SOYBEAN MEAL SUPPLEMENTATION OF LIGHT WEIGHT BEEF CALVES GRAZING SPRING-BURNED TALLGRASS RANGE

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Story in Brief

Weaned, fall-born beef calves were maintained on spring-burned tallgrass range from May 21 through July 20 and supplemented with 0 (control), .5, 1.0, and 1.5 lb soybean meal/day. Diet samples averaged 15.9% crude protein in May and dropped to only 8.9% crude protein in July. Control calves (no supplement) gained 1.86 lb/day. Weight gain increased linearly with added increments of soybean meal. Feeding 1.5 lb soybean meal increased average daily gain .18 lb/day. Consequently, 7.2 lb soybean meal were required for each pound of added weight gain. Prescribed burning may increase forage quality to the extent that soybean meal supplementation is not effective. Thus, producers should not feed soybean meal to growing calves grazing burned range in early summer.

(Key Words: Beef Cattle, Soybean Meal, Prescribed Burning, Rangeland)

Introduction

Fall-born beef calves weaned in May have access to tallgrass range that averages 10% crude protein in May but declines to 6% crude protein by July (Waller et al., 1972). In order to gain 1.5 to 2.0 lb/day, 400 lb calves require 11.5 to 12.7% crude protein in their diet (NRC, 1984). Previous research has illustrated that either soybean meal supplementation or prescribed spring burning increase the daily gain of fall-born calves in early summer (Scott et al., 1987). Although burning increases the crude protein content of burned range in May (14%), declining protein content is reflected by low ruminal ammonia concentrations (Scott et al., 1988). Thus, lightweight calves grazing burned range may respond to supplemental protein. The objective of this study was to evaluate the growth response of fall-born, spring-weaned beef calves to incremental levels of supplemental soybean meal while grazing burned range.

Materials and Methods

Fifty-seven crossbred, fall-born beef calves (average calving date, October 26, 1986) were weaned on April 15, 1987 and maintained on a weaning ration plus prairie hay in drylot for two weeks. A tallgrass pasture (71 acres) was burned on April 16. Calves were maintained on the burned pasture for three weeks before the trial was initiated on May 21. The pasture was stocked at a rate of 3.3 acres/animal unit for 60 days. Calves were randomly assigned to one of four treatments: 0, .5, 1.0 or 1.5 lb soybean meal/day (as-is basis). The soybean meal supplement contained 48.6% crude protein (dry matter basis). The weekly allowance of supplement was individually fed five times/week and a

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mineral mix consisting of 50% trace mineralized salt, 45% dicalcium phosphate and 5% potassium chloride was offered free choice. Calves were weighed every three weeks following an 18-hour shrink. Diet samples were obtained with four esophageally cannulated heifers. Forage samples were freeze-dried and the crude protein content determined by Kjeldahl. Orthogonal polynomials were utilized to evaluate the effects of incremental soybean meal supplementation on weight gain.

Results and Discussion

The crude protein content of diet samples collected on April 30 was 15.9% and declined to 8.9% by July 20 (Figure 1). Although the crude protein content of burned range is high in May, rapid declines in forage quality may result in crude protein concentrations as low as 7% by July (Scott et al., 1988). Consequently, the nutritional quality of the burned forage in this study was better than expected.

Average daily gain for unsupplemented calves was 1.86 lb/day (Table 1). Soybean meal supplementation increased average daily gain linearly ($P<.07$) to a maximum of 2.04 lb/day with 1.5 lb SBM. Although weight gain increased with soybean meal supplementation, soybean meal was poorly converted into weight gain. With 1.5 lb soybean meal/day, 7.2 lb of soybean meal were required for each additional pound of calf weight gain. With soybean meal priced at $180/ton, the cost of each pound of added gain was 65¢. Consequently, soybean meal supplementation on burned range in early summer may not be economically feasible.

Soybean meal supplementation typically increases forage digestibility, intake and weight gain of beef cattle grazing native

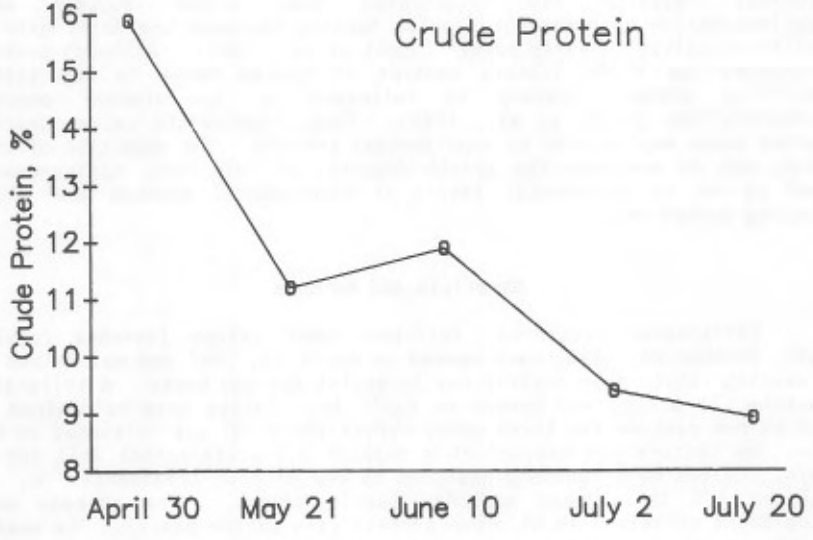

Figure 1. Seasonal changes in the crude protein content of diet samples from a burned native grass pasture (DM basis).

Table 1. Performance characteristics of beef calves fed incremental levels of soybean meal on burned pasture.

Item	Soybean meal (lb/day as-is)				
	0	.5	1.0	1.5	SE[a]
Number	14	15	14	14	
Actual SBM intake, lb/day	0	.42	.93	1.29	
Initial weight, lb	368	364	360	373	16.2
Average daily gain, lb[b]	1.86	1.92	1.92	2.04	.082
Conversion[c]		7.0	15.5	7.2	
Cost, ¢/lb added gain[d]		63.0	139.5	64.8	

[a]Standard error of the mean.
[b]Linear treatment response (P<.07).
[c]Conversion = lb supplement/lb additional gain.
[d]Soybean meal cost = $180/ton.

grass. In this study, increased weight gain with soybean meal supplementation may be attributed to greater energy intake rather than associative effects on forage digestibility. In fact, 1.5 lb of soybean meal supplies about 1.1 lb TDN which would account for the .18 lb increase in average daily gain.

Although soybean meal supplementation efficiently improves weight gain of lightweight calves grazing unburned range, supplementation of calves grazing burned range may not be cost-effective. Burning may improve ruminal nitrogen status to the extent that supplemental protein is not beneficial. Prescibed burning is a relatively inexpensive ($1/acre) management tool that improves forage quality and yield. The addition of soybean meal supplementation to a burning program, however, is neither nutritionally nor economically justifiable.

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