Long Versus Short Feeding Period for Steer Calves of Three Frame Sizes Fed High Energy Finishing Diets

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Summary

An experiment was conducted using Angus cross steer calves of three frame sizes (small, medium, and large) to compare performance of two different grow/finish feeding programs. Half of the cattle in each frame size group were fed a high energy ration through the growing period, similar to calves going directly into the feedlot. The other half was fed a low energy ration, similar to a backgrounding diet, for a period prior to the finishing phase. All cattle were fed a high energy ration through the finishing period. The data showed the cattle fed the low energy growing diet experienced some compensatory gains as shown by ultrasound backfat and average daily gains coupled with intakes greater than the increases seen in the high energy treatment. Carcass data and overall performance data showed no ill effects due to the low energy growing ration.

Introduction

Winter backgrounding and summer grazing followed by high grain finishing has been practiced for some time and has its advantages and disadvantages. Most feedlot operators would prefer to feed yearlings as opposed to calves for reasons including increased health status. But as the cyclical nature of the beef cattle industry causes cattle numbers to decline, feedlots may be forced to place weaned calves on feed to maintain feedlot capacity.

The advantages to backgrounding calves is the reduction of feed and health costs and compensatory gain in the subsequent finishing period. The major disadvantages of delaying the finishing period might be decreased feed effeciency, increased maturity, and overweight carcasses. Therefore, large-framed calves may require a different management strategy than small-framed calves. This experiment looked at the effect of frame size on long vs. short feeding period of feeding a high energy finishing diet.

Materials and Methods

An experiment was conducted using weaned steer calves of predominantly Angus breeding. The calves came from a breeding project that maintained three synthetic lines of cattle that varied in frame size (small, medium, and large) at the ISU Rhodes Research Farm at Rhodes, Iowa. The calves came from the fall calving herd and the trial started on May 6, 1996, and lasted until the cattle were slaughtered 186 days later on November 7, 1996. Ultrasound measurements of backfat and ribeye area between the 12th and 13th ribs were taken approximately every 30 days. Each of the frame size groups was divided at random to one of two pens making a total of six pens with six head each. The pens were equipped with Calan® feeding gates, which allowed for individual feed intakes to be monitored. Steers were fed in the Calan® feeding gates for a total of 139 days after which they were moved and bunk fed in three pens, one for each frame size.

The cattle were randomly assigned to one of two rations, which are described in Table 1. The high energy (.64 Mcal/lb) and low energy (.45 Mcal/lb) rations were balanced to contain equal amounts of crude protein (13%). The cattle fed the high energy ration remained on the high energy ration the entire length of the feeding period. The cattle fed the low energy ration were fed the low energy ration for 75 days (Period 1) and were then stepped up to the high energy ration for the remaining 111 days of the feeding period (Period 2). Period 2 was broken into a period 2a and 2b. During period 2a cattle were still fed in the Calan gate system. During period 2b cattle were fed in their respective frame size groups in outside pens where individual feed intakes could not be monitored. The cattle were slaughtered at a commercial packing facility and carcass data were collected after 24 hours in the cooler.

Table 1. Ration composition (as fed).

	Energy	
Ingredient	Low	High
Cracked corn	18.36	75.48
Dehydrated alfalfa	74.92	11.67
Cane molasses	5.92	2.34
Soybean meal	0	9.73
Ammonium phosphate	.48	0
Limestone	0	.48
NaCl	.30	.30
TM premix	.024	.024
Vit A premix	.08	.08
Rumensin®	.0175	.0175
NEg, (Mcal/lb)	.45	.64
CP, %	13	13

Results and Discussion

Performance of the cattle by period is given in Table 2. In period 1 (day 0 - 74) cattle were fed either the low or high energy ration and individual intakes were monitored. Cattle fed the low energy growing diet ate less feed, except for the medium-frame group, were less efficient and gained less weight and subcutaneous fat. During period 2, cattle fed the low energy growing ration gained more weight per day, accumulated backfat at a faster rate, and ate more feed during period 2a. These data show that the cattle fed the low energy growing diet experienced some compensatory gains as shown by ultrasound backfat and average daily gains.

Carcass data are presented in Table 3. Carcass data along with the performance data showed no ill effects due to the low energy growing ration, suggesting an economically feasible alternative for feeding calves.

Implications

Commonly, there are two options for weaned calves: 1) place them directly into the feedlot on a high energy ration, or 2) background for a period of time prior to placement into the feedlot on a high energy ration. This experiment provides evidence that the latter option, which is usually associated with lower feed costs over cattle going directly to the feedlot, may be an economically feasible alternative. If the price of roughage is low compared with corn, backgrounding could save money over direct feedlot placement by not sacrificing carcass merit, by allowing for the marketing of cattle at the same age, and by decreasing overall feed costs.

Table 2. Feedlot performance by period.

	Large		Medium		Small	
Period 1 (0-74)	High	Low	High	Low	High	Low
Backfat						
Initial	.15	.14	.12	.13	.17	.17
Final	.25	.16	.19	.15	.25	.20
Weight						
Initial	840	817	767	749	699	697
Final	1053	983	971	930	864	811
ADG	2.84	2.22	2.71	2.42	2.20	1.52
Feed						
Intake	1503	1446	1393	1490	1279	1188
Feed/Gain	7.06	8.69	6.85	8.21	7.75	10.45
Period 2 (75-185)						
Backfat						
Initial	.25	.16	.19	.15	.25	.20
Final	.54	.34	.44	.41	.47	.49
Weight						
Initial	1053	983	971	930	864	811
Final	1414	1371	1285	1318	1147	1098
ADG	3.25	3.49	2.83	3.49	2.55	2.59
Period 2a (75-138)						
Backfat						
Initial	.25	.16	.19	.15	.25	.20
Final	.35	.21	.26	.23	.36	.31
Weight						
Initial	1053	983	971	930	864	811
Final	1226	1160	1122	1114	1018	967
ADG	2.70	2.77	2.37	2.87	2.41	2.43
Feed						
Intake	1429	1541	1271	1458	1133	1195
Feed/Gain	8.26	8.69	8.39	7.94	7.35	7.68
Period 2b (139-185)						
Backfat						
Initial	.35	.21	.26	.23	.36	.31
Final	.54	.34	.44	.41	.47	.49
Weight						
Initial	1226	1160	1122	1114	1018	967
Final	1414	1371	1285	1318	1147	1098
ADG	4.01	4.48	3.46	4.34	2.74	2.80
Cumulative (0 - 185)						
Backfat						
Initial	.15	.14	.12	.13	.17	.17
Final	.54	.34	.44	.41	.47	.49
Weight						
Initial	840	817	767	749	699	697
Final	1414	1371	1285	1318	1147	1098
ADG	3.09	2.98	2.78	3.06	2.41	2.16

Table 3. Carcass characteristics.

	Large		Medium		Small		
Variable	High	Low	High	Low	High	Low	
Carcass wt, lb	860.1	810.9	788.1	787.5	710.8	674.0	
Dressing %	61	59	61	60	62	61	
Ribeye area, in^2	13.0	13.4	13.5	13.0	12.2	10.1	
Backfat, in	.54	.35	.44	.41	.47	.49	
KPH, %		2.5	2.3	2.2	2.2	2.7	2.7
Quality grade	5.5	5	5.8	4.8	5.8	5.7	
Prime	0	0	1	0	0	0	
Choice	6	5	5	4	6	6	
Select	0	1	0	1	0	0	
Yield grade							
1	0	0	0	0	0	0	
2	4	6	6	5	1	5	
3	1	0	0	0	4	1	
4	1	0	0	0	1	0	