

## SPECIALIZED LINES FOR BEEF BREEDING HERDS

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### UA RESEARCH

Research conducted by The University of Arizona Animal Sciences Department indicates that the use of specialized sire and dam lines could improve productivity of commercial beef breeding herds.

This conclusion is based on an experiment which compared the breeding performance of topcross progeny of three inbred sire lines with each other and with an outbred control herd. Comparisons involved birth weights, weaning weights, and weaning conformation and condition scores of 400 bull and heifer calves. The cattle were from the registered Hereford herd owned by the San Carlos Apache Indian Tribe. The herd is maintained approximately 60 miles east of Globe, Arizona, on a semi-arid range at an elevation of approximately 5,000 feet. The breeding season normally extends from May 1 to August 1, and calves are weaned and evaluated in October or early November. No supplement was provided for cows and calves during the period of this study.

The topcross parental stock involved in this study were the progeny of eight sires from three inbred lines (1, 6 and 9) of the U.S. Range Livestock Experiment Station, Miles City, Montana.

Since some of these lines have become very popular in the beef industry, a brief history of their development is presented.

#### Line 1

cows traced back to stock purchased in 1926 from George M. Miles of Miles City, Montana. Most of the foundation cows were sired by Colonel Perfection and his two sons, Colonel Grayfield 2nd and Colonel Defender 3rd, and two other bulls, Domino Perfection 3rd and Blanchard 40th. These cows were mated to two half brothers, Advance Domino 20th and Advance Domino 54th, purchased from a Colorado breeder. The first calves were dropped in 1934, and the line has remained closed to outside breeding since that time.

#### Line 6

was initiated in 1948 with the purchase of 30 heifers and two bulls of Real Prince Domino breeding from a Nebraska breeder. The foundation sires were Perfect Lad 18th and Maude's Mischief 19th. The first calves were dropped in 1949.

#### Line 9

resulted from twenty-eight head of heifer calves and one bull calf of King Domino breeding purchased from a Montana breeder in 1948. The foundation sire of this polled line was Seth Domino. The first calves were dropped in 1951.

Of the original sires (grand-sires of the calves included in this study), four were from line 1 and two each from lines 6 and 9. Parents designated SC (San Carlos) were the progeny of 30 purebred sires originating within the herd. With the exception of the control matings (SC X SC), the parental stock was composed of 50% SC breeding and 50% of the respective line involved in the topcross mating. Topcross sires

were chosen from those available to be as representative of the group as possible. The number of sires used were:

L1	X	SC-2	L9	X	SC-2
L6	X	SC-2	SC	X	SC-3

Results from the experiment are presented in Table 1. Birth weights of the calves averaged 74 lbs., with minor differences among the various breeding groups. Heaviest calves at birth included line 9 cross cows mated to San Carlos bulls, whereas the lightest calves were from San Carlos cows mated to topcross line 9 bulls.

topcross bulls on San Carlos cows) resulted in calves that were among the lightest (469 lbs.). A difference of this magnitude (45 lbs.) has some important implications. First of all, it indicates that factors associated with the cow (maternal ability) are more important under Arizona range conditions than the genetic potential of the calf in determining growth of the calf to weaning. This probably reflects differences in the milking ability of the cow. Secondly, it suggests that there may actually be an antagonism between preweaning growth and maternal ability. Additional evidence for this antagonism is seen in the results of crosses involving line 1. Although the differences between the reciprocal crosses is not as great in this case (16 lbs.), it is still large enough to be of economic importance.

**Table 1. Birth and Weaning Traits by Line of Breeding**

Sire Line		Dam Line	Birth Weight (lbs.)	Weaning Weight (lbs.)	Conformation Score <sup>a</sup>	Condition Score <sup>a</sup>
1	X	SC	74	476	11.1	10.5
6	X	SC	76	469	11.1	10.5
9	X	SC	73	470	11.1	10.8
SC	X	1	76	492	11.5	11.1
SC	X	6	74	514	11.8	11.1
SC	X	9	76	466	11.3	10.9
SC	X	SC	75	479	11.4	10.8
Average			74	479	11.3	10.8

<sup>a</sup> Evaluated on a 15 point scale, with higher values indicating more desirable conformation or greater condition. A condition score of 11-12 is considered optimum.

Conformation and condition scores are also listed in the table. In general, the results followed the same trends as noted for weaning weight. Higher scores were observed when these inbred lines were used in the cow side of the cross. All of the values would be considered very acceptable for Hereford calves at weaning.

These results indicate that two (1 and 6) of the three inbred lines tested were much more valuable when incorporated into cows than in bulls. This would mean that different criteria for selection of bull and heifer calves at weaning would be the most

Substantial differences occurred in weaning weights. The heaviest calves were produced by topcross line 6 cows mated to San Carlos bulls (514 lbs.). Surprisingly, the reciprocal cross (line 6

efficient system. A natural outgrowth of this procedure would be a breeding program using specialized sire and dam lines for commercial beef production.

One of the more effective methods of developing specialized lines is through crossbreeding. Breeds of cattle often excel in different desirable traits. These same traits are present within different lines of the same breed of cattle, but the differences are normally not as great as between breeds and thus are more difficult to identify. Desired traits for brood cows are early puberty, high fertility, ease of calving, adequate milk production, adaptability, a strong mothering instinct, etc. Oftentimes large mature size or weight is a disadvantage in the cow herd, especially on southwest ranges. The bull's major contribution is in size and weight as reflected by growth rate of his calves. Other traits are also important, such as the ability to travel, libido (sex drive), desirable muscling, relatively small calves at birth, etc.

One example of such a crossbreeding program is the "terminal sire" system. All of the cows are crossbreeds developed from two (or more) breeds selected specifically for maternal characteristics and adaptability. Bulls are selected from a breed differing from those in the cow herd with primary emphasis on growth and carcass characteristics. All calves produced go to market, hence the term "terminal sire." Research results indicate an increase of approximately 25% in pounds of calf weaned per cow with this system.

The use of specialized sire and dam "lines," either within a breed or through the use of different breeds, provides the breeder with a technique to substantially improve production.

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