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Abstract

Steers red high-concentrate limit-fed rations were more efficient during growing than steers fed silage plus grain at 25% of their dry matter (DM) intake, or silage only. The limit-fed cattle also tended to gain faster (P<.10) and were more efficient (P<.05) during the finishing phase and did not have the expected depressed DM intakes compared to cattle fed the other growing-phase rations. Steers fed barely had lower DM intakes (P<.05) but gained more efficiently (P<.05) than those fed grain sorghum.

Keywords

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Effect of Limit-Fed, High Energy Growing Rations on the Performance of Feedlot Steers

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Summary

Steers fed high-concentrate limit-fed rations were more efficient during growing than steers fed silage plus grain at 25% of their dry matter (DM) intake, or silage only. The limit-fed cattle also tended to gain faster ($P<.10$) and were more efficient ($P<.05$) during the finishing phase and did not have the expected depressed DM intakes compared to cattle fed the other growing-phase rations. Steers fed barley had lower DM intakes ($P<.05$) but gained more efficiently ($P<.05$) than those fed grain sorghum.

Introduction

Limit feeding cattle during the growing phase involves restricting intake of energy-dense rations in order to control average daily gain. Several questions have been raised concerning limit-fed programs. Producers are concerned that all of the "gain" will be gone before the finishing phase because number of days on grain is high; that the cattle will finish too soon and have poor feed conversions, daily gains, and yield grades; and that intakes in the finishing phase will be less than those of cattle "grown" on a traditional program. In addition, feed and bunk management becomes paramount. Arguments in favor of limit feeding are that it is economically favorable when grain prices are low. Furthermore, since gain is controlled, cattle weights should be uniform at the end of the growing phase. However, proponents of the program concede that there might be an intake depression in the finishing phase.

Experimental Procedures

Eighty Hereford and Hereford X Angus crossbred steers with an average initial weight of 607 lbs were allotted to one of five growing phase treatments, with four pens of four steers per treatment. These five treatments were: (1) ad libitum high concentrate, (2) limit-fed high concentrate (35% roughage), (3) limit-fed high concentrate (20% roughage), (4) silage plus grain at 25% of dry matter (DM) intake, and (5) silage only. In the high energy rations, dry rolled barley and grain sorghum were compared as grain sources. In Table 26.1 are the compositions of the growing phase rations. All rations were formulated to contain 12.5% crude protein. The two limit-fed groups were fed once daily at 10 am, restricted to a DM intake of 2.1% of body wt., and targeted to gain 2 to 2.25 lbs per day. The other three rations were fed ad libitum twice daily. All steers were implanted with Ralgro at the start of the growing phase.

All steers were restricted to feed intakes of 2.1% of body wt. for 3 days, then shrunk overnight, prior to taking 84-day weights. On day 84, all steers were measured for backfat by ultrasound and reimplanted with Ralgro. Steers were switched to ad libitum finishing rations containing the respective grain they were fed during the growing phase. Steers receiving the silage only rations during the growing phase were fed either barley (2 pens) or grain sorghum (2 pens) as the grain source during the finishing phase. All finishing-phase rations included 80% grain, 15% silage, and 5% supplement and were formulated to contain 11.2% protein and 12.5 mg of Rumensin per pound.

Results and Discussion

The performance of limit-fed steers receiving the 20 or 35% level of roughage did not differ ($P>.05$) during the 84-day growing phase or the subsequent finishing phase. Therefore, all eight pens of limit-fed steers were pooled for analysis of main effects. There were no significant interactions. Performance data comparing ration treatments during the growing and finishing phases along with the performances during the combined phases are shown in Table 26.2.

Limit-fed steers gained more efficiently than steers fed silage + 25% grain or silage only during the growing phase. Steers that had been limit-fed during the growing phase tended to gain faster and were more efficient ($P<.05$) during the finishing phase than steers fed ad libitum during the growing phases, regardless of their ration energy level. Feed intakes were not different among rations during the finishing phase, ranging from 23.48 to 24.49 lbs of DM daily. It appeared that the limit feeding of high energy rations during the growing phase did not adversely affect finishing phase performance. It should be pointed out that steers fed the silage + 25% grain and silage only rations had exceptional gains during the growing phase, which might have had a negative impact on their efficiency during finishing.

The effect of grain source on the feedlot performance of steers is shown in Table 26.3. Barley-fed steers had lower DM intakes and better feed efficiencies than grain sorghum-fed steers during both phases. However, average daily gains did not differ for the two grain sources during any phase.

The effect of grain source on the performance of steers limit-fed during growing is shown in Table 26.4. Barley-fed steers gained faster ($P<.05$) and more efficiently ($P<.05$) than grain sorghum-fed steers during the growing phase. During the finishing phase, barley-fed steers had lower DM intakes ($P<.05$) and tended to have improved feed efficiencies compared to grain sorghum-fed steers. Therefore, when growing and finishing phases were combined, barley-fed steers had lower DM intakes and faster and more efficient gains overall compared to grain sorghum-fed steers. We observed that during the growing phase, limit-fed steers receiving barley took several hours longer to consume the same amount of ration DM than steers receiving grain sorghum.

Table 26.1. Composition of the Growing Phase Rations

Ingredient	Limit-Fed High Conc		Ad Libitum		
	20% Roughage	Silage 35% Roughage	High Conc	Silage + 25% Grain	Silage only
	% of the Ration DM				
Grain[a]	67.6	52.6	72.6	25.0	---
Forage					
Sorghum Silage	20.0	35.0	15.0	62.6	87.6
Supplement[b]	12.4	12.4	12.4	12.4	12.4

[a]Barley or grain sorghum.
[b]Provided 200 mg of Rumensin/Head/day.

Table 26.2. Effect of Growing Ration Treatments on the Feedlot Performance of Steers

Item	Growing Phase Ration Treatments			
	Ad Lib High Conc	Limit Fed High Conc	Silage + 25% Grain	Silage Only
No. of Pens	4	8	4	4
No. of Steers	16	31	16	16
Initial Wt.,lb	608	610	605	605
84-Day Wt.,lb	880[a]	819[c]	846[b]	826[bc]
174-Day Wt.,lb	1110	1095	1088	1078
GROWING PHASE: 84 days				
Intake (DM), lb/d	20.32[a]	14.84[c]	19.69[ab]	19.14[b]
ADG, lb	3.24[a]	2.48[c]	2.86[b]	2.64[bc]
Feed/Gain	6.27[ab]	6.07[a]	7.03[bc]	7.25[c]
Back Fat,in.	.34[a]	.25[b]	.27[b]	.19[c]
FINISHING PHASE: 90 days				
Intake (DM),lb/d	23.49[f]	23.48[d]	24.12[e]	24.49[de]
ADG, lb	2.54[b]	3.07[a]	2.68[b]	2.80[b]
Feed/Gain	9.23[b]	7.68[a]	9.01[b]	8.78[b]
Back Fat, in	.50	.48	.41	.38
COMBINED PHASES: 174 days				
Intake (DM), lb/d	21.96[a]	19.31[b]	21.98[a]	21.91[a]
ADG, lb	2.88[ab]	2.78	2.77[b]	2.72[b]
Feed/Gain	7.61[ab]	6.98[a]	8.00[b]	8.04[b]
Percent Choice	75.00	93.55	93.75	81.75
Liver Abscesses,%	18.75	6.45	0	0

[abc]Means in the same row with different superscripts differ (P<.05).
[def]Means in the same row with different superscrips differ (P<.10).

Table 26.3. Effect of Grain Source on Feedlot Performance of Steers

Item	Grain Source	
	Barley	Grain Sorghum
No. of Pens	10	10
No. of Steers	39	40
GROWING PHASE: 84 Days		
Intake (DM), lb	18.08[a]	18.91[b]
ADG,lb	2.89[a]	2.72[b]
Feed/Gain	6.25[a]	7.03[b]
FINISHING PHASE: 90 days		
Intake(DM),lb	21.78[a]	26.01[b]
ADG, lb	2.75[a]	2.79[b]
Feed/Gain	7.98[a]	9.37[b]
COMBINED PHASES: 174 days		
Intake(DM),lb	19.99[a]	22.58[b]
ADG,lb.	2.81[a]	2.76[b]
Feed/Gain	7.11[a]	8.20[b]

[abc]Means in the same row with different superscripts differ (P<.05).

Table 26.4. Effect of Grain Source on Performance of Steers Limit-fed During Growing

Item	Grain Source	
	Barley	Grain Sorghum
No. of Pens	4	4
No. of Steers	15	16
GROWING PHASE: 84 days		
Intake (DM), lb/day	14.84	14.84
ADG, lb	2.78[a]	2.18[b]
Feed/Gain	5.33[a]	6.80[b]
FINISHING PHASE: 90 days		
Intake (DM), lb/day	21.37[a]	25.59[b]
ADG, lb	3.05	3.10
Feed/Gain	7.09	8.27
COMBINED PHASES: 174 days		
Intake (DM), lb/day	18.21[a]	20.40[b]
ADG, lb	2.92[a]	2.65[b]
Feed/Gain	6.27[a]	7.68[b]

[ab]Means in the same row with different superscripts differ (P<.05).