

Eradication and control of lameness in sheep

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INTRODUCTION

Lameness costs the sheep industry in Ireland approximately €5m annually. Farmers have developed a tolerance for looking at 'sheep prayer syndrome' and many fail to recognise the adverse effects of lameness on production, fertility and longevity. In this review, we will examine how and when to investigate a farm problem and outline some approaches to treatment and prevention.

INVESTIGATION

Prevalence of lameness on the farm establishes the need (or not) for further investigation. Estimating prevalence can be done by counting the number of sheep lame on any one day. If more than 5% of the flock is lame then intervention is necessary. Furthermore, it is critical to establish what is causing the lameness. In 2004, Jasmeet Kaler and Laura Green, two researchers at The University of Warwick, carried out a survey of English sheep farmer's ability to recognise six common foot lesions of sheep (Kaler and Green, 2008). The questionnaire they used in this survey is an excellent resource to check if you can correctly name all six lesions.

It can be accessed at <http://wrap.warwick.ac.uk/2966/>

THE CLINICAL ENTITIES

Scald is also known as interdigital dermatitis. Scald is caused by a bacterium called *Fusobacterium necrophorum*. *F. necrophorum* is found in the intestines of ruminants and is passed in faeces. Infection occurs through damaged skin. When the interdigital space is exposed to excoriation, trauma or wet conditions the *F. necrophorum* proliferate and cause scald. On examination the interdigital space is inflamed (red/pink) and moist with loss of hair. There is no smell and no involvement of the horn of the hoof.

Footrot occurs where scald is already established and the sheep come in contact with a second bacterium called *Dichelobacter nodosus*. *Dichelobacter* possess virulence factors, which result in under-running of the horn from the heel forward. Disease is associated with a characteristic pungent odour. Footrot is a sheep-to-sheep disease and, control and prevention must focus on a whole flock health plan.

Contagious Ovine Digital Dermatitis (CODD) was first reported in the UK in 1997. The aetiology of this disease remains unconfirmed but it is thought to be due to a spirochete, probably of the *Treponema* spp. (Sayers et al, 2009). Furthermore, in Sayers et al it was suggested that there might be a link with Digital Dermatitis of cattle, which may be important in the epidemiology and control. It causes

a high morbidity when it first enters a flock with up to 50% of the flock becoming lame. The pathology of this disease results in under-running of the hoof wall, starting at the coronary band and progressing downwards, and may result in separation of the entire hoof capsule.

Toe granuloma is a strawberry-like protrusion from the sole or, more commonly, the toe. The main cause of toe granuloma in sheep is over zealous foot paring. Treatments, such as blue stone (copper sulphate) and removal and cautery, are associated with limited success and often the best option is to cull the sheep.

Shelly hoof is synonymous with white line disease. It is a weakness in the junction between the wall and sole of the hoof. The wall detaches and the resulting space becomes clogged with soil and other debris. An abscess can form as the condition worsens. Paring may be required to release purulent material or infection can track out at the coronary band spontaneously. The aetiology of this condition remains uncertain but it is speculated that there may be a nutritional involvement (Winter 2004). In the absence of knowledge of causality, no definitive method of prevention has been established. In an Irish study in 2011, Shelly hoof was present in nine out of 10 flocks examined and was found in both lowland and hill flocks (Lynch and Hanrahan, 2011).

WHAT OPTIONS ARE AVAILABLE FOR CONTROL OF LAMENESS ON FARM?

Depending on the cause, individual aspects of a lameness control plan may need to be altered to render them farm specific.

CULL CHRONIC ANIMALS

Any sheep that has repeated bouts of lameness should be culled. Some sheep can be chronic carriers of foot rot and will not respond to treatment. These sheep should be identified and culled as they are an ongoing source of infection for the rest of the flock. Foot rot is mainly a sheep-to-sheep disease and infection is maintained in the flock on the hooves of these carrier sheep.

QUARANTINE 'BROUGHT-IN' SHEEP

It is important to have a purchase policy in place on farm. The most common way that foot rot and CODD enter a farm is on an infected sheep. Segregation of all sheep on arrival on farm (quarantine) and maintaining them separate from the main flock for at least 28 days is essential. Examination of their feet repeatedly during this time and foot bathing or treatment should be conducted as necessary.

SEGREGATE LAME SHEEP

Segregation of diseased sheep is another critical control step. All lame sheep should be isolated and maintained as a separate group and treated accordingly.

TREATMENT

Clinical cases of lameness should be promptly isolated and treated. Farmers that treat lameness within three days have a greater success rate and significantly lower flock incidence.

Treatment options include the following:

a) Paring

Historically, the most common treatment for foot rot was paring the hoof and applying a topical antibiotic spray. However, routine foot paring of the whole flock has been associated with a higher level of foot rot (Green et al, 2007). Also, paring lame sheep was associated with a longer time to recovery (Kaler et al, 2010). Therefore, we do not recommend routinely paring lame sheep.

b) Foot bathing

This is a very important part of any lameness control programme. Foot bathing can be an effective treatment for scald. However, its role in foot rot lies in helping with control and prevention. For foot rot, formalin and zinc

sulphate are the solutions of choice. There is no evidence that one of these formulations is more effective than the other. Solutions must be used at the concentrations recommended by the manufacturer. Stand sheep on a clean, dry surface for at least one hour afterwards. Turn sheep out onto a field that has been 'sheep-free' for at least two weeks.

In the case of CODD, there are no licensed footbath treatments. However, lincomycin and spectinomycin soluble powder or tylosin soluble powder (100g per 200L of water) have been used in early cases of CODD with some success. This can be repeated after 48 hours if necessary.

c) Topical antibiotics

Oxytetracycline spray is effective for scald. It is important that the sheep are kept standing on a dry area for one hour after such treatment.

d) Parenteral antibiotics.

A study of UK farmers in 2005 found that only 12% of farmers always treat foot rot with an antibiotic and 44% never include antibiotics in the treatment regime (Wassink et al, 2005). This is a matter of concern as foot rot is an infectious disease and antibiotic injections are now considered to be the preferred method of treating cases of foot rot. The most successful treatment for foot rot is parenteral administration of long-acting oxytetracycline (1ml/10kg bodyweight), plus removal of debris and application of oxytetracycline spray. In one study, parenteral administration of oxytetracycline resulted in 75% of the sheep with foot rot recovering within five days (Kaler et al, 2010). This antibiotic injection will result in therapeutic levels in serum for approximately 72hrs, therefore, it is important that sheep are turned out onto 'clean' pasture or they will become re-infected. There is no benefit in treating cases of scald with parenteral antibiotics as it is a superficial infection and so will respond better to topical antibiotic sprays.

CONSIDER THE EPIDEMIOLOGY OF THE DISEASE AND THE FARM-SPECIFIC CIRCUMSTANCES

Any lameness control plan must be farm specific and consider the agent(s) and the facilities. Farmers should take precautions to avoid the spread of infection. Gathering sheep for foot bathing can be counterproductive if the handling facilities are inadequate. Inappropriate management (hygiene of handling facilities, muddy tracks and damp pastures) can encourage the spread of infection.

VACCINATION

A vaccine is available for foot rot. Footvax, manufactured by MSD Animal Health, is licensed for the prevention of foot rot. It is a multivalent vaccine that contains 10 strains of *Dichelobacter nodosus*. Used correctly, this vaccine is an important part of successful foot rot control. Footvax is administered as a 1ml dose subcutaneously and should be repeated six weeks later. A booster dose is recommended

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every six months. Used in combination with other aspects, highlighted above, it has been found to be very effective.

SUMMARY

Establish the prevalence of lameness in the flock.
Establish the cause of the lameness in the flock.
Adapt the control measures above as appropriate to ensure that they are farm specific.

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Can you identify the following sheep lameness conditions?



It is:

1. Contagious;
2. Usually enters flock on feet of 'brought-in' animal;
3. Lesion starts at the coronary band; and
4. Involves the outside wall of the hoof instead of the sole



It is:

1. Contagious;
2. Underrunning of the horn from the heel forward; and
3. Foul smell



It is:

1. Contagious;
2. The interdigital space is red and inflamed; and
3. There may be loss of hair in the interdigital space

1. CODD 2. Footrot 3. Scald