

# Energy vs Protein Supplementation of Steers Grazing Native Range in Late Summer

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## Story in Brief

Thirty-six Hereford and Hereford X Angus crossbred calves weighing about 350 lb were grazed on native range from July 20 to September 15, 1982. Steers were divided into four groups and fed no supplement (control), .8 lb/day of protein supplement with and without Monensin<sup>®</sup>, and 3.0 lb/day of a 10 percent protein corn-based supplement. Soybean meal was the protein source. Supplements were fed on Monday, Wednesday and Friday. Average daily gains for the 56-day period were 1.35, 1.72, 1.77 and 1.38 pounds, respectively. Pounds of supplement per pound of added gain were 2.16, 1.90 and 60.0 for the .8 lb with and without Monensin<sup>®</sup>, and for the 10 percent protein supplements, respectively. These results are in agreement with a similar study conducted in 1981 and show that supplemental protein efficiently improves gains on native range in late summer. The small amount of supplemental protein apparently increases forage intake and digestibility.

## Introduction

Feeding small amounts of high protein meals to ruminants consuming low quality roughages has been shown to increase forage digestibility and intake. A previous study at OSU showed a .4 lb/day increase in daily gain from feeding .8 lb of a protein meal to 575 lb steers from mid-July to mid-October. If efficient increases in weight gains can be accomplished with small amount of protein, the costs of summer grazing could be reduced. The objective of this research was to verify the effectiveness of supplementation with small amounts of protein with and without Monensin<sup>®</sup> vs an energy supplement fed to light-weight steers grazing native range in late summer.

## Experimental Procedures

Thirty-six Hereford and Hereford X Angus crossbred steers, about nine months old, were allotted by breed to four treatments. Treatments were: (1) control, no supplement; (2) .8 lb per day of a 39 percent protein supplement; (3) .8 lb per day of a 39 percent supplement to provide 80 mg Monensin<sup>®</sup> per head per day; and (4) 3.0 lb per day of a 10 percent protein supplement. Composition of the supplements is shown in Table 1. Treatments 2, 3 and 4 provided the same amounts of supplemental protein, but treatment 4 provided additional supplemental energy. Each supplement provided about 9 g. of calcium, phosphorus and potassium per day. All supplements were fed on

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**Table 1. Supplement composition (percentage as fed).**

Ingredients, %	Treatment		
	2 .8 lb/day 39% protein	3 .8 lb/day 39% protein with Monensin®	4 3.0 lb/day 10% protein
Soybean meal	87.5	87.5	4.0
Corn	—	—	92.85
Limestone	1.5	1.5	.6
Dicalcium phosphate	10.0	10.0	1.8
Potassium chloride	1.0	1.0	.75
Rumensin 60® (60 gm/lb)	—	3.3 lb/ton	—

Monday, Wednesday and Friday with supplement amounts prorated to give the prescribed daily amount. Salt and minerals were provided free-choice for control steers.

The trial was conducted at the Lake Carl Blackwell Range 10 miles west of Stillwater in North Central Oklahoma. Liberal stocking rates (9 acres/steer) and 2-week pasture rotation between treatments were used to reduce chances of pasture effects. Weights of the steers were taken after the steers were held off pasture and water overnight.

## Results and Discussion

Gains of steers and pounds of supplement required per pound of added gain are shown in Table 2. Steers fed no supplement gained 1.35lb/day. Feeding .8 lb/day of protein supplement increased daily gains over the 56-day period to 1.72 lb/day with a conversion of 2.16 lb supplement per pound of added gain. Feeding Monensin® increased daily gain an additional .05 lb/day and improved the conversion of supplement to gain to 1.90 pounds of supplement per pound of added gain. Steers fed 3.0 lb/day of the 10 percent protein supplement gained 1.38 lb/day, only slightly more than the control steers.

**Table 2. Weight gains of steers fed protein and energy supplements.**

	Treatments <sup>a</sup>			
	Control No Supp.	.8 lb 39% Prot.	.8 lb 39% Prot. with Monensin® (80 mg/day)	3.0 lb 10% Prot.
No. steers/treatment	9	9	9	9
Initial wt., 7/20/82	335	361	339	339
Final wt., 9/15/82	411	457	438	416
Total gain, lb.	76 <sup>a</sup>	96 <sup>b</sup>	99 <sup>b</sup>	77 <sup>a</sup>
Daily gain, lb.	1.35 <sup>a</sup>	1.72 <sup>b</sup>	1.77 <sup>b</sup>	1.38 <sup>a</sup>
lb supp./lb added gain		2.16	1.90	60.0

<sup>a,b</sup>Means with different superscript letters differ ( $p < .05$ ).

Results of this study are in close agreement with a similar study in which the same .8 lb/day protein supplement and 3.0 lb/day energy supplement were fed to 575 lb steers on native range from mid-July to mid-October (Lusby, et. al., 1982). In the previous study gains for the control, .8 and 3.0 lb/day treatments were 1.46, 1.91 and 1.78 lb/day.

The efficient improvements in added gain for the protein supplement strongly suggests an increase in both forage intake and digestibility. Forage samples clipped to estimate forage being consumed by the steers are shown in Table 3. Range forage contained 7.7 percent crude protein (CP) and 52.3 percent in vitro dry matter digestibility (IVDMD) on August 6 and only 4.7 percent CP and 35.6 percent IVDMD on September 15. Both forage samples would have been deficient for light-weight steers to gain over 1 lb/day. The low protein content of the forage also explains the poor response to the energy supplement because protein would have been the first limiting nutrient in the diet. The response to Monensin® was lower than seen in many studies and may have been due to the Monensin® being fed in a protein supplement. One of the effects of Monensin® is to spare protein, and this effect would not be observed in a high protein supplement.

**Table 3. Crude protein and in vitro dry matter digestibility (IVDMD) of native forage grazed by steers**

Sampling date:	Crude Protein (% of DM)	IVDMD (%)
August 6	7.7	52.3
September 15	4.7	35.6

In order to observe the efficient increases in gain with the high protein supplements, there must be adequate range forage. The principle effect of protein with this type of forage is probably to increase forage intake and digestion and there must, therefore, be ample forage for the cattle. The application of these data to other forages such as fescue and bermuda is less clear and needs to be researched further.

If supplements used in this study were priced at \$245/ton, \$253/ton and \$135/ton for the .8 lb/day supplements with and without Monensin® and the 3.0 lb/day supplement, respectively, feed costs for each pound of added gain would have been \$0.26, \$0.24 and \$4.05, respectively.

### Literature Cited

Lusby, K.S., et. al. 1982. Okla. Agr. Exp. Sta. Rep. MP-112:36.