A Preliminary Study of Growth Characteristics in Purebred and Crossbred Sired Pigs

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Story in Brief

Purebred and crossbred boars were mated to crossbred females involving the Duroc, Yorkshire, Spot and Landrace breeds. Breeds of sire (BOS) were compared for feed efficiency, average daily gain (ADG) and feed per day.

A significant year-season by BOS interaction was found for feed efficiency (pounds of feed per pound of gain). In two seasons there were essentially no differences in feed efficiency between the sire groups, while in the second and third season differences were significant.

Duroc sired pigs had the greatest ADG (1.516 lb/day) while pigs from Yorkshire, Crossbred, Spot and Landrace sires gained 1.508, 1.473, 1.458 and 1.432 lb/day, respectively.

Differences in average feed consumption were small, ranging from 4.637 and 4.805 lb of feed per day. As a whole, there were essentially no differences in efficiency, ADG or consumption between crossbred and purebred sired pigs.

Introduction

In 1976, a project was initiated to evaluate the performance of Duroc, Yorkshire, Landrace and Spot breeds as pure breeds and in two-, three- and four-breed crosses. The objectives of the project were to identify mating systems that maximize production efficiency and investigate the effects of crossbred boars.

Previous work at the Oklahoma Agricultural Experiment Station has suggested a higher conception rate and greater libido for crossbred over purebred boars. However, very little information is available on the effects of a crossbred sire on the growth and feed efficiency of offspring through the finishing period. Therefore, this report is a brief summary of growth and efficiency data collected from pigs born during fall '77, spring '78, fall '78 and spring '79 seasons.

Experimental Procedure

Crossbred and purebred seedstock were produced at the Stillwater Experimental Swine Farm by mating purebred males and females of Duroc, Yorkshire, Spot and Landrace breeding in all possible combinations. The crossbred and purebred boars were raised in open front confinement barns with concrete floors. Boars with the highest index based on age and backfat thickness were selected to be used in the second phase of this experiment. The selected boars, three from each breed group every season, were then transported to the Southwest Livestock and Forage Research Station (SLFRS) to be used in the production of three-breed and four-breed offspring the following season.

At SLFRS, offspring were produced from the matings of purebred and crossbred boars with crossbred females of different breeding. Pigs were placed in confinement barns with concrete floors at approximately 8 weeks of age and removed at a final weight of 220 lb. Offspring of similar age and weight were penned together based on the breed of sire in order that feed efficiency and rate of gain could be calculated for offspring of each sire breed. During the four seasons a total of 61 pens with four-breed cross pigs and 113 pens with three-breed cross pigs were utilized in comparisons.

Results and Discussion

Total gain, total feed consumed and total days on test were obtained for each pen. Statistical analysis of these data indicated no significant differences in ADG or in feed consumed per day due to the BOS (Table 1). However, the year-season of the test period was significant for both traits (Table 2). It should be noted that during the first season of the experiment there was Atrophic Rhinitis in the herd and this may have had a large effect on the results. Both ADG and feed intake may be reduced by poor herd health.

A significant year-season by BOS interaction was found for feed efficiency (Table 3). This simply says that there was a reversal in ranking of the sire groups between different year-season or a change of magnitude in the differences of sire group means between year-seasons. Within the first and last seasons there were no significant differences between sire group means. However, within the seasons 1978-1 and 1978-2, differences between sire groups were significant. In season 1978-1, the efficiency of the Duroc sire group was significantly better than that of the Spot, Landrace and Crossbred groups, while in 1978-2 the Duroc group was significantly better than the Yorkshire sire group only. This interaction may, in part, be caused by differences in the sampling of the breeds. This may indicate that selection of specific sires within a breed may be more important than the breed itself.

During the last three seasons the Duroc sired pigs were more efficient than the others, although these differences were not statistically significant. In the first season, that in which the greatest health problem existed, the Landrace group was most efficient. An explanation is not apparent since it is not known whether disease affects all crosses in the same way or whether some of the breed crosses had greater contact with the disease.

Another significant factor contributing to differences in feed efficiency was the barn in which the pigs were fed during the growing-finishing period. Two barns were utilized to handle all pigs in each season. The barns were of equal size, but one had smaller pens with more pens per barn and fewer pigs per pen. This barn also had a better ventilation system. Since feeder space was not limiting in either barn, the difference in feed efficiency was probably due to the difference in environment. Pigs in the barn with the better air flow system required an average of 3.158 pounds of feed per pound of gain while pigs in the other barn required a significantly greater amount of feed (3.221 lb) per pound of gain.

In general, when comparing all three-breed crosses to all four-breed crosses, there were no significant differences in feed efficiency, ADG or feed consumption per day. It is concluded that the use of a crossbred sire, being mated to a female of a different breed, will have no detrimental effect on the growth traits.

Upon completion of the final season, a complete analysis will be done on all aspects of this project. These data will then provide additional information to aid in selection of specific mating systems and the utilization of breeds available.

Table 1. Average growth rate and feed consumption of three- and four-way cross barrows and gilts grouped by breed of sire.

Sire Breed	No. of Pens	ADG	Feed/day
Duroc	29	1.516	4.688
Yorkshire	26	1.508	4.805
Spot	27	1.458	4.637
Landrace	31	1.432	4.639
Crossbred	61	1.473	4.693
Purebred	113	1.477	4.690

Table 2. Average growth rate and feed consumption of three- and four-way cross barrows and gilts grouped by the year and season of birth.

Year-Season*	ADG	Feed/day
1977-2	1.368$^{(a)}$	4.405$^{(a)}$
1978-1	1.595$^{(b)}$	5.113$^{(b)}$
1978-2	1.469$^{(c)}$	4.599$^{(c)}$
1979-1	1.442$^{(c)}$	4.578$^{(a,c)}$

^{abc}Means in a column with different superscripts differ significantly ($P < .05$).
*Year-season of birth: Test period in the following season.

Table 3. Least square means for year-season by breed of sire for feed efficiency.

Sire Breed	Year-Season* 1977-2	1978-1	1978-2	1979-1
Duroc	3.213^{a}	3.036^{a}	3.064^{a}	3.139^{a}
Yorkshire	3.227^{a}	3.161^{ac}	3.243^{b}	3.213^{a}
Spot	3.262^{a}	3.307^{bc}	3.082^{a}	3.162^{a}
Landrace	3.175^{a}	3.362^{b}	3.174^{ab}	3.212^{a}
Crossbred	3.272^{a}	3.187^{bc}	3.101^{ab}	3.193^{a}

^{abc}Means in a column with different superscripts differ significantly ($P < .05$).
*Year-season of birth: Test period in the following season.