

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

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## Annual Reports 2008

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

#### Title

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

#### Publisher

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Design: Hanne Mari Jordsmyr,  
National Veterinary Institute  
Front page photo: Tor Atle Mo,  
National Veterinary Institute

ISSN 1503-1454

#### Example of citation:

Mo TA, Kristensen AM, Norheim K, Jansen PA. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. Annual report 2008. In: Brun E, Hellberg H, Mørk T (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Oslo: National Veterinary Institute; 2009.

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## Introduction

*In 2008, Gyrodactylus salaris was not detected in any new rivers or farms with salmon or rainbow trout.*

During the period of 1975 to 2007, pathogenic strains of *Gyrodactylus salaris* has been detected on Atlantic salmon (*Salmo salar*) fingerlings/parr from 46 rivers, 13 hatcheries/farms with Atlantic salmon parr/smolts and 26 hatcheries/farms with rainbow trout (*Oncorhynchus mykiss*). In addition, a non-pathogenic *G. salaris* strain has been found on Arctic charr (*Salvelinus alpinus*) in several lakes. The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected rivers and farms. In farms, the procedure is to eliminate the hosts (salmon and rainbow trout). By doing so, the parasite is also eliminated because it does not have specialized free-living stages or intermediate hosts. In rivers, acidified aluminium sulphate is now the main chemical used to kill the parasite but not the fish host. By 31 December 2007, *G. salaris* was confirmed to be eradicated from 15 rivers and from all hatcheries/fish farms. The eradication has not yet been confirmed for six additional rivers. The parasite is known or suspected to be present in 25 rivers in Norway.

*G. salaris* is a notifiable (List 3) disease in Norway. 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). Surveillance is not performed in rivers or farms known to be infected unless measures for eradication of the parasite have just been carried out or other circumstances that justify the need for surveillance.

The Norwegian Food Safety Authority is responsible for sampling rivers and fish farms although County Environmental Departments and other institutions/companies are commissioned to do the actual sampling. The National Veterinary Institute in Oslo (the OIE reference laboratory for the disease) is responsible for examination of samples and taxonomical studies 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 Atlantic salmon are sampled from each river. Fingerlings/parr/smolts are caught by means of electrical fishing gear. In some of the large rivers, sampling is done at different dates and at different sampling stations. The fish are killed and then preserved as whole in 96 % ethanol. At least 30 Atlantic salmon or 60 rainbow trout are sampled from each farm. Farmed fish are caught by net. The fish are killed, and all fins (except adipose fin) are cut off and preserved in 96 % ethanol. The samples are sent to the National Veterinary Institute in Harstad where body surface and fins are examined for wild fish and fins are examined for farmed fish. Samples are examined by a stereo microscope (10 - 15 times magnification).

## Results

Altogether, 3,137 specimens from 96 rivers and 2,310 specimens from 72 farms were examined in 2008 (Tables 1 and 2). No new infection with *G. salaris* was detected in any river or farm.

## Conclusion

*G. salaris* did not extend its range to any rivers or fish farms.

Table 1. Rivers examined for *Gyrodactylus salaris* in 2008

County	No. of rivers	Species	No. of fish examined	Detections
Finnmark	9	Atlantic salmon	405	0
Troms	6	Atlantic salmon	226	0
Nordland	7	Atlantic salmon	212	0
Nord-Trøndelag	11	Atlantic salmon	319	0
Sør-Trøndelag	4	Atlantic salmon	127	0
Møre og Romsdal	22	Atlantic salmon	657	0
Sogn og Fjordane	12	Atlantic salmon	366	0
Hordaland	3	Atlantic salmon	90	0
Rogaland	6	Atlantic salmon	180	0
Vest-Agder	5	Atlantic salmon	145	0
Aust-Agder	2	Atlantic salmon	61	0
Telemark	1	Atlantic salmon	12	0
Vestfold	2	Atlantic salmon	77	0
Buskerud	1	Atlantic salmon	30	0
Akershus	3	Atlantic salmon	98	0
Oslo	1	Atlantic salmon	31	0
Østfold	2	Atlantic salmon	50	0
<b>Total</b>	<b>97</b>		<b>3,086</b>	<b>0</b>

Table 2. Fish farms examined for *Gyrodactylus salaris* in 2008

County	No. of farms	Species	No. of fish examined	Detections
Finnmark	2	Atlantic salmon	60	0
Troms	4	Atlantic salmon	120	0
Nordland	9	Atlantic salmon	270	0
Nord-Trøndelag	-	-	-	-
Sør-Trøndelag	4	Atlantic salmon	120	0
Møre og Romsdal	11	Atlantic salmon	330	0
Sogn og Fjordane	4	Atlantic salmon	120	0
Hordaland	25	Atlantic salmon, rainbow trout	900	0
Rogaland	8	Atlantic salmon	240	0
Vest-Agder	-	-	-	-
Aust-Agder	-	-	-	-
Telemark	2	Atlantic salmon	60	0
Buskerud	1	Atlantic salmon	30	0
Oppland	2	Rainbow trout	60	0
<b>Total</b>	<b>72</b>		<b>2,310</b>	<b>0</b>

Table 3. Rejections in the *Gyrodactylus salaris* surveillance programme due to sample quality in 2008

County	No. of farms	Species	No. of fish sampled
Nord-Trøndelag	3	Atlantic salmon, rainbow trout	90
Møre og Romsdal	1	Atlantic salmon	30
Sogn og Fjordane	2	Atlantic salmon	60
Hordaland	1	Rainbow trout	30
Rogaland	2	Atlantic salmon, rainbow trout	60
Vest-Agder	2	Atlantic salmon, rainbow trout	120
Vestfold	1	Atlantic salmon	10
Buskerud	1	Atlantic salmon	30
Hedmark	1	Rainbow trout	30
<b>Total</b>	<b>14</b>		<b>460</b>

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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 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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