Interrelationships Between Defoliation Systems, Morphological Characteristics, and Growth of 'Coastal' Bermudagrass¹

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During the past several years Coastal bermudagrass (Cynodon dactylon [L.] Pers.) has increased in importance as a forage for the southeastern United States. Many studies have been conducted to determine the growth characteristics and production of Coastal bermudagrass under systems of hay utilization; however, information is lacking concerning its performance under varying grazing-utilization management systems. In recent investigations in Georgia (4), Coastal bermudagrass was studied under harvesting systems which varied from 3-week to 24-week intervals. Total dry matter production was less on the 3-week or the 24-week interval than the other intervals; little difference in crude protein production was obtained between the 3-, 4-, 5-, and 6-week intervals.

Most workers have found that very close and frequent defoliations of bunch-type grasses have the general effect of reducing the total yield. However, with sod-forming grasses of different morphological characteristics, some studies have shown that close, frequent defoliation resulted in increased production. Results of this nature have been reported, for example, from sod-forming grasses, such as Kentucky bluegrass (Poa pratensis L.) Graber (5) and Mortimer and Ahlgren (6).

Recent studies (1) relating different management systems and the Leaf Area Index (LAI) of Coastal bermudagrass to growth gave LAI's ranging from 1 to 20 depending upon the system of management. Investigators working with other forages have suggested that an LAI of approximately 5 is needed to obtain optimum rates of growth of certain grasses (2).

The primary objectives of this study were to determine the influence of severe defoliation (simulating grazing systems) on the growth of Coastal bermudagrass and the relations of these systems to protein content, morphological characteristics such as leaf area index, and green blades, and percent stem and sheath.

MATERIALS AND METHODS

This study was conducted over a period of 4 years on a Chesterfield sandy soil at the Central Crops Research Station, Clayton, N. C. The Coastal bermudagrass was sprigged on March 28, 1957, and the management treatments were initiated in the spring of 1958. The experiment was a split-plot design with 10 subplots completely randomized on each of the 4 replications. The whole plots consisted of 2 defoliation periods, in one the 10 subplots were harvested from spring until October 25 and in the other whole plot were harvested until August 25. The subplots consisted of the following defoliation treatments: when grass reached 4 inches in height, cut back to 3 inches; from 6 back to 3 inches; from 3 back to 1½ inches; from 2 back to 1½ inches; and from 12 back to 3 inches at the uniform harvest with remaining cut.

The plots were fertilized annually between April 15 with 32 pounds of P as Ca(H₂PO₄)₂, 179 pounds of K as KCl, and 320 pounds of N as NH₄NO₃ of 1958. During 1958, 2 applications of 100 pounds were applied in April and June. From 1959 through 1962, two 100-pound applications were made in April and June, and 60-pound applications were made in July and late August each year. Although all defoliation treatments were imposed in 1958, no data were taken to determine yields or leaf area because the grass was still in an established phase. Plants were fully established by mid-July.

Before the first harvest each spring, the plots were cut in late February or early March to remove the dead material that had accumulated during the preceding fall. Each plot was cut to a height of 4 inches with a 3-foot sickle bar mower.

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