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The surveillance and control programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2012

Anne-Gerd Gjevre

Irene Ørpetveit

Øyvind Vågnes

Saraya Tavornpanic

Trude M Lyngstad



Surveillance and control programmes for terrestrial and aquatic animals in Norway

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Project managers at the Norwegian Veterinary Institute:

Ståle Sviland (Terrestrial animals)
Anne-Gerd Gjevre (Aquatic animals)
Mona Torp (Food safety)

Publisher

Norwegian Veterinary Institute
PO Box 750 Sentrum
NO-0106 Oslo
Norway

Fax: + 47 23 21 60 01
Tel: + 47 23 21 60 00
E-mail: postmottak@vetinst.no
www.vetinst.no

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Authors:

Anne-Gerd Gjevre, Irene Ørpetveit, Øyvind Vågnes, Saraya Tavornpanich, Trude M Lyngstad

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The surveillance and control programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2012

Anne-Gerd Gjevre, Irene Ørpetveit, Øyvind Vågnes, Saraya Tavoranpanich, Trude M Lyngstad

The surveillance programme was evaluated in 2010 and as a result, amended in 2011 and 2012 towards a risk-based approach. Viral haemorrhagic septicaemia virus and infectious haematopoietic necrosis virus was not detected at any of the sites tested in the 2012 surveillance.

Introduction

Viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) are two important diseases in salmonid fish caused by rhabdovirus infections (1).

VHS has most frequently been recorded in farmed rainbow trout, but may also cause losses in other wild and farmed fish species, both marine and freshwater (2, 3). Norway obtained disease free status for VHS and IHN in 1994 (4). VHS was diagnosed in farmed rainbow trout in Norway in 2007 and disease free status was temporarily suspended (5, 6). Measures to eliminate the disease and prevent its spread were immediately taken by the Norwegian Food Safety Authority (NFSA). In 2011 Norway regained its VHS free status.

Outbreaks of IHN have resulted in significant economic losses in farmed rainbow trout and salmon in North America and Europe, and the disease has also had an impact on wild populations of Pacific salmon. IHN has never been diagnosed in Norway.

The Norwegian Veterinary Institute (NVI) coordinates the surveillance programme and publishes the overall results in monthly and annual reports. Fish samples are analysed at the Norwegian Veterinary Institute or at PatoGen Analyse AS.

<http://www.vetinst.no/nor/Faktabank/Alle-faktaark/Viral-hemoragisk-septikemi>
<http://www.vetinst.no/nor/Faktabank/Alle-faktaark/Infeksioes-Hematopoetisk-Nekrose>
<http://www.vetinst.no/eng/Research/Publications/Fish-Health-Report>
<http://www.vetinst.no/eng/Research/Publications/Surveillance-and-Control-Programs-annual-reports>

Aim

The aim of the programme is to document the absence of VHS virus (VHSV) and IHN virus (IHNV) in fish farms in order to maintain Norway's VHS and IHN free status (7).

Materials and methods

The strategy for the surveillance programme for VHS and IHN is risk-based, focused on targeting sites with rainbow trout and fish with disease signs (8).

In 2012 the NFSA intended to sample all active sites with rainbow trout and 20 % of the active sites with salmon, during each production cycle. An active site was defined as having stocked fish for at least three continuous months of the year. For 2012 this meant sampling of 20 fish per site from 38 sites with rainbow trout and 100 sites with salmon, at a water temperature below 14 degrees (9).

Sampling was done partly by fish health services in connection with disease investigation and partly by farmers for screening purposes, targeting moribund and newly dead fish. Additionally, a few sites with rainbow trout were sampled by the NFSA in connection with inspections. Samples on RNAlater™ submitted to the NVI were processed and analysed for VHSV and IHNV by real-time RT-PCR with VHSV primers and probe from Matejusova *et al.* 2008 modified according to Duesund *et al.* 2010, and IHNV primers and probe from Liu *et al.* 2008 (10, 11, 12). Samples on RNAlater™ submitted to PatoGen were

analysed by real-time RT-PCR assays developed by this laboratory. The PCR assay for VHSV is accredited according to ISO17025.

Samples on transport medium for cell culture analysis were submitted to the NVI and processed according to Decision 2001/183/EC (9) and recommendations from the Community reference laboratory for fish diseases in Denmark. Following homogenisation and low speed centrifugation, the resulting supernatant was incubated with a polyclonal antibody against infectious pancreatic necrosis virus and analysed in cell culture.

Results

In 2012, 58 marine sites with rainbow trout and 721 marine sites with sites with Atlantic salmon were registered as active. This is based on monthly report on production statistics to the Norwegian Authorities, biomass data obtained as described in Kristoffersen et al 2009 (13). Active freshwater sites are not included in these numbers (data not available).

In total, 1660 fish samples from 60 % (35/58) of the active sites with rainbow trout and 14 % (100/721) of the active sites with Atlantic salmon were tested for VHSV and IHNV in 2012. All samples were negative (Figure 1, 2; Table 1, 2).

There were two main sources of submitted samples: for disease investigation and for screening purpose. Of 639 fish samples submitted for disease investigation, 165 were from the rainbow trout sites and 474 were from the Atlantic salmon sites (Figure 1, 2; Table 1). The mean number of samples per site was 7 (minimum 1, maximum 26). Of 1021 fish samples submitted for screening, 167 were from the rainbow trout sites and 854 were from the Atlantic salmon sites (Figure 1, 2; Table 2). The mean number of samples per site was 17 (minimum 5, maximum 25).

Table 1. Fish samples investigated for VHSV and IHNV at Norwegian Veterinary Institute in 2012. The samples were submitted in connection with disease investigation. The samples are grouped according to species and type of production. All samples were negative for VHSV and IHNV

	Rainbow trout (trout)				Atlantic salmon			
	Fry/smolt	On-growing	Brood fish	Total	Fry	On-growing	Brood fish	Total
No. sites	7	19	0	26	6	52	1	59
No. samples investigated by real-time RT-PCR	59	68	0	127	48	397 ¹	7	452
No. samples investigated by cell culture	6	32 ¹	0	38	5	17	0	22

¹ 4 samples from 1 site with rainbow trout and 10 samples from 3 sites with Atlantic salmon were not tested for IHNV virus

Table 2. Fish samples investigated for VHSV and IHNV at PatoGen in 2012. The samples were submitted in connection with screening, but targeted towards fish with disease sign. The samples are grouped according to species and type of production. All samples were negative for VHSV and IHNV.

	Rainbow trout (trout)				Atlantic salmon			
	Fry	On-growing	Brood fish	Total	Fry	On-growing	Brood fish	Total
No. sites	5	2	2	9	1	35	5	41
No. samples investigated by real-time RT-PCR	100	30	37	167	20	725	109	854

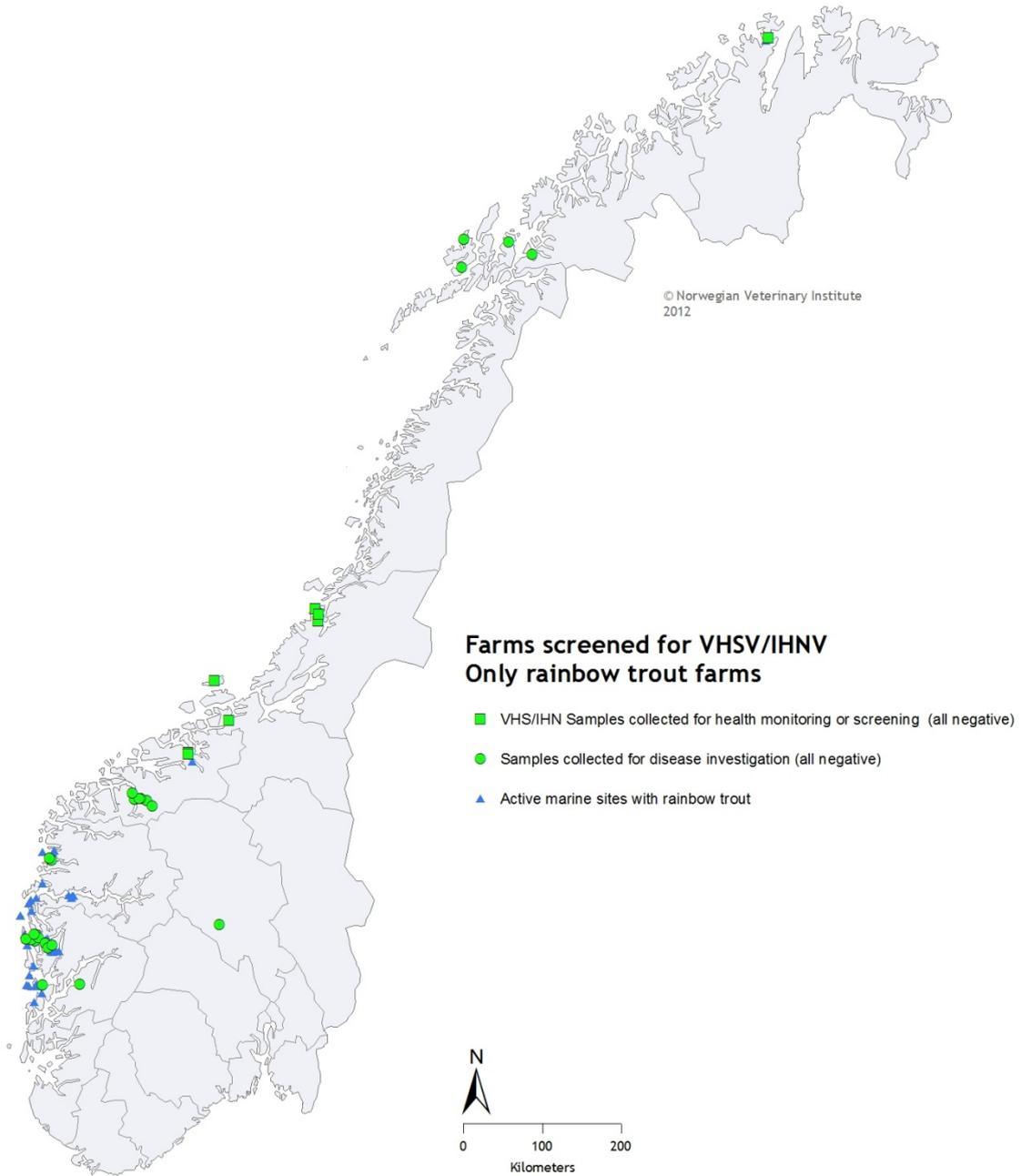


Figure 1. Map of active marine sites with rainbow trout in 2012. Active freshwater sites are not shown (data not available). Green symbols indicate sites included in the 2012 surveillance programme.

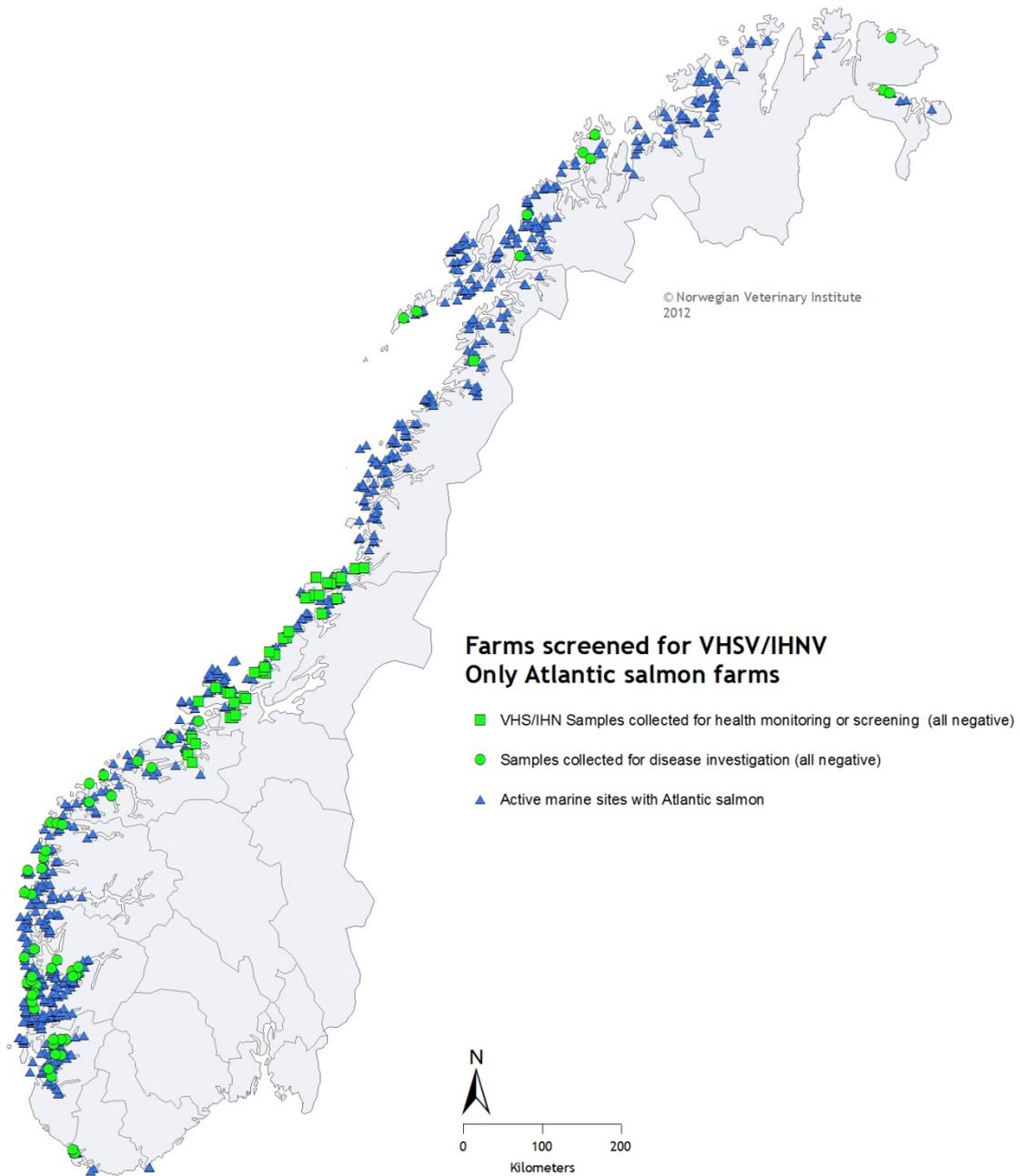


Figure 2. Map of active marine sites with Atlantic salmon in 2012. Active freshwater sites are not shown (data not available). Green symbols indicate sites included in the 2012 surveillance programme.

Discussion and conclusion

The risk based surveillance programme did not detect any VHSV- or IHNV-positive Atlantic salmonids during the 2012.

Both 2011 and 2012 has been trial years, and complete implementation of the risk based strategy is still not achieved. Amendment of the strategy for risk based surveillance is in process to further improve the future surveillance scheme.

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The Norwegian Veterinary Institute (NVI) is a nationwide research institute in the fields of animal health, fish health, and food safety. The primary mission of the NVI is to give research-based independent advisory support to ministries and governing authorities. Preparedness, diagnostics, surveillance, reference functions, risk assessments, and advisory and educational functions are the most important areas of operation.

The Norwegian Veterinary Institute has its main laboratory in Oslo, with regional laboratories in Sandnes, Bergen, Trondheim, Harstad og Tromsø, with about 360 employees in total.

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The Norwegian Food Safety Authority (NFSA) is a governmental body whose aim is to ensure through regulations and controls that food and drinking water are as safe and healthy as possible for consumers and to promote plant, fish and animal health and ethical farming of fish and animals. We encourage environmentally friendly production and we also regulate and control cosmetics, veterinary medicines and animal health personnel. The NFSA drafts and provides information on legislation, performs risk-based inspections, monitors food safety, plant, fish and animal health, draws up contingency plans and provides updates on developments in our field of competence.

The NFSA comprises three administrative levels, and has some 1300 employees.

The NFSA advises and reports to the Ministry of Agriculture and Food, the Ministry of Fisheries and Coastal Affairs and the Ministry of Health and Care Services.

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