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	University of Kentucky College of Agriculture, Food and Environment Cooperative Extension Service
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Perk Test Determines How Well Soil Drains

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Fall is the best time to plant many trees and shrubs. Before planting, determine how well the soil drains. According to Dr. Willian Fountain, University of Kentucky Extension Professor Emeritus of Arboriculture and Landscape, eighty to ninety percent of disease and insect problems on landscape plants can be attributed to stressed plants due to soil conditions.

Too little or too much water is a common reason installed plants fail to establish and thrive. The proper amount of water is far more critical for growth than even fertilizer. Often, plants die from too much water due to poor soil drainage.

Soil saturated with water from too much rain, applying too much water, or poor drainage contains very little oxygen. Without oxygen, the leaves wilt because plants cannot absorb the water even when it is abundant. The appearance of drought symptoms increases the temptation to add more water, which compounds the problem of saturated soil. Soil with minimal oxygen

MESSENGER-INQUIRER

allows plant pathogens to grow, often killing roots, making it even more difficult for plants to absorb water.

The color of the soil indicates poorly drained or compacted soils. Well-drained soils may be brown or reddish. Blue-gray soils have very little oxygen. The soil's naturally occurring iron has not had sufficient oxygen for it to turn a red color. Blue-gray and white soils are almost always very poorly drained. Plants preferring well-drained soils should never be installed in these soils. Species adapted to wet and flooded sites are more likely to survive.

Conducting a perk test is the best way to see how well the soil drains. This simple test works even on the side of a hill or slope. It takes relatively little time and the effort is a small investment that can beautify landscapes for many decades.

To conduct a perk test, dig a hole in the soil with a shovel or posthole digger. The diameter can be relatively small, three inches or larger, and should go down at least 12 inches; 18 inches is better. If a plant has already been chosen, the planting hole can be used for the test. The best depth is to measure the height of the plant's soil ball. Avoid digging when the soil is wet as the sides of the hole can be glazed. If the soil is glazed, water will not drain, and will give false results.

Next, fill the hole with water, and allow it to drain. Then, refill the hole with water and measure the amount of time it takes to drain. Ideally, the water should drain at the rate of about 2 inches per hour. Anything between 1 and 3 inches per hour is acceptable. Anything significantly less than 1 inch per hour indicates the site is poorly drained, and you will need to improve the

MESSENGER-INQUIRER

drainage or select plants that grow on waterlogged sites. It is not unusual for planting holes in the same landscape to drain at significantly different rates.

Do not add sand to heavy soils to deal with a poorly drained site. Contrary to logic, adding sand to heavy soils slows the drainage. Furthermore, do not add large amounts of organic matter to poorly drained soils. When organic matter breaks down in excessively wet soils under low oxygen levels, toxic gases and other byproducts of decomposition become toxic to roots. Finally, amending the backfill in planting holes often makes it more difficult for water to drain. It is best to put the soil taken out of the hole back into the planting hole without adding anything to the soil.

Poorly drained sites can be located on a slope. If there is a poorly drained site on the side of a hill, dig a trench from the bottom of the planting hole toward a lower site. Lay a small plastic pipe in the bottom of the hole that will drain excess water downhill until it comes to the surface. One inch drop for every 5 feet of run is usually sufficient for water to drain. Cover the end of the pipe with a piece of window screen and a handful of rock to improve movement of water from the soil into the pipe. Also, redirecting water from uphill areas and the downspouts on a house reduce the amount of water in the plant's root zone.

Selecting trees for poorly drained sites is the best way to increase the likelihood of the plant surviving. These include: bald cypress (*Taxodium distichum*), black gum (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), sweetbay magnolia (*Magnolia virginiana*), swamp white oak (*Quercus bicolor*), and American holly (*Ilex opaca*). Shrubs for these sites include: summersweet (*Clethra alnifolia*), common witch hazel (*Hammamelis virginiana*),

MESSENGER-INQUIRER

winter berry holly (*Ilex verticillata*), spicebush (*Lindera benzoin*), Virginia sweetspire (*Itea virginica*), and viburnum species (*Viburnum* spp.). A list of more trees and shrubs is available at the Daviess County Cooperative Extension Service in the publication “Soil Percolation: A Key to Survival of Landscape Plants” and on the web at

<http://www2.ca.uky.edu/agcomm/pubs/ID/ID237/ID237.pdf>.

For more information about a perk test, contact the Daviess County Cooperative Extension Service at 270-685-8480 or annette.heisdorffer@uky.edu.

Annette’s Tip:

An option to handle water runoff is to install a rain garden. Rain gardens are sunken areas designed to collect water, allowing more time for it to soak into the soil. Plants in rain gardens must be able to tolerate wet and dry conditions.

Farmers’ Market Update

From August 1 through October 31, the Market will be open from 8:00 a.m. to noon on Tuesdays, Thursdays, and Saturdays.

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