

Soil Test Every Four Years To Monitor Limestone

URBANA, ILL.

Proper use of limestone is one of the most important management strategies in crop production. Limestone should be the first soil amendment considered in cropping systems.

Don't try to guess what your soil lime needs are. A soil test every 4 years is the best way to monitor the need for limestone. The measurement of soil pH tells if limestone is needed, but not how much.

In a cash-grain system a pH of at least 6.0 is recommended. With alfalfa and clover in the rotation, the pH needs to be at least 6.5, preferably closer to 7.0.

Remember the pH scale is in logarithmic terms, so each unit change in pH means a ten-fold change in acidity or alkalinity. Thus, lime needs increase rapidly as pH drops.

The benefits of a liming program are many. Limestone can lower the soil solution concentration of aluminum and manganese, which can be toxic to plants. An increase in soil microbial activity is noted as soil acidity is decreased. Liming enhances nitrogen fixation and may improve soil structure and tilth. The availability of mineral elements (for example phosphorus and molybdenum) to plants can be increased by proper liming.

Several factors determine the type of liming program, with the crop to be grown probably the most important. Soil texture, organic matter, and method and depth of tillage are other critical items. The timing and frequency of lime applications are also important. For example, with leguminous crops, lime should be applied at

least 6 months before seeding on acid soils. If applied just before seeding, the lime will not have adequate time to react with the soil.

Limestone quality is measured by two factors—the effective neutralizing value and the degree of fineness. The acid-neutralizing ability of the material is indicated by the calcium carbonate equivalent (CCE). The higher the CCE value, the greater the limestone's ability to neutralize soil acidity. Pure calcium carbonate (CCE of 100) is the standard against which all liming materials are measured. The CCE level is inherent in the material, it can not be changed.

The second factor is particle size or fineness of grind. The rate of reaction depends on the surface area of the liming material in contact with the soil. The finer the limestone is ground, the faster it will neutralize soil acidity. Limestone too coarsely ground will be very slow in raising the soil pH. Lime particle size is based on the percentage of materials that pass through 8-, 30-, and 60-mesh screens.

Those applying limestone are encouraged to obtain a copy of the "Illinois Voluntary Limestone Program Producer Information" booklet. The booklet, produced every August by the Illinois Department of Agriculture and Department of Transportation, indexes limestone samples from quarries that wish to participate in the Illinois Voluntary Limestone Program. Analyses of CCE, fineness scores, magnesium percent, and correction factors are included. It's available at University of Illinois Extension Offices and at <http://www.agr.state.il.us/news/pub/2008LimeBook.pdf>.

Δ