

## Ovine brucellosis

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Ovine brucellosis is present in many sheep flocks in New South Wales. It occurs in all districts, in all breeds and causes considerable economic loss in many flocks, through ram wastage, low lamb-marking percentages and long drawn-out lambing seasons.

It causes epididymitis in rams, resulting in infertility and sterility in some affected rams. In some flocks over 50 per cent of rams are affected. In some flocks, it also causes abortion in a small percentage of ewes.

Ovine brucellosis is caused by infection of the sheep with *Brucella ovis* bacteria, found in the semen of infected rams, in foetal fluids and in the mammary glands of infected ewes.

### Reproductive organs of the normal ram

In the normal ram, sperm are produced in the testes and are stored in the head, body and tail of the epididymides. When the ram ejaculates, sperm passes through the vas deferens to the penis, with secretions from the accessory sex glands being added. These organs are shown on page 4.

In the normal ram, the testes and epididymides on each side should be uniform in size, shape and texture (feel). Any hardening, differences in size, shape or feel or any abnormal swellings should be considered abnormal.

The method for examining a ram to detect abnormalities in the scrotum is shown in the photos.

### Symptoms in the ram

In the ram, lesions (abnormalities) occur in the testes, epididymides and in the accessory sex glands.



*Rams can be examined in either a standing or sitting position. The neck of the scrotum is grasped between the thumb and forefingers, feeling for any swelling or lumps. Any lesions in the spermatic cord or the head of the epididymis will be felt in this area. This photograph clearly shows the tail of the epididymis at the bottom of each testis.*

**All rams should be examined before purchase. If in doubt, consult your local veterinarian for advice.**

In infected rams, the obvious lesions that can be palpated occur in the testes and epididymides. The infection first affects the epididymides, causing inflammation, and swelling of the surrounding tissues. In most rams, the epididymides are completely blocked for a period, causing sperm to build up behind the blockage. 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 regress so that the ram, although infected, may feel normal.



Gross lesions first occur in the tail of the epididymis, which becomes enlarged and inflamed. In some cases, the testes may also be inflamed. The disease can affect one or both testes, with the tail of the epididymis being the site most commonly affected.

Rams with chronic infections may have a grossly enlarged tail of the epididymis and a shrunken testicle. In other rams, the lesions may regress.



The tail of the epididymis is palpated between the thumb and forefingers. The tails should be firm with no hard swellings, and they should be similar in size. The demarcation between the testicle and the tail of the epididymis should be obvious.



The testes are slipped between the thumb and fingers feeling for any hardening, abscesses, injuries or differences in size between the two sides. The testes should feel firm and be uniform in size.



Testes and epididymides of an infected ram which was not excreting organisms in the semen. The testicle and the head, body and tail of the epididymis on the left is normal. The testicle on the right is shrunken and the tail of the epididymis is markedly enlarged. In this ram the epididymis was completely blocked. The swellings visible on the tail are masses of sperm which have built up behind the blockage. This ram could excrete *Brucella ovis* in the semen at a later stage if the blockage broke down.



An infected ram affected on both sides. On the left, the testicle is shrunken and the tail of the epididymis is shrunken and hardened. On the right, the testicle is also shrunken with a marked enlargement of the tail of the epididymis. The head of the epididymis on the right (near the thumb) is also enlarged.

Although these rams may appear to be clinically normal, they may have microscopic lesions and still carry the infection.

The photographs show the lesions in the scrotum of infected rams. They also show the lesions in the testes and epididymis of infected rams.



*Testes and epididymides of a ram excreting organisms in the semen, with the lesions of the testes and tail of the epididymis on the left. Again, the affected testis is shrunken and the tail of the infected epididymis is twice the size of the normal side on the right.*



*Ram infected with ovine brucellosis. The testicle and epididymis on the right felt normal. The testicle on the left is shrunken and the tail of the epididymis is hardened and shrunken also.*

There are other causes of epididymitis and other lesions in the scrotum besides ovine brucellosis. Another infectious disease, *Actino-bacillosis*, can also cause epididymitis. The photo below shows a ram with 'cheesy gland' abscesses in the wall of the scrotum.

Teaser rams will normally develop an epididymitis after vasectomy. Although they cannot pass on any infection from the epididymis, infected teasers can still carry and spread *Brucella ovis* infection via the accessory sex glands.



*A ram with normal testes; not infected with ovine brucellosis. This ram had several 'cheesy gland' abscesses in the scrotal wall.*

In any infected ram flock, where the disease is well established, there will be a percentage of infected rams with obvious clinical lesions, some infected rams with no obvious clinical lesions and some non-infected rams. In flocks where there has been no attempt to control the disease, 50 per cent or more of rams may be infected. Ewes may excrete *Brucella ovis* in the milk and pass the infection onto their lambs.

### **Symptoms in the ewe**

A small proportion of infected ewes may abort. However, there are few reports of abortion due to ovine brucellosis in sheep flocks in New South Wales, even though many ram flocks are infected.

### **Effect on flock fertility**

The infection in the epididymides and accessory sex glands leads to a reduction in semen quality and in some rams, sterility.

The effect on flock fertility will depend on the number of rams infected and the severity of the lesions in the infected rams. In many flocks, the full effects of the disease are not obvious because not all rams are infected and also because most graziers replace part of their ram flock each year, introducing fertile rams.

In other flocks, ovine brucellosis has little effect because there are other conditions affecting the lambmarking percentage to a greater extent, for example, clover disease or feral pig predation.

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

- **The lambing period is extended**, often causing problems with flock management. When infected rams of low fertility serve ewes on heat, the chance of conception is low and many of these ewes will usually return to service 17 days later. In some affected flocks, more than half the ewes return to service. If ewes are only joined for 6 weeks, then many ewes may not get in lamb.
- **The lamb-marking percentage is reduced**, when a high percentage of clinically affected rams is used. It is usually seen in flocks when replacements are made only every two to three years or in those flocks where the replacement rams are infected at the time of purchase, for example, rams from infected studs or rams bought out of saleyards. Many rams offered in

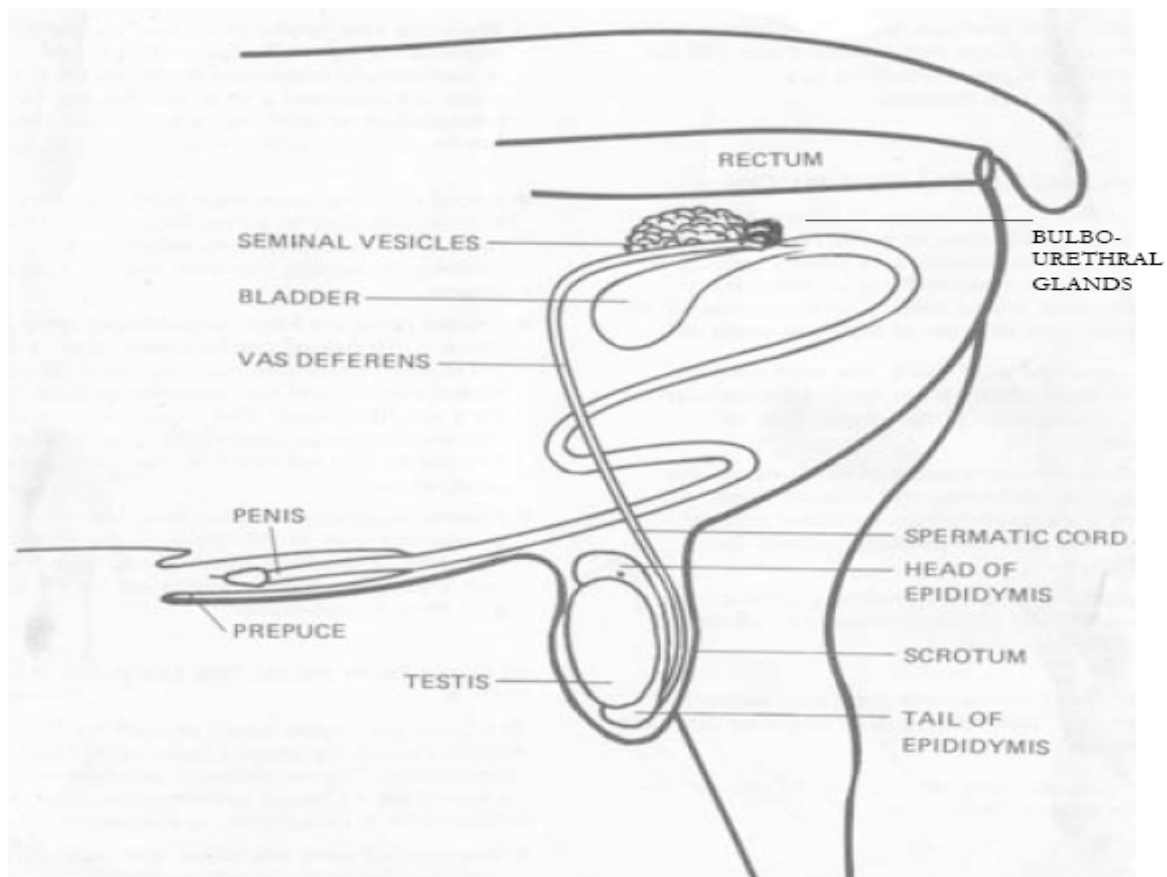
saleyards are cull rams because of age or abnormalities reducing fertility, or are infected with ovine brucellosis. These rams are unsuitable for breeding.

- **Ram wastage is high**, with infected rams being culled after one or two years in the flock.

### Spread of infection between rams

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, in several ways:

- When rams are running with ewes, infected rams will inseminate infected semen into the vagina of the ewe. Other rams serving the same ewe in the same heat period will be exposed to infection.
- Infected rams can inseminate infected semen into the rectum of other rams, exposing them to infection. Sodomy is very common in some groups of young rams, so that rapid spread can occur.
- During the lambing period, rams can be exposed to infection from ewes that have recently aborted and are excreting the organisms.
- It has been demonstrated experimentally that rams can be infected by intranasal inoculation of infected semen. The sniffing and nosing



Diagrammatic illustration of ram's major reproductive organs

behaviour of rams in ewe flocks could also provide a means of spread through a ram flock.

In stud flocks, ovine brucellosis is a bigger problem in the British breeds of rams, because they are sexually active at a younger age than Merinos. However, it can cause problems in any stud flock where older infected rams and the young rams are run together, exposing the young rams to infection.

The incidence is always higher in flocks where small numbers of ewes graze with the ram flock when they are not being joined, for example, killers or cull sheep.

In these situations, a number of rams are likely to serve any ewe on heat, resulting in rapid spread through the ram flock.

### **Diagnosis of ovine brucellosis**

Diagnosis is based on the careful manual examination of the scrotal contents, and on the results of a blood test.

Careful palpation of all rams in the flock (as shown in the photos) will show whether clinical abnormalities are present. If more than 5 per cent of rams have abnormalities, then ovine brucellosis is the most likely cause.

Any rams with abnormalities should be checked by your local veterinarian. A blood test will be used to check if the ram is infected. When the incidence of rams with abnormalities is low, only those with lesions will normally be blood-tested, to check if infection is present in the flock.

A negative blood test does not always mean a ram is free of infection. In some rams the blood test may not become positive until up to 7 weeks after infection. Rams from an infected flock can be incubating the disease and give a negative blood test. If tested 6 to 7 weeks later, then they will be positive. There are several cases where blood-test negative rams bought from infected studs have subsequently developed ovine brucellosis, because they were incubating the disease when they were first blood-tested.

In some cases, examination of semen at the Regional Veterinary Laboratory may be necessary to diagnose infection.

### **Control of ovine brucellosis in the flock**

Treatment of infected animals is not worthwhile. In most rams, the damage is permanent and the fertility of the ram will be low, even after treatment.

Attempts to control the disease by removal of all rams with obvious lesions in the testes or epididymis will fail, because not all infected rams will have obvious lesions. Infection will remain in

the flock and clinical cases will be removed each year, resulting in considerable ram wastage.

### **Eradication from stud flocks**

In stud flocks, eradication is based on eliminating infection in older rams and preventing the infection of young rams. It is achieved by a combination of manual examination, blood-testing and removal of all infected rams as soon as they are detected.

In an infected stud flock, the stud owner should seek advice from his local veterinarian on an eradication program. This will involve:

- A clinical examination of all rams on the property, including the weaner rams. All rams with epididymitis or other clinical abnormalities are culled and sold for slaughter.
- A blood test of all remaining rams on the property. All positive rams are culled and sold for slaughter.
- The blood test is then repeated every 30 days until two consecutive negative tests are obtained.

Flock management should aim to reduce the chance of re-infection by:

- Weaning ram lambs early and keeping them segregated from all older ram groups. This is particularly important in flocks where the ewes are rejoined 2 to 3 months after the completion of lambing, when some ram lambs can start to show an interest in the ewes. Wean prior to joining.
- Avoid running rams with lambing ewes. If a ewe aborts due to ovine brucellosis, then rams may be exposed to infection by sniffing or serving the ewe shortly after she aborts.
- Ensure rams are kept in paddocks where there is no risk of contact with stray rams. All clinical cases and rams positive to the blood test should be removed as soon as they are identified. The longer these rams remain on the property, the greater the chance of a breakdown in the eradication program.
- Ensure introduced rams come from properties free of infection. If the status of the stud of origin is not known, then the ram should be kept segregated for 60 days and then blood-tested.

### **Eradication from the commercial flock**

The same principles apply as with stud flocks. Advice should be sought from your local veterinarian. The eradication program will be based on a clinical examination of all rams, followed by a blood test, as follows:

- Examine all rams manually and cull all rams with epididymitis or other clinical abnormalities.

- Blood test the remaining rams and remove all positive reactors.
- Repeat the blood test every 30 days until two consecutive negative tests of all rams are obtained.

It will be difficult to eradicate ovine brucellosis if infected rams are with the flock being joined. Any eradication program should begin at least 3 to 4 months before the start of joining, to allow all infected rams to be removed from the flock prior to joining.

In some heavily infected commercial flocks, it may not be economical to sell all infected rams and replace them with young rams in the one year. In these flocks, infected rams which are not showing severe clinical lesions may be kept for another joining provided they can be kept segregated from the other rams up to and during the joining period. They should be sold immediately after joining. If an infected ram group has to be joined, then it should be joined to the older ewes at a higher percentage than usual, so that the effect of the lowered fertility will be minimised.

### **Prevention of re-infection of the flock**

Once the disease has been eradicated from the flock, then precautions must be taken to ensure that infection is not re-introduced by either stray rams from adjoining properties or by rams introduced onto the property. Commercial flocks must take the following precautions.

- Buy replacement rams only from those studs which can guarantee they are free of ovine brucellosis. Studs should be part of the NSW Ovine Brucellosis Accreditation Scheme.
- Prevent stray rams getting into the ram flock and prevent rams getting into the neighbour's flocks, which may be infected. A sheep-proof ram paddock is necessary.
- If rams are purchased at a ram show or sale, ensure that the stud of origin is free of ovine brucellosis and that the show or sale is only open to rams from flocks free of ovine brucellosis. A negative blood test on a ram from an infected flock does not guarantee freedom from disease.
- Do not purchase rams from saleyards. Owners have an obligation under the Stock Diseases Act not to sell rams infected with ovine brucellosis for other than slaughter. Unfortunately there are still graziers who buy cheap and often diseased or cull rams at saleyards for use in their flocks.
- All rams in the flock should be checked at least one month prior to joining to ensure they are sound and free from abnormalities. If there is any doubt, rams should be checked by your local veterinarian.

- Rams should be sold for slaughter unless they originate from an Ovine Brucellosis Accredited flock or from a flock which has tested negative for the disease within the previous 30 days. Stud owners should take similar precautions.
- Any rams returning from shows and sales must be kept segregated from all other sheep for at least 60 days unless the show or sale has been restricted to rams from flocks free of infection. After 60 days, the rams should be blood tested to ensure that they were not exposed to infection at the show or sale.
- All rams on the property, including the young rams, should be examined every year. Any rams with any clinical abnormalities should be blood-tested to ensure they are free of ovine brucellosis.

### **Accredited ovine brucellosis free flock scheme**

The New South Wales Ovine Brucellosis Accreditation Scheme, which commenced in January, 1981, provides ram buyers with a list of studs from which they can purchase rams free of ovine brucellosis. The Scheme is open for all breeds.

As at 30 January 2007 there were 909 flocks in the Accreditation Scheme. To maintain accreditation, flocks have to undergo regular testing. Accreditation certificates are issued to all currently accredited flocks.

Further information on the Scheme is available from your local veterinarian.

Remember, if you have any doubts about ovine brucellosis; seek advice from your veterinary practitioner or official veterinarian.

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