Annual Report

The post-treatment control programme to ascertain freedom from infection with *Gyrodactylus salaris* in Atlantic salmon 2017

Veterinærinstituttet
Norwegian Veterinary Institute

Mattilsynet

The post-treatment control programme to ascertain freedom from infection with *Gyrodactylus salaris* in Atlantic salmon 2017

Content

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

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Summary

In 2017, *Gyrodactylus salaris* was not detected in any of the rivers included in the surveillance programme.

Introduction

During the period from 1975 to 2017, 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 is done by rotenone treatment. One exception is the treatment of River Lærdalselva in 2011-2012, where acidified aluminum sulphate was used to eradicate the parasite.

By December 31th 2017, *G. salaris* was confirmed to be eradicated from 32 rivers and from all hatcheries/fish farms. In additional 11 rivers, eradication measures have been completed, but eradication has not yet been confirmed. Thus, at the end of 2017, the parasite is confirmed present in 7 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 to ascertain freedom from infection is increased proportionally.

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* is 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 whole fish surface including body, head 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.

The NVI is the OIE reference laboratory for the disease and the methods used for species identification follow 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 and Discussion

Altogether, 2,199 salmon juveniles from 20 watercourses were examined in 2017 (Table 1).

Rivers in two infection regions were declared free from *G. salaris*. Eradication measures with rotenone were completed in the Vefsna infection region in 2012, and after five years of thorough surveillance the nine rivers Vefsna, Drevjo, Hundåla, Halsanelva, Hestdalselva, Dagsvikelva, Nylandselva, Ranelva and Leirelva were declared free from *G. salaris* by the food safety authority in September 2017. Treatment with an acidic aluminum solution (the aluminum method), a newly developed eradication method that kills the parasite without eradicating the Atlantic salmon population, was completed in River Lærdalselva in 2012. In October 2017, this famous salmon river was declared free from *G. salaris*.

Table 1. Number of watercourses and number of fish examined for *Gyrodactylus salaris* in 2017.

County	No. of watercourses	Species	No. of fish examined	Detections
Nordland	11	Atlantic salmon	1 045	0
Møre og Romsdal	6	Atlantic salmon	691	0
Sogn og Fjordane	1	Atlantic salmon	407	0
Troms	2	Atlantic salmon	**56**	0
Total	20		**2 199**	**0**

In 2017, *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.

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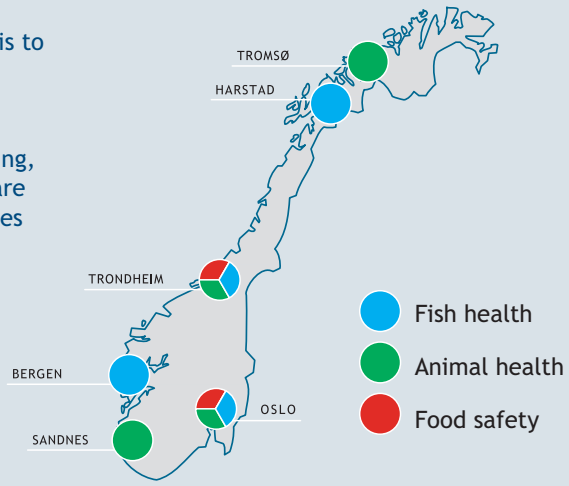

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Oslo	Trondheim	Sandnes	Bergen	Harstad	Tromsø
postmottak@vetinst.no	vit@vetinst.no	vis@vetinst.no	post.vib@vetinst.no	vih@vetinst.no	vitr@vetinst.no

www.vetinst.no

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