

crossbred females from these litters are being mated to purebred and crossbred boars to compare the productivity of various crossbred females. These results, in conjunction with growth and carcass merit of the breeds will provide information to make better decisions on how to utilize these breeds in crossbreeding systems.

Growth and Carcass Traits for Pigs Of Four Swine Breeds and Their Crosses

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Story in Brief

Growth and carcass characteristics of 162 purebred and crossbred boars, 464 purebred and crossbred gilts and 150 purebred and crossbred barrows of Duroc, Yorkshire, Landrace and Spot breeding were compared. Crossbred boars, gilts and barrows grew 11 percent, 7 percent and 9 percent faster, respectively, than purebreds. There were very small differences between purebred and crossbred pigs for backfat probe.

The differences between pigs by Duroc, Yorkshire, Landrace and Spot sires were small for average daily gain and days to 220 lb for boars and barrows and for days to 200 lb for gilts. Duroc sired pigs consistently had less probe backfat than pigs by the other sire breeds. However, pigs from Yorkshire and Spot dams were less fat than those out of Duroc and Landrace dams. Duroc and Spot dams tended to have pigs that gained faster than pigs from Yorkshire and Landrace dams. Gilts were fed either in confinement pens or pasture lots. Gilts raised in confinement were 3.49 days younger at 200 lb and had .03 inch less backfat probe than those raised on pasture. Duroc sires produced barrows which had less carcass backfat, larger loin-eye areas, greater percent lean of carcass weight and higher marbling and firmness scores than sires of the other breeds. Yorkshire, Landrace and Spot sires produced barrows that were very similar for percent lean of carcass weight. Barrows by Yorkshire and Spot dams had less backfat than barrows by Duroc and Landrace dams and Yorkshire dams produced pigs which had the greatest percent lean of carcass weight.

Introduction

This report gives a preliminary analysis of the feedlot performance and carcass merit of Duroc, Yorkshire and Spot breeds of swine and their two-
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breed crosses. Previous research at this station has shown that crossbred pigs grow faster and more efficiently than purebreds but that there is little difference between them for carcass traits. Previous research has also shown there to be considerable variation among breeds for growth rate, feed efficiency and carcass merit; therefore, the average performance of a breed will be useful in decisions involving breeding programs for commercial production.

There is little data available on the characteristics of the Landrace and Spot breeds for economically important traits. A comparison of these breeds to the Yorkshire and Duroc breeds, for which the performance has been quite well established, will provide useful information to producers for establishing breeding programs to make maximum use of breed differences. This report includes two seasons of performance data. Additional seasons with the same mating structure will be completed to more thoroughly evaluate the breeds.

Materials and Methods

The records of 162 purebred and crossbred boars, 464 purebred and crossbred gilts and 150 purebred and crossbred barrows which were fed during fall 1976 and spring 1977 at the Stillwater Experimental Swine Farm are summarized. Information on the formation of the herds, the mating structure and the handling of sows and litters is presented in the preceding paper. Seventy-five to 80 litters were produced each season.

The pigs were weaned at six weeks of age at which time the two boars with the heaviest weaning weights were selected from each of 40 litters and the rest of the boars were castrated. Litters from which boars came were randomly selected within breed groups so that there were eight boars from each breed group (4 purebred and 6 reciprocal cross groups).

At approximately eight weeks of age the pigs were allotted to test pens. All boars were fed in confinement with 10 boars per pen. Gilts were randomly allotted within litter to either confinement (10 gilts/pen) or pasture lots. One barrow was randomly selected from each litter and fed on pasture with the gilts. There was approximately 50 pigs per lot.

Boars and barrows were weighed off test at 220 lb and all records were adjusted to 220 lb. Gilts were weighed off test at 200 lb and all records were adjusted to 200 lb. After the barrows were weighed off test, they were slaughtered at the University Meat Laboratory. All carcass measurements were taken after the carcasses had been chilled for at least 24 hr. Standard carcass measurements of length, backfat thickness, loin-eye area and pounds of closely trimmed lean cuts were collected. One loin chop from each carcass was scored for marbling firmness and color.

Results and Discussion

Table 1 contains the overall comparisons between purebreds and crossbreeds and the standard deviation for each trait. Crossbred boars, bar-

Table 1. Comparison of purebred and crossbred boars, barrows and gilts for growth rate, probe backfat thickness and carcass merit

Item	Crossbreds		Purebreds		SD
	No.	Avg.	No.	Avg.	
Boars	94		68		
ADG, lb/day*		1.67		1.51	.21
Age at 220 lb*		167.6		182.8	19.1
Probe backfat at 220 lb		.98		1.00	.13
Barrows	117		33		
ADG, lb/day*		1.64		1.51	
Age at 220 lb*		171.1		182.5	15.8
Probe backfat at 220 lb		1.29		1.23	.15
Carcass length, in*		31.3		31.7	.69
Carcass backfat, in		1.28		1.26	.18
Loin-eye area, in ²		4.62		4.56	.53
Percent lean cuts in carcass		56.5		57.0	2.57
Marbling ^a score		3.7		4.0	1.28
Firmness ^a score		4.5		4.8	1.24
Color ^a score*		5.2		5.7	.86
Gilts	340		124		
ADG, lb/day*		1.54		1.44	.17
Age at 200 lb*		166.5		176.0	14.7
Probe backfat, in		1.03		1.02	.12

^aScore of 1=devoid of marbling, very soft and pale; 5=average marbling and firmness and pink color; 7=abundant marbling, very firm and very dark.

*Significant difference ($P < .05$) between crossbreds and purebreds.

rows and gilts grew 11, 7 and 9 percent faster, respectively, than purebreds. There was essentially no difference between crossbreds and purebreds for probe backfat thickness or carcass merit; purebred barrows, however, had carcasses that were .4 inches longer than crossbred barrows.

Tables 2 and 3 show the average performance of boars and barrows by each breed of sire and breed of dam, respectively. There is little difference between sire breeds for average daily gain or days to 220 lb; but Landrace and Spot sired boars tended to be slightly younger at 220 lb. Landrace sired boars probed significantly fatter (1.07 in) than did Duroc (.95 in), Yorkshire (.97 in) or Spot (.96 in) sired boars. There were small differences between breeds of dam for average daily gain and days to 220 lb (Table 3). Boars from Yorkshire dams probed significantly less backfat (.92 in) than those from Duroc (1.02 in) or Landrace (1.03 in) dams. Boars from Spot dams were intermediate for probe backfat.

Spot-sired barrows had an average daily gain of 1.65 lb/day and took 168.1 days to reach 220 lb (Table 2). Duroc, Yorkshire and Landrace sired barrows had an average age of 175.4, 174.8, and 177.4 days, respectively, at 220 lb. Duroc sired barrows had the least backfat probe (1.23 in) while Yorkshire sired barrows had the largest backfat probe (1.32 in). Barrows which had Duroc or Spot dams grew fastest and were about eight days younger

Table 2. Average growth rate and probe backfat for boars and barrows by each breed of sire

Breed	Boars				Barrows			
	No.	Avg. daily gain, lb/day	Age at 220 lb	Backfat probe, in.*	No.	Avg. daily gain, lb/day	Age at 220 lb	Backfat probe, in.
Duroc	40	1.59	175.9	.95	38	1.61	175.4	1.23
Yorkshire	41	1.61	174.3	.97	36	1.61	174.8	1.32
Landrace	40	1.61	172.9	1.07	38	1.55	177.4	1.27
Spot	41	1.59	172.7	.96	38	1.65	168.1	1.28

*Breed of sire is significant $P < .01$.**Table 3. Average growth rate and probe backfat for boars and barrows from each breed of dam**

Breed	Boars				Barrows			
	No.	Avg. daily gain, lb/day	Age at 220 lb	Backfat probe, in.*	No.	Avg. daily gain, lb/day*	Age at 220 lb*	Backfat probe, in.*
Duroc	41	1.59	172.0	1.02	38	1.67	169.3	1.32
Yorkshire	40	1.58	176.2	.92	34	1.57	179.5	1.23
Landrace	40	1.59	174.5	1.03	45	1.54	177.4	1.31
Spot	41	1.63	173.1	.98	33	1.66	168.7	1.21

*Breed of dam significant $P < .05$.

Table 4. Average growth rate and probe backfat for gilts by each breed of sire

Breed	No.	Avg. daily gain, lb/day	Age at 200 lb.	Backfat probe, in.*
Duroc	117	1.51	170.1	.96
Yorkshire	113	1.51	168.4	1.03
Landrace	111	1.49	170.3	1.07
Spot	123	1.52	167.8	1.08

*Breed of sire significant ($P < .01$).

Table 5. Average growth rate and probe backfat for gilts by each breed of dam

Breed	No.	Average daily gain, lb/day	Age at 200 lb	Backfat probe, in.*
Duroc	122	1.52	166.5	1.06
Yorkshire	114	1.51	170.1	.98
Landrace	124	1.48	171.2	1.07
Spot	104	1.52	168.7	1.01

*Breed of dam significant ($P < .01$).

at 220 lb than those with Yorkshire or Landrace dams (Table 3). Yorkshire and Spot dams produced barrows which probed 1.23 inches and 1.21 inches, respectively, as compared to Duroc (1.32 in) and Landrace (1.31 in) dams (Table 4).

Sire breed means for gilt feedlot performance show that Yorkshire and Spot sired gilts tend to be younger at 200 lb but this is not significant (Table 4). Duroc sired gilts had the least backfat probe at 200 lb (.96 in) while Landrace and Spot sired gilts had the greatest backfat probe (1.07 in and 1.08 in, respectively). Duroc dams produced gilts which were 166.5 days at 200 lb in contrast to Yorkshire and Landrace dams whose gilt offspring were 170.1 and 171.2 days at 200 lb (Table 5). Gilts out of Yorkshire and Spot dams were leaner than gilts with Duroc and Landrace dams.

A comparison between gilts raised on pasture or in confinement is presented in Table 6. Confinement, in this case, is an open front, solid concrete floor building with no supplemental heat. Pasture lots were planted to wheat for winter and sorghum for summer and contained an open-front shed as a sleeping area. The same ration was fed to both groups. Breed groups x management interactions were tested, but were not significant, indicating that the differences between breed groups was about the same for pasture and confinement gilts. Gilts which were fed in confinement grew .04 lb per day faster, were 3.49 days younger at 200 lb and probed .03 inches less backfat than gilts raised on pasture (Table 6).

Differences among means for barrows by each breed of sire were significant for all carcass measurement except color score (Table 7). Landrace sired barrows were the longest (31.60 in) and Spot sired barrows were the shortest (31.18 in). Duroc sired barrows had the least backfat (1.18 in) while Yorkshire and Spot sired barrows had the greatest (1.36 in and 1.32 in, respectively).

Table 6. Average growth rate and probe backfat for gilts raised in confinement or on pasture

Item	No.	Avg. daily gain, lb/day*	Age at 200 lb*	Backfat probe, in.*
Confinement	226	1.53	167.19	1.02
Pasture	238	1.49	170.68	1.05

*Significant difference between confinement and pasture ($P < .05$).

Table 7. Average carcass merit for barrows by each breed of sire

Breed	No.	Length, in.*	Avg. Backfat in.*	Loin-eye area sq. in.*	Percent lean cuts of carcass weight*	Marbling score ^a	Firmness score ^a	Color score ^a
Duroc	38	31.43	1.18	4.98	59.06	4.45	5.08	5.24
Yorkshire	34	31.37	1.36	4.44	55.91	3.28	4.19	5.31
Landrace	45	31.60	1.24	4.49	55.84	3.24	4.18	5.16
Spot	33	31.18	1.32	4.53	55.44	4.08	4.63	5.47

^aScore 1 is devoid of marbling, pale and very soft; score of 7 is abundant in marbling, dark and very firm.

*Sire breed is significant $P < .05$.

Table 8. Average carcass merit for barrows by each breed of dam

Breed	No.	Length, in.	Avg. Backfat in.*	Loin-eye area sq. in.	Percent lean cuts of carcass weight*	Marbling score ^a	Firmness score ^a	Color score ^a
Duroc	38	31.34	1.30	4.56	55.88	4.13	4.95	5.37
Yorkshire	34	31.38	1.21	4.71	57.69	3.59	4.44	5.29
Landrace	45	31.44	1.33	4.55	56.45	3.49	4.18	5.29
Spot	33	31.42	1.23	4.65	56.38	3.91	4.61	5.21

^aScore of 1 is devoid of marbling, pale and very soft; score of 7 is abundant marbling, dark and very firm.

*Dam breed is significant $P < .05$.

Duroc sired barrows had the largest loin-eye area (4.98 sq. in.) and approximately three percent more lean cuts than barrows by the other three breeds. Duroc sired barrows also had the highest marbling and firmness scores.

Dam breed differences for carcass traits were quite small (Table 8). Barrows from Yorkshire or Spot dams had considerably less backfat than barrows from the other dam breeds. Yorkshire dams produced barrows which had the highest percent lean cuts of carcass weight (57.69 percent) while Duroc dams produced those with the lowest percent (55.88 percent).

These data suggest that there are some differences among the breeds for some of the economically important traits. However, these results should be viewed as preliminary in that only two seasons data have been collected. Also, only five sires and about 30 dams per breed are represented. Four additional seasons utilizing the same mating structure, but with new samples of sires and dams, will provide additional data that will give more precise estimates of the breed differences.