



Trees Killed by Drought from Too Much Water

Summer 2020 - Backyard Wisdom

When Does Too Much Water Cause Trees to Die From Drought?

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Right now, in our forest preserves and our landscapes we see the evidence of too much water causing our trees to die from drought. Let me explain. Trees, like every organism, need to breathe. Of course, we all know that during the day tree leaves use CO₂ and give off O₂, through the miracle of photosynthesis. What we may not realize is that trees, like us, respire all the time using O₂ and giving off CO₂. They don't have mouth parts, but they do have openings called stomates in their leaves, lenticels and ray cells in their stems and roots through which they "breathe".

But how do tree roots breathe in the dirt? Good question, and it's one that we usually neglect, causing most of the damage and death to our friends, the trees. **Fifty percent of the volume of normal undisturbed soil is made up of air spaces. It is in those air spaces that the tree roots live and breathe.** Of course each soil type is different but in general, the deeper you go, the less air exchange with the surface, so there are fewer roots down below because they can not "breathe". That is why, according to the Morton Arboretum, **more than 90% of all tree roots live in the upper 12 inches of soil.**

So why doesn't the water drain away through the air spaces? Also, a good question, because if you lived outside of *The Prairie State* most of the water would drain away through those air spaces. For instance, if we traveled to the east side of Lake Michigan, their soil is made up of



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sand and silt particles that are in some cases 10,000 times bigger than the clay particles of our Illinois soils. Think of sand on the shore versus talcum powder. Because of their size, the way that sand particles knit together leaves big spaces for water to pass through and our talcum powder size clay mushes together and holds water rather than allowing it to wash away.

What happens when we have record breaking rainfall as we have for the last 4 years? All of the air spaces in which roots normally breathe, are filled up with water, drowning the roots. With no roots to supply water to the tree tops the trees wilt from, believe it or not, lack of water.

It's sad and ironic but this is why prairie was the dominant species in Illinois before European settlement. It is also the reason that Illinois has the very best black topsoil in the world. Farmers from all over the world would kill to have access to such wonderful food producing soils. The clay didn't allow the water to percolate away making the breakdown of old leaves and stems anaerobic (without air) which is 8 times slower than aerobic (with air) like most of the world. That made the build up of productive topsoil 8 times faster than in the rest of the world.

Is there anything that we can do to save our trees? Well, by the time they are wilting and the tops are dying it is too late. But here are some things you can do preventatively.

- 1) Even your lawn is suffering from too much water if you have your sprinkling system set up for watering every other day. The University of Illinois says that even during drought you should **water your lawn no more often than once a week.** Look around town and you will see most sprinklers are set at 2 or 3 times a week. It is drowning your lawn and driving the roots closer to the surface where they are less drought tolerant and get burnt from the heat of the sun.
- 2) Before you plant trees, shrubs or flowers make sure there is a place for the water to drain away. Too many plants are dying because down spouts pool water around them.
- 3) Plant water tolerant trees and shrubs.
- 4) When you plant in Illinois soil plant high. Most landscapers don't want to do this but it can make the difference between life and death. See our Planting Abstract®.
- 5) Ask your landscape architect/planner to plant a prairie garden and or rain garden to make lemonade out of lemons.

