The Plant Doctor's LANDSCAPE TIPS

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

VARIABLE WEATHER, VARIABLE PESTILENCE

INTRODUCTION

Climate Scientists have warned us about the impacts of Climate Change. Some of those proposed impacts include sea level rise, melting glaciers, melting polar ice caps, more variable and more violent weather, including hurricanes and tornadoes, etc. Among the predicted climate change is a warming planet (Photo 1). Even though some people don't believe in climate change, just like they believe the moon landings were faked, I think most people believe in climate change but disagree on what is causing it. This article does not propose to settle those disputations.

Regardless of the causes of a changing climate, there will, nonetheless, be consequences for our industry. We can forecast some of those consequences, others we cannot. I think most of us can agree that the weather in 2024 has been somewhat unusual so far. The winter of 2024 was fairly mild, with above average temperatures. According to our experiences in Michigan, the spring appeared around a month earlier than normal. I thought it might be interesting to review just a few examples of the weather's impacts on diseases, pests, and plants.

Photo 1

Photo 1: Growing up in Ohio many decades ago (to avoid revealing my age), it seemed that winters were colder, and snow and ice often persisted for many weeks and months. In recent years, snow typically melts every couple of weeks. The weather is a-changin'.

DISEASES

Like plants, disease agents largely become inactive with the advance of cold weather. Hence, winter represents a reprieve for many living entities in northern states. Diseases "wake up" in the spring usually coincident with the flowering of plants. Typically, spores of fungi or propagules of other agents are released in the spring to infect emerging foliage, usually during the time of flowering (Photo 2A). With the fungal disease we call **'Scab'** on *Malus* sp. (apple, crabapple), lesions form on the foliage, and the repetitive cycles of the disease throughout the season (Scab is a multicyclic disease) ensures catastrophic defoliation by August (Photo 2B). What was unusual about 2024 in Michigan is that with the early spring, initial infections of Scab occurred much earlier than normal and built up much more quickly, resulting in defoliating trees, sometimes by as early as May rather than in August. Not to worry, Scab never kills trees – *Malus* trees usually start each new season refreshed (Photo 2A).

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Photo 2A

Photo 2B

Photos 2A & 2B: Spring brings flowering on many plants including trees such as this crabapple (2A, Photo Credit: Sandy Allen). This same crabapple is usually defoliated by August every year from Scab infections. In 2024, the unusually early spring caused unusually early leaf drop from Scab (Photo 2B & Inset). This tree was at least 50% defoliated by Scab in mid-May, 2024. The positive side of most foliar diseases is that they rarely cause severe health issues for trees and other plants despite their seemingly abhorrent visual impact on plants.

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'Trellis Rust' on Pear (*Pyrus* sp.) and **'Tar Spot'** on Maple (*Acer* sp.) are examples of monocyclic diseases. Spores of the fungus are released in a rather narrow window in the spring as the foliage on their host plant is emerging; there are no repeating cycles as with Scab. In other words, "What you see is what you get". The total incidence of these monocyclic diseases depends on those initial infections in the spring. However, those initial infections can be so intrusive that severe defoliation may ensue (Photo 3).

Trees that are defoliated early in the season may produce new foliage soon after they are defoliated (Photos 4A & 4B). Trees that are defoliated later in the season generally do not produce foliage until the following season (Photo 2A). How do trees that are defoliated this year know whether to re-foliate this same season or wait until the next year? They know. Believe me, they just know.

Photo 3: Abundant Tar Spot infections on Maple resulted in an unusually heavy leaf loss in the year this photo was snapped in Traverse City, Michigan, by the author.

Arthropods: Insects and other critters are also affected by weather. Mild winters may enable better survival of insect pests; harsh winters may reduce the populations of pests. Complicating these thoughts of insect survival is that beneficial insects, often at odds with pests, may also be affected by weather conditions. While we often are concerned about insect pests, we also need to be mindful of beneficial critters. We cannot often know what impact weather has on arthropods. The Emerald Ash Borer (EAB) overwinters as larvae and emerges in the spring and early summer as adults (Photo 5A). Gypsy Moth (Spongy Moth) overwinters as eggs and emerges as larvae, which can strip trees of their foliage in no time at all (Photo 5B). Sap Beetles, which transmit the lethal fungal disease Oak Wilt, overwinter as adults (Photo 5C). Each of these stages of insect life cycles is affected by weather. The accumulation of heat units, known as the Degree Day Calendar, may not only predict the emergence of flowers/foliage on plants, but can also help us understand the emergence/activity of insects.

OAK WILT AND WEATHER

As with other diseases, Oak Wilt requires three factors: **1) Susceptible Host Plant (Red Oak), 2) Conducive Environment (Weather), and 3) a Virulent Pathogen.** Oak Wilt might be perceived as a uniquely complex issue associated with Weather (Schematic #1). For example, Pressure Pads (PP) sometimes form in the fall following infection of oak trees the same year (contrary to the Michigan DNR's stance that PP do not form before the end of April, the year after infection). Nothing is better for Pressure Pad (fungal) survival than cold temperatures. Hence, the fungus (virulent pathogen) is present in PP in the fall, through the winter, into the spring and early summer (Photo 5C). Another complicating factor is that the sap beetle does not necessarily behave like many other insects, which respond

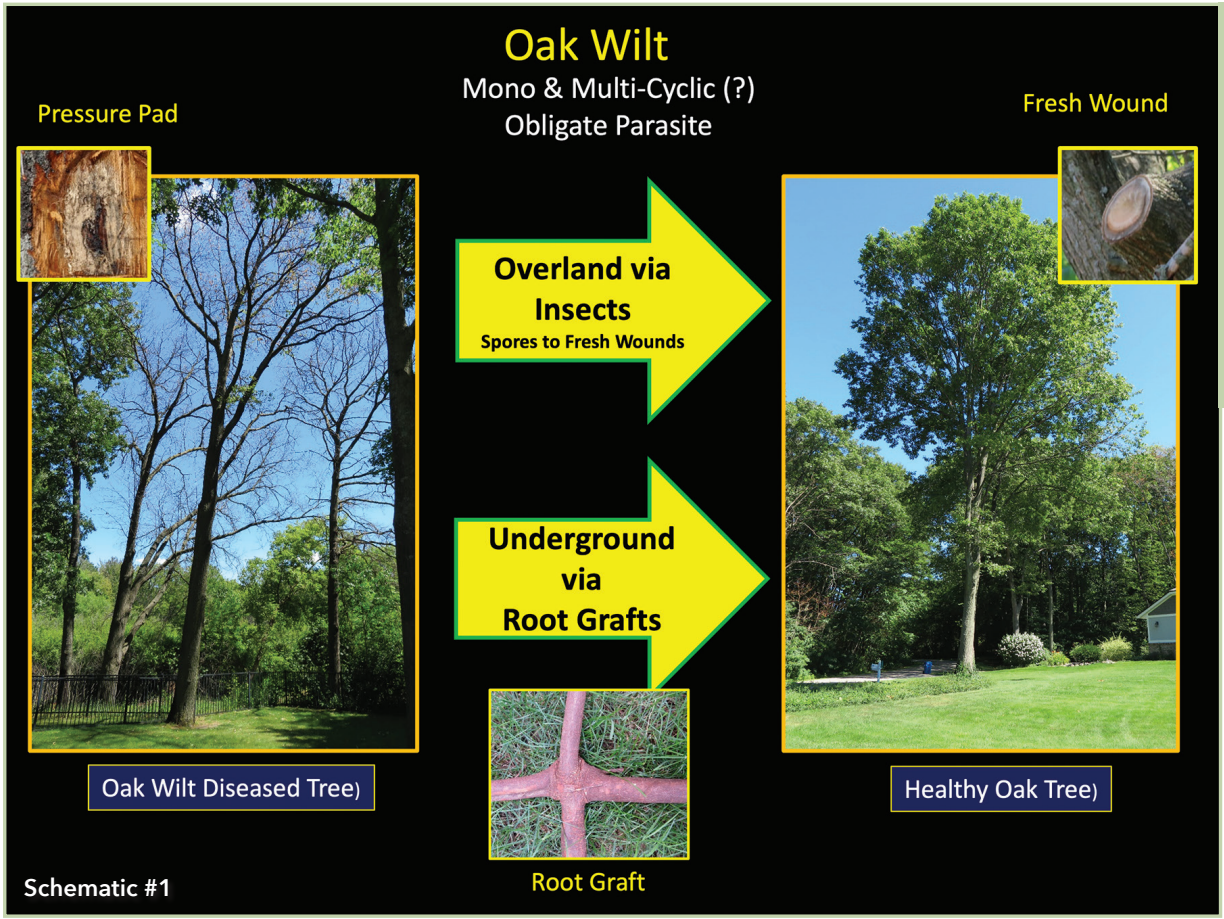
Photos 4A & 4B: Diseases such as anthracnose on sycamore may defoliate trees in the spring and early summer (4A). Early defoliation often results in re-foliation within the same season. The tree in Photo 4A was virtually 50% defoliated in late May but had produced new foliage within 1-2 months (4B). Other diseases that cause slow defoliation throughout the season (i.e. Scab), resulting in severe defoliation by July or August, may not produce new foliage until the following year.


Photo 5A


Photo 5B


Photo 5C

Photos 5A, 5B, & 5C: Insects may survive Michigan winters by different means. The Emerald Ash Borer overwinters as a larva and emerges as an adult as Photo 5A demonstrates – the author luckily captured this just-emerged adult after it had made the serpentine tunneling as a larva. This park near Ann Arbor, Michigan, contains trees that have been stripped of their foliage by Spongy Moth (formerly Gypsy Moth) larvae in the summer (Photo 5B and Inset). A sap beetle (small black blob) is feeding on an Oak Wilt Pressure Pad (mold) where it haphazardly collects spores to be transferred Overland to an injured oak tree *(Photo 5C, Credit: Matt Bainbridge)*.



Schematic #1: The disease cycle of Oak Wilt is briefly summarized in this schematic. Oak Wilt is a very complex disease affected by weather on several fronts: emergence of sap beetle vectors, development and survival of Pressure Pads, safe and high risk tree injury periods, etc.

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to the accumulation of heat units, required for metamorphic changes as described above for the EAB and Gypsy Moth. The Sap Beetle, overwintering as an adult, simply becomes active when temperatures warm up . . . and inactive when temperatures cool down; these fluctuations in temperature are becoming more common in Michigan winters. Yet another important variable complicating Oak Wilt is that tree injury is required for Overland Spread. When the DNR and its comrades claim that it's safe to prune oak trees until April 15, can we trust this message when spring arrives about a month early as it did in 2024? Do insects and fungi follow the artificial human calendar? I don't think so.

WEATHER IMPACTS

Weather can impact plants, pathogens, and arthropods (pests and beneficials). Winter injury is quite common on plants (Photo 6). Winter and subsequent weather during the warm season can significantly impact the disease and pest activity. Foliar diseases, for example, require certain minimal periods of leaf wetness so that fungal spores have time to germinate and infect the foliage. If the moisture is not present or is not present long enough, the pathogen propagule cannot infect the plant and most commonly

Photo 6: Not only do weather conditions affect Pest and Diseases, but variable weather may also affect the health of plants. The winter of 2014 was especially harsh, causing many trees and shrubs, including these crab apples in this boulevard, to exhibit dieback and decline.

dies from exposure to sunlight (especially UV light). This year, I've received several queries from concerned arborists who are treating diseases such as Scab or Trellis Rust. In some cases, their treatments were not effective; the diseases developed despite the arborists' best efforts. In other cases, the arborists lamented that disease activity was nonexistent, on their treated trees as well as non-treated trees; they worried about their clients' perception of plant health care by our industry. Are we trying to take advantage of the public by charging them for services that may not have been necessary? The lack of disease is simply due to non-conducive weather conditions (moisture) at the time infections could've taken place – a good thing! We should not be discouraged when Variable Weather interferes with the problems in landscapes we are trying to manage . . . that may result in Variable Pestilence. ❄

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