

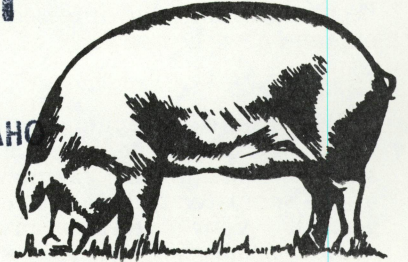


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Atrophic Rhinitis Disease of Pigs

Atrophic rhinitis is a chronic infectious and contagious disease that may affect pigs of all ages. The disease was first recognized in Germany in 1830 and is now believed to be distributed in major swine-producing areas throughout the world including the United States. Greatest economic losses from the disease occur in the younger affected pigs and result from unthriftiness and chronic illness or death due to secondary bacterial infections.

Tissues Affected, Cause, Transmission

The disease is usually confined to the upper respiratory tract and causes atrophy (shrinking) and eventual destruction of the turbinates in the nasal cavity. These lesions are most often seen in pigs exposed at 3 weeks of age or less. The nasal turbinates are delicate, scroll-like structures that normally serve to warm the air and to filter out harmful substances such as dust particles and bacteria from air that is inhaled. Loss of this protective function may result in irritation and secondary respiratory infections. Damage to nasal turbinates is less severe and the chances of secondary infections are often reduced in older pigs.

A variety of infectious microorganisms and chemical and gaseous irritants can cause atrophy of the nasal turbinates. Thus, the term atrophic rhinitis is not specific for a particular causative agent or substance but merely describes the major lesion. However, the bacterium *Bordetella bronchiseptica* is generally considered to be the most common cause. *B. bronchiseptica* organisms can also cause other types of lesions in the respiratory tract including a mucoid inflammation of the nasal passages and the throat area and chronic

bronchial pneumonia. Various strains of the organism are more virulent (i.e., more capable of producing the disease) than others but no practical laboratory tests are available to determine the degree of virulence of the field strains isolated.

B. bronchiseptica organisms are found most commonly in the respiratory tracts of infected pigs. However, they can also be isolated from the digestive tract of infected and apparently normal pigs and will survive for varying times in the environment outside the animal.

Exposure can occur at any age, usually by direct contact with infective nasal secretions and by aerosol spread of the organisms from infected to noninfected animals. Direct (nose to nose) and indirect (aerosol) transmission of the disease readily occurs in a farrowing house where the animals are concentrated. The disease passes from one litter to another and soon all the litters are infected. Similarly, the disease will spread to noninfected pigs that are commingled with infective native or newly purchased stock. Infection can also occur simply by moving noninfected pigs into an unclean area or building previously occupied by infected pigs.

The potential for spread of the disease within a herd and between herds on neighboring farms is increased since the *Bordetella* organisms have also been isolated from many other species including man, dogs, calves and rodents. Wild birds and insects may be important carriers of the organism as well. Conditions of dryness and direct contact by sunlight will kill most of the organisms in 5 to 6 weeks but they will survive for up to 4 months in cool, moist and shaded areas. Most of the commonly used disinfectants and fumigants are effective in killing the organism on contact.

Clinical Signs and Pathologic Changes

The clinical signs of severe atrophic rhinitis disease include frequent sneezing, sniffing, snorting, nasal discharge and excessive formation of tears. Baby pigs are born free of the disease but may be exposed soon after birth and begin showing signs at 1 week of age. Remember, however, that rhinitis with sneezing and coughing can be caused by other infectious agents and also noninfectious factors such as dust, chemicals, ammonia gas and poor ventilation. These agents do not cause turbinate atrophy, however.

Within 3 to 5 weeks, most pigs severely affected with atrophic rhinitis will cough, show a bloody nasal discharge and develop wrinkled, twisted and distorted snouts. The latter signs coincide with extensive atrophy and destruction of the nasal turbinates. Occasionally, changes in the snout are not visible even though the turbinates are severely affected. Preexisting stresses associated with inclement weather, chilling, overcrowding, starvation and diarrheal diseases and repeated aerosol exposure of the same animals to atrophic rhinitis organism often cause more severe lesions of the turbinates.

Pneumonia is a common secondary complication of atrophic rhinitis. The pneumonia may be due to *B. bronchiseptica* or some other microorganisms. Most researchers agree that the pneumonia, rather than the rhinitis, is responsible for poor weight gains, unthriftiness and death. Herds with a high incidence of turbinate atrophy and pneumonia do poorly while those with a moderate-to-low incidence continue to make satisfactory gains.

Peak infection rates of 90% have been recorded among litter-

mates by the time they are 6 to 10 weeks of age. Natural recovery, even without treatment, occurs slowly and reduces the infection rate to 25 to 30% in 8- to 10-month old pigs and 10 to 15% in adult pigs. Naturally recovered pigs are known to be resistant to reinfection. However, some recovered pigs become chronically infected and expose new generations of pigs.

Diagnosis

Diagnosis of atrophic rhinitis is made by observing the clinical signs and postmortem examination of the snout for turbinate atrophy. Consult your veterinarian for routine inspection of animals to determine whether atrophic rhinitis is a problem in your herd.

Another useful method for identifying and eliminating *B. bronchiseptica*-infected animals from a herd is to culture swabs taken of the nasal cavity. Collecting swab samples requires special techniques and should be done by or under the direct supervision of your veterinarian. The infection rate in a herd can often be determined by testing with nasal swabs a random sample of 15 pigs at 4 to 10 weeks of age. Animals with positive cultures should be sold for slaughter. To establish a *Bordetella* rhinitis-free breeding herd, test all animals by nasal swab culture once a week for at least 5 weeks or until all those that remain have passed three consecutive negative tests. An ideal time to test breeding stock is before farrowing.

Treatment

Treatment of atrophic rhinitis is complicated by the fact that the infection is confined to the outer surface of the nasal cavity which is essentially outside the body. A number of antibiotic substances are effective against the *Bordetella* organisms. Unfortunately, most of these drugs are of little use in treatment because they are not secreted onto the nasal membranes in sufficient concentration to kill the infective organisms.

Presently, the two most commonly used drugs are sulfamethazine (100 to 450 grams per ton) and sulfathiazole (1/3 to 2 grams per gallon drinking water depending on the size of the animal). These two sulfonamides are approved for use in treating the disease and they do accumulate in effective levels in the respiratory secretions. For best

control, continuous treatment is required for 5 weeks in younger pigs and 4 weeks in older pigs. Field studies in the central plains states have detected the emergence of significant numbers of infective strains of the organism which are now resistant to the sulfonamides. These drug-resistant strains have apparently emerged after prolonged use of the sulfonamides. Currently there are no effective alternate drugs available.

Control

The control of atrophic rhinitis disease must be directed toward breaking the chain of disease transmission from infected to noninfected pigs. Before attempting any control measures, however, you must first evaluate the genetic value of the herd, the type of housing facilities available and the availability of the proper diagnostic laboratory facilities. Based on our current knowledge, the following management practices can be applied to prevent and control the disease in a herd.

1. Determine, first of all, the level of infection by visual examination of all animals for external signs, examination of the nasal turbinates of several market animals and collection of nasal swabs from 4- to 10-week-old pigs for culture of *B. bronchiseptica* organisms. Also, determine sensitivity of all *B. bronchiseptica* isolates to sulfonamide drugs. Culling visibly affected animals will reduce the infection rate in some herds but will not effectively eliminate the disease.

2. Retain as many older breeding sows in the herd as possible because of the direct correlation between advanced age and the higher number of recovered noninfected animals. Conversely, do not add younger breeding gilts to the herd during control efforts because of higher infection rates in this age group.

3. Separate breeding stock from younger growing-finishing pigs and use separate feeding and watering facilities for each. Also, use separate clothing and footwear when working with the different groups and keep other animals such as dogs, wild birds and rodents away, if possible.

4. Treat all breeding age animals with an adequate course of sulfonamide in the feed for 5 to 6 weeks to reduce the number of infected animals. Make certain the pigs have

free access to water at all times during treatment.

5. Collect nasal swabs from all treated breeding stock and new additions to the herd and culture. Repeat samplings until all culture-positive animals have been removed. Sample again 2 weeks before the breeding animals enter the farrowing house.

6. Thoroughly clean and disinfect the farrowing house and keep it empty for 6 weeks before placing the culture-negative breeding stock in it. The ideal situation would allow each sow to farrow and raise a litter in separate isolated quarters until after the piglets are weaned. This system is not always possible or practical, however.

7. If you have the time and labor, allow the piglets to nurse at regular intervals during the day, but between nursing move them to separate quarters where they are reared by hand.

8. Another method of establishing an atrophic rhinitis-free breeding herd is to procure and raise specific pathogen-free pigs.

The following additional management practices should also be applied to prevent atrophic rhinitis disease in a herd.

1. Purchase breeding animals only from herds known to be free of atrophic rhinitis.

2. Isolate all newly purchased animals from the parent stock and have them inspected by your local veterinarian for signs of the disease.

3. Observe and measure the performance of your pigs to allow early and complete detection of other related signs of the disease.

4. Become familiar with the early warning signs of other common diseases of pigs and be aware of the current disease status of other swine herds in your area.

Reinfection is a constant threat even though a herd has been freed of the disease by adequate treatment and control measures. This is especially true since man and other animals may be carriers of the organism. A bacterin has been developed and is now commercially available for immunization of young pigs against atrophic rhinitis. This product is designed to enhance resistance to the disease. Studies have been designed to establish the protective role of colostral antibody from vaccinated dams for newborn piglets.