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Infectious Swine Reproductive Diseases

Author

A. D. Leman, University of Minnesota

Reviewers

Frank DeJong, Colorado Springs, Colorado

William L. Mengeling, National Animal Disease Center,
Ames, IowaD. R. Redman, Ohio State University, O.A.R.D.C.,
Wooster, Ohio

This fact sheet reviews the major infectious diseases capable of reducing reproductive efficiency in swine. It discusses cause, clinical signs, diagnosis and control of viral and bacterial diseases in both sows and boars.

Viral Diseases

Viral reproductive disease in swine has, for the last ten years, been loosely categorized under the acronym SMEDI, referring to stillbirths, mummified fetuses, embryonic deaths and infertility. Although this term was useful for understanding the varied effects of viruses on swine reproduction, it is no longer a desirable term. Knowledge of the specific viruses and their effects on reproduction has increased substantially; the scientific community and pork producers, therefore, should discuss the diseases caused by specific viruses.

South Dakota researchers recently reported that viruses most commonly isolated from aborted swine fetuses were enteroviruses, parvovirus, adenovirus and reovirus.

Parvovirus

The virus currently causing the greatest concern in swine reproductive failure is the porcine parvovirus. When susceptible gilts or sows are infected with parvovirus during the first month of gestation, fetal death and resorption of fetal tissue can result. These infected females return to heat and may be identified as repeat breeders. Infection during the second month of pregnancy usually results in mummified fetuses. Part or all of the pigs may become mummified. Parvovirus infection usually does not result in death of all the fetuses at the same time; therefore, mummies of different sizes may be seen within the litter. Slaughterhouse studies have shown that most of the mummified pigs are the result of the porcine parvovirus and that the virus is often responsible for small litters. Abortion is seldom seen with parvovirus infection. If infection occurs during the late stages of pregnancy, the fetuses seem resistant to the effects of parvovirus.

Herd outbreaks of parvovirus infection are characterized by small litters and increased mummified pigs. Repeat breeding is a common sign of infection, but without

mummified fetuses to sample, the disease is difficult to diagnose.

Diagnosis is best achieved by submitting mummified fetuses to diagnostic laboratories for direct fluorescent antibody testing. Fortunately, the parvovirus persists for long periods of time in the mummified pig. Blood tests are available for determining evidence of previous exposure to parvovirus, but they have limited value because they do not determine the time of parvovirus infection.

Preventing parvovirus infection is difficult. Clinical observation suggests that the traditional method of mixing sows, gilts and boars is not always effective in establishing a common protection against the disease. Until more knowledge is available, however, management of the gilts to encourage natural exposure to the virus is recommended. New evidence from Australia suggests that withholding gilts from breeding until they reach 10 months of age helps prevent parvovirus infection. By that time, most gilts are actively immunized to the disease. Vaccines, designed to hasten the time that gilts develop active protection against parvovirus, are currently being studied. None is currently federally licensed for use.

Other Viruses

Researchers have reported that another group of viruses called enteroviruses can cause reproductive failure in pigs. Inoculation of gilts with these viruses during early gestation can cause embryonic deaths and returns to heat. Experimental enteroviral infection has also been manifested by fetal mummification and stillborn pigs. Even though experimental studies have shown that enteroviruses can cause reproductive failure, the scientific literature contains few reports of naturally occurring enteroviral reproductive disease. There is no additional evidence that enteroviral reproductive disease is of major economic importance. In the author's experience, nearly all United States swine prior to breeding age already have antibodies that presumably offer protection against all of the strains of enteroviruses. Very little is known about the prevalence or the economic seriousness of other viruses that reduce reproductive performance.

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Bacterial Disease—Leptospirosis

Porcine leptospirosis usually causes abortion, stillbirths and low baby pig survival. Leptospirosis should always be suspected when reproductive failure is being investigated. In the United States, the 4 most troublesome serotypes of leptospirae in swine are: *L. pomona*, *L. grippotyphosa*, *L. canicola*, and *L. icterohaemorrhagiae*. *L. pomona* is the most important cause of swine leptospirosis throughout the world, but within specific areas other serotypes may be prevalent.

The incubation period for leptospirosis is usually 1 - 2 weeks. The acute illness includes only a moderate fever and loss of appetite in the breeding herd. The leptospirae are present in the urine ten days after the onset of acute illness and are sometimes detectable for up to 12 months. Reproductive failure is not manifested until approximately 10 days after acute infection.

The stage of pregnancy is an important factor in determining the clinical signs of leptospirosis. There are no effects on the embryo when infection occurs during the first month of pregnancy. Infection during the second month of pregnancy may cause fetal death and resorption, mummification or abortion. During the third month of gestation, infection usually causes abortion.

Common sources of leptospirae include infected urine, contaminated surface water and direct contact with urine of shedder animals, and infected tissues such as the carcasses of rodents. Leptospiral organisms can enter the body through the skin or the mucous membranes. Because swine can shed large numbers of organisms over an extended period of time, they are a serious threat to adjacent animals and to humans.

Leptospirosis is diagnosed on the basis of herd history, post mortem findings, and blood tests. The herd history must consider vaccination schedules, methods for leptospirosis testing of new stock entering the herd, and exposure of the herd to wildlife, including skunks, cats, raccoons, opossums, dogs and rats that may be vectors for the various strains of leptospirae. The best diagnosis of leptospirosis can be achieved by measuring antibodies from a sample of serum from infected dams. Because the acute disease usually precedes the observed reproductive failure by about 10 days, antibodies to leptospiral organisms are usually detectable at the time of the observed reproductive failure. Many laboratories also use fluorescent antibody techniques to help diagnose leptospirosis.

Control of leptospirosis is usually based on a vaccination program and the isolation of the herd from the source of the organisms. Breeding swine should be vaccinated with bacterins for each pathogenic leptospiral serotype prevalent in the geographic area. To assure continued protection, bacterin injection should be repeated every six months or prior to every breeding. Confinement of the breeding herd reduces exposure to wildlife and substantially reduces the probability of leptospirosis. Blood testing new additions to the herd and eliminating positive animals is a method of reducing the likelihood of introducing leptospirosis into a herd.

Brucellosis

Although the incidence of swine brucellosis has decreased markedly during the past two decades, it remains a cause of abortion and infertility. The disease caused by *Brucella suis* is usually spread by ingestion of the organism, although it can be transmitted venereally. Sterility or infertility may be the only manifestation of brucellosis. Infertility is usually the result of unobserved abortions or fetal resorptions. The cause of infertility in sows appears to be a persistent metritis. The incidence of abortion is usually less than 30% of the breeding herd in naturally occurring brucellosis. The average time of abortion with brucellosis infection is about 70 days of gestation. In the boar, brucellosis can cause sterility and reduced fertility. A positive diagnosis of brucellosis can be made using the standard card test on the serum of sows or boars.

The best control method is to eradicate the disease by purchasing breeding stock from validated brucellosis-free herds, by testing incoming breeding animals, and by eliminating positive animals from infected herds.

Eperythrozoonosis

Eperythrozoonosis is a small parasite of red blood cells. Because of a newly-developed serum test, veterinarians are more capable of diagnosing this infection. Even though very little scientific information is available, the following clinical entities have been reported to be associated with high titers against eperythrozoonosis: failure to exhibit behavioral estrus, repeat breeding, occasional abortion, prolonged farrowing,agalactia (no milk), weak, anemic pigs at birth, hemorrhagic deaths of newborn pigs, slow growth of pigs and acute deaths in growing pigs.

Notice that these signs are similar to many other diseases. Differential diagnosis is imperative to avoid over-diagnosing eperythrozoonosis. Diagnosis should be based on clinical signs, serum titers, or the detection of the parasite in blood smears. Although determining serum titers helps confirm the diagnosis, the following statements indicate the inaccuracy of basing the diagnosis entirely on titers:

1. About 20% of all herds are seropositive for eperythrozoonosis.
2. When titers are detectable, they are almost always in adult animals. Pigs under 6 months of age are likely to be seronegative.
3. Within a positive herd, there is a very poor correlation between animals with high titers and the clinical signs mentioned above.

Because of the uncertainty regarding eperythrozoonosis, the following course of action seems warranted:

1. Test each breeding herd semiannually. At least 10 adult boars and sows should be sampled. An increasing number of diagnostic laboratories are capable of conducting the newly-developed serum test.
2. Control mange. Mange infection can mimic many of the signs of eperythrozoonosis. Contrary to published reports, spraying for mange for 6 consecutive weeks will not eradicate sarcoptic mange. An alternative program is to spray the first and second Fridays of every month.
3. There is scientific evidence that arsenilic acid helps limit the signs of eperythrozoonosis; tetracycline and lincomycin have not been shown to be effective.

Whenever repeat breeding, mummified fetuses, stillborn pigs, small litters or weak pigs are observed, infectious reproductive disease should be considered. Fetal specimens should be gathered as quickly and cleanly as possible and refrigerated or taken directly to your veterinarian or diagnostic laboratory. Additionally, veterinarians are advised to submit maternal blood samples for diagnostic testing. Diagnosis is essential for establishing effective control or preventive measures.

Diseases of Boars

Boar fertility is likely to be reduced whenever boars have any disease that results in fever. Likely causes of fever in breeding boars include pseudorabies, brucellosis, erysipelas and influenza. If fever occurs and fertility is reduced, it is not likely to return to normal until about 2 months after the infection.

Several researchers have shown that high ambient temperatures can reduce fertility. Extended exposure to temperatures of 90 F. results in lowered fertility that does not return to normal until about 2 months later.

The role of the boar in disease transmission is poorly studied. Brucellosis, pseudorabies and parvovirus organisms have all been isolated from boar semen. While the boar is thought to be a primary vector in brucellosis transmission, the role of the boar in pseudorabies and parvovirus transmission is unclear. Artificial insemination, therefore, may also serve as a mechanism for disease transfer.