

## Five-day foot bathing treatment of ovine footrot

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Five-day foot bathing is a treatment option that can be used as a disease reduction measure in winter and early spring, or introduced at the start of summer to treat clinically mild forms of footrot in sheep. Foot bathing can be used as part of a management strategy to eradicate virulent footrot from a flock but it can not be guaranteed to eradicate deep lesions of virulent footrot. Therefore, foot bathing alone can not be approved for eradication in place of a summer inspection program.

### Topical treatment of ovine footrot

*Dichelobacter nodosus*, the infectious agent of footrot, is easily destroyed in the laboratory by air and water. Yet it is an alarming survivor in the ruminant hoof, its natural habitat. In under-run and deep covert (hidden) footrot lesions, *D. nodosus* may survive five days of exposure to zinc sulphate, a powerful skin disinfectant. Although topical treatments may 'cure' many infected sheep, they will seldom achieve 100% cure of all sheep.

The destruction of *D. nodosus* in footrot lesions by repeated foot bathing appears to be cumulative. Zinc sulphate plus wetting agent penetrates a short distance into skin tissue and gradually reduces the number of viable *D. nodosus* bacteria in superficial lesions.

*D. nodosus* is inaccessible to treatment in deep under-run lesions. Research has shown that there is a significant risk that a treatment of five daily bathings of feet with under-run and deep footrot lesions will be unsuccessful. Five daily bathings are needed to ensure complete destruction of *D. nodosus* in feet with lesions of maximum score 1 or 2. The five bathings may be spread over ten days.

### What is covert footrot?

Sheep with covert footrot carry *D. nodosus* without showing obvious lesions. In general, covert footrot has two forms:

#### Superficial covert footrot

This is the most common form in Western Australia where outbreaks are invariably associated with mild virulent footrot. *D. nodosus* is present on or near exposed surfaces of the skin and is susceptible to external factors. Five-day foot bathing is very effective against this type of footrot.

#### Deep covert footrot

This form of footrot lesion is where *D. nodosus* has invaded the deeper tissues of the hoof. The skin or horn surface may appear to have healed and scar tissue may be evident but it is dry. Footbathing will not cure footrot in these circumstances. This form of covert footrot is usually associated with extremely virulent organisms. However, it is also a potential cause of treatment failure in susceptible sheep that are chronically infected with low virulence organisms, particularly in wet environments.

#### Why five-day foot bathing?

Five-day bathing will increase the probability of eradicating superficial covert footrot that otherwise may progress to deep lesions. It also can minimise the spread and progress of minor lesions during the 'spread period'. However, in practice, foot bathing in summer increases the risk of lesions being walled off and then acting as a source of infection after the next break of season. For this reason foot bathing is not normally recommended for use in summer.



Five-day foot bathing will destroy *D. nodosus* organisms located on or near the surface of the hoof. Foot bathing does not work against organisms that have deeply penetrated the hoof.

Photograph by Jo Peters, Footrot Operations Supervisor

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## To reduce the rate of culling

Left uncontrolled, the prevalence of sheep with lesions may be over 50 per cent during early summer, often in cases of mixed infection with 'S' and 'U' strains. Five-day foot bathing can minimise score 1 and 2 footrot lesions associated with these strains, with little or no culling. When applying five-day bathing in this situation, allow enough time between treatment and the summer eradication inspection, according to procedures recommended by your stock inspector.

## Detection of lesions after treatment

Five-day foot bathing at pasture senescence does not interfere with the detection of lesions six weeks after treatment. Lesions were observed within two weeks after five-day bathing in an experimental flock infected with a highly virulent 'S' strain. However, it was impossible to predict which individual sheep would have lesions after the foot bathing. Flocks infected with low virulence 'S' strains of *D. nodosus* showed no lesions in the six weeks after bathing or in the following spring.

## Factors affecting topical treatment of footrot

Environment, host resistance and virulence of *D. nodosus* strains are the major factors affecting the severity of lesions and the effectiveness of topical treatments. The deeper the lesions, the lower the chance of successful foot bathing. *D. nodosus* can persist in deep covert lesions for many months.

Environmental features that help summer eradication also increase the success of five-day foot bathing.

- Footrot can self cure on dry or sandy, well-drained soils.
- The chance of footrot eradication is also increased in hot dry summers.
- Footrot was not eradicated from a sheep flock chronically infected with mild 'S' strains of *D. nodosus* when the sheep were placed on wet lush pasture after five-day bathing.

Sheep with foot abscess can harbour the footrot bacterium without showing typical footrot lesions. There is no guarantee that *D. nodosus* harboured in foot abscesses will be successfully treated by five-day bathing. Abscesses are surrounded by thick scar tissue which may interfere with footrot treatment.

Other aspects to consider:

- Placing treated sheep on wet or lush pastured environments will greatly reduce the success of five-day foot bathing. Allow feet to dry out on grating or similar.
- Foot bathing solutions must be topped up daily and be free of mud.

- Mis-mustering can undo all the benefits of foot bathing treatments.
- Failure to adhere to the treatment protocol increases the risk of breakdown.

## Protocol for five-day foot bathing

The feet of all sheep are examined by an experienced inspector, and lesion scores recorded, in the week before five-day foot bathing.

- All sheep with greater than score 2 lesions, foot abscess or abnormalities as listed in the 'Farmer's Guide to Eradication', are culled from the property before bathing.
- Treat only sheep with score 0, 1 or 2 lesions.
- Baths are set up according to Miscellaneous Publication 25/2004.
- Prepare the foot bathing solution by slurring 20 per cent zinc sulphate heptahydrate plus wetting agent in a drum for 24 hours to dissolve.
- Bathe the sheep in the solution, covering the coronet of the foot, for 10 minutes each day.
- Monitor the strength of the solution daily with a Zinc Sulphate Footbath Hydrometer (Nufarm, Victoria).
- Use the same solution for five days, if it is not too dirty, topped up daily with extra chemical to maintain concentration and volume.
- Carry out the foot bathing in a dry environment, such as on grating, to maximise uptake of zinc in the horn. Mud overloads the bath with organic matter that binds and inactivates zinc sulphate.
- Between daily bathings keep the sheep in a dry paddock, or on concrete or slats.
- Dispose of the foot bathing solution according to local regulations.
- After foot bathing, keep the sheep on dryland conditions.

## Biosecurity

Livestock, machinery, fodder and people can introduce animal and plant diseases, weed seeds and pests. Develop a biosecurity plan for your farm to reduce the risk of these problems.

## Further reading

- Farmnote 67/2005 'Understanding benign footrot in sheep'
- Farmnote 60/2005 'Virulent footrot eradication in Western Australia'
- Miscellaneous Publication 25/2004 'Eradicating virulent footrot from Western Australia: a farmer's guide to eradication'