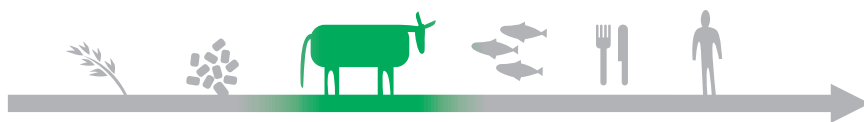


The Surveillance programme for footrot in Norway 2017



Veterinærinstituttet
Norwegian Veterinary Institute



The surveillance programme for footrot in Norway 2017

Content

Summary	3
Introduction	3
Aim	3
Materials and methods	3
Results	4
Discussion	4

Authors

Annette H Kampen, Lene Hermansen, Bjarne Bergsjø, Synnøve Vatn (Animalia), Petter Hopp

Commissioned by



ISSN 1894-5678

© Norwegian Veterinary Institute 2018

Design Cover: Reine Linjer
Photo front page: Colourbox

Summary

In 2017, approximately 122,000 sheep were inspected for footrot. A total of 95 animals originating from 64 different flocks were examined by PCR. Virulent strains of the bacterium *D. nodosus* was detected in one sheep flock.

Introduction

Ovine footrot is an infectious disease of sheep and is caused by the bacterium *Dichelobacter nodosus*. The severity of disease varies and is dependent on the breed of sheep, environmental factors and bacterial strain. *D. nodosus* strains are divided into so-called benign and virulent strains. In Norway, disease caused by virulent strains (severe footrot) is a notifiable disease (List B). The control of this disease is enforced by government legislation and restrictions on animal movement.

Since 1948, footrot had not been detected in Norway until the bacterium was detected in a single herd with lameness in 2008. Clinical footrot was detected in other flocks later the same year. All sheep flocks in the counties of Rogaland, Aust-Agder and Vest-Agder, more than 250,000 animals, were then included in the project "Turn the sheep" launched by the sheep industry. *D. nodosus* was detected by PCR in more than 500 flocks, but at that time no laboratory methods were available in Norway to differentiate between benign and virulent strains.

In 2009, the project "Healthy feet" was launched as a collaborative project between the industry, the Norwegian Food Safety Authority and the Norwegian Veterinary Institute. The goal was to eradicate severe ovine footrot in Norway. The project terminated end 2014. In this project, more than 400,000 examinations of sheep originating from approximately 4,500 flocks were performed in the field, and approximately 190,000 animals were inspected at slaughterhouses (1).

A national surveillance programme for footrot in sheep was established in 2014 (based on methods already used in the "Healthy feet" project). In addition to the surveillance programme (2), footrot is also sometimes detected via clinical investigations. Any positive finding is followed up, and contacts are traced.

Aim

The aim of the surveillance programme for ovine footrot is to detect flocks with virulent strains of *D. nodosus* in sheep.

Materials and methods

The feet of approximately 122,000 sheep were inspected by specially trained staff at six slaughterhouses in Southern Norway. There were 147 inspection days at five slaughterhouses in areas where footrot had occurred, i.e. the counties of Rogaland and Aust-Agder. In addition, three inspection days were used at one abattoir situated in the county of Buskerud.

Samples were collected from sheep feet showing clinical signs in agreement with footrot score 2-5. Normally three samples were collected from the same flock to secure the diagnosis, normally by sampling two feet of the first animal with symptoms and one foot from another animal. In addition, two samples should be collected each inspection day if no sheep with clinical signs was found at the slaughterhouses situated outside the county of Rogaland.

Samples were analysed using a 16S rRNA real-time PCR for the detection of *D. nodosus*, and positive samples were further analysed using a duplex real-time PCR to differentiate between benign and virulent strains of *D. nodosus*.

Results

A total of 125 different samples from 95 animals originating from 64 different flocks were examined by PCR. Virulent strain of *D. nodosus* was detected in one sheep flock.

Table 1. Number of inspection days at abattoirs and number of samples examined with PCR and the corresponding result for the Norwegian surveillance programme for virulent footrot in sheep.

Year	Inspection days at abattoirs	Estimated number of inspected carcasses	Examined by PCR		Positive	
			Animals	Samples	Animals	Flocks
2014	150	121 000	150	172	0	0
2015	150	92 500	221	310	6	3
2016	150	120 000	186	253	0	0
2017	150	122 200	95	125	1	1

Discussion

The detection of a virulent strains of *D. nodosus* in one sheep flock shows that slaughterhouse surveillance may detect infected herds and spark investigation of an outbreak. The low number of positive flocks in the slaughterhouse-based surveillance in 2017 combined with the results from previous years indicates that the occurrence of severe footrot is low, and that the probability of the disease being spread outside Rogaland and Aust-Agder is very low (3). However, six positive contact flocks were detected during the investigations following the slaughterhouse detection, all with little or no clinical symptoms.

It is challenging to detect infectious agents with the ability to both cause subclinical infections as well as severe disease outbreaks, and difficult to discover the infection prior to disease outbreaks and further spread if severe clinical signs are absent. The number of animals sampled in the surveillance programme were lower in 2017 than the previous years, despite high levels of rain, and infected flocks showing little symptoms. Under such conditions it should be considered to include sampling of animals with score 1 in future surveillance.

The findings in the programme underline the importance of continued awareness of footrot as well as continued active surveillance in order to reach the goal of eradicating virulent footrot from Norway.

References

1. Anonymous. Sluttrapport Friske føtter http://www.fotrater.no/media/Sluttrapport_Friskefotter_mai_2015_lavvoppl.pdf (accessed 15.05.2016).
2. Kampen AK, Hermansen L, Bergsjø B, Vatn S, Hopp P. The surveillance programme for footrot in Norway 2016. Surveillance programmes for terrestrial and aquatic animals in Norway. Annual Report 2016. Oslo: Norwegian Veterinary Institute 2017.
3. Grøneng GM, Vatn S, Kristoffersen AB, Nafstad O, Hopp P: The potential spread of severe footrot in Norway if no elimination programme had been initiated: a simulation model. Vet Res 2015, 46:10.

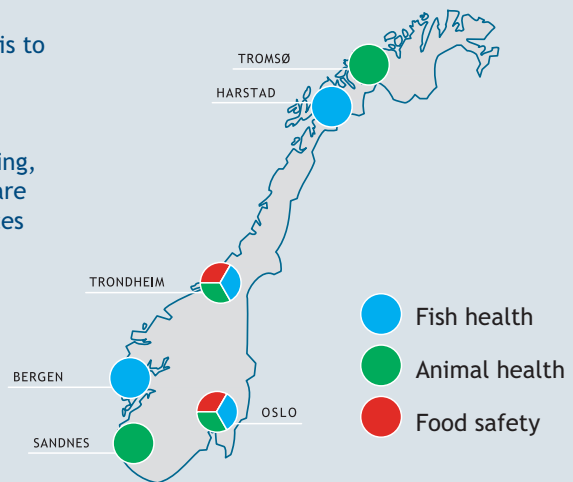
*Scientifically ambitious, forward-looking and cooperatively oriented
– for integrated health*

The Norwegian Veterinary Institute is a national research institute that operates in the fields of animal and fish health, food safety and feed hygiene; its primary task is to provide the authorities with independently generated knowledge.

Emergency preparedness, diagnostic services, monitoring, reference functions, consulting, and risk assessments are all important areas of activity. Our products and services include research results and reports, analyses and diagnoses, studies and advice.

The Norwegian Veterinary Institute's central laboratory and administration lie in Oslo, and we operate regional laboratories in Sandnes, Bergen, Trondheim, Harstad and Tromsø.

The Norwegian Veterinary Institute collaborates with a large number of national and international institutions.



Fish health



Animal health



Food safety



Oslo
postmottak@vetinst.no

Trondheim
vit@vetinst.no

Sandnes
vis@vetinst.no

Bergen
post.vib@vetinst.no

Harstad
vih@vetinst.no

Tromsø
vitr@vetinst.no

www.vetinst.no



Veterinærinstituttet
Norwegian Veterinary Institute