



Mycoplasma bovis

Note M bovis in this article refers to Mycoplasma bovis not Mycobacterium bovis, both are serious diseases of cattle.

Background information for veterinarians

Mycoplasma are a subset of bacteria, notable for their absence of a cell wall, less than a micron in diameter and are therefore difficult to see even with a conventional microscope. The lack of a solid cell wall gives them the ability to change shape, and to change their outer membrane rapidly (q9h). They are neither rods nor cocci. Their DNA length is amongst the smallest of self replicating organisms and they have an unusually low guanidine-cytosine ratio of their nucleotides.

Mycoplasmas are obligate parasites, the majority depend on an external source of cholesterol to synthesise their plasma membrane and as such are highly adapted to colonise mammals, and other animals and plants. Mycoplasmas depend on the host cells to do most things for them. They are therefore difficult to culture and require specialist media for growth. Many bacteria with a more utilitarian genome will outcompete them, so care in sample collection is needed.

Mycoplasma bovis is the most common mycoplasma of cattle, and the most important of its family. The closest relative to M bovis is M agalactiae found in sheep. This is the first report of Mycoplasma bovis in New Zealand. The absence of this organism in New Zealand has been noted in the past and serious attempts to find it via surveillance have been used. A 2009 survey of bulk milk (vat) samples randomly selected from New Zealand dairy farms found no evidence of infection using polymerase chain reaction (PCR) and bacterial culture techniques.

Mycoplasma bovis is listed as an Unwanted Organism under the Biosecurity Act 1993, and is therefore thought to be capable of causing unwanted harm to natural and physical resources. As a highly host adapted parasite Mycoplasma bovis does not colonise healthy humans and is only very occasionally seen in other ruminants like sheep and goats.

Diseases of cattle caused by Mycoplasma bovis

Mycoplasma bovis (M. bovis), first isolated in 1961 from a severe case of mastitis in cattle in the United States, can cause pneumonia, otitis media in young calves and mastitis and arthritis in older animals. M. bovis has spread widely to all parts of the world via animal movement. In recent years, M. bovis has become an important pathogen in young calves in Europe and North America, and its infection results in calf mortality, weight loss in surviving calves and a drop in milk production. Clinical diseases caused by M. bovis tend to be chronic, debilitating and unresponsive to antimicrobial therapy.

The clinical symptoms of affected cattle in New Zealand so far includes: mastitis in dry and milking cows, arthritis in cows, late-term abortions and the birth of premature calves. It is expected that calves on affected farms will have an increased incidence of pneumonia and otitis media. This will increase the morbidity and mortality on affected farms and if this disease establishes, an increased replacement rate for cattle will be required.

Treatment and Control

For animal welfare, the veterinarian can provide only limited relief for affected cattle. There are no effective vaccines. Palliative care of cattle involves the use of NSAIDs. Current methods of control are based upon prevention of exposure of calves to *Mycoplasma bovis* from adult cattle. This involves biosecurity, removal of calves at birth, feeding of powdered milk and fixed cohort rearing systems (all in, all out) for the first two years of life.

In herds with *M bovis* infection cows with mastitis must be milked separately from all other cows and milked last. Milk from mastitis cows must be discarded and definitely not fed to calves or other ruminants, unless it can be pasteurised first. Milk from affected herds can be collected for pasteurisation and processing by dairy processors, this organism is not a public health threat.

Movement control of animals, certain animal products, and equipment used for handling milk or semen is needed to reduce the risk of spread. Best practice hygiene of veterinary vehicles, clothing and equipment is recommended when going on and off farm.

Diagnosis and Surveillance

Molecular techniques such as real time polymerase chain reaction testing of milk samples or joint aspirates are the best tests currently available in New Zealand. They are not yet available at the regional laboratories, but any persons that suspect that they have a case should call the MPI free phone number 0800 80 99 66. A case definition, to assist the recognition of the disease, for veterinarians will be made available by MPI shortly.

Serology can be used to detect disease in a herd and can provide evidence of active infection at the herd level but lack sufficient sensitivity to decide individual animal status. The diagnostic protocol for veterinarians that wish to test a client's herd will be provided by MPI shortly.

Surveillance can be enhanced by veterinarians looking for herds that have an increased incidence especially two or more concurrent cases of cows with one or more of the following symptoms : cows with arthritis, abortion, birth of premature calves and mastitis, calves with pneumonia and otitis media.