THE YIELD, COMPOSITION, AND NODULATION OF SEVERAL CLOVER VARIETIES AS AFFECTED BY SOURCES OF CALCIUM AND PHOSPHORUS IN COMBINATION WITH OTHER FERTILIZERS ON SEVERAL SOILS

R. E. Blaser, G. M. Volk, and F. B. Smith

THE early development of the livestock industry of Florida has been greatly limited by the low productivity and quality of the native wire grass pastures which have been the major source of forage. If intensification of the industry is to be brought about, it can be by fertilization and planting of more highly productive pasture plants. Approximately 400,000 acres of improved pasture grasses, such as carpet, Dallis, Bahia, and Bermuda, have been planted during the past 3 years. Only a small acreage of pasture legumes has been used because the adaptation of these crops to Florida soils and climate is not as yet fully understood.

Clovers should have a prominent place in Florida pastures because they not only improve the quality and quantity of the forage but also furnish feed during the late winter and spring when it is very much needed.

The success of growing clovers on sandy soils of Florida depends upon selection of soils with ample moisture during the growing season and on fertilization with appropriate sources of the elements calcium, phosphorus, and potassium. Investigations to compare the value of different sources of calcium and phosphorus have been under way since 1938. This paper is a preliminary resume of a portion of the work carried on during the 1940-41 season.

EXPERIMENTAL PROCEDURE

Two randomized block design experiments comparing various sources of phosphorus and calcium in fertilizer mixtures were established on virgin Leon fine sand and Plummer fine sand in November of 1940. These soils are typical of a large portion of the flat pine lands of peninsular Florida. The fertilizer mixtures used are given in Table 1. They were broadcast by hand and incorporated by light disking. The area was immediately planted with inoculated seed and rolled. A seed mixture consisting of 4 pounds of Louisiana white clover, Trifolium repens, and 8 pounds of California bur clover, Medicago hispida, per acre was used.

Pure samples of California bur and white clover were taken from the plots on Leon fine sand for chemical analysis. Individual analyses were made for each of 3 replicates. Early season yields were taken from both experiments using a split plot design was laid out at the same time on several soil types to study growth of pure stands of nine varieties of clover. The results of phosphorus and calcium applied in various fertilizer combinations were used. The clovers were fertilized on large plots upon which the eight fertilizer treatments were randomized in smaller sub-plots. The fertilizer treatments and clovers tested are given in Table 4.

In January 1941, nodule counts were made on 10 plants taken at random from each sub-plot of a block established on Leon fine sand for this purpose.

EXPERIMENTAL RESULTS

The yields of mixed plantings of California bur and white clovers on Leon fine sand and Plummer fine sand fertilized with various sources of calcium and phosphorus are given in Table 1. The Leon fine sand had a pH of 4.9 and the Plummer fine sand a pH of 5.3. A fertilizer consisting of 2,000 pounds of calcium limestone, 600 pounds of superphosphate, and 100 pounds of muriate of potash per acre has been used and recommended for clovers for peninsular Florida and is here considered the standard for comparison.

The substitution of dolomitic limestone for calcium limestone in the standard clover fertilizer resulted in significantly lower yields on both soils when compared with the standard treatment (Table 1). The addition of either 500 pounds or 2,000 pounds of limestone to the rock phosphate and potash treatment produced highly significant yield increase in the Leon fine sand as compared to the same treatment without lime, but produced still lower yields on the Plummer fine sand. When the treatment of 3,000 pounds of rock phosphate, 500