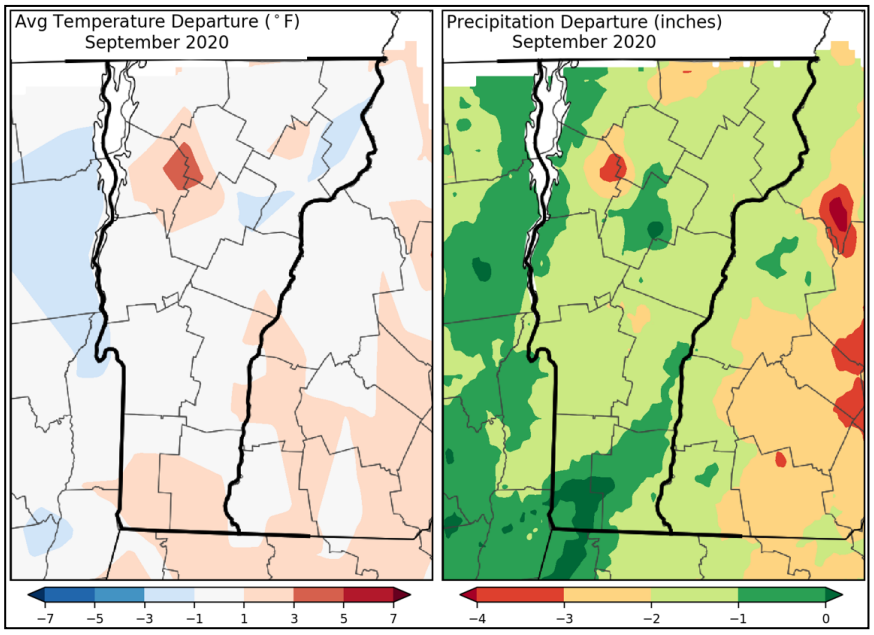
Vermont Forest Health

Insect and Disease Observations — September 2020

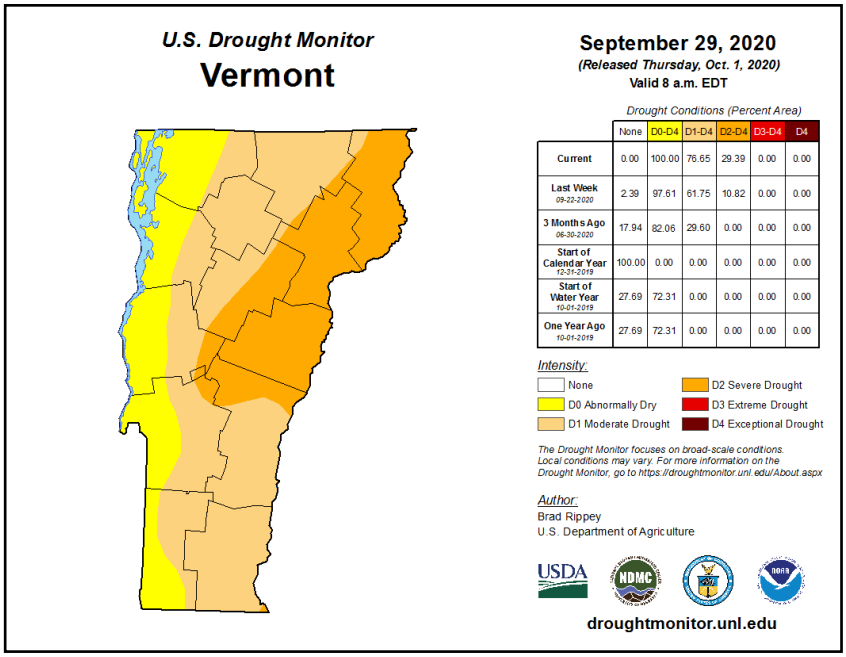
Department of Forests, Parks & Recreation
September 2020 vtforest.com

Weather Recap

Mid-September marked the official start of the fall season, with bright, beautiful colors and cooler temperatures right around the corner. On average, this month followed the warming trend of previous months, with warmer temperatures and less rainfall than September of 2019. Statewide temperatures averaged 57.4°F, which was 0.5°F warmer than last year. Statewide precipitation averaged 2.4 inches, which was 0.78 inches less than September of last year.



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



Low monthly rainfall has contributed to drought severity across the state. In the beginning of the month, the U.S. Drought Monitor listed 41.71% of the state in moderate drought. By the end of the month, 29.39% of the state was listed as severe drought, with the remainder listed as in moderate drought (47.26%) and abnormally dry (23.35%).

End of September drought conditions. Maps and data: National Drought Mitigation Center.

Fire Update

Ground fire at Willoughby State Forest this summer. Photo credit: FPR Staff.

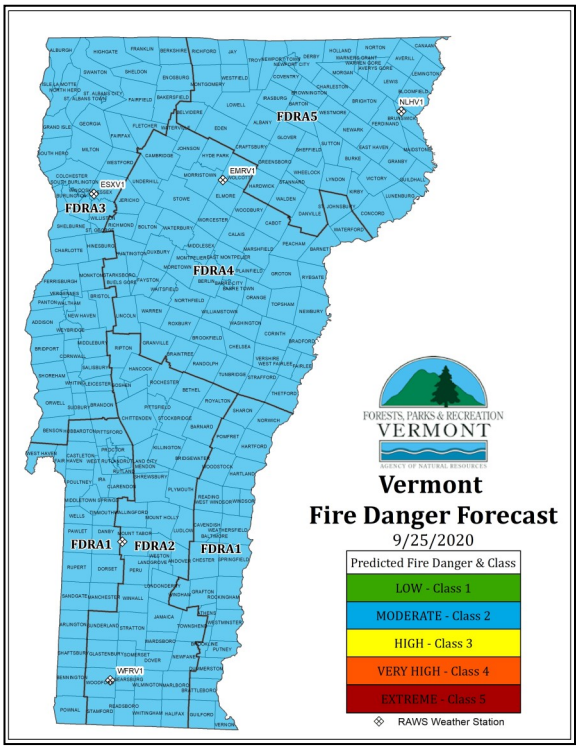
Decreased rainfall has impacted soil moisture leaving most of the state very dry. Organic matter in the soil (leaves, and twigs that fall to the ground and decay) have also become dry, increasing the potential for it to burn. Ground debris including the organic matter that catches fire is known as a ground fire and can be especially difficult and costly to extinguish once started.

Larger woody material including downed twigs, branches, and trees that have fallen, are also important in maintaining moisture near the ground. Our current drought conditions have made these materials excessively dry, and at a higher risk for burning.

Most years, there is enough moisture in the soil and woody material on the surface to quell any embers that smolder in burn piles, bonfires, and campfires. However, this year is unique and soil moisture is extremely low in many areas. Several ground fires have occurred this year in remote areas of the Northeast Kingdom and have been caused by campfires that were not properly extinguished.

Increased awareness can go a long way to limit the occurrence of wildland fires. Please do your part to help prevent wildfires by:

- Being aware of the current weather conditions before igniting a fire. Current conditions can be found at VT FPR Monitoring Fire Danger.
- Never leaving an open fire unattended.
- Never building a campfire on top of duff; Consider using a camp stove to prevent escaped fires.
- Extinguishing fires completely before leaving. This can be done by dousing the fire in water including all embers.
- If water is not available use dirt or sand to mix into the embers to cool them down.
- Continue to mix water and dirt with the embers until the material is cool.

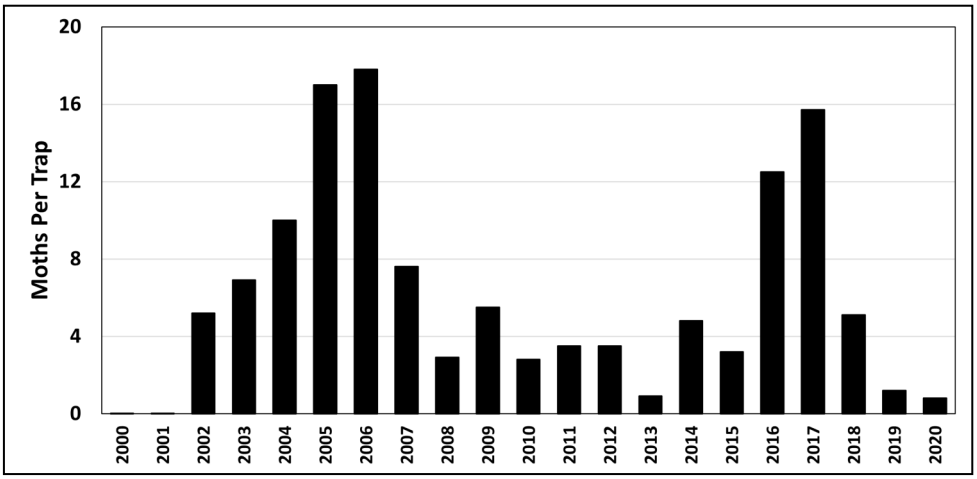


VT Fire Danger Forecast. Map and data: FPR Staff.

Forest Tent Caterpillar Update

Forest tent caterpillar (FTC, *Malacosoma disstria*) populations continue to decrease in Vermont following a 2016-2018 outbreak. These caterpillars are native hardwood defoliators and are commonly found feeding on sugar maples and ash in mixed hardwood forests. In consecutive years of severe outbreaks, trees may experience complete defoliation which can lead to dieback and mortality of infested hosts.

Forest tent caterpillar moth. Photo credit: Victoria Staples, Discoverylife.org.

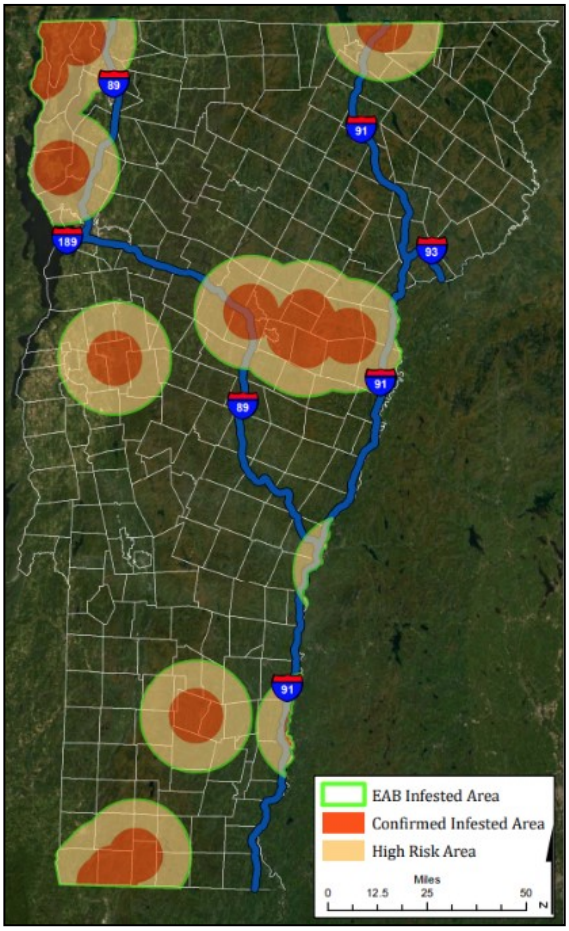


Average FTC trap contents decreased in 2020 from 1.2 moths/trap to 0.8 moths/trap.

Emerald Ash Borer Update

In northwestern Vermont, several new emerald ash borer (EAB, *Agrilus planipennis*) detections have expanded the current infested area into Franklin County. The new detections were discovered on purple prism traps, a tool used to monitor for EAB. A group of dedicated volunteers along with FPR staff placed these traps in the branches of ash trees throughout the state earlier this summer and checked them periodically for EAB. The map of the infested area in Vermont to which "Slow the Spread" recommendations apply now includes new areas in the towns of Isle LaMotte, North Hero, St. Albans, Swanton, and Highgate.

Purple prism EAB trap. Photo credit: USDA APHIS.



EAB Infestation Map. Map and data: FPR Staff.

Funnel Weaver Spiders

As the growing season comes to an end, and the weather becomes cooler, we start seeing dew and frost on the surfaces of vegetation and objects that are outside. One advantage of this moisture accumulation is the ability to see things that we might not notice otherwise. A great example of this is spider webs. The dew captured along the strands of the web make it easier to see, allowing us to enjoy the detailed architecture. We are familiar with the classical spider web, which captures prey in a sticky net-like configuration.

Funnel weaver spider webs in trees. Photo credit: FPR Staff.

The funnel weaver spiders (family *Agelenidae)* make a different type of web, a horizontal sheet-like web with a small funnel-like tube at the bottom. There are also vertical strands that flying insects hit making them fall into the sheet. The spider lays in wait near the funnel entrance and rushes out to capture its prey and bite it, subduing the insect allowing the spider to bring it back into the funnel for safe eating. These funnel webs are often noticed in the grass, low bushes, and shrubs.

Funnel weaver spider web close up. Photo credit: FPR Staff.

Monarch butterfly (*Danaus plexippus*) chrysalises have been observed in southern Vermont. In recent years, this native insect's populations have rapidly declined due to habitat loss, pesticide and herbicide applications, and invasive species. In December of this year, the U.S. Fish and Wildlife Service will consider this insect for federally endangered species status under the Endangered Species Act. For more information please visit USFWS Conserving the Nature of America.

Monarch butterfly chrysalis. Photo credit: Kathy Keatley Garvey.

Woolly gall wasps (*Andricus quercuslanigera*) have been observed causing woolly galls on the midrib of red oak leaves in northwestern VT this month. These galls develop as a result of larval salvatory secretions. These insects secrete enzymes to break down leaf tissue for easier consumption. Although galls may be numerous, this insect does not contribute to dieback or decline in infested hosts.

Woolly gall wasps. Photo credit: FPR Staff.

Woolly bear caterpillar, also known in its adult stage as the Isabella tiger moth, (*Pyrrharctia isabella*), is a native moth found throughout the U.S. This time of year, the second generation caterpillars can be observed scurrying across the road in hopes to find suitable habitat for overwintering. This caterpillar can be easily identified by being black at both ends and reddish-brown in the middle, a pattern used in folklore to predict upcoming winter weather. The pattern on the picture to the right would suggest that there will be an early cold snap, followed by a mild winter, and ending with a late season cold snap.

Woolly bear caterpillar found in fall 2020. Photo credit: FPR Staff.

Armillaria root rot (*Armillaria* spp.) are a group of fungal root pathogens that can infect many species of hard and softwood trees. Trees infected with this fungus show signs of decline including yellowing of leaves, dieback, and even mortality. When fruiting bodies are not present, this pathogen can be identified by shoestring like rhizomorphs and/or white mycelial fans underneath the bark.

Armillaria root rot on stump. Photo credit: FPR Staff.

Dead man's fingers (*Xylaria polymorpha*) are saprotrophic fungi that can be found in mixed hardwood forests. These fungi decay stumps and logs, and although they may look like they grow right out of the ground, they are usually attached to buried woody material. This fungus commonly fruits in clumps of 3 to 6 stroma that can be fused together. This growth gives off a similar appearance to decaying human fingers and makes for a spooky Halloween find.

Dead man's fingers. Photo credit: FPR Staff.

Apple scab has been reported throughout the state causing deformities on apple leaves and fruit. This disease is caused by the fungal pathogen *Venturia inaequali*, and causes leaf spot, yellowing, necrosis, premature leaf drop, and deformed fruit in infected hosts. This year's drought may have accelerated early leaf drop. This pathogen will overwinter in leaf litter and reinfect hosts in the Spring.

Apple scab symptoms on leaves. Photo credit: Joseph Obrien, USDA Forest Service, Bugwood.

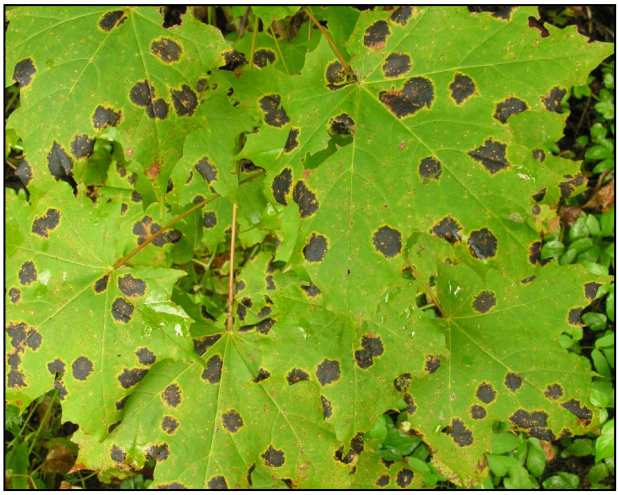
Slime molds can be observed throughout the state, on leaf litter and other decaying organic matter. Slime molds are an umbrella term used to describe several free-living single-celled eukaryotes. These organisms used to be classified as fungi, but modern molecular work has discovered that they are actually in the kingdom Protista. Slime molds only spend part of their lifecycle in a gelatinous, slimy state, where many single-celled organisms work together to find and share food and other resources. They move around the forest floor by pulsating calcium back and forth, and slowly creep and crawl towards their food source. For more information and to learn more about this slimy creature, check out this video.

Slime mold. Photo credit: Scot Nelson, U. of Washington Botanic Gardens.

Eastern spruce gall adelgid (*Adelges abietis*) damage was observed on spruce regeneration in central Vermont this month. As nymphs, these insects cause and reside in pine-cone-shaped galls on tips of spruce twigs and branches. Although these galls are not aesthetically pleasing, they do not contribute to large scale dieback or mortality of an infested hosts.

Eastern spruce gall. Photo credit: FPR Staff.

Tar spot (*Rhytisma* spp.) is being observed on urban maple trees across the state. This foliar disease can cause raised, black spots on the leaf surface. After leaf drop, this fungus overwinters in infected leaf litter and infects new leaves after leaf out in the spring. Although not responsible for dieback or decline, infected leaves produce fewer photosynthates, and in some cases, can cause premature leaf drop. Removing infected leaf litter in the fall can reduce its presence next growing season.

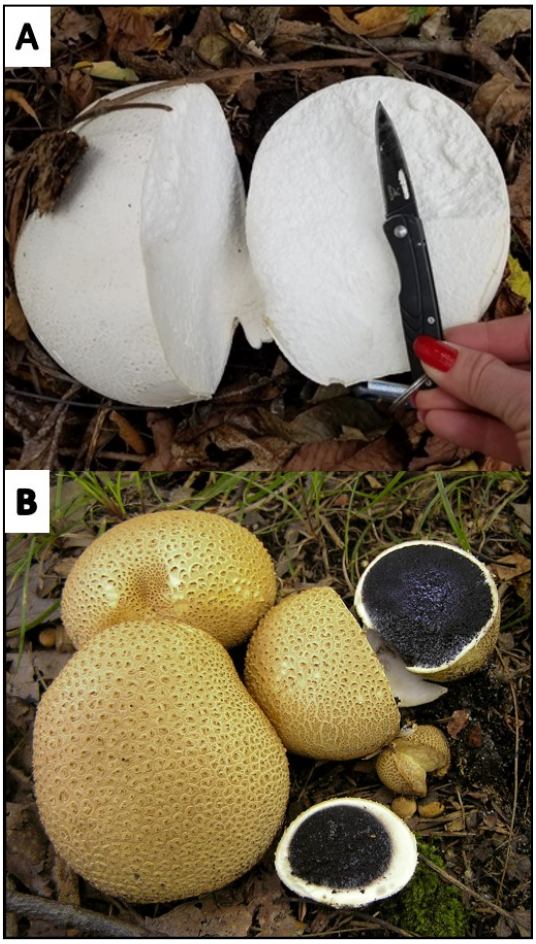


Tar spot. Photo credit: R. Kelley.

Tomentose burying beetles (*Nicrophorus tomentosus*) have been found throughout the state in FPR's forest tent caterpillar pheromone traps. These beetles belong to a family of decomposers, and are attracted to strong orders. These beetles consume dead and decaying vertebrates, and serve a crucial role in our local forest nutrient cycling.

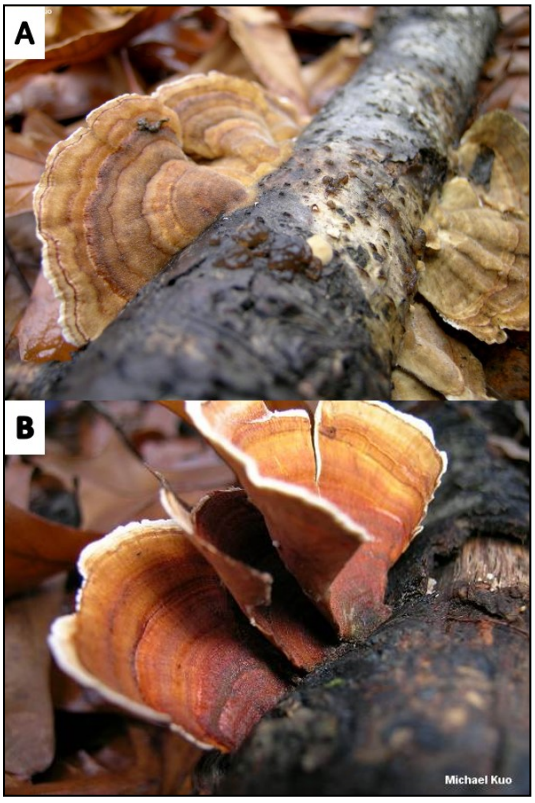
Tomentose burying beetle. Photo credit: Isaac Fox, BugGuide.

Foraging for Fungi



Giant puffballs (*Calvatia gigantea*) are a highly sought-after edible that have started to appear in lawns and forests throughout the state. These white to cream-colored puffballs grow to an average of 4 to 20 inches in diameter, although there are records that exceed 60 inches! Spores are produced inside of the puffball, and when immature (without spores) its cross-section is solid white. These mushrooms are only considered edible when immature! As the mushroom matures, the gleba (spore mass) darkens to a green-brown and becomes unsafe to consume. When small and immature, this mushroom is mistaken for common earth balls (*Scleroderma citrinum*). This round mycorrhizal mushroom is pale-brown to brown-yellow and is covered in warty scales. When cut laterally, the gleba is white when immature but darkens to a deep purple-black. **This is a poisonous mushroom and should not be consumed.**

A: Giant puffball. Photo credit: Cari Ocock, Inaturalist. **B:** Common earth balls. Photo credit: Herbert Baker, Mushroom Observer.



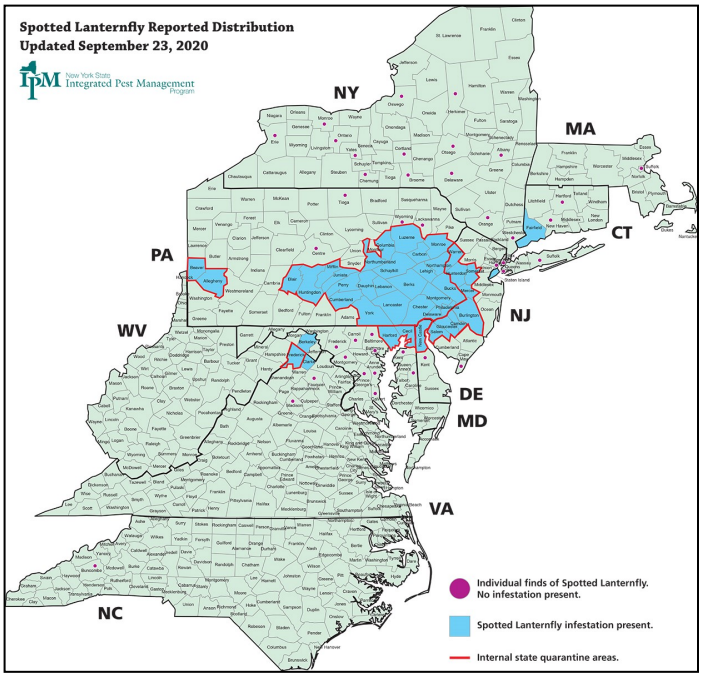
A: True turkey tails. **B:** False turkey tails. Photo credit: Michael Kuo, Mushroom Expert.

Turkey tails (*Trametes versicolor*), are a commonly foraged polypore that is found throughout the state. This mushroom is a saprotroph and are commonly found on dead hardwood (less frequently on softwoods) trees and stumps. The cap of this mushroom varies in color but are typically in the red brown to brown range with concentric zones of color. This mushroom has a thin and flexible cap that have fine hair on the surface and feels velvety when rubbed. The undersurface of this mushroom has pores that are noticeable to the naked eye. Although not a fungus you would cook and eat, some cultures have used extracts of this fungus as alternative medicine. These mushrooms have many lookalikes, including the non-edible false turkey tail, *Stereum ostrea*. This mushroom is also saprotroph, and has a brown to red-orange color cap. Unlike true turkey tails, this is a crust fungus, and has no pore surface underneath the cap. 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 these mushrooms.***

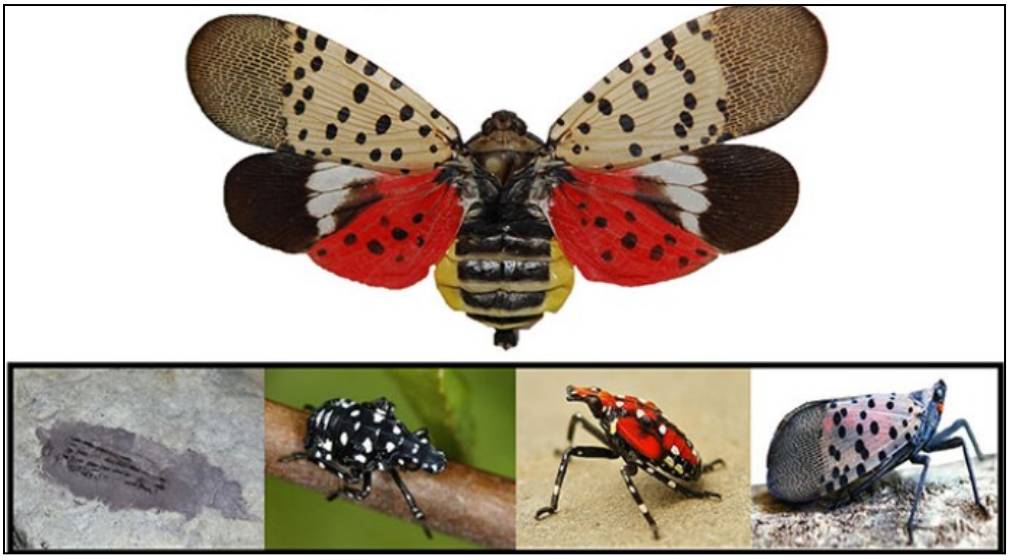
Pests in the Spotlight:

Spotted Lanternfly

The spotted lanternfly (SLF, *Lycorma delicatula*) is an invasive planthopper native to Asia and was first detected in the United States in Pennsylvania in 2014. Since then, it has been reported as established with an infestation in 7 U.S. states and reported individually without infestation in 5 U.S. states (data not shown on map). **This insect has not yet been reported in Vermont.** Although this invasive planthopper is a poor flyer, it can travel long distances by humans, hitching rides on vehicles, firewood and stone. The primary host of this insect is the tree of heaven (*Ailanthus altissima*), an introduced invasive plant from Asia. In addition to tree of heaven, this insect has been reported on more than 70 plant species and can drastically alter our forested and agricultural landscapes.



Confirmed SLF locations. Photo credit: New York State IPM Program.



SLF have one generation per year and are laying eggs during September—November. These eggs will overwinter and hatch between May—June.

Life stages of the SLF. Photo credit: New Jersey Dept of Agriculture.

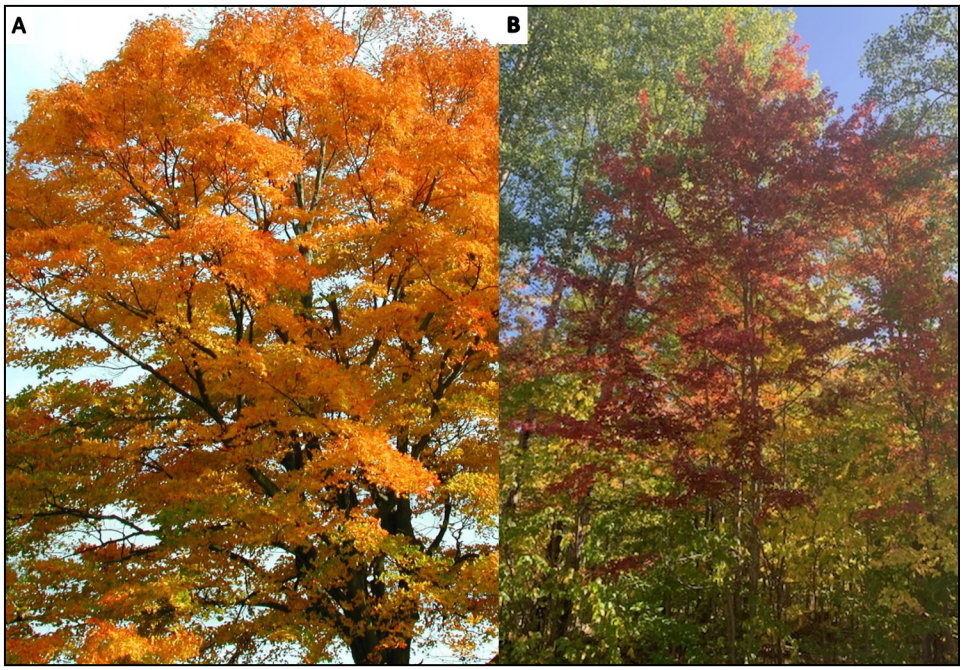
SLF use piercing and sucking mouth parts to consume phloem in plant tissue. Heavy feeding can cause oozing, wilting, reduced growth, dieback and mortality in infested hosts. Oozing/weeping wounds on plants in conjunction with SLF honeydew secretions attract sooty mold to infested plants. This black colored mold covers the plant and SLF secretions and can reduce photosynthesis as well as attract other nuisance insects with its strong odor. For more information, or to report a sighting, please visit VTInvasives.

Sooty mold covering trunk and base of tree. Photo credit: Don Grosman.

Why Do Leaves Change Color?

Cooling weather means that fall colors are right around the corner! The Vermont Fall Foliage Reports indicate that mid-September through late October is the best time to observe the fall colors in the Green Mountain State. Have you ever wondered why leaves change color?

Leaves start to change colors in the fall due to shorter days and a reduction in photosynthesis. During the long days of summer, leaves are pigmented green due to the chlorophyll inside the leaf tissue that is used in photosynthesis. Leaves have other pigments besides chlorophyll, which includes carotenoids that are responsible for yellow, orange; tannins that are responsible for brown pigments; and sometimes anthocyanin that are responsible for both red and purple pigments.



A: Sugar maple displaying carotenoid pigments. Photo credit: R. Kelley. **B:** Red maple displaying anthocyanin pigments. Photo credit: FPR Staff.

Carotenoids are also present in the chloroplasts, but their pigments are often masked by chlorophyll. As the season changes, the days become shorter and have fewer light hours. This reduction in sunlight slows down photosynthesis, causing chlorophyll production to slow down and eventually be degraded. As chlorophyll degrades, carotenoids become visible. While the chlorophyll is degrading, the leaf is still photosynthesizing. Glucose from photosynthesis in the fall gets trapped inside the leaf due to the abscission layer (cell layer at the base of the petiole that allows the leaf to shed). This trapped glucose forms the pigment anthocyanin and gives off a red and/or purple color. Over time, the before mentioned pigments will degrade and leave brown hues caused by tannins that are always present, but masked in the leaf tissue.

VT fall foliage behind Elmore Sugarhouse. Photo credit: R. Kelley.

To see estimates of peak fall foliage in the state, visit Foliage Forecaster.

Species Spotlight: Common Barberry

Common barberry. Photo credit: Frank Bramley, New England Wild Flower Society.

Common barberry (*Berberis vulgaris*) is a member of the barberry family (*Berberidaceae*), which includes native species like blue cohosh (*Caulophyllum thalictroides*) and mandrake (*Podophylum peltatum*), but there are no native members of the *Berberis* genus in New England. Species within the barberry family are perennial herbs or woody shrubs, all of which have alternately arranged leaves. The woody shrub species in this family have spines located at nodes along the stems.

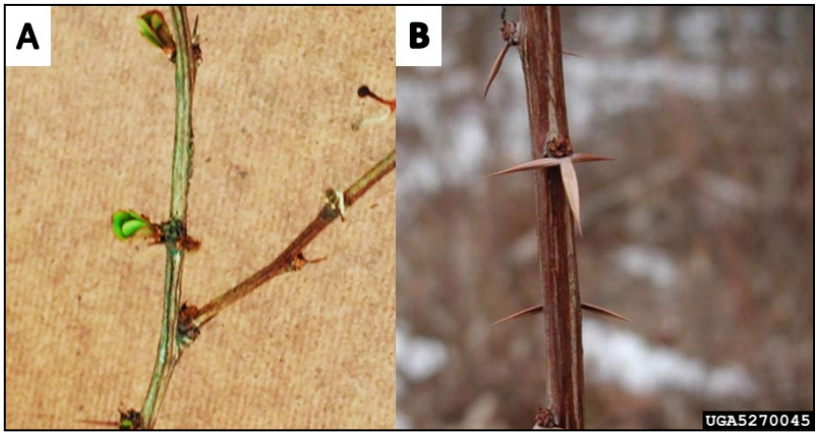
Common barberry originates from Eurasia and was used in European farmsteading traditions, which is how it ended up in North America. This plant easily escaped cultivation and naturalized, but was later discovered to be an alternate host of cereal stem rust (*Puccinia graminis*). Because these plants supported the growth and spread of a fungal pathogen that impacts cereal crops and was directly tied to failing wheat crops in the United States, an elimination program was established as early as the 18th century. While widespread eradication efforts did not hit stride until the 1900s, the combined efforts led to a decline in the presence of this plant on the landscape, and also to the introduction of another invasive plant, Japanese barberry (*Berberis thunbergii*), which was touted as a rust-resistant replacement for common barberry.

There are persisting populations of common barberry across the United States, and in the Northeast, it can be found near human development, in forests, forest edges, meadows, and fields. While not as common on the Vermont landscape as Japanese barberry, the Vermont Department of Forests, Parks & Recreation actively manages for this species on state land, including a population in the Northeast Kingdom that was scattered over 40 acres.

Leaves of common barberry are oval, small (~1” wide and ~2” long), with serrated margins, grouped in clusters along with each cane. The yellow flowers and subsequent red oblong fruit also hang in clusters below the cane (dangling racemes). A good way to tell common barberry apart from Japanese barberry is to compare leaves.

Common barberry in June 2020. Flower clusters hang below the canes alongside dried persistent fruit from the previous autumn. Photo credit: FPR staff.

Common barberry leaves will have serrations along the edge, and Japanese barberry leaf edges will be smooth. You can also compare thorns. Common barberry thorns are singly or triply born, while Japanese barberry has single thorns.



A: Japanese Barberry single thorns. Photo credit: FPR staff. **B:** Common barberry single or triple thorns. Photo credit: Leslie J. Mehrhoff, University of Connecticut, Bugwood.

This plant is on Vermont's Noxious Weed List and is listed on prohibited species lists across New England. The fall is a good time to scout for common barberry in the woods as the plant will hold onto its leaves into the fall, with blushing on the leaves and bright red clusters of berries. The University of New Hampshire Extension also offers a great list of non-invasive alternative shrubs that perform similar structural or aesthetic functions in a landscaped setting.

To learn more about Common barberry, check out VTinvasives and these additional resources:
USDA Plants Database
Washington State Noxious Weed Control Board
USDA National Invasive Species Information Center
New Hampshire Department of Agriculture
Midwest Invasive Species Information Network
Bugwood Invasive Plant Atlas
US Forest Service

September Invasive Plant Phenology

Volunteers are keeping track of invasive plant phenology in order to time management treatments most effectively. Below are observations made from September 14th-18th, 2020.

Chittenden County—Full Flower: knotweed; Fully Seeded: goutweed, common buckthorn, honeysuckle, knotweed, wild chervil, wild parsnip.

If you are interested in taking part in the project, please contact: elizabeth.spinney@vermont.gov.

FORESTS, PARKS & RECREATION VERMONT AGENCY OF NATURAL RESOURCES

For more information, contact the Forest Biology Laboratory at 802-565-1585 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

Forest health programs in the Vermont Department of Forests, Parks, and Recreation are supported, in part, by the US Forest Service, State and Private Forestry, and conducted in partnership with the Vermont Agency of Agriculture, Food, and Markets, USDA-APHIS, the University of Vermont, cooperating landowners, resource managers, and citizen volunteers. In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discrimination on the basis of race, color, national origin, sex, age, or disability.

2020-07