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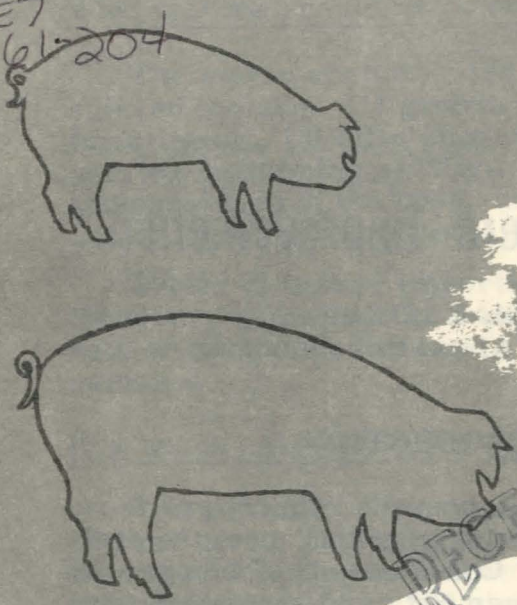

Swine Herd Improvement

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Swine Herd Improvement

by
Leo E. Lucas
Asst. Ext. Animal Husbandman

INTRODUCTION

Swine producers throughout the country are faced with the problem of producing hogs that meet the preference of the consumer. Consumers prefer hogs with a larger percentage of lean cuts and a smaller percentage of fat. Also, the producer must face the problem of producing hogs more economically to meet rising labor and equipment costs.

If you, as a producer, are going to market a higher quality product more efficiently, it is essential that records be kept on the major economic traits. Such records furnish the information for more accurate selection and for continued herd improvement.

The herd improvement program outlined in this circular is designed as a practical method that can be used in your herd. The program requires a minimum of time and record keeping, yet, if properly conducted, will result in steady improvement.

What value is a herd improvement program?

A herd improvement program is based on obtaining accurate records to help you in selecting replacement stock for steady improvement in the production of your herd. This helps you through selecting pigs with:

- Superior carcass quality
- Ability to make fast and efficient gains
- High sow productivity

What factors should be considered?

The major economic traits which should be considered include: (1) growth rate, (2) carcass quality (meatiness), (3) efficiency of gain, (4) sow fertility, and (5) mothering ability. Other factors, such as abnormalities of the body, unsound feet and legs, and qualifications for registration must be considered.

Traits of lesser importance may be considered. However, selection for additional traits reduces the rate of progress for traits of major economic importance.

How much extra time and equipment will be needed?

The amount of time needed will depend on the size of your herd. Probably no more than two days of your time would be required to weigh, probe, and complete the records of 150 to 200 pigs.

Scales, probing equipment (knife and steel rule), an ear notcher, hog catcher, and data forms are the necessary items needed.

You may obtain a list of companies making scales and probing equipment from your county agent or from the Extension Animal Husbandry Department.

Where should swine testing be conducted?

- Complete herd testing on the farm provides you the necessary records for selection based on the major economic traits. These records furnish you the information needed to select the top performing pigs, within your herd, for replacement breeding stock.
- Testing on the farm limits the risk of introducing disease into your herd. Hauling pigs to a central testing station for the purpose of testing increases the chance of picking up disease.
- Testing on the farm should result in good farm production records. These records enable you to become aware of other problems such as those related to nutrition and management. Correction of these problems may make an immediate improvement in production.

Should breeding stock be tested at a central testing station?

The testing of breeding stock at central testing stations is not recommended because of the increased emphasis on disease control. Normally, pigs are brought together from many farms to a testing station. This affords the opportunity for transfer of disease among the pigs being tested. These diseases could be then redistributed to the farms of producers who purchased breeding stock.

Should market barrows and gilts be tested at a central station?

Yes, central testing of market animals is beneficial, provided the information is used as a part of a herd improvement program.

Central testing of market animals is recommended over central testing of breeding animals for the following reasons:

(1) The animals are slaughtered, and cannot carry disease back to farms.

(2) Detailed carcass information can be obtained which can be used in conjunction with backfat probes to evaluate carcass quality.

If I have a strong herd improvement program, should production registry and other programs of our breed association be considered?

You are encouraged, not only to have a strong herd improvement program, but also to enter production programs of your breed association. In most cases, the same information you have obtained for your own herd improvement program can be used in breed association programs. The records furnished the breed association become official with the association and can serve in the promotion and selling of your breeding stock.

What records should be obtained for maximum overall herd improvement?

1. Birth Date is needed to estimate growth rate. Other notes on farrowing difficulties or abnormalities should be taken.

2. Weaning Weight measures the ability of the pig to gain to weaning and the milk producing ability of the dam.

3. Weight at or near 200 pounds is necessary to measure the overall gaining ability of the pig.

4. Backfat Probe is an essential record to evaluate carcass quality. The pigs must be within 25 pounds of 200 pounds for accurate corrections to a 200-pound constant.

5. Feed Efficiency Records measure the amount of feed required per unit of gain (optional). It is optional for two reasons: (1) the additional time and equipment required increases expense, and (2) the existing correlation between rate and efficiency of gain enables you to make nearly as much progress for efficiency of gain by selecting for rate of gain alone as when selection is for both.

What is the best way to use records for maximum improvement?

There is no best method for every herd since the level of performance for each trait will affect the manner in which the records are used. However, accurate use of records is the most important step in herd improvement. Care should be taken to make certain that only records made under similar conditions (nutrition, management) are compared.

Generally, how you will use your records for herd improvement will depend upon (1) the degree of influence heredity has on the trait (heritability) and, (2) the level of performance for each major economic trait. Table I shows the heritability estimates and the general goals for these traits. The goals are levels of performance which we feel should be attained or surpassed by purebred breeders.

Table I

Traits	Heritability Estimate	Goals
Rate of Gain	30%	200 lbs. at 5 months
Efficiency of Gain	38%	3 lbs. of feed/1 lb. gain
Backfat Thickness	46%	Gilts 1.45 inches or less Boars 1.25 inches or less
Litter Size	15%	10 pigs/litter (at weaning)
Litter Weight	15%	400-600 lbs. /56 days 200-300 lbs. /35 days

To explain the how and when of selection for each trait, let us examine each one individually.

Litter Weaning Weight indicates the ability of the pigs to gain to weaning and the milk producing ability of the sow. An earlier weight at 21 or 35 days is a better measure of mothering ability of the sow, since the pigs would have had less chance to express their gaining ability. Therefore, if we are primarily trying to evaluate milking ability, and since heritability for litter weight is low (Table I), these records should be used for selecting your high producing sows for additional litters.

Litter Size at weaning and at market time is extremely important to the hog breeder. Yet, the heritability of litter size is low (Table I) which indicates little progress for litter size through direct selection of pigs from large litters. Your improvement in litter size will come through better management, nutrition and breeding practices of the breeding herd and in management of the young pigs. Your records will allow you to evaluate the effect of these changes as they occur.

Efficiency of Gain measures the feed required to put on a unit of gain. The importance of feed efficiency is realized when we find 80-85% of the production cost from weaning to market weight is feed. Feed efficiency records can be combined with rate of gain and backfat thickness in an index or they can be used individually, culling each pig which falls below a preset level of performance.

Rate of Gain and Backfat Thickness are the two main traits which should be considered in selecting replacement gilts. If the carcass quality (meatiness) of your herd is below the suggested level (Table I), special emphasis should be placed on selecting gilts with the most desirable carcass quality. Herds with poor rate and efficiency of gain should select the faster gaining gilts. Composite scores or indexes can be developed based on rate of gain, backfat thickness, and efficiency of gain. You may also set certain levels of performance for each trait, if a gilt is below any one of these levels of performance, she is culled from the herd.

Other points which must be considered along with the above records in selecting gilts:

(1) A minimum of 12 evenly spaced, functional teats.

(2) Sound feet and legs with adequate bone.

(3) Freedom from disease and physical defects.

(4) Adequate length with thick well-muscled hams.

How much yearly progress can I expect with this program?

The genetic progress from this program each year will be small. However, the improvement is permanent and each year's progress will build on the preceding year.

The actual amount of progress you make each year depends primarily on the following factors:

. The percent of available gilts selected for replacements and the accuracy of these selections.

. The genetic superiority of your boar or boars to the present herd production level.

. The number of traits used in selecting replacement stock.

. The degree of influence heredity has on the traits considered in your selection program.

. Generation interval, or the average length of time required to produce offspring of reproductive age.

What are some suggestions for increasing yearly improvement?

. Select replacement gilts that are genetically superior, based on production records.

. Accuracy is of utmost importance if you are going to select the superior gilts available.

. Use all progeny and individual records available to help you in selecting your herd boars.

. Limit the number of traits you are selecting to the major economic traits. Selection for too many traits slows down rate of progress of major traits.

. Although you cannot change the effect heredity has on a trait, knowing the size of the effect allows you to plan your progress. Traits with low heritability (below 20%) respond very slowly to selection, therefore, only a small amount of progress will be made for these traits in a selection program. Traits affected more by heredity (estimates above 20%) will respond in a greater degree to selection and can be moved more quickly to the desired goals.

. When young boars of outstanding merit are found and proven genetically superior to present boars, they should be used to replace present boars. This lowers the generation interval and increases yearly progress.

What is the value of records in selling breeding stock?

Accurate records can be of considerable value in helping the buyer select stock. Complete records should be available, explaining the management and nutrition under which the records were obtained. Explain to the buyer that these records should be compared only under management conditions similar to those on your farm.

Who should be contacted about entering the program?

Contact your local county agent or write to the Extension Animal Husbandry Department, University of Nebraska, College of Agriculture, Lincoln 3, Nebraska.

PROCEDURES AND FORMS FOR YOUR PROGRAM

Procedures at Birth

A. Identify your pigs at birth by notching ears. Your pigs should be identified both individually and by litter. On page 12 is a suggested system for ear notching. If you are a purebred breeder, consult with your breed association before using this system.

B. Record date of farrowing, number farrowed and number of dam and sire on the litter record form. This is shown on page 13.

Procedures at Weaning

A. Obtain individual and litter weights at weaning (21, 35, or 56 days). Correction charts are available for adjusting to 21, 35, or 56 days. A 35-day weaning weight correction chart is explained and illustrated on page 14. Record your actual and adjusted weaning weights plus the litter weight on your litter record form.

B. If you plan to measure feed efficiency, pigs should be sorted into individual, litter, or sire groups. Accurate feed records must be taken if your records are to be of value. Make sure animals in all pens are treated exactly alike (feed, shelter, water, and management).

C. If some sows are going to be held for additional litters, select the sows which weaned the heavier litters.

Procedures When Pigs Reach 200 (180-220) Pounds

A. Take accurate weights of each pig. It is wise to check scales occasionally to see that they are balanced. Correct the weights to a standard age of either 154 or 180 days, depending on which is closer to the average age of your pigs. If some of your pigs vary more than 14 days either way of the standard age selected, additional weighing dates should be scheduled. Record the information on litter record forms.

B. Measure backfat thickness. Using the available correction charts, correct the backfat probes to a 200-pound standard. Only pigs between 175 and 225 pounds should be probed. Additional probing dates should be scheduled for pigs under 175 pounds.

Backfat measurements may be taken with either the leanmeter or the manual probe. Measurements on the live animal should be made at the points noted in Figure 1. They are:

(1) Behind the shoulder - above the elbow and back about one inch.

(2) Loin - over last rib.

(3) Hip - almost directly above the stifle joint and hip.

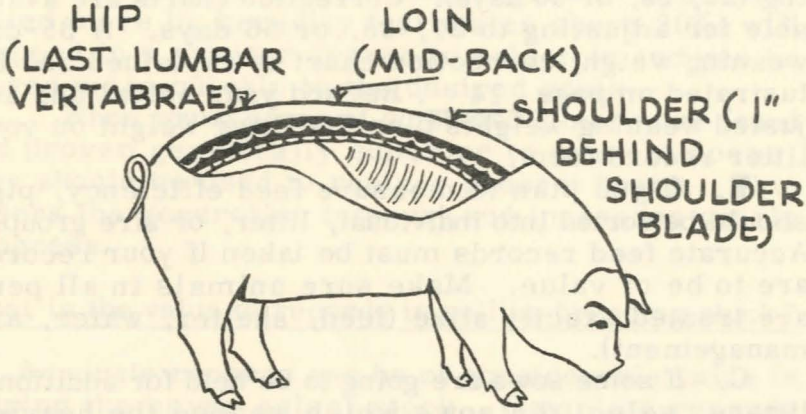


FIG. 1 - CUT-AWAY VIEW OF ANIMAL BODY

These measurements should be made about 1 to 2 inches to the right or left of the midline. The skin area should be free of dirt or mud. While taking these measurements, restrain the animal by holding with a snare or confine him in a chute. Record each measurement on the record sheet.

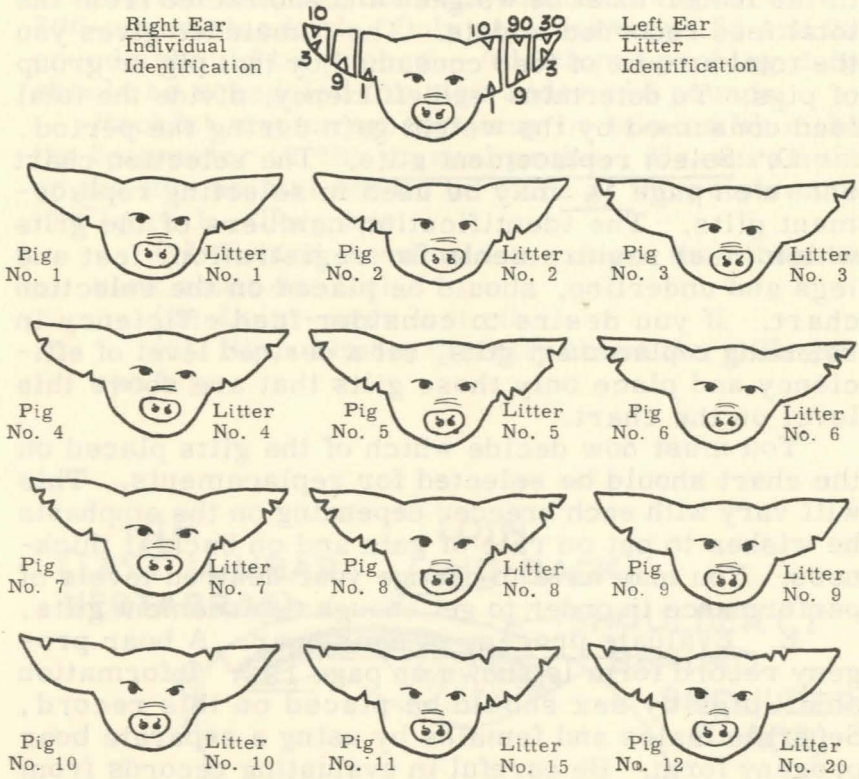
C. Complete feed records. The feed remaining in the feeder must be weighed and subtracted from the total feed recorded to date. The remainder gives you the total amount of feed consumed by that pig or group of pigs. To determine feed efficiency, divide the total feed consumed by the weight gain during the period.

D. Select replacement gilts. The selection chart shown on page 15 may be used in selecting replacement gilts. The identification numbers of the gilts which meet requirements for registration, feet and legs and underline, should be placed on the selection chart. If you desire to consider feed efficiency in selecting replacement gilts, set a desired level of efficiency and place only those gilts that are above this level on the chart.

You must now decide which of the gilts placed on the chart should be selected for replacements. This will vary with each breeder depending on the emphasis he wishes to put on rate of gain and on backfat thickness. You may have to change your desired levels of performance in order to get enough replacement gilts.

E. Evaluate progeny of each boar. A boar progeny record form is shown on page 16. Information on all pigs by sex should be placed on this record. Separate males and females by using a separate boar progeny form. Be careful in evaluating records from different boars as to comparable management, nutrition and to the type sows used.

EAR NOTCHING SYSTEM



Suggestions to Follow

1. Start each year with litter 1 (one) and mark litters consecutively throughout the year. When parts of a farrowing occur during different years, mark all litters according to the year in which the majority of the litters are farrowed (or will farrow).

2. In each litter, mark all gilts first starting with 1 (one) through as many numbers as needed. Then mark the boars with numbers following those of the gilts.

3. Take a full notch in baby pig's ear so notch will not grow shut.

4. Avoid notching too close to the head on the lower portion of the ear as notches will grow shut making identification difficult.

5. Notching pigs as soon as possible after farrowing will prevent errors.

6. If you have a tendency to become confused while marking, first draw the ear markings out on paper and then follow it while marking the litter.

LITTER RECORD

Cooperator _____ Address _____ County _____

	DAM	SIRE
Litter No _____	No. _____	No. _____
Date Farrowed _____	Adj. Wt. (da.) _____	Adj. Wt. (da.) _____
No. Farrowed _____	200 lb. Probe _____	200 lb. Probe _____
No. Weaned _____	Year Farrowed _____	Year Farrowed _____
No. at Mktg. _____	Breed _____	Breed _____

INDIVIDUAL PIG RECORD

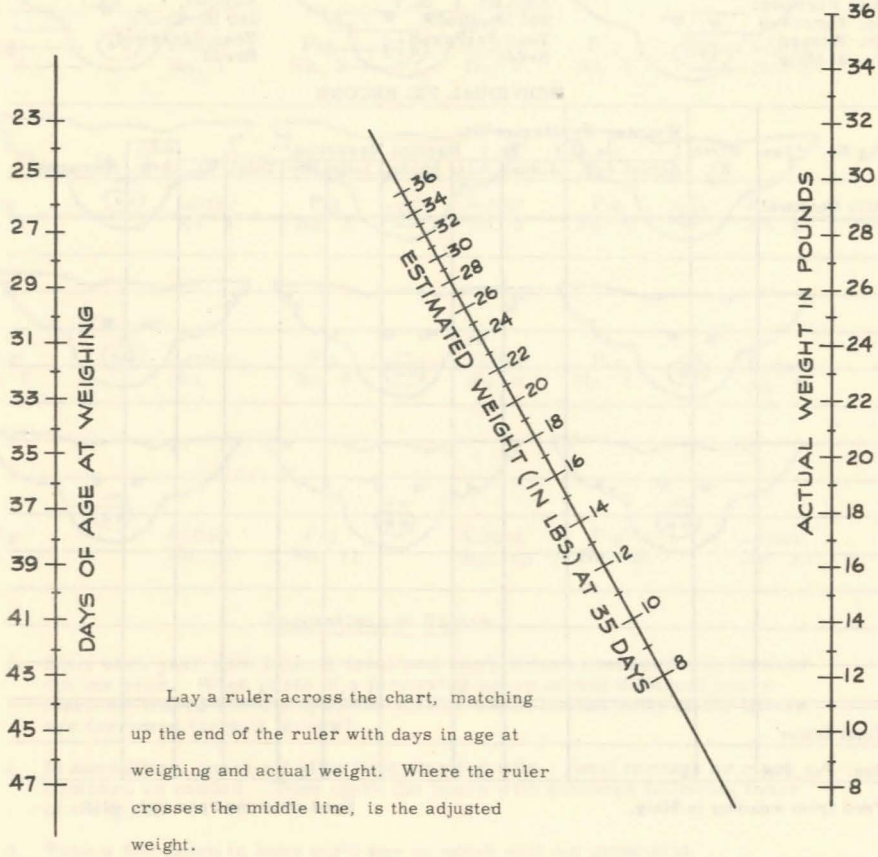
Pig No. - Sex	Birth Wt.	Weaning Wt. (da.)		Market Wt. (da.)		Backfat Measures					Adj. Avg.	Remarks[1]
		Actual	Adj.	Actual	Adj.	Shldr.	Loin	Hip	Total	Wt.		
Date Obtained												
Total Litter												
Ave. Per Pig												

Feed from weaning to Mktg. _____ Feed consumed per cwt. gain _____

1. Note breeding stock replacements kept.

(Remarks on back) _____ AGENT ASSISTING

ADJUSTED 35 DAY WEIGHT CHART



Lay a ruler across the chart, matching up the end of the ruler with days in age at weighing and actual weight. Where the ruler crosses the middle line, is the adjusted weight.

SELECTION CHART -- 154 or 180-Day Weight and Backfat Thickness

Cooperator_____

Address_____ Date_____

Adjusted 154-or 180-day weight	Adjusted Backfat Thickness (Average of three probes)												
	.9 or less	1.05-.91	1.10-1.01	1.20-1.11	1.30-1.21	1.40-1.31	1.50-1.41	1.60-1.51	1.70-1.61	1.80-1.71	1.90-1.81	2.00-1.91	2.01 over
250 or over													
245-249													
240-244													
235-239													
230-234													
225-229													
220-224													
215-219													
210-214													
205-209													
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195-199													
190-194													
185-189													
180-184													
175-179													
170-174													
165-169													
160-164													
155-159													
150-154													
145-149													
140-144													
135-139													
130-134													
130 or less													

ANNUAL BOAR PROGENY RECORD

Cooperator _____ Sex _____

Boar Name & No. _____ Date _____

Pig/ Litter No.	Wean. Wt.	Adj. Weaning Wt.	Market Weight	Adj. 154 or 180 Wt.	Av. Daily Gain	Average Backfat Thickness	Feed per lb. of gain	Remarks
Total								
No.								
Average								