TECHNICAL NOTES

EFFECT OF TIME OF CUTTING ON YIELD AND BOTANICAL COMPOSITION OF PRAIRIE HAY IN SOUTHEASTERN NEBRASKA[1]

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More than three million acres of native prairie are harvested annually in Nebraska for hay. This crop is an important natural resource in the livestock industry in the State. Good management of a native meadow requires the adoption of practices that will give maximum feeding value per acre of hay consistent with the maintenance or improvement of the stand and vigor of the desirable plants.

The effects of five cutting treatments on the yield and botanical composition of a native upland meadow in eastern Gage County, Nebraska, were studied for an eight-year period, 1945–1952. The cutting treatments involved early (early July), midseason (early August), and late (mid-September) cutting each year and early and midseason cutting in alternate years during the six years, 1945–1950. In five of the six years, an aftermath crop was harvested in mid-September from the plots cut early that year. All the plots were cut in midsummer in 1951 and 1952 to determine the cumulative effects of the cutting treatments on yield and botanical composition.

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The average yields of hay from the midseason and late cuttings were 1.35 and 1.28 tons per acre, respectively, for the six-year period. The average yield from the early cutting was 0.93 tons per acre, but when this was combined with the aftermath crop harvested from the same plots, the total was 1.40 tons per acre. The combined yield of early cutting and aftermath from plots cut early in alternate years averaged 1.53 tons per acre. The midseason harvest from the same plots in the other years averaged 1.26 tons per acre.

The crude protein content of the three regular cuttings of hay decreased with the later dates of cutting each year. Variations in ether extract, crude fiber, nitrogen-free extract, calcium and phosphorus were not consistent. Generally, the chemical composition of the aftermath hay approximated that of the midseason-cut hay of the same year.

The results of feeding trials conducted during the first three years of the experiment have been reported in Nebraska Experiment Station Bulletin 403 (Baker *et al.*, 1951). The hays from the three dates of cutting were fed alone and with two levels of protein supplement as wintering rations for growing calves. In general, as the maturity of the grass increased, the amount of hay consumed by the calves decreased, a larger portion of the hay was refused, and the average daily gains of the calves decreased. These trends were evident whether the hay was fed with or without supplement. More pounds of gain per acre of hay were obtained from early-cut hay than from mid-season- or late-cut hays when fed alone or with about one-half pound of protein supplement per head daily. In every comparison, the late-cut hay produced fewer pounds of gain per acre of hay than either the early-cut or midseason-cut hays, regardless of whether protein supplement was fed.

Permanent belt transects 12 inches wide and 475 or more feet in length were used for determining the effects of the different cutting treatments on the native forbs. Many of the important broad-leaved species were reduced in vigor and abundance by early cutting. The total forb population in the transects decreased 19 percent under six years of early cutting as compared with increases of 49 and 87 percent under midseason and late cutting, respectively.

Psoralea floribunda, the most abundant and conspicuous forb in the meadow at the beginning of the study, appeared to be affected by the time of cutting more than any other species. A marked reduction in size of the plants was noted after only two years of early cutting. In 1951, the average weights per stem following six years of early, midseason and late cutting were 1.04, 2.72 and 2.90 grams, respectively. The populations in the permanent transects were approximately 70, 83 and 113 percent, respectively, of those present at the beginning of the experiment.

Other important forb species which were reduced in size and abundance by early cutting are: *Aster multiflorus*, *Helianthus rigidus* and *Gaura biennis*. The populations of *Amorpha canescens* in the transects remained relatively constant, but the average weight per stem was reduced 52 and 28 percent by early and midseason cutting, respectively, as compared with late cutting each year.

The average total density of the grasses, sedges and rushes in 24

permanent meter-square quadrats increased approximately 25 percent from 1946 to 1952. There were no significant changes in total density due to the cutting treatments. *Poa pratensis* increased markedly under all the cutting treatments. *Sporobolus heterolepsis* decreased 60, 34 and 19 percent under early, midseason and late cutting, respectively. Important increases in the density of *Andropogon scoparius* occurred under early and midseason cutting, and of *Bouteloua curtipendula* under early cutting.

Early cutting and the removal of an aftermath crop in mid-September reduced the vigor of the grasses the following spring as compared with midseason cutting. The average yield of hay in 1951 from the 10 plots which were cut twice in 1950 was 1.08 tons per acre as compared with 1.41 tons from the 10 plots which were cut once in midseason the preceding year. In 1952, following one year of uniform cutting, the average yields were 1.08 and 1.12 tons per acre, respectively.

Delaying the harvesting of the aftermath from mid-September to early October and to late October increased the yield of the grasses the following summer 18 and 38 percent, respectively.

LITERATURE CITED

BAKER, M. L., E. C. CONARD, V. H. ARTHAUD AND L. C. NEWELL. 1951. Effect of time of cutting on yield and feeding value of prairie hay. Nebraska Agr. Exp. Sta. Bull. 403. 19 pp.

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