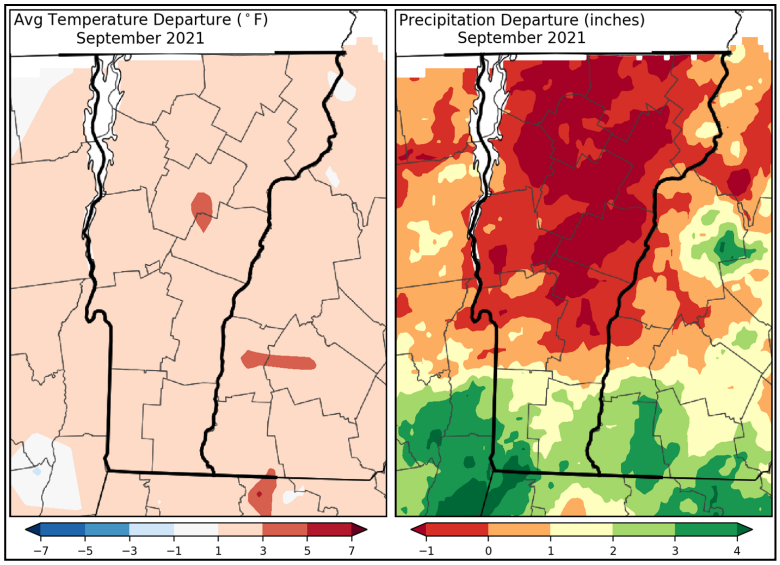
Vermont Forest Health

Insect and Disease Observations — September 2021

Department of Forests, Parks & Recreation
September 2021 vtforest.com

Weather Recap

The end of September marks the official start of the fall season! On average, this month was warmer and wetter than September of 2020. State-wide temperatures averaged 59.8 °F, which was 2.7 degrees cooler than August of last year. Statewide precipitation averaged 3.9 inches, which was 1.27 inches more than September of last year. By the end of the month, the U.S. Drought Monitor listed 10.85% of the state in moderate drought, 28.39% as abnormally dry, and 60.76% as no drought. Reduced drought conditions are predicted to have a positive impact on the length and vibrancy of fall foliage colors.



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

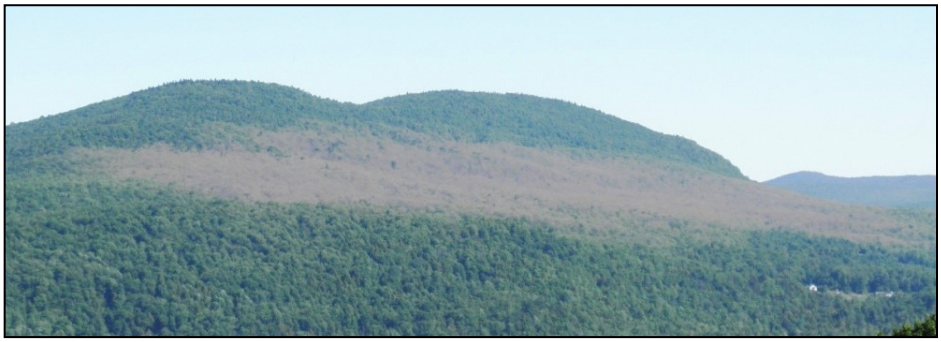
Fall Color Update

End of month fall foliage at Mount Umpire. Photo credit: FPR Staff.

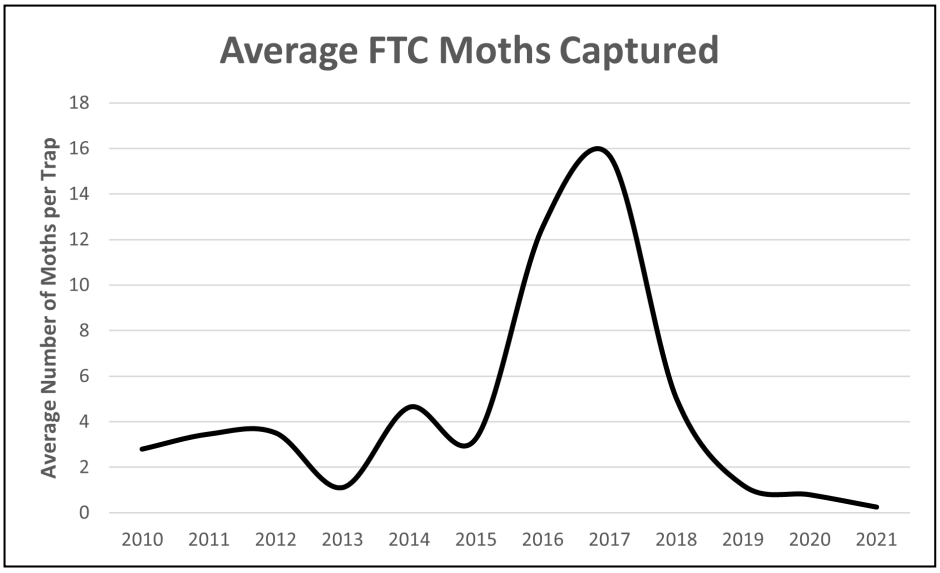
Leaves start to change colors in the fall due to shorter days, a reduction in photosynthesis as well as environmental conditions including, but not limited to, temperature and rainfall. Leaves that are normally pigmented green due to the chlorophyll inside the leaf tissue have other pigments besides chlorophyll, which includes carotenoids that are responsible for yellow and orange pigments, tannins that are responsible for brown pigments, and sometimes anthocyanin that are responsible for both red and purple pigments. For more information on the process of fall color and to see estimates of peak fall foliage in the state, visit Foliage Forecaster.

Native Forest Stressors

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.



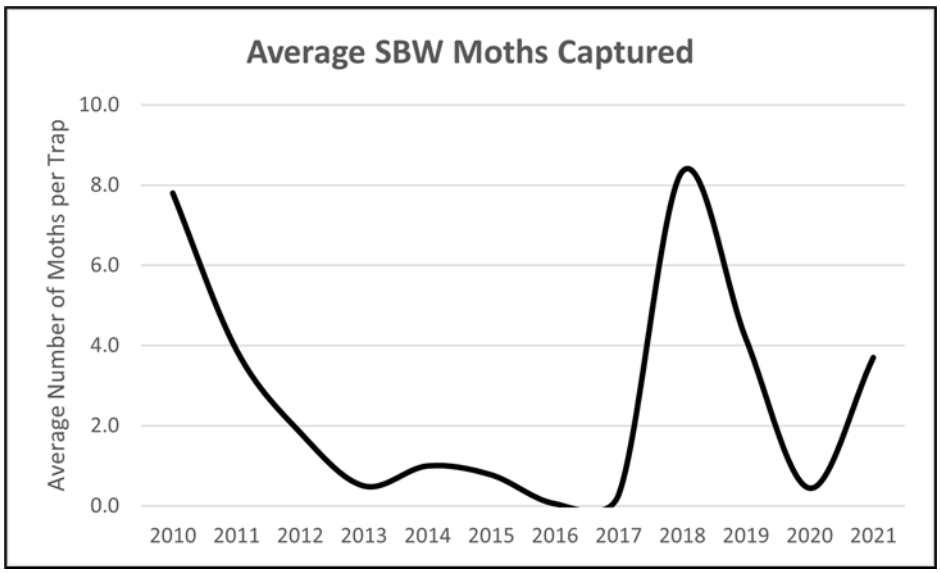
2016 FTC outbreak. Photo credit: FPR Staff.



Average FTC trap contents decreased in 2021 from 0.80 moths per trap to 0.25 moths per trap.

Spruce budworm (SBW, *Choristoneura fumiferana*) trap catches increased this year. Although a slight increase, overall SBW populations remain low compared to the 2000-2002 outbreak, where the average trap contents were 35.1 months per trap (data not shown). This native softwood defoliator feeds on balsam fir, white spruce, and black spruce and in consecutive years of severe outbreaks, trees may experience complete defoliation which can lead to dieback and mortality.

Average SBW trap contents increased in 2021 from 0.44 moths per trap to 3.70 moths per trap.



Other Observations

Cicada killer wasps (*Sphecius speciosus*) were observed in southern Vermont. This large, native wasp hunts down and captures cicadas. Once captured, the wasp "stings" the prey and injects it with venom to paralyze it. These cicadas are fed to their larvae which reside in underground tunnels. These are solitary wasps and therefore are not typically aggressive.

Cicada killer wasp carrying a cicada. Photo credit: Ronald F. Billings, Texas A&M USFS, Bugwood.

Porcupine (*Erethizon dorsatum*) damage was observed on several pine and spruce species in southern Vermont. Porcupines consume bark on the main stem and branches of both hardwood and softwood species. This feeding causes the affected area to become girdled, which leads to excessive resin pitching (in softwoods), dieback, and mortality depending on location and severity of the damage.

Porcupine feeding sites on eastern white pine. Photo credit: FPR Staff.

Chicken of the woods (*Laetiporus sulphureus*) has been reported across the state this month. This polypore is both parasitic and saprotrophic. As a parasite, it feeds off hardwood trees causing heart rot and killing the tree. Once dead, this fungus continues to live and feed off the deadwood as a saprotroph.

L. sulphureus. Photo credit: Fred Habegger, Messiah College.

Phomopsis galls (caused by the fungus *Phomopsis* spp.) were observed on hickory trees in Addison county. These woody galls range in size from 1-2 inches and can be found scattered on branches and on the main bole. These galls can cause girdling and dieback in infected trees, however, they are not usually reported as being the causal agent of mortality.

Phomopsis galls. Photo credit: Joe Boggs, Ohio State University Extension.

Eastern larch beetle (*Dendroctonus simplex*) damage was observed in the Northeast kingdom this month. This beetle is commonly associated with stressed or dying trees, although they can infest outwardly asymptomatic trees. Due to persistent drought conditions in Northern Vermont over the last two years, infested larch trees were stressed and predisposed to infestation. High beetle populations can lead to pitching, girdling, and dieback in infested hosts.

Eastern larch beetle galleries and exit holes. Photo credit: FPR Staff.

Ash-tree bolete (*Boletinellus meruliodes*) was observed growing in mixed hardwood stands in Northern Vermont. This mushroom has a symbiotic relationship with the leaf curl ash aphid (*Meliarhizophagus fraxinifolii*). This mushroom produces sclerotia that provide a protected space for the aphids against environmental conditions and predators. In return, the aphids secrete honeydew from feeding on ash trees that provide the fungus with nutrients.

Ash-tree boletes. Photo credit: Michael Kuo, mushroomexpert.

Sooty mold was observed covering a variety of hardwood leaves early this month. Sooty mold is a common name for several genera of fungi including but not limited to, *Capnodium*, *Fumago*, and *Scorias* which grow on honeydew (insect secretions). This type of fungi doesn't infect plants, but in heavy populations, the dark coloration of sooty mold can reduce photosynthesis because the sunlight cannot reach the surface of the leaf.

Sooty mold on leaves and ground. Photo credit: FPR Staff.

Butternut woollyworm (*Eriocampa juglandis*) was observed in Windham county this month. This sawfly covers itself in a white-woolly substance to protect itself from predators, which is shed with its skin after each molt. This insect is a pest of walnut, butternuts, and hickories, and consumes all leaf tissue besides the main veins and mid-rib. Since defoliation happens so late in the growing season, there is minimal impact on overall tree health and vigor.

Butternut woollyworms. Photo credit: Lacy L. Hyche, Auburn University.

Jumping oak gall (caused by *Neuroterus* spp.) damage was observed on bur oak leaves this month. These leaf galls are caused by larvae of small wasps that live in and deform the leaf tissue. During the summer, galls mature and fall off of the leaf (with larvae inside), leaving behind pockmarks that remain on the leaf for the rest of the season. The galls that have fallen off may "jump" a few centimeters around in the leaf litter and soil to find a suitable area to overwinter in.

Jumping oak galls. Photo credit: Missouri Botanical Garden.

LDD egg parasitoids (*Ooencyrtus kuvanae*) were observed on LDD (*Lymantria dispar*) egg masses this month. This parasitic wasp was introduced in the United States in 1909, then repeatedly reintroduced between 1970-1980 as a biological control for LDD moths. Although still being researched, these wasps have also been observed feeding on spotted lanternfly egg masses out of state.

Ooencyrtus kuvanae on LDD egg mass. Photo credit: Doug Wechsler, Bugguide.

Immature shaggy scalycap mushrooms (*Pholiota squarrosa)* were observed growing out of a rotting stump in Underhill. Mushrooms in this genus are typically saprotrophic, breaking down and living off of deadwood, however, sometimes this species has been documented as a weak or opportunistic parasite. Although some mushroom guides note a lemon or garlic-like odor, this is not a recommended edible.

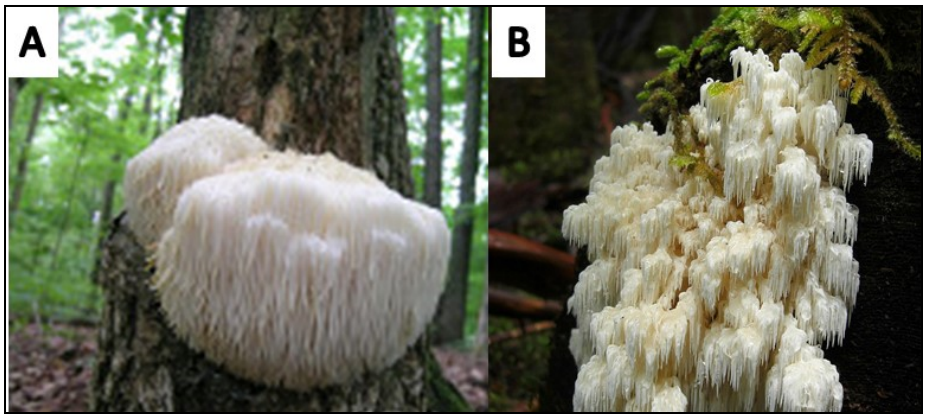
Cluster of shaggy scalycap mushrooms. Photo credit: FPR Staff.

Laurel sphinx caterpillars (*Sphinx kalmiae*) were observed feeding on ash trees early this month. This native caterpillar feeds on a variety of hardwoods including laurel, lilac, ash, poplar, and mountain holly. This caterpillar will overwinter as pupae, and emerge as an adult sphinx moth next spring. Although classified as a hardwood defoliator, due to generally low population densities, this insect does not typically contribute to large-scale defoliation or dieback.

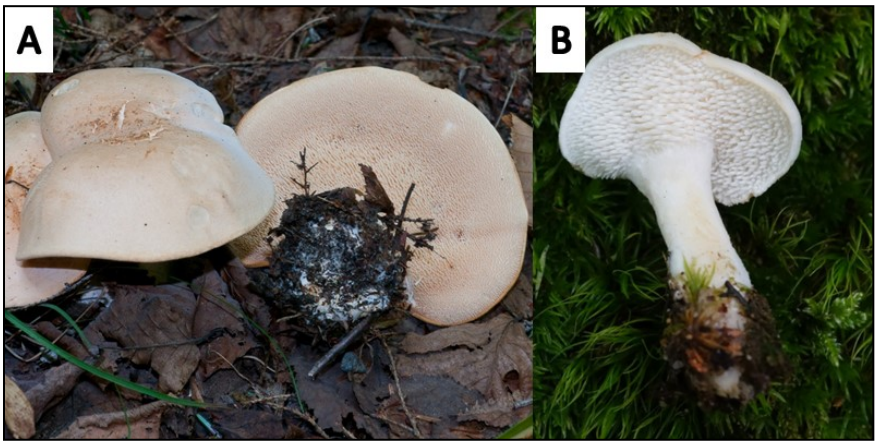
Laurel sphinx caterpillar. Photo credit: FPR Staff.

Foraging for Fungi

Lion's mane mushrooms (*Hericium erinaceus*) is a commonly foraged polypore that is harvested between late summer and early fall. This polypore is parasitic and saprotrophic and is commonly found growing out of wounded hardwood trees. This mushroom is one, unbranched clump of mycelium, that is 8-16 cm wide with 1-5 cm long soft spines that hang down from a hidden base. When immature, this mushroom is white and discolors yellow-brown with age and has a white spore print. This mushroom has several foragable look-a-likes in the same genus including *H. abietis* and *H. americanum.* These mushrooms are very similar to *H. erinaceus*, however, they start as a single clump, but develop branches with spines as they mature.



A: *Hericium erinaceus*. Photo credit: Michael Kuo, mushroomexpert. **B:** *H. abietis* mushrooms. Photo credit: Jason Hollinger Mushroom Observer.



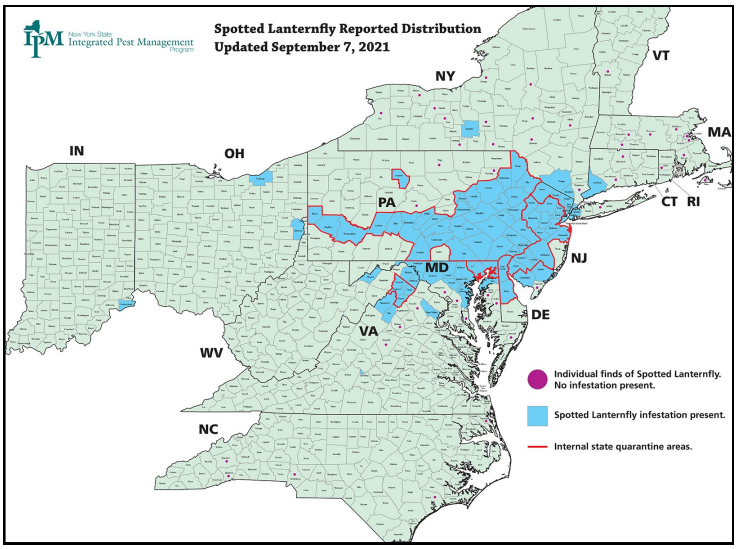
A: *H. repandum*. Photo credit: Dianna Smith. **B:** *H. albidum*. Photo credit: Tom Bigelow.

Hedgehog mushrooms (*Hydnum repandum*), are another late-season edible that can be found in our Vermont woods. This mushroom has mycorrhizal associations with both hard and softwood species, and therefore are wildly distributed. Its cap is 3-10 cm wide, is convex to broadly convex, and is yellow-brown to orange in color. This mushroom has spines that hang down on the underside of the cap. The stem is 2-8 cm long, and 0.6-2 cm wide, and is glabrous white to pale orange in color. All parts of this mushroom stain orange when bruised. This mushroom has an edible look-a-like, the white hedgehog mushrooms (*Hydnum albidum*). This mushroom has similar mycorrhizal associations as *H. repandum* and can be found in similar areas. This mushroom is smaller than *H. repandum,* having a broadly convex cap that is 1-7 cm wide and a stem that is 2-5 cm long and 0.8 cm to 2 cm wide. The cap is white to creamy in color, with white spines that hang down under the cap. The stem is glabrous white, and all parts of the mushroom stain a light orange when bruised.

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: Spotted Lanternfly

The spotted lanternfly (SLF, *Lycorma delicatula*) is an invasive planthopper native to Asia that was first detected in the United States in Pennsylvania in 2014. Since then, this species has been reported as established with an infestation in 11 U.S. states (MA 2021 infestation not shown on map) and reported individually without infestation in three U.S. states including Vermont. Although this invasive planthopper is a poor flyer, it can travel long distances by humans, hitching rides on surfaces including but not limited to, vehicles, firewood, nursery stock, and stone shipments.



Current distribution of SLF in the United States. Map and data credit: NY State Integrated Pest Management Program.

This insect has one generation per year. Eggs begin to be laid in September and will overwinter and hatch in April. This insect feeds in both the nymph and adult stage, which extends the damage period from April through December. SLF has been reported on more than 70 plant species and can therefore drastically alter our forested and agricultural landscapes. SLF uses their piercing and sucking mouthparts 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, like wasps, with its strong odor. Due to its broad host range, this is a high species of concern. For more information, or to report a sighting, please visit VTInvasives.

Life stages of SLF. Photo credit: PennState.

Early Detection – Tree-of-Heaven

Ailanthus altissima will grow just about anywhere. Photo credit: Ian Trueman, University of Wolverhampton, Bugwood.

In mid-August, a concerned community member brought to the attention of FPR scientists, the presence of the invasive insect, **spotted lanternfly**. This insect hitchhikes on just about anything including, but not limited to wooden pallets, slabs of stone, cars, campers, and backyard grills. What fate awaits it when it travels abroad largely depends on what plant species are available for it to utilize. It can survive on over 70 species of plants, most notable maples, walnuts, oaks, hops, grapes, and apples, often damaging those important crop and hardwood species. However, it appears that a favored plant, invasive **tree-of-heaven** (*Ailanthus altissima*) may be important in assisting the spread of this insect.

Tree-of-heaven evolved in China, as did spotted lanternfly. The tree was introduced to the United States in the 1700s as an ornamental plant popular in urban settings (fast-growing, resistant to pollution, provides shade), and was widely planted in the Northeast and California, and has spread to most U.S. states.

Several locally evolved trees look similar to the invasive tree-of-heaven: **white ash** (*Fraxinus americana*), **black ash** (*Fraxinus nigra*), **staghorn sumac** (*Rhus typhina*), **smooth sumac** (*Rhus glabra*), and **butternut** (*Juglans cinerea*). Luckily there are a few ways to distinguish invasive tree-of-heaven from its respective local look-alikes:

Leaves

- **Tree-of-heaven** (invasive) leaves are pinnately compound, alternately arranged, smooth margin with glandular teeth at the base, 1’-2’+ in length, with ~11-41 leaflets per leaf
- *White ash* (local) leaves are pinnately compound, oppositely arranged, mostly smooth or slightly serrated margin, 8-12” in length, with 5-9 leaflets per leaf
- *Black ash* (local) leaves are pinnately compound, oppositely arranged, finely serrated margins, 9-16” in length, with 7 -13 leaflets per leaf

Ailanthus altissima leaflet, showing the glandular teeth and gland at the base. Photo credit: James H. Miller, USDA Forest Service, Bugwood.

Leaves continued

- *Staghorn sumac* (local) leaves are compound, alternately arranged, sharply serrated margins, 6-16” in length, with 9-27 leaflets per leaf
- *Smooth sumac* (local) leaves are compound, alternately arranged, serrated margins, 8-18” in length, with 9-23 leaflets per leaf
- *Butternut* (local) leaves are compound, alternately arranged, finely serrated margins, 16-28” in length, with 11-17 leaflets per leaf

Fruit

- **Tree-of-heaven** (invasive) samaras are oblong and have a single seed in the center of the papery wing
- *White ash* (local) samaras are paddle-shaped, with thick, wide seeds
- *Black ash* (local) samaras are paddle-shaped, and the seeds are thin
- *Staghorn sumac* (local) fruits are small, red, and fuzzy and arranged on a panicle
- *Smooth sumac* (local) fruits are small, red, and fuzzy and arranged on a panicle
- *Butternut* (local) fruits are green, round - but oblong and pointed, and clustered together

The winged samaras of *Ailanthus altissima* are oblong, papery, and have a central, single seed. Photo credit: Chuck Bargeron, University of Georgia, Bugwood.

Height

- **Tree-of-heaven** (invasive) is a large-sized tree, ranging from 60-80’ in height
- *White ash* (local) is a large-sized tree, averaging 50-80’ in height, but capable of much larger heights
- *Black ash* (local) is a medium-sized to large-sized tree, averaging 40-70’ in height
- *Staghorn sumac* (local) is a shrub, averaging 15-25’ in height
- *Smooth sumac* (local) is a shrub, ranging from 3-15’+ in height
- *Butternut* (local) is a medium-sized tree, averaging 40-60’ in height

Leaf scars

- **Tree-of-heaven** (invasive) have large “v” or heart-shaped leaf scars
- *White ash* have “c” shaped leaf scars

Tree-of-heaven leaf scar; Jan Samanek, Phytosanitary Administration, Bugwood.

Leaf scars continued:

- *Black ash* have almost "o" shaped leaf scars
- *Staghorn sumac* leaf scars are a strongly curved horseshoe shape
- *Smooth sumac* leaf scars almost encircle the buds
- *Butternut* has a wooly fringe across the top of the leaf scar with no notch, and has a sheep or goat's face-like appearance

Other Characteristics

- **Tree-of-heaven** (invasive) crushed leaves and male flowers have a skunk-like rotten smell
- *White ash* (local) bark is light gray and uniformly fissured
- *Black ash* (local) bark is gray and scaly or flaky
- *Staghorn sumac* (local) gets its name from the velvety dense hairs that cover much of the plant
- *Smooth sumac* (local) is one of the first plants whose foliage turns color in the fall, going a bright red
- *Butternut* (local) in the Northeast will often exhibit signs of butternut canker

Ailanthus altissima male flowers. Photo credit: Trevor James, Brisbane City Council.

Ailanthus altissima infestation. Photo credit: Leslie J. Mehrhoff, University of Connecticut, Bugwood.

Tree-of-heaven can establish dense canopies, reducing understory cover diversity, and can be found in forests, forest edges, fields, and human-impacted areas. These trees are short-lived, have been documented producing fruit after two years (though not commonly), and can grow 8' in the first year of growth. Seeds are easily wind-dispersed and highly viable, and the tree can reproduce from seed or vegetatively. While shade-intolerant, it has been documented as a pioneer species in forests defoliated or impacted by biotic or abiotic stressors. Where it does grow, the trees release allelopathic chemicals, which reduce competition and will persist in the soil, inhibiting succession. This documented behavior and the continued spread of these trees in Vermont are reasons it is listed as a Class B Noxious Weeds in Vermont.

To learn more about invasive tree-of-heaven, check out VTinvasives.org and these additional resources:

- Centre for Agriculture and Biosciences International
- New Hampshire DAMF
- USDA Plants Database

Invasive Plant Phenology

In the second full week of every month, volunteers around the state record and report invasive plant phenology, creating both a timely resource for best management options and a historic record of plant behavior. The observations below are from September 13-17, 2021. If you would like to be involved in this effort, please contact Pauline.Swislocki@vermont.gov. Observers are still needed in multiple counties. For more information about the phenology of invasive plants in Vermont, check out Bud Buds, a podcast from the Invasive Plant Program.

Addison – Leaf out: Asiatic bittersweet, common buckthorn, phragmites, purple loosestrife, wild parsnip; Flowering: phragmites, purple loosestrife, wild parsnip; Full flower: phragmites, purple loosestrife, wild parsnip; Fruit forming: Asiatic bittersweet, common buckthorn, purple loosestrife, wild parsnip; Fruit ripening: Asiatic bittersweet, common buckthorn, phragmites, purple loosestrife, wild parsnip; Fully seeded: common buckthorn, wild parsnip

Caledonia – Leaf out: Asiatic bittersweet; Full flower: Japanese knotweed; Fruit ripening: common barberry, common buckthorn, glossy buckthorn, shrub honeysuckles; Fully seeded: common buckthorn

Chittenden – Leaf out: Asiatic bittersweet, common buckthorn, goutweed, Japanese knotweed, multiflora rose, phragmites, purple loosestrife, shrub honeysuckles, wall lettuce; Flowering: Japanese knotweed, phragmites, purple loosestrife, wall lettuce; Full flower: phragmites, purple loosestrife; Fruit forming: Asiatic bittersweet, goutweed, phragmites, purple loosestrife, wall lettuce; Fruit ripening: Asiatic bittersweet, common buckthorn, goutweed, multiflora rose, phragmites, purple loosestrife, shrub honeysuckle; Fully seeded: Asiatic bittersweet, common buckthorn, goutweed, multiflora rose, phragmites, purple loosestrife, shrub honeysuckles, wall lettuce, wild parsnip

Orange – Leaf out: Asiatic bittersweet, common buckthorn, Japanese knotweed; Flowering: Japanese knotweed; Fruit ripening: Asiatic bittersweet, common buckthorn

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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