The Plant Doctor's LANDSCAPE TIPS

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OAK WILT PART 4: THE PRUNING CONTROVERSY

INTRODUCTION:

In recent years, the Michigan Department of Natural Resources (DNR) has released spring media blitzes advising people to avoid injuring oaks between April 15 and July 15, but that pruning oaks can commence after July 15 and continue (through the summer, fall and early spring) to the following April 15. Many professionals in the plant industry know that I have recommended "No Warm Season Pruning" for approximately 20 years. These diverse recommendations are undoubtedly confusing to professionals and private citizens alike. I should add that there are abundant supporters on both sides. Recently, the DNR released a "White Paper" that discloses their rationale for their position. The purpose of this article is to discuss the two diverse views. Before delving into this discussion, I want to briefly review some basic information about Oak Wilt.

The lethal disease Oak Wilt (OW) (Photo 1), caused by the fungus *Ceratocystis fagacearum*, moves from infected trees to uninfected trees by two means: 1) **Overland Spread** by insects (Photo 2) to wounds, and 2) **Underground Spread** by root grafts between nearby trees. Even though it is believed that the majority of OW spreads by the underground transmission, most of the new cases I encounter every year are by the **Overland** method, often due to individuals who prune trees, especially during the spring and early summer. In the field of Plant Pathology, it is generally taught that three basic criteria are needed for development of a plant disease: 1) Susceptible Host Plant, 2) Pathogen, and 3) Conducive Environment. In the case of **Overland Spread** of OW, the primary subject of this article, the so-called Plant Disease Triangle (three criteria) or Tripod needs to be modified to the Plant Disease Quadra Pod or Water Tower or whatever… (Figure 1). What Figure 1 essentially teaches us is that four criteria are needed for OW infections by overland spread, and the elimination of anyone of these criteria should theoretically prevent disease development.

DNR'S POSITION STATEMENTS AND DAVID L ROBERTS' (DLR) RESPONSES:

The DNR refers to a Wisconsin DNR/Utility Study: In a collaborative study by a Wisconsin Utility company and a Wisconsin DNR employee, little evidence of overland spread was reported when pruning oaks after July 1 for several years. Based upon this study (and perhaps others) the Wisconsin DNR recommends no pruning of Oaks from April 14 to July 1, with no restrictions on pruning the balance of the year.

DLR Comments: The publication was not peer reviewed and because a utility concern was involved, there could be potential conflicts of interest. In review of some of the data, as an example, the report claimed that 3 of 38 trees pruned in the fall had died but that OW could not be confirmed because the wood was too dry for apparent lab cultures. The author

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Photo 1: These wilting oaks (note tan leaves) regrettably contracted Oak Wilt when an arborist pruned them during the spring of 2015. The infection avenue was Overland Spread of the fungus by sap beetles to the pruning wounds. Note that surrounding oaks are at risk; the measures to contain and eradicate the disease will be very costly.

Photo 2: Various Sap Beetles belonging to the family Nitidulidae are capable of transmitting the Oak Wilt fungal spores from fungal mats to fresh wounds on oaks. Sap beetles are everywhere and may become active at all times of year, whenever the temperatures achieve 45-50 degrees F and above.

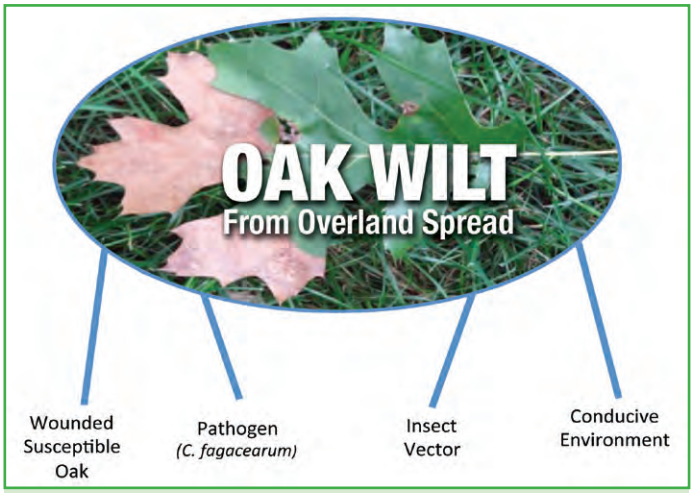

Figure 1: Four requirements are necessary for an Overland Oak Wilt infection according to this diagram. If one of those factors is missing, theoretically, no Oak Wilt should develop.

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of the Wisconsin study related that better notes by the Utility Company would have helped. In other cases where oaks died when pruned after July 1, they presumed that OW transmission through roots was involved; they could not discount overland transmission to pruning wounds. In Michigan, we have learned not to base our recommendations on one (questionable) study. If you recall, in Michigan's fight to eradicate the Emerald Ash Borer from North America, various state and federal agencies relied upon one study conducted by two scientists to implement a cut and chip (to one inch or less) program. Not believing the results of that study, I established my own research and found that not only could the EAB survive the one-inch chipping procedure but that the EAB was actually being spread in wood chips from quarantined areas to non-quarantined areas (Flint, MI).

DNR's Calendar Dates: DNR's calendar dates for no pruning are April 15 to July 15, while it is acceptable to resume pruning activities from July 15 through April 15 of the following year. These recommendations have been publicized widely via media releases.

DLR Comments: For simplicity of communication of guidelines about OW prevention, it is understandable why the DNR, and perhaps others, want to establish (arbitrary) calendar dates for pruning/not pruning oaks. However, it is my understanding that insects and microbes have not evolved sufficiently to comprehend the human calendar; critters and microbes are stimulated by environmental factors such as temperature (heat units) and moisture. These environmental conditions can vary considerably from year to year; Climate Change may add another increasingly important variable. In 2015, I documented an OW outbreak resulting from a pruning event during the first week of July (Photo 3 & no possibility of root graft transmission). By calendar guidelines, do fungi and insects understand that they are supposed to disappear/become ineffective in just a few days to appease the DNR's pruning commencement date of July 15…or that they should have already disappeared to meet Wisconsin's DNR and Utility pruning guidelines of July 1?

Photo 3: This oak contracted Oak Wilt from pruning during the first week of July, just days ***after*** Wisconsin's DNR suggest pruning can commence (on July 1) and just days ***before*** Michigan's DNR suggest pruning is acceptable (July 15). Unfortunately, the owner of this nice property on Houghton Lake will be paying $1000s to try to prevent further damage on her property and to trees on the very close neighbor's property.

Photos 4: Although the DNR claims that stumps are not infected by Overland Transmission of Oak Wilt, I have documented such events on a number of occasions. In this poor photo, this tree died via root graft transmission the year after a logging operation at this hunting camp in northern Michigan resulted in the infection of a stump from a nearby felled tree.

DNR Recommends No Stump Treatments: The DNR does not recommend treating stumps (Wisconsin does) even during the prime overland transmission period of April through July. Their rationale is that stump infections have "not been observed or documented in Michigan" and that sap flowing upward out of the stump prevents infection of the stump by the OW fungus.

DLR Comments: I have witnessed OW stump infections (Photo 4) that subsequently resulted in nearby oak tree death through underground root graft transmission. Furthermore, their contention that upward flowing sap prevents infection is inconsistent with my understanding of fungal infections and tree physiology.

DNR's Springwood vs. Summerwood: The DNR contends that "springwood formation is needed for infection, and summerwood is a barrier to infection." In their White Paper, the DNR advances that the summerwood barrier to infection is why oaks are not susceptible to infection from July 15 to April 15 the following year, further stating that springwood formation doesn't occur until May (the previous summer- wood is in place until May the following year).

DLR Comments: Oaks develop early (spring) vascular vessels which tend to be larger than later formed (summer) vascular vessels. This is why we can see with our unaided eyes the vascular rings that can be counted to determine a tree's age. I know of no evidence (I may have missed a scientific paper somewhere?) that suggests late wood is a barrier to infection. Often in this late summerwood argument, it is stated that the smaller vascular elements cannot be invaded by the OW fungus due to size. Microorganisms are extremely small and the size of a plants' vascular system would not generally be regarded as impediments to infection (Photo 5). In addition, isn't the large, early (spring) wood exposed when making a pruning cut or felling a tree in, say, August or October? The real reason OW infections may decline somewhat after July may very well be that the spring-formed fungal mats have probably disintegrated/decomposed to some extent due to insect and microbial activity.

DNR's Position on OW Pressure Pads: The DNR states that "new spore mat formation has not been documented in Michigan

before late April," which is essentially their view for why we need not be concerned about infections in early April or, for that matter, during warming trends in February or March.

DLR Comments: It is true that OW cannot occur if the fungus is not present according to Figure 1, above. Much of the literature states that fungal mats form the following spring after tree death (from the previous year). However we have known for many years that fungal mats often form in the fall (Photo 6). Nothing is better for fungal (mat) survival and viability than cold to freezing temperatures. Hence, in my view, when sap beetles become active above 45-50 degrees F during a warming period in the late winter or the early spring, they may visit the fungal mats where they feed and haphazardly pick up spores; if tree injury such as pruning or storm damage occurs during these times, I can visualize no reason why trees can't be infected in the late winter/early spring…or for that matter in the fall.

DISCUSSION AND CONCLUSIONS:

Even though we've known about OW for many decades, there are still many aspects about OW that we don't understand…the reason that many scientists, state departments, universities, arborists, etc. can't agree on some matters. Following are some issues that I believe need discussion so that arborists and tree owners can understand my position.

Legal and Cost Considerations: Oak Wilt is probably the most litigious and costly disease I have ever encountered. Property owners have successfully sued "arborists" who pruned trees that subsequently contracted OW and died. Neighbors may sue property owners who have not contained OW to their own property. Tree value and property value losses can be staggering from OW, often exceeding many $10,000s. The cost to contain and eradicate OW from a property can also be astronomical, sometimes taking substantial portions of one's (retirement) savings. OW is a disease we want to avoid at all cost, hence, the reason for my very pragmatic and cautious recommendations.

No Stinkin' Badges: In the classic film, "The Treasure of the Sierra Madre," the characters played by Humphrey Bogart and Walter Huston ask a group of Mexicans (actually bandits who want to steal the gold) for their (proof of authority) badges. After thinking about it for a moment and realizing they strongly outnumber the Americanos, the banditos reply, "Badges? We ain't got no badges. We don't need no badges. I don't have to show you any stinkin' badges." I realize DNR's charge in a variety of areas such as hunting and fishing licenses and oversight of various parks, forests, and so forth. And, I understand that they have the need and the right to develop their own policies governing the timbering and/or management of forest lands for which they have responsibility. For the most part, the Michigan DNR does an admirable job. However, in regards to Oak Wilt none of us have "any stinkin badges" – we are all strictly advisory to the citizens of Michigan….compared to Wisconsin and Minnesota, which have regulations governing pruning and oak wilt. Because there are currently no laws or legal regulations in Michigan governing any aspects of pruning and, hence, OW, and because the DNR has so much regulatory oversight on various issues, it is important that the public not misconstrue DNR recommendations on OW as regulatory.

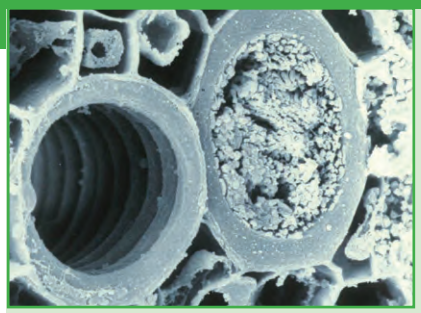

Photo 5: Some individuals claim that late (summer) wood cannot be infected due to its small size. Microorganisms are usually much smaller than plant vascular systems.

In this electron micrograph I took in the early 1980s, one can easily witness the small size of 1000s of bacterial cells in the xylem element on the right compared to the uninfected xylem element on the left. Oak vascular systems are typically much large than the vascular system of this turfgrass plant.

Photo 6: This fungal mat (black & grey, center) formed in the fall of 2015 after the host tree was pruned the previous spring. This mat contains spores that are highly infective.

Theoretically, wounding nearby oak trees in the fall or during the following late winter/early spring might prompt sap beetle transmission from this mat to those injured trees. Cold, even freezing temperatures will help the fungus survive until the following spring.

Conclusions: In 2015, I documented two significant observations, as I have in previous years: 1) a pruning event during the first week of July that resulted in an OW infection — this counters Wisconsin's guidelines and makes the MDNR's suspect, and 2) the death of an oak tree from pruning in October, 2014. Neither of these events could have resulted from root graft transmission.

In Michigan, there are ***different stakeholders***, and I think we need to be sensitive and objective to the various stakeholders. For example, a utility company has an important and challenging responsibility to maintain a consistent and safe power supply; the commencement of pruning operations is, for the most part, practical after July 15. However, it would behoove a utility company or its contractor to be sensitive to property owners with valuable oak trees by implementing precautionary measures if/when necessity occurs. Conversely, the objective of the owner of a $10 million dollar property in Bloomfield Hills (or an $80,000 property in Holt) with a 250 year old oak is substantially different than the objective of the utility company. The property owner with the large, old, valuable oak tree usually demands ZERO risk of oak wilt…and with my guidelines, I can virtually guarantee ZERO risk. The citizens of Michigan ought to have the right of ZERO risk for their own property if they so desire. And, because I have personally witnessed Oak Wilt infections near DNR's July 15 deadline and after (fall), I am certain the DNR cannot guarantee ZERO risk according to their current guidelines.

The author, MSU and MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.