



The Plant Doctor's LANDSCAPE TIPS

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

CAN WE LOG OUR WAY OUT OF OAK WILT IN MICHIGAN?

INTRODUCTION

With its vast tracts of forests and woodlands, Michigan enjoys a thriving timber and logging industry that contributes immensely to the state's economy (Photo 1). This begs the question, "How is the timber/logging industry affected by Oak Wilt . . . or vice versa?" Over the years, I've made several observations that I think many in our industry and the public will find interesting.



Photo 1

Photo 1: Timber and logging operations are an important component of the forestry industry in Michigan. In some cases, careless logging operations result in Oak Wilt outbreaks, as documented by the author. As another concern, is Oak Wilt being used as a justifiable means to promote logging in Michigan?

First, a little background. Oak Wilt is one of the most devastating and costly diseases of trees in Michigan (Photo 2). However, the numbers of trees lost from Oak Wilt pales in comparison to tree losses from other invasive species such as Dutch Elm Disease (DED), Emerald Ash Borer (EAB), and Chestnut Blight (CB). Likely the reason Oak Wilt kills fewer trees than some other invasive pests and diseases in Michigan is that it lacks an efficient vector to transmit the lethal fungus. Sure, sap beetles (and potentially other insects) can transmit the Oak Wilt fungus (*Bretziella fagacearum*) **Overland** to healthy oaks, but they do so haphazardly and only to trees that have been recently wounded . . . the recently created wounds and associated chemical exudates attract sap beetles, which may be carrying Oak Wilt fungal spores. By contrast, DED, a vascular wilt disease with some similarities to Oak Wilt, requires no wounding except for the chewing habits by its vector, the elm bark beetle.

Oak Wilt Management: A Brief Review

Oak Wilt containment and eradication has been summarized in prior *Landscape* articles. Briefly, there are two major "Models"

Continued on page 18

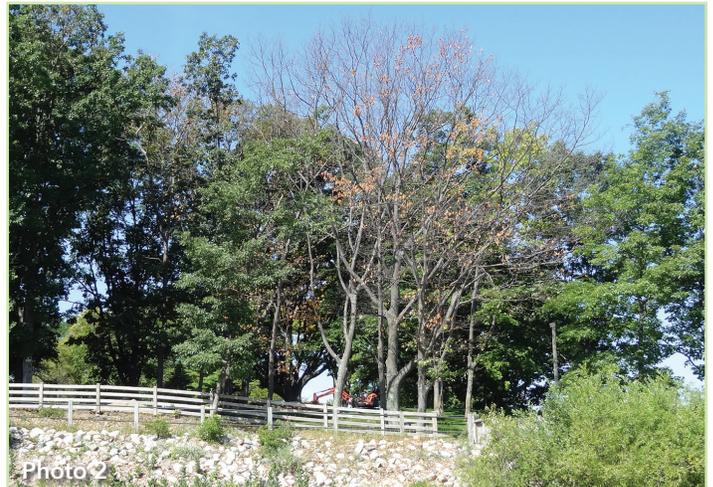


Photo 2

Photo 2: This Oak Wilt site on the shores of an inland lake will take special attention using Root Graft Disruption and Tree Injections. Implementation of these procedures via the Tier Tree Model was very effective at stopping Oak Wilt from spreading to dozens of nearby oak trees on this very nice property, without sacrifice of other oak trees.



The Plant Doctor's LANDSCAPE TIPS

CAN WE LOG OUR WAY OUT OF OAK WILT IN MICHIGAN?

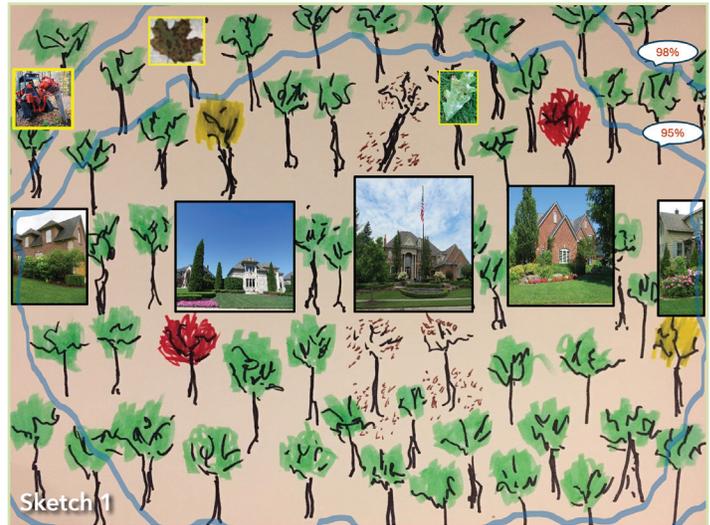
Continued from page 17

for Oak Wilt remediation being used in Michigan. The Tier Tree Model (aka 'Roberts Model') for Oak Wilt management was created by the author in Michigan beginning in 1984 when he assumed the position, Director of Michigan State University's Plant and Pest Diagnostic Clinic. The Tier Tree model was a natural extrapolation of DED management procedures that were in use by the author and others at the time. The Bruhn Model was devised in the early to mid-1990s. Both the Tier Tree Model and Bruhn Model initially employed Root Graft Disruption (RGD) to stop the spread of Oak Wilt between trees by severing root connections (Sketch 1). Over the decades, both models have evolved to also include girdle/herbicide treatments to kill oak trees to prevent disease spread and fungicide injections to protect healthy trees from root graft transmission.

In the author's opinion, there are several serious flaws with the Bruhn Model. Foremost, it doesn't sufficiently consider space and time factors, assuming the Oak Wilt fungus will transmit through roots the maximum modeled distance in a very short period of time (Table 1 & Sketch 1). This rapid, distant transmission of the Oak Wilt fungus is without validity; we know that the Oak Wilt fungus will not move very far from a tree within a few months to a year of initial infection. This limited, slow movement provides us with ample opportunity to remediate Oak Wilt without extensive sacrifice of healthy trees. Due to the excessive destruction of healthy trees, costs of remediation to property owners, and adverse environmental impacts, I have never utilized nor recommended the Bruhn Model, which I have sometimes referred to as the DNR/Bruhn model because of extensive modifications made by the DNR. Often, implementation of the Bruhn Model (without logging recommendations) results in the destruction of 10-20-30 or more healthy trees for every Oak Wilt-diseased tree. However, in the interest of ethical standards and a desire to disseminate comprehensive, educational information, I have always advanced all options, including the Bruhn Model, to arborists and property owners who are dealing with Oak Wilt. It is interesting to note that in several decades of presenting all options, at least in my experience, not one person has ever approved the use of the Bruhn Model when other options are also presented. Failure to discuss all options with Oak Wilt "victims" is disinformation. In fact, I discovered that discussion of the DNR/Bruhn Model with Oak Wilt victims has been a boon to my field research on the Tier Tree Model and its variations . . . generally tree owners not only want to save their trees, but they desire the least costly and least disruptive measures available. Therein lies one of the primary objectives for this article, "Can We Log Our Way Out of Oak Wilt".

Oak Wilt and the Logging Connection: A Conflict of Interest?

Tree/host plant removal/destruction has become a common approach for suppressing invasive species. While diseased Oak Wilt-infected trees are destined for removal to stop Overland Spread of the Oak Wilt fungus from pressure pads on infected trees, simply removing trees will not stop Underground Spread



Sketch 1: The DNR/Bruhn Model is also foisted on arborists and the public in residential communities. This sketch, obviously not drawn to scale, discloses the level of destruction of healthy trees within the "trench lines" (blue) specified by the Bruhn Model. Depending on the age of the infection (three freshly infected trees in this sketch) few to no sacrifice of healthy trees are needed with the Tier Tree Model, regardless of the incarnation used.

Table 1. Suggested buffer distance (feet) away from wilting or dead oaks.

Combined DBH (inches)	Any time the herbicide methods are used	Stump extraction, vibratory plowing, or trenching on sandy soils	Larger pocket on loamy sands, loams, or clays with stump extraction, vibratory plowing, or trenching	Smaller pockets (very few oaks killed in prior years) on loams or clays with stump extraction, vibratory plowing, or trenching
10	26	19	15	11
12	31	23	19	13
14	36	27	22	16
16	41	31	25	18
18	46	35	28	20
20	51	39	31	22
22	56	43	34	25
24	61*	47	37	27
26	66*	50	40	29
28	72*	54	43	31
30	77*	58	46	34
32	82*	62*	49	36
34	87*	66*	53	38
36	92*	70*	56	40
38	97*	74*	59	42
40	102*	78*	62*	45
42	107*	81*	65*	47
44	113*	85*	68*	49
46	118*	89*	71*	51
48	123*	93*	74*	54
50	128*	97*	77*	56
52	133*	101*	80*	58
54	138*	105*	83*	60
56	143*	109*	87*	60
58	148*	113*	90*	60
60	153*	116*	93*	60

Table 1: From the Minnesota DNR Oak Wilt Guide (April 2022), this modified Table of the Bruhn Model prescribes where Root Graft Disruption lines (or herbicide methods or stump extraction) should be placed from Oak Wilt-diseased trees. The modifications are based on the observation that the maximum distance Oak Wilt has spread underground in one year is 60 feet for newer infections. With older infections, the fungus may move greater distances (in several years) underground. The asterisks indicate the 60-foot spread limit, beyond which no further destruction of healthy trees needs to be performed. In my experience, the 60-foot spread in one year of new infections is highly unusual and to the extreme. It is important to note that Oak Wilt spread of 60 feet in one year by some individuals is an "observation" and likely not based on replicated research.

of the disease through root grafts. The DNR/Bruhn Model, whether employing Root Graft Disruption (RGD) or Girdle/Herbicide methods, has been promoted by the Michigan Department of Natural Resources (DNR) and the International Society of Arboriculture-Michigan Chapter (ISA-MI) as the “Official Method” for Oak Wilt remediation through the Oak Wilt Coalition, the Oak Wilt Qualifications (OWQ) program and other various training programs these entities advance. One troubling aspect about Oak Wilt remediation is that when certain entities promote the DNR/Bruhn Model as the “Official” recommendation, while not conveying other less “invasive” options, there seems to be a strong correlation of promoting “Logging” and “Timber and Firewood Sales” with it. If the most destructive and costly Oak Wilt remediation methods are being advanced to arborists and the public via scare tactics with accompanying recommendations of logging, couldn’t this be considered a Conflict of Interest? I thought it might be useful for the sake of discussion to provide several examples.

Michigan Invasive Species Grant Program (MISGP): The MISGP is funded by the DNR from monies they receive from federal sources. One example of this is a grant that was awarded to the Michigan Association of Conservation Districts (MACD) in 2016. A final report was generated in 2019 (Photo 3). For full disclosure, MACD personnel and Forestry Assistance Program (FAP) representatives involved in this grant receive Oak Wilt training from the DNR and its associates; the DNR/Bruhn Model was advanced as the officially sanctioned method for Oak Wilt remediation by these groups in this grant. This cost-sharing program specified that the Government will fund part of the costs for Oak Wilt management if the affected property owner assumes the balance. As the final report shows, the Bruhn Model was promoted essentially as a requirement of the grant if property owners wanted government funding. In accepting remediation of Oak Wilt by the Bruhn Model, a significant number of the property owners were urged to engage in “timber and firewood sales” to offset the destruction and costs of Oak Wilt remediation by the Bruhn Model. This grant, initiated in 2016 with a final report in early 2019, referencing only

STATE:	Michigan
GRANT TITLE:	Slowing and Preventing Oak Wilt
REPORT TYPE:	Final Performance Report
DATE:	March 31 st , 2019



Final Summary

This grant (IS15-3007, Slowing and Preventing Oak Wilt) was awarded on February 17th, 2016. The project agreement was signed on April 27th, 2016. The overall objective of the conservation districts and collaborators was to slow and prevent oak wilt by 1) implementing treatments in a 10-county area in West and Northwest Michigan, 2) implement outreach in order to arm the public with enough knowledge to make them capable of preventing oak wilt, and 3) use what was learned from implementing treatments to help guide future treatments of oak wilt across the state. Regarding oak wilt treatments, sites were selected and treated based on a prioritization system where only the highest priority sites were selected. High priority sites are sites where allowing oak wilt to continue to spread would cause the most harm, both ecologically and economically, at multiple scales. All treatment areas were delineated using the Bruhn model (Bruhn *et al* 1991). Treatment areas were delineated by four Forestry Assistance Program (FAP) foresters (Larry Czelusta, Rick Lucas, Kama Ross, and Josh Shields); three consulting foresters (Stephen Begin, Paul Gerhart, and James Scarlata); Scott Lint (Forest Health Specialist with Michigan Department of Natural Resources [DNR]); and Kayla Knoll (former Conservation Specialist with Manistee Conservation District and current Partner Biologist with American Bird Conservancy). Treatments included cutting and chipping or covering of symptomatic oak trees (those that shed their leaves because of oak wilt during the summer or autumn of 2016 for the first round, summer or autumn of 2017 for the second round, and summer or autumn of 2018 for the third round); removal and processing of apparently healthy oak trees (those that still possessed healthy crowns but were within the treatment area); injecting fungicide in apparently healthy trees; applying herbicide to the stumps of apparently healthy trees (the goal of the herbicide application was to kill the root system before the oak wilt fungus has a chance to move beyond that root system); and trenching a line (5 feet deep) along the treatment area boundary using a vibratory plow or other equipment. Across three rounds of treatment (October 2016 through March 2017; October 2017 through March 2018; and October 2018 through March 2019), **21 different treatment sites** were treated in **8 different counties** (Benzie, Grand Traverse, Lake, Leelanau, Manistee, Mason, Missaukee, and Wexford; Table 1). This equated to **~52 acres of treatment** (this ~52 acres included follow-up treatments; Table 1), exceeding our goal of 48 acres of treatment. **Fifteen different combinations of oak wilt treatments** were implemented, and data collected from these treatments resulted in an oak wilt treatment model (Figure 1) that should be modified as additional data are collected in subsequent years. Contractors were successfully hired (using a public bidding process) to implement treatments at all sites. **Eight different contractors** were hired across the three rounds of treatment – 1) Arbor Tech Outdoors (cutting/chipping/covering of symptomatic trees, herbicide application); 2) Gerhart Tree Service (cutting/chipping/covering of symptomatic trees, herbicide application); 3) L and S Tree Service and Nursery (fungicide injections); 4) Parshall Tree Care Experts (cutting/chipping/covering of symptomatic trees, cutting/removal/processing of apparently healthy trees, trenching, fungicide injections, herbicide application); 5) James Scarlata (fungicide injections, herbicide application); 6) Schillinger Forestry (trenching); 7) Taylor Tree Health Care (fungicide injections, herbicide application); and 8) VanVoorst Outdoors (cutting/chipping/covering of symptomatic trees, cutting/removal/processing of apparently healthy trees). All sites will continue to be monitored by FAP foresters and contractors. Across the entire reporting period (beginning of March 2016 through the end of March 2019), **~19,484 acres were surveyed for oak wilt**. Regarding outreach during the entire reporting period, an estimated **199,297 individuals were passively reached** via information distributed at events such as Gaylord Ultimate Hunting Expo, Huntin’ Time Expo, Northern Michigan Small Farm Conference, and Traverse City Hunting and Fishing Expo, and from reading or listening to material in articles or interviews published in media such as A Few Friends for the Environment of the World website, Bear Lake Watershed Alliance bulletin, Benzie Conservation District newsletter, Benzie Patriot newspaper, Big Star Lake newsletter, Cadillac News newspaper, Crooked Lake newsletter, Hamlin Township oak wilt post cards, Hamlin Township website, Lake County Riverside Property Owners

STATE OF MICHIGAN Invasive Species Grant Program
Error! Bookmark not defined. – Final Performance Report
 Page 1 of 16

Photo 3

Photo 3: A Michigan Invasive Species Grant Program (MISGP) for property owners promoted not only the expensive and destructive DNR/Bruhn Model but also “timber and firewood sales” where possible. The implementation of the cost-sharing grant for property owners with Oak Wilt in 2016-2018, and the final report submitted in March 2019, is not nearly long enough to gather useful information regarding the success of slowing or stopping Oak Wilt. The 16-page report is available on the Michigan.gov website.

a 2-3 year implementation window for Oak Wilt remediation, fell well short of the time necessary to determine the efficacy of the various methods used by awardees’ properties in this grant. The Grant Administrator of this MISGP purportedly submitted another grant for follow up, but this grant was not funded by the DNR. Hence, we lost a good deal of potentially valuable information that could’ve been garnered for

Continued on page 20



The Plant Doctor's LANDSCAPE TIPS

CAN WE LOG OUR WAY OUT OF OAK WILT IN MICHIGAN?

Continued from page 19

arborists, citizens, and even scientists. Implementing logging in association with the DNR/Bruhn Model for Oak Wilt remediation creates landscapes that are not only environmentally unsound and devastated but which are not likely preferred by property owners who would have pursued other methods if they had been given the opportunity to do so (Photo 4).

Sutton's Bay: One of several MISGP sites I visited at the request of property owner awardees and Forestry Assistance Program (FAP) representatives was near Suttons Bay (Photo 5A). Root Graft Disruption methods had already failed, likely because the trenching operations were not sufficiently deep in this sandy location. Regrettably, the Oak Wilt advanced underground from landscapes onto a very steep, long



Photo 4
Logging operations on Oak Wilt-infected properties leave destruction and wasteland-like environments that many property owners may not find acceptable.

cliff down to a lake shore where RGD was not possible. Clearly, this site was not amenable to the Bruhn Model by RGD nor for timber/logging operations. I advised using my Glyphosate/Stump Cup technique but was promptly overruled by the MISGP administrator who specified the use of the Triclopyr herbicide (such as Garlon 4) with the Bruhn Model. The Triclopyr did not stop the Oak Wilt either

(Photo 5B); the Oak Wilt continued to spread. Failures with these two procedures (RGD=trenching and Triclopyr herbicide) threatened to destabilize this long steep cliff, which runs counter to the aims of state government departments that manage critical dune areas and our water resources. Finally, an arborist was able to slow/stop the spread of the deadly disease with tree injections of propiconazole.

Traverse City: At a subdivision near Traverse City, Oak Wilt was winding its way through landscapes and interspersed woodlands (Photo 6). According to a FAP representative, the funding from the MISGP grant was sufficient to remove diseased/dead trees but not to stop the spread of Oak Wilt. In other words, trees were removed as the Oak Wilt continued unimpeded through a subdivision, killing more and more trees. Does this make any sense/cents?

Fife Lake: At an older, expanding Oak Wilt site near Fife Lake, MI (Photo 7), a Forestry Assistance Program expert trained by the

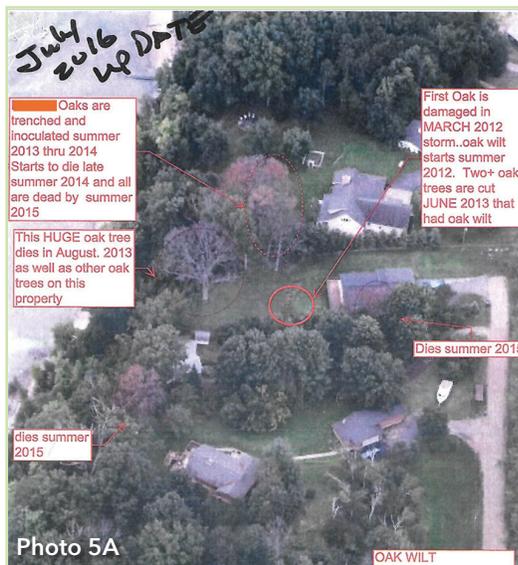


Photo 5A



Photo 5B

Photos 5A & 5B: In this satellite image of some Oak Wilt outbreaks near Suttons Bay, Michigan, a property owner documents the spread of the deadly disease over several years (Photo 5A). Initial trenching methods were not effective, and the disease progressed underground over a very steep, long cliff down to the water's edge of West Bay (left). My recommendation of my Glyphosate/Stump Cup technique on this steep slope was overruled by the MISGP Administrator who specified tree removal and Triclopyr treatments according to the Bruhn Model; tree removals and treatments with Triclopyr failed to kill trees (Photo 5B) to prevent spread of Oak Wilt, resulting in further spread of the deadly disease. An arborist was able to slow/stop the disease spread with tree injections of propiconazole.

DNR and associates recommended logging as a measure to offset the high cost of implementation of the recommended Bruhn Model. The costs and destruction caused by Oak Wilt and

the proposed logging operations often cause property owners to hesitate . . . they do nothing. These kinds of recommendations and kerfuffles are occurring throughout Michigan.

Summary

In my opinion, entities and individuals who promote the DNR/ Bruhn Model as the "Official Recommendation" are destroying many more healthy trees and having a much greater adverse environmental impact than necessary. Furthermore, it is my understanding that the entities promoting the DNR/ Bruhn Model as the "Official Recommendation" have no legal authority to advance any method as "Official". Official by whose standing? Government? A Professional Society? The Oak Wilt Coalition? Who?

We know that certain entities who are making Oak Wilt recommendations and performing training sessions about controlling the disease are tied closely to the timber/logging industry. If certain people and entities close to the timber and logging industry are foisting the destructive and costly DNR/ Bruhn Model on arborists and the public while suppressing other less costly and less destructive methods, isn't this a Conflict of Interest? Is this ethical? In many situations, far more oak trees are being killed/sacrificed by these recommendations than the Oak Wilt fungus does. 🌿

Dr. David Roberts has retired from Michigan State University but remains active with the industry. He can be reached at 248-320-7124 or treedoctordave@gmail.com.



Photo 6

Photo 6: At this residential site near Traverse City, Oak Wilt was advancing through properties via underground root connections. I was informed that there were only sufficient funds in the grant to cut down trees but not stop the spread of the deadly Oak Wilt disease. Is this a reasonable Oak Wilt Management strategy?



Photo 7

Photo 7: At this site near Fife Lake, Michigan, Oak Wilt had been spreading in extensive acreage of woodland for several years. An expert trained in the Oak Wilt Qualifications program recommended the Bruhn Model with the Girdle/Triclopyr Herbicide technique plus logging as a standard recommendation from this program. Such destructive recommendations would leave this woodland property in objectionable disarray (Photo 4). The property owners were overwhelmed with this recommendation, and nothing has been done. The Oak Wilt continues to spread.