pork industry handbook

Michigan State University Extension

Mycoplasmal Pneumonia of Swine

Authors
Barbara Straw, University of Nebraska
L. Kirk Clark, Purdue University

Reviewers
Clyde and Connie Fischer, Optima, Oklahoma
Calvin and Lisa Nichols, Morrisville, New York
Richard Ross, Iowa State University
Timothy P. Trayer, Denver, Pennsylvania
Doug Weiss, Apple Valley, Minnesota

Causative Agents

Mycoplasmal pneumonia of swine also is called enzootic pneumonia. It is a chronic respiratory disease of swine that seldom kills pigs but causes considerable economic loss through depression in performance.

Mycoplasma hyopneumoniae is the primary infecting agent responsible for mycoplasmal or enzootic pneumonia of swine. *M. hyopneumoniae* is able to colonize the normal lung, depressing lung defense mechanisms thus allowing other bacteria to produce secondary infections.

Except for laboratory controlled cases, *M. hyopneumoniae* infections always are complicated by secondary bacteria. The most common secondary bacterium in cases of mycoplasmal pneumonia is *Pasteurella multocida*. Other bacteria such as *Streptococci, Staphylococci, Bordetella bronchiseptica, Actinomyces pyogenes, Actinobacillus pleuropneumoniae, Klebsiella,* and *Salmonella* also may be involved.

Transmission

Transmission of *M. hyopneumoniae* can occur from carrier sows to their offspring, but the major source is from pig-to-pig in older pigs. Evidence indicates that most young pigs do not become infected until they leave the nursery and are housed in the grow-finish space with older pigs. In some herds, pigs are infected in the nursery especially if it is operated on a continuous-flow basis and younger pigs are commingled with older pigs.

Transmission of *M. hyopneumoniae* primarily is through direct contact. While long range aerosol transmission of organisms is possible, most clinical spread is due to nose-to-nose contact between animals. Therefore, environmental adjustments are designed primarily to provide a comfortable living space for the pigs rather than to dilute the number of organisms suspended in the air.

Prevalence of Infection

Nearly all (approximately 99%) commercial swine herds have mycoplasmal pneumonia. In a herd in which there are no clinical signs of mycoplasmal pneumonia, typical lesions may be seen in the lungs at a slaughter check. *M. hyopneumoniae* has been isolated from clinically normal lungs so pigs that appear healthy may be carrying organisms that will cause disease under stressful situations.

Clinical Signs of Infection

There have been occasional reports of nursing pigs being affected with mycoplasmal pneumonia, typically, signs are seen in pigs aged 6 to 10 weeks and older. Affected pigs have a dry, nonproductive cough that is most noticeable after exercise. Coughing may persist for 1 to 2 months. Although pigs continue to eat, feed intake is usually depressed and pigs fail to grow at a normal rate particularly if lesions are extensive due to secondary bacterial complications. The extent of damage to the lung and effect on growth rate are variable depending on

4/94 (Rev 12/92) 1.5M - KMF -FP, 25¢, single copy free to Michigan residents

the dose of *M. hyopneumoniae*, number and kind of secondary infections and degree of environmental stress.

Environmental Factors that Influence Severity of Infection

Researchers have identified numerous factors that influence the severity of clinical pneumonia in infected herds. These are presented in Table 1.

Economic Effect

One study estimated that the cost per pig for enzootic pneumonia was $4.08, and the annual cost for the entire U.S. swine herd was about $367,000,000. This cost excluded the costs of drugs used to treat or reduce the effects of this disease (which has been estimated to be about $100,000,000) and the disease enhancing effects of poor management.

Diagnosis

Diagnosis of mycoplasmal pneumonia is best achieved by a combination of procedures including clinical observation, postmortem and histological evaluations, and fluorescent antibody examination. Isolation of *M. hyopneumoniae* is occasionally used but is not routinely available. Serological tests such as the complement fixation (CF) or the Enzyme Linked Immuno-Sorbent Assay (ELISA) may be used on a herd basis to support a diagnosis or to screen groups of animals in special situations. Use of the CF test and ELISA is somewhat limited because each test yields some low level cross reactions with other mycoplasmas. These deficiencies are likely to be corrected with the development of species specific cell membrane antigens.

Control Measures

Antibiotics. Antibiotics have been used since their discovery in efforts to treat, control, and prevent pneumonia in pigs. Many antibiotics have been shown to be effective against *M. hyopneumoniae* grown in the laboratory. However the effect of antibiotics on enzootic pneumonia in pigs remains questionable. In one study researchers examined the effect of tiamulin, lincomycin, and a combination of chlortetracycline and tiamulin on the development of pneumonia and growth performance in naturally exposed pigs and the results indicate that the antibiotics used had little influence on the development of lesions of enzootic pneumonia. Although these antibodies enhanced growth performance, their use was not cost effective. In other studies, kitasomycin, tiamulin, and lincomycin, used either before or after *M. hyopneumoniae* challenge, did not reduce the clinical signs or lesions of mycoplasmal pneumonia. The newer quinalone antibiotics appear to be effective against mycoplasmal pneumonia, but none of these antibiotics are commercially available in the United States.

Vaccines. The fact that pigs that recovered from mycoplasmal pneumonia were refractory to subsequent challenge led researchers to investigate the possibilities of preparing an immunizing agent. Commercial vaccines are available for the prevention of mycoplasmal pneumonia in pigs. In two field studies using these vaccines, vaccinated pigs had a 77% to 92% reduction in lung lesions and were 5.5 lb to 11.5 lb heavier at market than unvaccinated controls. Other studies confirmed the reduction in lung lesions, but have not always demonstrated an advantage in growth rate.

The value of vaccination in relation to the cost of the procedure should be examined in each herd before initiating an immunization program.

Management. Whenever possible, the farm manager should attempt to incorporate sound management procedures into the production system. Special attention should be given to the factors listed in Table 1 especially the major influences designated with 3 pluses.

Elimination of Disease

Primary Specific Pathogen Free (SPF), Medicated Early Weaning (MEW), Modified Medicated Early Weaning (MMEW), Secondary SPF, MMEW plus 2- and 3-Site Multiplication (Isowean), and All-In, All-Out (AIAO) programs were developed to prevent the transmission of diseases from the sow to her pigs and from older pigs to younger pigs. These programs used alone or in combination have been shown to allow pigs to attain a growth rate near their genetic potential if all other inputs are correctly managed. These programs either prevent or control enzootic pneumonia, in addition to most other diseases in pigs.

Seed stock suppliers heavily utilize these disease control programs, however, because reinfection of herds free of enzootic pneumonia has been common, these programs (except AIAO) are less frequently implemented in commercial herds.

Table 1. Herd factors that exacerbate effects of respiratory disease.*

	Degree of effect
Production system:	
Large herd size	+++
High stocking density	+++
Conventional health system (not SPF, MEW, AIAO, etc.)	+++
Introduction of animals of unknown or low health status	+++
Continuous flow rather than batch movement of pigs	+++
Low average age of the sows	+++
Average age at weaning very low (less than 21 days)	++
medium (21 to 28 days)	+
high (greater than 28 days)	++
use of more susceptible breeds	+
Use of purebreds instead of crossbreds	+
Housing:	
Inadequately insulated & ventilated facilities (improper regulation of temperature and air exchange, and drafts)	+++
Housing of different aged pigs in same air space	+++
Open spaces in pen dividers	+++
Large growing-finishing rooms (more than 200/300 pigs)	++
Nutrition:	
Caloric intake insufficient	+
Improper content of macro/micro nutrients in feed	+
Feed without added fat (dust from feed)	+
Presence of non-respiratory diseases:	
Colibacillosis and dysentery	++
Mange and roundworms	+
Management Deficiencies:	
Insufficient control of environment	+++
Poor monitoring of signs of disease	++
Failure to treat or incorrect treatment of sick pigs	++
Absence of or incorrect preventive measures (vaccinations, strategic medications, etc.)	++
Insufficient care of sick animals (isolation, handling)	+
Poor hygiene	++

*Adapted from Christensen and Mousing, Diseases of Swine, 7th ed, 1992. * +++ = great, ++ = moderate, + = small