The Plant Doctor's LANDSCAPE TIPS

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MORE REVELATIONS ON THE GLYPHOSATE/STUMP CUP VS. GARLON 4/ DOUBLE GIRDLE TECHNIQUES FOR THE REMEDIATION OF OAK WILT

INTRODUCTION

Oak Wilt is a difficult and costly disease to manage (Photo 1). I developed the Glyphosate/Stump Cup technique beginning in 2008 as an alternative method to the destructive and disruptive Root Graft Disruption (RGD) procedures for the control and eradication of Oak Wilt. My hypothesis was, "Why not let the tree do the work for you?", meaning let the tree absorb the systemic herbicide and translocate it throughout the treated tree's root system to kill the entire root system, thus creating a dead root zone (barrier) that prevents the lethal Oak Wilt fungus from transferring between infected trees and healthy ones. I selected Glyphosate as my herbicide of choice because I had much better success with killing woody plants and trees with Glyphosate than other herbicides such as Triclopyr (i.e. Garlon 4). Over the ensuing years, the Glyphosate/Stump Cup technique has evolved into three variations: 1) Tier Tree Model Glyphosate/Stump Cup in which a tier or two of healthy trees around an Oak Wilt epicenter are sacrificed; 2) Glyphosate/Stump Cup 'Half Moon' in which trees treated with Glyphosate are only half girdled to hopefully focus the herbicide in the direction of the advancing Oak Wilt front while protecting healthy trees in the opposite direction from potential Glyphosate injury; 3) Glyphosate/Stump Cup 'Chaser' in which only the infected trees are treated with Glyphosate. With 'Chaser', the Glyphosate appears to move systemically much faster than the Oak Wilt fungus through roots, preventing the transfer of the fungus between diseased trees and healthy trees.

Around 2015, the Michigan Department of Natural Resources (MDNR) adopted a procedure I refer to as the Garlon 4/Double Gridle technique from American Indians in Minnesota. The technique involves creating a double girdle approximately 4" apart and spraying the cut surface with triclopyr, typically Garlon 4. The technique is applied with the Bruhn Model for RGD but in lieu of RGD. Because the MDNR began recommending the Garlon 4/Double Girdle method as an effective Oak Wilt control measure, a group of arborists and I visited Warren Dunes in 2020 where the procedure had been implemented in 2015 and later years. What we saw was troubling. Some of the trees had recovered from the Garlon 4/Double Girdle procedure (Photo 2), and it appeared that the Oak Wilt fungus had escaped through many tiers of healthy trees that had been sacrificed with the implementation of Garlon 4/Double girdle technique (Photo 3).

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Photo 1

Photo 1: When Oak Wilt strikes an Oak tree on residential properties, it can cause panic and despair. Not only may property values be drastically affected but the cost of remediation can be challenging for people's lifetime savings. At this site in western Michigan, the lone infected Oak tree has roots adjoining oaks on at least three properties.

Photo 2

Photo 2: At Warren Dunes, some of the trees that had been treated with the MDNR's Garlon 4/Double Girdle technique had recovered. Photo was taken in June 2020. Note a thin layer of callus had formed (arrow) over the double girdle, supporting the entire upper canopy of the tree (Inset). Apparently, the girdling operation was not quite deep enough, allowing recovery but also disclosing that Garlon 4 had no adverse impact on the health of the tree. Trees that survive the girdling and herbicide can transmit Oak Wilt.

Photo 3

Photo 3: The tree in Warren Dunes was recently killed by Oak Wilt and is located on the border of one of the Bruhn Model-Garlon 4/Double Girdle applications, likely indicating the Oak Wilt fungus had escaped the procedure. A pressure pad of the Oak Wilt fungus on this tree is revealed in the Inset.

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SUPERIORITY OF THE GLYPHOSATE/ STUMP CUP METHOD OVER THE GALON 4/DOUBLE GIRDLE METHOD

What we witnessed at Warren Dunes with the recovery of Oak trees subjected to the Garlon 4/Double Girdle technique stimulated many questions. If trees were not completely double girdled, why was the Garlon 4 not killing the trees? What impact did the Garlon 4 have on trees receiving the double girdle? Was the Garlon 4/Double Girdle technique failing in its effectiveness to prevent Oak Wilt from escaping through all those sacrificial layers of healthy trees as specified by the Bruhn Model?

Certain arborists and I tried to answer these questions with some research we began in the fall of 2020. We compared the Glyphosate/Stump Cup method with the MDNR's Garlon 4/Double Girdle method. The application of the 'Half Moon' (half girdle) for each technique would allow us to directly compare the impacts of both herbicides (Glyphosate and Garlon 4) on the health of live (uninfected) oak trees. What may not be obvious to many arborists is that half girdles (my 'Half Moon') will not kill trees and, at least initially, will not adversely impact a tree's health for at least several years. After initiating the treatments in the fall of 2020 (Photos 4A & 5A), we collected the data in the spring of 2021. The results were startling. Trees treated with the Glyphosate/Stump Cup could be described as "stone cold dead"; there was no leaf emergence and no visible life in any of the branches, buds, etc. (Photo 4B). Oak trees treated with the Garlon 4/Double Girdle had leafed out normally; there were no symptoms of any adverse effects from the Garlon 4 herbicide (Triclopyr) (Photo 5B). This research readily explained what we had witnessed at Warren Dunes: that Garlon 4 apparently had no negative impact on the health of oak trees treated with the Garlon 4/Double Girdle technique. This research was summarized in the article, Superiority of the Glyphosate/Stump Cup Technique over the Garlon 4 Double Girdle Technique, *the Landsculptor*, July 2021, Pages 9-12.

Photos 4A and 4B: In this replicated research trial, the Glyphosate/Stump Cup procedure was administered to red oak trees in replicated trials using the 'Half Moon' (half girdle) technique in the fall of 2020 (4A). Glyphosate was applied at the one cup (8 fl. oz.) per 12" dbh rate. In June 2021, the data was collected. Oak trees treated by the Glyphosate/Stump Cup method readily killed oak trees. Compare toGarlon 4/Double Girdle method in Photos 5A & 5B.

Photos 5A & 5B: The Garlon 4/Double Girdle technique was used with the 'Half Moon' (half girdle) and administered in the fall of 2020 in replicated trials (5A). Note that the liberal use of Garlon 4 results in the herbicide running down the trunk and eventually into the environment. In June 2021, all Garlon 4/Double Girdle trees exhibited normal leaf emergence and not even a hint of herbicide toxicity to the trees. Compare to the Glyphosate/Stump Cup treatments in Photos 4A & 4B.

"POLITICAL SCIENCE"

Through various avenues, it became clear that the MDNR did not welcome my research on the management of oak wilt through herbicide applications . . . nor for that manner, much of my other research efforts from more than 35 years working on Oak Wilt. Also, because I had shown a photo of the Farmworks' product, 41% Glyphosate, in one of my articles (Photo 6), the MDNR leaped to the erroneous conclusion that I had used the herbicide product in my studies, subsequently accusing me, surreptitiously, of violating Michigan's pesticide laws. Truthfully, I had not purchased nor recommended Farmworks 41% Glyphosate up to that time. The primary reason for my publishing a photo of 41% Glyphosate was to discuss the potential economic advantages of generic Glyphosate compared to other highly destructive and costly techniques after Monsanto's original Glyphosate patent (originally marketed as Roundup products) expired in 2000 (more on this later). Frankly, my Glyphosate/Stump Cup procedure was prescribed precisely by Gordon's "Stump Killer" label. The MDNR has been suppressing my research, even threatening organizations and societies with retribution if I was allowed to present my research at their conferences. Unfortunately, one of the arborist societies has largely succumbed to the MDNR's threats, and I am no longer able to participate in that society's programming nor the Oak Wilt Qualifications program. When the MDNR funds certain scientists, while actively suppressing other scientists and threatening professional societies, that

Photo 6

Photo 6: I had included in one of my articles this Photograph of Farmworks 41% Glyphosate, which the MDNR immediately but erroneously assumed I was recommending for use with my Glyphosate/Stump Cup technique. My primary reference to this photo was to disclose economics advantages of generic Glyphosate since Monsanto's patent expired in 2000. This 2½ gallon jug of glyphosate cost only $30 at that time.

is not science. It may be termed "Political Science" or "Cronyism", which is not in the best interests of Michigan Arboriculture or the Public Good.

FARMWORKS 41% GLYPHOSATE VS. GARLON 4 (FALL 2021 THROUGH SUMMER 2022)

Because the MDNR became fixated on the Farmworks' "41% Glyphosate", and has routinely proclaimed (along with ISA-MI) that it cannot be used in the manner I prescribe with my Glyphosate/Stump Cup procedure, I decided it might be interesting to test it at its label rate for comparison with the MDNR's Garlon4/Double Girdle Technique. The "41% Glyphosate" label specifies that 1 mL (milliliter) of product can be applied to a cut surface per 2-3 inches tree dbh (diameter at breast height=4.5 feet). That rate translates to approximately one teaspoon of 41% Glyphosate per 12" tree dbh. Again, as with the previous research comparing my Glyphosate/Stump Cup Method to the Garlon4/Double Girdle method, the "Half Moon" (Half Girdle) procedure was employed to determine the true impact of the test herbicides on tree health (Photo 7); again, half girdles generally do not adversely affect tree health . . . at least initially. These replicated experiments were implemented in November 2021, and data was collected in June 2022.

The results were surprising. All oak trees treated with the 41% Glyphosate at label rates in November 2021 were "deader than a door nail" in June 2022; there was no leaf emergence, no bud swell, and no evidence of life in any above ground portions of the treated trees (Photo 8). Recall that trees treated with the Garlon 4/Double Girdle technique exhibited regular leaf emergence and normal growth without any ill effects from the Garlon 4 herbicide (Photo 5B).

DISCUSSION

Since 2008, I have been using Glyphosate at the rate of approximately 8 fl. oz. per 12" dbh to presumably create a dead

Photo 7

Photo 7: Because of the MDNR's preoccupation with 41% Glyphosate, I decided to compare it at label rates to the Garlon 4/Double Girdle method promoted by the MDNR. The label rates prescribe 1 mL be applied to a cut surface (stump cup) for every 2-3 inches trunk dbh. That rate translates to approximately 1 teaspoon of 41% Glyphosate for every 12 inches dbh of the trunk. Again the 'Half Moon' (half girdle) was utilized in a replicated trial to determine the impact of this low rate of Glyphosate on the health of oak trees. Treatments were applied in a replicated trial in November 2021.

root zone so that the Oak Wilt fungus cannot transfer through root grafts to nearby healthy trees. This one cup rate seems to be sufficient to impede the translocation of the Oak Wilt fungus through root grafts whether my Glyphosate/Stump Cup 'Tier Tree Model' or my 'Chaser' technique is used.

While Farmworks' 41% Glyphosate may appear to be for "Grass and Weed Control", as the front of the container conveys (Photo 6), trees, including oaks, are nevertheless on the label. With reference to the present study, I had not expected that 41% Glyphosate applied at 1 teaspoon or 2 teaspoons per 12" or 24" dbh, respectively, could kill oak trees; that is why we do research. In this experiment, 41% Glyphosate killed trees with only 1 or 2 teaspoons of product while Garlon 4 did not kill or even adversely affect trees at "dozens" of teaspoons of the herbicide per tree (Photo 5A). When pondering 41% Glyphosate at label rates, the 2½ gallon jug (Photo 6) provides enough herbicide to kill almost 1000 24" dbh or almost 2000 12" dbh oak trees! I am skeptical, however, that the Farmworks' 41% Glyphosate label rates (1 teaspoon/12" dbh) are sufficient to kill the entire root system of an oak tree to prevent the transmission of Oak Wilt through root grafts.

There are distinct advantages of Glyphosate compared to Garlon 4. First, a minimum amount of glyphosate is applied and kept entirely within the vascular system of the treated tree, not escaping into the environment; Garlon 4 is applied promiscuously at doses that run down the trunk and escape into the environment, potentially causing unknown harm to the surrounding environment. Secondly, Glyphosate is applied with variations of my Stump Cup method that results in far less sacrifice of healthy trees than the Garlon/Double Girdle method applied with the Bruhn Model. Because of the invasive,

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disruptive and destructive nature of the Bruhn "nuclear option", I have never used it nor do I recommend it even though it appears to be the "go to" technique for the MDNR. There are serious environmental impacts, adverse consequences for conservation, and overwhelming economic considerations by implementation of the Bruhn Model whether Root Graft Disruption or Herbicide is used.

This research proves conclusively, once again, that Glyphosate is far superior to Garlon 4 for the killing of oak trees. That the MDNR is promoting a procedure with questionable efficacy and that is so destructive both environmentally and economically should be of concern to all of us.

The opinions expressed in this publication are those of the author and do not necessarily represent the views of the Michigan Green Industry Association.

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Photo 8: The results of the 41% Glyphosate at label rates trial, collected in June 2022, were startling. At the low rate of 1 teaspoon per 12 inches trunk dbh, trees were readily killed. There was no evidence of life in the treated trees: no leaf emergence, no bud swell, no live cambium, etc. The treated tree in this photo is highlighted by an arrow; its death from 41% Glyphosate may be difficult to discern due to the canopies of so many healthy oak trees surrounding it. Compare the results of these very low rates of Glyphosate/Stump Cup-treated trees with the Garlon 4/Double Girdle-treated trees (Photos 5A & 5B). These studies confirmed why we should be concerned about the application of the Garlon 4/Double Girdle technique with the highly destructive and sacrificial Bruhn Model per MDNR recommendations.