

The surveillance programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2013

Sigurd Hytterød
Maria Lie Linaker
Haakon Hansen
Tor Atle Mo
Saraya Tavoranpanich



Surveillance programmes for terrestrial and aquatic animals in Norway

Annual report 2013

Project managers at the Norwegian Veterinary Institute:

Ståle Sviland (Terrestrial animals)
Anne-Gerd Gjevre (Aquatic animals)
Mona Torp (Food safety)

Publisher

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

Fax: + 47 23 21 60 95
Tel: + 47 23 21 60 00
E-mail: postmottak@vetinst.no
www.vetinst.no

ISSN 1894-5678

Title:

The surveillance programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2013

Authors:

Sigurd Hytterød, Maria Lie Linaker, Haakon Hansen, Tor Atle Mo, Saraya Tavorntpanich

Date: 2014-03-27

Front page photo: Colourbox

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

Example of citation:

Hytterød S, Lie Linaker M, Hansen H, Mo TA, Tavorntpanich S. The surveillance programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2013. *Surveillance programmes for terrestrial and aquatic animals in Norway. Annual report 2013*. Oslo: Norwegian Veterinary Institute 2014

The surveillance programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2013

Sigurd Hytterød, Maria Lie Linaker, Haakon Hansen, Tor Atle Mo, Saraya Tavornpanich

In 2013, Gyrodactylus salaris was not detected in any rivers or farms included in the surveillance programme.

Introduction

During the period of 1975 to 2014 pathogenic strains of *Gyrodactylus salaris* have been detected on Atlantic salmon (*Salmo salar*) fingerlings/parr in 49 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*). The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected watersheds and farms. In farms, the eradication procedure is carried out by eliminating the hosts (salmon and rainbow trout) and thereby eliminating the parasite because *G. salaris* 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, acidified aluminium sulphate has been used with good results as the main chemical in the river Lærdalselva. However, it is too early to conclude whether the river is free from *G. salaris*. In contrast to rotenone, aluminium sulphate will kill the parasite but not the fish host. As of 31st December 2013, *G. salaris* was confirmed eradicated from 20 rivers and from all hatcheries/fish farms. Successful eradication has yet to be confirmed for 14 additional rivers. Thus, at the end of 2013, the parasite was present or suspected to be present in 14 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* has been performed in Norwegian salmon rivers since late 1970s (1-12). Surveillance is not performed in infected rivers or farms.

The Norwegian Food Safety Authority is responsible for the sampling in fish farms. The Norwegian 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 Norwegian Veterinary Institute in Harstad where the samples 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 Norwegian Veterinary Institute in Oslo (the OIE reference laboratory for the disease) for species 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) (http://www.oie.int/fileadmin/Home/eng/Health_standards/aahm/current/2.3.03_GYRO.pdf)

Results

Altogether, 2075 specimens from 65 rivers and 3016 specimens from 89 farms were examined in 2013 (Tables 1 and 2). There were no new infections with *G. salaris* detected in any farm or river samples included in the surveillance program.

Table 1. Number of rivers and number of fish examined for *Gyrodactylus salaris* in 2013

County	No. of rivers	Species	No. of fish examined	Detections
Finnmark	10	Atlantic salmon	420	0
Troms	5	Atlantic salmon	150	0
Nordland	5	Atlantic salmon	125	0
Nord-Trøndelag	5	Atlantic salmon	152	0
Sør-Trøndelag	7	Atlantic salmon	215	0
Møre og Romsdal	3	Atlantic salmon	90	0
Sogn og Fjordane	3	Atlantic salmon	90	0
Hordaland	3	Atlantic salmon	93	0
Rogaland	7	Atlantic salmon	206	0
Vest-Agder	5	Atlantic salmon	150	0
Aust-Agder	2	Atlantic salmon	60	0
Telemark	2	Atlantic salmon	60	0
Vestfold	2	Atlantic salmon	90	0
Buskerud	1	Atlantic salmon	30	0
Oslo	1	Atlantic salmon	29	0
Akershus	2	Atlantic salmon	60	0
Østfold	2	Atlantic salmon	55	0
Total	65		2075	0

Table 2. Number of fish farms and number of fish examined for *Gyrodactylus salaris* in 2013

County	No. of farms	Species	No. of fish examined	Detections
Finnmark	1	Atlantic salmon	30	0
Troms	4	Atlantic salmon	120	0
Nordland	9	Atlantic salmon	270	0
Nord-Trøndelag	3	Atlantic salmon	90	0
Sør-Trøndelag	11	Atlantic salmon, rainbow trout	390	0
Møre og Romsdal	18	Atlantic salmon, rainbow trout	630	0
Sogn og Fjordane	9	Atlantic salmon, rainbow trout	336	0
Hordaland	21	Atlantic salmon, rainbow trout	720	0
Rogaland	5	Atlantic salmon, rainbow trout	180	0
Telemark	1	Atlantic salmon	30	0
Oppland	4	Rainbow trout	125	0
Hedmark	1	Rainbow trout	30	0
Vestfold	1	Atlantic salmon	32	0
Akershus	1	Atlantic salmon	33	0
Total	89		3016	0

Conclusion

In 2013 there were no new infections with *G. salaris* detected in any farm or river samples included in the surveillance program.

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.
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 A-M, 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.
9. Mo TA, Kristensen A-M, Hansen H, Norheim K, Jensen BB. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. Annual report 2009. In: Karlsson A-C, Jordsmyr HM, Hellberg H, Sviland S (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Oslo: National Veterinary Institute; 2010.
10. Hansen H, Norheim K, Mo TA, Jensen BB. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Sviland S, Hellberg H (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2010. Oslo: Norwegian Veterinary Institute; 2011. ISSN 1503-1454.
11. Sviland C, Hansen H, Mo TA, Moen A, Bang Jensen B. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway. In: Sviland S, Hellberg H. Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2011. Oslo: Norwegian Veterinary Institute; 2012. ISSN 1890-9973.

12. Lie Linaker M, Hansen H, Mo TA, Moen A, Bang Jensen B. The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2012. *Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2012*. Oslo: Norwegian Veterinary Institute 2013. ISSN 1890-9973.

The Norwegian Veterinary Institute (NVI) is a nationwide 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 Norwegian 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
Norwegian 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

