

Brucella ovis in stags

A.L. Ridler, D.M. West, K.J. Stafford, P.R. Wilson

Abstract

For the past 50 years the bacteria *Brucella ovis* has been recognised as an important cause of infertility in rams in New Zealand, and as an occasional cause of ewe abortion. While the disease was thought to only occur in sheep, in the past 4 years it has been found in farmed deer in New Zealand. Research has shown that infection in stags significantly reduces semen quality and stag fertility.

Trials in 1999 showed that *Brucella ovis* can spread from infected rams to non-infected stags grazing in the same paddock, which supports the view that the initial source of infection in deer was from rams. While it has been demonstrated that infection can spread from stag to stag when they are grazing in the same paddock, no transmission occurred from successive grazing of stags (swapping paddocks) or by grazing in adjacent paddocks. It would appear that animals need to be confined together in the same paddock or pen for the disease to spread. An effective strategy for control of this disease in sheep on a property involves keeping infected and non-infected rams separate and it would appear that a similar strategy will be effective in stags.

Research is on-going to determine the effects of infection in hinds, and to fully characterise the transmission and effects of the disease in stags.

Introduction

The bacteria *Brucella ovis* (brucellosis) is an important cause of ram infertility in many countries. The bacteria invades the reproductive organs of rams and adversely affects semen quality, leading to reduced fertility. It is spread by infected semen and could be considered a venereal disease.

Brucella ovis was previously thought to be a disease of sheep only, but in 1996 it was found in the semen of a New Zealand-born sire stag. Since then, several lines of young stags from different farms sent for slaughter have been found to be infected. Research has been carried out at Massey University in 1998 and 1999 and is on-going in 2000 to determine how the disease is transmitted, how it can be controlled and whether it is likely to be a significant disease in deer that the industry should be concerned about. This paper summarises the findings to date.

Transmission of *Brucella ovis* in deer

Brucella ovis can be transmitted

- from infected rams to stags when they are grazing in the same paddock. In a 1999 trial 6 infected rams were grazed with 6 non-infected stags from March to July. Five of the 6 stags became infected 14 weeks after the trial started, at the end of the rut period (June).
- from infected stags to other stags when they are grazing in the same paddock. In a 1998 trial 2 infected stags were grazed with 8 non-infected stags from September to June. Four of the 8 non-infected stags became infected during the rut (April).

This means that for properties that are found to be infected, farmers should consider two sources of *Brucella ovis* - either from infected rams or from introduction of infected stags. If a deer farmer wishes to remain free from *Brucella ovis* infection it is important that rams of unknown *Brucella ovis* status are not grazed with stags, and that infected stags are not bought onto the property.

Experimentally, there was no transmission when:



- infected and non-infected stags swapped grazing, that is when non-infected stags were shifted onto a paddock that had just been vacated by infected stags. In a 1999 trial 6 infected stags swapped paddocks once to twice weekly with 6 non-infected stags from March to mid-August. In total, the 2 groups swapped paddocks 32 times. There was no transmission to the non-infected stags
- infected and non-infected animals were grazed in paddocks adjacent to each other. In a 1999 trial, 6 infected stags were grazed in a paddock adjacent to 6 non-infected stags for a 5.5 month period from March to mid-August. There was no transmission to the non-infected stags.

Similar results have been found in sheep and it would appear that for transmission to occur, animals must be in the same paddock or pen together. This means that during the control phase of *Brucella ovis* on a property, separation of infected and non-infected animals should be sufficient to limit spread of the infection.

Effects of *Brucella ovis* on deer

Preliminary results suggest that *Brucella ovis* infection has adverse effects on stag semen quality. In infected animals, sperm motility is decreased and there is an increased number of abnormal sperm. Some infected stags have no sperm motility at all, and frank pus is present in the sample. While there is some variation in how severely stags are affected, it is likely to seriously decrease stag fertility and some stags will become completely infertile. Therefore it is important that steps are taken to ensure breeding stags do not become infected.

Brucella ovis can cause abortion in ewes, although this is uncommon. At this stage it is unknown if it causes abortion or other reproductive effects in hinds - this research is being undertaken in 2000.

Controlling *Brucella ovis*

In New Zealand there is an accreditation scheme to control *Brucella ovis* in rams. This is a voluntary control scheme that is designed to prevent the spread of infection from breeding flocks to commercial flocks. The above research has shown that the epidemiology of *Brucella ovis* in stags is similar to that of rams, and many of the principles of this scheme can be applied to controlling *Brucella ovis* in deer.

Recommendations for the control of *Brucella ovis* in deer

If you are free of the disease:

- keep rams of unknown *Brucella ovis* status separate from deer
- stags that are purchased or introduced to the breeding stag group should either be
 - a) tested prior to bringing onto the property
 - b) kept in quarantine after arrival until they have been tested
 - c) kept in a separate group from breeding stags
- avoid lending or leasing stags to other farmers, or hold separate and test before re-introduction to the herd

If you are uncertain of the *Brucella ovis* status of your herd:

- get your breeding stags (and velvetting stags if desired) blood tested by your veterinarian at a convenient time, such as at velvet harvesting
- keep breeding stags and velvetting stags separate

If your deer are found to be infected:

- situations should be dealt with by your veterinarian on a case-by-case basis. Keeping infected animals as a separate group during the control phase should limit spread of infection.

If the *Brucella ovis* status of the breeding stags is unknown and the herd suffers from reproductive problems e.g increased numbers of dry hinds, consider testing the stags for *Brucella ovis*

Conclusions

- *Brucella ovis* is a bacterial disease capable of causing decreased fertility in stags
- stags can become infected by direct contact with infected rams or stags; disease spreads when animals are in the same paddock together
- infection is most important in breeding stags and ideally breeding stags should be kept as a separate herd, not grazed with rams, and blood tested annually New introductions should be tested prior to mixing

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