

The surveillance programme for
Gyrodactylus salaris in Atlantic salmon and
rainbow trout in Norway 2015



Surveillance programmes for terrestrial and aquatic animals in Norway

Annual report 2015

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The surveillance programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2015

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In 2015, Gyrodactylus salaris was not detected in any of the rivers or fish farms included in the surveillance program.

Introduction

During the period of 1975 to 2015 pathogenic strains of *Gyrodactylus salaris* have been detected on Atlantic salmon (*Salmo salar*) fingerlings/parr in 50 rivers, 13 hatcheries/farms with Atlantic salmon parr/smolts and 26 hatcheries/farms with rainbow trout (*Oncorhynchus mykiss*). The latest detection was in 2015, in River Kitdalselva, in Troms County, during a rotenone treatment. 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). This ensures elimination of 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 has been used with good results in the river Lærdalselva. In contrast to rotenone, aluminium sulphate will kill the parasite but not the fish host.

By December 31st 2015, *G. salaris* was confirmed eradicated from 22 rivers and from all hatcheries/fish farms. The eradication has not yet been confirmed for 18 additional rivers. At the end of 2015, the parasite is present in 10 Norwegian rivers; however rotenone treatment is ongoing in 3 of them.

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. The Norwegian Veterinary Institute (NVI) coordinates the surveillance programme and publishes the overall results in monthly and annual reports available on the NVI website (www.vetinst.no). Surveillance is not performed in infected rivers or farms.

The Norwegian Food Safety Authority is responsible for the sampling in fish farms. 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 document the freedom of *G. salaris* in Norwegian farms and rivers, and to detect and trace any spread of the parasite to new river systems or fish farms (or to rivers and farms declared free from infection).

Materials and methods

The selection of rivers to the surveillance programme is based on the risk for being infected with *G. salaris*. A total of 30 wild Atlantic salmon are sampled from each river, preferably at 3 different sites, far apart. In Tana, 150 salmon are sampled at 15 sites due to the large size of this watercourse. Fingerlings/parr/smolts are caught by means of electrofishing. The fish are killed and then preserved whole in 96 % ethanol.

In farms and hatcheries either 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 Norwegian Veterinary Institute in Harstad where the samples are examined under a stereo microscope at 10 - 15 times magnification. For wild Atlantic salmon the whole fish surface including the body, head and fins are examined, while fins only are examined for farmed fish.

When *Gyrodactylus* specimens are found, these are sent to the Norwegian 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 (*G. salaris*) chapter in the Manual of diagnostic tests for aquatic animals from the World Organisation for Animal Health (OIE) (http://www.oie.int/index.php?id=2439&L=0&htmfile=chapitre_gyrodactylus_salaris.htm)

Results

Altogether, 2320 specimens from 69 rivers and 3651 specimens from 106 farms were examined in 2015 (Table 1). There were no new infections with *G. salaris* detected in any farms or rivers included in the surveillance program.

Table 1. Number of rivers, farms and fish examined for *Gyrodactylus salaris* in 2015.

County	Rivers				Farms			
	No.	Fish*	No. of fish examined	Positive	No.	Fish*	No. of fish examined	Positive
Finnmark	8	AS	409	0	1	AS	30	0
Troms	4	AS	130	0	4	AS	120	0
Nordland	10	AS	302	0	8	AS	240	0
Nord-Trøndelag	6	AS	182	0	8	AS	243	0
Sør-Trøndelag	4	AS	122	0	14	AS / RT	460	0
Møre og Romsdal	19	AS	595	0	26	AS / RT	953	0
Sogn og Fjordane	4	AS	139	0	9	AS / RT	331	0
Hordaland	1	AS	31	0	22	AS / RT	724	0
Rogaland	3	AS	89	0	6	AS / RT	244	0
Vest-Agder	4	AS	151	0	0	-	0	-
Aust-Agder	0	-	0	-	0	-	0	-
Telemark	0	-	0	-	1	AS	30	0
Vestfold	3	AS	67	0	0	-	0	-
Buskerud	0	-	0	-	1	AS	32	0
Oppland	0	-	0	-	2	RT	120	0
Oslo	0	-	0	-	1	AS	30	0
Akershus	1	AS	33	0	1	AS	33	0
Østfold	2	AS	70	0	2	AS	61	0
Total	69		2 320	0	106		3 651	0

* AS = Atlantic salmon, RT = rainbow trout.

Conclusion

In 2015, *G. salaris* was not detected in any of the rivers or fish farms included in the surveillance program for *G. salaris* in Atlantic salmon and rainbow trout.

The Norwegian Veterinary Institute (NVI) is a nationwide 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 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 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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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.

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