A Comparison of Beef Cattle Breeding Methods to Improve Performance

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Artificial insemination has been promoted for a number of years as being one management tool available to cattlemen who desire more rapid genetic advancement. Semen is available from a variety of artificial breeding organizations and private breeders. Superior sires can be selected from a large number of animals on the basis of their expected progeny difference as measured in the National Sire Evaluation Program.

Crossbreeding has been shown to be an effective method for increasing total pounds of calf weaned through the effects of hybrid vigor.

The economics of current beef cattle production leave very little margin for error, particularly for the young producer. Therefore, management methods must be analyzed to identify those which will be the most profitable.

Crossbreeding, of course, means many things to many people. While a large number of breeds and combinations are available, our interest in this study was to evaluate overall production and economics among the most common breeds in southwestern North Dakota, Hereford and Angus. In 1976 a five year study was designed to compare crossbred and straightbred breeding management systems, using both natural service and artificial insemination.

In the trial, Hereford cows from the Dickinson Station herd were randomly divided by age and date of calving into three breeding groups during the period from 1976 to 1980. Group I contained an average 56 cows per year, and were inseminated each season with either Polled or Horned Hereford semen. Following a 25 day artificial breeding period, AI was terminated and Angus clean-up bulls were turned in. Groups II and III were the natural service Hereford and Angus treatments. The number of cows used in Groups II and III ranged from 25-32 head per year.

Heat detection in the AI group was done visually in 1976. In all subsequent years epididectomized bulls were used in addition. To insure a short calving interval, breeding was discontinued after 60 days. The cows were pregnancy tested in September of each year, and all cows identified as open, old or otherwise poor producers following performance testing were culled. Cows selected for AI breeding in 1976 received two pounds

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dry rolled oats per head per day during the 25 day breeding season. Since no breeding facility was available in the pastures grazed, the AI cows were trailed one-half mile each morning to a holding area where the supplemental grain was fed and those cows that had been detected in standing heat were sorted out. Breeding was done on a twice a day basis. When the cows were no longer in standing heat, they were turned in with an Angus clean-up bull.

The following changes were made in 1977. Prior to the beginning of the breeding season a handling facility and holding area for grain feeding was constructed adjacent to the water supply in the breeding pasture. This crested wheatgrass pasture was sub-divided into uniform pie shaped units around the water supply. With this arrangement the cows had to pass through the breeding facility for water and supplemental feed. Eight pounds of a mixture of equal parts of grain and chopped hay was fed per head per day. This, and the provision for adequate bunk space, eliminated competition for grain between older and younger cows. Twice a day breeding was discontinued in favor of once a day breeding at 8:00 each morning. All groups grazed separate crested wheatgrass pastures until approximately July 1 each year, depending on pasture condition, and were then moved to native pastures. Minerals were fed free choice in a 2:1 salt-di-calcium phosphate mixture to insure adequate phosphorous intake. During May and early June a level of 15% magnesium oxide was added to the mineral mixture as a grass tetany preventive.

Breeding and calving summaries for 1980 and the combined period from 1976-1980 are shown in tables 1 and 2. Combined actual and 205 day adjusted weaning weights are summarized in Table 3. An economic evaluation of each management system is shown in Table 4 for the 1980 calf crop; economics for the combined calf crops have been summarized in Table 5.

Summary:

Artificial breeding conception rate registered in this study ranged from a low of 37% to a high of 91% and averaged 48%. Changes in cow handling and facilities resulted in significant increases in AI breeding success, as well as a significant reduction in labor.

Angus X Hereford (BWF) steer calves sired naturally were 10 pounds heavier than the artificially sired Hereford steers and were 28 pounds heavier than the

naturally sired straightbred Hereford steers. Comparing the heifers, no difference existed in weaning weight-between the straightbred Hereford females sired artificially and the naturally sired BWF heifers. In contrast, however, the naturally sired Hereford heifers were 16 pounds lighter than the artificially sired females.

Lighter weaning weights among calves sired by clean-up Angus bulls in the AI system was significant. Calves from clean-up bulls were 46 pounds lighter than the other BWF crossbred calves produced in the natural service crossbreeding group.

Genetic improvement among artificially sired calves was significant compared to the naturally sired Hereford calves. However, improvement in the artificial breeding system was not great enough to offset the loss in weaning weight among cows that didn't settle on the first service. Major factors contributing to reduced profitability when breeding artificially are: 1) conception rate; 2) facility, equipment, semen, and flushing feed expenses; and 3) labor.

Crossbreeding naturally, under the conditions of this experiment, has resulted in heavier weaning weights and higher gross and net return per cow.

Table 1. Breeding and Calving Summary, 1980 Calf Crop.

| | A.I. System | | Natural Service | |
	A.I. (H × H)	Angus Clean-up (A × H)	Hereford (H × H)	Crossbred (A × H)
Total no. cows	46		24	21
Total no. cows inseminated	46			
No. sold for mgmt. reasons	0		0	0
No. having AI calves	42			
1st service conception rate, %	91			
No. calves from Angus clean-up bull		4		
No. dead calves	2	1	2	0
No. of calves:				
Steers	24	2	10	13
Heifers	16	1	12	8

[1]Once a day breeding at 8:00 AM.

Table 2. Five Calf Crop Combined Breeding and Calving Summary 1976-1980.

| | A.I. System | | Natural Service | |
	(H × H)	Angus Clean-up (A × H)	Hereford (H × H)	Crossbred (A × H)
Total no. cows	283		137	125
Total no. cows inseminated	283			
No. sold for mgmt. reasons	36		32	23
No. having A.I. calves	136			
1st Service conception rate, % (range, %)	(37%-91%)			
No. cows having (A × H) calves from Angus clean-up bull		10		
No. dead calves	9	6	13	4
No. and sex of calves obtained:				
Steers	71	61	44	49
Heifers	56	44	47	49

Table 3. Combined Actual and 205 Day Adjusted Weaning Weights from Five Calf Crops Born From 1976-1980 in a Three Breeding Management System Comparison.

| Systems: | A.I. Hereford with Angus Clean-up | | | | Natural Service Hereford | | Natural Service Angus | |
	No Hd.	(H × H)	No. Hd.	(A × H)	No. Hd.	(H × H)	No. Hd.	(A × H)
Steers								
Actual weight	71	462	61	426	44	444	49	472
Adjusted weight[1]		477		478		471		498
Heifers								
Actual weight	56	427	44	392	47	411	49	428
Adjusted weight[1]		469		470		459		474

[1]Adjusted according to the guidelines of the North Dakota Beef Cattle Improvement Association.

Table 4. Economic comparison - Systems of breeding, 1980.

Systems:	A.I. with Angus clean-up				Natural Service Hereford			Natural Service Crossbred		
	No. Hd.	Avg Wt.	(H × H) $ Value	(A × H) $ Value	No. Hd.	Avg Wt.	$ Value	No. Hd.	Avg Wt.	$ Value
Steers @ 85¢/CWT	24	515	10,506		10	512	4,352	13	543	6,000
	2	443		753						
Heifers @ 80¢/CWT	16	475	6,080		12	449	4,310	8	476	3,046
	1	420		336						
Total, $			16,586	1,089			8,662			9,046
Gross return/system, $			17,675				8,662			9,046
No. cows calved			46				24			21
Avg. return/cow calved			$ 384				$ 360.93			$ 430.76
Less breeding expense			− 17.00				− 11.50			− 11.50
			$ 367.23				$ 349.43			$ 419.26
Less est. annual expense/cow [1]			310.50				310.50			310.50
Net return/cow, $			$ 56.73				$ 38.93			$ 108.76

[1]Annual expense per cow taken from the North Dakota Farm Management Planning Guide, Section V:11, entitled, **Determining Beef-Cow Costs** by Billy Rice and Norm Toman.

Table 5. Economic analysis of 5 year combined calf crop when comparing three breeding management systems.

Systems:	A.I. with Angus clean-up				Natural Service Hereford			Natural Service Crossbred		
	No. Hd.	Avg Wt.	(H × H) $ Value	(A × H) $ Value	No. Hd.	Avg Wt.	$ Value	No. Hd.	Avg Wt.	$ Value
Steers @ 85¢/CWT	71	462	27,882		44	444	16,606	49	472	19,659
	61	426		22,088						
Heifers @ 80¢/CWT	56	427	19,130		47	411	15,454	49	428	16,778
	44	392		13,798						
Total, $			47,012	35,886			32,060			36,437
Gross return/system, $			82,898							
No. cows calved			247				104			102
Avg. return/cow calved			$ 335.62				$ 308.27			$ 357.23
Less breeding expense			− 17.00				− 11.50			− 11.50
			$ 318.62				$ 296.77			$ 345.73
Less est. annual expense/cow [1]			310.50				310.50			310.50
Net return/cow, $			$ 8.12				$ -13.73			$ 35.23

[1]Annual estimated expense per cow was taken from the North Dakota Farm Management Planning Guide, Section V:11, entitled, **Determining Beef-Cow Costs** by Billy Rice and Norm Toman.

continued from guest column

sure he is not similarly engaged. The secret of being tiresome is to tell everything.

Today is the tomorrow we were worrying about yesterday.

Rashness and haste make all things insecure. No person who is in a hurry is quite civilized. Drive like hell and you will get there.

The world's reformers are those who begin on themselves. Radicals will not take steps to improve themselves, they want to reform the whole system. Every absurdity has a champion to defend it.

Self distrust is the cause of most of our failures. In the assurance of strength, there is strength and they are the weakest, however strong, who have no faith in themselves or their own powers. If a person harbors any kind of fear, he has become the landlord to a ghost.

What is gone and what is past help should be past grief.

This too shall pass away.