

WINTER PROTEIN SUPPLEMENTS FOR STOCKERS ON NATIVE RANGE

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Story in Brief

One hundred eleven crossbred beef steers averaging 491 lb were fed one of three winter supplements from November 11, 1983, until April 17, 1984. Supplements were 1) 14 lb/hd/wk of a 42 percent CP cube (HP) 2) 16 lb/hd/wk of a 23 percent CP cube (LP) and 3) 16 lb/hd/wk of a 23 percent cube containing .05 percent sarsaponin (LPS). During the winter, HP steers gained 5 lb/hd while the LP and LPS groups lost 8 and 34 lb/hd, respectively. From April 17 to July 20, cattle were grazed on native range unsupplemented; gains were 229, 243 and 243 lb/hd for the HP, LP and LPS groups, respectively. As generally noted, despite differences coming out of the winter period, steers compensated and there were no differences in group weights on July 20.

(Key words: stocker cattle, winter, protein supplements, rangelands)

Introduction

Winter nutrition of stocker cattle on native range is of interest since feeder cattle prices are generally lower in late fall than in the spring months. However, the expense of maintaining the cattle through the winter with little or no weight gain can make a dry-winter program unattractive. Besides interest on borrowed capital, supplemental feeds are the primary costs of these programs. Thus, any method of improving winter performance or reducing feed costs for maintenance would be of value to the cattleman.

Sarsaponins are a group of naturally occurring steroid saponins of the yucca plant and have been suggested to enhance rumen fermentation. On high concentrate diets, performance responses most often occur when dietary protein is marginal. In dairy cows, both ruminal and total nitrogen and organic matter digestibilities were increased by supplementing a 50 percent concentrated diet with sarsaponin (Goetsch and Owens, 1984). Total tract fiber digestibility also tended to be higher on the sarsaponin diet. Other work has shown that certain fractions of sarsaponins have urease-inhibiting properties (Goodall, personal communication). Since dry wintered stockers exist on diets with marginal protein, rely on nitrogen recycled to the rumen as urea and could also benefit from enhanced organic matter, fiber and nitrogen digestion, the following study was conducted to monitor the influences of sarsaponin in a low-protein supplement on winter steer performance.

Materials and Methods

On November 11, 1983, 111 head of crossbred beef steers averaging 491 lb were weighed and allocated to one of the three winter feeding treatments. The steers were assembled by a cooperator and delivered to the Pawhuska Research Station after an initial receiving period. The

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three winter feeding treatments were 1) 14 lb/hd/wk of a 42 percent CP cube (HP) 2) 16 lb/hd/wk of a 23 percent CP cube (LP) or 3) 16 lb/hd/wk of the 23 percent CP cube containing .05 percent sarsaponin (LPS). Composition of the supplements are shown in table 1. The treatment groups were pastured separately on three native tallgrass pastures. Pastures were rotated bi-weekly to remove any effect of location or pasture. Salt, mineral and fresh water were available free choice. The cattle were weighed off trial on April 17, 1984, and subsequently allocated to grazing management treatments for the summer. Steer weights were measured again on July 20 to determine if winter performance influenced early summer gains on pasture. All weights (November, April and July) were taken in the morning after a 12 to 16 hour overnight period without feed or water. Supplement influences on winter weight gain and subsequent summer gains were analyzed by analysis of variance. A protected LSD was utilized to separate treatment means.

Table 1. Supplement composition, as-fed basis.

Ingredient, %	Supplement		
	HP	LP	LPS
Soybean meal	50.00	20.00	20.00
Cottonseed meal	48.89	20.00	20.00
Corn, ground	---	42.14	42.14
Alfalfa, ground	---	15.00	15.00
Vitamin A	.11	.11	.11
Dicalcium phosphate	1.00	2.70	2.70
Sevarin	---	---	.06

Results and Discussion

The winter of 1983-84 was characterized by periods of extremely harsh, cold weather with subzero chill factors occurring for several days at a time. This unusually cold weather undoubtedly had an influence on steer gains recorded in this trial. Winter weight gain ranged from -102 to +65 lb for all 111 head. The range of weight losses noted within each treatment group were similar; however, the mean weight gains (losses) varied between treatments. The HP group gained 5 lb/hd over the winter while the LP group lost 8 lb/hd. Adding sarsaponin to the LP cube reduced weight gains ($P < .05$). From previous work with other types of diets, one might have expected sarsaponin to moderate differences between the HP and LP treatments. The reduction in weight gain may be related to the urease-inhibiting properties of the sarsaponin. Ruminants on diets with marginal and/or deficient protein contents depend upon nitrogen which is conserved and recycled into the rumen as urea. If ruminal urease activity was inhibited then ruminal forage digestion, forage intake and total nutrient supply to the animal may have been reduced.

The previous winter, another group of steers gained 50 lb/hd from January 4 to April 14 (Gill et al., 1984). Those cattle had received either 9 lb/hd/wk of a 38 percent cube or 13 lb/hd/wk of a 25 percent CP cube. From these results, 1.25 lb/hd (9 lb/hd/wk) was suggested as a minimum supplementation level for 500 lb steers on dormant winter range.

The disparity between the current trial and the previous year complicate any feeding recommendations. Generally, 2 lb/hd/day of a 40 percent CP supplement would be expected to produce 0 to .5 lb/day gain (Gill, personal communication). Despite differences in winter gain, steers in the current study compensated and by July 20 there were no statistical differences in steer weights (table 2).

Table 2. Winter and summer performance of steers receiving high protein, low protein or low protein plus sarsaponin during dry winter phase.

	HP	LP	LPS
No. of steers	37	37	37
Weekly supplement, lb/hd/wk	14	16	16
Initial weight, lb (11/11/83)	490	489	496
Final weight, lb (4/17/84)	495 ^a	481 ^{ab}	462 ^b
Winter gain, lb/hd	5 ^a	-8 ^b	-34 ^c
Summer weight, lb (7/20/84)	724	724	705
Early summer gain, lb/hd	229 ^d	243 ^e	243 ^e

^{a,b,c}Means with different superscripts are different (P<.05).

^{d,e}Means with different superscripts are different (P<.10).

In summary, winter gains were lower than expected for the rates of supplementation. Severe cold weather may have reduced performance below the anticipated level. Addition of sarsaponin reduced steer performance significantly. This influence may have resulted from inefficient utilization of recycled nitrogen. Unfortunately, a 42 percent CP + sarsaponin cube could not be tested due to limited pasture space.

Literature Cited

Goetsch, A.L. and F.N. Owens. 1984. Sarsaponin and site of digestion and passage rates in dairy cows. OAES MP-116, pp. 79-82.