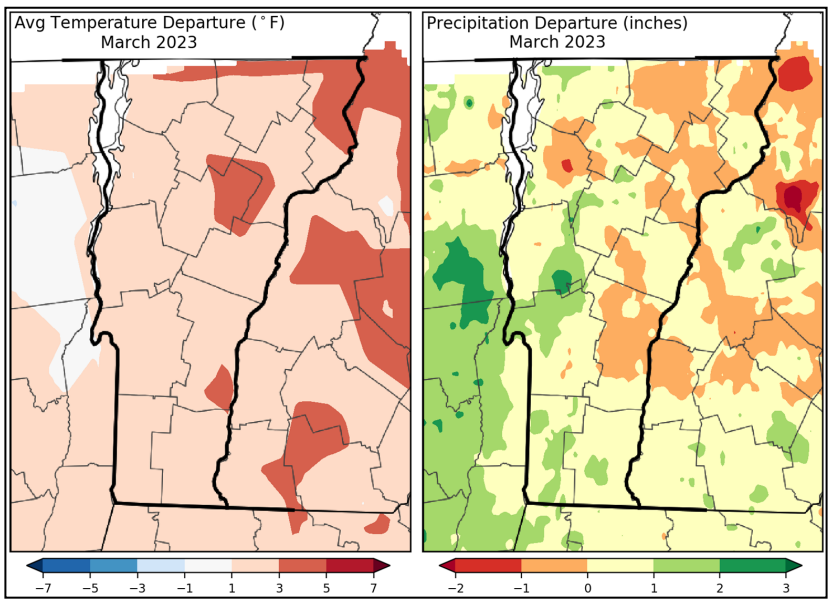
Department of Forests, Parks & Recreation
March 2023 vtforest.com

Winter Recap: Weather

Vermonters faced a warmer and wetter winter of 2022-2023 compared to years past. From December 1 to February 28, state-wide temperatures averaged 25.7°F, which was 5.4°F warmer than the winter of 2021–2022. Average precipitation across the state was 10.17 inches, which was 1.6 inches more than last year's average.



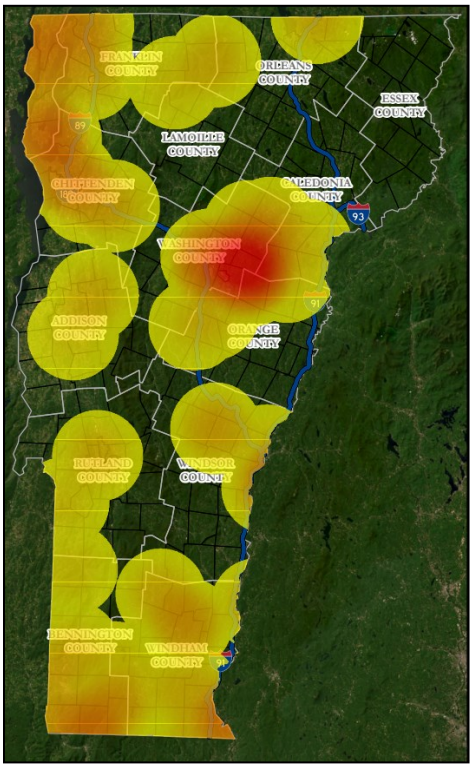
Temperature and precipitation departure from normal. Maps and data: Northeast Regional Climate Center.



The end of March marks the official start of spring, with the end of sugaring season around the corner. March of 2023 was slightly wetter and cooler than March of 2022. State-wide temperatures averaged 30.2°F, which was 0.4°F cooler than March of last year. Statewide precipitation averaged 3.41 inches, which was 0.28 inches more than March of last year.

Temperature and precipitation departure from normal. Maps and data: Northeast Regional Climate Center.

EAB Updates



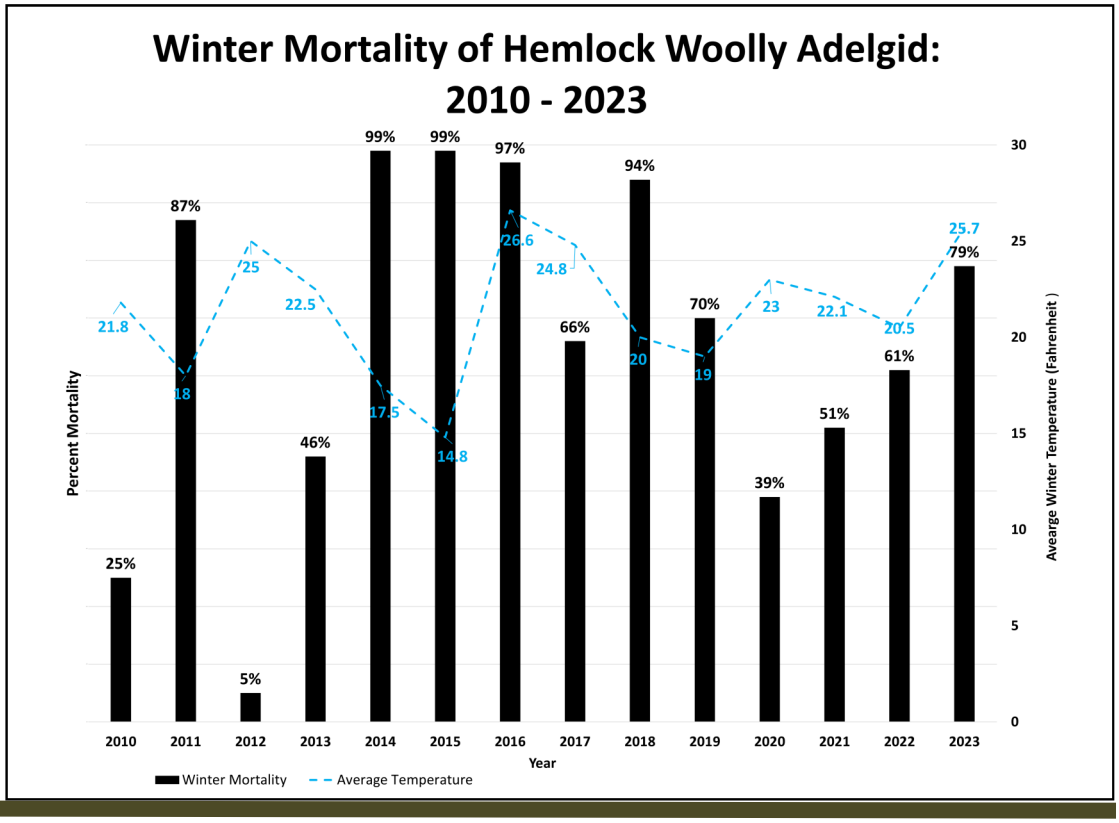
EAB infested areas in Vermont. Map and data: ANR's Natural Resources Atlas.

Several new emerald ash borer (EAB, *Agrilus planipennis*) detections were found by public reporting and FPR monitoring efforts. The new detections were found in the towns of Barnet Williamstown, Guilford, Brattleboro, and Montgomery. These new finds expand the area and severity of infestations to now include or expand further into- St. Johnsbury, Waterford, Vershire, Dummerston, Jay, Troy, and Irasburg. If you are a forest landowner, homeowner, forester, logging contractor, municipality, and/or utility professional in an infested area, you should evaluate the options available and immediately implement "Slow the Spread" recommendations. For additional resources including managing ash, or Use Value Appraisal guidance, check out the resources available at VTInvasives.

Hemlock Woolly Adelgid Overwintering Mortality

Seventy-nine percent of the hemlock woolly adelgids (HWA, *Adelges tsugae*) examined during the annual winter mortality survey were dead. HWA is more efficiently killed by subzero temperatures, however, they are vulnerable to the temperature fluctuations (periods of warming temperatures followed by successive days of deep freezes) VT experiences in early spring. These fluctuations could contribute to mortality by killing otherwise surviving HWA before they could reproduce. In the past, we have found HWA infestations in new locations following years with mild winters and mortality levels below 90%.

Assessments of overwintering mortality in hemlock woolly adelgid conducted on March 21, 2023, indicated that 79% of the adelgids had died.



HWA winter mortality (black bars) and average winter temperature (blue dashed line). Data: FPR Staff and Northeast Regional Climate Center.

Supplemental Sightings

Winter stoneflies (Taeniopterygidae) have been observed on the snow in Washington County. During the winter, stonefly larvae crawl from streams and other water bodies through the cracks in the snow and ice, emerging as adults. Although the adult stage has wings, this insect stays close to the ground in search of a mate. These adults die shortly after reproducing, with eggs hatching and nymphs entering diapause by mid-spring.

Winter stonefly. Photo credit: FPR Staff.

Pavement ants (*Tetramorium caespitum*) were reported in a building in Orange County this winter. Ant colonies tend to nest under sidewalks, building slabs and large rocks, and enter buildings through cracks in foundations, walls, or under doors. These ants are generalist feeders and consume other insects, seeds, and pollen and therefore are unlikely to make a home indoors without a food source.

Adult pavement ant. Photo credit: Joseph Berger, Bugwood.

Winter fireflies (*Ellychnia corrusca)* have been reported in sap buckets in Central Vermont in late March. As larvae, this insect feeds on rotting wood and overwinters as adults in bark grooves. In early spring, adults emerge to feed on flowers and sap, often falling in sap buckets and becoming a nuisance pest to sugar makers. Although not a significant stressor to the forest, this insect has historically been used as a predictor of the end of sugaring season.

Winter firefly. Photo credit: Elise, Seashore to Forest Floor.

Eastern ash bark beetle galleries. James Solomon, USDA Forest Service, Bugwood.

Eastern ash bark beetles (*Hylesinus aculeatus*) continue to be observed during emerald ash borer reports and surveys. These native beetles can act opportunistically, infesting stressed and low vigor as well as recently cut and broken ash (*Fraxinus* spp.) trees. These beetles create egg tunnels that are perpendicular to the branch or trunk. After hatching, larvae feed away from the egg sites, girdling the tree more in the process. If populations of this beetle are present in low populations, infested branches can be pruned out, and cultural practices could be implemented to reduce tree stress. Since this insect prefers weakened trees, management is not usually necessary.

Remnants from a bald-faced hornet (*Dolichovespula* spp.) nest were observed in Orleans County in early winter. These social insects build large paper-like nests, which start as upside-down flask-shaped nests. Each colony and its nest, lasts one year, with only fertilized Queens surviving the winter. In early Spring, a Queen will build a small nest and produce sterile offspring to enlarge and maintain the nest.

Bald-faced hornet nest remnant. Photo credit: Andy Carlow.

A late winter storm (March 14-15) brought snow loading and strong winds, causing widespread damage to trees. Fire region FDRA2 received 2-3 feet of snow with some locations reporting over 40 inches. Areas without continuous snow cover in conjunction with lack of deep hard frost in lower elevations will hasten drying conditions and increase wildland fire damage within the coming weeks. For more information on fire damage and current conditions for your area, visit Vermont's Fire Danger Forecast.

Marlboro snow drift. Photo credit: Allan McLane.

Birch (*Betula* spp.) seeds were reported covering the snow in Orange County. Easily mistaken for a swarm of insects, these wind dispersed seeds travel up to 250ft from the parent tree after being released. Birch trees are an early successional tree species, and disperse seeds throughout the winter to increase the chances of finding a favorable condition to germinate in the spring. Although birch are prolific seed producers, many seeds are lost to winter forage by a variety of birds and small mammals.

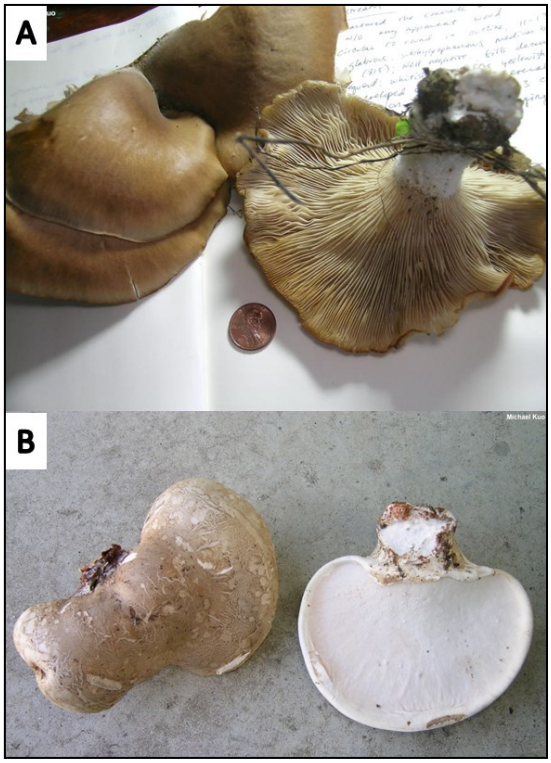
Birch seeds on the snow. Photo credit: J. Brockway.

Bristly beard lichen. Photo credit: David Stephens, Bugwood.

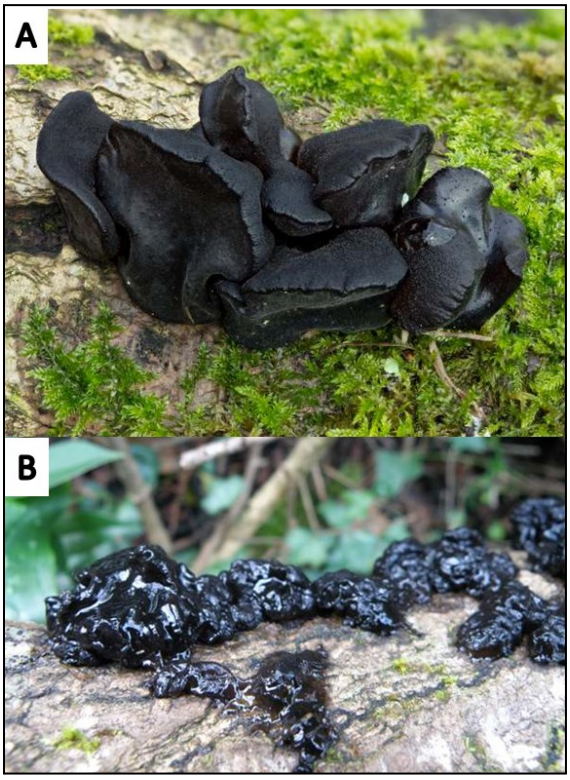
Bristly beard lichen (*Usnea hirta*) is a common fruticose lichen that can be found in both coniferous and mixed wood forests. Bristly beard lichen can be distinguished from other fruticose lichen by its short stature and abundant fibrils that give it a tufted appearance. These organisms are a byproduct of a symbiotic relationship between either algae and/or cyanobacteria and several fungal species. Although commonly mistaken for a parasite of trees, lichens photosynthesize and can take up their own water, only holding on to trees for an anchor point. The abundance and variety of lichens on a landscape can be used as an indicator of good air quality since they are sensitive to air pollution.

Foraging For Fungi

Oyster mushrooms (*Pleurotus ostreatus*) are a popular winter edible that is saprotrophic on hardwoods but can also occur on conifer trees. It has a broadly convex to flat cap that is pale to dark brown in color and measures 3-15cm across. The underside of the cap has close and frequent decurrent gills that are white when immature but yellow with age. It has a white to faintly yellow or lilac spore print. Its stem is white, hairy, and nearly absent, only measuring 1-7cm long and 1-3cm thick. Although other species of oyster mushrooms are more likely to be misidentified as this mushroom, their fruiting season takes place during the growing season. Birch polypore (*Fomitopsis betulina*) is an edible polypore that is saprotrophic and sometimes parasitic on birch (*Betula* spp.) that also persists through the winter. Its cap is white to dull brown and nearly spherical measuring 5-25cm wide and 4-10cm deep. The underside of the cap has a white to brown pore surface with the top of the cap rolling over to form a thick margin or rim around pores. It gives off a white spore print. The stem is either absent or stubby and is the same color as the cap.



A: Oyster mushrooms. B: Birch polypores. Photo and information credit: Michael Kuo, MushroomExpert.

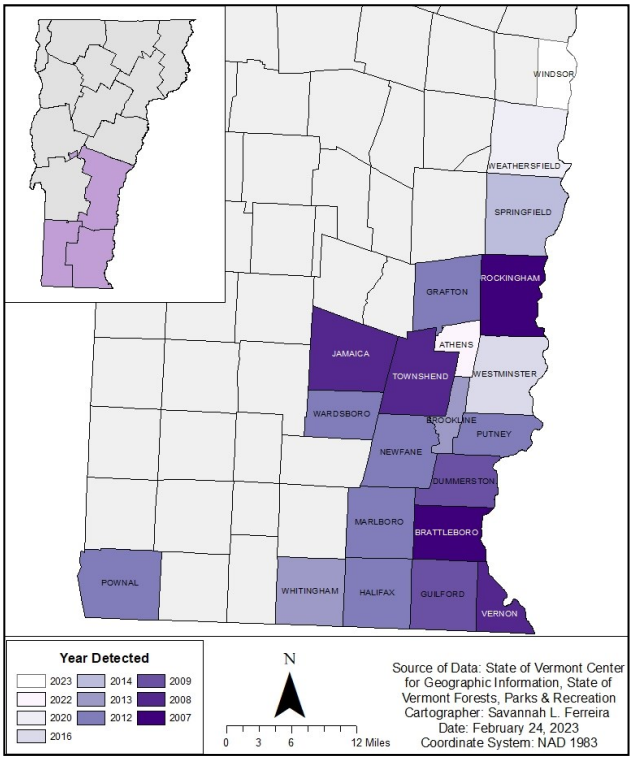


A: Black witches' butter. **B:** Warlock's butter.Photo and information credit: First-nature.

Black witches' butter (*Exidia glandulosa*) is a less foraged nonpoisonous fungi that has been associated with bad-luck superstitions. This saprotroph is often found in association with dead or decaying hardwoods including beech (*Fagus* spp.), oak (*Quercus* spp.), and occasionally pine (*Pinus* spp.). This fungus is a mid-brown to black gelatinous mass that shrivels to a warty olive-brown crust when dry. It measures 1-2cm but can sometimes coalesce to create larger masses that are 3-10cm wide. This fungus can get confused with the less commonly observed and reported warlock's butter (*Exidia nigricans*). This jelly fungus is shaped more brain-like and occurs more often on beech and ash (*Fraxinus* spp.) compared to black witches' butter.

As with all wild mushrooms, there are risks to eating and misidentifying them which can be both dangerous and fatal. Always ensure you have the correct identification before consuming any wild edible. ***The State of Vermont accepts no liability or responsibility for the consumption and/or misidentification of any mushrooms mentioned in this publication.***

Pests in the Spotlight: Hemlock Woolly Adelgid

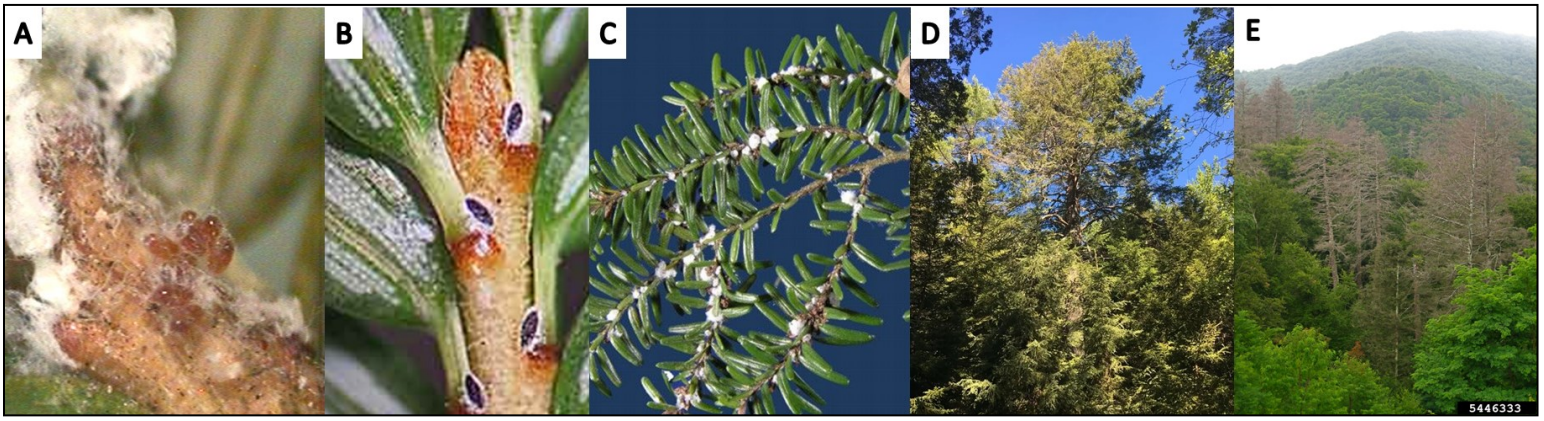


HWA Infestation in Vermont. Map and data: FPR Staff.

Hemlock woolly adelgid (HWA, *Adelges tsugae*) is an invasive sapsucking insect that feeds on twigs of eastern hemlock (*Tsuga canadensis*) and Carolina hemlock (*T. caroliniana*) causing needle yellowing, premature needle fallout, branch dieback, crown thinning and eventual mortality of infested hosts.

This pest was first detected in Oregon in 1924, then reported on the eastern side of the United States in Virginia in 1951. Since then, HWA has spread to 20 eastern states, including Vermont in 2007. **In 2023, HWA has been reported in 20 Vermont towns in three counties, with the most recent being in Windsor (2023), Athens (2022), and Weathersfield (2020).**

In its native range of Japan, HWA reproduces sexually and asexually, but populations are kept in check by natural predators. In North America, HWA only reproduces asexually, with two overlapping generations per year. The overwintering generation (sisten generation) is active between approximately June through March, and the spring generation (progrediens generation) is active approximately from March through June. Both generations have six stages of development, an egg stage, four nymph instars, and an adult stage. The spring generation produces winged adults, who fly off in search of a tiger-tail spruce (*Picea polita*), to complete sexual reproduction. This tree is not found in North America, so the winged adults perish before reproducing. Since the surviving generation does not fly, their localized spread is slow, however, HWA can spread larger distances by birds, wind, and human assisted transport. For more information or to report a sighting, visit VTinvasives.



A. HWA eggs. Photo credit: Trish Hanson. **B.** HWA adults without woolly covering. Photo credit: Mark Whitmore, Cornell University. **C.** HWA adults with woolly covering. Photo credit: Ron Kelley. **D.** Hemlock yellowing and dieback from HWA infestation. Photo credit: James Johnson, Georgia Forestry Commission, Bugwood. **E**. Hemlock mortality due to HWA. Photo credit: Jason Van Driesche, Bugwood.

Tracking the Phenology of Invasive Plants

Phenology is the scientific study of the timing of life cycle events of living things – like tracking when plants get their leaves, their flowers, and their fruits. Knowing this information gives us a better understanding of the species in Vermont's ecosystems, can guide our invasive plant management work, and can help us track the impacts of climate change on plants in Vermont.

Leaves and flower buds of **buckthorn** (*Rhamnus cathartica*). Photo credit: FPR Staff.

The Vermont Department of Forests, Parks & Recreation (FPR) is running two phenology monitoring projects focused on studying invasive plants in Vermont. These efforts are part of a growing Vermont Invasives Phenology Network. Collecting and tracking this information is made possible by our dedicated observers, and ***we hope you'll consider joining our efforts*.**

The Statewide Invasive Plant Phenology Monitoring Project (SIPPMoP) is entering its 7th year, where observers collect information on invasive plant phenology during the growing season. This opportunity is focused on collecting data on what is happening in the moment, and welcomes anyone who wishes to take part, especially people who are often outside, on the go, and able to recognize some common invasive plants. To take part, during the second full week of each month (April through October), observers note the phenology of any invasive plants they see. Observers submit their findings to FPR, and our staff summarize and publish that information monthly in the FPR Insect and Disease Observations, for immediate use throughout the state and for posterity.

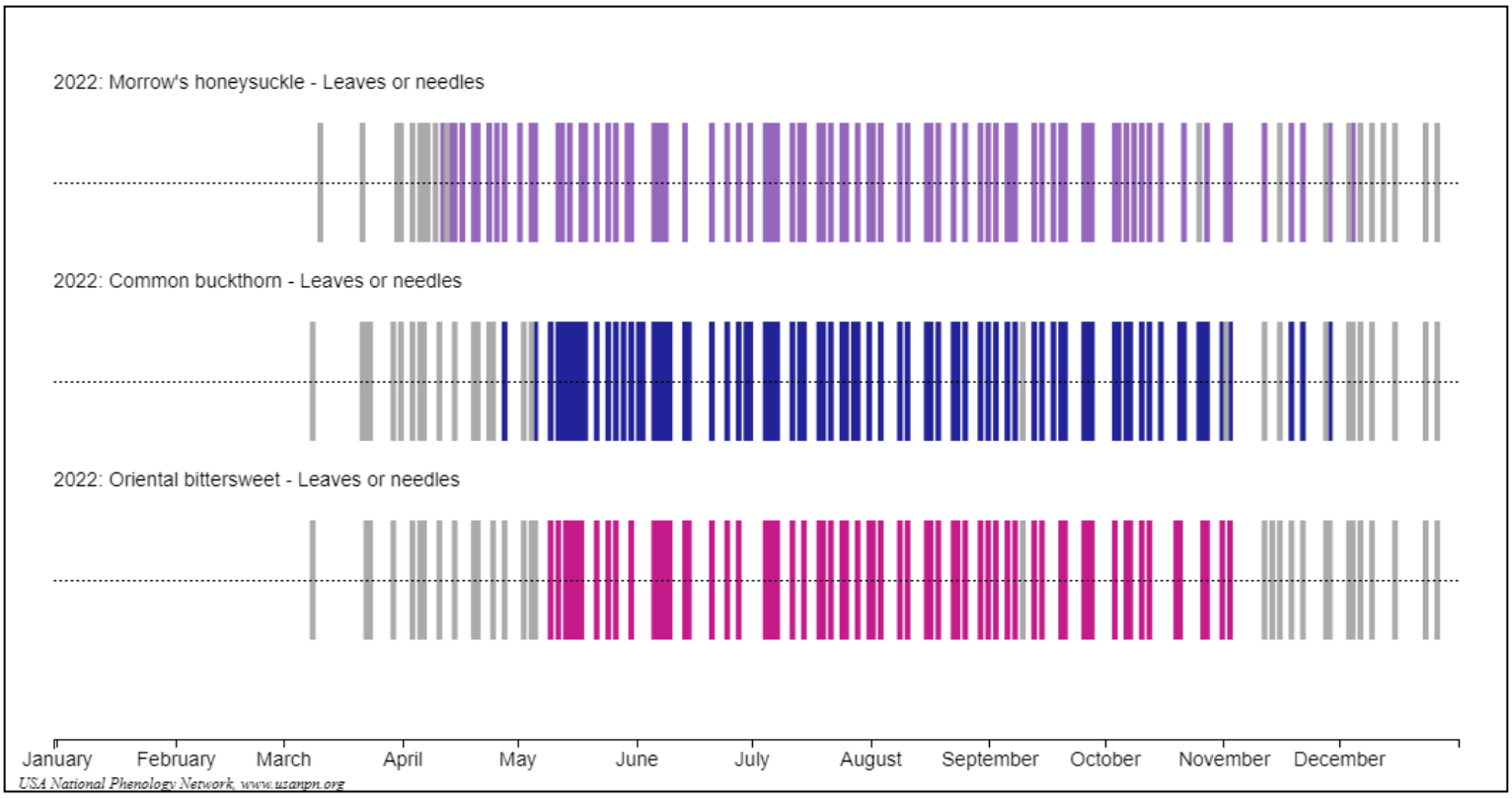
Leaves and flower buds of **honeysuckle** (*Lonicera morrowii*). Photo credit: FPR Staff.

Meanwhile, the Vermont Invasive Plant Phenology Project is entering its 2nd year, where observers collect information on phenology for invasive honeysuckle, buckthorn, and bittersweet, at specific sites located across Vermont.

This project is a multi-organizational collaboration, utilizing the National Phenology Network's database and their online mapping tool, Nature's Notebook, and uses a status monitoring approach. We are interested in collecting positive and negative data over time – or rather when a plant is or isn't leafed out, flowering, or fruiting.

This allows us to capture repeat events (like a second flowering period) and also estimate with a degree of certainty the timing of these life stages. Participants observe as part of a team and can expect to go out several times a month to collect data throughout the year. This long-term study is working to provide a baseline for plant changes we expect to see with a changing climate. Results are freely available through the National Phenology Network's online data visualization tool.

Data for 2022



"Yes" reports for the phenophase "Leaves" for **honeysuckle** (*Lonicera morrowii*), **buckthorn** (*Rhamnus cathartica*), and **bittersweet** (*Celastrus orbiculatus*). Lightest colored bars represent "No" reports for the "Leaves" phenophase. This represents preliminary results from data collected in 2022 as part of the Vermont Invasive Plant Phenology Monitoring Project, and data displayed is from all sites found across the state.

Together, we're hoping these two projects paint a robust picture of invasive plant phenology throughout the state. Data can be used to strengthen best practices for treatment and deepen our understanding of the way invasive species respond to climate change.

If you would like to be involved with these data collection efforts, there is a full list of volunteer opportunities on VTinvasives.org, and information about signing up.

FORESTS, PARKS & RECREATION VERMONT
AGENCY OF NATURAL RESOURCES

For more information, contact the Forest Biology Laboratory at 802-505-8259 or:

Windsor & Windham Counties	Springfield (802) 289-0613
Bennington & Rutland Counties	Rutland (802) 786-0060
Addison, Chittenden, Franklin & Grand Isle Counties	Essex Junction (802) 879-6565
Lamoille, Orange & Washington Counties	Barre (802) 476-0170
Caledonia, Orleans & Essex Counties	St. Johnsbury (802) 751-0110

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