

CONTROL AND MANAGEMENT OF OAK WILT IN RESIDENTIAL SETTINGS: A Guide to Recognizing, Diagnosing, and Treatment

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The number of oaks affected with oak wilt disease continues to rise, and many homeowners are concerned that the valuable oaks in their landscapes may become infected. There are many questions as to how best to protect their trees. Obviously, the best management of oak wilt is the prevention of the disease by following the recommended guidelines for pruning, wound management and firewood transport. But even when these recommendations are followed meticulously, the disease can appear in home landscapes. It is important that homeowners know the symptoms of oak wilt, and what steps to take to control the spread of the disease, because a timely response can make the difference between losing one tree or many.

Homeowners need to be aware of the importance of getting a definitive diagnosis as well as the importance of working with a professional trained in oak wilt management to avoid unnecessary costs and loss of trees.

Oak wilt spreads in two ways; overland transmission occurs when sap beetles carrying oak wilt fungal spores feed on fresh oak wounds. Underground transmission occurs through the movement of the fungal spores between shared roots of infected trees and surrounding oaks. Underground transmission accounts for the majority of tree losses each year. Overland transmission of the disease can be largely prevented through careful adherence to the guidelines for safe pruning times and care of damage to trees during the growing season. The only truly risk-free time to prune is in the winter months when the sap beetles are not active. All trees respond to wounding by compartmentalizing affected tissues, which stops the flow of sap to that area. Wounds are also colonized with protective fungi and bacteria that aid in the healing process. This process takes about 3 days, after which wounds are no longer vulnerable to infection from the oak wilt fungus, nor attractive to the beetles that carry the oak wilt spores. In warmer weather, damage to trees from storms need to be repaired as soon as possible and sealed immediately. Wounds from lawn equipment, etc, need to be sealed as soon as detected. Latex paint, clear shellac, or pruning sealers are all good choices to create a protective barrier to disease-carrying beetles. These tiny sap beetles are extremely attracted to fresh wounds, and have been known to arrive within 10 minutes after a wound is created. Lastly, homeowners should always avoid moving firewood unless all bark is removed, as this can bring the oak wilt disease to new locations. A prime example of this is the numerous oak wilt outbreaks near campgrounds where campers carried the disease in with their firewood.

Homeowners need to be aware of symptoms that suggest an oak might be infected with oak wilt. Leaf wilt beginning at the top of the tree is usually the first symptom in red oaks, followed by rapid leaf loss. Leaves shed from trees will usually exhibit a variety of colors ranging from tan to normal green. Leaves sometimes show a characteristic browning that

begins on the leaf margins and may progress inward toward the base. Trees can be completely defoliated within 4-6 weeks. A white oak may look like an oak in "decline", sometimes exhibiting symptoms on just a few branches. However, it is important to remember that there are several other maladies which can be mistaken for oak wilt, including several types of leaf scorch, Anthracnose, Two-Lined Chestnut Borer and herbicide injury. A link to an article describing these disease symptoms is below. Another reason to suspect oak wilt is if a dead oak tree is seen with symptomatic oak trees adjacent to it. This could be the epicenter of an infection spreading through shared roots. No symptom is a definitive diagnosis unless a spore mat is seen on the bark of a dead tree.

If oak wilt is suspected, it is important to send a sample to the MSU Diagnostic Services to get the disease verified. This can rule out look-alike diseases, and avoid unnecessary cost of inappropriate treatments. To get accurate test results, collect branch samples that are partially wilted, not dead and dry, with symptomatic leaves. Branch samples of at least 1 inch in diameter, taken from up to three symptomatic branches and cut into 6-8 inch lengths are desirable. Place samples in a sealable plastic bag, and keep cool during sampling and shipping by enclosing a small cooler pack in the shipping box. Send samples by overnight shipping or hand-deliver. A link to do's and don'ts of taking a sample for diagnosis can be found at the end of this article, along with a link to the MSU Diagnostic Services, where submission forms and other important information can be found. Diagnostic testing at MSU is done by two methods, including culturing the pathogen from the sample, as well as DNA testing. Culturing can take two to three weeks, but DNA results come back within a week. Clients are notified about the results of each test as soon as they become available. The discovery of a pressure pad beneath the bark of a dead tree is also considered to be a positive confirmation of oak wilt.

Once a positive diagnosis for oak wilt is made, many decisions regarding management face the homeowner and it is strongly advised to obtain professional help. If the affected tree is a red oak, that tree will very likely be dead, or nearly so, by the time a positive diagnosis is returned. In some situations, surrounding healthy oak trees within root graft range should be treated to minimize the number of trees lost. Treatment consists of injections of propiconazole, a fungicide that provides protection from oak wilt for a period of time. These treatments are typically done every other year over the course of 6 years, and prevent the healthy oaks adjacent to infected oaks from becoming infected through the roots shared with the dying tree. If these treatments are necessary, they are done prior to trenching, a process of severing shared roots to a depth of five feet into the ground. Trench line placement is dictated by several factors including the size of the trees involved, the distance between them, the amount of time the infection has been present on that site and topography. A professional with experience in oak wilt management will also take into account many factors including natural barriers, infrastructures on the site, gas lines and property lines. Pairing fungicide treatments with trenching can avoid unnecessary tree loss in certain situations.

When trenching is not feasible due to soil type, topography, or limited financial resources, a professional may recommend root-plate excavation. This method can be used only in the very

early stages of the infection if surrounding trees are to be saved. This means that only the upper branches of the tree are wilted, and that there are no trees that have died from oak wilt in the vicinity. In this situation, it is thought that the fungal spores have not yet reached the root system. Root plate excavation involves pulling the stump and support roots of the diseased tree out of the ground which severs root grafts between diseased and healthy trees before the fungus moves between them. This method is not as widely acceptable as the trenching and fungicide treatments, but when trenching is impossible, this method can be a good option.

Only after trenching and the initial fungicide treatments on surrounding oaks is complete should the dead tree be removed. Cutting an infected tree speeds the uptake of the fungus in surrounding oaks with shared roots. This is because the vascular system of the cut tree is no longer creating an upward pull on fluids from its root system, so surrounding trees with shared roots can pull fluids from the cut tree's root system more easily. Cutting down an oak tree with oak wilt disease before trenching not only doesn't stop the progress of the disease, but may infect the surrounding trees more quickly. About 6-12 months after a red oak tree dies from oak wilt, the fungus often produces a spore mat under the bark of the tree. This spore mat has a strong scent, and is attractive to certain beetles which feed on the spore mats as well as sap from fresh oak wounds, thereby infecting those trees. Moving wood from a diseased tree can move these spore mats and thus the infection to new locations. This is why firewood should not be moved. Only wood that has had the bark removed or that has been chipped is safe to move. Otherwise, burn the wood during the first winter after tree death, or bury the infected wood on site. Wood can also be rendered harmless by proper sealing of the firewood to the ground with a tarp to prevent beetle access, using plastic at least 4 millimeters thick, and burying the edges. The wood pile should be kept sealed until the wood is completely dried out so that the bark falls off. This usually takes about one year after tree death.

All of these are options which can be customized by a qualified professional for the unique situation that every landscape presents. It is important to find someone who is specially trained in the management of oak wilt. The Arboriculture Society of Michigan trains arborists to treat, manage, and control oak wilt. A link to their list of specially trained arborists, called Oak Wilt Qualified Specialists, can be found on the Michiganoakwilt.org website.

The Michigan DNR-Forest Health team is also available to provide support to homeowners. In some situations site visits by their forest health professionals can be arranged by calling or emailing the Forest Resource Division. Contact information for this resource is listed below.

Another program available to homeowners in the upper part of the state is the Forestry Assistance Program, run by the Michigan Department of Agriculture and Rural Development (MDARD). This agency awards grants to Conservation Districts across the state to provide education and one-on-one technical assistance to private landowners as well as to communities. Conservation foresters will often make site visits to assist with oak wilt management.

In addition, the Natural Resource Conservation Service (NRCS) provides funds to homeowners for trenching, wood removal, and stump removal through their EQUIP program.

If a landowner meets eligibility requirements, this program can help defray the costs involved in oak wilt control. More information on these programs can be found on the websites listed below.

It can also be helpful to contact the Cooperative Invasive Species Management Area (CISMA) that serves the area in which the outbreak is occurring. These groups provide support and education to landowners to assist with the management of invasive species, such as oak wilt. A link to Michigan's CISMAs is below.

Many homeowners in Michigan are now faced with the distressing loss of trees due to oak wilt, not to mention the costs involved in treatment and control of the disease. Homeowners should follow recommended guidelines to prevent making their oak trees vulnerable. When oak trees look symptomatic, prompt action should be taken to positively diagnose the problem, either by testing or the identification of a spore mat on a dead red oak. Once it is known if a tree is infected with oak wilt, treatment, trenching and removal should begin as soon as feasible so as to control the spread to other trees. State foresters and specially trained arborists can help determine the right approach to the unique challenges at each oak wilt site. There are currently several programs mentioned above that may help to defray the costs incurred when dealing with oak wilt. Oak wilt is presenting homeowners with a challenging task, but when a protocol is followed, management and control is possible.