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Boar Selection Guidelines for Commercial Pork Producers

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The performance level of the commercial swine herd is determined by two things: genetics and environment. The genetic contribution is determined by the boars and gilts selected and the crossbreeding program used. The environment, (weather, housing, feeding, management, etc.) will enhance or hinder the genetic expression of performance traits. The purpose of this publication is to provide recommendations for selecting replacement boars.

Identification of Responsible Seedstock Suppliers

It is extremely important that you identify seedstock suppliers who can provide you with superior seedstock as a result of their genetic selection and herd health programs. Identification of progressive, responsible seedstock suppliers, is the only means by which your herd can consistently improve its production efficiency.

Genetic Improvement

The rate of genetic improvement in a commercial pork producer's herd parallels the rate of genetic progress made by the seedstock suppliers (Figure 1). To make significant genetic progress for any economically important trait (growth rate, feed conversion, carcass merit, or litter size), performance records must be kept and superior animals selected to produce the next generation.

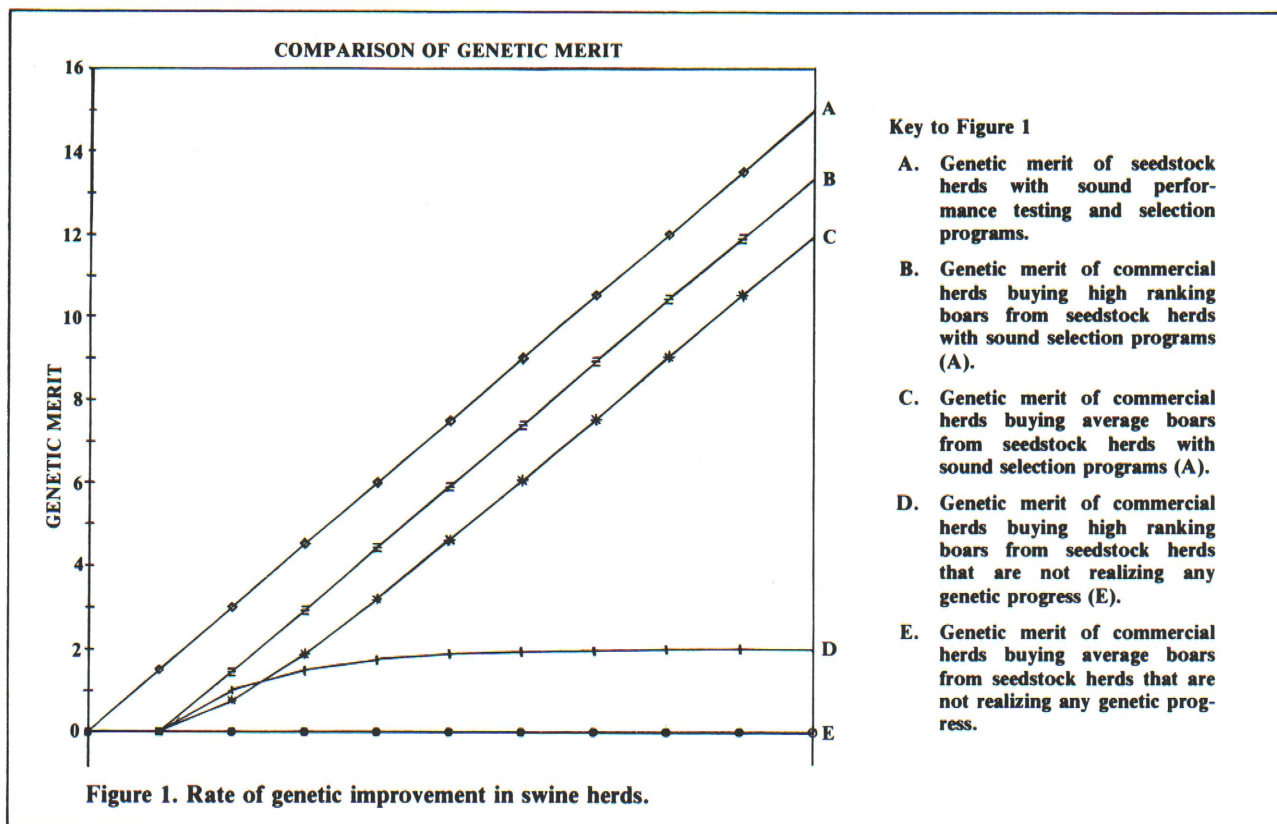
The top three lines (A, B, C) of Figure 1 show the expected improvement in genetic merit when the seedstock herds are making genetic progress. The genetic merit of commercial herds follows the progress made by the seedstock herds. In those seedstock herds making genetic progress, the purchase of the highest-ranking boars available,

will enable the commercial herd to approach the genetic level of the seedstock herd.

Purchase of boars from seedstock herds where genetic improvement programs are not utilized (lines D and E) results in inconsistent genetic progress. This is because the genetic merit of the boars purchased is not improving.

Commercial herds which purchase average boars from genetically improved seedstock herds have an advantage over commercial herds which purchase the very top boars from unimproved herds. Average boars from genetically superior herds can be of higher genetic merit than above average boars in genetically average or below average herds. For this reason, identification of seedstock producers is of primary importance. Selection of individual boars from these producers is secondary.

When selecting seedstock suppliers, review their genetic improvement program. A sound genetic improvement program should include four features: (1) accurate, complete performance records including animal identification, consistent measurement of all boars and gilts (not on-again, off-again or limited, partial performance testing), and ranking of animals within defined contemporary groups; (2) assessment of the genetic merit of economically important traits (growth rate, feed efficiency, carcass merit, and reproductive performance) based on the individual's performance relative to its contemporary group and incorporating the performance of relatives; (3) indexes weighting traits relative to their economic importance in commercial pork production (the indexes should correctly rank the individuals relative to their intended use in crossbreeding systems); and (4) selection of the highest-ranking boars and gilts based on selection indexes. Seedstock producers should utilize selection indexes as their primary selection criteria. Some emphasis should also be given to physical



characteristics such as reproductive and skeletal soundness. Refer to PIH-101 *Selection for Feet and Leg Soundness*. Selection indexes are the most effective means to improve a combination of economically important traits. Seedstock producers who ignore performance records and selection indexes realize only a small fraction of the genetic progress possible as compared to producers who utilize indexes as the primary selection criteria.

For seedstock herds to make consistent genetic progress as presented in Figure 1, they must use superior performance tested boars either from their own herd or from other herds that utilize sound performance testing and selection programs. Figure 2 shows the expected increase in genetic merit in herds using differing percentages of superior performance tested boars. If the seedstock producer selects his own replacement gilts but purchases boars from unimproved herds, very little genetic progress is possible. If the seedstock producer uses only 25 to 50% of the superior performance tested boars while also using boars of poor or unknown genetic merit, little genetic progress is possible. By compromising his selection program and using boars from producers who have not selected superior boars themselves, genetic progress is drastically reduced.

A commercial pork producer cannot expect the genetic merit for economically important traits in his herd to consistently improve unless the seedstock producer uses superior performance tested boars. Therefore, commercial producers should purchase seedstock from suppliers who use exclusively superior performance tested sires and are selecting superior replacement gilts.

Seedstock Herd Health

Identify seedstock producers that have implemented

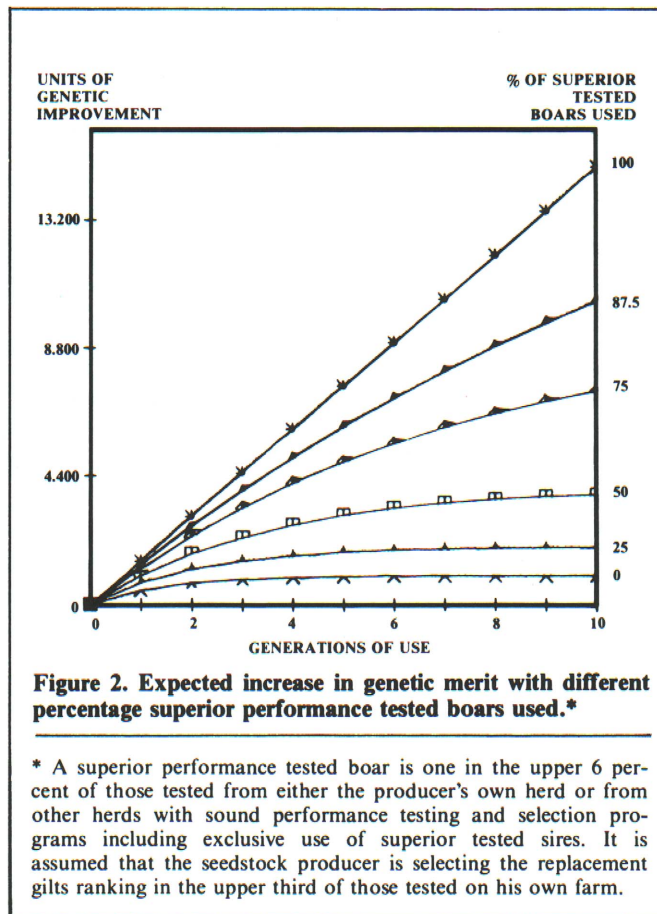
comprehensive herd health programs. A comprehensive herd health program includes a veterinarian that makes routine onfarm inspections, conducts blood tests and other diagnostic procedures, examines animals, counsels and makes recommendations. The seedstock supplier should minimize opportunities for new disease organisms to enter the herd by using blood testing, isolation of herd replacements, strict traffic control and sanitation. The management program should also include adequate nutrition, comfortable housing and ventilation, and vigorous parasite control.

Buy seedstock from herds whose health is superior to your own herd's. Reputable breeders can clearly define the health status of their herds and should be willing to have you or your veterinarian contact their veterinarian to answer any questions. The merits of minimal disease (e.g., SPF) breeding stock should not be underestimated.

Considerations When Choosing Boars

Breed of Boar—The crossbreeding program used will likely dictate the breed of boar. About 80% of boars are purchased from purebred breeders and 20% from commercial breeding organizations. Both can be good sources of replacement boars. Keep in mind that offspring performance in crossbreeding programs is maximized when "breeds" and "crosses" are used in a systematic manner. For more information on selecting breeds and crossbreeding systems, see PIH-39, *Crossbreeding Systems for Commercial Pork Production*.

Age of Boar—Select and purchase boars at 6 to 7 months of age for use after they reach 8 months of age. Don't use young boars just because they appear to be large enough. Replacement boars should be purchased at least 2



months prior to the breeding season. This allows them to be isolated and checked for health, conditioned to the farm, and test-mated or evaluated for reproductive performance.

Performance Records—When selecting boars on the basis of performance records, consider those in the top 50% of the contemporary group. The seedstock supplier should explain how the boars were ranked including the traits used in developing the ranking or index value. The seedstock supplier should also describe the criteria used to establish price categories. In general, the highest-ranking available boar is justifiable when he is expected to sire a large number of progeny and/or produce replacement gilts.

For rotational breeding programs, select boars on maternal traits as well as growth rate, carcass quality (backfat), and efficiency of gain. In specialized breeding programs where terminal sires are used, selection efforts should be based on boars that will sire fast growing, efficient pigs with desirable carcasses.

Maternal boars used to produce replacement gilts for terminal crossing programs should be selected on a balance of reproductive and postweaning performance. Reproduction traits are important, as a maternal sire can produce many replacement gilts. Growth rate, carcass merit and feed efficiency are important as the maternal sire will produce barrows and unselected gilt offspring. Also, selected daughters will transmit one-half of their genetic merit for postweaning traits to many terminal cross market hogs.

Performance Pedigrees—Performance pedigrees are a listing of the animal's ancestors with their performance and genetic evaluations. Performance pedigrees can document consistent performance testing and selection.

Economic Implications

Commercial pork producers should be willing to pay a premium for genetically superior, healthy seedstock, because of the resulting improved pork production efficiency, and to offset the seedstock producer's performance testing and health program costs. Support of seedstock producers who have comprehensive genetic improvement and herd health programs will allow continued genetic progress and improved performance. This will enhance your survival in a competitive market place and lead to a more efficient pork industry.

Selection Facts to Remember

- For long term genetic improvement for any economic trait, performance data must be collected and superior animals selected within seedstock herds.
- Improvement of seedstock herd performance by nongenetic means, such as new facilities, improved rations or more space per pig will not result in improvement of the seedstock's genetic merit or commercial progeny performance.
- Performance records from different herds do not allow an accurate assessment of genetic differences. Differences between performance levels of different herds are primarily due to management differences.
- Comparisons are more accurate when individuals are compared to other animals in the same contemporary group. Within a contemporary group, all animals should be treated as uniformly as possible, for example, the same pen space and diet.
- Performance testing does not result in genetic improvement. Genetic improvement occurs when seedstock herds select the highest-ranking boars and gilts as replacements based on performance data.
- Evaluate each potential seedstock supplier based upon their performance testing and selection practices.
- When purchasing F₁ boars, it is important to identify seedstock suppliers who have implemented genetic improvement programs in the purebred lines. Performance testing and selection within the purebred lines is the only means by which the genetic merit and progeny performance of the crossbred boars can consistently improve.
- Not all traits are expressed in boars, e.g., litter size, litter weight, but are expressed in their female ancestors, sibs, and offspring.
- Performance traits can be genetically correlated. For example, selection of the faster-gaining, leaner boars and gilts will result in a correlated response for improved feed efficiency.
- Genetic evaluation programs (STAGES or Estimated Breeding Value programs) will potentially allow more rapid genetic progress by incorporating each individual's performance records with available records of sibs, ancestors and progeny. The accuracy of these evaluation programs declines as the percentage of animals tested declines. Testing a limited sample of the herd yields inaccurate, possibly biased genetic evaluations.



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