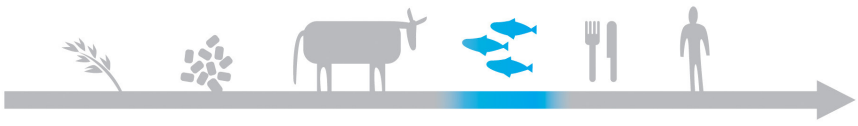
Annual Report

Mapping the occurrence of *Gyrodactylus salaris* upstream of the natural anadromous region of the Drammenselva catchment 2018



Veterinærinstituttet
Norwegian Veterinary Institute

Mattilsynet

Mapping the occurrence of *Gyrodactylus salaris* upstream of the natural anadromous region of the Drammenselva catchment, 2018

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Summary

This report presents results from a surveillance programme that aims to map the potential occurrence of *Gyrodactylus salaris* on fish hosts upstream of the anadromous parts of River Drammenselva and River Lierelva. The aim of the project in 2018 was to investigate the presence of G*. salaris* on Arctic char (*Salvelinus alpinus*) in Lake Krøderen. *Gyrodactylus salaris* was not detected in fin samples from any of the 86 Arctic char obtained from different locations in Lake Krøderen.

Introduction

During the period between 1975 and 2018, pathogenic strains of *Gyrodactylus salaris* were detected on Atlantic salmon (*Salmo salar*) fingerlings/parr in 50 rivers, in 13 hatcheries/farms with Atlantic salmon parr/smolts and in 26 hatcheries/farms with rainbow trout (*Oncorhynchus mykiss*) in Norway (8). Furthermore, both pathogenic and non-pathogenic strains of *G. salaris* have been found in lakes on resident Arctic char (*Salvelinus alpinus*) (5, 12).

In the 1980s, *G. salaris* was introduced into several watercourses in the River Drammenselva catchment, Buskerud County. In 1986 and 1987, *G. salaris* was detected on rainbow trout in two fish farms in Lake Tyrifjorden (10), a lake draining into the River Drammenselva. These discoveries led to the examination of rainbow trout in several farms in the watercourses draining into Lake Tyrifjorden, and *G. salaris* was detected in another eight farms. Seven of the farms drained into the Begna watercourse and one drained into Lake Randsfjorden. All fish in farms where *G. salaris* was detected were eradicated and the farms were thereafter declared free from *G. salaris*. Despite the eradication measures carried out in the farms, *G. salaris* was later found on juvenile Atlantic salmon in the River Drammenselva in 1987, probably due to spread from the farms via escaped infected rainbow trout.

The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected watersheds and farms (1). Eradication measures against *G. salaris* has been successful in Norway and by the end of 2018, the parasite is confirmed present in only seven rivers (8). Three of these rivers, Drammenselva, Lierelva and Sandeelva, are located in a defined infection area called the Drammenselva Region. In 2018 an expert group appointed by the Norwegian Authorities concluded that *G. salaris,* by use of existing chemical treatment strategies, can be eradicated from River Drammenselva (4). However, before the implementation of any eradication measures, the occurrence of *G. salaris* upstream anadromous areas in the Drammenselva watercourse needs to be mapped.

Upstream of the migration barriers for anadromous fish in the Drammenselva catchment, rainbow trout and Arctic char are the only hosts present that are known to be susceptible to *G. salaris* (2, 5, 11). Rainbow trout was common in the Begna watercourse in the 1980's (3), and while its current presence in the natural water system is unknown, there are several farms that rear rainbow trout in land-based production units alongside the lakes Slidrefjorden and Strondafjorden. These farms are landlocked and thus separated from the lake system. However, one single rainbow trout was recently caught in Lake Strondafjorden (13) indicating either fish escaping from farms or natural reproduction occurring in the watercourse. Natural reproduction is considered a prerequisite for the establishment of a permanent rainbow trout population in the catchment, and thereby establishment of a permanent fish host population for *G. salaris*. However, surveillance for the existence of rainbow trout in the Begna watercourse and Lake Tyrifjorden (6, 7) strongly indicates that natural reproduction of this species is not occurring, and that a permanent population of rainbow trout is not present in the respective waterbodies (7, 9).

Arctic char is described as a potential permanent host to *G. salaris* (5, 12). The fact that *G. salaris* has been detected on Arctic char in landlocked lakes without other known susceptible hosts present (5, 12), highlights the importance of mapping the occurrence of this parasite in lakes in the Drammen infection region with an Arctic char population. Lake Krøderen drains to River Drammenselva through River Snarumselva. Despite the lack of commercial rainbow trout farming along the Krøderen watercourse,

there is anecdotal evidence for the presence of rainbow trout in the lake. Recent catches of rainbow trout by anglers, and in gill nets (Jan Nielsen pers. comm.) show that rainbow trout specimens may be present in the lake. The above mentioned *G. salaris* history from the Begna watercourse in the 80s, together with information from local residents about a possible occurrence of unregistered rainbow trout farming along the Krøderen watercourse in the same decade, provide a reason for examining fish in Lake Krøderen for the presence of *G. salaris*.

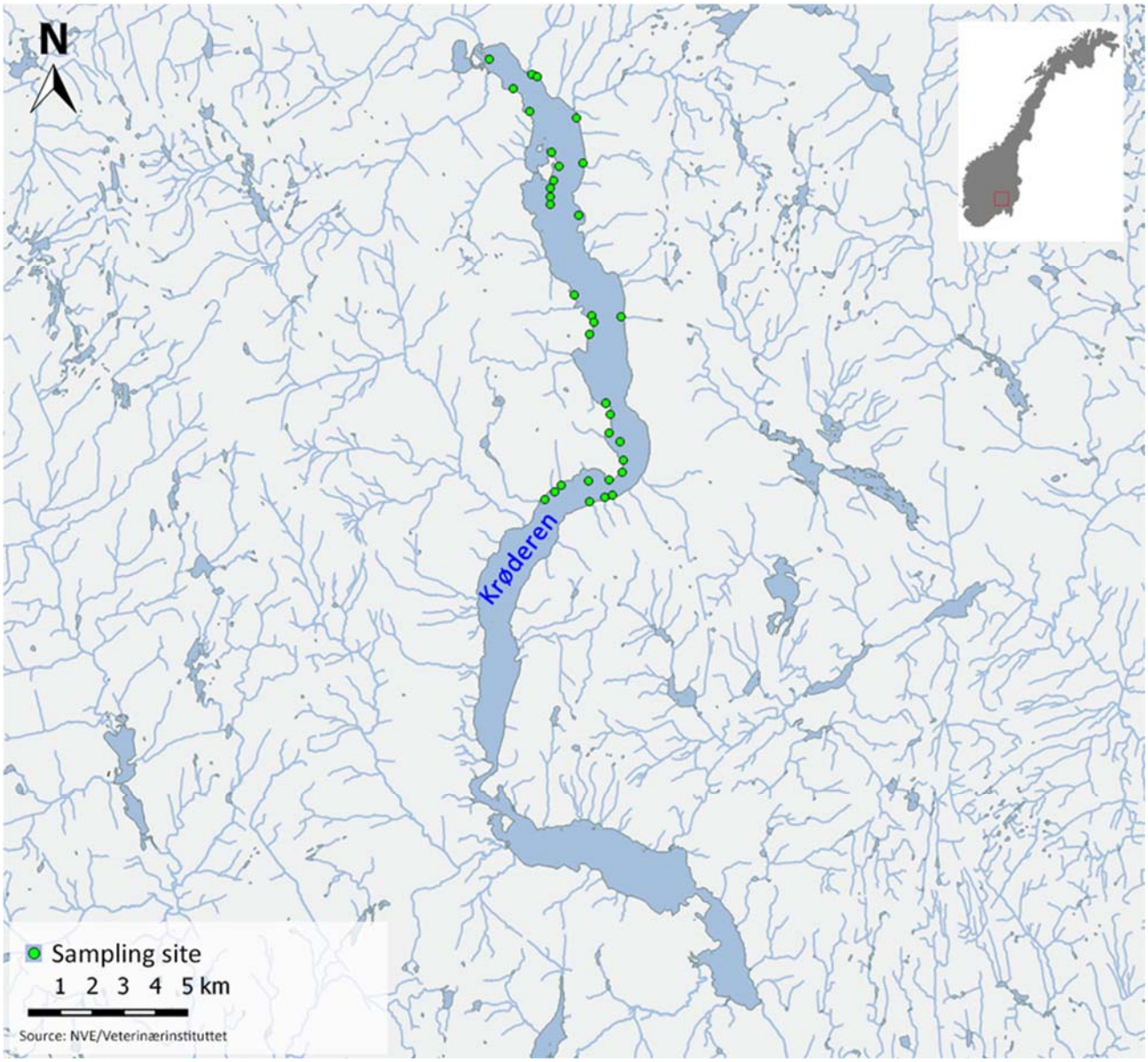
Aims

The aim of this study was to assess the potential occurrence of *G. salaris* on Arctic char and rainbow trout in Lake Krøderen. The current study is part of a larger project, aiming to map the occurrence of a *G. salaris* infection in the whole watercourse upstream anadromous parts of River Drammenselva. This work is considered essential to the further planning of eradication measures against *G. salaris* in the region.

Materials and methods

Due to the likely low prevalence and intensity *of G. salaris* in Arctic char populations (see 11, 12), a surveillance that aims to exclude the presence of *G. salaris* requires the examination of a large number of fish. The present study was therefore designed to screen approximately 500 Arctic char from Lake Krøderen.

Arctic char were caught at different locations in Lake Krøderen (Figure 1) during autumn 2018 at depths varying from 1.5 to 40 meters, using gillnets (mesh size 18, 21, 35, 39 and 45 mm). Live fish were carefully removed from the nets and killed by a blow to the head. All fins from fish larger than 25 cm fork length were clipped and preserved in ethanol (96%). Fish smaller than 25 cm, was preserved whole in 96% ethanol.



Figur 1. Map showing the 33 sampling sites in Lake Krøderen.

The screening of fish for the presence of *Gyrodactylus* parasites was conducted at the Norwegian Veterinary Institute following standard protocols (8).

Results and discussion

Altogether, 86 Arctic char were collected and examined. *Gyrodactylus salaris* was not detected. The sample size was smaller than expected despite a large fishing effort, and with gill nets of various mesh size. An extended fishing effort was discussed in an attempt to increase the sampling size, but this was not implemented due to the low catchability of Arctic char in the lake. The low number of samples has to be considered in the conclusion about the presence of *G. salaris* in Lake Krøderen. However, no detection of *G. salaris* on the 86 Arctic char examined, strongly indicates the absence of *G. salaris* on Arctic char in the lake.

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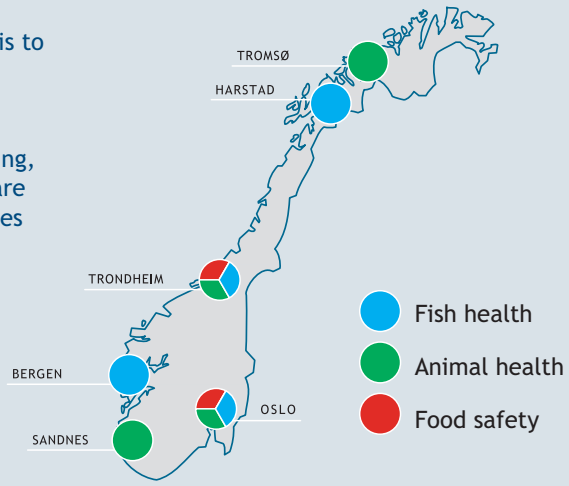

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