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

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Story in Brief

Trials were conducted to evaluate the efficacy of varying protein and energy levels on performance of light weight stocker cattle. Twenty-seven crossbred calves (year one, Yr1) and 56 calves (year two, Yr2) were randomly assigned to one of three treatments. Treatments were: NOR25, 25% protein (2.5 lb/day), HI40, 40% protein (1.5 lb/day) which provides the same daily crude protein with NOR25, and LO40, 40% protein (1 lb/day). Calves were fed five 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. Trials were initiated July 19, 1994 and July 18, 1995. Calves were weighed in 28-day intervals until the end of the grazing period October 11, 1995 Yr1 and September 28, 1995. During Period 1 NOR25 and HI40 calves gained faster compared with LO40. Additionally, NOR25 calves gained faster than HI40 calves (1.91 vs 1.73 lb). During Period 2 NOR25 and HI40 calves were similar in gain, but both gained faster than LO40 (1.57, 1.48 vs 1.33). During Period 3 NOR25 calves gained significantly faster than either HI40 or LO40 (1.62 vs 1.32, 1.30). Cost of added gain above LO40 favored the use of NOR25 compared with HI40 (.30 vs .38 $/lb of gain). Overall weight gains were higher in the NOR25 compared with HI40 and LO40. It appears that both energy and protein is limiting in the light weight stocker calf grazing native summer range.

(Key Words: Stocker Cattle, Supplementation, Early Weaning.)

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 applicable to young, light-weight calves. Development of specifications for supplements that could produce gains adequate to cover fixed and variable costs during the 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

Experimental Animals. Eighty-three (27 head Yr1, 56 head Yr2) Angus x Hereford calves born in February and March at the Range Cow Research Center west of Stillwater, OK were early-weaned approximately May 22 of each year. At the time of weaning calves were allowed access to native hay and fed 2 lb per calf daily of 40% protein and maintained in a drylot. At weaning all calves were vaccinated with 5cc ULTRABAC CSNS[1]. During Yr1 (July 15, 1994) all calves were treated with an anthelmintic[2] and CATTLE MASTER 4[1]. During Yr2 half the calves across treatments were given Ivomec pour-on[2]

Experimental Diets. Treatments (as-fed; Table 1) included: 2.5.lb/day of 25% protein pellet (NOR25), 1.5 lb/day of a 40% protein pellet which provides the same daily crude protein to NOR25 (HI40), and 1.0 lb/day of a 40% protein pellet (LO40). A negative control (non-supplemented) group was not included in the trial because weight gains would have been too low for meaningful application (Lusby, 1994). Daily feed quantity was adjusted to the 5-day per week feeding schedule. Calves were allotted to three treatments by weight and sex. All calves were maintained in a common pasture of native range throughout the trial with free access to water. Monday through Friday mornings (approximately 7:30 AM), calves were sorted into replications (8 replications/treatment) and fed supplements in bunks measuring 3 x 6 feet, then returned to pasture (approximately 9:00 AM). Beginning and ending weights were taken after a 16-hour withdrawal from feed and water. Intermittent weights at 28-d intervals were taken directly off pasture.

Statistical Analysis. Weight gains were analyzed using general linear models of SAS (SAS, 1985). The model included treatment, year and the two way interaction. There was no treatment x year interaction; therefore, the final model only included main effects, treatment and year. Main effects were tested with replication within treatment x year as the error term. Mean comparisons were made utilizing Tukey-method with alpha defined as .05.

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Results and Discussion

Calf Gains. Calves weighed 279 lb at the beginning of the trial (Table 2). Supplements were consumed usually in the first 15 minutes and no rejections of feed were noticed for both years. During Period 1 (July 17-August 23, Yr1; July 18 - August 12, Yr2) calves fed NOR25 and HI40 gained faster (P>.05) than LO40 (1.91, 1.73 vs 1.61 lb daily). Additionally, NOR25 calves gained faster (P<.05) than HI40 (1.73 vs 1.91 lb daily) during Period 1. Calves on the LO40 treatment did not get enough protein or energy to meet the requirements to attain equal growth with the two higher protein and energy supplements. The additional energy in the NOR25 treatment increased gains during this period above HI40.

During Period 2 (August 23 - September 2, Yr1; August 8 - September 15, Yr2) NOR25 gained faster (P<.05) than LO40 calves (1.57 vs 1.33) with HI40 being intermediate (1.49 lb. daily). Weather during the late summer period during Yr1 was hot and did not support grass growth and lowered mean treatment responses.

During Period 3 (September 29 - October 10, Yr1; and September 16 - September 28, Yr2) NOR25 calves gained significantly more weight compared with HI40 and LO40 (1.62 vs 1.32, 1.30 lb daily).

Overall rate of gain and total weight gain tended to be greater for NOR25 compared with HI40 (1.73 vs. 1.51 lb daily) The least weight gain was realized in the LO40 treatment. The additional energy in the NOR25 supplement increased weight gain over LO40 in all weight periods. The HI40 treatment was intermediate during most weight periods except the last. It would appear from these data that light weight calves require more protein and/or energy supplementation than offered in the LO40 treatment.

Year Effects. There was a significant year effect for practically every variable in the trial (Table 3). Beginning weights were higher for Yr2 compared with Yr1. This is probably due to the fact that calves utilized in Yr1 were early weaned from first calf heifers. Additionally, weight gain in periods differed, which is probably due to variations in herbage mass and quality between years. Calves grazed the same pastures in Yr1 and Yr2. During Period 3 in Yr2 all weight gains across treatments were poor. This period was short in terms of days, but it was hot and dry and calves on all treatments did poorly. Overall, year significantly affected gains in the calves. However, treatment responded in a similar magnitude for both years.

Cost of Gain. The cost of added gain compared to feeding 1 lb/day of 40% supplement as a base for Periods 1, 2, and 3 was lower for NOR25 compared with HI40 (Table 3.). Assuming supplement cost of $168/ton for NOR25, $212/ton for HI40, and $212/ton for LO40, the cost of additional gain above

LO40 was $.30/lb for NOR25 and $.38/lb for HI40. The decision of which supplement to use will depend upon 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 caves. The use of a 25% supplement showed a greater response in overall weight gain compared with feeding 1.5 lb of 40% supplement. Efficiency and cost of gain above 1 lb of a 40% favored the use of a 2.5 lb of a 25% compared with 1.5 lb. of a 40%. Light weight calves can attain an acceptable rate of gain if supplemented with enough energy and protein for a calf of this weight and age. Traditional management utilizing 1 lb of a 40% CP supplement may not be adequate due to relatively poor rates of gain as seen in these trials.

Literature Cited

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Table 1. Composition of supplements and amount fed.

	(% as fed)[a]		
	LO40	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/day[b]	1.0	1.5	2.5

[a] Rumensin was added to each supplement to provide 125 mg/day in NOR25 and 100 mg/day for HI40 and LO40.

[b] 7-day basis. Supplements were prorated for 5-day/week feeding schedule.

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

	Treatment		
	LO40	HI40	NOR25
Initial weight, lb	278	281	279
Weight gain, lb			
Period 1 (30 days), lb	48	51.9	57.2
Period 1 ADG, lb	1.61[a]	1.73[ab]	1.91[b]
Period 2, (31 days), lb	41	44.3	48
Period 2 ADG, lb	1.33[a]	1.48[ab]	1.57[a]
Period 3 (24 days), lb	31	32	42
Period 3 ADG, lb	1.30[a]	1.32[a]	1.62[b]
Total Gain, lb	118[a]	128[ab]	147[a]
Total ADG (85 days), lb	1.39[a]	1.51[ab]	1.73[b]
Lb sup/lb added gain[d]			
Period 1 (30 days)		3.8	5.0
Period 2 (31 days)		5.1	6.5
Period 3 (24 days)		12.0	3.6
Total (85 days)		3.8	4.3
Cost of added gain, $[e]			
Period 1		.37	.34
Period 2		.51	.45
Period 3		1.2	.24
Total		.38	.30

[a,b,c] Means within a row with uncommon superscripts differ P <.05.

[d] Lb supplement/lb gain using LO40 as a base (i.e. control).

[e] Supplement costs were $168/ton NOR25, $208/ton HI40, $212/ton LO40.

Table 3. The effects of year of live weights of light weight stocker calves.

	Year 1	Year2
Beginning weight	258[a]	287[b]
Period 1	305[a]	342[b]
Period 2	344[a]	396[b]
Period 3	390[a]	394[b]
Total gain	120[a]	134[b]

[a,b] Means within a row with uncommon superscripts differ P<.05.