

# Comparison of Feedlot Performance and Carcass Traits Among Various Three-Breed Cross Calves

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## Story in Brief

Feedlot performance and carcass traits were compared among 118 steers and heifers of various three-breed crosses. The heifers were placed in feedlot directly after weaning, and the steers were grazed on wheat pasture and placed in feedlot as yearlings.

Shorthorn and Red Poll were used as the sire breeds. On the average, differences in calf performance between these two sire breeds were not large but consistently favored the Shorthorn sires. Calves sired by Shorthorn bulls were in the feedlot six fewer days, gained 0.29 pounds more per day, were 32 pounds heavier at slaughter, and required 0.4 pound less feed per pound of gain than calves sired by Red Poll bulls.

These three-breed cross calves were produced by seven different kinds of two-breed cross cows (Hereford x Angus, Simmental x Angus, Simmental x Hereford, Brown Swiss x Angus, Brown Swiss x Hereford, Jersey x Angus, and Jersey x Hereford). Calves from the Jersey cross cows required the least amount of days on feed (129 days) and hence had one of the lightest slaughter weights at 818 pounds. Calves from Brown Swiss cross cows averaged 141 days in feedlot with one of the heaviest final weights at 903 pounds. The Brown Swiss and Simmental crosses averaged 0.35 pounds/day more rapid gain than the Jersey crosses but required eight to 12 days longer on feed to grade choice. Calves from Hereford x Angus, Simmental crosses, and Brown Swiss x Hereford cows had similar feed efficiency (averaged 7.52 pounds of feed per pound of gain) and were more efficient than the Brown Swiss x Angus and Jersey crosses by 0.65 pounds of feed per pound of gain on the average. Differences among crossbred cow groups with respect to carcass traits were not large.

## Introduction

Beef cattle producers have constantly been searching for ways to increase efficiency of production. Crossbreeding represents a genetic means for markedly improving production efficiency. It has been repeatedly shown that systematic crossbreeding systems can increase percent calf crop weaned and calf weaning weights, such that the pounds of calf weaned per cow in the

In cooperation with U.S.D.A., Agricultural Research Service, Southern Region.

breeding herd will be increased 20 to 25 percent. At the present time an extensive research program is underway at the Oklahoma Agricultural Experiment Station to compare the lifetime productivity of various two-breed cross cows mated to a bull of a third breed. It is important to also evaluate feedlot performance and carcass merit of the various three-breed cross calves produced, in order to evaluate various crossbred combinations relative to their total efficiency of producing beef.

## Experimental Procedures

Red Poll and Shorthorn bulls were mated to seven different two-breed cross heifers (Hereford x Angus, Simmental x Angus, Simmental x Hereford, Brown Swiss x Angus, Brown Swiss x Hereford, Jersey x Angus, and Jersey x Hereford) to produce their first calves during the spring of 1975. These two sire breeds were used primarily as an attempt to avoid excessive calving problems with two-year old heifers. Three bulls from each sire breed were used in these matings.

The calves were born in January, February, and March of 1975 at the Lake Carl Blackwell Range Research Area and remained with their dams on native grass until they were weaned September 11, 1975, at an average age of 205 days.

Feedlot performance and carcass merit were evaluated on 118 calves (55 steers and 63 heifers). Following weaning all calves were shipped to the Southwestern Livestock and Forage Research Station at El Reno, OK. The heifers were placed in feedlot immediately, and the steers were grazed on wheat pasture and placed in the feedlot for finishing as yearlings.

Each kind of three-breed cross was randomly assigned a pen in the feeding barn (a total of fourteen pens). Both steers and heifers were self-fed the ration shown in Table 1 during their respective finishing phases. Each animal was removed from the finishing pens for slaughter when it was estimated that a choice carcass grade had been attained.

**Table 1. Finishing ration for crossbred calves**

Ingredient	Percent in ration
Milo	78
Alfalfa	8
Cottonseed hulls	4
Molasses	5
Supplemental pellets <sup>1</sup>	5
	100

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

## Results and Discussion

### Comparison of sire breeds

Feedlot performance and carcass traits for each sire breed averaged over both sexes and all seven dam breeds are presented in Table 2. The initial on-test weight for calves of both sire groups was similar. Shorthorn cross calves were in the feedlot six fewer days on the average, gained 0.29 pounds more per day, and were 32 pounds heavier at slaughter than calves sired by Red Poll bulls.

As a result of being 32 pounds heavier at slaughter and having a 1.2 percent higher dressing percent, the Shorthorn sired calves were 29 pounds heavier in carcass weight. Shorthorn sired calves had 0.16 inches less fat thickness; 0.24 percent less kidney, heart, and pelvic fat; and 0.6 square inches larger rib-eye area and thus were 1.2 percent higher in cutability than the Red Poll sired calves. In addition, Shorthorn cross calves required 0.4 fewer pounds of feed per pound of gain.

Differences in performance were not large between these two sire breeds; however, they consistently favored the Shorthorn bulls. Part of this difference may simply reflect differences between the particular bulls used rather than real breed differences.

**Table 2. Feedlot and carcass traits of three-breed cross calves sired by Shorthorn and Red Poll bulls**

Trait	Breed of sire		Differences (S-RP)
	Shorthorn	Red Poll	
Number of animals	59	59	--
Initial weight, lb.	508	493	15
Final weight, lb.	878	846	32*
Days in feedlot	133	139	-6*
ADG, lbs./day	2.90	2.61	.29*
Slaughter weight, lb.	878	846	32*
Carcass weight, lb.	539	510	29*
Dressing percent	61.4	60.2	1.2*
Single fat thickness, inches	0.87	1.03	-0.16*
KHP, percent	2.69	2.93	-0.24*
Carcass conformation <sup>1</sup>	11.1	10.4	0.7*
Marbling <sup>2</sup>	5.7	5.3	0.4*
Carcass grade <sup>1</sup>	10.6	10.5	0.1
REA, square inches	10.7	10.1	0.6*
Cutability, percent	48.0	46.8	1.2*
Feed efficiency (lb. feed/lb./gain)	7.64	8.03	-0.39

\*Differences significant at the .05 probability level. Since all animals of a breed group were in one pen, feed efficiency could not be tested for significance.

<sup>1</sup>Carcass conformation and grade equivalents: 10=low choice, 11=average choice.

<sup>2</sup>Marbling score equivalents: 5=small, 6=traces.

**Table 3. Feedlot performance**

Trait	Breed of dam <sup>1</sup>						
	HxA, AxH	SxA	SxH	BSxA	BSxH	JxA	JxH
Number of animals	28	15	9	13	13	21	19
Initial weight, lb.	447	514	494	523	506	513	507
Final weight, lb.	815	891	885	900	899	818	828
Days in feedlot	139	135	139	141	141	129	129
ADG lb./day	2.69	2.95	2.94	2.76	2.88	2.50	2.56
Feed efficiency, (lb. feed/lb. gain)	7.66	7.53	7.41	8.12	7.49	8.28	8.11

<sup>1</sup>A=Angus, H=Hereford, S=Simmental, BS=Brown Swiss and J=Jersey.

### Comparison of crossbred dam groups

Table 3 presents the feedlot performance of three-breed cross calves produced by each two-breed cross dam group averaged over both sire breeds and sexes. The initial on-test weights varied with the Hereford-Angus crosses at 448 pounds being the lightest by 47 pounds. The Brown Swiss crosses, Simmental crosses, and Jersey crosses all were similar in initial on-test weight (average of 508 pounds). All calves were placed on-test the same day and at similar ages, and thus the variation in initial weight among crossbred groups was primarily due to differences in dam milk production and differences in genetic growth potential of the calves.

Jersey cross calves required the least amount of days on feed (129 days), and hence had one of the lightest slaughter weights at 818 pounds. The Brown Swiss crosses were in the feedlot the longest (141 days) with one of the heaviest final weights at 903 pounds. The Simmental crosses were similar in final weight (889 pounds) to the Brown Swiss crosses but spent four days less time in the feedlot; while the Hereford-Angus crosses were similar to the Brown Swiss crosses for days on feed (139 days) yet had one of the lightest final weights at 816 pounds. The Brown Swiss and Simmental crosses averaged 0.35 pounds per day more rapid gain than the Jersey crosses but required eight to 12 days longer on feed to grade choice.

Pounds of feed required per pound of gain was similar for calves produced by Hereford x Angus, Simmental crosses, and Brown Swiss x Hereford cows (averaged 7.52). This was 0.4 fewer pounds of feed per pound of gain on the average than was required by calves produced by Brown Swiss x Angus and Jersey cross cows.

Carcass traits are presented in Table 4 of calves produced by each crossbred dam group averaged over both sire breeds and sexes. The differences in carcass grade were small as each calf was sent to slaughter when an anticipated choice carcass grade was attained. There were very few major differences between calves of various crossbred dam groups for the carcass

**Table 4. Carcass traits**

Trait	Breed of dam						
	HxA, AxH	SxA	SxH	BSxA	BSxH	JxA	JxH
Number of animals	28	15	9	13	13	21	19
Slaughter weight, lb.	812	891	884	900	899	819	828
Carcass weight, lb.	496	542	545	551	552	495	491
Dressing percent	60.9	60.9	61.5	61.2	61.4	60.3	59.1
Single fat thickness, in.	1.01	0.94	1.04	0.94	0.94	0.87	0.92
KHP, percent	2.80	2.75	2.90	2.89	2.77	2.77	2.80
Carcass conformation <sup>1</sup>	10.8	10.9	11.5	10.8	11.4	10.0	9.76
Marbling <sup>2</sup>	5.9	5.9	5.0	4.9	5.5	5.8	5.7
Carcass grade <sup>1</sup>	10.8	10.8	10.0	10.1	10.7	10.7	11.0
REA, square inches	9.5	10.8	10.9	10.8	10.8	10.0	9.88
Cutability, percent	46.8	47.6	47.0	47.4	47.5	47.9	47.5

<sup>1</sup>Carcass conformation and grade efficiencies: 10=low choice, 11=average choice.

<sup>2</sup>Marbling score equivalents: 4=slight, 5=small, 6=traces.

traits. The calves were quite similar in fat thickness (averaged 0.95 inches and ranged between 0.87 inches to 1.01 inches), KHP fat (averaged 2.81 percent and ranged between 2.75 and 2.90 percent), marbling (averaged small amount), grade (averaged low choice), and cutability (averaged 47.4 percent and ranged from 46.8 to 47.9 percent). Brown Swiss crosses at 903 pounds and Simmental crosses at 889 pounds were heaviest at slaughter and thus had heavier carcass weights than either the Jersey crosses or Hereford-Angus crosses by at least 47 pounds. The Jersey and Hereford-Angus crosses averaged 816 pounds at slaughter with 493 pound carcasses. The Jersey crosses had a lower dressing percentage (59.7 percent) than all other crosses by at least 1.2 percent, with all other crosses being similar (averaged 61.1 percent). The Jersey crosses lacked carcass conformation by at least nearly one-third of a grade in comparison to other crossbred groups. Brown Swiss crosses and Simmental crosses had larger rib eye areas than Hereford-Angus crossed calves by 1.2 square inches and Jersey crosses by 1.0 square inch.

Overall, differences among calves produced by the seven kinds of crossbred cows used in this study were not very large. This may suggest that a commercial producer may be able to adequately involve several different kinds of crossbred cows in his breeding program and simply mate them all to an unrelated breed of bull. This would permit some flexibility in acquiring crossbred replacement heifers for their herd.