Vermont Forest Health

Insect and Disease Observations— June 2019

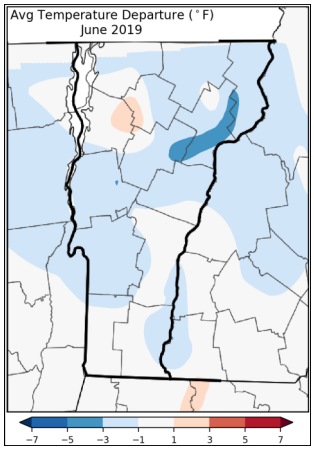
Department of Forests, Parks & Recreation
June 2019 vtforest.com

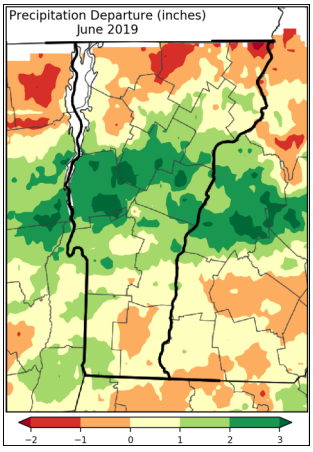
Sweater Weather in June

Like May, June featured below-normal temperatures and above normal rainfall. According to weather reporter Matt Sutkoski, the Champlain Valley ended the month near normal temperature-wise, but areas away from the lake were cooler. In his July 1 blog, Matt wrote, "Montpelier, which had a mean June temperature of 60.6, was 2.2 degrees chillier than normal. St. Johnsbury was downright frigid, with a mean temperature of 52 degrees. That was 3.6 inches colder than normal for June."

On June 20th, the National Weather Service issued a flash flood warning for 11 counties in the state. Montpelier received 2.55 inches, bringing the month total up to 7.06 which is three inches wetter than normal. Most other areas of Vermont were wetter than normal too, but central parts of the state won the wet award.

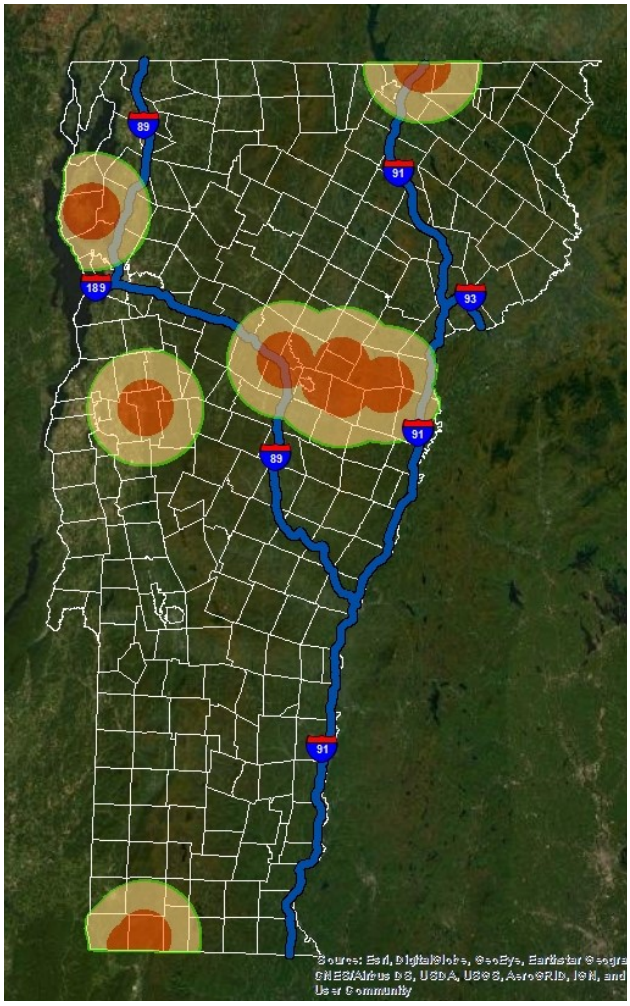
Thanks to the slow spring development, new red oak foliage retained a reddish tinge well into June. Maple anthracnose continues to be noticeable due to the wet weather when new growth was emerging and anthracnose fungi were releasing spores. Thin crowns from red maple seed production continue to be obvious. We also had reports of winter twig dieback in Hyde Park on lavender, lilac and plum, presumably due to the early cold weather last fall.





Maps from the Northeast Regional Climate Center (NRCC) show that much of Vermont was below normal temperature-wise and that the central part of the state was wetter than normal. Cool temps kept oak foliage looking red into spring; red maple crowns appear thin from heavy seed productions. Maps: NRCC; Photos: D. Dillner, B. Schultz

Emerald Ash Borer



On July 2nd, the presence of Emerald Ash Borer (EAB) was confirmed in Derby Line, VT. This is the first confirmed sighting in Orleans County. Based on tree symptoms, EAB had already spread to this location before it was first detected in Vermont last year. EAB is known to occur due north of this area in Canada.

Because of this detection, the mapped area in Vermont to which Slow-the-Spread Recommendations apply now covers much of northeastern Orleans County, and extends into the western edge of Essex County.

Sign up for the EAB Update Listserv to receive notification of new detections, and please continue to look for signs and symptoms of the insect, and report suspicious findings on vtinvasives.org. For those who have not explored the site, it's worth repeating that the page entitled Emerald Ash Borer in Vermont is a clearinghouse for Vermont's EAB information. Scroll down to find the Slow-the-Spread recommendations as well as infestation maps and management recommendations for forest and landscape trees.

Emerald ash borer has now been confirmed in Addison, Bennington, Caledonia, Grand Isle, Orange, Orleans, and Washington Counties. In addition, the infested area map, to which Slow-the-Spread Recommendations apply, includes parts of Chittenden, Essex, Franklin, and Windham Counties.

An email from a Derby Line Village resident prompted the confirmation of emerald ash borer on July 2. The infested tree is about six feet from the international border, with a few branches hanging over into Canada. There is a fair amount of dieback in the canopy, significant woodpecker activity (left) and D-shaped exit holes. Photos: J. Nunery

One benefit of slowing the spread of EAB is to allow research more time to help us understand this insect. An example is a recently published paper by scientists at Michigan State looking at ash condition in southeast Michigan. While noting the "catastrophic" ash mortality, the authors found many white ash that were still alive even though they had been attacked by EAB. The smaller white ash size classes had more survivors. It's safe to say that EAB has earned its reputation as a tree-killer, and that attacks on the boles of surviving trees will likely affect timber quality. But while we wait for additional science-based information, this research suggests that maintaining ash as a component of our forests is a goal we may be able to realize.

Since all of Vermont is now within the federal EAB quarantine boundary, the USDA is no longer deploying purple traps in Vermont. To fill in the gap, volunteers have put out about sixty traps in locations throughout the state. Most are participating in an effort coordinated by UVM Extension, and will be checking traps for EAB adult beetles twice during the summer.

Thank you to the many volunteers who assist with EAB detection efforts. This month, we also want to acknowledge those who monitored Cerceris nest sites for many years. While none of the Cerceris sites resulted in an EAB detection, a lot was learned about our native metallic wood borer populations during the course of this project. In Vermont, sixteen species were detected that had never been recorded in Vermont. A paper, Utilizing Prey Captures by *Cerceris fumipennis* Say (Hymenoptera: Crabronidae) for a Survey of Buprestidae (Coleoptera) in New England, USA, summarizes results from throughout the region.

Oak Shothole Leafminer

The oak shothole leafminer that left its mark on these leaves is a tiny fly in the family Agromyzidae. Leafminer specialist Charley Eiseman provided this good description in his book, Tracks and Sign of Insects and Other Invertebrates: "The adult fly makes punctures in oak leaves in early spring when the new leaves are still expanding. These tiny holes enlarge as the leaves continue to grow, and in mature leaves, they are frequently several millimeters wider, sometimes up to a centimeter or so. They may be very regularly spaced. They may be roughly circular, irregular or oblong, but the edges are characteristically smooth, without any evidence of chewing. On close inspection, some of the holes may have a tiny knob along the rim, indicating where the ovipositor was inserted."

The marginal leaf mines shown in the middle picture are sometimes mistaken for anthracnose. Photos: JoAnne Russo (left and center), Rochelle Skinner (right)

Be on the Lookout for Oak Wilt

Although you might think we already have our fair share of forest health issues to deal with, it's time for Vermont to start thinking about another forest disease. Oak wilt is caused by the fungus *Bretziella fagacearum* (formerly *Ceratocystis fagacearum*). The origin of this fungus is unclear, but it has caused oak mortality in scattered locations throughout the central US and many eastern states.

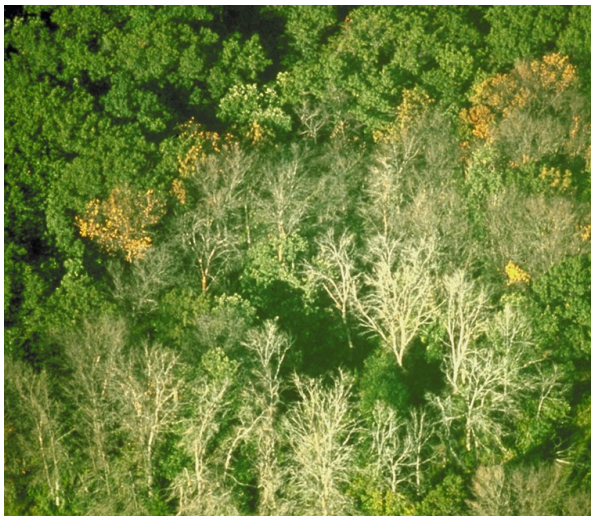
Oak wilt has not been detected in New England but has been found in several locations in New York. It is another non-native that moves on firewood, which is how it likely got to the closest known location in Glenville, NY, near Schenectady and about 50 miles from Vermont. Efforts are being made to eradicate the disease in this area. Eradication is realistic only if the disease is detected early, which is why we're asking people to look out for symptoms.
Oak wilt is closely related to Dutch elm disease and affects trees in a similar manner. As the fungus invades the xylem, water transport is affected, which causes leaves to wilt and drop prematurely. Water stress and foliage loss lead to rapid mortality.

Also like Dutch elm disease, oak wilt spreads from tree to tree through root grafts, resulting in expanding infection centers. Sap beetles spread the disease to new locations. They are attracted to oak wilt spore mats produced on red oaks which have died. If these beetles visit fresh wounds on healthy oaks, spores on their bodies can cause infection. Fortunately, these native insect vectors are less efficient than the host-specific bark beetles responsible for spreading Dutch elm disease.

Oak Wilt Pattern on the Landscape

- ***Spread within a stand occurs in pockets.***
- ***Symptoms on a tree are sudden, but spread within a pocket is slow.***
- ***More likely where wounding risk is high: edges, disturbed stands, landscape trees.***

Trees are infected in the spring or summer. By late July, some wilting leaves may discolor (gray-green to red-brown) starting from leaf margins; both discolored and green leaves may drop from the tree. Because leaves are fully expanded when symptoms develop, there is minimal leaf distortion. Symptoms may start on a single branch, progress from the outermost branches downward, or involve the whole tree at once. By the next growing season, trees in the red oak group will likely be dead.



Oak wilt spread within a pocket occurs slowly through root grafts. Sap beetles transport the disease short distances to new locations. It can be carried long distances on firewood and other untreated wood products. Photo: W. French, University of Minnesota, Bugwood.org

Although we do not currently suspect oak wilt anywhere in Vermont, it is never too early to be vigilant. Vermont is participating in a regional oak wilt early detection survey to slow the spread of this disease. If you have seen a tree with symptoms that match oak wilt, please visit https://www.vtinvasives.org/get-involved/report/reporting-a-tree-disease to report your observation. For more information: https://www.vtinvasives.org/invasive/oak-wilt.

Leaves on trees infected by oak wilt may turn gray-green or red-brown from the edge inward (below, left). Green and discolored leaves from wilted branches may be cast, with the petiole intact, as early as mid-July (below, right). The entire crown is affected within weeks or months, and red oaks will be dead by the following spring (above left). Photos: B. Schultz

Oak Wilt Symptoms

- ***Rapid onset***
- ***Outer margins of leaves often discolored***
- ***Leaf drop during the growing season***
- ***Minimal leaf distortion***
- ***May start as a flagging branch or progress downward from the top***
- ***Entire crown affected within weeks or months***
- ***Unlikely to be the cause if branches have been dying over a period of several years***

White Pine Needle Damage

We have received many reports of white pine needle damage (WPND) from around the state again this year. Symptoms developed later than other years and did not become noticeable until mid-June. WPND is a regional problem that has been widespread since 2005. Severity is linked to the amount of humidity when spores were produced the previous year. This is between May and August, generally peaking during shoot elongation in June. As a result of this year's weather, we expect similar symptoms to be present in 2020.

Research has shown that needle damage slows increment growth, but we are not aware of tree mortality outside of areas where additional stresses are contributing to decline. While several fungi have been associated with white pine needle damage, a "most important" causal agent has not been determined. It is also unknown whether the current episode represents a novel problem or if it is similar to previously recorded white pine needle blights.

Our surveys for WPND severity concluded on June 27th and data are being analyzed. Anecdotally, at one study site the trees looked "worse than they've ever been". We have been recording symptoms annually in these monitoring plots since 2012. Our observations confirm that: the needles that turn yellow and drop prematurely are the one-year-old needles; symptoms are more severe lower in the crown; and some trees have severe symptoms year after year while adjacent trees may look generally healthy year after year.

Some trees have severe symptoms year after year while adjacent trees may look generally healthy year after year. Photo: B. Schultz

Forest Tent Caterpillar and Pear Thrips

To date, we have not received reports of defoliation by forest tent caterpillar (FTC) from anywhere in the state. We did, however, increase our numbers of FTC traps and survey sites this year to better cover the state and increase our predictive capability for future defoliation events.

In general, pear thrips were not a problem for maples this spring. Our trapping efforts in Underhill yielded a total of 312 thrips caught, which is less than in 2018 (n = 455). Peak emergence was similar to 2018, with highest numbers being present in the first week of May.

This spring, junior scientist Aila Halman helped deploy pheromone traps for forest tent caterpillar. Photo: J. Halman

Crown Gall Rust

Yellow leaf spots and malformations on glossy buckthorn, associated with crown gall rust, have recently been observed at Fort Dummer State Park in Guilford, Sandbar WMA in Milton, and Winooski Valley Muddy Creek Wetlands Reserve in South Burlington. Susceptible buckthorns are infected in early spring when wind-carried spores infect young leaves. Bright yellow-to-orange spots, which contain the spore-bearing "pycnia", appear on the upper leaf surface. Eventually raised "cluster cups" form, and the aeciospores produced inside them are carried by air currents to infect oats. Though buckthorn is affected by the disease, the pathogen is much more lethal to oats than buckthorn, providing yet another good reason for eradicating buckthorn shrubs. Previous infections of buckthorn by the crown gall rust pathogen were reported in North Hero in 2012, Westminster in 2013, and South Burlington and Addison in 2015.

Buckthorn is an alternate host for crown gall rust, Puccinia coronata, a pathogen that infects oats. The buckthorn serves as an overwintering site, allowing the fugus to infect new crops the following season. Photos: J. Esden

Azalea Gall

Weather conditions this spring have favored the development of the azalea gall on branches, leaves and flowers of azaleas. The fungus overwinters as microscopic spores, deposited on leaf buds and flowers. As flower and leaf buds are emerging the following spring, new infections are initiated. High humidity and wet leaves provide an ideal environment for infections to occur. Susceptible plants growing in poorly aerated soils are more prone to infection than those growing in well-aerated sites.

The azalea gall fungus produces bladder-like galls of various sizes and shapes. The galls may appear light green, pink or white. Later they become brown and hard and drop to the ground. Photo: G. Kellman

Fir Broom Rust

Fir broom rust, observed on ornamental trees is Morrisville, is caused by a rust fungus that alternates between true firs and chickweeds. After spores from chickweed infect young fir needles, the fungus spreads into the woody tissues of branches and stems, causing the formation of witches' brooms. The yellow color of the fungal structures and spores cause the brooms to appear yellow. These spores complete the life cycle by spreading to chickweed.

Symptoms of fir broom rust include witches' brooms and the production of yellow rust pustules on needles. Photos: R. Dyer

Dusky Birch and Mountain Ash Sawflies

The dusky birch sawfly and the mountain ash sawfly feed gregariously along leaf margins in the spring when the larvae are small. Later, they feast on all but the leaf midrib. Though small trees may be completely defoliated quite rapidly, the host is rarely killed.

These dusky birch sawflies (left) have risen up in unison to ward potential predators. Mountain ash sawflies (right) feed gregariously at first, but later disperse throughout the crown. Photos: B. Schultz (left); R. Kelley (right)

Federal Noxious Weed List Spotlight: *Crupina vulgaris,* Common crupina

Vermont's Noxious Weed Quarantine includes species listed as **Class A** (not native to Vermont, not known to occur in Vermont, and pose a serious threat), and **Class B** (not native to Vermont, known to occur in Vermont and pose a serious threat), as well as those listed on the **Federal Noxious Weed List**. While many of the species on the Federal Noxious Weed List likely won't occur in Vermont, there are a few that have the potential. The objective of this series of articles is to draw attention to lesser known invasive species from the Federal Noxious Weed List, that can be found in the Northeast, and are, in fact, part of Vermont's Noxious Weed Quarantine.

This month's focal quarantine species is common crupina (*Crupina vulgaris*), also known as bearded creeper. It is a member of the Aster family (Asteraceae) and is native to Asia, North Africa, and Europe. It is also a member of the thistle tribe (*Cynareae*), which includes other aggressive invasive plants like yellow starthistle and spotted knapweed.

The species was first reported in Idaho in 1969, but the means of introduction are unknown. From this initial detection in Idaho, common crupina has spread to over 25,000 ha of land in the Northwest. It is now is present in the Northeast, and has been reported in Suffolk County, Massachusetts. Primary modes of spread include seeds dispersed by contaminated hay, soil, and straw, and dispersed by equipment, commercial and recreational vehicles, people, animals, and water.

This plant can form dense monoculture stands, excluding native and other favorable forage species in grasslands, rangelands, canyons, pastures, forested areas, riparian areas, and disturbed areas. It is because of this invasive behavior, that the United States added common crupina to the Federal Noxious Weed List. Fifteen states have additionally listed the species as invasive, and Washington State even requires by state law that this species, if detected, needs to be removed.

Common crupina is a small winter annual plant that overwinters as a rosette. The initial rosette leaves are oval to lanceolate, entire, and toothed. Mature plants range from 1-4' tall, with a multibranched ridged stem. The leaves are arranged alternately.

The common crupina flower head has pink-purple flowers. Seeds are dark in color, and have bristly pappus (tuft of hairs) attached to aid with movement away from parent plant. Photos: J. M. DiTomaso, University of California– Davis, Bugwood.org (top); J. Scher, Federal Noxious Weeds Disseminules, USDA APHIS PPQ, Bugwood.org (bottom).

As the plant develops, new leaves become increasingly lobed, and the leaves along the developing flower stem are deeply pinnately lobed, and smaller in size. The edges of the leaves are covered with short, stiff bristles. Common crupina has thistle-like flower heads, with an urn shaped base of bracts below pink to purple flowers. Each plant can produce ~40 flower heads, and each flower head can produce 1-5 seeds. These remain viable for 3 years with ~90% germination rate.

To learn more about common crupina: GoBotany – Native Plant Trust
Washington State Noxious Weed Control Board
USDA Invasive Plant Atlas
USDA Plants Database
California Invasive Plant Council
Oregon Department of Agriculture
Invasive Species Council of Manitoba
Government of Alberta, Canada

Common crupina infestation. USDA APHIS PPQ, Bugwood.org

June Invasive Plant Phenology

In a pilot project started this year, volunteers are keeping track of invasive plant phenology in order to time management treatments most effectively. Below is a summary of observations made from June 10-14th, 2019.

Addison County — Flowering: Dame's Rocket, Wild Parsnip, Wild Chervil, Honeysuckle, Common Buckthorn; Vegetative Growth: Knotweed (up to 72")

Bennington County — Flowering: Honeysuckle, Wild Parsnip

Chittenden County — Flowering: Dame's Rocket, Wild Chervil, Honeysuckle; Vegetative Growth: Knotweed (up to 72")

Grand Isle County — Flowering: Honeysuckle

Rutland County — Flowering: Honeysuckle, Asiatic Bittersweet, Dame's Rocket, Wild Chervil, Wild Parsnip, Goutweed; Fruit forming or going to seed: Honeysuckle, Garlic Mustard, Dame's Rocket; Bolting: Wall Lettuce; Vegetative Growth: Knotweed (up to 72")

Essex County — Vegetative Growth: Knotweed (up to 72"), Common Reed (up to 48")

Orleans County — Flowering: Honeysuckle; Vegetative Growth: Knotweed (up to 72"), Common Reed (up to 48")

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

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