

MESSENGER-INQUIRER



October 1, 2022

Percolation Test Checks Soil Drainage

Trees and shrubs become noticeable when the leaves change to beautiful colors in the fall. They are also noticeable when they are under stress and show browning leaves during the growing season. 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 issues with the soil. Too little or too much water in the soil is a common reason why installed plants fail to become established and thrive. The proper amount of water is far more critical for growth than fertilizer. Often, plants die from too much water due to poor soil drainage.

Soil saturated with water from too much rain or poor drainage contains very little oxygen. Without oxygen, plants cannot absorb water even though it is abundant, resulting in wilted leaves. The appearance of drought symptoms increases the temptation to add more water, which compounds the problem of saturated soils. Soil with minimal oxygen allows plant pathogens to grow, which kill roots, making it even more difficult for plants to absorb water.

Visual and physical indicators can be valuable clues to how well a soil drains. The best source of information is to test the soil's ability to drain before purchasing plants. This simple

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test takes relatively little time and is a small investment for plants that can beautify landscapes for many decades. Testing the percolation rate (perk test) is the best indicator of how well the soil drains, even on the side of a hill or slope.

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. It is best if the test hole is as deep as the soil ball of the plant that you want to place in that location. Also, the planting hole can be used for the test. 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 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.

To deal with a poorly drained site, do not add sand to heavy soils. Contrary to what logic would indicate, 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 are 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.

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If a poorly drained site is located on a slope, 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.

The color of soil provides an indication of poorly drained or compacted soils. Well-drained soils are 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.

Trees for poorly drained sites 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*), 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, contact the Daviess County Cooperative Extension Service at 270-

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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.

Upcoming Event:

“Maintaining Your Young Trees,” is an in person and virtual presentation through the Daviess County Public Library, scheduled for Tuesday, October 6 at 6:00 p.m.

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