Maple Decline

...or *Acer declinitis*

1

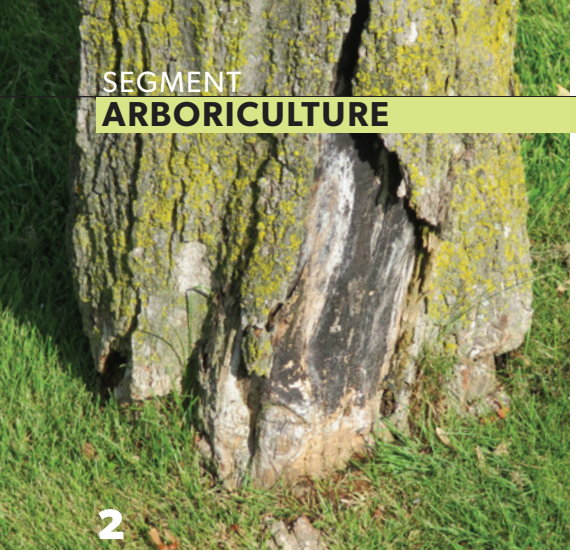
DAVID L. ROBERTS, PhD
MICHIGAN STATE UNIVERSITY

ABOUT THE AUTHOR

David L. Roberts, Ph.D is a Senior Academic Specialist at the College of Agriculture and Natural Resources, Michigan State University, with B.S. and M.S degrees in Plant Pathology from The Ohio State University and a PhD in Botany and Plant Pathology from Michigan State University. Dr. Roberts was the Director of MSU's Plant & Pest Diagnostic Clinic from 1984-1998. His current position is Senior Academic Specialist in the Deans Office at MSU's College of Agriculture and Natural Resources serving Michigan's Nursery and Landscape Industry.

Maple trees (*Acer* sp.) represent important components of Michigan landscapes and natural forests. This important genus comprises some very common species such as Sugar, Silver, Red, Norway and Boxelder (*A. saccharum, A. saccharinum, A. rubrum, A. platanoides, and A. negundo,* respectively). Less common but popular for many landscapes include species such as Amur maple (*A. ginnala*) and Japanese maple (*A. palmatum*). There are many cultivars of these species as well.

Maple Decline (MD) is a rather vague term used to describe a general fading in the health of maple trees that initially starts as branch dieback and sometimes results in the death of maples (Photo 1). MD, also termed "scientifically" in a tongue and cheek manner by the author as ***Acer declinitis,*** has been a descriptive term utilized for at least four decades, indicating that we haven't necessarily solved the "mystery", if there is a mystery, of why maples decline. It can probably be concluded that there is no one mystical thing that causes MD. Over the last several decades or so, a variety of factors have been documented that contribute to the mystery we call MD.



Causes of Maple Decline:

There appears to be a variety of contributors to Maple Decline (MD). Often, several factors work in collaboration to cause MD. Detective-style investigations and perhaps even a "Treeopsy" are sometimes necessary to discern among the contributors as discussed below.

Weed Trimmer/Lawn Mower Blight: Persistent injury of a tree's lower trunk by lawn mowers and weed trimmers causes physical damage to the vascular systems of trees (Photo 2). Without a healthy intact vascular system a tree cannot transmit nutrients and water to the upper portions of trees; wilted foliage and dieback often result. These lower trunk injuries also serve as avenues of infection for lethal diseases such as Verticillium Wilt and Phytophthora Collar Rot/Bleeding Canker.

Overhead Irrigation: Automatic lawn irrigation systems may not only provide too much moisture for trees, the continuous moistening of the trunks of trees (and foliage) also provides an ideal environment for fungal diseases (*Verticillium* and *Phytophthora*) to attack trees (Photo 3). If God or Mother Nature had intended for the lower trunks of trees to be continuously wet, She/He would've installed automatic irrigation in the forests.

Lawns vs. Trees: Trust me, there has been extensive research to show that trees and lawns do not mix; one can visualize this naturally by observing where trees are the happiest,… in forests. As humans, our constant struggle to establish thick, lush lawns under trees with lawn fertilizers, irrigation and chemical herbicides for weed control does not often bode well for trees (also see Mulch Madness on page 35). To be concise about the science, trees are adapted to a completely different ecosystem than lawns, the reason we rarely see them together in nature.

Verticillium Wilt: *Verticillium* comprises a number of species of fungi that are capable of attacking and killing many plants… whether they are tomatoes in our garden or shrubs and trees in our landscapes. *Verticillium* generally causes rather slow decline in trees, branch by branch. Sometimes the disease acts very quickly, especially in Japanese maple. The disease can often be diagnosed by looking for a discoloration in the vascular system (Photo 4 & Inset).

Phytophthora Collar Rot/Bleeding Canker: *Phytophthora* (fungus) comprises a number of species of fungi that are capable of

1 Maple Decline can be found wherever maple trees grow, but particularly in managed landscapes. Maple Decline, signified by a dieback in branches and sometimes resulting in death, is caused by a number of contributing factors.

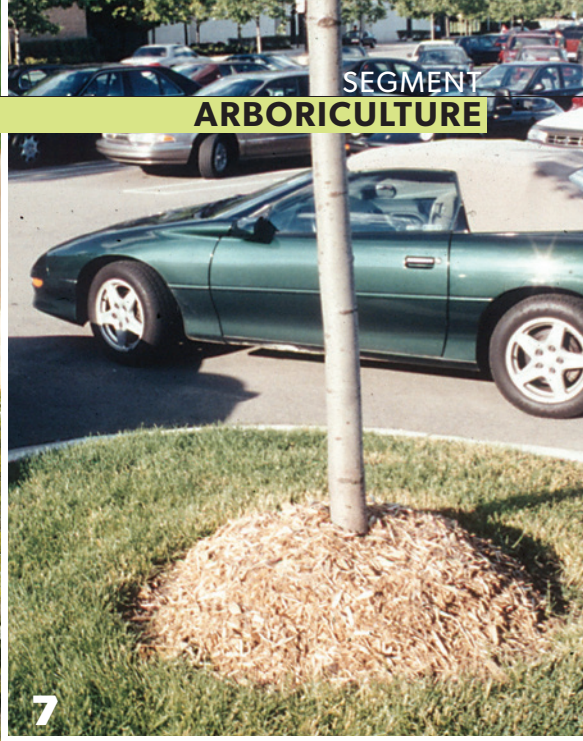
2 "Blight" from lawn mowers and weed trimmers not only injures the vascular systems of trees, but serves as avenues of infection by disease agents.

3 Overhead lawn irrigation (sprinklers) continuously moistens the trunks and lower foliage of trees, providing ideal environmental conditions for attack by fungal diseases.

4 *Verticillium* (fungus) wilt is a common vascular wilt and often fatal disease on maples whether in the landscape or nursery (note green discoloration in the base of this nursery tree). It may be diagnosed by looking for discoloration in the vascular system… note green streaks in the cambium tissues just beneath the bark (Inset). Sometimes the infection may not be found in the upper branches, but is confined to the lower trunk.

5&6 Contributors to a particular Maple Decline situation may be difficult to determine. A "Treeopsy" is sometimes necessary and was performed on the tree in Photo 1 (see acknowledgements & Photo 5). In close examination of the stump (Photo 6), note the abnormal discoloration in the vascular ring under the bark. The reddish, water-soaked area is typical of Phytophthora bleeding canker, probably initiated by continuous wounding from weed trimmers/lawn mowers, compounded by frequent wetting from irrigation.

6



7

8

9

attacking and killing woody (and herbaceous) plants ranging from rhododendron to maple. On maple, the fungus typically causes collar rot or bleeding canker. Injury to the trunks and roots of maples (weed whip and mowers) along with frequent wetness (irrigation) provides a perfect storm for disease development. A "Treeopsy" (Photo 5) is sometimes necessary to investigate maple decline. Note reddening discoloration beneath the bark of this declining maple stump affected by *Phytophthora* (Photo 6).

Mulch Madness: We as humans often engage in some pretty awful, unnatural practices; one such practice is known as "volcano mulch" (Photo 7). Excessive mulch around tree trunks maintains lower trunk wetness, encouraging attack by diseases (example – Phytophthora), and stimulates the development of girdling roots (see below). Conversely, the proper application of mulch can enhance the health of our trees (including maples) by keeping mowers and weed trimmers away, among many other benefits. While small mulch rings are helpful, a large mulch ring helps to simulate a natural forest situation and is most beneficial for trees.

Girdling Roots: Maple trees have a greater tendency to develop girdling roots than other types of trees. As girdling roots grow, they may restrict the vascular system of other roots or of the trunks of maples. Girdling roots may be initiated by application of too much mulch or by improper planting (when the tree was young). Sometimes, small girdling roots may be removed. Girdling roots may be invisible below ground or visible above ground (Photo 8).

Herbicides: Weed control in lawns or in the vicinity of trees may cause harm to trees that may be subtle or dramatic. A maple tree is nothing more than an overgrown dandelion in our lawns; the application of herbicides to control broadleaf weeds is likely to cause some toxicity to our trees. Never apply any herbicide that contains the chemicals Imazapyr or triclopyr or other broad spectrum vegetation killer in the vicinity of trees (Photo 9). Roundup Extended Control, Roundup 365, Ortho Ground Clear, and Barrier are a few among

7 While excessive ("volcano") mulch may appear aesthetically pleasing, it eventually results in problems for trees, creating ideal conditions for such detriments as girdling roots and diseases.

8 Girdling roots may restrict the uptake of nutrients and water to the branches, eventually leading to dieback and hence, "Maple Decline". Girdling roots may be evident above ground or inconspicuous (below ground)... in this case disclosed by the removal of soil by an "air spade".

9 Herbicides may be detrimental to trees, either by subtle or dramatic impacts. In this case the deadly herbicide, Imazapyr, was applied to the mulch rings of these maples for weed control, sometimes according to "label" instructions.

10

11

many of the herbicide products available today that contain Imazapyr.

Nuisance Pests & Diseases: There are numerous minor issues that affect maple trees. Several examples include aphids (and sooty mold), various gall formers, and tar spot (Photos 10 & 11). None of these "nuisance" issues contribute appreciably to Maple Decline despite their rather conspicuous, and perhaps objectionable, appearance.

Management of Maple Decline (DON'T DO THAT!!!):

Some of us are old enough to remember an old skit used by various comedy teams, including the Three Stooges - "Doc, it hurts when I do this!". The Doctor replies, "Well, don't do that!". Thwarting Maple Decline is also about "Not Doing That". Following are some "Dos" and "Don'ts" that can help us avoid and/or correct Maple Decline issues.

10 While the common fungal disease known as Tar Spot may be objectionable to some individuals, it would not usually be considered as a major contributor to maple decline. Tar Spot is typically found on Silver and Norway maple, but not Sugar Maple.

11 There are numerous pests that can "attack" maples and that seem unduly worrisome to some individuals. In this case bladder gall (caused by a mite) on Silver maple does no significant harm to these trees.

DON'T:

Injure tree trunks with lawn mowers, weed trimmers or by other physical means.

Plant trees where they "oughtn't" be (under power lines, too close to structures).

Allow irrigation water to strike the trunks of trees.

Apply broadleaf weed killers in the vicinity of trees.

Apply dense mulch around the trunks of trees.

Worry too much about nuisance or minor issues.

Make bad pruning cuts that may lead to decay from slow healing.

Injure the roots of trees with soil disturbance (construction, planting flowers, etc).

Take trees for granted while focusing all of our attention on lawns.

DO:

Irrigate trees infrequently and deeply during droughty periods.

Apply large, shallow (not thick) mulch rings around trees (the larger the better).

Plant and establish trees in a proper location (consider mature size, etc.).

Provide for adequate site preparation when installing new trees.

Occasionally fertilize trees.

Occasionally prune to remove deadwood and to shape and guide tree growth for better structure.

Respect trees and enjoy their natural beauty; they are the most valuable and important plants in any landscape!

Acknowledgments: Many thanks to Bart Heil and Crew at the Parks and Forestry Department of the City of Midland, Michigan for assisting with the "Treeopsy" in Photos 5 & 6.