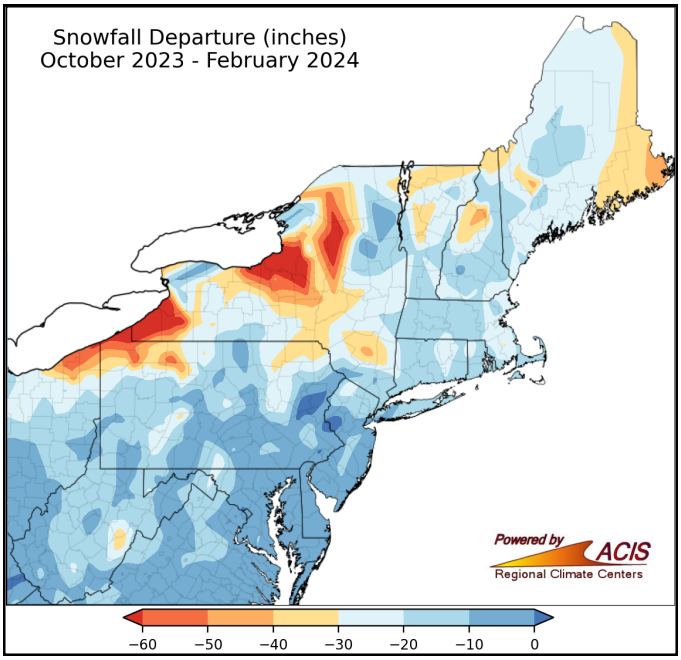
Vermont Forest Health

Insect and Disease Observations — March 2024

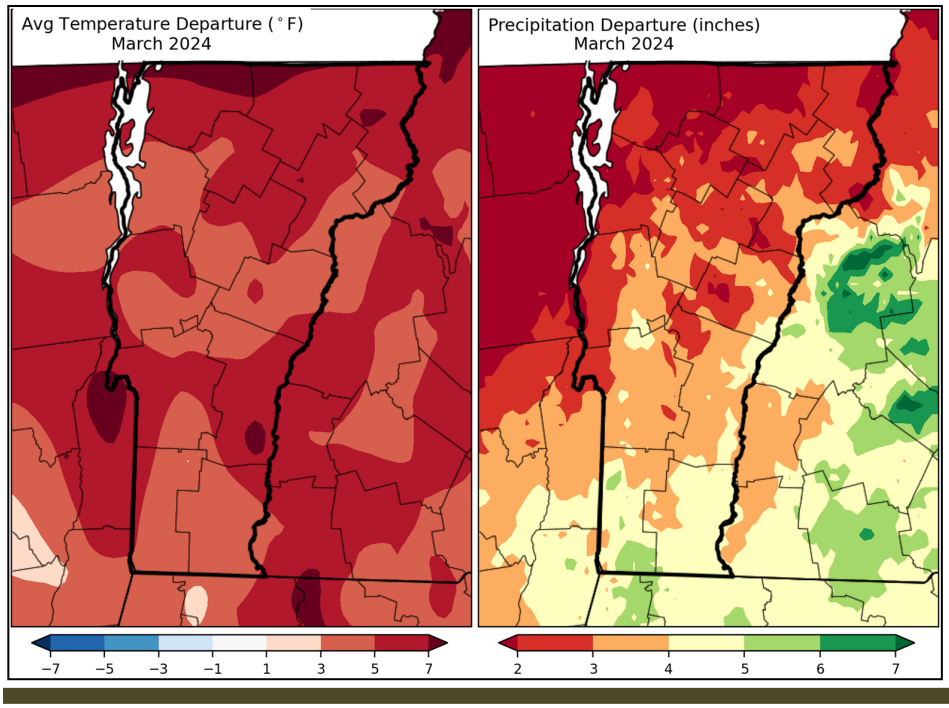
Department of Forests, Parks & Recreation
March 2024 vtforest.com

Winter Recap: Weather

Vermonters faced another warm and wetter winter of 2023-2024 compared to years past. From December 1 to February 29, state-wide temperatures averaged 27.0°F, which was 1.1°F warmer than the winter of 2022–2023. Average precipitation across the state was 10.42 inches, which was 0.2 inches more than last year's average. Although similar precipitation as last winter, most of it fell as rain, with winter snowfall being recorded up to 40 inches below normal (yellow) in some parts of the state.



Snowfall departure from normal. Map and data: Northeast Regional Climate Center.



March typically marks the official start of spring, and the unofficial start of mud-season, however February rain and warm temperatures helped to welcome in mud-season early. March of 2024 was warmer and slightly dryer than March of 2023. Statewide temperatures averaged 33.8°F, which was 3.4°F warmer than last year. Statewide precipitation averaged 3.34 inches, which was 0.07 inches less than last year.

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

Invasive Update

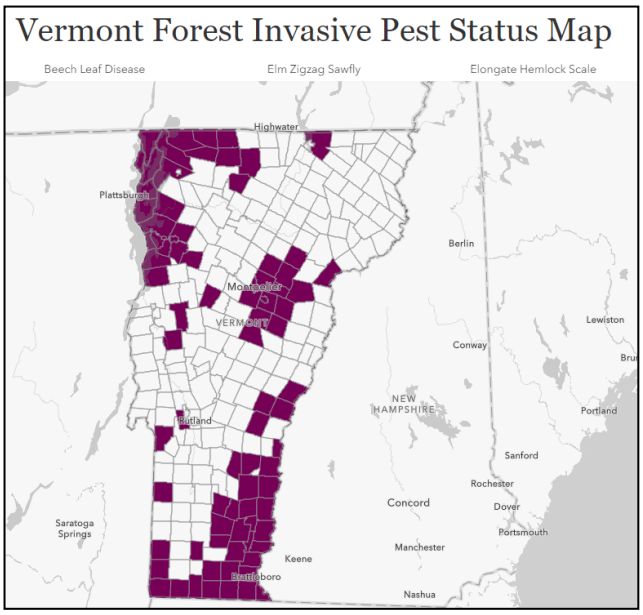
Several new detections of elongate hemlock scale (EHS, *Fiorinia externa*) emerald ash borer (EAB, *Agrilus* planipennisi) and hemlock woolly adelgid (HWA, *Adelges tsugae*) were found by FPR winter monitoring efforts.

New EAB detections were in the towns of Cavendish, Essex Junction, Norwich, Washington and Winooski.

New HWA detections were in the towns of Athens, Cavendish, Chester, Londonderry, Windham and Windsor.

New EHS detections were in the towns of Ludlow and South Burlington.

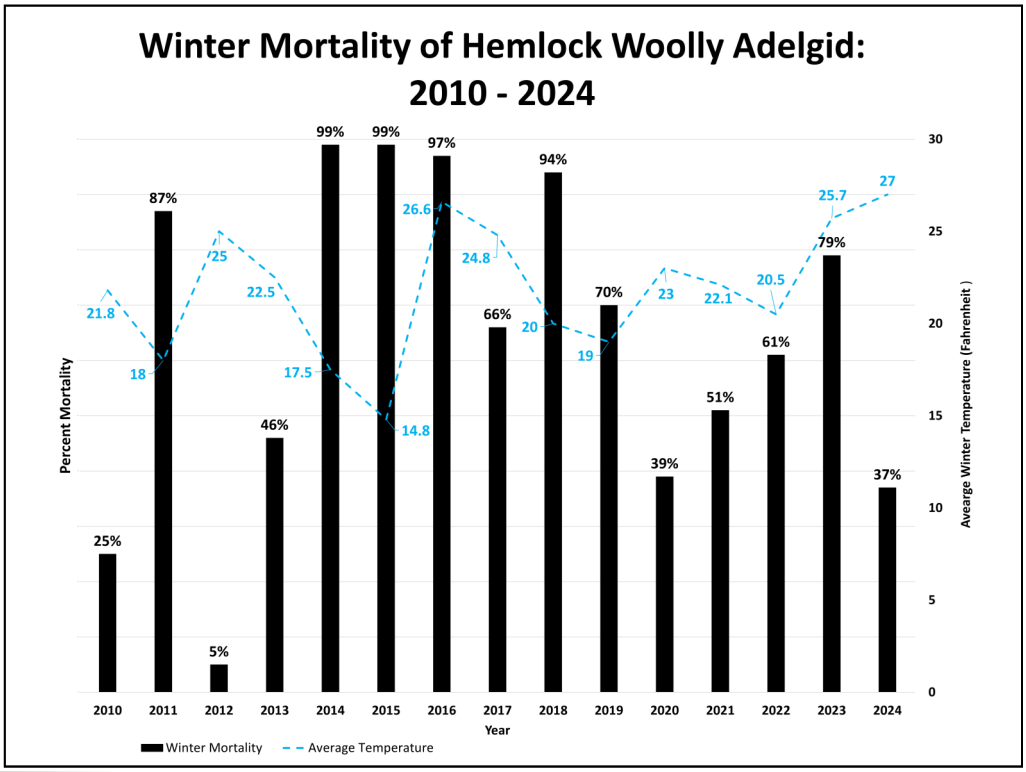
For up-to-date maps of all invasive pests affecting Vermont's forests, Vermont Forest Invasive Pest Status Map.



Hemlock Woolly Adelgid Overwintering Mortality

Thirty-seven percent of the hemlock woolly adelgids 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 19, 2024, indicated that 37% 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

Eastern filbert blight (*Anisogramma anomola*), was reported on hazelnut (*Corylus* sp.) in Franklin county. This native pathogen causes cankers and dieback in American hazelnuts (*C. americana*), and also mortality in European hazelnuts (*C. avellana*). In early spring, elliptical black stromata (which contain the spore-bearing structures, perithecia) can be found protruding from infected tissue in longitudinal rows. Although no fungicides are registered to treat this disease, infected plant material can be pruned out and properly disposed of to reduce its severity.

Eastern filbert blight stromata. Photo credit: FPR Staff.

Winter cutworm (*Noctua pronuba*) was observed crawling on the snow in Washington county. This caterpillar is the immature stage of the large yellow underwing, which is native to Europe and was introduced to North America in 1979. Although most of the feeding to garden and agricultural crops happens in late summer and fall, these cold-tolerant caterpillars can be found walking across the snow to find food when winter air temperatures are above 40°F.

Winter cutworm. Photo credit: FPR Staff.

Hemlock scale (*Hemiberlesia ithacae*) was observed on eastern hemlock (*Tsuga canadensis*) in Windsor and Orange counties. This native scale causes yellowing needles and premature needle drop in infested hosts, and when populations are high, can cause branch dieback and tree mortality. Although a native to the U.S., hemlock scale has not been previously detected in Vermont, with its historic northern documented range extending to southern New York and Connecticut.

Hemlock scale. Photo credit: FPR Staff.

Golden canker, caused by the fungal pathogen *Cryptodiaporthe corni*, was observed infecting pagoda dogwoods (*Cornus alternifolia*) in Franklin county. Cankers are more prevalent on branch tips but can progress down to larger branches and the main stem. Although a native pathogen, these cankers cause stem girdling which can lead to dieback and mortality. To reduce the presence and severity of this pathogen, tree stress should be minimized, which can include planting in cool and shaded sites and watering during periods of drought.

Golden canker. Photo credit: FPR Staff.

Oak skeletonizer (*Bucculatrix ainsliella*) cocoons were observed on eastern hemlock needles in Windham county. This native caterpillar skeletonizes the leaves of oaks (*Quercus* spp.). These insects have two generations per year, with the second generation over-wintering as pupae in a whiteish-brown ribbed cocoon. This cocoon can be attached to fallen branches, leaves, non-host plants, or nearby structures. Adults will emerge in early spring, mating and laying eggs on the upper side of oak leaves.

Oak skeletonizer. Photo credit: FPR Staff.

White pine blister rust (*Cronartium ribicola*) was observed causing cankers on eastern white pine (*Pinus strobus*) in Windsor county. This rust pathogen requires both eastern white pine and currants or gooseberries (*Ribes* spp., also *Castilleja* spp. and *Pedicularis* spp.) to complete its lifecycle. On eastern white pine, this pathogen causes cankers at branch whorls, which can be accompanied by resin, necrosis, white to yellow fruiting bodies and/or mortality.

White pine blister rust. Photo credit: FPR Staff.

Yellow-bellied sapsucker (*Sphyrapicus varius*) was observed causing damage to sugar maple (*Acer saccharum*) in Rutland county. This native woodpecker excavates holes in a linear fashion on both hard and softwood trees, consuming sap that is secreted, as well as arthropods attracted to the wounds. These birds can cause extensive damage, often girdling trees when feeding is vigorous.

Yellow-bellied sapsucker damage. Photo credit: Randy Cyr, Greentree, Bugwood.

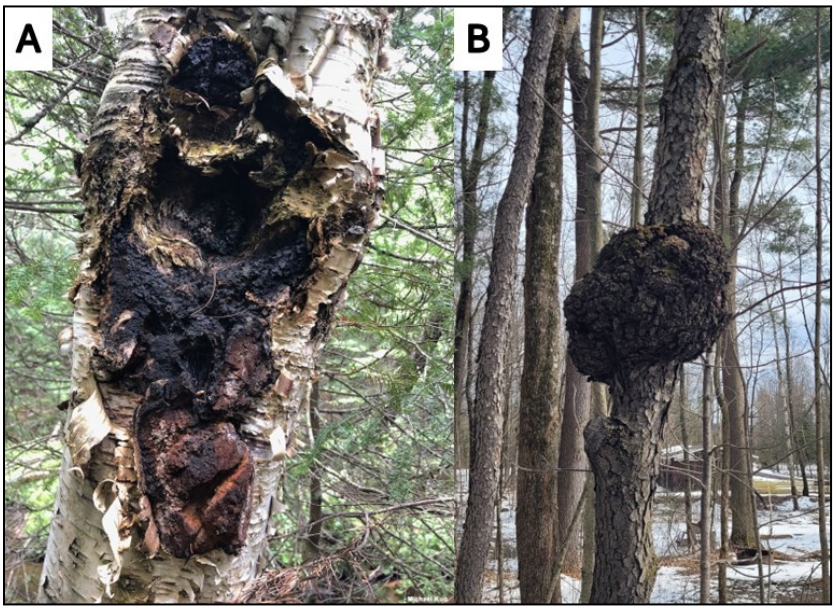
Beech bark disease (scale: *Cryptococcus fagisuga* and fungal pathogens: *Neonectria* spp.) was observed causing cankers on American beech (*Fagus grandifolia*) in Franklin county. The introduced scale primarily feeds on the main bole, causing small holes that are then colonized by the native fungal pathogens. Although typically small, hundreds of cankers can exist on a single tree, which contributes to severe dieback and mortality of infested hosts.

Beech bark disease. Photo credit: JoeO'Brien, USFS, Bugwood.

Foraging For Fungi

A: *C. rangiferina* **B:** *C. subtenuis*. Photo credit: (A) Ray Showman, (B) Bob Klips Ohio Moss and Lichen Association.

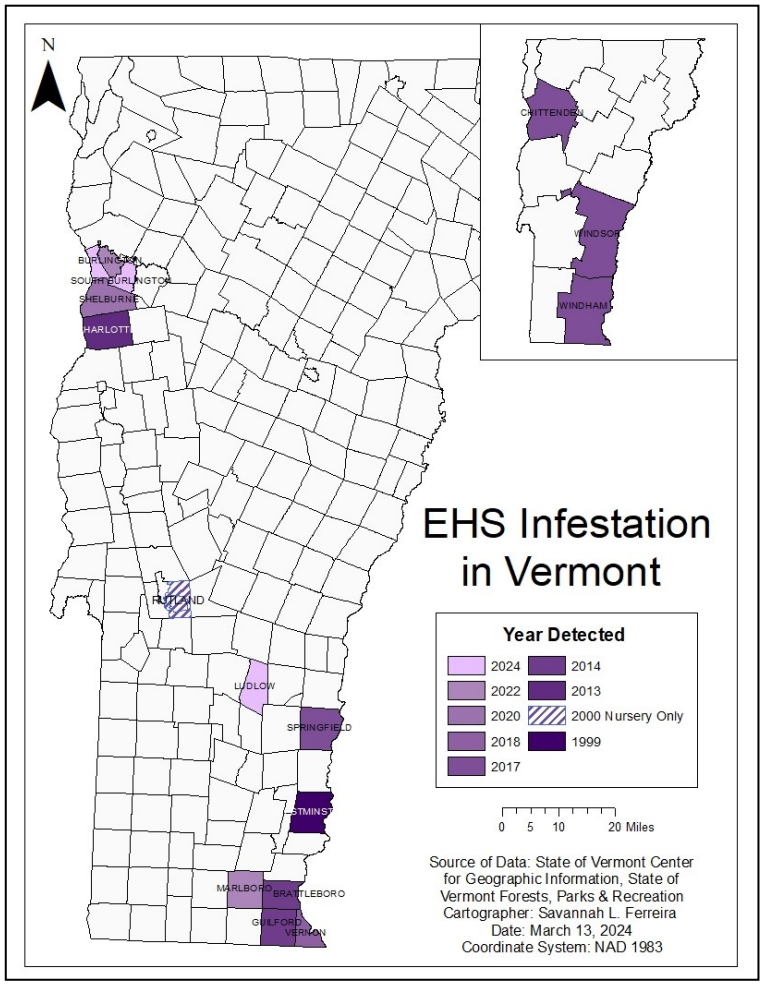
Reindeer lichen, *Cladonia rangiferina,* is an edible native lichen that is more commonly observed in northern tundra and taiga ecosystems, where it serves as forage for moose, caribou, and reindeer. In Vermont, this lichen can be found growing on sun-exposed mountain summits in spruce-fir forest types. Like other lichens, this organism is a byproduct of a symbiotic relationship between either algae or cyanobacteria and several fungal species. Reindeer lichen has a fruticose form (bushy-growth) made up of extensively multi-branched thalli that grow up to 8cm high. These branches have whorls of three and four branchlets and range in color from pale green to brown-grey or white. This lichen is slow-growing and can take decades to rebound if overgrazed or damaged. This lichen can be confused with another reindeer lichen, *Cladonia subtenuis*, however, this has mostly Y-branching.



A: Chaga. Photo credit: Michael Kuo, MushroomExpert. **B:** Black knot. Photo credit: FPR staff.

Chaga, *Inonotus obliquus,* is a parasitic fungus that is often found causing white rot on paper birch (*Betula papyrifera)* and other hardwood trees. While the tree is alive, this fungal conk is sterile and does not produce a fruiting body. The fruiting body is called a sclerotium, which is an irregularly shaped mass that can be up to 30cm wide and 30cm high. Its surface is dry and hard, being charcoal–like in consistency and color. When broken open this fungus is amber to rust yellow-brown in color. Chaga is commonly foraged for medicinal uses. A non-edible look-a-like is black knot, *Apiosporina morbosa*, which affects stone fruit trees such as cherry (*Prunus* spp.) and pear (*Pyrus* spp.). This parasitic fungus causes black galls to form around branches and the main bole, which leads to stem girdling and dieback. 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: Elongate Hemlock Scale



Elongate hemlock scale (EHS, *Fiorinia externa*) is an invasive armored scale that uses its piercing-sucking mouthpart to feed on photosynthates inside conifer needles. This insect was first observed in New York state in 1908 and has since spread to 20 states, including Vermont, where it was first observed in forested stands in 1999. In Vermont, the elongate hemlock scale is most commonly observed infesting eastern hemlock (*Tsuga canadensis*), although it can also be observed on other hemlock (*Tsuga* spp.), fir (*Abies* spp.), true cedars (*Cedrus* spp.), spruce (*Picea* spp.), Douglas fir (*Pseudotsuga menziesii*), Juniper (*Juniperus* spp.), pine (*Pinus* spp.) and yews (*Taxus* spp.).

EHS has two overlapping generations per year, with egg, nymph, and adult stages. The early instar nymph (crawler stage) is the only stage that can infect new hosts. These crawlers move passively by wind and animals but can move larger distances by humans moving infested plant material. Adult females are immobile, and adult males are weak fliers. Elongate hemlock scale feeding can lead to yellowing of needles (chlorosis), premature needle loss, and dieback. Symptomatic branches are usually observed in the interior of the lower branches, but progress upwards as scale populations increase. In severely infested trees, dieback can lead to tree mortality. Elongate hemlock scale and hemlock woolly adelgid often coexist on the same tree, sucking sap and rapidly depleting resources. For more information or to report a sighting, visit VTInvasives.

A: Singular EHS female. B: Heavy infestation of EHS. C: Chlorosis of eastern hemlock from EHS infestation. Photo credits: FPR Staff.

Early Detection Species: Garlic Mustard

As this year's 'fake springs' and March snows come to an end, it is time to be on the lookout for garlic mustard (*Alliaria petiolata*). Garlic mustard can be found virtually everywhere, including sites that are fully shaded during the growing season. Garlic mustard is a biennial plant, needing two full years to mature and produce seed. The easiest way to identify garlic mustard is by crushing its leaves and stems, which yields a distinctive 'garlic' smell. During its second year, it is also identifiable by being the only tall broad-leafed plant with a four-petaled white flower blooming in the early spring.

First year rosettes have leaves that are heart- or kidney-shaped with sunken veins. Photo credit: Richard Gardner, Bugwood.

Garlic mustard was brought to North America from Europe in the 1860's as a food plant and for medicinal use and it quickly escaped. While garlic mustard is edible by humans, it is not eaten by local wildlife or insects in North America. During its first year, garlic mustard grows from seed to form a rosette, with stems and leaves arranged in a circular clump fairly close to the ground. Garlic mustard maintains this rosette form during its first growing season and in dormancy through the winter. Surviving rosettes will "bolt" the following spring, producing shoots one to four feet tall, with triangular shaped leaves, white flowers and eventually seed pods. At the end of the plant's life, these pods, called siliques, will reach 'seed shatter' stage, drying out and releasing hundreds, up to thousands, of seeds that can remain viable for 10 or more years. Care must be taken not to transport seed by walking through areas of dried seed pods and accidentally picking up unwanted hitchhikers.

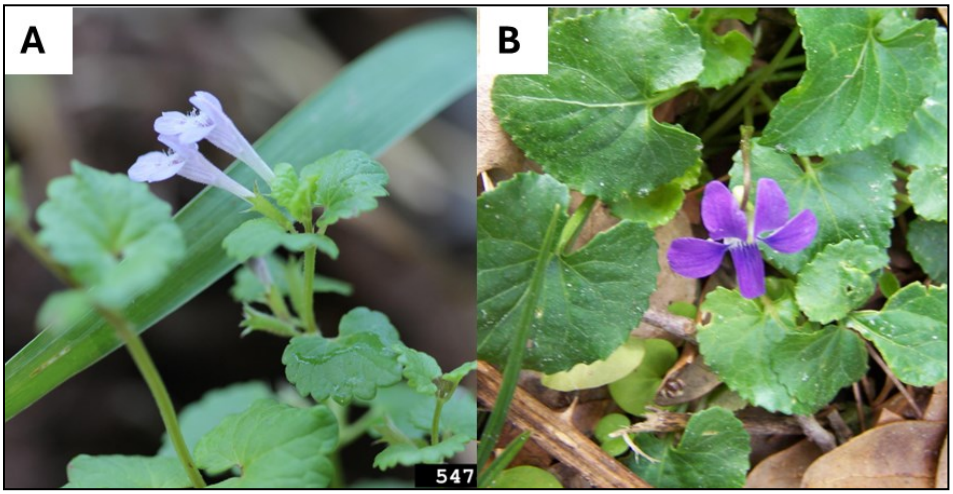
Second year shoots with toothed triangular leaves that become smaller closer to the white flowers and seed pods. Photo credit-Leslie J. Mehrhoff-University of Connecticut.

Garlic mustard is considered invasive for several reasons. Garlic mustard has tremendous seed production (over 50,000 seeds per square meter) and can establish and outcompete native vegetation in relatively stable forest understories. Being a non-native

plant, garlic mustard germinates earlier from seed than its native counterparts and its head-start from a rosette in its second year gives it a considerable advantage. Additionally, garlic mustard is allelopathic, meaning it exudes chemicals from its roots that hinder the growth of nearby plants. Studies have also suggested that garlic mustard increases nitrogen cycling in the soil by raising soil pH levels and changing the soil's microbial communities, resulting in invasion success of garlic mustard plant stands.

Invasion of second year garlic mustard plants. Photo credit: Steven Katovich-Bugwood.

So what to do with this plant? Control measures include hand-pulling, herbicide treatments, planting native species in high concentrations (to outcompete garlic mustard) and potentially biological controls, such as weevils from garlic mustard's native range in Europe. Hand pulling can be effective but is labor intensive and must be timed correctly to remove the plant before it produces seed. The entire plant, including its root, must be removed. Otherwise, it can resprout. Pulled plants must be kept in bags and preferably left to heat in the sun to kill these stubborn plants and prevent spread. Be careful not to remove lookalikes such as creeping charlie (*Glechoma hederacea*) or wild violets (*Viola sororia*). Herbicide treatments are recommended during late fall and early spring on rosettes when native plants are not actively growing. Repeated control measures are needed and will yield better results in reducing early or small garlic mustard invasions. For more information on garlic mustard and other invasive plants, insects, and diseases in Vermont's forests and waters, please visit VTinvasives.org.



A: Ground ivy. Photo credit: Rob Routledge, Sault College. **B**:Blue violet. Photo credit: Karan A Rawlins, University of Georgia.

FORESTS, PARKS & RECREATION VERMONT AGENCY OF NATURAL RESOURCES

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

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