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Systematic Rotational Crossbreeding

J. W. McCarty

A rotational crossbreeding program has been a part of this stations swine breeding project since the first crossbred litters were produced in 1947. The first seven generations included inbred lines of four breeds--Hampshire, Poland China, Duroc and Landrace used in that order. Except for the initial cross when Hampshire gilts were mated to Poland China boars, each breed was brought in in its turn by the use of boars. Two cycles were completed using these four breeds.

At the end of the 1953 season, the available crossbred gilts were divided into two as near equal groups as possible. These groups were moved to the North Central Substation at Eureka and the Newell Field Station. They are used as demonstration herds for commercial hog production. The crossing program has continued using boars from inbred lines of the Duroc, Hampshire and Yorkshire breeds maintained at Brookings. As nearly as possible, the breeding program at the two stations has been kept the same.

All litters are spring farrowed by gilts in central farrowing facilities. Sows and litters are moved to pasture as soon after farrowing as is practical. Gilts are removed at the 56 day weaning age, and the pigs are left to finish at desirable market weights of 200 to 210 pounds. Samples of the barrows are slaughtered for carcass test purposes. Replacement gilts and boars are selected on the basis of an index which emphasizes litter performance, and individual pig weight at five months, as well as live backfat measurements. Rations and other management follow current recommendations for good swine production. The basic growing-fattening ration has been shelled yellow corn and protein supplement, including antibiotics.

In the table which follows, a summary of performance for this rotational cross is shown for each station separately and combined for the five seasons 1954 through 1958. Pig crops those seasons were sired by inbred Hampshire, Duroc, Yorkshire, Hampshire and Duroc in that order. The crosses this season were sired by inbred Yorkshire boars and are the 13th crossbred generation.

Rotation Cross Performance Summary
Eureka and Newell Stations
1954 through 1958

Number Litters	Average Number Pigs			Average Pig Weights			Average Litter Weights		
	Far'd. Alive	56 Days	154 Days	Far'd. Alive	56 Days	154 Days	Far'd. Alive	56 Days	154 Days
<u>Eureka</u>									
77	10.9	9.6	9.5	2.9	39	193	31	375	1833
<u>Newell</u>									
78	10.2	8.3	8.1	3.0	33	168	30	286	1360
<u>Both Stations</u>									
155	10.5	8.9	8.8	2.9	34	181	31	301	1595

These data represent about 15 litters per station per season and totals of 1635, 1392 and 1365 pigs farrowed alive, weaned and at 154 days, respectively. Pigs reach desirable market weights at 165 days, or five and one-third months.

On the basis of these records, systematic rotation crossing is recommended as an efficient program for the production of slaughter hogs. Points of the program which should be emphasized are these:

- (1) Begin a crossing program with whatever gilts are available.
- (2) Choose boars of a breed which will complement the good performance characters of the sows.
- (3) Plan to maintain the crossing with up to three other breeds. More than that may cause confusion in keeping the cycle going. In any case use boars of some other breed than that which sired the gilts.
- (4) Use all available information in buying boars and selecting replacement gilts. The South Dakota On-the-Farm Selection program is a good, practical one to follow. Buy boars with testing or records behind them if possible.
- (5) A good breeding program deserves the opportunity to perform to its fullest, which sound feeding and management will provide. Hogs respond to good care.

Summary of Data from South Dakota Swine Evaluation Station Spring 1959

Twenty four breeders, representing 7 breeds, entered pens of 3 boars and one barrow all from one sire. The boars were from three different litters and the barrow was a litter mate of one of the barrows. Growth rate and feed efficiency were recorded on a full-fed mixed ration of corn and supplement. The boars were probed at approximately 200 pounds and the barrows were slaughtered at 200 pounds by John Morrell and Company. Summary of data of the boars and barrows are shown below in tables 1 and 2.

Table 1. Summary data of 72 boars entered Spring 1959.

	Spring 1959 Range	Spring 1959 Average	Winter 1958-59 Average	Spring 1958 Average
Average daily gain, lb.	1.37-2.27	1.82	1.89	1.86
Lbs. feed per lb. gain	2.47-3.13	2.89	3.31	3.00
Backfat probe, in.	0.90-1.48	1.09	1.10	1.22
Index *	96 -150	127	111	114
Sale Price	--	--	\$168.22	\$148.77

*Index calculated as follows: multiply rate of gain by 35 and add 260, subtract from this total the feed efficiency times 40 and the backfat times 75.

To be eligible for sale the boars had to gain at least 1.65 lbs. per day, require less than 3.25 lbs. of feed per lb. of gain, have less than 1.40 inches of backfat, and have an index of over 100. If a boar failed to meet any one of these factors he was not eligible for the sale. Ninety percent, (65) of the boars, entered qualified for the sale.

Table 2. Summary of data on 19 barrows. Winter - 1958-1959.

	Spring 1959 Range	Spring 1959 Average	Winter 1958-59 Average	Spring 1958 Average	Certification Requirements
Length, in.	28.5-33.1	29.7	28.8	29.4	28.5(minimum)
Backfat, in.	1.23-2.00	1.55	1.51	1.58	1.60(maximum)
Loin eye area, sq. in.	3.21-5.15	4.11	4.46	4.21	3.50(minimum)
Four lean cuts, percent	47.0-55.4	52.4	52.2	51.99	

Fourteen barrows met certification standards. Seven barrows were too fat, three were too short, and three did not have large enough loin eyes. Some of the barrows failed on more than one factor and that is why there appears to be more than 10 that failed to meet these standards.

Table 3 gives a summary of all the 24 pens. In this table the daily gain, probe and index are the average of the three boars. The efficiency(lbs. feed per 100 lbs. of gain) is the average of the pen including the barrow. The code for the barrow cutout is as follows: L - length in inches; B.F. - backfat in inches; L.E. - loin eye area at the 10th rib in sq. in. and L.C. - four lean cuts as a percent of chilled carcass weight.

Table 3. Summary of Pens of Pigs for Spring and Summer 1959
South Dakota Testing Station

Name & Address	Daily Gain	Feed Eff.	Ave. Probe of Boars	Ave. Index of Boars	Breed	L	Barrow Ave.	Cutout L.E. sq. in.	L.C. %
Alvin Ablen Groton, S.D.	1.71	2.79	1.04	130	Hamp	28.9	1.30	4.18	54.5
Arnold Anderson Bristol, S.D.	1.91	2.47	1.23	136	Duroc	29.2	1.53	3.56	53.8
Harold Anderson Chester, S.D.	1.69	3.13	1.09	112	Hamp	30.1	1.60	4.63	51.8
Kenneth Anderson RR #2 Mitchell, S.D.	1.69	2.99	1.08	118	Hamp	29.6	1.27	4.00	54.2
Clifford Anderton Alcester, S.D.	1.84	2.87	1.05	131	SPC	28.6	1.47	4.32	52.3
Robert Even Elkton, S.D.	1.71	2.73	1.10*	134*	York	29.0	1.67	4.80	53.2
Curtis Green Bruce, S.D.	1.70	2.99	1.02*	128*	Land.	30.9	1.20	5.15	55.4
Henry Hohweiler Chester, S.D.	1.98	2.95	1.29	115	Duroc	29.2	1.73	3.96	50.5
Albert Koller Parker, S.D.	1.90	2.99	1.01	131	Poland	28.9	1.50	4.40	52.2
Wendell Leafstedt Alcester, S.D.	1.63	2.99	0.95	127	Poland	29.1	1.50	3.62	50.8
Melvin Lifto Hartford, S.D.	1.77	2.86	0.98	134	SPC	29.2	1.47	4.02	55.0
Ray Olson Arlington, S.D.	1.86	3.00	1.05	126	SPC	28.5	1.83	3.92	49.0
Homer Ponto RR #1 Brookings, S.D.	1.77	3.01	1.01	125	Poland	28.8	1.60	5.01	50.5
Arthur Ramse Lennox, S.D.	1.84	3.00	1.37	101	Ches. White	29.0	1.70	3.48	51.4
A.V. Ramsell RR#3 Huron, S.D.	1.58	3.03	0.95	123	York	30.5	1.63	3.57	53.0

Phil Scheifen RR#2 Hudson, S.D.	1.75	2.96	1.03	125	Poland	29.0	1.47	4.10	50.8
Clarence Schladweiler Madison, S.D.	1.93	2.57	1.11	142	Duroc	30.4	1.23	4.22	54.8
Myron Schliem RR #2 Sioux Falls,S.D.	1.85	2.75	1.12	131	York	30.8	1.77	4.65	52.2
Gerhardt Schmeichel Salem, S.D.	1.86	3.00	1.10	123	York	31.2	1.60	3.93	53.2
Jake Shawd RR #2 Mitchell,S.D.	2.02	2.96	1.21	122	Duroc	29.9	2.00	3.21	47.0
Eldon Tiedeman Irene,S.D.	2.07	2.95	1.14	129	Hamp	29.9	1.67	4.07	52.3
Archie Vick Volga, S.D.	1.80	2.97	1.23	112	Ches. White	29.9	1.57	3.66	52.0
Wallace Welch Letcher,S.D.	1.99	2.59	1.05	147	SPC	29.1	1.53	3.94	53.0
Elmer Weerts Bancroft,S.D.	1.89	2.73	1.05	138	Land.	33.1	1.27	4.35	55.3
STATION AVERAGE	1.82	2.89	1.09	127		29.7	1.55	4.11	52.4

*Average of two boars.