EFFECT OF DOLOMITIC LIMESTONE ON SOILS AND CROPS WHEN USED AS A NEUTRALIZING AGENT IN COMPLETE FERTILIZERS

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Neutralizing the acidity of fertilizers caused by acid-forming nitrogen salts with dolomitic limestone has generally given increased yields of crops on many soil series in the South (1, 6, 8, 10, 11, 12). Dolomitic limestone in addition to neutralizing the acid-forming tendencies of fertilizer supplies calcium and magnesium. The relative importance of these two functions of dolomitic limestone may vary with crop and soil. The decomposability of dolomitic limestone in the soil and the availability of its magnesium to crops when used to make non-acid-forming fertilizers have been shown to be of considerable importance in crop fertilization (4, 5).

Greenhouse studies with cotton on the decomposition of limestone of different degrees of fineness on different soil types have shown that calcined dolomitic limestone, 80-mesh and finer, supplies a large part of the magnesium needs of plants; and that the pH and buffer capacity of the soil are the major soil factors involved in dolomitic limestone decomposition (4, 5). Results of field experiments with cotton, sweet potatoes, and Irish potatoes on Coastal Plain soils of North Carolina reported in this paper contribute additional soil and plant data on the subject.

PLAN OF THE EXPERIMENT

Fertilizers were formulated with 67% of the nitrogen from ammonium sulfate and 33% from uramon, superphosphate, and muriate of potash. This acid-forming fertilizer was compared with one made non-acid-forming with dolomitic limestone approximately 75% of which would pass through a 60-mesh screen. The treatments were in randomized blocks with five replications. Each plot was four rows, 50 feet long. The data were taken from two inside rows. Fertilizers were applied and mixed with the soil in the seed furrow 10 days before planting. On each plot the respective fertilizer treatment and crop were repeated each season for the duration of the experiment which was 4 years in the case of cotton and sweet potatoes and 3 years in the case of Irish potatoes. The details of treatments, soils, and fertilizer rates are shown in Table 1.

RESULTS WITH COTTON

The results in Table 2 show highly significant differences each year in yield of seed cotton from fertilizers formulated neutral with dolomitic limestone over acid-forming fertilizers. The increases were 175, 349, 466, and 184 pounds of seed cotton, respectively, for the 4 years.

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3Figures in parenthesis refer to “Literature Cited”, p. 901.