

# MESSENGER-INQUIRER



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## Liming Acidic Soils

There have been countless advancements made in agricultural agronomy but one of the most important relating to fertility is adding crushed limestone to acidic soils which increases nutrient availability. Soils become acidic for different reasons, but the primary reason in Kentucky is nitrogen fertilizer application.

By definition, acidic soil has a higher concentration of hydrogen ions than hydroxyl ions in the soil solution. However, a soil pH of 6.5 is considered ideal for Kentucky row crops. Lime products such as ag lime, pelletized lime, and other materials that consume hydrogen ions (acidity) are used to raise soil pH in agricultural fields. Ag lime consists of either calcitic, (calcium only) or dolomitic (containing both calcium and magnesium) limestone, in a range of particle sizes. Pelletized lime is typically calcitic limestone and consists of smaller particles that are pressed into a “pellet” and held together using a chemical binding agent. This reduces dust and improves spreading performance.

The effectiveness of limestone is determined by the purity of the material, referred to as the calcium carbonate equivalence (CCE), and the particle size of the material. The smaller the particle size of limestone the more quickly it will react with the soil when applied. The

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combination of particle size and CCE is used to calculate the relative neutralizing value (RNV) of the product in the following equation.

UK has been conducting a liming study across the state. The objectives of this study are to compare the effectiveness of liquid calcium, pelletized lime, and agricultural lime in raising soil pH in both the laboratory and in 16 forage field locations. Treatments included an untreated check, liquid calcium (Advanced-Cal, AgriTec International) at 5 gallons per acre, pelletized lime (RNV of 83) at 2.4 ton/A, and agricultural (ag) lime (RNV of 77) at 2.6 ton/A. Soil samples were collected again, 2-3 months later, when the producer harvested hay. A laboratory soil incubation study was conducted in conjunction with the field study. Soil with an initial pH of 5.2 was incubated in specimen cups and maintained at 80% water-filled pore space. Treatments equal to those used in the field study were applied and mixed into the soil in the cups. Soil pH was then measured at 1 and 3 months of incubation.

The field study site data shows that there was little to no change in soil pH in the untreated check and liquid calcium (Advanced-Cal, AgriTec International) treatments in the laboratory incubation. In the field, both these treatments actually resulted in a decrease in soil pH, relative to the initial field soil pH. Both pelletized and ag limes caused a positive change in field soil pH, between 0.30 and 0.40 pH units. Similar trends were observed in the laboratory study, which shows that pelletized and ag lime amended soils exhibited increased soil pH with time while the check and liquid calcium treated soils did not. The soil pH changes with time show the natural progression of soil pH decline when liming agents are not used and soil pH increase when high quality liming agents are used.

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Another factor to consider is the cost of the products. Prices vary from location to location and should always be checked prior to making any decision on input purchases. In western Kentucky, at the time this study was initiated, ag lime was roughly \$15 per ton or less. There is an additional delivery/spreading fee associated with this. Pelletized lime was between \$200 and \$300 per ton and still has an associated spreading fee. The liquid calcium was purchased for approximately \$30 per gallon with a recommended use rate of 2-4 gallons per acre. Ignoring application fees, this works out to about \$30/A for ag lime, \$400-600/A for pelletized lime, and \$60-120/A for liquid calcium.

When a person is deciding on the best way to lime a production field there are two primary questions that need to be answered. Does the product work? What does it cost? Pricing the proven products will go a long way towards making good agronomic and economic decisions for soil pH management.

## **Upcoming Event**

Ag Expo is on January 25<sup>th</sup> at the Owensboro Convention Center. This year, instead of a keynote speaker, there will be a panel discussion on how strategic thinking translates to a successful grain farming business. Be sure to read next week's article for more information.

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