

***Mycoplasma bovis* in Cattle**

Frequently Asked Questions

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A. The bacterium and how it spreads

What causes *Mycoplasma bovis*?

Mycoplasma bovis is caused by very small bacteria that does not have a cell wall. *Mycoplasma bovis* only infects cattle, although other *mycoplasmas* can affect different species. It can evade the animal's immune system so that some infected cattle may not be able to fully control or eliminate infection, leading to a carrier state. The organism's structure means that some commonly used antibiotics that act against bacterial cell walls are not effective against it and so treatment can be challenging with only a limited range of antibiotics suitable for use against it.

How does *Mycoplasma bovis* spread?

Mycoplasma bovis can spread directly or indirectly.

Directly, *Mycoplasma bovis* may be spread by contact as the bacterium is shed via all secretions from an infected animal, therefore spread can occur by:

- Close contact with an infected animal, including asymptomatic carriers (an apparently healthy animal could be a carrier)
- Semen from an infected bull.

Indirectly, *Mycoplasma bovis* may be spread by:

- Aerosol transmission (leading to nasal exposure and infection of the upper respiratory tract)
- Ingestion by calves of untreated colostrum or milk that is infected
- Use of shared equipment eg at milking, leading to infection via the teat canal
- Contaminated material eg on hands, in feed or water.

How common is *Mycoplasma bovis* in NI's beef and dairy herds?

The first confirmation of *Mycoplasma bovis* on the island of Ireland was in 1994 and since then it has gradually spread to become endemic in the cattle population.

- In 2017, 90 cases, representing 23.2% of diagnoses in bovine respiratory disease, were recorded by AFBINI.
- A study¹ to estimate herd level prevalence in the ROI using bulk tank samples from 2018 showed that 45% of the dairy herds tested had evidence of past exposure to *Mycoplasma bovis*.
- From the All-island Animal Disease Surveillance report 2022, 57 cases of *Mycoplasma bovis* were identified at post-mortem in the ROI in bovine respiratory disease cases (10.5%); 122 cases of *Mycoplasma bovis* were identified at post-mortem in NI in pneumonia cases (37.4%).
- *Mycoplasma bovis* is estimated to account for approximately 1% of the diagnosed causes of mastitis.

B. Clinical signs

How does *Mycoplasma bovis* affect an individual animal?

Mycoplasma bovis can cause respiratory disease in calves, arthritis and mastitis, either as a sole cause or in association with other organisms. Animals of any age can be affected.

Clinical signs in calves:

- Dullness
- Decreased appetite
- High temperature
- Respiratory signs
- Ear infections resulting in an ear droop or head tilt, head shaking and occasional discharge from the ear canal
- Severe lameness, which may be seen in several swollen lower limb joints (ie non foot lameness), that can become permanently damaged.

Clinical signs in older animals:

- Arthritis and severe lameness
- Mastitis (udder swelling and abnormal milk), lactating or dry² cows; increased SCC
- Eye infections
- Pneumonia (rarely).

Mycoplasma bovis infected animals may only show a couple of signs. Infection is likely to result in reduced growth rate and increased mortality. For those animals that have pneumonia, resulting lung damage may be linked to poorer carcase quality.

The infection may be a highly contagious cause of sub-clinical mastitis. Multiple quarters may be infected. Mastitis due to *Mycoplasma bovis* has a poor prognosis, and veterinary advice is often to cull affected cows to prevent the spread of infection.

If breeding bulls are infected, semen quality may be affected, and fertility problems could result in the herd, although the extent of this issue is not known in NI.

Various stressors may cause carriers to start shedding infection, including other diseases (such as viral infections), fluctuating temperatures, heat or cold stress, over-crowding, transport, poor air quality or poor nutrition.

What are the likely consequences of having *Mycoplasma bovis* infected animals in a herd? Disease may not appear for several weeks or months after a carrier is introduced into the herd, however *Mycoplasma bovis* can result in severe outbreaks of pneumonia that do not respond to treatment. Mastitis due to *Mycoplasma bovis* is contagious (it can be transmitted from infected cows to healthy cows at milking time) and can occur in single cases or as outbreaks.

If a naïve animal is brought into a herd with active *Mycoplasma bovis* infection it will be at a significant risk of infection.

C. Diagnosis

What tests are available to investigate *Mycoplasma bovis*?

Suspicion of the presence of *Mycoplasma bovis* in a herd due to clinical signs should be followed up with diagnostic tests. Rapid diagnosis is very important.

Culture

The organism may be cultured (grown) in a laboratory from a nasopharyngeal swab, lung washes, milk sample (individual, composite or bulk tank), fluid samples from joints or semen. (An accurate bulk tank culture and PCR test result depends on a clean sample without contamination from the environment.) Culture can take up to 21 days. Once detected, the organism needs further testing (such as by PCR or DNA sequencing), to identify which particular species is present. *Mycoplasma bovis* can be present, for example, in samples from the nose without causing disease.

It can be difficult to diagnose mastitis. Sometimes milk sampling needs to be carried out several times to try to detect the organism at a time when it is being shed by the animal.

PCR testing

PCR testing is a faster method of testing than using culture methods. A positive *Mycoplasma* PCR result should always be interpreted in the context of the clinical situation on the farm and the results of other diagnostic tests.

Testing of blood samples

Antibody levels in blood samples can persist for several years after infection. Antibodies can also be passed from a dam to a developing fetus, so it is useful, where surveillance is being carried out, for youngstock screens to be carried from around 6 months of age.

Detection of the presence of *Mycoplasma bovis* is always significant from a herd perspective.

D. Treatment and control

How should I manage an animal with *Mycoplasma bovis*?

Mycoplasmas can be difficult to treat and treatment needs to start early to have a chance to be successful³. It is important to decide on an appropriate choice of antibiotic, in line with veterinary advice, to target treatment to the necessary animals at the right stage, and to monitor them. However there are growing levels of antimicrobial resistance to *Mycoplasma bovis*.

If the positive animal is lactating, their milk should not be fed to calves. Pasteurisation of whole milk, where it is being fed, is essential. Carrier cows should be segregated and culled, to reduce the likelihood of further cases occurring.

As a general principle to improve calf health, it is important to keep calf group size small with a narrow age range, to have an all-in all-out system where possible and to keep calf accommodation as hygienic as possible.

How do I stop *Mycoplasma bovis* from coming into my herd?

The most common source of infection is from the purchase of infected cows or heifers, so if purchasing, knowing the status of the herd from which the cattle are being purchased can provide reassurance.

Key biosecurity principles:

- Keep a closed herd.
- Use risk-based trading principles when purchasing
 - Establish the herd health history
 - Buy from low SCC herds
 - Screen the herd or screen purchased animals and quarantine them on arrival
Buy as few cows from as few herds as possible.
- Don't feed waste milk to calves.

What different options are available to control *Mycoplasma bovis* in a herd?

The control of *Mycoplasma bovis* in a herd is challenging, however some steps can be taken to reduce the risk of spread. Importantly *Mycoplasma* infection outbreaks are often part of a multifactorial infection picture. Identifying and addressing other factors or infections that may be present (e.g. poor colostrum transfer of immunity or other respiratory infections) is important and will improve the likelihood of a more rapid and successful outcome.

When *Mycoplasma bovis* is present in a herd, it is important to apply general disease control principles and to have a health plan pre-housing.

Management measures

Work closely with your vet – managing a *Mycoplasma* outbreak can be a stressful time.

Calf care

- Maximise immunity: ensure colostrum quality, feed correct quantities at the right time
- Feed youngest calves first
- Feed pasteurised milk
- Avoid over-crowding, maintain excellent hygiene of calf pens and feeding equipment
- Reduce immunosuppression (BVD, salmonella, parasites)
- Reduce stressors (transport, feed and air quality)
- Avoid temperature fluctuation

Positive cases

- Isolate cases – separate airspace, separate drainage, milk last

Milking herd measures

- Reduce the risk of spread at milking by having excellent hygiene;
- Check cows carefully for evidence of mastitis and/or high somatic cell counts. Make sure that milk samples are taken aseptically and change gloves between cows Submit bulk tank
- samples regularly for PCR testing, even after obvious cases are culled Leave infected cows to
- the end of milking
- Carry out post-milking teat disinfection, using the proper technique.

What types of vaccines are available against *Mycoplasma bovis*?

Autogenous vaccines have been available (that are manufactured under licence for a specific farm), however they can be expensive to produce.

A vaccine is available that can currently be imported from the USA for herds where *Mycoplasma* has been diagnosed. It can be used in young calves and has been shown to reduce post-weaning mortality and antibiotic use in affected herds. Where vaccination is used it should form part of a wider strategy for infection control. Relying solely on vaccination in the absence of other measures will reduce the likelihood of timely infection control.

Can humans be affected by *Mycoplasma bovis*?

No, it does not cause disease in people and is not a food safety issue.

Is there a national programme for *Mycoplasma bovis* control in NI?

There is not an official control programme for *Mycoplasma* in NI. This bacterium is widespread so eradication is very challenging, particularly as it is often present in herds with no clinical signs and where it cannot be detected.

E. References

1 Seroprevalence of *Mycoplasma bovis* in bulk milk samples in Irish dairy herds and risk factors associated with herd seropositive status

C. I. McAloon 2022 J. Dairy Sci. 105:5410–5419

2 *Mycoplasma bovis* mastitis in dry dairy cows

Otter 2015 Vet Record <https://doi.org/10.1136/vr.h6663>

3 *Mycoplasma bovis* Infections—Occurrence, Diagnosis and Control. K

Dudek et al. 2020 Pathogens 9, 640. doi:10.3390/pathogens9080640