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VIBRIOSIS IN SHEEP

Vibriosis of sheep is an acute infectious disease characterised by abortion in the later stages of pregnancy. This article describes the disease and its occurrence in Western Australia.

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OVINE VIBRIOSIS or vibrionic abortion, a serious disease of breeding ewes, has been known for almost 50 years and has been reported from most of the important sheep breeding areas of the world. It is capable of causing serious economic loss.

Little is known of the incidence and distribution of this disease in Australian sheep. It has been reported in New South Wales, South Australia, Victoria and Tasmania.

The occurrence of this flock abortion-producing disease of sheep in Western Australia was confirmed for the first time in April, 1961. In 1962 the disease was positively diagnosed on 11 properties and strongly suspected on many more. It is interesting to note that nearly all these properties were situated in the northern and north eastern wheatbelt. The central position of the 1961 outbreak at Ballidu suggests the possible spread in several directions from a central focal point of infection. Outbreaks in 1963, 1964 and recently in 1965 showed the spread of infection within the eastern wheatbelt and into the higher rainfall areas of the South-West.

Signs of Infection

The characteristic symptom of vibriosis in sheep is abortion in the later stages of pregnancy. The usual history is that a few ewes abort (usually not recognised) in the earlier stages of pregnancy and the abortion "storm" commences about six weeks before the flock is due to lamb.

The earlier, unobserved abortions contaminate the paddocks with the infectious vibrios and spread the infection to the rest of the ewe flock.

Most abortion storms occur about six weeks before the due date of lambing and losses increase rapidly during the next few days. The epidemic (abortion "storm") may then commence to dwindle or may continue right up to the normal lambing date (and possibly beyond).

The abortion rate varies from 5 to 50 per cent. and may be as high as 70 per cent., but is usually between 10 to 20 per cent. Up to 5 per cent. of the aborting ewes may die as a result of uterine sepsis (blood-poisoning).

There are no well-defined signs preceding abortion, but close observation may reveal a vaginal discharge several days before abortion and the ewe may appear sick. The ewes usually have a brownish discharge for several days after abortion and apparently lose the infection within a few weeks.
All discharges, aborted lambs and placental membranes (afterbirth) contain countless millions of the infecting organism *Vibrio fetus*.

**Course of Infection**

The infective organisms, after *ingestion* by a susceptible pregnant ewe, enter the bloodstream, invade the uterus (womb) and proliferate in the placental tissues (afterbirth), resulting in a placentitis (inflammation of the afterbirth) which generally causes early expulsion of the developing lamb. However, the lamb may die in the uterus, become mummified and be expelled later, or die and become invaded by putrefactive bacteria; it may also be born dead, or born alive and weak at full-term, dying within a few days.

**Transmission of Infection**

Vibriosis in cattle is *venereal* and transmitted by infected bulls, but in ovine vibriosis the rams play little or no part in the transmission of infection. In contrast, infection appears to be transmitted *orally* in contaminated feed and water.

Experimental studies have shown ewes to be susceptible to infection in the second half of pregnancy and that abortion occurs one to three weeks after infection. The causative organism, *Vibrio fetus*, is fragile and quickly dies outside the animal body but it survives longer under cool, moist conditions. Therefore, an early abortion occurring onto moist ground around soaks or water troughs or onto the feed may be followed by rapid spread to the rest of the flock.

Once one ewe in a flock aborts, irrespective of the source of infection, the susceptible animals in the whole flock are endangered.

These facts help to explain why in most countries vibrionic abortion occurs mainly where lambing coincides with cold, wet seasons and why it can occur under the warm conditions prevailing with autumn lambing in Western Australia.

**Entry of Infection into a Flock**

The initial entry of vibriosis into a flock is usually impossible to trace, and little is known of its carry-over between abortion outbreaks. The usual history is that an outbreak occurs suddenly with no record of exposure to the disease. It appears likely that the organism enters the flock via a “carrier” animal from a previous outbreak. Evidence suggests that the organism may live in the gall bladder and/or intestines of these “carriers.”

Another possibility, however, is the existence of other “carrier” species such as crows and foxes. It is possible that infection could be picked up by these predators whilst scavenging dead, infected aborted lamb carcasses and placental membranes, and the infective organisms mechanically transmitted via their droppings to other susceptible flocks in the area. Work carried out by the Animal Health Laboratory in 1964 suggests that this is a possibility, at least with crows.

**Pathological Signs of Infection**

**LAMB**: About 20 per cent. of the aborted lambs show a number of pale, orange-yellow rosette-like areas of necrosis (degeneration) on and throughout the liver. A close-up view of a typical example is shown in the illustration.

**PLACENTAL MEMBRANES** (afterbirth): The membranes show evidence of infection (placentitis) occurring before abortion; instead of the cotyledons (buttons) being red in colour they are usually pale orange and degenerated. This tissue is one of the best to submit for confirmation of any cause of infectious abortion in sheep.

**ewe**: No characteristic signs are seen.
Photomicrograph showing the typical "flying seagull" appearance of V. fetus

Immunity
One aspect of this disease that must be emphasised is that it is self-limiting. Seldom is a recovered flock subjected to a second attack of vibriosis and it appears that such ewes are immune.

Diagnosis
Diagnosis of ovine vibriosis is based on the occurrence of abortion and examination of aborted lambs, placental membranes and vaginal discharges.

The most reliable method of diagnosis is by demonstration of the causative organism, V. fetus. This may be accomplished by microscopic examination of stained smears or by culture from the aborted lamb or placental membranes. The diagnosis is confirmed by finding the typical V. fetus organisms in stained smears or cultures. They have a characteristic curved appearance like "flying seagulls," as illustrated.

Specimens for examination by the Animal Health Laboratory should be despatched as quickly as possible, since V. fetus has a low viability, and also to reduce the degree of contamination.

If you suspect vibriosis in your flock, contact your nearest Government veterinary surgeon or private veterinary surgeon. Alternatively, send or bring the aborted lambs to the Animal Health Laboratory in South Perth without delay.

Treatment
There is no practical treatment available at present for vibriosis in ewes.

Control
There are no specific control measures for ovine vibriosis.

Once abortions have commenced in a flock, it is recommended that the following procedure be followed in order to reduce the lamb losses:
- Isolate all affected ewes for two to four weeks.
- Collect and destroy all aborted lambs and placental membranes.
- Do everything possible to prevent the contamination of feed and water by the vaginal discharges of the aborting ewes and by the aborted lambs.

It is not desirable for ewes from an infected flock to be sold for breeding as present evidence indicates that some may become "carriers." It is better to keep these ewes as they may be regarded as being immune to vibriosis.

Climate
In most parts of the world where vibriosis in sheep occurs it is associated with cooler localities and the colder months of the year.

The West Australian outbreaks in autumn have been different in that they have mainly occurred under hot, dry conditions. The reasons for the spread of infection under these seasonal conditions, particularly those occurring in 1962 (which was one of the hottest and driest on record) in the eastern wheatbelt are not fully understood at present. These outbreaks are considered to have been associated with spread around the areas of handfeeding and watering.

West Australian Outbreaks
The distribution of the vibronic abortion outbreaks is set out in the map. Except for the outbreaks occurring in 1963 and 1964 in the higher rainfall areas of the South-West (associated with late winter lambing), all the others have occurred in the 12 to 15 inch rainfall area of the wheatbelt, from Koolanooka in the north to Lake Grace in the south, and with extension to the Esperance district.
Confirmed outbreaks of vibrionic abortion in sheep have occurred in the following areas:

Babakin, Ballidu, Beverley, Bridgetown, Brookton, Carnamah, Chidlow, Chittering, Corrigin, Dalwallinu, Denbarker, Dinninup, Donnybrook, Gibson, Greenhills, Katanning, Kellerberrin, Kojonup, Kondut, Koolanooka, Lake Grace, Mandiga, Manjimup, Miling, Moora, Nungarin, Perenjori, Pithara, Quairading, Salmon Gums, Tammin, Tincurin, Traynin, Wanneroo, Yealering.

Ovine vibriosis has been diagnosed with certainty on 46 occasions since 1961 and strongly suspected on at least 16 other properties. It is also likely that many other outbreaks have occurred but have not been reported.

Distribution of confirmed outbreaks of vibriosis in W.A. since 1961. Each symbol represents the district concerned but not the number of outbreaks. The dots represent outbreaks associated with autumn lambing and the crosses winter and spring lambing.
It is considered from the observations of this disease over the past four years, that it may be regarded as being widespread throughout the eastern wheatbelt. The incidence of infection, however, remains unknown at present.

Current Studies

The Animal Health Laboratory is endeavouring to learn as much as possible about the distribution and transmission of this disease throughout the sheep breeding areas. This work is aimed at formulating better control measures for vibriosis in sheep.

Farmer Co-operation . . .

Your co-operation is earnestly requested with these investigations by reporting any abortion outbreak that occurs in your flock. Without adequate farmer co-operation, this work is impossible.

PREDATORS AND INFECTIOUS ABORTION

It is possible that infection due to flock abortion-producing pathogens may be picked up by predators whilst scavenging dead, infected aborted lamb carcasses and placental membranes, and the infective organisms mechanically transmitted via their droppings to other susceptible flocks in the area.

The possibility that these predators may act as "carriers" is being investigated by the Animal Health Laboratory. Work carried out in the past two years suggests that this is a possibility, at least with crows. Crows are effective scavengers of placental membranes, the tissue most likely to be infected with these flock abortion-producing diseases.

During 1964 the Animal Health Laboratory demonstrated that crows could be infected with Vibrio fetus and their droppings remain infected for at least 42 days. These infected droppings, when given to susceptible pregnant ewes by mouth, produced abortion and V. fetus was recovered from the lambs.

It is considered possible that crows may spread vibriosis from one flock to another or to other surrounding properties during a particular lambing season, but whether or not they can carry the infection over from one season to the next has yet to be elucidated. This work is continuing.

South Australian workers clearly demonstrated that crows could carry Salmonella typhimurium, the main causative organism of paratyphoid, in their droppings for two to four weeks and that these infective droppings were able to cause outbreaks of infection by contaminating water supplies.
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