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Your 4H Market Hog Project

Michigan State University Cooperative Extension Service

4-H Club Bulletin

Lee Johnston, Kenneth Geuns, Graydon Blank, E.C. Miller, Maynard, Ogberg, Animal Science

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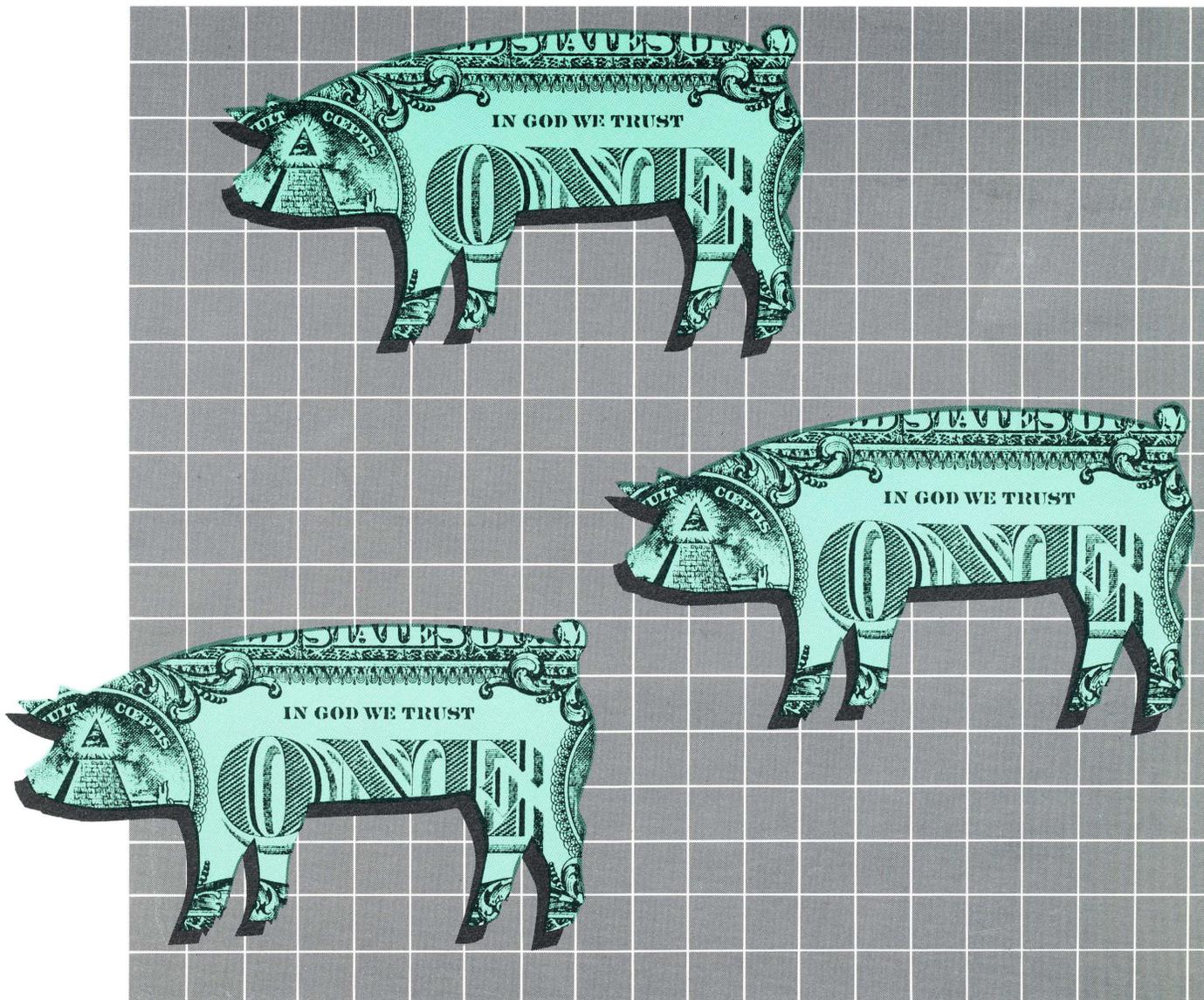
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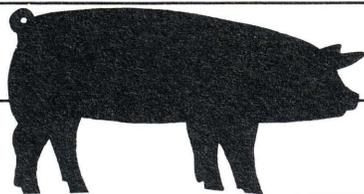
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Your 4-H

Market Hog Project





Your 4-H Market Hog Project

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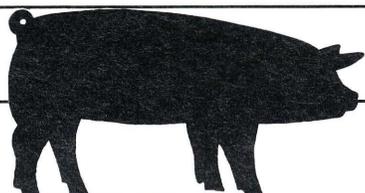
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This publication was written by Assistant Extension Swine Specialist Lee Johnston and Extension Live-stock Youth Specialist Kenneth Geuns, both of the Department of Animal Science, Michigan State University. The original guide was prepared by Graydon Blank, Professor Emeritus; E. C. Miller, Professor Emeritus; and Maynard Hogberg, Chairperson, Department of Animal Science, Michigan State University.

The publication was designed and illustrated by Marian M. Reiter, 4-H Graphic Artist. It was edited by Rebecca McKee, 4-H Publications Editor.

The material on grooming pigs for show on page 18 was adapted in part from the Nebraska **4-H Swine Manual** (4-H 89). It is a publication of the Cooperative Extension Service, University of Nebraska—Lincoln and the Institute of Agriculture and Natural Resources. The manual was revised by Doyle Wolverton.

The figure entitled "Estimation of body composition" on page 6 was adapted from the University of Wisconsin **Swine Selection Procedures** (A2931). It is a publication of the University of Wisconsin—Cooperative Extension Service. The manual was written by Dr. Carl Hirschinger and Dr. Robert Grummer.



Introduction

Feeding one or more pigs to sell as market animals is probably the most common 4-H swine project. It doesn't require a large amount of money or expensive buildings and equipment and it can be completed during the summer months.

The words "swine," "hogs" and "pigs" refer to animals of the porcine or pig family. In this bulletin, swine will be used in referring to the pig family in a general way, and "pig" will be used in referring to young animals. "Hog" will generally refer to animals at or nearing market weight or finished for market. The term "barrow" means a castrated male, and "gilt" means a young female.

What You Can Learn

In this 4-H market hog project you can learn how to:

- Select feeder pigs for your project.
- Select proper feeds for your pigs.
- Combine these feeds into a balanced diet.
- Figure costs and returns from your project.
- Tell when your pigs are sick.
- Tell when your pigs are healthy.
- Prepare your pigs for exhibition.
- Handle your pigs in a show ring.
- Determine if your pigs will be acceptable to the packer.

These are only a few of the many things you can learn. Working with your leader, you may want to make your own list of the things you want to learn from this project.

Project and Member Objectives

The objective of the 4-H market hog project is to encourage integrity, sportsmanship, cooperation and an ability to communicate through activities such as demonstrations, talks, judging events, tours and exhibits.

Knowing correct procedures for running and participating in a business meeting will be important to you all of your life. Your 4-H swine club is an excellent place to learn and practice these skills.

Here are some objectives you should keep in mind for your market hog project:

- To acquire information about and an understanding of scientific production and management practices through keeping records and owning and caring for livestock.
- To acquire skills in executing production and management decisions.
- To provide business experience and develop knowledge of the values and principles of purchasing, marketing, record-keeping and securing credit.
- To learn and use efficient procedures and methods in marketing livestock and their products.
- To develop an understanding and appreciation of the livestock/meat industry and its role in the agricultural and commercial economy of the country.
- To explore the livestock industry as a career.

The market hog project consists of feeding pigs to a market weight of approximately 200 to 240 pounds. This same procedure is carried on regularly by adult swine raisers. You will learn much of the same basic information adults engaged in swine production use.

Don't expect to make a big profit on your project. Your profit or loss will depend on the cost of the pigs when you start the project, the cost of the feed used, other costs (such as veterinarian and equipment bills), and the price you receive for your hogs when you sell them.

If you market your hogs at your county or area fair or show, generous people in your community may pay more for your animals than their true market value. This increases your chance for a profit. However, it is important that you know the difference between the regular livestock market price or value of your hogs and the price you receive at your fair or show sale. Your 4-H leader can help you get this information.

If your hogs bring more than the regular market price, you should realize that this difference is a reward for your having participated in the project and for having carried out the practices you learned.

Records to Keep

The reasons for keeping records on your market hog projects are to:

- Help you learn more about animals, their rate of growth, the feed they require and their habits.
- Help you plan future projects.
- Determine if you made or lost money and how much.
- Improve your management practices.
- Give you a record of your project activities.

The following information about your market hog project will be helpful and interesting. Use the

4-H Market Livestock Record Book (4-H 1177) to record it.

- The weight of each pig at the start of the project. Weights can be obtained by holding the pig and standing on a bathroom scale, and then subtracting the weight of the person holding the pig from the total. You will learn more about

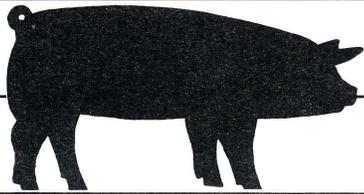
pigs if you weigh yours every 30 days during the project.

- The weight of each hog at the time it is marketed.
- The total cost or value of the pigs at the start of the project.
- The money received from the sale of the hogs.
- The amount of feed used.
- The total cost of medicine and veterinary fees.
- Anything interesting or unusual that happened to your pigs during the project.

From the above information you can:

- Make a chart or graph showing how fast each pig grew.
- Figure your hogs' average daily gain.
- Figure the feed cost per unit-of-gain.
- Figure the total cost per pound of hogs sold (cost of pigs + cost of feed + other expenses ÷ by weight of hogs sold).





Selecting Pigs for Your Project

Sources of Feeder Pigs

You can obtain feeder pigs from several sources, including:

- Your own or your parents' herd
- A neighbor's or friend's purebred or commercial herd
- Special feeder pig sales
- Regular feeder pig sales at weekly auctions

Feeder pigs are generally sold by the head, rather than by the pound. Therefore, it is necessary to have a good idea of how much the feeder pigs you are considering weigh before buying them. An acceptable weight-for-age standard for a feeder pig is 40 pounds at 8 to 10 weeks of age. If they weigh less than that, they may be stunted and fail to perform satisfactorily.

If you feed home-raised pigs, weigh them when they start on feed and figure their value using current market price. You will need this information to complete your livestock record book.

Feeder Pig Prices

Feeder pig prices depend a great deal on the price of market hogs when you buy your feeder pigs. A general rule is that the price per pound of feeder pigs will average two times the price of market hogs. When you have the privilege of selecting the top pigs from a large group, you should expect to pay some premium in price.

However, do **not** pay a high price for a pig with the idea that this alone will assure you of winning a grand championship. It takes good feeding and a lot of hard work, along with the right kind of pigs and good showmanship, to have a grand champion.

Where to Get the Money

Your money problems are the same as those of any other swine producer: "Where will I get the money to buy and raise my feeder pigs?" and "How much money will I need?"

There are probably three sources of money available to you:

- Your savings account
- Borrowing from your parents
- Borrowing from your bank

If you borrow the money from your parents, pay them interest as if you were borrowing from a bank. Keep the transaction on a businesslike basis.

Borrowing from your local bank will give you good business training. Have your parents go with you. Your banker will need to know three things:

- How much money will you need?
- How long will you need the money?
- How will you repay your loan if your pigs die or your project loses money?

If you need to borrow money to buy the feed for a project pig, you need to know how much feed your pig will eat. If your 40-pound feeder pig will be sold at 230 pounds, it will need to gain 190 pounds. You can estimate that it will take 3.5 pounds of feed per pound of gain. Therefore, your pig will probably need to eat about 665 pounds of feed.

If your feed costs 9 cents per pound, you will need to borrow \$59.85 ($665 \times \0.09) for feed, plus whatever you expect to pay for your feeder pig.

You will pay interest on the money you borrow from the bank. If you borrow \$130 per pig to finance your project, you will need the money for about five months (for example, from April to August). If the bank charges 12 percent annual interest, you will pay a 5 percent interest charge for the period of time you have the money (12 percent annual rate: one percent per month \times five months = 5 percent interest charge). At this interest rate, you will pay \$6.50 ($\$130 \times .05$) in interest. So, when you repay the bank, you will need to pay them \$136.50 (the original \$130 you borrowed plus \$6.50 in interest).

Paying off your loan when it is due will help your reputation as a borrower. This is called your credit rating. Whether you obtain the money from your parents or borrow it from a bank, it is important to pay your debts by their due dates. Honesty

and integrity are important to you as a 4-H'er and as a citizen.

Pig Identification

Very often pigs won't have any easily recognizable markings or traits that allow you to identify them. Consequently, swine producers use other methods to identify their pigs. Ear tags can be used, but they are often lost and may be difficult to read. Many producers depend on ear notching because it is a permanent method of pig identification. As a swine producer, you should learn and use the ear notching system.

Knowing a few basic rules will make understanding the universal ear notching system much easier.

1. Notches in the pig's right ear represent its litter number. Notches in the pig's left ear are its individual number. Under this system, every pig in a litter has the same notch(es) in the right ear, while no two pigs from the same litter should have the same notch(es) in the left ear.

2. For ear notching, the pig's ear is divided into two halves—the tip half and the base half. By using the top and bottom edge of each half of the ear, four areas are available for notching. A notch in the lower edge of the base half is assigned a value of one, while a notch in the lower edge of the tip half is three. A notch in the upper edge of the tip half indicates a 9, and each notch in the upper edge of the base half is valued at 27. A notch in

the very tip is assigned a value of 81 (see fig. 1).

3. The value of each notch in the right ear added together represents the pig's litter number; likewise, the values of all notches in the left ear are added to determine the pig's individual number.

4. There should never be more than two notches in any particular area of a pig's ear.

Proper Weight of Feeder Pigs

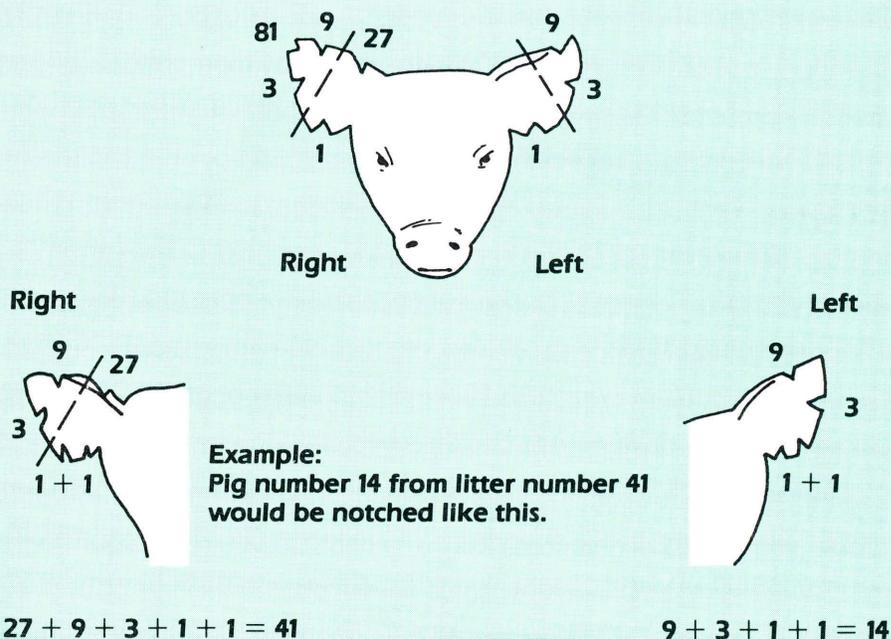
Select pigs that will have the proper amount of finish (fat cover) when they weigh 200 to 240 pounds. This is the most desirable market weight.

Healthy feeder pigs will gain from 1.5 to 1.8 pounds per day if fed properly. Many times, 4-H project pigs will gain over 2 pounds per day because they are raised in small groups and receive tender loving care.

Feeder pigs that weigh about 50 pounds at the start of the project usually make the best 4-H market hogs.

If your hogs are to be marketed at your county fair or show, you may need to consider the date of this event in selecting your feeder pigs. For example, if you have 106 days to feed your pigs, you will need to start your project with feeder pigs that weigh at least 50 pounds (106×1.6 pounds per day = 170 pounds gain; 50 pounds + 170 pounds gain = 220-pound market hog). If the pigs gain 1.7 pounds per day, their

Figure 1. Universal ear notching system.



finished weights will be 230 pounds. Both fall in the desired range of market weights.

Using the above example, you can decide when you should select or buy your feeder pigs to be at their best when you sell them. If you select a heavier pig or if you believe your pigs will gain more rapidly, fewer days will be required. Under those conditions, you can select your pigs or start your project later. Keeping accurate records the first year will help you plan your next project more accurately.

Evaluating Feeder Pigs

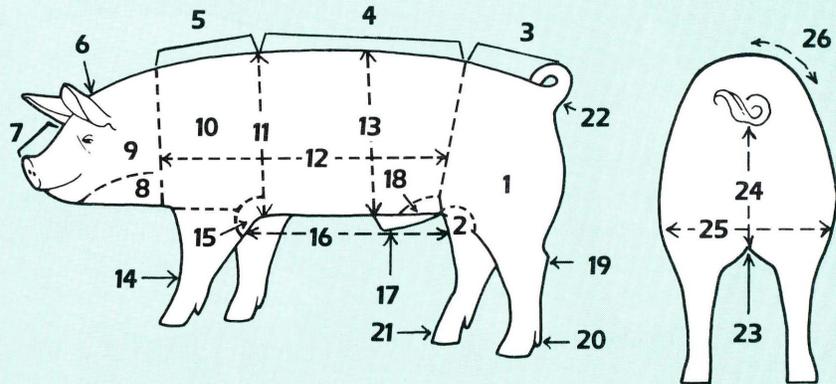
When evaluating live pigs, two major areas must be considered: body composition and structural soundness. In order to properly discuss the evaluation of live pigs, you should learn the parts of the live hog (see fig. 2). Knowing these parts will help you recognize quality feeder pigs and market hogs.

Body Composition

Consumers demand pork that is meaty with a minimum amount of fat. Therefore, it should be your goal to raise lean, meaty hogs. When selecting feeder pigs it's hard to predict which pigs will be lean and meaty at market weight. Nonetheless, knowing the desirable market hog body composition traits will help you pick desirable feeder pigs.

There are only two things evaluated when determining body composition: degree of muscling and finish. When viewed from the front, the muscles of the ham region should be long and thick, with the

Figure 2. Parts of a hog.



- | | |
|-------------------------|-----------------------------|
| 1. Ham | 14. Knee |
| 2. Stifle region of ham | 15. Elbow |
| 3. Rump | 16. Underline |
| 4. Loin | 17. Sheath |
| 5. Shoulders | 18. Rear flank |
| 6. Poll | 19. Hock |
| 7. Face | 20. Dew claw |
| 8. Jowl | 21. Pastern |
| 9. Neck | 22. Tail setting |
| 10. Shoulder | 23. Seam or crotch |
| 11. Heartgirth | 24. Depth of seam or crotch |
| 12. Length of side | 25. Width of stifle |
| 13. Depth of side | 26. Turn over loin edge |

thickest point through the stifle. There should be a good deal of spread or width between the hind legs, indicating ham muscling. The loin should have natural thickness and expression of muscling (muscle thickness) when viewed from the front or rear.

When evaluating the degree of finish on a live hog, only the fat a pig deposits over its muscles can be seen. Consequently, it is important to determine whether the thickness you see is due to muscle or fat.

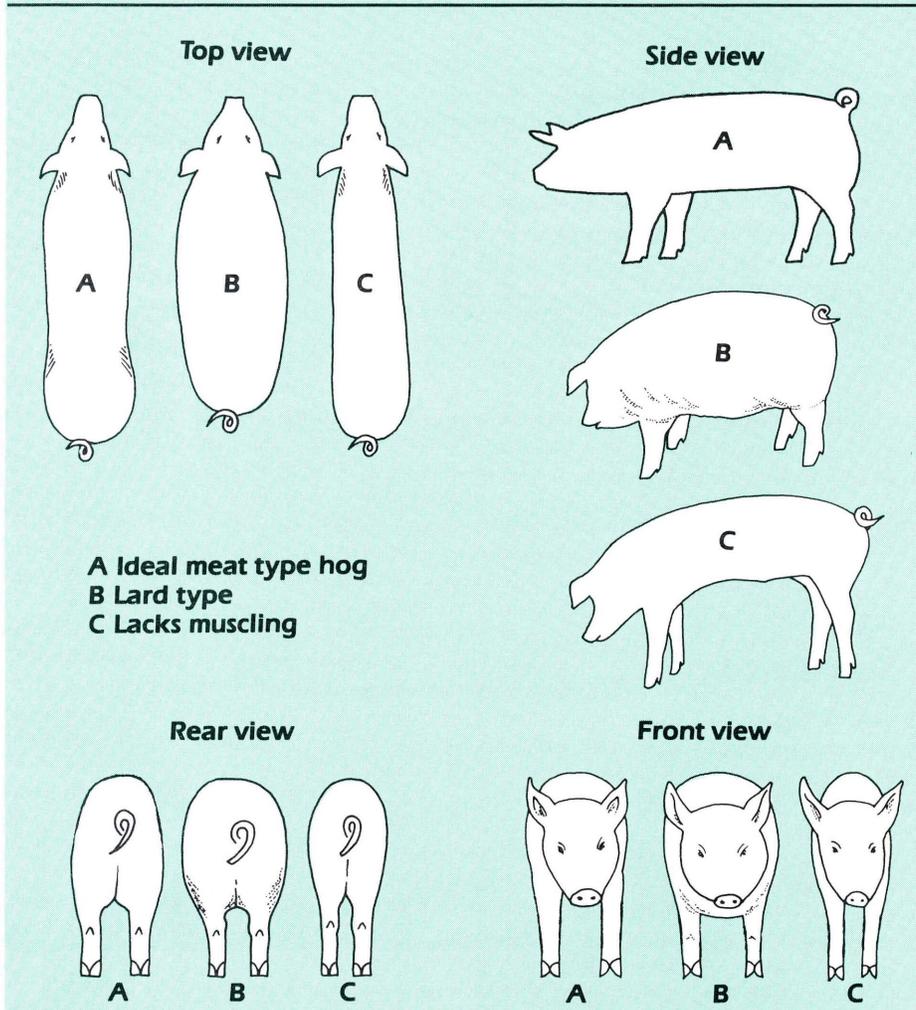
A lean hog will be trim in the jowl and elbow pocket with little fat deposited in its crotch or seam. It

will exhibit a desirable turn over the loin. On the other hand, the loin of a fat hog will appear flat and square due to fat accumulation along the loin edge. In addition, a fat hog may exhibit a heavy jowl, wasty elbow pocket, countersunk tailsetting and no shoulder blade movement (see fig. 3).

Structural Soundness

When evaluating structural soundness, you should look primarily at the pig's feet and legs, body cavity and topline. The pig's shoulder and front leg structures are very closely associated. Sloping shoulders give the front legs plenty of flex and

Figure 3. Estimation of body composition.



cushion, which will properly distribute the pig's weight over the entire sole of its foot. A very straight shoulder will cause the pig to be "over on its knees" and force it to stand on its toes. Similarly, the rear legs should show flexibility and freedom of movement, allowing the pig to take long strides easily.

The body cavity should be relatively deep, long and wide, giving the pig plenty of body capacity. When the pig is viewed from the side, body capacity can be described as the depth of rib and flank. When the pig is seen from the front, body capacity is the width of the chest floor. When viewed from above, body capacity is characterized by width between the shoulder blades and over the loin. Remember, a fat pig will **appear** to have a great deal of body capacity. However, the pig actually has a small body covered by a thick layer of fat. Finally the pig's topline should be level. Generally, a level-topped pig will be free moving and structurally sound (see figs. 4 and 5).

Figure 4. Hog with a desirable skeletal structure.

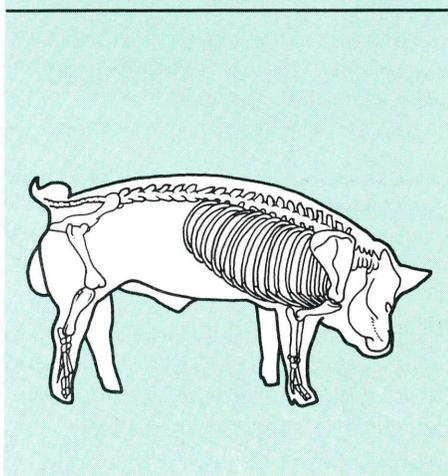
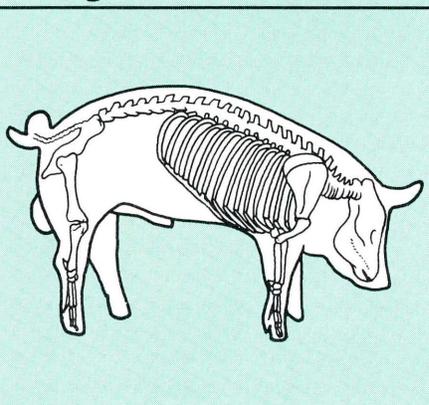


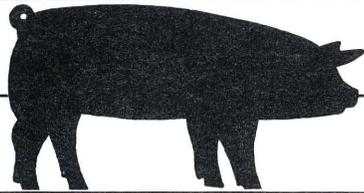
Figure 5. Skeletally incorrect hog that is high-topped, steep-rumped and straight-shouldered.



Breed

No one breed of swine is superior to all others for 4-H market hog projects. Therefore, you must select each project pig based on its physical attributes and the performance records of its relatives.

Good quality feeder pigs should appear thrifty, healthy, vigorous and alert. Male pigs should be castrated and healed.



Early Care and Management

Stress

Though stress is hard to define, it is important that you understand the concept so that you can give your pigs proper care early in their feeding period. Stress is a pig's physical or psychological reaction to circumstances that frighten, irritate, endanger or excite it. Any time a pig gets scared, it has been stressed.

Hauling, vaccinating, introducing it to strange surroundings and strange pigs, and many other things can scare or stress the pig. When a pig is stressed, it will be more susceptible to sickness. It may eat less feed and grow slower. It is important to minimize stress throughout the feeding period, but especially when you first get your pigs home.

Trucking Your Pigs Home

Handle your pigs quietly during loading to avoid getting them too excited. Before you leave the producer who raised your pigs, try to find out as much as possible about your pigs. Ask about their breed and age, how long they have been weaned, and whether they've been treated for internal and external parasites. It would also be very helpful to find out what feeds or diet they have been fed previously. If possible, buy a sack of this feed and start your pigs on it in their new home.

Use care in getting your pigs home. To avoid chilling your pigs, always haul them in a covered truck. In cold weather, bedding the truck with dry straw will keep your pigs warm. In hot weather, sand or sawdust makes good truck bedding. Don't park your truck in direct sunlight during hot weather.

Upon arriving at the pigs' new home, have a clean pen ready for them with feeder and waterer in place. Provide a **clean, dry, draft-free** sleeping area under a roof. During cold weather, bed the sleeping area with straw. Remember, you want to minimize stress on your pigs during this part of the feeding period.

Try to familiarize your pigs with their new home so that they know where the feed, water and shelter are located. It may be necessary to let the waterer drip slowly and to fasten the feeder lids open until your pigs learn to operate these devices.

General Health

It's important to maintain the health of your newly acquired pigs. The first 2 or 3 weeks are critical, so you should check your pigs several times each day during this period. Frequent observation allows you to detect any small problems before they grow into big ones. Strong appetites, body temperatures of 102.5 °F, sleek haircoats and tightly curled tails are all signs of healthy

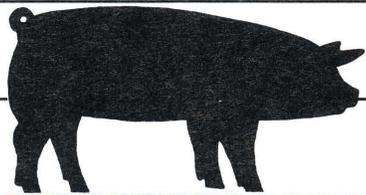
pigs. Healthy pigs are active and alert with bright looks in their eyes.

A pig will give you many clues when it isn't feeling well. Some of the clues are poor appetite, gauntness, rough hair coat, a dull look in the eyes, excessive coughing, diarrhea, inactivity and lameness.

If you think a pig is sick, take its rectal temperature. If it is 2 degrees or more above normal, call a veterinarian immediately. Quick diagnosis and treatment will pay big dividends. Always handle sick animals with care.

Contact your local veterinarian for information on recommended swine vaccinations in your area.





Facilities and Equipment

Housing

Many farms have barns or buildings that can be converted very inexpensively into pens for raising market hogs. You need to consider three things when designing housing for your pigs. First, pigs need a **clean, dry, draft-free** area under a roof to sleep. Pen floors should be concrete so that pigs can be kept clean and dry.

Second, pigs have specific space requirements that vary according to their weight. If pigs are crowded, they will be stressed, resulting in decreased growth rates. The space requirements of growing and finishing pigs are presented in table 1. "Growing pigs" weigh 40 to 125 pounds. "Finishing pigs" weigh from 125 pounds to market weight (about 230 pounds).

Finally pigs, like people, have an ideal temperature at which they are most comfortable. This is called the thermoneutral zone. The ideal temperatures for growing and finishing swine of various weights are presented in table 2.

If the temperature falls below this ideal zone, some type of bedding,

such as wood shavings or oat or wheat straw, should be supplied in the sleeping area to keep the pigs warm. When the temperature rises well above the thermoneutral zone, misters will help cool your pigs by continuously spraying a fine mist of water on them. Leaving misters on all night can chill your pigs and result in very sick animals, so turn the misters off in the early evening.

Feeders

The feeder is one of the most important pieces of equipment in your swine enterprise. When properly maintained it will supply the proper amount of feed to your pigs around the clock. Feeder baffles should be set to provide about one-half to three-quarters of an inch space (fig. 6). Baffles adjusted too low will prevent feed from flowing into the trough, while a high adjustment will result in wasted feed. Check feeder holes **daily** to make sure your pigs are getting all the feed they can eat.

When selecting feeder size, allow four to five pigs per feeder hole. Only put enough feed in the feeder to last 3 to 4 days. This keeps the

feed from getting stale as it sits in the feeder. Pigs prefer fresh feed.

Waterers

The ideal way to supply fresh, clean water to your pigs is through a nipple drinker or a water cup. Unfortunately, these are expensive to install. Water barrels are less expensive and work very well. Water cups and water barrels should be cleaned periodically to ensure that your pigs **always** have fresh, clean water available.

List of Equipment

The 4-H market hog project doesn't require a great deal of expensive equipment. As a beginner you won't need all of these items immediately; you can buy them as needed. You can purchase equipment from livestock supply companies. Your county 4-H Youth agent should be able to help you locate equipment. Below is a list of equipment you will need.

- Small, covered sleeping area
- Two- or three-hole hog feeder
- Water barrel or nipple waterer
- Hog panels to fence in pen
- Syringe and hypodermic needle

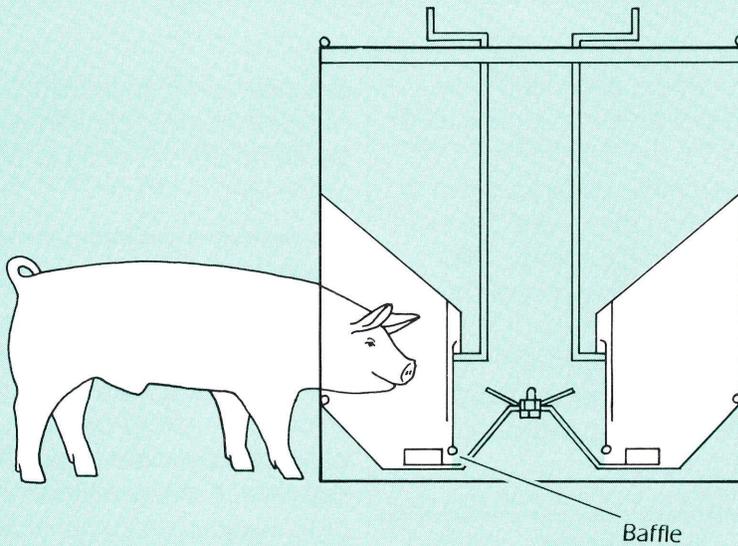
Table 1. Space Requirements of Growing and Finishing Swine

Pig weight	Space requirements/plg
30-60 pounds	3-4 square feet
60-125 pounds	6 square feet
125 pounds—market weight	8 square feet

Table 2. Ideal Temperature for Growing and Finishing Swine

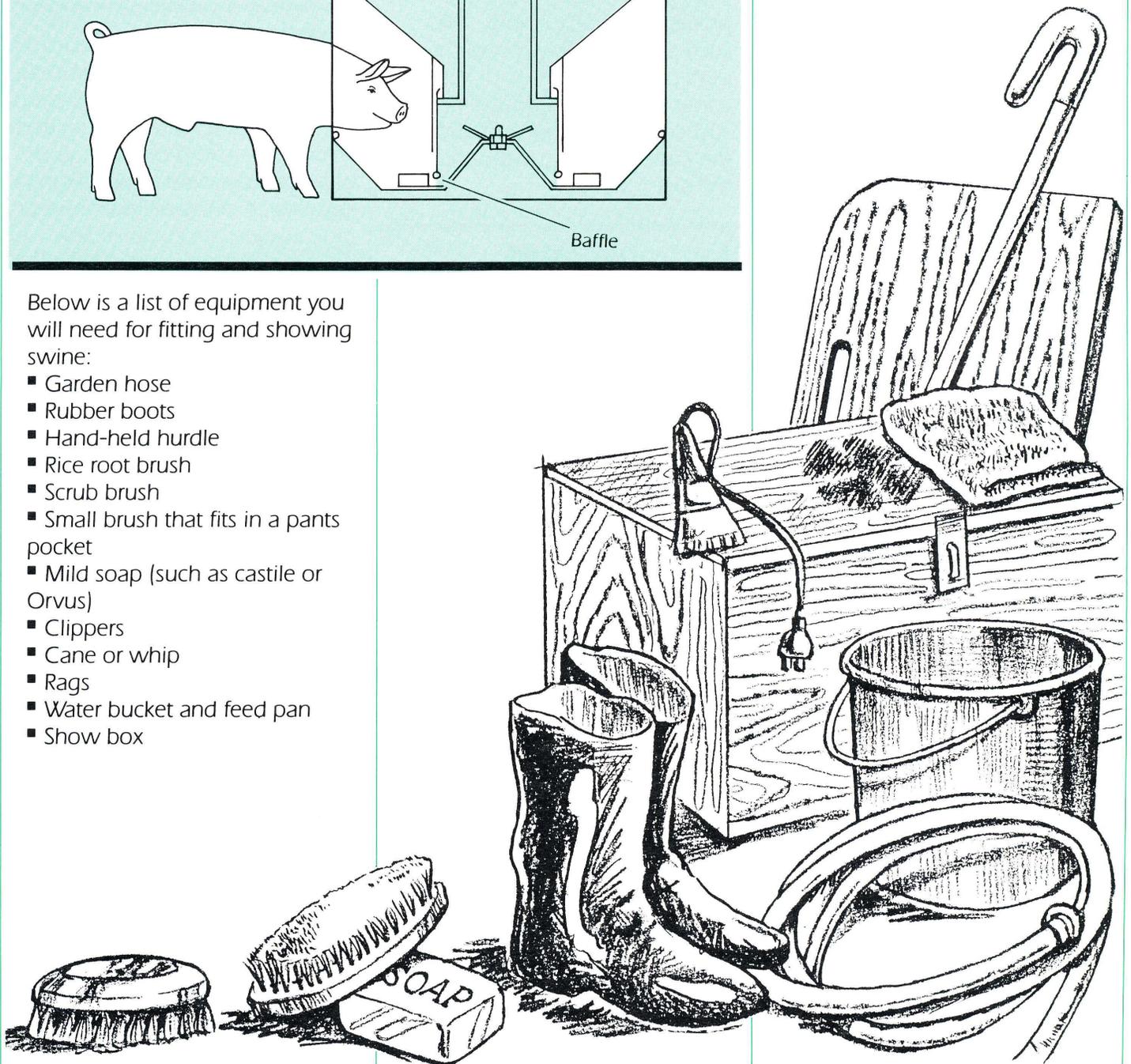
Pig weight	Temperature
30-60 pounds	70-75 °F
60-125 pounds	65-70 °F
125 pounds—market weight	60 °F

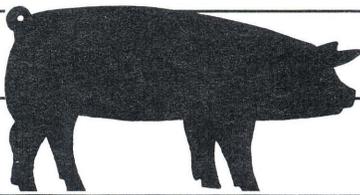
Figure 6. Proper feeder adjustment.



Below is a list of equipment you will need for fitting and showing swine:

- Garden hose
- Rubber boots
- Hand-held hurdle
- Rice root brush
- Scrub brush
- Small brush that fits in a pants pocket
- Mild soap (such as castile or Orvus)
- Clippers
- Cane or whip
- Rags
- Water bucket and feed pan
- Show box





To properly feed your project pigs, you need to know what the various feed nutrients are and how they contribute to the growth and health of your pigs.

Water

Water is the most important part of a pig's diet. Strictly speaking, water is not a nutrient. However, without it many of your pig's important body functions can't happen. One-half to two-thirds of a pig's body is made up of water. Therefore, pigs should be supplied with as much clean, fresh water as they will drink.

The pig needs water to properly digest its feed and carry nutrients to the body cells. Water carries away waste products, lubricates joints and is a built-in cooling system. A pig can live longer without feed than without water.

Proteins

The protein a pig eats as part of its feed is called dietary protein. It is broken down by the pig's body into amino acids. These amino acids are then used by the pig to build body proteins, which make up muscles, internal organs, bones and blood. Body proteins are also part of hair, hooves, skin and many other body parts.

There are two kinds of amino acids: those the pig's body can manufacture, and those the pig's body can't make on its own. The second group of amino acids is called

essential amino acids, and they must be included in the pig's diet.

If you feed more dietary protein to your pigs than they need, the extra protein is used for energy. Grains such as corn supply part of the pig's protein (amino acid) needs. A commercial protein supplement or soybean meal is used to balance the protein (amino acid) content of the diet.

Carbohydrates

Carbohydrates are to a pig what gasoline is to an automobile. They supply the energy or fuel the pig needs to walk, breathe, stand and grow. Carbohydrates also produce heat to keep the body warm. Energy nutrients not used right away are stored as fat until the body needs them.

Sugars and starches are carbohydrates. Grains such as corn and wheat contain much sugar and starch. Cellulose is one of the more complex carbohydrates. Grasses and hays are high in cellulose. Since pigs can't readily use cellulose for energy, swine diets shouldn't contain hays or grasses as major energy sources.

Fats

Fats also provide energy for movement and heat. They produce about 2¼ times as much energy as carbohydrates. Fats are also needed to help digest certain vitamins. Fats digest easily in the pig's body but

at a slower rate than carbohydrates. Most swine diets contain enough fat, so fat doesn't need to be added to the diet.

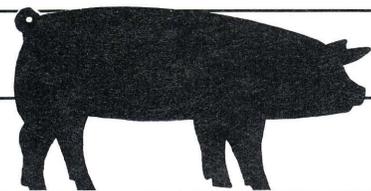
Minerals

Minerals build bones and teeth and support other life processes in pigs. Calcium, phosphorus, sodium and chlorine are called macrominerals because they make up the largest percentage of the minerals in your pig's body.

Minerals that are needed in very small amounts are called trace minerals or microminerals. Some examples of trace minerals are copper, iron, zinc and iodine. Minerals can be added separately to swine diets or they can be supplied in a commercial protein supplement.

Vitamins

Vitamins are just as important as other feed nutrients, but they are needed in smaller amounts. Vitamin A is needed for the health of the eyes, nasal passages and lungs. Vitamin D is necessary for strong bones, and vitamin K for blood clotting. Pigs need other vitamins to aid other body functions. Most of the grains fed to swine contain all or part of the necessary vitamins. One vitamin, vitamin D, can be manufactured by pigs that are exposed to sunlight. If a swine diet made from grains contains only part of the needed vitamins, extra vitamins must be added to the diet.



Feeds for Swine

Feed will represent from 70 to 75 percent of the cost of your market hog project. This fact, along with the rather specific requirements of growing pigs for certain essential nutrients, makes it very important for you to understand a few basic rules for selecting the proper feeds in the right proportions for your pigs.

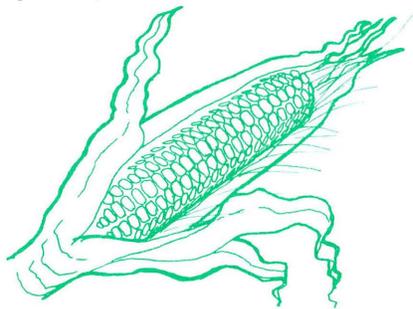
It's a good idea to learn and use proper terminology when referring to swine feeding programs. Your 4-H market hog project is a good place to begin. Often, the terms diet and ration are used to refer to the same thing, but there is a difference between the two. A swine **diet** is a nutritionally-balanced mixture of feed ingredients. A **ration** is the amount of feed a pig is allowed to eat in a 24-hour period.

Pigs are nonruminant animals. They have a single stomach in contrast to ruminants such as cattle and sheep, which have stomachs that are divided into four compartments. To grow rapidly and efficiently, swine need a high energy, concentrated grain diet that is low in fiber (cellulose) and is supplemented with adequate protein. Cattle and sheep on the other hand, can digest large quantities of fibrous feeds such as hay and pasture.

Energy Feeds or Concentrates

Farm grains are the most common and the best source of energy feeds

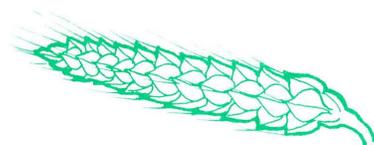
for swine. The following tells how farm grains can be used and how they compare as feeds for swine.



Corn is an excellent energy feed for all classes of swine. It is an ideal finishing feed because it is high in digestible carbohydrates, low in fiber, and is a very palatable, safe feed. Corn can be fed shelled, ground, mixed or free-choice, or even as ear corn. It may be dry or high moisture. It makes little difference to the pig; pigs like corn any way it is offered.

In spite of its virtues, corn alone won't keep pigs growing and healthy. Corn contains 7 to 9 percent protein, but the protein is deficient in practically all of the essential amino acids required by the pig. It is also so deficient in calcium and other minerals, and so inadequate in vitamin content, that pigs will perform very poorly if they are limited to a diet containing only corn.

Corn must be supplemented with a protein that makes up its amino acid deficiencies. It is equally important to supply the needed minerals and vitamins. When corn is properly supplemented, it is an excellent feed for all classes of swine.



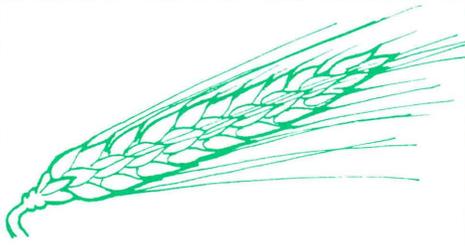
Barley is an excellent energy feed when corn is not available. But because of its higher fiber content, barley has more bulk and is slightly lower in energy than corn. It contains more protein than corn, but the amino acid balance isn't good. In feeding value, it is worth about 90 percent of corn.

Barley should be rolled or ground to a medium degree of fineness for swine. When fed in this manner, it can replace all or part of the corn in a swine diet. It is somewhat less palatable to pigs than corn, so it is best to mix the ground barley with a protein supplement.



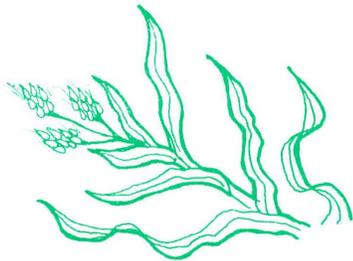
Oats are not a good energy feed for pigs because of their high fiber content. This bulk makes oats a better feed for breeding animals than for young pigs or finishing hogs where high energy diets are needed for fast gains.

The feed value of oats ranges from 70 to 80 percent that of corn. Fine grinding or removal of the hull improves the feed efficiency. When ground oats comprise no more than 20 percent of the total diet, the growth rate of growing pigs will not be reduced.



Wheat, for all practical purposes, is equivalent to corn as an energy source and is slightly superior to corn in the quality and quantity of its protein. Wheat can be used as a pound-for-pound substitute for corn; but because of its relatively high cost, it is not widely used as a swine feed. Low quality wheat not suitable for milling and damaged wheat can be profitably utilized by swine.

Wheat should be coarsely ground or rolled for hogs. When ground too fine, it has a tendency to form a pasty mass in the pig's mouth and becomes less palatable.



Grain sorghums (milo) have many of the same virtues and deficiencies as corn and can replace corn in all swine diets. The kernel is hard and small and should be ground before mixing with other ingredients. The feeding value of grain sorghums is approximately 95 percent that of corn.

Protein Supplements

After reading about the common farm grains fed to pigs, you should recognize that all are deficient in both the quantity and quality of protein they provide. Therefore it is

necessary to supplement the grains used in swine diets with protein-rich feeds. Usually, 4-H members will find it more convenient and cheaper to purchase a commercial protein/vitamin/mineral supplement prepared especially for swine.

The commercial supplement should contain all the required minerals and vitamins along with the protein (amino acids) missing in the grain ingredients.

Antibiotics

Antibiotics aid in efficient swine production because they are very effective in improving weight gain and the general health of pigs. Some people believe antibiotics are effective because they suppress the growth of harmful bacteria in the pig's body.

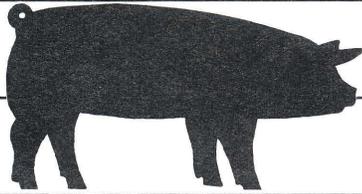
Other people believe long-term antibiotic feeding is a potential threat to human health. They point out that continuous feeding of antibiotics may result in bacteria that can't be killed by antibiotics. Antibiotics would have limited usefulness in curing disease if antibiotic-resistant bacteria infected people.

Because of the potential threat to human health, the safety of feeding antibiotics to livestock has been questioned. The effect of future regulations concerning the use of antibiotics in livestock feeds is uncertain at this writing.

If you decide to use antibiotics in your swine diets, be sure to read and follow all label directions. Observing the recommended withdrawal time is especially

important. Withdrawal time is the amount of time before slaughter that the pig cannot eat feed containing antibiotics. Contact your county Cooperative Extension Service office for the latest regulations and recommendations concerning antibiotics in swine diets.

Antibiotics such as Aureomycin or Terramycin can be added to swine diets at low levels (10 to 20 grams per ton of complete feed). Remember, antibiotics can't take the place of good management and sound nutrition.



Feeding Your Pigs

Nutrient Requirements

The nutrient requirements of growing and finishing swine are presented in table 3. Pigs weighing 40 to 125 pounds are referred to as growing pigs. From 125 pounds to market weight (about 230 pounds) pigs are called finishing hogs.

As a pig grows, the total amount of dietary protein it needs each day also increases. Since smaller pigs don't eat as much feed each day as heavier pigs, the percentage of protein in grower diets must be higher so that the growing pigs receive their daily protein requirement.

Grower diets are often referred to as nutrient dense diets. Older pigs eat more feed so they can meet their daily requirements with a less nutrient dense diet. Remember, muscles and internal organs contain quite a bit of protein. During the finishing phase, the pig's weight increase is due to increased fat deposits throughout the body. Fat tissue contains very little protein.

Lysine is the essential amino acid most likely to be deficient in corn-soybean meal diets for swine. Consequently, you must be sure to meet your pig's lysine requirements when formulating diets.

Suggested Diets

Corn-supplement diets for both growing and finishing pigs are presented in table 4. Two dietary

plans (A and B) have been provided based on the crude protein content of the supplement you buy. Use the diets in Plan A if your supplement contains 40 percent crude protein. The diets under Plan B are designed for diets containing a 34 percent crude protein supplement.

In Michigan, corn is the most popular source of energy for pigs because it is readily available and relatively inexpensive. The supplement provides protein, minerals and vitamins. The ground corn and supplement should be mixed thoroughly and fed in meal form. The

Table 3. Nutrient Requirements of Growing and Finishing Swine

Nutrient (in percentages)	40-125 lbs	125 lbs—Market weight
Protein	16.00	14.00
Lysine	.75	.62
Calcium	.75	.60
Phosphorus	.65	.50

Table 4. Suggested Diets for Growing and Finishing Swine

Ingredient (In lbs)	PLAN A ¹		PLAN B ²	
	Grower	Finisher	Grower	Finisher
Corn	77	83	72	80
Supplement	23	17	28	20
Total	100	100	100	100

¹40% crude protein supplement, 2.63% lysine, 3.93% calcium, 2.02% phosphorus.

²34% crude protein supplement, 2.20% lysine, 3.10% calcium, 1.65% phosphorus.

calculated nutrient composition of the suggested diets is presented in table 5. Compare the calculated nutrient composition of these diets to the nutrient requirements of growing and finishing swine.

Amount of Feed

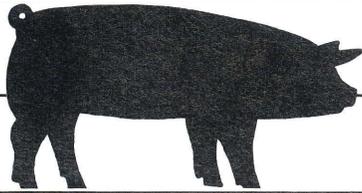
Pigs should be self-fed (given all the feed they will eat) throughout the feeding period. Self-feeding allows a pig to grow as fast as possible. The daily feed intake of pigs of different weights is presented in table 6. This information will help you calculate the approximate amount of feed that will be needed during the pig's feeding period. Remember, pigs should be switched from the grower to the finisher diet when they weigh about 125 pounds.

Table 5. Calculated Nutrient Composition of Suggested Growing and Finishing Swine Diets

Nutrient (In percentages)	PLAN A		PLAN B	
	Grower	Finisher	Grower	Finisher
Protein	16.00	14.00	16.00	14.00
Lysine	.78	.64	.79	.63
Calcium	.91	.67	.87	.63
Phosphorus	.66	.55	.64	.53

Table 6. Normal Daily Feed Intake of Growing and Finishing Swine

Pig weight in pounds	Feed intake in pounds	Intake as a percent of body weight
40	2.7	6.67
60	3.8	6.30
80	4.7	5.83
100	5.6	5.55
120	6.3	5.37
140	6.8	4.84
160	7.4	4.66
180	7.8	4.27
200	8.3	4.18



Common Diseases— Their Prevention & Control

Maintaining the health of your newly purchased pigs is critical. The first 2 to 3 weeks following their arrival at your farm are very important. New pigs require a great deal of care and attention. By careful observation, you will learn to distinguish a normal, healthy pig from a sick one. Early diagnosis and treatment of any illness will pay big dividends. Ease the discomfort of the pig during its illness by giving it good feed, plenty of water, a clean pen protected from dampness and drafts, and plenty of rest.

Infectious Diseases

Erysipelas

Signs—This disease is caused by a bacterium which can affect swine of all ages. High fever (104 to 106 °F), poor appetite and stiffness are characteristic of the acute form of this disease. Affected pigs may stand with their feet well under their body, giving their backs an arched appearance. They may also constantly shift their weight in an effort to relieve the pain. Diamond-shaped skin lesions may appear during an acute attack.

Prevention—Vaccinations are particularly effective against this disease. Pigs should be vaccinated against erysipelas at 8 to 10 weeks of age. Erysipelas vaccinations are usually given at the beginning of the feeding period.

Treatment—Antibiotics such as penicillin are good treatment for an acute attack of erysipelas.

Pneumonia

Signs—Pneumonia is a lung inflammation or irritation. Pneumonia can be caused by bacteria, viruses or mycoplasma organisms. Internal parasites living in the pig's lungs and the pig breathing excessive amounts of dust can also cause pneumonia. Stress is often an important factor in respiratory diseases such as pneumonia because stress lowers the pig's defenses against pneumonia-causing organisms.

Some common signs of pneumonia are abnormal nasal discharge, persistent cough and labored breathing—sometimes called **thumping**. Pigs may also display decreased appetites, gauntness and dull appearances of the eyes and haircoat.

Prevention—Because so many factors can cause swine pneumonia, it is difficult to guard against any particular cause of the disease. Providing a well-ventilated, draft-free environment with a minimum amount of stress will go far toward preventing pneumonia.

Treatment—Due to the wide range of pneumonia-causing organisms in swine, no treatment will be effective in all cases. If you suspect that your pig has pneumonia, ask your veterinarian about treatment.

Pseudorabies (Mad Itch, Aujeszky's Disease)

Signs—Pseudorabies is a very serious, highly contagious disease caused by a virus. The disease can be spread from pig to pig in drinking water, in bedding or on the shoes and clothes of people.

In growing swine, fever is a major sign of pseudorabies, followed by loss of appetite, labored breathing, vomiting and trembling. Affected pigs have difficulty controlling their hind legs, and may rub their noses excessively, sneeze and cough. Only 5 percent of infected pigs die; however, pigs which recover usually take longer to reach market weight.

Prevention—Buy your pigs from a qualified pseudorabies-free herd. Once you have your pigs, the best prevention is to restrict human and animal traffic around them. Vaccinating market hogs is not recommended because vaccinated pigs are indistinguishable from pigs that have had pseudorabies. Identification of pseudorabies carriers (pigs that have had the disease) is important in order to control its spread.

Treatment—If your pigs catch pseudorabies, they must be placed under strict quarantine to prevent the spread of the disease. Contact your veterinarian for advice and proper treatment procedures.

Atrophic Rhinitis

Signs—Atrophic rhinitis results from a bacterial infection of the turbinate bones of the pig's snout. The turbinates are small scroll-like bones in each nostril that warm, moisten and filter the air a pig breathes. This disease is not fatal, but infected pigs have slower growth rates and are more susceptible to pneumonia.

The most common signs of atrophic rhinitis are sneezing, sniffing, snorting and coughing. The pig may have moist areas below its eyes due to excessive tear production. In severe cases, twisting and/or shortening and thickening of the nose is common.

Prevention—Vaccines are available for use in the prevention of atrophic rhinitis. These vaccines should only be used if rhinitis is a problem in your facility. Ask your veterinarian about the need for and the best time to vaccinate.

Treatment—Sulfonamide drugs mixed in the feed during the early part of the feeding period are useful in the treatment of atrophic rhinitis. Do not forget to observe the proper withdrawal period.

Swine Dysentery (Bloody Scours)

Signs—This disease is caused by a bacterium which affects the pig's large intestine. Typically, affected pigs have diarrhea with mucus and blood in it.

Swine dysentery causes reduced rates of gain and poor feed efficiencies. In severe cases, pigs may

die. People wearing contaminated clothes, dogs, birds and flies can spread this disease, so keep pets out of the pig pen and control pedestrian traffic.

Prevention—No vaccine has been developed against swine dysentery. The best preventive measure against the disease is to keep human and pet traffic around the hog pen to a minimum. You should isolate pigs with swine dysentery from other pigs.

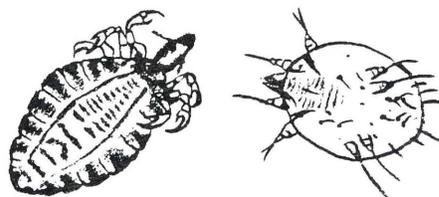
Treatment—Various drugs can be mixed in the feed to treat swine dysentery. Your veterinarian can give you advice on which drug is most effective.

External Parasites of Swine

Lice and Mange Mites

These are common external parasites frequently found on pigs. Lice are small insects that suck blood from the pig. On a white pig, lice look like small specks of dirt. They are very difficult to see on a black pig. Mange mites, on the other hand, can't be seen because they burrow under the skin.

Both lice and mange mites irritate the pig's skin, causing it to scratch constantly. Irritation caused by these parasites makes pigs restless and may decrease their feed intake and growth rate.



Since lice and mange mites are difficult to see, you must constantly be alert for them. Check your pigs frequently. Lindane, Malathion and Prolate are all chemicals used to control these pests. For effective control of lice and mange, several applications of one of these chemicals (10 to 14 days apart) may be necessary.

Insecticides are strong chemicals. It is important for you to follow the manufacturer's directions on the label. Most insecticides are available in sprays, wettable powders or dust preparations. Some are applied directly while others are mixed with water before application. Be certain to mark containers clearly and store these chemicals safely. Avoid accidental poisoning.

Internal Parasites of Swine

Swine are hosts to a wide variety of internal parasites. Different parasite species affect different swine organs. Several of the internal parasites found in swine and their locations are presented in table 7.

The primary internal parasite of economic importance in swine production is the roundworm or ascarid. High infestations of ascarids will reduce growth and keep pigs from gaining efficiently. The pig eats roundworm eggs found in soil or manure which then hatch in the pig's intestine.

During its life cycle (see fig. 7), the immature roundworm passes from the pig's intestine into its liver. While in the liver, the roundworm causes scar tissue to form which

will result in liver condemnation at slaughter. Condemned livers can't be sold for human consumption, so the packer loses money on that hog's liver. If a producer has a history of selling hogs whose livers are condemned, buyers may eventually hesitate to buy that producer's animals.

From the liver, the ascarid travels to the lungs where it causes irritation. This irritation causes the pig to cough up the worm and swallow it. Once in the intestine, the ascarid matures and lays eggs which will pass out of the pig in its manure. These eggs can then reinfest the same pig or infect penmates.

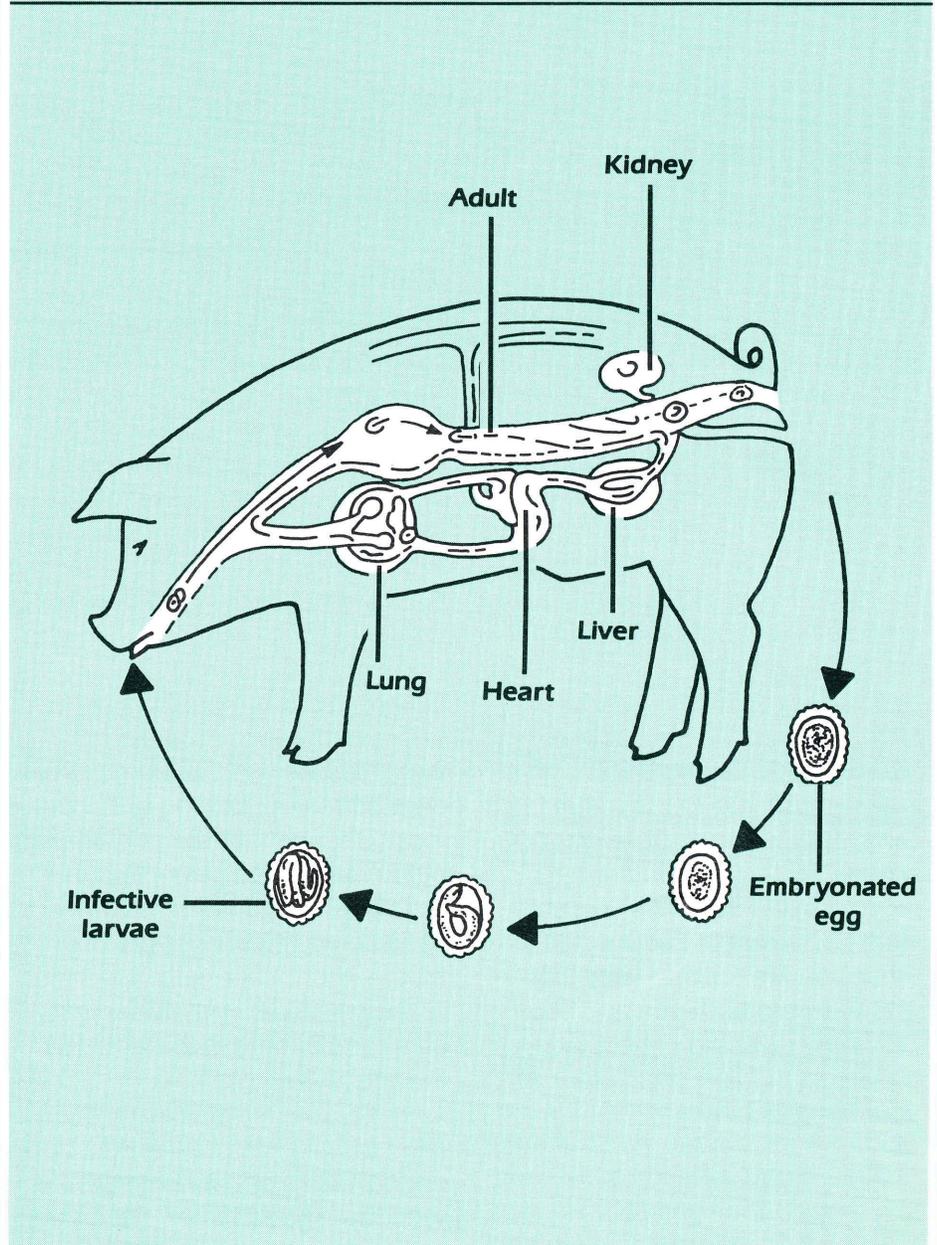
Wormers such as Dichlorvos or Levamisole can be mixed in the pig's feed to kill the adult worms living in its intestine. Another wormer, Piperazine, can be mixed into the pig's water. Pigs should be wormed once with one wormer and then again 30 days later with a different wormer. The second treatment is needed to kill the adult worms that were larvae at the time of the first treatment. Banminth is a wormer that can be added to the pig's diet throughout the feeding period. When Banminth is used, no other roundworm treatment is needed.

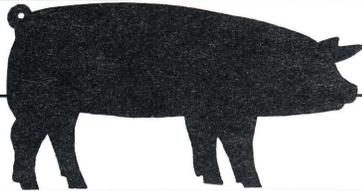
Whipworms, nodular worms, stomach worms, kidney worms and lungworms are not usually a major problem in market hogs. Many of the wormers used for ascarid treatment will kill several species of parasites. Your veterinarian can aid you in the diagnosis and control of these other internal parasites.

Table 7. Internal Parasites of Swine

Parasite name	Usual location
Ascarid (large roundworms)	Small intestine
Whipworm	Large intestine
Nodular worm	Large intestine
Stomach worm	Stomach
Kidney worm	Kidneys
Lungworm	Lungs

Figure 7. Life cycle of the ascarid.





Exhibiting Your Hogs

You and other members of your club may want to exhibit your market hogs at your county or area fair or show. This is often a requirement if you are to sell your hogs there. Exhibiting your hogs should be a pleasant experience for you; however, it is only one part of your project.

It is perfectly normal for you to want to win and to feel badly if you don't. The important thing to remember is not to let the results of the show spoil what would have otherwise been an enjoyable experience in your 4-H project.

In order to exhibit your hogs properly and to enjoy your experience in the show ring, you must begin preparing for the show when you start your project. Your pigs must be healthy and free from internal and external parasites. They must be fed at the proper rate so that they will show the proper weight for their age.

Next, you must begin training them several weeks before the show. It may surprise you to learn that hogs can be trained to respond to your actions. You must train them to move easily at a walk. Have your leader or parent act as a judge while you are training your pigs. This will help both you and your pigs know what to expect when the actual judging takes place at your fair or show.

Grooming Your Pigs for Show

Grooming is just as important as training when getting pigs ready for show. Proper grooming improves the general appearance of a pig.

Your pig's general appearance is the first thing a judge notices about it. This first impression is important because it has some bearing on where the pig is placed in its class.

Washing

The most helpful thing you can do in grooming a pig is to wash it. Wash your pigs twice—once about a week before fair time and again the day before your show. More frequent washings are not necessary if the pigs are kept clean and well-bedded. Spend your extra time putting the finishing touches on training.

Before washing your pig, rinse it with clean water. A bucket of water can be used, but a hose will do a better job. Rinsing will remove loose dirt and wet the skin and hair before soap is applied. Hold the pig's ears closed when you rinse its head so you won't get water in them—this is especially important at the fair. A pig with water in its ears can be difficult to handle in the show ring.

After the pig has been rinsed, apply enough soap or mild detergent to work up a good lather. Then scrub

its hide well with a stiff brush. Don't forget to scrub its underline, head and feet. These parts are often neglected.

If the lather from the first wash is dirty, rinse it off and start over. A bar of castile or Orvus soap is good for washing pigs. If you use a mild, liquid detergent, mix it with a bucket of warm water and apply it with a brush. Don't ever use a strong soap or detergent because it will harm the pig's skin.

When you have finished scrubbing, rinse the pig with cold water until all the soap is gone. Give special attention to your pig's underline and the area between its legs. Keep the pig on a clean surface after leaving the wash rack. Take your pig to a holding pen and dry it as much as possible with a terry cloth towel. Continue to dry the pig by brushing it with a dry brush. Brush the hair in the direction that it will lie naturally until it is dry, or it will curl up on the sides when your pig lies down.

Clipping

Clipping the hair from the belly, tail and ears of your market hog is optional. Some national shows now discriminate against a pig that has been clipped. Check with the local fair authority on specific rules concerning the clipping of pigs. If you plan to clip your pigs, use either a hand clipper or electric barber's clippers, and clip them the day before leaving for the fair.

Clip the tail from a point 2 to 3 inches above the switch to the tail setting. Blend the hair carefully into the rump at the tail setting. Clip the inside and outside of the ears. Clip to the base of the ear where it attaches to the head, but don't clip the head.

Blend the clipped areas with the unclipped areas. Clipping the sheath of a barrow tends to make him appear trimmer in the middle. Clipping the underlines of market hogs makes them appear trimmer in the belly region.

Dressing the Hair

After the pig has been washed and clipped, it will be ready for show, except for dressing its hair. How the hair is dressed will depend on the color of the pig. If you decide to use powder or oil on your pigs be sure to use the following guidelines.

White hogs—Use white talcum powder or cornstarch. Sprinkle the powder on very lightly then brush to spread the powder evenly and to get rid of any excess.

Black, red and spotted hogs—Use a light oil (several commercial preparations are good; lightweight mineral oil is good, too). Another good mixture is two parts 10-weight oil and one part kerosene. Apply oil lightly and evenly with a fly sprayer, pressure sprayer or a wool rag. Make sure to oil the pig completely. Don't apply an excessive amount of oil to your pig, and don't use powder on the belt of a Hampshire.

If you accidentally apply too much oil, rub your pig with a dry towel to

Suggested Guidelines for Fitting and Showing Swine

In 4-H market hog showmanship classes, the exhibitor is being evaluated. This evaluation includes indications of the care, attention, training and preparation given the animal, and the appearance of the exhibitor.

	Perfect Score
Appearance of the Exhibitor	10
<ul style="list-style-type: none"> ▪ The exhibitor should be neat and clean. He/she should be appropriately dressed for the occasion. Leather boots or shoes should be worn for protection. 	
Appearance of the Pig	40
<ul style="list-style-type: none"> ▪ The pig should be thoroughly washed, including its ears and feet. Animals should be healthy and free from external parasites. ▪ If long hair is clipped, the clipped areas should enhance the appearance of the pig. 	
Show Ring Procedures	50
<ul style="list-style-type: none"> ▪ The exhibitor should enter the show ring promptly with the pig under control at all times. Showing the pig to its best advantage takes precedence over all other things. ▪ When driving the pig, exhibitors should have a cane or whip in one hand, a small brush in one pocket and one hand free to open gates. ▪ Exhibitors should never do anything that will distract attention from another exhibitor's pig. ▪ Exhibitors should be courteous to the judge and try to do as he/she asks. 	

100

remove the excess. All oil or powder should be washed off your pigs immediately after showing them to prevent any damage to the skin.

It is better to use water than powder or oil to dress your pig's hair. Apply the water just before you enter the show ring. This makes the pig appear fresh and helps keep it from overheating in warm weather.

In the Show Ring

The following are generally accepted procedures in exhibiting your hogs.

Your Personal Appearance

You should be neat, clean and appropriately dressed for the occasion. Neutral slacks would be suitable for showing light-colored pigs and dark slacks for exhibiting a red

or black pig. A white shirt or blouse is suitable; dresses and shorts are not. Leather boots or shoes should be worn for protection. Expensive or elaborate clothing is not preferred over neat, clean, more conservative apparel. Don't forget to securely fasten your exhibitor number to the back of your shirt.

Your Pig's Appearance

Pigs should show proper size for age, indicating an acceptable growth rate. Evidence of good health as indicated by a youthful haircoat is necessary. A youthful haircoat can be recognized by its relatively short, sleek and shiny hair. Animals should be healthy and free from internal and external parasites. Your pig should be prepared for the show ring following the steps outlined in the sections of this manual on grooming, washing, clipping and dressing the hair.

Show Ring Procedures

Enter the show ring promptly when your class is called with the pig under control at all times. Showing your pig to its best advantage is the first requirement of you as a good exhibitor. You must know where the pig and the judge are at all times.

When driving your pig, have a cane or whip in one hand, a small brush in your pocket and one hand free to open gates. The small brush can be used to remove sawdust and dirt that may get on your pig during the show.

If you use a cane, hold the straight end in your hand and guide the pig with the curved end. This gives you more surface to guide the pig with and you can use the hook to pull your pig from a fight. Never use the hook except to separate pigs that are fighting.

If you use a whip, make sure it is lightweight and not more than 3 feet long with a small switch on the end. Drive your pig by gently tapping it on the shoulder or neck. Tap the pig gently behind the front flank or on the side to move it forward.

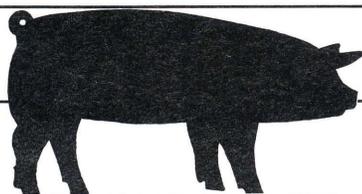
Never hit the pig on the back, rump or snout. Never place your hand or cane around the pig's tail or hind legs. Never shove your pig or use your knee to make it move.

Keep the pig between you and the judge. Never get between the pig and the judge or between a fellow exhibitor's pig and the judge. Try to keep your pig in the judge's view and not too close or too far away. Generally speaking, the pig should be kept 10 to 15 feet away from the judge.

When showing your pig, stay out of bunches or large groups. Try to keep your pig in an open area where the judge can see it. Try to anticipate every movement of the judge and have your pig where the judge is looking and will be looking. Keep your pig at a slow walk. Pigs look better walking than standing still.

Be courteous to the judge and try to do as he/she asks. After the pigs have been placed give the judge a quiet "thank you." It's all right to disagree with the judge since no two people see things exactly alike, but keep your disagreement to yourself. Always congratulate the winner. A loser who can smile after a loss may be a bigger, stronger person than the person who can smile only after winning.





Marketing

Swine producers, like other business operators, are working to produce and sell a top quality product. The goal of the swine industry is to raise lean, heavily-muscled hogs which will yield a maximum amount of edible meat. In order to properly market your hogs and decide on a fair price for them, you must be able to determine their quality.

Determining Hog Quality

When assessing the quality of hogs, two major areas must be considered: production traits and carcass traits. Production traits, such as average daily gain, days required to reach market weight and feed efficiency, are important to the swine producer. These traits are ways to measure how fast and efficiently a pig grew. Production traits are measured on the live hog.

Carcass traits are measured after the hog has been slaughtered and is in carcass form. Some commonly measured carcass traits are backfat depth, loin eye area, carcass length and percent muscle in the carcass. Many times producers and buyers try to predict carcass quality before the animal is killed by estimating these carcass traits. This is not always very accurate, but it can be a useful selection tool.

It is important that you know these measures of performance and carcass quality and understand what they mean. The normal ranges and average values for several of these traits are shown in table 8.

Production Traits

Growth rate—Average daily gain (ADG) and days required to reach 230 pounds (days to 230) are both measures of growth rate. A greater value for ADG and a smaller value

for days to 230 indicate a fast-growing pig.

Feed efficiency value—This measures the amount of feed a pig requires to gain 1 pound. A feed efficiency value (sometimes called feed-to-gain ratio) of 3.6 means that a pig had to eat 3.6 pounds of feed to increase its body weight by 1 pound. A low feed efficiency value is more desirable.

Carcass Traits

Many times, 4-H'ers don't receive carcass information on their project pigs. This is unfortunate, because seeing how your live pigs look in carcass form can be very educational. Evaluating the carcasses of the pigs you raise this year might make selecting your feeder pigs easier next year. This section describes the physical measurements and characteristics of swine that are called carcass traits.

Dressing percentage—Dressing percentage represents the amount (percentage) of the hog's live weight that is present in carcass form. To calculate dressing percentage, divide the chilled carcass weight by the live weight and multiply by 100.

The amount of fat and the amount of fill (stomach and intestine contents) are the two factors that influence dressing percentage. Fat hogs will dress higher than lean hogs, while hogs that are full of feed and water will dress lower than shrunk

Table 8. Normal Ranges and Average Values for Various Production and Carcass Traits

Trait	Normal Range	Average
Production		
Average daily gain (pounds per day)	1.4-2.1	1.6
Days to 230 pounds	165-200	180
Feed efficiency	3.2-3.8	3.5
Carcass		
Live market weight (pounds)	190-265	230
Dressing percent	68-77	72
Backfat depth (inches)	.7-2.2	1.3
Loineye (square inches)	3.0-7.0	4.5
Carcass length (inches)	28-34	30.5
Percent muscle	45-65	51
Combined traits		
Average daily lean gain (pounds per day)	.47-.83	.60

Figure 8. Sites for measuring average backfat depth on a live hog.

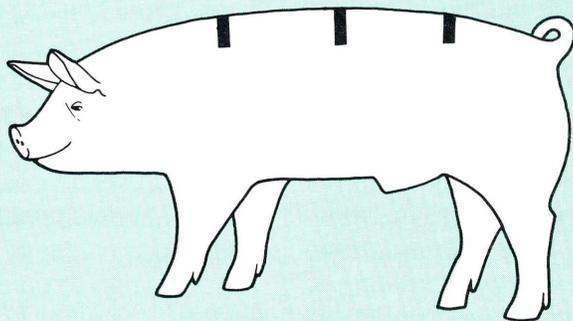
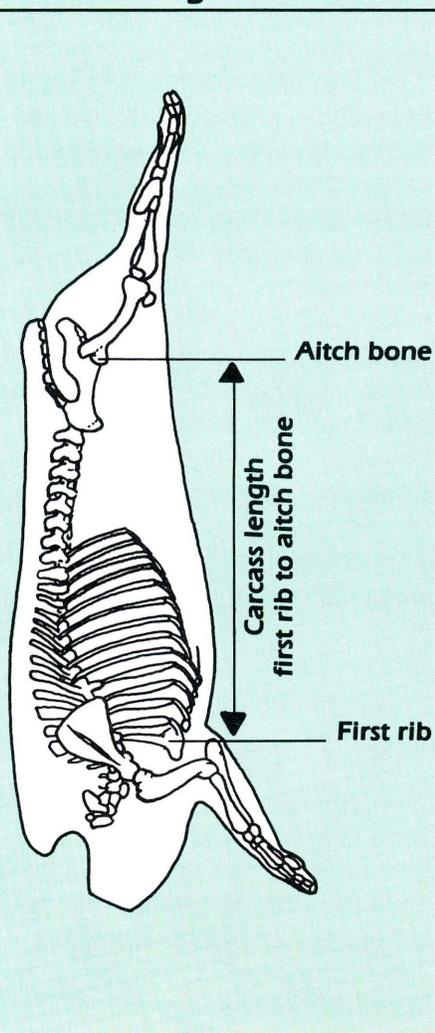


Figure 9. Measuring carcass length.



hogs (those held off feed for 12 to 24 hours).

Backfat depth—Backfat depth is measured at three points on the hog's topline—opposite the first rib, last rib and last lumbar vertebra. The average of these three measurements is the average backfat depth (see fig. 8).

Loineye area—This is a measurement of the size of the major muscle that is found in the loin. Loineye area is determined by cutting the loin crosswise at the 10th rib and measuring the area of the muscle face. Loineye area is a good indicator of the total amount or degree of muscling in an animal.

Carcass length—This is simply a measure of the live pig's body length, but this measurement is taken from the carcass. Carcass length is measured from the aitch bone to the first rib (see fig. 9).

Percent muscle—While loineye area is used as an indicator of muscling, percent muscle describes the total amount of lean meat present

in the carcass. When calculating percent muscle, the loineye area, backfat depth and carcass weight are all considered.

Average daily lean gain—Average daily gain measures only the rate of absolute increase in a pig's body weight. That increase in weight is due to increases in lean and/or fat tissue. On the other hand, when the various carcass traits are measured, only the amounts of lean and fat tissue in the end product (the market hog) are evaluated. Carcass traits say nothing about the hog's growth rate up to slaughter time.

Because evaluating just production traits or just carcass traits has serious limitations, hog producers measure average daily lean gain (ADLG). Growth rate, leanness and muscling are all looked at when measuring ADLG. For ADLG formulas see **A Guide for Exhibiting and Evaluating 4-H Swine Projects for 4-H Swine Leaders and Judges** (4-H 1183).

Average daily lean gain represents the amount of lean tissue growth per day. Average daily gain values are higher than ADLG values because ADG measures lean **and** fat tissue growth while ADLG measures only lean tissue growth.

Selling Your Pigs

Most 4-H members market their hogs at their county fair or show sale. If you sell your hogs by this method, you should check with your 4-H leader regarding the market price farmers are receiving for hogs of similar weight and quality. If you receive more than

this amount, it is due to the generosity of the person who bought your hogs. You should consider it a reward for your efforts and not the true value of the animals.

Many 4-H clubs find it advantageous to promote their county fair sale. You can promote your sale by visiting or sending letters to local businesses asking them to bid on your market hogs. You can promote your auction by holding a buyer appreciation banquet after the sale as a special way of thanking your buyers. You, your fellow club members and club leader probably can think of additional ways to increase community support for your livestock auction.

If you don't market your hogs at your county fair sale, there are livestock auctions and buying stations throughout the state that will buy your pigs. Desirable market hogs are always in demand. Your 4-H leader can help you select one of these markets.

Regardless of where you sell your hogs, you should always have them looking as attractive as possible. Avoid filling them with extra feed and water. Buyers don't want to pay for this feed. They base their price on the pounds of meat your hogs will produce.

Send a thank-you letter to the buyer of your 4-H hog as soon as you get home from the show. This lets the buyer know his/her efforts are appreciated and encourages him/her to support future sales. It is also a good idea to thank your show and sale officials for their efforts in organizing a good show and sale for you. Also remember to thank your 4-H leader, parents and

Figure 10. Wholesale or primal cuts of pork.

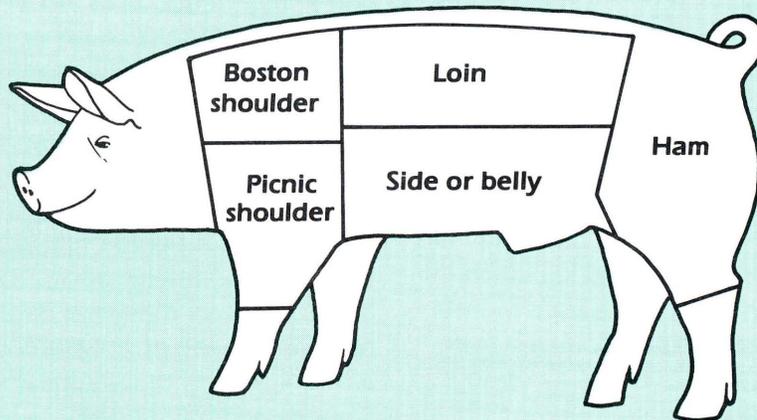


Table 9. Wholesale Pork Cuts as a Percentage of Carcass Weight and Total Carcass Value

Cut	Percent of Carcass Weight*	Percent of Total Carcass Value*
Ham	21	28
Loin	19	29
Boston shoulder	8	8
Picnic shoulder	9	8
Total lean cuts	57	73
Side or belly	16	15
Total primal cuts	73	88
Other	27	12
Total	100	100

*Based on a 240-pound pig which dresses 72 percent.

4-H Youth agent or program assistant for all their help during the year.

Pork Products

The only reason for breeding, selecting, raising and selling swine is to produce pork. The final step in pork production is the processing of hog carcasses to yield a lean,

meaty product for human consumption. After the hog has been slaughtered, carcasses are cut into five primal or wholesale cuts.

The five primal cuts are the ham, loin, Boston shoulder, picnic shoulder, and side or belly (see fig. 10 and table 9). Of the five primal cuts, four are called lean cuts because they contain more muscle than fat. The four lean cuts are the

ham, loin, Boston shoulder and picnic shoulder. The side or belly is known as a fat cut.

Each wholesale cut is trimmed of excess fat and separated into retail cuts. Retail cuts of pork are the meat that is sold in grocery stores and restaurants (see fig. 11). It is important that you know all the wholesale and some of the most popular retail cuts of pork. This will give you a greater appreciation for the need to produce lean, meaty hogs. Lean, meaty hogs result in wholesale and retail cuts of pork with a larger proportion of lean than fat.

Pork for Good Nutrition

Recent research proves that modern pork is lean, low in calories and

high in protein, iron and thiamine. Many people aren't aware of the nutritional quality of pork. They don't realize that improved nutrition and genetics have produced a hog that is 50 percent leaner than a similar hog of 25 years ago. As a swine producer, you must understand and promote the nutritional quality of pork to the public.

Pork is often thought of as high in cholesterol. Actually, pork contains less cholesterol than veal or dark turkey meat and about the same amount as beef or dark roast chicken without the skin.

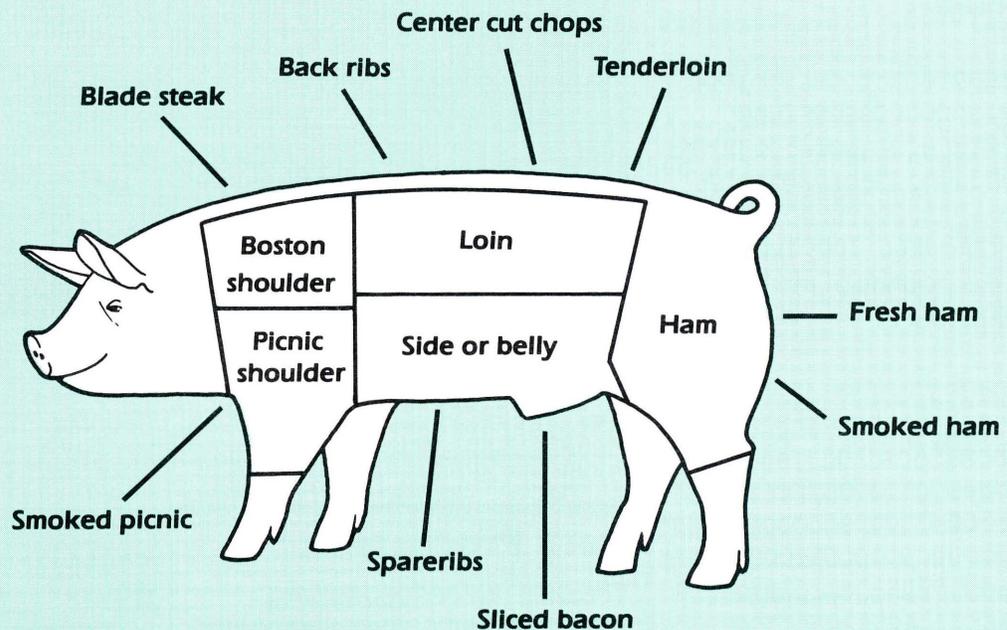
Years ago, swine producers fed raw garbage and table scraps to their pigs. This practice led to a high rate of trichina infections in pigs. If undercooked meat from these pigs was eaten, people contracted

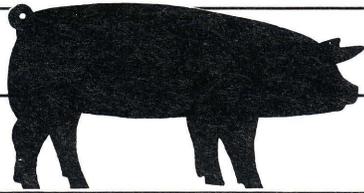
trichinosis. Trichinosis is a muscle infestation by a small parasite. To avoid trichinosis, people had to cook pork thoroughly before they ate it.

In the modern swine industry, feeding pigs raw garbage and table scraps is relatively rare. Consequently, trichinosis has become a medical rarity in the United States. All chance of contracting trichinosis is eliminated if pork is cooked to 140 °F. Pork's good taste, tenderness and juiciness is preserved when it is cooked to an internal temperature of 170 °F.

Another myth about pork is that it is hard to digest. Modern pork products are about 98 percent digestible. This is one more reason why pork is a valuable source of nutrients.

Figure 11. Major retail cuts of pork.





Other Activities

Demonstrations and Illustrated Talks

Giving a demonstration or illustrated talk literally means getting up in front of a group and demonstrating or illustrating something from your project. You learn from the preparation and practice, and your audience learns from your presentation. It teaches you to speak and express yourself in front of a group.

You can give demonstrations and illustrated talks to your local club, at the county or state fair, or in a national contest. You might also give one at a community meeting or on television. Some topics for your demonstration or talk might be:

- How to select a modern feeder pig
- The parts of a pig
- The nutritional requirements of swine
- How to prepare a diet for swine
- How to control parasites in swine
- How to read ear notches
- Cuts of pork

You and your 4-H leader can think of many other topics.

Public Speaking

Giving a speech on some phase of swine production will help you learn to express yourself and will give you a chance to learn more about swine. You may want to pick a topic you don't know much

about to increase your knowledge. Some topics for your speech might be:

- The swine industry in Michigan
- The importance of swine to the American people
- The nutritive value of pork
- By-products of pork production
- Breeds of swine
- Why I chose a market swine project

Judging

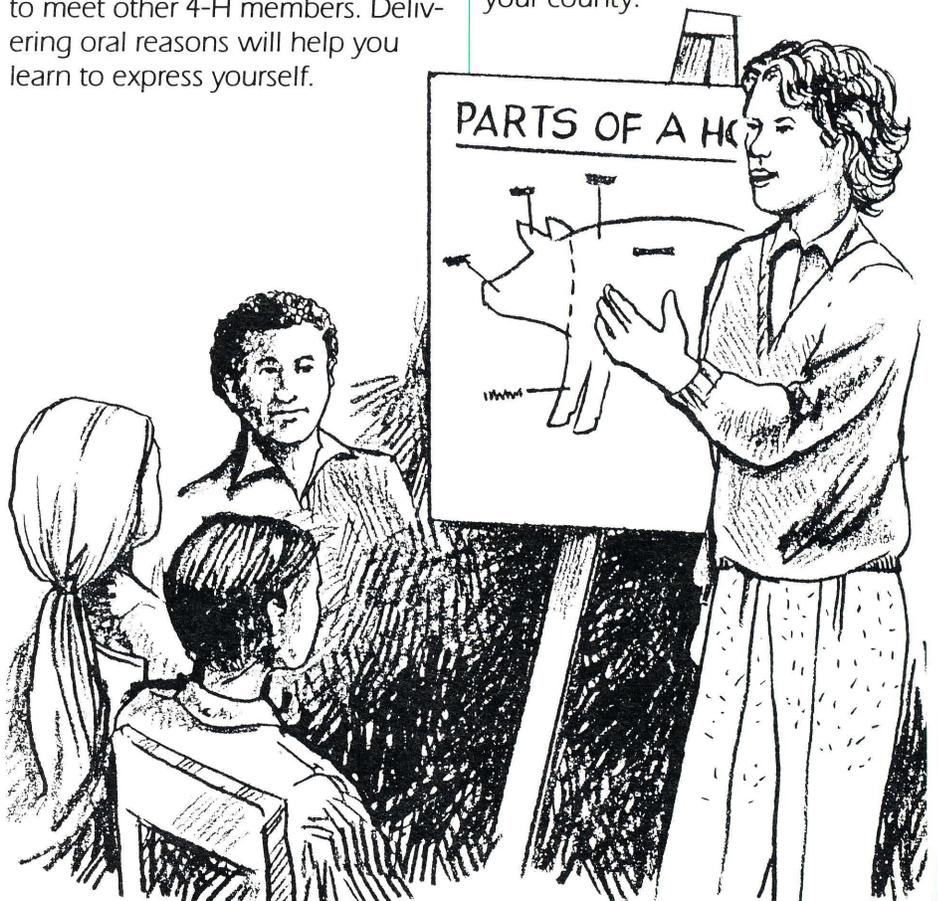
Livestock judging will help you learn to observe, evaluate and make decisions, and will give you a chance to see good livestock and to meet other 4-H members. Delivering oral reasons will help you learn to express yourself.

Fitting and Showing

Fitting and showing teaches you to prepare and show an animal and yourself. It teaches you to be a good exhibitor in and out of the ring, and it encourages good sportsmanship.

4-H Camp

Participating in a variety of 4-H activities will make you a well-rounded 4-H member. One such activity is 4-H camp, which is fun and provides an opportunity for you to meet other 4-H members in your county.



4-H Trips and Tours

Following are some trips and tours your group might take:

- A tour to each of the 4-H members' homes to observe their project pigs.
- A visit to the Animal Science farms and laboratories at Michigan State University.
- A trip through a feed manufacturing plant or a local elevator. If possible, have one of the nutritionists discuss how the livestock diets being produced are formulated.
- A visit to the farm of a purebred swine breeder who participates in a performance testing program. Have the breeder explain what he/she is doing and why.
- A visit to one or more of the swine breed association field days that are scheduled each summer.
- A visit to a packing plant or food

store. Emphasis should be placed on the carcass desirability of the animals being slaughtered. Have one of the officials explain the importance of a good carcass.

- A visit to a large livestock show or sale. Observe any new developments that are being used, such as furnishing judges with performance data and measuring ADG and carcass traits.

Animal Science Week

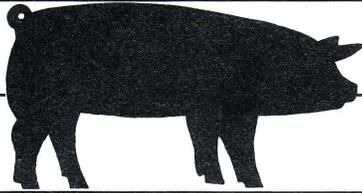
Attend Animal Science Week at Michigan State University. This event gives you an opportunity to test your abilities in many livestock-related areas such as livestock evaluation and judging, quiz bowl and livestock photography. It also gives you a chance to meet 4-H'ers involved in livestock projects from around the state.

Careers in Animal Science

Use your 4-H swine project as a way of exploring careers in animal science. Many careers, such as farm manager, hog buyer and veterinarian, involve working directly with animals. Other careers such as food scientist, meat cutter or meat inspector, allow you to work with animal products.

With the help of your 4-H leader, make a list of all the careers related to animal science. Choose three or four careers from your list and investigate them. You may want to present your findings at your 4-H club meeting so others can benefit from your research.





References

- Material on pork and other meats can be obtained from the National Live Stock and Meat Board, 444 North Michigan Avenue, Chicago, IL 60611.

- The USDA publishes a number of bulletins about swine which can be obtained from your county Cooperative Extension Service office. It is listed in your telephone directory under your county name.

- 4-H publications which can be obtained at your county Cooperative Extension Service office:

175A **Animal Nutrition—
4-H Animal Science
Series A**

175B **Animal Reproduction
—4-H Animal Science
Series B**
4-H 1183 **A Guide for
Exhibiting and
Evaluating 4-H Swine
Projects for 4-H Swine
Leaders and Judges**

4-H 1151 **Livestock Judging
Guide**

4-H 1177 **4-H Market Livestock
Record Book**

4-H 1276 **Livestock Record Card**

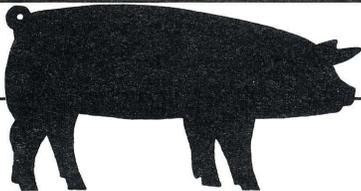
4-H 1277 **Feed Record Card**

4HCA869 **Swine Management
Game** (computer
program)

- Michigan State University produces numerous publications and supplies audiovisual materials dealing with various phases of swine production. Contact your county Cooperative Extension Service office for this information.

- The Michigan Pork Producers Association, 3775 Forrest Road, Suite 2, Lansing, MI 48910 and the Michigan Swine Breeders Association, 324 Barnhart Road, Coldwater, MI 49036, provide information and educational materials about the swine industry.

- Other books dealing with swine and livestock in general may be found in your library.



U.S. Swine Breed Associations

Following is a list of swine breed associations where you can get information about the major swine breeds. Most of them have excellent youth books that will help you in your project. Most of the publications are free if you ask for them.

- American Berkshire Association, P.O. Box 2436, 1769 U.S.-52 North, West Lafayette, IN 47906.

- Chester White Swine Record Association, P.O. Box 228, Rochester, IN 46975.

- United Duroc Swine Registry, 1803 West Detweiller Drive, Peoria, IL 61615.

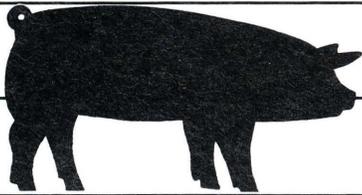
- Hampshire Swine Registry, 1111 Main Street, Peoria, IL 61606.

- American Landrace Association, P.O. Box 2340, 1769 U.S.-52 North, West Lafayette, IN 47906.

- Poland China Record Association, P.O. Box 2537, 1769 U.S.-52 North, West Lafayette, IN 47906.

- National Spotted Swine Record Office, P.O. Box 2807, West Lafayette, IN 47906.

- American Yorkshire Club, Inc., P.O. Box 2417, West Lafayette, IN 47906.



Aitch bone—the exposed bone in the ham region of a pork carcass; used as a reference point to determine carcass length (see fig. 9 on page 22)

Amino acids—small compounds that are the building blocks of proteins

Ascarids—an intestinal parasite of swine, commonly called large roundworms

Atrophic rhinitis—a contagious disease caused by a bacterium which makes the turbinate bones of a pig's nose stop growing and eventually deteriorate

Average daily gain (ADG)—a measure of the pig's daily growth rate; calculated by dividing the pig's total weight gain by the number of days required to achieve that gain

Average daily lean gain (ADLG)—measures the amount of lean tissue growth per day

Backfat depth—a measure of the thickness of the fat layer covering a pig's back

Barrow—a castrated male pig

Bloody scours—bloody diarrhea; a sign of a very contagious disease called swine dysentery

Body proteins—amino acids linked together to form protein molecules which make up muscles, skin, internal organs, bones, blood, hair and hooves

Calcium—a macromineral pigs need to build bones and teeth and to support other life processes

Carcass length—the distance from the first rib to the aitch bone of a hanging pork carcass (see fig. 9 on page 22)

Carcass traits—characteristics of pigs such as muscling, leanness and length, which can be estimated on live animals but accurately measured only on pork carcasses

Countersunk tailsetting—a small depression or dimple where the pig's tail attaches to its body; characteristic of extremely fat pigs

Days to 230—measures the pig's growth rate by recording the number of days it takes the pig to reach 230 pounds

Diet—nutritionally balanced mixture of feed ingredients

Dietary proteins—proteins in feed ingredients that are used by pigs as a source of amino acids

Dressing percentage—the portion of live weight that is represented as carcass weight; calculated by dividing live weight into carcass weight and multiplying the result by 100

Ear notching—a method of permanently identifying pigs by notching their ears

Erysipelas—a bacterial disease characterized by poor appetite, high fever, stiffness and diamond-shaped skin lesions

Essential amino acids—amino acids that must be present in the diet because pigs can't make them in their bodies

Fats—a dietary compound that supplies energy for the pig and aids in digestion of certain vitamins

Fat cut—a wholesale cut of pork that contains much more fat than lean tissue

Feed efficiency value—a measure of how many pounds of feed are required for the pig to gain 1 pound; calculated by dividing the weight gain of a pig into the pounds of feed it eats

Finishing hogs—swine of either sex weighing between 125 and 250 pounds

Free-choice—a feeding system that offers feed ingredients cafeteria-style to the pig

Gilt—female pig that has never given birth

Growing pigs—swine of either sex weighing between 40 and 125 pounds

Growth rate—rate of weight gain

Hog—usually refers to swine weighing more than 125 pounds; may refer to any class of swine

Kidney worms—an internal parasite that lives in the pig's kidneys

Lean cuts—wholesale cuts of pork that contain much more lean than fat tissue

Liver condemnation—pig livers judged by federal meat inspectors to be unfit for humans to eat; usually caused by ascarid infestation

Loiney area—area of the major muscle in the loin; determined by cutting the loin of a pork carcass crosswise and measuring the area of the exposed muscle

Lungworms—an internal parasite that lives in the pig's lungs

Lysine—the essential amino acid that is most likely to be deficient in a standard swine diet

Macrominerals—minerals required by the pig in relatively large amounts because they make up the largest percentage of minerals in the pig's body

Market price—the amount of money being paid for pigs on any given day

Microminerals—sometimes called trace minerals because they are required in very small amounts by the pig

Minerals—elements required by the pig to build bones and teeth and to support other life processes

Nodular worms—an internal parasite that lives in the adult pig's large intestine

Nutrient dense diet—a feed that contains high concentrations of the required nutrients, such as amino acids, minerals and vitamins

Percent muscle—the proportion of the pig's body that is made up of lean tissue

Pig—usually refers to swine of either sex weighing less than 125 pounds

Phosphorus—a macromineral required by the pig to build bones and teeth and to support other life processes

Pneumonia—inflammation of the lungs that results in breathing difficulties

Primal cuts—the five parts of a pork carcass that are further divided into retail cuts; often called wholesale cuts (see fig. 10 on page 23)

Production traits—characteristics of swine measured by swine producers dealing with growth rate, feed efficiency and soundness

Protein—a dietary nutrient that supplies amino acids to the pig

Protein supplement—an ingredient of swine diets that supplies protein, vitamins and minerals to the pig

Pseudorabies—a highly contagious swine disease caused by a virus; fever is a major sign of this disease, followed by loss of appetite, labored breathing, vomiting and trembling

Ration—the amount of feed consumed by a pig in one day

Stomach worms—an internal parasite that lives in the pig's stomach

Swine—refers to the porcine or pig family in general

Swine dysentery—a contagious disease caused by a bacterium; bloody scours is the major sign of this disease

Thumping—the labored breathing of a pig with pneumonia

Trace minerals—minerals required by pigs in very small or trace amounts; often called microminerals

Turbinate bones—small, curled bones in the pig's snout that warm and help remove dust from inhaled air

Turn over the loin—the shape of the loin edge as it blends into the pig's side

Vitamins—dietary nutrients needed in very small amounts for the health of eyes, nasal passages and lungs, for strong bones, for blood clotting and for other body functions

Whipworms—an internal parasite that resembles a buggy whip and lives in the pig's large intestine

Youthful hair coat—relatively short, sleek and shiny hair



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