

# Feedlot Performance and Carcass Merit of Calves from Hereford, Hereford x Holstein and Holstein Cows

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## Story in Brief

The feedlot performance and carcass characteristics of calves sired by Angus bulls and out of Hereford, Hereford x Holstein, and Holstein cows which had been on different levels of winter supplement were compared.

Most apparent differences were those due to breed of dam. Calves out of Hereford cows tended to gain the fastest and those out of Holstein cows the slowest. Calves out of Holstein cows were least efficient. Calves out of Holstein cows required the longest feeding period and were heaviest at slaughter, followed by calves out of the crossbreds.

Calves out of Holstein cows had an advantage in dressing percent, marbling, carcass grade, and tenderness.

## Introduction

The cow-calf operator trying to obtain the highest possible return per dollar invested is interested in increasing the weaning weight of his calves. Research has shown a strong positive relationship between level of milk production in beef cows and weaning weight of their calves. Selection of heifer calves higher in weaning weights will result in higher milk production, but a faster method of increasing milk production in the cow herd is to infuse dairy breeding. The resulting increase in milk production should increase weaning weight, but in order to fully evaluate this practice, the feedlot performance and carcass characteristics of calves with a percentage of dairy breeding should be determined.

The primary purpose of this experiment was to compare the feedlot performances and carcass characteristics of calves out of Hereford, Hereford x Holstein crossbred and Holstein females.

## Experimental Procedure

Calves used in this study were sired by Angus bulls and out of Hereford, Hereford x Holstein and Holstein females calving for the first time. These calves were dropped from mid-November, 1970 through

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February, 1971. At calving their dams within each breed were assigned to one of two (Hereford and Hereford x Holstein) or three (Holstein) levels of winter supplementation designated as Moderate, High or Very High. Daily post-calving amounts of a 30 percent protein supplement consisted of approximately 2.5, 5.5 and 7.7 lb. for Moderate, High and Very High treatments, respectively. The experimental design is illustrated in the heading of Table 1.

The calves were placed in the feedlot at weaning which was at  $240 \pm 7$  days. Their weaning weight, taken after a 12-hour shrink, was used as the initial feedlot weight. The calves were fed an 80 percent concentrate ration containing 65 percent milo, 10 percent wheat, 10 percent alfalfa, 7.5 percent soybean meal, 1.0 percent urea, 5.0 percent molasses and 1.0 percent salt and minerals. Stilbestrol and Vitamin A were also added at recommended levels. Calves were vaccinated upon entry into the feedlot for blackleg, PI3 and IBR. Calves were group fed, by sex and by dams' breed and supplement level.

Cattle were slaughtered as each steer or heifer reached an anticipated grade of choice based on apparent fatness. Slaughter weight was based on an overnight 12-hour shrink. Animals were slaughtered at a federally inspected commercial packing plant. After slaughter, all carcasses were chilled for 24 hours after which time a USDA grader estimated quality grade, marbling score, maturity, conformation score and kidney, heart and pelvic fat. A tracing was made at the 12th-13th rib separation on each carcass to determine rib-eye area and backfat thickness. Cutability was calculated using the Murphy cutability prediction equation.

Shear values were determined on two-inch rib steaks removed at the 12th rib. The steaks were cooked to an internal temperature of 150° F. After 24 hours of chilling, three cores were taken from each steak and each core was subjected to three shear tests.

## Results and Discussion

A summary of feedlot performance and carcass characteristics of calves grouped according to breed and level of winter supplement of their dams is shown in Table 1 for steers and Table 2 for heifers. With the small number of calves per treatment and lack of consistent patterns, it is difficult to make definite conclusions concerning possible effects of level of winter supplement of the dams of calves on their feedlot performance and carcass merit.

Steers and heifers are compared according to breed of dam in Table 3. Calves from the crossbred and Holstein dams required a longer feeding period (an average of 17 and 46 days) and were heavier at slaughter (approximately 100 and 200 lb.) than calves out of Hereford cows. Breed differences in rate of gain were largest among steers; steer calves out of

Table 1. Feedlot Performance and Carcass Characteristics of Steer Calves (All Sired by Angus Bulls)

Item	Breed of Dam and Supplement Level						
	Hereford		Hereford x Holstein		Holstein		
	Moderate	High	Moderate	High	Moderate	High	Very High
No. of head	5	7	6	6	4	7	9
Initial wt., lb.	507	518	556	535	608	635	641
Slaughter wt., lb.	938	906	1018	1039	1146	1121	1181
Days fed	127	128	149	169	180	180	203
Daily gain, lb.	3.37	3.07	3.09	3.00	3.03	2.73	2.70
Feed/lb. gain, lb.	6.82	7.34	7.20	7.42	8.06	8.60	8.68
Carcass wt., lb.	555	545	616	630	703	683	732
Dressing percent	59.2	60.2	60.5	60.6	61.3	60.9	62.0
Ribeye, sq. in.	11.7	10.5	11.7	11.6	11.0	12.1	12.8
Backfat thickness, in.	0.75	0.87	0.78	1.00	0.90	0.69	0.75
Cutability, %	49.09	47.86	48.25	47.08	45.76	48.87	48.1
Marbling score <sup>1</sup>	12.6	12.7	12.3	14.1	15.0	16.0	17.9
Carcass grade <sup>2</sup>	9.2	9.4	8.8	10.0	10.0	10.0	11.0
Shear value <sup>3</sup>	19.8	18.6	19.3	18.4	16.1	18.0	16.5

<sup>1</sup> Higher value indicates more marbling.<sup>2</sup> 8=Average Good, 9=High Good, 10=Low Choice, 11=Average Choice.<sup>3</sup> Low value indicates greater tenderness.

Table 2. Feedlot Performance and Carcass Characteristics of Heifer Calves (All Sired by Angus Bulls)

Item	Breed of Dam and Supplement Level						
	Hereford		Hereford x Holstein		Holstein		
	Moderate	High	Moderate	High	Moderate	High	Very High
No. of head	7	6	7	7	7	7	3
Initial wt., lb.	483	456	516	554	569	579	568
Slaughter wt., lb.	861	803	936	930	1039	1036	993
Days fed	152	155	162	149	179	202	180
Daily gain, lb.	2.66	2.33	2.57	2.57	2.65	2.33	2.28
Feed/lb. gain, lb.	8.21	8.13	7.20	7.42	9.45	9.61	9.44
Carcass wt., lb.	526	496	580	571	655	650	627
Dressing percent	61.1	61.8	62.0	61.4	63.0	62.7	63.1
Ribeye, sq. in.	11.1	10.0	11.4	10.9	12.0	11.8	12.3
Backfat thickness, in.	.80	.95	.96	1.00	.89	.71	.91
Cutability, %	48.1	47.2	46.9	46.4	47.1	47.5	47.5
Marbling score <sup>1</sup>	14.5	13.7	13.4	15.1	17.4	15.0	15.7
Carcass grade <sup>2</sup>	9.9	9.7	9.6	10.1	11.0	10.0	10.3
Shear value <sup>3</sup>	17.8	18.2	20.5	18.0	16.0	18.5	17.6

<sup>1</sup> Higher value indicates more marbling.<sup>2</sup> 8=Average Good, 9=High Good, 10=Low Choice, 11=Average Choice.<sup>3</sup> Low value indicates greater tenderness.

Table 3. Feedlot Performance and Carcass Characteristics of Steer and Heifer Calves by Breed of Dam (All sired by Angus Bulls)

Item	Breed of Dam					
	Hereford		Hereford x Holstein		Holstein	
	Steers	Heifers	Steers	Heifers	Steers	Heifers
No. of head	12	13	12	14	17	17
Initial wt., lb.	513	467	546	535	628	572
Slaughter wt., lb.	922	832	1029	933	1139	1023
Days fed	128	153	159	156	188	187
Daily gain, lb.	3.22	2.50	3.05	2.57	2.82	2.42
Feed/lb. gain, lb.	7.08	8.17	7.31	7.97	8.45	9.50
Carcass wt., lb.	550	511	623	575	706	644
Dressing percent	59.7	61.5	60.6	61.7	61.4	63.3
Ribeye, sq. in.	11.1	10.6	11.7	11.2	12.0	12.0
Backfat thickness, in.	.81	.88	.89	.98	.78	.83
Cutability, %	48.5	47.7	47.7	46.7	47.6	47.4
Marbling score <sup>1</sup>	12.7	14.1	13.2	14.3	16.3	16.0
Carcass grade <sup>2</sup>	9.3	9.8	9.4	10.4	10.3	10.4
Shear value <sup>3</sup>	19.2	18.0	18.8	19.3	16.9	17.3

<sup>1</sup> Higher value indicates more marbling.

<sup>2</sup> 8=Average Good, 9=High Good, 10=Low Choice, 11=Average Choice.

<sup>3</sup> Low value indicates greater tenderness.

Hereford cows gained the fastest, followed by calves out of crossbred cows and Holstein cows. Heifers out of Holstein cows also gained the slowest. Feed efficiency was poorest for calves of both sexes out of Holstein cows.

Calves out of Holstein cows had an advantage in dressing percent, marbling score, carcass grade and tenderness, with slightly less fat cover than calves out of Hereford and crossbred cows.

An economic analysis of feeding costs and returns is presented in Table 4, based on an average of steers and heifers for each breed. Prices used were representative of values at the time of the feeding trial. Other prices considered more appropriate may be substituted in the calculations as desired.

The following prices were used:

	Steers	Heifers
Initial value of calves (per cwt.)		
Hereford	41.00	36.00
Hereford x Holstein	39.00	34.00
Holstein	37.00	32.00
Value of carcasses (per cwt.)		
Choice	54.00	52.50
Good	51.00	49.50

Feed was valued at \$45.00 per ton and yardage and interest are charged at the rate of \$0.20 per day.

The return above initial value of the calves, feed, yardage and interest was calculated. On this basis, calves out of the Holstein cows were the most profitable, followed by those out of the crossbred cows. The

Table 4. Economic Analysis (Average for Steers and Heifers)

Item	Breed of Dam		
	Hereford	Hereford x Holstein	Holstein
Carcass value, \$	274.60	311.01	355.11
Feedlot costs, \$			
Initial value of calves	189.58	197.33	207.70
Feed cost	67.83	76.64	98.44
Yardage and interest	28.20	31.50	37.47
Total costs	285.61	305.47	343.61
Return above initial value, feed, yardage and interest, \$	-11.01	5.54	11.94
Value of carcass less cost of feed, yardage and interest, \$	178.58	202.87	219.67
Value of calf for feeding, %	36.37	37.53	36.60

breed differences in returns were primarily due to the differences in initial value assumed for the calves.

Another type of calculation was made. Feed, yardage and interest costs were subtracted from the value of the carcass, and the resulting return was divided by the initial weight of the calves to provide an estimate of the value of the calves for feeding. On this basis, calves from cows of the three breeds were relatively close in value, \$37.53, \$36.90 and \$36.37 per cwt. for calves from crossbreds, Holsteins and Herefords, respectively.

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