

Table 6. Average change in performance per year for boars of five breeds^a

Breed	Trait			
	Avg. daily gain, lb	Lb of feed/lb gain	Loin eye area, in. ²	Backfat thickness, in.
Chester White	.020**	-.013*	-.107**	-.031**
Duroc	.010**	-.022**	-.083**	-.033**
Hampshire	.033**	-.031**	-.107**	-.024**
Spot	.033	.006	-.083**	-.007**
Yorkshire	.032**	-.034**	-.075**	-.040**
Overall average	.019**	-.021**	-.088**	-.029**

^aBerkshire, Poland and Landrace boars not included due to small numbers of boars tested.

*Average change per year is significantly different from zero, $P < .05$.

**Average change per year is significantly different from zero, $P < .01$.

If these phenotypic trends reflect changes that were occurring in the swine industry, they indicate improvement in growth rate, feed efficiency and backfat thickness. There is currently concern about the extent to which loin eye area has been changed. While it is possible that many hogs were too heavily muscled ten years ago, it is also possible that the total reduction has been too severe since then.

The Relationship Between Measures of Performance and Selling Price in Tested Boars

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Story in Brief

Performance records and sale prices of 901 boars that sold from the Oklahoma Swine Evaluation Station from 1971 through 1979 were used to evaluate the effect that performance had on selling price. Measures of performance that were included were age at final weight, average daily gain, feed efficiency, back fat thickness and loin eye area.

None of the traits was highly correlated with selling price. Average changes in price per unit change in each trait indicated that less than half of the variation in selling price was explained by variation in the performance traits. Generally one of the measures of growth rate had the most important impact on selling price.

Introduction

Performance testing of swine has been increasing for several years. One of the methods of performance testing is the central test station. Such a station enables potential buyers to have an evaluation of boars that have been managed under uniform

conditions but come from various breeders. It would be helpful to potential buyers if they knew the extent to which various performance traits contributed to selling price. Sufficient numbers of boars have been tested at the Oklahoma Swine Evaluation Station to analyze the relationship between selling price and those performance traits that are evaluated at the station.

Materials and Methods

The Oklahoma Swine Evaluation Station began testing boars in 1971. There were 1731 boars that completed the test through 1979, and of those, 901 sold at auction following completion of each test. There were several reasons why the remaining boars did not sell. Approximately 20 percent of the boars did not meet minimum performance standards and were not offered for sale. In addition, several boars were excluded from sale because of structural unsoundness. Beyond those exclusions some boars did not sell because the breeder elected not to sell his animal, or no bid was received above a predetermined minimum sale price.

Sale catalogs were available to potential buyers prior to the sale. These catalogs included identification of each boar including sire, dam and breeder name. Performance traits included were: age at final weight (either 220 or 230 lb), average daily gain, probe backfat thickness (average of shoulder, last rib and last lumbar vertebra) and a scanogram estimate of loin eye area. In addition, feed efficiency (lb feed/lb gain) was presented for each pen. In all cases a pen consisted of three or four pigs by the same sire. Boars were sold according to their rank based on an index of average daily gain, backfat thickness and feed efficiency. This index changed several times during the period under consideration.

These analyses included all those performance records and sale prices of boars that sold from the Chester White, Duroc, Hampshire, Spot and Yorkshire breeds. Berkshire, Poland and Landrace boars were also tested but were excluded from these analyses because of the very limited numbers of boars from those breeds.

The relationship between selling price and the performance traits was evaluated by calculating the correlation between price and each trait after accounting for the variation due to breed, year, season and test group.

Contributions of each trait to selling price for each breed was independently evaluated by obtaining partial regressions of price on each performance trait. These regressions were obtained simultaneously for all the traits after accounting for the variation due to year, season and test group. The trait that contributed the least in each breed was removed from consideration, and the analyses were repeated until only those traits that made significant contributions to selling price remained. In this way the traits could be ranked by order of their effect.

Results and Discussion

Correlations between various performance traits and selling price are shown in Table 1. All are significantly different than 0 and are in the desired direction. Despite this, all are relatively small with the largest being .277 for average daily gain.

Table 1. Correlations between selling price and performance traits of tested boars

	Age at final wt	Average daily gain	Performance traits		Loin eye area
			Pen feed efficiency	Backfat thickness	
Price	-.236	.277	-.227	-.142	.090

The average change in price per unit of change in each performance trait is shown in Table 2. These are shown for each breed separately. Missing values indicate traits that did not make significant contributions to selling price. The regression coefficients indicate the amount of change in selling price that is associated with the change in that trait. The column headed with R^2 shows the proportion of the variation in price that can be explained by the performance traits indicated. For example, in Chester White boars there was a \$13.24 decrease in price for each day increase in age at final weight, and there was a \$63.33 decrease in price for each .1 in. increase in backfat thickness. Variation in these two traits explained 44 percent of the variation in the price of Chester White boars. All the regression coefficients are in the desired direction except for loin eye area in Yorkshire boars. Performance traits do not explain more than half of the variation in selling price in any breed.

A rather crude ranking of the traits can be obtained through these analyses (Table 3). These rankings indicate very little pattern except that one of the two measures of growth (age at final weight or average daily gain) generally had quite an important effect on selling price.

Both the sale order and the physical appearance of the boars may have had a profound effect on these results. Selling the boars in order of some performance index highlights the boars that are superior, but it may also inflate the price of the highest performing boar because of a desire to own the winner of the test. Certain boars have physical characteristics which may either lead or mislead a buyer at sale time. The extent to which visual appraisal was used to determine a boar's price is unknown but was probably quite large. In addition to these, certain breeders and lines of breeding may have a large impact on selling price of a boar.

Table 2. Partial regressions^a of sale price on various performance traits

Breed	Age at Final wt (\$/day)	Performance traits				R^2 ^b
		Average daily gain (\$/.1 lb)	Pen feed efficiency (\$/.1 unit)	Backfat thickness (\$/.1 in)	Loin eye area (\$/.1 in. ²)	
Chester White	-13.24**			-63.33**		.44
Duroc	-4.0*	22.84*	-18.91**	-68.24**		.42
Hampshire		70.10**		-61.34**	13.35*	.38
Spot		56.95**				.28
Yorkshire		58.99**	-56.73**	-18.15**	-14.35**	.47

^aChange in price per unit of change indicated for each trait.

^bProportion of variation in price accounted for by traits having coefficients for that breed.

* $P < .05$.

** $P < .01$.

Table 3. Ranking of five performance traits in order of their importance as contributors to sale price

Breed	Age at final wt	Performance traits			
		Average daily gain	Pen feed efficiency	Backfat thickness	Loin eye area
Chester White	1	4	3	2	5
Duroc	2	4	3	1	5
Hampshire	4	1	5	2	3
Spot	5	1	4	3	2
Yorkshire	5	1	2	4	3