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Boar-Progeny Performance Differences

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BOAR-PROGENY PERFORMANCE DIFFERENCES

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Of the several possible performance comparisons among pigs, one of the most striking is often that between groups of pigs sired by different boars. Just looking at groups of pigs sorted according to sire may not be very informative. However, records showing the average performance of groups of pigs by several sires will often suggest that there are real differences among sires in their breeding ability. Sire groups are likely to include rather large numbers of offspring out of several different sows, farrowed on the same farm and in the same season. The fact that pigs by the same sire out of several different sows tend to perform better or worse than pigs in other sire groups is an aid in selecting among sires. In herds where more than one boar is used, selections for herd replacements can be helped by using the information on sire differences as well as individual pig differences.

Testing of groups of pigs by different sires at central stations or on producer farms is getting increasing attention as a means of improving the performance and carcass quality of our various breeds. Only by such testing is it possible to determine the better performing individuals and strains.

Examples of the size of sire differences for three performance characters--56 and 154 day weight and live backfat measurements at market weight--are shown in the table below. The data include an entire group of inbred and of crossbred litters for a spring farrowing season.

Sire Group Summaries for Three Performance Characters of Swine

Sire	No. Litters	56 Day Weight Per Pig, Lbs. Av.	St.Dev.	Range	154 Day Weight Per Pig, Lbs. Av.	St.Dev.	Range	Backfat at Market Weight, Inches Av.	St.Dev.	Range
Inbred Litters										
1	3	32.5	7.0	20-40	173	16.2	138-196	1.58	.24	1.03-2.15
2	5	32.3	6.2	18-44	173	21.1	126-217	1.66	.22	1.20-2.20
3	7	31.6	6.2	18-42	160	27.1	108-216	1.51	.28	.60-2.20
4	6	30.0	6.1	14-44	166	24.1	112-210	1.46	.31	.67-2.15
Total or Average	21	31.3	6.3	14-44	167	23.8	108-217	1.54	.28	.60-2.20
Crossbred Litters										
1	6	41.9	7.0	20-56	188	25.1	156-248			
2	5	41.2	6.1	22-55	194	18.3	151-231			
3	4	36.8	6.7	18-49	181	17.3	138-210			
Total or Average	15	40.2	7.0	18-56	188	21.5	138-248			

St.Dev. - Standard Deviation

Herds of the size shown here would likely be one-sire producer herds. We purposely raise from three to seven or eight litters per sire in order to learn how large these sire differences really are. Litter groups of the size shown are sufficient to show the differences among sires and to help identify those which are the better breeders.

Differences among the averages for the various sire groups can be seen by comparison of them. The greatest differences are 5.1 pounds at 56 days among the crossbreds and 13 pounds at 154 days in both groups. These differences are not extreme. However, considering the cost of feed and labor to have slower growing pigs on the farm longer, such differences as these can become important. Weights at 56 and 154 days also represent attention to growth rate. Research data shows that growth rate and feed efficiency are positively correlated. Therefore, when selecting for heavier pigs at 154 days, there is associated selection for pigs more efficient in their use of feed.

Largest difference in average backfat thickness among sires is 0.20 inch or 1/5 of an inch. This is 13 per cent of the overall average.

Averages do not always tell the entire story of variation. For that reason the range among weights and backfat measurements are also shown. The standard deviation is a figure which describes the "average" amount of variation in a group, taking each individual weight or measurement into account. A standard deviation of seven pounds at 56 days says that any randomly chosen pig from the group could be expected to weigh as much as seven pounds above or below the average for the group. It can also describe the difference to be reasonably expected between any two randomly chosen pigs in the same group. Note that all 56 day standard deviations are about 20% as large as the group's average.

The breeder's problem is capitalizing on the observed differences among potential breeding animals. Only that part of the differences having a genetic basis can be expected to be passed on by the animals chosen to be parents. Part of the observed variation is caused by differences in environment. This part can be controlled only if the environment can be kept constant from season to season.

That part of the difference in performance between the average of a pig crop and those selected from it as breeding animals, which can reasonably be expected as genetic improvement in the next pig crop, is called heritability. Heritability estimates for the three performance characters discussed here are: 56 day weight - 12 per cent, 154 day weight - 21 per cent, thickness of backfat - 46 per cent. The lower the heritability estimate, the more influences other than genetic have on the expression of a character. Conversely, the higher is the heritability estimate, the more likelihood of noticeable improvement by selection. For example, if the pigs saved for breeding were forty pounds heavier at 154 days than the entire pig crop, it is expected that the next pig crop should have an average 154 day weight of 21 per cent times forty pounds or 8.4 pounds better than the previous pig crop.

Progress or improvement by selection depends on recognizing the occurring variation and keeping for breeders those animals which represent the greatest "reach" possible for each performance character considered important in the breeding program.