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Seasonal variation in quality of grazed forage during a drought year

Abstract

Concentration of fiber in the forage selected by beef steers grazing bluestem range during a drought year (1989) was highest in the winter but declined substantially in the spring and remained fairly constant throughout summer. Conversely, crude protein concentration was lowest during the winter, peaked during the spring, declined through early summer, but increased in the late summer before declining during the fall. Precipitation was well below normal in all months except August, September, and October, which were above normal. Improvement in forage quality during those months was probably due to stimulation of late-season forage growth in response to elevated precipitation.

Keywords

Cattlemen's Day, 1991; Kansas Agricultural Experiment Station contribution; no. 91-355-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 623; Beef; Range; Forage; Protein; Fiber; Drought

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SEASONAL VARIATION IN QUALITY OF GRAZED FORAGE DURING A DROUGHT YEAR¹

R. C. Cochran and E. S. Vanzant

Summary

Concentration of fiber in the forage selected by beef steers grazing bluestem range during a drought year (1989) was highest in the winter but declined substantially in the spring and remained fairly constant throughout summer. Conversely, crude protein concentration was lowest during the winter, peaked during the spring, declined through early summer, but increased in the late summer before declining during the fall. Precipitation was well below normal in all months except August, September, and October, which were above normal. Improvement in forage quality during those months was probably due to stimulation of late-season forage growth in response to elevated precipitation.

(Key Words: Range, Forage, Protein, Fiber, Drought.)

Introduction

Performance of beef cattle grazing native range depends on both quality of forage selected and quantity of forage consumed. The ability of producers to accurately predict periods of nutrient deficiency and, thus, the need for supplementation requires knowledge of seasonal changes in forage intake and quality. Variation in environment between years can influence those characteristics. Because cattle are very selective grazers, hand-clipped samples do not accurately reflect the quality of grazed forage. Therefore, our objective was to depict the seasonal changes in quality of forage selected by

esophageally fistulated beef steers grazing bluestem range during a drought year.

Experimental Procedures

Five, mature, Angus x Hereford steers (average wt = 1700 lb) with esophageal fistulas were used to monitor seasonal changes in quality of forage selected. All steers grazed as a single group on bluestem range and were confined to a 5-acre trap during each of the 3- to 4-day collection periods. Number of days in each collection period varied depending on whether esophageal samples were successfully collected from all animals on the first 3 days. To minimize regurgitation, steers were gathered in the early morning on collection days and withheld from grazing (with access to water) during the morning. Samples of grazed forage were collected via the esophageal fistula in the early afternoon during a 30-minute grazing period. Sample bags were lined with plastic to allow collection of both grazed forage and saliva. Samples were placed on ice, transported to the laboratory, frozen immediately, and later freeze-dried in preparation for chemical analyses. Samples were collected near the end of each month. The pasture was burned after the April collection. Data were analyzed with a repeated measures approach using the repeated option of the general linear models procedure of SAS. Most high-order, orthogonal, polynomial contrasts were found to be significant for both fiber and protein concentration.

¹Appreciation is expressed to Gary Ritter, Wayne Adolph, Kelly Brandyberry, Kirk Vanzant and Jane Beatty for their invaluable assistance in conducting this trial.

Results and Discussion

Precipitation was well below normal (Figure 1) throughout the course of the study, with the exception of August, September, and October, when precipitation was well above normal. For steers grazing bluestem range during the typical season-long stocking period (May - October), neutral detergent fiber (NDF) concentration in grazed forage is usually lowest in the early spring followed by a rise in concentration as the growing season progresses (Peischel, 1980, M.S. Thesis, KSU). Variability in the NDF concentration was noted in the late season in Peischel's study, apparently because of variability in late season rains and its influence on forage growth. A similar pattern was evident for the NDF concentration (Figure 2) in our study during the same period of time. NDF concentration was highest in the winter months when the plants were not only dormant but also had weathered. Because the pasture was not burned until after the April collection, the April

sample was a mixture of dormant forage and forage growth. Cool-season grasses may have made a valuable contribution to quality of diet selected during that period. As a result, NDF concentration during April appeared to be intermediate between the winter values and those observed after burning. Crude protein (CP) concentration in the Peischel study was highest in the early spring and continued to drop through late summer, after which it appeared to stabilize. A similar pattern was evident in our study (Figure 3) except that CP concentration increased during August and September, followed by a decline in November. We interpret this pattern as resulting from late-season forage growth stimulated by the above average precipitation in August through October, following extremely dry conditions during the early growing season. Crude protein concentrations were lowest during the winter, with a slight rise in April, probably attributable to the mixture of dormant and vegetative forage selected by animals just before burning.

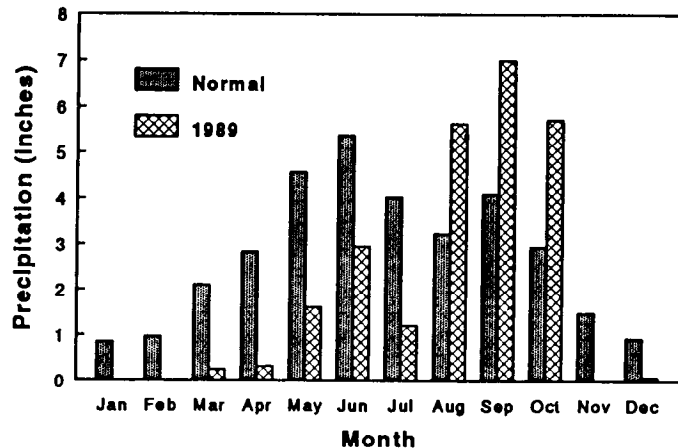


Figure 1. Precipitation Patterns During 1989

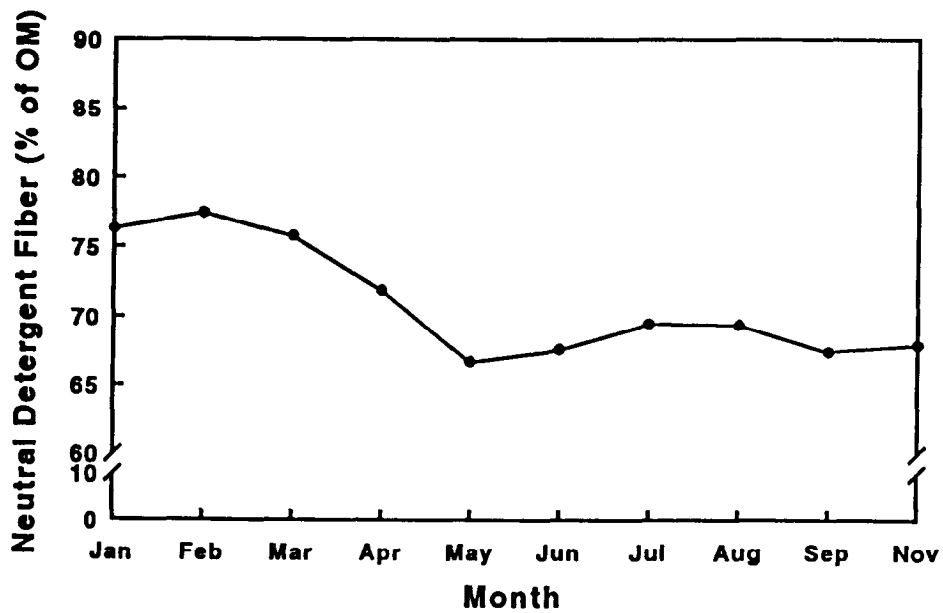


Figure 2. Influence of Season on Fiber Concentration in Grazed Forage

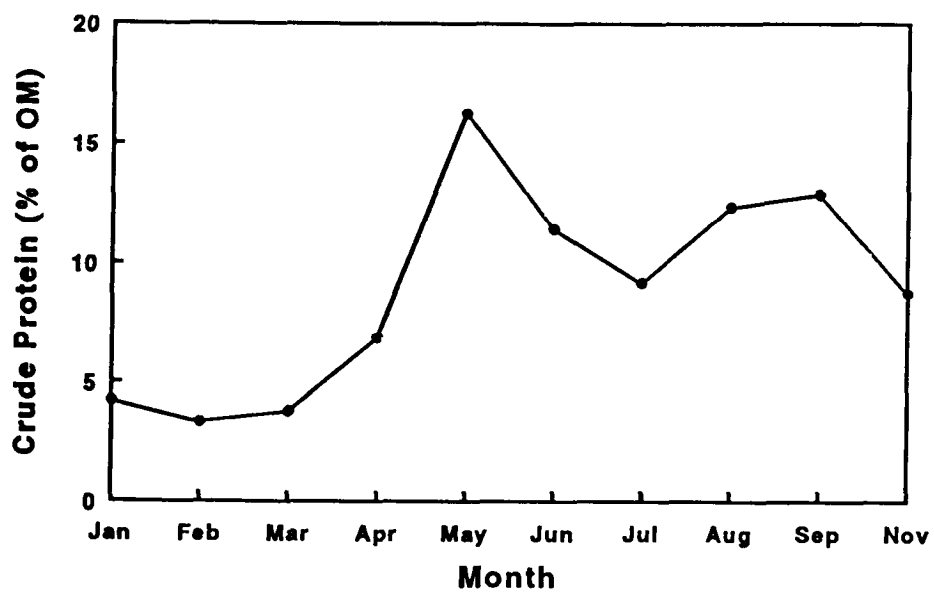


Figure 3. Influence of Season on Protein Concentration in Grazed Forage