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Comparison of feedlot performance of steer calves produced by Angus x Hereford and Brahman x Hereford cows

Abstract

Steer calves that were 75 percent Hereford and either 25 percent Angus (BWF) or Brahman (BRX) were compared in a feedlot study that involved either high-concentrate or high-silage finishing rations. The BRX steers gained significantly faster, but there was no concomitant response in feed efficiency. The ration energy utilization by BRX steers appeared to be less than that of BWF steers. Performance of both breeds was poorer on the high-silage ration than on the high-grain ration, and there was no breed by ration interaction. A greater proportion of BWF calves graded USDA choice, but there was little difference between breeds in average cutability grade. Rates of backfat increase were determined with ultrasound scanning and were higher when the high-grain rations were fed. No significant breed effect on fattening rate was detected. Ultrasound was effective in identifying cattle that could be fed for an additional 28 days. During that period, cattle retained for additional feeding gained an equivalent 3.89 pounds per day when gains were adjusted to a constant dressing percentage.

Keywords

Kansas Agricultural Experiment Station contribution; no. 88-363-S; Cattlemen's Day, 1988; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 539; Beef; Feedlot; Performance; Steers

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Comparison of Feedlot Performance of Steer Calves
Produced by Angus X Hereford and
Brahman X Hereford Cows

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Summary

Steer calves that were 75 percent Hereford and either 25 percent Angus (BWF) or Brahman (BRX) were compared in a feedlot study that involved either high-concentrate or high-silage finishing rations. The BRX steers gained significantly faster, but there was no concomitant response in feed efficiency. The ration energy utilization by BRX steers appeared to be less than that of BWF steers. Performance of both breeds was poorer on the high-silage ration than on the high-grain ration, and there was no breed by ration interaction. A greater proportion of BWF calves graded USDA choice, but there was little difference between breeds in average cutability grade. Rates of backfat increase were determined with ultrasound scanning and were higher when the high-grain rations were fed. No significant breed effect on fattening rate was detected. Ultrasound was effective in identifying cattle that could be fed for an additional 28 days. During that period, cattle retained for additional feeding gained an equivalent 3.89 pounds per day when gains were adjusted to a constant dressing percentage.

Introduction

At the Fort Hays Branch Experiment Station, a study is being conducted to evaluate the F1 Brahman crossbred cow for use in Kansas cowherds. This phase of the study considers the feedlot performance of the steer progeny. We conducted a feedlot trial to measure traditional performance characteristics, such as gain, feed intake, and efficiency, and carcass quality. This experiment was designed to determine if Brahman-cross steers performed better than traditional cross-bred steers on a less concentrated feedlot ration. Backfat was measured with ultrasound periodically throughout the trial to track changes in carcass composition.

Experimental Procedures

The study was conducted with 116 yearling steers born in the spring of 1986 to a cowherd that consisted of either Angus X Hereford or Brahman X Hereford F1 dams. That herd had been created by combining heifers from several locations in order to make each group representative of its breed. Cows had been mated to Hereford bulls that were related to each other, and the steers used in this test were 75 percent Hereford. The calves had been weaned in the fall of 1986 and wintered together until the feeding trial began on May 13, 1987. Calves from each breed group were assigned to either a high-grain or a high-silage finishing ration.

¹Fort Hays Branch Experiment Station.

The rations were comprised primarily of rolled milo and sorghum silage. The high-silage ration included 46 percent silage (dry matter basis), whereas the high-grain ration contained only 13 percent silage. Each breed X ration treatment was replicated in two pens. Because of later puberty and lower conception rates among the Brahman cows, there were 65 Angus X Hereford (BWF), but only 49 Brahman X Hereford (BRX) steers available for this test.

After 121 days on feed (September 10), the fattest steers in each pen were identified with ultrasound scanning and slaughtered. The others were fed for an additional 28 days and slaughtered on October 8.

At the start of the test, mean weight of the BRX calves was 12 pounds heavier than that of the BWF calves, despite the fact the the BRX calves averaged 21 days younger. Mean birth dates were March 7 and March 28 for the BWF and BRX calves, respectively. Where appropriate, covariance analysis was used to correct the data to a constant animal age.

Results and Discussion

The BRX steers gained 6 percent faster ($P < 0.05$) than the BWF steers during the feeding trial (Table 5.1). Cattle fed the high-grain rations gained faster than those fed the high-silage rations and there was a tendency for the BRX steers to respond more to the high-grain ration. That contradicts previous results of pilot trials, in which Brahman F1 cattle performed better on higher levels of roughage. However, those pilot studies were conducted in cold weather, and there could be an environmental effect on performance of Brahmans fed different amounts of roughage.

Although average gains of the BRX steers were greater than those of BWF steers, their feed intake was also substantially higher, so there was no improvement in feed conversion ratios. In addition to calculating feed conversion from gain and intake measures, a detailed analysis of energy utilization was conducted by calculating individual animal net energy gain and reconciling that estimate with calculated net energy provided by the ration. Those calculations suggested that ration energy utilization by the BRX steers was less efficient. Feed utilization ratios were 5 percent less for BRX than for BWF steers. That reduction in energy utilization by BRX steers was especially apparent when the high-silage ration was fed. The poorer utilization of the high-silage ration by BRX cattle might have resulted from greater feed intake, since ration digestibility decreases when consumption is excessive.

More BWF steers than BRX steers graded choice. Carcass quality grade of cattle that contain Brahman heredity also has been poor in other experiments. Even though the steers were only 25 percent Brahman, the proportion graded USDA Choice was 40 percent compared to 66 percent for the BWF steers. A similar reduction in quality grade occurred when the high-silage ration replaced the high-grain ration.

On the other hand, breed effect on cutability grade was small. When the two energy levels were combined, the BWF steers were slightly fatter and 58 percent of their carcasses were yield grade 3 compared to 48 percent among the BRX carcasses. When crosses were combined, feeding a high-silage ration increased the proportion of yield grade 2 carcasses to 62 percent.

Using ultrasound technology, we were able to monitor backfat thickness on each individual animal during the course of the trial. Our other research has indicated that the accumulation of backfat best fits an exponential equation:

$$Y=Ae^{kt}$$

where Y is backfat thickness predicted at a future date, A is the backfat thickness at time of measurement, t represents the number of days after measurement $e=2.7148$, and k is an estimated rate coefficient. A higher rate coefficient indicates a faster fattening rate, and dividing .693 by the rate coefficient gives the number of days to double backfat thickness. Calculating a rate coefficient is a convenient way to reduce many measurements on a large number of animals to a single value for comparing treatments. The values shown in Table 5.1 were obtained on only the leaner cattle fed for the full 148 days, because there were not enough ultrasound measurements for calculations from the set slaughtered earlier. Those values indicate that cattle fed high-grain rations fattened at a faster rate, ($P<0.05$) but that there was only a small effect of steer breed on fattening rate.

Measuring backfat with ultrasound was completely successful in identifying steers that could be fed an additional 28 days without any cattle becoming too fat. Regression analysis was used to estimate dressing percentage of retained animals at the time when the first group was slaughtered. Carcass gain of retained animals was estimated as 2.47 pounds per day, equivalent to 3.89 pounds per day live gain at a constant 63.5 dressing percent. That indicates fast and efficient gains can be made by cattle that have been in the feedlot a considerable length of time, if their fattening rate is still low.

These results indicate that summer feedlot gains of BRX steers were higher than those of their BWF cohorts. However, metabolic efficiency of BRX tended to be lower. There was no advantage to feeding a ration with lower caloric density to either BRX or BWF steers. The BRX calves were less likely to deposit intramuscular fat and grade USDA Choice. Fattening rate of BRX steers was numerically, but not significantly, less than that of BWF steers.

Table 5.1. Comparison of feedlot Performance of Steer Calves Produced by Angus X Hereford and Brahman X Hereford Cows. May 13 to October 7, 1987, 148 days

Item	Angus X Hereford (BWF)		Brahman X Hereford (BRX)	
	High-grain	High-silage	High-grain	High-silage
Number of head	33	32	25	24
Average initial wt	727.6	710.2	730.6	732.1
Average final wt	1193.1	1134.1	1233.5	1165.3
Average gain	465.5	423.9	502.9	433.2
Average daily gain	3.44	3.13	3.73	3.22
Average feed intake (DM)	22.33	24.00	23.31	24.89
lb DM/ 100 lb gain	649.8	765.9	624.7	772.5
Ratio of observed to predicted net energy gain	1.02	1.02	0.98	0.96
Carcass data:				
Percent USDA Choice	76%	56%	56%	25%
Percent USDA Select	24%	44%	44%	75%
Percent yield grade #2	27%	56%	36%	67%
Percent yield grade #3	73%	44%	64%	33%
Rate coefficient for increase in backfat (see MS)	.0096	.0083	.0099	.0088