

1987

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## Recommended Citation

Marshall, D.M. and Dinkel, C.A., "Evaluation of Varying Levels of Hereford, Simmental and Angus Breeding Cows" (1987). *South Dakota Beef Report, 1987*. Paper 16.

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EVALUATION OF VARYING LEVELS OF HEREFORD, SIMMENTAL AND  
ANGUS BREEDING FOR CALF PRODUCTION THROUGH WEANING

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CATTLE 87-15

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Summary

Cow size, reproductive performance and calf performance to weaning were evaluated for Simmental-Hereford cows (25 to 38% Hereford) mated to Hereford bulls, Simmental-Hereford cows (50% Hereford) mated to Hereford bulls, Simmental-Hereford cows (62-75% Hereford) mated to Simmental bulls, Angus-Hereford cows (25-38% Hereford) mated to Hereford bulls, Angus-Hereford cows (50% Hereford) mated to Hereford bulls and Angus-Hereford cows (62-75% Hereford) mated to Angus bulls. Simmental cross cows were heavier and taller and produced heavier calves at birth and weaning than Angus cross cows. Pregnancy rate, calf preweaning survival rate and calf birth date did not vary significantly among breed groups. Preweaning growth was greater for calves from cows of high percentage Simmental cows mated to Hereford bulls than for calves from low percentage Simmental cows mated to Simmental bulls, indicating a strong maternal effect for Simmental on calf growth.

(Key Words: Beef Cows, Breed Types, Performance.)

Introduction

Selection of breeds or breed crosses is an important decision for cost efficient beef production. Since calf weaning weight is positively correlated with cow size, level of milk production and efficiency of cow-calf feed utilization, many cow-calf producers have sought to increase calf weaning weights through use of larger and/or higher milking breed types. However, higher producing cow types require more feed per cow than lower producing cows to attain adequate reproductive performance. To maximize economic efficiency, it's important to identify cow types that perform well under given management and environmental circumstances.

The present study is a portion of a comprehensive research project designed to investigate genetic aspects of efficiency of beef production. The objective of this study was to characterize and evaluate performance of cow types varying in mature size and level of milk production under western South Dakota range conditions.

Materials and Methods

This analysis included data from Simmental-Hereford cross and Angus-Hereford cross cows ranging from 3 to 13 years of age. For the most part, two-breed cross daughters of one breed of sire were mated to the other sire breed. Replacement daughters were retained from the two-breed rotational crossbreeding systems which had been in progress for several years, resulting in various proportions of Hereford breeding and heterosis levels in the crossbred cows.

Data from crossbred cows were sorted so that cows within a group were of similar breed compositions. Overall, data from 507 matings from 1983-1985 were sorted into 6 breed groups: (1) Simmental-Hereford cows (25 to 38% Hereford) mated to Hereford bulls, (2) Simmental-Hereford cows (50% Hereford) mated to Hereford bulls, (3) Simmental-Hereford cows (62-75% Hereford) mated to Simmental bulls, (4) Angus-Hereford cows (25-38% Hereford) mated to Hereford bulls, (5) Angus-Hereford cows (50% Hereford) mated to Hereford bulls and (6) Angus-Hereford cows (62-75% Hereford) mated to Angus bulls.

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Cows were maintained at the Antelope Range Livestock Station near Buffalo, South Dakota, on native pastures, including western wheatgrass, buffalograss, prairie pinegrass and sage. Cows received winter supplementation as a group to maintain condition assumed to be adequate for reproduction. Breed groups were treated as uniformly as possible. Cows were culled for failure to conceive, poor health or at random to provide room for replacements. Calves were born in the spring and male calves were castrated at birth. Calves were weaned in the fall when the entire group averaged approximately 7 months of age.

Means were computed by breed group for various cow and calf traits. Statistical comparisons are presented in tables for comparison of the 50% Angus-50% Hereford crossbred dam group to each of the other five breed groups. In addition, the average of the three Simmental groups was compared to the average of the three Angus groups. Breed group means were adjusted for differences in cow age and year effects and for sex of calf, calf weaning age and sire when appropriate.

### Results and Discussion

Means for cow size and condition traits are presented in table 1. Cow weights averaged 1116 and 1026 lb in the spring and 1221 and 1151 lb in the fall for Simmental cross and Angus cross cows, respectively. Within the Simmental crosses, cows of high percentage Simmental were generally heavier and taller than those of low percentage Simmental. High and low percentage Angus cross cows were similar in cow weight to 50% Angus cows. However, low percentage Angus cows were slightly taller than 50% Angus cows.

TABLE 1. LEAST SQUARES MEANS<sup>a</sup> FOR COW WEIGHT, HEIGHT AND CONDITION

Trait	Cow breed <sup>c</sup>	SSH	SH	SHH	AAH	AH	AHH	Avg Sx SE of vs. mean Ax <sup>b</sup>	
No. records		68	12	110	52	37	121		
Spring cow wt, lb		1143*	1112*	1094*	1033	1017	1028	18.7	**
Fall cow wt, lb		1235*	1208	1221*	1160	1126	1168	20.4	**
Spring cow height, in		53.4*	51.3*	51.2*	49.1	48.6	49.7*	.31	**
Fall cow height, in		53.6*	51.4*	51.5*	49.4	48.7	50.1*	.34	**
Spring wt/height, lb/in		21.4	21.7	21.3	21.0	20.9	20.6	.30	**
Fall wt/height, lb/in		23.0	23.5	23.7	23.4	23.0	23.3.	.32	NS

<sup>a</sup> Presence of \* indicates the mean for that breed group differs (P<.05) from the mean for the 50% Angus-50% Hereford dam breed group.

<sup>b</sup> Compares the average of the three Simmental cross groups with the average of the three Angus cross groups. \*\* denotes significance at .01 probability level, NS denotes nonsignificance (P>.05).

<sup>c</sup> SSH = Simmental-Hereford cross (25-38% HH), SH = Simmental-Hereford cross (50%HH), SHH = Simmental-Hereford cross (62-75% HH), AAH = Angus-Hereford cross (25-38% HH), AH = Angus-Hereford cross (50% HH) and AHH = Angus-Hereford cross (62-75% HH).

Cow weight/height ratios, indicating condition or fleshiness, were greater in fall than in spring, reflecting seasonal differences in nutrient availability and/or requirements. Differences among breed groups were generally small, although Simmental cross cows had statistically higher ratios than Angus cross cows in spring. Simmental cross cows appeared to maintain condition over the winter quite well compared to the smaller Angus cross cows.

Means for reproductive traits are presented in table 2. Percentage of cows conceiving and percentage of calves born surviving to weaning averaged 90.4 and 96.1, respectively, averaged over all breed groups. Date of calf birth averaged 83.7 days (March 25) overall. Variation among breed groups was not sufficiently great to warrant specific comparisons of breed group means for these traits.

TABLE 2. LEAST SQUARES MEANS<sup>a</sup> FOR REPRODUCTIVE TRAITS  
AND CALF SURVIVAL

Trait	Calf breed group							Avg SE of mean	Sx vs. Ax <sup>b</sup>
	Sire breed Cow breed <sup>c</sup>	Her SSH	Her SH	Sim SHH	Her AAH	Her AH	Ang AHH		
No. matings <sup>d</sup>		84	21	131	60	62	149		
No. calves born		74	13	114	54	38	130		
Pregnancy rate, %		90.8	86.4	91.7	96.2	87.3	89.7	3.88	
Percent calves weaned of those born		97.5	89.7	97.0	100.0	95.7	96.9	4.31	
Gestation length, days		288.1*	286.6	289.4*	284.6	284.3	285.3	1.30	**
Julian date of birth, days <sup>e</sup>		84.8	82.7	87.0	79.5	82.9	85.2	9.17	

<sup>a</sup> Presence of \* indicates the mean for that breed group differs (P<.05) from the mean for the 50% Angus-50% Hereford dam breed group.

<sup>b</sup> Compares the average of the three Simmental cross groups with the average of the three Angus cross groups. \*\* denotes significance at .01 probability level.

<sup>c</sup> SSH = Simmental-Hereford cross (25-38% HH), SH = Simmental-Hereford cross (50% HH), SHH = Simmental-Hereford cross (62-75% HH), AAH = Angus-Hereford cross (25-38% HH), AH = Angus-Hereford cross (50% HH) and AHH = Angus-Hereford cross (62-75% HH).

<sup>d</sup> Includes cows culled after pregnancy checking in the fall.

<sup>e</sup> 1 = January 1, 80 = March 21, etc.

Gestation length averaged 3.3 days longer for Simmental crosses than for Angus crosses. Within the Simmental cross groups, gestation was slightly longer for cows of low percentage Simmental. Keep in mind that cows of low percentage Simmental were mated to Simmental bulls, whereas cows of high and medium percentage Simmental were mated to Hereford bulls.

Birth and preweaning traits are presented in table 3. Birth weights averaged 91.3 and 86.1 lb for calves from Simmental cross and Angus cross cows, respectively. Calves from low percentage Angus cows were heavier at birth than calves from 50% Angus cows.

Weight gain from birth to weaning averaged 2.13 and 1.95 lb/day for calves from Simmental cross and Angus cross cows, respectively. Within the Simmental crosses, calves from cows of high percentage Simmental gained faster than calves from cows of low percentage Simmental. These calves from cows of low percentage Simmental were sired by Simmental bulls and thus were of high percentage Simmental. Maternal effects, primarily reflecting milk production, of the Simmental breed were apparently more important than the direct genetic effect on calf growth through weaning compared to the Hereford breed. Breed group rankings for calf weaning weight reflected differences in birth weight and preweaning daily gain.

TABLE 3. LEAST SQUARES MEANS<sup>a</sup> FOR BIRTH AND WEANING TRAITS

Trait	Calf breed group							Avg SE of mean	Sx vs. Ax <sup>b</sup>
	Sire breed Cow breed <sup>c</sup>	Her SSH	Her SH	Sim SHH	Her AAH	Her AH	Ang AHH		
No. calves born		74	13	114	54	38	130		
Calf birth wt, lb		90.7*	89.7*	93.6*	85.4	83.3	89.7*	1.92	**
Avg daily gain, lb/day		2.23*	2.09*	2.07*	1.99	1.93	1.94	.042	**
Calf weaning wt, lb		551.8*	521.9*	524.7*	498.0	482.8	491.5	8.86	**

<sup>a</sup> Presence of \* indicates that the mean for that breed group significantly differs ( $P < .05$ ) from the mean for the 50% Angus-50% Hereford dam breed group.

<sup>b</sup> Sx vs Ax compares the average of the three Simmental cross groups with the average of the three Angus cross groups. \*\* denotes significance at .01 probability level.

<sup>c</sup> SSH = Simmental-Hereford cross (25-38% HH), SH = Simmental-Hereford cross (50% HH), SHH = Simmental-Hereford cross (62-75% HH), AAH = Angus-Hereford cross (25-38% HH), AH = Angus-Hereford cross (50% HH) and AHH = Angus-Hereford cross (62-75% HH).

In conclusion, overall performance of both Simmental-Hereford and Angus-Hereford crossbred cows under range conditions was acceptable. Although Simmental-cross cows produced heavier calves at weaning than Angus crosses, drylot studies indicate that such a difference in calf weight would likely be offset by higher feed costs per cow-calf pair for Simmental crosses. Additional work in drylot needs to be conducted to evaluate whether or not efficiency of feed utilization varies with varying levels of Simmental breeding.