Lameness / mycoplasma
Technical Paper

Cambridge Technologies

Key Points:

1. *Mycoplasma* related lameness in pigs contributes to economic loss and decreased animal welfare.
2. Lameness caused by *M hyosynoviae* and *M hyorhinis* is widespread in the swine population.
3. Mycoplasma can be quickly identified from clinical specimens using real time PCR.
4. Currently only autogenous vaccines are available for protection against *M hyosynoviae* and *M hyorhinis*.

Introduction

Arthritis caused by *Mycoplasma hyorhinis* and *Mycoplasma hyosynoviae* continues to be an ongoing issue for pork producers and veterinarians. In addition to the economic loss (up to $23 per pig)[8], there is the issue of decreased animal welfare due to reduced locomotion, pain, and general discomfort and sickness[6].

Studies have indicated the within-herd prevalence of sow lameness to range between 8.8% and 16.9%[6]. When considering all cases of lameness in swine, it is estimated that approximately 26% are a result of *Mycoplasma* infection[2].

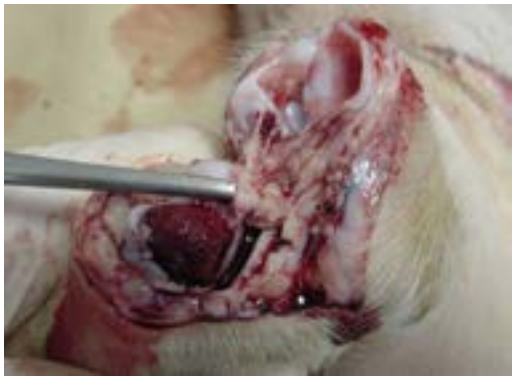
Mycoplasma can affect pigs of all ages. Sows are presumed to be the primary carriers, with piglets being affected prior to weaning or via horizontal transmission post-weaning. There are numerous factors affecting whether or not a pig infected with *Mycoplasma* develops lameness, including age, immunity, virulence factors and/or infection pressure, and, in some herds, stress and low general resistance[5].

A small, fragile, bacteria-like organism, *Mycoplasma hyosynoviae* is easily spread in the air and feces. It has been suggested that it can spread in the wind between farms. *Mycoplasma hyorhinis*, can cause respiratory disease and, occasionally, lameness[7]. In evaluating 431 cases of lameness seen at the Iowa State University Veterinary Diagnostic Laboratory between 2003 and 2010, *M. hyorhinis* was diagnosed more frequently in animals 10 weeks of age or younger, while *M. hyosynoviae* was more common in animals older than 10 weeks[3].

DISEASE

Mycoplasma spp.-associated arthritis is more commonly seen in gilts than in boars, particularly in older animals[7].

Pigs infected with *M. hyorhinis* will generally begin to show clinical signs of polyserositis and polyarthritis 3 to 10 days after exposure. The pathogen tends to primarily affect 3- to 10-week-old pigs, although occasionally older animals may be affected. Infected pigs may appear lethargic and unthrifty, have swollen joints and be unwilling to move[3]. The pathogen colonizes the upper respiratory tract of pigs. Acute inflammation of the serosa of body cavities and synovium may occur, and if not stopped can become chronic[1].



M. hyosynoviae tends to affect older animals, generally between the ages of 3 to 5 months. Infected pigs may appear to be uncomfortable, with swollen joints and stiff movement. Many animals will recover without treatment, although clinical signs may persist especially if there is co-infection or joint lesions present[3]. Arthritis tends to show up 2 to 3 weeks following initial exposure, and the infection is often located in the tonsils. An acute infection will last approximately 2 weeks, during which time the pathogen may spread to the joints and various tissues. In some cases, infection will persist to adult age and become systemic[4].

DIAGNOSIS

Diagnosing *Mycoplasma spp.* is best done via real-time PCR, which can be conducted directly on clinical specimens, joint or nasal swabs, or tonsil scrapings. Danielle McKeown, Diagnostics Manager at Cambridge Technologies explains their approach: "We offer a Mycoplasma Multiplex qPCR that identifies and quantifies the amount of Mycoplasma hyopneumoniae, hyorhinis, and/or hyosynoviae present in a given sample. We are able to conduct this test in a matter of hours. If the sample is negative for these three Mycoplasmas, we also offer a Mycoplasma species PCR that detects any Mycoplasma spp. that may be present in the sample. We can then conduct 16s sequencing to help us identify the specific species of Mycoplasma."

VACCINATION AND TREATMENT ISSUES

There is no known cross-immunity between *M. hyosynoviae* and *M. hyorhinis,* and no commercial vaccine available for either pathogen[7]. This leaves producers and veterinarians faced with either antibiotic therapy or vaccination with an autogenous bacterin.

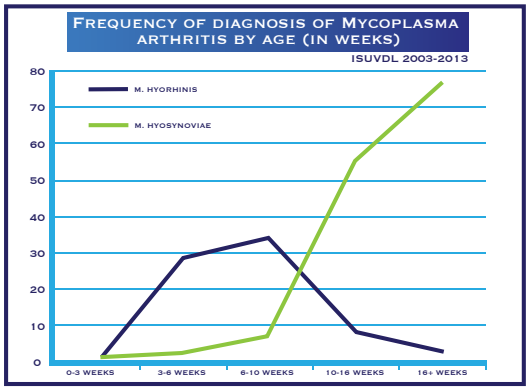
There are a number of antibiotic therapies available, with acute cases requiring 3-5 days of treatment[7]. However, the recent implementation of FDA guidance 209 and 213 along with the expansion of the Veterinary Feed Directive has created

a need for an alternative. Autogenous vaccines offer veterinarians and their clients a flexible management tool.

THE CAMBRIDGE ADVANTAGE

Using industry-leading diagnostic technology and innovative autogenous vaccine formulation, Cambridge Technologies is able to arm veterinarians and producers with customized tools and protocols for a targeted, flexible approach to *Mycoplasma*-associated lameness.

Molecular diagnostic tools allow for identification of the precise strain(s) of *M. hyosynoviae* and *M. hyorhinis* posing a threat to the animals. Armed with that information, the Production team can then build a vaccine customized to the needs of each specific farm, including antigen concentration, multiple adjuvant choices, and dose sizes. "At Cambridge Technologies we utilize custom media formulations and fermentation techniques that have been optimized for Mycoplasma hyosynoviae and mycoplasma hyorhinis production. Combining that with our proprietary antigen formulation criteria we are able to provide a consistent and safe solution for this persistent disease" explains VP of Manufacturing Operations, Jon Mahlberg. Should a new strain or agent emerge in the future, upcoming manufacturing runs of the autogenous product can be adjusted to include the new threat.



CONCLUSION

A quarter of all lameness in swine is caused by infection with *Mycoplasma hyorhinis* and/or *Mycoplasma hyosynoviae*[2]. The condition not only brings animal welfare issues, but also causes pork producers to suffer economic loss. *Mycoplasma* can affect pigs of all ages. In addition to lameness, swine infected with *M. hyorhinis* can also develop respiratory issues[7].

With no known cross-immunity between *M. hyosynoviae* and *M. hyorhinis,* and no commercial vaccine available for either pathogen[7], veterinarians and producers often find themselves utilizing antibiotic therapy to treat. However, new FDA guidelines and the VFD are creating a need for an alternative.

Cambridge Technologies utilizes cutting-edge diagnostic technology to precisely identify the strains of Mycoplasma hyorhinis and/or Mycoplasma hyosynoviae contributing to an infection. Once the threats have been identified, a targeted, autogenous vaccine can be formulated. Ongoing diagnostic monitoring and the flexible nature of autogenous products enable veterinarians and producers to modify the product as needed should the disease threats change.

SOURCES

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