Testing Soil pH

Overview

Successful gardeners seeking to optimize the results of growing plants know the importance of soil pH, which is as crucial as location, exposure, and soil preparation. Soil pH is the measurement of the degree of acidity (sourness) or alkalinity (sweetness) of soil. It is measured on a scale of 0 to 14, with lower numbers more acidic and higher numbers more alkaline. The value of 7.0 is neutral—i.e., neither acidic nor alkaline**.**

When pH levels are too high or too low, minerals are bound to soil particles and thus, unavailable to the plant. In this situation, adding more fertilizer won't do any good. Both the quantities of minerals present in native soil and annual rainfall affect soil pH. In Western Oregon, rain tends to leach out minerals and results in soils that become more acidic. In Eastern Oregon soils are more alkaline.

In general, most plants grow best in a neutral soil pH, although there are important exceptions. For example, blueberries, azaleas and rhododendrons do well in soil pH between 4.5 and 5.5. Lawns favor a pH of 5.5 to 6, while roses do best in soils with a pH or 6.5 to 7.

Types of Soil Test

There are two primary types of soil test: One measures soil minerals and the other measures soil pH. A test for minerals measures the soil nutrients that are available to the plant. This test needs to be done in a professional lab.

Soil pH can be checked at home using a simple kit. In addition, Clackamas County Master Gardeners conduct free soil pH testing several times a year. Master Gardeners use sophisticated equipment which generates more accurate results. Check www.clackamascountymastergardeners.org or ask a Master Gardener for dates of these free pH testing events.

How to Take a Soil Sample

Take care in following these steps so that the sample you test truly represents the entire area.

1. Determine the number of samples based on topography and crop/plants grown; each area should have its own sample. For example, if you have a hillside and a low, wet area, take separate samples from each. If you have a vegetable garden, lawn and a perennial bed, take separate samples from each.
2. Once you determine the number of areas from which to take soil samples, prepare the same number of clean containers (plastic or glass jar or plastic bag). Ideal capacity for the container is about 1 cup, although larger ones are acceptable.
3. Each sample should contain between ½ and ¾ cup of soil. The sample should be a mixture of several, smaller sub-samples from the area you wish to test.
4. Use clean sampling tools that are not galvanized, bronze, or brass. Be sure your hands and gloves are clean. A small amount of fertilizer on the tools, on your hands or gloves can seriously affect test results.
5. Take samples at the correct depth -- the root zone of the plants in that area. For vegetable gardens, samples should be taken between the surface and 8" deep.
6. Be sure to label each sample with your name and the location in your garden, e.g., rose bed, west lawn, vegetable garden, etc.

7. Avoid taking samples from unusual areas such as compost or manure piles, or burned areas, because they do not represent the soil in your garden.

Test Results and Remedies

Each sample will yield a pH reading. Low numbers indicate acid soil, and higher numbers, alkaline soil. When Master Gardeners conduct the test, they also help interpret the results and give you information on any remedy. It is best to adjust soil pH over several years. Add the appropriate amendment in the fall, check the soil pH again in 3 to 6 months. Repeat as needed.

To raise soil pH, add lime. Doing so in the fall produces optimal results. Use 5 to 10 lb lime per 100 square feet if mixing into the soil before planting. For established lawns or plants, add 5 lb per 100 square feet. Retest soil pH in 3 to 6 months to see whether you've achieved the target pH.

There are various forms of lime—powdered, granular, or pelletized. Granular or pelletized lime is easier to spread. If using powdered form, wear a mask. Dolomite lime contains magnesium and makes a good choice for gardeners in Western Oregon where soils are often deficient in magnesium.

Soil pH greater than 7.0 is uncommon west of the Cascades, so gardeners in this area typically acidify their soil for growing acid-loving plants. Soils on the east side of the Cascades are alkaline, and need to be acidified for all crops.

To lower soil pH, add elemental sulfur. Like lime, sulfur is best added in the fall. It is more effective to add it to an area before planting. For established trees and shrubs, add a small amount to the soil along the drip line, or broadcast in a band along a row of blueberries. For more information about lowering soil pH, see EC 1560-E. There is no test to determine sulfur amendment amounts. A soil pH test in 3 to 6 months will let you know if more is needed.

OSU Extension Service resources

Visit your OSU Extension Service office at 200 Warner-Milne Road, Oregon City, for these publications, or get them online at http://extension.oregonstate.edu/catalog/html/ec
Sustainable Gardening Handbook EM 8742
Soil Test Interpretation Guide EC 1478
A List of Analytical Labs Serving Oregon EM 1550
Soil Sampling for Home Gardens and Small Acreages EC 628
Acidifying Soil for Blueberries and Ornamental Plants in the Yard and Garden, EC 1560-E

For Master Gardener™ advice

- Call Home Horticulture Helpline: 503-655-8631 (Clackamas Co), 503-725-2300 (Washington Co), 503-445-4608 (Multnomah County)
- Visit Clackamas Chapter Master Gardeners website www.clackamascountymastergardeners.org for 10-Minute University™ handouts
- Look for Master Gardeners at area Farmer's Market