Annual Report

The surveillance programme for Schmallenberg virus (SBV) in Norway 2016

Veterinærinstituttet
Norwegian Veterinary Institute

The surveillance programme for Schmallenberg virus (SBV) in Norway 2016

Content

Authors
Johan Åkerstedt, Ståle Sviland, Chiek Er

ISSN 1894-5678

Design Cover: Reine Linjer
Photo front page: Colourbox

Summary

Bulk milk samples from southern Norway tested in 2016 were positive for antibodies against Schmallenberg virus (SBV). It is uncertain if SBV has circulated in Norway after the epidemic in 2012.

Introduction

Schmallenberg virus (SBV) is an arthropod born virus in the genus Orthobunyavirus and is a member of Simbu serogroup viruses. Midges (*Cullicoides* spp.) act as vectors. Vertical transmission occurs through placenta.

The virus causes subclinical infection or mild non-specific clinical signs in cattle and sheep during the vector season. In pregnant cattle, sheep, goats and bison, SBV causes stillbirth and congenital malformations. Disease caused by Schmallenberg virus is not notifiable in Norway.

Orthobunyavirus of the Simbu serogroup was not detected in Europe before 2011. Schmallenberg virus was first identified in Germany and the Netherlands from dairy cattle diseased in summer and autumn of 2011. Soon after, presence of SBV was confirmed in new-born lambs with congenital malformations. Since then, SBV has rapidly spread in many European countries (1).

In Norway, Schmallenberg virus was first detected in midges in September 2012. Two months later a high proportion (17.3%) of dairy herds in the southern part of the country was seropositive for SBV. Retrospective analysis of some of these seropositive herds showed that they had seroconverted in the previous summer months (2). In the following winter, a calf was born with malformations due to Schmallenberg virus infection (3).

After the SBV epidemic in 2012, bulk milk analyses revealed no infected dairy farm further north along the west coast of Norway. A total of 60 samples of midges collected at five locations in Southern Norway in 2013 were negative for SBV (2). Since then, no clinical case of Schmallenberg disease or deformations in newborn ruminants due to SBV has been recorded at the Norwegian Veterinary Institute (unpublished data). Given the limited surveillance, it is uncertain if SBV has circulated in Norway since 2013 or not.

The Norwegian Food Safety Authority was responsible for carrying out the surveillance programme for SBV. The Norwegian Veterinary Institute was in charge of designing the programme, collecting the bulk milk samples from the dairies and performing the tests. Blood samples from cattle herds were collected by inspectors from the Norwegian Food Safety Authority.

Aim

The aim of the surveillance and control programme for SBV in 2016 is to document if SBV has circulated or re-emerged in Norway, and to estimate the proportion of still seropositive dairy herds, after the epidemic in 2012.

Materials and methods

The target population of surveillance consisted of dairy herds delivering milk to dairies during the sampling period in November, after the end of the vector season. Bulk milk samples were collected from 468 dairy herds from counties in the southern part of Norway. The number of herds per county and the number of herds selected in the surveillance programme for Schmallenberg virus (SBV) in 2016 are given in Table 1.

Additionally, blood samples from cows having an abort between 5th and 9th Month of pregnancy were collected within two weeks in farms having at least two such abortions within a year, table 2. These samples came from both beef cattle and dairy farms all over Norway.

The bulk milk samples were tested with an Indirect ELISA (ID Screen® Schmallenberg virus Milk Indirect, ID.vet, Grabels, France) for detection of antibodies against SBV. Blood samples from cows with abortions were examined in duplicates with with another indirect ELISA (ID Screen® Schmallenberg virus Indirect Multi-species, ID.vet).

The samples were analysed at the Norwegian Veterinary Institute in Sandnes (bulk milk samples) and in Oslo (blood samples).

Table 1. Numbers of dairy herds and numbers of dairy herds sampled in the surveillance programme for Schmallenberg virus (SBV) in Norway in 2016.

County	Dairy herds (Total no.*)	Dairy herds sampled (No.)	Positive (No.)	Prevalence (%) [95%CI]
Østfold	257	55	5	9.1 [4.0 – 19.6]
Akershus	267	85	1	1.1 [0.2-6.0]
Oslo	4	1		
Hedmark	845	14		
Oppland	1 635	10		
Buskerud	426	14		
Vestfold	174	17		
Telemark	280	5	1	20 [3.6-62.5]
Aust-Agder	211	29	6	18.8 [8.9-35.3]
Vest-Agder	431	122	29	23.8 [17.1-32.1]
Rogaland	1 845	96	2	2.1 [0.6-7.2]
Hordaland	813	20		
Total	**7 188**	**468**	**44**	**9.4 [7.1-12.4]**

* Based on data from the Register of production subsidies as of 31 July 2016.

Results

From the 468 sampled dairy herds in 2016, 44 bulk milk samples were positive for antibodies against SBV (9,4%). Highest incidence was found in counties with coastline to open sea, whereas counties bordering on the inner Oslo Fjord and beyond, had none or very few positives (Table 1).

Of the 468 tested farms in 2016, 387 farms had also been tested in November 2012. These farms had a prevalence of 17 (4.4%) positive herds in 2012, while 30 (7.8 %) herds were positive by November 2016. Of these positive herds, 20 had negative and 10 had positive bulk milk results in 2012. Eleven of the dairy farms that seroconverted during these four years are situated in the county of Vest-Agder (Figure 1).

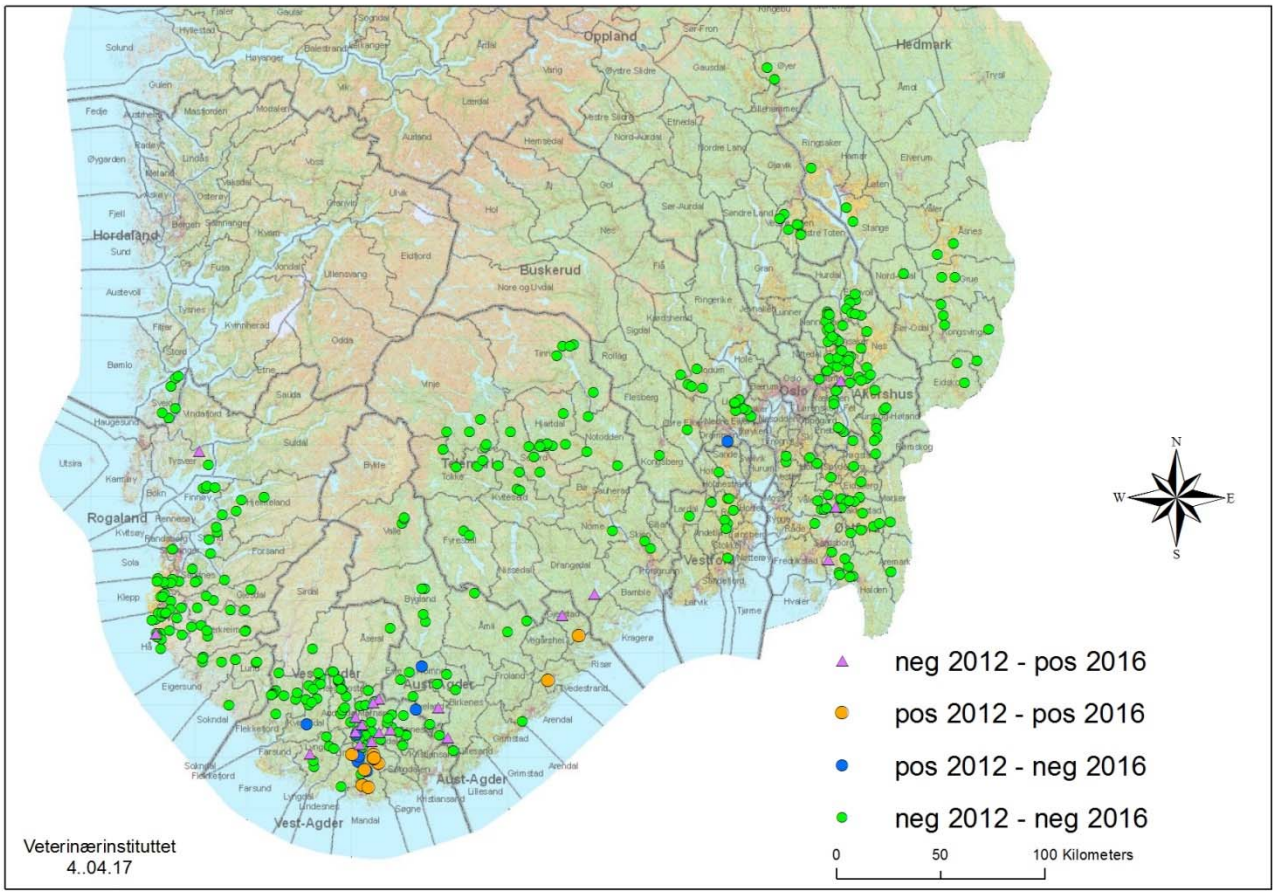


Figure 1. Schmallenbergvirus antibodies in bulk milk from Norwegian dairy herds tested both in 2012 and 2016.

From the 141 sampled cows with abortions in 2016, one sample was positive for antibodies against SBV. The sample came from a farm in Rogaland County. Four other cows with abortions on the same farm were seronegative for SBV. Table 2 shows the results of the testing of cows with abortions during the period from 2013 to 2016.

Table 2. Numbers of Norwegian cattle herds and numbers of cows with abortions tested for Schmallenberg virus (SBV) during the years 2013-2016.

Year	Total number of cattle herds[1]	Number of herds sampled	Number of tested cows with abortion	Number of positive herds
2013	15 079	68	150	1
2014	14 550	44	102	0
2015	14 210	48	104	3
2016	14 047	62	149	1
Total		**222[2]**	**505**	**5**

[1] Based on data from the Register of production subsidies as of 31 July the same year.
[2] Total number of unique herds

Discussion

The data of this report show that the prevalence of antibody positive dairy farms is reduced since November 2012. However, seroconversion from negative to positive in 20 farms and 5 seropositive cows that aborted in the 5th to 9th month of pregnancy implies that SBV has circulated in Norway after the 2012 epidemic. The study was not designed to determine the point in time for seroconversion. This could have occurred in any of the four years following the epidemic.

After the spread of SBV by midges, *Cullicoides* spp., in the summer season of 2012, SBV had its largest dissemination in central and northern Europe. Large proportions of ruminants got infected and developed immunity towards infection. In the midges-free season the virus could over-winter in midges or in fetuses of pregnant animals (4). In endemic areas not all herds were infected, nor were all animals in one herd infected. In this way, SBV still circulated at a low grade in continental Europe (5). Due to climate and geography it may have been less likely that the virus circulated in ruminants in Northern Europe. Reports from Great Britain and Ireland show that SBV circulated at low levels in both 2013 and 2014, but was not detected in young stock in 2015, and was unlikely to have circulated in 2016 (5,6).

In the years after the 2012 epidemic, the numbers of immunologically naíve replacement animals have increased. There is now a major concern that SBV may re-emerge in previously exposed areas, at present SBV free. The source of reintroduction would most likely be airborne transfer of infected midges from neighboring countries or transport of live ruminants, where especially pregnant animals would be at risk The most probable entry of windborne infected midges is in the southern part of Norway from the beginning of May until the end of October. Infected midges may come from Sweden, Denmark or Scotland. The topography in Norway with hills and valleys makes it difficult for long distance transfer of midges from one local area to another and the relatively low density of ruminants compared to the rest of Europe makes it less likely for a widespread of the agent if SBV should be reintroduced. Testing of bulk milk collected from the end of October and onwards will detect any infection introduced during the previous vector season.

The most important purpose of the surveillance programme is to reveal potential infections brought in with airborne midges during the vector season. Cattle are efficient sentinel animals for Schmallenberg virus. Most dairy cattle have to be kept outdoors, at least eight weeks during the summer, making their exposure to midges not very different from the exposure of beef cattle or small ruminants to the vector.

References

1. OIE Technical Factasheet: Schmallenberg virus, October 2013.
2. Åkerstedt J, Hamnes IS, Sviland S. The surveillance and control programme for Schmallenberg virus (SBV) in Norway 2012-2013. Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2013. Oslo: Norwegian Veterinary Institute 2015.
3. Wisløff H, Nordvik BS, Sviland S, Tønnesen R. First documented clinical case of Schmallenberg virus in Norway: fetal malformations in a calf. Veterinary Record 2014; Feb 1;174(5):120. doi: 10.1136/vr.102149.
4. European Food Safety Authority (EFSA). Schmallenberg virus: state of art. EFSA Journal. 2014;12(5):3681. doi:10.2903/j.efsa.2014.3681. 54 pp.
5. Afonso A, Abrahantes JC, Conraths F, Veldhuis A, Elbers A, RobertsCollins ÁB, Barrett D, Doherty ML, Larska M, Mee JF. Post-epidemic Schmallenberg virus circulation: parallel bovine serological and Culicoides virological surveillance studies in Ireland. BMC Veterinary Research. 2016;12:234. doi:10.1186/s12917-016-0865-7.
6. Stokes JE, Baylis M, Duncan JS. A freedom from disease study: Schmallenberg virus in the south of England in 2015. Veterinary Record 2016;179,435.

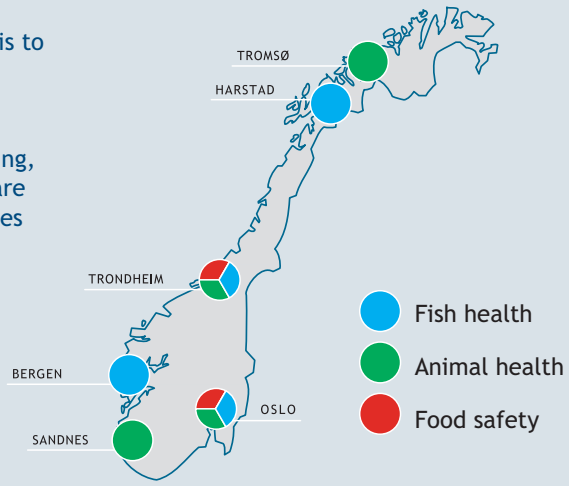
Scientifically ambitious, forward-looking and cooperatively oriented – for integrated health

The Norwegian Veterinary Institute is a national research institute that operates in the fields of animal and fish health, food safety and feed hygiene; its primary task is to provide the authorities with independently generated knowledge.

Emergency preparedness, diagnostic services, monitoring, reference functions, consulting, and risk assessments are all important areas of activity. Our products and services include research results and reports, analyses and diagnoses, studies and advice.

The Norwegian Veterinary Institute's central laboratory and administration lie in Oslo, and we operate regional laboratories in Sandnes, Bergen, Trondheim, Harstad and Tromsø.

The Norwegian Veterinary Institute collaborates with a large number of national and international institutions.



Fish health

Animal health

Food safety

Oslo	Trondheim	Sandnes	Bergen	Harstad	Tromsø
postmottak@vetinst.no	vit@vetinst.no	vis@vetinst.no	post.vib@vetinst.no	vih@vetinst.no	vitr@vetinst.no

www.vetinst.no

Veterinærinstituttet
Norwegian Veterinary Institute