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DISSERTATION TITLE: *On the biology of Gyrodactylus spp. and their hosts in natural and human influenced freshwater systems*

A new PhD-thesis at the University of Oslo have investigated how certain parasites of the genus *Gyrodactylus* have spread after the last ice age in Norwegian freshwater systems and how humans have affected the spread. *Gyrodactylus* includes a species-rich group of monogeneans that lives as parasites on the skin of fish. Ruben A. Pettersen has studied the variation in two mitochondrial genes of *G. thymalli* (which parasitizes grayling *Thymallus thymallus*) to find out how this parasite colonized the Glomma river system after the last ice age. Large genetic variation was found, and the genetic variation was largest downstream in the river system. It was also clear that different genotypes dominated different parts of the river system.

In Mjøsa, the largest lake in Norway, there was especially great genetic variation. The genetic variation of the host species (grayling) was also investigated using analysis of microsatellite markers. Pettersen's research has shown that the genetic structure of various spawning populations of grayling in Lake Mjøsa did not coincide with the genetic structure of *G. thymalli*. This indicates that the migration and behavior of the grayling throughout the year, has a major impact on how the parasite is spread between host individuals.

Minnows (*Phoxinus phoxinus*) is naturally widespread in Eastern Norway, but has also been actively spread by humans. Pettersen has tested the Enemy Release Hypothesis, which states that host populations lose parasites species during relocation to a new environment. This was tested by comparing the prevalence of four different species of *Gyrodactylus* (*G. magnificus*, *G. phoxini*, *G. macronychus* and *G. aphyae*) in native minnow populations with newly translocated minnow populations. Pettersen did not find evidence of the Enemy Release Hypothesis. He found that native and introduced minnow populations had similar species compositions of *Gyrodactylus* species.

Most species of *Gyrodactylus* have little effect on their host (rarely leads to death). The exception is *G. salaris*, which has a strong negative effect on juvenile salmon (*Salmo salar*) in Norway. In an experimental study, Pettersen reveals how *G. salaris* is affecting and ultimately kill salmon juveniles. In the laboratory, salmon exposed to *G. salaris*. Parasite

numbers increased exponentially with time. The feeding activity of the parasites on the fish skin lead to loss of ions and a disruption of the ion balance. The fish probably died because of their failure to maintain blood homeostasis.

These studies has given a better understanding of how *Gyrodactylus* spreads together with its hosts, with and without human influences.