Annual Report · 2015

The surveillance programme for virus associated with disease in rainbow trout (virus Y) in Norway 2015





# Surveillance programmes for terrestrial and aquatic animals in Norway

Annual report 2015

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ISSN 1894-5678

Title:

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Date: 2016-03-17

Front page photo: Colourbox

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#### Example of citation:

Gjevre AG, Modahl I, Spilsberg B, Lyngstad TM. The surveillance programme for virus associated with disease in rainbow trout (virus Y) in Norway 2015. Surveillance programmes for terrestrial and aquatic animals in Norway. Annual report 2015. Oslo: Norwegian Veterinary Institute; 2016.

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# The surveillance programme for virus associated with disease in rainbow trout (virus Y) in Norway 2015.

Anne-Gerd Gjevre, Ingebjørg Modahl, Bjørn Spilsberg, Trude M Lyngstad

This surveillance programme has a risk-based approach and was based on analyses of samples collected from diseased fish. Virus Y, a piscine orthoreovirus related virus, was detected in nine of the sites tested in the 2015 surveillance programme. However, no new cases of the disease were observed.

## Introduction

During disease investigation in hatcheries of rainbow trout in 2013, the Norwegian Veterinary Institute (NVI) isolated a gene sequence from a new virus. This virus is closely related to piscine orthoreovirus (PRV) which is associated with heart- and skeletal muscle inflammation in Atlantic salmon (HSMI) (1). NVI uses the working name "virus Y" pending taxonomic data that can provide the basis for naming. The gene sequence was found in tissue and blood from diseased fingerlings of rainbow trout and in contact farms for these hatcheries. This included both broodstock groups and on-growing farms. In addition, small amounts of virus Y were detected in randomly selected historical material from the counties Hordaland and Møre og Romsdal back to 2011. Virus Y was detected until 15 months after seawater transfer and there is reason to believe that subclinical disease may occur.

Infection trials conducted in 2014 and 2015 showed that the virus can be transmitted to both rainbow trout and Atlantic salmon by injection of red blood cells from diseased rainbow trout. It was also shown that the virus is transmitted horizontally through the water between individuals of the same species. The virus replicates more slowly in salmon than in rainbow trout. No tests are carried out to show whether the disease is transmitted between species.

## Aim

The aim of the programme is to document the occurrence of virus Y in farmed rainbow trout in Norway.

# Materials and methods

The strategy for the surveillance programme for virus Y is risk-based, i.e. targeting fish with disease signs, and with a primary focus on sites with rainbow trout.

In 2015 the surveillance programme for virus Y included investigation of relevant samples mainly from active sites with rainbow trout. The samples were submitted by the fish health services in connection with disease investigation or the NFSA in connection with inspections on sites with rainbow trout targeting moribund or newly dead fish. An active site was defined as having stocked fish for at least three months of the year. In 2015, 64 marine sites with rainbow trout and 685 marine sites with Atlantic salmon were registered as active. These numbers are based on monthly reports on production statistics to the Norwegian Authorities, biomass data obtained as described in Kristoffersen et al 2009 (2). Active freshwater sites are not included in these numbers (data not available).

Samples on RNAlater<sup>TM</sup> submitted to the NVI were processed and analysed for virus Y by real-time RT-PCR. NVI designed in 2014 a reverse transcriptase real-time PCR that target the sigma 3 protein to be able to detect virus Y (1). The PCR was later in-house validated. This method will detect both virus transcripts and the virus genome.

# Results

In total, 680 fish samples from 60 of the sites with rainbow trout and 18 fish samples from two of the sites with Atlantic salmon were tested for virus Y in 2015. The mean number of samples per site was 9. (Table 1, Figure 1)

**Table 1.** Fish samples tested for virus Y at the Norwegian Veterinary Institute in 2015. The samples were submitted in connection with disease investigation. The samples are grouped according to species and type of production.

Species	Production	Numbers investigated for virus Y by real time `RT-PCR		
		Samples	Sites	Positive sites
Rainbow trout (trout)	Smolt	155	14	0
	On-growing	495	43	8
	Broodfish	10	1	0
	Unknown	20	2	1
Atlantic salmon	Smolt	18	2	0

Nine sites with rainbow trout tested positive for virus Y in 2015 (Table 2). The disease was not observed at any of these sites (Figure 1).

In three of the sites virus was detected on more than one occasion. In six of the sites virus was detected for the first time in 2015, and in one and two of the sites virus Y also was detected in 2013 and 2014, respectively.

Samples from two hatcheries with Atlantic salmon were tested on suspicion of the disease caused by the new virus. Virus Y was not detected in samples from these sites.

Site	Туре	Virus Y detected by PCR	Detection of disease
1	Broodfish	2014	
2	On-growing	2013, 2014	
3	Smolt producer	2014	2013, 2014
4	On-growing	2015	
5	Smolt producer	2013, 2014	2013, 2014
6	On-growing	2015	
7	Smolt producer	2014	2014
8	On-growing	2014	
9	On-growing	2015	
10	On-growing	2014, 2015	2014
11	On-growing	2014, 2015	2014
12	Smolt producer	2013	2013, 2014
13	Broodfish	2014	
14	Broodfish	2015	
15	On-growing	2015	
16	On-growing	2015	
17	On-growing	2013, 2015	

Table 2. Sites with rainbow trout where virus Y was detected in 2013 - 2015.



Figure 1. Map of sites included in the 2015 surveillance programme for virus Y. Green symbols indicate rainbow trout sites, blue symbols indicated salmon sites, and red indicate sites positive for virus Y

## Discussion and conclusion

Virus Y was detected in 19 different sites with rainbow trout in the years from 2011-2015. The virus was detected in nine out of 60 tested sites with rainbow trout in 2015. In three of these sites virus was detected on more than one occasion. This indicates that the virus persists in the fish for several months.

In 2015 virus Y was detected at six new sites with rainbow trout. These sites were located in the same area where virus Y was detected earlier. However, the NVI did not diagnose the disease associated with the virus at any of the positive sites in 2015.

The surveillance programme will continue in 2016 aiming to document the occurrence of virus Y in the rainbow trout and Atlantic salmon sites in areas where virus has been detected in the two previous years.

## References

1. Olsen A.B., Hjortaas M., Tengs T., Hellberg H., Johansen R. First description of a new disease in rainbow trout (*Oncorhynchus mykiss* (Walbaum)) similar to heart and skeletal muscle inflammation (HSMI) and detection of a gene sequence related to Piscine orthoreovirus (PRV). PLOS ONE, July 15, 2015. e0131638. Doi:10.1371/journal. pone.0131638

2. Kristoffersen AB, Viljugrein H, Kongtorp RT, Brun E, Jansen PA (2009) Risk factors for pancreas disease (PD) outbreaks in farmed Atlantic salmon and rainbow trout in Norway during 2003-2007. Prev Vet Med 90: 127-136.

The Norwegian Veterinary Institute (NVI) is a natitonwide biomedical research institute and Norway's leading centre of expertise regarding biosafety in aquatic and terrestrial animals. The aim of the Institute is to become Norway's contingency centre of preparedness for One Health.

The primary mission of the NVI is to give researchbased 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 Institute has its main laboratory in Oslo, with regional laboratories in Sandnes, Bergen, Trondheim, Harstad and Tromsø, with about 330 employees in total.

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![](_page_6_Picture_4.jpeg)

Veterinærinstituttet

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 two administrative levels, five regions in addition to the head office, and has some 1250 employees. The NFSA advises and reports to the Ministry of Agriculture and Food, the Ministry of Trade, Industry and Fisheries and the Ministry of Health and Care Services.

www.mattilsynet.no

![](_page_6_Picture_9.jpeg)