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University of Missouri

Infectious Causes of Infertility in Sows

Jeanette L. Floss
College of Veterinary Medicine

Roderick C. Tubbs
Swine veterinarian
Commercial Agriculture Program

Any time a sow farrows prematurely, there is the fear that additional litters will be lost. An abortion rate of less than 2 percent is considered an acceptable level in most herds. Premature farrowing usually results from nutritional, genetic or environmental stresses, but the exact cause is often unknown.

Abortion is the most dramatic expression of production loss. When the incidence increases for a given herd, an infectious agent is usually suspected. This increase may follow the addition of replacement animals or the mingling of previously isolated groups of animals. Approximately 38 percent of diagnosed abortions are attributed to infectious causes.

The stage of gestation during which the sow and/or fetuses become infected will determine the litter's ability to survive. In some cases the infectious agent will directly affect developing fetuses and placentas, causing fetal compromise and death.

Any severe illness in a pregnant sow may result in fetal death due to a disruption in the normal uterine environment. One, several or all fetuses in a litter may be lost. If fetal compromise occurs at less than 35 days of gestation, fetuses may be reabsorbed. If infection occurs between 35 and 70 days of gestation, fetal mummification occurs. If infection occurs after 70 days of gestation, pigs may be delivered weak or dead. This publication addresses several infectious causes of infertility and abortion in sows along with some preventive measures.

Bacterial infections

Bacteria gain access to the uterus through the open cervix at farrowing, but usually are eliminated before they are able to establish an infection. Sows will have a vaginal discharge for 1 to 3 days after farrowing. This discharge is normal, is not foul smelling and is not associated with clinical illness in the sow or pigs.

However, if a sow farrows in an environment contaminated with excessive fecal material or the delivery is assisted in an unsanitary fashion, metritis may develop. This is the most severe form of infection in the uterus. The uterus fills with large amounts of malodorous fluid and decomposing fetal membranes. The sow will develop a fever, be ill and possibly die as a result of bacterial toxins. Her pigs may demonstrate signs of malnourishment. This condition is seen within days of farrowing. If the sow recovers, her fertility during the next breeding will be reduced.

Endometritis or inflammation of the lining of the uterus is less severe clinically, but possibly more important economically. Bacterial infections of the reproductive tract may result in conception failure and/or early embryonic deaths. Bacteria gain entrance to the uterus during estrus and breeding because the cervix relaxes at this time. An increased return-to-service rate may be the only indication that a problem exists. Return intervals may be normal or prolonged.

Inflammation of the endometrium is not compatible with the survival of embryos and the pregnancy will be terminated. These animals are often clinically normal or they may have a low-grade fever. A mild vaginal discharge may be seen around the time of the next expected heat. Gilts that are housed in overcrowded conditions may also develop endometritis.

Vaginitis will also cause a vaginal discharge. Fertility may not be reduced unless bacteria gain entrance to the uterus at breeding. Gilts and sows that have been exposed to high levels of the mycotoxin zearalenone in the diet will develop vaginitis and a discharge. The estrogenic properties of this compound will prevent these animals from cycling normally.

A diet high in calcium or phosphorous may result in the formation of salts in the urine leading to a white, chalky fluid which is seen at the vulva. This should not be confused with infection, although infections of the urinary tract may cause vaginal discharges. Adequate water intake helps to prevent infection by encouraging frequent urination and mechanical flushing of the urinary tract.

The bacteria that cause these urinary and reproductive tract infections can be found within the tracts and/or in the environment. When the tracts are contaminated and the defense mechanisms are overloaded, infection results. The most effective means of preventing this is to provide a clean environment (proper waste removal) and a sufficient source of fresh water.

Leptospirosis

A large number of Leptospira organisms are known to infect swine. In most herds that have already been exposed, few clinical cases of disease will be found.

Leptospira bacteria prefer the kidney and are shed in the urine. Contact with contaminated urine is the most common means of spreading the infection to other animals. Leptospira also will localize in the pregnant uterus. If susceptible breeding animals become infected, leptospirosis may lead to abortions, stillbirths or the birth of weak neonates.

Several serovars of *Leptospira interrogans* have been found to infect swine. Pomona is most commonly involved in swine infertility. Bratislava also has been found to persist in the oviducts and uterus of non-pregnant females and in the upper genital tract of boars contributing to infertility. It is possible that this infection could be spread during mating. At the present time, however, bratislava infection has not been linked to clinical outbreaks on a wide scale in the U.S.

Vaccines are available for leptospirosis. However, the immunity they provide is usually short-lived. Breeding animals should be vaccinated at least twice a year and up to four times a year in infected herds. Vaccinations should be given prior to breeding. Antibiotics will help reduce the incidence of disease but cannot completely eliminate it from an infected herd. Rodents and local wildlife may also be infected and contribute to the spread of leptospirosis. Management practices that eliminate the rodent population and prevent urine contamination of feed and water will contribute a great deal to controlling infection. During an outbreak, clinically ill animals should be treated and in-contact animals should be vaccinated.

Brucellosis

Brucellosis in swine is caused by *Brucella suis.* Brucella organisms are also infectious to humans, but due to federal eradication programs very few cases are reported in people or livestock. Brucellosis is spread by direct contact with infected tissues, primarily aborted fetuses and membranes. Boars can develop a persistent infection and shed bacteria in the semen, which contributes to the spread of this disease. Females that become infected at breeding may abort at any stage of gestation.

Antibiotics are of little value in treating brucellosis. The prevalence of swine brucellosis has been reduced to the point that vaccination is not practical. Management practices for maintaining a brucellosis-free herd status are encouraged. The human health risks of brucellosis should always be considered when handling any aborted fetuses or fetal membranes.

Porcine parvovirus

Few animals exhibit clinical illness as a result of porcine parvovirus (PPV) infection. This virus is found in most swine herds, but previously exposed animals develop immunity.

Porcine parvovirus will cross the placenta and infect developing fetuses. Non-immune females that become infected during the first half of gestation will usually have several mummified fetuses at farrowing. Gilts are affected much more often than sows.

Infertility, stillbirths, neonatal deaths and delivery of weak pigs may follow infection during pregnancy. Abortions resulting from PPV infection are uncommon. If infection occurs late in gestation, fetuses usually will survive.

Because PPV is widespread in swine herds, all gilts should be naturally exposed or vaccinated at least 30 days prior to breeding. Inactivated as well as modified live vaccines are available and should be administered under the direction of a licensed veterinarian. There is no treatment for PPV-induced infertility, but animals that are naturally infected are often immune for life.

Porcine enteroviruses

Like porcine parvovirus, porcine enteroviruses are present in most swine herds but often do not cause clinical illness. Enteroviruses have been associated with central nervous system disease (polioencephalitis), diarrhea and pneumonia. They may also produce non-specific fetal losses resembling those seen with PPV infection. Viruses cross the placenta, therefore pregnant gilts and sows may deliver stillborn pigs and mummies, deliver fewer pigs per litter or fail to farrow. Abortions are rare.

There is no vaccine available for protection against reproductive losses resulting from enterovirus infections. The best preventive practice is to make sure gilts have been exposed to the fecal material of other herd animals, especially older sows, at least one month prior to breeding. As with PPV there is no treatment for enterovirus infection. However, subsequent fertility does not appear to be affected.

Pseudorabies

Abortions resulting from pseudorabies virus (PRV) infections typically follow a period of fever and respiratory disease in pregnant gilts and sows. If susceptible females become infected early in gestation, fetuses may be resorbed. Approximately 20 percent of females that become infected late in gestation will abort. Pigs that are delivered alive are weak and often do not survive more than a day or two. Other signs of disease in a recently infected herd include pneumonia in grower/finisher pigs and nervous system disease and death in suckling and newly weaned pigs. Endemically (chronically) infected herds may show no clinical signs other than an increased susceptibility to respiratory disease in growing and finishing pigs.

Vaccines for PRV are available. These do not prevent clinical illness if animals become infected, but they reduce the severity of the disease and its spread within the herd. Vaccinations should be performed by a licensed veterinarian and in association with the state regulatory recommendations for the eradication of PRV.

PRRS/SIRS

In the late 1980s, many swine herds experienced a large number of abortions. An increased incidence of stillbirths and mummies followed the abortion storms. Survival rates were poor for pigs born alive. Pneumonia, affecting pigs of all ages, was also reported in these herds. Many recovering sows experienced periods of infertility lasting for varying lengths of time. Recently an RNA virus has been isolated as the causative agent. This disease process, once identified as Mystery Pig Disease, is now known as Porcine Reproductive and Respiratory Syndrome (PRRS) or Swine Infertility and Respiratory Syndrome (SIRS).

Newly infected herds followed the disease pattern described above. More recently PRRS has been associated with poor doers in the nursery and decreased farrowing rates. In addition, conception rates and the number of animals bred have decreased. Near farrowing, sows may develop a fever and go off feed.

Because there is no specific treatment for PRRS, supportive therapy should be provided to clinically ill animals. Medications to reduce fever and to encourage animals to resume eating are beneficial. Presently, no vaccine is available for the control of PRRS/SIRS. Purchasing animals from herds that have not been exposed, isolation of new animals for at least 30 days and strict control of animal movement within the herd will help to minimize the spread of this disease.

Summary

Abnormal vaginal discharges must be distinguished from normal postpartum discharges and urinary sediments in order for affected animals to be properly managed. Discharges resulting from reproductive tract infections generally are associated with other reproductive events such as farrowing (metritis) and estrus or breeding (endometritis). Discharges associated with vaginitis and urinary tract infections usually do not follow the reproductive cycle. Milder cases can be treated with antibiotics, but persistently infected animals should be culled.

Porcine parvovirus or enterovirus should be suspected when the incidence of mummified fetuses increases, particularly in gilts not previously exposed. Respiratory distress accompanied by high fever and followed by abortions may indicate a pseudorabies or PRRS infection in a susceptible herd. Abortions resulting from brucellosis are uncommon but leptospirosis should be considered in areas where it is prevalent.

Infectious reproductive problems are best controlled by stringent preventive management practices. All gilts should be exposed prior to breeding to older sows in herds with PPV and PEV. Once infected, gilts will develop a life-long immunity and subsequent fertility is good.

Vaccines are available for PPV, PRV and leptospirosis. These should be administered at least 30 days prior to breeding gilts and repeated as necessary in high-risk areas (leptospirosis). Herds are best protected from PRV and PRRS by raising replacement gilts or obtaining them only from herds that are free of these diseases. New additions should be isolated from the rest of the herd for the first 30 days.

Sanitary maintenance should include adequate waste removal, sufficient housing space and the prevention of feed and water contamination. The combination of all these management practices will reduce production losses resulting from infectious causes.

Table 1
Infectious causes of infertility

Mixed bacterial infections	**Clinical signs** Increased return-to-service. Mild to profuse vaginal discharges. Sows with metritis will have a fever and go off feed.
	Preventive measures Do not house gilts or sows in overcrowded, unsanitary conditions. Provide ample amounts of fresh water.
	Comments A discharge for one to three days after farrowing is normal.
Leptospirosis interrogans pomona	**Clinical signs** Few clinical cases in previously exposed herd. Susceptible breeding females may abort or deliver weak or dead pigs.
	Preventive measures Vaccinate breeding animals two to four times each year. Protect feed and water from urine contamination.
	Comments Rodent numbers should be controlled because they also contribute to the spread of this disease.
Brucella suis	**Clinical signs** Abortions during any stage of pregnancy.

	Preventive measures Prompt removal of all aborted tissues. Routine testing for maintenance of brucellosis-free herd.
	Comments Potential for human infection.
Porcine parvovirus	**Clinical signs** Delivery of mummified pigs. Stillbirths, neonatal deaths and infertility are possible. Abortions are rare.
	Preventive measures Vaccinate or expose gilts to infection 30 days prior to breeding.
	Comments Previously infected animals develop a life-long immunity.
Porcine enteroviruses	**Clinical signs** Resembles porcine parvovirus. Abortions are rare.
	Preventive measures Expose gilts to fecal material from older sows prior to breeding.
	Comments No vaccine is available.
Pseudorabies virus	**Clinical signs** Abortions may follow fever and respiratory disease in susceptible gilts and sows. Live-born pigs are weak. Pneumonia in growing pigs.
	Preventive measures Vaccination will reduce the severity of clinical disease. Participation in the federal eradication program.
	Comments Vaccination requires the approval of the state veterinarian.
PRRS/SIRS virus	**Clinical signs** New herds experience an increase in abortions, stillbirths and mummies. Pneumonia in pigs of all ages. Reduced fertility in recovered sows.
	Preventive measures New animals should be purchased from unexposed herds and quarantined for at least 30 days.
	Comments No vaccine is available.