

## MYCOPLASMA ERADICATION

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*Mycoplasma hyopneumoniae* is one of the most insidious pathogens that affect the pig. *M. hyopneumoniae* is present in the vast majority of farms worldwide, causing respiratory distress resulting from pneumonia in growing pigs. *M. hyopneumoniae* also has a very important role as the initiator of serious secondary disease. Classically, *Pasteurella multocida* has been associated with this Mycoplasma, resulting in severe pneumonias (1).

More recently, *M. hyopneumoniae* has been shown to play an important role in aggravating PRRS virus infections. Although the direct costs associated to Mycoplasma infection have been difficult to document, there is little doubt that farms free of Mycoplasma show a dramatic increase in performance, especially associated with growth rates and feed efficiency.

Elimination of *Mycoplasma hyopneumoniae* from herds has been attempted for many years, with mixed results. Some of the first attempts tried to establish Mycoplasma-free herds by offsite rearing of litters from older parity sows (2). These was based on the belief that sows of older parities (3 and above) had cleared the infection and their litters were therefore free of the microorganism. Although many of these newly established herds seemed to be free of Mycoplasma (as assayed by lesions and cultures) a large proportion of them eventually were reinfected (3). At this point it is not clear if these early successes were due to using litters from older females or were the result of the offsite rearing of these litters. Recent work in our group using PCR from nasal swabs (4,5) has found a high prevalence of Mycoplasma-positive females of older parities in conventional herds, which suggests that the original hypothesis that these were Mycoplasma-free animals may have been flawed.

Today, efforts at eliminating *Mycoplasma hyopneumoniae* from herds use one of two techniques:

- **Early, segregated weaning:** A number of workers have shown that early-weaned pigs (5 days of age) are not yet infected from their dam and can be reared in isolation as Mycoplasma-free pigs (6). Obviously, this technique is only useful in the establishment of new herds and it cannot be used in clearing existing herds from the organism.
- **Depopulation of younger animals:** Recently, European workers have shown that it is possible to eliminate *M. hyopneumoniae* from existing herds by using a protocol that consists of eliminating all pigs less than 10 months of age from the herd. This is followed by a 2-week hiatus on farrowing and by the treatment of the remaining sows with an anti-Mycoplasma antibiotic (7). The schedule has apparently proven successful in many herds, although the majority of these are relatively small herds using one site production.

These techniques, although encouraging, do have some drawbacks:

- They cannot be used to clear Mycoplasma from existing herds, or

they can do so only in relatively small herds (there are exceptions to this, see reference 8).

- They have not determined if the organism has truly been eliminated, or if the animals are negative only to the lesions and seroconversion.

There remain some very relevant and valid questions that can be asked of the existing eradication protocols:

- Are the animals truly free of the microorganism? Some of our recent research has shown that animals can be colonized by *M. hyopneumoniae* and not develop lesions or seroconvert. There is the question of course, if this happens to a whole (large) population of animals, or if this symbiotic state cannot be maintained in such large populations. The frequent reinfections seen in these cleaned herds suggests that either Mycoplasma is very efficient (more than most bacteria) at establishing area spread, or it was inside the population all along and was not expressed until a level of stress or microbism was reached that resulted in overt disease.
- Is there really an age cutoff that eliminates transmission of the organism? Both of the above-mentioned techniques use an age limitation concept. In the early wean program, the hypothesis is that pigs get infected from their dams at different times of lactation, so that if an early enough time is chosen, transmission does not occur. The second program implicitly assumes that pigs older than 10 months are either free of the Mycoplasma or unable to transmit it to naïve recipients. There is some contradiction between these two theories.

Both of these assumptions have not been scientifically documented, mainly due to a lack of available techniques. However, with the establishment of very sensitive molecular diagnostic methods, these questions should now be explored and answered if we are going to be able to have a universal technique for cleaning herds of this important pathogen.

### **Be Aware:**

- Immunity: Following an outbreak, immunity seems to stimulate life long protection. However, recovery from infection does not imply elimination of the microorganism. Vaccination does not prevent colonization, although it is not known whether the amount of bacteria shed is decreased. Vaccination also does not prevent infection, only a decrease of clinical signs and pneumonic lesions.
- Mycoplasma is a mucosal colonizer that attaches to the tip of the vili and that does not penetrate the bronchial tissue. Therefore, it is difficult for antibiotics to reach effective concentrations where the Mycoplasma is found
- Presence of carrier animals without clinical signs has been described in farms considered as Mycoplasma negative.
- Serological response under field conditions is delayed (related to infec-

tious dose?). It is unclear whether *Mycoplasma* as colonizer (without clinical signs) can elicit a serological response or if such response will result only from infection and presence of clinical signs.

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