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The causes and control of infertility of rams

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FACTORS other than physical faults often cause infertility of rams. Obviously, it is important to distinguish between temporary and permanent infertility to apply the proper remedy.

TEMPORARY INFERTILITY

Temporary infertility is any infertility from which the ram will eventually recover. The extent of this type of infertility is difficult to assess but it is possibly fairly common.

One of the main causes of temporary infertility is variation in the quality of the semen. This is known as seminal degeneration.

Seasonal Effects

It has been demonstrated that normal rams are more highly fertile in the autumn and winter than in the summer; this appears to be due to variation in the hours of daylight between the longest and shortest days. The effect of decreasing hours of daylight is to increase the reserves of sperms within the epididymes, and to stimulate the sperm-forming tissues of the testicles.

The manufacture of sperms by the male genital organ of mammals can only take place when the temperature of the testicles is below that of the body, and in all domestic animals the testicles are so placed as to make this possible. Normally the temperature within the ram's testicles is 8° F. lower than the rectal temperature. If for any reason the temperature of the testicles rises to, or higher than, that of the body, sperm production ceases and the animal is rendered infertile.

The effect of hot weather is also likely to lead to seminal degeneration and decrease of fertility. Generally speaking the body temperature of fat, well-fed sheep rises higher during hot, dry weather than that of poorly-fed animals.

Under Australian conditions, poor quality semen is commonly associated with high body temperatures produced in the ram, or with high summer temperatures, when the atmospheric temperature remains above 90° F., for more than a few days at a time, and is accompanied by hot nights. The poor quality of native pastures during the dry period may also contribute to this.

These environmental conditions would apply particularly to the pastoral areas of the State, and it seems probable that the poor lambing percentages in the northern sheep areas may be largely attributed to a combination of these factors.

High body temperatures and consequent seminal degeneration may also be a sequel to blowfly strike, abscesses, over-driving or fighting during very hot weather, as well as to such infectious diseases as foot-rot, foot abscess, "swelled head" and "pink eye." In fact any disease process which induces a fever can be responsible for seminal defects.

Incidental Factors

There is some evidence, too, that even dipping and jetting with standard arsenical preparations can cause a temporary degeneration of the semen. For this reason it is unwise to dip rams closer than six weeks before mating.
Other incidental factors such as internal parasitism may at times also have an important effect on semen production and quality, while severe scrotal area infestation of chorioptic mange (*Chorioptes ovis*) or of leg lice (*Linognathus pedalis*) may interfere with ram libido (sexual desire).

Recovery from specific ailments like those described does not immediately restore the quality of the semen. In fact an interval of two to three months may elapse before the semen once more becomes normal. A similar period must pass before the semen again returns to normal after the extreme heat of summer or after the pastures have once more become green.

**Nutrition**

A low vitamin A diet causes the production of poor quality semen, and it has been suggested that vitamin A deficiency may be an important factor in inducing infertility in rams. Since green feed is rich in this vitamin it was believed that poor, dry pastures devoid of vitamin A might be responsible for a poor output of sperms. It is well known, however, that the liver of sheep is able to store sufficient vitamin A secured during the green feed period of the year to last several months. So it is not likely that a deficiency of vitamin A, sufficient to cause infertility in rams, would be common in areas other than those of the pastoral north and east of Western Australia, where prolonged drought conditions could be anticipated.

However, rams joined on dry feed during the late autumn may be liable to the effects of insufficient vitamin A, and the provision of vitamin A supplement would be warranted under these circumstances.

Inadequate protein will cause the production of poor quality semen and some graziers feed a protein-rich supplement to rams before mating them on dry feed. If this is done it is important to ensure that the rams do not become too fat. Such a supplement need not exceed a 10 per cent. protein level.

The intake of plant oestrogens by rams grazing green subterranean clover pastures may lead to lowered fertility, but this effect appears to be transient and is unlikely to be important in W.A. where mating invariably takes place at times well removed from the green feed period.

In general, the seasonal quality of the semen of rams corresponds to the periods in which a high proportion of the ewes in that district come into oestrus, and it is therefore obvious that this is the ideal time for mating to take place. When most of the rams in a flock refuse to work, the cause is more likely to be absence of heat in the ewes than any lack of sexual desire on the part of the ram.

Although the temporary forms of ram infertility may be responsible for low lambing percentages, they may also affect the lambing in other ways; the onset of lambing may be delayed, or having once started, it may be interrupted with the result that lambing may be extended over a considerable period.

**PERMANENT INFERTILITY**

Permanent infertility in rams may be caused by a number of conditions; this type of infertility is one from which the affected ram does not recover, although in many instances such a ram may not necessarily be completely sterile.

In commercial flocks, provided 2 to 3 per cent. of rams are used in mass matings, lambing percentages may be quite good and the flock owner may have little or no idea that some of his rams may be sterile; the normal sound rams would usually cover up for the others.

In stud properties, by contrast, epididymitis in particular can have serious effects where single matings are carried out. Furthermore, the return of affected rams after purchase would damage the reputation of the stud.

For all practical purposes, a ram affected with the six scrotal abnormalities described hereunder should be culled from the flock, and any such rams should be rejected at the time of purchase. These abnormalities can be detected fairly readily by manual examination of the ram. They are:

1. Epididymitis (inflammation of the epididymis).
2. Orchitis (inflammation of the testicle).
3. Hypoplasia (degenerated or underdeveloped testicle).
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Rams showing gross changes caused by epididymitis. Not all cases are as obvious as these. Any ram affected with this disease should be slaughtered.

(4) Cryptorchidism (failure of the testicle to descend).
(5) Hernia (rupture).
(6) Varicocele (varicose veins).

Epididymitis

Epididymitis is the commonest and most important cause of permanent infertility in rams. It is usually of bacterial origin, caused by the micro-organisms Brucella ovis (mainly), Corynebacterium ovis (the "cheesy gland" germ) and Actinobacillus seminis, as well as other miscellaneous bacteria.

Apart from these infectious conditions, the low position of the epididymis in relation to the ground renders it especially liable to damage from mechanical causes such as striking the ground, rocks or other elevated objects, and it has been suggested that a non-infectious or traumatic epididymitis may result. This particular belief may be less valid than was once thought since certain limited experimental evidence has failed to confirm such damage as an important factor in the epididymitis syndrome.

Epididymitis is usually detected as an enlarged and hardened tail of the epididymis at the base of the testicle, but it may sometimes occur in the head or body of that organ. By the time epididymitis can be easily seen and felt, the disease process has reached an advanced stage and is incurable. It may be difficult or even impossible to locate the early stage of this condition. When both sides are affected rams may be completely sterile; where epididymitis is present only on one side, the production of semen in the other testicle is adversely affected and although these rams may work well, they have a lower fertility when compared with normal rams.

Orchitis

Orchitis is usually the result of some external injury to the testicles, such as may happen when one ram is horned by another.

In the early stages, the affected part may be swollen and hot to touch, and the ram may resent handling; if the skin is broken, secondary infection may also occur. Later, adhesions may be found between the scrotum (purse) and the testicle, which remains enlarged, hard and lumpy.

Hypoplasia

Hypoplasia describes a condition in which the testicle becomes atrophied and fails to reach normal size. Such small undeveloped organs cannot produce sperms and in adult rams this should be regarded as a serious fault. It may also occur when a chronic or long-standing epididymitis is present, the gross enlargement of the epididymis leading to a corresponding secondary shrinkage of the testicle of the same side.

Cryptorchidism

Cryptorchidism, a failure of the testicles to descend into the scrotum, may affect one or both testicles.

Although a ram with only one testicle may be quite fertile, the condition is a hereditary defect and affected rams should be culled for that reason. When one testicle only descends into the

* See "Ovine Brucellosis," P. 886

885

Journal of Agriculture Vol 5 No 11 1964
scrotum the descended testicle commonly becomes overdeveloped, a compensatory response to the absence of its fellow. Since the manufacture of sperms can only take place when the temperature of testicles is below that of the body, a bilateral (both sides) cryptorchid is completely sterile.

Hernia
Hernia may be inguinal or partial when a portion of bowel occupies the inguinal canal in the groin region, or complete when the loop of bowel descends to occupy the scrotum. These forms of hernia may be congenital (existing at birth), or acquired (when it occurs later in life). The latter form is mainly due to accidents such as kicks, falls or blows. A ram affected with hernia is not necessarily infertile.

Varicocele
Varicocele is the term used when the veins within the spermatic cords above one or both testicles become greatly distended. It is more common in older rams; a ram so affected has an uncomfortable gait and may be unwilling to work.

OVINE BRUCELLOSIS
The term epididymitis describes a condition which affects only a specific part of the genital organs. Although this abnormality has long been known to occur in rams, it has only comparatively recently been shown to be of bacterial origin. Brucellosis is the most important infectious disease involving the testicles and epididymes of rams. It is caused by the organism Brucella ovis, a germ which is similar but not identical to Brucella abortus, the cause of contagious abortion in cattle (bovine brucellosis).

It is known that these bacteria may be present in the semen of an infected ram and therefore the disease may be spread venereally, that is from an infected ram to a ewe during service, and thence to another ram. Unmated rams may also contact epididymitis and in these instances the spread of infection can be attributed to “ram homosexuality.” For this reason it is desirable to have at least two ram paddocks, one for the older rams and another for the younger rams which have not been mated.

In the first instance, a diagnosis of epididymitis can be made by handling the affected testicles, although this does not identify the exact cause of the inflammation. This can only be done by—

- Collecting a sample of semen from the ram (often a very difficult task) and following this by cultural examination at the laboratory,
- By obtaining blood samples from rams and submitting these to a blood test, the complement-fixation test.

It should be noted that the complement-fixation test is only of value in detecting an infection due to ovine brucellosis. It has no purpose where epididymitis due to other bacteria is concerned.

Although epididymitis may be detected by palpation of the genital organs in very young rams, even as young as five months of age, it is more usual to find this disease increasing with advancing age. It also appears to be more common in British breeds of sheep than in Merinos.

Occasional outbreaks of abortion in ewes and perinatal lamb losses from Br. ovis infection have been detected in recent years.

The use of Br. ovis vaccine to control ovine brucellosis in rams is not recommended in Australia.

METHODS OF EXAMINATION FOR GENITAL DEFECTS
Examination for genital defects can be carried out either with the ram controlled by the head and standing in the normal position, or held in the sitting position as for shearing; it is best done by a veterinarian whenever possible.

To begin with, the area above the testicles is examined for varicocele, hernia or abscess formation (“cheesy gland”). This is done by grasping the spermatic cords between the thumb and fingers of each hand.

The hand should then be passed down the testicles so as to identify any abnormalities there, such as may be due to adhesions between the purse and the testicles, to undue firmness or lumps within the testicles, or to enlargement of the head or body of the epididymis.
Finally, at the base of the testicles, any variation in the size or texture of the tail of the epididymis can be felt.

The normal tail is fairly soft and has a well-defined neck. If this neck cannot be clearly identified such a ram should be suspect, since, with a well-marked epididymitis, the base of the testicle and the epididymis itself appears to be one solid structure.

The testicles vary in size from ram to ram, but unduly large or small testicles should be regarded as faulty, especially if they do not correspond with their fellows.

The testicles should feel relatively firm, not unduly soft or flabby, and not very hard; and on handling they should move freely within the skin of the scrotum.

A definite routine should be followed when examining rams, and constant practice with normal rams is extremely important; in this way, any departure from the normal state may be more readily detectable.

**PREVENTION OF INFERTILITY**

It is possible to avoid the conditions associated with, or leading to, temporary infertility by carrying out sound animal husbandry practices:—

- Wherever possible rams should be kept in shady, well grassed paddocks with easy access to water.
- At mating time, rams should be in good physical (but not fat) condition. Driving during the heat of the day should be avoided.
- Modern blowfly control measures including mulesing and tail stripping should be a flock routine and the head, body and crutch of rams should be jetted to avoid flystrike during mating. There should be a six-weeks interval between dipping and jetting where arsenical dips are used.
- Rams should be chosen carefully, and in this respect plain-bodied sheep appear to be less susceptible to temporary infertility than those with well developed wrinkly skin.

Genital abnormalities leading to permanent infertility can be readily diagnosed following a veterinary examination, but in the absence of this a flock owner willing to handle the rams frequently, can in time acquire an appreciation of the nature of these genital faults. The most important of these is, of course epididymitis.

The following routines should be carried out for the control of epididymitis:—

1. Dispose of for slaughter any ram affected with epididymitis.
2. Examine rams before purchase and reject any abnormal rams.
3. Check rams before mating and again after mating; cull for epididymitis and any other genital abnormalities.
4. Keep the ram flock young; as a general rule it is better to keep a larger proportion of young rams, since older rams are more likely to be affected with genital defects.
5. Keep young rams separated from older rams.
6. Mate sheep on an age basis, young rams with young ewes and older rams with older ewes.
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