PERFORMANCE OF LIGHT WEIGHT STOCKER CALVES GRAZING SUMMER NATIVE RANGE WITH 25 OR 40% PROTEIN SUPPLEMENTS

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Story in Brief

Twenty-seven five month old Angus X Hereford calves were utilized to evaluate the efficacy of varying protein and energy levels on performance of light weight stocker cattle. Calves were randomly assigned to one of three treatments. Treatments were: NOR25, 25% protein (2.5 lb/d), HI40, 40% protein (1.5 lb/d) which is isonitrogenous with NOR25, and LOW40, 40% protein (1 lb/d). Calves were fed 5 days per week in three replications per treatment and feeding rate was prorated to a 5 day basis. All calves were managed as one herd while grazing native range. From July 19 to August 23 gain was significantly higher for NOR25 (53 lb) and HI40 (50 lb) than for LOW40 (39 lb), suggesting that protein was the limiting nutrient during this period. From August 24 to September 20 weight gains were similar for all treatments. During the third period, September 21 to October 11, NOR25 calves gained significantly more weight than HI40 and LOW40 (30 vs 22 and 20 lb). Total gain for the 84 day trial was higher for NOR25 (125 lb) than for HI40 (111 lb) which was greater than LOW40 (95 lb). It appears that both energy and protein is limiting in the light weight stocker calf. Early in the grazing season forage TDN:CP ratio may be decreased by protein supplementation. However, as forage quality decreases, light-weight stocker calves respond to additional energy. Total weight gain favored the use of both energy and protein but efficiency favors higher protein supplements.

(Key Words: Stockers, Supplements, Protein, Energy.)

Introduction

The stocker cattle industry has in recent years been forced to purchase younger, lighter-weight calves because of competition with feedlots for yearlings. This leads to the management of cattle with vastly different nutrient requirements than larger, older calves. While acceptable backgrounding gains on native range with supplements are often attainable with older calves, results may not be acceptable with young, light-weight calves. Development of specifications for supplements that could produce gains adequate to cover fixed and variable costs during growing period would obviously be beneficial to

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producers. Such supplements may need to provide more protein and energy relative to body weight than is needed for older stockers. The objective of these studies was to evaluate supplements for young, light-weight stocker calves grown on summer native range.

Materials and Methods

Twenty seven Angus X Hereford calves, born in February and March at the Range Cow Research Center west of Stillwater were early-weaned on May 22, 1994. Calves were allowed access to native hay and fed 2 lb per calf daily of 40% protein daily and maintained in a drylot. At weaning, all calves were vaccinated with 5cc ULTRABAC CSNS® (Beecham Labs). On July 15, 1994 all calves received were treated with an anthelmintic (IVOMEC®, Merck) and CATTLE MASTER 4®(Beecham Labs). Treatments (as-fed; Table 1) included: 2.5 lb/d of 25% protein pellet (NOR25), 1.5 lb/d of a 40% protein pellet which is isonitrogenous with NOR25 (HI40), and 1.0 lb/d of a 40% protein pellet (LOW40). A negative control (non-supplemented) group was not included in the trial, because weight gains would have been too low for meaningful application (Lusby et al., 1993). Daily feed quantity was adjusted to the 5 d/wk feeding schedule. Calves were allotted to three treatments by weight and sex. All calves were maintained in a common pasture throughout the trial with free access to water. Monday through Friday mornings (approximately 7:30 am), calves were sorted into replications and fed supplements in bunks measuring 3 x 6 feet, then returned to pasture (approximately 9:00 am). Three replications of three calves each based on sex and weight were used per treatment. Beginning and ending weights were taken after a 16 hour withdrawal from feed and water. Intermittent weights at intervals were taken directly off pasture.

Calf weight gains were analyzed using least squares analysis (SAS 1985). The model included treatment sex and replication. Main effects for treatment were tested with replication within treatment as the error term. All means comparisons were made using Tukey procedure of SAS with alpha set at .05.

Results and Discussion

Calves weighed about 261 lb at the beginning of the trail (Table 2). Supplements were consumed usually in the first 15 minutes and no rejections of feed were noticed throughout the 82 day trial. During the first weigh period (July 17-August 23) NOR 25 and HI40 gained more weight than LOW40 (50 and 53 vs 39 lb; $P<.05$). However, NOR25 and HI40 did not differ. These calves responded to the additional protein in the supplements compared to LOW40 (HI40, NOR25 supplied .6 lb/d vs .4 lb/d for LOW40), but the additional energy in the NOR25 did not enhance gains. This suggests the

calves were grazing forage with a high TDN:CP ratio and that additional supplemental protein provided adequate nitrogen to support equal gains between NOR25 and HI40.

During the second period (August 23 - September 20) all weight gains were similar for NOR25, HI40, and LOW40 (42, 39, and 36 lb, respectively). Weather conditions during the late summer period were hot and did not support grass growth.

During the third period NOR25 calves gained significantly more weight than HI40 or LOW40 (30 vs 22 and 20 lb). The additional energy in the NOR25 supplement increased weight gain during this period. The benefits of additional protein in the HI40 were not seen and may be explained by the declining quality of the native range during this period. As quality decreases TDN value of the forage declines to a point where additional protein cannot be utilized. The addition of protein without energy did not increase weight gain above LOW40.

The cost of added gain compared to feeding 1 lb/d of 40% supplement during the first and second weight period favored HI40 compared to NOR25 supplementation (LOW40, fed at a rate of 1 lb/d used as a base). However, during the third weight period calf gains and efficiency of added gain was better for NOR25. Overall pounds of feed per pound of added gain over LOW40 favored HI40 compared to NOR25 (2.6 vs 4.2 lb feed/lb gain).

Assuming supplement cost of $168/ton for NOR25, $212/ton for HI40, and $212/ton for LOW40, the cost of additional gain above LOW40 was $.35/lb for NOR25 and $.27/lb for HI40. The decision of which supplement to use will depend on the value of added gain and also ingredient prices for high vs medium protein supplements.

In conclusion, it appears that both energy and protein can be limiting weight gain in light weight stocker calves. Additional amounts of high-protein supplementation may be indicated early in the grazing season when forage TDN:CP ratio may be decreased by protein supplementation. However, as forage quality decreased during late summer (TDN:CP ratio decreases), the calves responded to additional energy as well as protein.

Table 1.Composition of supplements and amount fed.

	Percentage in ration as fed[a]		
	LOW40	HI40	NOR25
Soybean meal	91.3	90.7	34.9
Wheat middlings			59.1
Cane molasses	4.8	3.2	3.5
Limestone	2.9	4.2	2.6
Dicalcium phosphate	.93	1.9	.0
Amount fed/d[b]	1.0	1.5	2.5

[a] Rumensin was added to each supplement to provide 125 mg/d in NOR25 and 100 mg/d for HI40 and LOW40.

[b] 7-d basis. Supplements were prorated for 5-d/wk feeding schedule.

Table 2. Weight gains of light-weight stocker calves grazing native range with protein and/or energy supplementation

	Treatment		
	LOW40	HI40	NOR25
Initial weight, lb	262	260	261
Weight gain, lb			
7/19-8/23	39[a]	50[b]	53[b]
8/24-9/20	36	39	42
9/21-10/11	20[a]	22[a]	30[b]
Total Gain 7/19-10/11	95[a]	111[b]	125[c]
Lb supp/lb added gain[d]			
7/19-8/23		1.5	3.7
8/24-9/20		5.8	7.9
9/21-10/11		5.8	2.8
7/19-10/11		2.6	4.2
Cost of added gain, $			
7/19-8/23		.16	.31
8/24-9/20		.60	.66
9/21-10/11		.60	.23
7/19-10/11		.27	.35

[a,b,c] Means in same row not sharing a common superscript differ (P<.05).

[d] Lb supplement/lb gain using LOW40 as a base (i.e. control).

[e] Supplement costs were $168/ton NOR25, $208/ton HI40, $212/ton LOW40.