Early and Deferred Cutting Management of Alfalfa, Ladino White Clover, Bromegrass, and Orchardgrass

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N EARLY all cutting management studies with forages to date have described either spring or fall cutting schedules and have related growth responses to carbohydrate reserves. Few, however, have observed the influence of varying first harvests and differing subsequent harvests on production and survival of individual species in the mixture.

The purpose of this study was to determine the influence of extremes in harvest management on four forage mixtures throughout late spring and summer on survival and subsequent production.

METHODS

Mixtures of certified ‘Atlantic’ alfalfa (Medicago sativa, L.), ladino white clover (Trifolium repens, L.), ‘Lincoln’ bromegrass (Bromus inermis, Leyss.), and common orchardgrass (Dactylis glomerata, L.) were established in randomized plots measuring 6 by 20 feet during August 1956. Three replicates were provided on a Nixon silt loam soil that had good drainage, above-average fertility, and a pH of 6.3. Establishment was excellent and during the first year there was no evidence of loss of stand due to winter killing. During early spring, 1957, and during each subsequent year 200 pounds per acre of 5-4-8 (N-P-K) fertilizer was applied to the entire plot area. In addition, 700 pounds of 0-6.5-25 (N-P-K) fertilizer was applied each spring to half of each plot; these areas were then designated as “high-fertility plots.”

Three uniform harvests were taken from all plots during 1957 (a dry season) and careful roguing in a few plots established uniform, weed-free stands of about 50% ground coverage by the legume prior to the application of cutting treatments. Throughout 1958 and 1959, 12 harvest treatments were applied to plots of each of the 4 mixtures at the 2 fertility levels. Spring cuttings were made at pasture (P), silage (S), and hay (H) stages of maturity. These were followed in all combinations at second and third (and subsequent) harvests with cuttings at pasture (P) and hay (H) maturities. Only in a few instances and only on plots receiving prior cuttings as pasture were any cuttings made after September 9.

Pasture in spring was designated as the stage at which the forages were about 10 to 12 inches high, before bud development of alfalfa and after stem elongation but before the inflorescence was out of the boot of the grasses. The silage cut in spring was about 18 inches tall, after the head had emerged from the boot of the grasses and during the late bud stage of alfalfa. Hay stage in spring was designated when alfalfa was about half bloom and the grasses were past anthesis. In summer, pasture harvests were made when 8 to 10 inches tall and prior to blossoming of alfalfa. The hay stage was represented by alfalfa in full bloom with a corresponding time interval for recovery growth by mixtures with ladino clover.

In 1950, following 2 years during which the stands were subjected to cutting regimes, uniform harvests were made of all plots when alfalfa was at 1/10 bloom on May 30. Hand separations of harvested forage were made and data recorded as tons of legume and of grass per acre. The very small amounts of weedy forage were discarded. Stands were treated each season for insect control. Climatic conditions were normal for the area during 1959 and 1960 with adequate rainfall of good distribution. The year 1958

RESULTS

Total yields of alfalfa-orchardgrass and alfalfa-bromegrass were less during 1958 than 1959 (Figures 1 and 2). The alfalfa mixtures on plots having the first and second crops removed as pasture yielded the most during 1958. By comparison, greater total yields were obtained from most plots having the first crops removed as hay in 1959.

The first crop removed for silage at intermediate maturity produced the least during both years.

Total yields of ladino clover-orchardgrass and ladino clover-bromegrass were slightly greater in 1958 than in 1959 (Figures 3 and 4). Highest yields during both years were obtained on plots where the first crop was removed as hay; this was most evident where bromegrass was present. Second and third cuttings had little effect on total yield. The moisture stress experienced during June, 1958, reduced the ladino clover population slightly. Stands, however, were uniform throughout individual plots and recovered sufficiently to reflect responses to cutting treatments in 1960.

Mixtures with Alfalfa

Stand of alfalfa in April 1960, after 2 years of different cutting treatments, was only slightly greater when grown with bromegrass than with orchardgrass Figure 5). Those plots which received cuts for hay at the last cutting of the summer maintained better stands of alfalfa than where the last cut of the season was as pasture. Stage of maturation, with which the first or second harvests were taken in 1958 and 1959, had no consistent relationship to survival.

Yield differences in 1960 were not significant between plots treated with different levels of mineral fertility, and interactions with cutting treatments were nonexistent.

Yield of alfalfa with bromegrass on May 30, 1960, was greater than that with orchardgrass (Figure 6). Furthermore, alfalfa with either grass yielded better in those plots where the last cutting of the season during the previous years had been removed as hay. Lowest productive capacity of alfalfa was from those plots which had the last crop of the season removed as pasture. No yield relationship was observed with respect to the stage of maturity at which the first two cuttings of the season were removed.

Yield of orchardgrass was greater than that of bromegrass when grown with alfalfa. The maturity at first and second harvests during 1958 and 1959 had no consistent influence on the yield of these grasses in 1960. Those plots harvested at the pasture stage in late summer during these 2 years produced, however, more in 1960 than those having the last crop removed as hay.

Total yields of legume plus grass were not significantly different when comparing the 12 cutting treatments applied. Alfalfa-orchardgrass outyielded alfalfa-bromegrass by 10 to 15%.

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