



# The Plant Doctor's LANDSCAPE TIPS

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

## TREES AND DROUGHT

### INTRODUCTION

Many believe climate change is a real thing. Scientists warn us that just a couple degrees of temperature increase can have dire consequences for Planet Earth as we know it (Photo 1). There are predictions that weather patterns will become more extreme over time. It seems that drought is becoming a more common phenomenon. One of the most extreme cases of drought I can remember is the Drought of 1988. I'm sure many readers of this column, especially the older folks, will remember that year. The well at my home went dry. Weeks and weeks of little to no precipitation wreaked havoc with nursery and landscape plants. I recall the scary prolonged elevated temperatures (>90° F) along with never-ending hot winds; the conditions seemed to cause trees and many other plants to cry out for help. We learned a lot during the drought of 1988, some of which will provide guidance for this article. Perhaps in hindsight, it was a needless worry, but I feared for the trees on my own property because some were over 100 years old and would be irreplaceable during my lifetime. At the time of this writing, Michigan is in a pretty severe drought . . . down by at least five inches or more of precipitation in June alone in many parts of the state. What can we expect? What can we do? Will my grand old tree die (Photo 2)? Many people begin to panic when they realize their irreplaceable, multi-generational trees may be severely harmed. Other people could care less about their trees because they are fixated on their annual flowers and lawns, believing trees are so hardy they will survive anything Mother Nature will throw at them.

### RECOGNIZING SYMPTOMS OF DROUGHT

While drought symptoms may seem obvious to most of us in the plant industry, it is surprising how many questions and photos I receive regarding trees, shrubs, and other landscape plants in the midst of drought conditions. Hence, I thought it might be useful to review symptoms in plants that are deficient in moisture.



**Photo 1:** Scientists warn us about climate change and its impact on the health of Planet Earth. In this photo, Michigan's state capitol in Lansing is shrouded in a haze emanating from drought-induced wildfires in Canada. Millions of acres of forests in Canada and the U.S. have been destroyed due to these wildfires.



**Photo 2:** In general, drought conditions may stress old, established trees but will not result in their demise.

In some situations, well-established trees may not show any outward signs of drought stress even though they are affected by low moisture; in some instances, dendrological examinations may reveal certain years when drought was a likely factor in the growth of trees (Photo 3). In other situations, symptoms of drought in plants can range from mild to wild. The following are some examples.

**Wilt/Lethargy:** Most herbaceous plants will exhibit signs of wilt when they encounter low moisture. This is a common situation when I forget to water my tomato plants. Woody plants are less inclined to show severe signs of wilt; their tendency is to react with the symptoms discussed below. Nevertheless, if we are astute, we can often see the subtle signs of drought via scrutiny of suspect trees (Photos 4A & 4B).

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**Photo 3:** Drought may affect the growth of a tree. In this photo taken of a core from a sugar maple, we can see a narrow growth ring (yellow arrow, left) compared to thicker growth rings (orange arrow, right). Thickness of growth rings may be due to a variety of factors such as diseases and pests but is also associated with moisture levels during the spring and early summer.



**Photos 4A & 4B:** Symptoms of drought may result in symptoms of wilted, droopy (lethargic) foliage (Photo 4A). For comparison, turgid foliage is shown in Photo 4B.

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**Scorch:** Leaf tissue necrosis (death) is one of the more common reactions of trees and other woody plants to low soil moisture conditions. Death of leaf tissue in woody plants from drought conditions is often referred to as "Scorch". Scorch may be manifested in a variety of ways, but leaf margin and/or interveinal necrosis are quite common (Photos 5A & 5B).

**Leaf Drop:** When certain species of established trees encounter drought conditions, their initial reaction is to start shedding foliage. Perhaps shedding leaves is a survival mechanism to reduce the loss of moisture through transpiration. People begin to become stressed-out or even alarmed when their trees drop leaves in the middle of summer, because they traditionally rake leaves in the fall. Some of our fellow Plant Professionals or clients may mistake leaf drop for diseases (Photo 5B).



Photo 5A



Photo 5B

**Photos 5A & 5B:** Another symptom of drought on trees is "Scorch", either manifested as leaf margin necrosis (Photo 5A, Linden) or as interveinal necrosis (Photo 5B, Oak). The symptoms of Scorch on Oak in Photo 5B was mistaken for Oak Wilt.

**Leaf Death:** Leaves that wilt may die and cling to the stressed tree or may drop to the ground. Leaf death is terribly alarming to people, but, again, established trees are usually not killed by extreme symptoms of leaf wilt and necrosis (Photos 6A & 6B).



Photo 6A



Photo 6B

**Photos 6A & 6B:** Symptoms of drought may result in foliage turning brown and hanging on the tree. In Photo 6A, note the brown, withered foliage on a branch (right) and the new, green growth that emerged with the ending of the drought and abundant precipitation. Photo 6B shows a maple tree with brown foliage in the top of the tree where moisture is less likely to be translocated during low soil moisture conditions. My prognosis is that the brown branches will re-foliate the following year on this well-established tree.

**Confusion with Other Maladies:** Leaf loss and apparent tree death are often confused with other causes. Tree diseases come to mind. As examples, anthracnose (fungal) diseases usually attack early in the season, but recovery usually occurs soon after. (Photos 7A & 7B). In other situations,

such as scab on *Malus* sp., diseases may affect trees later in the season; because defoliation occurs late in the season before or during natural leaf senescence, these trees will usually not re-foliate that year but will wait until the following spring. Trees just seem to know what they are doing!



Photo 7A



Photo 7B

**Photos 7A & 7B:** Drought-stricken trees may appear dead when they are not. Diseases and pests may also be mistaken for drought and tree death. In Photo 7A, this American Sycamore was attacked by an Anthracnose fungus in the spring as leaves were emerging. Compared to surrounding trees, this sycamore appeared dead (Photo 7A). With 1000's of years of evolution, trees have learned to cope with such difficulties and this example appeared healthy 1-2 months later (Photo 7B).

**Apparent Tree Death:** Leaf loss may be mistaken for tree death (Photos 8A & 8B); in such instances trees are often removed and replaced. As Mark Twain (Samuel Clemens) once said, "Rumors of my death are greatly exaggerated". Trees have evolved over thousands of years to survive all kinds of dilemmas. Established trees rarely succumb to drought.



Photo 8A

**Photos 8A & 8B:** This parking lot island represents a very tough environment for any tree, especially if irrigation is not available. During a drought in 2012, these two Lindens were afflicted by severe stress; the one on the right even appears to have died (Photo 8A). It is vitally important that we do not condemn trees before performing a thorough diagnosis as I did at this site. The buds were swollen, and the cambium was green, indicating the tree would likely recover the following year . . . as it did in 2013 (Photo 8B).



Photo 8B

**Actual Death:** Severe drought stress that results in death of established plants is very rare. However, death of new transplants is not uncommon (Photo 9).



Photo 9

**Photo 9:** Drought conditions are especially tough on or lethal to new plantings that have not yet established themselves. Irrigation will be necessary to keep them alive. Factors such as correct mulching practices and low fertilization should help these plantings with survival.

### DROUGHT REMEDIATION

We can virtually divide plants into two groups where drought is concerned: 1) Established plants, and 2) Non-Established plants. Whatever the case may be, it is surprising how many trees will recover from drought. The basic message is to thoroughly check out the trees for the potential of continued viability. In other words, **DO NOT OVERREACT** and **DO NOT ACT TOO HASTILY**. Exercise patience and reason.

**Established Plants:** For trees and other woody plants, there is generally little need to worry about them when drought conditions occur . . . unless it is really severe. Trees are very likely to survive just fine. However, if there is concern, irrigation may help. Advice for irrigation of established trees involves what many arborists and scientists regard as "Deep Root Watering", which means letting a hose run at various locations within and in the vicinity of the dripline of the tree for extended periods. Deep Root Watering usually only

needs to be done once or twice a week during drought. Lawn irrigation may not be sufficient water for tree roots because lawns are very competitive with trees for moisture.

**Non-Established Plants:** Newly transplanted trees are most susceptible to injury from drought. Death may even be the result (Photo 9). If new transplants are installed in a landscape, regular watering is recommended for normal adjustment to their new site but even more so during drought. It is also important to understand that standard lawn irrigation practices may not provide sufficient moisture for trees in lawn areas.

**What about lawns?** Although the focus of this article is trees, so many of our clients are concerned about their lawns. They hardly ever look up at their trees until they have lost all their foliage and appear dead for some reason. In reviewing the terrible Drought of 1988, I remember several aspects about lawns. Lawns that continued to receive regular irrigation tended to pull through the drought in good health. Lawns that received no irrigation tended to pull through the drought just fine once the rains/precipitation returned; lawns became dormant through the drought because turfgrass, like trees, have developed mechanisms to survive long periods of low moisture. Lawns that encountered the most trouble were those that were irrigated intermittently. It seemed that turf that was continually brought in and out of dormancy expended so much energy in the survival process that they often succumbed to the drought.

**Cultural Influences:** Factors such as lawn mowing during drought, and applications of fertilizers and herbicides, etc. may exacerbate drought issues on lawns and trees (Photo 10). 🌱



Photo 10

**Photo 10:** If not irrigated during drought, lawns will likely become "dormant". In general, they will recover when the drought ends. Mowing and fertilizer applications may exacerbate drought conditions. Note in this photo that the neighbor on the left stopped mowing during the drought while the neighbor on the right continued to mow, putting the health of his lawn in serious jeopardy (shading from the Maple also helped the lawn on the left).

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