PASTURE AND SUBSEQUENT FEEDLOT PERFORMANCE BY BEEF CATTLE GRAZING *ACREMONIUM COENOPHIALUM*-INFECTED TALL FESCUE AND OFFERED DIFFERENT LEVELS OF GROUND GRAIN SORGHUM

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Summary

One hundred twenty-six crossbred steers and sixty-three crossbred heifers (704 lb BW) were used to evaluate the effects of energy supplementation on animal performance during grazing of endophyte-infected tall fescue and on subsequent feedlot performance. Grazing ADG increased linearly ($P < .05$) from .70 lb/d for control (no supplementation) to .93 and 1.12 lb/d for cattle receiving .25% and .5% of BW as ground sorghum grain (SG), respectively. Initial feedlot weight was increased linearly ($P < .02$) by pasture SG levels. Feedlot daily gain, dry matter intake, and feed conversion; carcass characteristics; and liver abscess scores were not affected ($P > .10$) by SG that had been fed on pasture.

(Key Words: Sorghum Grain, Steers, Heifers, Grazing Performance, Feedlot Performance, Carcass Merit, Fescue, Endophyte.)

Introduction

Cattle grazing endophyte-infected fescue frequently show signs of fescue toxicosis or `summer slump' and are often discounted when purchased by feedlots. Various management practices have been applied to reduce these toxic effects. Sorghum grain has been used to improve rate of gain of grazing cattle, but cattle offered supplemental grain during grazing often exhibit reduced performance and efficiency in the feedlot. Supplemental grain reduces forage intake, so offering grain supplements to cattle grazing endophyte-infected fescue should dilute its toxic effects, which, in turn, should have a dramatic effect on animal performance. However, effects on subsequent feedlot performance remain unknown. This study was conducted to evaluate the effects of supplementation with different levels of ground sorghum grain on pasture and subsequent feedlot performance by beef cattle grazing endophyte-infected tall fescue pastures.

Experimental Procedures

Grazing Phase. Ninety crossbred yearling steers each year in 1990 and 1991 and 90 crossbred yearling heifers in 1992 were used in a 3-year experiment to determine the effects of different levels of supplemental ground grain sorghum on performance of stocker cattle grazing endophyte-infected fescue. During each grazing season, cattle were vaccinated against IBR, BVD, PI3, five strains of leptospirosis, seven clostridial strains, pinkeye, and BRSV; were dewormed; received an insecticide ear tag; and then were commingled for 7 days on a mixed pasture of endophyte-free fescue, bromegrass, and native grass. Cattle were randomly allotted by weight into nine groups of seven head each, then transported to one of nine 5-acre *A. coenophialum*-infected tall fescue pastures (70% of the plants infected), where they grazed for an average of 62 days. Pastures were randomly allotted such that steers grazing

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each of the nine pastures were assigned to a control (no supplement) or were offered ground sorghum grain at levels of .25% and .5% of body weight daily, with three pastures per grain level. The remaining 27 animals were evenly distributed across experimental pastures to control excess forage production. Water and mineral blocks containing Rumensin® (Monensin, 800 g/ton) were provided free-choice. Grain levels were adjusted according to interim weights measured at 21-day intervals.

Beginning and ending weights were measured on the mornings of two consecutive days without prior removal from pasture and water. Following ending weights, cattle were moved to endophyte-free pastures for a 5- to 7-day period to equalize gut fill. Cattle were then transported overnight to the Southwest Research-Extension Center, Garden City, KS for the feedlot phase of the trial.

Feedlot Phase. Cattle received into the feedlot were individually weighed and processed within 24 hours of arrival. Processing included implanting with Compudose® 200; de-licing and de-grubbing with Tiguvon® (Fenthion); and vaccinating against IBR, BVD, PI3, five strains of leptospirosis, seven clostridial strains, and *Haemophilus somnus*. Cattle were then divided into groups of 10 head and placed in feedlot pens overnight, with fresh bromegrass hay and water. A second initial weight was taken the following day. Animals were then sorted into pens with seven head each to maintain grazing-phase treatment structure.

All cattle received a starter ration on arrival and were stepped-up to a finishing diet (Table 1) over a 13-day period. Fourteen days after arrival, animals were revaccinated against IBR, BVD, PI3, and five strains of leptospirosis and were dewormed with Valbazen® (Albendazole). Deccox® (Decoquinate) was fed (180 mg/head daily) for an average of 20 days, then removed from the ration. Monensin and Tylan® (Tylosin) were then fed for 7 days at 150 and 90 mg/head daily, respectively. Monensin was then increased to 300 mg/head daily for the remaining feedlot period. During the 1992 study, the heifers received .40 mg/head/d of MGA® (melengestrol acetate) in the finishing ration.

Table 1. Percent Composition and Nutrient Analysis of Finishing Diets on a Dry Matter Basis

	Year		
Item	1990	1991	1992
Steam-flaked corn	76.3	75.0	0
Steam-flaked milo	0	0	75.3
Alfalfa hay	5.8	5.8	5.4
Corn silage	7.8	7.9	7.4
Molasses	2.4	1.3	1.3
Tallow	0	1.9	4.8
Supplement[a]	7.8	8.5	5.8
Dry matter	74.7	75.9	76.7
Crude protein	11.9	11.9	13.3
ADF[b]	6.0	6.9	11.1
NEm, Mcal/cwt	99	102	95
NEp, Mcal/cwt	68	69	62
TDN[c]	85.5	87.1	82.0
Ca	.97	.99	.91
P	.37	.36	.34
K	.90	.91	.96

[a]Pelleted supplement: Wheat millfeed, 29%; calcium carbonate 23%; dehy alfalfa, 15%; urea, 8.6%; potassium chloride, 7.9%; meat and bone meal, 5.1%; salt, 4.0%; ammonium sulfate, 4.0%; dicalcium phosphate, 2.3%; and trace mineral package, .75%.
[b]Acid detergent fiber.
[c]Total digestible nutrients.

Dry matter intake was recorded daily. Interim weights and 2-day final weights were measured before the once-a-day morning feeding to calculate rate of gain and feed conversion. Cattle were slaughtered at a local packing plant, and liver abscess scores were recorded. Carcass characteristics were measured after a 24-h chill.

Results and Discussion

Grazing Phase. Statistical analysis indicated no year by SG level interactions.

Pasture gain increased linearly ($P < .05$) with increasing SG level (Table 2). Each pound of supplemental SG produced .12 lb additional gain. Grain consumptions averaged across years were 0, 112, and 228 lb for the 0, .25%, and .5% GS levels, respectively.

Feedlot Phase. No year by SG level interactions were noted for any feedlot performance data. All animals experienced an average transit shrink of 5.9% (Table 2). Across treatments, fill losses were regained in approximately 13 days. A linear response was evident for pasture total gain. Initial feedlot weight also increased linearly ($P < .02$), with increasing SG. Total feedlot weight gain (avg 466 lb) and ADG (avg 3.58 lb) was not affected ($P > .10$) by SG level for the 130-day finishing phase. Dry matter intake (avg 20.8 lb) and feed conversion (avg 17.3 lb gained/100 lb dry matter consumed) were also not affected ($P > .10$) by SG level. Total weight gains (grazing plus feedlot) were 462, 477, and 481 lb for 0, .25%, and .5% GS levels, respectively.

Hot carcass weight (avg 731 lb), dressing percent (avg 62.1%), rib-eye-area (avg 13.2 in.^{2}), KPH (avg 2.47%), percent choice (avg 42%), quality grade (avg Choice minus), and liver abscess score (avg 1.56) were not affected ($P > .10$) by SG levels (Table 2). Adjusted back fat thickness and yield grade responded to SG levels differently, depending on grazing year (Interaction $P < .07$).

In conclusion, supplemental ground sorghum grain up to .5% of body weight improved pasture performance of stocker cattle grazing endophyte-infected tall fescue pastures without negatively affecting subsequent feedlot performance or carcass characteristics.

Table 2. Effect of Grain Sorghum Level during Pasture Phase on Grazing and Subsequent Feedlot Performance and Carcass Merit of Cattle Grazing *A. coenophialum*-infected Tall Fescue Pastures

	Grain level, % of body weight		
Item	Control	.25	.5
Pasture phase			
Pastures per year	3	3	3
No. of cattle	63	61	63
Initial wt., lb	705	701	704
Final wt., lb[a]	748	759	772
Pasture gain, lb[a]	43	57	68
Gain, lb/head/d[a]	.70	.93	1.12
Grain consumption, lb/head/d[b]	0	1.8	3.7
Total grain consumed lb	0	112	228
Feedlot phase - performance			
Pens per year	3	3	3
No. of cattle	63	61	63
Initial wt., lb[c]	700	710	721
Transit shrink %	6.0	5.9	5.7
Final wt., lb	1,167	1,178	1,185
Gain, lb	467	468	464
Daily gain, lb	3.59	3.60	3.57
Dry matter intake, lb	20.8	20.7	21.0
Gain to feed[d]	17.3	17.4	17.2
Carcass merit			
Hot carcass wt., lb	723	730	739
Dressing percent, %	62.0	61.9	62.4
Ribeye area, in.^{2}	13.4	13.0	13.3
Backfat, in.[e]	.40	.44	.44
Kidney-pelvic-heart fat, %	2.44	2.44	2.52
USDA yield, calculated[e]	2.44	2.72	2.65
USDA quality grade	5.12	5.20	5.16
Percent choice, %	38	42	46
Liver abscess score[f]	1.4	1.4	1.8

[a]Linear increase ($P < .05$).
[b]Linear increase ($P < .01$).
[c]Linear response ($P < .02$).
[d]Gain to feed ratio based on lb gained per 100 lb DMI.
[e]Year by SG level interaction ($P < .07$).
[f]USDA Quality grade: 5.00 to 5.29 = small degree of marbling, Choice -; 5.30 to 5.59 = modest, Choice 0; 5.60 to 5.99 = moderate, Choice +.
[g]Liver abscess score: 1 = not condemned, 2, 3, and 4 = condemned due to increasing severity of abscess damage.