

First Country to Attempt Eradication of Cattle Disease *Mycoplasma bovis*

Mycoplasma bovis was first confirmed as present within New Zealand in July 2017. Now it's the first country to ever attempt an eradication of the disease – a decision that will cost upwards of US\$598 million and will see around 152,000 cattle culled over a two-year period. Being a disease that's very difficult to detect, the eradication effort is predicted to take up to 10 years to complete. It's a bold move to prevent production losses and animal welfare issues.

The disease is endemic in the cattle population in most of the developed world, having been recognised as a significant problem in Australia since 2006. Although there is evidence that it has been successfully eradicated (Bicknell *et al.* 1983) from individual farms, it has never been successfully eradicated from a country once infection has been established.

In May 2018, the government and dairy and beef industries agreed to attempt to completely rid *Mycoplasma bovis* from New Zealand's dairy and beef herds. This means continuing to trace all potentially affected cattle, testing, and then culling those herds with infected animals in them. This will continue until regular surveillance and testing reveal no remaining sign of the disease.

Both the animal sector groups and government reached this decision after intense technical and operational analysis. They reasoned that if eradication wasn't attempted in the initial stages of the outbreak, then there would never be another chance to do it. The consequences of the disease would otherwise become a permanent condition for the country to manage.

The bacteria can cause a range of quite serious conditions in cattle that do not respond to treatment, including mastitis, pneumonia, arthritis and late-term abortions. Amongst other conditions, *Mycoplasma bovis* causes untreatable mastitis in dairy cows. It also causes severe pneumonia in up to 30 per cent of infected calves (starting as a hacking cough) as well as ear infections – the first sign typically being one droopy ear, progressing to ear discharges and, in some cases, a head tilt. It results in abortions, as well as swollen joints and lameness (severe arthritis/synovitis) in all ages of cattle.



Mycoplasma bovis is spread from animal to animal through close contact and bodily fluids, for example, mucus and milking equipment. Calves can be infected through drinking milk from infected cows. Farm equipment may play a role in spreading the disease, especially equipment coming into direct contact with infected animals such as AI instruments.

Mycoplasma bovis is not considered a disease of relevance to trade by the World Animal Health Organisation (OIE) and has no regulatory restrictions in New Zealand for meat and dairy products.

As it is very difficult to detect, seemingly healthy animals can carry and spread the disease. This is why the whole herd is culled if one animal is infected – as it is likely that others are too. The New Zealand government says that this is the best way to protect the national dairy and beef herds. Getting rid of the disease eliminates the ongoing impacts of production loss for farmers and animal welfare issues.

The Ministry for Primary Industries – New Zealand's biosecurity regulator – believes that the disease is limited to one network of farms that are connected by animal movements. It says that it is not widespread and there is just one strain of the disease out there.

The Ministry says it is taking a phased approach – this means that the culling will be done in cooperation with affected farmers to allow flexibility around the timing to offset production losses. For example, providing biosecurity controls are met, a farmer could milk out a season or a beef operation could finish the cattle before slaughter. The Ministry expects to complete this in two years, but says that it could take up to ten years to complete the testing and checks required to be sure the disease is gone.

Of more than 20,000 beef and dairy farms and lifestyle blocks, around 200 will need to be depopulated. Another 126,000 cattle are expected to need culling over and above the 26,000 already underway. To put it in perspective, 4.2 million cattle are slaughtered annually in New Zealand, so the figure may seem small in comparison, but can be distressing for affected farmers.

The full cost of eradication over 10 years is projected at US\$598 million. Of this, US\$11 million will be the loss of production borne by farmers. The cost of the response is US\$587 million (including compensation to farmers). The Government will meet 68 per cent of this cost and industry groups – DairyNZ and Beef+Lamb New Zealand – will pick up 32 per cent.

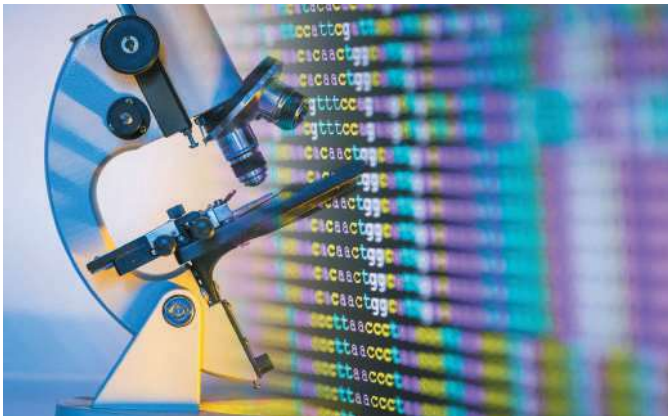
As part of the eradication effort, all infected properties and properties regarded as high-risk – e.g. those known to have received animals from infected farms – are under strict quarantine controls set out in Restricted Place Notices under the Biosecurity Act. These legal controls restrict the movement of stock and equipment on and off those farms to contain the disease and protect other farms.

These will be animals from known farms, those that are discovered, as well as highly suspect farms – those under Restricted Place Notices.

First Detection and Pathways

Mycoplasma bovis was first detected in New Zealand in July 2017 – when cattle in the Oamaru area of the South Island were diagnosed with the bacterial infection. Before then, the country was considered free from the disease.

Evidence indicates that the disease arrived in New Zealand in late 2015 to early 2016. This has been confirmed via gene sequencing the disease to identify its genetic fingerprint.



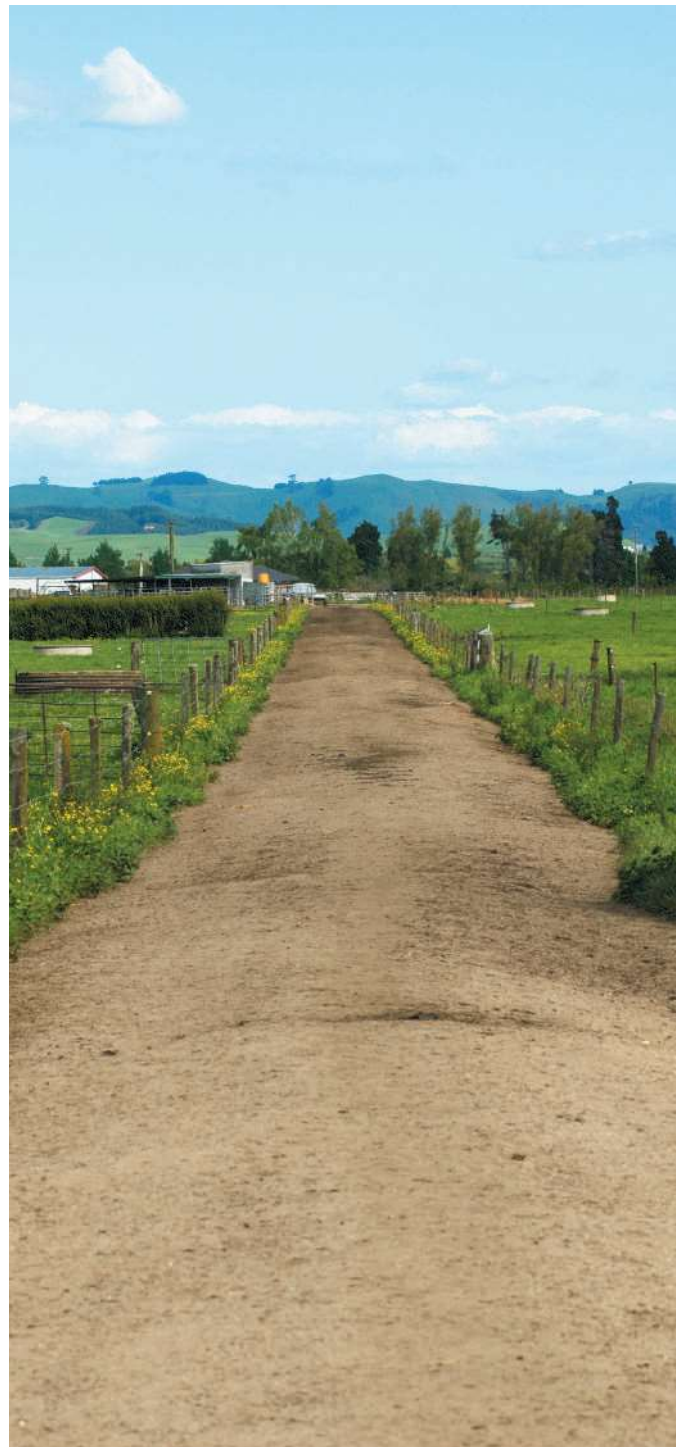
Gene sequencing

The discovery of an exotic disease on the first affected farm was very unexpected. It was the combination and severity of clinical signs initially seen that contributed to a timely diagnosis.



Since it was discovered, the disease has been primarily found in animals in the south of the South Island on farms connected through animal movements. At the time of writing, there were 178 infected properties – 141 in the South Island and 37 in the North Island. Another 239 properties were placed under the Restricted Place Notice. 105,889 animals have been culled.

Using available information and a combination of assessment methodologies, a technical working group identified seven potential introduction pathways of arrival for the disease i.e. imported live cattle, imported frozen semen, imported embryos, imported feed, imported used farm equipment, imported illegal animal medicines, and other imported live animals. The group expert assessment concluded that, while none of the potential pathways should



be excluded, some pathways were more likely to have caused the outbreak (i.e. imported frozen germplasm) than others (imported live cattle, imported used equipment).

The seemingly one-off nature of the outbreak might be explained by a failure of existing border measures to prevent entry, or entry through an unregulated/illegal pathway, the detail of which is currently unknown. An Australian infection source is believed to be unlikely. This is because there were no recent live cattle imports from Australia with the evidence provided by genomic analysis of the New Zealand *Mycoplasma bovis* strain.

Imported frozen semen was widely speculated as a presumed pathway. However, analysis by technical experts revealed considerable weaknesses in this theory. Hundreds of thousands of semen straws from endemic countries have entered New Zealand without any evidence of previous incursions. Alongside this, there is an absence of studies showing transmission of the disease via semen. Another factor is that there have been no significant changes in the risk management strategy for nearly three decades. Therefore, it is critical that alternative explanations continue to be explored.

As yet, no pathway of entry has been formally confirmed.

This analysis has highlighted the critical importance of baseline surveillance data to benchmark the presence or absence of pathogens in New Zealand and to support disease response activities such as this one.

The response has highlighted several shortcomings, including the well-documented failure of the National Animal Identification and Tracing (NAIT) scheme. NAIT is New Zealand's cattle and deer tracing system and compliance is required by law. Farmers are encouraged to keep their animal movement and NAIT records up to date. Accurate record-keeping is vital to track the spread of the disease and help control it. The scheme has since been reviewed, with new legislation in place to ensure greater farmer compliance in the future.

On a positive note, the *Mycoplasma bovis* response has increased awareness of the importance of good farm hygiene and vigilance regarding animal abnormalities and washing farm vehicles, for example. This will improve and tighten New Zealand's biosecurity systems for the future.

Supporting Affected Farmers

The disease can be devastating for affected farmers. In the majority of cases, they are left with a farm empty of animals and no long-term income. They are, however, offered a variety of support. All affected farmers receive their own case manager to work with them and receive help from the NZ Rural Support Trust – which refers farmers to experts and services, such as planning and management advice, health information, employment and financial assistance.

Farmers that are directed to have animals culled or their farm operations restricted under movement controls are eligible for compensation. The compensation claim process has been accelerated and the Ministry advises that a substantial part of a farmer's compensation claim for culled cows should now take 4–10 days, with payment of a fully verified claim taking 2–3 weeks.

To date US \$53 million has been paid out in compensation to farmers. *Mycoplasma bovis* entering

the country underscores the need for robust biosecurity systems. A key part of this is managing the risks that illegal animal medicines pose to New Zealand agriculture. Greater regulatory controls on online sales of unregistered products are needed to ensure that this potential pathway doesn't allow biosecurity threats to enter the country.

Illegal veterinary products can be found on sale on Trade Me, New Zealand's largest online auction site. Most recent examples include pet flea treatments, cattle drenches, products decanted into plastic containers without labels, and products not registered for animal use. Owners of companion animals (equines, cats and dogs) are the main target for these products.

The risks of buying illegal products are very high. They can cause health issues for animals and people, especially if food is treated with illegal veterinary medicines. They can also lead to less effective control of zoonotic infection, and risks of increasing antimicrobial and anti-parasitic resistance. As the Ministry has alluded, the unregulated/illegal pathway is one possible source of *Mycoplasma bovis* entry into New Zealand.

To avoid these repercussions and ensure effective treatment, animal owners are urged to purchase from reputable manufacturers and suppliers and choose only authentic veterinary medicines when buying online or via distributors. The government is encouraged to take action against illegal medicines. An industry-government task force could offer a solution to ensure that illegal products are identified and offenders are prosecuted, where known.

Latest Update

New Zealand's Prime Minister Jacinda Ardern and Biosecurity Minister Damien O'Connor announced recently that international experts were impressed by the *Mycoplasma bovis* eradication efforts to date, and were more confident the campaign was working. The Technical Advisory Group is more optimistic than it was six months ago having confirmed that evidence showed the response was dealing with a single and relatively recent incursion. However, other commentators highlight that the statement from the Prime Minister should be treated with cautious optimism as there is still a long way to go prior to confirming a successful eradication.

If successful, New Zealand will be the first country in the world to eradicate the disease from its shores.



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