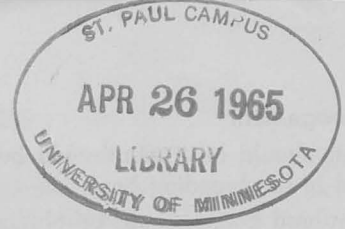
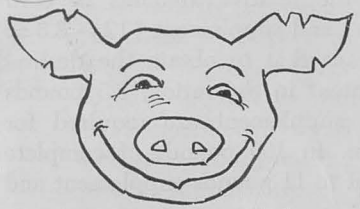


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Extension Folder 223



FEEDER PIG PRODUCTION GUIDE

Agricultural Extension Service UNIVERSITY OF MINNESOTA U.S. Department of Agriculture

Feeder pig production is well-adapted to certain areas of Minnesota. This enterprise requires less grain per dollar of product sold, but a greater labor supply than finishing pigs for market. Because of its specialized nature, feeder pig production also requires above-average management skills.

Success in the feeder pig business depends on economically producing large litters of high-quality, uniform, healthy pigs. Feeder pig production is a profitable enterprise for producers following sound feeding, breeding, management, disease control, and marketing practices. This publication outlines practices to aid in more efficient feeder pig production and sow herd management.

Breeding Management

Herd Health Management

Consult your veterinarian regarding a health program for cholera, erysipelas, and leptospirosis. Purchased breeding stock should be blood-tested for brucellosis and leptospirosis and vaccinated for cholera. In some areas it is also advisable to vaccinate for erysipelas and leptospirosis.

Specific information on external and internal parasites is published in Extension Folder 208, "Pests and Parasites of Hogs."

A 25 percent wettable lindane powder at the rate of 1½ pounds per 100 gallons of water is suggested for mange and lice control. Piperazine is recommended for roundworm control.

Sow and Gilt Management

1. Gilts should be at least 8 months old and weigh about 250 pounds before they are bred.
2. Gilts should be in at least the third heat period when bred. The number of eggs produced during the heat period increases markedly from the first to the third or fourth heat period after puberty.

3. "Flushing" (increasing feed intake) during the breeding season often increases the ovulation rate. Flushing is most effective when sows and gilts are on a lower level of nutrition prior to the breeding season.

Gilts can be hand-fed 5 pounds daily of high-energy ration during the growing period. This can be increased to 6 pounds per day 10 days to 2 weeks before breeding starts, and maintained until all are bred. Flushed gilts should be put back on a limited feeding program as soon as possible after breeding to reduce embryo death loss.

4. Hand or individual mating of boars to sows is recommended over pen mating (free mating). Two services at each heat period are recommended if a sufficient number of boars are available. Mating should be made on the first and second days of heat. Two services increase the proportion of gilts that settle and may also increase the average litter size.

5. Gilts and sows mated only once should be served near the middle of the heat period—usually 24 to 30 hours after start. Sows usually remain in heat 2 to 3 days and return to heat about every 21 days.

6. Sows or gilts showing signs of illness or fever should not be bred.

7. Accurate breeding records are needed to determine when sows are due to farrow.

8. The time to rebreed sows depends on their condition and when their litters are weaned. The following schedule is suggested:

Age weaned:	When to rebreed following weaning:
less than 4 weeks	on second or third heat period
5 or more weeks	on first or second heat period

9. Generally, sows and gilts should not run together during gestation.

Boar Management

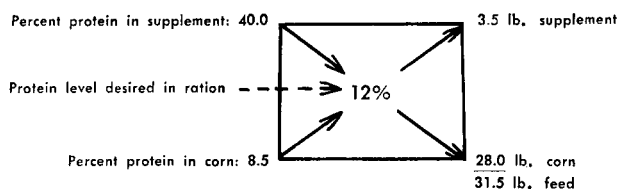
1. Boars should be 8 months old before they are used in the breeding herd.
2. New herd boars should be obtained at least a month before the breeding season. They should be isolated from the sow herd to observe their health and freedom from disease. It is also important to allow them to become adjusted to their new surroundings before using.
3. Whenever practical, boars should be used to serve several sows or gilts outside the breeding herd prior to serving those in the breeding herd.
4. Boars of the same age or size can be run together. Boars of different ages (junior and mature) should not be run together.
5. Usually one rugged, healthy boar is needed for each 15 to 20 females in the herd.
6. A breeding crate is often desirable when breeding gilts to old boars or when mating old sows to young boars.

Feeding and Management Suggestions

How to Balance a Ration for Protein

The square method is useful in determining the ratio of grain to combine with an available supplement to arrive at the desired protein level in the complete ration.

For example, assume that a commercial protein-mineral-vitamin supplement containing 40 percent protein, and No. 2 yellow corn containing 8.5 percent protein are available and you wish to mix a complete ration with a 12-percent protein content. Set up the square in this manner:



EXTENSION FOLDER 223 MINNESOTA AGRICULTURAL EXTENSION SERVICE

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Subtract the smaller number from the larger on the diagonal to find the relative amounts of corn ($40 - 12 = 28$ pounds) and supplement ($12 - 8.5 = 3.5$ pounds). This means that to obtain the desired 12-percent protein content in the ration, 3.5 pounds of 40-percent protein supplement are required for each 28.0 pounds corn. In 100 pounds of complete ration this is equivalent to 11 pounds supplement and 89 pounds corn:

$$\frac{3.5 \text{ pounds supplement}}{31.5 \text{ pounds combined corn and supplement}} = 11 \text{ percent supplement.}$$

The protein contents of other supplements, cereal grains, or mixtures can be substituted in the same manner as outlined above to determine the necessary ratios of each to mix a complete ration of the desired protein content.

Sow Herd Feeding and Management

Protein, mineral, and vitamin requirements (units needed per cwt. of ration)

Nutrient	Bred sows	Lactating sows
Crude protein, lb.	13-15	15-16
Calcium, lb.	0.7	0.8
Phosphorus, lb.	0.5	0.6
Salt, lb.	0.5	0.5
Vitamin A, I.U.	120,000	120,000
Vitamin D, I.U.	6,000	6,000
Riboflavin, mg.	150	150
Pantothenic acid, mg.	600	600
Niacin, mg.	500	500
Vitamin B ₁₂ , mcg.	500	500

Vitamins

Rations that contain 10 percent or more of alfalfa meal from *sun-cured* hay (fine stemmed, leafy) will usually provide 3 or more times as much vitamin A potency and at least 1½ times as much vitamin D as required by pregnant and lactating sows.

Management of Gilts Prior to Breeding

Replacement gilts should be separated from market pigs when they are about 4 months old and weigh about 150 pounds. They should then be fed to gain approximately 1 pound daily until shortly before breeding season. They may be limit-fed 4 to 5 pounds per head per day or full-fed a bulky ration similar to gestation rations until 2 weeks before breeding.

Flushing may be accomplished by increasing their feed intake to 6 pounds per head per day about 10 to 14 days before breeding and continuing until all are bred.

Feeding During Gestation

Avoid getting sows too fat. Heavy feeding immediately after breeding can cause serious losses to developing embryos. Hand-feeding to control weight gain is recommended.

A bulky, high-fiber, self-fed ration containing 30 to 40 percent alfalfa meal may be used if labor to permit hand feeding is not available. A gain of about 80 pounds during pregnancy is usually considered adequate, providing proper feeding is followed late in pregnancy.

In restricting feed intake, it is important to provide adequate trough space for each sow so that boss sows do not have an advantage. Provide individual stalls or spread the feed thinly over a large area so all sows have an equal chance for the feed.

Provide at least 0.9 pound of total protein per sow per day during the last third of the gestation period. The following levels of feeding will accomplish this:

- 5 pounds of 18 percent protein feed ($5 \times 0.18 = 0.9$)
- 6 pounds of 15 percent protein feed ($6 \times 0.15 = 0.9$)
- 7 pounds of 13 percent protein feed ($7 \times 0.13 = 0.9$)

Gilts weighing about 250 pounds at the beginning of gestation may be fed 4 pounds per head daily the first month, 5 pounds daily the second month, 6 pounds daily the third month, and 6½ to 7 pounds daily the last 3 weeks of gestation. These levels can be altered according to the sow's condition.

Rations for hand-feeding during gestation

Nutrient	Suggested rations				
	1	2	3	4	
Ground yellow corn, lb.	65	75	65	75	
Ground oats, lb.	10	.....	10	.....
Alfalfa meal, 17%, lb.	10	10	10	10	
and {	Soybean oil meal, lb.	8	10	5	6
	Linseed oil meal, lb. ....	.....	.....	4	4
	Tankage, 60%, lb.	5	4	5	5
	Dicalcium phosphate, lb.	1	0.7	0.5	0.5
	Ground feeding limestone, lb.	0.2	0.2	0.3	0.3
	Iodized salt, lb.	0.5	0.5	0.5	0.5
	Vitamin supplement*	.....	.....	.....	.....
or {	Substitute the following amounts of a 36% sow supplement, lb.	17	18	17	18

* Supplement should provide 200,000 I.U. vitamin A, 20,000 I.U. vitamin D, 100 mg. riboflavin, 300 mg. calcium pantothenate, 300 mg. niacin, and 500 mcg. vitamin B₁₂ per cwt. of ration.

Other Suggested High-Energy Gestation Rations

- 76 pounds ground yellow corn
- 24 pounds 36 percent protein sow supplement (or equivalent)

- 88 pounds ground barley
- 12 pounds 36 percent protein sow supplement (or equivalent)
- Sows may also be hand-fed equal parts of corn (or barley), oats, and good quality alfalfa plus 1 gallon of skim milk (or buttermilk) per head per day.

Rations for self-feeding during gestation

Ingredient	Bulky rations for self-feeding				
	1	2	3	4	
Barley (ground), lb.	22	.....	.....	.....
Ear corn (ground), lb. ....	.....	.....	35	.....
Shelled corn (ground), lb. ....	.....	26	.....	45
Oats (ground), lb.	25	20	15	.....
Alfalfa hay, good quality (ground), lb.	45	45	40	45	
and {	Soybean oil meal, lb.	3	4	5	5
	Tankage or meat scraps, lb.	4	4	4	4
	Trace mineral salt, lb.	0.5	0.5	0.5	0.5
	Steamed bonemeal, lb.	0.5	0.5	0.5	0.5
	Vitamin B ₁₂ , mg.	0.5	0.5	0.5	0.5
or {	The following amounts of a 36% sow supplement, lb.	10	11	14	12

Silage Feeding

The primary disadvantage of silage feeding is the weight and volume of material that must be handled. Silage contributes little to the nutrition of sows, except for the corn it may contain. Grain and protein-mineral-vitamin supplement must also be fed.

Pastures for Gestating Sows

Grass-legume pastures are excellent for sows during gestation. Pastures make it possible to limit the feeding of grain and protein supplements. Usually 2 to 4 pounds of grain daily per sow is enough. One-half to three-quarters pound of sow supplement should be adequate during the last one-third of pregnancy.

Minerals should be provided free-choice to swine on pasture. A suggested mixture would be: 2 parts feeding limestone, 2 parts bonemeal or dicalcium phosphate, and 1 part trace-mineral salt.

Farrowing and Baby Pig Management

Farrowing Tips

- ◆ Consider using farrowing stalls to help save baby pigs. Contact your county extension office for a copy of University of Minnesota M-Sheet M-136 "Sow Herd Quarters and Farrowing Units."

- ◆ Move sow to farrowing barn about the 109th day of gestation. The average gestation period is between 112 and 115 days.
- ◆ Scrub sow with warm soapy water before placing in farrowing area. This will remove worm eggs and break the cycle for other disease-producing organisms.
- ◆ Feed a moderately laxative farrowing ration.

A typical farrowing ration

Ingredient	Pounds
Ground yellow corn	65
Alfalfa meal	5
Wheat bran	10
Soybean meal (44%)	10
Linseed meal	5
Tankage (60%)	3
Ground limestone	1
Dicalcium phosphate	0.5
Trace mineralized salt	0.5
Vitamin premix supplement*	

* Vitamin supplement to provide 200,000 I.U. vitamin A, 20,000 I.U. vitamin D, 100 mg. riboflavin, 300 mg. calcium pantothenate, 300 mg. niacin, and 500 mcg. vitamin B₁₂ per cwt. of ration.

- ◆ Feed about 6 pounds daily of farrowing ration until the day before farrowing. Give only fresh water for 12 hours after farrowing. Then restrict feed level for first 2 days following farrowing to avoid excessive milk flow and caked udders. A typical feeding sequence for the 1st, 2nd, 3rd, and 4th day after farrowing is 2, 4, 6, and 6 pounds of feed, respectively. Sows are then adjusted to full feed.

- ◆ Clip large baby pig needle teeth with a specially designed nipper at birth. A side-cutter pliers can be used, but take care not to injure the gums when removing the teeth.

- ◆ Use heat lamps when temperatures are below 50° F. (200-watt bulbs are commonly used). Suspend lamps 24 to 30 inches above the floor in creep area where pigs are protected from the sow and free from drafts. Hang lamps by a chain or separate wire, not by the electric cord. Use a protector or shield. If possible, locate electrical outlets so that lamps disconnect before they touch the bedding if the chain or wire breaks.

- ◆ Prevent anemia by using one of the following practices (milk is low in iron content):

- Give 150 to 200 mg. of injectable iron in form of iron dextran or iron dextrin when the pigs are 3 to 7 days of age. This level will protect baby pigs until they are eating sufficient amounts of creep feeds.
- Or swab sow's udder *daily* with iron sulphate solution. Dissolve 1 pound in 2 quarts of boiling

water and store in crockery or glassware container. Continue until pigs are 5 to 6 weeks of age—assuming pigs are creep fed.

- Or mix 1 tablespoon of iron sulphate per gallon of fresh, uncontaminated black soil and feed free-choice. A new, fresh supply (preferably from under line fences) should be provided every 2 to 3 days.

Feeding During Lactation

Start substituting lactation rations for farrowing rations about 5 days after farrowing. Some suggested sow lactation rations are shown below:

Lactation rations

Ingredient	Suggested lactation rations				
	1	2	3	4	
Ground yellow corn,* lb.	77	80	70	73	
Alfalfa meal, lb.			10	10	
and {	Soybean meal, lb.	20	12	18	11
	Tankage, 60%, lb.		6		5
and {	Dicalcium phosphate, lb.	1.3	0.4	1.1	0.6
	Ground feeding limestone, lb.	1	0.7	0.8	0.1
or {	Iodized salt, lb.	0.5	0.5	0.5	0.5
	Vitamin supplement †				
or {	Substitute the following amounts of a 36% sow supplement, lb.	25	24	22	21

* Ground oats can replace 10 to 15 percent of the corn.

† Vitamin supplement to provide 200,000 I.U. vitamin A, 20,000 I.U. vitamin D, 100 mg. riboflavin, 300 mg. calcium pantothenate, 300 mg. niacin, and 500 mcg. vitamin B₁₂ per cwt. of ration.

Feeding the Baby Pig

Protein, mineral, and vitamin* requirements

Nutrient required per cwt. feed	Pigs up to 40 pounds	Pigs 40 to 100 pounds
Crude protein, lb.	16-18	15-16
Calcium, lb.	0.8	0.6
Phosphorus, lb.	0.6	0.5
Salt, lb.	0.5	0.5
Vitamin A, I.U.	60,000	40,000
Vitamin D, I.U.	9,000	6,000
Riboflavin, mg.	150	120
Pantothenic acid, mg.	500	450
Niacin, mg.	500	500
Vitamin B ₁₂ , mcg.	500	500

* Additions of 200,000 I.U. vitamin A, 20,000 I.U. vitamin D, 100 mg. riboflavin, 300 mg. calcium pantothenate, 300 mg. niacin, and 500 mcg. vitamin B₁₂ per cwt. of ration will provide slightly more than adequate vitamin supplementation for pig starters. Most pig starters will contain 50 to 100 grams antibiotic per ton of ration.

For grower rations, 100,000 I.U. vitamin A, 10,000 I.U. vitamin D, 50 mg. riboflavin, 300 mg. calcium pantothenate, 300 mg. niacin, and 500 mcg. vitamin B₁₂ per cwt. of ration is adequate supplementation. To support maximum growth, 10 to 20 grams of antibiotics are added per ton of ration.

Creep Feeds

A healthy pig weaned at 5 weeks of age will often eat about 40 pounds of starter feed by the time he weighs 40 pounds. Pigs weaned at 8 weeks will eat 25 to 30 pounds of starter feed.

A simplified 16 to 18 percent protein starter ration can be made by mixing ground shelled corn with a protein supplement.

Corn-soybean meal type starters containing 18 percent protein supported satisfactory rates of gain and feed conversion efficiencies in recent University of Minnesota trials. Here is an example of a simplified 18 percent protein starter ration:

Starter ration

Ingredient	Pounds
Finely ground yellow corn	70
Soybean meal, 44%	26
Dicalcium phosphate	1.3
Ground limestone	1.2
High-zinc trace mineral salt*	0.5
Vitamin-antibiotic premix†	1.0

* Contains 0.8 percent zinc and supplies 40 p.p.m. supplemental zinc when added at 0.5 percent of complete ration.

† See table above for vitamin-antibiotic supplementation.

Selection of Breeding Stock

More efficient production of a high quality meaty carcass is the basic goal of every swine producer. This means breeding for improvement in sow productivity, rate and efficiency of gain, soundness, and carcass merit. Improvement through breeding depends upon the job you do in selecting the males and females who will contribute their genes to the next generation. Performance should be considered in selecting both boars and gilts for your breeding herd.

Heritability

The expected rate of improvement through selection depends on the extent to which the trait is inherited. Highly heritable traits can be improved more rapidly than traits with lower heritabilities.

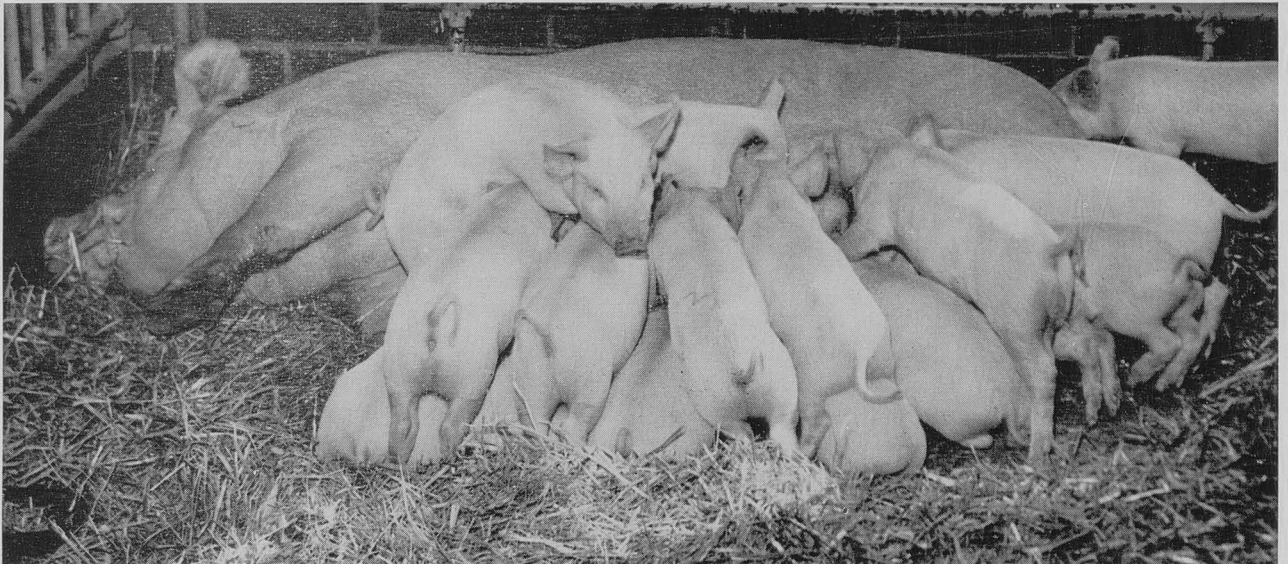
Heritability estimates

Level of heritability	Trait	Average percent
High	Carcass length	60
	Percent ham of carcass weight	60
	Backfat thickness	50
	Loin eye area	50
Medium	Percent lean cuts of carcass weight	35
	Feed required per 100-pound gain	30
	Growth rate—wean to market weight	30
	Five-month weight	25
Low	Weaning weight	15
	Number farrowed	10
	Number weaned	10
	Birth weight	5

Gilt Selection Program

A simplified program to aid in selecting the most productive gilts for the breeding herd is outlined below:

- ▶ At farrowing time ear notch gilts:
 1. from litters of 9 or more pigs;
 2. with at least 12 well-spaced nipples;
 3. from litters free of abnormalities and inherited defects;
 4. from litters with healthy, uniform-sized pigs.
- ▶ At weaning time cull any gilts not making good sow prospects. Do not keep gilts from litters with ruptures or other defects.



Large litters of healthy pigs are essential for profit.

- ◆ If possible, separate potential replacement gilts from market pigs when they weigh approximately 150 pounds.
- ◆ Make final selections as gilts approach 200 pounds:
 1. select only gilts with sound underlines free from inverted nipples;
 2. select faster gaining gilts; consider weighing and calculating age at 200 pounds.
 3. select gilts with least fat; gilts may be probed for backfat thickness at approximately 200 pounds or visually appraised to estimate backfat thickness.
 4. cull off-type gilts, select well-muscled gilts with adequate length, and straight, strong feet and legs.

Boar Selection

When buying a herd boar insist on at least the following records and levels of performance:

- Weigh at least 200 pounds at 165 days of age.
- Have not more than 1.2 inches backfat at 200 pounds.
- Come from a performance-tested herd with good carcass cutout.

Present meat-type certification requirements for pigs weighing 190 to 220 pounds

Carcass length	at least 29 inches
Backfat thickness	not more than 1.6 inches
Loin eye area at 10th rib	at least 4.0 square inches

Yield of ham and loin, although not required for certification, should equal at least 26 percent of liveweight or 37 percent of carcass weight.

Crossbreeding

Crossbreeding refers to the mating of individuals from different breeds or lines of breeding. The basic goal is to increase profits for commercial hog production through hybrid vigor resulting from crossing genetically different lines or breeds. Hybrid vigor, or heterosis, is defined as the superiority of crossbred offspring over the average of their parents. Crossbreeding also allows a breeder to utilize the strong points of different breeds.

The following is a summary of results expected from crossbreeding due to hybrid vigor.

Crossbreeding can increase:

1. litter size (crossbred sows farrow and wean larger litters);
2. livability (ruggedness and survival);
3. growth rate.

Crossbreeding will not:

1. substantially increase feed efficiency;
2. increase meatiness;
3. cover poor management;
4. lose its effectiveness or cause pigs to "run out"

if good performance tested breeding stock is used.

Crossbreeding Program Considerations

Choose breeds to be used for crossing carefully. The weak points of one breed should be paired with the strong points of another breed so the overall performance of the crossbred pig is better than either of the breeds used in the cross.

Crossbred sows farrow and wean larger litters than the average of the breeds making up the cross. Litter size is lowly heritable and cannot be greatly improved through selection alone. It is important that at least one of the breeds used in the breeding program be above average in litter size.

Growth rate has a medium heritability and can be improved by selecting the fastest gaining individuals within any breed.

Carcass desirability is not improved by crossbreeding. Crossbred pigs are intermediate in meatiness between the two parents, so parents should be meat-type regardless of breed. Meatiness is highly heritable and can be improved rather rapidly through selection.

There are outstanding individuals and herds in all breeds; the average performance for the major breeds is estimated in the following table:

Approximate performance of major swine breeds

Breed	Litter size	Growth rate	Meatiness
Berkshire	—	—	A
Chester White	A	A	—
Duroc	A	+	—
Hampshire	A	A	+
Landrace	+	A	A
Poland China	—	A	+
Spotted	A	A	A
Yorkshire	+	A	A

Symbol code: + = above average; A = average; — = below average.

Suggested crossbreeding systems using major breeds

Group I	Group II	Group III
Landrace	Berkshire	Chester White
Yorkshire	Hampshire	Duroc
	Poland China	Spotted

Gilts from group I cross well with boars from group II for the first cross. The next cross can be with a boar from group III if a three-breed rotation is desired. For example, a Yorkshire-Hampshire-Duroc rotation is a possible crossbreeding program using three breeds.

For more detailed information on selection and crossbreeding, contact your county extension office for a copy of Extension Bulletin 306, "Improving Swine Through Breeding."

