

Johne's disease transmission

South East Local Land Services

March 2018

Important aspects for sheep and beef cattle producers in the South East

There was considerable angst around the middle of 2017 when changes to Johne's disease (JD) regulation in Australia came to light. Now that the excitement has died down, it is well worth reviewing the current state of JD knowledge so sheep and cattle producers know best how to control the disease on their farms, whether that means managing disease already present on the property or minimizing the risk of disease introduction.

JD is caused by infection with *Mycobacterium avium* subsp. *paratuberculosis* (Mptb), a species of bacteria that grows slowly in the gut wall of infected animals. Animals become infected by ingesting bacteria, though in addition the fetuses of clinically affected dams can become infected. Animals are more likely to be susceptible to infection when young, especially up to 12 months of age. Infection with bacteria causes the walls of the gut to become thickened, which interferes with the absorption of food. As a result, infected animals will progressively lose weight despite a good appetite. They may also have diarrhea and bottle jaw. As the thickening of the gut develops slowly over time, an infected animal is more likely to show clinical signs as an adult.

Infected animals with clinical signs shed larger numbers of bacteria in their faeces compared to infected animals without clinical signs, although animals without clinical signs will still shed significant numbers of bacteria. There is no treatment for infected animals. At any point in time in herds or flocks infected with Mptb, animals showing clinical signs of infection are the tip of the iceberg. Many more animals will be infected, shed bacteria, and have reduced production levels but will not show obvious clinical signs. As a result, the economic impact of Mptb on infected farms is often underestimated.

Mptb usually enters a herd or flock via the introduction of infected animals. However, Mptb can survive in the environment for extended periods of time and animals can also become infected by grazing contaminated paddocks. It survives much better in shady locations compared to sunny locations, and survival can be longer than a year in faeces in shaded locations. However, around 90% of the bacteria in the environment die in the first three months of spelling the paddock.

Water is good at moving bacteria around – bacteria can spread to neighbouring properties in run-off water and bacteria will survive longer in water compared to soil under the same environmental conditions.

In Australia, Mptb infection of cattle is most common in dairy herds and therefore in the states of Victoria and Tasmania. It is also common in the dairy sector of NSW, although there are no evidence-based estimates of the percentage of NSW dairy herds infected. Infection occurs rarely in beef herds, and is most commonly identified in beef herds having close contact with infected dairy herds. Because of the differences between beef and dairy

enterprises, dairy calves are more likely to be exposed to high doses of bacteria at a younger age compared to beef calves.

Not all animals exposed to Mptb will become infected. Further, not all infected animals will go on to shed Mptb. The consequence of exposure in an uninfected animal depends largely on four factors:

- the strain of the bacterium the animal is exposed to
- the dose, or the number of bacteria the animal is exposed to
- the age of the exposed animal
- individual animal factors (genetics and immunity)

These factors are reviewed in detail, along with their implications for disease control.

The strain of the bacterium

There are two strains of Mptb of significance to Australian sheep and cattle producers. The cattle strain of Mptb mainly affects cattle, goats, deer and camelids (i.e. alpacas and llamas), while the sheep strain mainly affects sheep and goats. Ovine Johne's disease (OJD) is almost always due to the sheep strain of Mptb, while Bovine Johne's Disease (BJD) is almost always due to the cattle strain of Mptb, however cross species transmission (sheep strain Mptb infection in cattle and vice versa) does happen, albeit very occasionally. The recent changes to BJD policy mean that the sheep and cattle Mptb strains are not considered as separate infectious agents and infection of cattle with either strain is classified as BJD.

The age of the exposed animal

Younger animals are more susceptible to Mptb infection compared to older animals. Further, animals exposed at a young age are more likely to develop clinical disease compared to animals exposed later in life. Finally, animals exposed at a young age are more likely to shed bacteria compared to animals exposed at an older age.

The dose of bacteria

Animals exposed to high doses of Mptb are more likely to shed bacteria compared to animals exposed to low doses of Mptb.

Individual animal factors

There is evidence that some animals are resistant to Mptb infection. These are the animals that you want to maintain in the herd or flock and use in future breeding programs. This area is the subject of ongoing research.

Taken together, these factors have one implication for infected properties – to reduce the burden of disease, reduce the number of bacteria to which young stock are exposed, particularly lambs and calves.

Similarly, to minimise the risk of introducing Mptb onto uninfected properties, ensure new stock have not been in contact with large numbers of the relevant strain of Mptb early in life and reduce the likelihood of young stock coming into contact with large numbers of the relevant strain of Mptb.

Recommendations for beef herds

By far the greatest risk to uninfected beef herds is infected dairy cattle shedding bacteria, or land contaminated by dairy cattle shedding bacteria. The first recommendation is to avoid the risks associated with dairy cattle. To keep your risk to the absolute minimum, don't buy dairy cattle. If you are going to purchase dairy calves, do not mix them with calves you plan to retain in your herd and move them off your property by 18 months of age. Do not run calves you plan to retain on land grazed by cattle from the dairy industry for at least twelve months after the dairy cattle have moved off that land – other classes of stock are at lower risk. If you are in the business of buying adult dairy cattle do not mix them with cattle under a year of age that you plan to retain or intend to sell as breeders.

Many producers agist their cattle down the coast when feed on the tablelands is in short supply. It is important to ask about the grazing history of the property. Avoid grazing cattle you plan to retain that are less than a year of age on agisted property that has been grazed by adult dairy cattle, particularly in the previous twelve months.

Sheep flocks infected with sheep strain Mptb present far less of a risk for JD transmission to beef herds than dairy cattle. However, to reduce the risk of beef cattle becoming infected with sheep strain Mptb on mixed enterprises ensure you're vaccinating your sheep with Gudair®, including any bought in sheep, to reduce the dose of Mptb to which both young sheep and young cattle are exposed.

It's important to know that vaccination will not eradicate the risk of shedding Mptb (see below). Do not co-graze sheep and cattle (i.e. do not graze cattle and sheep in the same paddock at the same time), but in particular older sheep and young replacement cattle.

Avoid grazing paddocks previously grazed by older sheep with young replacement cattle for the first three months after the older sheep have been moved off the paddock. If you find a ewe with signs consistent with OJD, cull that animal promptly and mark her lamb to ensure it is not retained as a replacement animal.

According to the current BJD policy, clinical JD in either sheep or cattle can impact the Johne's Beef Assurance (J-BAS) score of cattle from the same property (<https://www.animalhealthaustralia.com.au/jd-cattle-tools/>).

Recommendations for sheep producers

On infected properties, a Gudair® vaccination program dramatically reduces the burden of disease and mortalities. Current research has shown that on many infected properties low levels of infection will persist even with a long history of Gudair® vaccination and will increase once vaccination ceases, and therefore until further information about eradication is available ongoing vaccination is strongly encouraged. If any new sheep are acquired make sure they have been vaccinated with Gudair®, either as lambs if they are coming from high risk or infected properties, or when you bring them onto the property.

There is no benefit from Gudair® vaccination of lambs you will sell to slaughter. In addition to vaccination, the burden of disease can be reduced by culling any sheep suspected of being infected sooner rather than later and by identifying and culling lambs from any ewes suspected of being infected. Reduce infection rates in young stock by ensuring weaned lambs don't graze paddocks for at least three months after they have been grazed by older classes of sheep. Consider fencing off low areas or creeks where water may be contaminated.

On properties with no history of infection, only buy in sheep with a high level of assurance of having not come off of a property infected with OJD. Options include buying in sheep from an area previously classified as low prevalence and/or buying sheep from flocks in the SheepMAP.

Always ask for a Sheep Health Declaration when buying in sheep, which has a large section describing the JD risk of those sheep. Consider the risk that neighbours with sheep present to your property, in particular the potential for movement of water between properties, movement of sheep faeces (e.g. the potential for a summer storm to wash sheep faeces from a neighbour's sheep camp on the high side of the boundary fence), and straying stock.

Also, consider the location of your property in relation to the previous OJD prevalence areas (<https://www.dpi.nsw.gov.au/animals-and-livestock/sheep/health/other/ojd/about/historical/ojd-prevalence-areas-jan2011>). The majority of sheep properties within the South East Local Land Services region are in what were previously classified as medium and high prevalence areas. Depending on the risk neighbours present to your property and your level of risk tolerance, you may decide to vaccinate your sheep with Gudair® even if you do not suspect infection.

While regulation of JD has changed and now largely excludes the involvement of government, clinical cases of disease remain notifiable. If you suspect JD in your stock contact your local district veterinarian for further advice.

Finally, it is important to bear in mind that the characteristics of JD infection make it a challenging research subject – the information provided above is a brief synopsis of over 20 years of research and is based on what is currently known. Recommendations may change as further research findings become available.

More information

Kate Sawford DVM PhD MANZCVS (Epidemiology) DACVPM | District Veterinarian

Biosecurity and Emergency Services

South East Local Land Services

42 Ryrie Street | PO Box 97 | Braidwood NSW 2622

T: +61 2 4842 2594 | F: +61 2 4842 2655 | M: +61 4 27 422 530

E: kate.sawford@lls.nsw.gov.au

© State of New South Wales through Local Land Services 2018. The information contained in this publication is based on knowledge and understanding at the time of writing March 2018. However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate officer of Local Land Services or the user's independent adviser.

For updates go to www.lls.nsw.gov.au