

Comparison of Feedlot Performance and Carcass Traits of Charolais and Brahman Sired Three-Breed Cross Calves

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Story in Brief

Feedlot performance and carcass traits were compared between Charolais and Brahman sired three-breed cross calves. Data were obtained on 251 calves (127 heifers and 124 steers). All calves were placed on a self-fed finishing ration immediately after weaning and slaughtered when each animal attained an estimated low choice carcass grade. Feedlot performance favored calves sired by Charolais. Charolais sired calves gain .31 lb/day more rapidly and were 91 lb heavier at slaughter.

Significant sirebreed differences were also found for carcass traits. Charolais sired calves were 39 lb heavier in carcass weight, had a .07 lb advantage in carcass weight per day of age, were lower in dressing percent by 1.2 percent, had .15 inches less fat cover, .33 percent less KHP fat, 1.99 square inches more REA and 2.05 percent higher estimated cutability than Brahman sired calves. Tenderness scores were similar and quite acceptable for both sirebreeds. Based on actual performance, Charolais cross calves would return \$16.46 more per head above feedlot costs than Brahman cross calves.

Introduction

Research studies have consistently shown that systematic crossbreeding systems can effectively increase the efficiency of producing beef. Over half of this increase is due to utilizing a crossbred cow. Consequently, an extensive research program is currently in progress at the Oklahoma Agricultural Experiment Station to evaluate the productivity of various two-breed cross cows when mated to bulls of a third breed. It is important to the overall efficiency of beef production that the three-breed cross calves produced in such a system have adequate feedlot performance and carcass merit. The purpose of this study was to compare Charolais and Brahman as sirebreeds with regard to feedlot performance and carcass traits of such three-breed cross calves.

Experimental Procedure

Eight different two-breed cross cow groups (Hereford x Angus, Angus x Hereford, Simmental x Angus, Simmental x Hereford, Brown Swiss x Angus, Brown Swiss x Hereford, Jersey x Angus, Jersey x Hereford) were mated to Charolais and Brahman bulls to produce three-breed cross calves in Spring of 1976 and 1977. Cows were three- and four-year-olds with the four-year-olds being bred only to Charolais. Three Brahman bulls and four Charolais bulls were used for the 1976 calf crop. Three of the original Charolais bulls, six new Charolais bulls and three new Brahman bulls produced the 1977 calf crop. Breeding season was from May 1 to July 15 each year, and the

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calves were born from February to early April. Calves remained with their dams on native and bermuda grass pastures at the Lake Carl Blackwell Research Range until weaned at an average age of 205 days.

Following weaning, all calves were shipped to the Southwestern Livestock and Forage Research Station at El Reno and placed immediately in the feedlot. Each kind of three-breed cross calves (steers and heifers combined) were randomly assigned to a pen in the feeding barn and self-fed the finishing ration shown in Table 1. Each animal was removed and sent to slaughter when an estimated low choice grade was attained. Feedlot performance and carcass traits were evaluated on 251 calves (154 Charolais and 97 Brahman crosses, respectively). A sample of 55 Charolais and 46 Brahman cross steer carcasses were taken to the Oklahoma State University Meat Laboratory for detailed carcass evaluation. Tenderness estimates were obtained by subjecting one inch core samples from oven-broiled steaks to Warner-Bratzler shear procedures.

Results and Discussion

Interactions between sirebreed and year were significant for several traits measured. However, in all traits but two, the sirebreeds ranked the same and only the magnitude of the differences varied between the two years. Sirebreeds did change rank for slaughter age and starting weight. In 1976, Brahman crossbreds went on test at a heavier weight and were older at slaughter. In 1977, the opposite was true. Both the heavier starting weight and the older slaughter age were probably influenced by the sample of bulls used within each breed each year and the average breeding date of the crossbred cows in the respective sirebreed groups.

Feedlot performance for steers and heifers sired by Brahman and Charolais bulls are presented in Table 2. Performances have been averaged over two years and over crossbred cow groups. Charolais sired calves significantly outgained Brahman sired calves by .31 lb/day and were 91 lb heavier at slaughter. Although not significant, on the average Charolais cross calves were 10 lb heavier in initial weight and were in the feedlot two days less than Brahman sired calves. Sirebreeds differed significantly for feed efficiency with Charolais crosses requiring .34 less lb of feed per lb of gain than Brahman crosses. It should be noted that the winter feeding periods in these two years were characterized by colder temperatures and more snow than is usual for central Oklahoma, thus explaining in part, the somewhat low average daily gains.

Carcass traits for steers and heifers sired by Brahman and Charolais bulls are presented in Table 3. Since Charolais sired calves were 91 lb heavier at slaughter, carcass weights were heavier and carcass weight per day of age was superior to Brahman sired calves, even though Brahman cross calves had 1.2 percent higher dressing percentage.

Carcasses of calves produced by Charolais bulls had .15 inches less external fat over the loin eye and .33 percent less kidney, heart and pelvic fat (KHP). On the

Table 1. Finishing ration for cross-bred calves.

Ingredient	Percent in ration
Corn	39
Milo	39
Alfalfa	8
Cottonseed hulls	4
Molasses	5
Supplemental pellets ¹	5

¹Supplemental pellets consisted of 67.6% soybean oil meal (44%), 12% urea, 10% calcium carbonate, 8% salt plus aurofac, vitamin A and trace minerals.

Table 2. Feedlot performance of three-breed cross calves sired by Charolais and Brahman bulls.

Traits	Sirebreed (steers)		Sirebreed (heifers)		Difference averaged over both sexes (Charolais-Brahman)
	Charolais	Brahman	Charolais	Brahman	
Number of animals	72	52	82	45	--
Initial weight, lb	475	463	455	448	10
Days in feedlot	261	255	244	255	-2
ADG, lb/day	2.43	2.44	2.27	1.84	.31**
Final weight, lb	1103	1022	1006	904	91**
Feed efficiency, lbs feed/lb gain ¹	7.91	8.25	7.91	8.25	-.34**

¹Steers and heifers of each three-breed cross group were together in a pen, thus feed efficiency could not be measured for each sex.

**Differences are significant at the .01 probability level.

Table 3. Carcass traits of three-breed cross calves sired by Charolais and Brahman bulls.

Traits	Sirebreed (steers)		Sirebreed (heifers)		Difference averaged over both sexes (Charolais-Brahman)
	Charolais	Brahman	Charolais	Brahman	
Number of animals	72	52	82	45	--
Slaughter age, days	471	450	448	454	7
Carcass weight, lb	693	660	634	589	39**
Carcass weight per day of age	1.47	1.47	1.42	1.28	.07**
Dressing percent	62.7	63.9	62.9	64.1	-1.20**
Single fat thickness, in	.42	.58	.46	.60	-.15**
KHP, %	3.12	3.37	3.14	3.58	-.33**
Marbling score ¹	5.00	5.22	5.17	5.52	-.27
Carcass grade ²	9.9	10.2	10.0	10.6	-.42*
REA, sq in	13.30	11.26	12.46	10.52	1.99**
Cutability, % ¹	50.5	48.4	50.2	48.2	2.05**
Tenderness, lb ³	16.9	16.2	--	--	.7

¹Marbling score equivalents: 4 = slight, 5 = small.

²Grade equivalents: 9 = high good, 10 = low choice and 11 = average choice.

³Tenderness measured as lb of Warner-Bratzler shear force. Only 55 Charolais and 46 Brahman cross steers were evaluated for this trait.

**Differences are significant at the .01 probability level.

*Difference is significant at the .05 probability level.

Table 4. Economic analysis of performance differences between Charolais and Brahman sired three-breed cross calves.

	<u>Charolais</u>	<u>Brahman</u>
Feed cost ¹ , \$	203.01	182.67
Overhead ² , \$	118.44	119.85
Total	321.45	302.52
Carcass weight, lb	663	625
Yield grade	3	3
Quality grade	Choice	Choice
Price, selling		
Yield and grade, \$ per cwt ³	93.13	93.13
Return above feedlot cost, \$	296.00	279.54
Break-even feeder price, \$ per cwt	63.66	61.44

¹Based on: \$3.80/cwt milo, \$2.60/bu corn, \$80/ton alfalfa, \$70/ton cottonseed hulls, \$90/ton molasses, \$150/ton supplemental pellets.

²Includes \$.22 per day interest and \$.25 per day yardage.

³Carlot beef price quotations, Texas panhandle and western Oklahoma, Jan. 10, 1979 (average of heifer and steer quotations).

average ribeye area (REA) for the Charolais cross calves was 1.99 square inches larger than for Brahman crosses. Charolais cross calves were 2.05 percent higher in cutability estimates and although not significant, Brahman cross carcasses had slightly more marbling. The average carcass grade of the two sirebreed groups was essentially the same (9.95 vs 10.38 for Charolais and Brahman, respectively). The intent was to slaughter each animal as it attained a low choice carcass grade, and the small differences in carcass grade reflects the failure of personnel being able to predict carcass grade of the live animal with the same degree of accuracy for the various groups of cattle evaluated. Specifically, the Brahman cross heifers should have been slaughtered a few days earlier.

Tenderness as measured by Warner-Bratzler shear force, was similar for both sirebreeds (16.9 vs 16.2, Charolais and Brahman crosses, respectively) and within the range of consumer acceptability.

An economic evaluation of the feedlot performance of Charolais and Brahman sired calves is presented in Table 4. Feed costs, overhead costs and carcass sale value were based on prevailing prices for January 10, 1979, in the Oklahoma panhandle feedlot area. From this table, it can be seen that Charolais crossbred calves returned \$16.46 more above feedlot expenses than Brahman sired calves and would, on that basis, be worth \$2.22 per cwt more as feeder calves.

Although these Brahman and Charolais bulls were mated to a diverse group of crossbred cows, calves produced were quite uniform in conformation and condition. These data would suggest that either sirebreed could be successfully utilized in a terminal cross mating system. This is especially apparent when noting how close the performance of Charolais cross heifers was to that of Charolais cross steers. Since heifers will not be selected for replacement from a terminal cross system, it is important that they perform acceptably from the standpoint of feedlot performance and carcass desirability.