

Mycoplasma Bovis

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The cause of mycoplasma mastitis

There are a number of species of the mycoplasma genus that cause mastitis and other cattle diseases. Yet the large majority, perhaps as many as 85%-90%, of mycoplasma mastitis cases are due to *Mycoplasma bovis*. What makes this group of pathogens so difficult to deal with is that they are amongst the smallest bacteria, slow growing, and they do not have a cell wall. Thus, detection of *Mycoplasma sp.* is difficult, and these bacterial pathogens are very difficult to eliminate in the infected host by standard antibiotic therapy.

Prevalence of mycoplasma mastitis

It appears that the first defined case of mycoplasma mastitis occurred in 1961 in a herd in the USA.

- In this herd of 95 cows, 25 presented with mild or subclinical mastitis.
- These cows were treated with an intramammary suspension of procaine penicillin G.
- Within a day all treated mammary quarters were clinical, hard and swollen with little secretion.
- Moreover, new mammary quarters of the same gland presented as clinical during the next 7-10 days.
- Within 3 weeks, 5 additional cows, cases, were noted and more than half the affected cows were sent to slaughter.

The agent was eventually described as *M. bovis*. Shortly after this reported outbreak of mycoplasma mastitis there were several reports in the global veterinary literature describing similar cases. One should not think that this agent became widespread around the world. Rather, it appears that this first defined case in the USA was able to identify the agent of a rather “mysterious” outbreak of mastitis; that description allowed other investigators to identify *Mycoplasma sp.* and report their findings. Thus, it appears *Mycoplasma sp.* in general, and *M. bovis* in particular, are highly contagious mastitis pathogens that can cause rapid outbreaks of disease.

Over the years there have been numerous reports of mycoplasma mastitis and the prevalence varies both between countries and within regions within a country.

- In Europe, herd prevalence appears to be less than 5%, meaning that approximately 1%-5% of herds have at least one cow infected at any time.
- In the USA prevalence is greatest in the western states with approximately 10% herd prevalence. But prevalence increases with increasing herd size and herds with more than 500 cows have reported prevalence of 20%.
- Australia has endemic problem with the disease and New Zealand suffered its first outbreak of mycoplasma mastitis 2 years ago and is currently trying to eradicate *M. bovis* from the dairy population.
- In Canada, a Prince Edward Island survey suggested approximately a 2% prevalence and other provinces may have similar findings.

Mycoplasma mastitis is receiving more global attention. This is likely a function of our increasing ability to detect the pathogens involved. Also, the increased prevalence appears to be due to increased opportunities for transmission from the cattle trade: there are more cattle moving between herds and between regions.

Identification and control of mycoplasma mastitis

Traditionally mycoplasma mastitis was diagnosed via examination for the infectious agent by standard culture techniques.

- The advantage of culture is that it is inexpensive, tried and true and can detect most species of *Mycoplasma*. But culture takes 3 to 10 days to observe a result. Also, culture techniques are not standard nor available in all labs.

We now have commercial kits that can identify the DNA of *Mycoplasma species* by polymerase chain reaction (PCR).

- An advantage of PCR is that it can provide a rapid response. Yet disadvantages are that PCR can be much costlier, it does not necessarily detect live organisms, and it may miss some or many *Mycoplasma sp*

There are also kits that can detect antibodies in milk and blood that an animal produces in response to an infection.

- Antibody detection via ELISA can give a rapid response but antibody detection is a measure of the immune response to an infection, not the infection itself.

Some *Mycoplasma sp.* are highly contagious and will infect organs other than the mammary gland; especially *M. bovis*.

- Cattle may carry *Mycoplasma sp.* in their nostrils and not show any symptoms. Some outbreaks of mycoplasma mastitis are believed to have begun via nose/nose contact or through aerosol droplets. Thus, the prime risk factor for mycoplasma mastitis may be importing new cattle into a herd. This emphasizes the need for dairy biosecurity.
- As a contagious mastitis pathogen, *M. bovis* is believed to be spread at milking time. Thus, the milking time hygiene techniques of pre-dip, single service towels to clean and dry udders, use of rubber like gloves by milkers, backflush and post-dip, should be practiced as control elements.

It should be noted that *Mycoplasma sp.* were the most sensitive to disinfectants of all the mastitis pathogens we tested.

- Mastitis control starts with biosecurity: make sure that animals that enter the herd are healthy.
- Since imported animals may carry the disease into a herd asymptotically it is important to keep these animals isolated at the time of entry, introduce them into the herd slowly to reduce stress.

Parturition is stressful and thus dairy managers should be on the look-out for clinical cases of mastitis shortly after calving.

Bulk tank samples are taken routinely for culture for mycoplasma, advisably weekly.

- Use these samples to monitor the management changes and assist in the identification of infected cows.
- If the bulk tank is positive for *Mycoplasma sp.* there is usually at least one milking cow that is infected.
- There is a need to identify that cow; sample those cows with recent cases of mastitis or very high SCC.
- Samples can be cultured or perhaps subjected to PCR. If the infected cow can not be identified with these criteria, then a sampling strategy should be established with the herd's veterinarian to find the infected cow(s).

Cows that are found to be infected should be segregated and culled as soon as possible. Keys to mycoplasma mastitis control are biosecurity, minimizing stress in susceptible animals, identification, and isolation/removal of infected animals

Summary Points

1. Mycoplasma mastitis is most often caused by infections with *M. bovis*.
2. Not all mycoplasma mastitis originates from cows with udder infections. The agent may be carried asymptotically and transmitted from cow to cow via aerosols.
3. Importation of cattle is a major risk factor for outbreaks.
4. As a contagious pathogen, strict milking time hygiene strategies must be in place to control the disease.
5. Additional efforts to control the disease include reducing stress amongst cattle, removing the reservoir of infection by segregation and culling of infected cattle.