Surveillance and control programmes for terrestrial and aquatic animals in Norway
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The surveillance and control programme for maedi in Norway

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Introduction

None of the investigated flocks were diagnosed with maedi.

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 caused by the same virus as maedi, but is a neuropathogenic manifestation of the infection (1, 2). 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 new, nationwide surveillance and control programme, which was started in November 2003 (4, 6).

An overview of the number of new infected flocks registered each year up to 2008 is given in Figure 1.

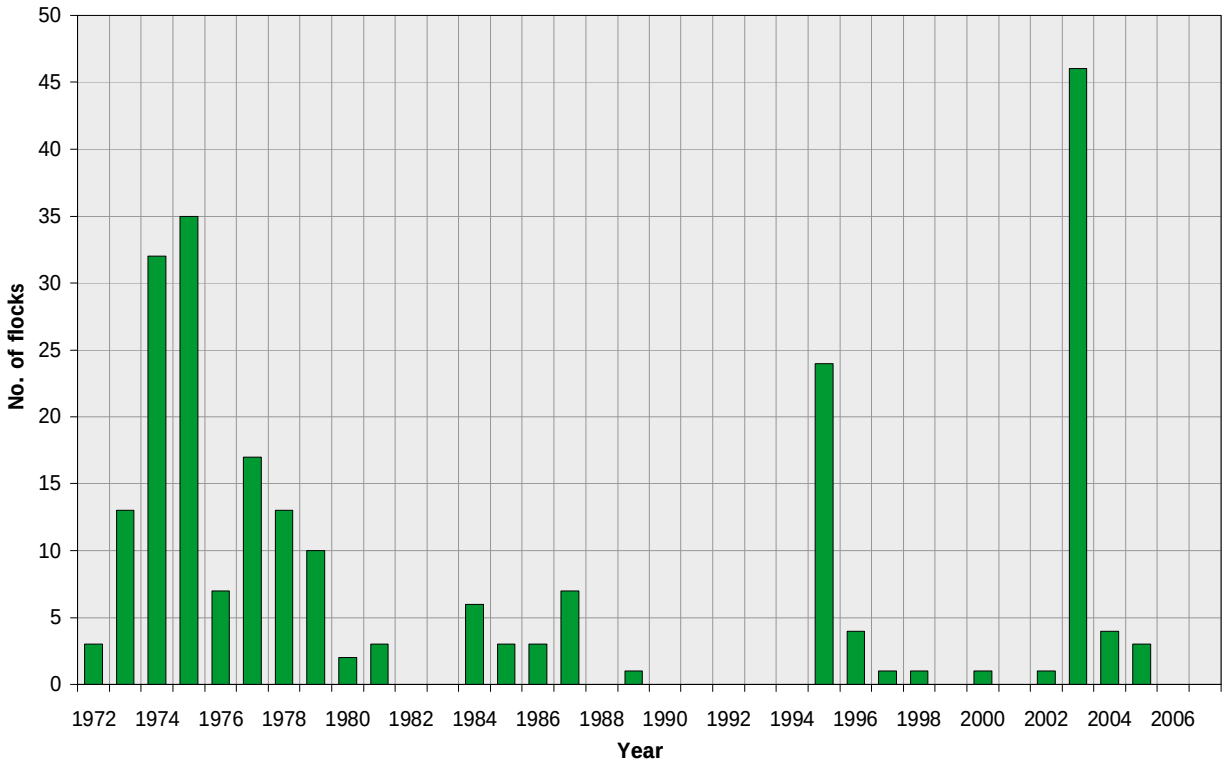

Figure 1. The number of new flocks infected with maedi during the period 1972 to 2008. The bars for 2003 – 2005 show both seropositive flocks detected through the investigations after the outbreak in Nord-Trøndelag county and seropositive flocks identified in the programme.

Aim

The aims of the surveillance and control 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

Ram circles and their member flocks registered by The Norwegian Sheep and Goat Breeders Association constitute the target population for the programme. Of a total of 15,059 sheep flocks in the national population, approximately 1,744 flocks were part of this breeding system in 2008. Of the breeding flocks, 563 flocks were selected for testing. In addition, sheep from 300 randomly selected flocks not belonging to any ram circle were included.

In flocks of less than 30 animals, all animals were sampled. In flocks of 30 to 100, 100 to 200, and more than 200 animals, samples from 30, 35, and 40 animals were analysed, respectively. All rams and sheep more than one-and-a-half years old were sampled in each flock.

The programme in 2008 was based on serological examination of blood samples from the selected sheep for antibodies against maedi-visna virus with the ELISA from Pourquier (ELISA CAEV/MAEDI-VISNA serum verification kit, Institut Pourquier, Montpellier, France). Sero-positive ELISA-results were retested in duplicate with the same ELISA and verified by an agar gel immunodiffusion test (AGIDT, Meditect, Veterinary Laboratories Agency, Weybridge, UK). CAEV specific agar gel immunodiffusion test was performed in cases where CAEV could have been the cause of positive reactions in the ELISA. In the case of inconclusive results (including single reactors), new blood samples from the animals were taken one to two months after the first sampling. These samples were tested in duplicates in both tests (7).

Due to the known cross-reactions in the serological tests between maedi-visna virus and caprine arthritis encephalitis virus (CAEV) infection, blood samples from sero-positive flocks with both sheep and goats are tested with a PCR-method developed at the National Veterinary Institute. The PCR-method is designed to amplify sequences from both CAEV and maedi-visna virus, followed by sequencing to differentiate the two virus types.

The meat inspectors at the abattoirs still play an important role in the programme by monitoring sheep and especially sheep lungs for detection of suspicious cases consistent with maedi-visna virus infection.

Results

Samples from a total of 783 flocks were analysed in 2008, this is approximately 5.2% of the total Norwegian sheep flocks. Of these flocks, 501 were members of ram circles, corresponding to approximately 28.7% of the total number of flocks in ram circles (Table 1).

In 2008, none of the investigated flocks were concluded positive for maedi. Seven sheep from one flock with close contact with goats were positive in the serological tests. Two sheep in this flock were confirmed to be infected with CAEV by immunedifusion test. Twenty-four sheep from another flock with close contact with goats were positive in the serological tests. New samples were received from a number of sheep, but lentivirus was not detected in any of these samples. Further follow up was not performed, since the flock had been slaughtered in the meantime, and the flocks were concluded to be negative for mædi.

Table 1. The number of flocks and sheep tested in the Norwegian surveillance and control programme for maedi 2003-2008

Year	Total no. of sheep flocks*	Total no. of flocks in ram circles	No. of flocks sampled	No. of animals tested	No. of positive flocks
2003	18,400	2,227	456**	13,951	1
2004	17,439	2,600	1,230	36,911	1
2005	16,500	2,519	940	29,248	2
2006	15,800	2,198	911	27,846	0
2007	15,400	1,654	1004	29,633	0
2008	15,059	1,744	783	23,235	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

The programme, which started in 2003, was designed to increase the sensitivity of detecting infected flocks without increasing the costs per flock. This was done by increasing the number of sampled animals per flock and applying a more sensitive, but less labour-intensive test.

The sample size per flock was adjusted so that if none of the tested animals were seropostive, the prevalence of maedi-visna infected animals in a flock would be less than 6 %, given a confidence level of 95 % and 100 % test sensitivity.

A commercial ELISA from Inst. Pourquier is employed in this programme. Another ELISA and the AGIDT were previously used when the first test was positive. In 2006, the second ELISA test was omitted, as a study showed that this would increase the overall sensitivity of the test regimen without lowering the specificity (7).

Results from the surveillance and control programme for maedi, including data from November 2003 through 2006, show a preliminary prevalence of less than 0.2 % positive flocks (4, 8). Knowledge about the distribution of the disease so far indicates that it is regionally clustered, and that a more extensive spread of maedi-visna virus has probably been prevented by the restrictions on transfer of sheep across county borders.

References

1. Pálsson PA. Maedi-visna. History and clinical description. In: Pétursson G, Hoff-Jørgensen R (editors). Maedi-visna and Related Diseases. Boston: Kluwer Academic Publishers; 1990. p. 3-17.

2. Martin WB, Aitken ID. Diseases of Sheep, 3rd edition. Oxford: Blackwell Scientific Publications; 2000.

3. Krogsrud J, Larsen HJS, Rimstad E. Mædi og lungeadenomatose [Maedi and lung adenomatosis, No]. Nor Vet Tidsskr. 1996; 108: 729-36.

4. Sviland S, Nyberg O, Tharaldsen J, Heier B T, Mork J. The surveillance and control programme for maedi in Norway. In: Mørk T, Hellberg H (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2003. Oslo: National Veterinary Institute; 2004. p. 89-95.

5. Kampen AH, Tharaldsen J, Åkerstedt J, Norström M, Nestvold OK, Myhre JL, Nyberg O. Diagnosis and investigations of an outbreak of maedi in Norway 2002 – 2005. Proceedings of the 6th International Veterinary Vaccines and Diagnostics Conference; Jun 25 – 29. Oslo, Norway; 2006. p. 91-2.

6. Mork J, Jarp J. The surveillance and control programme for maedi in Norway. In: Fredriksen B, Mørk T (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2001. Oslo: National Veterinary Institute; 2002. p. 109-15.

7. Toft N, Åkerstedt J, Tharaldsen J, Hopp P. Evaluation of three serological tests for diagnosis of Maedi-Visna virus infection using latent class analysis. Vet Microbiol. 2007; 120: 77-86.

8. Kampen AH, Tharaldsen J, Stuen S, Grøneng G, Nyberg O. The surveillance and control programme for maedi in Norway. In: Brun E, Hellberg H, Sviland S, Jordsmyr HM (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2006. Oslo: National Veterinary Institute; 2007. p. 82-86.

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