

## CORN GLUTEN FEED OR SOYBEAN MEAL AS SUMMER SUPPLEMENTS FOR GROWING BEEF CATTLE GRAZING NATIVE RANGE

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### Story in Brief

Forty-three Hereford and Hereford X Angus yearling heifers weighing about 645 lb were grazed on native range from July 16 to October 8, 1985. Heifers were allotted by weight and breed to four supplement treatment groups. Treatments were: no supplement (Control); 1.2 lb/day 41% protein soybean meal; 2.8 lb/day 18% protein corn gluten feed; and 1.9 lb/day 26% protein corn gluten feed and soybean meal blend. Supplements were prorated and fed daily Monday through Friday. Average daily gains for the 84 day period were .83, 1.25, 1.64 and 1.51 pounds for the Control, soybean meal, corn gluten feed, and corn gluten feed/soybean meal, respectively. Pounds of supplement per pound of added gain were 2.88, 3.46 and 2.80 for soybean meal, corn gluten feed, and corn gluten feed/soybean meal, respectively. Based on the weight gains of the corn gluten feed and corn gluten feed/soybean meal, corn gluten feed does not appear to have a negative effect on forage digestibility and intake. The results of this study suggest corn gluten feed effectively increases weight gain on growing beef animals grazing native range in late summer.

(Key Words: Beef Cows, Winter, Supplements, Corn Gluten Feed, Soybean Meal.)

### Introduction

As native forage quality declines in late summer and early fall, protein and energy supplements have been shown to increase performance of growing steers and heifers. High protein meals generally increase weight gains of cattle grazing low quality forage more efficiently than energy supplements. In a previous OSU study, Lusby et al. (1982) showed a .4 lb/day increase in daily gain from feeding .8 lb of a 39% protein supplement to 575 lb steers from mid-July to mid-October. The same study showed a .3 lb/day increase in daily gain from feeding 3 lb of a 10% protein/energy supplement made up of corn and soybean meal (SBM). Therefore, the pounds of supplement per pound of added gain were 1.8 for the 39% protein and 8.8 for the 10% protein supplement. A small amount of supplemental protein apparently increases forage intake and digestibility. Feeding energy in the form of corn with the same amount of protein generally reverses this process. The digestion of starch from corn makes the rumen less favorable to bacteria that digest roughages. However, recent Nebraska research (DeHaan et al., 1983) suggests that by-product feeds that contain digestible fiber such as corn gluten feed (CGF) is more efficient at increasing total energy intake of grazing cattle than supplements containing grains. The positive response may be because the same types of bacteria that digest forage also digest the highly digestible fiber fraction of CGF. The objective of this research was to evaluate CGF as a protein and energy supplement for growing beef

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cattle grazing native range in late summer and early fall.

### Materials and Methods

The trial was conducted at the Lake Carl Blackwell Range 10 miles west of Stillwater in North Central Oklahoma. Forty-three Hereford and Angus X Hereford heifers, averaging 16 months of age, were allotted by breed and weight to four supplement treatments. Treatments were no supplement (Control), 1.2 lb/day of a 41% protein SBM supplement (SBM), 2.8 lb/day of an 18% protein CGF supplement (CGF), and 1.9 lb/day of a 26% protein CGF and SBM blend (CGF/SBM). Supplement compositions are shown in Table 1. Treatments 2, 3 and 4 provided the same amount of supplemental protein, but varying amounts of supplemental energy. All supplements were fed on Monday through Friday with supplement amounts prorated to give the prescribed daily amount. All heifers grazed a single pasture and were individually fed their respective supplements, from July 16 to October 8, 1985. Heifers were weighed at 28 day intervals after an overnight shrink. A mineral mix containing 55% dicalcium phosphate and 45% salt was provided free choice to all heifers.

Table 1. Supplement composition and feeding rates (as fed).

	Treatment		
	SBM 1.2 lb/day	CGF 2.8 lb/day	CGF/SBM 1.9 lb/day
Ingredients, %:			
Soybean meal	93.10	0.00	32.33
Corn gluten feed	0.00	96.38	62.66
Molasses	3.59	3.58	3.58
Dical	3.24	0.00	1.38
Vitamin A premix	0.07	0.04	0.05
Composition, %:			
Crude protein	41.11	17.89	25.90
TDN	74.41	73.99	73.94
Calcium	0.98	0.34	0.62
Phosphorus	1.22	0.71	0.94
Potassium	1.87	0.66	1.08
Supplied/day in supplement:			
Crude protein, lb	0.49	0.50	0.49
TDN, lb	0.89	2.07	1.40
Calcium, grams	5.34	4.32	5.34
Phosphorus, grams	6.65	9.02	8.11
Potassium, grams	10.19	8.39	9.32

### Results and Discussion

Average daily gains were .83, 1.25, 1.64 and 1.51 lb/day for the Control, SBM, CGF and CGF/SBM groups, respectively (Table 2). Heifers fed no supplement gained 70 pounds from July 16 to October 10, 1985.

Table 2. Heifer weights, weight gain and lb supplement/lb added gain.

	Treatment <sup>a</sup>			
	Control 0 lb/day	SBM 1.2 lb/day	CGF 2.8 lb/day	CGF/SBM 1.9 lb/day
No. heifers/treatment	10	11	11	11
Initial wt, 7/16/85	652 <sup>b</sup>	644 <sup>c</sup>	644 <sup>d</sup>	646 <sup>cd</sup>
Final wt, 10/8/85	722 <sup>b</sup>	749 <sup>c</sup>	782 <sup>d</sup>	773 <sup>cd</sup>
Weight gain, lb	70 <sup>b</sup>	105 <sup>c</sup>	138 <sup>d</sup>	127 <sup>cd</sup>
Weight gain, lb/day	.83 <sup>b</sup>	1.25 <sup>c</sup>	1.64 <sup>d</sup>	1.51 <sup>cd</sup>
Pound supplement/lb added gain	---	2.88	3.46	2.80
Cost/lb of added gain	---	\$0.26	\$0.20	\$0.18

<sup>a</sup>Supplements fed 5 days/week (Monday through Friday).

<sup>bcd</sup>Means with different superscript letters are significantly different (P<.01).

During the 84 day treatment period, feeding 1.2 lb/day of SBM supplement increased gains 35 pounds over the unsupplemented control (105 vs 70), a conversion of 2.88 lb of supplement per pound of added gain. Feeding 2.8 lb of CGF supplement per day improved gains by 68 pounds (138 vs 70) with a conversion of 3.46 lb supplement per pound of added gain. The heifers fed 1.9 lb of CGF/SBM supplement gained 127 lb with a conversion of 2.8 lb of supplement per pound of added gain. The CGF and CGF/SBM supplements which provided additional energy to the animal in the form of digestible fiber had conversions similar to those heifers receiving SBM supplement. This can be compared to a previous OSU study (Lusby et al., 1982) in which 8.8 lb of a corn/SBM supplement were required for each pound of added gain. Supplements in the present study were fed daily Monday through Friday, whereas corn in the previous trial (Lusby et al., 1982) was fed 3 days per week. Therefore, it is not known if feeding corn gluten feed supplements 3 days/week would affect the efficiency of supplement to added gain. The daily feeding of corn supplements would likely improve performance over feeding relatively large amounts less frequently. At a cost of \$180/ton (9 cents/lb) for SBM and \$116/ton (5.8 cents/lb) for CGF, the feed cost per pound of added gain was \$0.26 for the SBM supplemented heifers, \$0.20 for the CGF supplemented heifers and \$0.18 for the CGF/SBM supplemented heifers.

Temperatures were average and moisture was above average during the trial period. Pastures had abundant forage; total clip samples on an adjacent pasture had crude protein of 5.6, 5.0, 4.4, and 4.4% for July 14, July 25, August 14 and August 31, respectively. The increased gains from feeding a small amount of SBM supplement was likely the result of increased fiber digestibility and forage intake. Based on the weight gains of the CGF and CGF/SBM groups, corn gluten feed does not appear to have a negative effect on forage digestibility and intake; therefore, the consumption of higher levels of supplemental TDN may be increasing the total energy available to the animal.

In summary, the results of this study suggest CGF fed alone or with SBM effectively increase total energy intake by the animal. The feeding of additional energy in the form of highly digestible fiber does not appear to have the negative effects on forage digestibility and intake.

### Literature Cited

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