

The surveillance and control programme for bovine virus diarrhoea (BVD) in Norway

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Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2009.

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 hemorrhagic 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 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 aim of the programme has been surveillance and control (4).

Aim

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

Materials and methods

In 2009, 12.5% of all Norwegian dairy and beef cattle herds were selected for examination. Bulk milk samples from the dairy herds were provided by the dairies, and individual blood samples were collected from cattle older than 24 months in the beef herds.

The target dairy herd population consisted of all herds delivering milk to dairies during the sampling period. In 2009, bulk milk samples from 1,315 randomly sampled dairy herds were collected. The group of beef herds to be sampled was based on a register of all beef herds receiving governmental support according to recordings of July 2008. A total of 5,048 individual blood samples from 435 beef cattle herds were stored in pools with a maximum of ten samples in each pool. The sampled herds represented 11.0% of the Norwegian cattle herds (Table 1).

Table 1. Numbers of dairy herds and beef herds tested within the frame of the Norwegian surveillance and control programme for BVD in 2009.

Herd category	Total no. of cattle herds*	No. of herds tested	% tested of the total no. of herds
Dairy herds	11,800	1,315	11.1
Beef herds	4,100	435	10.6
Total	15,900	1,750	11.0

* Based on data from the Register of production subsidies as of 31 July 2009.

All samples were tested for antibodies against BVDV using a commercial indirect enzyme-linked immunosorbent assay (ELISA; Svanova Biotech AB, Uppsala, Sweden) at the National Veterinary Institute in Sandnes (5). In case of positive or inconclusive results in pooled blood samples, the individual samples were tested.

Depending on the level of antibodies in bulk milk, dairy herds were divided into four groups (6). In herds with moderate or high levels of antibodies, individual blood samples from young stock were collected, pooled, and tested as pooled samples. Seropositive or inconclusive results from beef cattle herds could also be followed-up by testing samples from young stock. Table 2 shows numbers of tested herds and individual cattle during the years 1993 to 2009.

In case of seropositive young stock, identification of persistently infected animals would be done by testing blood samples for antibodies from every individual in the relevant herd. Animals with weak positive or negative serological results were 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.

Results

From the 1,315 sampled dairy herds, bulk milk samples from 1,267 herds were negative for antibodies against BVDV in 2009. One herd had high levels of antibodies and 44 herds had low levels of antibodies against BVDV in bulk milk (3.42%). Results from three herds were excluded from the study, due to poor quality samples that gave unspecific reactions in the ELISA.

Of the 435 sampled beef cattle herds, pooled blood samples from eleven herds were seropositive for BVDV (2.53%). Individual samples representing the positive pooled samples were tested. In one herd, five of the individually tested cows gave inconclusive results, whereas seropositive animals were found in the ten other

seropositive herds. In eight of these ten herds, older cows (> 4 yrs) were found seropositive, whereas younger cows were seronegative, suggesting that positive reactions in these herds were results of earlier infections.

Individual blood samples for serological testing of young stock were submitted from ten herds, including the remaining two beef cattle herds with positive individual cow samples; the cattle herd with inconclusive results from individual testing; the one dairy herd with high levels of antibodies in bulk milk as well as from six other beef cattle herds. No seropositive animals were found.

Thirty-one animals from seven herds were additionally investigated for BVDV. Infected animals were not detected (Table 2).

Discussion

No herds had restrictions because of BVD at the beginning of 2007. Testing of bulk milk from all dairy herds and a 20% representative sample of all beef cattle

herds during 2006 with no findings of new infected herds, indicated that the goal of eradicating BVD in Norway could be considered achieved. The results of the surveillance and control programme for 2007 to 2009 confirm this conclusion. No new infected farms were found and no restrictions were imposed on any farm due to BVD.

Although Norwegian livestock is currently free from the disease, import of infected animals and unknown wildlife reservoirs may pose a continuous 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.

References

1. Baker, JC. The clinical manifestations of bovine viral diarrhoea infection. *Veterinary Clinics of North America: Food Animal Practice* 1995; 11: 425-45.

Table 2. Numbers of Norwegian cattle 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 milk samples from primiparous cows	Pooled blood samples	Individual blood samples		No. of virus positive	
	No. of herds	No. of herds	No. of herds ^{1, 2}	No. of herds	Samples	Herds	Individual 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	-	445	7	31	0	0

¹Before 2009, one pooled sample from young stock was examined.

²From 2009, beef cattle older than 24 months were sampled (n=435). In case of seropositive or inconclusive results from beef cattle older than 24 months or bulk milk, additional samples from young stock were collected (n=10).

³Approximate numbers

NA=Data not available

2. Nyberg O, Lindheim D, Gudmundsson S, Eikenæs O. The surveillance and control programme for bovine viral diarrhoea (BVD) 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. 93-101.

3. Kampen AH, Åkerstedt J, Gudmundsson S, Hopp P, Grøneng G, Nyberg O. The surveillance and control programme for bovine virus diarrhoea (BVD) in Norway. In: Brun E, Jordsmyr HM, Hellberg H, Sviland S. (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2006. Oslo: National Veterinary Institute; 2007. p. 65-71.

4. Grøneng GM, Åkerstedt J, Norström M. The surveillance and control programme for bovine virus diarrhoea (BVD) in Norway. Annual report 2008. In: Brun E, Hellberg H, Mørk T (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Oslo: National Veterinary Institute; 2009.

5. Juntti, N, Larsson, B, Fossum, C. The use of monoclonal antibodies in enzyme linked immunosorbent assays for detection of antibodies to bovine viral diarrhoea virus. J Vet Med B 1987; 34: 356-63.

6. Niskanen R. Relationship between the levels of antibodies to bovine virus diarrhoea virus in bulk tank milk and the prevalence of cows exposed to the virus. Vet Rec 1993; 133: 341-4.



Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2009. Photo: Colourbox

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