

## The surveillance and control programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2011

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# Surveillance and control programmes for terrestrial and aquatic animals in Norway

Annual report 2011

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## Publisher

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ISSN 1890-9973

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Date: 4 June 2012

Front page photo: Anne-Mette Kirkemo

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## Example of citation:

Hellberg H, Ørpetveit I, Bang Jensen B, Tavoranpanich S, Lyngstad TM. The surveillance and control programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2011. *Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2011*. Oslo: Norwegian Veterinary Institute 2012.

# The surveillance and control programme for viral haemorrhagic septicaemia (VHS) and infectious haematopoietic necrosis (IHN) in Norway 2011

Hege Hellberg, Irene Ørpetveit, Britt Bang Jensen, Saraya Tavorpanich, Trude M Lyngstad

*The surveillance programme was evaluated in 2010 and as a result, amended in 2011 towards a risk-based approach. Viral haemorrhagic septicaemia (VHS) virus and infectious haematopoietic necrosis (IHN) virus was not detected at any of the sites tested in the 2011 surveillance. Only farms in the approved zone are included in the surveillance programme.*

## 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 May 2008, Norway regained its VHS free status, with the exception of the VHS outbreak area (6). 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.

For more information on fish rhabdoviruses and fish health status in Norway:

<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 within the approved zone (6) in order to maintain Norway's VHS and IHN free status.

## Materials and methods

The surveillance programme was evaluated in 2010, and a risk-based approach was suggested. The risk-based surveillance strategy focused on sampling fish from all active sites with rainbow trout, and 20 % of the salmon sites. A minimum of 20 samples per site from fish with disease signs was needed to ensure a high probability of detecting VHS (7).

## Sampling

Sampling was done by fish health services in connection with disease outbreaks and episodes of increased mortality (Table 1). To improve the geographical distribution, additional sites were sampled in connection with inspections carried out by the NFSA according to Directive 2006/88/EC and Decision 2001/183/EC (8, 9) (Table 2).

## Analysis

Samples received on RNAlater® were processed and analysed for VHSV and IHNV by real-time RT-PCR with VHSV primers and probe modified according to Duesund *et al.* from Matejusova *et al.* 2008, and IHNV primers and probe from Liu *et al.* 2008 (10, 11, 12).

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

## Results

Fish samples submitted in connection with disease investigations and increased mortality comprised 8 rainbow trout and 30 Atlantic salmon sites in 2011 (Table 1). Additional samples from inspections carried out by the NFSA comprised 22 rainbow trout and 35 Atlantic salmon sites (Table 2).

In total, 63% of all active rainbow trout and 9% of all active Atlantic salmon sites were tested for VHSV and IHNV (Table 3), and all samples were negative for VHSV and IHNV. An active site is defined as having stocked fish for at least three continuous months of the year. In 2011, 48 rainbow trout and 726 Atlantic salmon sites were registered as active.

Table 1. Samples submitted in connection with disease investigations or episodes of increased mortality tested for VHSV and IHNV. The samples are grouped according to species and type of production.

	Rainbow trout ( <i>Oncorhynchus mykiss</i> )				Atlantic salmon ( <i>Salmo salar</i> )			
	Fry - smolt	On-growing	Brood fish	Total	Fry - smolt	On-growing	Brood fish	Total
No. sites	0	8*	-	8	7*	23	-	30
No. of individual fish tested by PCR	0	55*	-	55	50*	95	-	145
No. of pooled samples tested in cell culture	0	9	-	9	4	50	-	54

\*1 site was not tested for IHN virus. Number of individual fish tested by PCR is therefore lower for IHN virus.

Table 2. Samples submitted in connection with inspections carried out by the NFSA tested for VHSV and IHNV. Grouped according to species and type of production.

	Rainbow trout ( <i>Oncorhynchus mykiss</i> )				Atlantic salmon ( <i>Salmo salar</i> )			
	Fry - smolt	On-growing	Brood fish	Total	Fry - smolt	On-growing	Brood fish	Total
No. sites	4	18	-	22	5	30	-	35
No. of individual fish tested by PCR	11	0	-	11	0	17	-	17
No. of pooled samples tested in cell culture	36	174	-	210	15	91	-	106

Additional to the the surveillance programme, histology samples showing necrosis of haematopoietic tissue was also routinely analyzed for VHSV and IHNV by immunohistochemistry, all negative with regard to VHS and IHN.

## Discussion

The programme did not detect any VHS- or IHN-positive salmonids during the 2011 testing.

The risk based surveillance strategy (7) is a 2 steps sampling method. The first sampling step focuses on collecting at least 20 samples per site and targeting fish with disease signs to ensure a high confidence level (95%) of detecting the viruses, if present within a site. Assuming the 1<sup>st</sup> sampling step is achieved, the 2<sup>nd</sup> sampling step recommended that the program includes all active sites with rainbow trout, and 20 % of the salmon sites to attain a high probability of disease detection in the approved area.

2011 was a trial year, and complete implementation of this strategy was not achieved. Amendment of the risk based surveillance is in process to further improve the future surveillance scheme.

## Conclusion

The surveillance programme was evaluated in 2010 and amended in 2011 towards a risk-based approach targeting sampling during disease outbreaks and increased mortality. Analysis has been extended to include PCR analysis in addition to cell culture.

Based on the examinations carried out in the surveillance and control programme for VHS and IHN at the Norwegian Veterinary Institute in 2011, no confirmed or suspected cases were registered within the approved zone.

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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.

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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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