

The post-treatment surveillance programme for *Gyrodactylus salaris* 2019



Veterinærinstituttet
Norwegian Veterinary Institute



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Summary

In 2019, *Gyrodactylus salaris* was not detected in any of the rivers included in the surveillance programme. The 6 watercourses Rauma (103.Z), Skorga (103.5Z), Måna (103.1Z), Henselva including Isa and Glutra (103.4AZ), Innfjordelva (103.2Z) and Breidvikelva (103.42Z) in Møre og Romsdal County were declared free from *G. salaris* in October 2019.

Introduction

During the period 1975 - 2019, pathogenic strains of *Gyrodactylus salaris* have been detected on Atlantic salmon (*Salmo salar*) fingerlings/parr in 51 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, where infected fish were found during a rotenone treatment. In addition, both pathogenic and non-pathogenic strains of *G. salaris* have been found on Arctic char (*Salvelinus alpinus*) in lakes (Hytterød et al., 2020).

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 (Atlantic 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 31.12.2019, *G. salaris* was confirmed to be eradicated from 38 rivers and from all hatcheries/fish farms. In additional five rivers, eradication measures have been completed, but eradication has not yet been confirmed. Thus, at the end of 2019, the parasite is confirmed present in eight Norwegian rivers.

Gyrodactylus 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 samples and subsequent species identification if *Gyrodactylus* is detected.

Aims

The post-treatment surveillance programme for *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 kilometre, 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 samples are sent to the NVI where the whole surface of the fish, including head, gills and fins, is examined under a stereo microscope at 10 - 15 times magnification.

When *Gyrodactylus* specimens are detected, species determination is performed by NVI. NVI is the OIE reference laboratory for "Infection with *Gyrodactylus salaris*" and the methods used for species identification follow those given by 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, 1455 salmon juveniles from 11 watercourses were examined in 2019 (Table 1). *G. salaris* was not detected in any of the rivers. The 6 watercourses in the infection region Rauma were declared free from *G. salaris* in October 2019 after sampling for five years (Table 2).

Table 1. Number of watercourses and number of fish examined for *Gyrodactylus salaris* in 2019.

County	No. of watercourses	Species	No. of fish examined	Detections
Nordland	2	Atlantic salmon	292	0
Møre og Romsdal	6	Atlantic salmon	658	0
Troms	3	Atlantic salmon	505	0
Total	11		1 455	0

Table 2. The number of Atlantic salmon juveniles sampled during 2015-2019 in the Rauma infection region (Møre og Romsdal County).

Watercourses	Watercourse code	2015	2016	2017	2018	2019	Detections
Rauma inc. Istra	103.Z/103.A1Z	125	295	315	260	261	0
Skorga	103.5Z	-	22	12	38	10	0
Måna	103.1Z	-	112	100	100	100	0
Henselva inc. Isa/Glutra	103.4AZ/103.4Z	-	144	158	180	167	0
Innfjordelva	103.2Z	-	60	60	60	60	0
Breidvikelva	103.42Z	-	23	46	20	60	0
Total		125	656	691	658	658	0

References

1. Anon (2014). Handlingsplan mot lakseparasitten *Gyrodactylus salaris* for perioden 2014-2016. Miljødirektoratet 2014. 114 s.
2. Hytterød, S., Fornes, G. J., Larsen, S., Mohammad, S. N., Darrud, M., Rolén, E., Welde, H. I., Svendsen, J., Soleim, K. B. and Hansen, H. (2020). The surveillance programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2019. Surveillance programmes for terrestrial and aquatic animals in Norway. Annual report 2019. Oslo: Norwegian Veterinary Institute 2020. 8s.

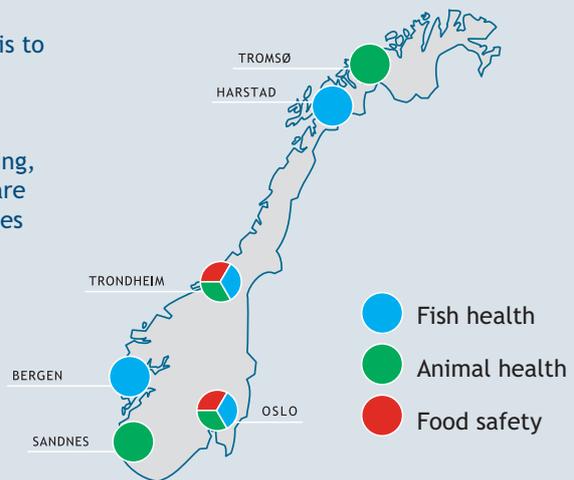
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