RESPONSE OF FALL-BORN BEEF CALVES TO SPRING PASTURE BURNING OR EARLY SUMMER PROTEIN SUPPLEMENTATION

R.R. Scott[1], C.A. Hibberd[2], and C. Worthington[3]

Story In Brief

A two-year study was undertaken to evaluate the response of fall-born beef calves (340 lb) to spring pasture burning or protein supplementation. Calves were weaned in April and allocated to four groups. One group grazed burned pasture while the remaining groups were placed on unburned pasture and received no supplement (control), soybean meal or corn gluten meal. In year 1 (1985), supplemented calves gained more weight than calves grazing control or burned pastures. Within the supplemented groups, calves fed soybean meal gained .20 lb/day more than calves fed corn gluten meal. In year 2 (1986), supplemented calves gained more weight than control calves but less than calves grazing burned native range. Calves fed corn gluten meal tended to be heavier than calves fed soybean meal by the end of the trial. This study suggests that both protein supplementation and spring burning will improve gains of beef calves in early summer. Burning, however, offers the most cost-effective alternative for improving the performance of light weight calves.

(Key Words: Beef Cattle, Pasture Burning, Supplements, Soybean Meal, Corn Gluten Meal.)

Introduction

The crude protein content of native range peaks in April and early May. Because the nutritional value of native range is considered to be adequate during this time, growing calves traditionally receive no supplemental feed except free-choice mineral. Medium-frame beef calves require almost 15% crude protein (CP) in order to gain 2.0 lb/day which is considerably higher than the protein content of the forage (10 to 12% CP). In late summer, supplemental soybean meal (rumen degradable protein) increases weight gains of growing cattle (Lusby et al., 1982). The increased protein content of spring forage may be highly degradable in the rumen, however, suggesting that a supplemental bypass protein such as corn gluten meal could increase calf growth. An alternative to protein supplementation is to burn the range. Burning removes dead forage and debris resulting in improved digestibility and palatability at a minimal cost ($1.00/acre). The objective of this study was to evaluate the growth response of young, light-weight beef calves to early-summer protein supplementation or spring burning.

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[1]Graduate Assistant [2]Assistant Professor [3]Herdsman

Materials and Methods

Year 1 (1985)

Sixty Limousin-sired fall-born calves (322 lb) grazed native grass pastures at the Southwest Livestock and Forage Research Laboratory, El Reno, OK. Calves were weaned on April 22 (average age 169 days) and fed grass hay plus a weaning ration in drylot for two weeks prior to the start of the trial. The native grass pasture was burned April 12 and grazing was initiated on May 6 when regrowth was approximately four inches tall. Calves were allocated to four groups. One group grazed burned pasture, the other three groups were maintained on unburned pasture and fed no supplement (control), soybean meal (SBM) or corn gluten meal (CGM). Pastures were stocked at 7.3 acres/animal unit for 87 days. Supplements were formulated to provide .40 lb of total protein per day (table 1). Supplements were individually fed at a rate of .87 lb DM (SBM) and .98 lb DM/head/day (CGM). Calves received their weekly allowance of supplement 5 days/week and were allowed free access to a mineral mix containing 50% trace mineralized salt and 50% dicalcium phosphate. Calves were weighed every three weeks following a 15-hour shrink.

Year 2 (1986)

Fifty-six Angus-sired fall-born calves (364 lb) were weaned April 15 (average age 174 days) and fed grass hay plus a weaning ration in drylot for two weeks prior to the start of the trial. The native grass pasture was burned April 6 and grazing was initiated on April 29 at a stocking rate of 3.5 acres/animal unit for 98 days. The study location and treatment allocations were the same as in year 1. In year 2, however, both supplements were balanced to provide .30 lb/day of rumen degradable protein. An additional .10 lb/day of bypass protein was supplied in the CGM supplement. The SBM and CGM supplements were individually fed at daily rates of .90 lb DM and .71 lb DM/head/day, on 5 days/week. Calves had free access to a mineral mix consisting of 50% trace mineralized salt, 45% dicalcium phosphate, and 5% potassium chloride. Calves were weighed at 14 to 21 day intervals following a 15-hour shrink.

Table 1. Percent composition, daily feeding rate, and cost of supplements (DM basis).

	1985		1986	
Feed ($/ton)	SBM	CGM	SBM	CGM
Soybean meal ($180)	98.56		89.03	17.71
Corn gluten meal ($250)		91.03		67.37
Alfalfa, dehy ($100)			10.11	9.58
Molasses ($100)		4.04		4.06
Limestone ($100)	1.44		.24	
Dicalcium Phosphate ($250)		4.93		.22
Sodium sulfate ($284)			.86	.81
Item				
Feeding rate, lb DM/day	.90	.77	.87	.98
Daily feed cost, ¢	8.95	9.49	8.28	11.68

Economic analyses were performed using traditional feed costs (table 1). The cost of burning native pasture was assumed to be $1.00/acre.

Data were subjected to least squares analysis. Significant differences between least square treatment means were detected by orthogonal contrasts.

Results and Discussion

Year 1 (1985)

Supplemented calves gained more (P<.01) weight than calves grazing unburned (control) or burned pastures (table 2). Soybean meal supplementation increased (P<.05) calf growth by .20 lb/day over calves fed CGM. The supplement response observed in this study indicates that light weight (322 lb) calves grazing early-season native grass are probably deficient in protein. Because calves fed CGM gained less (P<.05) weight than SBM-fed calves, the primary deficiency may have been for ruminal degradable protein. Burning improved average daily gains by approximately 16% (.23 lb/day).

Supplements were efficiently converted to additional calf gain (1.67 lb supplement/lb added gain for SBM, 2.08 lb supplement/lb added gain for CGM, table 2). These conversions translate into a feed cost/lb added gain of 16.6¢/lb for SBM and 27.9¢/lb for CGM. Pasture burning, however, remained the most inexpensive treatment based on cost/lb added gain.

Trial 2 (1986)

In year 2, calves grazing the burned pasture gained more weight (P<.01) than control or supplemented calves through July 15 (figure 1). Calves grazing the burned pasture, however, lost 1.24 lb of body weight from July 15 to August 5. Low rainfall (.53 inches) from July 12 through August 4 may have decreased forage quality to the extent that calf performance declined. Consequently, the 1986 data (table 3) is presented through July 15.

Table 2. Calf performance and economic analysis for year 1 (5/6 to 8/1, 1985).

Item	Treatment			
	Control	Burn	SBM	CGM
Number	16	16	14	14
Initial wt, lb	324	338	307	319
Final wt, lb	448	482	478	472
Weight gain, lb[a,b,c]	124	144	170	153
Daily gain, lb[a,b,c]	1.42	1.66	1.96	1.76
Conversion[d]	---	---	1.67	2.08
Cost of added gain, ¢	---	7.35	16.57	27.91

[a]Control vs supplements (P<.01).
[b]Burn vs supplements (P<.01).
[c]SBM vs CGM (P<.03).
[d]lb supplement/lb of added gain.

Supplemented calves gained more weight (P<.01) than controls in year 2. Calves fed CGM tended to be heavier than calves fed SBM by the end of the trial. Both supplements in this study (year 2) supplied the same quantity of ruminal degradable protein (.3 lb/day). The CGM supplement, however, supplied an additional .1 lb of bypass protein. Thus, increased performance of the CGM calves may be attributable to improved protein status in the small intestine. Much of the CGM response was observed in the first 14 days of the study (figure 1) suggesting that bypass proteins may better complement the protein requirements of newly-weaned calves. The CGM advantage was maintained throughout the remainder of the trial.

Burning was the most cost-effective alternative for improving weight gains through mid-July (table 3). Even if the cost per lb of

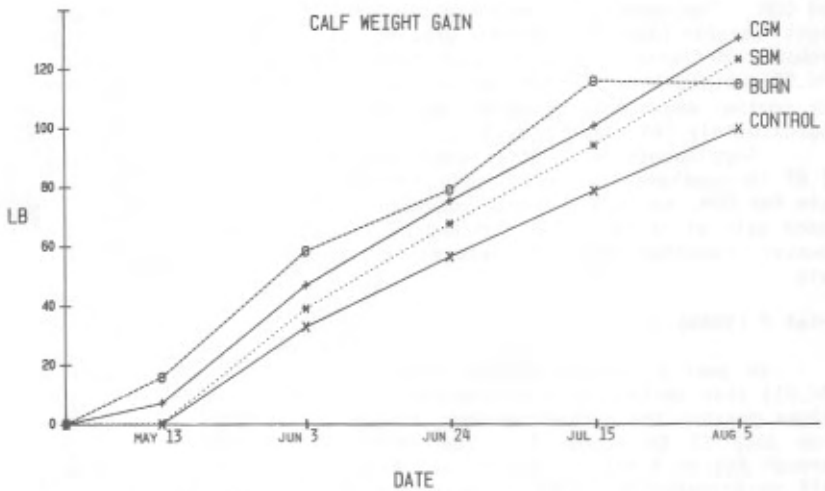

Figure 1. Accumulative weight gains of calves grazing burned pastures or unburned pastures with no supplement, SBM or CGM (year 2).

Table 3. Calf performance and economic analysis for year 2 (4/29 to 7/15, 1986).

Item	Treatment			
	Control	Burn	SBM	CGM
Number	13	15	15	15
Initial wt, lb	389	366	348	353
Final wt, lb	468	482	442	454
Weight change, lb[a,b]	79	116	94	101
Daily gain, lb[a,b]	1.02	1.50	1.22	1.31
Conversion[c]	---	---	4.33	3.36
Cost/lb added gain, ¢	---	4.15	41.40	40.27

[a]Control vs supplement (P<.01).
[b]Burn vs supplement (P<.01).
[c]lb supplement/lb added gain.

added gain is calculated through August (when calves on burned pasture lost 1.24 lb), burning costs were only 10.47¢/lb added gain compared to 36.00¢ and 37.68¢ for calves fed SBM and CGM, respectively.

In conclusion, both protein supplementation and pasture burning enhance the weight gain of young, growing calves grazing native range during early summer. Burning, however, is the most economical alternative because of the low initial input cost.

Literature Cited

Lusby, K.S. et al. 1982. Energy vs protein supplementation of steers grazing native range in late summer and early fall. Okla. Agr. Exp. Sta. Misc. Pub. MP-112:36.