MANAGING FAST- VS. SLOW-GROWTH GENOTYPES TO OPTIMIZE QUALITY AND YIELD GRADES

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Summary

Fast-growth genotype steers placed on a high energy ration a month after weaning were compared to a slow-growth genotype on a growing ration for 155 days, followed by a finishing ration for 62 days. The fast-growth genotype produced heavier, higher quality carcasses in less time than the slow-growth genotype, with similar energy conversion. Using contemporary prices, the fast-growth genotype cattle broke even, and the slow-growth genotype lost $124 per head.

Introduction

Considerable variation exists in the growth genotypes of beef cattle. With the availability of growth EPD's (Expected Progeny Differences) for cattle of the major breeds, selection for growth rate can be very effective. However, as growth rate and cattle size change, nutrition and management must change (Schalles, Bolsen and Dikeman, 1983 Cattlemen's Day Report, Comparison of Cattle Types and Management Systems). The purpose of our study was to evaluate two management systems that would produce carcasses of acceptable weight, quality, and composition from cattle of two different genotypes.

Experimental Procedures

Sixteen Simmental steers with an average frame score of 6.2 and weighing 668 lbs represented the fast-growth genotype, and 15 Angus x Hereford calves with an average frame score of 3.7 and weighing 595 lbs represented the slow-growth genotype. Steers started the trial 27 days after weaning at an average age of 239 days. Steers of each genotype were fed in three groups. The fast-growth genotype was placed on a high energy (83% TDN) ration and permitted to grow as rapidly as possible, whereas the slow-growth genotype was placed on a silage-based growing ration (64% TDN) for 155 days (until April 12) followed by a 62 day finishing period. Steers were slaughtered at IBP, Emporia, Kansas, at an average fat thickness of 0.38 in, measured with ultrasonics. Five of the fast-growth genotype steers were slaughtered on April 25, at an average age of 413 days; the other 11 were slaughtered on May 26, at an average age of 440 days. The slow-growth genotype steers were slaughtered on June 30, at an average age of 473 days. Carcass information was collected at the plant.

Results and Discussion

Production and efficiency data are shown in Table 30.1. The fast-growing steers were fed to gain about a pound per day faster than the slow-growing steers during the first 155 days of the trial. This was done to allow the slow-growth genotype to grow without excess of fat, in an effort to produce carcasses of an acceptable weight and yield grade. When the slow-growth genotype steers were put on the finishing ration, they gained 2.93 lbs per day and increased in fat thickness from 0.19 to 0.38 inches in 55 days. The fast-growth genotype steers were slaughtered an average of 44 days sooner, with the same backfat thickness, and weighed 151 lbs more. The dressing percent (calculated from live weights at the slaughter plant) of the fast-growth genotype was 62.5% vs 60.4% for the slow-growth genotype. The fast-growth genotype steers had 2 sq in larger loin eyes and 29% more graded choice. They required slightly more energy (TDN) per lb of gain because of the higher maintenance requirements.

Economic data are shown in Table 30.2. The fast-growth genotype had greater economic merit because of the younger age at slaughter (which reduced yardage and interest costs) and a higher percent grading Choice. Feed cost was higher for the slow-growth genotype because of the slower rate of gain during the growing period. The slow-growth genotype would have lost money, even if silage had been free.

The slow-growth genotype steers probably would have had a higher percent grading Choice if they had been fed the finishing ration longer. This could have been accomplished by starting the finishing phase earlier, which would have produced lighter carcasses at the same fatness. On the other hand, this genotype could also have been started on the finishing ration at the same time and fed somewhat longer. However, this would have increased the amount of fat in the carcasses, producing a less desirable yield grade.

With the management described, these results indicate that the larger-frame, faster growing steers that were heavier at the start of the trial were worth more per lb at weaning than the lighter weight, slower growing steers.

Table 30.1. Least Squares Means of Growth and Carcass Traits of Two Genotypes

Trait	Fast-growth Genotype	Slow-growth Genotype
No. of Head	16	15
Adjusted 205-day Wt., lb	649[a]	507[b]
Nov. 9 Age, days	242[a]	236[a]
Nov. 9 Wt., lb	668[a]	595[b]
Nov. 9 Ht., in	47.9[a]	42.8[b]
Frame Score	6.25[a]	3.73[b]
Nov. 9 Backfat Scanned, in	0.01[a]	0.01[a]
Apr. 12 Wt.[1], lb	1162[a]	850[b]
ADG Wn. to Apr. 12, lb	2.81[a]	1.84[b]
Apr. 12 Backfat Scanned, in	0.29[a]	0.19[b]
Slaughter Wt., lb	1272[a]	1047[b]
Scanned Slaughter Backfat, in	0.38a	0.38[a]
ADG Wn. to Slaughter, lb	2.88[a]	2.06[b]
ADG Apr. 12 to Slaughter, lb	3.11[a]	2.51[a]
Slaughter Age, days	429[a]	473[b]
TDN Consumed, lb	3579[a]	3006[b]
Protein Consumed, lb	520[a]	499[b]
TDN/gain, lb	6.02[a]	6.77[b]
Slaughter Wt./Day, lb	2.98[a]	2.22[b]
Carcass Wt.[2], lb	760[a]	604[b]
Carcass Backfat, in	0.31[a]	0.37[a]
Carcass Loin Eye Area, in^2	13.2[a]	11.3[b]
Yield Grade	2.53[a]	2.58[a]
Percent Choice	93[a]	64[b]
Carcass Wt./Day, lb	1.78[a]	1.28[b]

[ab]Means with different superscripts are different ($P < .05$)
[1]The slow-growth steers were changed to a finishing ration on April 12.
[2]One carcass of each genotype was not available for carcass information.

Table 30.2. Economic Results of Genotypes as Affected by Management

Trait	Fast-growth Genotype	Slow-growth Genotype
EXPENSES/HEAD:		
Starting value ($85 and $89/cwt.)	$567.80	$529.55
Interest on cattle (11% per year)	31.99	37.81
Feed cost	220.00	182.29
Yardage ($0.15 per day)	28.05	35.55
Total expenses	$847.84	$785.20
INCOME/HEAD:		
Carcass value (Choice = $112/cwt., Select = $105/cwt.)	$847.48	$661.26
PROFIT (LOSS)/HEAD:	($ 0.36)	($123.94)
FEED INPUTS/HEAD:		
Silage DM, lb	755.9	2811.0
Cost, at $50/ton DM	$18.90	$70.28
Milo DM, lb	3427.6	1297.9
Cost, at $4.80/cwt.	$164.52	$62.30
Supplement DM, lb	257.4	349.8
Cost, at $14.21/cwt.	$36.58	$49.71
TOTAL FEED COST/HEAD	$220.00	$182.29