IPNI Plant Nutrition TODAY
Better Crops, Better Environment...through Science

From Scientific Staff of the
International Plant Nutrition Institute (IPNI)
3500 Parkway Lane, Suite 550
Peachtree Corners, Georgia 30092-2844 USA
Phone: 770-447-0335 Fax: 770-448-0439
E-mail: info@ipni.net Website: www.ipni.net

Winter 2014/15, No. 3

ANOTHER LOOK AT LIMING ACID SOILS

It is estimated that soil in over 30% of the world's cropland is acidic and would benefit from liming and soil improvement. Most soils have a natural tendency to become acidic over time through natural and managed factors. Farmers too often fail to monitor soil acidity, despite its widespread nature.

Several natural factors contribute to the development of soil acidity. The geologic material that weathers into soil has a large influence on soil pH. Acid soils occur more frequently in high rainfall areas where leaching removes cations such as calcium and magnesium from the root zone. Poor plant nutrition is frequently a significant problem in acid soils due to the lack of adequate calcium. Phosphorus availability also becomes limited as the soil pH drops. Soil acidity also limits nitrogen fixation in many legume crops. However, aluminum toxicity is usually the largest constraint to plant growth in acid soils.

Nitrogen fertilizer can also be a contributor to the development of soil acidity. When urea or ammonium-based fertilizers are converted to nitrate by soil bacteria, hydrogen ions (acidity) are naturally released. Any nitrogen source containing ammonium (including manures, composts, or cover crops) will contribute to the gradual process of acidification.

There are many examples to show where decades of repeated nitrogen fertilizer use has led to a gradual decline in soil pH. This gradual soil acidification can occur even in regions where acidity problems are not common. For example, this natural process is often noted in areas where nitrogen fertilizer is repeatedly applied to the same place in the soil for many years, such as surrounding a drip irrigation emitter in a permanent crop. Fortunately, measuring soil pH is one of the easiest analyses to perform in the laboratory.

The addition of ground limestone to agricultural soils neutralizes acidity and reduces the presence of soluble aluminum, which is toxic to plant roots. Adding limestone to acidic soil will also enhance the solubility of phosphate, which becomes more available for plant uptake as the pH approaches neutral. Finally, limestone will provide a valuable source of calcium, which is frequently lacking in acidic soils.

Limestone requires acidity to rapidly dissolve in soil. In regions where the soil pH is greater than 6.5, limestone dissolves very slowly or not at all. Areas with naturally occurring limestone are classified as having calcareous soils. If there is a need to supply large amounts of supplemental calcium in non-acidic soils, gypsum (calcium sulfate) is commonly used. Although gypsum does not rapidly dissolve in soil, it supplies more soluble calcium than limestone in neutral and alkaline soils.

IPNI recently released a publication entitled: *Soil Acidity Evaluation & Management*, which provides an overview of issues related to acidity. More information can be found at the IPNI website: http://info.ipni.net/IPNI-3353.

– RLM –

For more information, contact Dr. Robert Mikkelsen, IPNI Director, North America Program, Ph: 770-825-8070; E-mail: rmikkelsen@ipni.net.