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BLACKLEG or BLOOD-POISONING

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What is Blackleg and where is it found?

Blackleg is an acute general infection of cattle and sheep caused by a micro-organism (*Clostridium chauvei*). The disorder is generally characterised by gangrenous swellings either in the muscles or soft organs. The disease occurs in most parts of the world. Man is seldom affected by this organism, but can be affected by other members of the Clostridial family which cause gas gangrene. In the North Island of New Zealand the disease affects young cattle and these only in two areas. Sheep of all ages are affected in both islands, but in some areas in the South Island young sheep are the greatest sufferers. Cattle are seldom affected in the South Island.

What causes it?

A micro-organism called *Clostridium chauvei* is the direct cause of Blackleg. This organism is usually found in greatest numbers in the soil of permanent pastures and around well-used sheep yards. Once the disease appears, it is likely to reappear year after year because the organism can remain alive in the soil for many years in its resistant or spore form. Often these spores are picked up by sheep and find their way into the muscles where they can remain dormant for long periods.

How do the sheep become infected?

The precise mechanisms involved in stimulating these dormant organisms to bring about the disease are not fully understood. It is known, however, that infection is brought about in two main ways.

1. Sheep ingest the resting organism from contaminated pasture or water. This is frequently seen in cases when winter feeds such

as turnips are fed in breaks and the sheep are left on for periods of three to four weeks. These long periods allow the sheep to consume large amounts of contaminated soil. Hoggets are frequently infected in this way. The spores thus picked up may come to rest in the muscles of the animal and cause no harm until some other factor such as bruising or tissue damage occurs. Then the organisms begin to multiply rapidly. They produce poisons, kill tissue cells and form gasses in the muscles. The conditions most likely to set the organisms multiplying are any form of bruising, for example, rough handling during shearing, dipping, assisted lambing or vaccinating.

2. Sheep may have their tissues directly invaded with organisms by way of wounds. Wounds are frequently inflicted during the processes of shearing and dipping. Sheds and dipping pens are often grossly contaminated with Blackleg spores which thus gain entrance and cause trouble. Another form of wounding is the tissue damage caused when assisting ewes to lamb. If the organism gains entrance here, "blood poisoning," as Blackleg is sometimes called, usually follows. Ewes lambing without assistance can also be infected if lambing takes place on contaminated pastures or in close proximity to unfenced shelter belts which are sometimes infected.

How do pastures become contaminated?

As we have seen, healthy sheep can carry the dormant organism harmlessly in their intestines, thus

bringing the spores with them when introduced to a new farm. Only too often the farmer is to blame for paddocks becoming infected because he has failed to remove and destroy all dead sheep. When sheep have died from Blackleg infection and have been left to rot exposed to the elements, the organisms causing the death are allowed to escape, as spores, into the soil. They can remain there for many years, a constant source of danger to other sheep in the area.

What does the organism do to the animal?

The spores, which usually lie in a muscular area, or have been introduced to a wound or into the reproductive passages, begin to multiply rapidly on receiving the proper stimulation. They produce poisons which kill tissue or muscle cells. Gases are manufactured and the area becomes markedly inflamed and swollen. Later on it turns a blue-black colour, is cold and insensitive.

In addition to these local changes other organs are also affected. For example local lymph glands become swollen and changes also take place in the liver. Soon after death the organisms assist in the rapid putrefaction which follows.

In sheep assisted to lamb these same processes due to infection take place in the reproductive passage. In this case a blood-like discharge is often noted.

What are the signs of infection?

Often no signs of infection are seen and all one knows is that the animal has died suddenly. Occasionally an affected sheep will separate from the flock and cease grazing or ruminating. A closer examination discloses such an animal to be detected with perhaps a slight lameness due to limb muscles being affected. Soon the animal becomes cast and breathes rapidly. Muscular tremors are frequently observed. At first the sheep has a high temperature, but later this falls to below that of normal (102 deg. F.) and death follows within 12 to 36 hours.

One to two days after assisted lambing, similar symptoms are often seen. The vagina is swollen, turns black in colour and discharges a dark fluid. Lambs infected during faulty castration operations usually die about the third or fourth day following. They may show a dark swollen scrotum or tail or they may not show anything at all. When Blackleg sets in after shearing the majority of sheep die within 48 hours. The swollen black area pre-

viously described is usually found to be associated with a wound.

How can the disease be diagnosed?

This can be done firstly by the farmer himself observing the general symptoms and comparing them with those known to be present in Blackleg infections. Should the animal be dead when found he should pluck the wool, look for any dark swollen areas and note if any of these areas are associated with wounds. By opening the chest and abdominal cavities an examination can be made of the enclosed organs. However, it must be pointed out that the opening up of infected sheep will spread the organism further. Such an operation should be carried out only where thorough sterilisation is possible.

Diagnosis can also be made by laboratory examination of diseased tissue. Farmers can assist laboratory examination by sending the correct specimens. In this case they are—

1. Portions of affected muscle.
2. Two ribs with muscles removed.

Both these specimens should be taken from an animal which has been dead only a short time. Two ounces of intestinal contents from the lower third of the intestine would be of assistance in differentiating the disease from pulpy kidney with which it is frequently confused.

What can be done to prevent this disease and to limit future outbreaks?

There are three main ways in which this can be done.

1. By management:

- (a) Farmers should regulate the breaks of winter turnips so that sheep are on them for about seven days only.
- (b) When the disease occurs frequently after shearing it is well worth while taking steps to disinfect the boards and blades; at the same time farmers should aim at reducing all wounding to a minimum. Protruding objects in pens and yards should be removed. Since yards may be heavily contaminated and the spores are stirred up in the dust, it might help to damp the yards before allowing in the newly shorn sheep. It would help, too, if shorn sheep were removed from the yards as quickly as possible.
- (c) Since Blackleg or "blood poisoning" often appears

after marking and castrating, the general recommendations for these procedures should be adhered to. Briefly they are as follows: They should be carried out on clean pastures using temporary yards. All instruments should be boiled before use. Hands should be washed thoroughly and a 10% solution of Dettol should be available for frequent cleansing of knives. Lambs should then be kept on clean pastures until healing takes place.

- (d) Lambing should never take place on pastures known to be infected or in paddocks with unfenced shelter belts.

2. By observing common principles of hygiene:

All dead sheep should be burnt or at least buried. The skinning of dead sheep liberates the organisms which then form spores that can remain dormant for years. This might well result in a harvest of deaths in the future. Some attempt should always be made to disinfect the soil where the bloody discharges from mouth and vagina have fallen.

3. By vaccination:

Where a farmer has verified that his losses have been from Blackleg he can ensure a high

degree of protection by vaccination. This should be done at least three weeks before the usual losses are expected. Immunity develops in about ten days and remains for about one year when it can be reinforced by another vaccination. To protect lambs up to six weeks of age (that is to protect them at tailing) one should vaccinate the ewes a short time after tupping and again about ten days before lambing. The immunity substances are then passed to the lambs in the first milk or colostrum. To give protection over six weeks of age one should vaccinate the lambs at marking. Vaccine can be produced from the Department of Agriculture, stock firms and Veterinary Clubs. Literature giving details of procedure usually accompany the vaccine.

Is treatment of any value?

Generally treatment of an animal is of no value once the disease becomes apparent. Some farmers claim some success in preventing the disease by using penicillin and sulpha drugs after assisting a ewe to lamb.

Blackleg is a common disease of sheep and can be markedly reduced by observing the common principles of management and hygiene, and by making full use of the available vaccines.

Copies of this Bulletin may be obtained from the Secretary, Canterbury Chamber of Commerce, P.O. Box 187, Christchurch.