

PROCEDURE – BC & MS DIVISION

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NSW DEPARTMENT OF
PRIMARY INDUSTRIES

BIOSECURITY, COMPLIANCE & MINE SAFETY
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Title: DIAGNOSIS OF FOOTROT
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Authorised by: Executive Director, Biosecurity, Compliance and Mine Safety

OVERVIEW

This circular replaces Animal Industries Circular AI 2002/104 issued as a Written Instrument on 3/10/02 concerning the procedure on the diagnosis of footrot. The major change is the introduction of the DNA *intA* gene test as an additional laboratory test to assist with the diagnosis of virulent footrot.

SCOPE

This Procedure applies to Department of Primary Industries (DPI) staff. When approved and issued as a Written Instrument by the Rural Lands Protection Board (RLPB) State Council, the procedure also applies to inspectors employed by the RLPBs.

WARNINGS

All procedures for the diagnosis of footrot will address OH&S issues.

DEFINITIONS

Footrot, for the purpose of the Stock Diseases Act 1923, means virulent footrot, i.e. infection with virulent strains of *Dichelobacter nodosus* (*D. nodosus*)

RELATED LEGISLATION	Stock Diseases Act 1923 Stock Diseases Regulation 2004 Veterinary Practice Act 2003 Veterinary Practice Regulation 2006			
RELATED PROCEDURES	AI2002/106 Laboratory support for the diagnosis of footrot procedure			
RELATED DELEGATIONS	Nil			
RELATED DOCUMENTS	Information document on 'Laboratory Testing for Footrot'			
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PROCEDURE

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1. DIAGNOSIS

The principal criteria in making a diagnosis of footrot in a flock/mob are:

- prevalence of sheep within the flock/mob with lesions of score 2 or greater,
- prevalence of sheep within the flock/mob with lesions of score 4 or greater;
- progression or regression of lesions without treatment.

But these criteria have to take into account past and present environmental conditions and the flock history.

2. RECORDING

Veterinarians, Rangers, other inspectors and accredited Footrot Contractors are required to record accurate details of sheep examinations, flock history and environmental assessments. The veterinarian is responsible for ensuring that these records are maintained in order to justify diagnoses.

A footrot property report must be completed at each visit. This report must include the foot score report, an assessment of environmental conditions and details on the flock history, including changes since the previous visit where applicable.

Templates for foot scores and environmental assessment are available in AI Circular 2002/108 – Laboratory Support for Diagnosis of Footrot.

3. FLOCK HISTORY

The flock history must include details of:

- previous history of footrot in the flock,
- footrot status of neighbouring flocks,
- recent introductions into the flock,
- recent treatments that may have suppressed lesions,
- age, breed and sex of sheep,
- recent trucking of sheep between properties.

4. ENVIRONMENTAL CONDITIONS

In each flock where footrot lesions are detected, the veterinarian should always consider whether environmental conditions are conducive to the complete expression of clinical signs at the time of examination. There are different environmental requirements for the transmission, expression and progression of the less virulent forms of the disease. Some factors which should be taken into account include:

- time of year,
- rainfall in the previous 3 months,
- nature of pasture, including proportion of clover and an estimate of the dry matter per ha,
- mean daily temperature in the district in the previous 4 weeks,
- the ability of the pasture to keep sheep's feet moist.

A suitable "spread period" cannot be defined adequately district by district or season by season.

5. EXAMINATION OF SHEEP

A veterinarian must be familiar with the range of lesions present in the flock and must interpret these in the light of the environmental and flock history before establishing a flock diagnosis.

In all circumstances where virulent footrot is suspected, a sufficient number of sheep must be examined to ensure that the number of affected sheep (score 2 or greater) reflects the actual flock situation. In cases where the diagnosis is not certain this will involve the examination of **at least 100 sheep selected at random from the mob in question**. Repeat inspections and/or examination of more sheep are recommended when the diagnosis is not certain.

At each inspection, the lesions seen in sheep that have been examined are to be recorded on a foot score report.

6. CLINICAL PRESENTATION OF VIRULENT FOOTROT

Virulent footrot should be considered in any flock where sheep show advanced underrunning (score 4 or 5 lesions) or where a significant proportion show underrunning (score 3). The arbitrary level of more than 1% of sheep showing score 4 or 5 lesions may be a useful guide but should not be used as an exclusive criterion for considering virulent footrot.

Under warm, moist conditions, sheep show a severe and progressive separation of the soft and hard horn from the soft tissues underneath, often involving the whole of the sole and extending up the wall.

The disease develops rapidly in favourable conditions. Within 7 to 14 days inflammation between the claws (score 2) can develop into advanced underrunning (score 4).

Under favourable environmental conditions, more than 10% of sheep usually show advanced underrunning (scores 4 and 5) with lesions persisting if treatments are not undertaken.

Usually both claws are affected and often more than one foot.

Lameness is a feature of the disease.

Virulent footrot is capable of causing significant production losses.

7. CLINICAL PRESENTATION OF BENIGN FOOTROT

The main lesion is an inflammation of the skin between the claws, referred to as interdigital dermatitis (scores 1 and 2).

The condition is indistinguishable clinically from interdigital dermatitis and early virulent footrot. The interdigital skin between the claws is moist and inflamed and the horn at the heel may be slightly underrun.

A high percentage of the flock can be affected under favourable environmental conditions.

Usually more than one foot is affected.

Lameness is a feature but is usually not severe. An exception is heavy sheep (rams and pregnant ewes), where the weight aggravates the lameness particularly when sheep first stand up after resting.

The disease can disappear spontaneously without treatment, especially in dry weather or when sheep are moved to dry pasture.

In some circumstances lesions may progress to score 4 in a small proportion of the flock. These score 4 lesions are usually limited in severity compared to those of virulent footrot and regress without treatment.

The clinical expression of the disease depends on the strain of *D. nodosus*, the time of year, the pasture conditions and animal factors, e.g. young naïve merinos in suitable conditions are more likely to show clinical expression than adult sheep. If environmental conditions are less than ideal for footrot, the prevalence of lesions will be lower.

Any treatment will suppress expression and make clinical diagnosis more difficult.

8. OBJECTIVE SCORING FOR FOOTROT

Clinical lesions associated with *D. nodosus* infection are scored using the standard scoring system approved by the national Animal Health Committee as follows:

SCORE	DESCRIPTION
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	There is 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, raw and usually has an exudate present. This condition may involve part, or all, of the soft horn of the inside of the claws. There is no underrunning of the horn.
Score 3a	There is separation of the skin horn junction, with underrunning extending no more than 5 mm
Score 3b	There is underrunning no more than halfway across the heel or sole.

Score 3c	There is 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.

Descriptions of benign and virulent footrot are also provided on page 2 of the Primefact: 'Footrot in Sheep and Goats'. Lesions are illustrated on pages 6 and 7 of the Primefact.

9. DIAGNOSIS IN THE FLOCK SITUATION

There are four circumstances that are most likely to confront the veterinarian in the field when investigating footrot. The following are guiding principles to assist in making a field diagnosis.

9.1 Circumstances where the disease is virulent

There are sufficient sheep with advanced underrunning (Score 4 or 5 lesions), that the veterinarian is confident of a diagnosis of virulent footrot based on a single inspection and can justify this with adequate records.

OR

There are obvious chronic cases of advanced under-running (Score 4 or 5 lesions) irrespective of prevalence, in circumstances where risk assessment indicates virulent footrot is likely, e.g. a mob traced from an infected flock.

In these circumstances where the diagnosis is obvious on clinical grounds, laboratory tests are unnecessary and cannot be justified.

9.2 Circumstances where disease appears virulent, but further investigations may be required before making a diagnosis

There is a high proportion of sheep with lesions \leq Score 3c.

OR

There is a small proportion of sheep with Score 3c, Score 4, or even occasional Score 5 lesions, irrespective of the prevalence of lesser lesions in the flock.

Either circumstance may be due to:

- incomplete expression of virulent footrot because the infection is recent,
- incomplete expression of virulent footrot due to suppressive management procedures,
- full expression of benign footrot in a favourable environment.

The veterinarian must use his/her professional judgement as to whether the percentage of sheep with Score 3c or greater lesions is significant under the circumstances. The proportion of affected sheep will depend on the environmental conditions.

Where there are favourable conditions for expression, the flock must be reinspected in order to establish the diagnosis.

On re-inspection 2-3 weeks later, in the case of untreated virulent footrot:

- the prevalence of Score 3c lesions will have increased,

- Score 3c lesions detected at the previous inspection will have progressed to Score 4 or 5 in a significant number of sheep.

On re-inspection 2-3 weeks later, in the case of benign footrot:

- recent lesions will not have progressed significantly and some may have regressed.

Where there are unfavourable conditions for expression, the veterinarian may:

- use a laboratory test to assist in the investigation, and/or
- elect to wait for environmental conditions that favour expression before re-inspecting the sheep.

Where the veterinarian is uncertain of the clinical diagnosis but suspects virulent footrot, movement from the property should be restricted until a final diagnosis can be made.

9.3 Circumstances where the disease appears benign, but further investigations may be required before making a diagnosis

There is a significant proportion of sheep with Score 2 lesions.

OR

There is a small proportion of sheep with Score 3a, 3b or 3c lesions, irrespective of the prevalence of lesser lesions in the flock.

The veterinarian must use his/her professional judgement as to whether the proportion of sheep with these lesions is significant under the circumstances, e.g. environment, suppressive management.

Where there are favourable conditions for expression, the flock should be reinspected in order to establish the diagnosis.

On reinspection 2-3 weeks later, lesions will have progressed if due to virulent footrot.

Laboratory tests may assist the investigation.

9.4 Circumstances where virulent footrot can be excluded

Other identifiable causes of lameness not involving *D. nodosus* are diagnosed and the veterinarian is confident that the investigation has excluded the possibility of virulent footrot infection in the flock.

10. DIAGNOSIS OF FOOTROT IN PUBLIC PLACES

In a public place a veterinarian or an inspector may not have access to information about the flock history on the property of origin and in most cases will not be able to examine large numbers of sheep. In this situation diagnosis in the mob at the public place should be based on the clinical findings in the sheep examined.

Inspectors may use their powers under the SDA to act on **suspicion of virulent footrot** in a public place in order to minimise potential spread of the disease, but will require some confirmation of virulent footrot before taking action on the property of origin. Diagnosis of virulent footrot on the property of origin of the sheep is the responsibility of a veterinarian.

Inspectors must be able to justify the suspicion of virulent footrot in sheep in a public place with clinical and/or diary records.

For regulatory purposes, in public places, any underrunning assessed as Score 3a or higher of any hoof will constitute a basis for regulatory action. Further details on regulatory action are outlined in the footrot regulatory policies.

11. LABORATORY TESTING FOR FOOTROT

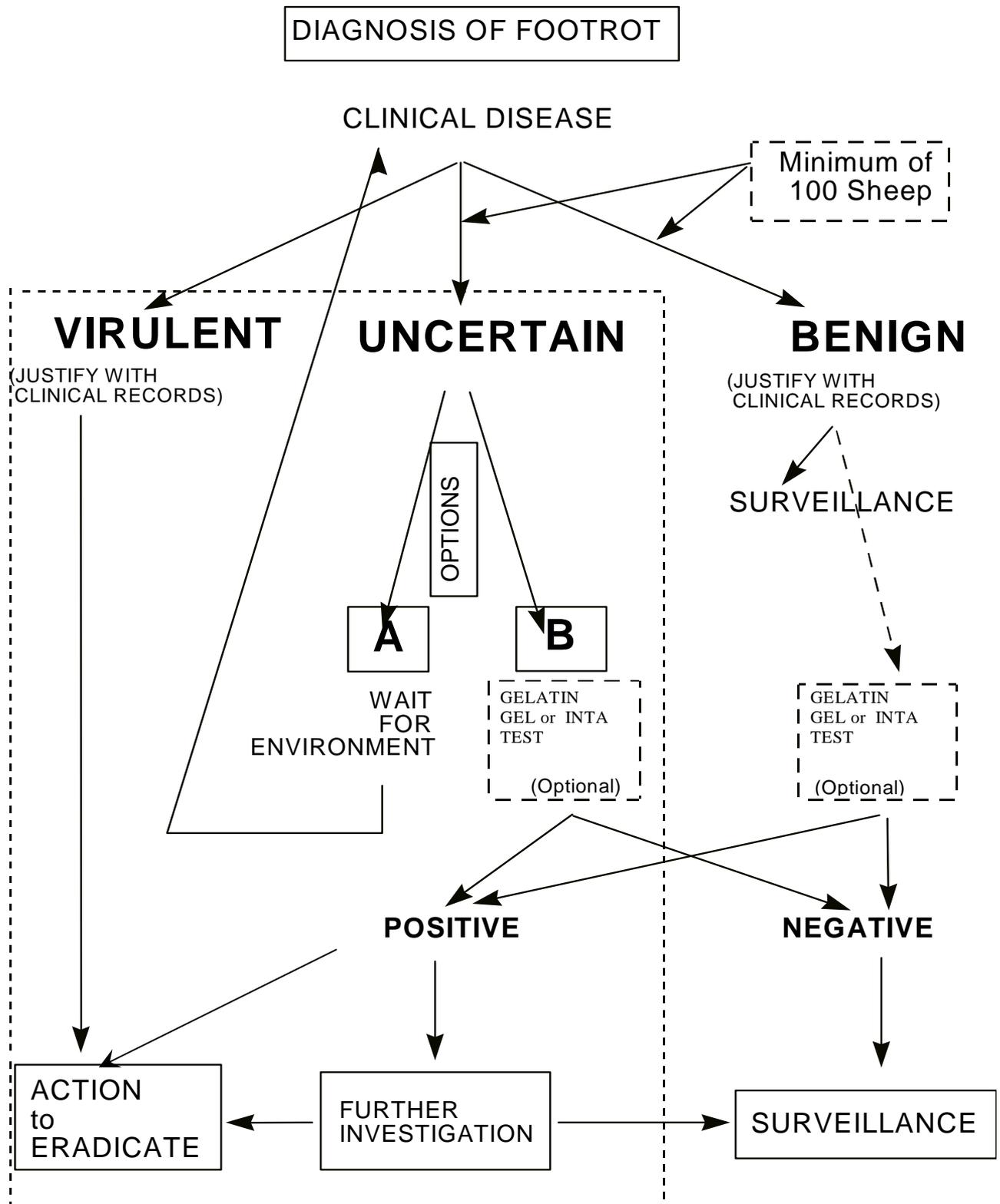
Description of laboratory testing for footrot is outlined in the Information Document 06/006. Reference should also be made to AI Circular 2002/108 – Laboratory Support for Diagnosis of Footrot.

IntA testing will be available only where a full field investigation has been undertaken and all epidemiological information is reported on the Footrot Specimen Advice (a minimum of 100 sheep examined at random, foot-scores reported, environmental score provided and clinical information included). The performance of the test will continue to be evaluated.

Investigations involving gel stable, *intA* negative isolates may be classified as benign footrot providing field investigations show:

- no evidence of progression of the disease, and
- a regression of existing lesions without treatment, and
- a very low persistence of underrunning lesions.

12. FLOWCHART FOR FLOCK DIAGNOSIS





NSW DEPARTMENT OF
PRIMARY INDUSTRIES

WRITTEN INSTRUMENT

state council
RURAL LANDS PROTECTION BOARDS

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DIAGNOSIS OF FOOTROT

The attached document is a **WRITTEN INSTRUMENT** issued with the concurrence of the Director-General of NSW Department of Primary Industries under Clause 8.3 of Memorandum of understanding between the Director-General of NSW Primary Industries and State Council of Rural Lands Protection Boards.

APPROVED

for B D BUFFIER
DIRECTOR-GENERAL
NSW DEPARTMENT OF PRIMARY
INDUSTRIES
Date: 21.02.2007

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CHIEF EXECUTIVE OFFICER
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Date: 13.02.2007