

## **WINTER GROWTH AND BREED PRODUCTION COMPARISON OF FIRST GENERATION HEIFERS**

**BY**

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One of the major segments of the Dickinson Experiment Station's beef cow efficiency study is to evaluate the winter growth and production efficiency of several experimental crossbreds. The overall study has been undertaken to provide cattlemen with information relative to beef cow efficiency conducted in southwestern North Dakota. This station does not have the animals or the land base to evaluate a large number of biologically different breeds, but does have the capability to evaluate a small number of crossbred cow types representative of many of the combinations possible in North America.

As stated in the previous discussion, "Feedlot Breed Comparison of First Generation Steers", the breeding model is designed to develop crossbred brood cow types that should maximize heterosis when bred back to unrelated terminal sires. The first generation breeding plan is shown in Table 1.

Winter growth performance, age and weight at puberty, first service conception rate and weaning weight of calves from these calves as first calf heifers are being evaluated in this phase of the overall cow efficiency investigation.

For the purpose of this progress report, information available includes winter growth performance, age and weight at puberty, pregnancy status and actual calving data.

Replacement heifers representative of four breed types have been fed during the winter growing periods of 1984, 1985 and 1986. In 1984, the heifers were self fed a mixture of dry rolled barley, chopped mixed hay, salt and dicalcium phosphate. Barley made up 30% of the ration initially and was increased to 55% and fed at that level for the duration of the study. The second year, corn silage was substituted for part of the chopped hay portion, with rolled barley making up approximately 38% of the ration. In 1986, the level of barley averaged 28% of the ration, with corn silage and chopped hay making up the rest of the ration.

Heifers on trial were given a seven-way Clostridium booster vaccination at the start of the trial. They were also vaccinated for Brucellosis, leptospirosis and vibriosis prior to breeding. Individual weights were taken on 28 day intervals with estrus determined with the aid of sterile epididectomized bulls equipped with Chin-Ball<sup>R</sup> marking halters. Weight at first estrus (Table 4) was estimated by interpolation based on days between two monthly weigh periods.

In early June, the heifers were assigned to an estrus synchronization artificial breeding study. This year, the heifers were kept isolated from fertile bulls for one month following breeding. They were checked for early pregnancy by Dr. Patrick Hemming using an Equiscan III ultrasonic scanner. Dr. Hemming is the owner of Animal Reproductive Technologies, North Glenn, Colorado. The Equiscan III ultrasound scanner was provided by the Bion Corporation of Westminster, Colorado. At breeding, blood samples were collected and sent to Dr. Dale Redmer, Department of Animal and Range Sciences, NDSU for progesterone assay, as part of the synchronization study. In July, the heifers were manually palpated for pregnancy by a local veterinarian. They were also re-checked in early October after having been exposed to cleanup bulls.

### **Discussion:**

Heifers fed in 1986 gained from 1.94 to 2.15 pounds per head per day (Table 1). By the end of the wintering period, May 15<sup>th</sup>, average heifer weight varied from 797 pounds for the Milking Shorthorn crossbreds to 880 pounds for the Simmental X Hereford crossbreds. The heifers consumed 28-29 pounds of mixed feed per day with only minor differences between breed groups. Feed costs per heifer ranged from a low of \$85.43 for the straightbred Hereford to \$88.05 for the Milking Shorthorn (AXH) crossbreds. The Milking Shorthorn crossbred heifers exhibited their first estrus at 723 pounds of body weight while the Simmental crossbreds weighed 837 pounds at first estrus. The average date of first estrus ranged from April 5<sup>th</sup> to April 15<sup>th</sup> with no major differences between groups.

Actual calving records from the first two years of the study show a large percent of the Simmental crossbred heifers conceived early in the breeding season since 77.3% of these heifers calved in March. This compares with 48% in March for the Herefords; 50% for the Angus X Herefords; and 41% for the Milking Shorthorn X (AXH) crossbreds. (Table 7)

### **Summary:**

During the three years this trial has been in progress, average daily gains have ranged from 2.02 pounds per day for the Angus X Hereford crossbred to 2.25 pounds per day for the Herefords. Feed intake has varied from 26.9 and 27.3 pounds per day for the Herefords and Angus X Herefords crossbred to 28.4 and 29.3 pounds per day for the Simmental X Hereford crossbreds and the Milking Shorthorn X (AXH) crossbreds. This seems to indicate a higher feed requirement or lower feed efficiency especially for the Milking Shorthorn X crossbreds. Because of differences in feed consumption, the actual wintering feed costs ranged from a low of \$83.71 for the Hereford heifers to \$91.67 for the Milking Shorthorn X (AXH) crossbreds, a difference of \$7.96 per heifer wintered. No definite conclusions are possible regarding the ability of the different breed types to cycle and conceive due to the limited number of heifers used in the trial to date.

**Table 1. Gains and Wintering Economics of Heifers to be used in the Cow Efficiency Study in 1986**

	<b>Hereford Lot 16</b>	<b>Angus X Hereford Lot 15</b>	<b>M. Shorthorn X (AXH) Lot 14</b>	<b>Simmental X Hereford Lot 17</b>
<b>Gains:</b>				
No. of Head	10	10	9	10
Initial Wt. Total/Lot	5327	5023	4328	5942
Average Weight	532.7	502.3	480.9	594.2
Final Wt. Total/Lot	8429	8085	7173	8804
Average Weight	842.9	808.5	797	880.4
Total Gain/Lot	3102	3062	2845	2862
Average Gain/Head #	310.2	306.2	316.1	286.2
Days Fed	147	147	147	147
Animal days	1470	1470	1312	1470
Average Daily Gain	2.11	2.08	2.15	1.94
<b>Feed and Economics:</b>				
Total Feed/Head #	4221	4266	4342	4321
Feed/Head/Day	28.71	29.03	29.52	29.40
Feed/Lb./Gain #	13.61	13.93	13.74	15.1
Feed Cost/Head/Day \$	.58	.58	.60	.59
Total Feed Cost/Head \$	85.43	86.51	88.05	87.36
Cost/cwt, Gain \$	27.54	28.25	27.86	30.52

**Table 2. Average Ration Consumed by Breed Comparison Heifers Fed in 1986**

	<b>Hereford</b>	<b>Angus X Hereford</b>	<b>M. Shorthorn X (AXH)</b>	<b>Simmental X Hereford</b>
Chopped Mixed Hay	9.10	9.22	9.50	9.30
Corn Silage	11.56	11.63	11.65	11.86
Dry Rolled Barley	7.86	7.98	8.17	8.04
Trace Mineral Salt	0.10	0.10	0.10	0.10
Dicalcium Phosphate	<u>0.10</u>	<u>0.10</u>	<u>0.10</u>	<u>0.10</u>
	28.71	29.03	29.52	29.40

**Table 3. Three Year (1984-1986) Average Gain and Feed Efficiency for Heifers to be used in Cow Efficiency Study**

	<b>Hereford</b>	<b>Angus X Hereford</b>	<b>M. Shorthorn X (AXH)</b>	<b>Simmental X Hereford</b>
<b>Gains:</b>				
No. of Head	31	42	31	32
Average Days Fed	119	119	119	119
Initial Weight	543	571	586	611
Final Weight	811	811	843	873
Gain	268	240	257	262
ADG	2.25	2.02	2.16	2.20
<b>Feed and Economics:</b>				
Total Feed/Head #	3200	3244	3484	3384
Feed/Head Daily #	26.9	27.3	29.3	28.4
Feed/lb. Gain #	11.9	13.5	13.54	12.91
Feed Cost/Day \$	.72	.72	.79	.76
Total Feed Cost/Hd. \$	83.71	84.40	91.66	88.31
Cost/cwt Gain \$	31.48	34.62	35.64	33.75

**Table 4. 1986 Average Puberty Distribution, Age and Weight**

	<b>Hereford</b>	<b>Angus X Hereford</b>	<b>M. Shorthorn X (AXH)</b>	<b>Simmental X Hereford</b>
<b>Puberty Distribution:</b>				
% Showing Estrus				
February		0	0	
March	30%	40%	33.3%	30%
April	60%	60%	44.4%	40%
May			22.2%	30%
Not Detected	10%	0	0	0
Average Cycle Date	96	95	100	105
Calendar Date	Apr. 6	Apr. 5	Apr. 10	Apr. 15
Average Calculated Weight at 1 <sup>st</sup> Estrus, Lbs.	781	729	723	837

**Table 5. Pregnancy Status of Heifers Artificially Inseminated in June, 1986**

	<b>Hereford</b>	<b>Angus X Hereford</b>	<b>M. Shorthorn X (AXH)</b>	<b>Simmental X Hereford</b>
<b>Percent Pregnant:</b>				
July	40%	40%	55%	50%
October	55%	70%	87%	70%

**Table 6. Actual Calving Date of Heifers Bred in 1985 and Calving 1986**

	<b>Hereford</b>	<b>Angus X Hereford</b>	<b>M. Shorthorn X (AXH)</b>	<b>Simmental X Hereford</b>
<b>Calving In:</b>				
March	50%	50%	42%	92%
April	50%	42%	42%	8%
<b>Open or Aborted</b>				
	0	8%	16%	0

**Table 7. Two Year Combined Calving Date of Heifers**

	<b>Hereford</b>	<b>Angus X Hereford</b>	<b>M. Shorthorn X (AXH)</b>	<b>Simmental X Hereford</b>
<b>Calving In:</b>				
March	48%	50%	40.9%	77.3%
April	38%	34.4%	45.4%	22.7%
May	9.4%	3.1%	4.5%	0
<b>Open or Aborted</b>				
	4.6%	12.5%	9.2%	0