

AGRICULTURAL EXPERIMENT STATION
of The Alabama Polytechnic Institute, Auburn, Ala.
E. V. SMITH, Director

BREEDING MEAT-TYPE HOGS for ALABAMA

C. D. SQUIERS, Associate Animal Breeder

W. D. SALMON, Animal Nutritionist



THE PREFERENCE of present day consumers for lean pork is generally recognized. The scarcity of acceptably lean pork in the markets is probably the major reason for the failure of pork to keep pace with the increased per capita consumption of beef and broiler meat in recent years. There is a critical need, therefore, for leaner type hogs than the average hogs now being marketed in the United States. Efficient and profitable production of such hogs requires that they possess inherent characteristics for satisfactory litter size, suckling ability in the sows, and rate and economy of gain in the pigs as well as leanness of carcass.

Methods for producing such hogs are being investigated at the Agricultural Experiment Station of the Alabama Polytechnic Institute in a hog breeding project started in 1951. These studies are far from complete. Nevertheless, results have been obtained that can be used by hog producers to improve carcass quality and increase efficiency of producing market hogs. A discussion of these results along with certain results from other experiment stations is presented in this report.

Comstock and associates (1) proposed a method for the improvement of corn called "recurrent reciprocal selection," which was designed to increase the combining ability of non-related lines by measuring the performance of their first-cross progeny. This method would, in theory, make possible the production of a superior hybrid without the expensive procedure of forming, testing, and discarding hundreds of inbred lines. It was

decided to employ the basic principles of this method in a hog breeding program. The Landrace breed seemed a good possibility for this program because of its low relationship to most American breeds, if the white color was not too great a problem.

RESULTS

A group of Landrace × Hampshire gilts tried at this station had unusually good first litter performance. They farrowed an average of 12.1 pigs, and raised 9.6 to an average litter weight of 341.1 pounds. Based on these results, the decision was made to try boars of various breeds on this group of sows for (1) identifying a third breed that might cross well with Landrace × Hampshire sows, and (2) obtaining more information on performance of the sows themselves.

In these tests an effort was made to use representative boars from each breed tried, including Berkshire, Tamworth, Poland China, Duroc, Yorkshire, and Landrace. The Duroc-Poland China boars were production tested boars from a line initiated at this Station by crossing purebred Durocs with purebred Poland Chinas and selecting from within. Growth information on the various crosses is given in Table 1.

In the first three seasons, growth information was obtained with pigs grazing Ladino clover pasture and having access to self-feeders plus adequate shade and water. Concrete test pens

TABLE 1. WEIGHT FOR AGE OF PIGS FROM LANDRACE \times HAMPSHIRE SOWS CROSSED WITH BOARS OF DIFFERENT BREEDS, 1953-55

Season	Breed of sire	Number of boars	Number of pigs	Mean 154-day weight	Significant differences
		Number	Number	Pounds	
Fall 1953 ¹	Duroc-Poland China	2	30	156.8	Berkshire over Tamworth and Duroc-Poland China. Tamworth over Duroc-Poland China.
	Berkshire	1	34	176.3	
	Tamworth	2	49	164.1	
Spring 1954 ¹	Duroc-Poland China	2	52	169.8	None
	Poland China	2	28	161.9	
	Berkshire	1	31	170.0	
	Tamworth	2	14	173.1	
Fall 1954 ¹	Poland China	2	26	160.7	None
	Berkshire	2	37	152.6	
	Landrace	2	21	156.9	
Spring 1955 ²	Poland China	2	45	216.0	Poland China over Berkshire and Yorkshire. Berkshire over Yorkshire.
	Berkshire	2	30	201.0	
	Yorkshire	1	25	184.0	
Fall 1955 ²	Poland China	2	18	214.0	Poland China and Duroc over Berkshire.
	Duroc	2	18	215.0	
	Berkshire	2	18	186.0	

¹/ Fed on pasture.
²/ Fed in concrete pens.

were used in the last two seasons, the pigs being self-fed and self-watered. Data on all pigs raised in each breeding group in the first four seasons are included. Little difference was noted in 154-day weights of pigs sired by Berkshire, Poland China, Tamworth, or Landrace boars in the first three seasons. In the 1955 spring test, pigs sired by Poland China boars were heavier at 154 days than those sired by either Berkshire or Yorkshire boars, while pigs sired by Berkshire boars were heavier than those by Yorkshire boars. In the

1955 fall test, pigs sired by Poland China and Duroc boars were approximately equal in weight at 154 days and were heavier than those by Berkshire boars. It is pointed out, however, that the 18 Berkshire-cross pigs tested were from gilt litters and averaged only 33.6 pounds at the beginning of the trial as compared with 43.5 pounds for Poland China crosses and 44.4 pounds for Duroc crosses.

The performance of Landrace \times Hampshire sows was highly satisfactory. Data for all litters

TABLE 2. CARCASS DATA OF THREE BREED CROSSES, SUMMER AND WINTER, 1955 (SPRING AND FALL PIGS)

Item	Summer, 1955			Winter, 1955	
	BLH ¹	PLH ²	YLH ³	DLH ⁴	PLH ²
Carcasses, number	28	44	18	18	14
Cuts, per cent chilled carcass weight					
Ham	18.51	18.28	18.05	16.62	17.83
Loin	15.25	13.75	14.33	13.00	13.48
Shoulder	16.50	15.74	15.39	14.68	15.00
Bacon	14.03	14.02	14.20	11.74	11.20
3 lean cuts	50.26	47.77	47.77	44.30	46.31
4 primal cuts	64.29	61.79	61.97	56.04	57.51
Average backfat thickness, inches	1.42	1.53	1.65	1.56	1.39

¹/ Berkshire \times (Landrace \times Hampshire).
²/ Poland China \times (Landrace \times Hampshire).
³/ Yorkshire \times (Landrace \times Hampshire).
⁴/ Duroc \times (Landrace \times Hampshire).

produced by the original group of 16 is given below:

<i>Number of litters</i>	<i>Number farrowed</i>	<i>Number weaned</i>	<i>56-day litter weight</i>	<i>56-day pig weight</i>
65	12.8	9.0	373 lb.	41.8 lb.

Carcass information was obtained during two seasons through the cooperation of a local packing house, Table 2, and limited observations of carcass quality were made in other seasons.

Carcass quality of pigs from Landrace × Hampshire sows sired by Berkshire boars was outstanding. This was true both in terms of yield of cuts and from the viewpoint of lean-fat composition of the cuts. Poland China boars ranked second to Berkshires in carcass quality of their progeny from Landrace × Hampshire dams. Carcass quality and type of pigs sired by boars of the other breeds tried were somewhat less desirable than Berkshire or Poland China sired pigs. Pigs sired by Duroc and Yorkshire boars were fatter and those by Tamworth sires lighter in ham than was desired. The fatness of carcasses from Duroc crosses was expressed not only in thicker backfat, but also in excessive trim from primal cuts and in a high ratio of fat to lean in the cuts themselves. This finding was discouraging in view of the rapid growth rate of Duroc crosses. Data from other stations, however, indicate that the finding is reasonable and probably should have been expected.

RESULTS from OTHER STATIONS

The Oklahoma Agricultural Experiment Station (2) reported in 1954 that among the hogs sampled, outbred Durocs had 35.7 per cent, line-cross Durocs 35.0 per cent, and Duroc × Poland China crosses 38.2 per cent of lean cuts expressed as a proportion of slaughter weight. Carcass quality was improved by breeding the Duroc sows to Poland China boars, as compared with straight Durocs. In a test at the Oklahoma Station (3) conducted in 1951, carcasses from purebred Durocs averaged 2.05 inches of backfat and yielded \$18.30 worth of primal cuts per 100 pounds live weight, whereas those from Duroc crosses averaged 1.68 inches of backfat and yielded \$18.78 worth of primal cuts per 100 pounds live weight. In the Oklahoma study the crossbred pigs were sired by Montana No. 1, Hampshire, Poland China, and Minnesota No. 1 boars. All boars except the Minnesota No. 1 improved carcass quality over

straight Durocs. The Oklahoma Station (4) reported a test in 1953 in which carcasses of purebred Durocs averaged 1.83 inches of backfat and had a value of \$22.31 per 100 pounds live weight. In the same test, carcasses of Landrace-Poland China crosses averaged 1.45 inches of backfat and had a value of \$24.12 per 100 pounds live weight.

A comparison of purebred Durocs with several kinds of Duroc crosses was reported in 1952 by the Oklahoma Station (5). The crosses were sired by Landrace, Poland China, Chester White, and Minnesota No. 2 boars. Carcasses from purebred Durocs averaged 1.95 inches of backfat and yielded \$18.78 worth of primal cuts per 100 pounds live weight, whereas the crosses averaged 1.60 inches of backfat and yielded \$19.52 worth of primal cuts per 100 pounds live weight. In this experiment also, carcass quality of the pigs was better when Duroc sows were bred to boars of other breeds than when they were bred to Duroc boars.

In a Missouri Agricultural Experiment Station study (6) published in 1950, carcass information was given on purebred Durocs, purebred Poland Chinas, purebred Hampshires, and their crosses. In this study, in addition to yield of cuts and other carcass components the cuts were scored for quality. After adjustment for quality, carcass yields were expressed as the equivalent amount of loin produced per 100 pounds live weight. On this basis purebred Hampshires yielded 51.42, Hampshire × Poland China crosses 49.04, Duroc crosses 47.94, purebred Poland Chinas 47.92, and purebred Durocs 42.79 pounds of adjusted loin equivalent per 100 pounds of live weight. The purebred Durocs ranked last in carcass quality primarily because of low yield of loin, ham, and shoulder and because of a high ratio of fat to lean in these cuts. In a similar study at the Missouri Station (7) in 1952, purebred Hampshires yielded 51.8, purebred Landrace 51.3, purebred Poland Chinas 48.0, and purebred Durocs 46.8 pounds of adjusted loin equivalent per 100 pounds live weight. Duroc carcasses were low yielders in this test also, because of the low proportion of lean cuts and because of the high ratio of fat to lean in these cuts. In this same test, Landrace-Poland China crosses yielded 49.7, Landrace-Hampshire crosses 49.5, Landrace-Duroc crosses 49.0, and Duroc-Poland China crosses 47.6 pounds of adjusted loin equivalent per 100 pounds live weight. The Duroc-Poland China crosses were low in carcass quality, largely because of a high

proportion of fat to lean in the ham, loin, and shoulder.

The South Dakota Agricultural Experiment Station (8) in 1947 reported on a comparison of carcasses from purebred Durocs with those of 4 Poland China groups of different breeding. The Poland China groups averaged 1.52 inches of backfat, as compared with 1.90 inches for Durocs. The loin area for Poland Chinas was 4.27 inches and 3.40 inches for Durocs. Poland Chinas yielded 47.4 pounds and Durocs 43.7 pounds of lean cuts per 100 pounds live weight.

FUTURE PLANS

Plans for the future, based on results of this study, include use of a line of Landrace, a line of Hampshires, and a third line, not definitely determined, in a selection program designed to progressively improve cross performance. The outline of this program is as follows:

1. Reciprocal matings of Landrace and Hampshire will be the first step.
2. Measures of performance of test-cross Landrace × Hampshire litters will include: (a) growth rate, (b) feed efficiency, (c) carcass quality, and (d) reproductive and suckling abilities of gilts.
3. Landrace × Hampshire gilts will be mated to boars of the third line.
4. Performance of test-cross litters will determine which boars and sows are chosen to reproduce the pure Landrace and Hampshire lines.
5. Performance of test-cross litters from step 3 will determine which boars are used to reproduce the third line.
6. Selection in the next generation and following generations will involve the same procedure.
7. Selection of boars and gilts to produce test-cross litters will be based on individual performance and type.

CONCLUSIONS

Although this study is incomplete, certain conclusions are justified from results obtained to date:

1. The Landrace × Hampshire sows of this study were outstanding producers in terms of reproductive, mothering, and milking ability.
2. A high proportion of meat-type pigs was produced by sows of this breeding and these pigs

grew well, easily reaching market weights at 5 to 6 months of age.

3. Among the crossbred pigs from Landrace × Hampshire sows, those sired by Berkshire boars produced the greatest proportion of high quality carcasses. These carcasses were outstanding in terms of yield of cuts and from the viewpoint of a high ratio of lean to fat in the cuts.

4. Results of this study indicate that a producer who has lard-type hogs might quickly shift to producing meatier pigs through systematic use of selected boars of Landrace, Hampshire, and Berkshire breeding. A logical procedure would be: (1) breed the sows he now has to a purebred Landrace boar, (2) save replacement gilts from this cross and breed them to a Hampshire boar, (3) save replacement gilts from this cross and breed them to a purebred Berkshire boar, and (4) continue to rotate boars in the order listed, saving gilts of each generation. It is stressed that such a program will be effective only if good, meat-type boars of each of the three breeds are used. Each boar used should be chosen on the basis of the size of litter from which he came, number and 56-day weights of pigs weaned in that litter, his own weight for age, and the thickness of his backfat at 200 pounds.

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