

Treatment of footrot in lambs with Intra Hoof-fit Gel

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1 Introduction

1.1 General information

Intra Hoof-fit Gel is registered as a veterinary medicinal product for the treatment of Digital Dermatitis in dairy cattle. The active ingredients are chelated copper and zinc. Copper has a bactericidal effect and zinc enhances wound healing. For this reason we believe the medicinal product can be used for treatment of many other skin-related diseases.

In this study, Intra Hoof-fit Gel used to treat footrot is lambs. More details on footrot can be found below.

1.2 Background information on footrot

Footrot is a contagious bacterial disease in sheep and goats, caused by the organism *Dichelobacter nodosus* (*D. nodosus*) in association with a number of other bacteria. With full expression, virulent footrot is a severe, disease with significant economic loss from reduced wool growth and quality, poor ewe fertility, poor growth rates, losses from blowfly strike, and reduced value of sale sheep. In infected flocks, there are also significant costs associated with the control of the disease.

The development of footrot in sheep depends on both *infective* and *environmental* factors.

Infective factors

The bacterium *Dichelobacter nodosus*:

- is the only bacterium that will cause footrot;
- will not survive in the environment for more than 4 days even under the most favourable conditions;
- may persist for many years in the feet of infected sheep, even under dry conditions;
- will not invade dry healthy feet;
- will only establish if conditions are right for the development of dermatitis between the claws.

Environmental factors

Footrot is introduced into a clean flock by the introduction of infected sheep. The three main environmental factors for a footrot infection to establish and then transmit from sheep to sheep are:

- an average daily temperature of 10°C or higher for 4–5 days; and
- adequate moisture; and
- adequate pasture length or pasture density to make feet susceptible to infection.

Lesion development

The development of footrot lesions depends on:

- the presence of *D. nodosus* and the particular strain involved,
- host susceptibility (younger sheep are generally more susceptible than older sheep, merinos are generally more susceptible than crossbreds)
- environmental factors (see above),
- predisposing infection with other bacteria between the claws.

Strain differentiation

There are many strains of *D. nodosus* and they vary in the severity of the disease they cause. In many flocks, several strains of *D. nodosus* may exist. Benign strains usually cause lesions that are transient in nature with minimal economic loss. Infection with benign strains is termed 'benign footrot'. Virulent strains usually cause chronic and severe lesions associated with lameness, loss of production and, in severe cases, mortalities. Infection with virulent strains is termed 'virulent footrot'.

The term 'footrot', when used in the context of notification, control and eradication, means 'virulent footrot'.

1.3 Explanatory images on footrot

The photographs (see below) in the footrot scoring photo guide illustrate the progress of the disease from an inflammation between the claws to severe under running with a highly virulent strain.

In warm moist conditions, inflammation between the claws (score 1 and score 2) can develop into typical virulent footrot (score 3 and score 4) within 2 weeks if virulent strains of *D. nodosus* are present.

In the absence of virulent strains, lesions will not normally progress to the more severe form of the disease, even in the warm, moist conditions that are ideal for spread. However, a small percentage of sheep affected by benign strains, especially younger naïve sheep, may sometimes develop scores 3 and 4 lesions. Most of these will resolve without treatment when pastures dry off.

The clinical expression of the disease is strongly influenced by any treatments given, and by the environmental conditions at the time. In cold conditions or dry situations, virulent footrot may not develop into the typical score 4 lesion, but may remain at score 2 or score 3. However, when these sheep are moved to warm wet conditions, the disease will develop.

Footrot scoring guide



Normal foot

There is normal skin between the claws, with no reddening or inflammation and no loss of hair. There is no exudate present.



Score 1

Slight to moderate inflammation with some erosion between the claws. There is no underrunning or erosion of the skin or horn.



Score 2

The skin between the claws is inflamed and raw. This condition may involve part, or all, of the soft horn on the inside of the claws. There is no underrunning of the horn.



Score 3a

Separation of the skin horn junction, with underrunning extending no more than 5 mm.

Footrot scoring guide



Score 3b
Underrunning no more than halfway across the heel or sole.



Score 3c
More extensive underrunning of the heel or sole but not extending to the outside edge of the sole of the claw.



Score 4
The underrunning extends to the outside edge of the sole of the claw and involves hard horn.



Score 5
This is a severe form of the disease involving the sole, with extensive inflammation and underrunning of the hard horn of the hoof.

2 Materials and Methods

2.1 Materials

The product to test was Intra Hoof-fit Gel. The batch number is unknown but it was a 2013 batch, produced by Femigin (the registered veterinary medicinal product version) for the French market.

The target species for this trial were lambs presenting infected podales hurts, suppuratives to purulents.

2.2 Methods

The following setup was chosen for this test:

- 9 infected lambs were included in the trial
- Each lamb was treated once
- The infected area was completely covered with the product, after cleaning the hooves
- In some cases the hooves were also trimmed, causing the wounds to bleed again
- No bandage was used during treatment
- Images were acquired before or just after treatment (day 0) and on day 15 after treatment
- In all photos the lamb tag is included, showing the animal number

No other treated groups or untreated groups were included in the trial as positive or negative controls. So the effect of spontaneous healing is not taken into account in this study. However, it is known that the disease does not simply heal on its own: treatment is required.

The complete test was conducted by a French veterinarian and started on October 15th, 2013:

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3 Results and Discussion

The photos acquired were not always sharp and clear. In addition, on day 15 the claws were not always cleaned and the lesion may be covered with dirt on the photo. Hence not all results are clearly visible.

However, in most cases a clear improvement on the infected area can be seen (in 7 out of 9 lambs):

- On day 0 redness and wetness can be seen which are indications of an open wound.
- On day 15 these areas are darkened and dried, which indicate they are not open anymore.

In some cases (when the photos are of good quality), a complete and perfect heal can be observed (4 out of 9 lambs). In 2 out of 9 cases, the lesions only improved to a small extend and were still bleeding a bit on day 15.

Examples of two photos demonstrating good results are shown below. Images of all other lambs can be found in Appendix 1 of this study.



The veterinarian who conducted the study concluded the following:

“After a single application, these photos show favorable evolutions of all the hurts, same if some are not perfectly healed (some tracks of bleeding persist). According to me, a protocol planning two applications in one week or 10 days would be optimal.”

We agree with the advice of the veterinarian of applying the product twice in 7 days, since this is also more in line with the instructions for use for the treatment of Digital Dermatitis in dairy cattle.

4 Conclusion

Intra Hoof-fit Gel is effective in the treatment of footrot in lambs, when being applied only once without using a bandage. Applying the product twice in one week is expected to give optimal results.

Note that this is off-label use, since the product is registered as a veterinary medicine for the treatment of Digital Dermatitis in dairy cattle.

5 Appendix: Photos of all lambs

Day 0



Day 15



Day 0



Day 15



Day 0



Day 15

