FRACTIONAL NEUTRALIZATION OF SOIL ACIDITY FOR THE ESTABLISHMENT OF CLOVER

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Various tests for soil acidity and lime requirement of soils carry the general presumption that the soil must be neutral for successful growth of the clover crops. In consequence, the amount of limestone recommended is that amount of calcium carbonate revealed by the particular test as necessary to neutralize completely 2 million pounds of soil, or an acre 7 inches. If the application of limestone to a 7-inch layer of the root zone suffices to establish clovers, the questions logically follow, Might not this treated area be reduced to a much shallower stratum? or, Is it necessary to have other than certain limited, limed areas accessible to the plant roots? Previous reports (1, 2, 3, 5, 6) suggest this possibility, so that the work here described was undertaken in order to answer these questions more fully.

PLAN OF EXPERIMENT

Clovers were seeded on a sour soil, beginning in 1927, which were treated with varying small amounts of finely ground limestone applied directly with the seed and comparing the crop with that obtained on the same soil treated with the more common 10-mesh agricultural limestone at the rate of 2 1/2 tons per acre, or the amount considered as the “lime requirement” of this particular soil. In all trials, the application of the 10-mesh limestone was broadcast from 6 months to a year in advance of the seeding of the clover. The work was always done on a field basis, and in some trials as extensively as 30 acres, on soil which had never been limed or seeded to clover.

The fine limestone of the first trial consisted of 200-mesh material, but 30-mesh stone was later substituted for this. The fineness of the latter, according to standard sieve analysis, is given in Table 1 along with similar data for the 10-mesh stone. It is to be noted from the table that 66.7% of the 30-mesh stone was fine enough to pass the 100-mesh sieve, while this degree of fineness was obtained in only 39% of the 10-mesh stone.

The soil used is known as Gerald silt loam. The surface is a friable, brownish-gray, silt loam about 10 inches deep, underlain by an impervious plastic, brown, clay subsoil grading into a gravelly or