Vermont Forest Health

Insect and Disease Observations — June 2020

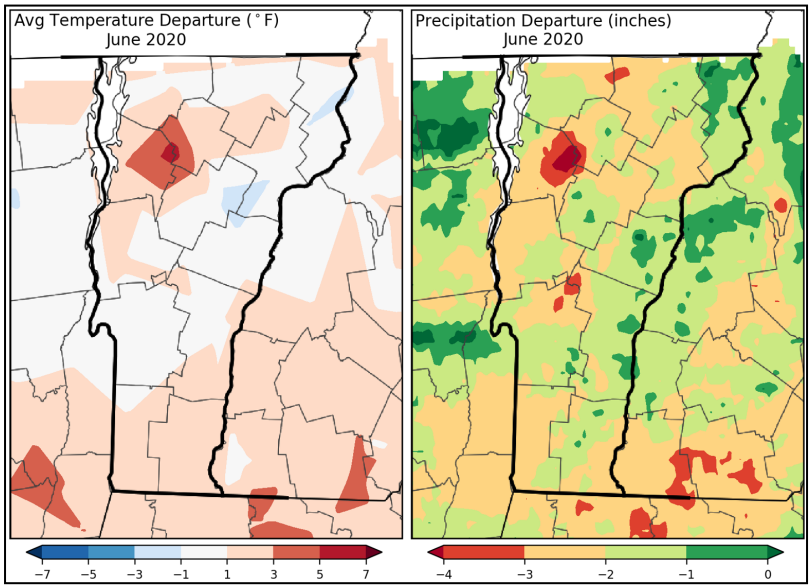
Department of Forests, Parks & Recreation
June 2020 vtforest.com

Weather Recap

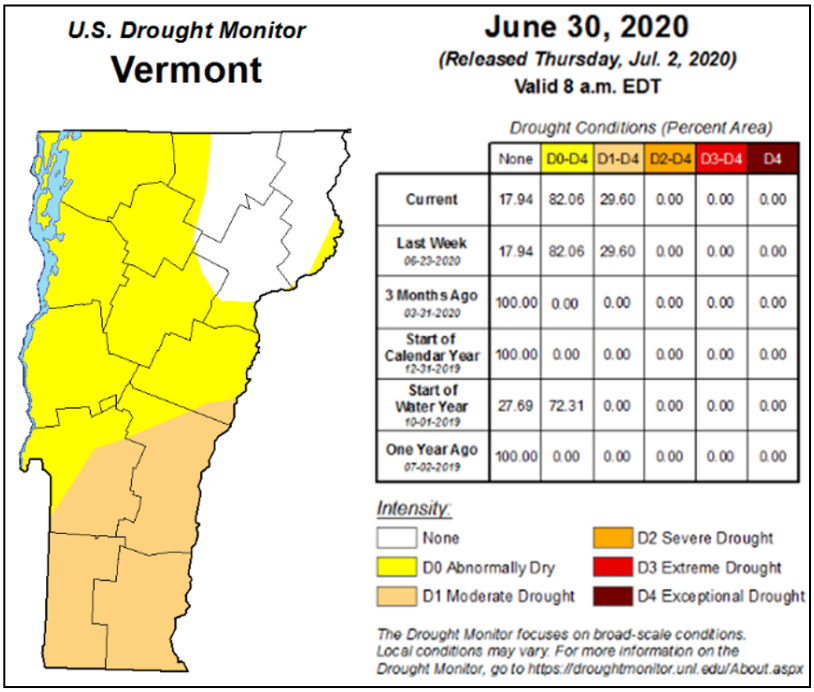
Mid-June marks the end of spring and the official start to the summer season. Temperatures fluctuated throughout the month, with average ranges between 50 °F and 75.8 °F. Compared to last year, this month was warmer and dryer than June of 2019. Statewide temperatures averaged 62.9 °F, which was 2.3 °F warmer than last year. Statewide precipitation averaged 2.54 inches, which was 3.07 inches less than June of last year.

The U.S. Drought Monitor listed most of Vermont as abnormally dry starting on June 9th. Northwestern Vermont was the first area listed as abnormally dry starting on June 2nd, which increased to 82.06% of the state being affected. By the end of the month, 29.60% of the state was listed as moderate drought. Soil moistures as measured by the Keech-Byram Drought Index (KBDI) are at levels normally seen by late summer on a dry year. KBDI values of over 300 are considered dry and increased potential for fire burning in duff and other ground fuels. As of the last week of June, Vermont Emergency Management has activated the Drought Task Force to monitor the situation.

Vermont drought conditions at the end of June. Maps and data: National Drought Mitigation Center.

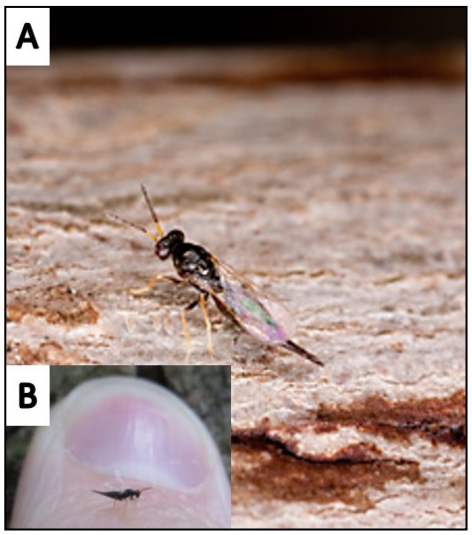


Temperature and precipitation departure from normal. Maps and data: Northeast Regional Climate Center.



EAB Update: Biocontrol Release

Emerald ash borer (EAB, *Agrilus planipennis*) is an invasive insect from Asia that was first detected in Vermont in 2018. This insect has no natural predators in the United States, and with an abundant source of food and shelter, it has been responsible for decimating more than 25 million ash trees in the country. To date, little to no natural defense to EAB has been detected in North American ash trees.



A: *T. planipennisi.* Photo credit: Bill McNee, WI DNR. **B:** *T. planipennisi* on finger for scale. Photo credit: Stephen Ausmus, USDA Forest Service.

Across the country, efforts have been made to prevent complete ash species eradication. Chemical methods of preserving individual trees are available, but they are costly and impractical to treat trees on a broad level. Biological control programs, or biocontrol, were introduced in 2007 to manage EAB populations on a landscape level. Biocontrol strives to manage a pest's population by introducing its natural predators into the same environment. This predator release regulates the undesired species' unchecked population growth and aims to reduce the damage caused by that pest. Species used for biocontrol only target the unwanted pest and will not harm humans or the environment it was introduced in. The USDA has listed four species of small, non-stinging parasitoid wasps for EAB biocontrol in the U.S. Between 2009-2019, over 6 million parasitoid wasps have been released across 29 states to manage EAB populations. On June 9th, the Vermont Department of Forests, Parks & Recreation and, the Agency of Agriculture released *Tetrastichus planipennisi*, a small, non-stinging wasp native to North Asia at LR Jones State Forest in Plainfield, and on a property in South Hero. The parasitoids were produced and supplied from, the United States Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ) EAB Parasitoid Rearing Facility in Brighton, MI. For parasitoid information please call 866-322-4512.

FPR Staff Jon Cherico installing a bolt that is infested with *T. planipennisi* to an ash tree. Photo credit: Judy Rosovsky.

This parasitoid wasp is only 3-4 mm long, is incapable of stinging humans, and specifically parasitizes EAB larvae. *T. planipennisi* drills through the bark of ash trees and lays its eggs in EAB larvae. As the eggs hatch, they consume the EAB larvae from the inside out. Due to its smaller size, *T. planipennisi* is best suited for ash trees that are 4" in diameter or less, as it cannot penetrate the bark of larger trees to reach EAB larvae. This year, five more releases of these wasps will be completed at both of these locations to strengthen their population. FPR plans to release more parasitoid wasp species in tandem with *T. planipennisi* across all counties in the coming years. This statewide presence of biocontrol agents will help regulate EAB populations, which will in turn prolong the life of Vermont's ash trees. For more information about EAB and how to report a sighting, please visit VTInvasives.

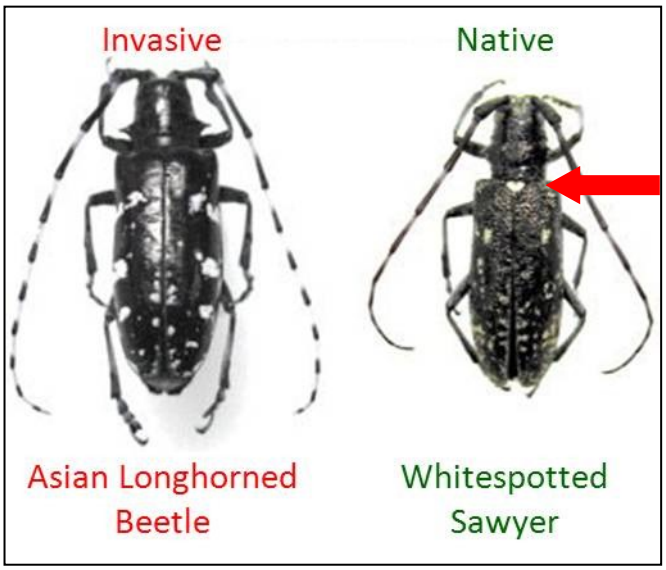
White Pine Needle Damage

Eastern white pine trees with white pine needle damage complex. Photo credit: FPR Staff.

White pine needle damage (WPND) is a fungal complex of four different foliar pathogens, *Bifusella linearis, Lecanosticta acicola, Lophophacidium dooksii,* and *Septorioides strobi,* that have been associated with both needle cast and needle blight on eastern white pine trees throughout Vermont. Although this is an increasingly damaging complex, individually these pathogens are not documented as causal agents of large-scale defoliation. Infected trees have been observed having chlorosis (yellowing) and necrosis (browning) of 1-year-old needles, with heavy infections having defoliation and dieback. 2019 aerial survey efforts detected WPND on 23,891 acres in the state. In addition to aerial surveys, long-term monitoring plots have been established across the state to monitor the spread and disease progression of these foliar pathogens. For more information on WPND, please see our annual Forest Insect and Disease Conditions report.

Whitespotted Sawyer Beetle

Whitespotted sawyer beetles (*Monochamus scutellatus*) are a native wood-boring beetle commonly found in the state. These beetles attack a variety of dead or dying conifer species and are therefore only considered a minor or secondary pest to eastern softwood forests. As larvae, this insect bores into the wood, contributing to girdling and dieback in living infested trees. As adults, these dull brown beetles feed on the bark and undersides of branches.



Asian longhorned beetle (left) and Whitespotted sawyer (right) Photo credit: Massachusetts Department of Agricultural Resources.

This beetle can commonly be mistaken for the Asian longhorned beetle (ALB, *Anoplophora glabripennis*), an invasive wood-boring beetle of hardwood species. Whitespotted sawyer beetles can be distinguished from ALB by the presence of a single white spot on its thorax between its wing covers (see arrow in picture) as well as the absence of a bright black and white banding pattern of their antenna. For more information on this native beetle including managing recommendations, visit forestpests.org. For more information on ALB, or to report a sighting, visit VTinvasives.

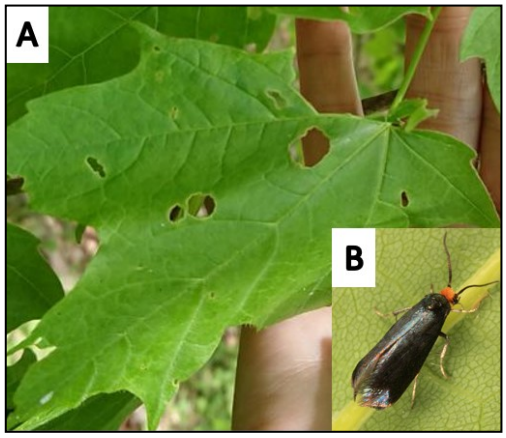
Quick Bites

Spiny oak sawfly (*Periclista albicollis*) larvae were observed early this month feeding on red oak saplings in Waterbury, VT. Young larvae chew holes in the leaves, then switch to feeding on leaf material between leaf veins as they mature. In large numbers they can cause severe defoliation to host plants.

Spiny oak sawfly larvae. Photo credit: FPR Staff.

Swarms of lake flies (family *Chironomidae*) were reported emerging from ponds in Craftsbury, VT early this month. Although related to mosquitoes, these insects do not bite and are not harmful to humans. As aquatic larvae, these flies are vital food resources to many species of fish, amphibians, and waterfowl, and as adults, to insect-eating birds, bats, and amphibians.

Lake fly. Photo credit: Even Dankowicz, Bug-guide.



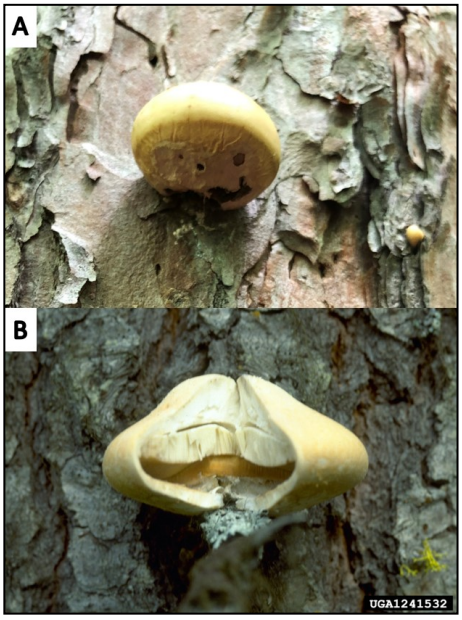
Maple leaf cutter (*Paraclemensia acerifoliella*) damage is predominately found on sugar maples, although this insect also feeds on other hardwoods such as red maple, beech and birch species. Larvae excise circular holes in the leaf, which is then bound together with silk, and used as protection from predators and environmental conditions.

A: Maple leaf cutter damage. Photo credit: FPR Staff. **B:** Maple leaf cutter. Photo credit: Tom Murray, Bug-guide.

Pear thrips, (*Taeniothrips inconsequens)* have been observed affecting beech and maple trees in central and southern Vermont this growing season. These insects feed on opening vegetation and flower buds, causing infested branches to appear tattered and stunted. High infestation levels can cause thinned crowns and premature leaf drop. For more information visit VTinvasives.

Pear thrips damage. Photo credit: FPR Staff.

The veiled polypore (*Cryptoporus volvatus*) was observed on dead red pines in Waterbury, VT, and acts as an indicator species for pine beetle infestations. This polypore has a protective "veil" layer that protects its reproductive structures from drying out, which is also used by pine beetles for shelter. Using the veil, the polypore can maintain the temperature and moisture requirements of the pine beetles, providing them habitat, while being immersed in fungal spores. When the beetles mature and exit the polypore, they vector this decay organism to the next tree.

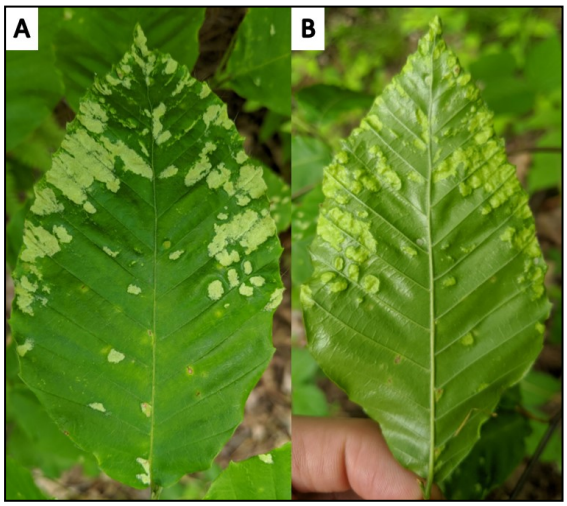


A: Veiled polypore. Photo credit: FPR Staff. **B:** Internal view of veiled polypore. Photo credit: John W. Schwandt, USDA Forest Service.

Maple bladder gall mites (*Vasates quadripedes*) have been observed causing leaf galls on maples in central Vermont. Galls are formed as a response to the mites feeding on leaf the tissue, and once formed, can be used by the mites as shelter. Although feeding can be extensive, they are not known to cause or contribute to large scale dieback or defoliation.

Leaf infested with maple bladder gall mites. Photo credit: Rob Broekhuis, Bug-guide.

Beech erineum mites (*Acalitus ferrugineum*) are a common sight in Vermont, being reported in most parts of the state. Infested leaves have light yellow patches on the top of the leaf early in the season, which will later progress to a reddish-brown color later in the growing season. The bottom of the leaf is often observed having small, raised, gall formations. These mites are not known to cause or contribute to large scale dieback or defoliation.



A: Top, **B:** Bottom of beech leaf infested with beech erineum mites. Photo credit: FPR Staff.

Crimson erineum galls *(Eriophyes calaceris*) are another common site in Vermont, being reported in most parts of the state. These galls are typically found near the edges of leaves and are caused by the feeding of *E. calaceris* mites. Once formed, these galls are used as shelter and sites of reproduction.

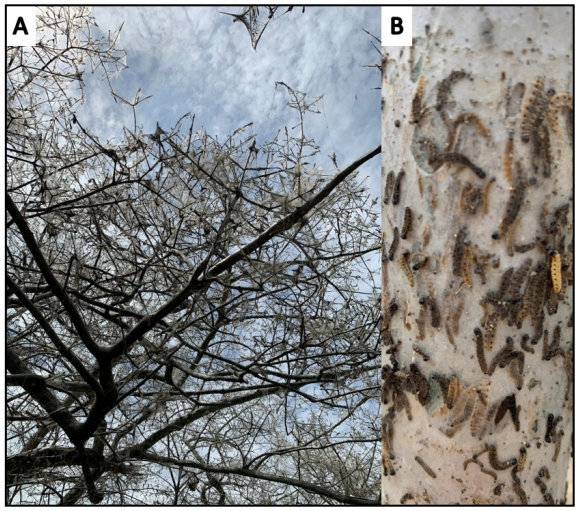
Leaf infested with crimson erineum galls. Photo credit: FPR Staff.

Eastern tent caterpillar (ETC, *Malacosoma americanum*) nests have been spotted throughout the state at low populations. These caterpillars build silk nests in the crotches and branch unions of numerous hardwood trees, and can contribute to significant deflation when populations are high. To help prevent damages, silk nests should be removed and destroyed when possible. Nests should never be lit on fire because doing so may start a forest fire.

ETC silk nest. Photo credit: FPR Staff.

Scarlet cup fungi (*Sarcoscypha coccinea*) have been spotted earlier in the month following periods of heavy rain. These fungi decompose deadwood and are frost tolerant. These mushrooms are commonly found in European mythology, being used as small cups for wood elves.

Scarlet cup fungi. Photo credit: Neil Lindbald.



Euonymus caterpillar (*Yponomeuta cagnagella*) were found heavily infesting an apple tree in Bethel, VT. Although not commonly detrimental to tree health, in large numbers they can cause severe defoliation to host plants. Successive years of defoliation can lead to severe dieback and mortality of host plants.

A: Euonymus caterpillar infested tree. Photo credit: FPR Staff. **B:** Euonymus caterpillar larvae. Photo credit: FPR Staff.

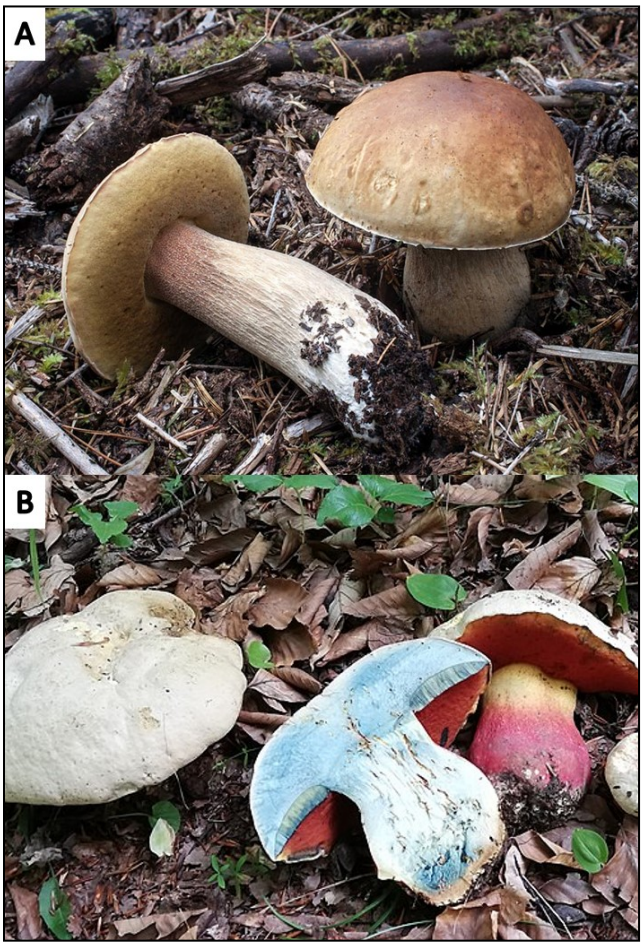
Black knot is caused by the native fungus *Apiosporina morbosa.* This disease has been reported at low levels throughout the state, infecting stone fruit species such as cherry and plum trees. Infected trees develop stem galls that grow and girdle branches. Galls should be pruned out of the tree whenever possible to stop the spread onto uninfected branches and trees.

Black knot. Photo credit: R. Kelly.

Foraging for Fungi

Chanterelle mushrooms (*Cantharellus cibarius*), are a native edible fungus that have started to appear in central Vermont. This fungus can be identified by its yellow to deep orange color, its funnel shape, and the presence of false gills under the cap. False gills partially run down the stalk of the mushroom, and cannot be picked off and separated from the cap. These mushrooms grow directly out of soil and are ectomycorrhizal, meaning that they have a symbiotic relationship with trees. This mushroom has a poisonous look alike commonly known as, Jack o' lantern mushrooms (*Omphalotus* sp.). These mushrooms are orange and have gills with bioluminescence properties in low light conditions. Unlike chanterelles, this mushroom is often found growing in clumps out of decaying wood and contains the toxin illudin.

A: Chanterelles. **B:** Jack o' lantern mushrooms. Photo credit: Michael Kuo, mushroomexpert.com.



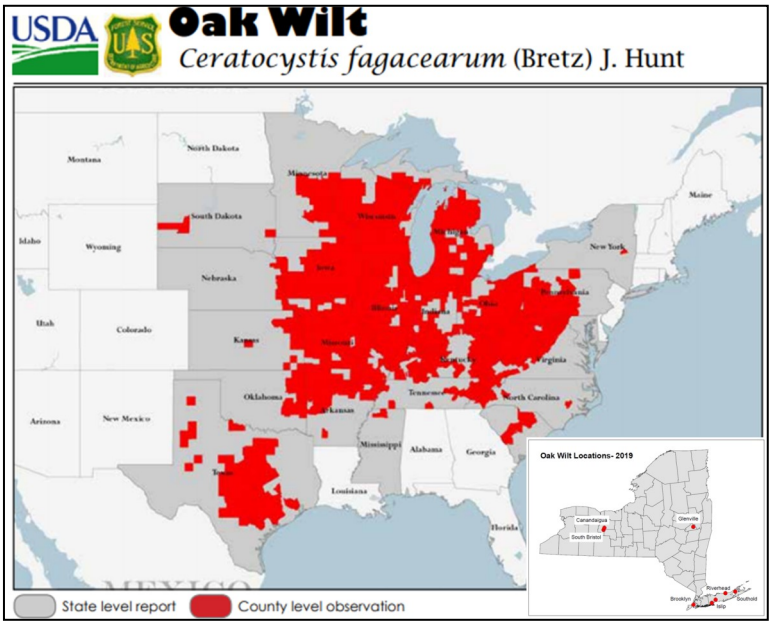
Porcini mushrooms (*Boletus edulis*), are another wild edible that is found throughout the state. This fungus can be identified by its yellow-brown to reddish-brown caps, presence of pore/ spore tubes under the cap, and lack of pigmentation when bruised or damaged. This mushroom is also ectomycorrhizal and grows out of soil, not out of decaying wood. This mushroom has a poisonous look alike known as Satan's bolete (*Rubroboletus satanas*). Unlike the porcini mushroom, this mushroom has a bright red stem and pore surface and its cap stains blue when cut. 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.***

A: Porcini. Photo credit: Luke Emski. **B:** Satan's bolete. Photo credit: Michael Wood.

Pests in the Spotlight: Oak Wilt

Oak wilt (*Bretziella fagacearum*) is a vascular tree disease of oak trees, which causes rapid decline and mortality in infected hosts. Due to the fast progression of this disease, it is thought to be introduced to the United States, however its exact origin is unknown. This pathogen was first documented in Wisconsin in 1944 and has currently not been observed in Vermont. This pathogen can spread large distances through a variety of bark and sap feeding beetles as well as locally, through root graphs. Humans can expedite the spread by moving infected firewood, or transporting insect vectors.

Oak wilt infected tree. Photo credit: William M. Ciesla, Forest Health Management International, Bugwood.



This pathogen has currently been reported in 22 states, with the most recent being in New York in 2008.

Early symptoms of this pathogen include wilted and discolored margins of leaves. This can lead to leaf drop during the growing season which gives infected trees a "fall-like" appearance. Overtime, dieback and mortality will progress, with red oak family members having rapid onset and mortality which can happen over a single growing season, and white oak family members having a slower decline. Cutting into the infected tree will show symptoms of xylem streaking and expose fungal hyphal mats. For more information on oak wilt, or to report a sighting, please visit VTinvasives.

Oak wilt causing leaf discoloration. Photo credit: Ryan Armbrust, Kansas Forest Service, Bugwood.

Oak wilt hyphal mat. Photo credit: Joseph OBrien, USDA Forest Service, Bugwood.

A Closer Look: Dame's Rocket and Wild Chervil

There are many blooming flowers that begin to pop up in marginal/edge areas and fields each spring. Some we may overlook, thinking they are native or naturalized species. In June, keep an eye out for two flowering invasive plants: dame's rocket (*Hesperis matronalis*) and wild chervil (*Anthriscus sylvestris*).

Dame's rocket four-petaled flowers and alternately arranged leaves. Photo credit: FPR Staff.

Dame's rocket sometimes referred to as "early phlox", can be distinguished from our native woodland phlox (*Phlox divaricata*) and garden phlox (*Phlox paniculata*), by looking at their names and their petals. Phlox has five petals, and five letters spell its name. Dame has four petals, and four letters spell its name. It is a common misconception that these biennial/short-lived perennial plants found growing along forest edges, river edges, and roadsides are a native wildflower. Dame's rocket is on the unofficial watch list for invasive plants in Vermont. The flowers can range in color from white, pink, and purple hues and are clustered at the top of the plant as a terminal cluster. The leaves are simple, long (lanceolate), with serrated edges, and are alternately arranged up the stem, becoming smaller in size as they get closer to the top. Dame's rocket seeds are spread mechanically when the seed pods burst open (dehiscent fruits).

A: Wild chervil's five-petaled flowers. **B:** Wild chervil's fern-like leaves. Photo credit: FPR Staff.

Wild chervil (*Anthriscus sylvestris*), a separate species from cultivated chervil, can also be seen alongside roads, but most notably in our beautiful rolling Vermont fields. Often confused for Queen Anne's lace (*Daucus carota*), wild chervil can be distinguished by a lack of "bracts" (in this case, on Queen Anne's lace, the bracts are small feathery leaves under the flower head). While both plants originate from Europe and Asia, wild chervil is on the unofficial watch list for invasive plants in Vermont. The flowers are white, 5-petaled, tiny blossoms, clustered together in an umbrella-like flower head (umbel). The leaves are fern-like, and the base of the leaf stem clasps around the main stem of the plant. The stems are hollow and ridged, with small hairs near the base of the plant. Wild chervil can grow from seed or root buds.

Dame's rocket and wild chervil spread by seed on tires, mowers, shoes, animals, or by the wind. These plants have aggressive growth habits and can tolerate a large range of growing conditions, making them highly adapted to outcompete native plants for space, nutrients, and other resources. Both are also common to see in "wildflower mixes", which adds to their spread. There are steps we can all take before buying seed mixes that might potentially include invasive plants (whether wildflower, grass or even birdseed mix).

These steps include:

- **Checking the species listed on the product** (be aware that plants may be listed by scientific name, and that some plants in the mix may not be listed).
- **Considering sourcing seed mixes from local native plant nurseries** or from conservation organizations like Xerces Society who make native seed mixes based by region.
- **Spreading the word, not the plant!**

To learn more about the biology and control of dame's rocket and wild chervil, check out www.VTinvasives.org and these additional resources:

- Northwest Michigan Invasive Species Network
- USDA Forest Service
- Norcross Wildlife
- Midwest Invasive Species Information Network
- Western New York PRISM
- Wisconsin Department of Natural Resources
- Washington State Noxious Weed Control Board

June Invasive Plant Phenology

Volunteers are keeping track of invasive plant phenology in order to time management treatments most effectively. Below are observations made from June 8th-12th, 2020.

Addison— Flowering: garlic mustard; Fruit Forming: garlic mustard.
Caledonia County— Flowering: honeysuckle, goutweed, glossy buckthorn, wild chervil, common barberry; Fruit Forming: wild chervil; Vegetative Growth: knotweed (3-6'), phragmites (2-3').
Chittenden County— Flower Bud: honeysuckle; Flowering: yellow iris, garlic mustard, honeysuckle, goutweed, dame's rocket; Fruit Forming: garlic mustard, common buckthorn; Vegetative Growth: knotweed (6').
Essex County— Vegetative Growth: knotweed (>6'), phragmites (3-4').
Rutland— Leaf Out: wild parsnip, Japanese knotweed; Flowering: dame's rocket.

If you are interested in volunteering, 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

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