

# SURVEILLANCE OF INFECTIOUS DISEASES IN ANIMALS AND HUMANS IN SWEDEN 2020

Chapter excerpt -  
Footrot



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**Cover:** Juvenile mink in hand. Photo: Elina Kähkönen

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**Reporting guidelines:** Reporting guidelines were introduced in 2018 for those chapters related to purely animal pathogens. The guidelines build on experiences from several EU projects, and have been validated by a team of international experts in animal health surveillance. The aim is to develop these guidelines further in collaboration within the global surveillance community and they have therefore been made available in the form of a wiki on the collaborative platform GitHub (<https://github.com/SVA-SE/AHSURED/wiki>). Feel free to contribute!

**Layout:** The production of this report continues to be accomplished using a primarily open-source toolset. The method allows the source text, produced by authors, to be edited independently of the template for the layout which can be modified and reused for future reports. Specifically, the chapter texts, tables and captions are authored in Microsoft Word and then converted using pandoc and R to the LaTeX typesetting language. Most figures and maps are produced using the R software for statistical computing and the LaTeX library pgfplots. Development for 2020 has further improved the importing of content from Excel files to automatically build figures in the pgfplots LaTeX library. The tool is available as an R-package on GitHub (<https://github.com/SVA-SE/mill/>). The report generation R-package and process was designed by Thomas Rosendal, Wiktor Gustafsson and Stefan Widgren. In 2020, final typesetting was done primarily by Wiktor Gustafsson with contributions from the report authors.

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# Footrot



Lameness is a common sign of footrot. Photo: Bengt Ekberg/SVA.

## BACKGROUND

Footrot is a globally distributed contagious disease in sheep and goats. The causative agent is *Dichelobacter nodosus* (*D. nodosus*). The disease is characterised by interdigital necrotising inflammation with underrunning of part or all the soft horn of the heel and the sole. Predisposing factors are humid and warm weather conditions. The severity of footrot can vary by the strain of *D. nodosus* and the environmental conditions.

The first case of footrot in Swedish sheep was identified in 2004. Data on all affected flocks have been recorded since 2004. A voluntary control programme for footrot (“Klövkontrollen”) was established by Farm & Animal Health in 2009. Within the programme, the definition of footrot is when virulent strains of *D. nodosus* are detected with or without clinical lesions or when benign strains are detected together with clinical lesions.

## DISEASE

The clinical signs of the disease are typically foot lesions, and lameness due to the painful lesions. However, lameness is not a consistent clinical sign in affected sheep. Footrot varies greatly in severity from inflammation of the interdigital skin to complete underrunning of hoof horn.

## LEGISLATION

Footrot is a notifiable disease in Sweden (SJVFS 2013:23).

## SURVEILLANCE

The aim of the control programme is to eliminate footrot from affected sheep flocks and to provide certification of freedom from footrot for the sheep trade. Another important part of the programme is training of veterinarians and non-veterinary staff to perform clinical inspection and footrot scoring. The feet of sheep are inspected by veterinarians and farmers on an annual basis. The inspections are performed from August 15 to October 15, when the risk of footrot is highest due to the weather conditions. For all newly affiliated flocks and for all affiliated flocks with clinical signs suspecting footrot, a real-time PCR is used for detecting *D. nodosus* and determining strain virulence.

Flocks in which no clinical signs of footrot or virulent strains of *D. nodosus* are detected in any of the adult sheep are certified as free (F-status). If signs of footrot (virulent strains with or without clinical lesions or benign strains with clinical lesions) are detected, measures to eliminate footrot are undertaken, including foot baths in zinc sulphate and if necessary antibiotic treatment, moving of animals to clean pasture and culling of chronically infected sheep. Flocks

with a history of footrot can be certified as free at the earliest ten months after the last signs of infection.

328 (out of a total of 7900) sheep flocks are affiliated to the control programme. Most of the pedigree flocks in Sweden are affiliated to the programme.

## RESULTS

In 2020, footrot was confirmed in 5 new flocks; 2 within the control programme and 3 outside the programme (Figure 9). In 3 of the 5 flocks, virulent strains of *D. nodosus* were detected. In the programme, 326 flocks were certified free from footrot (F-status). Actions for elimination were taken in two flocks with footrot. Actions for elimination are voluntary, hence why not all positive flocks undergo elimination procedures. Prevalence studies in slaughter lambs were performed in 2009 and 2020. In the period between these screenings the prevalence had decreased from 5.8% to 1.8%.

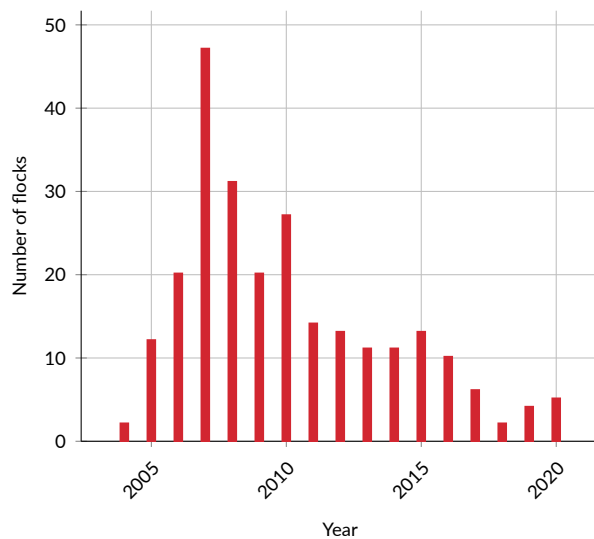


Figure 9: Number of sheep flocks detected with footrot within the programme, 2004–2020.

## DISCUSSION

The control programme demands quarantine before new animals can enter the flock, and hence the awareness of biosecurity and disease control in general has been enhanced in the sheep farming community. Since most of the pedigree flocks are affiliated, the impact of the programme is significant although they represent a minority of sheep flocks in Sweden. The sheep farmers association's agreement on a trade ban from infected flocks has been essential to the programme's success. Good collaboration between authorities, the sheep farming community and individual sheep farmers

has resulted in a cost-effective control programme. The new real-time PCR can discriminate between benign and virulent strains. This typing might make it possible to limit mandatory notification to virulent strains of footrot.

## TWO CASES OF CONTAGIOUS OVINE DIGITAL DERMATITIS

Contagious ovine digital dermatitis (CODD) is a severe infectious foot disease of sheep. In United Kingdom this condition is an important cause of severe lameness in sheep, typically affecting one digit of one foot. The etiology is not fully established, but *Treponema* spp. resembling those involved in digital dermatitis in cattle, are probably involved. There is no effective treatment of CODD, and it has a substantial impact on animal welfare. Outside UK, CODD has only been reported from a few countries, and in 2019 and 2020 the first two cases of CODD were diagnosed in Sweden. No connection between the two farms has been found. Both flocks were slaughtered. Through an intensive communication campaign from authorities and farm organizations, Swedish sheep farmers and veterinarians have been encouraged to increase their preparedness for symptoms related to CODD.

## REFERENCES

- Albinsson R (2021) Förekomst av klinisk fotröta och *Dichelobacter nodosus* hos svenska slaktlamm/Prevalence of clinical footrot and *Dichelobacter nodosus* in Swedish slaughter lambs. Master thesis SLU.
- Frosth S, König U, Nyman AK, Aspán A (2017) Sample pooling for real-time PCR detection and virulence determination of the footrot pathogen *Dichelobacter nodosus*. *Vet Res Comm* 41:189–193
- Frosth S, König U, Nyman AK, Pringle M, Aspán A (2015) Characterisation of *Dichelobacter nodosus* and detection of *Fusobacterium necrophorum* and *Treponema* spp. in sheep with different clinical manifestations of footrot. *Vet Microbiol* 179:82–90
- Frosth S, Sletteåas JS, Jørgensen HJ, Angen O, Aspán A (2012) Development and comparison of a real-time PCR assay for detection of *Dichelobacter nodosus* with culturing and conventional PCR: harmonisation between three laboratories. *Acta Vet Scand* 54:6
- König U, Nyman AKJ, de Verdier K (2011) Prevalence of footrot in Swedish slaughter lambs. *Acta Vet Scand* 53:27