Profitable
PORK PRODUCTION
in Missouri

CIR. 734 JANUARY, 1961

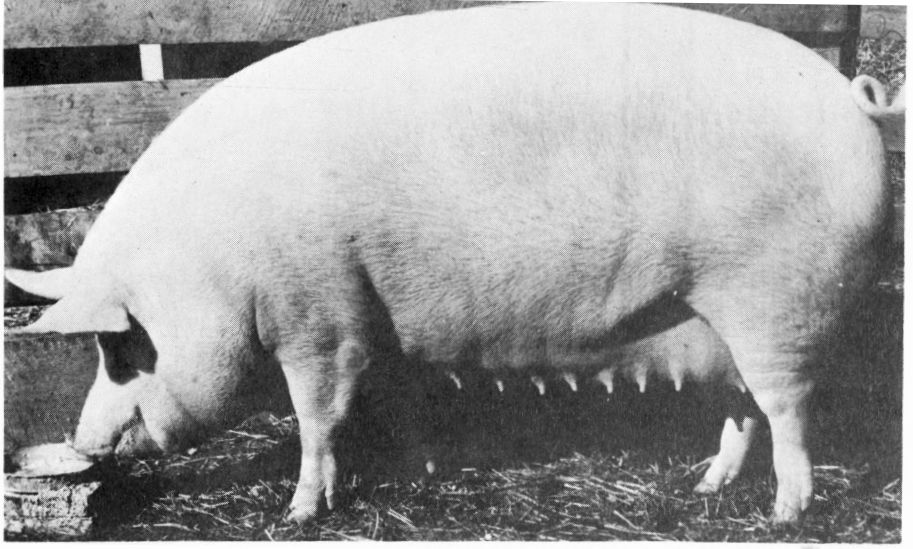
UNIVERSITY OF MISSOURI AGRICULTURAL EXTENSION SERVICE

CONTENTS

PROFITABLE PORK PRODUCTION

in
Missouri

by
Homer B. Sewell
Extension Animal Husbandman



An example of a good mammary system with a large number of sound udder sections. A sow must have a good mammary system to wean large, thrifty litters.

CHAPTER 1

Selection of Breeding Stock

Today's consumer demands high quality pork that has a high percentage of lean. In selecting breeding stock, the producer should keep in mind the type of hog that yields a carcass that satisfies this consumer desire, yet is economical to raise.

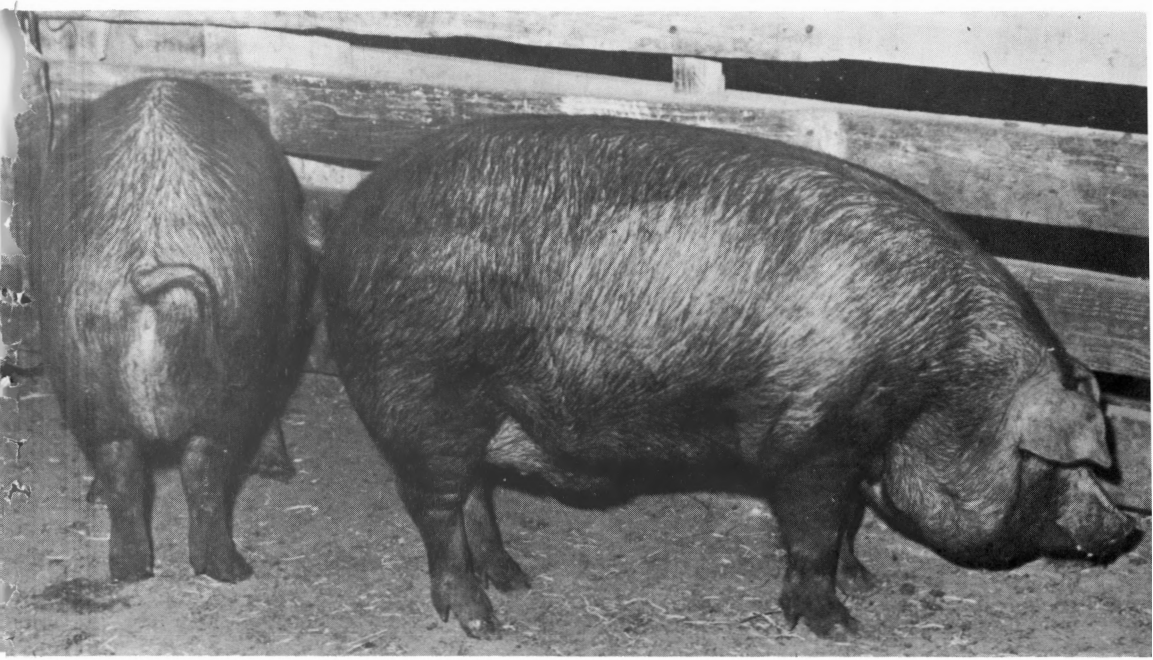
Production records on each litter are necessary to select good breeding stock. Ear notch pigs to identify litters, so a record of each sow's production can be kept. Choose your gilts and boars from large, fast-gaining litters that have superior meat-type qualities. A heavy litter at weaning is an indication of a sow that is prolific, a good mother, and a good milker.

Pick individuals that have length and are well-muscled and trim. They should be muscular and heavy in their hams and loin, have strong bone and stand squarely on sound feet and legs. Depth and width through the heart girth are an indication of vigor and good constitution.

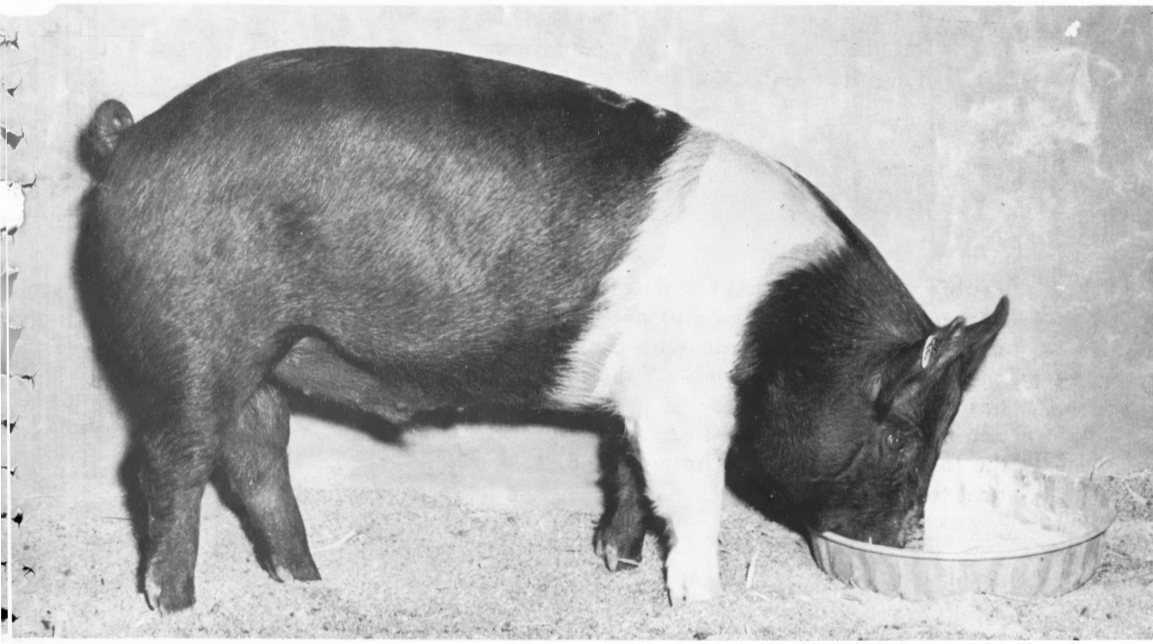
Avoid animals that show lardiness and lack muscling.

Indications of excess fat are a countersunk tail, flabby hams, sides that taper from top to bottom, a roll of fat over the neck and shoulders and a heavy jowl. Probe boars and gilts at 180 to 200 pounds to determine the amount of backfat.

Obtain carcass data on litters with good production records whenever possible and select breeding stock from the meatiest litters.



These over-fat market hogs are very wasty and lack muscling.



Notice the heavy ham, muscling, and firmness exhibited by this good meat-type barrow.

TABLE 1-REQUIREMENTS FOR A CERTIFIED MEAT TYPE LITTER

1. Production registry litter of 8 or more pigs.
2. Two pigs must be slaughtered.
3. They must weigh 200 pounds by 180 days of age.
4. Both must meet or exceed these carcass standards:
   a. Cannot weigh over 220 pounds when slaughtered.
   b. Length 29 inches or more (front of first rib to front of aitchbone.)
   c. Backfat 1.6 inches or less.
   d. Loin eye 4 square inches or more (backside of 10th rib.)

Selecting Gilts

Select gilts from the high producing sows. If you are raising purebreds, give preference to gilts from certified meat-type litters. Table 1 gives standards for meat-type certification of a litter.

Standards for Selecting Gilts:

1. From litters of 8 or more pigs weaned.
2. Weigh 200 pounds by 5½ months when full fed a growing-finishing ration.
3. Probe 1.4 inches or less of backfat at 200 pounds.
4. Have 12 or more well-spaced functional teats.
5. From uniformly good litters.

Probing a gilt for backfat. The skin is punctured with a knife point and three measurements are made with a small metal ruler, 1½ to 2 inches off the midline at the following places: (1) about one inch back of the front elbow, (2) at the last rib, (3) halfway between No. 2 and the base of the tail.

Notice the plump ham, long rump, prominent teats and depth of body on this meat-type gilt.

A young meat-type boar showing length, fullness of ham, good bone, and a trim underline.

Selecting the Boar

A good boar is essential to herd improvement because he furnishes half the inheritance. Use only purebred boars from meat-type herds with a reputation for good performance and freedom from disease.

Try to find a boar that is superior in the weak traits of your sow herd. Give preference to boars that made good records on a performance test and are from certified meat-type litters and strains.

Look for a boar that is muscular and has good length. He should be heavy-hammed, wide-loined and trim. A boar should be heavy boned and strong in his feet and legs.

Standards for Picking Boar

(1) is from a litter of 8 or more raised;
(2) weighs 200 pounds at 5 months;
(3) probes 1.2 inches or less of backfat at 200 pounds;
(4) has made 100 pounds of gain for each 300 pounds of feed or less from weaning to 200 pounds.
(5) has superior individuals for close relatives.

Crossbreeding

If you are a commercial producer, a systematic crossbreeding program will have some advantages. Crossbreeding will increase the number of pigs farrowed, the number of pigs weaned, and rate of gain, but will have little effect on efficiency of gain and make no improvement in carcass quality. Crossbreeding will give greatest improvement under poor environmental conditions. Table 2 shows the advantages to be expected from crossbreeding swine.

TABLE 2-ADVANTAGE OF CROSSBREEDING USING TWO AND THREE BREEDS

Trait	Improvement over Purebreds of:	
	2-Breed Cross	3-Breed Cross
	Percent	Percent
Number of pigs born	0	7
Number of pigs at 56 days	19	42
Weight per pig at 56 days	7	7
Weight per litter at 56 days	28	51
Rate of gain after weaning	7	7
Feed per 100 pounds of gain	0	0

Comparisons have shown that using three breeds will give maximum benefit from crossbreeding. Rotate purebred boars from these breeds on your sow herd and select the crossbred gilts for replacements. Changing boars each year and keeping gilts for two litters is a simple system that works well. However, the advantage of keeping high producing sows and superior boars in the herd should be considered. Older sows will farrow more pigs and wean heavier litters than gilts on the average.

A crossbreeding program will be successful only if superior boars are picked to use on your best crossbred gilts; gilts that come from large, fast-gaining, meaty litters.

CHAPTER 2

Farrowing Systems

One Litter Per Year

Gilts are bred to farrow in the spring or early summer. After the pigs are weaned, the gilts are fattened for market. Replacement gilts are saved from the pig crop or purchased and bred to farrow the following spring.

Advantages:

1. This system requires little housing, expensive equipment, or labor.
2. Good use is made of pasture which provides easier sanitation and disease control.
3. It fits well where hogs are used primarily to glean cornfields or follow cattle in the foodlot.

Disadvantages:

1. This system doesn't lend itself to high volume production.
2. Efficiency is apt to be lower than with other systems.
3. Hogs are marketed at a time when prices are usually low for the year.

Two Litters Per Year

Most hog producers in Missouri follow the two-litter system of production though there is a trend toward multiple farrowing. If properly timed, the two-litter system will produce hogs that are marketed at the time of year when hog prices are usually at their seasonal high. Table 3 shows the months when hog prices are normally best. Plan your farrowing dates so that your hogs will be marketed at this time. Good farrowing periods are late January and February for winter litters and the last of July and August for fall litters.

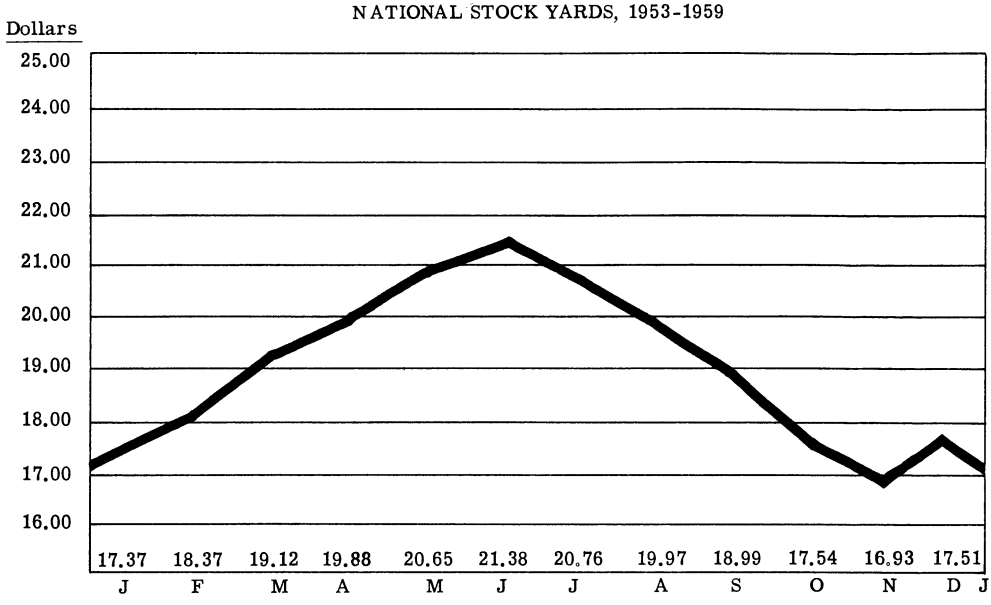
The two-litter system has been popular because it doesn't compete with row crops for labor at farrowing time. However, good equipment is needed to save pigs that are farrowed in the winter.

Multiple Farrowing

More hog raisers are following a system of farrowing several times during the year. Much of the current leveling out of the number of hogs marketed in different seasons of the year is attributed to multiple farrowing.

A common multiple system, where the pigs are raised in confinement, is to farrow three sets of sows twice a year, spacing farrowings two months apart. The

TABLE 3–AVERAGE MONTHLY PRICE OF 200-220 POUND BARROWS AND GILTS AT NATIONAL STOCK YARDS, 1953-1959



sows are exposed to the boars for a four-week period. Those that don't settle are marketed or carried over to the next period.

Two sets of sows are used in the four-litter system. The farrowings are spaced so that the same facilities can be used for both sets.

The five-litter system is a modification of the two-litter system. Three sets of sows are farrowed in the winter months and are grouped into two sets for late summer farrowing. A typical farrowing schedule for this system would be December, January, February, late July and August.

Advantages:

1. Lends to large volume production.
2. Makes fuller use of equipment and labor.
3. Levels out the number of hogs marketed by months, which is good for the industry and provides the operator with a steadier income.
4. Reduces housing and equipment costs per hog but not in proportion to the increase in farrowing since some facilities and inputs must be wholly or partially duplicated.

Disadvantages:

1. Greater management skill is necessary to time breeding dates and other management practices.
2. Sanitation and disease problems are often increased.
3. More lots and pens are required for different ages of hogs.
4. The average sale price of hogs may be less than when hogs are farrowed to sell at the high seasonal price periods of the year.

CHAPTER 3

Breeding Program

Age to Breed

Breed gilts when they are about eight months old and have had three or more heat periods. Breeding gilts too young may result in small litters, weak pigs, and difficulty at farrowing time.

Boars should be 8 months old and weigh at least 250 pounds before they are used for service.

Time to Breed

The interval between breeding and farrowing in swine is about 114 days. Sows usually come in heat 3 to 5 days after farrowing but few will settle at this time. Weaning the pigs when they are 6 to 8 weeks old will usually cause a sow to come in heat in 3 to 4 days. When two litters a year are produced, the sow is usually bred at this heat period. If pigs are weaned under three weeks of age, it is best to wait until the second heat period after weaning before breeding the sow.

The heat period is 40 to 45 hours long in gilts and may be close to 65 hours in sows. Mating sows twice during the heat period will increase the settling rate and in some experiments 1 or 2 more pigs per litter have been farrowed. The sow should be bred on the first and second day of heat with the matings spaced 12 or more hours apart. More eggs are shed during the latter part of the heat period. If only one mating is to be made, the second day of heat would be nearest the time of largest egg release.

Hand Mating

Hand mating is where the boar is confined and the sows are brought to him for breeding. This system is often followed in purebred herds.

Accurate breeding dates are obtained and a boar can handle more sows under this system. Allow 15 to 20 sows for young boars and 25 to 30 sows for mature boars 15 months of age or older when hand mating.

Maximum Number of Services Per Boar

	Per Day	Per Week
Mature Boar	3	12
Junior Boar (Under 15 Months)	2	8

Pasture Mating

Allowing the boar to run with the sows requires less time and labor. Pasture breeding is usually preferred when there are only 10 to 15 sows in the herd and

exact breeding dates are not necessary. One mature boar, 15 months of age or older should be provided for each 15 to 20 sows. For younger boars allow 8 to 10 sows per boar.

If you have more than one boar, use one of these systems with pasture breeding: (1) divide the sow herd and turn one boar with each sow group, or (2) turn one boar or group of boars with the sows on day and then alternate the other boar or group of boars with the sows the next day. Alternating the boars is usually preferred over dividing the sow herd.

Flush Sows

A sow should be in a thrifty condition when bred, neither too fat nor too thin. Increasing the feed intake of sows before they are bred so they will be in a gaining condition is called "flushing." This should be started 10 to 14 days before breeding and continued until all sows are bred. There is little experimental evidence to support this practice, but most producers think flushing causes the sow to settle more readily and farrow more pigs. Worm the sow shortly before breeding and guard against reinfestation through the gestation period.

Care of the Boar

A boar should be active, in good health, and not too fat if he is to perform well in the breeding season. An exercise lot of ¼ acre is adequate for boars. Boars of the same size and maturity may be turned together. The tusks of mature boars should be removed when they are turned together; also at the start of the breeding season to make them safer to handle.

The boar should be fed a ration similar to that of the sows. Boars should be fed about 1 pound of concentrate daily per 100 pounds of body weight. One to 1¼ pounds of this concentration should be a 35 to 40 percent protein supplement or its equivalent. If a bulky ration has been used to maintain the boar between breeding seasons, change to a 14 to 15 percent protein growing-finishing ration or one of the sow rations in Table 4 during the breeding period. Increase his ration two to three weeks before breeding time so he will be in a gaining condition.

Feeding Gilts and Young Boars

Keeping gilts on a fattening ration until they weigh 180 to 200 pounds before selecting replacement gilts has some advantages. By then the gilts are more fully developed and you can score them better for carcass and feedlot performance traits. The selected gilts should be changed to a gestation ration (see Table 4) to grow them to breeding age. Gilts should gain about 1 pound daily on this ration but should not fatten.

Self-feed boars a fattening ration until they weigh 200 pounds. Then limit their ration by hand feeding or changing to a bulky ration that will cause the boar to continue to grow and remain thrifty. Use this limited ration until two weeks before breeding time.

Green pasture is an important part of a pregnant sow's ration.

CHAPTER 4

The Gestation Period

Feeding the Pregnant Sow or Gilt

Proper feeding of the unborn pig is important. The ration fed from breeding to farrowing affects the number and size of pigs born. It also influences the milking ability of the sow and the number of pigs weaned. A pig weighing 2½ pounds at birth has a much greater chance of being weaned than one weighing less than 2 pounds.

Less is known about the nutritional requirements for swine during reproduction than at any other stage of their life cycle. Good pasture is one of the best safeguards against nutritional deficiencies during gestation. Ladino clover, alfalfa, red clover and small grains are excellent pastures for sows. One acre of good legume pasture will carry 8 to 10 sows or 10 to 12 gilts.

When green pasture is not available green feed should be supplied with alfalfa leaf meal, ground alfalfa hay, or lespedeza hay as part of the ration. Hay less than one year old should be used since it loses vitmin A content in storage.

Control the amount of feed so that sows and gilts will not get too fat. Sows should gain 60 to 80 pounds and gilts 75 to 100 pounds from breeding to farrowing. Increase the amount of feed in the last one-third of the gestation period to meet the increased needs of the unborn litter.

Take care to insure that the gestation ration is adequate in protein, vitamins, and minerals. Minerals can be supplied by self feeding a mixture of equal parts limestone and salt or by mixing minerals in the ration.

Feeding on Pasture

Sows need about ½ pound and gilts ¾ pound of a 40 percent protein supplement daily when on good pasture. Sows need about 2 pounds and gilts about 3 pounds of a grain ration daily on high quality pasture for best performance.

SCHEDULE FOR FEEDING RATIONS IN TABLE 4 TO GILTS OR SOWS

1. Hand-feed 6-7 pounds of the sow ration per head daily from 10-14 days before breeding starts until all sows are bred.

2. Feed 4-5 pounds daily for the first 2/3 of the gestation period.

3. Feed 6 pounds daily the last 1/3 of the gestation period.

4. Change level of feeding to maintain proper condition of sow or gilt. Don't get them too fat. Older sows on excellent pasture may not need over 3 pounds of the ration daily.

5. Three to four days before farrowing, replace one-half of the sow's daily ration with wheat bran or gound oats.

6. After farrowing, limit feed for 3 days by hand-feeding or limited access to self-feeder.

7. Bring sow to a full feed by 7-10 days, and continue throughout lactation.

Feeding in Dry Lot

A general rule for hand feeding in dry lot is to give sows 1 to 1½ pounds and gilts 1½ to 2 pounds of ration daily for every 100 pounds of live weight. Sows in dry lot need around 1 pound and gilts 1¼ pounds of a 40 percent protein supplement daily.

TABLE 4-RATIONS FOR SOWS OR GILTS
(1,000-Lb. Mix)

Ration	Dry Lot	Pasture
Percent Protein	15%	14%
Corn	800 lb.	828 lb.
Soybean Oil Meal	110 lb.	110 lb.
Tankage or Meat and Bone Scraps	50 lb.	50 lb.
Alfalfa Meal	28 lb.	---
Salt	5 lb.	5 lb.
Bonemeal	4 lb.	4 lb.
Limestone	3 lb.	3 lb.
Vitamins[1]	+	---
Vitamin B_{12}, Milligrams	5 lb.	5 lb.

[1]Add the following amounts of vitamins per 1,000 pounds of ration;

Vitamin A	1,100,000 I.U.
Vitamin D	182,000 I.U.
Riboflavin	2 grams
Pantothenic Acid	4 grams
Nicotinic Acid	9 grams

Hand Feeding vs. Self Feeding.

Hand feeding sows once a day during gestation is more satisfactory than self feeding on most farms. You naturally watch sows more closely when you hand feed them and are less likely to get them too fat. Hand feeding saves feed when sows are grazing good pastures like alfalfa and ladino. Self-fed sows do

not graze readily so they wind up with too much feed and not enough pasture. Self feeding may save labor and protect against timid sows being undernourished.

Table 5 gives bulky rations that are satisfactory for self feeding. These rations can be used for either dry lot or pasture feeding. If the sows or gilts become too fat, substitute finely ground corn cobs or alfalfa hay for part of the grain in the ration.

TABLE 5-RATIONS FOR SELF-FEEDING PREGNANT SOWS AND GILTS

Percent Protein	14.7	13.4
Ground Ear Corn	---	450
Ground Shelled Corn	320	---
Ground Oats	300	300
Alfalfa Meal or Ground Alfalfa Hay	300	150
Soybean Oil Meal	40	60
Tankage or 50% Meat and Bone Scrap	30	30
Salt	5	5
Bone Meal or Dicalcium Phosphate	5	5
B Vitamins:[1]		
Riboflavin, grams	---	1
Pantothenic Acid, grams	---	2
Vitamin B_{12}, milligrams	4	4

[1]B vitamin additions will not be needed on pasture.

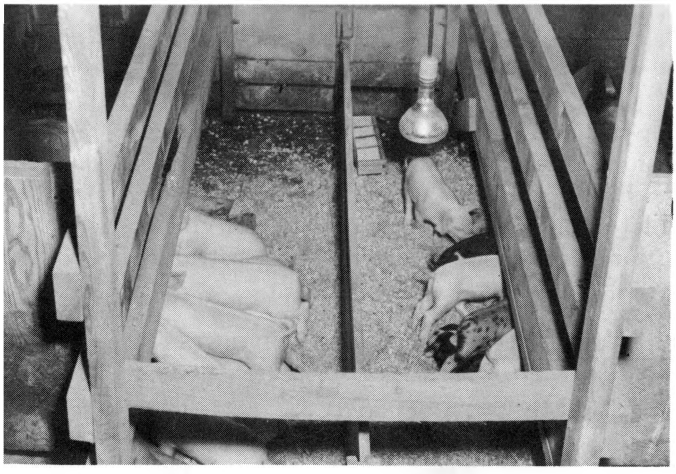
Silage for Gestation

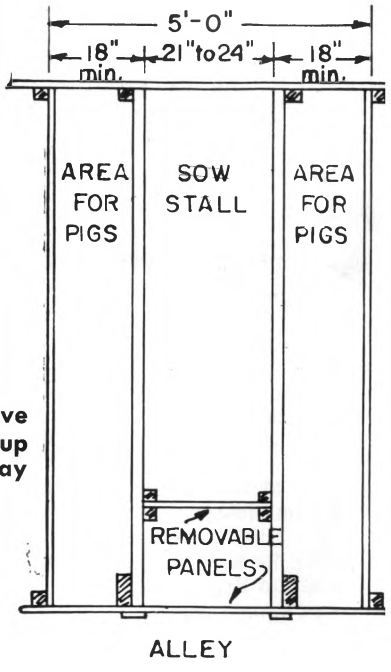
Corn silage, when properly supplemented, is a cheap and satisfactory ration for pregnant sows and gilts. The silage may be self fed. Sows will need 10 to 14 pounds daily and gilts 8 to 12 pounds. Supplement the corn silage with minerals and 1 to 1½ pounds of a 35 to 40 percent protein supplement per head daily. A pound or more of grain may be needed to maintain the condition of the animals. Moldy silage should not be fed to hogs.

Alfalfa or alfalfa-brome silage has been fed successfully to sows. It is higher in protein but lower in energy than corn silage. With such silage you need to supply ¾ to 1 pound of a 40 percent protein supplement and 2 to 3 pounds of grain per head daily.

Before Farrowing

About 3 to 4 days before she farrows add bulk to the sow's ration to prevent constipation while she is penned. The amount of feed need not be reduced. If you are hand feeding, mix the sow's ration half and half with wheat bran or ground oats. If you are self feeding, add one-fourth bran to the ration.





Farrowing stalls are popular. They help save pigs. The stalls pictured, above, can be set up and then dismantled when not in use. Stalls may also be used in individual houses.

CHAPTER 5

Preparation for Farrowing

Type of Farrowing House

Farmers are getting good results from both central farrowing houses and portable houses under proper management. Central farrowing houses may save labor and be better adaped to a multiple farrowing system where sows are being farrowed several months of the year. Portable houses cost less and can be moved to a pasture to house the sow and litter until weaning time. Portable houses can be arranged around a concrete slab for winter farrowing. Water and electricity can be supplied to the houses at the slab.

A farrowing pen for a mature sow should have approximately 50 to 65 square feet. This may be a 6′ x 8′ or 8′ x 8′ individual house or pen. Put guard rails 8 inches above the bedding and 8 inches from the wall.

Either pens or stalls or both pens and stalls can be used in a central farrowing house. One system is to have one-fourth as many farrowing stalls as sows to be farrowed during one period. The remainder of the house is used as pens. Sows are kept in the stalls for one week after farrowing; then they are moved to pens for the remainder of their stay in the farrowing house. Some producers prefer farrowing stalls for all the sows and only a few pens. A desirable practice is to turn sows out of the farrowing stall twice a day to a concrete feeding floor for feed, water, and exercise.

Your county agent has plans for hog houses and equipment.

Clean Farrowing Quarters

A clean farrowing house is the starting point in a good swine sanitation program. Clean and disinfect your farrowing house to reduce chances of pigs picking up diseases and parasites. Scrape the floor and sides to remove caked manure and bedding. Then scrub the house with boiling lye water (1 pound lye to 20 gallons of water.) The lye will help remove dirt but heat is necessary to kill worm eggs and disease germs. A steam cleaner is best for cleaning and sterilizing a farrowing house.

Bed the house with a light layer of ground corn cobs, chopped straw, or shavings. Use just enough to keep the floor dry. Piling the bedding too high may cause the sow to lay on more pigs.

Preparation of Sow

Spray the sow for lice and mange 30 to 40 days before she goes to the farrowing house. This is to prevent infestation of the baby pigs. Move the sow to the farrowing quarters 4 to 5 days before she is due to farrow. This acquaints her with her new surroundings so she will be more settled at farrowing time.

Before moving the sow into the farrowing pen, scrub her with warm soapy water to remove worm eggs and dirt. In extremely cold weather dry the sow off by brushing her well after scrubbing.

Heat lamps will prevent baby pigs from being chilled in cold weather.

CHAPTER 6

Farrowing Time

Care of the Sow at Farrowing

Sows seldom need assistance at farrowing, but it is a good practice to be on hand while they farrow, especially in cold weather. A sow should finish farrowing within 2 to 3 hours. Administer help only if needed.

How to Feed After Farrowing

Give the sow plenty of fresh water after she farrows. If she seems hungry, offer her 1 to 2 pounds of a bulky feed like bran or ground oats for the first day. After the first day, regulate her feed by hand feeding or by allowing her a limited time at a self feeder. Gradually bring the sow to a full feed by 7 to 10 days after farrowing. When on full feed a mature sow suckling pigs should be eating around 10 to 14 pounds of feed a day.

Care of Baby Pigs

As soon as the pigs arrive, remove them from the surrounding membrane and clean mucus from their nose and mouth. Placing newly born pigs under a heat lamp or brooder may save some of them from being laid on or chilled.

Pigs may need help to nurse if the sow is restless. It is important that pigs receive colostrum milk soon after birth. Some recent research work has shown that the ability of a pig's body to absorb antibodies from colostrum milk decreases rapidly after birth.

You can change pigs to even up litters when two or more sows farrow within 48 hours. However, the pigs should be allowed to nurse and runt pigs should be destroyed before extra pigs in a litter are transferred to another sow.

Prevent Chilling

When the temperature drops below 65° Fahrenheit, baby pigs can be chilled. Research and experience have shown that heat lamps can save an average of 1½ more pigs per litter in cool weather by preventing chilling which often occurs soon after birth. Electric heat cables or hot water pipes installed in the floor or space heaters can be used in central farrowing houses to prevent chilling.

Two 250-watt infra-heat lamps are often used over farrowing stalls the first 12 to 24 hours after the sow farrows. One is placed over the farrowing area and one over the nursing area. After the first day, one lamp is used over the protected area for the pigs. Electric heat lamps or brooders must be used safely to prevent fire and burns on pigs.

Rules for safe use of heat lamps:

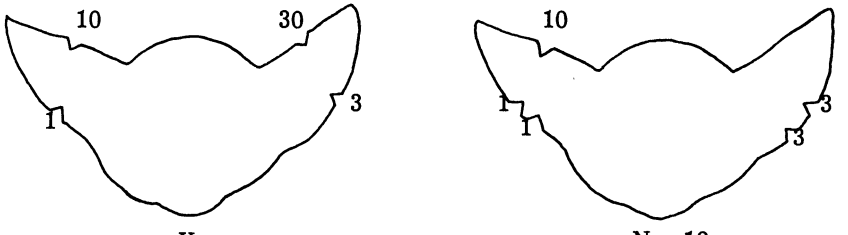
1. Suspend heat lamp 30 inches above bedding or 6 inches above back of animal (whichever distance in greater) when using it over farrowing area.
2. Suspend 24 inches above bedding when using it over the protected pig area.
3. Keep the lamp and cord out of reach of the sow.
4. Equip lamp with a porcelain socket and a bail for tipping fallen lamps away from bedding.
5. Don't suspend lamp from electric cord.
6. Locate electrical outlet over lamp and shorten electric cord so that lamp will unplug if it falls.

Clip "Needle" Teeth

Clipping the black "needle" teeth soon after birth is advisable if properly done. These small sharp teeth, four on a side, may cause the pigs to cut the sow's udder or injure each other's noses when fighting. Cut the tip of the tooth off with a pair of sharp side-cutter pliers. Be careful not to crush the teeth or injure the gums or you may do more harm than good.

Ear-Notch Pigs

Ear notch each pig by 24 to 36 hours after birth. Ear notching is necessary to identify sows and their pigs for production records and breeding stock selection. Purebred litters should be earmarked with the system recommended by the breed association. A simple earmarking system for identifying litters is shown in the drawing.



An ear notching system for identification of litters that is simple and easy to use.

All notches in the lower side of the right ear have a numerical value of 1; upper right 10; lower left 3 and upper left 30.

Guard Against Anemia

Pigs left on concrete or wooden floors for 2 weeks after farrowing may develop anemia and die or be stunted. Pigs farrowed on pasture in the winter when the weather is bad may develop anemia, too. The skin of anemic pigs is often wrinkled and the hair is rough. The skin, ears, and inside of the mouth

Ear notching pigs to identify litters is the first step in good breeding stock selection. Shown at left is a pair of side-cutter pliers for clipping needle teeth.

become pale and the pig may have difficulty in breathing and develop the "thumps."

Anemia is caused by a lack of hemoglobin in the red blood cells. Iron and copper are necessary elements for the formation of hemoglobin. The pig's body has a low store at birth and the sow's milk is deficient in both elements.

There are several satisfactory methods of preventing anemia in pigs. A recent method that is very effective is the injection of an iron compound into the pig at 2 to 4 days of age. Present research indicates that an injection of an iron dextran compound supplying a minimum of 100 milligrams of iron is needed to prevent anemia in baby pigs. Dirt also should be provided for the pigs to give added protection and eliminate the need for a second injection.

Other preventive methods that may be used are:

1. Placing worm-free soil in the pens.
2. Swabbing the sow's udder each day with an iron sulfate (copperas) solution. Mix by dissolving 1 pound of iron sulfate in 3 quarts of water.
3. Giving iron pills to pigs at regular intervals. Sometimes there is difficulty in getting the pigs to swallow the pills and they may cough them up.

All oral treatments must be given at regular intervals to be successful.

Anemia prevention measures should be continued until the pigs go to pasture or until they are eating about ⅓ pound of creep feed per head daily.

Creep Feeding

Pigs soon use all the milk given by the sow and need additional feed to make maximum gains until they are weaned. Pigs will start to eat by 10 to 14

days of age if creep feed is kept before them beginning the first week. Pigs are very efficient users of feed at this age and less feed is required to make a pound of gain compared to gains made after weaning.

A creep ration should be a high quality feed that is eaten readily. It should be a complete mixed feed that contains 18 to 20 percent protein and 40 to 50 grams of antibiotics per ton. The energy, mineral, and vitamin content of this ration must be high.

Good creep rations can be purchased or mixed with a mechanical mixer. Table 6 gives formulas for creep rations.

TABLE 6-CREEP RATIONS FOR PIGS

Ingredients	Ration 1	Ration 2
Percent Protein	18%	19%
Ground Yellow Corn	600 lb.	685 lb.
Rolled Oats	75 lb.	--
Soybean Oil Meal	235 lb.	160 lb.
Tankage or 50% Meat and Bone Scrap	25 lb.	80 lb.
Fish Meal	--	30 lb.
Alfalfa Meal	25 lb.	25 lb.
Dried Whey	25 lb.	--
Trace Mineral Salt	5 lb.	5 lb.
Steamed Bone Meal or Dicalcium Phosphate	5 lb.	--
Limestone	5 lb.	2 lb.
Vitamins[1]	+	+
Antibiotics	20 grams	20 grams

[1]Add a vitamin premix to supply the following amounts per 1000 pounds of ration:

Vitamin A	-	2,100,000 I.U.
Vitamin D	-	365,000 I.U.
Riboflavin	-	4 grams
Pantothenic Acid	-	8 grams
Nicotinic Acid	-	18 grams
Choline	-	20 grams
Vitamin B_{12}	-	10 milligrams

Place creep feeders in a well lighted area near the water supply. The edge of the feeder should not be over 4 inches above the floor and 1 foot of linear feeder space should be provided for every five pigs.

Castrate Before Four Weeks Old

Castrate pigs before they are four weeks of age. They are easier to handle at this age and the wound will heal faster. Pigs should be castrated at least two weeks before they are vaccinated for cholera. If pigs are weaned before four weeks of age, they should be castrated a week or more before weaning.

The scrotum should be washed with a disinfectant before the incision is made but no disinfectant is needed in the wound. Hands and tools should be clean. The incision should be made low to give good drainage and faster healing. Clean bedding and quarters free of dust will help prevent infection.

Vaccination for Cholera

Hog cholera is still a serious threat to every pig crop. Pigs should be vaccinated for cholera with serum and a modified live virus hog cholera vaccine.

Vaccinating at 6 to 8 weeks of age is recommended. Pigs vaccinated under 5 weeks of age while nursing an immune sow may not develop good immunity from the vaccination.

Vaccination for Erysipelas

Vaccinate your pigs for erysipelas if this disease is in your herd or if you are in an area where this disease is prevalent. Vaccination of pigs for erysipelas at 8 weeks of age or older gives better immunity than vaccination at a younger age. Vaccination of sows in mid-pregnancy will give some protection to pigs while nursing.

Age to Wean

Weaning pigs at 6 to 8 weeks of age is more practical for most producers than weaning at a younger age. Weaning at 5 to 6 weeks of age may be best for confinement rearing to reduce the amount of housing space needed. To wean pigs at an earlier age will take more skill, special rations, and warm quarters that are dry and free of drafts.

Experiments have shown that pigs weaned at 8 weeks are often heavier than 8-week-old pigs that have been weaned earlier. Early weaning takes less feed per litter since the sow's ration is reduced after the pigs are removed. However, the feed cost per pound of gain is often higher for the pigs weaned younger than 8 weeks due to a greater consumption of the higher cost creep ration. Early weaning may save labor on some farms. It will cut down on the housing space needed in a confinement system since the sows are moved out when their litters are weaned.

SCHEDULE FOR TAKING CARE OF PIGS UNTIL WEANED

1. First day—ear notch and clip needle teeth.
2. 2 to 4 days—give iron shots or start other anemia preventives.
3. 6 days—provide creep feed.
4. 2 to 4 weeks—castrate.
5. 6 to 8 weeks—vaccinate for cholera and erysipelas.
6. 6 to 8 weeks—wean.

CHAPTER 7

Feeding From Weaning to Market

Feed makes up about 70 to 75 percent of the total cost of producing hogs. Rations that supply proper nutrition at the least cost increase profits.

Cereal grains are the principal feeds for hogs. They must be supplemented with protein, mineral, and vitamin feeds to provide adequate nutrition for reproduction and growth.

Suggestions on Feeding Grains

Corn—Pigs will eat more shelled corn if you grind it. The pigs will also gain faster and be ready for market sooner. Ground corn can be mixed with the protein to prevent pigs from eating too much of an expensive protein supplement and there may be fewer "tail end" pigs when ground corn is fed. However, pigs fed ground corn may require slightly more feed per 100 pounds of gain than pigs fed shelled or ear corn. Grinding corn may increase the feed cost of gains since the saving on protein may not offset the cost of grinding and mixing.

The extra bulk of the cobs in ground ear corn slows the gains of pigs compared to shelled corn. Ground ear corn provides bulk in a ration for pregnant sows and gilts.

Yellow corn and white corn have the same feeding value for hogs except for the vitamin A content of yellow corn. However, yellow corn may lose most of its vitamin A value after 7 to 8 months of storage.

TABLE 7-THE VALUE OF GRAINS PER POUND IN COMPARISON TO SHELLED CORN AS A FEED FOR HOGS

Grain	Per Cent Value of Corn	Rate of Gain	Use as Only Grain for Fattening	Must be Ground for Best Results	Fineness of Grind
Corn	100		Yes	No	Medium
Grain Sorghum	90	equal	Yes	Yes	Medium
Barley	85	slightly slower	Yes	Yes	Medium-fine
Wheat	105	equal	Yes	Yes	Coarse
Oats	80	slower	1/3	Yes	Fine
Rye	65-90	equal	1/2	Yes	Coarse

Grain Sorghums—None of these contain an appreciable amount of vitamin A.

Grain sorghums should always be ground for breeding stock or when hand fed to young hogs. It will usually pay to grind grain sorghums even when they are self fed to young pigs.

Barley—Protein supplements should either be mixed with the barley or hand fed, since hogs will eat more supplement than is economical when the supplement is self-fed separately. Scabby barley should not be fed to hogs.

Wheat—Wheat is an excellent feed for hogs but usually costs more than other grains. Wheat can be self fed separate from the protein supplement.

Oats—Oats, like barley, vary considerably in feed value, depending upon the weight of the grain. Hulls make oats too bulky to give maximum gain when fed as the only grain. Oats are higher than corn in protein and minerals and make a good feed for breeding animals.

Rye—There is much variation in the quality of rye and some rye may be worth only 65 to 70 percent as much as corn. Rye is not too palatable and should be fed in combination with other grains for best results. Ergot infected rye should not be fed to breeding animals. Pregnant sows may abort when they are fed rye containing ergot. A ration that contains over 0.5 percent to 1 percent ergot will slow gains and increase the amount of feed required for growing and finishing hogs.

Pelleting

Swine rations containing barley have shown the most benefit from pelleting. Several experiments have shown enough increase in rate of gain and feed saving from pelleting a barley ration to more than pay the cost of pelleting.

Pelleting a corn and supplement ration for hogs has not given a consistent improvement in rate of gain or feed saving. Generally, pelleting a corn, grain sorghum, or wheat ration does not seem to give enough increase in feed efficiency to pay the pelleting cost.

Pelleting does decrease the dustiness of a feed and may decrease feed wastage compared to a meal for self-feeding.

Protein Requirements

Protein supplements must be included in swine rations for efficient and fast gains. There is a tendency for some producers to feed too little protein to meet the pig's requirement since protein feeds are often the only part of the ration purchased. The percent protein needed in the ration of a pig decreases as he increases in size. Table 8 gives the recommended protein levels for swine rations.

You can feed most protein supplements free choice or mix them in the ration with good results. However, a straight soybean meal supplement is too tasty to be fed free choice. It must be mixed with the grain or hand fed to prevent the pigs from eating more of the soybean meal than is economical.

TABLE 8-PROTEIN REQUIREMENTS OF SWINE

	Live Weight (Lb.)	Crude Protein % of Ration	35% Supplement Corn Supplement Ratio	35% Supplement Protein Supplement Daily (Lb.)	40% Supplement Corn Supplement Ratio	40% Supplement Protein Supplement Daily (Lb.)
Drylot						
	10	24				
	25	17				
	50	15	3.2:1	.75	3.8:1	.7
	100	13	4.9:1	.9	6:1	.75
	150	12	6.7:1	.9	8:1	.75
	200	12	6.7:1	1.0	8:1	.9
*Bred						
Gilt	300	15	3.2:1	1.4	3.8:1	1.25
Sow	500	13	4.9:1	1.3	6:1	1.0
Lactating						
Gilt	350	15	3.2:1	2.6	3.8:1	2.3
Sow	450	13	4.9:1	2.1	6:1	1.9
*Boar						
Young	300	15	3.2:1	1.4	3.8:1	1.25
Adult	500	13	4.9:1	1.3	6:1	1.0

*For hand-fed rations.

TABLE 9-PROTEIN SUPPLEMENTS FOR SWINE

Supplement	A[1]	B	C	D[5]	E
Percent Protein	44	47	51	39	40
Soybean Oil Meal	1020	1300	1000	1800	790
Tankage or Meat Scraps	600	640	980	----	650
Alfalfa Meal	300	----	----	----	----
Wheat Gray Shorts	----	----	----	----	500
Salt	40	40	30	40	40
Limestone	----	----	----	80	20
Bonemeal or Dicalcium Phosphate	40	20	----	80	---
Antibiotic[2]	+	+	+	+	+
Vitamins[3]	+	+	+	+	+
Zinc[4]	+	+	+	+	+

[1]Supplement A with alfalfa meal is preferred for brood sows.

[2]Add an antibiotic supplement to supply 50 grams of antibiotic per ton of protein supplement until hogs weigh 100 to 125 pounds. Aureomycin or terramycin is preferred.

[3]Add a commercial vitamin premix to supply the following amounts of vitamins per ton of supplement for pigs in dry lot or on poor pasture.

Vitamin A, I. U.	-	4,000,000
Vitamin D, I. U.	-	800,000
Riboflavin, grams	-	6
Pantothenic acid, grams	-	20
Nicotinic acid, grams	-	36
Vitamin B_{12}, milligrams	-	40

Vitamin D can be omitted for pigs not confined under roof in summertime.
Vitamins will not be needed if excellent pasture is available.

[4]Add one of the following to each ton of protein supplement to supply approximately 250 grams of zinc: 1 lb. zinc carbonate, 1 1/4 lb. zinc sulfate, or 3/4 lb. zinc oxide.

[5]Supplement D is too palatable to feed free-choice.

PARTS OF CORN TO BE MIXED WITH ONE PART OF PROTEIN SUPPLEMENTS IN TABLE 9 TO MAKE A COMPLETE RATION

Supplement	A	B	C	D	E
For pigs from weaning to 125 lb.	3.8	4	4.5	3	3
For pigs 125 lb. to market	8	9	11	8	8
Brood sows	4	5	5.5	4	4

Barley, grain sorghums or wheat may be used to replace all or part of the corn. Oats should not replace over 1/3 of the corn in the ration of growing fattening pigs or for lactating sows.

Except for soybean meal, plant proteins in general are of poorer quality than animal proteins for feeding hogs. High quality animal proteins include tankage, meat scraps, fish meal and milk-products.

Soybean Meal—Experiments have shown that if the deficiencies of soybean meal are corrected, it is equal in value to a mixture of protein from several sources as a supplement to corn for hogs. Soybean meal is deficient in the B vitamins (riboflavin and pantothenic acid), vitamin B_{12}, vitamin A, and vitamin D, calcium and phosphorous. If these deficiencies are corrected it is an excellent supplement to corn as a feed for hogs.

TABLE 10-GROWING - FINISHING RATIONS
(1,000 Lb. Mix)

Ingredients	Weaning to 125 Lb.		125 Lb. to Mkt.	
	Ration 1	Ration 2	Ration 1	Ration 2
Percent Protein	16%	16%	12%	12%
Corn	800	768	886	874
Soybean Oil Meal	151	210	76	104
Tankage or 50% Meat & Bone Scrap	50	---	25	---
Salt	4	5	4	5
Bonemeal or Dicalcium Phosphate	2	10	4	10
Limestone	3	7	5	7
Vitamins [1]	+	+	+	+
Vitamin B_{12}, milligrams	6	6	---	---
Antibiotic, grams	5	5	---	---
Zinc[2]	+	+	+	+

[1]Add the following amounts of vitamins per 1,000 pounds of ration:

Vitamin A	510,000 I.U.
Vitamin D	91,000 I.U.
Riboflavin	1 gram
Pantothenic acid	3 grams
Nicotinic Acid	5 grams

[2]Add 2 1/2 lbs. zinc carbonate or 1 1/2 lbs. zinc oxide to each 100 lbs. of salt used in pig rations to supply approximately 50 grams of zinc per ton of feed. Trace mineral salt should contain a minimum of 0.8 percent actual zinc as a fortification for zinc in dry lot rations.

Antibiotics and Arsenicals

Adding antibiotics to the rations of pigs has increased gains and feed efficiency. Antibiotics aid in controlling secondary infections, but should not be considered a substitute for good management and sanitation. Antibiotics give

the greatest benefit when fed to pigs from birth up to 125 pounds. Feeding antibiotics to heavier pigs will not usually pay unless pigs are unthrifty or there are several "tail-end" pigs in the group. Antibiotics are not recommended for gestation or lactation rations.

Effective antibiotics for hogs are oxytetracyclne (terramycin), chlortetracycline (aureomycin), procaine penicillin, bacitracin and streptomycin. Oxytetracycline and chlortetracycline have given the best results. Some of the recent experimental work has indicated that mixing one of these two with another antibiotic may be superior to using either alone.

The arsenicals most commonly used in hog rations are arsanilic acid and 3-nitro-4-hydroxy-phenylarsonic acid. The activity of these compounds like that of antibiotics is upon the microflora of the digestive tract. They haven't been as consistent as antibiotics in improving weight gains. These drugs have been more effective in controlling swine dysentery.

Arsenicals are toxic and must be used according to label instructions. They should be taken out of the feed five days before slaughter.

Table 11 gives recommendations for including antibiotics and arsenicals in hog rations.

TABLE 11-SUPPLEMENTATION OF SWINE RATIONS WITH ANTIBIOTICS AND ARSENICALS

Size of Hog	Antibiotic (Gms/ton)	Arsanilic Acid (Gms/ton)	3-Nitro-4-Hydroxy-phenylarsonic Acid (Gms/ton)
1. Complete mixed ration			
Pre-weaning	40	90	22
Weaning to 125 pounds	10	90	22
125 pounds to market	0	90	22
2. Protein supplement			
Weaning to 125 pounds	50	450	100
125 pounds to market	0	450	100

Vitamins

Swine rations are most likely to be deficient in vitamins A and D, riboflavin, pantothenic acid, niacin, and vitamin B_{12}. Green pasture is a good source of vitamins. Hogs fed on concrete or on poor pasture will need green feeds or vitamin premixes added to the ration at the levels shown in Table 10 to prevent vitamin deficiences.

Yellow corn may provide all the vitamin A needed in the ration of older hogs. However, yellow corn is not a dependable source of vitamin A since it may lose as much as 60 percent of its vitamin A value during the first seven months of storage.

Vitamin D is not needed for hogs that are in sunlight in the summer. It should be added to winter rations and to the rations of hogs confined under roof.

The vitamin deficiences of rations for hogs in dry lot or on poor pasture can be met by adding alfalfa meal or vitamin premixes to the protein supple-

ment or complete mixed ration. The vitamin premixes are sometimes a cheaper source of vitamins that alfalfa meal. Fiber in alfalfa meal will tend to slow gains when added in amounts necessary to supply vitamins for dry lot feeding. Alfalfa meal will vary in its vitamin content.

Both dry lot and pasture rations may need fortification with vitamin B_{12}. Varying amounts of vitamin B_{12} are present in antibiotic supplements, animal proteins, manure of ruminant animals, and the soil.

Minerals

Minerals must be added to hog rations since grains are low in some of the minerals necessary for normal growth and reproduction of hogs. The minerals most likely to be lacking are salt, calcium, and in some cases phosphorous.

With the exception of iron for young pigs, zinc is the principal trace mineral deficiency in Missouri. Pigs that are hairless at birth due to an iodine deficiency in the sow's ration have been noted in a few localities of Missouri.

Minerals can be supplied to hogs by self feeding a mineral mixture free choice or by adding minerals to the protein supplement or complete mixed ration. Mixing minerals into the protein supplement or complete ration will give greater assurance that each pig gets adequate amounts in his diet. A mineral mixture for feeding hogs free choice is 2 parts limestone and 1 part salt. If a soybean meal protein supplement is fed, a mixture of 1 part steamed bone meal, 2 parts limestone, and 1 part salt is best. Supply 3 self-feeder holes or 3 linear feet of feeder space for each 100 pigs fed salt or a mineral mixture free choice.

Salt should make up 0.5 percent of a hog's total feed. Protein supplements for pigs in dry lot need 1.5 to 2 percent salt to furnish this amount. A supplement for pigs on good pasture would need 2.5 percent salt since less supplement is eaten.

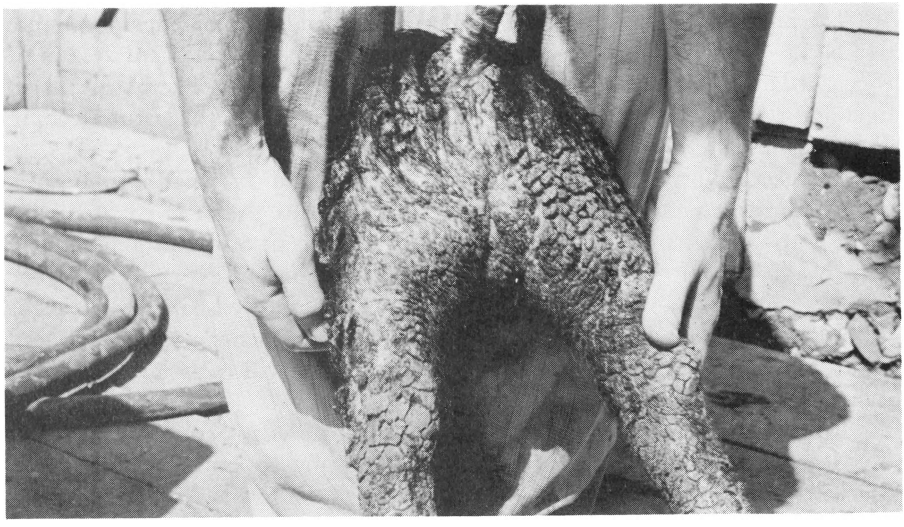
Zinc: A deficiency of zinc will cause parakeratosis, a "skin disease" of hogs. Symptoms of parakeratosis are reduced appetite, slow growth, skin lesions and diarrhea. Too much calcium in a ration usually retards growth and aggravates parakeratosis. The recommended level of calcium for a 50-pound pig is 0.65 percent of the ration and for a pig weighing 100 pounds or over, 0.50 percent of the ration.

The zinc requirement of the pig is about 55 parts per million of zinc in the ration. As a margin of safety, it is recommended that complete rations for growing swine be fortified with 50 grams of zinc per ton. Add 250 grams of zinc per ton to protein supplements. Fifty grams of zinc is contained in 125 grams of zinc sulfate or 62.5 grams of zinc oxide or 100 grams of zinc carbonate.

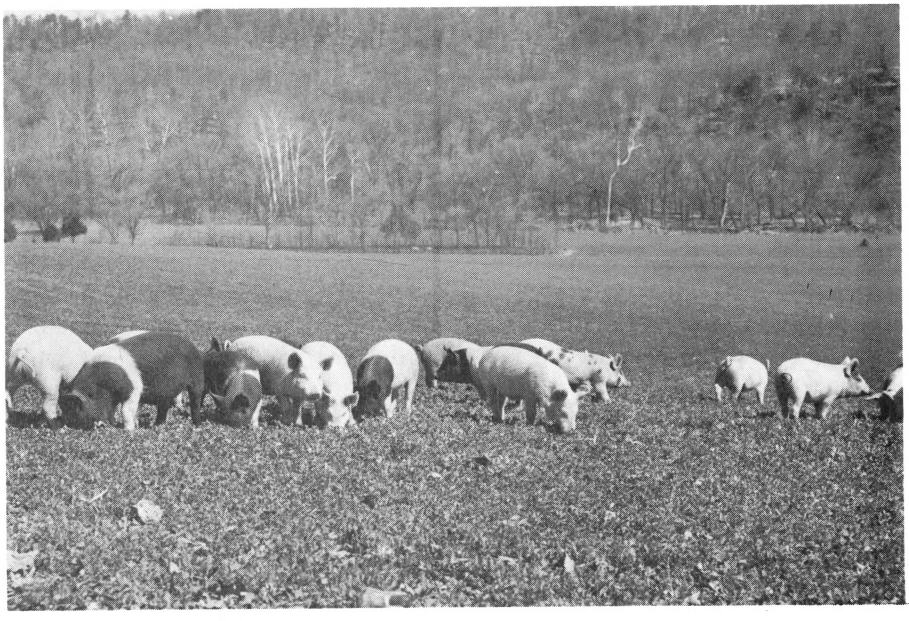
Pasture for Hogs

Many efficient hog operations in Misnouri are built on good pasture. Pasture will supply protein, vitamins, and minerals and make disease and worm control easier. It is highly desirable for pregnant sows and gilts.

A well planned pasture system will have a water supply in each field and litters will be started on ground that has been free of hogs for two years.



A hog with a severe case of parakeratosis. This disease is caused by a zinc deficient ration. Affected swine have poor appetites, slow growth, and often exhibit diarrhea in early stages of the disease. Pox-like lesions followed by crusty scab-like lesions develop on the legs, ears, tail, and in severe cases over the whole body. Do not confuse this disease with mange.



Pigs grazing alfalfa pasture. Good pasture will supplement a deficient ration and make disease and parasite control easier.

The amount of labor and time needed to feed and care for hogs on pasture may be no greater or even less than is required with a confinement system of rearing if large self-feeders are used and lanes are arranged so that a self-unloading wagon or other equipment can be used to fill the feeders. Pasture feeding eliminates manure disposal problems.

Pasture is worth more when a poor ration is fed or when sanitation is faulty or management poor. In the past, a good pasture has been credited with saving 5 to 10 percent of the grain and 30 to 40 percent of the protein supplement needed for growing and finishing hogs. More recent experimental work indicates only a 3 to 5 percent total feed saving when a well-balanced ration is full fed on pasture in comparison to dry lot. This represents a $10 to $20 feed saving per acre of pasture. Hogs that are limited fed will make greater use of pasture than hogs on a full feed.

Ladino, alfalfa, and red clover rank in this order as a pasture for hogs. An acre of good legume pasture will carry 20 to 30 pigs to market weight or be sufficient for each three sows and their litters when the sow is removed at weaning and the pigs remain on the pasture until marketed.

Small grains, dwarf essex rape, sudan grass and grass-legume mixtures can be combined with legumes to provide pasture throughout the year for hogs.

Method of Feeding

Studies vary on whether it is more economical to feed corn and supplement separately to pigs after weaning or to grind the corn and mix it with the supplement to make a complete ration. Most experiments show that it takes slightly more feed per pound of gain when the complete ration is fed, likely due to greater feed waste with the meal ration. Complete rations must bear the extra cost of grinding and mixing so feed costs are often higher for gains made on complete rations.

Pigs usually gain faster when fed a complete ration, especially on pasture, and there is a tendency for the lot to stay more uniform in weight. Because complete rations are better suited to automatic feeding and because palatable proteins like soybean meal are consumed too heavily when fed free-choice, more hog raisers are feeding complete rations.

If from weaning to market weight your pigs are eating over ¾ pound of a 40 percent protein supplement per head daily in dry lot or ⅔ pound when on pasture, they are eating more protein than they need. The cost of gains is increased and hand feeding the supplement to control consumption will often pay good wages. Ground oats or alfalfa meal can be mixed with the protein to cut consumption. Keep in mind that mixing minerals with protein supplements to regulate the amount eaten increases the danger of parakeratosis and the amount of water needed by hogs.

Drinking Water

Furnish plenty of clean drinking water to your hogs at all times. Keep the temperature of the water above 35° to 40° Fahrenheit during the winter. A tank

heater or a freeze-proof automatic waterer to keep the water temperature up in the winter will save feed.

Pigs will require 0.5 to 2 gallons of water a day depending upon size of pig, temperature, and feed. A sow and litter may need as much as 4 to 5 gallons of water per day. The minimum capacity of a waterer to supply 10 pigs for a day should be 25 gallons in the summer and 15 gallons in the winter. Table 12 gives the number of hogs at different weights that one automatic watering cup will supply.

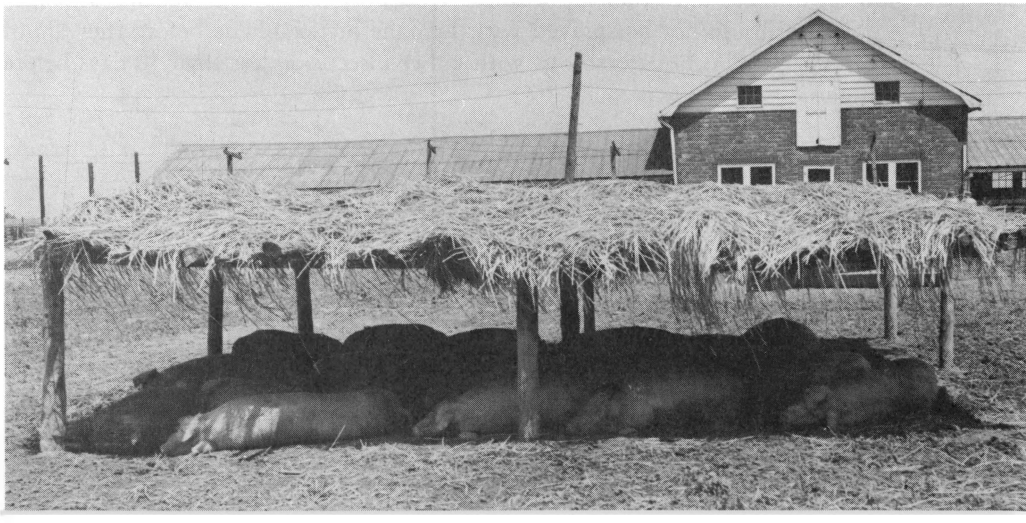
TABLE 12-FEED AND WATER SPACE REQUIREMENTS FOR HOGS

	Water Head Per Automatic Cup	Self-Feeder Head Per Hole or Linear Foot		% of Self-Feeder Space for Protein Supplement	
		Dry Lot	Pasture	Dry Lot	Pasture
Boar	2	2	2	--	---
Sows - Gestation	15	2	2	--	---
Sow - Nursing	10	1	1	--	---
Creep (10 - 30 Lbs.)	1 litter	5	5	--	---
Weaning to 75 Lb.	40	4	5	25	20-25
75 Lb. to 125 Lb.	30	3-4	4-5	20	15-20
125 Lb. to Market	20	3	4	15	10-15

Keeping Hogs Cool

Hogs will eat more and gain faster in the summer if kept cool. When the temperature is above 90° Fahrenheit, hogs are in great need of cooling. The effect of high temperatures on rate of gain and feed efficiency increases as hogs increase in weight. Experiments at Purdue and California have shown that hogs weighing 200 pounds or more may lose weight at temperatures above 95° Fahrenheit.

Hogs must have shade in hot weather to make fast and efficient gains. A low-cost shade that is easy to build is shown here. Provide 8 square feet of shade for each 200-pound hog.



Hogs need both shade and water to keep cool in hot weather. A minimum of 8 square feet of shade should be available for each 200 pound hog. If there isn't enough natural shade, build a temporary shade. The shade should be close to the feed and water.

Water plus shade is more effective in cooling hogs than shade alone. Portable, sanitary wallows placed in the sun but near the shade are effective. A sprinkler nozzle that sprays a fine mist works well, especially on a concrete floor. Work at Purdue and other Universities has indicated that mist sprays used on fattening hogs in hot weather will increase gains an average of 10 percent over those animals with shade alone. Each nozzle should supply 1 to 3 gallons of water per hour at 40 pounds of water pressure. Figure one nozzle for each 25 hogs.

Internal Parsites

The large roundworm is the most harmful internal parasite of hogs in Missouri. The best way to handle this parasite is to prevent pigs from picking up the worm eggs.

Worm sows before they are bred and handle them in a way to keep down worm infestation during gestation. Scrub the sow and house before farrowing, as mentioned under Preparation for Farrowing, to destroy worm eggs. Keep pigs away from dirty hog lots and stagnant water. Rotate pastures so that each pig crop goes to a field that has been free of hogs for two years.

Worm pigs if they need it. However, keep in mind that the worms have done most of their damage before they can be removed from the intestines. Consequently, worming the pig will not make him as "good as new."

Piperazine and cadmium oxide are effective worming agents. They are not very toxic and can be used safely to worm sows one to two weeks before farrowing and pigs soon after weaning.

External Parasites.

Hogs must be kept free of lice and mange if they are to make the most profitable gains. Lindane or toxaphene sprays are very effective against both hog lice and mange. Spraying the sow 30 to 45 days before farrowing will usually protect the pigs until they are weaned. Treat boars before the breeding season.

Pigs should not be sprayed with Lindane or toxaphene before they are of weaning age. Do not treat hogs with either insecticide less than 30 days before slaughter.

UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE AND THE UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

C. B. RATCHFORD, Director, Agricultural Extension Service
Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914

University Libraries
University of Missouri

Digitization Information Page

Local identifier	EC734-1961

Source information

Format	Book
Content type	Text with images
Source ID	Gift copy; not added to MU collection.
Notes	

Capture information

Date captured	12/13/2024
Scanner manufacturer	Fujitsu
Scanner model	fi-7460
Scanning system software	ScandAll Pro v. 2.1.5 Premium
Optical resolution	600 dpi
Color settings	8 bit grayscale
File types	tiff
Notes	

Derivatives - Access copy

Compression	Tiff: LZW compression
Editing software	Adobe Photoshop 2024
Resolution	600 dpi
Color	grayscale
File types	tiff, combined into pdf
Notes	Images cropped, straightened, brightened...