pork industry handbook

Michigan State University Extension

Swine Dysentery
(Bloody Scours, Vibrionic Dysentery, Black Scours)

Authors
D. L. (Hank) Harris, Iowa State University
Robert D. Glock, Colorado State University
Lynn Joens, Arizona State University
Thad B. Stanton, NADC, USDA/ARS, Ames, Iowa

Reviewers
Edward M. Jenkins, Tuskegee University
Duane Miksch, University of Kentucky
Alan B. Scheidt, Purdue University
M. J. Wannemuehler, Iowa State University

Swine dysentery occurs most frequently in 8 to 14 week-old pigs, although all ages may be affected with the disease. Typically, the pigs pass loose stools containing blood and mucus. When swine dysentery occurs in young weaned pigs, up to 90% to 100% of these pigs may be affected and 20% to 30% may die if an effective treatment is not administered. The disease also may appear in suckling pigs or adult swine. In such cases, the disease usually is mild and may not be readily diagnosed. Often, when the disease has been present in a herd for a time, the clinical picture is less dramatic, especially when drugs are routinely used to control swine dysentery. In such cases, only sporadic diarrhea is seen.

Due to the inapparent infectiousness of the disease, the economic significance is difficult to assess. In typical outbreaks, losses result from poor rate of gain and feed efficiency, medication costs, and death. Annual cost of swine dysentery to U.S. pork producers has been estimated to be $100 million.

Cause

An anaerobic (killed by exposure to air) bacterium, *Serpulina hyodysenteriae* (*S. hyodysenteriae*), (previously called *Treponema hyodysenteriae*) is the cause of swine dysentery. As the disease progresses, blood may be lost through the damaged intestinal wall. Death usually results because of dehydration and a loss of electrolytes.

Most herds of pigs harbor various bacteria which look like *S. hyodysenteriae* but are nonpathogenic. One of these, *Serpulina innocens,* has been studied and does not cause swine dysentery in pigs. The two types of bacteria can be identified by laboratory tests and oral inoculation into experimental pigs. Recent advances in molecular biology have produced new approaches for identifying *S. hyodysenteriae*. All of these are based on detecting unique DNA sequences in the *S. hyodysenteriae* genome. These new techniques are proving useful for diagnosing swine dysentery and for studying the epidemiology of the disease. A definitive diagnosis of swine dysentery should only be based on the isolation and identification of *S. hyodysenteriae* in a qualified laboratory.

Transmission

The most common mode of transmission of swine dysentery from farm to farm is the asymptomatic carrier pig. *Serpulina hyodysenteriae* is present in the feces of pigs that are either affected with, or have recovered from, swine dysentery. After susceptible pigs ingest the organisms, symptoms of swine dysentery usually occur in 2 to 21 days; however, longer incubation times have been reported. The incubation period is usually shortened by the ingestion of larger numbers of *S. hyodysenteriae*.

Sows may harbor *S. hyodysenteriae* without having clinical evidence of swine dysentery. The organism lives in the feces of the sow and is transmitted to the suckling pigs. Often, it appears that most pigs are not susceptible to the disease while nursing the sow but are affected after weaning.

Although *S. hyodysenteriae* is an anaerobe, it will survive in feces for 1 to 2 months. Exact survival time is not predictable because of the influence of variable environmental factors such as temperature and moisture. The organism has been found in lagoon water collected from an infected premise (Table 1). Pigs that have recovered from swine dysentery may

4/94 (new 12/93) 1.5M - KMF - FP, 30¢, single copy free to Michigan residents

shed *S. hyodysenteriae* in their feces for over 2 months. *Serpulina hyodysenteriae* has been isolated from the feces of field mice. Mice are considered an important reservoir of the organism. Experimentally, mice may remain infected for over 200 days. Infectious organisms can be transmitted from farm to farm in feces carried on contaminated boots or vehicle tires. Dogs, birds, rats, and flies may carry *S. hyodysenteriae* for periods adequate to permit movement from one premise to another. Dogs, birds, rats, and flies are not long-term reservoirs of the organism as compared to mice.

Table 1. Survival time of *Serpulina hyodysenteriae* in animals and the environment.*

Location	Condition	Temperature	Survival Time
Pigs	---	---	60 days
Mice	---	---	1 year
Rats	---	---	2 days
Dogs	---	---	13 days
Feces			
Manure pits	Moist	45°F	60 days
Hog lots	Dry	65°F	7 days
Hog lots	Cold/Frozen	45°F	until temp increases
Lagoons	---	---	60 days

*From: *Swine Dysentery–Practitioner Planning Guide for Herd Elimination Program,* Livestock Conservation Institute and American Association of Swine Practitioners-1990, by DL Harris, JD McKean, LA Joens, RD Glock and R Schultz.

Diagnosis

Typical outbreaks of swine dysentery may be diagnosed by observing several pigs with watery feces (containing blood and mucus) and by the presence of appropriate lesions at necropsy. Samples should be submitted to a laboratory for isolation and identification of *S. hyodysenteriae* to make a definitive diagnosis of swine dysentery.

Several other diseases commonly confused with swine dysentery include: salmonellosis, trichuriasis (whipworm infestation), porcine proliferative enteritis (necroproliferative enteritis, ileitis, hemorrhagic bowel syndrome), and gastric ulcers. An accurate diagnosis of gastrointestinal disorders must be based on a thorough examination of the entire pig at necropsy and submission of samples for microscopic and cultural evaluation.

Treatment

Pigs that are gaunt and depressed due to swine dysentery should be treated with drugs which have been added to the drinking water. Usually, affected pigs in the early stages of disease consume very little feed. Therefore, treatment via the feed alone is not always effective. Pigs with swine dysentery may also be treated by injection of drugs, but this is usually impractical unless very few animals are affected.

If possible, during treatment, the pigs should be dispersed into a larger area and the floor of the pens should be cleaned daily to decrease reexposure to *S. hyodysenteriae*.

Table 2 lists the various drugs used for the treatment of swine dysentery. As is typical with other infectious diseases, drugs that have been available for a number of years are often less effective.

Prevention

Vaccines are available for prevention of swine dysentery. However, usually these must be used in combination with drugs to completely suppress the clinical signs of the disease. Vaccines do not eliminate *S. hyodysenteriae* from pigs and therefore cannot be used alone to eradicate the disease from a herd.

Since the disease is so economically devastating, great care should be taken to prevent introduction of the infectious agent into a noninfected herd. The asymptomatic carrier pig is the most important source of *S. hyodysenteriae*. Research is being conducted to develop cultural, molecular, and/or serological procedures to detect herds infected with *S. hyodysenteriae*. Unfortunately, no accurate methods are available to screen individual herd additions for the disease. Quarantine of all new animals is an excellent procedure, especially since clinical signs often occur in normal appearing but affected animals as a result of stress from transportation.

Serpulina hyodysenteriae can be carried into a herd on boots, farm implements, and trucks. Isolation of the herd and aggressive rodent control are essential in reducing potential disease.

Economic losses in affected herds also can be reduced or prevented by various management procedures. Outbreaks of swine dysentery are often associated with stress such as handling, transportation, severe weather, or dietary changes. Minimizing stress or using preventive levels of various

Table 2. Dosage level, duration of administration and withdrawal time for various drugs used for the treatment and/or prevention of swine dysentery as approved by the U.S. Food and Drug Administration.

Drug	Dosage in water	Duration (days)	Withdrawal (days)	Dosage in feed	Duration (days)	Withdrawal (days)
Bacitracin MD	1 g/gal	7-14 up to 250 lb BW	None	250 g/ton	Up to 250 lb BW	None
Carbadox	NA	NA	NA	50 g/ton	Up to 75 lb BW	70
Gentamicin solution	50 mg/gal (1 ml)	3	3	NA	NA	NA
Lincomycin	250 mg/gal	5-10	6	40-100 g/ton	Up to 250 lb BW	6
Tiamulin	227 mg/gal	5 up to 250 lb BW	3	35 g/ton	Up to 250 lb BW	2
Tylosin	0.25 g/gal	3-10	2	100 g/ton	3 wks then 40 g/ton thereafter	None
Tylosin injectible	4.0 ml/lb BW	3	14	NA	NA	NA
Virginiamycin	NA	NA	NA	25-100 g/ton	*See Below	None

*For nonbreeding swine over 120 lb BW. For swine up to 120 lb BW use 100 g/ton for 14 days, then 50 g/ton thereafter.
NA = Non-applicable; BW = body weight.

From: *Diseases of Swine,* Ed. Leman, A. D. et al., 1992, Chapter 49: Swine Dysentery, Harris, D.L. and Lysons, R.J., Pages 599-616.

approved compounds may be useful aids. Sanitation also is extremely important since the severity of the disease within an individual or a herd is directly related to the quantities of contaminated feces that are ingested. Reducing crowded conditions and providing a clean, dry environment can produce dramatic results. Conversely, poor sanitation will greatly enhance the prevalence and severity of the disease within a herd. An example of this may be seen occasionally in herds in northern latitudes where severe outbreaks have followed overfilling of manure pits under slotted floor systems where outlets became frozen.

Serious losses may be prevented even in infected herds by the use of preventive levels of various therapeutic compounds (Table 2). The judicious use of these compounds as described in the section on therapy may be very beneficial, but these compounds should not be relied upon as a substitute for good management.

Elimination of the Disease from a Herd

In some situations, pig producers must continually use medications and vaccines for control of swine dysentery. Quite often, however, the cost of such programs is prohibitive due to poor profitability. If the producer is capable of maintaining a herd free of swine dysentery then consideration should be given to eliminating *S. hyodysenteriae* from the herd/facilities. The options are as follows.

Eradication of *S. hyodysenteriae* without depopulation is one possibility. The principle applied for elimination without depopulation is to medicate via feed, water, and/or injection to all pigs in the herd for a period of several days to months. During this medication period, a sanitation program is conducted, which eliminates the organism from the facility. In addition, the rodent population is exterminated. General guidelines for eradicating swine dysentery from a herd without depopulation are:

A. A warm season in which temperatures are higher than 59° F (15°C) is preferable.

B. The number of animals in the herd should be decreased to as few as possible.

C. If farrowings occur in batches, the recommended time to eradicate the disease is when no suckling pigs are on the farm.

D. An effective rodent control program which includes renovation of buildings, should be instituted.

E. All liquids should be removed from manure pits within the buildings in which pigs are housed.

F. Any buildings that do not contain pigs should be cleaned, disinfected and fumigated.

G. All pigs on the farm should be medicated simultaneously for a period of 3 to 10 weeks with drugs in conjunction with a vaccination program. Consult with a veterinarian to determine the appropriate drugs and dosages. All pigs should receive medication a minimum of 3 weeks. If suckling pigs are present and are not individually medicated, the whole-herd medication period should be 3 weeks plus the suckling period.

H. After one week of medication, all equipment used for handling pigs, feed and manure should be cleaned and disinfected.

I. During the medication period, floors of buildings should be cleaned and disinfected frequently. Animals should not be housed in over-crowded conditions.

With very good management and proper drug selection this process can be successful. However, if either are lacking then failure can occur. To determine if the disease has been eliminated, it is recommended that for 3 to 6 months following medication no drugs be used that are efficacious for the treatment of the disease. Clinical evidence of the disease will usually reappear if the organism is still present.

Another alternative is the classic two-site or three isolated-site production with partial depopulation. Endemic swine dysentery is often not difficult or costly to control in the adult population. Dams previously recovered from swine dysentery confer resistance to their young during the suckling period. The cost of medication to control swine dysentery to 40-50 lb (18 to 23 kg) body weight is not prohibitive, since certain drugs at growth-promotion levels often control swine dysentery in this age of pig. Therefore, if pigs are removed from either the farrowing rooms after receiving colostrum as in isolated weaning (Figure 1) or the nursery (Figure 2) accommodation up to 66 lb (30 kg) body weight, it is possible that the pigs will be free of *S. hyodysenteriae* at this time. The swine dysentery-free pigs should be isolated from the adult herd and moved to facilities not contaminated with *S. hyodysenteriae*. The use of a swine dysentery vaccine in the sow herd may also be helpful in this procedure.

Figure 1. Isolated three-site production.

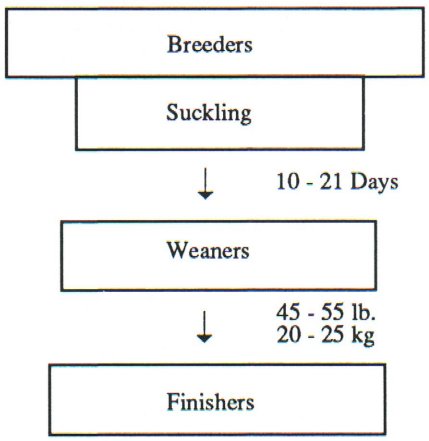
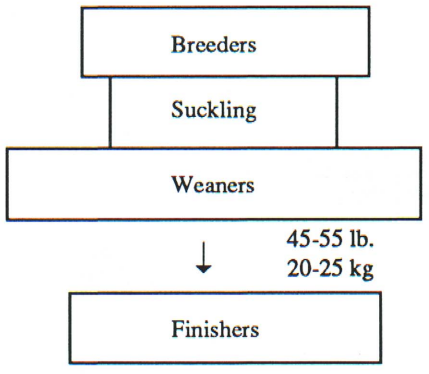


Figure 2. Classic two-site production.



And the third alternative is total depopulation, cleanup, disinfection and repopulation with swine dysentery-free stock. The decision to totally depopulate an ongoing pig operation should not be made without serious deliberation and accurate financial calculations. However, in some situations, this alternative is the only method available to eliminate *S. hyodysenteriae* from the herd/facilities. At warm temperatures, the organism does not survive well in soil (less than 7 days). Therefore, the most important reservoirs for the organism in a depopulated facility are the manure and rodents. At temperatures above 60° F (16 C), facilities can be cleaned, disinfected, and repopulated very rapidly. Any attempt to eliminate swine dysentery should be done utilizing the services of a veterinarian.

Avoiding Introduction of *S. hyodysenteriae* into Herds Free of Swine Dysentery

Herds that have been established as free of swine dysentery and are either closed or maintained in a closed pyramid will remain free of swine dysentery if situated in an isolated locale and precautions are taken to prevent contamination by feces from carrier pigs. If breeding stock or feeder pigs are introduced into the herd, care should be taken to prevent contamination by feces from carrier pigs.

If breeding stock or feeder pigs are introduced into the herd, care should be taken to limit the introductions to as few sources as possible and to procure the pigs from herds known to be free of swine dysentery. Pigs should be purchased from herds that do not use drugs or vaccines known to prevent the occurrence of swine dysentery. In addition, the source herd should not have made recent introduction of pigs from questionable or swine dysentery-positive herds. It is not recommended that tests be conducted to ascertain the swine dysentery status because cultural tests lack sensitivity and serologic tests often have false-positive reactions. A fecal ELISA test has been developed but it appears to be no more sensitive than culture, and false-positive reactions also occur.

If the swine dysentery status of the source herd(s) cannot be ascertained, then it is imperative that pigs be placed in quarantine prior to entry into the swine dysentery-free herd. In quarantine, the pigs should either be nonmedicated and observed for signs of swine dysentery or be medicated to eliminate carriers of *S. hyodysenteriae*. It is more practical to medicate, since it has been reported that unmedicated pigs may remain asymptomatic carriers of the disease for at least 60 days.