

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

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*The surveillance programme was amended in 2009 and sampling was limited to rainbow trout (*Oncorhynchus mykiss*). IHN virus (IHNV) was not detected at any of the sites tested in the 2009 surveillance. VHS virus (VHSV) was detected at one site connected to the VHS outbreaks in Storfjorden in 2007 and 2008. Only farms in the approved zone were sampled in 2009, and the detection resulted in an immediate amendment of the control zone.*

Introduction

VHS and IHN are two important diseases in salmonid fish caused by rhabdovirus infections (1). VHS occurs in several fish species in both freshwater and seawater, but has most frequently been recorded in farmed rainbow trout. The VHS outbreak in the Great Lakes in North America continues to cause large losses among several wild fish species (2, 3). VHS was diagnosed in farmed rainbow trout in Norway in 2007 (4). 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:

<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 VHSV and IHNV in fish farms within the approved zone in order to maintain Norway's VHS and IHN free status.

Materials and methods

Sampling

Sampling and inspection is carried out by the Norwegian Food Safety Authority District Offices according to

Directive 2006/88/EC and Decision 2001/183/EC (5, 6). The virological analyses are performed by the National Veterinary Institute. Thirty fish are sampled from each site and, depending on fish size, samples from five or ten individuals are pooled on transport medium.

Analysis

The samples are processed according to Decision 2001/183/EC (6). Following homogenisation and low speed centrifugation, the resulting supernatant is incubated with a polyclonal antibody against infectious pancreatic necrosis virus (IPNV) and analysed according to Decision 2001/183/EC and recommendations from EU reference laboratory for fish diseases in Århus, Denmark.

Results

In 2009, a total of 160 pooled samples (1,600 individual fish) from 50 sites were examined (Tables 1 and 2). All samples were negative for IHNV and 2 pooled samples from one site were positive for VHSV.

In 2 pooled samples from one submission from Hordaland, CPE appeared in the BF-2 cell cultures. These were negative for IPNV as tested by virus neutralization test (IPNV), and negative for VHSV by real-time reverse transcription polymerase chain reaction (RRT-PCR) (VHSV). Further investigations of cell cultures exhibiting CPE by immunofluorescence tests and RRT-PCR revealed the presence of salmonid alphavirus (SAV), the causative agent of pancreas disease (PD).

Discussion

In 1994, Norway obtained disease free status for VHS and IHN (7). The 2007 VHS outbreak in rainbow trout caused a temporary suspension of the disease free status. Measures to eliminate the disease and prevent its spread were immediately taken by the Food Safety Authority. In May 2008, Norway regained its VHS free status, with the exception of the VHS outbreak area (8). The surveillance programme only covers the approved zone.

In 2009, 3 pooled samples from 1 site were rejected, compared to 1 pooled sample from 1 site in 2008.

The isolation of SAV in samples received for surveillance of VHSV and IHNV continues to represent a problem for detection of the two rhabdoviruses. Presently, neutralising antibodies against SAV are not available. Also, it is not known whether replication of SAV will inhibit replication of VHSV in the BF-2 cells. Therefore,

Table 1. Different categories of fish analysed for VHSV and IHNV in 2009.

	Fry - smolt		On-growing		Brood fish		Total	
	No. sites	No. of pooled samples	No. sites	No. of pooled samples	No. sites	No. of pooled samples	No. sites	No. of pooled samples
Rainbow trout (<i>Oncorhynchus mykiss</i>)	16	54	32*	96	1	7	49	157
Brown trout (<i>Salmo trutta</i> L.)	1	3	-	-	-	-	1	3
Total	17	57	32	96	1	7	50	160

* VHSV was detected at one (1) on-growing site.

Table 2. Number of farms and species analysed for VHSV and IHNV during the time period 1995-2009.

Farm types	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<i>Per production type</i>															
Smolt producing farms	71	169	162	30	27	45	30	32	54	51	125	104	140	84	17
On-growing farms	207	340	346	478	527	447	508	414	429	303	280	276	282	315	32
Brood stock farms				2	3	7	7	14	2	9	14	15	12	48	1
<i>Per species</i>															
Farms with Atlantic salmon	225	425	392	417	462	382	408	372	387	295	345	316	359	376	
Farms with rainbow trout	31	63	69	66	62	83	93	61	74	48	61	49	54	48	49
Farms with brown trout	15	13	38	21	27	28	24	23	24	21	8	24	13	17	1
Farms with char	1	7	6	5	4	10	8	9	9	5	7	8	5	8	
Farms with turbot	6	1	1		1	1	4		1	1		1		1	
Farms with sea trout				2	3	2	4	1	2	2	2	2	2		
Farms with brook trout				2		1	1	2	1	2					
Farms with relict Atlantic salmon				1						1					
Farms with cod													5		
Total	278	509	506	510	554	494	534	468	498	375	417	392	434	444	50

* During the period 1995-2008, cultivation facilities for wild stocks were categorized as brood stock farms.

tissue homogenates of SAV-positive samples are always examined for VHSV by RT-PCR to ensure the absence of this virus. The SAV-positive site is located in the region where PD is considered endemic.

Conclusion

Based on the examinations carried out in the surveillance and control programme for VHS and IHN at the National Veterinary Institute in 2009, no confirmed or suspected cases of IHNV were registered within the approved zone. VHSV was detected at one site in 2009. This site was located outside of, but very close to the control zone established after the VHS outbreaks in Storfjorden in 2007 and 2008 and the detection resulted in an immediate amendment of the control zone. Prior to the 2007 VHS outbreak, none of the involved sites had tested positive in the surveillance programme. An evaluation of the surveillance programme started in 2009 and will be completed in 2010.

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hagic septicaemia (VHS) in seawater-farmed rainbow trout in Norway caused by VHS virus genotype III. *Dis Aquat Org.* 2009; 85: 93-103.

5. Council Directive 2006/88/EC of 24 October 2006 on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals.

6. Commission Decision 2001/183/EC of 22 February 2001 laying down the sampling plans and diagnostic methods for the detection and confirmation of certain fish diseases.

7. EFTA Surveillance Authority Decision No. 71/94/COL of June 1994.

8. EFTA Surveillance Authority Decision No. 302/08/COL of May 2008.

The National Veterinary Institute (NVI) is a nation-wide 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 National 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.

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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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