The Effect of Clipping, Nitrogen Application, and Weather on the Productivity of Fall Sown Oats, Ryegrass and Crimson Clover

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There has been an increased reliance on winter grazing as a source of feed during the winter months in the southeastern United States. It has been found that high production and dependability of winter pastures are influenced by factors such as date of planting, fertilization, rainfall, temperature, and diseases (3, 4, 5, 10). Burton, et al. (3) reported that winter pasture crops differed in the production of fall forage, and that by rotationally grazing several crops, an adequate supply of pasturage could be maintained. However, since many farmers rely on one winter grazing crop or mixture, it is necessary to secure maximum production and dependability of winter pastures are influenced by factors such as date of planting, fertilization, rainfall, temperature, and diseases (3, 4, 5, 10).

Extensive investigations have been conducted concerning the effects of rotational grazing and frequency of clipping of permanent pasture plants on animal and forage production. Conflicting results have been reported, but usually rotational rather than continuous grazing has resulted in the maintenance of higher quality forage and improved animal performance (4, 6, 9, 13). Frequent removal of foliage has resulted in a reduction of root and forage growth and a decrease in the amount of lignin and fiber fractions, but the nitrogen, ether extract, ash, calcium, and phosphorus contents of the plant have been higher with such management (1, 2, 4, 6, 7, 8, 9, 11 12).

Experiments herein reported concerned the effects of weather, frequency of clipping and applications of nitrogen on the productivity of a mixture of fall sown oats, ryegrass, and crimson clover. Such a mixture is suitable for fall and winter grazing. It was anticipated that the results of this investigation could be used as an aid in planning a management system for temporary winter pastures.

Materials and Methods

In mid-September of 1947, 1948, and 1949 a winter pasture mixture consisting of 3 parts oats, 2 parts ryegrass, and 1 part crimson clover was sown on a Davidson clay loam soil at Experiment, Ga. A uniform rate of 2-, 4-, and 8-week intervals. The clipping frequencies were 16, 32, and 48 pounds per acre of nitrogen applications were made each month, beginning in February and continued for 6 months.

Clippings were begun in November when the forage was approximately 10 inches high, and were repeated at 2-, 4-, and 8-week intervals. A sickle-bar mower was used to cut a 3-foot swath through the center of the plots which were 6 by 25 feet in size. The green weight of the forage from each plot and a sample was taken for dry weight determination; calcium and phosphorus determinations were made in the laboratory.

Forage accumulations have been reported on a bi-monthly basis since it was found that these data were more closely correlated with the weather data, and since the data from the interval fit this classification. Forage production for the same period correlated with the following weather variables: rainfall, sunshine (recorded as gram calories per square cm. on a horizontal surface), and temperature (number of hours per bi-monthly period above 45°F). Relations were made between forage yields and each of the above using the total bi-monthly dry forage accumulation and treatment for each of the 3 years. The effect of each variable was determined by use of partial correlation.

Results and Discussion

Effect of Clipping Interval on Bi-monthly Forage Yield

During the fall and early winter growth period (November–December clipping period) the forage yields from the 2- and 4-week clipping treatment were variable from year to year but the difference between them was not significant. The 8-week clipping treatment resulted in approximately 60% more forage during the fall of 1947 and 1948 than the 2- and 4-week clipping interval, being 1,645, 1,090, and 800 bushels per acre. Since little difference occurred between the 2- and 4-week clipping treatments, it was decided to use a 4-week clipping interval for future experiments.