Pelletized Lime for Short-Term Treatment of Soil Acidity
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University of Missouri-Delta Research Center

Correct soil pH is the cornerstone of a successful crop nutrient management program. Annual applications of nitrogen fertilizers on crops slowly produce acid conditions in fields. If low pH is not corrected by agricultural lime applications, soil acidity will reduce nutrient availability to plants (especially P), produce toxic levels of aluminum and manganese, and diminish the weed control activity of some herbicides.

The lime recommendation program at the University of Missouri is based on many years of field research across the state. Soil test recommendations are made to correct soil acidity by applying enough effective neutralizing material (ENM) of liming material to bring the soil pH_{salt} to between 6.1 and 6.5. ENM is used to indicate the effectiveness of liming materials based on measured calcium carbonate equivalents and the amount of material retained or passing through three sieve mesh sizes. Large lime particles are assumed to be less reactive than smaller particles.

Transportation expenses to haul ground limestone from quarries to production fields are a major part of the liming costs for cotton farmers. Total cost to purchase, haul, and apply lime in fields in the Delta region range from $18 to $25 per ton. The least expensive liming material often depends on the closest quarry producing ag lime.

In recent years, agricultural fertilizer dealers have reported 2 to 3 fold increases in sales of pelletized lime. Pelletized lime is finely ground limestone, which is made into small pellets for broadcasting with conventional fertilizer equipment. Because pelletized lime is relatively expensive per ton, it is applied at lower rates (<300 lbs/acre) as compared to recommended rates of agricultural lime. A “1:10 ratio” rule of thumb has been promoted for comparing the short-term neutralizing effectiveness of pelletized lime to agricultural lime. (Example: if a soil test recommends the ENM equivalent of 2000 lbs of agricultural lime per acre apply 200 lbs of pelletized lime/acre). Most farmers realize that pelletized lime is not a long-term “fix”, but expect it to reduce soil acidity to tolerable levels for one year. Typically, farmers apply this material on fields that a landlord is unwilling to share part of the cost of applying agricultural lime or will not provide a lease agreement for more than one year.

**Objective:** Evaluate the general philosophy of using finely ground lime to provide a short-term, “quick fix” of soil acidity and compare corn and cotton yield response of pelletized lime to agricultural lime.

**Procedure:** Production fields with marginally low soil pH (5.0 to 5.3) and very low pH (<4.9) will be selected for evaluating lime treatments on corn and cotton at Portageville, Missouri. Soil samples will be collected from the 0 to 6-inch soil layer and tested at the Delta Center Soil Lab for recommended agricultural lime using the Woodruff buffer pH and salt pH. Treatments will include agricultural lime rates of \(\frac{1}{4}\) recommended ENM, \(\frac{1}{2}\) recommended ENM, \(\frac{3}{4}\) recommended ENM, the recommended ENM per acre, and no lime (untreated check). Two brands of pelletized lime will be included as treatments at rates of 1/10 of each agricultural lime treatment. For academic comparisons, equivalent rates of finely ground lime (not pelletized) will be broadcast by hand. Treatments will be
incorporated before planting the crops. Soil samples will be collected bi-weekly and analyzed for soil pH and extractable Mn. Corn and cotton plots will be mechanically harvested for yield. Pelletized and finely ground will be applying annually. Ag lime will only be applied in 2005.

**Timetable for proposed research:** This will be a three-year project (2005-2007).

| March-April | Develop field plans, weigh out lime for individual plots, and prepare fields for planting. |
| May-October | Apply and incorporate lime treatments, plant corn and cotton, collect soil and tissue samples, and harvest plots. |

**Strategy for application/transfer of knowledge:**

Results will be presented at Delta Center field days and Missouri Cotton Conference in Kennett. Articles will we written for Mid-America Farmer. When the study is completed a final report will be written and a manuscript submitted to scientific journal such as the Journal of Plant Nutrition.

**Proposed budget:**

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EDUCATION
Degree: Ph.D., Agronomy, 1992
Institution: Mississippi State University
Professor: Dr. Jac J. Varco

Degree: M.S., Plant and Soil Science, 1982
Institution: University of Tennessee-Knoxville
Professor: Dr. Donald D. Tyler

Degree: B.S., Biology, 1979
Institution: Union University

EMPLOYMENT
1994 – Present University of Missouri-Delta Research Center, Portageville, MO
Crop Production Specialist

1990- 1994 Mississippi State Univ./USDA Crop Simulation Lab, Starkville, MS
Soil Scientist

1984- 1990 North Mississippi Branch Experiment Station, Holly Springs, MS
Research Associate

RECENT PUBLICATIONS:


