FEEDLOT PERFORMANCE OF STEERS GRAZED AS STOCKERS ON FESCUE: A 2-YEAR STUDY

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Story in Brief

A total of 114 Angus, Brahman x Angus, Angus x Brahman-Angus, and Simmental x Brahman-Angus steers, 13 to 19 months old, were used. Steers had been grazed from November to May on: (1) Kentucky 31 fescue (76% endophyte infected), (2) Kentucky 31 (74% infected) interseeded with clovers, or (3) Low endophyte Kentucky 31 fescue (.7% infected). Steers were removed from fescue pastures on May 21, held for 6 days on bermudagrass-ryegrass pastures, shipped to a feedlot in western Oklahoma, and fed for 117 or 113 days (Years 1 and 2). Steers from high endophyte fescue weighed 101 pounds less than steers from low endophyte pastures at the end of grazing but gained 68 pounds more during the feedlot phase. High endophyte steers gained faster during a 6-day holding period, tended to lose less weight in transit to the feedlot, and gained faster during the first 48 to 49 days in the feedlot. Because of slightly greater gains on pasture and in the feedlot, and greater gains during the 6-day holding period, interseeded clover steers had heavier slaughter and carcass weights than low endophyte steers. Rectal temperature was greater for high versus low endophyte steers at the end of fescue grazing and after the 6-day holding period with interseeded clover steers intermediate. No difference in rectal temperatures was noted at the feedlot. Carcass weights were lighter and quality grade tended to be lower for high endophyte steers. Steers with fescue toxicosis can compensate for up to 67% of reduced grazing gains.

(Key Words: Fescue, Endophyte, Feedlot, Finishing, Steers.)

Introduction

A number of trials have shown reduced pasture performance of cattle grazing endophyte infected fescue. Because thousands of these cattle are

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shipped to high plains feedlots for finishing, information about carryover effects of the endophyte toxin on subsequent performance in the feedlot is extremely important. The objective of this study was to evaluate feedlot performance and carcass characteristics of steers with large differences in previous pasture performance due to endophyte infection from grazing fescue pastures and pastures interseeded with clovers.

Materials and Methods

Steers from the second and third year of the fescue grazing study were shipped to a commercial feedlot in the Oklahoma panhandle. A total of 114 Angus, Brahman x Angus, Angus x Brahman-Angus, and Simmental x Brahman-Angus were used. The steers were from 13 to 19 months old when placed on feed. Steers had been grazed from November to May on Kentucky 31 fescue (76% endophyte infected), (2) Kentucky 31 (74% infected) interseeded with a mixture of clovers, or (3) low endophyte Kentucky 31 fescue (.7% infected). The grazing phase of the study was conducted at the Kerr Center, Inc. near Poteau in eastern Oklahoma.

Steers were removed from fescue pastures on May 21, 1987 (year 1) and May 19, 1988 (year 2), and hauled three miles to a bermudagrass-ryegrass pasture adjacent to shipping facilities and held for 6 days before shipment. At the time of shipment, steers were weighed directly off the bermudagrass-ryegrass pasture at 5 p.m., loaded onto trucks, and shipped 450 miles during the night to the Henry C. Hitch Feedyard near Guymon in western Oklahoma. The 6-day holding period on bermudagrass-ryegrass and night time shipping were used to minimize heat stress of steers from endophyte infected pastures.

On arrival at the feedyard, steers were placed in their pen and rested until the following morning when they were individually weighed full on electronic scales, had rectal temperatures taken and were given routine processing procedures for incoming cattle. Processing consisted of IBR-BVD-Leptospirosis, BRSV, 7-way Clostridial, injections of Vitamin A and copper, implanting with Synovex-S and deworming with ivermectin.

Steers were then fed for 117 days in year 1 and 113 days in year 2 on a 90% concentrate finishing ration with high moisture corn, steam flaked corn and steam flaked wheat. The ration contained approximately .97 Mcal NE_m/lb, .62 Mcal NE_g/lb and 12.65% crude protein on a dry matter basis. All steers were slaughtered at a commercial packing facility about 50 miles from the feedlot.

Steer weights at the end of the fescue grazing phase were taken after overnight withdrawal from feed and water. All other weights were full.

Steers were weighed individually at about 49 days into the feeding period, and again the day before slaughter. Steers were slaughtered on September 22, 1987 and September 15, 1988 and were graded about 24 hours after slaughter. Calculations of weight gains were based on 4% shrinks (actual full weights multiplied by .96) of live weights.

Results and Discussion

At the end of approximately 197 days of fescue grazing in late May, high endophyte steers showed typical clinical signs of fescue toxicosis including reduced gains (Table 1), increased rectal temperatures and rough hair coats.

During the 6-day period when cattle were held on bermudagrass-ryegrass pasture, steers previously grazing high endophyte and interseeded clover pastures gained faster ($P<.05$) than those previously on low endophyte pastures (35 and 44 vs 22 lb,respectively). Because the shipping weight was taken without shrink, results suggest that high endophyte steers took on more

Table 1. Weight gains and body temperatures of steers during the preshipment holding period and the feedlot.[a]

	Treatments			
	Endophyte infected fescue	Infected fescue & clover	Endophyte free fescue	SE
No. steers	41	34	39	
Weight off fescue pasture, lb	768[c]	878[b]	869[b]	12.1
Weight changes, lb				
6-day holding period	35[b]	44[b]	22[c]	5.5
Transit to feedlot	-22	-33	-35	6.2
Weight gains in feedlot, lb				
First 48-49 days on feed	222	200	196	9.0
July to finish, 65-68 days	231	227	218	7.5
Off fescue to slaughter	466[c]	440[bc]	400[b]	15.6
Total, pasture plus feedlot, 315-319 days	713[a]	792[c]	748[b]	12.1
Final finish weight, lb	1236[b]	1313[d]	1269[c]	12.3
Rectal temperature, F				
At time of shipping[e]	103.4[c]	103.1[c]	102.8[b]	.15
At processing in feedlot	102.2	102.0	101.8	.20
In feedlot, July	104.1	103.9	104.0	.17

[a]Two years data.
[bcd]Means on the same line with different superscripts differ $P<.05$).
[e]Second year only.

fill and(or) began gaining more rapidly than low endophyte steers when offered non-endophyte infected forage.

In other studies, reduced forage intake has been shown to be a major factor in poor performance of cattle grazing endophyte infected fescue. In the present study, high endophyte steers appeared gaunt at the end of the grazing study and the heavy forage accumulation in the endophyte infected pastures suggested reduced intake of endophyte infected fescue. The rapid gain of steers grazing interseeded clover during the 6-day holding period was unexpected because of the similar pasture gains of interseeded clover and low endophyte steers during the fescue grazing period. Weight losses during transit to the feedlot were similar for all three groups.

During the first 48 to 49 days on feed, steers from high endophyte pastures gained 222 compared to 200 lb for interseeded clover and 196 lb for low endophyte steers ($P<.09$). The increased rate of gain during the first part of the finishing period, together with more rapid gain during the 6-day holding period suggests that effects of the endophyte in this study were not permanent and that compensatory gain and(or) fill began almost immediately after removal from the infected fescue. Our results agree with recent research in which steers that had grazed fescue in Georgia were shipped to Texas for finishing during summer and early fall (Cole et al., 1987). In the Georgia-Texas studies, cattle that had grazed high endophyte fescue made more rapid gains, especially during the first 28 days in the feedlot, than cattle from low endophyte fescue.

In Arkansas trials (Piper et al., 1987), steers were moved from fescue pastures to feedlot pens in Arkansas. Steers previously grazing endophyte infected pastures made greater gains than steers from endophyte free pastures when steers were moved to the feedlot in October but not in July. These studies strongly suggest that environmental temperature at the time cattle are removed from endophyte infected pastures and shipped to finishing programs can affect the time required for cattle to begin compensating for poorer pasture performance.

Gains during the second half of the finishing period were similar for all three groups, suggesting that most of the compensatory growth occurred relatively early in the feeding period. Total weight gains from the time of removal from fescue grazing to slaughter were significantly greater for high endophyte (466 lb) compared to low endophyte steers (440 lb) with interseeded clover intermediate (400 lb).

A slight advantage in weight gain for interseeded clover steers compared to low endophyte steers in every phase of the study resulted in a significantly increased total gain from the onset of fescue grazing to slaughter (792 vs 748 lb) and a greater final finish weight (1313 vs 1269 lb). Although an explanation for this difference is not apparent, these findings are both interesting and consistent.

Rectal temperatures at the time of removal from fescue were significantly affected by pasture treatment. Following the 6-day holding period, temperatures were still higher for high endophyte steers than for low endophyte steers (103.4° vs 102.8°F) with interseeded clover intermediate (103.1°F). The rectal temperature of one high endophyte steer was 107.3°F at the time of removal from pasture. This steer exhibited extreme distress and was not shipped to the feedlot because it was felt he would not survive the stress of transportation. Heat stress is the major risk factor in handling cattle from endophyte infected fescue.

Rectal temperatures at the time of processing at the feedlot were similar and within normal ranges for all groups. Environmental temperatures in Poteau on mornings that steers were weighed after the end of fescue grazing ranged from about 80° to near 90°F for 1987 and 1988 with high humidity, while temperatures in Guymon the mornings steers were processed into the feedlot were about 58° to 65°F with low humidity. Kentucky research (Hemken et al., 1981) has shown that the effects of fescue toxicosis were more pronounced with environmental temperatures above 88°F. Elevated temperature in endophyte infected cattle is apparently caused by a failure of the body temperature regulatory mechanism under heat stress. While affected steers could not maintain body temperature in the hot, humid eastern Oklahoma climate, they had little difficulty in the cooler, dryer climate of the Oklahoma panhandle.

Rectal temperatures at 48 to 49 days on feed were again similar for steers on all treatments (Table 1). All temperatures were higher than "normal" for cattle but were probably not atypical for steers on a full feed of a high concentrate diet. One steer each year died in the feedlot. However, neither death was believed related to previous pasture treatment nor was the steer from the high endophyte treatment. Sickness was minimal throughout the study.

Carcass characteristics are shown in Table 2. Carcass weights reflected final live weights and were significantly lighter for high endophyte steers compared to low endophyte and interseeded clover steers (794 vs 821 and 849 lb). Fat thickness over the 12th rib and yield grades were similar for steers on all treatments. High endophyte steers tended to have lower quality grades, and smaller ribeye areas than low endophyte or interseeded clover steers. A summary of quality grades by percent of steers in each grade showed that all standard carcasses were from the high endophyte treatment. High endophyte steers also had the fewest choice carcasses. The lower quality grades of the high endophyte steers probably reflect their lighter weights and poorer body condition going on feed.

In conclusion, steers previously grazing high endophyte pastures weighed 101 lb less than steers from low endophyte pastures at the end of fescue grazing. There was considerable compensatory gain following

Table 2. Carcass characteristics of steers previously grazed on fescue pastures.[a]

	Treatments			
	Endophyte infected fescue	Infected fescue & clover	Endophyte free fescue	SE
Slaughter				
KHP[b], %	2.2	2.1	2.2	.05
Quality grade[c]	10.8	11.4	11.2	.21
Hot carcass weight, lb	794[d]	849[f]	821[e]	7.43
Ribeye area, sq in	13.1	13.6	13.6	.24
Fat thickness, in	.45	.47	46	.02
USDA yield grade	2.86	2.95	2.85	.08
Dressing percent	64.2	64.7	64.7	.42
USDA quality grade, %				
Standard	15	--	--	
Select	60	50	60	
Choice	25	50	40	

[a]Two years data.
[b]Kidney, heart and pelvic fat.
[c]11=Select^{+}, 12=Choice^{-}, etc.
[def]Means on a line with different superscript letters differ (P<.05).

removal from high endophyte pastures and continuing through the first 48 to 49 days of the finishing period. By the end of the feedlot phase, high endophyte steers weighed only 33 lb less than low endophyte steers. Interseeding clover appears to be an effective means of partially offsetting the undesirable effects of fescue endophyte. Steers from interseeded clover pastures gained slightly faster than low endophyte fescue steers both during grazing and in the feedlot, and were significantly heavier than low endophyte or high endophyte steers at the time of slaughter. If heat stress can be minimized during shipment to the feedlot and during the first few weeks of finishing, cattle previously exposed to fescue endophyte can perform very well in the feedlot and can compensate for some of the reduced performance during grazing.

Literature Cited

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