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NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORT NO. 28

GYRODACTYLUS ON SALMONIDS  
IN NORWAY

by

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Report to: Department of Conservation

Freshwater Fisheries Centre

MAF Fisheries

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CHRISTCHURCH

*Servicing freshwater fisheries and aquaculture*

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## NEW ZEALAND FRESHWATER FISHERIES MISCELLANEOUS REPORTS

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## GYRODACTYLUS ON SALMONIDS IN NORWAY

A report prepared for the Department of Conservation

by

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### THE ORGANISM AND DISEASE

This ectoparasite is one of the monogenea or flukes belonging to the genus *Gyrodactylus*. This genus comprises hundreds of species affecting a wide range of both freshwater and marine fish. The species causing losses in Atlantic salmon presmolts in Norway is *Gyrodactylus salaris*. *G. salaris* is recorded as a parasite of salmonids in Sweden but at frequencies less than those occurring in Norway<sup>1</sup>. Another species of *Gyrodactylus* is known from salmonids in Canada<sup>2</sup>. *Gyrodactylus* species are said to be very host specific. They are live bearers having a direct life cycle. *G. salaris* affects its host through the attachment, with hooks, and feeding from external surfaces (fins and skin) of the host. Attachment may involve perforation of the skin which may become infected by fungi and bacteria. Fungal infections have been reported from Atlantic salmon infected with *G. salaris*<sup>2</sup>. Although initial studies suggested the losses from *G. salaris* may have been related to adverse environmental changes in the river<sup>3</sup>, later investigations found this implausible and the problem is attributed to the introduction of the parasite to a susceptible host (see transmission).

### ORIGIN

The origin of this parasite to Atlantic salmon in Norway is believed to be from the importation of live fish or fish eggs<sup>4</sup>, possibly from Sweden<sup>2</sup>.

### HOST RANGE

Although *Gyrodactylus* species are said to be very host specific, *G. salaris* is found on rainbow trout and can survive for months on char (*Salvelinus alpinus*) and brook trout (*S. fontinalis*). It

disappears quickly from brown trout (*Salmo trutta*). It can exist on rainbow trout for years however the incidence, both prevalence (% of fish infected) and intensity (number of parasites per fish) is usually very low. In total only one or two parasites may be found from an examination of ten rainbow trout<sup>4</sup>.

#### TRANSMISSION

The parasite can move directly from fish to fish, and be transmitted by the transfer of live infected fish. It has been found to survive for many days attached to salmon eggs. Some rivers have become infested as a result of escaped infected farmed fish. In spring, many fjords have a surface layer of brackish or fresh water from melting snow. Some rivers have probably become infested by infected fish moving between rivers through these upper layers. *G. salaris* can survive 8 ppt salinity<sup>4</sup>.

An important connection has been found between the occurrence of *G. salaris* in Norwegian rivers and the deliveries of fish for river stocking from infected hatcheries<sup>2</sup>. One area infested by the parasite had been subject to dumping of smolt from a Swedish smolt-transport in 1975<sup>2</sup>.

#### CURRENT RANGE

The parasite was first recorded as infecting wild fish in 1975<sup>3</sup>. By the end of 1986 it had been reported from 28 rivers and nine hatcheries<sup>5</sup>. By 22 January 1990 *G. salaris* had spread to 34 rivers. (Norway has about 350 salmon rivers). It has been found in 36 fish farms of which 23 have only rainbow trout<sup>4</sup>.

#### EFFECT

Overall, results of investigations so far indicate that infestation by *G. salaris* causes great reduction and near extermination of populations of Atlantic salmon parr from some rivers<sup>1</sup>. The drop in juvenile salmon numbers is described as catastrophic and drastic<sup>3,5</sup>. Mortalities occurred one year after the first observations of *G. salaris* were made<sup>5</sup>. Populations of other species of salmonids do not appear to be affected. Some studies found that where salmon parr were heavily affected, no parasites were found on other salmonid species examined. Other studies found juvenile brown trout occasionally infected. The parasite mainly affects the parr stage. Smolts are less affected and there are no reports of the parasite causing disease or death of adult salmon in affected rivers although adult fish may carry the parasite. The parasite has greatly reduced the subsequent returns of adult salmon to rivers where the infection exists<sup>5</sup>. Losses of adult salmon in 1984 due to *G. salaris* were estimated at between 260 and 520 t<sup>2</sup>.

## CONTROL

Successful efforts to eradicate the parasite have been reported. These were by the use of rotenone in 1981-82 in the river Vikja, and an infested hatchery has been successfully disinfected by drying<sup>2</sup>.

## COMMENTS REGARDING NEW ZEALAND

*Gyrodactylus* species have been recorded on Koaro (*Galaxias brevipinnis*) in New Zealand<sup>6</sup> and undoubtedly occur on other fish, both marine and freshwater. No *Gyrodactylus* are known from salmonids in New Zealand.

The occurrence and distribution of *G. salaris* in Norway is attributed to movement of farmed fish for stocking of rivers, Thus the problem relates to the movement of stocks rather to the effect of aquaculture alone. Movement of stock for both the sports fisheries and aquaculture is common in New Zealand but the situation differs from that occurring in Norway as discussed below.

The phenomenon of inadvertent introduction of exotic parasites and diseases is well recognised in this country and is addressed by MAF through the Quarantine Service and controls on the import of live fish. This is evidenced by the stringent quarantine period and conditions applied to the import of channel catfish.

Some control on transfer of disease is provided by the system of fish transfer authorisations administered by the Freshwater Fisheries Centre of MAF Fisheries. The need for mandatory testing of all stocks before transfer authorisations are provided is an issue that could be further discussed. However the legitimate fish transfer activities carried out in the past by Acclimatisation Societies, government agencies, both DOC and MAF, and the aquaculture industry, combined with the knowledge of the sparse parasite fauna of our salmonids and the stringent import controls, suggest that further controls may not be justified.

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