THE EFFECT OF LIME AND FERTILIZER ON THE COMPOSITION AND YIELD OF PASTURE HERBAGE IN ALABAMA

J. W. McCLENDON AND E. L. MAYTON

A LABAMA’S rapidly expanding livestock program has focused attention upon the development and maintenance of more and better pastures as a basis for a stable livestock economy. Pasture research has been given considerable attention at the Alabama Agricultural Experimental Station during the last few years. At present, experiments include rates and time of applying various sources of lime and fertilizer materials on a number of soil types throughout the state. In addition, cultural treatments, seeding rates, and seed combinations are being studied. Results from experiments located at the Gulf Coast, Black Belt, and Tennessee Valley Substations are presented in this report.

PROCEDURE

Experimental plots at the Gulf Coast Substation were located on Norfolk sandy loam soil type. In the spring of 1937, plots of 1/20 acre size were prepared, fertilized, and seeded with a mixture of carpet grass, Dallis grass, and lespedeza. A good stand of all plants was obtained, but since the summer of 1939 carpet grass has predominated. Attempts were made, but with little success, to establish white Dutch clover on this sod.

Four-acre plots at the Black Belt Substation were located on Bell and Houston clay soil types, these types being alkaline in reaction. In the fall of 1931 the plots were prepared, fertilized, and seeded with a mixture of white Dutch, black medic, annual yellow, and biennial white clovers. Dallis grass, red top, and orchard grass were seeded the following spring. Since Dallis grass was slow in becoming established, Kentucky bluegrass was seeded in the fall of 1934. Plants which survived were white Dutch, black medic, Kentucky bluegrass, and Dallis grass.

At the Tennessee Valley Substation, plots were located on Decatur clay loam soil type. Plots of 1/600-acre size were laid out in duplicate tiers; the land was prepared, fertilized, and seeded with white Dutch, hop clover, and Kentucky bluegrass in the fall of 1937. Dallis grass and lespedeza were added the following spring. Due to extreme cold in the winter of 1937–38 and the drought the following summer, only a thin stand of plants persisted on these plots. During the second and third years, however, a satisfactory stand of plants was present.

Yield data were obtained by clipping areas 1/600 acre in size, usually at intervals of 30 to 40 days. Green weights were recorded and a composite sample of the clippings from ungrazed areas on the same plot.

RESULTS AND DISCUSSION

Since the soils at the Gulf Coast Substation are low in potash, it was deemed necessary to apply ash with the different rates of superphosphate. Each increment of superphosphate applied, 800 pounds per acre annually produced a significant increase in the total yield. The application of 200 pounds of superphosphate increased the phosphorus, nitrogen, phosphorus, and calcium approximately 100, and 60%, respectively, over the unfertilized check plot. When lime was applied with 200 pounds of superphosphate, the yields obtained were approximately equivalent to those resulting from the application of 400 pounds of superphosphate with or without lime. The application of 600 pounds of superphosphate, 150 pounds of muriate, once in 3 years, produced slightly higher yields than the annual application of 200 pounds of superphosphate and 50 pounds of muriate. When basic slag was applied at the same rate of superphosphate, it was superior to the latter, probably due to its lime content.

Animals grazing on the unfertilized areas probably suffer from deficiencies of phosphorus and calcium in their diet, since the mineral content of plants produced on these areas was extremely low. The plants responded well, however, to the application of fertilizers. The quality of the herbage improved by each increment of superphosphate. The application of 800 pounds of superphosphate and 50 pounds of muriate annually almost doubled the phosphorus and calcium content of plants. The increase, however, was only up to the minimum requirement for grazing animals.

The unfertilized check plot at the Black Belt Station produced 2,541 pounds of dry material (Table 2) on the same area, whereas greater

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Yield Data</th>
<th>Results and Discussion</th>
<th>Application</th>
<th>Lime and Fertilizer</th>
<th>Improved Plants</th>
<th>Fertilized Check Plot</th>
<th>Requirements</th>
<th>Grazing Animals</th>
</tr>
</thead>
</table>