

The surveillance programmes for paratuberculosis in Norway 2013

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The surveillance programme for paratuberculosis in Norway 2013

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In 2013 Mycobacterium avium subsp. paratuberculosis infection was not recorded in Norway.

Introduction

Paratuberculosis was first diagnosed in cattle and goats in Norway in 1907 and 1934, respectively (1, 2). *Mycobacterium avium* subsp. *paratuberculosis* infection in ruminants is a notifiable disease (List B) in Norway. The control of this disease is enforced by government legislation and restrictions on animal movement. In goat herds, government restrictions combined with vaccination have been used to control paratuberculosis, however, the last years a large proportion of the Norwegian goat herds has followed a disease eradication programme to get rid of the infection (3).

A national surveillance and control programme for paratuberculosis in cattle was established in 1996 (4, 5). The programme was extended to llamas and alpacas, goats and sheep in 2000, 2001 and 2002, respectively (6).

Descriptions of occurrence of the disease in Norway, control measures taken up to 1995, and results from the surveillance and control programmes from 1996 to 2001, can be found in the annual report for 2001 (5). The number of new infected herds detected since the programme started is given in Figure 1.

Aim

The aim of the surveillance programme for paratuberculosis is to detect and control the infection in the Norwegian ruminant and camelid population.

Materials and methods

Cattle, goats, sheep, llamas and alpaca were examined in the programme in 2013. Faecal samples were collected on the farms by the Norwegian Food Safety Authority, while organ samples were collected at slaughterhouses.

Active surveillance

Cattle

The target population consisted of all cattle herds delivering milk to dairies in the sampling period and all beef cattle herds receiving state support according to records of July 2012. Fifty herds were selected for sampling by a risk-based strategy. Faecal samples were collected from the five oldest cows in each herd.

Goats

Ninety herds were selected by a risk-based strategy for sampling from areas where paratuberculosis is registered in goat herds, and thirty herds were selected from areas where paratuberculosis have not been registered. Faecal samples from the ten oldest goats were collected.

Sheep

Fourty flocks from areas where paratuberculosis is registered in goat herds were randomly selected for sampling. Faecal samples from the ten oldest sheep were collected.

Llamas and alpacas

Llama and alpaca were introduced as new species to Norway in 1997-98. Some animals are imported every year, many of which originate in countries where paratuberculosis is endemic. Faecal samples from five animals older than four years of age are collected in each herd each year. In addition, organ samples are collected at slaughter and from animals that die when older than four years.

Passive clinical surveillance

Clinical surveillance has been included in the programme since 2000. For cattle, special emphasis is placed on the collection of samples from animals with reduced milk production, loss of weight, diarrhoea lasting more than 14 days, and animals that are older than three years of age.

Samples

Number and type of samples collected in the programme are given in Table 1.

Table 1. Number of samples collected for examination for *Mycobacterium avium* subsp. *paratuberculosis* in 2013

		Faecal samples No. of animals	Organ samples No. of animals	Total no. of animals	Total no. of herds / flocks
Cattle	Risk-based sample	237	-	237	48
	Suspected cases	2	3	5	5
Goat	Risk-based sample	1029	-	1029	110
	Suspected cases	1	0	1	1
Sheep	Random sample	388	-	388	40
	Suspected cases	0	2	2	1
Camelides	Random sample	398	9	417	128
	Suspected cases	0	0	0	0

Histopathological examination

Samples from jejunum, ileum, ileocecal valve, and mesenteric lymph nodes were examined histopathologically. The tissue was fixed in 10% neutral-buffered formalin, processed by routine methods and stained with haematoxylin and eosin (HE) and the Ziehl-Neelsen (ZN) method for acid-fast bacteria. Samples showing typical granulomatous lesions with acid-fast bacteria were considered to be positive for paratuberculosis.

Bacteriological examination

The samples were decontaminated with 4% sodium hydroxide and 5% oxalic acid with 0.1% malachite green (7), and inoculated onto selective and non-selective Dubos medium with mycobactin (2 µg/ml) and pyruvate (4 mg/ml) (8). Incubation time was 16 weeks.

Mycobactin dependency, acid-fastness by Ziehl-Neelsen staining, and presence of the insertion segment IS900 by a PCR technique (9) were used to identify the isolates.

Results

All results from bacteriological and histopathological examinations are given in Table 2. *Mycobacterium avium* subsp. *paratuberculosis* was not isolated in Norway in 2013.

Since the surveillance programme for paratuberculosis started in 1996, infection with *M. avium* subsp. *paratuberculosis* has been found in altogether 10 cattle herds, 6 sheep flocks and in 34 different goat herds of which the bacteria were detected for the first time in 27 of these (Figure 1).

Table 2. Results of histopathological and bacteriological examination of cattle, goats, sheep and llamas in the surveillance programme for paratuberculosis in 2013

Species	Type of samples	Bacteriology			Histopathology			Total	
		Examined		Positive	Examined		Positive	Positive	
		Animals	Herds	Animals	Animals	Herds	Animals	Animals	Herds
Cattle	Faecal	237	50	0	-	-	-	0	0
	Organs	2	2	0	3	3	0	0	0
Goat	Faecal	1030	111	0	-	-	-	0	0
	Organs	0	0	0	0	0	0	0	0
Sheep	Faecal	388	40	0	-	-	-	0	0
	Organs	2	1	0	2	1	0	0	0
Camelides	Faecal	389	126	0	-	-	-	0	0
	Organs	9	3	0	9	3	0	0	0
Total	Faecal	2044	327	0	-	-	-	0	0
	Organs	13	6	0	14	7	0	0	0

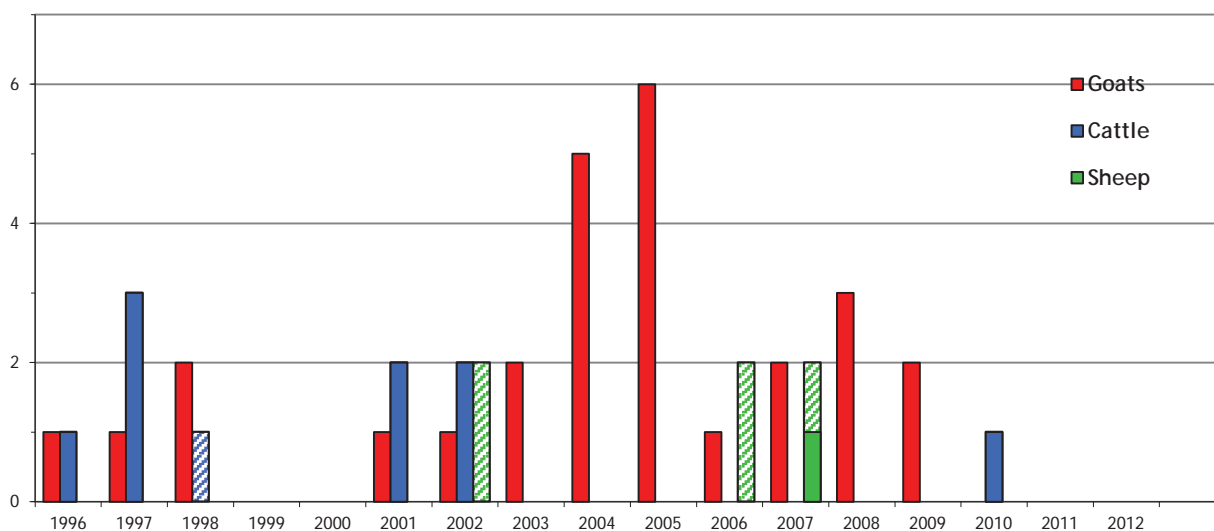


Figure 1. The numbers of new detected goat, sheep and cattle herds since 1996 that have been reported positive for *Mycobacterium avium* subsp. *paratuberculosis* irrespective whether the samples were collected as part of the surveillance programme or not. Cattle herds and sheep flocks where another species at the same holding previously has been reported positive are presented with striped bars.

Discussion

Paratuberculosis has been considered to occur among goats in 6 out of the 19 counties in Norway. All the cases among cattle and sheep can be attributed to one of two reasons; either brought into the country with imported cattle (seven cattle herds, one sheep flock) or contact with infected goats (three cattle herds, five sheep flocks). Importation of live cattle almost ceased by 1996 and has since been replaced by importation of semen and embryos.

The dairy organisation (TINE) and the Norwegian Goat Health Services have conducted an eradication programme, "Healthier goats", for three widespread infectious diseases in goats. The programme started in 2001 and concentrated on caprine arthritis encephalitis and caseous lymphadenitis the first years. From 2004, herds in areas where paratuberculosis had been detected were included. From 2001 to 2013 a total of 599 goat herds have been included in the eradication programme (3).

By summer 2014, all goat milk herds in Norway have joined the eradication programme and either have eradicated or are in the process of eradicating the three diseases. All known goat herds diagnosed with paratuberculosis have joined the eradication programme or have slaughtered their animals. Hence, Norway is in the unique position of having no known cases of paratuberculosis in goat or sheep herds which are not in the process of sanitation. One cattle herd, in which paratuberculosis was diagnosed in 2010, still has restrictions. Although remaining restrictions on goat herds will not be lifted for some years, this is a historical opportunity to eradicate the infection from the entire country.

The eradication programme has reduced the indigenous source of *M. avium* subsp. *paratuberculosis*, but goat herds may still represent a risk for spread of the infection to other ruminants the coming years. Furthermore, the import of sheep, goats, llamas and alpacas presents a risk for introduction of infected animals into the ruminant population.

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