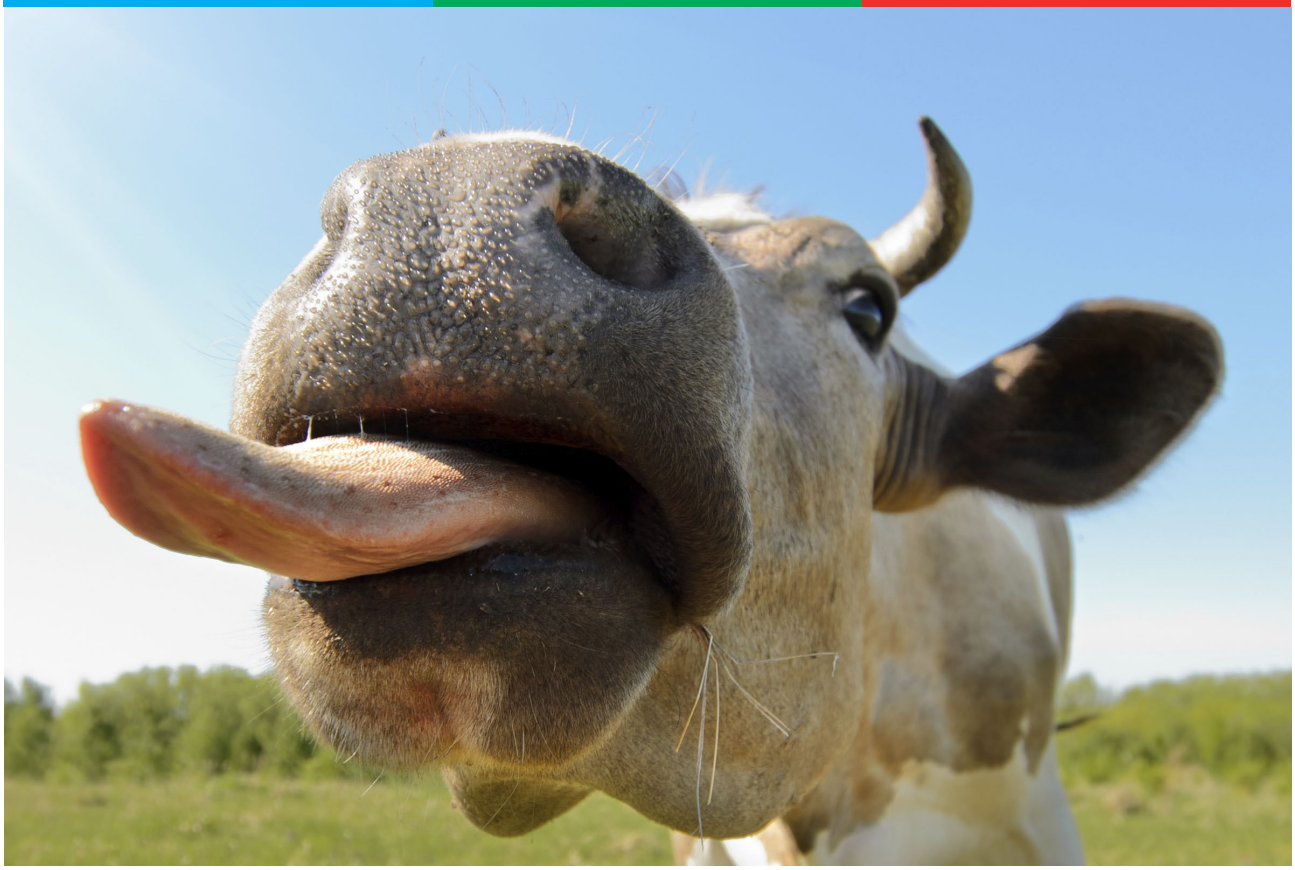
Veterinærinstituttet
Norwegian Veterinary Institute

Rapport 5 - 2021

The surveillance programme for *bovine virus diarrhoea* (BVD) in Norway 2020



REPORT 5/2021

The Surveillance programme for *bovine virus diarrhoea* (BVD) in Norway 2020

Authors

Thea Blystad Klem, Johan Åkerstedt and Siv Klevar

Suggested citation

Klem, Thea Blystad, Åkerstedt, Johan, Klevar, Siv. The Surveillance programme for bovine virus diarrhoea (BVD) in Norway 2020. Surveillance program report. Veterinærinstituttet 2021. © Norwegian Veterinary Institute, copy permitted with citation

Quality controlled by

Merete Hofshagen, Director of Animal Health, Animal Welfare and Food Safety, Norwegian Veterinary Institute

Published

2021 on www.vetinst.no

ISSN 1890-3290 (electronic edition)

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Commissioned by / In collaboration with

Norwegian Food Safety Authority

Mattilsynet

Colophon

Cover design: Reine Linjer

Cover photo: Colourbox

www.vetinst.no

Content

Summary

Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2020.

Introduction

Bovine virus diarrhoea (BVD) is caused by bovine virus diarrhoea virus (BVDV) in the genus pestivirus. The virus is the cause of mucosal disease and haemorrhagic syndrome, but the economically most important manifestations of disease are related to infection in pregnant animals, resulting in embryonic death, abortion and congenital defects. Persistently infected calves may be born and serve as the main reservoir of infection to other animals (1). Bovine virus diarrhoea is a notifiable disease (list B) in Norway.

An eradication programme, financed by the authorities and the industry, started December 1992 (2). During the programme period, the number of herds with restrictions decreased from 2,950 in 1994 to none at the end of 2006. Details of the programme and a discussion of factors important for its success are given in the annual report for 2006 (3). Since 2007, the aims of the programme have been surveillance and control (4).

The Norwegian Food Safety Authority was responsible for implementing the surveillance programme for BVD. The Norwegian Veterinary Institute was in charge of planning the programme, collecting the bulk milk samples from the dairies and performing the tests. Blood samples from beef herds were collected by inspectors from the Norwegian Food Safety Authority.

Aim

The aim of the surveillance programme for BVD in 2020 was to document freedom from the infection in Norwegian livestock and to contribute to the maintenance of this favourable situation.

Materials and methods

The surveillance programme included both dairy and beef herds. The target population of dairy herds consisted of all cattle herds delivering milk to dairies during the sampling period. The target population of beef herds was all herds delivering cattle to slaughter in 2020.

Eighteen per cent of the dairy herds were randomly selected for sampling, and the dairies provided bulk milk samples from 1,169 of these herds. From the beef herds, individual blood samples from animals older than 24 months were collected at 21 slaughterhouses, with a maximum of five animals per herd and day of sampling.

Thus, a total of 3,709 individual blood samples from 1,258 beef cattle herds were received for analyses in pools (n = 1,621). The sampled herds represented approximately 18.4% of all Norwegian cattle herds (**Table 1**).

***Table 1**: Numbers of dairy herds and beef herds sampled within the frame of the Norwegian surveillance programme for BVD in 2020.*

Herd category	Cattle herds (total no.[1])	Sampled herds (no.[2])	Sampled herds (%)
Dairy herds[3]	7 211	1 169	16.2
Beef herds[4]	5 730	1 258	22.0
Total	**13 073**	**2 404**	**18.4**

[1]Based on data from the Register of production subsidies as of 1 March 2020.
[2]Combined beef cattle and dairy farms could be sampled under both herd categories. Number of unique farms is given as total number of sampled herds.
[3]Cattle herds delivering milk to dairies.
[4]Sampling performed at slaughterhouses.

Blood samples (pooled or individual samples) and bulk milk samples were examined for antibodies against BVDV using a commercial indirect enzyme-linked immunosorbent assay SVANOVIR® BVDV- Ab ELISA (Boehringer Ingelheim Svanova, Uppsala, Sweden) (5). In case of positive or inconclusive results in pooled blood samples, individual samples were re-tested. Bulk milk and individual serum samples with inconclusive or positive results were re-tested in duplicates with SVANOVIR® BVDV- Ab to rule out false positive reactions (5).

Depending on the level of antibodies in bulk milk, dairy herds are divided into four groups (3, 6). In herds with low to high levels of antibodies (classification 1 to 3), new bulk milk samples or individual blood samples from young stock are collected and tested. Seropositive or inconclusive results from beef cattle herds are followed-up by testing blood samples from young stock.

In case of seropositive young stock, identification of persistently infected animals is performed by testing blood samples for antibodies from every individual in the relevant herd. Animals with weak positive or negative serological results are tested for the presence of virus using an antigen-capture ELISA (IDEXX Laboratories, Inc., Westbrook, Maine, USA). Positive reactions in newly infected herds would be verified with the polymerase chain reaction (PCR) and sequence analysis.

Table 2: *Numbers of herds and individual cattle tested for antibodies against BVDV, and numbers of herds and individual cattle positive for BVDV (antibody results not shown).*

Year	Bulk milk samples	Pooled blood samples from beef cattle >24 months[1]	Pooled milk samples from primiparous cows	Pooled blood samples from young stock[2]	Individual blood samples		No. of virus positive	
	No. of herds	No. of herds	No. of herds	No. of herds	No. of herds	Samples	Herds	Ind. blood samples
1993	26 424	-	5 031	5 000	NA	46 000[2]	NA	1 300[3]
1994	26 148	-	3 228	4 107	NA		NA	
1995	25 577	-	3 191	5 347	NA	36 065	NA	1 180
1996	25 167	-	1 849	3 163	NA	21 437	NA	685
1997	24 862	-	1 297	3 292	1 515	16 023	265	525
1998	24 038	-	1 415	3 407	780	7 091	98	198
1999	23 584	-	924	3 060	648	7 619	92	224
2000	21 796	-	100	1 610	423	6 947	72	129
2001	19 910	-	53	4 198	386	6 287	56	174
2002	18 771	-	-	2 854	284	3 962	28	43
2003	17 549	-	-	2 100	149	1 135	9	22
2004	7 365	-	-	1 351	84	1 017	2	6
2005	7 481	-	-	1 230	48	356	1	4
2006	14 620	-	-	997	28	113	0	0
2007	1 575	-	-	387	8	20	0	0
2008	1 424	-	-	423	8	34	0	0
2009	1 315	435	-	10	7	31	0	0
2010	1 328	507	-	47	11	63	0	0
2011	1 226	1 278	-	0	5	44	0	0
2012	1 190	1 179	-	0	4	19	0	0
2013	1 042	1 167	-	0	2	10	0	0
2014	1 489	937	-	11	4	20	0	0
2015	1 178	1 206	-	0	6	32	0	0
2016	1 181	1 334	-	0	1	5	0	0
2017	1 107	1 448	-	0	2	20	0	0
2018	1 131	1 341	-	0	0	0	0	0
2019	1 071	1 328	-	0	0	0	0	0
2020	1 169	1 258	-	0	2	10	0	0

[1]Sampling performed in the herds prior to 2011. A small number of blood samples collected at slaughterhouses could originate from dairy herds.
[2]Prior to 2009, this number included surveillance in beef cattle.
[3]Approximate numbers
NA=Data not available

Results

From the 1,169 sampled dairy herds in 2020, bulk milk samples from 1,163 herds were negative for antibodies against BVDV, while five herds had weak positive results (classification 1), and one herd had moderate levels of antibodies (classification 2). New bulk milk samples from four of these herds, and five blood samples of young stock from two of these herds, respectively, were negative.

All 3,709 blood samples from 1,258 sampled beef cattle herds, tested in 1,621 pools, were serologically negative for BVD.

Table 2 shows the results of the testing during the period from 1993 to 2020.

Discussion

Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2020.

In Norway, no infected farm has been found and no restrictions have been imposed on any farm due to BVD since 2005. In 2006, bulk milk from all dairy herds and blood samples from 20% of the beef cattle herds were tested. No farm with recent infection was identified. Since then, more than 10% of all dairy and beef cattle farms have been tested every year and none has been found to be infected by BVD. Using scenario tree modelling, the probability of freedom from BVDV in Norway at the end of 2011 was calculated to 99.6% (7). The results of the surveillance programme from 2012 to 2020 support that the Norwegian cattle population is free of BVD.

Although Norwegian livestock is currently free from the disease, import of infected animals and animal products of bovine origin may pose a threat to the present status. For the rapid detection of a potential reintroduction and consecutive control of spreading, a surveillance system has to make efficient use of the competence and awareness existing among farmers and local veterinarians.

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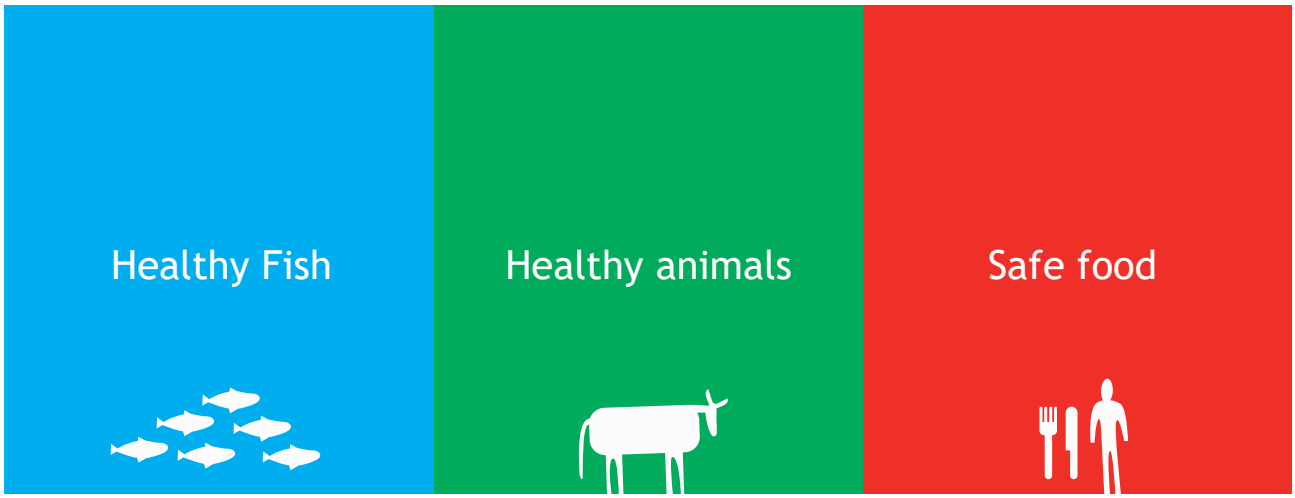

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Veterinærinstituttet
Norwegian Veterinary Institute

Ås Trondheim Sandnes Bergen Harstad Tromsø

postmottak@vetinst.no
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