



NEW HAMPSHIRE

OAK WILT RESPONSE PLAN

Division of Forests and Lands and Partners

2020



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Background

Disease Description

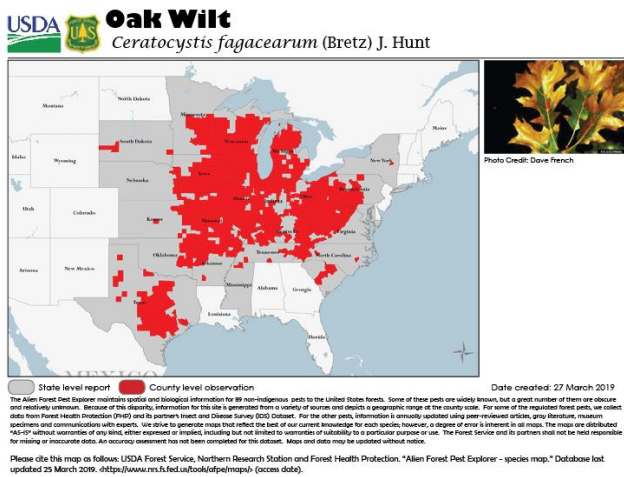
“Oak wilt” is the common name for *Bretziella fagacearum*, (formerly *Ceratocystis fagacearum*) a fungal pathogen known to infect all oak tree species. Oak wilt gets its common name due to the response of infected oaks to drop wilted leaves during the middle of the growing season. This fungi attacks the vascular system of oaks and elicits a response from the tree that eventually kills the tree. Oaks respond to the fungal attack by producing tyloses in the vessels. That shedding of the cell walls plugs the vessel and stops the movement of both fungi and water. As tyloses response expands in the tree less water reaches the foliage and the leaves wilt and die.

Origin

The origin of oak wilt fungi is not definitely known. Evidence suggests its likely native to Central or South America but other theories suggest that its native to North America; although a hybridized species from two other closely related fungi can't be ruled out. (Juswick et al. 2008)

<https://tcharrin.public.iastate.edu/OakWiltOrigin.pdf>

The first reports of infected trees came in 1942 in Wisconsin. Today, oak wilt can be found throughout the mid-west, south to Texas, and as far east as Long island, NY.



dec.ny.gov

Potential Economic impact

Forests dominate the New Hampshire landscape and cover 83% of the 6 million acre total. While white pine dominates the total volume of trees in the sawlog size classes at over 10

billion board feet, red oak is second with 4.4 billion board feet of valuable timber over 9” diameter. Based on the current estimate of average stumpage value published by the NH Department of Revenue of \$300 per thousand board feet of red oak, this statewide volume of standing red oak is worth approximately 1.3 billion dollars to the landowners.

According to the 1996 State Forest Action Plan developed by the NH Division of Forests and Lands, the wood products industry ranks third in the state for value-added, cost of materials and value of shipments, and ranks fourth in employment and wages. For every \$1 of stumpage value there is a \$27 value added sum to the NH economy. If there is over a billion dollars of value in standing red oak lumber then the potential impact to the economy in NH is more than 27 billion dollars.

The combination of high red oak sawtimber value and the statewide volume clearly showcase the need to manage damage causing agents like oak wilt. Any decline in growth or productivity will have a profound economic impact to the owners of oak forest land and the forest industry of NH.

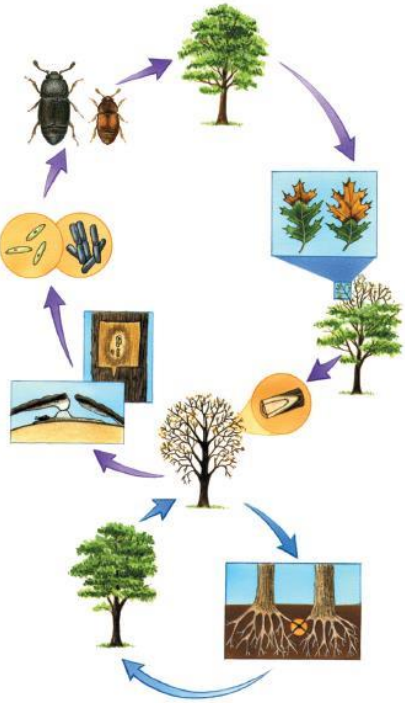
Mode of Spread

Spread of oak wilt fungi is described as either “above ground” or “below ground”.

“Below ground” is the migration of spores through roots of infested trees that are grafted to roots of neighboring host trees.

“Above ground” spore dissemination can happen in many different ways. The most common is through the feeding of nitadulid beetles that are attracted to fresh wounds or spore pads on infested trees and accidentally transfer spores to feeding sites on uninfected trees.

Long distance spread, well beyond the flight distance of beetles, is achieved through the movement of freshly cut trees transported as firewood to new sites where insects can then transfer spores between infected wood and new host trees.



Oak Wilt Disease Cycle
[USDA How To Identify, Prevent, and Control Oak Wilt](#)

Survey and Detection

Aerial

Aerial statewide surveys to monitor for forest damage are conducted annually. Flights done in July, when oak wilt symptoms are more easily seen, will focus extra attention on areas at high risk for oak wilt. Additional flights may be necessary once oak wilt has been detected in the state.

Ground

Symptomatic trees mapped during aerial surveys will be ground checked to determine the need for oak wilt testing. Ground surveys will also be used to monitor high risk sites and check symptomatic trees reported by the public. Monitoring and surveying efforts will continue at infection sites until no additional oak wilt infections are detected for at least five years.

Sampling and Testing

Samples from potentially infected trees will be collected during the growing season, primarily in the summer months (July-Sept). Samples will consist of 6-10 twigs, 6-12 inches long, and 2 inches in diameter from living symptomatic branches scattered throughout the tree. Branch sampling wounds will be sprayed with tree paint and pruning tools will be cleaned with alcohol between each sample. Branch samples will be double bagged and labeled with collectors name, sample date, town, county, tree species, and location coordinates. Leaf samples will also be collected by placing 10-20 dry symptomatic leaves in a separate bag. Branch and leaf samples will be kept in a cooler on ice during transport and shipped overnight (Monday-Thursday). Samples will be sent to the Cornell Plant Disease Diagnostic Clinic in Ithaca, NY, (confirm someone will be available to receive shipment) to be tested for the oak wilt fungus using culturing, PCR analysis, and DNA sequencing. If oak wilt is confirmed, we will implement management tactics to eradicate or control oak wilt.

Reporting

Public meetings, stakeholder trainings, and social media will be used to provide information on the symptoms of oak wilt. The public will be encouraged to report trees displaying oak wilt symptoms between July and September. Photos of the symptomatic leaves and trees will be requested to help determine if a site visit and ground survey are warranted. Photos can be uploaded at nhbugs.org, or emailed/texted to staff.

Outreach

FPAG

The Forest Pest Advisory Group will meet to discuss action plans associated with the detection of oak wilt in NH. The purpose of the Forest Pest Advisory Group is to provide a forum for public agencies and private organizations to discuss forest pest problems that impact New Hampshire, and to provide feedback to the State Forester and partnering agencies.

OBJECTIVES:

- 1.) Share information and strategies on forest pests.
- 2.) Develop action plans to address New Hampshire forest pest problems.
- 3.) Distribute information to the general public on forest pests.

COMMITTEE MEMBERS:

One representative from each of the following agencies or organizations: NH Department of Natural and Cultural Resources, Division of Forests and Lands; NH Department of Agriculture, Markets and Foods, Division of Plant Industries; UNH Cooperative Extension; USDA Forest Service, White Mountain National Forest; US Forest Service, State and Private Forestry; USDA Animal and Plant Health Inspection Service; NH Audubon Society; Granite State Division Society of American Foresters, and Society for the Protection of New Hampshire Forests.

NHbugs.org



A page on oak wilt was created on NHbugs (<https://nhbugs.org/oak-wilt>), a website supported and maintained by several agencies to protect the trees and forests of NH. The website will be kept up to date with information pertaining to the detection and control of oak wilt in NH. Cooperating agencies are NH Department of Natural and Cultural Resources, Division of

Forests and Lands; NH Department of Agriculture, Division of Plant Health, Markets and Foods; UNH Cooperative Extension; USDA Forest Service; and USDA Animal and Plant Health Inspection Service.

Press Release

Press releases will go out in July/August to encourage the public to report symptoms. Press releases shall also be made upon initial detection of oak wilt in NH. Sample release:

FOR IMMEDIATE RELEASE: August 8, 2019

Public asked to look for signs of oak tree disease approaching NH

New Hampshire forestry officials are concerned about a new oak tree-killing disease that may be making its way to the state.

Oak Wilt disease has been in the Great Lakes region for decades but recent outbreaks in Albany and Long Island, New York have New Hampshire officials on alert. Red oaks – which have pointy-tipped leaves – are most susceptible to the disease and can die within a few weeks to six months of being infected. White oaks – which can be identified by round-tipped leaves – are less vulnerable.

Oak Wilt is a fungus that affects the vascular system of most oak species, stopping the movement of fluids throughout the infected tree, which then quickly dies of dehydration.

The disease is spread over long distances through the transportation of infected logs and firewood. Over short distances, it is spread through root grafting as well as by beetles that ingest sap from infected trees and then travel to other trees.

Once an oak tree is infected with Oak Wilt disease, it cannot be saved. It is possible, however, to control and eradicate the disease's spread to other trees, making it critical to find outbreaks early.

Trees with Oak Wilt disease are easily identified, as they drop their leaves during the summer, starting at the top of the tree.

Anyone noticing an oak tree that shed its foliage in July or August is asked to please contact the N.H. Division of Forests and Lands' Forest Health Program at 603-464-3016 or to go to NH Bugs.org and submit a report that can also include a picture.

Part of the N.H. Department of Natural and Cultural Resources, the Division of Forests and Lands protects and promotes the value provided by trees, forests and natural communities. For more information about the Division of Forests and Lands and the work of its Forest Health Program, visit nh.gov/nhdfl or call 603-271-2214.

Workshops

Staff will conduct outreach workshops on ways to prevent the spread of oak wilt, including pruning oak trees at the right time of year and following the New Hampshire firewood regulations. Education efforts for pruning best management practices will be focused on landowners, arborists, loggers, and landscapers. Staff will present at professional meetings, provide trainings and workshops, and create outreach materials, such as handouts and online media, to disseminate this information.

Control Areas

Until such time as the NHDFL determines oak wilt control measures are deemed unlikely to succeed in eradicating oak wilt from the State of New Hampshire, control areas will be established and measures will be implemented in accordance with the State Forester's recommendations.

Authority

The State Forester, with consultation of the State Entomologist, has the authority to designate control areas under Title XIX-A Forestry, Chapter 227-K.

227-K:3 Designation of Control Areas. –

- I. The director may publicize information concerning forest insects and diseases.
- II. Control areas may be designated upon determination of the director, in consultation with the commissioner, the state entomologist, the commissioner of the department of agriculture, other agencies as necessary, and affected landowners, that an exotic, non-native forest insect or disease poses a significant threat to forests and that there is the potential for localized infestations to spread to adjacent lands. Notification of such designation may be provided as authorized under paragraph I.
- III. (a) A landowner within a control area shall carry out such control measures as are ordered by the director, to the extent practical and where proven technology is available, including but not limited to, the removal and destruction of any plants harboring insects or diseases.
(b) If such control measures are not immediately taken by the property owner, the director or authorized agent may remove and destroy infected vegetation from any land within the control area. Cost of actions taken by the state shall be borne by the state.
(c) A landowner's right to appeal a decision by the director under this chapter shall be provided in rules adopted by the commissioner under RSA 541-A.

Source. 1995, 299:1, eff. Jan. 1, 1996.

Delimiting Control Area Boundary

Once confirmation of an oak wilt infestation is made by the US Forest Service, or other certified diagnostic lab, a control area will be established by the NH Department of Natural and Cultural Resources, Division of Forests and Lands.

The entire control area will include all infested trees and the land between infested trees and the perimeter of any control actions. This boundary will be as small as possible but must achieve the goals of removing known infected trees and removing the threat of spread to uninfested hosts.

Forest Health Specialists with the NH Division of Forests and Lands will work with the landowner to determine the smallest control area possible to achieve successful control. The use of Johann Bruhn's root grafting distance tables are still the most common guide with respect to control area boundary related to known infested trees. The below chart is a condensed version to

be used as a guide when establishing boundaries. The potential root grafting distance between trees is based on the combined size of the two trees in question and the soil type. The sandier the soil the farther oak trees reach out and root graft.

Root grafting distances based on 99% Confidence level (Bruhn et al., 1992)		
Combined DBH (in.)	Sandy Soil (ft)	Loam Soil (ft)
10	25.5	14.8
16	40.8	23.7
20	51.1	29.5
24	61.3	35.5
28	71.5	41.4
32	81.7	47.4
36	91.9	53.2
40	102.1	59.1
44	112.3	65.1
48	122.5	70.9

Bruhn, J. N. and R. L. Heyd. 1992. "Biology and Control of Oak Wilt in Michigan Red Oak Stands." Northern Journal of Applied Forestry 9 (2): 47-51.

Treatment requirements

1. All oak trees in the control area will be girdled and immediately treated with herbicide.
2. All oak trees within the control area will be cut as soon as practical to facilitate step 3.
3. Cut oak trees may be removed from the site between October 1 and April 1.
4. There will be a stump treatment of herbicide to any cut oak still alive after the initial girdle and herbicide treatment.
5. Cut trees being removed from the site must be sent to a receiving site that debarks the logs and chips or burns the material.
6. If cut material stays on site it must be covered with 4-mil plastic until bark loosens or dries completely.
7. If herbicides are not preferred, there must be a root graft disruption method deployed to sever the roots around the perimeter of the entire control area AND around the smaller group of infected trees BEFORE oak trees are cut in the control area.

Root graft disruption methods must include mechanical ditching or digging of a trench at least 60" deep.



Girdle and Herbicide Treatment



Vibratory Plow

Slow the Spread

1. Site Monitoring

Oak trees along the perimeter of the control area will be monitored for 5 years following treatments. Any suspect trees will be sampled and sent for lab confirmation.

2. Pruning Standards

Education and Outreach should be conducted in the Town and County of the outbreak to inform the public that pruning of oaks in this area should be avoided between April 1 and August 1.