Variation in Efficiency of Hogs

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Two of the major factors contributing to efficiency of production of hogs are the rate of increase in live weight and the feed necessary to produce this gain. Record of performance results in Denmark and in the United States show great variability in both the rate and the economy of gains from weaning till marketable hogs are produced.

These variations are economically important. Overhead, labor, and interest costs are greater for the slower growing pig and generally a less desirable carcass results. There is also a close association of rate of gain with feed required per unit of gain, the

The data used were obtained in a swine improvement project conducted in cooperation with the Bureau of Animal Industry, U. S. Department of Agriculture.
faster growing pig usually requiring less feed per 100 pounds gain. Since the feed is a major item in the cost of production, one should consider the factors responsible for variations in feed requirements.

Such environmental factors as care and management, kind, quality, and amount of feed, sanitation, etc., are important in efficiency of production. It is the purpose of this circular, however, to report variations in rate and economy of gains which are due to differences in breeding in hogs handled under the same environmental conditions and to show the importance of these genetic variations in improvement of swine by breeding and selection.

**Regional Swine Breeding Laboratory**

Investigators in the Bureau of Animal Industry, United States Department of Agriculture and the State Agricultural Experiment Stations in the corn-hog region recognized the need for improving swine with the result that a regional laboratory has been established through the cooperative efforts of the agencies mentioned. The Missouri Agricultural Experiment Station is a cooperating station.

The primary object of the laboratory is to improve swine through breeding methods. The principal technics used to date have been selection and inbreeding and the use of inbred stock for top-crossing and cross breeding to secure greater production is showing considerable promise.

It is recognized that the improvement of swine through breeding is a long time operation. However, the data secured with animals in this improvement project are already contributing useful information to hog producers (see Mo. Bul. 461) and it is believed that a project report on variations observed should indicate to breeders the importance of breeding and selection in securing more efficient animals.

**Results**

1. **A comparison of inbred lines.**

The Missouri Station has developed three inbred lines of Poland Chinas: Line I was established from breeding animals in the college breeding herd, Line II was established by combining thick, easy feeding stock with moderately rangy stock of different breeding, and Line III had foundation stock based primarily on its reputation for farrowing and raising large litters. The three lines were not related.

A representative group of Line I gilts is shown in Figure 1, a boar used in this line in Figure 3 (top), and a six-months-old hog ready for market in Figure 4 (top). The weight at 6 months was
210 pounds, and the feed required per 100 pounds gain from weaning to market was 345 pounds for all hogs in this line.

A representative group of Line II gilts is shown in Figure 2 (upper), a herd boar used in this line in Figure 3 (middle) and a six-months-old hog, ready for market in Figure 4 (middle). The weight at 6 months was 215 pounds and the feed per 100 pounds gain from weaning to market was 342 pounds for all hogs in this line.

A group of Line III gilts is shown in Figure 2 (lower), a herd boar used in this line in Figure 3 (lower) and a six-months-old hog in Figure 4 (lower). The weight at 6 months was 194 pounds and the feed per 100 pounds gain from weaning to market was 371 pounds.
Figure 3. Top. Line I boar.
       Middle. Line II boar.
       Lower. Line III boar.
Figure 4. Top. Inbred Line I fat hog. The average weight at 6 months = 210 lbs. and the feed per 100 pounds gain = 345 lbs.

Middle. Inbred Line II fat hog. The average weight at 6 months = 215 lbs. and the feed per 100 lbs. gain = 342 lbs.

Lower. Inbred Line III fat hog. The average weight at 6 months = 194 lbs. and the feed per 100 lbs. gain = 371 lbs.
In all three lines some hogs were fed on pasture and some were fed in dry lot. The data on each line includes all hogs produced.

From the photographs, data giving the rate of gains, and the feed per unit of gain it can be seen that Line II was the most efficient and Line III the least efficient.


A line-cross I X II six-months-old hog ready for market is shown in Figure 5 (top). The average weight at 6 months was 215 pounds and the feed per 100 pounds gain from weaning to a marketable weight (225 pounds) was 359 pounds.

A line-cross I X III six-months-old hog is shown in Figure 5 (middle). The average weight at 6 months was 195 pounds and the feed per 100 pounds gain from weaning to market was 385 pounds.

A line-cross II X III six-months-old hog is shown in Figure 5 (lower). The average weight at 6 months was 222 pounds and the feed per 100 pounds gain from weaning to market was 376 pounds.

The data on the line-cross pigs include all pigs in each combination and, while again both pasture and dry lot feeding was practiced, a greater proportion of these pigs were fed in dry lot than in the case of the inbred pigs. This probably accounts, in part, for the greater feed requirements in the line-cross pigs.

The photographs, rate of gain, and feed required per unit of gain show that the Line II combined favorably with other lines. The combination of the two less desirable inbred lines (I X III) gave very poor results.
Figure 5. Top. Line-cross I X II fat hog. The average weight at 6 months = 215 lbs. and the feed per 100 lbs. gain = 359 lbs.

Middle. Line-cross I X III fat hog. The average weight at 6 months = 195 lbs. and the feed per 100 lbs. gain = 385.

Lower. Line-cross II X IIII fat hog. The average weight at 6 months = 222 lbs. and the feed per 100 lbs. gain = 376 lbs.
3. A comparison of lines for crossbreeding.

Inbred boars in each of the 3 lines were mated to Hampshire sows which were also inbred. The data on the cross-bred pigs include all pigs by boars of each line, some fed on pasture and some fed in dry-lot. Again a greater proportion of the cross-bred pigs were fed in dry lot and this may, again partially, explain the greater feed requirement for the cross-bred pigs.

A crossbred (I X Hampshire) six-months-old hog ready for market is shown in Figure 6 (upper). The average weight at 6 months was 255 pounds and the feed per 100 pounds gain from weaning to marketable weight (225 pounds) was 390 pounds.

A crossbred (II X Hampshire) 6 months old hog ready for market is shown in Figure 6 (middle). The average weight at 6 months was 256 pounds, and the feed per 100 pounds gain from weaning to market was 420 pounds.

A crossbred (III X Hampshire) 6 months old hog is shown in Figure 6 (lower). The average weight at 6 months was 202 pounds and the feed per 100 pounds gain from weaning to market was 423 pounds.
Figure 6. Upper. Crossbred, Line I X Hampshire fat hog. The average weight at 6 months = 255 lbs. and the feed per 100 lbs. gain = 390 lbs.

Middle. Crossbred, Line II X Hampshire fat hog. The average weight at 6 months = 256 lbs. and the feed per 100 lbs. gain = 420 lbs.

Lower. Crossbred, Line III X Hampshire fat hog. The average weight at 6 months = 202 lbs. and the feed per 100 lbs. gain = 423 lbs.
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Discussion

All pigs in this project were self fed, either on pasture or in dry lot. Observations have revealed that the faster growing pigs have a greater appetite particularly for grain feeds. When fed on pasture, the pigs from the thriftier and faster growing lines ate more grain and less pasture; whereas, the slower growing pigs grazed more and ate less grain, particularly at the younger ages. The Line III pigs, for example, grew slowly and ate little grain in early feeding on pasture but after they reached a weight of 125 pounds to 150 pounds ate greater quantities of grain and then gained as rapidly as younger pigs of the same weight in other lines. When these slower growing pigs (Line III) are fed in dry lot they are much less economical in feed utilization than pigs in Lines I or II or than pigs in this line fed on pasture. When fed on pasture the slower growing pigs (Line III) are as economical in feed utilization as pigs in the faster growing lines.

In the data (pictures) presented on individual merit, rate of gain, and feed required per 100 pounds gain, one observes considerable variability. Some lines are superior to others and some lines combine with other lines and other breeds to a better advantage than do others. The Line II in this project is the best inbred line, and it combined more favorably with other lines and with the sows of the Hampshire breed. From these data one might assume that the better inbred lines may be more useful in top-crossing or cross breeding for improvement.

Perhaps the most encouraging part of the study is that the faster growing pigs, which are also more economical in feed utilization, make more desirable butcher hogs than slower growing ones. Since there are differences in individual merit, rate of gain, and economy of feed utilization which are genetic in nature, these characteristics should be carefully considered in the selection of breeding animals.
Summary and Conclusions

Pigs in Line II grew more rapidly, required less feed per unit of gain, and were more desirable butcher hogs than pigs in Lines I and III and Line I was superior to Line III in these respects.

Line II combined more favorably with other lines and sows of another breed than Lines I and III and Line I was superior in this respect to Line III.

It appears that the desirability of the inbred line may be an indication of its merit for use in top-crossing and cross breeding.

The pigs that grew more rapidly were economical in feed utilization and were superior as butcher hogs.

Since considerable variation of a genetic nature exists in rate of gain, economy of feed utilization, and merit of the fat hogs for slaughter, these characteristics should receive careful consideration in selecting breeding animals.