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Baby Pig Management—Birth to Weaning

Michigan State University

Cooperative Extension Service

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pork industry handbook

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Good care and management in the farrowing quarters has a major influence on the number of liveborn piglets that are weaned and on how well they perform in later stages of production. According to a 1995 survey of swine management practices in the United States, the average number of preweaning piglet deaths per litter on farms was .88 or 9.4% of those born alive. The two leading causes of preweaning deaths were laid on (48.7%) and starvation (20.5%). Other surveys have shown that over 50% of the deaths occur in the first two to three days of life.

A successful caretaker understands that newborn piglets have certain physical characteristics which make them very reliant on proper management and care. Piglets are born without any antibody protection, their bodies contain fat energy for about one day of life, and they cannot regulate internal body temperature well until they are a few days old. Thus, anything that may lead to a reduction in milk production or consumption, such as chilling or exposure to disease organisms, compromises the health and well-being of newborn piglets.

Piglets born alive fall into two broad categories—normal and disadvantaged. It is important to recognize the difference between normal and disadvantaged piglets so appropriate assistance can be provided. Normal piglets will be born quickly, get on their feet within a minute or two and be suckling in about 15 minutes. They move from teat to teat, taking a disproportionately large share of the most concentrated, immunoglobulin-rich colostrum. If the sow is a good mother and the farrowing environment is adequate, normal piglets thrive without much help from the caretaker.

Disadvantaged piglets are ones weakened by the rigors of the birth process, are lightweight, have a congenital defect(s), are slow reaching the udder, or are chilled. Piglets weakened during the birth process include those that were oxygen-deprived but not killed, “apparent” stillbirths that were revived,

and piglets experiencing excessive physical trauma. The longer a sow takes to farrow the greater the chance these problems will appear. Lightweight piglets, especially those weighing less than 2.75 lb at birth, are much less likely to survive to weaning than heavier piglets. Splayleg is a common congenital defect observed in disadvantaged piglets. Disadvantaged piglets are also slow in getting on their feet and to the udder. Their weakened state compromises their ability to compete with stronger, normal litter mates for access to teats during the first hours after birth. This reduces their intake of colostrum. Chilled piglets often experience a lower core body temperature which makes them susceptible to death. Often these piglets are seen shivering and huddled with litter mates, because their thermal requirements have not been met.

This fact sheet describes management practices that should increase the number of piglets weaned as well as their ability to perform well in subsequent stages of production. Some of these practices are meant for all piglets in the litter, whereas others are mainly for disadvantaged piglets. There is a general time frame in which it is most desirable to perform many of these techniques.

Attended Farrowings

Research indicates that attending and assisting at farrowing can increase piglet survival and the number of pigs weaned. By being present at farrowing, one can quickly identify disadvantaged piglets and begin to assist them. However, each producer should weigh carefully the costs and benefits of supervised farrowings. Having many litters to supervise at one time (through batch farrowing or continuous farrowing in a multiple farrowing room complex) makes more efficient use of labor.

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Prevent Chilling

The farrowing quarters need to provide two different micro-climates: a cool one for the sow (60-65°F) and a hot one for the newborn piglets (85-95°F the first few days, then decreased to the 70-80°F range). To achieve this goal, maintain a room temperature at approximately 65 to 70°F and provide zone heating for the litter.

Closely monitor the sow and litter's responses to the zone heating to ensure their thermal needs are met. If the amount of heat provided by the zone heaters is excessive, piglets will move away from the heat source. This not only wastes power but can cause the sow to become too warm and increase piglet mortality. The thermal needs of piglets are met if they are lying in a prone position gently touching each other. If they are piled, attention should be given to providing more heat.

Provide zone heating in the farrowing quarters beginning 24 hours before expected farrowing. Heat lamps, heat pads, radiant heat devices, and hovers are common ways to provide zone heating in farrowing houses. Many times, however, the zone heating is placed only to the side of the sow in the creep area. Research indicates that having an additional heat lamp placed at the rear of the sow during farrowing reduces piglet mortality. The extra heat source assures the piglet of immediate warmth following birth. The key is to have the supplemental heat directed behind the sow before farrowing and until farrowing is completed. If there is no extra heat present behind the sow during farrowing, position disadvantaged piglets in a heated area immediately after birth.

Colostrum Intake

The first milk, colostrum, is rich in disease-preventing immunoglobulins; the very first colostrum is the richest and best, because the quality of colostrum declines over time. Getting a good dose of colostrum, especially from the piglet's dam, is probably the single most important factor related to a piglet's survival and long-term health. Strong, early-born piglets get to the udder hours before their later-born litter mates and go from teat to teat taking the best colostrum. Thus, disadvantaged piglets often need assistance to obtain enough colostrum. Below are some methods to ensure piglets obtain an adequate dose of colostrum.

- Prevent chilling so piglets stay warm and active.
- Split suckle. This involves removing part of the litter for one to two hour periods the first 12 hours after farrowing. For best results, remove the largest, strongest piglets for a one to two hour period during the morning and again in the afternoon, leaving the small piglets on the sow to nurse. Give the sow 20 to 30 U. S. P. units of oxytocin (1 to 1.5 ml) each time the largest piglets are removed. Be sure to hold the large piglets in a box fitted with supplemental heat to prevent chilling. Use this technique to ensure high colostrum intake before crossfostering.
- Collect colostrum from the sow or obtain cow colostrum and give it to piglets via a stomach tube or a syringe. To milk a sow, remove all her piglets for one hour. Then give her 20 to 30 U.S.P. units or 1 to 1.5 ml of oxytocin, wait one or two minutes, then strip her teats (front teats are better because they produce more milk) to obtain colostrum. Cow colostrum also can be used and may be more easily obtained. Either type of colostrum can be frozen in ice cube trays for future use. However, do not thaw the cubes in a microwave

oven, because rapid thawing reduces the immunological value of the colostrum. Stomach tubes can be made from model airplane fuel tubing or by using a urinary catheter (size 14 French) available from medical supply stores. Attach the tube to a syringe and lubricate the tube with vegetable oil or KY jelly before inserting it 6 to 7 inches into the piglet's stomach. Give the piglet 10 to 15 ml of colostrum once or twice during the first 24 hours of life.

Crossfostering

The lowest piglet mortality is observed in high birthweight litters with low within-litter piglet weight variation. Crossfostering is the most effective way to reduce within-litter piglet weight variation. The primary purposes of crossfostering is to reduce the weight variation within the litter and to more evenly match the number of piglets with the sow's ability to raise them (determined by the number of functional teats).

Crossfostering should be practiced carefully to achieve best results. A good crossfostering program makes milk supplies more available to all piglets and does not compromise the health status of the piglets in segregated early weaning (SEW) programs. Below are important tips to ensure good results from crossfostering.

- Ensure piglets that will be crossfostered consume colostrum from their dam. Allow piglets to remain with their dam for at least four to six hours following birth before they are crossfostered. Otherwise, it is likely the fostered piglets will not consume an adequate amount of colostrum, especially if they are fostered to a sow which farrowed one to two days previously.
- Crossfoster piglets before they are 24 to 48 hours old. Piglets establish teat fidelity (preference for a teat) within the first days after birth and will almost always suckle at the same teat or pair of teats until weaning. It is an advantage for piglets to establish teat fidelity, because it reduces competition and fighting at the udder. When teat fidelity is not established, piglets fight more throughout lactation and have poorer weight gains. Crossfostering after teat fidelity is established is disruptive and induces fighting between resident and fostered piglets. An exception to this rule is the fostering of one of a pair of piglets continuing to dispute a single teat location.

In SEW programs where maximum weaning age is important or in PRRS-positive herds, crossfostering piglets after they are 24 to 48 hours old places them at risk of coming into contact with a nurse sow shedding pathogens against which the piglets received no colostrum immunity. Therefore, disease may pass from the nurse sow to the piglets.

Some producers have successfully transferred older, small piglets to nurse sows following early weaning of the nurse sow's litter. In these instances, be sure the weaning age of the fostered piglets does not exceed the maximum weaning age set for the farm.

- Choose small, docile sows with small, slender nipples of medium length to raise below-average-weight piglets.
- Observe for the presence of disease problems in the farrowing quarters before crossfostering. This is important to reduce the spread of disease. Avoid moving a healthy piglet to a diseased litter or vice-versa.
- Transfer males rather than females when replacement animals are retained from within the herd. Otherwise, accuracy

of female selection may be reduced and gilts reared by foster dams have poorer reproductive performance.

Processing Piglets

Processing piglets includes clipping teeth, clipping and treating the umbilical cord, iron administration, tail docking, identification, treating splaylegged piglets, providing supplemental nutrients, and castration. These skills can be performed in different ways and in the sequence of personal preference. Some producers elect not to perform all these procedures, or they prefer to delay some of them for three to four days to reduce stress on the very fragile one-day-old piglet. Those who operate pasture farrowing systems tend to do all their processing of piglets during the first day after farrowing, because the piglets are easier to catch. Producers recording mortality rates from birth to weaning in excess of 15% may consider delaying teeth clipping, tail docking, and castration of smaller piglets for a few days.

Equipment

Have all the equipment you need to process piglets arranged in a hand-held carrier which can be attached to a pig cart preferably on wheels. Supplies and equipment needed to process piglets as described in this fact sheet are: disinfectant, such as chlorhexadine (Nolvasan®) or quaternary ammonium compounds; antiseptic, such as tamed iodine (U.S.P. 1 to 2.5% solution), usually in a spray bottle; side cutters; supplemental iron; syringe with 18 to 20 gauge, 1/2 to 5/8 inch needles and a 14 to 16 gauge 1 to 1 1/2 inch needle (optional); cord or plastic clips for tying off umbilical cords; V-ear notcher or small animal tattoo pliers; adhesive, elastic or duct tape cut in 1/2 to 3/4 inch strips; castration knife or scalpel; shallow container for disinfect-

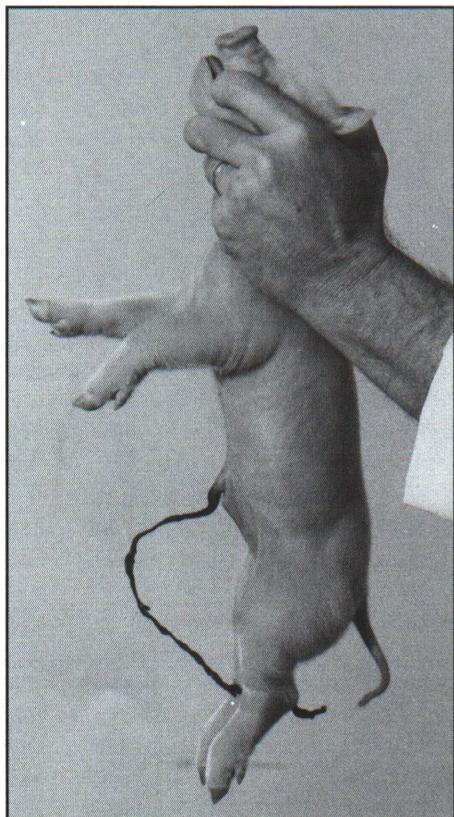


Figure 1. An efficient method of holding and restraining the pig.

tant in which to put the cutting edge of instruments between uses.

Disease Transfer

While processing piglets, take steps to minimize transfer of disease. This can be done by processing sick litters last, cleaning and disinfecting the box or cart you use to transport piglets when you finish for the day or before you move to another room to process, and dipping instruments into a disinfectant after you have processed each piglet. Be sure to change the disinfectant daily or after processing every tenth litter, whichever comes first.

Personal Safety

Be careful when removing piglets from the farrowing quarters. Sows often try to bite or grab you to protect their litter. Always have the farrowing crate or another sturdy partition between you and the sow before you attempt to pick up a piglet.

Holding the Piglet

Hold the piglet so you can cut the teeth, tail, and umbilical cord and administer iron in very rapid succession without changing your grip. For a right-handed person: place your left thumb into the crease behind the piglet's right ear about midway from top to bottom. Maneuver your left index finger across the front of the piglet's face and into the corner of the left side of its mouth, behind the needle teeth. Your left thumb will end up either behind the piglet's ears or in front of them depending upon the length of your fingers (Figure 1). Beware not to choke the piglet by pressing the remainder of your fingers into its throat. Use the fingers under the jaw to support some of the piglet's weight. Dangle the piglet in front of you, and it will struggle less than if you pull it against you. You can also sit and support its weight on your knees if necessary.

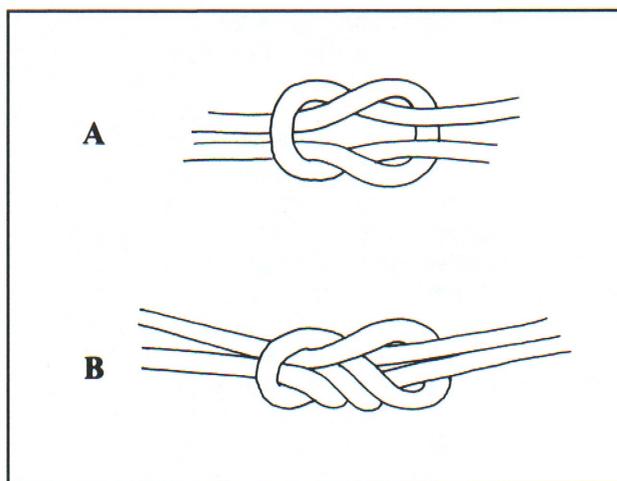


Figure 2. A. square knot; B. surgeon's knot.

Umbilical Cord Care

The umbilical cord, which enables the fetus to obtain nutrients from the dam and expel wastes during pregnancy, usually does not require much attention. While it is possible that bacteria and viruses can travel up the cord after the piglet is born and cause infection or that piglets can bleed excessively from it, these situations are rare.

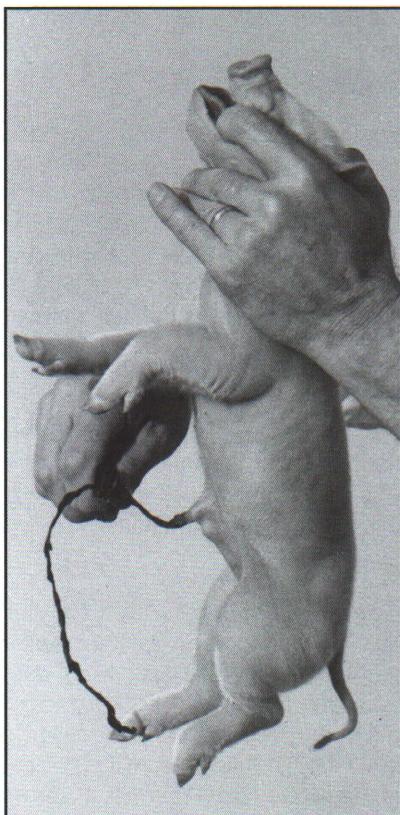


Figure 3. Clipping the navel cord.

If excess bleeding occurs from the umbilical cord, tie it off immediately with string using a square or surgeon's knot (Figure 2) or clamp it with a commercially available plastic clip. Seldom do newborn piglets need to have their umbilical cords tied or clamped. Sometimes newborn piglets bleed excessively immediately after the umbilical cord breaks, especially if it breaks shorter than four to five inches. The loss of blood may cause the piglet to perform poorly or die. The cause of the excess bleeding could be due to a failure of the piglet's clotting mechanism.

If the cord is not dried up but fresh at the time of processing, cut it off with disinfected side cutters. If the umbilical cord has been tied, you can leave about one inch. Leave three or four inches if the umbilical cord has not been tied; check for bleeding. Apply iodine antiseptic by swabbing, spraying, or dipping. The dip method requires placing the umbilical cord inside the antiseptic bottle and shaking gently. Any of these methods is satisfactory, but be sure to get good coverage of the umbilical cord. Use disinfected side cutters and a fresh iodine solution (changed daily if dipping or swabbing, since iodine solutions break down in the presence of organic matter). A contaminated iodine solution might actually cause an infection.

If the cord is dry and shriveled, it is not necessary to treat. Just cut it off, leaving one to three inches of cord. (Figure 3).

Needle Teeth Clipping

The newborn piglet has eight needle teeth, sometimes referred to as wolf teeth, located on the sides of the upper and lower jaws. Many producers clip these within 24 hours after birth to reduce the chance piglets will lacerate each other and/or the sow's udder. Some producers have stopped teeth clipping entirely while others do it as needed and they have not observed any serious problems. It seems less necessary to clip teeth of piglets nursing well-milking sows. However, in cases when



Figure 4. Clipping the needle teeth.



Figure 5. Clipping the needle teeth.

sows are not milking well, or if greasy pig disease is a problem, teeth clipping appears necessary for optimum results.

- Use sharp cutters without nicks in the blades. Otherwise, teeth will be crushed, which could lead to infection. Also, replace side cutters that have jaws that do not meet squarely. Avoid ordinary wire cutters as they often are not made with the quality of steel necessary to cut teeth adequately.
- Cut away one-half of the tooth. Do not remove the entire tooth and avoid crushing or breaking it. Otherwise, an infection is possible or the piglet may not nurse well. Avoid cutting the piglet's gum or tongue. This will likely make it difficult for the piglet to nurse.
- Cut the teeth off flat and not at an angle. Piglets are not as apt to cause skin injuries when they fight if the teeth are cut off flat. Wear glasses or goggles to protect your eyes from flying pieces of teeth.
- Hold the piglet as described previously, and place sterilized side cutters over both the lower needle teeth on one side of the mouth with the flat side of the cutter to the gum line. Place the side cutters parallel to the gum, and cut off one-half of the two lower teeth at once (Figure 4). Turn the side cutters over and cut the two upper teeth (Figure 5). Repeat on the other side of the mouth.



Figure 6. Docking the tail. Leave about a 1-inch tail stump.

Tail Docking

The undocked tail is a very convenient target for tail biting or cannibalism. This leads to injury and possibly infection. To reduce tail biting, dock (or cut off) the tail of newborn piglets within about 24 hours after birth. Tail docking is usually required by purchasers of early weaned or feeder pigs. It should be done within about 24 hours after birth because it is least stressful on the piglet for these reasons: the piglets are small and easy to hold; at this age, littermates are less likely to investigate and nip or bite a newly docked tail; the piglet and farrowing quarters are still clean; and the piglet is well protected with antibodies from the colostrum of the sow. However, some producers delay docking the tails of male piglets in the litter until castration. The males are easier to find in a litter if their tails have not been docked.

Dock the tail about one inch (or width of your thumb) from the place where the tail joins the body of the piglet (Figure 6). Cutting the tail too short could interfere with muscle activity around the anus later in the piglet's life and could be an aggravating factor in rectal prolapse or rear leg paralysis. If too much tail is left, tail biting might still occur. Occasionally, a tail will bleed excessively. If this occurs, tie it off using the same method as for umbilical cords.

Use sterilized side cutters (most commonly used), a chicken debeaker, or a special heated cutter to cauterize the cut tail. Do not use a very sharp instrument, such as a scalpel, because excess bleeding may occur. To cauterize properly, cut the tail slowly so the hot blade has time to cauterize the tail as you cut. Cauterizing leaves a cleaner wound that bleeds less than when side cutters are used. Apply an antiseptic to the wound. The tail should be completely healed within seven to 10 days.



Figure 7. Injecting iron into the neck muscle.

Supplemental Iron

Iron is necessary to prevent anemia in piglets. Iron deficiency anemia develops rapidly in nursing piglets because of low iron reserves in the newborn piglet, the low iron in sow's colostrum and milk, the lack of contact with iron in the soil, and the rapid growth rate of piglets. With no access to soil, iron deficiency anemia may result within seven to 10 days after birth.

Iron can be administered either by injection or orally. Injection is preferred because iron given orally is not as well absorbed by piglets, thus reducing the quantity of iron that reaches critical tissues. Oral iron also may predispose some piglets to enteric disease (scour) problems, because iron is a necessary nutrient for the growth of microorganisms in the piglet's digestive tract. In addition, oral iron may not be absorbed in piglets with diarrhea.

Administer iron to piglets while they are one to three days old. Give piglets 200 mg of iron either as one injection while they are one to three days old or in two-100 mg injections—one between one and three days of age and again at weaning. Injectable iron products are available in both the 100 and 200 mg of iron/ml concentrations. Read the label carefully to learn the iron concentration of the product you are using. Do not overdose, as too much iron can be toxic.

Using a clean syringe, withdraw iron solution from its container, using a 14 or 16 gauge (large diameter) needle which is left inserted in bottle. The idea is to avoid using a contaminated needle to draw iron from the bottle. Otherwise, foreign matter and pathogens will likely be introduced into the bottle. Some producers decide to change needles after they have finished giving iron injections to each litter. In this case, it is not necessary to use a different needle to draw iron from the bottle.

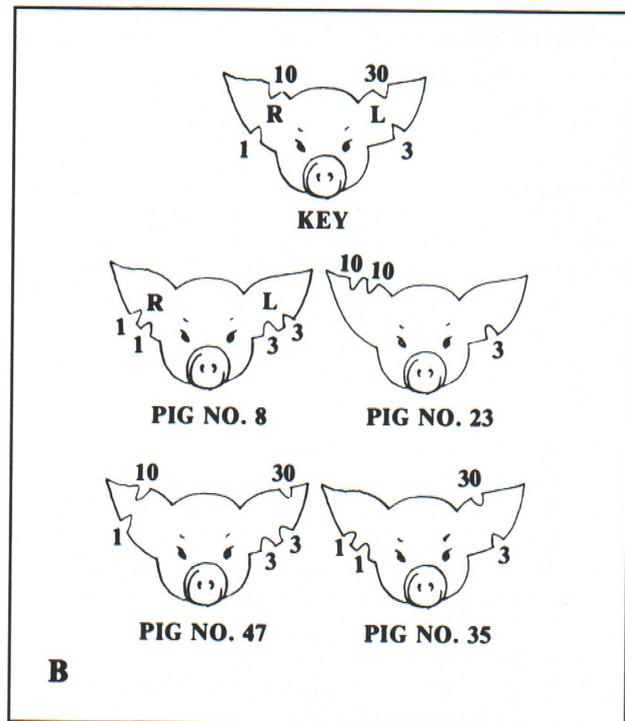
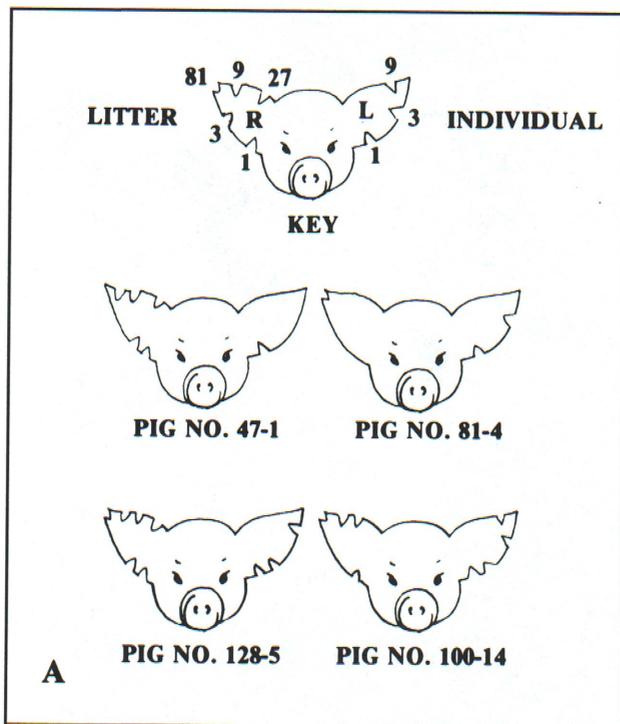


Figure 8. Examples of ear-notching numbering systems: A. Universal ear-notching system using litter and individual pig numbers; B. Using individual pig numbers.

After filling the syringe, use an 18 to 20 gauge, 5/8 to 1/2 inch needle to inject iron into the piglet's muscle. If there are air bubbles in the syringe, point the needle up, tap the syringe and push the air out. Inject iron into the neck muscle just off the midline (Figure 7). Iron should not be injected into the ham. The injection should be given in the neck because of possible sciatic nerve damage, scarring, and also, because of residual iron stain in the carcass of market hogs if it is given in the ham. If the

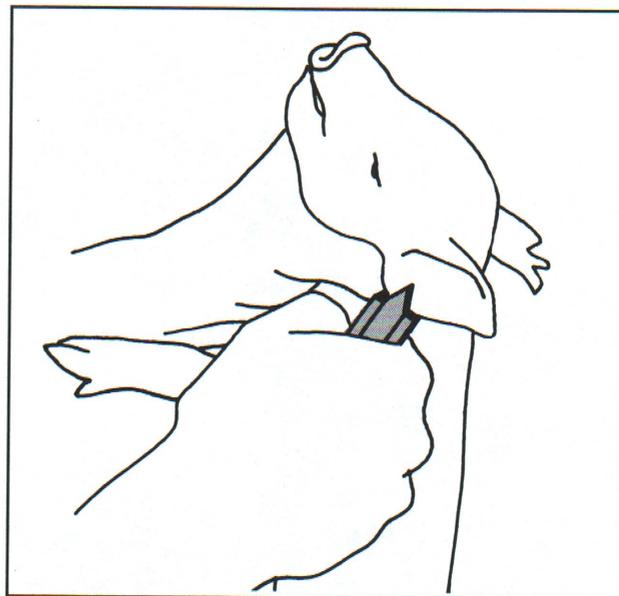


Figure 9. Notching the left ear.

injection site is dirty, wipe it clean with an antiseptic before injecting. Be careful not to inject into the spinal area.

Pull or roll back the skin with your finger or bend the piglet's neck sideways prior to inserting the needle. Insert the needle perpendicular to site and inject. If you have pulled or rolled the skin back or bent the piglet's neck to tighten the skin properly, when the needle is withdrawn, the skin will help seal the injection site and runback will be minimal. Consider placing a finger on the site momentarily to help prevent or reduce runback if necessary. Be sure to inject the iron into the muscle, not just beneath the skin.

For convenience, some producers mix various injectables together with iron and inject the solution into piglets while they are processed. This practice is not recommended unless prescribed by a veterinarian, because it is possible that the products could be rendered ineffective and possibly toxic to piglets.

Piglet Identification

In some pork producing operations, it is important that piglets be permanently identified at birth. Options for permanent identification included ear notching or tattooing. Ear notching is the more common method. Each piglet must have a unique ear notch or tattoo in seedstock herds because it is a requirement for pedigree and performance records. It is not necessary that each piglet have an individual number in operations where all hogs except replacement gilts are marketed for slaughter. Each litter, or all piglets in a farrowing group, or only gilts to be considered for replacements might be ear notched or tattooed at birth with the same patterns.

The most common ear notching system is shown in Figure 8. It is the identification system required by the purebred swine associations in the U.S. The litter number is notched in the piglet's right ear and the individual piglet number in the piglet's left ear. Several modifications of the system exist.

Use a V-ear notcher designed for piglets to ear notch. Some producers use a hole puncher to place a hole in one ear for identification. Firmly hold the ear you are notching and place the portion of the ear you are notching well back into the jaws of the notcher (Figure 9). Notches that are too shallow may fill in, heal over, and be difficult to read. Leave at least one-fourth inch

between notches. Do not make notches too close to the tip of the ear, as these can be torn off. When you have notches on both top and bottom of the ear near the tip, position them so that the deep points of the notches are offset from each other. When making notches on top of the ear close to the head, uncurl the ear with your fingers so you can make it deep into the cartilage. Otherwise, it might be unreadable after it heals.

Use tattooing pliers designed for small animals to tattoo piglets. Apply the tattoo to the backside of the ear so it can be read easily as the piglet grows. Be sure to apply even pressure across the entire tattoo area (i.e., avoid the cartilage ribs in the ear). Avoid tattooing piglets with color on their ears, because the tattoo will be hard to read. Green ink seems to work the best.

Supplemental Nutrients

Many liveborn piglets die because they starve. Disadvantaged piglets are most affected because they cannot compete well for milk and they are most vulnerable to chilling. Producers can improve their survival rate by giving a supplemental source of nutrients the first few hours of life.

Provide disadvantaged piglets with 10 to 15 ml of milk every six to 12 hours during the first day or two following farrowing. The economic benefit of providing supplemental milk to piglets depends primarily on the preweaning survival rate of piglets in the herd and on the anticipated profit from the piglet. In general, if the average preweaning survival rate of piglets in the herd is over 90% and the market value of the piglets is low, the cost of the extra labor to feed the small ones may not be recovered.

It is critical that the first dose be colostrum, especially if the piglet has not suckled. Colostrum from the dam is best, but obtaining it is time consuming. Commercial milk replacers have proven effective after the piglets receive an adequate dose of colostrum. Some people use products containing medium chain fatty acids (MCT) in lieu of milk, but research results on their effectiveness are mixed. Use a stomach tube or a syringe to give the supplemental milk to the piglets.

Splaylegged Piglets

Splaylegged piglets appear to be normal except when they attempt to stand, their hind legs (and sometimes front legs) extend sideways. The condition appears to be a congenital disease with a higher incidence in litters with a 113 day or shorter gestation period. Also, a slippery floor in the farrowing quarters can be an important predisposing factor. Nutrition does not appear to play a role. The mortality rate in piglets where only the back legs are splayed can be reduced by taping the legs soon after birth to prevent them from extending sideways. Piglets that are splayed in both their front and back legs often are not worth trying to save. Consider euthanizing them.

Use either elastic wrapping tape, adhesive tape, or duct tape. Obtain elastic tape from medical supply stores or veterinary offices and adhesive tape from sporting goods store or pharmacies. Cut the tape in 1/2 to 3/4 inch strips. Apply tape to the rear legs allowing a two-inch gap between legs so the piglet can stand properly. Avoid wrapping the tape too tightly as to restrict circulation of blood and be sure to remove the tape a few days later.

Castration

Castration, the surgical removal of the two testicles, is a routine management practice for male piglets destined for slaughter. The testicles produce sperm and the male hormone, testosterone. Pork from boars, or uncastrated male piglets at

slaughter weight, may have an odor during cooking that is very offensive to many people. This is called a "boar odor" or a "boar taint".

There are various ways to castrate piglets. The position of the animal during surgery and the method and degree of restraint are dictated by the age and size of the animal. The best time to castrate a piglet is when it is four to 14 days of age. Young piglets are easier to hold or restrain, bleed less from surgery, and have antibody protection from the sow's colostrum and milk. Piglets can be successfully castrated when they are less than four days old; however, one of the major disadvantages of castrating very young piglets is that scrotal hernias are more difficult to detect and the testicles may not have descended.

Examine each piglet carefully before castrating to identify those with a scrotal hernia. A piglet with a scrotal hernia has a loop of intestine in its scrotum. Hold the piglet upright so the scrotum is down to see if the scrotum is uniform in size, or hold the piglet with its head down and squeeze the back legs together to lift the testicles. If there is an enlargement in one or both halves of the scrotum, the piglet probably has a hernia. Do not castrate the piglet unless you are trained to repair hernias. The piglet's intestines will be forced through the incision. Sometimes the testicle is removed before a scrotal hernia is discovered. If this happens, the herniation must be repaired by suturing immediately. Most scrotal hernias are genetic in origin. Do not keep replacement animals from any litter in which one or more piglets was herniated.

If one or both testicles are not found, the piglet may be a cryptorchid. This means that the testicle(s) failed to descend through the inguinal canal from the abdomen during development. When this condition is noticed, ear notch or mark the piglet and make a record of it. Often, the testicle(s) will descend to a normal position as the piglet grows. The piglet should be castrated after the testicle presents itself. If one testicle has descended at the time of castration, it should be removed.

Use either a surgical knife or side cutter to castrate. The surgical knife can be either a #12 hooked blade or straight blade. The instrument of choice must be sharp and disinfected. If the scrotum is dirty, clean it and surrounding area with a cotton swab soaked in a mild disinfectant.

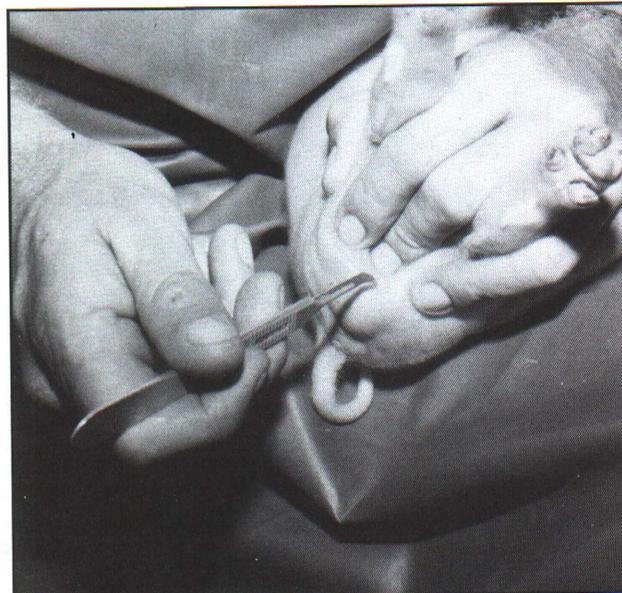
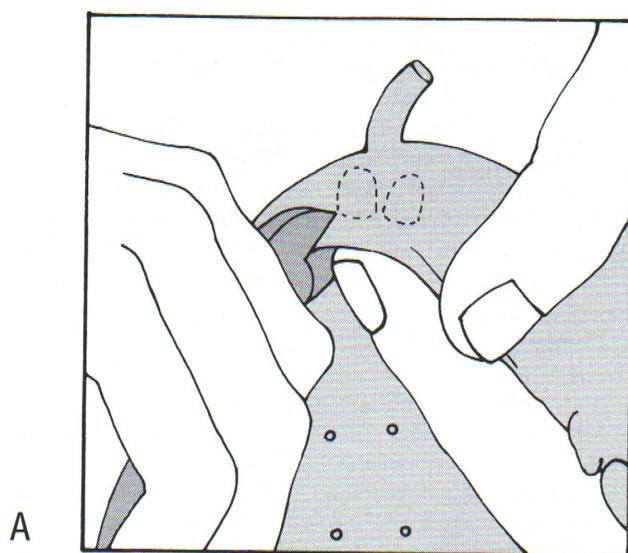
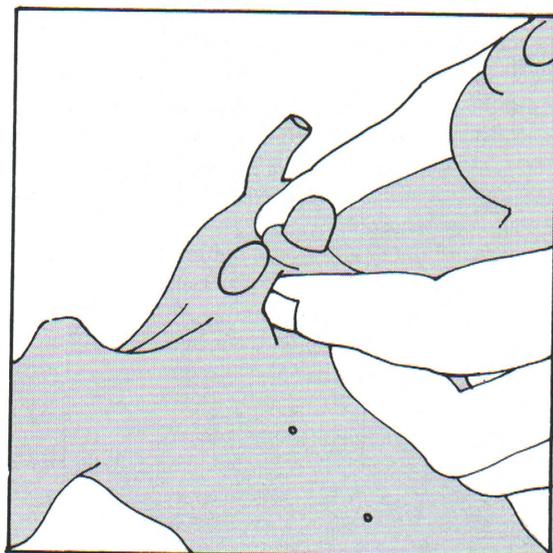


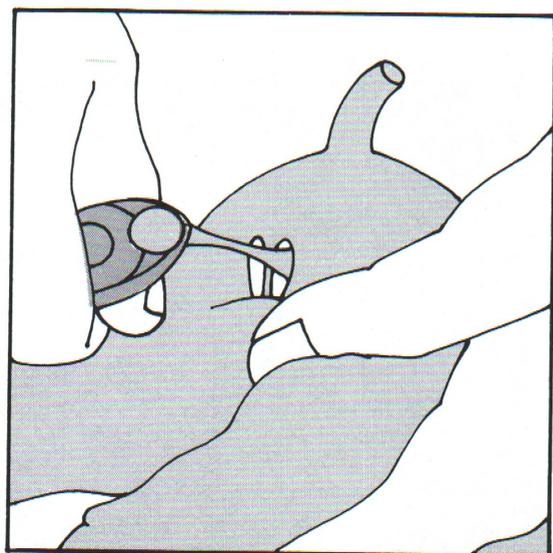
Figure 10. One person castrating a young pig.



A



B



C

Figure 11. Castration using sidecutters: A. Making the incision; B. Exposing the testicles; C. Removing the testicle.

Castration Methods for One Person Using a Knife

Hold the piglet by both hind legs with its head down. Push up on both testicles and make an incision through the skin toward the tail (Figure 10). Be sure to cut low in the scrotal sac to ensure good drainage. It does not matter if you cut through the white membrane or not. Pop the testicles through the incision and pull on them slightly. Pull each testicle out pressing your thumb against the pelvis of the piglet. Use of your thumb is very important to ensure the cord will break off at the point of your thumb and not from deeper inside the piglet's body. Otherwise, you may cause a hernia.

Alternatively, place the piglet's head between your legs after you have made the incisions as described above, grab each testicle and cut the cord close to the incision with a scraping motion. Also, cut any cord or tissue protruding from the incision and spray the wound with an antiseptic.

Castration Method for One Person Using Side Cutters

This technique is best performed on piglets between four and 10 days of age. There is little or no bleeding with this method. Hold the piglet between your legs with the belly outward. Use your index finger, or whichever is comfortable to use, to push up on one testicle to make it more pronounced. The resulting fold of skin is where the incision is made (Figure 11a). Position disinfected side cutters about two-thirds of the way into the fold and make a cut directly through the scrotal tissue (right of the midline). Make a similar incision through the scrotal tissue, but to the left of the midline. Pop the testicles out through the incisions by pinching your thumb and index finger together (Figure 11b).

Press very firmly with your index finger against the pelvis of the piglet in front of the scrotum and pull the testicles out with the side cutters (Figure 11c). Use of your index finger is very important to ensure the cord will break off at the point of your index finger and not from deeper inside the piglet's body. Otherwise, you may cause a hernia. Care is taken to avoid cutting through the cords beneath the testicle. Remove any loose cord tissue left outside the incision. Nothing but the disinfected side cutters touches the exposed tissue. Spray the wound with an antiseptic.

Castration Method for Two People Using a Knife

One person holds the piglet by the rear legs while another does the castrating. With one hand, tighten the skin over the scrotum to help expose the testicle and the site for the incision. With the castration knife, make two incisions about as long as the testicles near the center of each (Figure 12a). Cut deeply enough to go through the outside body skin. It does not matter whether you cut through the white membrane (tunica vaginalis), which surrounds the testicle, or not. Squeeze, or pop, the testicles through the incision (Figure 12b). Enlarge the incision slightly at the end closest to the tail if the testicle will not pop out. Pull out the end of the testicle which is toward the tail at a right angle to the length of the body and cut the cord close to the incision (Figure 12c). Do not pull straight up on the testicle. Repeat the procedure for the second testicle. Spray the wound with an antiseptic.

Post-Castration Care

Observe castrated animals for excess bleeding or the presence of tissue or intestines (hernia). Apply pressure to the wound for about two minutes to stop any bleeding. Cut off any cord that may be protruding from the incision as this may serve as a wick for infection, but make sure it is not intestine.

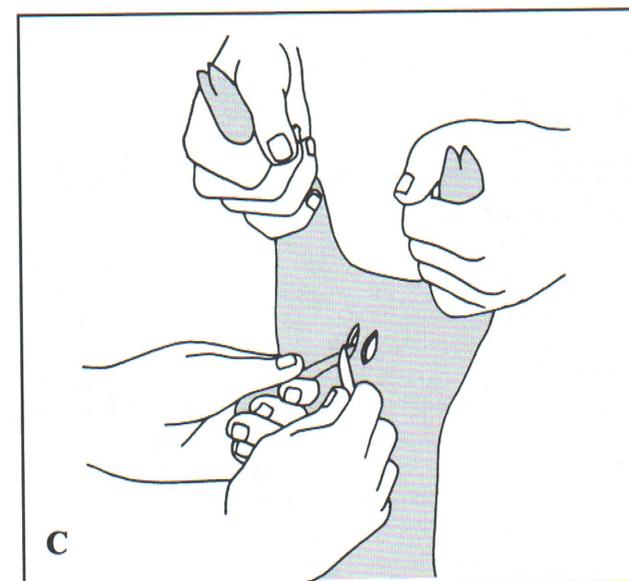
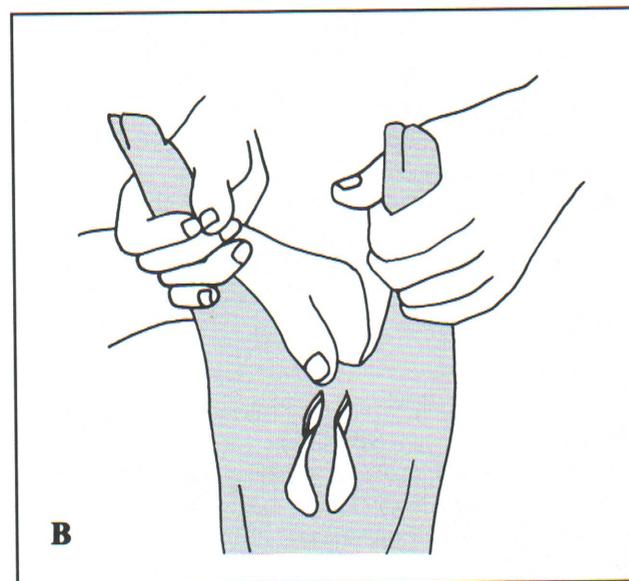
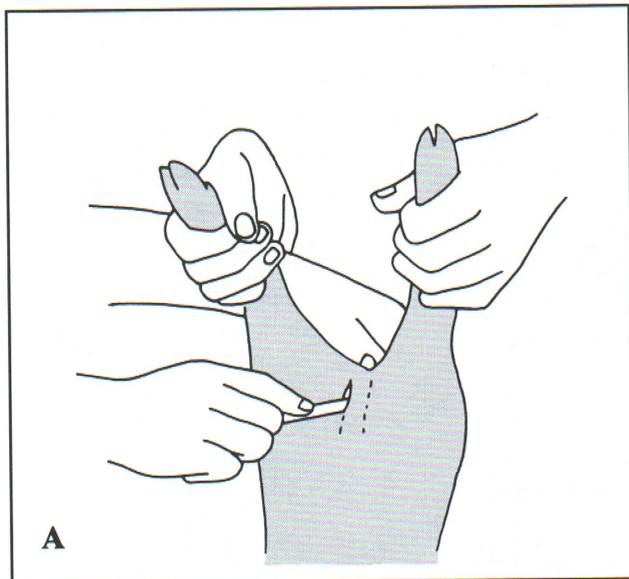


Figure 12. Castration procedure for pigs several weeks old: A. Making the incision; B. Squeezing out the testicles; C. Cutting the cord.

If intestines protrude and they are black or torn, it is usually best to euthanize the piglet. If the problem was recognized promptly after the intestines came out, it is possible to save the piglet. First, gently clean the intestines with clean, warm water containing a surgical disinfectant, and push them back through the opening holding the piglet's head down by its rear legs. Close up by suturing the tunica vaginalis (white membrane which surrounds the testicle). If a skilled professional is not available to suture the tunica vaginalis, simply suture the castration incision closed to allow time for a skilled surgeon to repair the hernia properly a few hours later. If a skilled surgeon is not available in a few hours, the piglet should be euthanized. It is much easier to replace the intestines if the tunica vaginalis covering the testicle is not removed during castration. Administer an antibiotic after surgery.

Equipment Care

Proper equipment care will help ensure that piglets will be processed with minimal discomfort and complications from infection. After each use, place equipment such as side cutters and ear notchers in a bowl of nonirritating disinfectant. Do this rather than laying equipment on the cart or platform after they have been used to process each piglet. Change the disinfectant after about every ten litters. Before moving to another farrowing room to process, clean and disinfect the cart and equipment. Also, check needles to ensure they are not bent or blunt on the end. Replace needles after they have been used on 30 to 50 piglets or earlier if damaged. Dispose of needles in a sharps container.

Weighing

Pork producers who use birth weights as part of their management system can incorporate the weighing into the piglet processing routine. Most piglets are not weighed at birth, but if they are, this should be done first, followed by the rest of the processing. Some producers weigh each piglet and record the sex and weight. Others place the entire litter on the scales and record total litter weight.

Records

We recommend pork producers use production records to identify strengths and weaknesses in the operation. If problems are experienced in the farrowing quarters, these problems will continue to propagate if accurate records are not kept. It is important to realize that reproductive traits are heritable. Record keeping allows superior sows to be identified and retained on the farm (see PIH-27). This will lead to successive improvements in lactational performance which should lead to fewer problems in the farrowing quarters.

In addition, accurate records provide an important view of the animal caretaker's job performance. Records help management identify people who are doing a good job (which may be rewarded) and they help identify weak areas that the caretaker can work to improve.

Records kept in the farrowing quarters include: birth date, number of piglets born alive and dead, date and cause of death of piglets, pedigree information, number of piglets weaned, and piglet (or litter) weaning weight. Remarks on anything unusual or wrong with the piglet should be noted as well. In addition, many producers are recording feed intake during lactation. Medications given to animals should be recorded to ensure treatment protocols and withdrawal periods are followed.

Have cards, clipboards, or other recording devices near each

farrowing crate or pen. Having the opportunity to record information the moment it is collected or observed ensures accuracy. Always have a pencil or pen in your pocket and also with the equipment used to process piglets. Record data in ink whenever possible and practical. This makes the forms easier to read and ink also withstands the environment of the farrowing quarters better. Also, record data in legible handwriting and make it a habit to write your initials beside the entry if more than one person routinely works in the farrowing quarters.

Daily Piglet Observation

Closely observe each piglet at least twice daily for evidence of adequate milk production by the sow. Careful observation of piglet behavior and body condition is the best method of determining if a sow is milking well. Lactation failure must be treated aggressively and the litter may need to be given supplemental milk as the sow is recovering.

Healthy, well-nourished piglets run around and play, especially when the sow rises to eat. For the first few days of their lives, piglets do little more than eat and sleep. However, in a few days they begin to be active away from the udder. These activities are delayed in piglets that are sick or undernourished. After a successful nursing, piglets will often settle down and sleep. Milk is frequently seen around their mouths.

In the normal sow, milk ejection from the teats starts about one to three minutes following initiation of nursing behavior (which occurs about once each hour in early lactation). Then oxytocin is released and milk letdown occurs. The piglets will nurse steadily for about 30 seconds then gradually quit. Piglets nursing a sow with lactation failure will spend more time at the udder, including fighting, and will be less content. If the piglets' needle teeth have not been clipped, they can inflict severe damage to the faces and snouts of litter mates and sometimes to the sow's udder.

Well-nourished piglets have tight, shiny skin and a thrifty look, i.e., "bloom". Piglets go from having less than 1% body fat at birth to about 10% by 10 days of age. Much of that fat is stored just under the skin. It is that rapid accumulation of subcutaneous fat that gives piglets tight, shiny skin and a thrifty look. Piglets that are not performing well, have loose skin, look depressed, and have a "hairy" appearance.

Preventing Piglets' Exposure to Diseases

Preventing piglets from encountering disease agents (primary prevention) involves five basic areas: (1) source and handling of primary and replacement breeding stock, (2) rules governing movement of people, vehicles, materials, and pigs, (3) layout of the farm, (4) location of a new farm, and (5) cleaning the farrowing quarters and the sow. These factors are discussed in PIH-79.

We recommend producers divert more resources to primary and secondary prevention techniques. Less emphasis should be placed on the less effective and more costly approach of using drugs and biologics to treat sick piglets. How much to divert and the response to expect will depend on the current status of the herd. A record program that can store the necessary information and allow data retrieval in a usable format is the basis of an effective health program.

Baby Pig Infectious Diseases and Treatment Protocols

The most important aspects of maintaining the health of piglets is to ensure they receive as much colostrum as possible and that they have a warm, draft-free environment. Regardless, piglets will die of disease and the causes can be broadly classified as those occurring regularly (endemic) or only occasionally (epidemic). Although the causes will vary by farm, the typical endemic disease will cause problems continually and contribute to a low-level "normal" neonatal mortality of 5 to 15%. Colibacillosis and Coccidiosis are often endemic diseases. In contrast, a disease such as Transmissible Gastroenteritis can cause an epidemic of neonatal losses up to 100% and last for many weeks.

Diagnosis

Determining the cause of neonatal pig losses is not easy because few diseases produce signs that are unique to the causative agent. For example, baby pig scours can be caused by a bacteria, virus, or parasite and you cannot distinguish between them by the nature of the scours. Your veterinarian can assist you in obtaining a diagnosis and recommending treatment. It's expensive and wasteful to begin treating if you're unsure of the cause of the disease so it is important to obtain a diagnosis and treat accordingly. For the experienced observer, some diseases which occur regularly on the farm can be recognized by farm managers and treatment instituted as soon as the signs are recognized. However, if the piglets do not respond to treatment, then contact your veterinarian to reassess the situation and check the diagnosis.

Treatment

Appropriate treatment will vary depending on the cause of the disease. Provided the organisms are sensitive, antibiotics will usually alleviate a bacterial infection; however, antibiotics will not affect viruses or parasites. Sometimes antibiotics are recommended to help prevent secondary infection when the primary infection is a virus or parasite. In these cases, the antibiotics do not affect the organism causing the disease, they just help ensure that bacteria do not take advantage of the weakened piglet. Treatments for individual diseases are discussed below. Remember that all drugs must be administered according to label directions unless your veterinarian has directed you to do otherwise.

Commonly Seen in Unweaned Piglets (Listed Alphabetically)

Clostridial Infections. The disease is caused when *Clostridium perfringens*, which is a normal inhabitant in the large intestine, becomes established in the small intestine. This usually occurs when the piglet has had insufficient intake of colostrum. Its severity will vary dependent on the type, A, B, or C (the most severe), but piglets usually develop a foul smelling diarrhea and many will die. It is more commonly seen in piglets less than seven days old. Antitoxins can be injected into sows and piglets and oral ampicillin is commonly recommended.

Coccidiosis (See PIH-81).

Congenital Tremor. Most pork producers have seen newborn pigs with tremors and shaking muscles. It tends to come and go sporadically but seems to be more common in gilt herds, where 80% of litters can have affected piglets. The disease is associated with infections with Pseudorabies virus, Japanese

Encephalomyelitis virus, Classical Swine Fever (Hog Cholera) and Circovirus. It is also associated with hereditary disease in Landrace and Saddleback breeds or with organophosphate poisoning. Affected piglets must be assisted to suckle and provided for until they grow out of the disease in a few weeks.

Colibacillosis (See PIH-30).

Greasy Pig Disease (*Exudative Dermatitis*). Greasy pig disease is often a problem in newly established gilt herds. The causative bacterium, *Staphylococcus hyicus*, infects the skin of a piglet and produces a toxin that damages its liver and kidneys. A piglet is usually infected at, or soon after, birth. Lacerations on the side of the face, made by unclipped needle-teeth as piglets scramble for the best teat on the sows' udders, are thought to be the site where the bacterium often first infects the piglet. The first clinical signs appear between 4 to 35 days when small dark spots appear on the side of the face. Then, brown scales develop on the underside of the piglet which, in serious cases, spread to cover the whole piglet. Severely affected piglets usually die and survivors do poorly. Affected herds can suffer decreased growth performance for 12 months. The disease is readily recognized by its typical appearance, and treatment is most successful when started as soon as signs appear. Before antibiotic treatment is started, affected live piglets should be submitted to a laboratory to determine the antibiotic sensitivity of *Staphylococcus hyicus*. Greasy pig disease is difficult to control unless mange is first eliminated. The mange mites damage the skin and allow *Staphylococcus hyicus* to enter. Affected piglets should be given electrolytes orally because they become dehydrated rapidly. Some farms experiencing severe outbreaks have had success using an autogenous vaccine. The disease can be prevented by removing any sharp edges in the farrowing crate that may lacerate the piglets, cutting needle teeth, spraying the udder of the sow with an iodine based disinfectant, adopt an all-in/all out policy for the farrowing house and ensure the room is thoroughly disinfected and dry before sows enter.

Transmissible Gastroenteritis (TGE) (See PIH-47).

Sometimes Seen in Unweaned Piglets

Atrophic Rhinitis (See PIH-50).

Eperythrozoonosis (*Epe*). Epe is a difficult disease to both understand and treat. The causative rickettsial organism, *Eperythrozoon suis*, is present in the blood of sows in both healthy and diseased herds. In some piglets, it attaches itself to red blood cells and destroys them causing anemia. Affected piglets are weak, pale, and jaundiced, have scours and pneumonia, and suffer high mortality. Before attempting to treat for Epe, it is very important to have your veterinarian confirm the diagnosis. The response to drug treatment is poor and, at the time of writing, the Food and Drug Administration (FDA) has not approved any drug for treating Epe. *Eperythrozoon suis* is spread by infected blood so, when attempting to control an epidemic, it is very important to clean and disinfect instruments between piglets when processing. Anything that can result in blood being transferred between piglets must be controlled including parasites, fighting, tagging, and injections.

Glasser's Disease. Glasser's Disease is caused by Hemophilus parasuis which is present in most herds. It has become more important in recent years with piglet mortality sometimes exceeding 50% in high-health status herds. The disease usually affects weaned pigs, but suckling piglets can be affected. Often

the heaviest, best looking, piglets die. Pigs are fevered, depressed, slow to rise, lack appetite, and have swollen joints. Some have nervous signs such as tremors. Before they die, the skin often turns blue and the eyes are reddened. The organism is hard to grow so diagnosis is usually made solely on clinical signs and post-mortem findings. Hemophilus parasuis is sensitive to a wide range of antibiotics including the penicillins, tetracyclines, and ceftiofur. It is best to start treatment as early as possible and a combination of injectable and water medication is usually indicated. In problem herds, autogenous vaccines can be useful.

Parasites (See PIH-40 and PIH-41).

Porcine Reproductive and Respiratory Syndrome (PRRS).

PRRS is usually only seen in unweaned piglets when the disease first infects a naive herd. Piglets may cough, sneeze, and have diarrhea, conjunctivitis, and difficulty breathing. Signs in individual herds will vary because of the effects of different secondary infections. Individual piglets should be rehydrated and treated with antibiotics to control secondary infections. A herd control program should be formulated in conjunction with the attending veterinarian.

Pseudorabies (See PIH-38).

Rotavirus (See PIH-61).

Streptococcus suis (See PIH-118).

Tetanus. Tetanus is rare in piglets but sometimes the causative bacterium, *Clostridium tetani*, will infect piglets when they are castrated. Because the incubation period is 1-10 weeks, signs are rarely seen until the pigs are at least two weeks old. Affected piglets are stiff, have an erect tail, and facial muscle spasms. For problem herds, an effective vaccine is available. Managers should review castration and other processing procedures to ensure they are using hygienic techniques.

Rarely Seen in Unweaned Piglets

The diseases mentioned above are the main ones found in suckling piglets. Other diseases may rarely occur—when they do, it is usually associated with overwhelming infection in a naive herd. Those disease include: Mange, Mycoplasma pneumonia, *Actinobacillosis suis*, Brucellosis, Erysipelas, Leptospirosis, Parvovirus, and Influenza.

Methods of Euthanasia for Baby Pigs

Euthanizing animals is an unpleasant but necessary part of livestock farming. Producers often have to euthanize piglets because they are sick and suffering with little-or-no chance of recovery. Some piglets should be euthanized because if left to live they become a source of infection for their pen or littermates. This situation is particularly important in the Porcine Reproductive and Respiratory Syndrome (PRRS) era when removing the poor-doing, PRRS- virus-carrying piglets is an important part of controlling the disease. In these and other similar situations, euthanasia is the humane and responsible solution.

Piglets should be euthanized by exposure to carbon dioxide or blunt mechanical trauma to the head. Electrocutation is acceptable but it can be a human health safety hazard, and piglets must be processed one at a time making it very time consuming. Controlled drugs (e.g., barbiturates) are very effective but present major human health risks and should be used only by veterinarians.

Carbon Dioxide

Obtain a cylinder of carbon dioxide, a regulator, a 50-gallon trash can and a supply of plastic trash bags to fit the can. Take a trash bag and blow it up, like a balloon, with the carbon dioxide. This ensures that the bag is full of carbon dioxide. Place the bag in the trash can, add up to six piglets, and close the bag. The piglets will exhibit a physiologically induced short period of muscle spasms as they rapidly die from respiratory arrest. Leave the piglets for at least 15 minutes, then open the bag and check each piglet to ensure that it has died before disposing of it normally. Your veterinarian can show you how to check for a heart beat and the corneal reflex.

Blunt Mechanical Trauma

Place the piglet on the ground and apply a quick, firm blow with a blunt instrument, such as a hammer, to the piglet's head. The point to aim for is where two imaginary lines, drawn from the base of each ear to the opposite eye, cross. Alternatively, hold the piglet by its hind legs and forcefully hit the piglet's head against a hard surface such as concrete. Immediately repeat the above procedures if there is any possibility that the animal is still alive.

Farm managers need to be sensitive to the aversion many people have to euthanizing animals and ensure they assign the task to someone who is comfortable with the job. Many people entering the pork industry nowadays do not have a farming background and are not accustomed to routine farming practices. If people are not comfortable with the task and they find no relief, their feelings can result in absenteeism, belligerence, or careless and callous handling of animals, and high staff turnover.

Reference: *On farm euthanasia of swine—Options for the producer*. AASP and NPPC booklet.

Creep Feeding

Creep feeding is recommended beginning at about 10 days of age for piglets weaned at three weeks of age and later. Sow milk yield typically plateaus at about 12 to 16 days of lactation indicating that sufficient nutrients will not be available thereafter to sustain maximal piglet growth. For piglets weaned at less than three weeks of age, the value of creep feed is questionable, because they often consume very little feed. If creep feed is offered, use techniques to ensure piglets consume the feed.

Some management techniques that help improve creep feed intake are below.

- Use the proper diet. The complexity of the diet is a big factor affecting success of creep feeding. Piglets will consume more of a diet that has several speciality ingredients (e.g., plasma proteins, whey, etc.) than a simpler one. A feed provided in a mini-pellet form is preferred as well. Therefore, use a diet specially made for creep feeding.
- Have fresh water available. Piglets that have access to fresh water eat more feed than those who don't. Special nipple waterers are available for piglets.
- Keep the feed fresh. Piglets must be attracted to the feed, which means feed cannot smell like the surroundings. Offer limited amounts of feed to the piglets several times daily and store the feed in a facility or room separate from pigs. Remove stale or uneaten feed from the farrowing quarters daily.
- Make the feed easily accessible. When introducing creep feed, sprinkle small quantities on the floor or in a shallow pan.

Split Weaning

Where piglet flow management allows it, split weaning is a technique that can give slower growing piglets a boost just before weaning. The process involves weaning the heavier piglets in a litter a few days before weaning the smaller ones. This allows smaller piglets access to a larger milk supply with less competition. To ensure that smaller piglets in the litter will benefit from split weaning, wean the heaviest piglets three to five days early.

This technique may shorten the weaning-to-estrus interval in sows, especially in those left with just a few piglets for the last couple days of lactation. This may alter breeding schedules slightly.



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