GROWING of legumes for soil building, for pasture, and for hay is a well-established practice and any economic means of increasing the amount and quality of these crops is desirable. Not only has the acreage devoted to legumes in the South been greatly increased in the past few years, but also the problems associated with their culture. Although the importance of sufficient calcium has long been recognized, there are undoubtedly other fertility factors to which leguminous crops are sensitive in southern soils. The response to different soil conditions in the South show wide variation not only among the different legumes, but also with the same legume grown on different soils. Since it has been shown by Albrecht (3) that with soybeans the detrimental effect of soil acidity was brought about not so much by the degree of acidity as by the deficiency of available calcium in the soil, considerable attention has been directed toward the determination of the effect of degree of base saturation on the growth of legumes.

Albrecht and Smith (2) have also reported greenhouse work from which they concluded that in liming and fertilizing the soil, attention must go to the degree of saturation of the soil. Davis and Brewer (4) have shown that application of lime and superphosphate to soils low in calcium content enabled the plant to absorb larger quantities of calcium, phosphorus, and nitrogen. Homer (5) has reported that raising the base saturation of a soil colloid from 40% to 97%, the total amount of calcium taken up by the crop was more than doubled. In order to determine whether calcium is an important factor in the success or failure of legumes on certain soils of Mississippi, greenhouse and laboratory investigations were conducted on Grenada silt loam soil, using soybeans, Korean lespedeza, and sweet clover as indicator crops.

PROCEDURE

Some of the surface soil of Grenada silt loam, which is a soil developed from Loessial material, was taken from a cultivated field and brought to the greenhouse and prepared for various treatments. The titratable hydrogen was determined by titrating a 10-gram sample (dry weight) with 0.04 N calcium hydroxide from the initial pH, which was 4.7, to 7, using the glass electrode. The treatments consisted of adding re-precipitated calcium carbonate in the amounts necessary to neutralize 25, 50, 75, and 100% of the titratable hydrogen, respectively. For each kilogram of this soil, it took 8, 16, 24, and 32 M.E. of calcium to neutralize 25, 50, 75, and 100% of the titratable hydrogen, respectively. All treatments received a uniform application of 0-8-6 fertilizer at the rate of 500 pounds per acre.

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3Figures in parenthesis refer to “Literature Cited”, p. 793.