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The Surveillance programme for bovine viral diarrhoea (BVD) in Norway 2024

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Content

Summary

Bovine viral diarrhoea virus was not detected in any of the herds sampled in 2024.

Introduction

Bovine viral diarrhoea (BVD) is caused by the bovine viral diarrhoea virus (BVDV), which belongs to the genus *Pestivirus*. The virus is the cause of mucosal disease and haemorrhagic syndrome. Its most economically important impact stem from infections in pregnant animals, which can result 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). In Norway, BVD is classified as a List 2 disease and is also listed by the World Organisation for Animal Health (WOAH). Within the EU, BVD is a categorised under disease categories C, D, and E.

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 factors contributing to its success are given in the annual report for 2006 (3). Since 2007, the aims of the programme have been surveillance and control (4). Norway has not applied for official free status for BVD from the ESA/EU.

The Norwegian Food Safety Authority (NFSA) is responsible for implementing the surveillance programme for BVD. The Norwegian Veterinary Institute is responsible for planning the programme, collecting the bulk milk samples from the dairies, performing the analyses, and reporting the results. Blood samples from beef herds are collected at slaughterhouses by NFSA inspectors.

Aim

The aim of the surveillance programme for BVD in 2024 was to document freedom from the infection in Norwegian livestock and to contribute to the maintenance of this favourable situation.

Materials and methods

Herds and sampling

The surveillance programme included both dairy and beef herds. The target population of dairy herds were all Norwegian cattle herds delivering milk to dairies during the sampling period. The target population of beef herds were all Norwegian herds delivering cattle to slaughter in 2024.

Of the dairy herds, 24.9% were randomly selected for sampling. From the beef herds, individual blood samples from animals older than 24 months were collected at 16 slaughterhouses, with a maximum of five animals per herd per sampling day.

The dairies provided 1,747 bulk milk samples from 1,525 dairy herds. One bulk milk sample was not approved, leaving 1,746 samples from 1,524 dairy herds for analysis. A total of 4,213 individual blood samples from 1,372 beef herds were collected. The blood samples were analysed in pools of 1-5 animals (n= 1,725). The sampled herds represented approximately 24.3% of all Norwegian cattle herds (Table 1).

Table 1. Numbers of dairy herds and beef herds sampled in the Norwegian surveillance programme for BVD in 2024.

Herd category	Cattle herds (total no.[1])	Sampled herds (no.[2])	Sampled herds (%)
Dairy herds[3]	6 226	1 525	24.5
Beef herds[4]	5 708	1 372	24.0
Total	11 934	2 897	24.3

[1]Based on data from the Register of production subsidies as of 1 March 2024.
[2]Combined beef and dairy farms could be sampled under both herd categories. The number of unique farms is given in the total number of sampled herds.
[3]Cattle herds delivering milk to dairies.
[4]Sampling performed at slaughterhouses.

Laboratory analyses

Bulk milk samples and blood samples (pooled or individual samples) were examined for antibodies against BVDV using a commercial indirect enzyme-linked immunosorbent assay (ELISA), SVANOVIR® BVDV- Ab Confirmation (Indical Bioscience GmbH, Leipzig, Germany), following the manufacturer's instructions (5). If pooled blood samples produced positive or inconclusive reactions, the corresponding individual blood samples were retested. Bulk milk and individual blood samples with positive or inconclusive results were retested in duplicate using the SVANOVIR® BVDV- Ab Confirmation kit and/or, for blood samples, a competitive ELISA, ID Screen® BVDV p80 Antibody Competition (IDvet, Grabels, France), to rule out false positive reactions (5).

Based on the level of antibodies in bulk milk, dairy herds were categorized into four groups, indicating the prevalence of antibody-positive cows within the herd (3, 6). Dairy herds with low to high levels of antibodies, or with inconclusive serological results, would undergo further testing through the collection of new bulk milk or individual blood samples from youngstock. For beef herds, positive or inconclusive results would similarly be followed up by collecting and testing individual blood samples from youngstock in the herd of origin.

Animals with positive or inconclusive serological results would then be tested for the presence of BVDV using an antigen-capture ELISA (IDEXX Laboratories, Inc., Westbrook, Maine, USA). Positive reactions would be verified with the polymerase chain reaction (PCR) and sequence analysis.

Results

Among the 1,746 bulk milk samples from dairy herds screened for BVDV antibodies, 1,738 tested negative, while 8 (0.5%) showed weak positive reactions. All weak positive samples were negative upon retesting.

Of 1,725 pooled blood samples from beef herds, 1,723 were seronegative, while two pools (0.1%) tested positive. The individual blood samples contributing to the two positive pools were retested with the SVANOVIR® ELISA, and for each pool, there was one seropositive individual sample. Both of these individual samples were negative when retested with the ID-vet ELISA.

In conclusion, all 1,524 dairy herds and 1,372 beef herds in the surveillance program for BVD were negative for antibodies against BVDV in 2024. Table 2 shows the results of the surveillance programme from 1993 to 2024.

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[2]		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	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
2021	1 212	1 413	-	0	0	0	0	0
2022	1 093	1 432	-	0	0	0	0	0
2023	1 336	1 393	-	0	0	0	0	0
2024	1 524	1 372	-	0	0	0	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

Discussion

Bovine viral diarrhoea virus was not detected in any of the herds sampled in 2024.

In Norway, no infected farms have been found, and no farms have been subject to restrictions due to BVD since 2005. In 2006, bulk milk from all dairy herds and blood samples from 20% of the beef herds were tested, with no evidence of recent infection identified. Since then, more than 10% of all dairy and beef farms have been tested annually, and none have been found to be infected by BVD. Using scenario tree modelling, the probability of freedom from BVDV in Norway by the end of 2011 was calculated to 99.6% (7). The results of the surveillance programme from 2012 to 2024 continue to support the conclusion that the Norwegian cattle population is free from BVD.

Although Norwegian livestock is currently free from the disease, the import of infected animals and bovine-derived products continues to pose a risk to this status. To ensure rapid detection of any potential reintroduction and effective control of further spread, the surveillance system has to make efficient use of the competence and awareness of farmers and local veterinarians.

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