

What A Gardener Should Know About Soil Acidity

By Myron S. Anderson¹

SOIL ACIDITY is developed mostly by the action of water on soil-forming minerals of silicate forms such as feldspars, micas and others. Bases, particularly calcium, magnesium and sodium are replaced by the hydrogen of water. The process is hastened by the decomposition of organic matter that grows on and near the soil surface.

Acid soils are developed only where the rainfall is relatively high, perhaps at least 25 inches annually. This means that acid soils may be formed from the Atlantic coast to the eastern part of Nebraska. Then again there are areas near the Pacific Coast where rainfall is adequate for acid soil formation.

Soil acidity and the need of lime application are closely related terms. Soil acidity is often designated by the term pH to indicate the degree of acidity or alkalinity that may prevail when the soil is mixed with water. The values normally found in soil range from about a pH of 4.0 in very acid soil to about 8.5 in soils with a considerable content of lime carbonate. Neutrality is pH 7.0. One should keep in mind that the pH values become smaller as the acid becomes stronger.

The following table shows the interpretations often given to soil pH readings.

Soil pH	Degree of Acidity or Alkalinity
8.5	Strongly calcareous (Alkalinity)
7.5	Moderately alkaline
7.0	Neutral
6.5	Very slightly acid
6.0	Slightly acid
5.0	Strongly acid
4.0	Very strongly acid

Much of the apparent acidic value is derived from surface action of clay and organic matter. It does not change greatly by moderate dilution with water. Many farmers know something of what pH means with respect to need for lime additions. It is very important also that the gardener know the practical importance of the term.

The gardener's knowledge of pH aids him in the selection of plants that grow well at the acidity present in his particular garden plot. The following table indicates a few plants that grow well at each of the pH values indicated:

Very acid (4.5-5.0): azaleas, rhododendrons, potatoes, cranberries, watermelons.

Moderately acid (5.0-5.5): buckwheat, corn, grapes, cucumbers, strawberries.

Nearly neutral (6.5-7.0): cabbage, eggplants, red clover, turnips, muskmelons.

Slightly alkaline, calcareous (7.0-8.0): alfalfa, asparagus, beet, celery, parsnip.

Major adjustments of pH are possible but not always practical, but small changes may be both practical and beneficial for the gardener. It sometimes happens that a lawn or garden on an adjoining lot at a higher level may be heavily limed. The surface drainage to the lower level lot may interfere with the growing of azaleas or other acid-loving plants. The situation may be corrected, however, if the gardener treats the lower lot with powdered sulfur applied at the rate of about one ounce per square foot of soil mixed to a depth of 3 or 4 inches. Bacterial action quickly oxidizes the sulfur to form sulfuric acid, a situation favorable for plants requiring an acid soil. A similar situation sometimes arises in the vicinity of a new

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building. Waste lime or cement, frequently discarded, serves to make the soil too alkaline for suitable growth of certain plants.

Plants needing a near-neutral soil will grow well with moderate applications of limestone. Such soils, however, frequently tend to revert rather rapidly toward a more acid condition than when freshly limed.

Far reaching changes often take place when very acid soils are limed. Results are more pronounced when hydrated lime is used than when ground limestone is the material added. High acidity (low pH) brings into the soil water relatively high concentrations of iron and aluminum. Soluble aluminum compounds are frequently toxic to plants. Limestone applications tend to lower the content of soluble aluminum.

Solubility of phosphates tends to be highest near neutrality and therefore most usable for plants. When lime is added there is a danger that certain of the minor elements may be changed to a form plants can not use. Some of these necessary minerals are copper, zinc and manganese. The danger may appear when the pH of the soil is near neutrality but increases as alkalinity becomes pronounced. As a rule ground limestone for soil application would contain from 5 to 10 percent of magnesium carbonate.

A gardener takes pride in the excellence of the plants he grows. He does best when he has a proper relationship between soil acidity and the requirements of his particular plants. This is a short story of soil acidity, the selection of suitable plants for the soil available and the making of soil pH adjustments when it is desirable to do so.

PALM TREE BEFORE THE MIST

*So many days I've looked across the canyon
Upon a haze-blue slope where blurry trees
Melt softly into bush-rounds in a tapestry
Of hidden individualities.*

*One stormy day a mist hung on the valley
Gold-glinted from the west where skies were calm.
And at the canyon, dark out of the mist
Appeared in sudden silhouette, a palm
Of perfect symmetry. I'd never seen
This tree before, commanding as a queen.*

*I've looked since for the palm. Yes, it is there,
But gray and insignificant once more.
Why should rare circumstance, alone, reveal
So many treasures at our very door?*

Lydia Bowen



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