

# *Mycoplasma ovis* infection in a New Zealand sheep flock

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## Background

*Mycoplasma ovis*, formerly known as *Eperythrozoon ovis*, is a small bacterium that parasitizes the surface of ovine and caprine red blood cells. Infection can result in haemolytic anaemia and outbreaks of sudden death in young sheep (Gill 1990). It has also been associated with reduced growth rates, decreased wool production and increased susceptibility to other infectious diseases (Burroughs 1988, Daddow 1979, Grønstøl and Overås 1980, Sutton and Jolly 1973). Clinical cases are generally limited to young sheep in the spring, summer and autumn months although it may be sporadically seen older animals.

Transmission of *M. ovis* predominantly occurs through the activity of biting arthropods such as flies and mosquitos but any mechanism by which infected red cells are transferred between animals can transmit infection (Sutton 1970). This includes husbandry procedures such as tailing, mulesing and vaccination. As infection is presumed to be lifelong, recovered animals likely act as a reservoir of infection for lambs in subsequent seasons.

*Mycoplasma ovis* has been found to be present in all sheep producing countries where it has been looked for. Serological studies in Australia have found a high prevalence of infection. Approximately 90% of farms in Victoria (Nicholls and Veale 1986), 47% of farms in Western Australia (Kabay *et al.* 1991) and 45% of sheep tested in Tasmania (Mason *et al.* 1989) had evidence of infection. Geographical differences in prevalence have been noted (Burroughs 1988, Kabay *et al.* 1991, Rjeibi *et al.* 2015). This may relate to varying conditions favourable to insect vectors.

In New Zealand, clinical disease due *M. ovis* was first reported by Jolly in 1967. Since that time sporadic cases of *M. ovis* haemolytic anaemia are seen most years through the laboratories (Clark and Gill 2000) with very occasional cases of mass mortality (Gill 1990). Clinical cases appear restricted to Merino sheep and the lower South Island however no studies have been performed to determine the prevalence of this organism in New Zealand.

## Case history

In April 2017, 128 blood samples from a group of eight month old Merino sheep were submitted to the laboratory to collect baseline haematological and biochemistry data prior to the commencement of a drug safety trial. The sheep were from a commercial sheep farm in South Otago and appeared healthy on general examination.

## Haematological findings

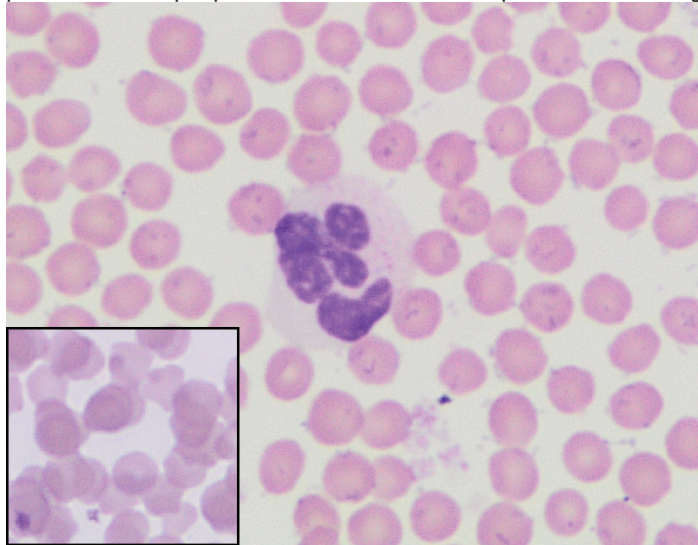
On analysis of the blood, numerous small coccoid structures were noted attached to red cells and in the background of blood films from 16 sheep (Figure 1). Small coccoid structures were also seen in lesser numbers in many of the other samples. Four animals additionally had evidence of red cell regeneration including polychromasia and basophilic stippling in their red cells. The haematocrits (HCT) of these four sheep were 0.23, 0.28, 0.3 and 0.35L/L (laboratory reference interval: 0.22–0.4L/L). No

evidence of red cell regeneration was seen in the remainder of the samples and the mean HCT +/- 1 standard deviation for the whole group was 0.35 +/- 0.029 (Figure 2).

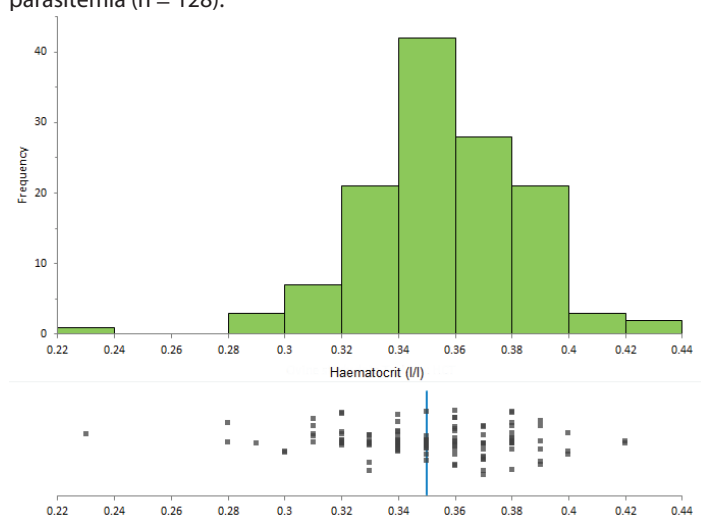
### Further diagnostic testing

PCR testing was performed on 38 of the samples to further confirm *M. ovis*. Approximately half of the samples were from sheep with high levels of parasitemia with the remainder selected from sheep that either had very few or no observable organisms on microscopy. Thirty-two of the 38 samples were positive for *M. ovis* on PCR.

**Figure 1.** Blood film from a sheep heavily infected with *Mycoplasma ovis*. Numerous small basophilic structures consistent with *M. ovis* are seen on the surface of the red cells and free in the background of the smear. A blood film from a non-parasitemic sheep is provided in the inset for comparison (1000 x magnification, Wright's stain).



**Figure 2.** Frequency distribution of the haematocrits from a group of eight-month old sheep with *Mycoplasma ovis* parasitemia (n = 128).



### Discussion

The above case demonstrates how high levels of parasitemia can be present in a flock without outward signs of clinical disease. The decrease in HCT was mild and limited to a few animals but it is possible that the full effects of the infection may not yet have occurred. A number of experimental studies have found that peak parasitemia often occurs before the fall in HCT and organisms may be undetectable by the time the anaemia has fully developed (Burroughs 1988, Littlejohns 1960, Sutton and Jolly 1973).

Although clinical cases in New Zealand have been largely restricted to Merinos, many different sheep breeds are represented in the scientific literature. This includes a study on weight gain and wool production in Perendale lambs on a New Zealand hill country farm (Sutton and Jolly 1973). In that study, a moderate production effect was noted with the mean weight difference peaking at 2kg between inoculated and control lambs at 5 weeks post infection. Other studies have been more mixed in their conclusions on the production effects of *M. ovis* (Daddow 1979, Harbutt 1969, Kabay *et al.* 1992).

Currently the distribution of *M. ovis* in New Zealand is unknown. As clinical signs can be subtle or overlap significantly with other diseases such as haemonchosis, leptospirosis or copper toxicity, it is possible that this organism may be more prevalent than appreciated. Further study may therefore be useful to determine the geographical distribution of this organism and its significance to production systems in New Zealand.

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