

Cow-Calf and Stocker

Performance to Weaning of Crossbred Calves from Hereford Cows

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Story in Brief

Data were analyzed on 304 crossbred calves produced by Hereford cows mated to Angus, Simmental, Brown Swiss and Jersey bulls over a two year period. As compared to Angus sired calves, Simmental and Brown Swiss sired calves were 13.1 lbs. (20.2%) and 12.3 lbs. (19%) heavier at birth, gained .11 lb./day (6.7%) and .06 lbs./day (3.6%) more rapidly to weaning and were 31 lbs. (7%) and 23 lbs. (5.2%) heavier at weaning, respectively. Jersey sired calves were only 2.21 lbs. (3.4%) lighter at birth, gained .02/lb/day (1.2%) less rapidly to weaning and thus were only 10 lb. (2.2%) lighter at weaning than Angus sired calves.

Heavier weaning weights for Simmental and Brown Swiss sired calves were offset by a higher calf death loss to the extent that pounds of calf weaned per pregnant cow were similar for Angus, Simmental and Brown Swiss sired calves. Providing Angus, Simmental and Brown Swiss sired calves can be sold for the same selling price per pound, there was little difference in these three groups in total income per pregnant cow from the sale of weaning age calves. Under current market conditions, Jersey sired calves returned \$31.80 less than Angus sired calves per pregnant cow.

Introduction

Crossbreeding is being increasingly used in commercial beef production systems because of its beneficial effect on total productivity and production efficiency. Crossbreeding provides an opportunity to increase productivity by combining desirable traits from two or more breeds in a complementary manner and from heterosis. Extensive studies at several

experiment stations involving crosses among British breeds have indicated raising crossbred calves from straightbred cows will increase the calf crop weaning percentage by 4.1% and weaning weight by 4.6%. The combined effect of these two traits would result in nearly a 10% increase in pounds of calf weaned per cow in the breeding herd over a straightbreeding program on the average. This increase in production can be doubled by keeping crossbred cows and breeding them to a bull of a third breed.

Producers that decide to crossbreed are confronted with a large selection of breeds to choose from. The purpose of this study was to compare the performance to weaning of crossbred calves produced by mating Angus, Simmental, Brown Swiss and Jersey bulls to Hereford cows. These crosses were made as part of a comprehensive study designed to evaluate lifetime productivity of various two-breed cross cows when mated to bulls of a third breed. Angus, Simmental, Brown Swiss and Jersey bulls were selected for use on Hereford cows in order to produce crossbred cows of contrasting biological types. Primarily, these crosses are expected to result in crossbred cows varying in mature size and level of milk production.

Experimental Procedure

Angus, Simmental, Brown Swiss and Jersey bulls were mated to a herd of Hereford cows to produce crossbred calves in the spring of 1973 and 1974. The number of calves in each crossbred group are shown for each year in Table 1. There were a total of eight bulls used of each sire breed (four each year) in order to obtain as broad a genetic sample as possible of bulls representative of the breed.

The cows were managed under range conditions at the Lake Carl Blackwell research range west of Stillwater. Calves were born during February, March and early April of 1973 and 1974 and remained with their dams without creep feed until they were weaned at an average age of 205 days. Each calf was evaluated at weaning time for conformation

Table 1. Number of Crossbred Calves Weaned from Hereford Cows.

Sire Breed	Year		Total
	1973	1974	
Angus	49	37	86
Simmental	37	31	68
Brown Swiss	41	34	75
Jersey	34	41	75
Total	161	143	304

fied individuals. Weaning weights were adjusted to 205 days of age and condition (level of fatness) by a committee of at least three quali-further adjusted for age of dam by multiplying the 205-day weights of calves from 2, 3 and 4 year old cows by 1.15, 1.10 and 1.05, respectively.

Results

Calving Difficulty

Ease of calving is an important economic trait and can be of special concern in crossbreeding systems that utilize bulls from breeds that are of larger size than the cow breed. Herdsmen carefully determined a calving difficulty score for each calf born and a summary of calving difficulty is presented in Table 2 for each year. The important information is the percentage of cows that calved unassisted, and of course, producers would like this to be 100%. In 1973 nearly all of the Hereford herd were heifers calving for the first time and considerable calving difficulty was encountered with both Simmental and Brown Swiss sired calves with over half of the calves in these two groups requiring assistance from the herdsmen. The following year when the cows were more mature there was essentially no calving difficulty in any crossbred group. Jersey sired calves did not have any calving difficulty in either year. Obviously, use of bulls from larger breeds on first calf heifers should be avoided if at all possible.

Calf Liveability

The number of calves that survive from conception to weaning is an important factor in determining income from a cow-calf operation. Good management will keep death losses to a minimum, however, it is also important to know whether various breed crosses differ in their

Table 2. Calving Difficulty Summary for Crossbred Calves from Hereford Cows¹.

Sire Breed	1973			1974		
	No. calves born	Live calves %	Percent calving unassisted	No. calves born	Live calves %	Percent calving unassisted
Angus	53	94.3	88.7	40	97.5	100
Simmental	41	92.7	48.8	37	91.9	100
Brown Swiss	43	93.3	46.5	39	94.9	97.3
Jersey	39	92.3	100	44	95.5	100
Total	176	93.4	71.4	160	950	99.3

¹ In 1973 most of the Herefords were heifers calving for the first time.

Table 3. Liveability to Weaning of Crossbred Calves from Hereford Cows.

Trait	Sire Breed			
	Angus	Simmental	Brown Swiss	Jersey
No. pregnant cows ¹	96	81	86	87
No. calves born	93	78	82	83
No. live calves	89	72	79	78
Live calves from pregnant cows, %	93.7	88.9	91.9	89.7
No. calves weaned	86	68	75	75
Calves weaned from pregnant cows, %	90.5	84.0	87.2	86.2

¹ Based on pregnancy diagnosis following the breeding season.

ability to survive under the management system being used. Data on the liveability of each crossbred group are presented in Table 3. The number of pregnant cows was determined by pregnancy examination in the fall following breeding season. Many factors are involved in determining whether a calf survives to weaning or not and differences among crossbred groups in percentage of pregnant cows weaning calves is the combined effect of all these factors. Increased stress on the calf during calving (during 1973 particularly) may account for some of the lower liveability experienced with the Simmental and Brown Swiss sired calves. The lower survival rate for Jersey sired calves was primarily due to a higher death rate among young calves during stormy conditions.

A random sample of Hereford cows was exposed to each sire breed. Thus, differences in reproductive performance (% cows bred) would not be expected unless there were differences in bull fertility among sire breeds. It was not possible to make a valid comparison of bull fertility among sire breeds because some sire breeds involved artificial insemination while others did not.

Crossbred Calf Performance

Average performances for various traits to weaning age are presented in Table 4 for each crossbred group. Performances have been averaged over sexes and years. Since Angus x Hereford is a popular cross and most producers have a fairly good idea how calves from this cross will perform, average performances for the other crossbred groups have been compared to the Angus x Hereford calves on a percentage basis. Simmental and Brown Swiss sired calves had the heaviest birth weights and were 12.7 lbs. (19.6%) heavier than Angus sired calves. Jersey sired calves were only 2.2 lbs. (3.4%) lighter at birth than Angus sired calves.

Simmental and Brown Swiss sired calves gained, on the average, .08 lb./day (5.2%) more rapidly from birth to weaning than Angus sired

Table 4. Average Performance of Crossbred Calves from Hereford Cows¹.

Trait	Sire Breed			
	Angus	Simmental	Brown Swiss	Jersey
No. calves weaned	86	68	75	75
Birth weight, lbs.	64.9 (100) ³	78.0(120.2) ²	77.2 (119.0) ²	62.7 (96.6) ³
Preweaning ADG, lbs./day	1.65 (100) ^{3,4}	1.76(106.7) ²	1.71(103.6) ^{2,3}	1.63(98.9) ⁴
205-day weaning weight, lbs.	466(100) ³	477(107.0) ²	469(105.2) ²	436(97.8) ³
Weaning conformation ⁵	12.8 (100) ³	13.4(104.7) ²	12.6 (98.4) ³	11.3 (88.3) ²
Weaning condition ⁵	5.6 (100) ²	5.5(98.2) ^{2,3}	5.2 (92.9) ⁴	5.3 (94.6) ^{3,4}
Ratio of calf weaning wt. to cow wt.	.497(100) ³	.523(105.2)	.520(104.6) ²	.479(96.4) ⁴

¹ Values in parenthesis are the ratio of that crossbred average to the Angus x Hereford average on a percentage basis.

^{2,3,4} Averages in the same row that do not share at least one superscript in common are significantly different at the .05 probability level or less.

⁵ Conformation scores: 11=high good, 12=low choice, 13=average choice and 14=high choice.

⁶ Condition scores range from 1 for very thin to 9 for very fat with 5 being an average level of fatness.

calves. Jersey sired calves gained at essentially the same rate as Angus sired calves.

Because of a heavier birth weight and more rapid rate of gain, Simmental and Brown Swiss sired calves were 31 lbs. (7%) and 23 lbs. (5.2%) heavier at weaning, respectively, than Angus sired calves. Jersey sired calves were only 10 lbs. 2.2%) lighter than Angus sired calves at weaning.

Simmental sired calves exhibited the most muscling and overall conformation, however, the Angus and Brown Swiss sired calves also had quite acceptable quality as feeder calves with conformation scores of low choice. Jersey sired calves averaged high good in conformation mainly for lack of muscling in the hindquarters. Angus and Simmental sired calves tended to be slightly fatter at weaning than the other two crossbred groups.

The last trait shown in Table 4 is the average ratio of calf weaning weight to weight of the cow. Cow weight used in this calculation was the average of the cow's weight in April just prior to the start of the breeding season and her weight in the fall at weaning time. Larger values of calf weight to cow weight ratio indicate more efficient production on a per cow basis among cows weaning a calf. Since only Hereford cows were used, comparisons of this ratio among crossbred groups reflects primarily differences in average weaning weight. This ratio will be more useful to compare differences in production efficiency for crossbreeding systems involving different breeds of cows.

Profitability of Different Crossbred Calves

Income for a cow-calf operation is determined largely by the number of calves produced, calf weights and the quality of the calves as it influences selling price. Table 5 compares total income per pregnant cow from selling weaning age calves from Hereford cows sired by Angus, Simmental, Brown Swiss and Jersey bulls. Differences in calf survival (% calves weaned from pregnant cows) and average weaning weights were combined to determine pounds of calf weaned per pregnant cow. Heavier weaning weights of the Simmental and Brown Swiss sired calves were offset by a slightly higher death loss such that pounds of calf weaned were similar for Angus, Simmental and Brown Swiss sired calves. Use of Jersey bulls resulted in 28 lbs. (6.9%) fewer pounds of calf weaned per pregnant cow than the Angus sired calves.

Selling price is the average price for steer and heifer calves typical of the January 1976 market. When these prices change or a producer believes other values to be more appropriate, sufficient data are presented so that producers can make economic comparisons based on whatever price structure they wish. The same selling price was used in this analysis for Angus, Simmental and Brown Swiss sired calves simply because they had conformation scores in the acceptable feeder calf grades of low to average choice. If a producer feels these three crossbred groups would sell for different prices at the market he generally uses, comparisons can easily be made using whatever price differentials thought appropriate.

Since the same price structure was used for Angus, Simmental and Brown Swiss sired calves, total income per pregnant cow was similar for all three groups since they were so similar in pounds of calf produced per pregnant cow. Jersey sired calves returned \$31.80 less than Angus sired calves. Thus, the use of Jersey bulls should be seriously considered

Table 5. Gross Income per Cow from Sale of Weaning Age Crossbred Calves from Hereford Cows.

Trait	Sire Breed			
	Angus	Simmental	Brown Swiss	Jersey
Pounds of calf weaned per pregnant cow ¹	404 (100)	401 (99.3)	409 (101.2)	376 (93.1)
Selling price per lb. ²	\$0.33	\$0.33	\$0.33	\$0.27
Gross income per pregnant cow ¹	\$133.32	\$132.33 (99.3)	\$134.97 (101.2)	\$101.52 (76.1)

¹ Values in parentheses are the ratio of that crossbred average to the Angus x Hereford average on a percentage basis.

² Average price for steer and heifer calves based on January 1976 market (\$0.37 and \$0.29 for choice steers and heifers; \$0.31 and \$0.23 for good steers and heifers).

by the producer only under special circumstances like when there is particular concern about calving difficulty in first calf heifers or when Jersey cross heifers are desired for addition to the cow herd.

Performance to Weaning of Crossbred Calves from Angus Cows

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Story in Brief

Data were analyzed on 345 crossbred calves produced by Angus cows mated to Hereford, Simmental, Brown Swiss and Jersey bulls over a two year period. Simmental sired calves as compared to Hereford sired calves were 3.9 lbs. (5.1%) heavier at birth and 33 lbs. (7%) heavier at weaning. However, because of 3.7% fewer calves being weaned, there was only a 12 lb. (2.8%) advantage for Simmental sired calves in terms of pounds of calf weaned per pregnant cow in the herd. Brown Swiss sired calves were similar in birth weight to Hereford sired calves. However, the combined effects of a 7.4% higher calf liveability and 16 lbs. (3.4%) heavier weaning weights resulted in the Brown Swiss sired calves having a considerable advantage of 51 lbs. (11.8%) in terms of pounds of calf weaned per pregnant cow in the herd.

If Brown Swiss sired calves can be sold at weaning age for the same selling price as Hereford sired calves, \$16.83 more income per pregnant cow can be achieved from using Brown Swiss bulls under current market conditions. Jersey sired calves were lightest at birth and weaning and resulted in 15 lbs. (3.5%) fewer lbs. of calf weaned per pregnant cow than Hereford sired calves. This combined with a lower selling price because of a lowered feeder calf grade at weaning resulted in \$29.97 less income per pregnant cow than Hereford sired calves under current market conditions.