

SOIL pH

Soil pH is the measure of the acidity or alkalinity of a soil. A pH of 7.0 reflects a balance of acidity and alkalinity and is referred to as *neutral*. A pH value below 7.0 is *acidic*; a pH value above 7.0 is *alkaline*. The following table shows soil pH values from extremely acidic to strongly alkaline:

← INCREASING ACIDITY					INCREASING ALKALITY →			
EXTREME	VERY STRONG	STRONG	MODERATE	SLIGHT	NEUTRAL	MILD	MODERATE	STRONG
3.5-4.4	4.5-5.0	5.1-5.5	5.6-6.0	6.1-6.5	6.6-7.3	7.4-7.8	7.9-8.4	8.5-9.0

The pH of a soil depends on its mineral content and the amount of rainfall the soil receives. Soils in rainy areas tend to be acidic, whereas soils in arid areas tend to be alkaline. Most Inland Northwest soils range from slightly acidic to slightly alkaline.

Correcting Acidic & Alkaline Soils

To make alkaline soils more acidic (lower soil pH 0.5 - 1 unit):

Per 100 square feet of soil, add:

1/2 lb. finely ground sulfur, 3 lbs. iron sulfate, or 3 lbs. aluminum sulfate

(In heavier soils: increase the rate by 1/3)

- **Sulfur** acts slowly, but is effective for years.
- **Iron sulfate** is quick acting and adds iron to the soil.
- **Aluminum sulfate** is quick acting, but aluminum may build up in the soil causing toxicity to some plants.
- NOTE: Pine needles DO NOT make soils more acidic.

To make acid soils more alkaline: our native soils range from pH 6.5 to pH 7.5 and would rarely need this type of adjustment. Please do not attempt to make your soil more alkaline unless a soil test indicates the need.

The significance of pH

Soil pH affects the availability of plant nutrients. For plant roots to take up nutrients, the nutrients must be in solution, and pH affects the solubility of these nutrients. For example, iron is not very soluble at high pH, and plants can experience iron deficiency and thus turn chlorotic (yellow) in high pH soils even if abundant iron is present. High pH levels may also make manganese, copper, zinc, phosphorus and boron poorly available to plants. In soils with pH values below 5.5, calcium and magnesium may be inadequately available to plants.

Soil pH also affects the microorganisms in the soil. The activity of many soil microorganisms is important to the nutrition of plants. Those organisms which contribute to the availability of nitrogen, sulfur, and phosphorus function best in a pH range of 6.6-7.3.

Shrubs:

Almond, Flowering (<i>Prunus glandulosa</i>).....	6.0-7.0
Azalea (<i>Rhododendron</i> spp.).....	4.5-6.0
Barberry (<i>Berberis</i> spp.).....	6.9-7.5
Deutzia (<i>Deutzia</i> spp.).....	6.0-7.5
Euonymus (<i>Euonymus</i> spp.).....	6.5-7.0
Firethorn (<i>Pyracantha</i> spp.).....	6.0-7.0
Hibiscus (<i>Hibiscus</i> spp.).....	6.0-8.0
Hydrangea Blue (<i>H. macrophylla</i>).....	4.5-5.0
Hydrangea, Pink (<i>H. macrophylla</i>).....	6.0-7.0
Hydrangea, Oakleaf (<i>H. quercifolia</i>).....	5.1-7.5
Lilac (<i>Syringa</i> spp.).....	6.0-7.5
Mock Orange (<i>Philadelphus</i> spp.).....	6.0-8.0
Quince (<i>Chaenomeles speciosa</i>).....	6.0-7.0
Rose (<i>Rosa</i> spp.).....	5.5-7.0
Spirea (<i>Spiraea</i> spp.).....	6.0-7.0
Viburnum (<i>Viburnum</i> spp.).....	6.5-7.5
Weigela (<i>Weigela</i> spp.).....	6.0-7.0

Trees:

Apple (<i>Malus</i>).....	5.0-6.5
Arborvitae (<i>Thuja</i> spp.).....	6.8-7.2
Birch, River (<i>Betula nigra</i>).....	4.5-6.0
Cherry (<i>Prunus</i>).....	6.5-7.0
Crabapple (<i>Malus</i>).....	5.0-6.5
Dogwood, Flowering (<i>Cornus florida</i>).....	5.0-7.0
Maple (<i>Acer</i> spp.).....	6.0-7.5
Oak, Red (<i>Quercus falcata</i>).....	5.0-7.5
Peach (<i>Prunus persica</i>).....	6.5-7.0
Pear (<i>Pyrus</i>).....	5.0-6.5
Pine (<i>Pinus</i> spp.).....	5.0-6.0
Plum (<i>Prunus</i>).....	6.5-7.0
Redbud, Eastern (<i>Cercis canadensis</i>).....	5.5-6.5
Weeping Willow (<i>Salix x sepulcralis</i>).....	5.0-6.0

Common Garden Flowers:

Begonia (<i>Begonia</i>).....	5.5-7.5
Candytuft (<i>Iberis</i>).....	6.5-7.0
Canna Lilies (<i>Canna x generalis</i>).....	6.0-7.0
Chrysanthemum (<i>Chrysanthemum</i>).....	6.0-8.0
Cosmos (<i>Cosmos</i>).....	6.5-7.0
Daffodil (<i>Narcissus</i>).....	6.0-7.5
Dahlia (<i>Dahlia</i>).....	6.5-7.0
Daylily (<i>Hemerocallis</i>).....	6.5-7.0
Foxglove (<i>Digitalis</i>).....	6.5-7.0
Geranium (<i>Geranium</i>).....	6.0-8.0
Hollyhock (<i>Alcea rosea</i>).....	6.0-8.0
Hosta (<i>Hosta</i>).....	6.5-7.5
Iris, Bearded (<i>Iris cristata</i>).....	6.5-7.0
Lenten Rose (<i>Helleborus</i>).....	7.0-8.0
Lupine (<i>Lupinus</i>).....	6.5-7.0

Common Garden Flowers (cont):

Marigold (<i>Tagetes</i>).....	6.0-7.5
Nasturtium (<i>Tropaeolum</i>).....	6.5-7.0
Pansy (<i>Viola</i>).....	5.0-6.0
Periwinkle (<i>Vinca</i>).....	6.5-7.0
Phlox (<i>Phlox</i>).....	5.0-6.0
Poppy (<i>Papaver</i>).....	6.5-7.0
Rudbeckia (<i>Rudbeckia</i>).....	5.7-7.0
Shasta Daisy (<i>Leucanthemum maximum</i>).....	6.0-8.0
Snapdragon (<i>Antirrhinum majus</i>).....	6.0-7.5
Sweet Alyssum (<i>Lobularia maritima</i>).....	6.5-7.0
Sweet Pea (<i>Lathyrus latifolius</i>).....	6.5-7.0
Sweet William (<i>Dianthus barbatus</i>).....	6.1-7.5
Tulip (<i>Tulipa</i>).....	6.0-7.0
Verbena (<i>Verbena</i>).....	6.0-8.0
Zinnia (<i>Zinnia</i>).....	5.8-6.0

Vegetables and Berries:

Asparagus.....	6.0-8.0
Beans.....	6.0-7.5
Beets.....	6.0-7.5
Blueberries.....	4.0-5.5
Blackberries.....	5.5-7.0
Broccoli.....	6.0-7.0
Cabbage.....	6.0-7.5
Cantaloupe.....	6.0-7.5
Carrots.....	5.5-7.0
Corn.....	5.5-7.5
Cucumbers.....	5.5-7.0
Garlic.....	5.5-8.0
Grapes.....	5.5-7.0
Horseradish.....	6.0-7.0
Kale.....	6.0-7.5
Kohlrabi.....	6.0-7.5
Leek.....	6.0-8.0
Lettuce.....	6.0-7.0
Onions.....	6.0-7.0
Peas.....	6.0-7.5
Peppers.....	5.5-7.0
Potatoes.....	4.8-6.5
Pumpkins.....	5.5-7.5
Radishes.....	6.0-7.0
Raspberries, Red.....	5.5-7.0
Rhubarb.....	5.5-7.0
Spinach.....	6.0-7.5
Squash.....	6.0-7.5
Strawberries.....	5.0-6.5
Swiss Chard.....	6.0-7.5
Tomatoes.....	5.5-7.5
Turnips.....	5.5-6