Liquid Feed Supplements for Stocker Cattle Grazing Native and Bermudagrass Pasture During Late Summer

D.L. Lalman, K.C. Barnes, F. Sticklen, B.E. Caldwell, D.D. Skidgel, H.T. Purvis II, and C.R. Krehbiel

Story in Brief

Two experiments were conducted to determine the effectiveness of liquid supplements to enhance the performance of stocker cattle during midsummer and early fall. In Exp. 1, 43 steers and heifers grazed bermudagrass pastures in East Central Oklahoma from June 21 through August 15 for a total of 55 d. Experimental treatments included no supplement (Control), 20% crude protein liquid supplement (Liquid 20), or 24% crude protein liquid supplement containing 150g/ton lasalocid (Liquid 24B). Excessive rainfall resulted in abundant forage growth throughout the experiment and moderate to high forage protein concentration (10 to 14% CP). Supplemental treatment did not significantly affect animal performance, apparently due to adequate forage protein concentration. In Exp. 2, 47 steers grazed native tall grass prairie pastures in Central Oklahoma from July 17 through November 14 for a total of 120 d. Forage protein concentration was moderate initially, and extremely low (3.5%) by the termination of the study. Liquid 20 supplemented steers consumed 4.8 lb of supplement per day, although their performance was not different from that of Control steers. Conversely, steers receiving Liquid 24B gained .44 lb more per day compared to Control cattle. Performance of cattle grazing low quality native pasture during late summer and early fall was improved when supplemented with a lasalocid-containing liquid feed.

Key Words: Supplementation, Stocker Cattle, Lasalocid, Protein

Introduction

Cattle grazing native warm season grasses typically gain between 2 and 3 lb/d during spring and early summer. However, weight gains of nonsupplemented cattle frequently fall below 1.5 lb/d during late summer and early fall. A rapid decline in forage quality is the principal factor causing reduced animal performance. Previous research has shown that small amounts (.9 to 1.2 lb/d) of oilseed meal supplementation can result in increased rate of weight gain by .27 to .49 lb/d.

Due to the low margin nature of the cattle business, large stocker cattle operations must minimize capitol equipment and labor inputs. Liquid feed supplementation programs require minimal labor and capital investment, but have not been examined thoroughly for their potential to enhance stocker cattle performance during late summer and early fall.

Materials and Methods

Two experiments were conducted to evaluate the effects of liquid supplements on stocker cattle performance during late summer and early fall. In Exp. 1, 43 weaned fall-born steers and heifers (initial weight = 544±21 lb) grazed bermudagrass pastures at the Eastern Research Station near

Haskell, OK. The Angus sired calves were weaned, weighed, vaccinated and dewormed with Ivomec Plus® on June 12, 2000. The experimental grazing period was initiated on June 21 and continued through August 15, 2000, for a total of 55 d. Steers and heifers were arranged by weight and randomly assigned (within sex) to one of three treatments: 1) no supplement (Control); 2) free-choice access to 20% crude protein liquid supplement (Liquid 20); or 3) free-choice access to a 24% crude protein liquid supplement containing 150 g/ton Lasalocid (Bovatec®) (Liquid 24B). Chemical composition of the supplements is shown in Table 1. Each treatment group was randomly assigned to one of three pastures containing predominately bermudagrass forage. Supplements were provided in covered plastic tanks with lick wheels. The cattle were weighed at trial initiation, mid-point and termination after a 16-h removal from feed and water. The cattle and supplements were rotated through the pastures on a bi-weekly basis. Forage availability and clipped forage sample nutritive value was estimated at trial initiation and termination. Forage nutritive value was also determined using forage samples that were hand plucked at trial initiation, mid-point and termination. Individual animals were considered the experimental unit with sex, treatment and the sex x treatment interaction included in the statistical mode SAS (SAS Inst. Inc., Cary, NC).

Table 1. Nutrient and chemical composition of liquid supplements (DM basis)

	Treatment[a]	
Item	Liquid 20	Liquid 24B
Dry matter, %	67.0	65.0
TDN, %	89.6	72.3
Invert sugars, %	53.7	36.9
Crude protein, %	29.9	36.9
Equivalent CP - NPN, %	25.4	24.6
Calcium, %	.9	.5
Phosphorus, %	.7	1.5
Potassium, %	3.0	4.6
Magnesium, %	.5	.2
Sulfur, %	.6	1.0
Vitamin A, IU/lb	29,851	46,154

[a]Liquid 20 = 20% crude protein, as fed basis and Liquid 24B = 24% crude protein, as fed basis, with 150 g/ton Bovatec®

Experiment 2 was conducted similarly with the following modifications. This experiment was conducted in eastern Noble County on tall grass native pasture. Forty-seven crossbred steers (initial weight = 521±19 lb) were arranged by weight and sequentially allotted to the same three treatment groups as described in Exp. 1. The experimental grazing period began on July 17, 2000, and continued through November 14, 2000, for a total of 120 d. Three adjacent 40-acre pastures were used and the cattle were rotated through the pastures on approximately 30-d intervals. Forage availability and nutritive value was estimated at study initiation and termination.

Results and Discussion

Experiment 1. Abundant summer rainfall resulted in rapid forage growth and accumulation during the grazing period (Table 2). High ambient temperatures, adequate soil moisture and soil fertility resulted in significant crabgrass accumulation in these bermudagrass pastures. Consequently, forage protein concentration was relatively high throughout the experiment (Table 3), although it declined (P<.01) over time. The high concentration of NDF and ADF shown in Table 3 is evidence that the forage was relatively mature throughout the experiment. Four calves experienced severe pinkeye infection during the experiment. Animal performance data from these animals were retrospectively removed from the weight and daily gain analysis. Overall, performance of the calves in this experiment was marginal at best (Table 4), averaging less than 1 lb per head per day. Perhaps high temperatures and humidity, coupled with relatively mature forage provide a partial explanation for poor animal performance. There was no difference in weight gain due to supplementation or supplement type (Table 4). Apparently, forage protein concentration was adequate to maintain the marginal rate of weight gain and heat stress or energy availability was first limiting. Intake of the Liquid 24B supplement resulted in an average lasalocid intake of 110 mg per head per day, compared to the targeted and recommended dose of 200 mg.

Table 2. Forage availability by date and location

Date	Forage availability, lb/acre
Exp. 1, Bermudagrass	
6/22	5,299
8/15	11,180
Exp. 2, Native	
7/17	4,312
11/14	2,930

Table 3. Forage chemical composition (DM basis) by sample date and sample type

Sample date and type	Ash	Protein	NDF	ADF
Exp. 1, Bermudagrass				
Clipped				
6/22	9.5	11.6[a]	76.9	50.1
8/15	9.0	7.8[b]	78.9	50.7
Plucked				
6/22	8.6	13.6[a]	75.1	46.2
7/19	7.8	10.4[b]	75.4	44.3
8/15	7.6	9.7[b]	75.0	43.4
SE	.4	.5	.9	1.4
Exp. 2, Native, clipped				
7/17	6.3	7.9[a]	73.0[a]	43.6
11/14	6.2	3.5[b]	76.8[b]	48.8
SE	.5	.7	1.0	1.9

[a,b]Values within a column and sample type with uncommon superscripts are different (P<.01).

Table 4. Effect of liquid supplement on performance of steers and heifers grazing

bermudagrass pasture. (Exp. 1)				
Item	Control	Liquid 20	Liquid 24B	SE
Initial wt, lb	549	536	535	21
Final wt, lb	600	595	583	22
ADG, lb	.93	1.07	.88	.1
Supplement intake, lb/day as fed	-	2.42	1.47	-

Experiment 2. Adequate forage availability was maintained throughout the study (Table 2). Forage protein concentration was marginal at the initiation of the experiment, but declined significantly by November, and, at less than 4% of dry matter, would be expected to severely limit animal performance (NRC, 1996). Similarly, forage ADF and NDF concentration was high during mid-summer and NDF concentration increased (P<.01) by November (Table 3). There was no difference in performance of Control steers and steers receiving Liquid 20 supplement, although supplement intake was high throughout the study (Table 5). Lack of response in the Liquid 20 group cannot be explained at this time, particularly since supplement intake was adequate and forage protein concentration was extremely low. Steers receiving Liquid 24B were heavier at study termination (P<.05) and gained 77% faster (P<.01) compared with Control steers. Intake of Liquid 24B resulted in average daily lasalocid intake of 188 mg. Apparently, cattle receiving Liquid 24B made more efficient use of supplement, forage or both. Further research is warranted to determine the effectiveness of liquid supplements to enhance performance of cattle grazing pasture during late summer and early fall.

Table 5. Effect of liquid supplement on performance of steers grazing tall grass prairie (Exp. 2)				
Item	Control	Liquid 20	Liquid 24B	SE
Initial wt, lb	521	514	529	20
Final wt, lb	589[a]	587[a]	650[b]	21
ADG, lb	.57[a]	.60[a]	1.01[b]	.08
Supplement intake, lb/day as fed	-	4.84	2.51	-
[a,b]Means within a row with uncommon superscripts differ (P<.05).				

Literature Cited

NRC. 1996. Nutrient Requirements of Beef Cattle. 7th Revised ed. National Academy Press, Washington, DC.

Acknowledgements

Appreciation is extended to Dan Ripley, Ripco Farms for supplying cattle, pasture and labor for this experiment. Special thanks to Tommy Pickard, Duane Miller and Ted Newell for their assistance and to Quality Liquid Feeds and Alpharma for providing products and financial support for these experiments.