



Combating Fish Disease

An explanation of the controls on notifiable fish diseases in Great Britain and advice on steps to prevent the spread of disease.

Introduction

■ **About this booklet**

This booklet details the checks and controls which we apply to prevent the spread of disease outbreaks in this country. You will see that different rules apply to different diseases, generally reflecting the severity and other characteristics of the disease. The booklet also tells you something about each of the diseases and helps you to recognise symptoms.

This booklet is split into three parts:

- Part 1** an overview of the controls;
- Part 2** details for each of the diseases; and
- Part 3** advice on some of the precautions you can take to guard against the spread of disease.

Please note: in this booklet the term “relevant Fisheries Department” means The Department for Environment Food and Rural Affairs (Defra), the Welsh Assembly Government (WAG) or the Scottish Executive Environment and Rural Affairs Department (SEERAD), as the case may be.

■ **Why do we have fish controls?**

For many years we have taken action to prevent the introduction and spread of serious fish diseases in Great Britain. This has played a major part in ensuring that we remain free from some of the most serious diseases that occur in other countries and which have a severe impact on their fish farms and wild fisheries. In 1993 our national rules were replaced by European Union-wide rules designed to promote trade within the single market while safeguarding those parts of the Union with a high fish health status - such as this country.

There are four parts to our approach:

- we guard against introducing disease by ensuring, as far as possible, that only healthy fish come into the country;
- we regularly monitor fish farms in this country to check for the presence of disease;
- if there are outbreaks of serious diseases we act quickly to contain them and prevent their spread; and
- we ask you as a farmer or fishery manager and all concerned with the buying, selling, keeping and movement of live fish, to ensure that every precaution is taken to prevent the introduction or spread of disease.

A separate booklet called *A Guide to Importing Fish* details the controls which are applied to imports of live and dead fish. This booklet concentrates on our monitoring arrangements and the action we take in the event of a disease outbreak, and offers guidance on steps which you can take to guard against the spread of disease.

It is very much in your interest to follow the rules and to take all the necessary precautions to prevent your farm or fishery being infected by disease. The Government will do what it can to guard against the spread of disease, but with

trade between countries of the European Union constantly increasing, no system can be foolproof. You need to take sensible steps to ensure that any fish you buy are not a source of infection for your existing stock. Part 3 of this booklet gives details of the precautions you can take.

In addition, you may face prosecution if you do not follow any of the legal requirements set out in this booklet, including the duty to notify us of suspected disease outbreaks and the movement controls which may be imposed following an outbreak (or suspected outbreak) of a fish disease.

■ **Who does what?**

Fish health controls in Great Britain are administered by:

- The Department for Environment Food and Rural Affairs (Defra)
- The Welsh Assembly Government (WAG); and
- The Scottish Executive Environment and Rural Affairs Department (SEERAD).

In England and Wales, much of the day-to-day work is dealt with by the Fish Health Inspectorate at the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) laboratory in Weymouth. In Scotland this is dealt with by the Fisheries Research Services Marine Laboratory in Aberdeen. Contact addresses are shown in Appendix 1.

■ **For further advice**

Appendix 1 shows who you can contact for further advice about the controls mentioned in this booklet.

Please note that separate controls exist for the following:

- **the release of fish into inland waters:** all releases of live fish or eggs into inland waters in England and Wales must have the consent of the Environment Agency under Section 30 of the Salmon and Freshwater Fisheries Act. Releases into most fish farms are, however, exempted from this requirement. Contact your local office of the EA for details. In Scotland, releases of salmon into inland waters (except fish farms) must have the consent of the local District Salmon Fishery Board.
- **the release of non-native species:** The Wildlife and Countryside Act 1981 makes it an offence to introduce non-native species of fish into the wild without a licence issued by the Department for Environment and Rural Affairs or the Welsh Assembly Government. The Act is complemented by the Prohibition of Keeping or Release of Live Fish (Specified Species) (amendment) (England) Order 2003, made under the Import of Live Fish (England and Wales) Act 1980, which makes it an offence to keep or release certain non-native species without a licence issued by the Department for Environment and Rural Affairs or the Welsh Assembly Government Agriculture. For further details please contact the relevant address shown in Appendix 1.

Public Health: if you are marketing live or dead fish for human consumption you will need to follow separate and additional rules designed to safeguard public health. For further details you should contact an Environmental Health Officer at your local authority.

Part 1

An overview of the controls

■ *What controls are there under the European Union system?*

The key features of the system are:

- diseases considered to be exotic to the EU List I diseases (see below), must be kept out and any outbreaks of disease eradicated - the disease, infectious salmon anaemia (ISA), falls into this category;
- areas which can demonstrate that they are free of the serious salmonid diseases, infectious haematopoietic necrosis (IHN) and viral haemorrhagic septicaemia (VHS), both List II diseases, can be declared approved zones;
- fish that are moved into an approved zone must be certified as coming from another approved zone or, where the fish are of a species not susceptible to the serious salmonid diseases, from an approved farm or from another source which is not connected to any other waters and which does not hold any of the susceptible species;
- all certification is done at the farm of origin;
- Member States can set up programmes to control other (List III) diseases.

Great Britain and Northern Ireland are approved zones for IHN and VHS. The UK has introduced an EU-approved control programme for the List III diseases, spring viraemia of carp (SVC) and gyrodactylosis (GS). The UK also operates control programmes for other List III diseases bacterial kidney disease (BKD), furunculosis and infectious pancreatic necrosis (IPN) in salmon, pending EU approval.

■ *How do Fisheries Departments discover fish disease outbreaks?*

There are two main ways. Firstly, you are legally obliged to notify us if you suspect the presence of any of the diseases mentioned in this booklet (it is for this reason that they are known as “notifiable diseases”). Secondly, we may find the diseases during routine monitoring of fish farms, or when following up contacts with infected sites. Tracing contacts is an important part of the mechanism for disease regulation and control. This is why all fish farms must register with Fisheries Departments and keep their movement records up to date.

■ *How many notifiable diseases are there?*

There are 8 notifiable diseases of fish. They are:

- List I and II diseases:**
- Infectious salmon anaemia (ISA)
 - Infectious haematopoietic necrosis (IHN)
 - Viral haemorrhagic septicaemia (VHS)

List III diseases:

- Spring viraemia of carp (SVC)
- Gyrodactylosis (caused by *G. salaris*)
- Bacterial kidney disease (BKD)
- Furunculosis in salmon
- Infectious pancreatic necrosis (IPN) in salmon

An outbreak of ISA was identified in May 1998 in two salmon farms in Scotland. ISA was subsequently confirmed on eleven Scottish marine salmon farms in total. Control action to eradicate the sources of infection and prevent the spread of the disease were taken in accordance with the EC control measures directive (93/53/EC). The last confirmed outbreak was in May 1999. An outbreak of VHS on a single farm in Scotland in 1994 was successfully eradicated. Apart from these outbreaks, Great Britain has remained free of the diseases ISA, IHN, VHS and GS. We will always act to contain any outbreak of these diseases with the aim of preventing them from spreading. We may take additional steps to eradicate ISA, IHN and VHS as set out in Part II.

■ ***What should I do if I suspect an outbreak of a notifiable disease?***

You must notify us **immediately** you become suspicious. If you suspect ISA, IHN or VHS you should first notify us by telephone, fax or e-mail before confirming in writing. Contact addresses are shown in Appendix 1.

■ ***What will happen then?***

We will normally visit and look for ourselves. If we share your suspicions, we will take a sample of fish for laboratory analysis and may impose temporary movement controls, as a precaution. We will let you know the results as soon as we can.

■ ***What about movement restrictions?***

Two types of movement restriction are applied:

- 30 Day Notices; and
- Designated Area Orders (DAOs).

■ ***What is a 30 Day Notice?***

This is a temporary “standstill” notice, which we may serve on suspicion of a notifiable disease, and is a precautionary measure while tests are being carried out. They are usually served on the owners or occupiers of fish farms, or of other premises used to keep fish with a view to their sale and transfer to other waters. If necessary, a second 30 Day Notice may be served to allow any tests to be completed, or to allow you to clear and disinfect the premises.

The Notice will prohibit you from moving fish to and from the site, unless otherwise authorised in writing by the Fisheries Departments. We will tell you where you can apply for consent and what information we will need in order to consider your application. The Notice may require you to take other precautions as appropriate to the particular disease.

■ ***When will a 30 Day Notice be lifted?***

A Notice will normally be lifted immediately if the tests undertaken by Fisheries Departments for a notifiable disease are negative. However, if there remains a strong suspicion that disease is present, but that this cannot be confirmed immediately, a Designated Area Order may be made (see below).

For List III diseases, a 30 Day Notice as above may also be lifted if, during the period of the notice, you take action to remove any infection, for example by undertaking a clearance and disinfection programme under our supervision. A further 30 Day Notice as above may be served to allow you time to carry this out.

■ ***What is a Designated Area Order?***

A Designated Area Order (DAO) is made by the relevant Secretary of State to impose controls on the waters specified in the Order. They are usually made in the following circumstances:

On fish farms or other premises:

- when a List III notifiable disease has been confirmed and you have decided against taking immediate action to remove stocks and to cleanse and disinfect the site under our supervision;
- exceptionally, when there is strong suspicion of infection of a List III notifiable disease but it is not possible to confirm this quickly (for example, with diseases which are difficult to detect at certain times of the year);
- when ISA, IHN or VHS is suspected or confirmed in your river catchment or coastal area.

On other waters:

- on confirmation, or reasonable suspicion, of a notifiable disease being present and where we think it would be sensible to control movements;
- when ISA, IHN or VHS is suspected or confirmed in your river catchment or coastal area.

DAOs give Secretary of States powers:

- to regulate movements of live fish, eggs, gametes or foodstuffs **into, from** and **within** the infected area;
- to serve notices requiring you to remove any dead and dying fish, and to dispose of them in a particular way; and
- to serve notices (in respect of ISA, IHN or VHS) requiring you to take action to eradicate the disease, including the slaughter of all fish on infected farms and subsequent disinfection.

The controls which are actually applied under a DAO will depend very much on the nature of the disease concerned, and on other factors such as the nature and location of the infected waters. If movement controls are applied, we will tell you how to apply for a consent to move fish and what information we will need in order to consider your application.

■ ***When will a DAO be lifted?***

A DAO will be lifted when we are satisfied that the infection is no longer likely to be present at the designated site. This may occur, for example, where:

- you have removed **all** fish from the site, and undertaken a comprehensive cleaning and disinfection programme, under our supervision; or
- under our supervision, you have (a) removed the **infected stock** from the site, (b) disinfected the holding facilities and associated equipment, and (c) subsequent tests over a period of up to two years prove to be negative; or
- the fish stocks remain but subsequent tests over a period of up to three years prove to be negative.

Any action to disinfect a site is at the owner's expense. The CEFAS Laboratory (for England and Wales) and the Fisheries Research Services, Marine Laboratory (for Scotland) will advise and assist in any way they can.

■ ***What publicity is given to 30 Day Notices and DAOs?***

We do not normally publish any details of 30 Day Notices. We do, however, normally publish details of any DAOs which we make, including the location of the infected sites. Equally, we publicise any DAOs which we lift.

As well as placing movement controls on sites where disease is suspected or confirmed, Fisheries Departments investigate whether suppliers and buyers who have traded with infected sites have encountered disease problems or mortalities in their own fish stocks. This may involve taking fish samples for laboratory analysis. Normally we do not pay for the fish we sample, but if we sample on suspicion during a disease outbreak and the sample tests negative, we may be able to contribute towards the value of the fish.

Part 2

Checks and controls applied to particular diseases

This part of the booklet gives details of the diseases that are covered by our controls. You will see that typical symptoms of the diseases are explained and this may help you to recognise an outbreak. **If you do suspect any of these diseases to be present you must notify us. See Appendix 1 for details of whom to contact.**

We also show the movement controls which we will normally apply if and when there are outbreaks of the disease. **We must, however, emphasise that these controls may need to be modified to take account of the disease situation at the time, or to reflect the circumstances on particular sites.**

Infectious Salmon Anaemia (ISA)

■ *What is it?*

ISA is a contagious viral disease affecting all ages of Atlantic salmon in sea water. Outbreaks typically occur after transfer of farmed smolts to cages in sea water, with peaks in new cases in late spring and in autumn.

Important symptoms are swollen and haemorrhagic eyes, visceral haemorrhage, darkening of the liver, severe anaemia and high mortality rates. Atlantic salmon are the only species known to be susceptible to ISA though sea trout and rainbow trout have been shown, experimentally, to transmit the disease.

The disease is transmitted via urine and faeces, and can be spread by the movement of infected but symptomless carrier fish. It can also be transmitted by contact with blood and viscera of infected fish. No treatment exists for ISA at present, although new European rules allow for vaccination in some cases.

■ *Where does it occur?*

ISA has been found in Scotland, Norway and the Faroe Islands.

■ *What checks are made for it in this country?*

During routine inspection and sampling visits of marine salmon farms for List II diseases we will inspect for clinical signs of ISA and will carefully investigate any abnormal mortalities.

■ **What if you find it on my premises?**

Immediate action will be taken, by means of a 30 Day Notice and/or a DAO, to establish a “control zone”. Previous movements into and out of the isolated area will be thoroughly investigated.

On **suspicion** of infection we will place strict controls on the suspected site, covering:

- movements to or from the site of any live or dead fish, fish eggs or gametes;
- the disposal of any dead fish or offal;
- movements to or from the site of any equipment, materials or substances liable to transmit disease;
- people and vehicles entering or leaving the site;
- disinfection of entrances and exits to the site.

We will also require you to keep records of any fish mortalities or changes in population.

In addition, controls will be applied to all other fish farms and fisheries within the isolated area covering the removal of live or dead fish, fish eggs, gametes or zygotes out of, into or within the isolated area.

If the disease is suspected or confirmed in wild or non-farmed stocks, we will place a DAO on the affected area. This will include controls on the movement of all fish, whether farmed or from the wild, and their ova, sperm and zygotes, and controls on movements of people and vehicles, and disinfection as appropriate and practicable.

Under EU legislation all Member States are required to take action to eradicate any outbreaks of ISA.

To eradicate the disease, on **confirmation** of infection on a site we shall require:

- all fish to be removed from the waters of the site in accordance with directions from the Secretary of State;
- the draining, cleaning and disinfection of all pools on inland farms;
- the destruction of all eggs, gametes, dead fish and fish showing signs of disease;
- the slaughter of all live fish. Fish which have reached a commercial size and show no clinical signs of disease may be marketed or processed for human consumption, under the supervision of the Secretary of State;
- the treatment of fish waste and offal to destroy disease pathogens and the treatment of used water to destroy any pathogens it may contain;
- the cleaning and disinfection, or destruction, of equipment, material or substances, liable to be contaminated with the disease pathogen, under the supervision of the Secretary of State;
- that the re-population of the farm shall only take place when the Secretary of State so authorises by notice.

These activities will be undertaken in accordance with a scheme drawn up by the Secretary of State.

We will immediately inform the European Commission and other EU Member States of the action taken.

Infectious Haematopoietic Necrosis (IHN)

■ *What is it?*

IHN is a contagious disease caused by a rhabdovirus infection which can cause high mortalities among susceptible juvenile salmonids. Outbreaks generally occur at water temperatures of 10-12°C and are typified by a sudden increase in mortality.

Symptoms include swelling of the abdomen, protruding eyes, darkening of the body and haemorrhaging at the fin bases and anus. Affected fish are typically lethargic though they may display brief periods of hyperactivity, and often trail very long faecal casts.

All salmonid species are susceptible to IHN and pike fry have been shown to be susceptible under experimental conditions.

The virus is transmitted horizontally through urine, faeces and reproductive fluids and external mucous secretions. Transmission between generations is generally by surface contamination of eggs. No treatments are available for IHN.

■ *Where does it occur?*

IHN has never been found in British waters and the whole of Great Britain has been designated as an “Approved Zone” for IHN. This allows us to impose strict controls on movements into this country of susceptible species.

IHN was first recorded in Europe in 1987 in France, and has since been found in Belgium, Italy and Germany. IHN is widespread and endemic along the Pacific coast of the USA and Canada, and has been reported from other areas of the USA. Occurrences of IHN have also been reported from Japan and Taiwan.

■ *What checks are made for it in this country?*

To maintain approved zone status, all fish farms holding species susceptible to IHN are inspected twice every year (once per year for marine farms without broodstock) and tested at least once every two years. Diagnostic tests are conducted on the internal organs removed from a sample of at least 30 fish. For those farms holding broodstock, part of the sample may be made up of ovarian fluids drawn from live fish. Samples will be tested using tissue culture methods.

■ *What if you find it on my premises?*

Immediate action will be taken, by means of a 30 Day Notice and/or a DAO, to establish an “isolated area” which will normally be, at minimum, for freshwater sites - a complete river catchment and the adjoining coastal

region, or for marine sites - a complete coastal zone and rivers discharging into it. Previous movements into and out of the isolated area will be thoroughly investigated.

On **suspicion** of infection we shall place strict controls on the suspected site, covering:

- movements to or from the site of any live or dead fish, fish eggs or gametes;
- the disposal of any dead fish or offal;
- movements to or from the site of any equipment, material or substances liable to transmit disease;
- people and vehicles entering or leaving the site;
- disinfection of entrances and exits to the site.

We will also require you to keep a note of any fish mortalities or changes in population.

If the disease is suspected or confirmed in wild or non-farmed stocks, we will place a DAO on the affected area. This will include controls on the movement of all fish, whether farmed or from the wild, and their ova, sperm and zygotes, and controls on movements of people and vehicles, and disinfection as appropriate and practicable.

In addition, controls will be applied to all other fish farms or fisheries within the isolated area covering the removal of live or dead fish, fish eggs, gametes or zygotes out of, into or within the isolated area.

On confirmation of infection: Fisheries Secretary of State will consider whether action should be taken to restore the disease free status of the area in the light of the circumstances of the outbreak. Restoring disease free status will require the disease to be eradicated. Following that, the UK would need to apply to the European Commission to undertake a 4 year programme of checks and tests in the affected area before it could be considered again for approved zone status.

To eradicate the disease: on confirmation of infection on a farm we shall require:

- all fish to be removed immediately from the waters of the site;
- all pools on inland farms to be drained, cleaned and disinfected;
- all eggs, gametes, dead fish and fish showing clinical signs of infection to be destroyed;
- the slaughter of fish showing no clinical signs of disease for marketing or processing for human consumption. If the Secretary of State so authorises, slaughter may be deferred to allow the fish to be fattened to a commercial size;
- the treatment of fish waste and offal to destroy disease pathogens and the treatment of used water to destroy any pathogens it may contain;
- the cleaning, disinfection or destruction of equipment, material or substances liable to be contaminated;
- that the re-population of the farm shall take place where the Secretary of State authorises it.

These activities will be undertaken to an agreed protocol and supervised by us, as necessary.

We will immediately inform the European Commission and other EU Member States of the action taken.

Viral Haemorrhagic Septicaemia (VHS)

■ ***What is it?***

VHS is a contagious disease caused by a rhabdovirus infection which leads to significant mortalities among farmed rainbow trout. Outbreaks normally occur at water temperatures between 7 and 14°C, but sporadic outbreaks have been recorded at higher temperatures. All ages of fish are susceptible though the disease is most common in fingerling and yearling fish. Outbreaks are typified by a sudden increase in mortality rate.

Symptoms include darkening of the body, protruding eyes, swollen abdomen and haemorrhaging at the fin bases, in the eyes and gills. The main internal signs include petechial haemorrhaging on the surfaces of the visceral fat, internal organs and muscle, with the accumulation of fluid in the abdominal cavity. Fish may congregate around pond outlets and sides, and show erratic swimming behaviour, such as darting, spiralling and swimming on their sides.

While farmed rainbow trout are the main susceptible species, VHS has also been recorded in brown trout, grayling, coregonids, pike and turbot. New evidence suggests that cod may also be susceptible to VHS.

Transmission of the disease is largely through contact with live infected fish, and transmission on eggs is rare. Survivors of an outbreak may be lifelong carriers of the disease. No treatment is available for VHS.

■ ***Where does it occur?***

The whole of Great Britain is designated as an “Approved Zone” for VHS. This allows us to impose strict controls on movements of susceptible species into this country.

VHS has been recorded from 16 countries in Europe since its first record in 1938. It has also been recently identified in migratory salmonid stocks and Pacific cod and herring populations on the West coast of North America.

■ ***What checks are made for it in this country?***

To maintain approved zone status, all fish farms holding species susceptible to VHS are inspected twice every year (once per year for marine farms without broodstock) and tested at least once every two years. Diagnostic tests are conducted on the internal organs removed from a sample of at least 30 fish. For those farms holding broodstock, the tests will be partly conducted on ovarian fluids drawn from live fish. Samples will be tested using tissue culture methods.

■ ***What if you find it on my premises?***

Immediate action will be taken, by means of a 30 Day Notice and/or a DAO, to establish an “isolated area” which will normally be, at minimum, for freshwater sites - a complete river catchment and the adjoining coastal

region, or for marine sites - a complete coastal zone and rivers discharging into it. Previous movements into and out of the isolated area will be thoroughly investigated.

On **suspicion** of infection we shall place strict controls on the suspected site, covering:

- movements to or from the site of any live or dead fish, fish eggs or gametes;
- the disposal of any dead fish or offal;
- movements to or from the site of any equipment, material or substances liable to transmit disease;
- people and vehicles entering or leaving the site;
- disinfection of entrances and exits to the site.

We will also require you to keep a note of any fish mortalities or changes in population.

In addition, controls will be applied to all other fish farms or fisheries within the isolated area covering the removal of live or dead fish, fish eggs, gametes or zygotes out of, into or within the isolated area.

If the disease is suspected or confirmed in wild or non-farmed stocks, we will place a DAO on the affected area. This will include controls on the movement of all fish, whether farmed or from the wild, and their ova, sperm and zygotes, and controls on movements of people and vehicles, and disinfection, as appropriate and practicable.

On CONFIRMATION of infection, Fisheries Secretary of State will consider whether action should be taken to restore the disease free status of the area in the light of the circumstances of the outbreak. Restoring disease free status will require the disease to be eradicated. Following that, the UK would need to apply to the European Commission to undertake a 4 year programme of checks and tests in the affected area before it could be considered again for approved zone status.

To ERADICATE the infection, on confirmation of infection on a site we shall require:

- all fish to be removed immediately from the waters of the site;
- all pools on inland farms to be drained, cleaned and disinfected;
- all eggs, gametes, dead fish and fish showing clinical signs of infection to be destroyed;
- the slaughter of fish showing no clinical signs of disease for marketing or processing for human consumption. If the Secretary of State so authorises, slaughter may be deferred to allow the fish to be fattened to a commercial size;
- the treatment of fish waste and offal to destroy disease pathogens and the treatment of used water to destroy any pathogens it may contain;
- the cleaning, disinfection or destruction of equipment, material or substances liable to be contaminated;
- that the re-population of the farm shall take place where the Secretary of State authorises it.

These activities will be undertaken to an agreed protocol and supervised by us, as necessary. We will immediately inform the European Commission and other EU Member States of the action taken.

Spring viraemia of carp (SVC)

■ *What is it?*

SVC is a contagious disease caused by a rhabdovirus infection which often results in significant mortalities in farmed and wild fish. Outbreaks generally occur as water temperatures rise above 7°C and maximum mortalities occur between 10 and 15°C. Above 17°C mortalities reduce considerably and at 23°C they are rare, though the virus will remain viable within the fish. All ages of carp are susceptible if previously unexposed to the virus. Symptoms can include darkening of the skin, swollen eyes, abdominal swelling (dropsy), pale gills, trailing faecal casts, and protrusion of the anus. Infected fish may be lethargic and show signs of bleeding in the gills and skin.

Susceptible species include common carp (including all variants e.g. mirror carp, leather carp, koi carp), grass carp, bighead carp, silver carp, crucian carp, goldfish, orfe, pike, roach, rudd, tench and Wels catfish.

The disease is transmitted horizontally by contact with carrier virus shed via faeces, urine, reproductive fluids and external mucous secretions from infected fish. There is no known treatment for SVC.

■ *Where does it occur?*

The disease is endemic in continental Europe but not in Great Britain. The disease was first identified in Great Britain in 1976 and since then there have been significant outbreaks in 1988, 1994 and 1995.

■ *What checks are made for it in this country?*

Checks will be made when we visit major producers of susceptible species, to test for the presence of SVC. In addition, abnormal mortalities occurring in carp and other susceptible species will be fully investigated. Identification of the disease is by virus isolation.

■ *What if you find it on my premises?*

We will serve a 30 Day Notice and/or make a DAO to control all movements of live fish or eggs to and from the site.

Movements from the site: these will normally be prohibited.

Movements onto the site: these are unlikely to be prohibited in closed waters but are not recommended.

Gyrodactylosis

(caused by *Gyrodactylus salaris*)

■ **What is it?**

Gyrodactylosis is caused by the freshwater trematode parasite *Gyrodactylus salaris*. It can cause heavy losses in both hatchery and wild riverine Atlantic salmon stocks. Clinical gyrodactylosis has been recorded in Norway, where wild juvenile salmon populations in some rivers have been almost eradicated by this disease. The parasite was believed to have been introduced to Norwegian rivers as a result of re-stocking from the Baltic.

Symptoms reflect the irritation the parasite causes to the skin, with increased mucus production, flashing (darting and twisting of fish as they try to rub against surfaces, reflecting light in different directions which an observer sees as flashes) and erratic swimming. Other symptoms found closer to death include fin erosion and secondary fungal infections.

Atlantic salmon from outside the native range of the parasite appear most susceptible to this disease. Baltic salmon appear to be more resistant to *G. salaris* infestations and may act as non-symptomatic carriers of the parasite. Both brown trout and rainbow trout can act as carriers of the parasite without showing clinical signs of the disease. Recent studies suggest that wild salmon stocks in the UK would be very susceptible to *G. salaris* infestation. The parasite cannot tolerate high salinity water. Transmission is primarily through contact with infected fish. Chemical treatments can be effectively used to eliminate infestations in hatcheries, but treatment in wild populations is not possible.

■ **Where does it occur?**

G. salaris has been found in fish stocks in Sweden and Finland and other countries bordering the Baltic and has also been found in fish stocks in Norway. There are also reports of its identification in rainbow trout in Denmark, Germany and Spain. The disease, and *G. salaris*, has never been found in British waters.

■ **What checks are made for it in this country?**

We will make checks for the presence of *G. salaris* when visiting freshwater farms holding salmon and trout, and when sampling wild salmonid populations. *G. salaris* identification would be confirmed by laboratory examination.

■ **What if you find it on my premises?**

We will serve a 30 Day Notice and/or make a DAO to control all movements of live fish or eggs to and from an “isolated area”.

Movements to AND from the isolated area will normally be prohibited.

If and when the disease is confirmed, we would need to consider whether action could and should be taken to restore the disease free status of the area.

Bacterial kidney disease (BKD)

■ **What is it?**

BKD is a bacterial disease caused by *Renibacterium salmoninarum* and can result in significant mortalities in both wild and farmed salmonid stocks. Outbreaks can occur throughout the year, but generally accompany rising water temperatures in the spring. All sizes of fish can be affected, though the disease is rare in young fish. Losses are often chronic, occurring over an extended period. Symptoms include swollen abdomen, protruding eyes and haemorrhaging at the fin bases. The gills may appear pale and anaemic. Internally there may be fluid accumulation in the abdominal cavity and enlargement of the kidney. In some fish, cream or grey nodules may be seen in the kidney and also in the spleen and liver. There may also be enlargement of the spleen which, along with the kidney, may be covered by an opaque membrane. Most salmonids are susceptible to BKD, and the bacterium has been isolated from other non-salmonid species which may act as transient carriers. Transmission can be vertical via eggs or sperm, or horizontal by direct contact with infected fish or water. There are no reliable treatments.

■ **Where does it occur?**

BKD was first recorded in wild Atlantic salmon populations in the rivers Spey and Dee in 1933, and has subsequently been recorded in both wild and farmed salmonid populations in North America, Chile, Japan and parts of Western Europe. Sporadic outbreaks continue to occur in a few farm sites in Great Britain.

■ **What checks are made for it in this country?**

All fish farms holding salmon or trout will be regularly inspected for BKD, in conjunction with checks being undertaken for VHS and IHN. The viscera of fish sampled for VHS and IHN testing will initially be screened visually for evidence of BKD infection, or kidney smears may be taken. Where examination suggests infection may be present, further samples will be taken and tested in the laboratory.

■ **What if you find it on my premises?**

We will serve a 30 Day Notice and/or make a DAO to control all movements of live fish or eggs to and from the site.

Movements from the site: we will not permit movements of live fish or eggs which are intended for restocking or on-growing except as part of a clearance programme agreed with Fisheries Departments and to a site already designated as infected.

Movements on to the site: farms will be allowed to receive fish for growing on and slaughter for human consumption.

Furunculosis in salmon

■ **What is it?**

Furunculosis is a disease of salmonids caused by the bacterium *Aeromonas salmonicida*. It can affect all life stages in freshwater and sea water. Outbreaks generally occur as water temperature rises above 10°C, but cold water forms of the disease have been recorded at temperatures down to 2°C.

Furunculosis may be acute, with diseased fish showing few symptoms, or chronic where external signs may include large swellings or furuncles in the lateral musculature of the fish. Haemorrhaging in the gills at the fin bases may also be observed. Internally, there may be haemorrhaging in the body cavity, heart and liver. Enlargement of the spleen and inflammation of the intestine may also occur.

All salmonids appear to be susceptible to furunculosis, and the causative bacterium can also cause disease in other fresh-water and marine fish species.

The disease is transmitted horizontally from infected or carrier fish and via contaminated water. Transmission between generations can occur via surface contamination of the eggs by bacteria released with the faeces or reproductive fluids of the parent fish.

Treatment with antibiotics is often effective if administered early in an outbreak, but problems of antibiotic resistance may occur. A range of vaccines against this disease is now widely available and these are proving effective in reducing the overall impact of the disease in salmon farming. Disinfection of eggs with iodophors can prevent transmission between generations.

■ **Where does it occur?**

Furunculosis is widespread in Britain, Europe and many other parts of the world.

■ **What checks are made for it in this country?**

All salmon farms will be regularly inspected and the fish visually examined for evidence of clinical infection with furunculosis. If disease is suspected, samples of fish will be taken and tested using bacterial culture methods.

■ **What if you find it on my premises?**

Where furunculosis has been confirmed, movements of salmon may be subject to control by means of a 30 Day Notice and/or a DAO for the period of the outbreak.

Infectious pancreatic necrosis (IPN) in salmon

■ *What is it?*

IPN in Atlantic salmon is a disease affecting the gut and pancreas caused by a birnavirus. The disease affects first-feeding fry and small parr in freshwater as well as smolts in sea water. In freshwater, the main signs are the fish going off feed very quickly during an outbreak. Affected fry will be somewhat darker in coloration, lethargic and collect at the bottom of the tank. There will be a clear absence of food in the hind gut.

In smolts in sea water, the disease is part of a disease complex affecting poor-doing smolts, which are underweight and pencil thin. Mortalities are associated with both the failing smolts syndrome and the effects of IPN.

Mortalities in both freshwater and sea water are highly dependent on the serotype of the virus and the level of fish husbandry. IPN virus has been isolated from a variety of sea fish and shellfish which indicates its wide host range. The virus can also survive well in fresh, brackish and sea water. Lateral spread of the virus can take place via the faeces of recently infected fish. Vertical transmission via the eggs or milt can also occur.

■ *Where does it occur?*

The disease has a wide geographical distribution occurring in most, if not all major salmonid farming countries of North and South America, Europe and Asia. It is also widespread in trout and marine salmon farms in Great Britain.

■ *What checks are made for it in this country?*

All fish farms holding salmon will be regularly inspected and tested for IPN virus, in conjunction with checks being undertaken for VHS and IHN. A sample of 30 fish will be taken from all salmon farms at least once every two years and will be tested by tissue culture techniques followed by identification of any isolated virus using serological methods.

■ *What if you find it on my premises?*

We will normally serve a 30 Day Notice and/or make a DAO on salmon sites to control all movements of live salmon or salmon eggs from the site.

Movements from the site: movements of salmon will need individual authorisation by the relevant Fisheries Department. Movements of salmon to other farm sites will only be permitted where the receiving site is:

- itself under a DAO for IPN; and/or
- there is no significant risk to other farmed salmon populations in the vicinity of the receiving site.

Movements of salmon ova to salmon hatcheries and smolt units will be allowed provided:

- the parent broodstock are slaughtered and ova kept only from those fish testing negative for IPN infection; and
- all ova are disinfected at the green ova stage.

Movements onto the site:

- no controls will be applied to movements of live fish and eggs to the site.

Part 3

Steps you can take to guard against the spread of disease

Importers

You should:

- **study the import rules** set out in the booklet *A Guide to Importing Fish*, and must follow them;
- **report** any knowledge or suspicion of a notifiable disease to the CEFAS Weymouth Laboratory or the Fisheries Research Services, Marine Laboratory (see appendix 1 for addresses) ; and
- **consider** taking the steps set out below.

Farmers, Dealers and Traders

You should:

- **report** any knowledge or suspicion of a notifiable disease to the CEFAS Weymouth Laboratory or the Fisheries Research Services, Marine Laboratory.
- **keep stress to a minimum** wherever possible. Fish have an increased susceptibility to disease when they are stressed. Stress can be caused by a number of factors such as rapid changes in water temperature, movement from one site to another, poor handling, or overstocking.
- **avoid collecting and mixing fish from different sites**, especially when you intend to sell on the fish quickly. If possible, you should consider a **period of quarantine** for recently acquired stocks. When netting stocks, ensure that nets and equipment are **disinfected** between use at different sites.
- **disinfect bought-in ova** and destroy the packaging.
- **buy from a reputable supplier**
- **not use raw/unprocessed fish as fish feed** as this may introduce infectious disease to your stocks.
- **ask to see the supplier's health records and health certificates** relating to any fish or ova you are purchasing.

Fishery Managers and Anglers

You should:

- **report** any knowledge or suspicion of a notifiable disease to Fisheries Departments;
- make sure there are **no unauthorised transfers** of live fish (live salmon in Scotland) between waters;

- follow a policy of **disinfection** as set out overleaf; and
- **buy fish stocks from a reputable supplier.**
- **ask to see the supplier's health records and health certificates** relating to any fish or ova you are purchasing.
- **not use raw/unprocessed fish as fish feed** or bait as this may introduce infectious disease.

If waters are subject to a DAO, or if there is any suspicion of disease, you should:

- **avoid the use of keep-nets and carp sacks** since these can carry infection and may also bring infected fish into close contact with other fish; and
- **disinfect** fishing tackle, nets, sacks, footwear and other equipment such as boats, before moving to other waters. Wherever possible you should also disinfect equipment used in fishery remedial work, such as bank repairs and stock netting.

Questions to ask your supplier

When buying fish, you should ask your supplier if:

- they disinfect ova before despatch
- regular examinations for disease are carried out on fish stocks held on the supplier's site/premises
- all new consignments of fish brought into the suppliers site/premises are examined for disease
- the examinations are undertaken by the supplier's own employees, private veterinarians, or official fish disease services
- only sick fish are examined, or whether random samples of apparently healthy fish are also routinely examined
- samples are taken for laboratory tests for bacteria, viruses, parasites, and, if yes, which laboratory carries out the tests
- the supplier can provide a list of tests carried out on site/premises and the results
- you can have a list of the steps the supplier takes to ensure that the health status of fish the supplier buys is acceptable.

Disinfection

Iodine-based preparations (iodophors) are recommended for disinfecting equipment. Advice on local sources of supply may be obtained from local veterinary surgeons, local EA, the CEFAS Weymouth Laboratory or the Fisheries Research Services, Marine Laboratory. Iodophors should be diluted to provide a final concentration of 250 parts per million active iodine or 500 parts per million in sea water. Suppliers can advise in cases of doubt. Disinfection is achieved by first cleaning off all mud etc. followed by immersion for 15 to 30 minutes; or by application to surfaces using a pad soaked with disinfectant.

For regular disinfection of heavily soiled footwear, a bath of 1% caustic soda (sodium hydroxide) solution is more appropriate. The strength of the caustic soda should be checked daily and the disinfectant replaced if the pH is 11 or below, as shown by indicator test papers. Protective clothing should be used when handling caustic soda to protect the skin and eyes. This disinfectant can corrode metals.

Iodophors and many other disinfectants are extremely poisonous to fish. Footwear and all equipment, especially nets, should be thoroughly rinsed with tap water after disinfecting. Disinfectant and washings must be disposed of in a way which does not harm the environment. They should **never** be tipped into water containing fish or other aquatic life.

You must ensure that vehicles used for the carriage of live fish are thoroughly cleaned and disinfected both before moving fish and as soon as possible after unloading. You must also make sure that no water escapes from the vehicle and that any water changes take place only at approved water stations.

Appendix 1

Contact addresses: England

To:

- **notify** a suspected outbreak of a notifiable disease.
- **discuss** the requirements of a 30 Day Notice or DAO.
- **general enquiries, further information and guidance literature** please contact:
 - **Centre for Environment, Fisheries and Aquaculture Science**,
Weymouth Laboratory,
The Nothe, Barrack Road,
Weymouth, Dorset DT4 8UB
Telephone: 01305 206600
Fax: 01305 206601
e-mail: fish.health.inspectorate@cefas.co.uk
Website: www.cefas.co.uk

To:

- **apply** for permission to move fish, eggs or foodstuffs which are controlled by a 30 Day Notice or DAO please contact:
- **Department for Environment, Food and Rural Affairs**
Fisheries Division II,
Room 308, Nobel House
17 Smith Square, London SW1P 3JR
Telephone: 020 7238 5944/6049
Fax: 020 7238 5938
e-mail: fishii@defra.gsi.gov.uk
Website: <http://www.defra.gov.uk>

For:

- **information** on the release of non-native species into the wild please contact:
- **Department for Environment, Food and Rural Affairs**
Fisheries Division II,
Room 308, Nobel House
17 Smith Square, London SW1P 3JR
Telephone: 020 7238 5931
Fax: 020 7238 5938
e-mail: ILFA.Database@defra.gsi.gov.uk
Website: <http://www.defra.gov.uk>

Contact addresses: Wales

Apply for permission to move fish, eggs or foodstuffs which are controlled by a 30 Day Notice or DAO.

Information on the release of non-native species into the wild:

- Welsh Assembly Government
Agriculture and Fisheries Policy Division 2,
Cathays Park, Cardiff CF1 3NQ
Telephone: 029 2082 3744
Fax: 029 2082 3562
e-mail: glyn.perryman@wales.gsi.gov.uk

Contact addresses: Scotland

Notify a suspected outbreak of a notifiable disease.

Discuss the requirements of a 30 Day Notice or DAO.

Apply for permission to move fish, eggs or foodstuffs which are controlled by 30 Day Notice or DAO.

General enquiries, further information and guidance literature.

- Scottish Executive Environment and Rural Affairs Department (SEERAD)
Fisheries Research Service, The Marine Laboratory
PO Box 101, Victoria Rd, Aberdeen AB9 8DB
Telephone: 01224 876544
Fax: 01224 295620
Website: <http://www.marlab.ac.uk>

Information on the release of non-native species into the wild.

- Scottish Executive Environment and Rural Affairs Department (SEERAD)
Pentland House, 47 Robbs Loan, Edinburgh EH14 1TW
Telephone: 0131 244 6224
Fax: 0131 244 6313
e-mail: Dave.Wyman@scotland.gsi.gov.uk

If you are not sure who to contact, please get in touch with any of the above who will be happy to help.

Appendix 2

Legislation covering Fish Disease Controls

Legislation governing the controls contained in this booklet is set out below. Copies may be purchased from Her Majesty's Stationery Office or through booksellers.

■ ***The Fish Health Regulations 1997***

These Regulations implement Council Directive 91/67/EEC (as amended) and Decisions made under it, and control the movement into Great Britain from elsewhere in the EU of

- all live fish their eggs and gametes; and
- certain dead fish

They also implement the EU rules on marketing and transport of fish and certain fish products.

Articles 12 and 13 of 91/67/EEC also make provision for Member States to forward programmes for approval to the Commission to prevent the introduction or spread of certain diseases including IPN, BKD, SVC, gyrodactylosis and furunculosis as set out at List III of Annex A of 91/67/EEC. List III diseases are those which are present in the Union, and which may cause financial losses where they occur, but which can be controlled.

The UK has received EU approval to operate additional guarantees for imports to guard against SVC (Commission Decision 93/44/EEC). This Decision was extended by Commission Decision 94/865/EEC to cover an additional 8 species susceptible to the disease in the light of scientific evidence which was gained during the outbreak of SVC which occurred in Great Britain in 1994.

The European Commission has also recognised the UK as a GS free zone (Commission Decision 96/490/EC as amended by 98/24/EC) allowing the UK to refuse imports of salmonids from areas of the community which have not also been recognised as free from GS.

■ ***The Diseases of Fish (Control) Regulations 1994 (as amended)***

These Regulations implement the disease control measures which are required on an EU-wide basis where suspicion and/or confirmation of the List I disease ISA, and the List II diseases IHN and VHS occurs.

List I diseases are those considered to be exotic within the European Union that would have severe economic consequences (for farmed and wild fish stocks) were they to occur. These are controlled at EU level by a policy of eradication. List II diseases, which also have severe economic implications, are present in some parts of the European Union but are exotic to others, including Great Britain which is an approved zone for both VHS and IHN.

Should a List I or a List II disease be confirmed in Great Britain, the measures in these Regulations would come into effect.

■ ***The Diseases of Fish Act 1937 (amended by the Diseases of Fish Act 1983)***

Section 4 of this Act requires the notification of any suspicion of the presence of a notifiable disease to the relevant Secretary of State.

Section 6 provides powers for those appointed as Inspectors under this Act to take samples of any fish, eggs of fish or foodstuffs of fish for testing purposes. Where the presence of disease is suspected, a 30 Day Notice may be placed on the site, and movements of live fish, eggs of fish and foodstuffs of fish either to or from the site may be controlled for the period of time covered by the Notice.

Where the presence of disease is suspected or confirmed, a Designated Area Order (DAO) may be made under Section 2 of the Act, and placed on the site. All movements of live fish and eggs, both to and from the designated site, are then subject to the prior written consent of the Secretary of State. Any person who knowingly moves fish either to or from a site which is subject to a DAO, without this written authorisation, shall be guilty of an offence. Section 2a of the Act allows Secretary of States to require the removal of dead and dying fish from the waters of a designated site.

■ ***The Registration of Fish Farming and Shellfish Farming Businesses Order 1985 (as amended)***

Made under the Disease of Fish Act 1983) requires anyone who carries on a business of fish farming to register the business with Fisheries Departments and to keep stocking and movement records.

N.B. 30-Day notices may only be placed on sites which constitute the waters of a fish farm or other premises used to keep fish with a view to their sale and transfer to other waters. Other inland waters, such as the waters of a fishery, will be subject to a Designated Area Order should the presence of a notifiable disease be suspected.

■ ***The Wildlife and Countryside Act 1981***

Section 14 of this Act makes it an offence to release or allow to escape into the wild, any animal which is not ordinarily resident in or a regular visitor to the UK, or which is established in the wild and listed in Schedule 9 of the Act, without a licence. Licences to release non-native fish or shellfish are issued by the **Department for Environment Food and Rural Affairs**. English Nature and the Environment Agency are consulted on every application for a licence.

■ ***Prohibition of Keeping or Release of Live Fish (Specified Species) Order 1998***

The Wildlife and Countryside Act 1981 is complemented by the Prohibition of Keeping or Release of Live Fish (Specified Species) (amendment) (England) Order 2003, made under the Import of Live Fish (England and Wales) Act 1980, which makes it an offence to keep or release certain non-native species without a licence issued by the **Department for Environment Food and Rural Affairs** or the Welsh Assembly Government.

■ ***Salmon and Freshwater Fisheries Act 1975***

Section 30 of this Act makes it an offence to introduce fish into an inland water without first obtaining the written consent of the Environment Agency.

