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Swine: Swine Health Program[1]

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PREVENTING SWINE DISEASE BUILD-UP

Swine disease outbreaks are often related to a high concentration of pigs raised continuously in the same facility or on the same lot or pasture. Overcrowding and continuous use can result in rapid buildup or accumulation of disease producing organisms in the environment. These organisms can infect and keep reinfecting the herd. In addition, the movement of hogs from farm to farm can introduce new infectious disease-producing agents into the herd. The possibility of an outbreak can be greatly reduced by these important methods of removing the cause of diseases:

(1) Preventing the introduction of new disease.

(2) Vacating or rotating facilities to break the disease cycle.

(3) Cleaning and disinfecting to reduce the number of disease organisms.

(4) Practicing good management and using a sound nutrition program to lessen the effect of stress.

(5) Eliminating animals that are carriers of disease.

PREVENTING THE INTRODUCTION OF NEW DISEASES

A farmer may purchase swine, and shortly afterward experience an outbreak of disease in his herd. Some precautions can be taken in purchasing new animals:

(1) Buy healthy animals. Avoid mixing animals from multiple sources.

(2) Test breeding swine for brucellosis, leptospirosis and pseudorabies before purchase. A health certificate showing all tests and vaccinations should be obtained at the time of purchase.

(3) Make sure the swine are properly identified and delivered in a clean disinfected truck.

(4) Isolate newly purchased swine for 30 to 60 days at least 300 feet from other swine. Retest before adding them to the herd. Never bring newly purchased sows or boars into a farrowing house or expose baby pigs to new animals.

(5) Keep visitors out of hog lots, if possible. Keep rubber boots, disinfectants, and a change of clothing available for those who must enter the herd.

VACATING FACILITIES

Many of the disease-causing organisms found in a farrowing house or finishing floor cannot live very long outside the body of the swine. By removing the animal, these organisms will be without their source of survival and will rapidly decrease in number. The facility should be kept empty for 3 to 4 weeks or longer for best results, but will also help in reducing the number of parasite eggs and infectious agents. Vacating buildings and feeding floors is especially helpful in breaking the disease cycle when combined with a good system of cleaning and disinfecting.

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CLEANING AND DISINFECTING

Effective disinfection requires cleanliness first because the disinfectants have little or no action on dirty surfaces. The organic material in manure and dirt inactivates the chemical disinfectant. Also, dirt and manure provide protection for disease organisms and the chemical solution is unable to penetrate and reach them.

Cleaning can be done with a shovel and a brush or speeded up by use of high pressure washers and detergents or steam cleaners. When there is an excessive amount of manure or dirt present, sanitation can be made more effective by first using a detergent followed by a disinfectant applied in a high velocity stream of hot water. The detergent hastens the job of removing the dirt by increasing the wetting speed, while a layer of water containing the disinfectant will remain on the surface to destroy the bacteria left after cleaning. Some detergents and disinfectants can be combined for easier one-step cleaning and disinfection. Steam is an effective method of cleaning but the nozzle would need to be held not more than 6 to 8 inches from the surface to have much value in killing organisms.

Several disinfectants have value. For disinfection of buildings and feed floors with a high amount of organic matter, disinfectants such as sodium orthophenylphenates, saponated solution of cresol, and hot lye solution are effective. Also, fumigation using formaldehyde can be used in tightly enclosed buildings after proper cleaning (see Veterinary Medicine Fact Sheet 3 - *Disinfectants and Disinfection*).

SPECIAL SANITATION PROBLEMS

Dead Animals

Dead animals can be a source of disease for other swine. They should either be removed immediately by a licensed rendering truck, completely burned, or buried at least six feet deep, well away and downgrade from any source of drinking water, and covered with a generous supply of quicklime before fill dirt is added. For small pigs, a large drainage tile can be sunk in a high sandy area supplying good bottom drainage. A tightly fitting lid should be made so that children, dogs, insects and predatory animals can be kept out. Dead pigs may then be dropped in and covered with quicklime.

Farrowing Time

Sanitation at farrowing time is extremely important. Farrowing pens should be cleaned and disinfected. Before the sow is placed in the farrowing pen, she should be washed with detergent and water. Particular attention should be paid to the udder, but no part of her should be overlooked. The dirt on the sow's body, udder, and feet is likely to contain numerous worm eggs and disease germs, and the newborn pigs would be likely to swallow infective material with the first milk. Make farrowing pens off limits to all visitors.

Discharges of Sick Animals

Discharges of sick animals that accumulate on bedding and floors are a potential source of infection. To destroy the disease germs, all bedding, manure, and other waste materials should be burned or spread thinly on ground not used for animals. Buildings should be thoroughly cleaned and disinfected.

Wet Places

Wallows, shallow ponds, slow moving streams, and other wet places breed disease. Drain or keep swine away from such areas. The development of wallows can be avoided by frequently moving the troughs and waterers, and by providing temporary shade.

MAINTAINING GOOD MANAGEMENT PRACTICES

Depending on drugs to control swine diseases is a poor substitute for balanced rations, sanitation, and management aimed at disease prevention. Good husbandry and management also eliminate many contributing stress factors. Good management practices include:

(1) Protecting feed and water from being contaminated with manure and urine from other swine and from the droppings of birds and rodents.

(2) Regular deworming of the swine herd.

(3) Spraying for lice and mange.

(4) Segregating young pigs from older pigs.

(5) Observing animals frequently for signs of diseases.

(6) Isolating and treating sick animals.

(7) Keeping animals comfortable.

(8) Providing iron for baby pigs.

(9) Vaccinating for diseases as recommended by a veterinarian.

IMMUNIZATION PROGRAMS

The prevalence of specific diseases in a given area and the availability of effective vaccines will dictate an immunization program. In Florida, the sow or gilt should be immunized against leptospirosis and parvovirus preferable 2 weeks or more prior to breeding. Erysipelas vaccination of sows and gilts 3-4 weeks before farrowing is a method or provaccination of pigs 6 to 10 weeks of age that is usually economically advantageous. In some problem herds, vaccination of pigs against erysipelas at a very young age followed by a second vaccination near weaning may be needed.

A vaccine is now available for atrophic rhinitis. Pigs can be vaccinated at 7 and 28 days of age and sows and gilts at 4 and 2 weeks before farrowing. If the sow is maintained in the herd, it is necessary to revaccinate approximately 2 weeks before each subsequent farrowing. New boars can also be vaccinated.

Vaccines are also available for transmissible gastroenteritis (TGE) and other diseases. Discuss with your veterinarian for possible usage.

CONTROL OF REPRODUCTIVE DISEASES

Brucellosis and leptospirosis are two bacterial diseases that cause abortions and birth of dead or weak pigs. In addition, there are several viral diseases (primarily parvovirus) that cause stillbirths, mummified fetuses, embryo deaths and infertility if sows or gilts are exposed at breeding or during gestation. Therefore, it is best to pre-expose sows, gilts and boars to all viruses present before breeding and gestation. Sows and gilts should be co-mingled 30 to 60 days prior to breeding. Fenceline contact of newly purchased boars with other animals on the farm should also be accomplished. Feces from boars can be placed directly in sow or gilt feed to ensure exposure. Another method is to switch pens several times so breeding animals (females and boars) are exposed to each others manure. Manure could also be transferred from one pen to another. In this 30 to 60 day period before breeding, the animals are exposed to the viral agents which are relatively harmless to hogs during this period and develop good immunity against the organisms by the time of breeding. New boars become adjusted to their new environment during this period and will perform better.

PARASITE CONTROL

Internal and external parasites are an economic problem in most swine herds. Deworming agents and insecticides should be used routinely. Treatment of the breeding herd with ivermectin or of pigs with ivermectin or thiabendazole to remove strongyloides is necessary in most Florida swine herds. Consult Vet Medicine fact sheets available for control of these problems in swine herds (AS-50, *Controlling Parasites of Swine* and ENT-30, *External Parasites of Swine*).

Pigs heavily parasitized are more susceptible to diseases such as scours and pneumonia. The resulting diseases and unthriftiness are a major cause of economic loss. The swine producer should be aware of the common internal parasites of swine and methods of prevention and control.

Ascarids (Roundworms)

An adult female ascarid produces thousands of eggs daily. These pass out in the feces and under favorable conditions of adequate moisture and warm temperature become infective in 3 to 4 weeks or more. A protective shell resists adverse environmental conditions enabling the eggs to remain alive for 5 years or longer. Consequently, infective eggs are abundant on hog lots, pastures, and other places contaminated by droppings of infected hogs. When pigs swallow infective eggs, the larvae emerge from the eggs in the intestinal tract and migrate through the liver, lungs, and other tissues. Migration of ascarid larvae through the lungs may lead to pneumonia and coughing. These larvae eventually return to the intestine where they mature and become prolific egg layers. Activity of ascarids results in decreased feed

efficiency, lowered growth rates, and condemnation of livers.

Nodular Worms (oesophagostomum)

Nodular worms also inhabit the intestinal tract causing intestinal damage and unthriftiness in pigs. Eggs pass out in the feces and hatch on the ground. The larvae develop over an extended period and are ingested by the pig. They burrow into the intestinal wall and develop within nodules in the wall of the intestine before re-entering the intestinal tract where they mature.

Strongyloides (threadworms)

Strongyloides are another inhabitant of the intestinal tract. Their eggs pass out in the feces and hatch within a few hours under favorable conditions. The parasite can also multiply outside the animal host, can be transmitted from the sow to the pig before birth (prenatal infection), can be transmitted through the colostrum, and is capable of penetrating unbroken skin. As a result, mature threadworms have been detected in baby pigs as early as 4 days old. The resulting yellowish diarrhea and possible death loss in baby pigs can be a difficult problem.

Whipworms (Trichuris)

Whipworms are common internal parasites of swine. Eggs passed with the feces develop into infective larvae in the environment in about a month. The larvae are ingested and penetrate the intestinal wall, damaging tissue and robbing the pig of essential nutrients. Pigs infected with whipworms are also prone to other intestinal infections such as salmonellosis and swine dysentery.

Lungworms

The adult lungworm produces eggs in the lungs which are coughed up, swallowed and pass out in the feces. Earthworms ingest the eggs and become infected. Pigs may root up and swallow earthworms containing the infective stage of the parasite. Lung infection then occurs and considerable lung damage and pneumonia can result.

Kidney Worms

The kidney worm infects the liver, may also be found in the abdominal cavity, fat surrounding the kidneys and have been found in the spinal canal. It requires about 9-12 months for a female to reach the egg laying stage. Eggs are passed from the animal to the ground. Kidney worm larvae have survived in earthworms for more than a month. The animal picks them up by swallowing infected larvae with contaminated forage, or the larvae can penetrate the skin of the pig while it is lying down in a contaminated lot. Pigs infected may show unthriftiness due to the damage in the tissues and organs they invade. The principal damage involves the liver. With a heavy infection of kidney worms, the entire carcass may be condemned at slaughter.

Other Internal Parasites

Several other parasites are also of importance in swine. These include coccidia, thorny-headed worms, stomach worms, and trichina (from raw or improperly cooked garbage). See USDA bulletin, *Parasites and Control, Internal Parasites of Hogs* H2240.

Sanitation and Management Recommendations

Internal parasite control is aimed at reducing infection and minimizing the effect. Although several drugs are available, cleanliness and general good management must be practiced to minimize losses. A combination of good management and sanitation plus proper use of deworming agents will most effectively control internal parasites of swine.

Breaking the Parasite Life Cycle

Management should be aimed at breaking the cycle of the parasite. Most parasite eggs and larvae persist and thrive in warm weather with plentiful moisture. They are destroyed by direct sunlight and drying. However, pastures and lots can remain infective for years because parasite eggs are protected by layers of soil or manure. Mud holes and shade encourage parasite survival. Rooting for earth- worms favors lungworm infection. Therefore, land and lot rotation is of some value in parasite control. Confinement rearing on slatted floors or concrete is also of practical value, especially if good sanitation is practiced.

Sanitation

Sanitation is of definite value in controlling parasites, as well as to prevent other diseases of swine. Thorough cleaning that removes the parasite eggs from the environment plus disinfection is of real value. Hot lye solution, saponated solutions of cresol, sodium orthophenylphenate, organic iodide or iodophors, and fumigation with formaldehyde gas are satisfactory disinfectants if preceded by mechanical cleaning and the use of a detergent solution or steam cleaner.

Specific Management and Sanitation Practices

The following sanitation and management practices are recommended for controlling internal parasites:

(a) Wash sows as described earlier. Give special attention to the udder and feet.

(b) Keep farrowing pens clean and free of manure to prevent exposure of baby pigs to large numbers of worm eggs and parasite larvae.

(c) Avoid using permanent pastures. If temporary pastures are not available, rotate permanent pastures yearly or renovate pastures periodically.

(d) Fence off low, wet areas to avoid strongyloides, lungworms and thorny headed worms.

(e) Use well-drained areas for lots and pastures. Avoid formation of mudholes.

(f) Avoid contact of suckling pigs with older hogs other than their mothers.

(g) Avoid contact of feeder and market pigs with older breeding stock.

(h) Provide adequate nutrition to minimize the effects of parasitism and to reduce the tendency of pigs to search and root for food.

(i) Ring pigs that have a tendency to root.

(j) Pigs raised on concrete have some advantage over those raised on dirt particularly if regular cleaning and sanitation practices are followed.

(k) Do not feed raw or improperly cooked garbage or table scraps to swine (to prevent trichinosis).

Deworming and Control Recommendations

Regular deworming of pigs and sows is needed to control common internal parasites of swine. Ascarids (roundworms), nodular worms, strongyloides (threadworms), whipworms, lungworms, and kidney worms cause problems in Florida swine. Several good deworming agents are available but vary in their range of effectiveness against specific parasites as described in Table 1.

(a) Piperazine is inexpensive, effective against adult roundworms and moderately effective against nodular worms. It can be administered in feed or water. Hygromycin B has value as an aid in control of whipworms, nodular worms, and roundworms and is used as a feed additive. Dichlorvos (Atgard) is effective against roundworms, nodular worms, and whipworms and is a good dewormer to use for sows one to two weeks before placing them in the farrowing house. It is used only in feed. Levamisole (Tramisol) is effective against lungworms, roundworms, kidney worms, and nodular worms and is used only in feed. Thiabendazole paste is the drug approved for use against strongyloides (threadworms) in baby pigs. Fenbendazole (SafeGuard) is effective against roundworms, nodular worms, whipworms, lungworms and kidney worms and is used in the feed. Ivermectin (Ivomec) is effective against roundworms, nodular worms, lungworms and kidney worms. It is administered by injection and is a good dewormer to give sows 4-5 days prior to farrowing to control strongyloides (threadworms) in baby pigs.

(b) In a parasite control program, sows and gilts should be dewormed with dichlorvos or levamisole one to two weeks before entering the farrowing house. Sows and gilts should also be washed prior to entering the farrowing house to get rid of worm eggs on their bodies. If strongyloides is a problem in small pigs, sows

should be treated with ivermectin when brought into the farrowing house or thiabendazole paste should be used on baby pigs at five days of age and repeated at 10 days of age. When pigs reach six to eight weeks of age, they should be dewormed with dichlorvos, levamisole or pyrantel. Deworming again in 30 days using a different drug is advantageous.

(c) Monitoring of the internal parasite problem in the herd is recommended. Fecal samples can be collected and examined by a veterinarian or diagnostic laboratory at regular intervals.

Discussion of the problem with a veterinarian is desirable to adopt the most effective program in the herd. Management practices to prevent parasite infections are important control measures in addition to use of chemical deworming agents.

Table 1. Effectiveness of Deworming Agents in Removing Common Swine Parasites

Deworming Agents	Types of Parasites					
	Round Worms	Nodular Worms	Whip Worms	Lung Worms	Kidney Worms	Strongy-loides
Dichlorvos*	99-100%	95-100%	90-100%	0	0	60-80%
Hygromycin B**	95-100%	95-100%	85-100%	0	0	0
Levamisole***	99-100%	80-100%	60-80%	90-100%	80-95%	80-95%
Piperazine	75-100%	50%	0	0	0	0
Pyrantel****	96-100%	99-100%	0	0	0	0
Thiabendazole+	0	0	0	0	0	100%
Fenbendazole++	92-100%	99-100%	94-100%	92-99%	100%	Variable
Ivermectin+++	90-100%	86-100%	Variable	99-100%	100%	99-100%

* Trade name Atgard, SDS Biotech
** Trade name Hygromix, Elanco Products
*** Trade name Tramisol, American Cyanamid
**** Trade name Banminth, Pfizer and Co.
\+ Trade name Thibenzole, Merck and Co.
++ Trade name SafeGuard, American Hoechst
+++ Trade name Ivomec, Merck and Co.