ment costs, it would appear that cows on the lower supplement levels yield the greatest return, $169.46 and $182.95 for the Hereford and Holstein breed treatment groups, respectively. In the Hereford x Holstein breed group, the higher supplement level showed the greatest return when expressed in this manner.

A more realistic profit picture is provided by adjusting for rebreeding performance. This adjustment was made by multiplying the return above feed cost per calf by percent conception of the cows as 5-year-olds. On this basis, Moderate Hereford females were the most profitable followed by Moderate Hereford x Holsteins, High Hereford x Holsteins and High Herefords. The low rebreeding performance of the High and Very High Holsteins made them uncompetitive. As indicated previously, the low rebreeding performance of Moderate Holsteins as 4-year-olds resulted in their exclusion as a breed treatment group this year.

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

K. S. Lusby, R. D. Wyatt, D. F. Stephens and Robert Totusek

Story in Brief

Eighty-four Charolais crossbred calves from Hereford, Hereford x Holstein (Crossbred) and Holstein dams were fed from weaning (240±7 days of age) until each calf reached an anticipated grade of choice based on apparent fatness.

Holstein progeny were heavier in weight and larger in skeletal size at both weaning (entry to the feedlot) and at slaughter. Crossbred progeny were intermediate. Hereford progeny required the shortest feeding period and gained the most efficiently, followed by Crossbred progeny. Daily gains were the highest for Holstein progeny.

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Holstein progeny produced more carcass weight per day of age, while Hereford progeny produced carcasses with more muscling (more rib eye area/100 lb. carcass, higher conformation score). Marbling score and quality grade were highest for Holstein progeny.

Introduction

Previous research has shown that weaning weights can be greatly improved by increasing the milk production of beef cows. The fastest method of increasing milk production in beef herds is by infusing genes from dairy breeds. However, to evaluate the effect of heavier weaning weights from high milking dams on the overall efficiency of beef production, a comparison of post-weaning feedlot performance and carcass traits of beef, beef x dairy and dairy progeny is needed.

The purpose of this experiment was to compare feedlot performance and carcass traits of calves with 0, 25 and 50 percent Holstein breeding, when fed to approximately equal grade.

Experimental Procedure

The feedlot performance and carcass characteristics of calves with 0, 25 and 50 percent Holstein breeding were determined. Calves, sired by Charolais bulls, were from four-year-old Hereford, Hereford x Holstein (Crossbred) and Holstein cows calving for the third time. Dams from each breed had been wintered on one of two levels of protein supplementation, Moderate or High, while an additional group of Holsteins also received a Very High level of supplement. Daily post-calving amounts of a 30 percent natural protein supplement were 2.6, 5.8 and 8.4 lb. per day for Moderate, High and Very High supplement levels, respectively.

Calves were born in December, January and February and placed in the feedlot at weaning (240 ± 7 days of age). At weaning, all calves were shrunk for 12 hours, then weighed, photographed and vaccinated for blackleg, P13, IBR and BVD. The weaning weight was used as the initial feedlot weight. The calves were fed a 75 percent concentrate ration consisting of (percent): ground corn, 60.2; cottonseed hulls, 15.0; ground alfalfa, 10.0; cottonseed meal, 8.0; molasses, 5.0; urea 1.0; salt, 0.3; minerals and Vitamin A. Calves were group fed by sex and by dams' breed and previous level of winter supplementation.

Each calf was slaughtered when estimated to have reached a quality grade of low choice, based on apparent fatness. Final weights were taken after an overnight 12-hour shrink. All calves were slaughtered at a commercial slaughter plant and chilled 72 hours before quality grade, marbling score, maturity, conformation score and kidney, heart and pelvic

fat (KHP) were estimated by a USDA grader. Ribeye area and backfat thickness were measured from a tracing at the 12-13th rib separation on each carcass. Cutability was calculated using the Murphy catability prediction equation.

Results and Discussion

Little influence of dams' previous level of winter supplementation on the calves feedlot performance or carcass traits was seen. Therefore, results for feedlot performance (Table 1) and carcass traits (Table 2) are shown only by breed of dam.

Results were similar to those reported for the previous two years. Holstein progeny were the heaviest, and Hereford progeny the lightest, at both the start of feeding and at slaughter. Crossbred progeny were intermediate. Average length of the feeding period and consequent age at slaughter increased with each increment of Holstein breeding. Holstein progeny gained slightly faster than Crossbred or Hereford progeny, while feed efficiency definitely favored Hereford progeny, followed by Crossbred progeny. Feed required per lb. of gain was 19.8 percent greater for Holstein progeny and 11.0 percent greater for Crossbred progeny than for Hereford progeny.

Carcass merit is summarized in Table 2. Carcass weight trends were similar to slaughter weights with Holstein progeny the heaviest and Hereford progeny the lightest at slaughter. Holstein progeny produced more carcass weight per day of age than Hereford or Crossbred progeny in spite of the longer feeding period for Holstein progeny. The superiority of Hereford progeny for muscling was shown by REA/100 lb. carcass weight and is consistent with previous data on these breeds. Cutability estimates also favored Hereford progeny. The higher marbling score for

Table 1. Feedlot Performance of Calves from Four-Year-Old Cows.

Item	Breed of Dam		
	Herefords	Hereford x Holstein	Holstein
No. of head	27	26	31
Initial weight, lb.[1]	548	607	667
Slaughter weight, lb.[2]	997	1091	1241
Age at slaughter, days[2]	429	450	466
Average days fed	189	210	226
Average daily gain	2.42	2.35	2.61
Feed/lb. gain, lb.	8.62	9.52	10.33

[1] Actual weaning weight.
[2] 240 days + average days fed.

Table 2. Carcass Merit of Calves from Four-Year-Old Cows.

Item	Breed of Dam		
	Hereford	Hereford x Holstein	Holstein
No. of head	27	26	31
Hot carcass weight, lb.	607	667	777
Rib eye, sq. in.	12.05	12.37	12.82
Rib eye/100 lb. carcass	1.98	1.85	1.65
Fat thickness, in.	0.73	0.75	0.75
Fat thickness/100 lb. carcass, in.	0.12	0.11	0.10
KHP Fat, %[1]	2.95	3.09	3.25
KHP Fat/100 lb. carcass, %	0.48	0.46	0.42
Cutability, %	50.0	48.5	47.8
Carcass weight/day of age, lb.	1.41	1.50	1.67
Conformation score[2]	10.6	10.9	10.1
Marbling score[3]	12.0	12.2	14.3
Carcass grade[2]	8.5	8.8	9.7

[1] Kidney, heart and pelvic.
[2] 9=high good, 10=low choice, 11=average choice.
[3] Higher score indicates more marbling.

Holstein progeny, also observed in the first calf crop, resulted in a higher carcass grade. A longer feeding period and greater age probably contributed to the greater marbling in Holstein progeny.

Economic Analysis

An economic analysis of feedlot costs and returns is presented in Table 3. The analysis is 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	$58.00	$52.00
Hereford x Holstein	57.00	51.00
Holstein	55.00	49.00
Value of carcasses (per cwt.)		
Choice	66.00	65.00
Good	64.00	63.00

Feed was valued at $97.50 per ton. Yardage cost was estimated at 15¢ per head per day and the interest rate was estimated at 9 percent.

The return above initial value of the calves, feed yardage and interest was calculated. On this basis, all breed treatment groups showed a loss. Hereford calves showed the smallest loss at −$151.68. Hereford x

Table 3. Economic Analysis (Average for Steers and Heifers).

Item	Breed of Dam		
	Herefords	Hereford x Holstein	Holstein
Carcass Value, $	385.45	423.55	508.28
Feedlot costs, $			
Initial value of calves	301.40	327.78	346.84
Feed cost[1]	188.68	224.62	289.06
Yardage[2]	28.35	31.50	33.90
Interest[3]	18.70	23.10	27.76
Total cost, $	537.13	607.00	697.56
Return above initial value, feed yardage and interest, $	—151.68	—183.45	—189.28
Value of carcass less cost of feed, yardage and interest, $	149.72	144.33	157.56
Value of calf for feeding, $/cwt.	27.32	23.78	23.62

[1] Total feed consumed x $97.50 per cwt.
[2] 15¢ per head per day.
[3] [½ feed cost + initial value of calf] x $\frac{\text{days on feed}}{360}$ x 0.90.

Holstein calves were intermediate at a loss of —$183.45 and Holsteins calves showed the greatest loss at —$189.28. The lack of profitability of the feedlot phase of the project may be attributed to the high initial value of the calves combined with the high feed costs.

An additional calculation was made in which feed yardage and interest costs were subtracted from the carcass value, and the resulting return was divided by the initial calf weight. This calculation was used to provide an estimate of the value of the calves for feeding. On this basis, Hereford, Hereford x Holstein and Holstein calves had values of $27.32, $23.78 and $23.62 per cwt., respectively.