



**FIRST-CALF
PERFORMANCE**
of
**foreign X domestic
hybrid heifers**

PUBLICATION 1537 1974

630.4
C212
P 1537
1974
(1977 print)
c.3



Agriculture
Canada

Copies of this publication may be obtained from
INFORMATION DIVISION
CANADA DEPARTMENT OF AGRICULTURE
OTTAWA
K1A 0C7

© MINISTER OF SUPPLY AND SERVICES CANADA 1977

Cat. No.: A63-1537
ISBN 0-662-00616-X

Printed 1974
Reprinted 1975, 1977

8M-4:77

FIRST-CALF PERFORMANCE of foreign X domestic hybrid heifers

H.T. Fredeen¹, J.E. Lawson², J.A. Newman¹, and G.W. Rahnefeld³

In 1968, the Canada Department of Agriculture started a program to evaluate the reproductive performance of hybrid heifers produced by mating Charolais, Limousin, and Simmental bulls with Angus, Hereford, and Shorthorn cows. The Shorthorn crossbred heifers were produced from cows at the Brandon and Lacombe research stations. Angus and Hereford crossbred heifers were produced in cooperating ranch herds representative of those used for commercial production in the Prairie Provinces. All matings were made by artificial insemination using 8 to 10 bulls chosen at random annually from each sire breed. Bulls were allocated equally and at random to cows of the cooperating herds.

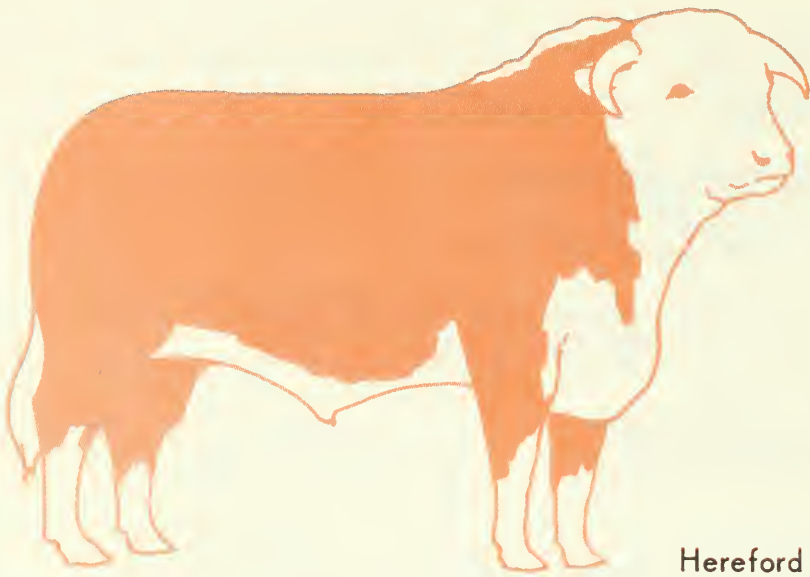
After weaning at about 7 months of age on the ranch of origin, the hybrid heifers were transferred to Brandon or Lacombe for rearing. At 14 months of age, they were allocated at random to two contrasting environments — Manyberries, Alta., and Brandon, Man. — for maintenance and evaluation of reproductive performance through at least five calf crops. At each location, management and nutrition were designed to conform with traditional commercial practices in that region.

The mating plan to produce the original hybrid heifers resulted in nine hybrid combinations — three sire breeds X three dam breeds. A tenth group, the commercially popular Hereford X Angus cross, was

¹ Research Station, Lacombe, Alt.

² Research Station, Lethbridge, Alta.

³ Research Station, Brandon, Man.



Hereford

added at Manyberries and Brandon to serve as a common control population. Hybrid heifers, introduced to the program over a 3-year period, produced their first calves in 1972, 1973, and 1974. This publication summarizes breeding, conception, and calf performance to weaning for 1972 and 1973 first-calf production from 1000 hybrid heifers at both locations. Results at this point must be regarded as tentative pending completion of the 1974 calving year.

All heifers were bred as yearlings to one of seven Beefmaster or eleven Red Angus bulls. Breeding was by artificial insemination through a 9-week season beginning the middle of June. No clean-up bulls were used.

Breeding, Conception, and Gestation

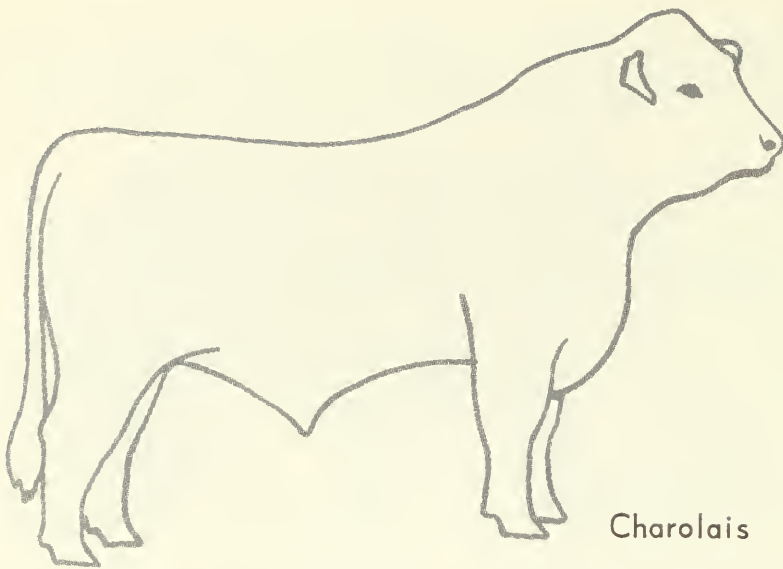
Over the 2 years, detection rate for heifers averaged 98.1% and of these 84.2% conceived. Number of services per conception averaged 1.4. Although both detection and conception differed between specific hybrid combinations, the differences between breeds of sire, breeds of dam, and location were no greater than expected from chance alone.

Gestation length for all heifers averaged 282 days with a maximum of 283.8 and minimum of 280.4 for the individual hybrid combinations.

TABLE 1. ESTRUS DETECTION RATES, % CONCEPTION, SERVICES PER CONCEPTION, AND TOTAL NUMBER OF HYBRID HEIFERS EXPOSED TO BREEDING

Breed of heifer's sire	Breed of heifer's dam			Av for breed of heifer's sire
	Hereford	Angus	Shorthorn	
	No. of hybrid heifers			Total for sire breed
Charolais	107	102	87	296
Simmental	124	118	124	366
Limousin	97	101	140	338
Total for breed of heifer's dam	328	321	351	(150)*
	% estrus detection			
Charolais	98.1	99.0	98.9	98.7
Simmental	97.6	100.0	97.6	98.4
Limousin	92.8	99.0	98.6	96.8
Average for breed of heifer's dam	96.1	99.3	98.4	(98.7)*
	% conception			
Charolais	81.9	83.2	82.6	82.6
Simmental	85.1	82.2	87.6	85.0
Limousin	77.8	87.0	83.3	82.7
Average for breed of heifer's dam	81.6	84.1	84.5	(86.5)*
	Services per conception			
Charolais	1.33	1.43	1.34	1.37
Simmental	1.40	1.51	1.37	1.43
Limousin	1.32	1.56	1.48	1.45
Average for breed of heifer's dam	1.35	1.50	1.40	(1.49)*

*Values in parentheses are for Hereford X Angus control.



Charolais



Shorthorn

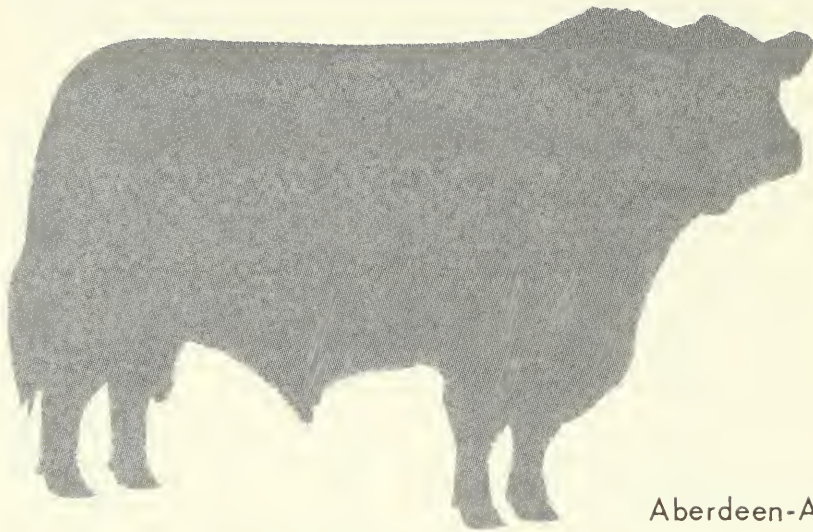
Calving Ease

Of the 801 calves born in 1972 and 1973, 57% of the males and 80% of the females were unassisted. Sex of calf influenced calving ease in the expected fashion, with 14.0% of the bull and 4.0% of the heifer calves recorded as difficult births (including four Caesarian sections). Differences between hybrid female subgroups were not consistent between locations or between years and the influence of breed of sire or dam on calving ease will not be evaluated until completion of calving in 1974.

TABLE 2. NUMBER OF HEIFERS CALVING AND CALVING EASE SCORES BY SEX OF CALF

Breed of heifer's sire	Breed of heifer's dam			Total for breed of heifer's sire
	Hereford	Angus	Shorthorn	
No. calving male calves				
Charolais	38	19	31	88
Simmental	53	57	50	160
Limousin	30	32	64	126
Total for breed of heifer's dam	121	108	145	(62)*
No. calving female calves				
Charolais	31	39	28	98
Simmental	45	39	39	123
Limousin	23	14	47	84
Total for breed of heifer's dam	99	92	114	(60)*
Ease of calving – male calves (% Unassisted/% easy pull/% difficult)				
Charolais	50/34/16	52/32/16	55/26/19	52/31/17
Simmental	64/19/17	63/26/11	58/30/12	62/25/13
Limousin	50/30/20	56/35/9	48/36/16	51/34/15
Av for breed of heifer's dam	54/28/18	57/31/12	53/31/16	(64/26/10)*
Ease of calving – female calves (% Unassisted/% easy pull/% difficult)				
Charolais	81/13/6	74/21/5	71/18/11	76/17/7
Simmental	82/9/9	82/15/3	72/23/5	78/16/6
Limousin	74/26/0	98/0/7	81/17/2	83/14/3
Av for breed of heifer's dam	79/16/5	83/12/5	75/19/6	(85/15/0)*

*Values in parentheses are for Hereford X Angus control.



Aberdeen-Angus

Calf Survival

Mortality before or immediately after birth was higher among males than females (5.0 vs 3.6%) and weak calves were also more frequent among males (4.0 vs 1.1%). Survival to weaning for all calves born to 'exotic'-cross heifers averaged 91.0%, with the Hereford X Angus controls averaging 94.3%. Calves dead at birth or born weak represented the major loss for all groups.

TABLE 3. SURVIVAL TO WEANING OF ALL CALVES BORN (%)

Breed of heifer's sire	Breed of heifer's dam			Av for breed of heifer's sire
	Hereford	Angus	Shorthorn	
Charolais	88.6	92.2	95.2	92.0
Simmental	90.0	97.4	90.2	92.5
Limousin	90.6	81.5	90.8	87.6
Av for breed of heifer's dam	89.7	90.4	92.1	(94.3)*

*Value in parentheses is for Hereford X Angus control.

Calf Weights at Birth and Weaning

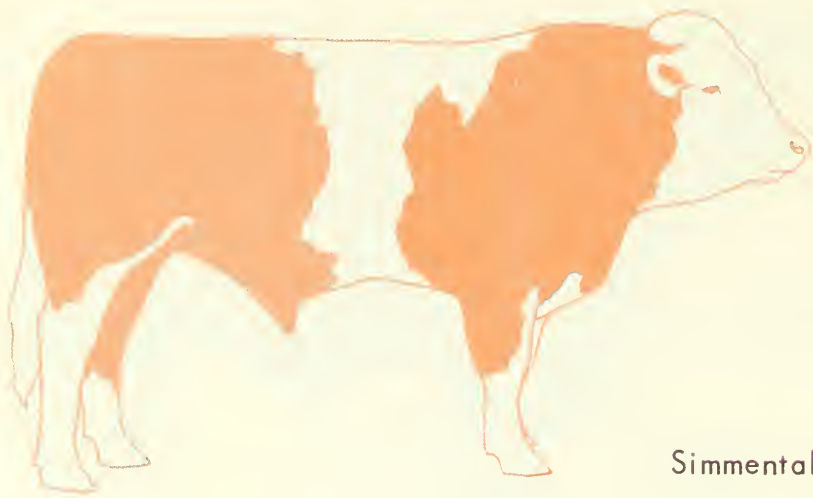
Most of the 'exotic'-cross hybrid heifers produced calves that were significantly heavier at birth and weaning than those produced by the

Hereford X Angus controls. The combined data for both sexes provided rather sound evidence that the Simmental-sired heifers weaned heavier calves than the Charolais- and Limousin-sired heifers and that the heifers with Shorthorn dams weaned heavier calves than those from Hereford and Angus dams.

TABLE 4. BIRTH WEIGHTS AND 200-DAY ADJUSTED WEANING WEIGHTS (LB)

Breed of heifer's sire	Breed of heifer's dam			Av for breed of heifer's sire
	Hereford	Angus	Shorthorn	
Birth weight – male calves				
Charolais	81.9	80.7	83.2	82.1
Simmental	80.0	80.2	83.7	81.3
Limousin	78.5	73.5	80.1	77.8
Av for breed of heifer's dam	80.2	78.2	82.1	(73.3)*
Birth weight – female calves				
Charolais	77.6	75.7	77.8	76.8
Simmental	76.7	78.4	80.1	78.3
Limousin	70.4	68.1	75.3	72.2
Av for breed of heifer's dam	75.2	75.3	77.6	(69.7)*
Weaning weight – male calves				
Charolais	400	414	428	413
Simmental	431	425	445	434
Limousin	408	400	422	412
Av for breed of heifer's dam	415	415	432	(380)*
Weaning weight – female calves				
Charolais	385	384	418	395
Simmental	413	410	426	416
Limousin	371	380	394	384
Av for breed of heifer's dam	393	395	412	(356)*

*Values in parentheses are for Hereford X Angus control.



Simmental

Heifer Weights at First Breeding and First Calving

At 14 months (first breeding), and later at first calving, the heaviest hybrid females were Charolais X Shorthorn and the lightest were Limousin X Angus. The latter group was somewhat lighter at breeding than the Hereford X Angus controls but was significantly heavier at calving time. Comparisons with the control may not be fully valid at this age because of differences in prebreeding management of this group. At calving time, when all females had been under a common environment for about 1 year, all exotic hybrid groups were heavier than the controls with the exotics being ranked in the same order as at 14 months. Summarized by breed of sire, the ranking of hybrid groups for weight was Charolais = Simmental > *Limousin = Control at breeding, and Charolais = Simmental > Limousin > Control at calving. Hybrid females out of Shorthorn dams were generally heavier than those out of Hereford and Angus dams at both ages.

*More than.

TABLE 5. HEIFER WEIGHTS (LB)

Breed of heifer's sire	Breed of heifer's dam			Av for breed of heifer's sire
	Hereford	Angus	Shorthorn	
Weight in June, immediately before first breeding season				
Charolais	698	718	754	722
Simmental	696	718	731	715
Limousin	664	661	696	677
Av for breed of heifer's dam	688	703	723	(675)*
Weight at time of first calving				
Charolais	855	845	884	861
Simmental	839	845	843	842
Limousin	782	781	807	793
Av for breed of heifer's dam	829	828	839	(749)*

* Values in parentheses are for Hereford X Angus control.

Cow Productivity

Production efficiency of a beef herd is strongly influenced by the number and weight of calves weaned per 100 cows entered in the breeding herd. Compared on the basis of percentage production, the control Hereford X Angus were marginally above the best of the nine hybrid combinations and about 10% better than the three crosses involving Hereford dams and the three involving the Limousin sires. These differences incorporate differences in detection, conception, and survival rates. In this respect, the superiority of control heifers over those sired by Limousin bulls and those from Hereford dams seems to be more than a chance variation. When compared on the basis of weight of calf weaned per cow exposed to breeding, the highest production was obtained from the three crosses involving Simmental sires and the three involving Shorthorn dams.

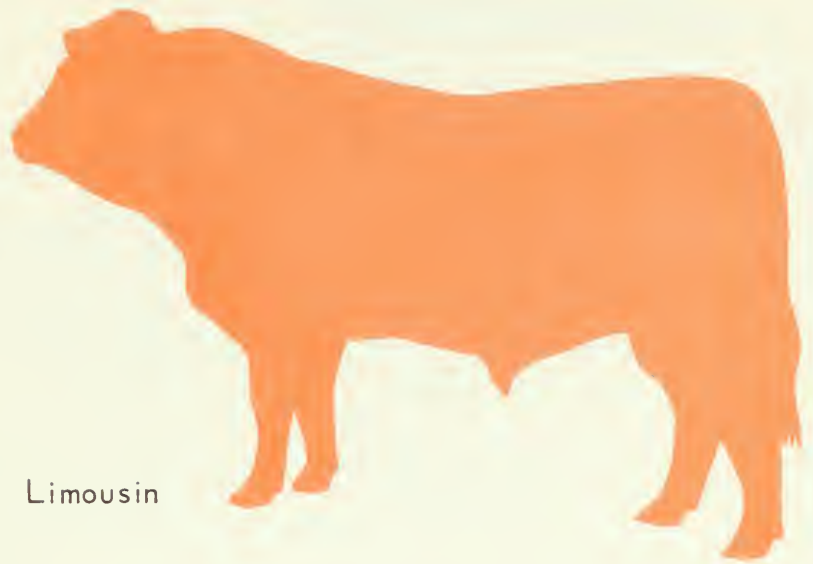
Another measure of cow efficiency is the relationship between weight of calf weaned and the weight of its dam. Weaning weights of calves produced by Hereford X Angus control averaged 49.2% of their dams' weights at calving. The percentage for the 'exotic'-cross heifers ranged from 45.9% (Charolais X Hereford) to 51.7% (Simmental X Shorthorn).

Differences between the two environments have been negligible for all of the traits measured.

TABLE 6. COW PRODUCTIVITY

Breed of heifer's sire	Breed of heifer's dam			Av for breed of heifer's sire
	Hereford	Angus	Shorthorn	
Calves weaned per 100 cows entering the breeding herd				
Charolais	71.2	75.9	77.8	75.0
Simmental	74.7	80.1	77.1	77.3
Limousin	65.4	70.2	74.6	70.1
Av for breed of heifer's dam	70.4	75.4	76.5	(80.5)*
Weight of calf weaned per cow entering the breeding herd (lb)				
Charolais	272	303	329	301
Simmental	315	334	336	329
Limousin	255	274	304	278
Av for breed of heifer's dam	281	304	323	(297)*
Weaning weight of calf as a percentage of dam weight at calving				
Charolais	45.9	47.2	47.9	47.0
Simmental	50.3	49.4	51.7	50.5
Limousin	49.8	49.9	50.5	50.1
Av for breed of heifer's dam	48.7	48.8	50.0	(49.2)*

* Values in parentheses are for Hereford X Angus control.



Limousin

Comparative Performance of Beefmaster vs Red Angus Sires

Progeny of Red Angus bulls have less calving difficulty, less early mortality, and a lower incidence of weak calves than those sired by Beefmaster bulls. They weighed about 4% less at birth and weaning, with these differences slightly greater for the male calves.

TABLE 7. COMPARATIVE PERFORMANCE OF CALVES Sired BY BEEFMASTER AND RED ANGUS BULLS

	Beefmaster		Red Angus	
	M	F	M	F
Number of calves	199	190	239	177
Ease of calving				
% unassisted	51.3	76.8	61.5	82.5
% easy pull	29.6	19.5	28.5	12.4
% difficult	19.1	3.7	10.0	5.1
Condition of calf				
% normal	84.5	94.2	94.6	96.0
% stillborn	2.0	1.1	1.2	0.6
% died at birth	7.0	4.2	2.1	1.7
% weak	5.5	0.5	2.1	1.7
Birth weight (lb)	83	76	77	74
Weaning weight (lb)	423	398	404	384

Future Program

The final allotment of 155 hybrid heifers was made in May 1973. These will not wean their calves until the fall of 1974 and a comprehensive report on reproductive and nursing performance of the hybrid heifers will be prepared after that date.

CONVERSION FACTORS FOR METRIC SYSTEM

Imperial units	Approximate conversion factor	Results in:
LINEAR		
inch	x 25	millimetre (mm)
foot	x 30	centimetre (cm)
yard	x 0.9	metre (m)
mile	x 1.6	kilometre (km)
AREA		
square inch	x 6.5	square centimetre (cm ²)
square foot	x 0.09	square metre (m ²)
acre	x 0.40	hectare (ha)
VOLUME		
cubic inch	x 16	cubic centimetre (cm ³)
cubic foot	x 28	cubic decimetre (dm ³)
cubic yard	x 0.8	cubic metre (m ³)
fluid ounce	x 28	millilitre (ml)
pint	x 0.57	litre (ℓ)
quart	x 1.1	litre (ℓ)
gallon	x 4.5	litre (ℓ)
WEIGHT		
ounce	x 28	gram (g)
pound	x 0.45	kilogram (kg)
short ton (2000 lb)	x 0.9	tonne (t)
TEMPERATURE		
degrees Fahrenheit	(°F-32) x 0.56 or (°F-32) x 5/9	degrees Celsius (°C)
PRESSURE		
pounds per square inch	x 6.9	kilopascal (kPa)
POWER		
horsepower	x 746 x 0.75	watt (W) kilowatt (kW)
SPEED		
feet per second	x 0.30	metres per second (m/s)
miles per hour	x 1.6	kilometres per hour (km/h)
AGRICULTURE		
gallons per acre	x 11.23	litres per hectare (ℓ/ha)
quarts per acre	x 2.8	litres per hectare (ℓ/ha)
pints per acre	x 1.4	litres per hectare (ℓ/ha)
fluid ounces per acre	x 70	millilitres per hectare (ml/ha)
tons per acre	x 2.24	tonnes per hectare (t/ha)
pounds per acre	x 1.12	kilograms per hectare (kg/ha)
ounces per acre	x 70	grams per hectare (g/ha)
plants per acre	x 2.47	plants per hectare (plants/ha)

