The Effects of Excessive Rainfall on Trees

The summers of 2011 and 2012 were very dry years, but during the summer of 2013, the Upstate of South Carolina received 2-½ times the normal amount of rainfall. The rainfall kept the soil continually wet, and the fine pores of the red clay soils filled with water and excluded the necessary soil air for normal root growth and functioning. The results of the continuously wet conditions are now being seen, with many shallow-rooted trees exhibiting premature leaf-yellowing and drop. Dogwoods and redbuds on poorly drained sites began early discoloration of foliage during August. However, now the rains have subsided, and the soil has dried. Tulip poplar foliage is quickly yellowing and dropping due to the dry soil conditions that followed the excessive summer rainfall. The loss of roots due to suffocation now does not allow for adequate water uptake during this dry September weather. Without sufficient root uptake of water, the pigments within the foliage begin to degrade and the leaves drop.

In addition to drought or excessive soil moisture, many other factors can affect the health of trees, such as high temperatures, insect pests, root rots, foliar diseases, trunk damage and soil disturbance. Trees, though, are quite resilient, and may tolerate the loss of some roots or foliage due to weather conditions, insects or fungi by growing additional roots and foliage. They may suffer trunk damage by mowers or weed-eaters, or root damage by trenching, but if these are not too severe, trees may heal their wounds. Trees may also tolerate minor damage caused by broadleaf weed herbicides used on lawns nearby, such as from weed and feed products. However, when stress factors combine or continue over a 2- to 3-year period, such as years of severe drought followed by a year of excessive rainfall, one may begin to see a decline in landscape tree health.

Additionally, the cloudy and rainy weather reduced photosynthesis in plants this summer, as the amount of sunlight was drastically reduced. The rainy weather predisposes foliage to become diseased if the spores of fungal pathogens blow onto the leaves. Diseased leaves have less healthy leaf surface area to manufacture the carbohydrates required for optimal tree growth and health. Stored reserves of carbohydrates begin to dwindle when used for repair and regrowth of roots that suffocated in wet soil and leaves that became diseased. Examples of summer rain affected foliage are seen on ornamental cherries and American sweetgum, which have experienced leaf spotting and leaf drop due to Cercospora leaf spot or other fungal leaf diseases. An important point is that losing leaves late in the season is not as significant as a leaf drop earlier in the year. The trees kept their leaves almost the whole summer growing season, and normal autumn leaf drop will occur soon.
Late-season Cercospora leaf spot on American sweetgum (*Liquidamber styraciflua*) due to frequent summer rainfall. Joey Williamson, ©2013 HGIC, Clemson Extension

Fortunately, there are several things that South Carolina homeowners may do to relieve as many stressful factors as possible, and help landscape trees recover:

- try to improve the drainage in the area of tree roots,
- do not broadcast broadleaf weed herbicides in their vicinity,
- water the trees weekly during periods of drought,
- apply mulch beneath the trees to as far out as the branch drip-line,
- fertilize beneath the trees with a slow-release tree & shrub fertilizer during the spring, and
- rake up and dispose of prematurely fallen leaves to reduce the chance of foliar disease the following year.

Trees are a valuable asset to the home landscape. To learn more about how to properly care for landscape trees, please see the various helpful fact sheets at: [http://www.clemson.edu/extension/hgic/plants/landscape/trees/](http://www.clemson.edu/extension/hgic/plants/landscape/trees/). For more information about environmental and cultural factors that may cause stress to landscape trees, please see HGIC 1030, *Landscape Tree Decline*.

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