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Performance of stocker heifers and steers grazing high endophyte fescue and offered oxytetracycline in a mineral mixture.

Abstract

Two experiments were conducted to evaluate the performance of stocker calves grazing high-endophyte fescue (68 to 70%) and offered oxytetracycline in a free-choice mineral supplement. In Experiment 1, 24 yearling crossbred heifers were utilized in a 112-day grazing study beginning on June 18. Performance of both control calves and those receiving oxytetracycline was extremely poor, making data interpretation difficult. Average oxytetracycline consumption was 327 mg per head, daily. Approximately 8296 of the total grazing time occurred during the daylight hours (6am - 10pm) for both treatment groups. Heifers offered the medicated mineral mix grazed 20 minutes more than heifers offered the control mineral mix. Hair scores and rectal temperatures were unaffected by oxytetracycline supplementation. In Experiment 2, fifty-three crossbred steers were utilized in an 83-day grazing study beginning on September 15. Steers were randomly divided into groups of 25 and 28. One group received a control mineral mixture, whereas the other received a similar mineral mix containing oxytetracycline, 250 mg per ounce. Steers fed oxytetracycline gained faster ($P < .05$) and tended to have lower ($P = .12$) rectal temperatures. Therefore, response of cattle to consumption of oxytetracycline from a mineral mixture may be variable. Heifers grazing endophyte infected tall fescue (Experiment 1) may not have gained sufficiently to support treatment differences. However, when cattle were gaining weight (Experiment 2), treatment differences were observed.

Keywords

Kansas Agricultural Experiment Station contribution; no. 88-363-S; Cattlemen's Day, 1988; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 539; Beef; Performance; Stocker heifers; Steers; High endophyte fescue; Oxytetracycline

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Performance of Stocker Heifers and Steers Grazing
High Endophyte Fescue and Offered¹
Oxytetracycline in a Mineral Mixture

Ken Coffey and Frank Brazle²

Summary

Two experiments were conducted to evaluate the performance of stocker calves grazing high-endophyte fescue (68 to 70%) and offered oxytetracycline in a free-choice mineral supplement. In Experiment 1, 24 yearling crossbred heifers were utilized in a 112-day grazing study beginning on June 18. Performance of both control calves and those receiving oxytetracycline was extremely poor, making data interpretation difficult. Average oxytetracycline consumption was 327 mg per head, daily. Approximately 82% of the total grazing time occurred during the daylight hours (6am - 10pm) for both treatment groups. Heifers offered the medicated mineral mix grazed 20 minutes more than heifers offered the control mineral mix. Hair scores and rectal temperatures were unaffected by oxytetracycline supplementation.

In Experiment 2, fifty-three crossbred steers were utilized in an 83-day grazing study beginning on September 15. Steers were randomly divided into groups of 25 and 28. One group received a control mineral mixture, whereas the other received a similar mineral mix containing oxytetracycline, 250 mg per ounce. Steers fed oxytetracycline gained faster ($P < .05$) and tended to have lower ($P = .12$) rectal temperatures. Therefore, response of cattle to consumption of oxytetracycline from a mineral mixture may be variable. Heifers grazing endophyte infected tall fescue (Experiment 1) may not have gained sufficiently to support treatment differences. However, when cattle were gaining weight (Experiment 2), treatment differences were observed.

Introduction

Tall fescue is the predominant cool-season forage in southeastern Kansas. It is characterized by high forage production and animal carrying capacity, but is often associated with poor animal performance, particularly during the summer months. Cattle grazing endophyte infected tall fescue often display a number of symptoms indicating a generally unhealthy status. Because antibiotics have been used to help improve performance of both grazing and feedlot cattle, the purpose of this study was to determine if free-choice consumption of oxytetracycline from a mineral mixture would improve performance by cattle grazing endophyte-infected tall fescue.

¹Oxytetracycline and partial financial support were provided by Pfizer, Inc. Lee's Summit, MO 64063.

²Southeast Kansas Branch Station and Southeast Kansas Area Livestock Extension Specialist, respectively.

Experimental Procedures

Experiment 1. Twenty-four yearling Limousin crossbred heifers were randomly allotted by weight to one of four pasture replicates of six head each. Each replicate then was randomly assigned to one of two salt mixtures, which were provided ad libitum. Two replicates received a control salt mixture, whereas two replicates received a similar salt mixture containing oxytetracycline (Table 13.1) at a level of 250 mg/oz. The salt mixtures were provided free-choice from covered "weather vane" mineral feeders. The cattle were placed on one of four 7.5 acre fescue pastures (70% endophyte infestation) for a 112-day grazing study beginning on June 18. Hair scores and rectal temperatures were measured at the beginning and end of the 112-day grazing study. Hair score was estimated on a scale of 1 to 10; 1 is a smooth short hair coat with no long hair and a 10 is a rough long hair coat with dead hair on at least 75% of the body.

Three heifers from each group of six were randomly selected for grazing behavior observations. Those heifers were fitted with grazing clocks, which recorded when and for how long the heifers grazed during a 7-day period. Grazing behavior was measured from July 16 to 23 and from August 18 to 25 on the same heifers.

Experiment 2. Fifty-three crossbred steers (512 lb) were randomly allotted to two groups and placed on separate endophyte-infected (68%) tall fescue pastures on Sept. 15. One group received a control mineral mix and one group received the same mineral mix with oxytetracycline used in Experiment 1, offered in "weather vane" mineral feeders. Body temperatures, hair scores, and weights were measured at the initiation and termination of the 83-day, fall grazing study.

Results and Discussion

Experiment 1. Mineral consumption (Table 13.2) tended to be greater ($P>.10$) when oxytetracycline was added to the mixture. Actual consumption of oxytetracycline was 327 mg/head/day, which was somewhat below the anticipated level of consumption, 400 mg/head/day.

Heifer performance was unaffected by oxytetracycline supplementation (Table 13.3). Heifers receiving no oxytetracycline in the mineral mixture actually gained .15 lb/day more ($P>.10$) than those receiving oxytetracycline. However, these differences are trivial considering the low total gain for the study. At gains of this magnitude, differences are more likely due to animal variability. Although not statistically different ($P>.10$), heifers offered oxytetracycline in the mineral mix tended to graze more, particularly during the daylight hours (Figure 13.1). Approximately 40% of the total daylight grazing time occurred between 6 and 10 pm for both groups (Figure 13.2). Proportions of the daylight grazing time occurring at the other 4-hour increments were similar between treatments.

Although final rectal temperatures were similar between treatments, heifers consuming oxytetracycline tended to have a greater reduction in temperature between the initial and final temperatures. Unfortunately, heifers allotted to the oxytetracycline treatment groups had higher initial hair scores ($P<.01$). Final hair

scores were similar ($P>.10$) resulting in a tendency for a lower magnitude of increase from heifers offered oxytetracycline.

Experiment 2. Mineral consumption tended to be greater ($P>.10$) when oxytetracycline was not included (Table 13.5). Average oxytetracycline consumption was 600 mg/head/d. Steers consuming the medicated mineral mixture gained 26.5% faster ($P<.05$) and their rectal temperatures tended to be lower ($P=.12$) than those of steers consuming nonmedicated mineral (Table 13.6). Hair scores were not affected by the adding oxytetracycline to the mineral mix.

Conclusions

Oxytetracycline had little effect on the heifers grazing tall fescue in Experiment 1. That might be attributed to the generally poor performance of all heifers. One possible solution would to have been to start the study earlier in the grazing season to take advantage of the spring growth of fescue. Another solution might have been to hand feed the oxytetracycline in a carrier of ground corn or grain sorghum. During the fall grazing experiment (Experiment 2), gains were adequate and treatment differences were apparent. Therefore, oxytetracycline supplementation in a free-choice mineral mixture may offset some of the performance reduction observed by cattle grazing endophyte-infected tall fescue. However, a response should be expected only in cattle that are in a weight gaining status.

Table 13.1. Composition of Mineral Mixtures Offered to Cattle Grazing Tall Fescue Pastures in Experiments 1 and 2

Ingredient	Control	Medicated
	-----	-----
		%
Trace mineralized salt	33	30
White salt	29	27
Dicalcium phosphate	27	25
Soybean meal	11	10
Terramycin 50	0	8

Table 13.2. Mineral Consumption by Heifers Grazing Tall Fescue Pastures, Experiment 1

Item	Control	Medicated
Mineral consumption, Oz./head/day	.8	1.3
Oxytetracycline consumption, mg/head/day	0	327

Table 13.3. Performance of Heifers Grazing Tall Fescue Pastures and Offered Oxytetracycline in a Mineral Mix, Experiment 1^a

Item	Control	Medicated
Initial wt., lb	729	730
Final wt., lb	750	734
Total gain, lb	21	4
Daily gain, lb	.19	.04

^aNo statistically significant ($P < .10$) differences observed.

Table 13.4. Temperatures and Hair Scores Heifers Grazing Tall Fescue Pastures and Offered Oxytetracycline in a Mineral Mix, Experiment 1

Item	Control	Medicated
Initial temp., F	102.6	103.1
Final temp., F	102.5	102.7
Temp. difference, F	-.1 ^a	-.4 ^b
Initial hair score	3.2 ^a	3.9 ^b
Final hair score	5.8	5.8
Hair score difference	2.6	1.9

^{a,b}Means within a row with unlike superscripts differ ($P < .01$).

Table 13.5. Mineral Consumption by Steers Grazing Tall Fescue Pastures, Experiment 2

Item	Control	Medicated
Mineral consumption, oz/head/d	3.1	2.4
Oxytetracycline consumption mg/head/day	0	600

Table 13.6. Performance of Steers Grazing Tall Fescue and Offered Oxytetracycline in a Mineral Mixture, Experiment 2

Item	Control	Medicated
No. of steers	25	28
Initial weight, lb.	518	508
Final weight, lb.	599	611
Total gain, lb.	81	103
Daily gain, lb.	.98 ^b	1.24 ^a
Final hair score	5.7	5.7
Rectal temperature, F	103.3	103.1

^{a,b}Means within a row with unlike superscripts differ ($P < .05$).

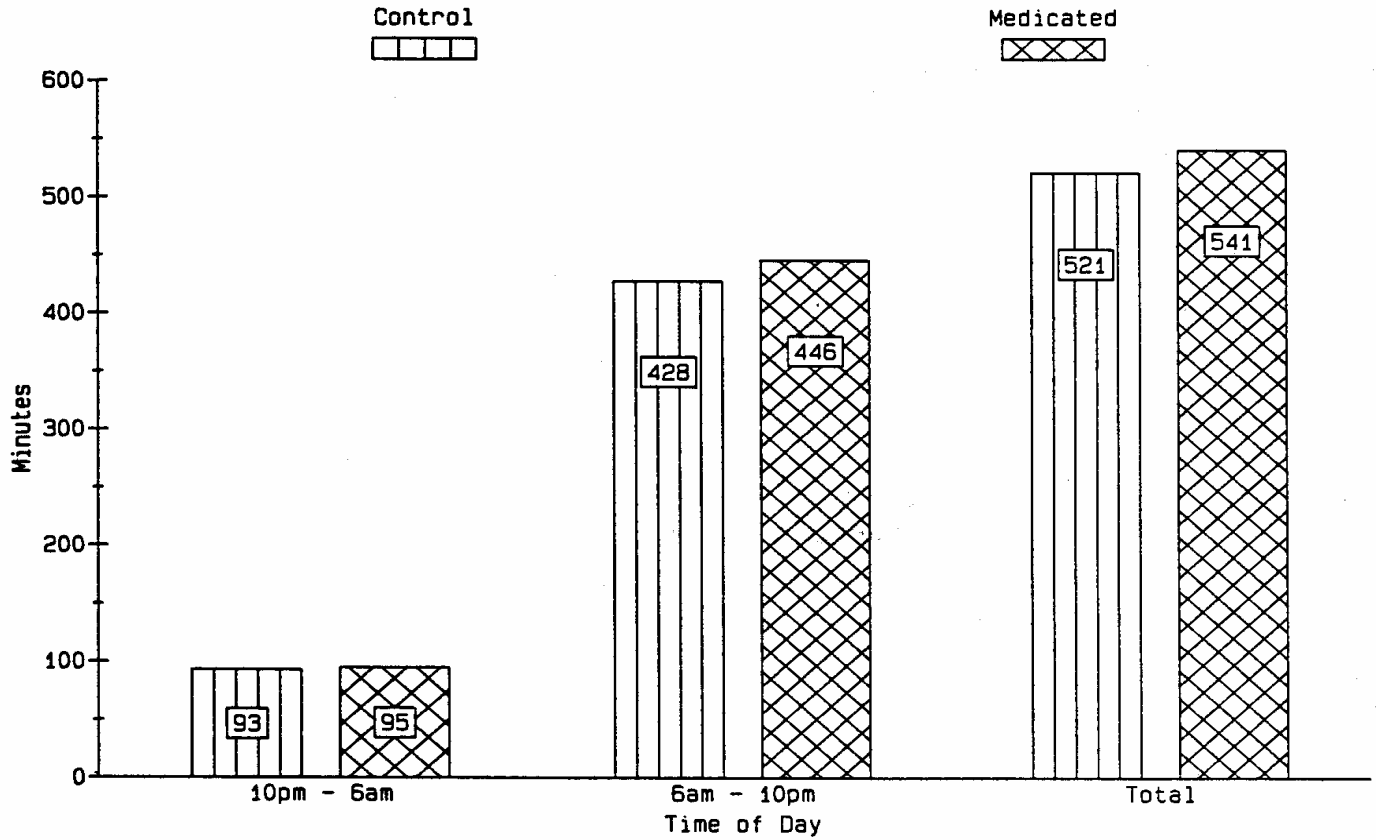


Figure 13.1. Grazing Time During Daylight and Night

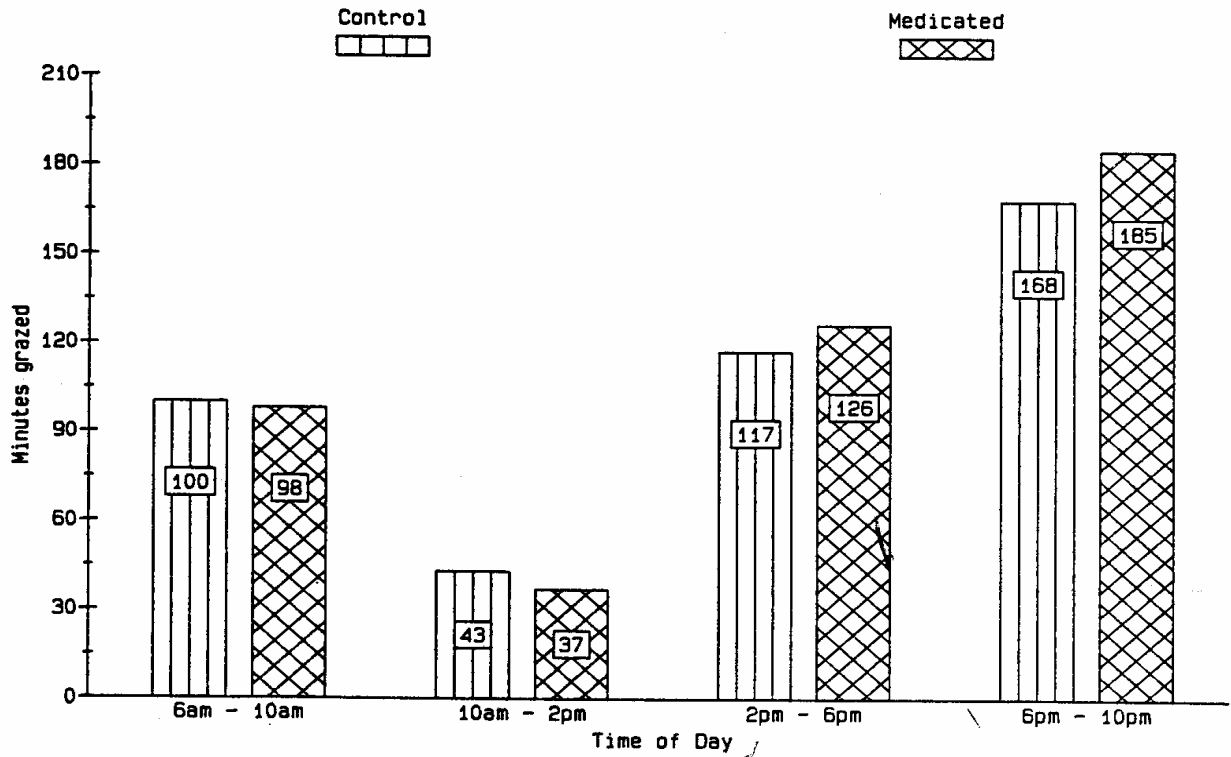


Figure 13.2. Grazing Time During Daylight Hours