

## The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2012

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

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# The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2012

Maria Lie Linaker, Haakon Hansen, Tor Atle Mo, Asle Moen, Britt Bang Jensen

*In 2012, Gyrodactylus salaris was not detected in any new rivers or farms with salmon or rainbow trout.*

## Introduction

During the period of 1975 to 2013 pathogenic strains of *Gyrodactylus salaris* have been detected on Atlantic salmon (*Salmo salar*) fingerlings/parr in 48 rivers, 13 hatcheries/farms with Atlantic salmon parr/smolts and 26 hatcheries/farms with rainbow trout (*Oncorhynchus mykiss*). In addition, both pathogenic and non-pathogenic strains of *G. salaris* have been found on Arctic charr (*Salvelinus alpinus*). The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected watersheds and farms. In farms, the eradication procedure is carried out by eliminating the hosts (salmon and rainbow trout) and thereby eliminating the parasite because it lacks specialized free-living stages and do not need intermediate hosts in its life-cycle. In rivers, the eradication procedure is carried out by treatment with rotenone, a poison that kills all the fish hosts. In addition, the use of acidified aluminium sulphate is under development and it has been used with good results as the main chemical in Lærdalselva region. But it is still too early to conclude that the river is free from *G. salaris*. In contrast to rotenone, aluminium sulphate will kill the parasite but not the fish host. By December 31 2012, *G. salaris* was confirmed eradicated from 20 rivers and from all hatcheries/fish farms. The eradication has not yet been confirmed for 14 additional rivers. Thus, at the end of 2012, the parasite was present or suspected to be present in 14 Norwegian rivers.

*G. salaris* is a notifiable (List 3) disease in Norway and it is listed as "Other significant disease" in the World Organisation for Animal Health (OIE). Surveillance of *G. salaris* has been performed in Norwegian salmon rivers since late 1970s (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11). Surveillance is not performed in infected rivers or farms.

The Norwegian Food Safety Authority is responsible for the sampling in fish farms. The National Veterinary Institute (NVI) is responsible for the sampling in the rivers but County Environmental Departments and other institutions/companies are commissioned to do the actual sampling. NVI is responsible for examination of all the fish samples and the species identification of the parasites if *Gyrodactylus* is detected.

## Aim

The surveillance programme aims to detect and trace any spread of *Gyrodactylus salaris* to new river systems or fish farms (or to rivers and farms cleared of infection).

## Materials and methods

At least 30 wild Atlantic salmon are sampled from each river. Fingerlings/parr/smolts are caught by means of electrofishing. In some of the large rivers, sampling is done at different locations far apart. The fish are killed and then preserved as whole in 96 % ethanol. At least 30 Atlantic salmon or 60 rainbow trout are sampled by seine net in each farm. The fish are killed, and all fins (except adipose fin) are cut off and preserved in 96 % ethanol.

All the samples are sent to the National Veterinary Institute in Harstad where the samples are examined under a stereo microscope at 10 - 15 times magnification. The whole surface including body, head and fins are examined for wild Atlantic salmon while fins only are examined for farmed fish.

When *Gyrodactylus* specimens are found, these are sent to the National Veterinary Institute in Oslo (the OIE reference laboratory for the disease) for species determination. The methods used for species identification follows those in the Gyrodactylosis (*Gyrodactylus salaris*) chapter in the Manual of diagnostic tests for aquatic animals from the World Organisation for Animal Health (OIE) ([http://www.oie.int/fileadmin/Home/eng/Health\\_standards/aahm/2010/2.3.03\\_GYRO.pdf](http://www.oie.int/fileadmin/Home/eng/Health_standards/aahm/2010/2.3.03_GYRO.pdf)).

## Results

Altogether, 3,817 specimens from 111 rivers and 3,091 specimens from 89 farms were examined in 2012 (Tables 1 and 2). There were no new infections with *G. salaris* detected in any farm or river samples included in the surveillance program.

## Conclusion

In 2012 there were no new infections with *G. salaris* detected in any farm or river samples included in the surveillance program.

Table 1. Number of rivers and number of fish examined for *Gyrodactylus salaris* in 2012

County	No. of rivers	Species	No. of fish examined	Detections
Finnmark	10	Atlantic salmon	472	0
Troms	7	Atlantic salmon	258	0
Nordland	13	Atlantic salmon	371	0
Nord-Trøndelag	11	Atlantic salmon	302	0
Sør-Trøndelag	7	Atlantic salmon	209	0
Møre og Romsdal	22	Atlantic salmon	767	0
Sogn og Fjordane	12	Atlantic salmon	443	0
Hordaland	3	Atlantic salmon	92	0
Rogaland	7	Atlantic salmon	193	0
Vest-Agder	5	Atlantic salmon	212	0
Aust-Agder	2	Atlantic salmon	77	0
Telemark	2	Atlantic salmon	99	0
Vestfold	3	Atlantic salmon	139	0
Buskerud	1	Atlantic salmon	13	0
Oslo	1	Atlantic salmon	26	0
Akershus	3	Atlantic salmon	63	0
Østfold	2	Atlantic salmon	81	0
<b>Total</b>	<b>111</b>		<b>3817</b>	<b>0</b>

Table 2. Number of fish farms and number of fish examined for *Gyrodactylus salaris* in 2012

County	No. of farms	Species	No. of fish examined	Detections
Finnmark	3	Atlantic salmon, rainbow trout	120	0
Troms	7	Atlantic salmon	210	0
Nordland	10	Atlantic salmon	303	0
Nord-Trøndelag	5	Atlantic salmon, rainbow trout	179	0
Sør-Trøndelag	2	Atlantic salmon	60	0
Møre og Romsdal	16	Atlantic salmon	540	0
Sogn og Fjordane	10	Atlantic salmon, rainbow trout	401	0
Hordaland	21	Atlantic salmon, rainbow trout	814	0
Rogaland	8	Atlantic salmon	240	0
Telemark	1	Atlantic salmon	32	0
Vestfold	1	Atlantic salmon	42	0
Buskerud	2	Atlantic salmon	60	0
Oppland	2	Rainbow trout	60	0
Østfold	1	Atlantic salmon	30	0
<b>Total</b>	<b>89</b>		<b>3091</b>	<b>0</b>



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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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