



Nursery News

December 2005 - Research & Development
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Drought So Bad... Trees Chase Dogs!

Did we get enough moisture this fall to make a difference?

The Great Lakes Region:

<http://www.drought.unl.edu/dm/monitor.html>

Drought should continue to affect portions of the Great Lakes region, Winter is typically drier than other seasons in these areas, so the chances for substantial drought improvement are small. http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html Northeast IL is still in extreme drought, and needs 9.33 in of precipitation to end the drought. Southeast WI is in moderate drought, and still needs 2.72in http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/palmer_drought/wpdcentr.txt

Total Precipitation numbers can be deceiving, the amount and frequency of irrigation during the growing season has greater affect on plant growth and health than total inches.

Drought effects on winter hardiness

If the drought continues and there is not enough snow in the winter, drought stress accumulates. Snow is important in mid winter for root insulation, and an important source of water in Spring.

Signs of Drought Damage

Stomata are the first responders at the scene of drought by closing. Recovery from stomatal closing is slow, it can take hours, days, or weeks (even if water becomes available). If water does not become available, plant growth and physiological processes are slowed.

Primary Effects

Visible symptoms of drought damage may not be seen for weeks, months or years after the drought.

Immediate effects are

- Wilting
- Chlorosis
- Browning
- Scorching
- defoliation

Long-term effects are

- smaller leaves
- premature leaf drop
- scorched leaves
- reduced growth
- dieback of branches
- chronic stress
- death of the plant

Secondary effects

Indirect effects of the drought are not as obvious, and will be seen in the next year or two following the drought.

As the drought becomes more severe

- limited energy production
- less defense mechanisms
- plant is vulnerable to insects/diseases

Drought related diseases include

- root rot
- Cankers
- wood rots
- Wilt
- diplodia tip blight
- Rhizosphaera needlecast
- Verticillium.

Drought related insects include

- wood boring insects

It may take 5-10 years for tree to be fully established, but most established trees are highly drought resistant and are rarely killed by one season of drought. The massive root system provides access to a large volume of soil, and some trees can store some water in bark-protected stems.



Several years of drought, however, can weaken an established tree, decreasing resistance to pests and disease. A weakened tree may decline over years before it is actually dead.

Importance of Root Systems in Drought Survival

90% of the root system is within the top 12-15" of soil. Root hairs at the edges of the root systems take up the majority of the water and are the first part affected by drought. Most of the root hairs are confined to the top 15" of soil at the drip-line and beyond, which is the first part to dry out in hot/dry conditions. Water uptake capacity is severely reduced if the root hairs become damaged. This is why new B&B transplants are more vulnerable to water stress, because a large amount of the dripline roots are lost from digging. Attention to watering detail can alleviate much water stress.

How do trees tolerate drought?

Trees, which can take 40-100 years to mature and woody shrubs, which take 5-10 years to mature, are a long-term investment and are not easily replaced. Thankfully, many woody species have developed ways to survive over those years and tolerate drought conditions.

Drought tolerance methods

- shed leaves to cut down on water loss (birch, tuliptree)
- develop a thick waxy coat on leaves to reduce transpiration (oak, beech)
- resins to protect them from drying out (needle evergreens).



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When to remove drought damaged plants

Most drought-damaged plants, even if completely defoliated by drought, will recover and return to normal if the water stress is relieved. If you can, wait until the following season before removing a plant to give it a chance to recover. If the stems are still pliable, there is a good chance it will produce healthy leaves the following season. If the stems are damaged, cut back to live stems near ground. Water carefully because a plant with no leaves uses much less water, over-watering can be detrimental.

Drought Tolerant Plants

Keep evaluating the site and try new plants if the original plants did not work. If maintenance is not in the budget, replace with low maintenance drought tolerant plants.

Plants that are native to the Midwest are naturally more tolerant of the summer extremes. Plants that are adaptable, have small, thick leaves, have silvery or hairy reflective surfaces, or have the ability to shed excess leaves are all drought tolerant.

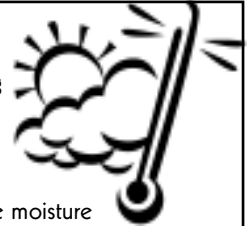
Prepare for Drought Conditions in Summer and Fall

The Midwest is prone to extended summer heat and drought, and lately recurring and prolonged drought seems to be more common. No need to panic!

Prioritize watering in drought conditions, trees should have higher priority than lawn, grass can go dormant and can be replaced easily, but it takes decades to replace a mature tree.

Summer Watering Tips

- o Provide 1-2" water every 2 weeks
- o Water slowly to get deep watering
- o Water in the early morning to avoid evaporation
- o Water the drip line not the leaves
- o Mulch to the drip-line to conserve moisture
- o Water loving trees (birch, alder, poplar, katsura, tuliptree, pin oak, silver maples) need at least 3" every week when temperatures are over 90°
- o Some shrubs (hydrangea) easily become wilted, need water every day or every other day in hot weather



Spring Tips

If water is still in short supply in Spring, supplemental water may be needed. Even when leaves are not out a plant needs water. Water for 1 hour once a week if needed. No fertilizer should be used at this time, water is the most important, and fertilizer can harm the plant. (September 2005 - A Word of Caution on Fertilizing Woody Plants)



Water is needed in the fall, especially in mild years as many plants are still active, especially evergreens, which do not go dormant but continue to transpire through fall and winter seasons. Also, trees planted in the current year need water because their roots are still in a limited area. (October 2004 - LET IT RAIN!...Please)

Drought /Transplanting Facts:

Plants have two kinds of responses to drought/transplanting stress. Drought avoiders have deep roots and handle water loss by adjusting leaf size and dropping leaves. Drought tolerators have shallower and usually more fibrous roots but have also evolved mechanisms to survive without water for a time by adjusting leaf stomata to maximize photosynthesis during stress. The native oaks are generally drought avoiders and don't close stomatal openings on the underside of the leaves when they experience drought conditions. They continue to transpire until they are completely desiccated and die. Transplanting creates a drought condition in trees that is best survived with as much root system as possible.

(March 2004 - OAKS-Getting At The Root Of The Problem)

Tips for Fall:

- o Apply a 2-4" layer of mulch to the drip line
- o Keep roots moist but not wet
- o Prune minimally until plants are dormant
- o Do not apply fertilizer- it can injure roots
- o Clean up diseased plants to prevent infections next year



'Long-term Drought Effects on Trees and Shrubs', UMass Extension
 'Watering Trees and Shrubs', U of I EXT