

COMPARISON OF LIMOUSIN AND GELBVIEWH AS TERMINAL CROSS SIRE BREEDS

E.D. Tinker¹, R.R. Frahm², H.G. Dolezal³
and S.G. May¹

Story in Brief

Twenty-eight bulls of each the Limousin and Gelbvieh breeds were compared for use as terminal sires by mating bulls of both breeds to various two-breed cross cows to produce 417 steers and 360 heifers in 1982, 1983, 1984 and 1985. Overall performance as terminal sires was similar for both breeds and none of the differences for individual traits were significant. Birth weights averaged 86 lbs and there was 5.2% difficult calvings. Average weaning weight was 544 lbs. After weaning, the 1982 and 1984 calf crops were placed on a self-fed, corn based finishing diet until an estimated low choice quality grade was attained. Mean feedlot average daily gain, slaughter weight and feed efficiency were 2.84 lbs/day, 1206 lbs and 6.99 lbs feed/lb liveweight gain, respectively. Hot carcass weight averaged 754 lbs and carcass weight per day of age was 1.67 lbs. Carcasses from calves sired by both breeds were quite desirable. The majority graded low choice and the means for external fat thickness, kidney, heart and pelvic fat and rib eye area were .48 in, 2.75% and 14.0 sq in, respectively. All performance and carcass traits were similar for the two sire breeds, and both breeds would be very satisfactory for use as terminal cross sires.

(Key Words: Crossbreeding, Terminal Sire, Limousin, Gelbvieh)

Introduction

Many studies have demonstrated the advantages of crossbreeding for increasing the efficiency of beef production. Implementing a crossbreeding plan which utilizes a terminal sire provides the opportunity to make greatest use of breed complementarity. Such a plan can utilize the superior growth rate of the larger breeds while maintaining a cow herd of smaller, more efficient animals. The purpose of this study is to compare the Limousin and Gelbvieh breeds for use as terminal sires, and is part of a study being conducted at the Oklahoma Agricultural Experiment Station on lifetime productivity of various two-breed cross cows.

Experimental Procedure

Each year seven purebred bulls from each the Limousin and Gelbvieh breeds were selected by the North American Limousin Foundation and American Gelbvieh Association, respectively, with semen from each bull supplied by the owner. Cows from each of eight breed groups (Hereford x Angus, Angus x Hereford, Brown Swiss x Angus, Brown Swiss x Hereford,

¹Graduate Student ²Professor ³Assistant Professor

Simmental x Angus, Simmental x Hereford, Jersey x Angus and Jersey x Hereford) were randomly assigned to individual bulls so that all bulls received approximately the same number of cows in each breed group and age. Only mature cows were involved and ranged in age from 7 to 9 years of age at calving time in 1982 and from 10 to 12 years of age in 1985.

Calves were born primarily in February and March. Birth weights were recorded and all calvings were assigned a difficulty score from 1 to 5 (1=no difficulty, 5=caesarian birth) by the herdsman. Calves were raised by their dams on native tall grass and bermudagrass pastures on the north side of the Lake Carl Blackwell Research Range west of Stillwater until weaning at an average age of 205 days. Weaning weights were recorded the day of weaning and a panel of three people assigned scores to each calf for conformation (muscling) and condition.

Calves born in 1982 and 1984 were transported to the Southwestern Livestock and Forage Research Station at El Reno, OK the day of weaning. The 1982 calves were placed in the feedlot the following day, with their actual weaning weights used as weight on test. In 1984 the calves were given a brief period for adjustment to surroundings and diet before shrunk weights were obtained for weight on test. In both years the cattle were allocated into pens based on sex and breed group. The ration presented in Table 1 was fed ad libitum. As the cattle approached slaughter condition they were individually weighed and evaluated every two weeks. Cattle were individually selected for slaughter when an estimated low choice quality grade had been attained. Shrunk weights were obtained before transport to a commercial slaughter plant. Carcasses were chilled for 48 hours before collection of carcass data.

Table 1. Finishing ration.

Ingredient	Percent in ration
Corn	78
Alfalfa	8
Cottonseed hulls	4
Molasses	5
Supplemental pellets ^a	5
	Total
	100

^aSupplemental pellets consisted of 67.6% soybean oil meal (44%), 12% urea, 10% calcium carbonate, 8% salt plus Aurofac, vitamin A and trace minerals.

Results and Discussion

Sire breed means for performance and carcass traits were averaged over crossbred cow groups and sexes, and are presented in Table 2. A total of 777 calves were born in the four year period (1982-1984). Mean performances for the two sire breeds were similar for all traits evaluated and none of the differences were significant ($P>.10$).

Table 2. Three-breed cross calves sired by Gelbvieh and Limousin bulls.

Trait	Breed of sire ^a		Difference*
	Gelbvieh	Limousin	Gelbvieh-Limousin
<u>Performance to weaning:</u>			
Number of animals	366	411	---
Birthweight, lb	87.2	84.9	2.3
% difficult calving ^b	4.8	5.6	-.8
Calving difficulty score ^c	1.09	1.17	-.08
% death loss at birth or shortly after	2.48	1.69	.79
Preweaning ADG, lb/day ^d	2.29	2.17	.12
205-day weaning wt, lb ^d	557.5	530.5	27.0
Weaning conformation score ^{de}	13.4	13.5	-.1
Weaning condition score ^{df}	5.5	5.3	.2
<u>Feedlot performance:</u>			
Number of animals	192	217	---
Yearling weight, lb ^d	985	960	25
Weight on test, lbs ^d	551	524	27
Days in feedlot	232	238	-6
Average daily gain, lb/day ^g	2.83	2.84	-.01
Slaughter weight, lb ^h	1208	1204	4
Feed efficiency, lb feed/lb gain ^g	6.90	7.08	-.18
<u>Carcass traits:</u>			
Number of animals	192	217	---
Carcass weight, lb ^h	756	753	3
Carcass weight/day of age	1.68	1.65	.03
Dressing % ^h	62.1	62.9	-.8
Single fat thickness, in	.45	.50	-.05
KHP fat, % ^h	2.77	2.73	.04
Marbling score ⁱ	4.8	4.8	0
Carcass grade ^j	9.7	9.4	.3
Ribeye area, sq in	13.9	14.0	-.1
Cutability, %	50.8	50.5	.3

^aMeans averaged over years and sexes.

^b% calving with calving difficulty scores 3, 4 or 5.

^cCalving difficulty: 1=no difficulty, 2=little difficulty, 3=moderate difficulty, 4=major difficulty, 5=caesarian.

^dTrait adjusted for age of calf.

^eConformation score equivalents: 12=low choice, 13=average choice, 14=high choice.

^fCondition score equivalents: 1=very thin, 5=average to 9=very fat.

^gTrait adjusted to a constant weight on test.

^hTrait adjusted to a constant marbling score.

ⁱMarbling score equivalents: 4=slight, 5=small.

^jCarcass grade equivalents: 9=high good, 10=low choice.

*No differences are significant at the .10 level of probability.

The calves averaged 86 lbs at birth, which is not excessively large, particularly for mature cows. The low percentage of cows requiring assistance calving (5.2%) was probably due to only mature cows being involved in this study. If younger cows were involved (less than five years old) more calving difficulty could probably be expected.

Both sire breeds produced very acceptable calves at weaning, with an average weaning weight of 544 lbs and average conformation score of 13.4 (13=average choice). The Gelbvieh sired calves showed a nonsignificant advantage at weaning time of 27 lbs. All weaning traits were adjusted to a constant age of 205 days.

Only calves born in two of the years (1982 and 1984) were finished out in order to obtain feedlot and carcass data. In those two years 409 calves (218 steers and 191 heifers) were evaluated for feedlot performance and carcass traits. Performance was similar for progeny of each sire breed and was quite desirable. Gelbvieh sired calves maintained their nonsignificant advantage of 27 lbs at weaning through yearling weight (985 vs 960 lbs). Average daily gain and feed efficiency for the feedlot period were adjusted to a constant on test weight of 540 lbs. Average daily gain was 2.84 lbs and 6.99 lbs feed/lb of liveweight gain were required. Slaughter weight was adjusted to a constant marbling score of small, with a resulting average of 1206 lbs.

The inability in some cases to accurately determine when the cattle had reached the desired low choice quality grade resulted in the Gelbvieh sired calves having a slight advantage (nonsignificant) in carcass grade. Some of these cattle should have been left on feed a few more days, which probably would have increased slightly the difference in days on feed between the two sire breeds. Slaughter weight would not be affected since it was adjusted to the desired marbling score. The carcasses produced were very acceptable, with an average rib eye area of 14.0 sq in and an average quality grade of 9.5 (9=high good, 10=low choice). Means for 12th rib external fat thickness and cutability were .48 in and 50.7, respectively. Hot carcass weight, dressing percent and percent KHP fat were adjusted to a constant marbling score of small, with means of 754 lbs, 62.5% and 2.75%, respectively.

Results from this study indicate that both Limousin and Gelbvieh perform well as terminal sire breeds. Both breeds sired calves with good growth, feed conversion and carcass traits. The small differences between the two breeds would indicate that decisions on which to use as a terminal sire need to be based as much on the genetic merit of individual bulls available, and the price at which they can be obtained, as the breed of the bull.