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Calving Difficulty of Two-year-old Hereford Dams and Performance of Calves Sired by Angus and Hereford Bulls

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Summary

Difficulty in calving two-year-old Hereford heifers was not reduced by the use of Angus bulls, since the variability in birth weights of calves between sires of the Angus and Hereford breeds was less than the variability of birth weights of calves between sires within each breed. On the other hand, crossbreeding was found to be a practical method for increasing the live performance of calves, especially in heifer calves. Significant improvement in suckling gain, conformation score at weaning, feedlot gain, and carcass grade were noted in crossbred heifers compared to the straightbred heifers. As a result of the increased performance of the crossbred heifers, almost fifteen dollars more per head were received for the crossbred calves than for the straightbred Hereford calves when they were marketed for slaughter.

Introduction

Heifers bred to calve at two years of age frequently have difficulty during parturition, and calves often die when assistance is not administered. Since Angus calves are usually smaller at birth than Hereford calves, many livestock operators producing Hereford cattle have attempted to reduce calving troubles by mating Angus bulls with Hereford heifers. However, variability in birth weights of calves from sires of the same breed, whether Hereford or Angus, sometimes limits the effectiveness of reducing difficulties in calving by such means. Moreover, studies of the performance of crossbred calves compared to straightbred calves from birth to slaughter have been conducted with conflicting results. Even though it is most commonly reported that crossbred calves grow more rapidly than the straightbreds, some controversy still exists.

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An experiment was initiated to 1) study the effect of breed of sire upon birth weight and its relationship with calving difficulty of two-year-old Hereford heifers; 2) compare the performance of crossbred calves with straightbred Hereford calves during the suckling period and during a finishing period in the feedlot; and 3) study the effect of sire and sex of calf as related to calving difficulty of the dam and the performance of the crossbred calves and the straightbred Hereford calves from birth to slaughter.

Procedure

Data were collected over a period of three years in which 52 yearling Hereford heifers were mated with two Angus bulls and 52 yearling Hereford heifers were mated to three Hereford bulls. The Angus bulls were purchased from Angus herds which were not related by breeding. The Hereford bulls were from the same herd as the yearling heifers to which they were mated, and half-sibs of the Hereford bulls were automatically sorted into the Angus breeding groups. All other heifers were randomly sorted into both the Angus and Hereford breeding groups.

The bulls were mated with the heifers for six weeks each year beginning in the early part of May. A total of 85 calvings (45 from Angus sires and 40 from Hereford sires) were involved in the study, and the difficulty observed in calving, the birth weight, sex, and individual identification of calves were recorded. Male calves were castrated at birth by the use of elastrator rings.

The calves and their dams were confined to meadow pastures until the last of June and then were moved to summer range located in the foothills of the Blue Mountains of eastern Oregon. No supplemental feeding was provided for either the calves or their dams while on pasture. Calves were weaned each year in the first week of September because of the seasonal decline in the nutritional value of the range forages. Individual weights and scores for body conformation were recorded at weaning, when the average age of the calves was about 185 days. After weaning, the calves were allowed to

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graze regrowth from alfalfa-grass hay meadows until they entered the feedlot in early November.

Steer and heifer calves were fed a finishing ration in dry lot. The ration consisted of dry-rolled barley, chopped grass hay, and a protein supplement. Barley was fed at 1.5 percent of body weight until calves averaged 600 pounds and free choice thereafter. After calves weighed 600 pounds, hay allowance was reduced gradually to one pound per head per day. The protein supplement was restricted to one pound per head per day during the entire finishing period. At the beginning of the feeding period and again after 112 days, steer calves were each implanted with 12 mg. of diethylstilbestrol (DES). Heifer calves were not implanted. The length of the feeding period was 217 days for heifers and 223 days for steers. All calves finished in dry lot were sold at the conclusion of the feeding period to a commercial packing company with the selling price based on carcass grade. Cold carcass weights and grades were recorded to further evaluate the effects of crossbreeding. The data were subjected to analysis of variance to determine statistical differences due to breed, sire, and sex (Snedecor, 1946).

Results and Discussion

Birth weight of calves was not significantly affected by breed of sire, but there were marked differences due to individual sires (regardless of breed) and sex of calf. Moreover, most of the differences in birth weight of calves between sires were noted in heifer calves (Table 1). Heifer calves were smaller at birth than bull calves, and greater differences in birth weight between sexes occurred in the straightbred than in the crossbred calves. Since bull calves were heavier than heifer calves at birth and a greater percentage of the total number of cows

giving birth to bull calves were assisted at calving time compared to the number of cows assisted in giving birth to heifer calves, birth weight and its relationship to sex appear to be more responsible for calving difficulty than breed of sire in this experiment.

Crossbred calves exhibited significantly greater rates of gain during the suckling period and were heavier at weaning. However, most of the increased performance was observed in heifer calves. The crossbred heifer calves gained .19 pound per day more during the suckling period and weighed 44.2 pounds heavier at weaning time than straightbred heifer calves, whereas the performance of the straightbred steer calves was equal to that of the crossbred steer calves (Table 2). These results agree with other reported data, which show the effect of heterosis to be greater in heifers than in steers (Stonaker, 1963 and Gregory *et al.*, 1965). Suckling gain and weaning weight were not significantly affected in this experiment by individual sires of the same breed.

Breed of sire and sex of calf also had a significant effect upon conformation score of the calf at weaning (Table 2). Crossbred calves were scored one-third of a grade higher than straightbred calves, and steers scored almost one-third of a grade higher than heifers.

Calves born during the third year of the study were not fed in dry lot but were sold after being weaned. Therefore, data on the progeny of one of the Hereford sires (3x112) were collected only through weaning. Crossbred calves born the third year of the study were also sold after being weaned, but progeny of the Angus sire (762) had been tested in the feedlot the preceding year.

The performance in the feedlot of the progeny of two sires of each of the Angus and Hereford breeds (Table 3) shows that the straightbred Hereford heifers were lighter in weight going into the feedlot and at the con-

Table 1. BIRTH WEIGHTS AND CALVING ASSISTS ACCORDING TO BREED OF SIRE AND SEX OF CALF

	Angus G77		Angus 762		Hereford 1x19		Hereford 2x2		Hereford 3x112	
	M ¹	F	M	F	M	F	M	F	M	F
Calves born	8	9	15	13	5	8	8	10	3	6
Cows assisted..	4	2	7	2	3	4	5	2	0	1
Dead calves ²	0	0	1	0	0	0	0	0	0	0
Avg. birth wt., lbs.:										
All calves	77.6 ^a	74.9 ^a	66.7 ^{bc}	61.7 ^c	76.6 ^a	71.9 ^{ab}	71.6 ^{ab}	64.2 ^c	75.3 ^a	63.3 ^c
Calves assisted	77.5	68.5	70.0	65.0	76.0	73.3	73.8	71.5	.....	53.0
All sires by breed	Angus				Hereford					
Sex of calf	M		F		M		F		All	
Calves born.....	23		22		16		24		40	
Cows assisted	11		4		8		7		15	
Dead calves ²	1		0		0		0		0	
Avg. birth wt., lbs.:										
All calves	70.5 ^{ab}		67.1 ^b		73.9 ^a		66.5 ^b		69.5	
Calves assisted	72.8		66.8		74.6		69.9		72.4	

¹ M and F refer to sex of calf.

² Calves which died because of calving difficulty of dam.

^{a,b,c} Means on the same line within sire and sex followed by different superscripts differ statistically ($P < .05$).

clusion of the feeding period than the Hereford steers, crossbred heifers, and crossbred steers. Moreover, rate of gain during the feeding period was less for the straightbred heifers than for the crossbred heifers, straightbred steers, or crossbred steers. Although the straightbred and crossbred steers gained at a faster rate than the straightbred and crossbred heifers, some of the increased growth rate in steers could have been attributed to the response from DES. On the other hand, the .15 pound per day advantage of the crossbred heifers over the straightbred heifers was apparently due to the response obtained from crossbreeding. Difference in

rate of gain in the feedlot between straightbred and crossbred steers was not statistically significant, which further indicates that in the feedlot, as well as during the suckling period, the effect of crossbreeding was more pronounced in heifers than in steers.

Data collected after slaughter show carcass weight and pounds of carcass produced per day of age were related to growth rate of the live animal (Table 3). Since steers were fed for a longer period of time and also gained at a faster rate, their carcasses were heavier than carcasses from heifers, and they produced more pounds of carcass per day of age. Differences in the same char-

Table 2. PERFORMANCE OF CALVES TO WEANING ACCORDING TO BREED OF SIRE AND SEX OF CALF

	Angus G77		Angus 762		Hereford 1x19		Hereford 2x2		Hereford 3x112	
	M ¹	F	M	F	M	F	M	F	M	F
Avg. weaning wt., lbs. ²	374.4 ^{ab}	382.6 ^a	369.6 ^{abc}	353.5 ^{abc}	356.5 ^{abc}	328.9 ^{bc}	380.6 ^a	321.2 ^c	364.7 ^{abc}	311.5 ^c
Avg. suckling gain, lbs./day	1.62 ^a	1.65 ^a	1.61 ^{ab}	1.54 ^{abc}	1.57 ^{abc}	1.44 ^{bc}	1.61 ^{ab}	1.37 ^c	1.62 ^a	1.38 ^c
Avg. weaner grade ³	15.8 ^{ab}	15.8 ^{ab}	16.8 ^a	15.6 ^b	15.5 ^b	14.9 ^b	15.4 ^b	15.0 ^b	15.3 ^b	13.7 ^c
All sires by breed			Angus				Hereford			
Sex of calf	M		F		All		M		F	
Avg. weaning wt., lbs. ²	371.4 ^a		365.7 ^a		368.7 [*]		371.0 ^a		321.5 ^b	
Avg. suckling gain, lbs./day	1.61 ^a		1.59 ^a		1.60 [*]		1.60 ^a		1.40 ^b	
Avg. weaner grade ³	16.4 ^a		15.7 ^{ab}		16.1 [*]		15.4 ^b		14.6 ^c	

¹ M and F refer to sex of calf. Male calves were castrated at birth with elastrator rings.

² Weaning weights and conformation scores were recorded when calves were about 185 days of age.

³ Weaner grade for conformation: good, 14; choice, 17.

^{a,b,c} Means on the same line within sire and sex that are followed by different superscripts differ statistically ($P < .05$).

^{*}, ^{**} Means on the same line within breed of sire followed by different superscripts differ statistically ($P < .01$).

Table 3. FEEDLOT PERFORMANCE, CARCASS GRADE, AND VALUE OF CALVES ACCORDING TO BREED OF SIRE AND SEX OF CALF

	Angus M ¹	Angus F	Angus M&F	Hereford M	Hereford F	Hereford M&F
Number head	6	13	19	6	13	19
Days on feed	223	217	.....	223	217	.....
Avg. initial wt., lbs.	468.7 ^a	448.0 ^{ab}	454.5	476.2 ^a	426.4 ^b	442.1
Avg. final wt., lbs.	1005.7 ^a	898.0 ^b	932.0 [*]	998.1 ^a	842.5 ^c	891.6 ^{**}
Avg. gain, lbs./day	2.41 ^a	2.07 ^b	2.18	2.33 ^a	1.92 ^c	2.05
Avg. cold carcass wt., lbs.	567.0 ^a	504.5 ^b	524.3 [*]	564.8 ^a	458.5 ^c	492.1 ^{**}
Avg. carcass yield, %	56.4 ^a	56.2 ^a	56.3 [*]	56.6 ^a	54.3 ^b	55.1 ^{**}
Avg. lb. carcass/day of age, lbs.	1.20 ^a	1.10 ^b	1.13 [*]	1.20 ^a	1.01 ^c	1.07 ^{**}
Avg. carcass grade, USDA ²	15.5 ^a	17.5 ^b	16.8	16.0 ^a	16.0 ^a	16.0
Avg. feed/lb. gain, lbs.	.....	.....	7.5	.....	.....	7.7
Avg. feed cost/lb. of gain, cents ³	.....	.....	15.94	.....	.....	16.38
Avg. price received/100 lbs. of carcass, dollars ⁴	.....	.....	40.21	.....	.....	39.82
Avg. carcass value, dollars ⁴	.....	.....	210.82	.....	.....	195.95

¹ M and F refer to sex of calf. All male calves were steers and had been implanted with 12 mg. DES at the start of the finishing period and another 12 mg. after 112 days in the feedlot.

² USDA carcass grades: good, 14; choice, 17; prime, 20.

³ Feed cost: hay, \$25/ton; barley, \$45/ton; supplement, \$80/ton.

⁴ Rail price received per 100 lbs. of carcass:

	Year 1	Year 2	
	(Heifers)	(Steers)	(Heifers)
Good	\$33.50	\$43.00	\$39.00
Choice	35.00	44.00	43.00

^{a,b,c} Means on the same line within sex that are followed by different superscripts differ statistically ($P < .05$).

^{*}, ^{**} Means on the same line within breed that are followed by different superscripts differ statistically ($P < .05$).

acteristics due to breed of sire were also significant because of the increased live performance of the crossbred heifers over the straightbred heifers. The lower carcass yields of straightbred heifers also accounted for statistically significant differences in carcass yield due to sex of calf and breed of sire. Although carcass grade was not significantly affected by breed of sire or sex of calf, interaction of the two factors was significant. Carcasses from crossbred heifers graded higher than those from crossbred or straightbred steers and straightbred heifers. The straightbred heifers produced the lowest grading carcasses.

Since steers and heifers were fed in the same lots, the economic return from steers versus heifers could not be compared. Crossbred calves and straightbred calves

were fed in different lots, and the gross return per animal within each lot is presented in Table 3. The results of this experiment show an advantage of almost fifteen dollars per head in gross return in favor of the crossbred calves.

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