Guidelines for Choosing Replacement Females

Michigan State University
Cooperative Extension Service

Authors:
William T. Ahlschwede, University of Nebraska
Robert H. Grummer, University of Wisconsin
Reviewers:
C. Melvin Fink, University of Illinois
Ron Littlejohann, Wiggins, Colorado
Grant Sherritt, Pennsylvania State University

July 1977
4 pages

Fact Sheet 19.431.03
Extension Bulletin 1126, July 1977

pork industry handbook

COOPERATIVE EXTENSION SERVICE • MICHIGAN STATE UNIVERSITY

Guidelines for Choosing Replacement Females

Authors
William T. Ahlschwede, University of Nebraska
Robert H. Grummer, University of Wisconsin

Reviewers
C. Melvin Fink, University of Illinois
Ron Liittjohann, Wiggins, Colorado
Grant Sherritt, Pennsylvania State University

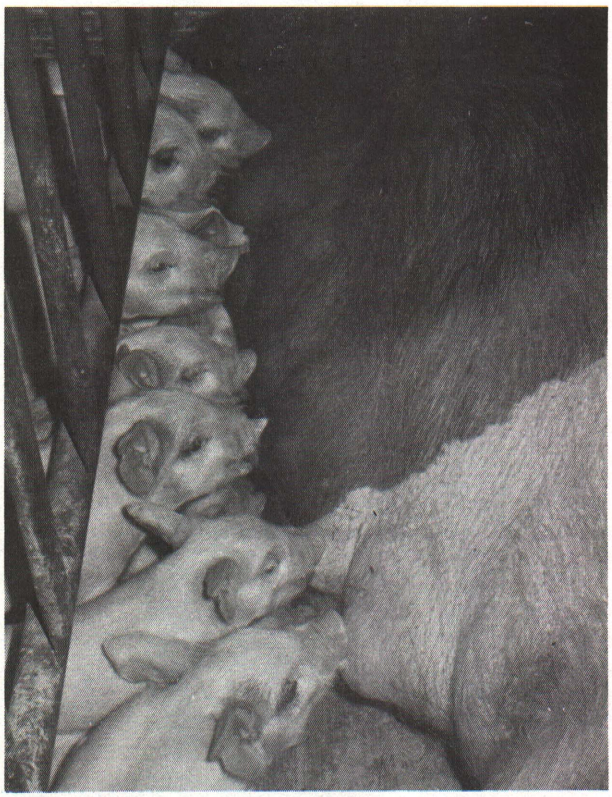
The productivity of the sow herd is the foundation of commercial pork production. The sow herd also contributes half of the genetic makeup of growing—finishing pigs. These factors together indicate the importance of careful selection of replacement gilts and wise decisions on their retention in the sow herd. It is recommended that the fastest growing, leanest gilts that are sound and from large litters be kept for sow herd replacements. Among sows which have farrowed and will rebreed, only sows with physical problems, bad dispositions, extremely small litters (2 pigs below herd average) and poor mothering records should be culled.

The Sow's Job

For a commercial pork operation to be successful, the sow herd needs to wean large litters of pigs regularly. This means that a large percentage of the sows and gilts show estrus and breed, farrow large litters of vigorous pigs, keep a high percentage of the pigs alive and get their pigs off to a good start. All of these functions are affected in large part by environmental situations and management practices. Although differences among breeds for these traits are apparent, the genetic influence is such that no direct selections can be made among replacement gilts for these functions.

The size of litter in which a gilt is born and the weaning weight of the litter genetically are traits of the gilt's mother. Selecting gilts for these traits would be selection on the dam's record, which dilutes the selection effort. Our understanding of the genetic basis for these traits indicates that economically important genetic changes can be made by selection. The large non-genetic variation in these traits, particularly litter size, makes it difficult to detect the change.

Keeping baby pigs alive and getting them off to a good start generally are classed as maternal effects. Successful management schemes usually assign the job of keeping



pigs alive to the man as well as to the sow. If management intervenes in the pigs' behalf by fostering pigs to equalize litter size, hand-feeding weak pigs and timely treatment of baby pig health problems, the sow shouldn't be held responsible for differences in survival. In the matter of getting pigs off to a good start, there are important genetic differences among sows which show up in weight gain of suckling pigs. Evaluation of pig weights for indication of sow milking performance should be made before the pigs are 4 weeks old, preferably at 3 weeks of age.

Evaluating maternal performance early is supported by two types of rationale. First, before 3 weeks of age, the pig relies almost entirely on the sow as a source of nutrients. Under usual production practices there is no alternative. After the third week the litter's need for nutrients often surpasses the sow's ability to produce milk. After the third week, the pigs can turn to dry feed to meet part or all of their needs. Many producers wean pigs at 3 weeks of age.

Second, the most current research in this area indicates that heavy pig weights up through 4 weeks indicate high levels of milk production. Heavy suckling pig weights after about 4 weeks of age may indicate lower levels of milk production. This is because pigs on poor milking sows start creep feed earlier and eat more dry feed. Hence, evaluation of sow milking performance should be made at about 3 weeks of age.

Since fairly low rates of sow culling are suggested and equalizing the size of litters is expected, evaluation of sow performance should identify those sows that obviously are milking poorly. Sows that are slow to come to their milk, have light pigs at 3 weeks or whose pigs die because of too little milk should be marked for culling.

In addition to farrowing and starting pigs, the sow supplies half the genetic composition of the offspring. Rate of gain, fat thickness and feed efficiency are commercially important traits which respond to selection. Increased gain and reduced fat thickness can be selected directly in replacements. Feed efficiency is favored indirectly by selecting the fast-growing, low-backfat gilts.

A balance between sow culling and gilt selection needs to be established. Replacement gilts need to be available in sufficient numbers to replace culled sows. Gilts replacing sows represent the major opportunities for genetic change in the sow herd. Since sows generally produce larger litters of heavier pigs, replacing sows with gilts may reduce production levels. This production differential and the low relationship between the performance of successive litters argue for low rates of culling based on sow performance in order to maintain high levels of production. This must be balanced against the genetic change made possible by bringing gilts into production. A total gilt replacement level of 20-25% is suggested for each farrowing.

Pork producers may find economic advantages in timing the culling of sows to take advantage of high sow markets. Consideration may also be given to possible tax savings through shifting income to capital gains by marketing sows at younger ages. This makes a higher percentage of the hogs sold eligible for capital gains because more cull sows would be sold. Some producers choose to sell all sows after only one litter to maximize their capital gains deductions.

The gilt selection/sow culling scheme suggested assumes that there are no major genetic antagonisms between litter size and maternal performance on one hand and rate of gain and low-backfat thickness on the other hand. There is some evidence that the so-called "very meaty gilt" does not make a good sow. However, there is no documented evidence that selecting fast-growing, low-backfat gilts will adversely affect sow performance.

Soundness—Soundness means being free from flaws or defects. In selecting replacement females, being sound means being free of flaws or defects which would interfere with normal reproductive and maternal functions. Three areas are of particular concern: (1) reproductive; (2) mammary; and (3) skeletal. For selection as replacement stock, sows and gilts should meet minimal levels in each of these categories.

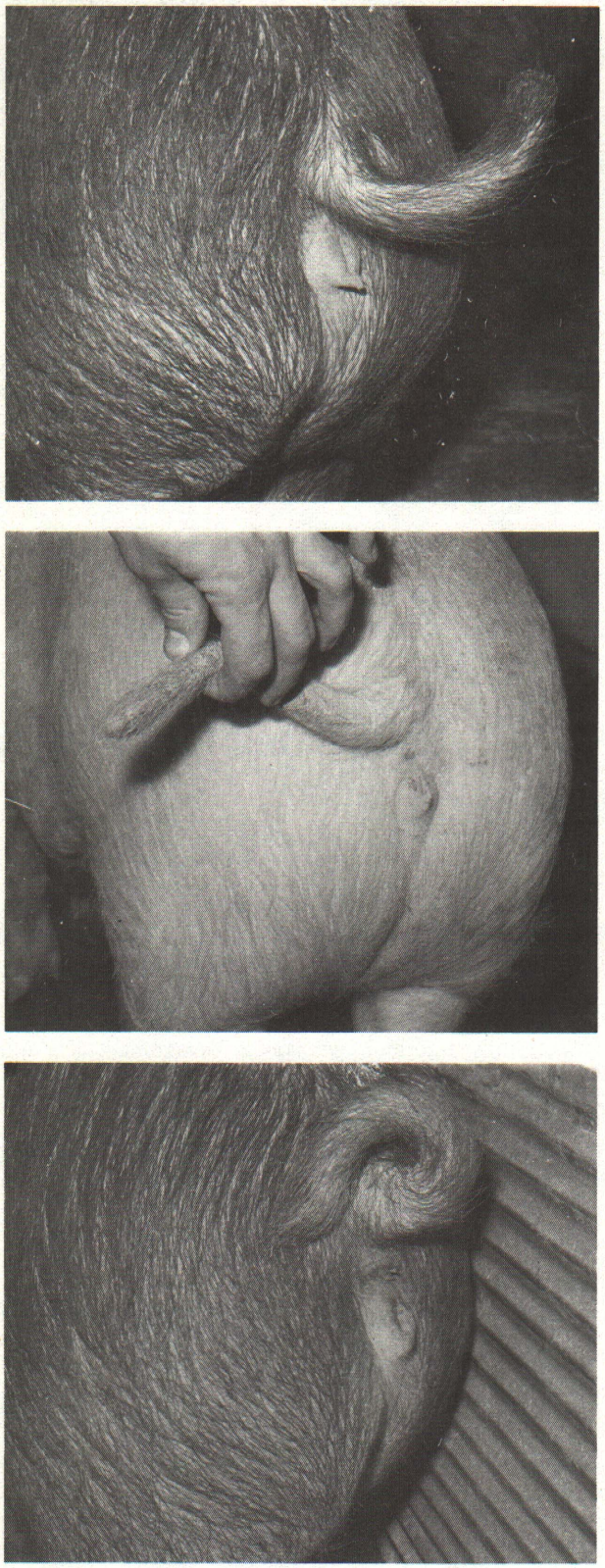


Figure 1. Select gilts with normally developed external genitalia (top). Gilts with small infantile (center) or abnormal (bottom) vulvas should not be kept.

Figure 2. Non-functional teat caused by concrete burn during first week of life.

Reproductive soundness—Replacement gilts should exhibit normal reproductive development, both anatomically and behaviorally. The external genitalia should be normally developed (Fig. 1).

Most anatomical defects of the reproductive system are internal and not visible. Gilts with small vulvas (Fig. 1) indicative of infantile reproductive tracts should not be kept. Replacement gilts should begin to show signs of puberty at least a month prior to anticipated breeding. Sows which have difficulty farrowing, are extremely slow farrowing or have damaged reproductive tracts (uterine prolapse or severe uterine infections) should be culled.

Mammary soundness—Replacement gilts should possess a sufficient number of functional teats to nurse a large litter of pigs. Current industry standards stipulate at least 6 functional teats on each side. Well-spaced udder sections are preferred. Gilts with inverted or scarred nipples should not be saved. New concrete, rough floors and corrosive chemical compounds on the floors of farrowing houses can cause abrasions to gilts' underlines which result in non-functional teats (Fig. 2). As the gilt approaches puberty, her underline should become more prominent, indicating normal development.

Skeletal soundness—Gilts with feet and leg problems which will interfere with normal breeding, farrowing and nursing functions should not be saved. Sows that are unable to get up and down in farrowing crates should be culled.

Which Gilts and Sows to Select

The fastest growing, leanest gilts which are sound and from large litters should be saved for replacement females. Sows which fail to rebreed should be culled. Sows which had small litters, failed to milk or had problems farrowing should be culled.

This selection and culling program requires identification of potential replacement gilts at birth. The gilts should be weighed and backfat probed as they approach market weight. Sufficient sow identification and farrowing house records need to be kept in order to cull the right sows.

Ear-notching gilts at birth with litter and individual notches, along with a written record of birth date and litter size, would meet the needs of the gilt selection program. Less complex identification systems can be used if they provide a method of identifying gilts from large litters and allow age determination at the time the gilts are weighed and backfat probed. Some producers have notched only

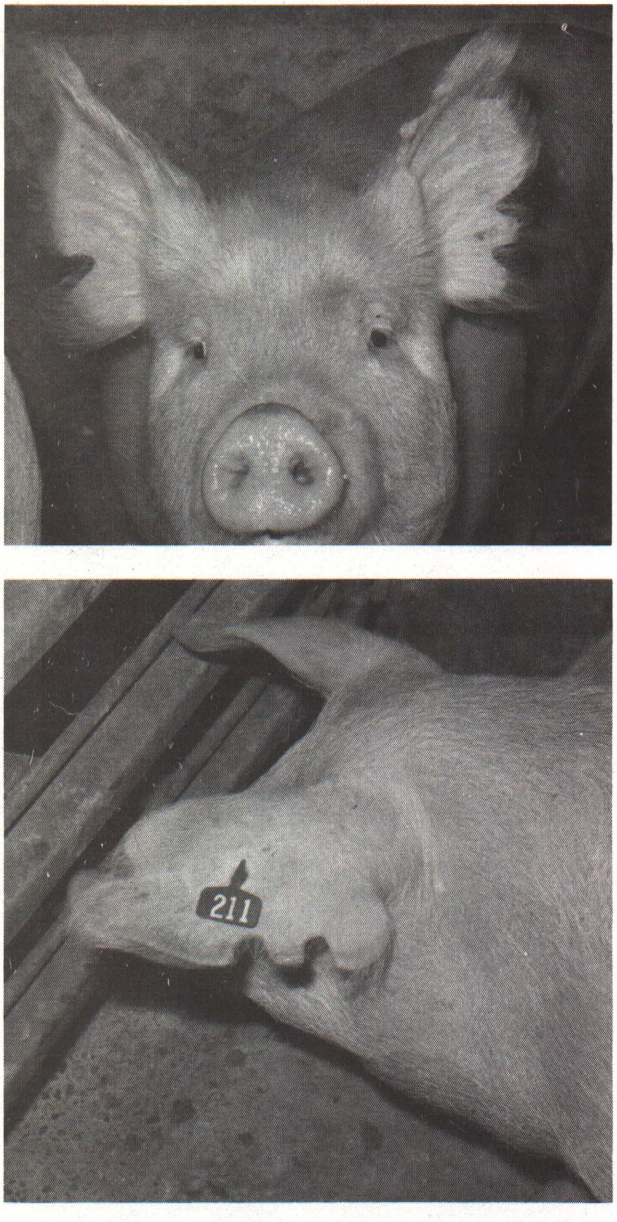


Figure 3. Permanent identification with ear notches (top). Ear notches can be supplemented with an ear tag for sow identification (bottom).

gilts from large litters, using birth date as the number so the age can be determined at weighing time. Ear tags are helpful in identifying sows in the breeding herd (Fig. 3).

Because selection among gilts for gain and backfat thickness is much more effective and direct than selection for the maternal traits, there is an important advantage to weighing and probing the gilts. To compare the gilts accurately, weights should be standardized for age and backfat standardized for weight. It is extremely difficult to estimate age-corrected weights without using a scale. Backfat should be measured rather than visually appraised. Backfat thickness can be measured very easily and accurately with a probe or an ultrasonic machine.

Standardization of weight for age can be done most easily by assuming a daily gain of 2 lb. per day at the time of evaluation. If the gilts are weighed and probed at about 180-200 lb., the data could be adjusted to a 200-lb. standard. Add ½ day to the gilt's age for each pound which she weighs below 200. Deduct ½ day for each pound over 200. Average backfat thickness should be adjusted by adding 0.004 in. of fat for every pound below the standard

and by deducting 0.004 in. of fat for every pound over the standard.

At the time the gilts are weighed and probed for backfat, they should be appraised for indications of normal reproductive development, functional appearance of the underline and skeletal soundness.

Management for Development

While little direct selection can be practiced for litter and maternal performance, several management practices can be used to help insure optimal performance from gilts. The way the gilt is managed at birth and as she approaches puberty can affect her subsequent reproductive performance. Management systems for keeping high percentages of baby pigs alive require the moving of pigs among litters at birth to equalize litter size. The practice of equalizing litter size—after the gilt pigs from large litters have been identified—may also give gilts the best chance to develop normally. Recent research suggests that gilts reared in large litters are less productive than gilts reared in small litters.

Following weaning, gilts should be fed and managed in a way that will accelerate their growth and development until they near puberty.

Gilts should be self-fed a balanced, well-fortified diet during the growing period. When gilts reach 180-200 lb. they should be evaluated and selected and placed on a restricted diet. At this weight accurate selection can be made for growth rate and backfat thickness. Added accuracy in measurement of growth and fat by extending the feeding period does not justify the cost of the added feed. The added weight gained on full feed is mostly fat which is not needed and may interfere with subsequent reproduction. In addition, the stimulation from sorting and moving the gilts and reducing their level of feed at 180-200 lb. may trigger puberty (first heat) in the gilts. These changes, coupled with fenceline boar contact, should help induce earlier puberty and insure a higher pregnancy rate and larger litters from the gilts.

Gilt Selection Calendar

When	*What*
Birth	•Identify gilts born in large litters. Hernias, cryptorchids and other abnormalities should disqualify all gilts in a litter for replacements.
	•Record birth dates, litter size, identification.
	•Equalize litter size by moving boar pigs from large litters to sows with small litters. Pigs should nurse before moving.
	•Keep notes on sow behavior at time of farrowing and check on: (a) disposition, (b) length of farrow, (c) any drugs such as oxytocin administered, (d) condition of udder, (e) extended fever.
3-5 wk.	•Wean litters. Feed balanced well-fortified diets for maximum growth and development.
	•Screen gilts identified at birth by examining underlines, and reject those with fewer than 12 well-spaced teats. If possible, at this time select and identify about 2-3 times the number needed for replacement.
180-200 lb.	•Weigh and backfat-probe potential replacement gilts. Evaluate for soundness.
	•Select for replacements the fastest growing, leanest gilts that are sound and from large litters. Save 25-30% more than needed for breeding.
	•Remove selected gilts from market hogs. Place on restricted feed.
	•Give fenceline contact with boar.
	•Observe gilts for sexual maturity. If records are kept, give advantage to those gilts that have cycled most frequently when final culling is made.
Breeding time	•Make final cull when the breeding season begins and keep sufficient extra gilts to offset the percentage of non-conception in your herd.
	•Make sure all sows and gilts are ear-tagged or identified.

 1P-3M-7:77-UP, Price 10 cents, Single Copy Free to Michigan Residents

Michigan State University Printing