

The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway

Tor Atle Mo

Ann-Marit Kristensen

Haakon Hansen

Kari Norheim

Britt Bang Jensen



Editor Ann-Charlotte Karlsson

Technical editor Hanne Mari Jordsmyr

Scientific editors Hege Hellberg and Ståle Sviland

National Veterinary Institute



Annual Reports 2009

Surveillance and control programmes for terrestrial and aquatic animals in Norway

Title

The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway

Publisher

National Veterinary Institute
PO Box 750 Sentrum
N-0106 Oslo
Norway

Fax: + 47 23 21 60 01
Tel: + 47 23 21 60 00
E-mail: vipost@vetinst.no
Homepage: www.vetinst.no

Design: Hanne Mari Jordsmyr,
National Veterinary Institute

Front page photo: Processed from Colourbox

ISSN 1503-1454

Example of citation:

Mo TA, Kristensen AM, Hansen H, Norheim K, Bang Jensen B. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. Annual report 2009. In: Karlsson AC, Jordsmyr HM, Hellberg H, Sviland S (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Oslo: National Veterinary Institute; 2010.

© National Veterinary Institute

Any use of the present data should include specific reference to this report.

In 2009, *Gyrodactylus salaris* was not detected in any new rivers or farms with salmon or rainbow trout.

Introduction

During the period of 1975 to 2008, pathogenic strains of *Gyrodactylus salaris* have been detected on Atlantic salmon (*Salmo salar*) fingerlings/parr in 46 rivers, 13 hatcheries/farms with Atlantic salmon parr/smolt and 26 hatcheries/farms with rainbow trout (*Oncorhynchus mykiss*). In addition, a non-pathogenic strain of *G. salaris* has been found on Arctic charr (*Salvelinus alpinus*) in several lakes. The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected rivers and farms. In farms, the eradication procedure is carried out by eliminating the hosts (salmon and rainbow trout) and thereby eliminating the parasite because it lacks specialized free-living stages and do not need intermediate hosts in its life-cycle. In rivers, the eradication procedure is carried out by treatment with rotenone, a poison that kills all the fish hosts. In addition, the use of acidified aluminium sulphate is under development. In contrast to rotenone, aluminium sulphate will kill the parasite but not the fish host. By December 31 2009, *G. salaris* was confirmed eradicated from 21 rivers and from all hatcheries/fish farms. The eradication has not yet been confirmed for three additional rivers. The parasite is present or suspected to be present in 22 Norwegian rivers.

G. salaris is a notifiable (List 3) disease in Norway and it is listed as "Other significant disease" in the World Organisation for Animal Health (OIE). Surveillance of *G. salaris* has been performed in Norwegian salmon rivers since late 1970s (1, 2, 3, 4, 5, 6, 7, 8). Surveillance is not performed in infected rivers or farms.

The Norwegian Food Safety Authority is responsible for the sampling in fish farms. The National Veterinary Institute (NVI) is responsible for the sampling in the rivers but County Environmental Departments and other institutions/companies are commissioned to do the actual sampling. NVI is responsible for examination of all the fish samples and the species identification of the parasites if *Gyrodactylus* is detected.

Aim

The surveillance programme aims to detect and trace any spread of *Gyrodactylus salaris* to new river systems or fish farms (or to rivers and farms cleared of infection).

Materials and methods

At least 30 wild Atlantic salmon are sampled from each river. Fingerlings/parr/smolt are caught by means of electrofishing. In some of the large rivers, sampling is done at different locations far apart. The fish are killed and then preserved as whole in 96 % ethanol. At least 30 Atlantic salmon or 60 rainbow trout are sampled by seine net in each farm. The fish are killed, and all fins (except adipose fin) are cut off and preserved in 96 % ethanol.

All the samples are sent to the National Veterinary Institute in Harstad where the samples are examined for are examined under a stereo microscope at 10 - 15 times magnification. The whole surface including body, head and fins are examined for wild Atlantic salmon while fins only are examined for farmed fish.

When *Gyrodactylus* specimens are found, these are sent to the National Veterinary Institute in Oslo (the OIE reference laboratory for the disease) for species



Gyrodactylus salaris. Photo: Tor Atle Mo

Table 1. Number of rivers and number of fish examined for *Gyrodactylus salaris* in 2009.

County	No. of rivers	Species	No. of fish examined	Detections
Finnmark	10	Atlantic salmon	436	0
Troms	7	Atlantic salmon	236	0
Nordland	7	Atlantic salmon	215	0
Nord-Trøndelag	9	Atlantic salmon	261	0
Sør-Trøndelag	5	Atlantic salmon	132	0
Møre og Romsdal	23	Atlantic salmon	688	0
Sogn og Fjordane	13	Atlantic salmon	458	0
Hordaland	4	Atlantic salmon	128	0
Rogaland	7	Atlantic salmon	211	0
Vest-Agder	5	Atlantic salmon	158	0
Aust-Agder	2	Atlantic salmon	47	0
Telemark	2	Atlantic salmon	74	0
Vestfold	4	Atlantic salmon	122	0
Buskerud	1	Atlantic salmon	10	0
Akershus	3	Atlantic salmon	75	0
Oslo	1	Atlantic salmon	13	0
Østfold	2	Atlantic salmon	66	0
Total	105		3330	0

► determination. The methods used for species identification follows those in the Gyrodactylosis (*Gyrodactylus salaris*) chapter in the Manual of diagnostic tests for aquatic animals from the World Organisation for Animal Health (OIE) (www.oie.int/eng/normes/fmanual/2.3.03_Gyrodactylosis.pdf).

Results

Altogether, 3,330 specimens from 105 rivers and 2,885 specimens from 89 farms were examined in 2009 (Tables 1 and 2). No new infection with *G. salaris* was detected in any river or farm.

Conclusion

G. salaris did not extend its range to any new rivers or fish farms.

References

1. Mo TA, Norheim K. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Fredriksen B, Mørk T (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2001. Oslo: National Veterinary Institute; 2002. p. 155-9.
2. Mo TA, Norheim K. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Heier BT (editor). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2002. Oslo: National Veterinary Institute; 2003. p. 137-41.
3. Mo TA, Norheim K. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Mørk T, Hellberg H (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2003. Oslo: National Veterinary Institute; 2004. p. 135-7.
4. Mo TA, Norheim K. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Mørk T, Hellberg H (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2004. Oslo: National Veterinary Institute; 2005. p. 137-9.
5. Mo TA, Norheim K. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Brun E, Hellberg H, Mørk T, Jordsmyr HM (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2005. Oslo: National Veterinary Institute; 2006. p. 134-7.

Table 2. Number of fish farms and number of fish examined for *Gyrodactylus salaris* in 2009.

County	No. of rivers	Species	No. of fish examined	Detections
Finnmark	1	Atlantic salmon	30	0
Troms	5	Atlantic salmon	150	0
Nordland	10	Atlantic salmon	300	0
Nord-Trøndelag	11	Atlantic salmon, rainbow trout	360	0
Sør-Trøndelag	9	Atlantic salmon, rainbow trout	305	0
Møre og Romsdal	13	Atlantic salmon	390	0
Sogn og Fjordane	12	Atlantic salmon, rainbow trout	420	0
Hordaland	16	Atlantic salmon, rainbow trout	570	0
Rogaland	7	Atlantic salmon	210	0
Vest-Agder	1	Atlantic salmon	30	0
Aust-Agder	0	-	-	-
Telemark	0	-	-	-
Buskerud	0	-	-	-
Oppland	4	Rainbow trout	120	0
Total	89		2885	0

Table 3. Rejections in the *Gyrodactylus salaris* surveillance programme in farms due to sample quality or quality in 2009.

County	No. of farms	Species
Troms	2	Atlantic salmon
Nord-Trøndelag	1	Atlantic salmon
Sør-Trøndelag	2	Atlantic salmon, rainbow trout
Møre og Romsdal	4	Atlantic salmon, rainbow trout
Sogn og Fjordane	1	rainbow trout
Hordaland	4	Atlantic salmon, rainbow trout
Hedmark	1	rainbow trout
Total	15	

6. Mo TA, Norheim K, Jansen PA. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Brun E, Hellberg H, Mørk T, Jordsmyr HM (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2006. Oslo: National Veterinary Institute; 2007. p. 143-5.

7. Mo TA, Norheim K, Jansen PA. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Brun E, Jordsmyr HM, Hellberg H, Mørk T (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2007. Oslo: National Veterinary Institute; 2008. p. 145-8.

8. Mo TA, Kristensen AM, Norheim K, Jansen PA. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. Annual report 2008. In: Brun E, Jordsmyr HM, Hellberg H, Mørk T (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Oslo: National Veterinary Institute; 2010.

The National Veterinary Institute (NVI) is a nation-wide research institute in the fields of animal health, fish health, and food safety. The primary mission of the NVI is to give research-based independent advisory support to ministries and governing authorities. Preparedness, diagnostics, surveillance, reference functions, risk assessments, and advisory and educational functions are the most important areas of operation.

The National Veterinary Institute has its main laboratory in Oslo, with regional laboratories in Sandnes, Bergen, Trondheim, Harstad og Tromsø, with about 360 employees in total.

www.vetinst.no



Veterinærinstituttet
National Veterinary Institute

The Norwegian Food Safety Authority (NFSA) is a governmental body whose aim is to ensure through regulations and controls that food and drinking water are as safe and healthy as possible for consumers and to promote plant, fish and animal health and ethical farming of fish and animals. We encourage environmentally friendly production and we also regulate and control cosmetics, veterinary medicines and animal health personnel. The NFSA drafts and provides information on legislation, performs risk-based inspections, monitors food safety, plant, fish and animal health, draws up contingency plans and provides updates on developments in our field of competence.

The NFSA comprises three administrative levels, and has some 1300 employees.

The NFSA advises and reports to the Ministry of Agriculture and Food, the Ministry of Fisheries and Coastal Affairs and the Ministry of Health and Care Services.

www.mattilsynet.no

