

LANDSCAPE PLANNING

Practical Techniques for the Home Gardener

The online companion to the book

ARTICLE

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The matter of soil pH—the measurement of soil alkalinity and acidity—bedevils gardeners.

Garden Science:

Soil pH

Mysteries abound in gardening. The matter of soil pH—the measurement of soil alkalinity and acidity—bedevils gardeners. Which is the best to have? How does pH affect plant growth and how can it be changed or influenced?

Let's start with an understanding of what determines the alkaline or acidic character of soil. Dig a hole deep enough and you'll strike bedrock—the most influential factor in making soil alkaline or acidic. If acidic rock, such as granite, is under your soil, frost action will distribute tiny particles of rock minerals through the soil and turn the pH toward acidity. In contrast, an alkaline rock, such as limestone, will push soil pH toward alkalinity.

Just about anything can be measured on the pH scale, which runs from 1 to 14, with the middle point of 7.0 being neutral. Ratings below 7.0 are acidic, while ratings above 7.0 are alkaline. As an example, pH ratings for some familiar products and elements are: fresh milk 6.7, cola drinks 3.0, white vinegar 2.6, soy sauce 5.0, rain water 6.0, ammonia 10.46. The term pH means “parts hydrogen,” and refers to the concentration of positively charged hydrogen ions in a soil sample. Hydrogen ions are electrically charged atoms that determine soil fertility and are most abundant in soil with slightly acid 6.5 to neutral 7.0 ratings.

Most plants grow best in soil that is close to neutral or just slightly acidic at pH 6.5. When soil pH is below 5.0 (very acidic) or above 8.0 (very alkaline), the availability of nutrients is affected, and plants grow poorly. Calcium, magnesium and potassium are insoluble in soil below pH 5.0 and can't be absorbed by plant roots. Phosphorus is similarly insoluble in soil above 8.0.

Soil-testing services can accurately measure pH from a small sample, and will give directions on how they would like the sample to be taken. Home testing kits and inexpensive meters can determine if a soil is acid or alkaline, but won't give an accurate pH reading. If soil is acidic, its pH can be temporarily raised toward neutral with the addition of dolomite lime. If soil is alkaline, adding sulfur will temporarily lower pH by one unit. But the natural pH character of your soil is likely to return to normal within six months.

Another way to cope with low or high pH levels is to grow plants with a preference for acidity or alkalinity. For example, rhododendrons, yews, cardinal flower (*Lobelia cardinalis*) and blueberries are tolerant of acidic soil. Honey locust tree, euonymus, phlox and iris are tolerant of alkaline soil. However, adding generous amounts of organic material to low or high pH soils will effectively buffer extreme pH conditions and help all plants to grow better.

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