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## Feedlot Performance and Carcass Merit of 2-Breed and 3-Breed Cross Pigs

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### Story in Brief

This study was initiated to evaluate differences in the feedlot performance and carcass merit for 2-breed and 3-breed crosses involving the Duroc, Hampshire and Yorkshire breeds. The data included the post-weaning feedlot performance on 606 barrows and gilts and the carcass data on 110 barrows.

There were no significant differences between 3-breed and 2-breed crosses for any of the feedlot and carcass traits evaluated. Overall, 2-breed and 3-breed cross pigs had nearly identical growth rates, feed consumption and feed efficiencies. The  $\frac{1}{2}$  Hampshire:  $\frac{1}{4}$  Duroc:  $\frac{1}{4}$  Yorkshire crossbred gilts had less backfat than the other groups and this resulted in the backfat thickness for the 3-breed crosses being 0.05 in. less than that for the 2-breed cross gilts. The carcasses from the 3-breed and 2-breed cross barrows were nearly the same for length, backfat thickness and loin eye area. The 2-breed cross carcasses averaged slightly higher yield of lean and higher color score but had a somewhat lower quality score for marbling.

In general, there appeared to be little added heterosis from 3-breed crosses over 2-breed crosses for measures of feedlot performance and carcass traits. Some interesting differences in performance between reciprocal crosses were noted, but more data are needed before drawing any definite conclusions regarding the relative importance of maternal effects.

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## Introduction

Growth rate and meat quality are moderately heritable traits in swine and have responded to crossbreeding, but the amount of heterosis observed appears to depend on which breeds are involved in the cross. Most swine carcass measurements (length, loin eye area, backfat thickness, and weight of the lean cuts) are in general highly heritable traits and have shown little response to crossbreeding.

Research has shown that a crossbred sow is needed in order to maximize production by capitalizing on the heterosis of a crossbred sow for preweaning performance. However, information on differences between specific crossing sequences is not available. Swine producers need to know which combinations yield the greatest advantage in terms of combining the strong points of the different breeds for feedlot performance and carcass merit.

This report deals with the second phase of the Oklahoma crossbreeding project where 2-breed and 3-breed crosses are compared for feedlot performance and carcass merit. The data includes only pigs farrowed in the 1972 spring at Ft. Reno, and the number of animals within any breed group are rather limited. The same breeding structure was repeated to produce litters in 1972 fall and these additional records are needed in order to provide sufficient numbers to evaluate the influence of maternal effects in crossing sequences. This report deals primarily with the relative differences between 2-breed and 3-breed cross pigs.

## Experimental Procedure

The data included 606 gilts and barrows involving 2-breed and 3-breed crosses among Durocs, Hampshires and Yorkshires. The pigs were farrowed in the Ft. Reno swine breeding herd in 1972 spring. The feedlot records included 280 two-breed cross and 326 three-breed cross pigs and the carcass data included 55 two-breed cross barrows and 55 three-breed cross barrows.

The pigs used in this study came from litters that were produced by mating purebred boars of each breed to two gilts of each breed-type not represented in the boar. For example, each Duroc boar was mated to two Hampshires, two Yorkshires and to four Hampshire-Yorkshire crossbred gilts (two of each reciprocal breed-type).

The pigs were weaned at 42 days of age and two weeks later were moved to the confinement finishing barn. They were allotted by breed group in groups of about 16 pigs per pen and given a one-week adjustment period before being weighed on test. All pigs were self-fed a 16 percent crude protein (milo, wheat, soybean meal) ration until they reached 220 lbs. Pigs were weighed off test on a weekly basis as they reached 220



lbs., and all gilts (a total of 304) were probed for backfat at that time. As the pigs were weighed off test, a random sample of about nine barrows per breed group were taken to the University Meat Laboratory and evaluated for carcass merit.

## Results

The growth rate, feed consumption and probe backfat data for the 2-breed and 3-breed crosses are presented in Table 1. The overall rate of gain and days to 220 lbs. was nearly identical for the 2-breed and 3-breed crosses. There was no significant difference in rate of gain or days to 220 lbs. among the various 2-breed crosses, but the  $\frac{1}{2}$  Duroc: $\frac{1}{4}$  Hampshire: $\frac{1}{4}$  Yorkshire crossbred pigs gained 0.06 lbs. per day less than the other 3-breed crosses. The 3-breed cross gilts had 0.05 in. less backfat than the 2-breed crosses, but this superiority was primarily due to the  $\frac{1}{2}$  Hampshire: $\frac{1}{4}$  Duroc: $\frac{1}{4}$  Yorkshire crossed gilts having significantly less backfat than any of the other breed groups.

There was virtually no difference in average daily feed consumption or feed efficiency between the 2-breed and 3-breed crosses. Hampshire X Duroc-Yorkshire crosses consumed significantly less feed and were more efficient feed converters than the Yorkshire X Duroc-Hampshire crosses.

The carcass measurements for the 110 barrows slaughtered are presented in Table 2. In general, there was very little difference between the 2-breed and 3-breed crosses for carcass merit. The 3-breed crosses tended to have slightly less lean yield, higher marbling scores and lower color scores than 2-breed crosses although these differences were not significant. Duroc-Hampshire 2-breed cross barrows tended to have less backfat and less lean yield than other 2-breed crosses while Hampshire X Duroc-Yorkshire 3-breed crosses were longer, less fat and had more lean yield than did the other 3-breed crosses. Duroc-Yorkshire 2-breed cross barrows had higher marbling, firmness and color scores than the other 2-breed crosses while Hampshire X Duroc-Yorkshire crosses had somewhat lower quality scores than other 3-breed crosses.

Results from the first phase of this study have shown rather large differences in reciprocal crosses in the production of 2-breed cross pigs. Although the numbers in the present study are limited, the results are very similar to those of the first phase. There was little difference between reciprocal crosses involving Hampshires and Durocs for either feedlot performance or carcass traits. However, the Yorkshire crossed pigs tended to grow faster and more efficiently and to have more desirable carcasses when the Yorkshire served as their dam breed rather than their sire breed. These differences were especially evident for the reciprocal crosses involving Durocs and Yorkshires. These data suggest that there

Table 1. Postweaning Performance and Probe Backfat Data for 2-Breed and 3-Breed Cross Pigs

	2-Breed Crosses <sup>1</sup>			3-Breed Crosses <sup>2</sup>			Overall		
	D-H	D-Y	H-Y	DxH-Y	HxD-Y	YxD-H	2-Breed Crosses	3-Breed Crosses	% Imprvmt. over 2-Breed
<i>Growth Rate:</i>									
No. pigs	95	97	88	106	105	115	280	326	
Avg. daily gain, lbs.	1.68	1.67	1.65	1.63	1.69	1.69	1.67	1.67	0.0
Days to 220 lbs.	169.2	170.0	174.2	172.9	170.5	170.6	171.1	171.3	0.1
<i>Probe Backfat Data:</i>									
No. gilts	51	49	48	50	53	53	148	156	
Backfat thickness, in.*	1.36	1.32	1.30	1.37	1.16	1.31	1.33	1.28	3.8
<i>Feed Records:</i>									
No. pens	6	6	6	6	6	7	18	19	
Feed/pig/day, lbs.	5.1	4.9	5.0	5.0	4.8	5.3	5.0	5.0	0.0
Lbs. feed/lbs. gain	3.09	2.95	3.07	3.08	2.93	3.20	3.04	3.06	-.7

<sup>1</sup> Includes the reciprocal crosses. Example: D-H includes all  $\frac{1}{2}$  Duroc;  $\frac{1}{2}$  Hampshire pigs regardless if sired by a Duroc or a Hampshire boar.

<sup>2</sup> First letter designates the breed of sire. Includes pigs farrowed by reciprocal breeds of dam.

\* Difference between 2-breed and 3-breed cross is significant ( $P < .05$ ).

Table 2. Carcass Cutout Data for 2-Breed and 3-Breed Cross Barrows from 1972 Spring Farrowing

	2-Breed Crosses <sup>1</sup>			3-Breed Crosses <sup>2</sup>			Overall		
	D-H	D-Y	H-Y	DxH-Y	HxD-Y	YxD-H	2-Breed Crosses	3-Breed Crosses	% Imprvmt. over 2-Breed
No. barrow carcasses	20	18	17	20	17	18	55	55	
Carcass length, in.	30.3	30.4	30.6	30.3	30.8	30.4	30.4	30.5	0.3
Carcass backfat, in.	1.17	1.30	1.27	1.29	1.13	1.32	1.25	1.25	0.0
Loin eye area, sq. in.	4.38	4.63	4.54	4.70	4.64	4.17	4.52	4.50	-.4
Lean cuts of live wt., %	40.9	41.2	41.4	40.7	42.0	39.5	41.2	40.7	-1.2
Ham — loin index	94.8	100.3	99.3	99.6	103.0	86.5	98.1	96.4	-1.7
<i>Carcass quality scores:<sup>3</sup></i>									
Marbling score	3.9	5.2	3.6	4.8	4.0	4.3	4.2	4.3	2.4
Firmness score	4.9	5.8	4.8	5.8	4.8	5.1	5.2	5.2	0.0
Color score	4.6	5.3	4.7	4.6	4.8	4.8	4.9	4.7	-4.1

<sup>1</sup> Includes the reciprocal crosses. Example: D-H includes an equal number of DxH and HxD pigs.

<sup>2</sup> First letter designates sire breed. Approximately the same number of barrows were slaughtered from each reciprocal dam breeding group.

<sup>3</sup> Loin quality at 10th rib evaluated using a 7-point scoring system: 1=devoid of marbling, very soft and pale; 5=average marbling and firmness and pink color; 7=abundant marbling, very firm and very dark.



may be rather large differences in the maternal influence of the three pure breeds for feedlot performance and carcass traits.

Another important question is whether reciprocally produced crossbred females differ in their maternal influence for these traits and also the relative importance of the maternal heterosis of the crossbred dam. However, more data are needed before any definite conclusions can be made.

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## Swine Crossbreeding Results: 2-Breed Crosses vs. Purebreds

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### Story in Brief

The reproductive performance for 440 Duroc, Hampshire and Yorkshire dams, the feedlot performance for 941 pigs, and the carcass data on 190 slaughter pigs were used to evaluate the influence of using a boar of a different breed on purebred females. Yorkshire females had a higher reproductive failure rate than Durocs or Hampshires, and Hampshires had a lower ovulation rate than Durocs or Yorkshires. Productivity of Durocs and Hampshires was increased by mating them to a boar of a different breed, but crossbreeding had negligible influence on the productivity of Yorkshire females. However, the purebred Yorkshire litters were larger and heavier than crossbred litters produced by Durocs and Hampshires.

Overall, purebred sows with crossbred litters showed an advantage of 7.4 percent more pigs at farrowing, 16.1 percent more pigs at weaning,

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