

The post-treatment control programme to ascertain freedom from infection with *Gyrodactylus salaris* in Atlantic salmon 2016



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Summary

In 2016, *Gyrodactylus salaris* was not detected in any of the rivers included in the surveillance program.

Introduction

During the period from 1975 to 2016, 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/smolt 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 charr (*Salvelinus alpinus*) in lakes.

The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected watersheds and farms (Anon 2014). 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 does not use intermediate hosts in its life-cycle. In rivers, the eradication measures are carried out by rotenone treatment. One exception is the treatment of River Lærdalsevla in 2011-2012, where acidified aluminum sulphate was used with promising results.

By December 31st 2016, *G. salaris* was confirmed eradicated from 22 rivers and from all hatcheries/fish farms. In 18 additional rivers, eradication measures have been completed, but eradication has not yet been confirmed. In three rivers, rotenone treatment was carried out in 2016, and the measures will be completed in 2017. Thus, at the end of 2016, 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 disease" 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 early 1980s. 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).

An adequate surveillance, in space and time, is required to ascertain freedom from infection with *G. salaris* in the treated rivers. Declaring freedom from the parasite 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.

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. 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 the parasite in previously infested rivers after implementation of eradication measures. The 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 program 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 in Oslo where the whole fish surface including body, head and fins are examined under a stereo microscope at 10-15 times magnification. When *Gyrodactylus* specimens are detected, species identification is performed by morphology and molecular methods.

NVI is the OIE reference laboratory for the disease and 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 and Discussion

Altogether, 2096 salmon juveniles from 18 rivers were examined in 2016 (Table 1).

Table 1. Number of rivers and number of fish examined for *Gyrodactylus salaris* in 2016.

| County | No. of rivers | Species | No. of fish examined | Detections |
|------------------|---------------|-----------------|----------------------|------------|
| Nordland | 11 | Atlantic salmon | 982 | 0 |
| Møre og Romsdal | 6 | Atlantic salmon | 656 | 0 |
| Sogn og Fjordane | 1 | Atlantic salmon | 458 | 0 |
| Total | 18 | | 2 096 | 0 |

In 2016, *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.

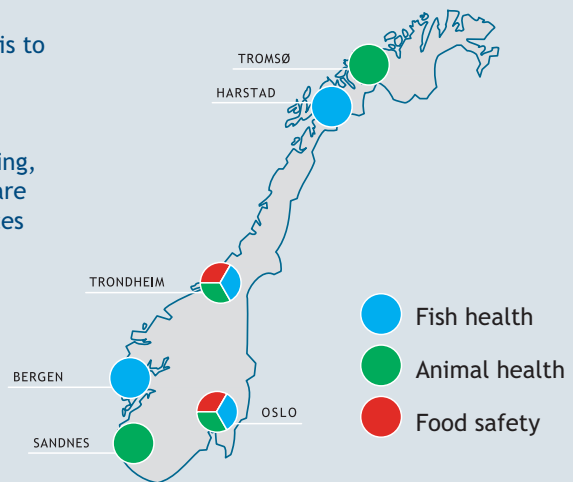
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