

Drought and Flood on Trees

According to the Kansas Mesonet, our Silver Lake weather station has collected 10.51 inches of rain from April 1st-May 20th, 2019 with the Rossville station collecting 11.01 inches in that same timeframe. This period of rainfall is in direct contrast with the 33.21 inches Rossville collected and the 27.78 inches Silver Lake collected for the entire year of 2018! In this part of the state, we expect to see between 33.84-41.14 inches of rainfall every year. So what is this fluctuation in precipitation doing to our plants?

The winter of 2017 leading into the summer of 2018 was a period of extreme heat and drought for this region. We saw many homeowners struggle to keep annuals and newly planted trees and shrubs alive. Vegetables often failed to produce fruit and many plants defoliated early in the fall. Even established trees struggled to cope with the extreme heat and dry soils. Although the drought is clearly behind us, we should expect to see the stress appear in our landscapes, especially trees.

A tree that experiences extreme drought copes by trying to conserve energy. Pulling water and nutrients from leaves and small branches, the tree will allow portions of the canopy to die or enter dormancy prematurely in order to save vital parts, like the trunk. This becomes visible in the landscape through dead branches, leaves falling in the summer and early fall color. Most of these symptoms have already presented themselves between last fall and this spring.

The next step for a stressed tree, and other flowering plants, is to set as many buds as possible. The tree is preparing to die but is determined to first create offspring. A severely stressed tree will produce an abundance of buds for the following year's bloom. This is the reason we had such a beautiful, flower filled spring—all the plants thought they were going to die. Luckily for us, this doesn't mean the plant or tree *will* actually die.

This phenomenon has been especially apparent in elms and maples whose top canopies may not have leafed out until after their fruit dropped. The tree spent so much energy setting fruit (like helicopters) that it didn't have energy to fully leaf out until after the fruit developed.

These stressed trees need additional water to fully recover. Before you run outside with the hose, remember that too much water can be just as bad as drought. As we consider what drought stressed trees look like should we also be on the lookout for flood damaged trees?

Tree and plant roots need water to survive but they also need oxygen, which flooded soils lack. For most trees, flood water that recedes within 7 days will allow the tree to recover. If the water is flowing rather than standing still, that is more favorable for tree recovery.

The type of tree you have will impact its ability to withstand flooding. The US Forest Service compiled the below list for tree's flooding tolerance:

Trees Tolerant of Flooding: These trees can survive one growing season under flooded conditions. Red maple, silver maple, pecan, hackberry, persimmon, white ash, green ash, sweetgum, sycamore, eastern cottonwood, pin oak and bald cypress.

Trees Moderately Tolerant of Flooding: These trees can survive 30 consecutive days under flooded conditions. River birch, downy hawthorn, honeylocust, swamp white oak, southern red oak, bur oak, willow oak and American elm.

Trees Sensitive to Flooding: These trees are unable to survive more than a few days of flooding during the growing season. Redbud, flowering dogwood, black walnut, red mulberry, most pines, white oak, blackjack oak, red oak and black oak.

A flood damaged tree will exhibit many of the same signs of a drought stressed tree. Leaf drop, iron chlorosis (yellowing in between leaf veins), leaf curl, branch dieback and sometimes death. The reason trees react the same is because their responses are to the extreme root damage these environmental issues cause. Both floods and droughts kill tree roots, depriving the tree of water and nutrients.

If flooding has deposited sediment over your tree roots, remove this excess soil as soon as possible to better allow oxygen to reach the roots. The second treatment for flood damaged trees is the same as for drought stress—watering. A damaged root system, from flood or drought, struggles to take up water and nutrients from the soil. Using a screwdriver, attempt to penetrate the soil underneath your tree. If you find it is difficult to push the screwdriver into the soil, it's time to water. Water the tree slowly with drip irrigation or a hose on a very slow trickle under the canopy. A well-watered tree should have soil moisture at a depth of 1 foot. Using a dowel or other similar object again try to penetrate the soil to see if moisture has reached this depth.

Other methods that help trees recover include mulching, pruning dead branches and avoiding damaging tree bark or roots through mowing or other activities. When you mulch, remember to avoid piling the mulch up like a volcano against the trees bark, this too can restrict oxygen and can cause bark damage. Instead, mulch in the shape of a doughnut around the tree at a depth of 2-3 inches. Stressed trees are also more susceptible to diseases and insects, so regularly scout for these issues.