1-1-1962

Ovine vibriosis: a new cause of sheep infertility

M. R. Gardiner
M. E. Nairn
I. J. Miller

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The authors wish to thank Mr. V. Bamford for his careful bacteriological work, which is so important for the confirmation of these abortion storms. Also Mr. H. G. Neil and Mr. C. Ralph of the Moora office, and Mr. B. Evans, Stock Inspector, Kellerberrin, for some of the field investigations.
OVINE VIBRIOSIS

A New Cause of Sheep Infertility

Vibrionic abortion of sheep has caused heavy losses in a number of wheatbelt flocks. In several flocks up to 50 per cent. of the ewes aborted as a result of this newly reported disease. This article gives the history of the disease in this State, and describes the symptoms for the benefit of other farmers whose flocks may be affected. Ewes become immune after the first attack.


OVINE VIBRIOSIS, a serious disease of breeding sheep, has been known in various parts of the world for almost 50 years. Except for a few scattered reports from the Eastern States of Australia in recent years, its presence in this country has seldom been recorded.

Little is known of the real incidence of Vibriosis in Australian sheep, or of its impact on the economy of sheep raising. The occurrence of this abortion disease of sheep in Western Australia was reported and confirmed for the first time in April, 1961. A description of this outbreak was subsequently reported in the Australian Veterinary Journal and it was hoped that, although interesting as a unique disease of sheep in this State, it would prove to be an isolated event.

However, the 1962 autumn lambing season has brought with it a series of outbreaks of ovine vibriosis and it is now likely that we will have to contend with the disease in the future, and that it may become increasingly important.

In the light of the experience of the 1962 autumn lambing season, it is felt that widespread attention should be drawn to the existence of ovine vibriosis in Western Australia, to the characteristics of the disease, and to those measures that may be employed in its prevention or control.

THE DISEASE

The chief feature of ovine vibriosis is abortion in the later stages of pregnancy, almost invariably during the last two months.

The main abortion “storm” is frequently preceded by a few (usually unrecognised) abortions, which contaminate the paddocks with the infectious agent and spread the infection to the rest of the ewe flock.

Most abortion “storms” take place between the sixth and second weeks before the date of first lambing, and losses increase rapidly during the next few days. The epidemic may then start to dwindle or it may continue right up to the normal lambing date.

Between 5 and 50 per cent. of the ewes may lose their lambs in this way, with an average lamb mortality of about 10 per cent. of the expected drop. Occasionally, as many as 60, or even 70 per cent. of the ewes may abort, but serious losses of this kind are uncommon.
The greater part of the flock loss is in lambs, although a few ewes will die as a result of septic metritis. However, in most cases the abortion is quite sudden and causes the ewe little trouble, but is accompanied by a chocolate-brown vaginal discharge lasting for several days to a fortnight and carrying great numbers of the infectious organism.

A proportion of the aborted lambs (about 20 per cent.) will show liver lesions in the form of large yellowish areas of degeneration throughout the substance of the tissue.

Ovine vibriosis is caused by a microorganism very closely related to, if not identical with, *Vibrio fetus*, the organism which causes vibriosis in cattle.

In spite of this extremely close relationship there appears to be little, if any, cross infection between cattle and sheep. The cattle disease is essentially venereal and is carried and transmitted by infected bulls; it is characterised by herd infertility and very early abortions.

**Transmission**

This contrasts with the sheep disease, which is neither transmitted by the breeding ram, nor has any effect on ewe fertility. On present evidence it appears to be transmitted orally in contaminated feed and water.

Considerable research carried out in other countries has emphasised the difficulty in producing clinical infection of the ewe until about the fourth and fifth month of pregnancy. In other words, the organism seems to require a foetus and its placental attachments at a later stage of pregnancy before it will begin to multiply and cause disease.

Following experimental infection of a susceptible ewe in the fourth or fifth month of pregnancy, abortion will follow as early as one week or as late as three weeks thereafter.

*Vibrio fetus*, in common with other related micro-organisms (such as *Vibrio jejuni* which causes an infectious diarrhoea in cattle, *V. coli* which is responsible for vibrionic dysentery of swine, and the human cholera organism) is helped to survive outside the animal host by a moist, cool environment and rapidly dies if these conditions are not met.

Therefore, an early abortion onto moist ground around soaks or water troughs, or onto damaged litter, hay or feed, may be followed by rapid spread to the rest of the flock. These facts help to explain why in most countries vibrionic abortion occurs mainly where lambing time coincides with cold, wet seasons.

In outbreaks of vibrionic abortion the paddock environment should be searched for areas which favour the survival and transmission of the infectious agent.

The initial entry of ovine vibriosis into a flock is usually impossible to trace, and little is known about its carryover between abortion storms.
On general principles, it seems likely that the organism could exist in carrier animals, either sheep or other species. It is of some interest that *Vibrio fetus* has been isolated from the gall bladder of every aborting ewe submitted to the Animal Health Laboratory in this recent series, and it is possible that this is the way in which the infection is carried over from one year to another.

With respect to other “carrier” species, the possibilities in Western Australia are much more limited than elsewhere. It would be hard to think of species other than crows, foxes and kangaroos that might act as vectors.

The infectious agent can practically always be cultured from the stomach contents, and frequently from the liver, kidney and brain of the dead foetus or lamb, and it is possible that the infection could be picked up by these predators and pests, harboured by them in some tissue and then mechanically transmitted to the susceptible flock. However, we can only speculate at present on the manner of introduction of infection.

**WEST AUSTRALIAN OUTBREAKS**

The first reported outbreak in this State began on April 24, 1961, in a Merino stud at Ballidu.

Four hundred of a total of 853 lambs were lost in five weeks, an abortion rate of 47 per cent. Abortions started 24 days before the anticipated lambing date.

The paddock in which the losses occurred had been grazed a few weeks before by a mob of stud ewes imported from New South Wales a year before.

No other cases of vibrionic abortion of ewes were recorded in 1961. There was, however, an obvious carryover into 1962, since the disease has appeared in recognisable form on at least 10 properties.

It is interesting to note that all these properties are situated in the northern and north eastern wheatbelt. The districts affected include Miling, Carnamah, Dalwallinu, Trayning, Qualrading, Pithara, Babakin, Perenjori, and Kondut.

The central position of the 1961 property at Ballidu suggests an over wintering spread in several directions from a focal point of infection.

Several of these 1962 abortion “storms” have been carefully investigated. A brief account of the main features of each may help to give a better understanding of the disease.

**Miling:**

The first losses from ovine vibriosis in 1962 occurred at Miling, in a flock of 1,200 Merino x Border Leicester ewes purchased in the Dalwallinu and Dowerin districts. Affected ewes were first noticed when the flock was brought in for crutching on March 26th.

About 600 of the ewes had aborted or were showing signs of impending abortion, an estimated incidence of 50 per cent. The local paddock conditions influencing the outbreak were not clear and no detailed investigation was made. However, the gall bladder of a submitted ewe revealed the presence of the vibriosis organism.

**Carnamah:**

The next outbreak was reported in the Carnamah district.

Five hundred ewes of mixed ages due to start lambing in mid-April had grazed a clover-grass paddock since February. During the absence of the owner in March the flock was allowed to self-feed from a stack of hay which soon became trampled down and contaminated over a wide area. Undoubtedly this soiled feed contributed heavily to the subsequent wave of abortions which began on April 2.

An estimated 10 per cent. of the ewes aborted. The flock was a closed one and there had been no introductions of sheep for at least 18 months.

*Vibrio fetus* was isolated from stomach contents of lambs submitted by the owner.

**Trayning:**

The Trayning outbreak occurred in an isolated area in a closed flock of from 400 to 500 ewes due to lamb towards the end of April.

Lamb losses started about three weeks before this, on about April 6. An estimated 50 per cent. of the lambs were lost through abortion.

There was fairly dense bush cover in this paddock and both kangaroos and foxes were very prevalent.
This flock had been handled separately from others on the property, and there had been no known sheep contacts for many years except for locally purchased rams, which were first used for three years in the main flocks.

The appearance of vibrionic abortion in this flock is hard to explain, but the possible role of vectors as mentioned above must be considered.

*Vibrio fetus* was cultured from the gall bladder of a ewe brought to the laboratory for examination.

**Dalwallinu:**

The Dalwallinu outbreak affected a flock of 800 Southdown x Suffolk ewes.

The losses are thought to have started about two or three weeks before the normal lambing date and 35 of the first 50 ewes dropped premature lambs.

Over 100 ewe lambs from the Miling district were introduced into the flock in 1961, but the origin of the infection remains unknown.

*Vibrio fetus* was isolated from a ewe gall bladder and from foetal stomach contents.

**Quairading:**

The vibrionic abortion storm at Quairading started in a Merino flock of 500 ewes on April 15, three weeks before lambing was due to begin.

The estimated abortion rate up to May 1st was 10 per cent.

*Vibrio fetus* was cultured from foetal stomach content.

**Other Outbreaks:**

The Pithara, Babakin, Perenjori and other small reported outbreaks were not investigated in detail but the clinical histories were typical of the disease.

**DISCUSSION**

There is no effective treatment of ovine vibriosis.

Once abortions have started, the only reasonable course is to—

- Isolate all affected ewes,
- Pick up and destroy all aborted lambs and foetal membranes, and
- Do everything possible to prevent contamination of feed and water by the vaginal discharges of the aborting ewes and by the aborted lambs.

As many members of a recovered flock should, on the basis of present knowledge, be regarded as possible chronic carriers, it would be advisable to prevent the dispersal of such flocks.

**Immunity**

There is one aspect of the disease that should be emphasised:

*Seldom is a recovered flock subjected to a second attack and it appears that such sheep become solidly immune.***

**Climate**

In most parts of the world where ovine vibriosis occurs it is associated with cooler localities and the colder parts of the year.

The 1962 Western Australian series suggested that this may not be essential as the season was one of the hottest and driest on record.

The reasons for the spread of infection under the seasonal conditions existing in the autumn of 1962 in the dry north eastern wheatbelt are not understood at present.

**ACKNOWLEDGMENTS**

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