Annual Report

The surveillance programme for maedi in Norway 2016

Veterinærinstituttet
Norwegian Veterinary Institute

The surveillance programme for maedi in Norway 2016

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Summary

None of the 3,504 investigated flocks were diagnosed with maedi in 2016.

Introduction

Maedi is a progressive viral pneumonia in sheep first described in Iceland in 1939 (1). The disease occurs in several European countries as well as in other continents. The disease visna is a neuropathogenic manifestation of the infection (1, 2). Both forms of disease are caused by a small ruminant lentivirus (SRLV), the maedi-visna virus (MVV) which is closely related to the caprine arthritis encephalitis virus (CAEV). Maedi-visna is classified as a list B disease in Norway and is notifiable to the Office International des Epizooties. In Norway, maedi was officially reported for the first time in 1972 (3).

In November 2002 and January 2003, post-mortem examinations of lungs from two diseased sheep from two different farms in Nord-Trøndelag county showed histopathological changes consistent with maedi. During the following investigations more than 15,000 sheep in 300 flocks were serologically examined for maedi-visna infection, and 50 flocks were found to be seropositive (4, 5). The outbreak demonstrated the need for a nationwide surveillance programme, which started in November 2003 (4, 6).

An overview of the number of new infected flocks registered each year up to 2016 is given in Figure 1.

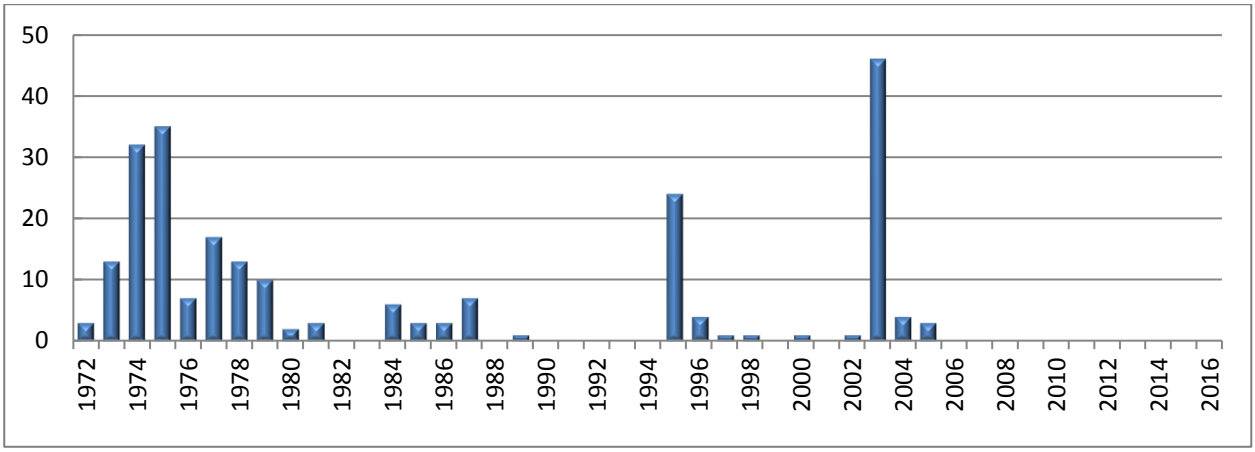

Figure 1. The number of new flocks infected with maedi from 1972 and onwards. The bars for 2003 – 2005 show both seropositive flocks detected through the investigations after the outbreak in Nord-Trøndelag county and seropositive flocks identified in the programme.

Aims

The aims of the surveillance programme for maedi are to document the status for maedi-visna virus infection in sheep in Norway and to identify infected flocks for disease control.

Materials and methods

The surveillance programme is based on serological examination of sheep. For 2016, collection of 10,000 blood samples from sheep taken at slaughter was planned. A maximum of five animals (>2 years old) were to be sampled per herd any given day. The sampling was done at 18 abattoirs, each slaughtering at least 100 sheep per month in the period January – May, which were the preferred sampling months. A smaller proportion of the animals were sampled in the period September – November. In addition, meat inspectors at the abattoirs were asked to monitor sheep and especially their lungs for detection of suspicious cases consistent with maedi-visna virus infection.

The samples were examined for antibodies against maedi-visna virus with ID Screen® MVV / CAEV Indirect ELISA (ID.vet, Grabels, France) at the Norwegian Veterinary Institute in Sandnes. Samples with inconclusive or positive ELISA results were tested in duplicates with ID Verification® MVV / CAEV Indirect ELISA (ID.vet). Positive and inconclusive samples were transferred to the Norwegian Veterinary Institute in Oslo and tested with an ELISA IDEXX MVV/CAEV p28 Ab Verification Test (IDEXX Laboratories, Maine, USA) and/or agar gel immunodiffusion test (AGIDT, Maeditect, Animal and Plant Health Agency (AHPA), Weybridge, UK).

In case of positive or inconclusive results on a sample taken from a sheep at slaughter, follow up sampling was done on selected animals in the flock of origin as described previously (7).

Results

A total of 9,858 samples from 3,504 flocks were analysed in 2016 (Table 1). This was approximately 24% of the total number of Norwegian sheep flocks.

In 2016, in total 40 samples from 38 different flocks had positive or inconclusive serological results. Twenty of these flocks were followed up with sampling of a selection of animals and were concluded serologically negative for maedi. One flock had a history of contact with goats positive for caprine arthritis encephalitis virus. The remaining 17 flocks will be followed up and sampled during 2017.

No suspicious cases consistent with maedi-visna virus infection were reported from the meat inspectors at the abattoirs.

Table 1. The results and total number of sheep flocks within the frame of the Norwegian surveillance programme for maedi 2003-2016.

Year	Total no. of flocks*	No. of flocks analysed	No. of animals analysed	Average no. of animals analysed per flock	No. of positive flocks
2003	18 400	456**	13 951	30.6	1
2004	17 439	1 230	36 911	30.0	1
2005	16 500	940	29 248	31.1	2
2006	15 800	911	27 846	30.6	0
2007	15 400	1 004	29 633	29.5	0
2008	15 059	783	23 235	29.7	0
2009	14 800	417	12 198	29.3	0
2010	14 800	188	5 697	60.6	0
2011	14 500	467	13 628	29.2	0
2012	14 300	479	14 043	29.3	0
2013	14 242	468	13 550	29.0	0
2014	14 218	3 506	9 771	2.8	0
2015	14 425	3 357	9 442	2.8	0
2016	14 561	3 504	9 858	2.8	0

* Based on data from the register of production subsidies as of 31 July the respective year.
** Sampling period: November 20. to December 31.

Discussion

During the years 2003-2008, ram circles and their flocks registered as members of The Norwegian Sheep and Goat Breeders Association constituted the target population for the programme. Approximately 90% of the Norwegian sheep flocks participating in ram circles were screened for antibodies against maedi during

2003 to 2005. They were retested in the programme during 2006 to 2008. In 2009, breeding flocks of other sheep breeds than those represented by The Norwegian Sheep and Goat Breeders Association were selected for sampling. In 2010 - 2013, randomly selected sheep flocks were sampled. From 2014 onwards, animals were sampled at slaughterhouses, giving a better surveillance of the total population with use of fewer resources compared to on-farm sampling (8). However, since fewer animals are sampled in each flock, the accuracy of the surveillance programme to predict a negative herd status for maedi is lower than before.

From 2003, the nationwide surveillance programme for maedi used an indirect ELISA (former ELISA CAEV/MAEDI-VISNA serum verification kit, Institut Pourquier, Montpellier, France) for screening sheep for MVV antibodies. This method was evaluated to be more sensitive than the AGIDT it replaced in the former programme (9). However, results from a proficiency testing scheme in 2013-2015, organized by the GDI Animal Health, Deventer, the Netherlands, revealed a lack of sensitivity of the kit (IDEXX MVV/CAEV p28 Ab Verification Test), when performed in our laboratory (10). It was decided to use the ID Screen® MVV / CAEV Indirect ELISA as screening test for the programme. Increased sensitivity seems correlated to lower specificity. In 2016, samples from 38 flocks have been seropositive or inconclusive for maedi with the new method. In nineteen flocks followed up so far, herd sampling has revealed no serologically positive animals, suggesting that this new ELISA may give some false-positive results.

Results from the surveillance and control programme for maedi, including data from November 2003 through 2006, showed a preliminary prevalence of less than 0.2 % positive flocks. Knowledge about the distribution of the disease so far indicates that it was regionally clustered, and that a more extensive spread of maedi-visna virus from the outbreak in 2003 has probably been prevented by the restrictions on transfer of sheep across county borders. The fact that maedi has not been detected in the surveillance programme since 2005 indicates that the prevalence of the infection in Norway is very low.

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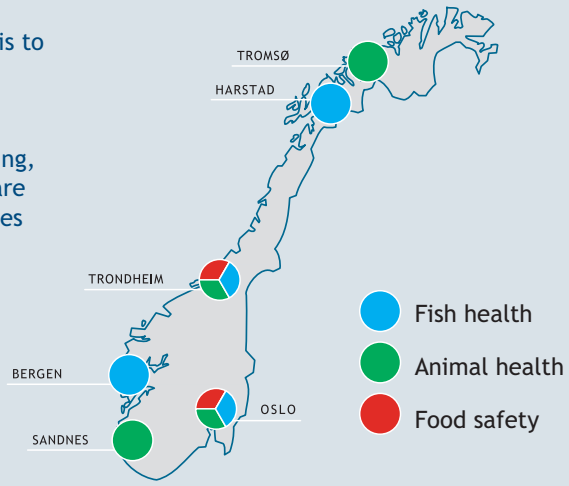

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