Comparison of Medicinal Feed Additives on Health and Growth Performance of Beef Calves Grazing Native Grass Pasture

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Introduction

Optimizing growth rate is an important contributor to overall profitability for stocker cattle grazing native Flint Hills pasture. Disease challenges from pinkeye and foot rot have traditionally been problems that compromise health and productivity of stocker cattle in this grazing region. Use of medicinal feed additives as a part of a supplementation program may prevent health problems and improve overall productivity during a spring/summer grazing season.

Experimental Procedures

A 90-day grazing study was conducted at the Kansas State University Beef Stocker Unit starting in May 2008 to determine the efficacy of supplementation programs that provide medicinal feed additives for managing growth and health of stocker calves grazing native grass pastures in the Flint Hills region of Kansas. All steers used in this study (306 head) were previously involved in a receiving study that focused on arrival mass medication programs. Off-test weights collected at the conclusion of the receiving study were used to randomly assign each animal to grazing treatments. Steers were assigned to two grazing treatments with six pasture replicates per treatment. All paddocks were stocked at 250 lb beef per acre.

On April 30, all calves were tagged, dewormed with Eprinex (Merial, Duluth, GA), and sorted to their preassigned paddock groups. The grazing season began on May 1 and ended on July 30. Treatment 1 (herein referred to as BA) consisted of a free-choice mineral formulated with Bovatec and Aureomycin (Alpharma Inc., Ridgefield Park, NJ; 200 and 350 mg/head per daily, respectively). Treatment 2 (herein referred to as RU) consisted of a free-choice mineral formulated with micronutrient content equal to BA but instead containing Rumensin (Elanco Animal Health, Indianapolis, IN; 200 mg/head daily). Both treatments were provided throughout the duration of the grazing study. Intake level for both self-fed supplements was targeted at 0.25 lb/head per day to achieve intended drug levels.

Mineral in the feeder of each paddock was checked weekly for manure, water, or other foreign matter that could interfere with normal supplement consumption. Bull Master feeders (Mann Enterprises, Inc., Waterville, KS) were used for mineral delivery in all paddocks. When inclement weather was forecasted, rubber flap covers on all feeders were closed to minimize moisture contamination. All flaps were reopened immediately after the threatening storm event. Each mineral feeder was weighed weekly, and the readings were recorded. The collected numbers were used to calculate the previous week's mineral intake. If mineral intake was beyond target, the feeder was moved further away from the primary water source. If this initial action did not effectively reduce mineral intake, salt blocks were placed next to feeders.

All calves were inspected daily for symptoms of sickness or lameness. Cattle diagnosed with foot rot and pinkeye received the label dosage of Bio-Mycin 200 (Boehringer-Ingelheim, Ridgefield, CT). First-treatment bovine respiratory disease diagnosed calves received the label dosage of Baytril 100 (Bayer Animal Health, Shawnee Mission, KS), and second-treatment bovine respiratory disease diagnosed calves received the label dosage of Nuflor (Intervet/Schering-Plough Animal Health, The Netherlands). Upon conclusion of the study, all steers were placed in drylot for 5 days and fed at a constant level of 2.5%/head per day (dry matter basis) to equalize gut fill. The diet consisted of cracked corn, wet corn gluten feed, prairie hay, and alfalfa hay. At the end of the 5-day post-grass period, all steers were individually weighed.

Performance and health data were analyzed by using the mixed model procedure of SAS (SAS Institute Inc., Cary, NC). Data were arranged in a randomized complete block design; pasture served as the experimental unit for growth and health outcomes as affected by treatment. In the model, fixed effects were treatment and pasture, and random effects were pasture × treatment, pasture, and animal ID. Percentages of foot rot morbidity and mortality were tested by using the Chi-Square test, and significance was declared at $P<0.05$.

Results and Discussion

Table 1 shows average intake of the supplemental mineral treatments during the 90-day grazing study. Although intake of the BA mineral slightly exceeded the targeted level, intake of the RU treatment was 40% lower than desired. Actual concentrations of Bovatec and Aureomycin were well within the desired dosage range, especially compared with the very low consumption of Rumensin that was realized as a consequence of poor mineral intake.

Figure 1 graphically depicts weekly mineral consumption throughout the entire trial and reveals a significant week × mineral treatment effect ($P<0.0001$). At the onset of the trial, BA mineral consumption exceeded desired intake targets. Intake of this mineral was abruptly reduced by week 6 and gradually increased to the desired intake target for the remainder of the study. In contrast, RU mineral intake never reached desired target levels.

Although RU mineral consumption was significantly less ($P<0.01$) than BA mineral consumption throughout the entire grazing season, there were no significant differences ($P=0.45$) in daily gain between treatments (Table 2).

There were no significant differences between treatments for pink eye and respiratory disease, (Table 3), but incidence of foot rot was reduced in cattle consuming BA mineral ($P<0.09$).

Table 1. Average intake of mineral mixes used in experiment

Item	Treatment: Aureomycin/ Bovatec	Treatment: Rumensin	SEM
No. of stockers	155	148	
No. of pasture groups	6	6	
Mineral intake, oz/head per day	4.22	2.39	0.01
Medication intake, mg/head per day – calculated (actual)			
Aureomycin	369 (325)		
Lasalocid	211 (186)		
Rumensin		120 (105)	

Table 2. Effect of mineral medication treatments on stocker performance

Item	Treatment: Aureomycin/ Bovatec	Treatment: Rumensin	SEM	P-value
On-test stocker weight, lb	583	582	4.1	0.84
Off-test stocker weight, lb	739	743	5.3	0.61
90-d daily gain	1.732	1.796	0.06	0.4495

Table 3. Effect of mineral medication treatments on incidence of stocker health problems

Item	Treatment: Aureomycin/ Bovatec	Treatment: Rumensin	SEM	P-value
No. of stockers	155	148		
Percentage of cattle treated for illness				
Foot rot	4.68	16.88	4.65	0.0930
Pink eye	0.63	0.0	0.45	0.3409
Respiratory diseases	0.67	0.62	0.64	0.9572

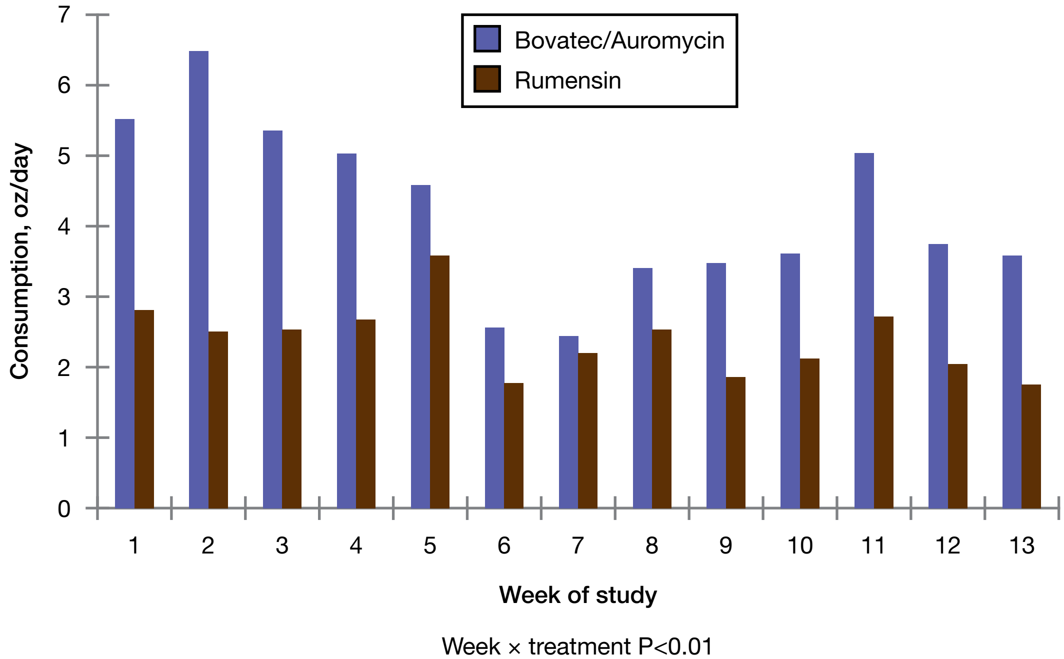

Figure 1. Weekly consumption of medicated mineral mixtures.