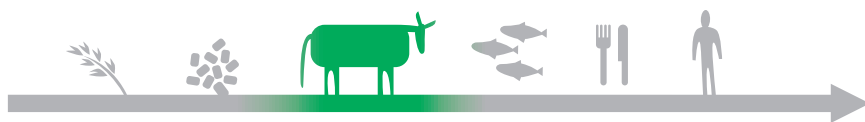


The surveillance programme for *Brucella melitensis* in small ruminants in Norway in 2017



Veterinærinstituttet
Norwegian Veterinary Institute



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Authors

Annette H Kampen, Kjersti Skaar, Attila Tarpai,
Siv Klevar

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Summary

Brucella melitensis was not detected in any sheep flock or goat herd sampled in 2017.

Introduction

Brucellosis in sheep and goats is mainly caused by *Brucella melitensis*, although infection with *Brucella abortus* and *Brucella ovis* can also occur. The infection usually results in abortion in pregnant females and can cause orchitis and epididymitis in affected males (1, 2). *B. melitensis* infection is a zoonosis, and the bacterium causes a serious infection in humans known as Malta fever, characterised by undulant fever, chills, sweat and debilitation (2).

B. melitensis is prevalent in sheep and goats in several Mediterranean countries (1), but has never been diagnosed in animals in Norway or any of the other Nordic countries (3, 4). Brucellosis is classified as a list A disease in Norway and is notifiable to the Office International des Epizooties.

After the agreement on the European Economic Area in 1994, Norway achieved status as free from *B. melitensis* in small ruminants on a historical basis. However, documentation is required to maintain the status. Hence, a surveillance programme for *B. melitensis* in sheep was established in 2004, and goats were included in the programme from 2007.

The Norwegian Food Safety Authority is responsible for carrying out the programme. The samples are collected by inspectors from the Norwegian Food Safety Authority, while the Norwegian Veterinary Institute is in charge of planning the programme, performing the analyses and reporting the results.

Aims

The aims of the programme are to document freedom from *B. melitensis* in sheep and goats according to the demands in EU Directive 91/68/EEC with amendments and to contribute to the maintenance of this favourable situation.

Materials and methods

In 2017, 61 goat herds were randomly selected for sampling. In addition, collection of 9 000 blood samples from sheep taken at slaughter was planned.

In sheep, the programme in 2017 was based on serological examination of blood samples collected at 18 abattoirs. In goat 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 sampled, respectively. The number of flocks represented in the surveillance programme for *B. melitensis* in small ruminants in 2017 is given in Table 1.

Blood samples were examined for antibodies against *B. melitensis* using the Brucella Rose Bengal Test (RBT) (APHA SCIENTIFIC, New Haw, United Kingdom) for the initial screening. Positive reactors are followed up using a suitable confirmatory or complementary method such as competitive ELISA (C-ELISA, Svanova Biotech AB, Uppsala, Sweden) and/or complement fixation test (CFT) (APHA SCIENTIFIC, New Haw, United Kingdom) to rule out false positive reactions due to cross reactions (5).

Results

A total of 9,114 samples from 3,520 sheep flocks and 1,712 samples from 61 goat herds were received in the programme in 2017. 97 sheep samples were rejected or not tested, leaving 9,017 samples from 3,444 sheep flocks for analysis. This is approximately 24% of the total Norwegian sheep flocks and 5% of Norwegian goat herds.

All samples screened for antibodies against *B. melitensis* using RBT in 2017 were negative, except for one sample with inconclusive results. The inconclusive sample was further tested with c-ELISA with negative results. A CFT of the same sample was inconclusive due to an anticomplementary effect of the serum. In addition, blood samples were collected from a selection of 35 animals from the herd, and all animals tested negative with RBT. The results are shown in Table 1.

Table 1. Results and total number of flocks within the frame of the Norwegian surveillance programme for *Brucella melitensis* in small ruminants from 2004 - 2017.

Year	Total number of									
	Flocks in Norway ¹		Animals in Norway		Flocks tested		Animals tested		Positive samples	
	Sheep	Goats	Sheep >1 year	Goats	Sheep	Goats	Sheep	Goats	Sheep	Goats
2004	17 439		918 500		1 655		50 501		0	
2005	16 500		927 400		935		28 406		1 ²	
2006	15 800		894 100		911		27 812		0	
2007	15 400	1 300	854 000	71 500	1 004	183	29 633	5 734	0	0
2008	15 059	1 308	891 427	69 637	783	80	23 235	2 399	0	0
2009	14 800	1 300	877 400	67 800	816	104	24 011 ³	3 124	0	0
2010	14 800	1 300	887 600	67 600	269	25	8 160	779	0	0
2011	14 500	1 300	882 000	66 900	467	93	13 629	2 698	0	0
2012	14 300	1 300	868 500	65 400	479	86	13 989	2 562	0	0
2013	14 242	1 276	871 976	64 112	468	95	13 550	2 827	0	0
2014	14 218	1 150	755 987	55 894	3 489	89	9 703	2 528	0	0
2015	14 425	1 177	784 558	58 048	3 353	97	9 418	3 048	0	0
2016	14 500	1 300	951 000	68 500	3 492	86	9 821	2 313	0	0
2017	14 463	1 227	984 832	72 658	3 444	61	9 017	1 712	0	0

¹ Based on data from the register of production subsidies as of July 31 the respective year. ² Probably unspecific reaction.

³ Corrected from previous reports.

Discussion

During the years 2004-2008, ram circles and their member flocks registered by The Norwegian Sheep and Goat Breeders Association constituted the target population for the programme. Approximately 90% of the Norwegian sheep flocks in ram circles were screened for antibodies against *B. melitensis* during 2004 and 2005. Most flocks participating in the ram circles were retested in the programme during 2006 to 2008, and breeding flocks of other sheep breeds than those regulated by The Norwegian Sheep and Goat Breeders Association were selected for sampling in 2009. In 2010 - 2013 a random selection of the Norwegian sheep and goat population was made.

In 2014, the programme started sampling of sheep at slaughterhouses. This gives a better surveillance of the total population with less resources than on-farm sampling. However, the negative status for each investigated sheep flock is no longer documented on the same level as before. In goats the surveillance is still based on sampling of live animals in goat herds.

The surveillance programme for *B. melitensis* in sheep was evaluated in 2006. When taking into account results accumulated from 2004 to 2006, it was estimated that there is a 99% probability that the prevalence of sheep flocks being positive for *B. melitensis* is lower than 0.2% (6). The results of the programme until 2014 have confirmed this conclusion (7).

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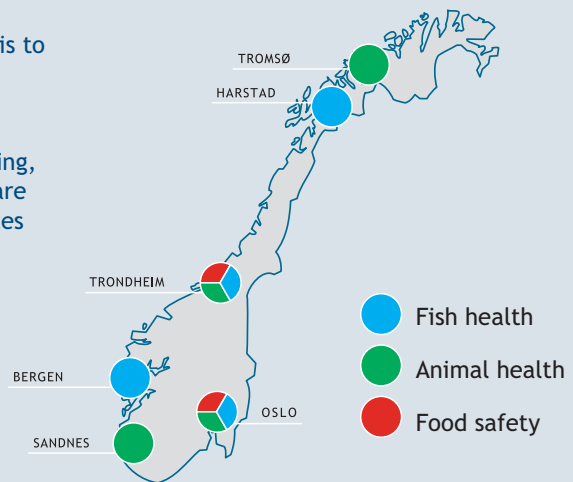
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Oslo
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vit@vetinst.no

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post.vib@vetinst.no

Harstad
vih@vetinst.no

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vitr@vetinst.no

www.vetinst.no



Veterinærinstituttet
Norwegian Veterinary Institute