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Effect of Deworming Treatment on Weight Gain of Steers During Season-Long Summer Grazing

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Story in Brief

Ninety crossbred yearling steers were used to evaluate the effect of three deworming treatments on live weight gain during a 132-d spring and summer grazing program on mixed prairie in western Oklahoma. Nematode egg counts of fecal samples from some of the steers of each treatment were also measured. Deworming treatments compared an ivermectin sustained release bolus, ivermectin pour-on solution, and a levamisole drench. Average daily gain of all steers decreased from 2.73 lb during the first 28-d period that ended on May 21 to 1.18 lb during the last 28-d period that ended on September 2, 1997. Nematode egg counts of fecal samples of steers of the two ivermectin treatments decreased markedly after deworming in late April, and remained at low levels through the end of the trial. Egg counts for the July and September sampling dates were significantly higher in levamisole treated steers. Total weight gain of steers treated with the ivermectin bolus (295 lb) was greater than those treated with levamisole (251 lb). Gains of steers treated with ivermectin pour-on (279 lb) were intermediate and not different from either the ivermectin bolus or the levamisole drench.

(Key Words: Growing Beef Cattle, Summer Grazing, Deworming.)

Introduction

A sustained release bolus containing ivermectin was recently developed as an improved deworming treatment for beef cattle. The bolus is placed in the rumen where it releases ivermectin at a dose of 12 mg/d for 135 d. This continuous administration of ivermectin may be more effective than a one-time application because it will prevent reinfection over a longer period of time. The objective of this trial was to determine the effect of three different deworming treatments on performance of steers grazing mixed prairie during the spring and summer.

Materials and Methods

This study was conducted at the Southern Plains Experimental Range located 17 miles northwest of Woodward, OK. Average precipitation at the research range is 22.3 in per year. Soils are deep sands. Vegetation is a mixed prairie dominated by sand sagebrush, little bluestem, blue grama, and sand dropseed. Average forage production is 1000 lb/acre/yr. Long-term conservative stocking rates are 17 to 20 acres/animal-unit/yr.

Experimental livestock were cross-bred yearling beef steers. The steers were purchased in the late fall and early winter of 1996 in north-central Texas. After purchase, they were placed in a backgrounding lot for 30 d where they were vaccinated and dewormed with albendazole oral drench. The steers were then grazed on dormant range vegetation for about 90 d and fed a cottonseed supplement (38% crude protein) at a rate of 1.5 lb/head/d. In mid-April, the steers were gathered, weighed, and then allotted to 12 treatment groups based on initial weight. The steers were also implanted at this time with Synovex-S[4]. Four groups of steers were randomly assigned to one of three deworming treatments: ivermectin pour-on (25 ml/steer), ivermectin sustained release bolus (12 mg/d release rate), and a levamisole drench (10 ml/steer). The steers were immediately turned out on experimental pastures ranging from 50 to 54 acres in size except for one pasture that included 107 acres. Vegetation in the pastures was good to excellent mixed prairie. All pastures were stocked at a moderate rate of 5 acres/steer for the summer grazing season. Treatment groups were either 10 or 11 steers except one group of 21 steers that grazed the largest pasture. The steers were not supplemented during the trial but had free choice access to pure block salt.

Grazing began on April 24. Steers were gathered and weighed at 28-d intervals throughout the

summer grazing season. Grazing was terminated on September 2 after 132 d. The last gain period was only 19 d. On each weigh date, the steers were held off water and feed for at least 12 h before weighing.

Fecal samples were collected from two steers of each group on April 24, July 16, and September 2 while steers were being weighed. Fecal samples were refrigerated until laboratory analysis. Nematode eggs were separated by centrifugation and counted. Counts were expressed as total nematode eggs per gram. Fecal samples were not collected from the levamisole treatment groups in April.

Steer weight gains were analyzed as a completely randomized experiment with three treatments and four replications. The pasture was considered to be the experimental unit and individual weight gains of steers were averaged within pasture. Gains per steer and average daily gain were analyzed for each weigh period and for the entire trial. If treatment effects were significant (P=.05), differences among means were tested by the least significant difference (LSD) method. Nematode eggs per gram of feces were also analyzed as a completely randomized experiment. Each sample date was analyzed separately. Variances were not homogeneous across treatment groups so the egg counts were transformed as ln(egg counts+1) for the analysis of variance. The LSD was used to separate significant treatment effects. Means of egg counts are presented in the original units.

Results and Discussion

Growing conditions were good during the spring and summer of 1997. Precipitation from April to August was 19.8 inches compared with the long term average of 13.7 inches. Distribution of rainfall was excellent with July being the only month below average in precipitation.

Worming treatment affected steer gain in the first two gain periods. Steer gains were different for all worming treatments in the first gain period with the ivermectin bolus giving the highest gains and the levamisole drench the lowest (Figure 1). For the second period, the two ivermectin treatments were equal in gain, but both were greater than the levamisole treatment. After June 18, steer gains were similar for all worming treatments. Average daily gain declined steadily for all steers as the grazing season progressed. Over all three treatments, average daily gain declined from 2.73 lb in the first weigh period to 1.18 lb in the last weigh period. This is a common occurrence as forage matures and nutritive value declines. As forage quality and overall gain potential declines, there may be less chance for the steers to respond to worming treatment.

Total live weight gain of steers treated with the ivermectin bolus was greater than those treated with levamisole (Table 1). The ivermectin pour-on treatment was intermediate and not different from either the ivermectin bolus or the levamisole drench. Because the number of grazing days was equal for all treatments, average daily gains followed the same pattern as total gains (Table 1).

Nematode egg counts were equal in the two ivermectin treatments on all sample dates (Figure 2). Egg counts declined dramatically after the cattle were wormed in late April and remained at low levels through the end of the trial. Egg counts were significantly higher in the levamisole treated steers compared with the ivermectin treatments in both July and September. Although egg counts were higher in cattle treated with levamisole, weight gains of steers were not different among treatments during these periods.

Acknowledgement

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Table 1. Total live weight gain and average daily gain of steers over the full summer grazing season (132 d).

		Treatment	
Response	Ivermectin bolus	Ivermectin pour-on	Levamisole drench
Total gain, lb steer	295[a]	279[ab]	251[b]
Average daily gain, lb	2.23[a]	2.11[ab]	1.90[b]

[a]Means within rows with the same superscript are not significantly different, (P<.05).

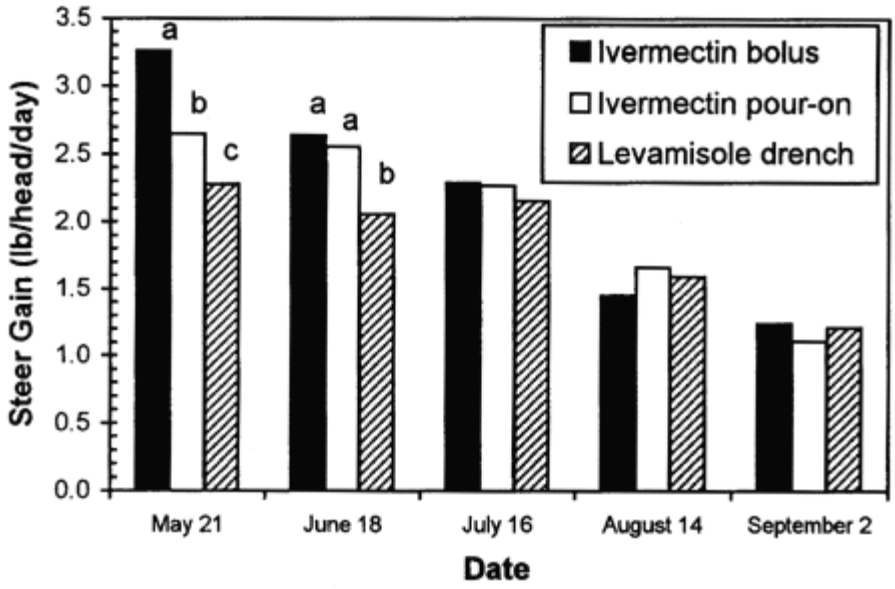

Figure 1. Average daily gain of steers for 28-day period prior to listed date. The gain period ending September 2 was 19 days. Bars within a date with different letters are different (P=.05).

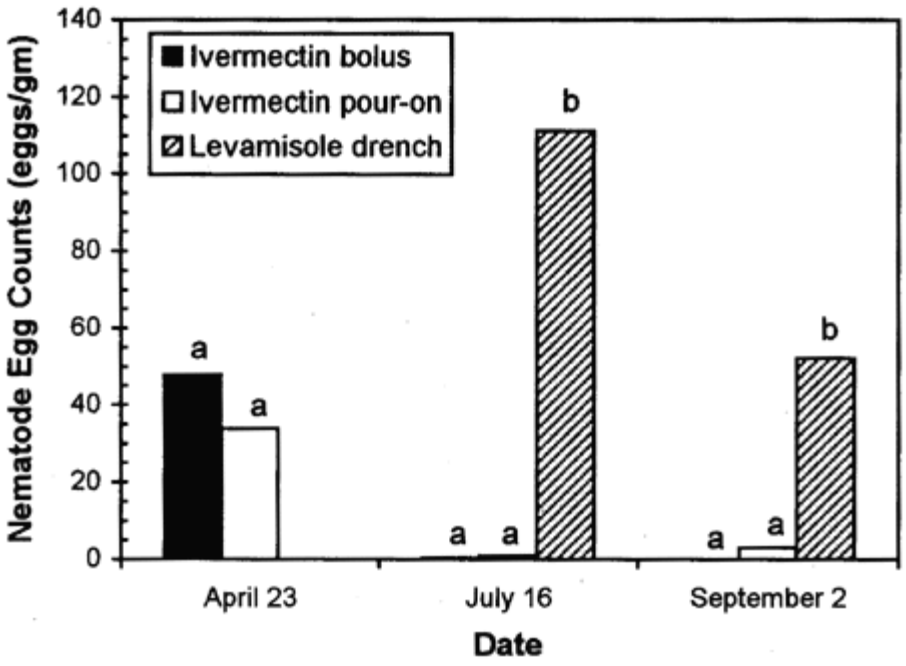

Figure 2. Nematode eggs in fecal samples for different dates. Steers on levamisole treatment were not sampled in April. Bars within a date with different letters are different (P=.05).

1998 Research Report - Table of Contents