Influence of Supplemental Protein Concentration on the Performance of Beef Cows Grazing Dormant Bluestem Range [1]

Tim DelCurto, Bob Cochran, and Larry Corah

Summary

Three milo/soybean meal mixtures representing three supplemental crude protein concentrations (13, 26, and 39%) were evaluated in terms of pregnant beef cow performance. Cow weight and body condition changes responded in a linear fashion to increasing protein. Cattle fed the high protein (39% Crude Protein) supplement lost the least weight and body condition, whereas cattle supplemented with the low protein treatment lost the most. Although there was little difference between treatment groups in terms of reproductive efficiency and subsequent calf performance, moderate (26% Crude Protein) and high protein supplements appear to offer the most benefit in maintaining cow weight and body condition during the critical winter months up to calving.

Introduction

Narrow profit margins for cow-calf producers necessitate optimizing both animal performance and utilization of native forage. Digestion and metabolism studies from Kansas State University have shown that protein supplements offer the most potential in terms of increasing dry matter intake of the native range forage. In contrast, energy or grain-based supplements have been shown to exert a negative influence on utilization of dormant bluestem range. Our objective was to find the protein concentration in winter supplements that optimizes cow performance, thus, making the best utilization of the native range resource.

Experimental Procedures

Ninety-nine Angus X Hereford cows were randomly assigned to one of three treatments: 1) low protein supplement, 13% crude protein (CP); 2) moderate protein, 26% CP; 3) high protein, 39% CP. Supplements, consisting of various levels of soybean meal and milo, were fed daily at .5% of body weight (5 lbs/hd/day). Because soybean meal and milo are nearly identical in energy content, supplemental energy was similar for all three treatments.

The trial began on Nov. 15, 1986, and the supplements were fed until the cows calved (average calving date: Mar. 8, 1987). After calving, all cows received 10 pounds of supplemental alfalfa per day until spring pastures became adequate. Cow weights and body condition scores were taken every 28 days and within 48 hours after calving.

Subsequent measurements were taken just prior to breeding (May 8) and on August 8. Before each weigh day, cows were gathered in the late afternoon, each fed 10 pounds of prairie hay and then withheld from additional feed or water overnight.

Results and Discussion

Cows supplemented with moderate or high protein gained weight with only a slight decline of body condition up to day 84 (Table 7.1). In contrast, cows fed low protein, or predominantly milo supplement, lost weight as well as a large degree of body condition during the first 84 days. Between day 84 and calving (approximately 30 days), cows responded in a linear fashion to supplemental treatments. All cows lost weight during this period, with weight loss greatest in the low protein group, intermediate in the moderate group and lowest in the high protein group. Calf birth weights increased in a linear fashion with increasing protein supplements.

Previous research at Kansas State University has shown that utilization of dormant bluestem range forage is optimized by using moderate to high levels of CP. The results from our trial support those findings in terms of cow weight and body condition changes. No differences were detected in cow reproductive efficiency or subsequent calf performance. However, winter weather conditions during this trial were relatively mild. Under more severe environmental conditions, reproductive efficiency might be depressed with low protein supplements.

Table 7.1. Influence of Supplemental Protein Concentration on Performance of Cows Grazing Dormant Bluestem Range Forage

Item		Low Protein	Moderate Protein	High Protein	SE[a]
Initial:	weight, lbs	1000	1005	999	16.8
	C-score[b]	5.64	5.67	5.69	.12
Day 84:	weight gain[cd]	-24.4	25.6	37.5	4.37
	C-score change[c]	-.74	-.40	-.20	.08
at calving:	weight gain[c]	-192.2	-123.7	97.1	8.98
	C-score change[c]	-1.84	-1.45	-.75	.11
at breeding:	weight gain[c]	-179.7	-156.9	-122.7	8.81
	C-score change[c]	-1.10	-.90	-.40	.09
Day 260:	weight gain[c]	8.3	21.0	43.8	9.55
	C-score change[c]	.32	.53	.69	.09
calf birth weight[c]		76.9	78.2	81.8	1.99
calf average daily gain (lb)		2.07	2.09	2.05	.05

[a]SE = Standard Error (n = 33 through day 84).

[b]condition score: 1 = extremely thin, 9 = extremely fat.

[c]linear response to increasing protein level (P<.05).

[d]quadratic response to increasing protein level (P<.05).