Slug: Ask the Master Gardener
Date: Apr. 1, 2007
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Soil pH is the measure of hydrogen-ion concentration in the soil or "power of hydrogen". Soils with a low concentration are acidic. The soil alkalinity or acidity is measured on a scale of 1-14, with 7 being neutral. Any pH level below 7 means the soil is acidic, while any level above 7 indicates the soil is alkaline. A change in one pH unit represents a tenfold increase or decrease in acidity or alkalinity. For instance, a change from a pH level of 7 to 6 means that the soil has become ten times more acid than it was at 7. In turn, soil registering a pH level of 5 would be very acid, with 100 times the hydrogen-ion concentration than that of pH level 7.

What is the importance of pH levels in the soil with reference to plant health? Soil alkalinity or acidity determines the availability of, rather than the abundance of, plant nutrients necessary for healthy growth. For example take phosphorous, a necessary plant nutrient. It is most available to plants at a pH level of 6.5. It is less soluble and less available at lower and higher pH levels. If soil pH level is 5, most plants will not be able to efficiently use phosphorous naturally present in the soil or phosphorus fertilizer added. Other nutrients are affected in a similar way, though the pH range for availability may differ somewhat. Most plants prefer a pH range of 6 to 7.5, though some will tolerate lower or higher levels.

Many processes that occur in soils are controlled by microorganisms that are also affected by soil pH levels. There are three basic types of soil microorganisms involved: algae and fungi, which like a little acidity, and bacteria, which tend to like a bit of alkalinity. An example of how important these microbes are is nitrification. This is the process where ammonia is converted into nitrite, and nitrite is converted to nitrate, the form of nitrogen a plant can readily use. This process is controlled by a specific group of bacteria that lose the ability to function normally when the pH level reaches 6 or 5.5. When the soil acidity level stops the nitrification process, a nitrogen deficiency will surely result.

Most western Washington soils are acid, registering between a pH level of 5 to 6.5. Vegetation and climate are the major factors causing this acidity, along with the use of fertilizers. The pH levels in our area often need to be raised.

To raise the pH level of a soil, use lime to neutralize soil acidity. "Lime" is ground limestone (calcium carbamate) or a derivative of limestone (calcium oxide or calcium hydroxide). Lime adds calcium to the soil as well as neutralizing acidity. If a soil is found to be deficient in magnesium, as many western Washington soils are, use dolomite lime instead.

To lower the pH, or acidify soil for acid-loving plants like blueberries and rhododendrons, sulfur may be added.

Often, the aspect of soil pH in garden soil management is overlooked, but it is very important when evaluating nutrient availability, soil fertility, and efficiency of fertilizer applications.

This column is written by Washington State University/Skagit County certified Master Gardeners. Questions may be submitted to WSU/Skagit County Extension, 306 S. First Street, Mount Vernon, WA 98273-3805.