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# Effects of winter herbage removal on Flint Hills rangeland

## Abstract

Intensive-early stocking (IES) in the Kansas Flint Hills has greatly increased livestock production efficiency. The potential for grazing of regrowth on IES pastures the following winter was studied by mowing different plots on a monthly basis from October to April, 1983-1985. Winter herbage removal had no significant effect on herbage production in the following seasons or on the total nonstructural carbohydrates (TNC) of big bluestem (*Andropogon gerardii*) rhizomes. Since there was no reduction in herbage yield for any mowing date, cattle producers can apparently restock IES pastures after October 1.

## Keywords

Cattlemen's Day, 1989; Kansas Agricultural Experiment Station contribution; no. 89-567-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 567; Beef; Intensive-early stocking (IES); Winter herbage removal; Flint Hills rangeland

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## EFFECTS OF WINTER HERBAGE REMOVAL ON FLINT HILLS RANGELAND

L. M. Auen and C.E. Owensby<sup>1</sup>

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### Summary

Intensive-early stocking (IES) in the Kansas Flint Hills has greatly increased livestock production efficiency. The potential for grazing of regrowth on IES pastures the following winter was studied by mowing different plots on a monthly basis from October to April, 1983-1985. Winter herbage removal had no significant effect on herbage production in the following seasons or on the total nonstructural carbohydrates (TNC) of big bluestem (*Andropogon gerardii*) rhizomes. Since there was no reduction in herbage yield for any mowing date, cattle producers can apparently restock IES pastures after October 1.

### Introduction

Kansas Flint Hills range is converted to saleable red meat more efficiently by intensive-early stocking (IES) than by season-long stocking. IES results in higher animal gains per acre without sacrificing individual performance. In addition, IES cattle can be sold in July, when traditionally fewer cattle are sold and prices are higher. IES consists of stocking at double the season-long rates during the first half of the growing season, then removing the animals and allowing the forage to regrow for the remainder of the season in order to replenish carbohydrate reserves. Winter grazing of regrowth on IES pastures offers additional grazing resources and gives greater flexibility in purchasing cattle. The objective of this study was to determine the effects of winter herbage removal on subsequent herbage production and on total nonstructural carbohydrates (TNC) reserves in big bluestem rhizomes, a key dominant of the Flint Hills.

### Procedures

The study was conducted on the Konza Prairie Research Natural Area near Manhattan, Kansas. The plots were located on a loamy upland range site with a Benfield-Florence complex soil. The site was burned by a wildfire in early spring of 1982. The vegetation within the plots was typical of the Flint Hills rangeland. The dominant grasses were big bluestem (*Andropogon gerardii*), indiagrass (*Sorghastrum nutans*), and little bluestem (*Andropogon scoparius*).

Treatments were mowing and removing herbage or mowing and leaving herbage on different plots on the first of each month from October 1983 to April 1984 and October 1984 to April 1985. These two treatments were replicated three times and applied on seven dates for 2 years. Snow cover eliminated December and February treatments. The 10 x 10-ft plots were mowed to a 2 inch stubble height with a sicklebar mower, and the cut herbage was either raked off or returned evenly over the plots. For comparison plots, herbage was removed on

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May 1 by burning in 1984 and by mowing and raking in 1985. Herbage production for all treatments was determined from fixed subplots by hand clipping to 2 inches on May 15, June 1, June 15, July 1, and July 15, 1984 and 1985. Samples were dried to a moisture-free basis and weighed to estimate dry-matter production. Rhizomes from six big bluestem plants were collected from each plot every 2 weeks from October 1, 1983 to May 1, 1984 and October 1, 1984 to May 1, 1985 and monthly from June 1 to September 1 of both years. No plants were removed from the herbage subplots. The rhizomes were dried and stored until the completion of the field study. Then the rhizomes were cleaned, and roots were removed, ground using a 1-mm mesh, and analyzed for TNC.

### Results and Discussion

None of the winter mowing treatments reduced herbage yields in the following season when compared to the control plots, with the herbage yield averaging 2,805 lb dry matter per acre on July 15, 1984 compared to 2,128 lb per acre on July 15, 1985. Precipitation during May and June was higher in 1984 than 1985 (Figure 12.1) and likely accounted for the difference. A previous study showed that intensive herbage removal by clipping through the growing season did not lower TNC reserves in big bluestem rhizomes until the second year following the clipping. In this study, two consecutive years of winter mowing did not significantly reduce TNC at any date for any treatment in the second year. In addition, the translocation of carbohydrates occur primarily during September, with little movement thereafter throughout the winter season. Therefore, restocking before October 1 would result in lower carbohydrate storage and lower herbage production in the following season. Removing all herbage by mowing to 2 inches on a given date during the winter should be more detrimental to subsequent herbage yields than selective herbage removal through the winter by grazing. Since winter mowing to 2 inches on Flint Hills range did not reduce herbage yields or TNC concentration in big bluestem rhizomes in the following season, cattle producers apparently can use IES pastures during the winter after sufficient regrowth has occurred.

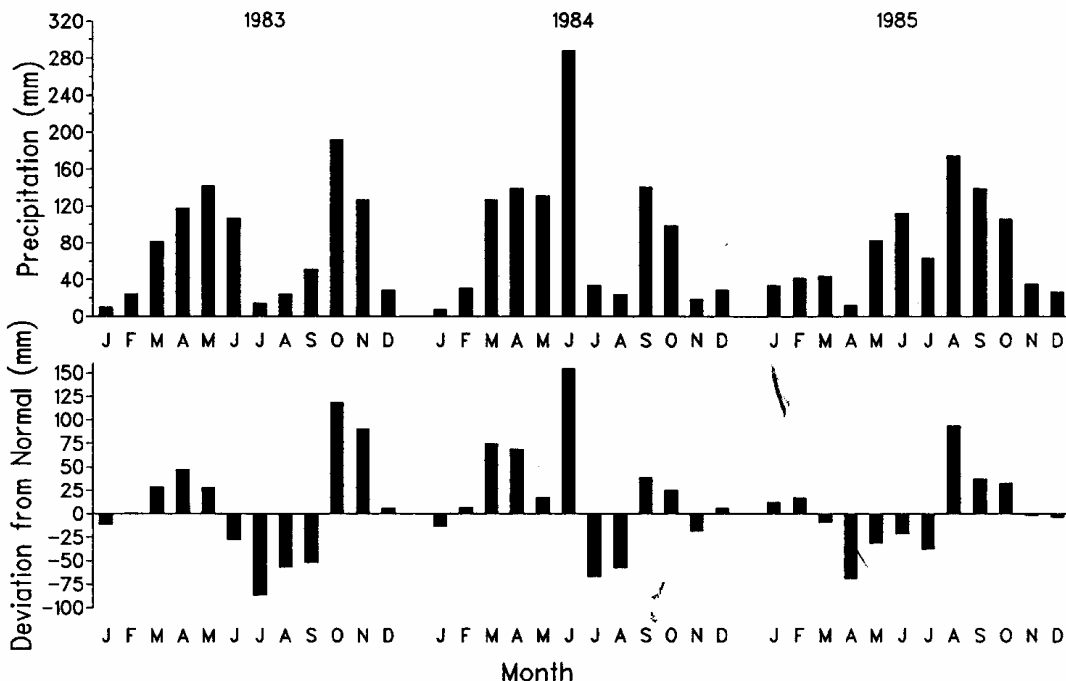


Figure 12.1. Precipitation for Manhattan, KS during the study period.