



# What Drought Means for Trees

by Ellen Crocker and Bill Fountain

It is no secret that the 2019 summer was hot and dry. In fact, most of the state experienced a severe drought with extreme drought in some areas (see Figure 1). From landscape settings to woodlands, trees show signs of water stress, and we may be seeing the repercussions of this drought for years to come. What does this mean for your trees? It depends on their location, species, and overall health.

## What are the signs of drought stress?

Different trees express water stress differently, but initial signs include reduced growth and wilting of leaves. Over time, leaves of some trees change color early (like red maple) while others may drop early (like yellow poplar)

or scorch brown from the tips in and die (like silver maple and deciduous magnolias) but are retained on the tree.

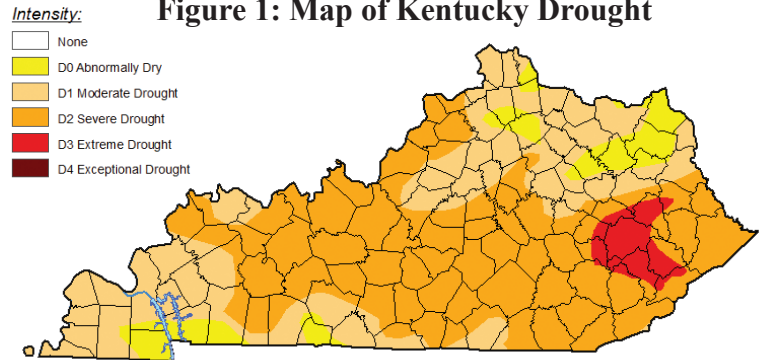
Drought symptoms tend to be most obvious and

severe in landscape settings but can have a big impact on forest trees as well. Trees that were recently transplanted and have not regenerated their root systems or are growing in poor, compacted soils are ill-equipped to deal with a shortage of water. However, trees in the landscape setting can (and should) be regularly watered in drought conditions, a luxury not available in woodlands.

## How does drought affect trees?

A severe drought is a major stress on trees in a variety of ways. First, since trees lose their leaves (and some of their roots) they produce fewer resources to sustain themselves. A tree's growth may be stunted for several years following a severe drought as trees replenish their stored energy

**Figure 1: Map of Kentucky Drought**



Map courtesy: Brian Fuchs, National Drought Mitigation Center, October 2019

reserves. It is possible that this year's drought is especially challenging for trees as it comes after two years of record rain, during which trees may have added additional growth that they now cannot support.

In severe droughts, species often go dormant as if it were winter. The problem comes when the drought ends in early fall and the plants begin growing as if it were spring. This new growth (e.g. flush of shoots or leaves) is not likely to become dormant before the first frost or freeze. When this happens, we immediately see shoot death. The following spring, vertical cracks may develop in the bark. While not visible, drought can also cause the death of root hairs responsible for uptake of water and nutrients. A smaller, less-vigorous root system can result in less growth the following year and a longer recovery time.

As soil dries it is common for it to crack. This cracking can physically snap

roots effectively pruning an already stressed root system. In soils that have an especially high amount of clay, this can result in trees that become unstable and lead to whole-tree failure. When the drought is eventually broken, initial rainfall will run into



Drought symptoms can vary by tree species and overall health of the tree. This American beech exhibited early leaf color change.



When the ground cracks because of drought, tree roots can break or be destroyed.

Photos courtesy: Ellen Crocker



these large cracks and be drained away from the plant's absorbing roots, continuing the effect of the drought.

Stress resulting from drought can also trigger decline in a tree and increase its susceptibility to insects and diseases. Many issues opportunistically affect trees that are otherwise compromised, from hypoxylon canker to two-lined chestnut borer to ambrosia beetles. This drought could set the stage for tree death years from now from secondary issues that would have been minor had the tree been growing vigorously and able to defend itself.

### ***Drought tolerance varies by species***

Our native trees are adapted to deal with occasional extreme weather conditions, and many are relatively drought tolerant, including many oaks. On the other hand, some species, such as yellow poplar, beech, and sycamore, are less tolerant of drought. This summer could mean future problems, especially if they are growing off-site in areas drier than they normally do. In general, upland and early-colonizing tree species are more drought tolerant while bottomland and late-successional species are less tolerant, although there are many exceptions.

### ***What does this drought mean for trees?***

It is hard to predict the impact this drought will have on our forests and woodlands. Many of our native trees are adapted to occasional droughts and are likely to bounce back with little damage. For others, severe water stress can be the beginning of a long decline (or the nail in the coffin if trees are already struggling). Supporting a diverse mixture of vigorously growing trees and management practices that promote healthy woodlands in general are likely to help trees recover from drought and other stressors.

## **Laurel Wilt Disease: A New Threat to Sassafras Trees**

by *Ellen Crocker*

Laurel wilt is a new disease that is killing sassafras trees in southwestern Kentucky. Here's what you should know about it:

### ***What's at risk?***

- In Kentucky, sassafras trees are the species most at risk from laurel wilt. However, it affects all members of the Lauraceae family including spicebush. Potential hosts do not include mountain laurel, which, despite its name, is not in this family.

### ***Symptoms***

- Sudden wilt of leaves
- Rapid tree death with dead red-brown leaves still attached
- Sapwood with dark, systemic, streaky staining when bark is cut away

Laurel wilt is caused by the invasive fungal pathogen *Raffaelea lauricola*, which colonizes sapwood and travels through the xylem. The disease clogs the flow of water in the tree's trunk, resulting in the "wilt" symptoms similar to those of a tree without enough water. This effectively strangles the tree and rapidly kills it. The laurel wilt fungus is moved by the invasive redbay ambrosia beetle, *Xyleborus glabratus*. These small insects (approximately 1/16-inch long) bore into trees or shrubs, leaving a very small circular hole in the bark, accompanied by a thin "toothpick" of sawdust. These beetles carry fungal spores with them that can spread to new trees as the beetles tunnel under the bark. Not all ambrosia beetle damage on sassafras is related to laurel wilt, and laurel wilt can still be present even if there are no visible signs of ambrosia beetle. No management options are currently available for laurel wilt. But you can help to slow its spread by not moving wood products, such as firewood, from infected trees.

As this disease is new to Kentucky, efforts are ongoing to determine the extent to which it is present in the state. If you suspect laurel wilt, please contact a local county Extension agent for further assistance.

### ***About the Authors:***

**Ellen V. Crocker, Ph.D.**, UK Department of Forestry and Natural Resources and Forest Health Research and Education Center. Her focus includes eastern forest health issues, education and outreach.

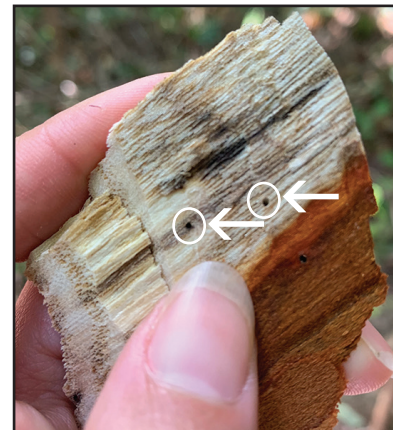
Cooperative Extension Service, Department of Forestry and Natural Resources, University of Kentucky, 216 Thomas Poe Cooper Building, Lexington, KY 40546-0073; Phone: 859.257.3040; Fax: 859.323.1031; E-mail: e.crocker@uky.edu

**Bill Fountain, Ph.D.**, Extension Specialist, University of Kentucky, Department of Horticulture. He is responsible for continuing education and instruction in the areas of arboriculture and landscape management.

Cooperative Extension Service, Department of Horticulture; University of Kentucky, N-318 Ag North, Lexington, KY 40546-0091; E-mail: Bill.Fountain@uky.edu; Phone: 859.257.3320; Fax: 859.257.2859.



*Cutting away the bark of infected sassafras trees reveals dark streaky staining caused by laurel wilt.*



*Redbay ambrosia beetles, which spread the laurel wilt pathogen from tree to tree, are tiny and leave very small exit holes in the bark of trees (arrows pointing to holes).*