



Ovine brucellosis

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Ovine brucellosis is an infection of sheep caused by a bacterium called *Brucella ovis* (*B. ovis*). The disease occurs in most of the major sheep-producing areas of the world including Western Australia. It is an important disease because it may cause considerable economic loss in flocks due to reduced lamb marking percentages, increased culling of rams, extended lambing seasons and, rarely, abortions and the birth of weak, poorly viable lambs.

Ovine brucellosis occurs naturally only in sheep and it can infect all breeds of sheep. Neither humans nor goats are susceptible to ovine brucellosis. It is a disease primarily of rams. Ewes rarely carry the infection for more than one or two oestrus cycles.

The disease in rams causes inflammation of the epididymides (the tubes which transport sperm from the testis). In some cases, one or both ram testes may also be affected. In pregnant ewes infection causes inflammation of the placenta.

Signs in rams

When first infected by *B. ovis* bacteria, a ram may have an elevated temperature and depressed appetite for a brief period. This is rarely noticed by the owner, and most rams with brucellosis appear and behave like normal rams. They are not noticeably 'sick'.

The infection first affects one or both of the epididymides, particularly the tail but sometimes the head or body of the epididymis, causing inflammation and swelling of the surrounding tissues. The epididymides may become completely blocked, causing sperm to build up. Obvious swelling, hardening or differences in size can often be seen, and can usually be palpated through the scrotum in the testes and epididymides.

Rams with chronic infection may have a grossly enlarged tail of the epididymis at the lower end of the testis and a shrunken testis.

In some rams, the blockage is permanent, resulting in a further swelling of the tail of the epididymis. In others, the blockage may break down and the swelling may reduce so that the testes feel normal. Despite appearing normal, the ram may still be infected, have microscopic lesions and be infertile.



Brucella ovis often causes the tail of the epididymis to swell and the associated testis to shrink as shown in the left epididymis and left testis above taken from a 15-month-old ram.

Other causes of epididymitis and scrotal lesions include infections with other bacteria, such as *Actinobacillus seminis* and *Corynebacterium pyogenes*, and injury.

Palpate the scrotal contents of all rams routinely prior to mating. This not only monitors for brucellosis but will identify, for culling, suspect and infertile rams due to other causes.

Signs in ewes

Ewes are more resistant to infection than rams and most ewes will not remain infected for more than two oestrus cycles after being served by an infected ram. Infection may cause early embryonic death without outward signs.

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If the placenta becomes inflamed, this may result in reduced nutrient supply to the foetus and subsequent abortion or production of small, weak lambs, although this is rare.

After abortion or parturition, the brucella organism may be present in vaginal discharges and milk. Present knowledge suggests lambs from infected ewes are not infected in the uterus.

Infection in most ewes is self-limiting so, following infection, ewes will usually breed normally in subsequent years. It has been suggested, but not proven, that a small number of ewes may become long-term carriers of infection in the udder, and pass infection on to their ram lamb progeny via their milk.

Effect on flock fertility

In flocks where ovine brucellosis is a problem, three main effects are seen:

- **Reduced lamb marking percentage**

When a high percentage of clinically affected rams is used, the lambing percentage may be reduced. Over some years, if no action is taken to eliminate brucellosis, the marking percentage will progressively reduce.

- **Extended lambing period**

When infected rams of low fertility serve ewes in heat, the chance of conception is low and many of these ewes will return to service 17 days later. If rams are left with the ewes, the numbers of ewes that eventually conceive will rise, but this will result in an unusually long lambing period.

- **High ram culling rate**

If rams are normally culled on the basis of detectable abnormalities found on palpation, then infected rams will usually be culled after one or two years. If brucellosis is not eliminated, this high culling rate will continue.

Spread of infection

Rams are infected by exposure to infected semen or to vaginal discharges from infected or aborting ewes. Infection can be spread from ram to ram directly or via the ewe.

The methods of spread within a flock include:

- rams serving ewes which have been served by infected rams during the same heat period
- sodomy, which is common among young rams, resulting in infected semen being deposited into the rectum of other rams
- rams being exposed to infection from ewes that have recently aborted and are excreting the organisms
- the sniffing and nosing behaviour of rams in ewe flocks which could lead to infection through the nasal passage
- rams running with small killer mobs or culls. In this situation a number of rams are likely to serve any ewe on heat, resulting in rapid spread of disease between rams.

Introduction of the disease to a previously clean flock is almost always through buying or borrowing an infected ram. It is risky to obtain cull rams from a saleyard and use them for breeding.

Diagnosis

Three methods are used to diagnose ovine brucellosis.

- **Palpation of the contents of the scrotum (testes and associated epididymides)**

Palpation of the scrotal contents is performed with the ram restrained in a standing or sitting position (as for shearing). Use both hands and start above both testes, moving down to the base of the testes and the epididymal tails. Check for symmetry, free movement of the testes within the scrotum and absence of odd lumps within the testes or in any part of the epididymides. The testes should feel relatively firm and springy.

Abnormalities will usually be felt as a swelling below either or both testes, due to inflammation of the tail of the epididymis. Occasionally there may be a swelling of the head of the epididymis, above the testis. Not all brucella-infected rams will have detectable (palpable) abnormalities in the scrotum and, conversely, rams with detectable abnormalities may not have brucellosis.

- **Semen examination**

This may reveal a reduced volume of semen, poor motility of sperm and/or a high proportion of abnormal sperm. *B. ovis* may also be cultured from semen.

- **Blood test**

Blood is tested to detect the presence of *B. ovis* antibodies which indicates previous exposure to infection.

Options for dealing with ovine brucellosis in breeding flocks

When ovine brucellosis is detected in a flock, the owner should discuss with their veterinarian the various management options that may be followed. Eradication is not compulsory. Eradication may not be the preferred option in every case because it can be a slow and expensive process, especially in large flocks, and it may fail if testing, segregation and culling are not practised carefully. If eradication is the chosen option, it can be achieved by a combination of manual examination, blood testing and removal of all infected rams as soon as they are detected. There is no effective vaccine. During an eradication program, it is important to prevent infected rams from having any contact with uninfected, young rams. Once eradication is achieved, precautions must be taken to prevent infected rams re-entering the flock, whether as strays or deliberate introductions.

What to do with infected rams?

Separate infected rams immediately from other tested-negative and young rams. Sell infected rams for slaughter.

Treatment is rarely undertaken and is likely to be economically practicable only in valuable rams. Prolonged antibiotic treatment may be effective in early cases

before irreparable damage occurs to the epididymides. Unilateral castration, to remove infected tissue when only one testis and associated epididymis appear to be infected, is unlikely to be successful as the bacteria may also be present in associated internal accessory sex glands.

Prevention

Owners must ensure that introduced rams are from a flock with a low risk of having ovine brucellosis. Ideally rams should come from an accredited-free flock. It is risky to rely on a single negative blood test by a veterinarian prior to purchase. A single test result can be misleading because a blood test may not become positive for up to seven weeks after a ram is infected.

Ovine brucellosis accredited-free flocks

The Department of Agriculture and Food Western Australia administers a voluntary, fee-for-service accreditation scheme for ram breeders, in conjunction with private veterinarians. In September 2008 there were about 130 flocks in WA accredited as free of ovine brucellosis.

Following an application to join the accreditation scheme a private veterinarian, chosen by the flock owner, will inspect the property to ascertain the suitability of fences, yards, paddock layout, handling facilities and ram identification method.

The veterinarian will palpate and collect blood samples from rams and teasers for testing at the Animal Health Laboratory, South Perth. Veterinary fees and laboratory charges are the responsibility of the flock owner.

Flock accreditation is achieved after two clean blood tests of all rams and teasers over 10 months old have been carried out, not less than 60 days or more than 120 days apart. To maintain accredited status, all introduced rams must either be from an accredited flock or must be isolated until two negative blood tests have been done. There are also protocols, which do not involve blood testing, for the introduction of ewes.

After accreditation, testing of rams continues annually for three years after which time it is biennial.

The incentives to join an accreditation scheme are:

- improved health and fertility status of the flock
- availability of certified disease-free rams to meet market preference
- eligibility to enter brucellosis accredited-free shows and sales both locally and interstate.

A publicly accessible list of all accredited flocks is in development and will be available at www.agric.wa.gov.au in 2009.

Biosecurity

Livestock, machinery, fodder and people can introduce animal and plant diseases, weed seeds and pests. Inspect any purchased or agisted sheep before movement and ask for a National Sheep Health Statement (NSHS) from the vendor. This Statement provides information — specific to the purchased sheep — about all the

major sheep diseases including ovine brucellosis. A copy of the NSHS can be obtained from Animal Health Australia's website www.farmbiosecurity.com.au or from any Department of Agriculture and Food WA office.

Confine introduced sheep to a designated area on the farm while any weed seeds drop off or pass out in dung and monitor the sheep for disease. This area should then be monitored for introduced weeds growing at a later date. Ask your veterinarian to investigate any disease problems and bring animals up to the home farm health status with vaccination and worm control before introduction to the home flock.

Acknowledgements

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Some information in this Farmnote was based on *Ovine Brucellosis*, Primefact 472, June 2007. Authors J.W. Plant and John Seaman, NSW Department of Primary Industries.

Further reading

Western Australian Voluntary Ovine Brucellosis Accreditation Scheme, Operational Guidelines. See the Department of Agriculture and Food website, www.agric.wa.gov.au, or obtain from department district offices.

