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M. C. Heck

University of Arkansas, Fayetteville

E. S. Ruby

University of Arkansas, Fayetteville

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CARCASS QUALITY OF INBRED AND CROSSBRED
UARK POLAND CHINA SWINE

M. C. HECK and E. S. RUBY
University of Arkansas

A basic problem confronting the swine breeder is obtaining an ideal animal—one that grows rapidly and consumes feed efficiently, giving a dressed carcass with a large percentage of lean and a minimum amount of fat. The ham, loin, picnic shoulder, and Boston butt comprise the four lean cuts of a pork carcass. Because they are the most valuable cuts, they receive special attention. The depth of the fat on the pork carcass wields considerable influence on the wholesale cuts yielded by the carcass. Scott (1930) found that as the depth of the fat increased the lean and bony cuts decreased. The longer carcass feels the effect of the fat covering less.

Hankins and Ellis (1934) found correlation of .84 between the percentage fat in the total edible portion of the carcass and the average back fat in millimeters. Dickerson, *et al.*, (1943) found that external conformation was more apt to indicate a difference in fat thickness and length of bone and muscle thickness. Consequently, they were less accurate in predicting cut out value.

EXPERIMENTAL PROCEDURES

In 1949-50 a total of 70 weanling pigs of both inbred UArk Poland China and crossbred UArk Poland China pigs were dry lot fed a ration of corn and a protein supplement free choice. They were grouped according to breeding and all were fed the same ration. The pigs were fed to a weight of approximately 225 pounds. One pig, considered average of its group, was slaughtered and carcass measurements were taken to determine which were the most desirable carcasses, according to the breeding of the swine. The breeding of the 14 groups is shown in Table I.

The 14 carcasses which were studied came from pigs of the Arkansas Agricultural Experiment Station Inbred Poland China swine herd, the Iowa Agricultural Experiment Station Inbred Poland China swine herd, the Missouri Agricultural Experiment Station Inbred Poland China and Hampshire swine herds, and the Minnesota Agricultural Experiment Station swine herds. A brood sow captured in the mountains near Mena, Arkansas, was identified as a UArk wild hog. These wild pigs had wattles and were similar to small bone Poland China and Black Essex hogs.

The carcass data and measurements were taken on the slaughtered animals. The data and measurements are shown in Table II, which also gives information on Group A, the most desirable carcass, and Group N, the least desirable carcass, according to Dickerson's Index.

Dickerson (1946) constructed an Index for determining carcass scores. The formula follows:

$$\text{Index} = (\text{Yr}) + (.4\text{P} + .4\text{L} + .2\text{H} - .5\text{B} - 1.5\text{V}).$$

Y - Yield of wholesale cuts in percentage of shrunk live weight.

r - Relative price, based on the average of the Chicago weekly quotations for the five-year period, 1937-41 inclusive.

$$\text{P} - \text{Ham plumpness index } \left(\frac{\text{ham circumference} \times 100}{\text{ham length}} \right).$$

L - Loin eye muscle index (width x depth of eye muscle).

H - Ham muscle index (width x depth of lean on ham face).

B - Deviation of sum of the backfat thickness from optimum

$$\text{B} = 4.5 - \frac{(\text{weight} - 210)}{40}.$$

V - Backfat range (difference between thickest and thinnest backfat measurement).

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CARCASS QUALITY OF INBRED AND CROSSBRED SWINE

33

Table I. The Breeding of Swine used in Carcass Measurement Studies During 1949 and 1950.

Group	Breeding of		Inbreeding coefficient or Fx		
	Sire	Dam	Sire	Dam	Litter
A	UArk Poland 48-88	UArk Poland 48-60	.5821	.5115	.5115
B	UArk Poland 49-41	UArk Poland 49-350	.6521	.6521	.6225
C	Iowa Poland AX 4090-48S	UArk Poland 48-73	.0000	.5731	.0000
D	UArk Poland 49-215	UArk Poland 49-263	.6521	.6521	.6857
E	Missouri Poland 608-LII	UArk Poland 49-35	.4118	.5821	.0000
F	UArk Poland 48-128	UArk Poland 48-126	.5043	.5043	.6135
G	UArk Wild 48-5-Wild	UArk Wild (Watkins)	.0000	.0000	.0000
H	Missouri Hampshire 269-1M	UArk Chester Poland Cross 49-CP-342	.3436	.0000	.0000
I	Missouri Hampshire 269-1M	UArk Poland 49-33	.3436	.0000	.0000
J	UArk Poland 49-31	Minnesota No. 1 Wild Cross 49-MW-22	.4560	.0000	.0000
K	Missouri Hampshire 269-1M	UArk Chester Poland Cross 49-CP-340	.3436	.0000	.0000
L	Minnesota No. 1 S. E. E. 762	UArk Poland 48-121	.0000	.5043	.0000
M	UArk Chesterwhite 48-C-53	UArk Poland 48-124	.0000	.5043	.0000
N	Minnesota No. 1 S. E. E. 762	UArk Wild 48-1-Wild	.0000	.0000	.0000

Table II. Carcass Data of the Most Desirable and the Least Desirable Carcass.

	Group	
	A (good)	N (poor)
<i>Dressing per cent</i>	65.19	73.58
Back fat thickness (inches):		
Over first rib	1.50	2.50
Over last rib	1.00	2.50
Over last lumbar vertebra	1.25	2.00
Average thickness	1.25	2.33
Five primal cuts (<i>per cent of total carcass</i>)		
Hams	19.57	15.00
Loins	15.94	10.63
Butts	7.61	5.00
Picnics	9.78	6.88
Bellies	11.23	14.69
<i>Five primal cuts - total</i>	64.13	52.20
<i>Four lean cuts - total</i>	52.90	37.51
Carcass measurements (inches):		
Length (aitch bone to first rib)	28.50	28.37
Depth (spinal canal to breast bone)	8.25	8.00
Width of shoulder	5.00	4.50
Width of ham	6.00	5.50
Plumpness of ham	32.50*	19.75
Length of ham	13.25	12.50
Length of hind leg	20.75	20.25

* Very plump hams.

The relative values given the various cuts in this formula included loin 1.0, ham .93, shoulder .80, belly .80, fat trim .35, and lean trim .53 (James, 1948).

Dickerson's formula was modified for this data because of lack of information about obtaining the loin eye muscle index, the ham muscle index, and the lean and fat trim.

Table III. The Rank of 14 Different Poland China Matings in Carcass Quality.

Group	Rank	Index Value	Breeding	
			Sire	Dam
A	1	63.92	UArk Poland	X UArk Poland
B	2	61.46	UArk Poland	X UArk Poland
C	3	61.25	Iowa Poland	X UArk Poland
D	4	60.02	UArk Poland	X UArk Poland
E	5	59.92	Missouri Poland	X UArk Poland
F	6	57.72	UArk Poland	X UArk Poland
G	7	57.51	UArk Poland X Wild	X UArk Poland X Wild
H	8	57.46	Missouri Hampshire	X Chester White X UArk Poland
I	9	57.44	Missouri Hampshire	X UArk Poland
J	10	56.81	UArk Poland	X Minnesota No. 1 X Wild
K	11	54.97	Missouri Hampshire	X Chester White X UArk Poland
L	12	52.71	Minnesota No. 1	X UArk Poland
M	13	52.44	Chester White	X UArk Poland
N	14	49.13	Minnesota No. 1	X UArk Wild

RESULTS

This study of carcass quality as indicated by yield of wholesale cuts in percentage of shrunk live weight, plumpness of ham, length of ham, and size of ham muscle face along with back fat thickness, proved valuable in testing the UArk Inbred Poland China swine breeding program. The UArk line of Poland China swine nicks well with other breeds. Table III shows the rank of the different matings.

SUMMARY

The most valuable carcass was obtained when the UArk Poland China swine herd line was crossed. The Index value was 63.92. This carcass came from a pig sired by UArk 48-88 with a coefficient of inbreeding of .5821. The dam, UArk 48-60, had an Fx of .5115. The pig had an Fx of .5115.

The second most valuable carcass was obtained from a crossing of two UArk Inbred Poland China Swine. The sire, UArk 49-41, had an Fx of .6521 and the dam, UArk 49-350, had an Fx of .6521. The carcass came from a pig with an Fx of .6225. The top six placings were all pure bred Poland China swine.

An Iowa Poland China inbred sire produced the third most valuable carcass. A Line II Missouri Poland China produced the fifth best carcass. Of all the carcasses studied the UArk Poland China swine herd produced four out of the top six.

The program of swine improvement at the University of Arkansas has developed a line of purebred Poland China swine with superior carcass quality.

CARCASS QUALITY OF INBRED AND CROSSBRED SWINE

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