



The Plant Doctor's LANDSCAPE TIPS

By Dr. David L. Roberts, The Plant Doctor LLC a.k.a. The Tree Doctor

OAK WILT'S RATE OF UNDERGROUND SPREAD (NEED TO KNOW)

INTRODUCTION

Oak Wilt, caused by a vascular-invasive fungus, typically moves from diseased trees to healthy trees (Photo 1) by two major methods: **Overland** (by insect transmission from fungal mats to fresh wounds, potentially several miles) and **Underground** (by root graft transmission, feet per year). Because we are dealing with a biological system involving variables such as disease, pests and the environment, Oak Wilt, like many other issues, is not always predictable. However, we can bring some of our knowledge and observations to light as we confront the Oak Wilt threat in Michigan.

Typical Underground Oak Wilt spread is demonstrated in Photos 2A & 2B. One tree became infected by Overland spread in 2022; the property owner probably didn't understand why this one lone tree died in 2022. By 2023, OW had spread to three other trees, the first tier out radially from the diseased tree, and the property owner suspected something was seriously amiss. He contacted an arborist who contacted me for assistance. The site was incorporated into my research by treating all four infected trees with my Glyphosate/Stump Cup 'Chaser' procedure. As of

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Photo 1

Photo 1: In the author's experience, Oak Wilt is becoming too insidiously established in Michigan's forests, woodlands, and landscape.

With over 40 years' experience with Oak Wilt (OW), I wanted to share three examples that, for the most part, exemplify the gamut of Oak Wilt Underground transmission among Oak trees. A general knowledge of tree anatomy and physiology may be helpful.

EXAMPLE #1: OAK WILT'S TYPICAL UNDERGROUND SPREAD

As I have often advised arborists, landscapers and the public, OW most commonly moves Underground around One Tier of trees per year. By that, I mean Oak Wilt moves from an infected tree to the nearest Oak trees (the first tier of trees in a 360-degree arc) within root graft range in a season. The unpredictability is that sometimes OW skips a tree. Contrary to popular belief (if diseased trees are not disturbed), the OW fungus moves very slowly through roots. When considering the Michigan DNR/Bruhn Model of root graft transmission, the fungus does not move 100 or 200 feet per year. The major deficiency of the Bruhn Model, at least as I understand it, is that it is based on the distance that a tree's roots extend horizontally in all directions from a diseased tree without considering the variable of time. In my experience, I have never witnessed OW spread the full distance as specified in the Bruhn Model Table within a relatively short period of time, say within a few months or a year.



Photo 2A



Photo 2B

Photos 2A & 2B: This Oak Wilt site was initiated by Overland Spread of the lethal fungus to a lone tree in 2022 (Photo 2A, yellow arrow). By 2023, the disease had spread Underground through root grafts to three additional trees, the first tier of trees adjacent to the original infected tree (Photo 2A, black arrows). Photo 2B shows a portion of the surrounding trees that would have been destroyed if the DNR/Bruhn Model had been implemented. For full disclosure, although probably not needed, the property owner opted for tree Injections with propiconazole of the two tiers of healthy trees adjacent to the OW epicenter, for additional insurance. The property owner treasures his landscape and was elated with the results thus far.

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2024, OW has not progressed any farther—no other trees became infected, and no healthy trees needed to be sacrificed. Presumably, if left untreated, Oak Wilt would have spread “exponentially” to another nearby 8 or 10 trees in 2024. Photo 2B shows just a portion of the trees that would have been destroyed if the Bruhn Model had been utilized or if Oak Wilt had spread unrestrained. The site will be monitored for several years to ensure success.

EXAMPLE #2: OAK WILT'S SLOW UNDERGROUND SPREAD

Oak Wilt's slow spread, demonstrated in Photos 3A, 3B, and 3C, is not that unusual. Because of the revelatory nature of these photos, I have often used them as a premier example of Oak Wilt Spread in my lectures and publications. In Photo 3A, all trees but one had been pruned by a drive-by, cash only, unscrupulous business owner who referred to himself as an “arborist”. Within a month of injury, the foliage of all pruned trees has started to turn brown and lose foliage (Photo 3A). The property owner refused to believe that her trees were dying from a lethal disease, so, she left them standing for the next two years . . . in hopes of their recovery. Photo 3B exhibits completely defoliated trees the year following infection; even though the lone “healthy” tree resided only 4-6 feet from the nearest OW-diseased tree, it had not contracted Oak Wilt via root graft (underground) transmission for the whole 1st and 2nd year after the nearby trees had been infected via Overland Spread from pruning. The lone tree finally became infected by root graft in the third year after the injury, after the infected trees were finally removed (Photo 3C). Why did it take so long despite its close distance and the likelihood that it is root-grafted to all diseased trees in Photo 3A? My assumption and/or theory is that the OW fungus stabilizes within the infected tree and that the healthy tree did not “suck” the fungus from diseased trees into itself by “Transpirational Pull” until the diseased trees were cut down.

EXAMPLE #3: OAK WILT'S RAPID UNDERGROUND SPREAD

The greatest distance that Oak Wilt (OW) was observed to spread Underground by



Photo 3A



Photo 3B



Photo 3C

Photos 3A, 3B, & 3C: The slow spread of the Oak Wilt fungus from diseased trees to the lone healthy tree is shown in this series of three photos taken over a period of three years, representing “Time Lapse Photography”. Note that the fungus did not spread the short distance of 4-6 feet until the diseased trees were removed. There's a take home message here . . .

folks in the Minnesota DNR was 60 feet per year, which is why they modified the Bruhn Model Table to reflect that distance. In many decades, I have never confirmed that distance of spread within a year except where diseased trees were rapidly removed soon after they became infected by Overland or Underground transmission. In past decades, scientists recommended

prompt removal of OW-diseased trees, but that was before we truly understood faster underground spread associated with fast removal of diseased trees. During the summer of 2024, I was once again called into an Oak Wilt situation where I witnessed very fast spread of OW. As told to me by the property owner (“Tony”), bark was knocked off the trunk of an oak tree by his mowing operations in July (Photo 4A Inset). The tree developed symptoms of OW very quickly (Photo 4A). Tony contracted with an arborist to have the tree removed in August. The arborist recommended Tony to me but apparently did not understand my recommendations of not removing trees until remediation efforts were completed. By late August and into September, four other nearby trees showed the telltale signs of Oak Wilt, indicating very fast Underground Transmission of Oak Wilt to the first tier of healthy trees (Photo 4B). This site represents “two cycles” of Oak Wilt transmission within one year: one Overland Transmission and one Underground Transmission. Two cycles of Oak Wilt per year is rarely seen unless infected trees are removed too quickly.

Again, as part of my research, an arborist company and I treated the four diseased trees with the Glyphosate/Stump Cup ‘Chaser’ method. This “experiment” should prove interesting. First, treating four diseased trees places a significant amount of Glyphosate in the root systems of these trees, which may slightly harm or, rarely, kill nearby oaks. Second, a swamp white oak resides within root graft range of the Glyphosate-treated red oaks; it will be elucidating to see if the swamp white oak contracts OW or is affected by the Glyphosate. I anticipate no impacts whatsoever on the swamp white.

AVOIDING OR SLOWING UNDERGROUND TRANSMISSION OF OAK WILT

Because I have witnessed the transmission of the OW fungus Underground numerous times over more than four decades, I believe it is wise to develop a plan for the management of Oak Wilt when we encounter the disease. We know that the OW fungus tends to move very slowly Underground when infected trees

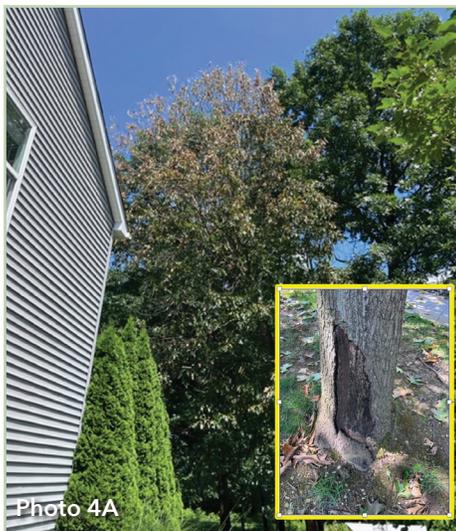


Photo 4A



Photo 4B

are left standing and/or not promptly removed. My strong recommendation is to complete remediation efforts BEFORE any OW-diseased trees are touched. These remediation efforts may include Root Graft Disruption (trenching to sever root grafts), Tree Injections, Girdle/Herbicide treatments or combinations thereof. Recall that in my research and that of others,

Photos 4A & 4B: A homeowner (“Tony”) accidentally knocked some bark off one of his Oak trees in July 2024 (Photo 4A Inset). The tree developed Oak Wilt symptoms very quickly (Photo 4A, center). Subsequently, Tony hired an arborist to remove the infected tree; within 1-2 months or so, four other nearby red oaks exhibited Oak Wilt symptoms, indicating rapid Underground Spread of the deadly disease due to quick removal of the lone infected tree (Photo 4B). The location of the original, infected tree is sketched in black in Photo 4B. This example essentially represents two cycles of Oak Wilt transmission within a single season (Overland & Underground). The four newly infected oak trees were treated with the author’s Glyphosate/Stump Cup method in November. It will be interesting to ascertain potential collateral damage of Glyphosate or Oak Wilt Spread to nearby healthy red oaks . . . as well as to a swamp white oak. The author projects no impact on the swamp white oak (Photo 4B, yellow arrow), which is likely not root-grafted to the red oaks.

despite the widespread recommendations of others, demonstrate that the Double Girdle with Triclopyr is not a particularly effective technique compared to my use of Glyphosate with the Stump Cup.

Regardless of the remediation effort(s) employed, some arborists have misinterpreted my recommendation of leaving diseased trees undisturbed as leaving them standing for or a couple years or so. That is not my recommendation. By implementing remediation efforts before removal of diseased trees, I am suggesting that remediation efforts typically be initiated in the late summer or fall followed by diseased tree removal during the late fall (of the same year) or winter. Removal of diseased trees after remediation tends to ensure less probability of OW Underground transmission as well as less potential for OW fungal mat (pressure pad) development for subsequent Overland transmission. 🌿

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