Annual Report

The post-treatment control programme to ascertain freedom from infection with *Gyrodactylus salaris* in Atlantic salmon 2018

Veterinærinstituttet
Norwegian Veterinary Institute

Mattilsynet

The post-treatment control programme to ascertain freedom from infection with *Gyrodactylus salaris*, 2018

Content

Authors
Sigurd Hytterød, Mari Darrud, Saima Nasrin Mohammad, Tobias Holter and Haakon Hansen

Commissioned by
Norwegian Food Safety Authority

ISSN 1894-5678

Design Cover: Reine Linjer
Photo front page: Sigurd Hytterød

Summary

In 2018, *Gyrodactylus salaris* was not detected in any of the rivers included in the surveillance programme.

Introduction

During the period from 1975 to 2018, 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*). In addition, both pathogenic and non-pathogenic strains of *G. salaris* have been found on Arctic char (*Salvelinus alpinus*) in lakes.

The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected watersheds and farms (Anon 2014). In farms, this is carried out by eliminating the hosts (salmon and rainbow trout). This ensures elimination of the parasite since it lacks specialised free-living stages and does not use intermediate hosts in its life cycle. In rivers, the eradication has mostly been carried out by rotenone treatment rotenone treatment. One exception was the treatment of River Lærdalselva in 2011-2012, where acidified aluminum sulphate was used to eradicate the parasite.

By December 31th 2018, *G. salaris* was confirmed eradicated from 32 rivers and from all hatcheries/fish farms. In an additional 11 rivers, eradication measures have been completed, but eradication has not yet been confirmed. Thus, at the end of 2018, the parasite is confirmed present in seven Norwegian rivers.

G. salaris is a notifiable (List 3) disease in Norway and it is listed as "Other significant diseases" by the World Organisation for Animal Health (OIE). Surveillance of *G. salaris,* aiming to declare freedom from the parasite in treated rivers, has been ongoing since the early 1980s. The Norwegian Veterinary Institute (NVI) coordinates the surveillance programme and publishes the overall results in annual reports available on the NVI website (www.vetinst.no).

An adequate surveillance, covering both space and time, is required to ascertain freedom from infection with *G. salaris* in the treated rivers. Declaring a river free from parasites requires examination of salmon juveniles sampled over a time period of a minimum of five years after an eradication measure is completed. This time frame is based on a smolt age of four years, adding one year safety margin. In rivers with higher smolt age, the time frame is increased accordingly.

The NVI is responsible for the sampling in the rivers, but county environmental departments and other institutions/companies are commissioned to carry out the actual sampling. The NVI is responsible for both examination of the fish and subsequent species identification if *Gyrodactylus* parasites are detected.

Aims

The post-treatment control programme to ascertain freedom from infection with *Gyrodactylus salaris* aims to document the absence of the parasite in previously infested rivers after the implementation of eradication measures. This documentation provides the basis for declaring the salmon populations free from infection. Freedom from infection is declared by the Norwegian Food Safety Authority.

Materials and methods

Wild Atlantic salmon juveniles are sampled along the whole anadromous part of the river. The programme recommends sampling of at least 10 salmon juveniles near the river outlet to the sea, and further 10 salmon at every second kilometer, all the way up to the migration barrier in the main river as well as in the tributaries. Thus, the total number of sampled fish is dependent of the length of the anadromous part

of the river system. Fingerlings and parr ranging in size from 7 - 12 cm are caught by means of electrofishing. The fish are killed and then preserved whole in 96 % ethanol.

All the samples are sent to the NVI where the fish surface including body, head, gills and fins is examined under a stereo microscope at 10 - 15 times magnification. When *Gyrodactylus* specimens are detected, species identification is performed by morphological analysis and with molecular methods.

When *Gyrodactylus* specimens are detected, a species determination is performed by the NVI in Oslo, the OIE (World Organisation for Animal Health) reference laboratory for the disease. The methods used for species identification follow those in the Gyrodactylosis (*G. salaris*) chapter in the OIE Manual of diagnostic tests for aquatic animals.
http://www.oie.int/index.php?id=2439&L=0&htmfile=chapitre_gyrodactylus_salaris.htm

Results and Discussion

Altogether, 1363 salmon juveniles from 11 watercourses were examined in 2018 (Table 1).

Table 1. Number of watercourses and number of Atlantic salmon (As) examined for *Gyrodactylus salaris* in 2018. ND= Not detected.

County	Watercourse	No. of As examined	*G. salaris*
Møre og Romsdal	Rauma incl. Istra	260	ND
Møre og Romsdal	Henselva incl. Glutra and Isa	180	ND
Møre og Romsdal	Måna	100	ND
Møre og Romsdal	Innfjordelva	60	ND
Møre og Romsdal	Breidvikelva	20	ND
Møre og Romsdal	Skorga	38	ND
Nordland	Fusta	150	ND
Nordland	Ranaelva	142	ND
Troms	Skibotnelva	188	ND
Troms	Signaldalselva	225	ND
Troms	Kitdalselva	0	-
Total	**11**	**1 363**	**0**

In 2018, *G. salaris* was not detected in any of the rivers included in the surveillance programme to ascertain freedom from infection with *G. salaris* in Atlantic salmon in Norway.

References

1. Anon (2014). Handlingsplan mot lakseparasitten *Gyrodactylus salaris* for perioden 2014-2016. Miljødirektoratet 2014. 114 s.

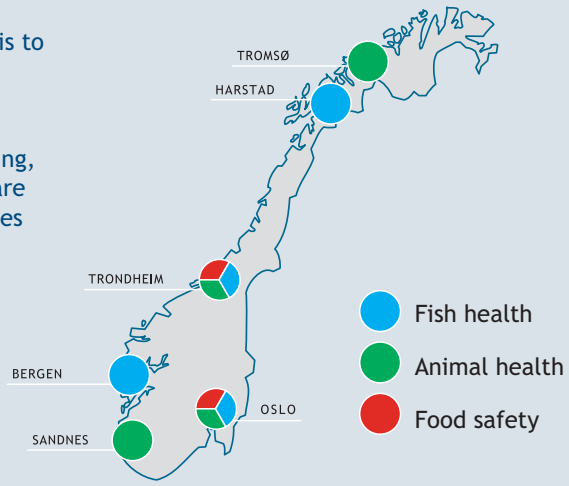
Scientifically ambitious, forward-looking and cooperatively oriented – for integrated health

The Norwegian Veterinary Institute is a national research institute that operates in the fields of animal and fish health, food safety and feed hygiene; its primary task is to provide the authorities with independently generated knowledge.

Emergency preparedness, diagnostic services, monitoring, reference functions, consulting, and risk assessments are all important areas of activity. Our products and services include research results and reports, analyses and diagnoses, studies and advice.

The Norwegian Veterinary Institute's central laboratory and administration lie in Oslo, and we operate regional laboratories in Sandnes, Bergen, Trondheim, Harstad and Tromsø.

The Norwegian Veterinary Institute collaborates with a large number of national and international institutions.



Fish health

Animal health

Food safety

Oslo	Trondheim	Sandnes	Bergen	Harstad	Tromsø
postmottak@vetinst.no	vit@vetinst.no	vis@vetinst.no	post.vib@vetinst.no	vih@vetinst.no	vitr@vetinst.no

www.vetinst.no

Veterinærinstituttet
Norwegian Veterinary Institute