

Vermont Forest Health

Insect and Disease Observations – September 2022

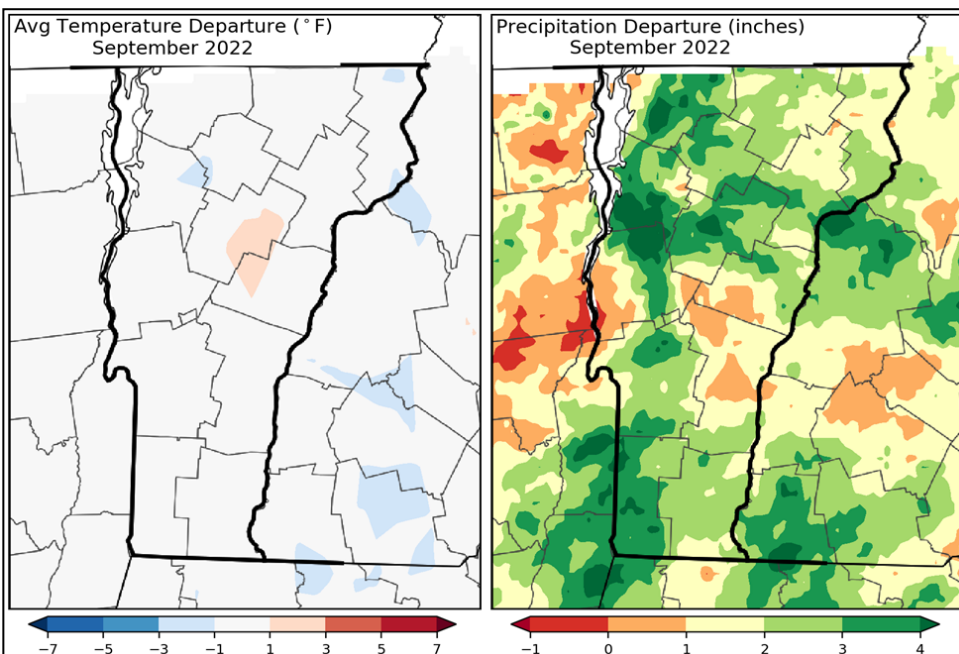
Department of Forests, Parks & Recreation
September 2022

vtforest.com

Weather

September officially starts the first month of the fall season. State-wide temperatures averaged 58.3°F, which was 1.1 degrees cooler than September of last year. Statewide precipitation averaged 5.68 inches, which was 1.79 inches more than September of last year.

Average temperature and precipitation departure from normal. Maps and data: [Northeast Regional Climate Center](http://NortheastRegionalClimateCenter.com).



Fall Color Update

Leaves start to change colors in the fall due to shorter days and a reduction in photosynthesis. Each individual leaf contains pigments including chlorophyll (green color), [carotenoids](#) (yellow-orange colors), [tannins](#) (brown color), and sometimes [anthocyanin](#) (red-purple colors). As the season changes, the days become shorter, slowing down photosynthesis which causes chlorophyll production to degrade and for carotenoids to become visible. Glucose from photosynthesis in the fall gets trapped inside the leaf due to the [abscission layer](#), forming the pigment anthocyanin. Over time, all of the pigments will degrade and leave brown hues caused by tannins. The amount of pigments and their progression though the fall can vary by tree species, and helps make Vermont a kaleidoscope of color.



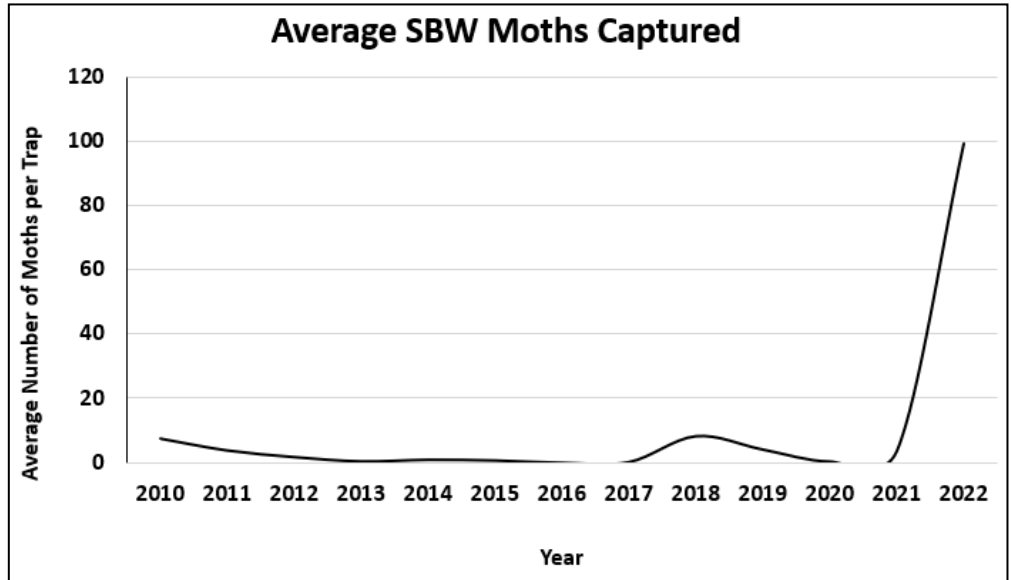
End of month fall color in Northeast Kingdom. Photo credit: FPR Staff.

Native Forest Stressors

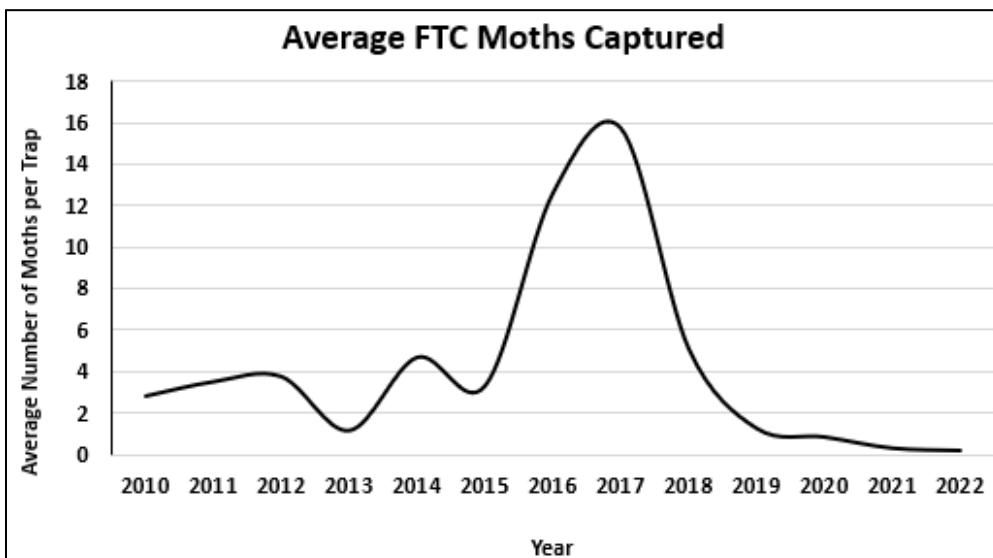
Spruce budworm (SBW, *Choristoneura fumiferana*) are native softwood defoliators of balsam fir (*Abies balsamea*), spruce (*Picea* spp.) and occasionally of larch (*Larix laricina*), pine (*Pinus* spp.), and hemlocks (*Tsuga* spp.). In consecutive years of severe outbreaks, trees may experience complete defoliation which can lead to dieback and mortality of infested hosts. In 2022, SBW moth trap catches in Vermont increased to an average of 99.33 moths per trap, compared to an average of 3.70 moths per trap in 2021. Although this increase is not predictive of severe defoliation in 2023, increased survey and monitoring efforts are being planned to track this forest pest.



SBW larva. Photo credit: Neil Thompson, University of Maine, [Bugwood](#).



Forest tent caterpillar (FTC, *Malacosoma disstria*) are native hardwood defoliators that are commonly found feeding on sugar maple (*Acer saccharum*) and ash (*Fraxinus* spp.) 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. To track population outbreaks, pheromone traps for FTC were deployed statewide in mid-summer. In 2022, the number of moths per trap averaged 0.15, evidence that populations are continuing to decrease in Vermont following a 2016-2018 outbreak.



FTC larva. Photo credit: Jon Yuschook, [Bugwood](#).

Supplemental Sightings

White-margined burrower bugs (*Sehirus cinctus*) were observed on Japanese knotweed (*Reynoutria japonica*) in Windsor County this month. This native insect feeds on seeds from a variety of hosts, but will also feed on stems and roots when seeds are not present. Although not a social insect, mothers stay with their eggs and provide the hatchlings with food.

White-margined burrower bugs. Photo credit: Robbo Holleran.

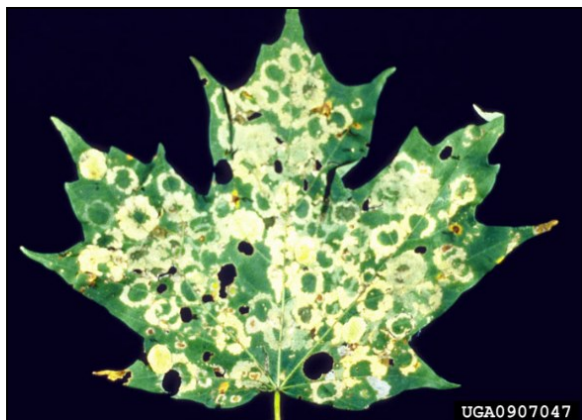


American Pelecinio wasp (*Pelecinus polyturator*) was observed in Washington County this month. This native insect is a parasite of numerous scarab beetles (*Phyllophaga* spp.). Adult females probe the ground with their ovipositor and deposit a single egg on a beetle larvae underground. When the egg hatches, the wasp larvae burrow into the beetle larvae and consume it from within.

American Pelecinio wasp. Photo credit: FPR Staff.

Sumac gall aphid (*Melaphis rhois*) damage was observed on staghorn sumac (*Rhus typhina*) in Orange County. Galls are induced from females laying a single egg on the underside of a host leaf. The single egg, later known as a "stem mother" hatches and reproduces parthenogenetically within the gall. Females released from these galls drop into the organic layer under the tree, where they will asexually reproduce and overwinter. Developed galls do not contribute to large-scale dieback or mortality of hosts.

Sumac gall aphid galls. Photo credit: FPR Staff.



Maple leaf cutter (*Paraclemensia acerifoliella*) damage has been reported on sugar maples (*Acer saccharum*) across the state this month. Larvae excise circular holes in the leaf, which are then bound together with silk, and used as protection from predators and environmental conditions. Although aesthetically alarming, this damage is not lethal to trees since defoliation happens late in the growing season.

Maple leaf cutter damage. Photo credit: FPR Staff.

Tar spot (causal agent *Rhytisma americanum*) has been reported on red maple (*Acer rubrum*) in Chittenden County this month. This is a native foliar pathogen that causes slight leaf necrosis and when heavy, premature leaf drop. In the fall, this fungus develops a stromata (tar spot) that will overwinter in leaf litter and be used to reinfect hosts in the Spring. Although damage to infected hosts is minimal, the future presence of this pathogen can be reduced by raking and burning symptomatic leaves after they fall.

Tar spot. Photo credit: Michael Kuo.

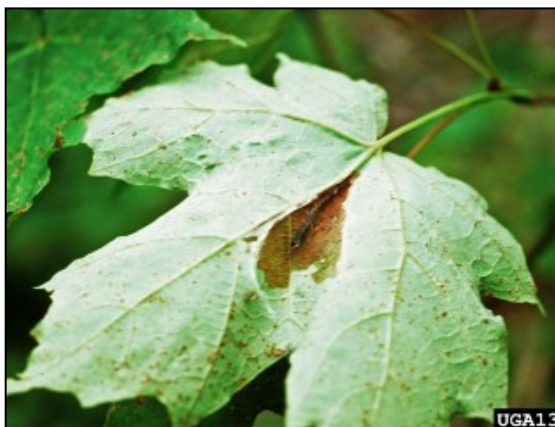


Hickory tussock moth (*Lophocampa caryae*) caterpillar was observed in Orange County. In its larval stage, this native insect feeds on a variety of hardwood species and contributes to defoliation between July and September. After feeding in the fall, caterpillars make cocoons that overwinter in protected areas such as leaf litter and/or under the bark of host trees. Caterpillars have urticating (stinging or prickling sensation) hairs that can cause contact dermatitis in humans if handled.

Hickory tussock moth caterpillar.
Photo credit: Betsy Higgins.

Asian lady beetle (*Harmonia axyridis*) was observed in by-catch in Asian longhorned beetle pheromone traps in Windham County. This insect is native to Asia and was introduced to the eastern United States as an agricultural biological control agent since it's a voracious predator of aphids, mites, and scale insects. These beetles congregate in high populations to overwinter, where they become nuisance pests in urban dwellings.

Asian lady beetle. Photo Credit: Russell R. Mizell, University of Florida.



Maple trumpet skeletonizer (*Catastega aceriella*) was observed on sugar maple in Caledonia County. These insects construct a trumpet-like tube out of silk and frass on the underside of infested leaves. These insects feed between July and October and since most defoliation is late in the growing season, it has minimal impact on overall tree health and vigor.

Maple trumpet skeletonizer. Photo credit: USDA Forest Service Northeastern Area, Bugwood.

Pseudocercospora leaf spot (casual agent *Pseudocercospora* spp.) was observed causing leaf necrosis on lilacs (*Syringa* sp.) in Chittenden County this month. This foliar pathogen causes marginal brown spots that progress inward to the main vein. Overtime infection leads to leaf curling and premature leaf drop. This pathogen overwinters in leaf litter where it can survive up to two years before infecting a host.

Symptomatic leaf. Photo credit: Peng Tian, University of Missouri Plant Diagnostic Clinic.



Eastern hemlock looper (*Lambdina fiscellaria*) moths were observed as bycatch in SBW pheromone traps. This native softwood defoliator can be a serious pest of eastern hemlock (*Tsuga canadensis*) and balsam fir (*Abies balsamea*) causing dieback and mortality in completely defoliated hosts. Hemlock looper outbreaks typically occur in mature stands, rapidly progressing but only lasting one to two years due to natural bio-control agents.

Eastern hemlock looper. Photo credit: Charley Eiseman, [BugGuide](#).

Cedar-hawthorn rust (causal agent *Gymnosporangium globosum*) was reported on midland hawthorn (*Crataegus laevigata*) in Chittenden County this month. This pathogen typically infects red cedars (*Juniperus virginiana*) and hawthorns (*Crataegus* spp.) but can also infect other common junipers (*Juniperus* spp.) and apples (*Malus* spp.). On hawthorns, this pathogen causes leaf spots, necrosis (killing of leaf tissue), and premature leaf drop. If severe, this can infect new/young shoots of hawthorn which can contribute to dieback. On junipers, this pathogen causes twig galls that can lead to dieback of infected tissue.

Cedar-hawthorn rust damage on hawthorn. Photo credit: University of Illinois Extension.

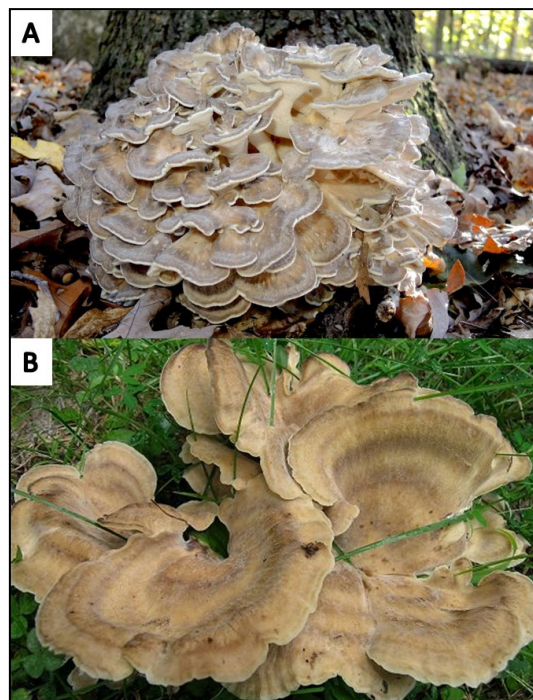


Butternut canker (causal agent *Ophiognomonia clavigignenti-juglandacearum*) was observed on butternut (*Juglans cinerea*) in Franklin County. This fungal pathogen causes numerous, elongated, sunken cankers that girdle the stem and branches of trees leading to severe dieback and mortality. For more information, view [June's Insect and Disease Observations](#).

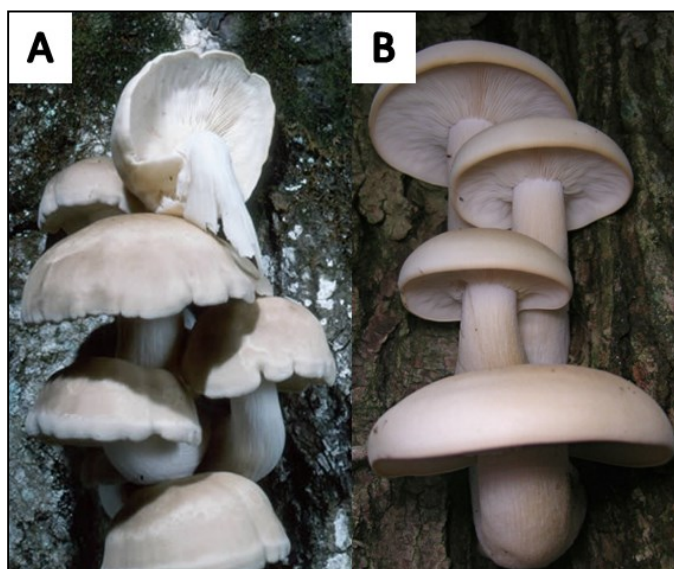
Butternut cankers. Photo credit: Tom Creswell, Purdue University, [Bugwood](#).

Foraging For Fungi

Hen-of-the-woods (*Grifola frondosa*) is an early fall edible that can be found in hardwood stands this month. This mushroom is weakly parasitic and saprotrophic causing butt rot of hardwoods, especially oaks (*Quercus* spp.). This fruiting body is a polypore consisting of a rosette of individual caps that arise from a single stem. The entire fruiting body is 15-40cm wide and 10-30cm high with individual caps being 3-14cm wide. The caps are fan-shaped and are dark to pale grey-brown with wavy margins. The underside of the cap has decurrent pores that vary in color from gray to white and stain yellow when bruised. Pores are angular to tooth-like and give off a white spore print. Its stem is white, branched, and often off-center. This mushroom has an edible lookalike, the black-staining polypore (*Meripilus sumstinei*). This mushroom is also parasitic and saprotrophic causing butt rot of hardwoods. This fruiting body is also a rosette of polypores that arise from a single stem. The entire fruiting body is 30cm wide with individual caps being 5-20cm wide. The caps are fan-shaped that are whitish to brown in color with concentric zones. The underside of the cap has angular pores that are whitish to dirty tan and gives off a white spore print. Its stem is whitish, discoloring brown-black with age, and often off-center.



A: Hen-of-the-wood. Photo credit: Melissa Kuo, [MushroomExpert](#). **B:** Beech mushrooms. Photo credit: Michael Kuo, [MushroomExpert](#).



A: Elm oyster mushrooms. Photo credit: William Roody, [Messiah College](#). **B:** Beech mushrooms. Photo credit: Michael Kuo, [MushroomExpert](#).

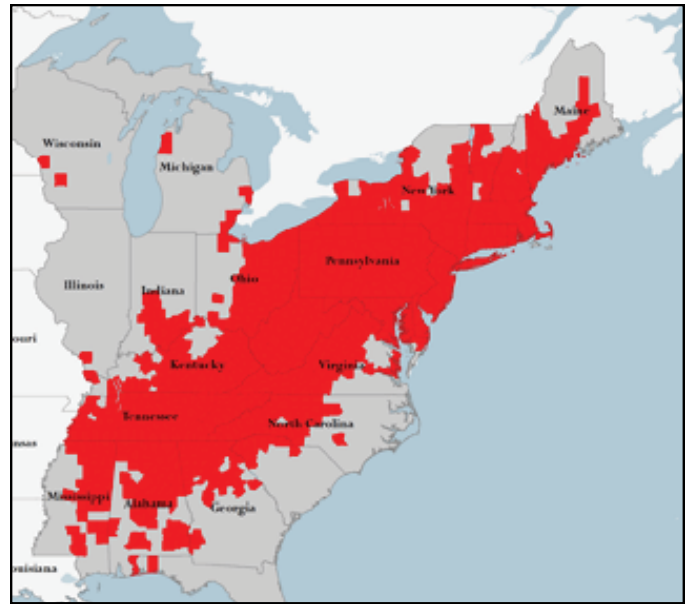
Elm oyster mushrooms (*Hypizygus ulmarius*) are another edible that can be foraged this time of year. This mushroom is saprotrophic, growing alone or in small clusters out of decaying hardwoods, especially elm (*Ulmus* spp.) and boxelder (*Acer negundo*). Its fruiting body is convex to broadly convex with a whitish to pale tan cap that is 5-15cm wide. The underside of the cap has whitish-cream colored gills that are attached and gives off a white spore print. Its stem is a similar color to its cap and is 5-10cm long and 1-2.5cm thick. The stem is smooth to finely hairy and is off-centered to nearly central. This mushroom has an edible lookalike, the beech mushroom (*Hypsizygus tessulatus*). This mushroom is distinguished from the elm oyster by microscopic spore analysis and host substrate. Beech mushrooms are saprotrophic growing in clusters of two or three fruiting bodies and can be commonly found on aspens (*Populus* spp.) and sugar maple (*Acer saccharum*).

The State of Vermont accepts no liability or responsibility for the consumption and/or misidentification of any mushrooms mentioned in this publication.

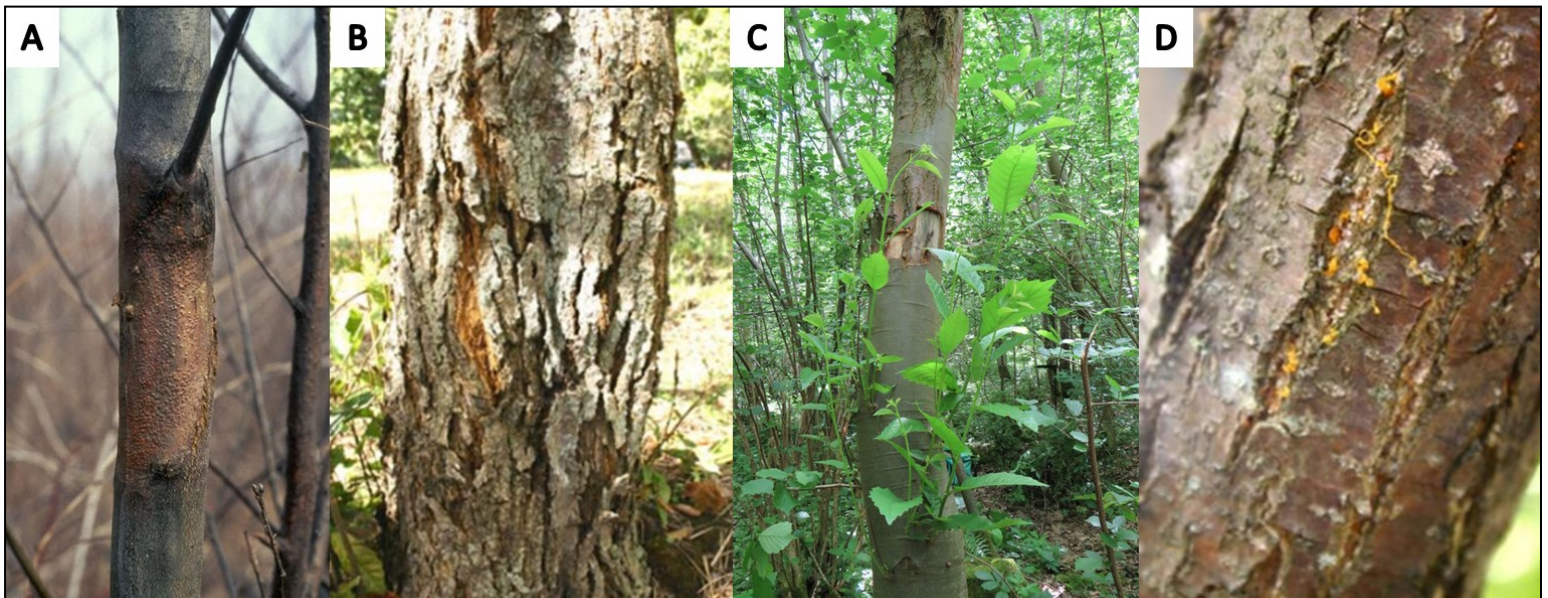
Pest in the Spotlight: Chestnut Blight

Chestnut blight (*Cryphonectria parasitica*) is a fungal canker pathogen of American chestnut (*Castanea dentata*), European chestnut (*C. sativa*), American chinquapins (*C. pumila*, *C. ozarkensis*), Chinese chestnut (*C. mollissima*), and some oak species (*Quercus* spp.) (only minor bark infections) and is most lethal to American chestnut. This pathogen was introduced to the United States in 1904 from a shipment of infected nursery stock from Asia, and is now widespread throughout American chestnut's native range.

Distribution of chestnut blight in the United States. Map and data: USDA Forest Service.



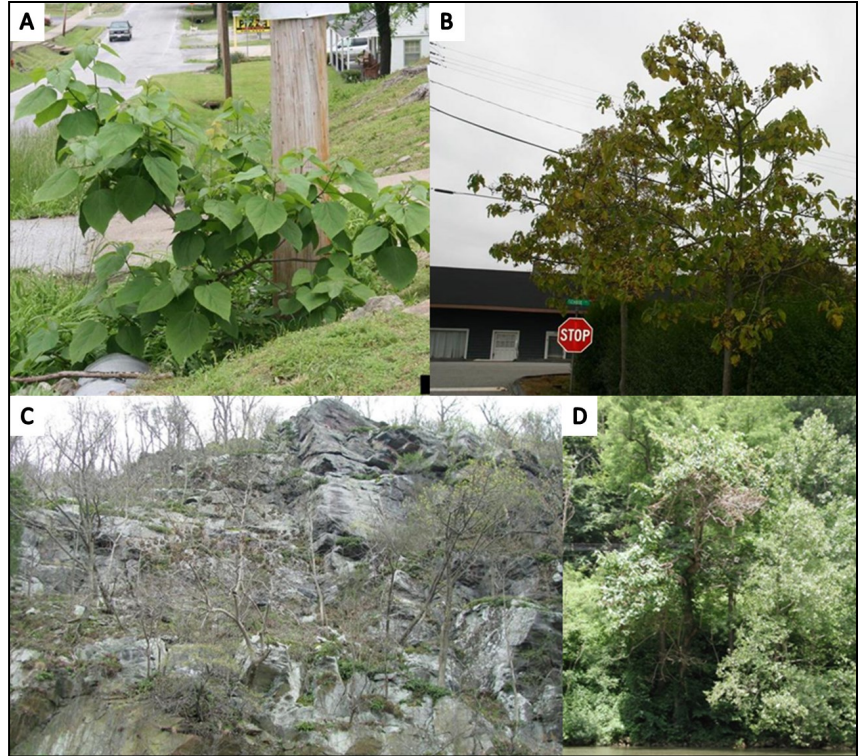
This pathogen enters its host through openings such as wounds, branch stubs, and lenticels. Once it becomes established, the fungus kills infected tissue, causing cankers that girdle branches and stems. Girdling leads to dieback and if the tree has enough energy reserves, it may induce epicormic bark or root sprouts that will likely be infected later. Over time numerous cankers and severe dieback will lead to mortality, which can occur over a single growing season. In the spring, yellow-orange masses of conidia tendrils (spores) ooze from fruiting bodies on and around the cankers. These spores get transported by rain splash, insects, and animals to susceptible hosts. Although this aggressive pathogen has caused American chestnut to become functionally extinct on our landscape, conservation efforts including seed collection, breeding programs, and biocontrol research are being conducted to prevent complete extinction. For more information, visit [VTInvasives](https://www.vtinvasives.org/).



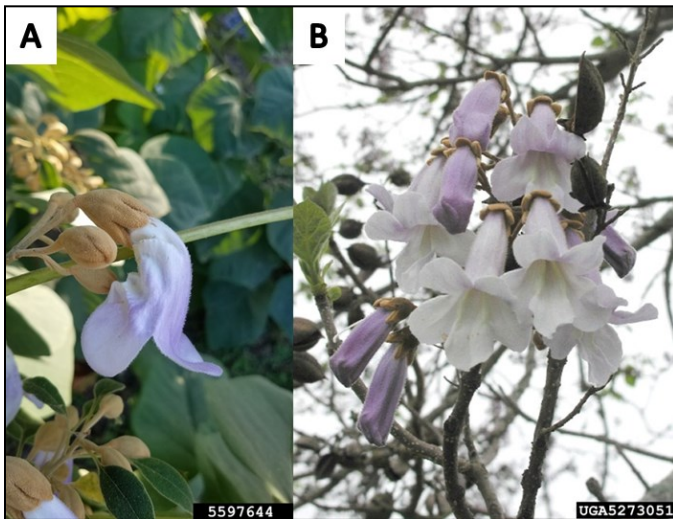
A-B: Cankers. **C:** Epicormic sprouting. **D:** Conidia tendrils. Photo credit: **A:** George Hudler, Cornell University, [Bugwood](https://bugwood.org/). **B,D:** Gerhard W. Weber, Cornell University, **C:** Félix TENG, Walloon Agricultural Research Centre (CRA-W), [Bugwood](https://bugwood.org/).

Early Detection Species: Princess Tree

This month's focal species is a tree where the fairy-tale stops with the name; Princess tree (*Paulownia tomentosa*) is an invasive plant that evolved in the warmer regions of China, as part of deciduous and mixed forests. Princess tree and several cultivars are sold as landscaping or street trees, have been used in disturbed site reclamation projects, and in some places in the world, are grown as a fast-growing hardwood crop tree for products manufactured and sold in Asia. The tree has been distributed by humans across the globe and is believed to have been introduced to North America via Europe in the 1840s as an ornamental plant. This species has escaped cultivation and is present in almost all eastern and central states from New York to Florida to Texas but has currently not been reported in a naturalized setting in Vermont.



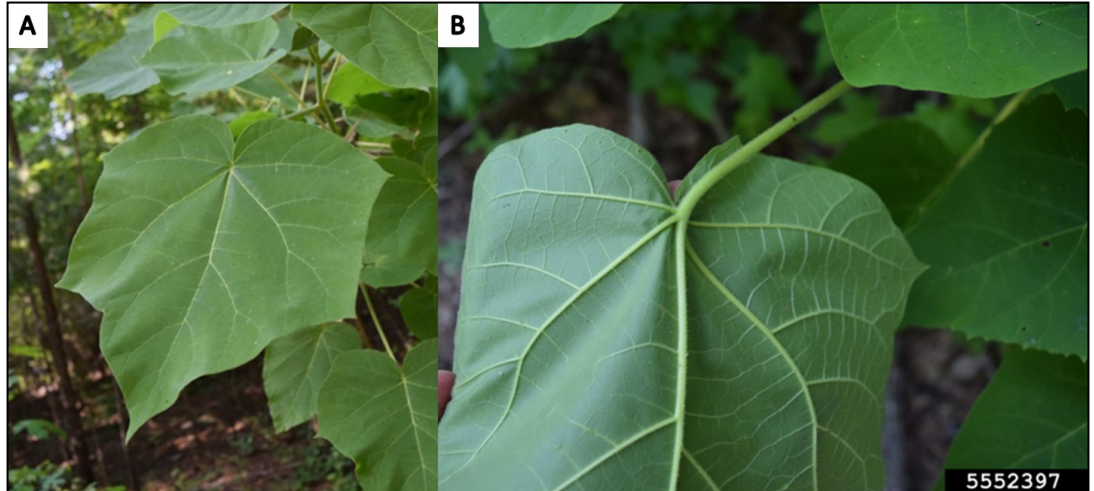
(**A-B**) Where you might expect to see princess tree growing (suburban yard, street tree) vs. (**C-D**) where it can end up growing (natural environments like forest edges, cliffs, and riverbanks). Photo credit: (**A**) Chris Evans, University of Illinois, [Bugwood](#), (**B**) Leslie J. Mehrhoff, UCONN, [Bugwood](#); (**C-D**) Leslie J. Mehrhoff, UCONN, [Bugwood](#).



Flowers of the princess tree. Photo credit: (**A**) Rebekah D. Wallace, University of Georgia, [Bugwood](#), (**B**) Leslie J. Mehrhoff, UCONN, [Bugwood](#).

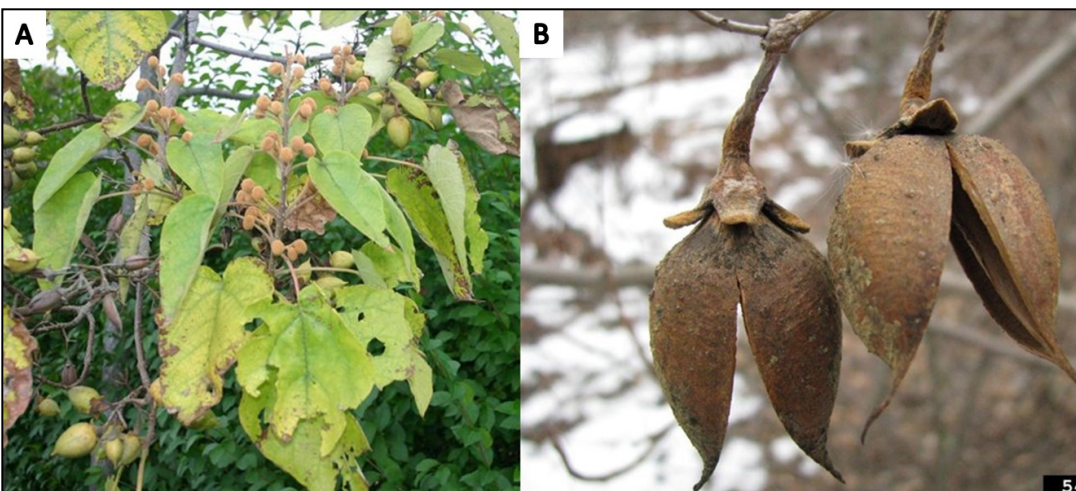
Princess tree has showy clusters of bell-like pale purple flowers, protruding from downy brown capsules. Flower buds are formed the previous year and overwinter, and open in the early spring. Pale green fruits form, and dry out, eventually splitting open and releasing winged seeds. Each capsule holds a few thousand seeds, with a single princess tree capable of producing millions of seeds each year. The leaves are large (half a foot to over a foot wide), broad, and oval to heart shaped, arranged oppositely, and can even grow off small root sprouts. Like the species name suggest (tomentose means softly hairy), there are hairs on the top and bottom surface of the leaves and on the petioles. The bark of young or new growth is brown with white spotted lenticels. The tree can reach moderate heights of up to 50'.

Researchers and managers alike are concerned about the unlocked invasiveness of certain naturalized species ([sleeper species](#)) like princess tree. When considering the invasive potential of a naturalized species (even one that's been around for more than 50 years), it is important to consider traits linked to invasiveness (like quick growth, short generation time, responsiveness to disturbance, and high reproductive output), characteristics of its climate of origin, known impacts, the current population size, and treatment efficacy. Predicted climatic shifts, including hardiness zones, may change where princess tree could establish and become invasive, both in altitude and latitude, and a predicted increase in forest disturbance could make princess tree a species to watch for.



(A) Top and **(B)** bottom surfaces of princess tree leaves. Photo credit: Nancy Loewenstein, Auburn University, [Bug-wood](#).

At present, this tree appears to be cold-limited, with observations suggesting its peak invasiveness is in North American hardiness zones 7-10, though it can survive to zone 5. This pressure is strongest against susceptible plants (young or damaged), but mature plants are capable of withstanding negative temperatures ($^{\circ}\text{F}$). Found in forests, forest edges, riparian areas, human disturbed areas, cliffs, and even rocky outcrops, princess tree can tolerate a wide range of growing conditions, and competition and shade may not be as strong a limiting force as once thought. This species has a strong preference for sunnier growing conditions, but also has wind-dispersed seeds, and sees rapid growth of seedlings, all of which make princess tree adept at establishing in newly disturbed sites. While the shade of a forest can restrict the success of princess tree, canopy disturbances in or at the edge of forests, including fires, may provide opportunity for establishment, and the tree's fast growth may mean those individual princess trees can remain in the canopy.



Princess tree fruits, flower buds, and leaves in the **(A)** autumn and fruit in the **(B)** winter. Photo credit: **(A)** Leslie J. Mehrhoff, UCONN, [Bug-wood](#) **(B)** Leslie J. Mehrhoff, UCONN, [Bug-wood](#).

Princess tree is known in southeastern U.S. to exclude locally evolved species in fire-prone areas and on cliffs and rocky outcrops. This species is on the Maine Do Not Sell Plant list, making it illegal to import, export, buy, sell, or intentionally propagate for sale or distribution within the state. Though there are aesthetic benefits to this species, the documented detrimental impacts and continued escape and spread throughout New England are reasons why princess tree is listed on Vermont's [unofficial watchlist](#), and why the species has a New York Invasiveness ranking of moderate. Beautiful alternatives to this invasive plant include locally evolved species like flowering dogwood (*Benthamidia florida* syn. *Cornus florida*) and shad-bush/serviceberry (*Amelanchier arborea*). Eradication is difficult if not impossible once the species is established because of its growth adaptations, so prevention and early detection, and supporting the resilience of forest and riparian habitats are the most effective means of control.

To learn more about princess tree and sleeper species, check out VTinvasives.org and these additional resources:

[RISCC Management Challenge, Preparing for Sleeper Species](#)

[USDA National Invasive Species Information Center](#)

[Centre for Agriculture and Biosciences International](#)

[US Department of Agriculture](#)

[USDA Forest Service](#)

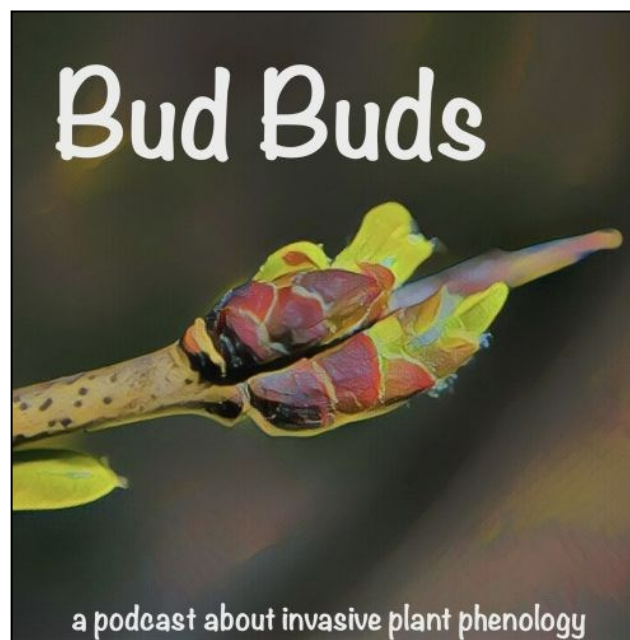
Invasive Plant Phenology

In the second full week of each month, volunteers around the state observe and report invasive plant phenology. Their observations are compiled here, creating both a timely resource for best management options and a historic record of plant behavior. If you would like to be involved in this effort, please contact pauline.swislocki@vermont.gov. This project aspires to include observations from every county, so observers are still needed in multiple places.

For more information about the phenology of invasive plants in Vermont, check out [Bud Buds](#), a podcast from the Invasive Plant Program.

Addison - Leaves: common reed, knotweed spp., wild parsnip; Flowers or flower buds: knotweed spp., common reed; Open flowers: knotweed spp., common reed; Fruits: wild parsnip; Ripe fruits: wild parsnip; Recent fruit or seed drop: wild parsnip.

Bennington - Leaves: Asiatic bittersweet, common reed, goutweed, knotweed spp., Japanese barberry, shrub honeysuckles; Flowers or flower buds: common reed, goutweed, knotweed spp.; Open flowers: common reed, goutweed, knotweed spp.; Fruits: Japanese barberry.



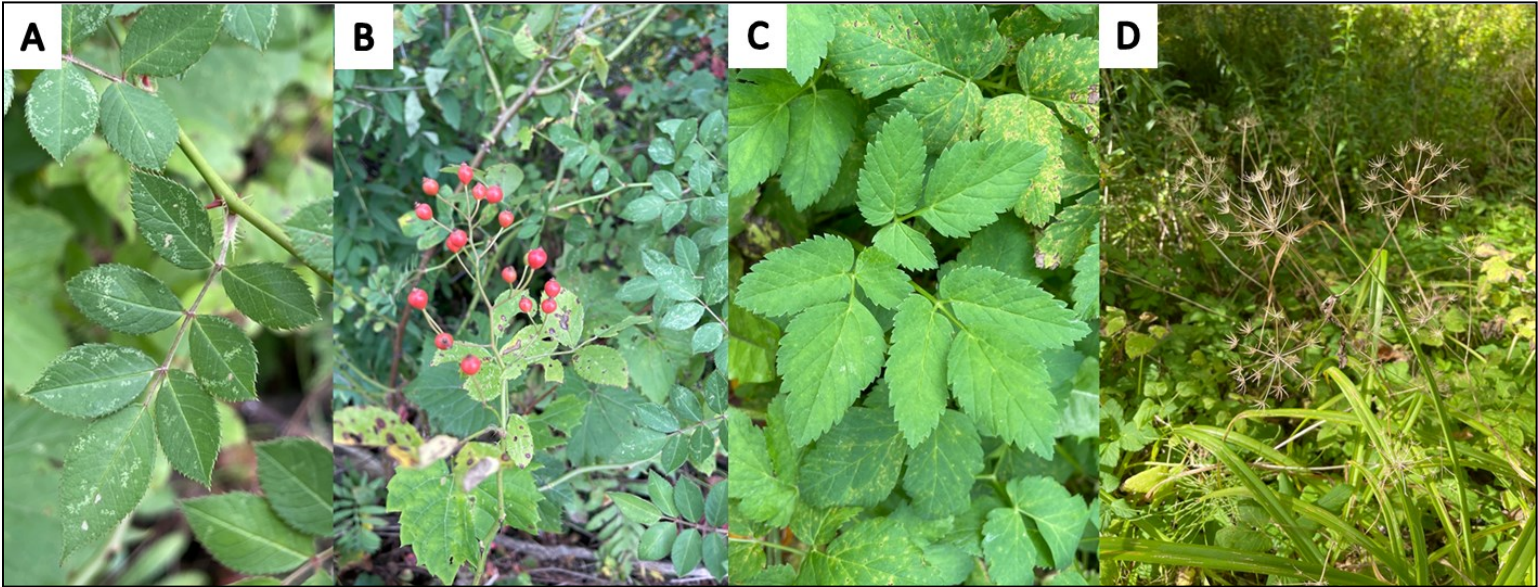
Caledonia - Leaves: Asiatic bittersweet.

Chittenden - Leaves: Asiatic bittersweet, common buckthorn, common reed, glossy buckthorn, goutweed, Japanese barberry, knotweed spp., multiflora rose, purple loosestrife, shrub honeysuckles, wild parsnip; Flowers or flower buds: common reed, goutweed, knotweed spp., purple loosestrife; Open flowers: common reed, goutweed, knotweed spp., purple loosestrife; Fruits: Asiatic bittersweet, common buckthorn, glossy buckthorn, Japanese barberry, multiflora rose, purple loosestrife, shrub honeysuckles, wild parsnip; Ripe fruits: common buckthorn, glossy buckthorn, multiflora rose, purple loosestrife, shrub honeysuckles, wild parsnip; Recent fruit or seed drop: common buckthorn, common reed, goutweed, multiflora rose, shrub honeysuckles, wild parsnip.

Orange - Leaves: Asiatic bittersweet, burning bush, common barberry, common buckthorn, knotweed spp.; Colored leaves: burning bush; Flowers or flower buds: knotweed spp.; Open flowers: knotweed spp.; Fruits: Asiatic bittersweet, common barberry, common buckthorn; Ripe fruits: common barberry, common buckthorn; Recent fruit or seed drop: common buckthorn.

Rutland - Leaves: burning bush, common reed, knotweed spp.; Colored leaves: burning bush; Flowers or flower buds: common reed, knotweed spp.; Open flowers: common reed, knotweed spp.; Recent fruit or seed drop: common reed.

Washington - Leaves: common buckthorn, Japanese barberry, knotweed spp.; Flowers or flower buds: knotweed spp.; Open flowers: knotweed spp.; Fruits: common buckthorn, Japanese barberry; Ripe fruits: common buckthorn.



September phenophases for multiflora rose (A) leaves and (B) fruits, ripe fruits, and recent fruit or seed drop, and phenophases for goutweed (C) leaves and (D) recent fruit or seed drop. Photo credit: FPR staff.



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 |

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.