



The Drought... don't forget the trees!

Indiana landscapes are suffering from the worst drought conditions in more than 100 years and trees in our communities are dying. This is a seemingly endless pattern of dry weather affecting crops and plants of all kinds. So, now what? With a little care, we can salvage and save trees from potential problems next year.

"Historically, a drought like the Dust Bowl would happen every 100 years, but what we've found is that modern droughts are shorter and can be more severe," said Keith Cherkauer, whose results were published in the early online version of the journal *Agricultural and Forest Meteorology*. "Historic data observed showed that those trends are expected to produce conditions in which droughts would be short, harsh and costly, but rare."

Drought can have a major impact on tree health and survival, by slowing and reducing growth. Drought reduces carbohydrate production, which significantly lowers energy reserves and production of defense chemicals in the tree. If drought is severe enough or lasts for a prolonged period of time, such as we are experiencing now, it also can cause death to all or portions of the tree.

In most situations, prolonged dry weather weakens trees and they become more susceptible to pests, which normally cannot invade a healthy tree. These pathogens enter, weaken and kill all or part of the tree, depending on how badly the tree is predisposed to this weakened state. At this point in the environmentally induced decline we can expect some permanent damage to our urban forests.

What can we expect? A biological lag effect is common in trees where environmental conditions during the year of bud formation control shoot length and expansion. Drought during the year of bud formation decreases the number of new leaves formed in the bud and new stem segments. Drought then influences the number of leaves, size of leaves and twig extension the following year when those buds expand.

The results of prolonged dry conditions might not inhibit the first growth flush, but may decrease the number of stem units formed in the new bud that will expand during the second (or third, etc.) flush of growth. If drought continues, all growth flushes will be affected. Thus, tree growth next year will be atypical and, again, create predisposed conditions to diseases and insects if not monitored and managed properly.

What to do? Obviously we cannot prevent drought. However, there are some measures we can take to make trees more drought tolerant and reduce the long-term effects of prolonged dry conditions.

- Always protect tree trunks, especially young trees, from mechanical damage such as string trimmers, lawn mowers and other equipment. Preventing damage to the bark and wood at the base of the tree maintains a continuous ring of water and food transporting tissues.
- Reduce competition for available moisture with other plant materials such as turf, shrubs and groundcovers, where feasible, by removing plants and adding mulch. Maintain an adequate mulch layer of 2-3" throughout the year. Add extended mulch beds and rings under the drip line of the tree canopy to protect those fine "feeder" roots from drying out.



Lindsey Purcell
Purdue University
Urban Forestry Specialist

- Water trees whenever rainfall is insufficient for extended periods, especially on newly planted trees and those less established. A proven recommendation is to use the 5 + 5 rule, which says to provide 5 gallons of water *plus* 5 gallons for every diameter inch of tree trunk. This should provide plenty of water to help the tree during times of inadequate moisture.
- For mature and well-established trees, a good rule is to provide 1 inch of supplemental water every week or so to keep leaf moisture adequate. To determine the amount of irrigation, place a tuna can or similar catch device to measure the amount of irrigation provided to the root zone of the tree planting space. It is advisable to water plants though the fall until the ground is frozen, so that trees have adequate moisture to survive the winter months and are ready for spring growth.
- Reduce or cease certain maintenance activities such as pruning and fertilization. Pruning green wood or live branches is not recommended in a severe drought because trees must expend energy to repair pruning cut wounds. It is not a good practice to fertilize any tree under stress conditions, especially drought. Trees expend additional energy to process the nitrogen, pulling water from the roots, which can worsen health conditions.
- Do not disrupt the soil or areas under the drip line or canopy of the tree in drought. This will reduce the capacity of the tree to uptake water due to root disturbance and damage.

“Trees and all forestlands are a major asset to our cities, towns and communities. They are working hard to provide aesthetic, functional and environmental benefits to improve the quality of life. Preservation and conservation of our urban forests are of critical importance to all of us as professionals and as a society.”

Plant a tree, cool the globe!