

# Infectious Pancreatic Necrosis in Farmed Salmonids

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## Description of IPN Virus

IPN virus is a member of a larger group of aquatic birnaviruses that have been isolated from a wide range of fish species, including salmonids, cyprinids and marine species. In addition, IPNV has been recovered from several species of aquatic invertebrates, including crabs and shellfish. Several distinct strains (serotypes) of the IPN virus are recognised, including Sp, Ab and VR-299. These strains differ in their geographical distribution and their potential to cause disease. In Europe, Sp and Ab are the predominant strains found. The Sp strain is capable of causing severe disease outbreaks, whereas the Ab strain is usually apathogenic. Compared to many other viruses, IPNV is very stable, surviving for several months in salt and fresh water. The virus is also relatively resistant to both high temperatures and low pH, meaning that it is not inactivated by ensiling or by passage through the gut of birds or mammals. It is susceptible to most of the commonly used disinfectants, including iodophors.

## Description of Disease

Infectious pancreatic necrosis (IPN) is a viral disease of fish caused by infectious pancreatic necrosis virus (IPNV). All ages of salmonids are susceptible to infection, but the most severe losses in farmed fish occur in fry and fingerlings. Mortalities can range from less than

10% to more than 90%. Both fish that survive an outbreak and older

fish that show no clinical signs may subsequently carry the virus for prolonged periods without showing further signs of infection. While the level of virus present in these carrier fish is lower than that seen in clinically affected fish, they pose a risk to susceptible populations. In addition, these carrier fish may transmit infection vertically through fertilised eggs. Recently IPNV has also emerged as a serious cause of acute mortality in smolts 7-12 weeks after sea transfer. During 2003 IPNV (Sp strain) has been isolated on two Northern Irish farms, one rearing rainbow trout and the other marine salmon. The infected trout had recently been imported from Scotland, and were considered to have been infected on the farm of origin. Using powers afforded by the Diseases of Fish Act (1967) the site was depopulated, disinfected and fallowed. The source of infection for the salmon has not been conclusively identified. It is most likely that the virus was introduced from a marine reservoir. Under the same legislation, movement restrictions were imposed on the farm and strict biosecurity and disinfection procedures implemented. Historically, Northern Ireland has enjoyed a high health status in farmed fish. Before 2003 there have only been a few isolates of IPNV from fish in NI, and all of these have been of the Ab serotype.

This contrasts with the situation in Great Britain and elsewhere in mainland Europe. IPNV was first detected in GB in farmed trout in Scotland in 1971 and is now considered widespread in GB trout production. More recently, the prevalence of IPNV infection in Atlantic salmon marine sites in Scotland has increased significantly with more than 50% now infected.

### **Clinical Signs**

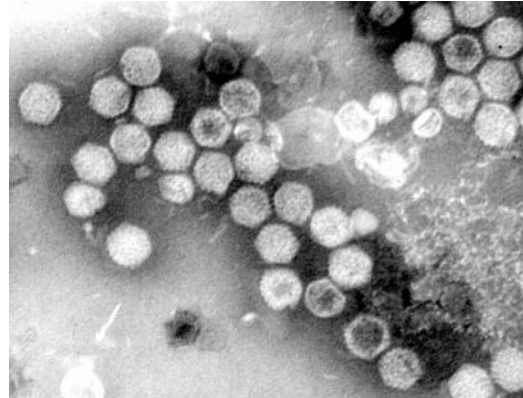
IPN is characterised by dark body colouration, “popeye” and the presence of pin-point haemorrhages in the skin. Affected fish do not feed and in the later stages show a loss of balance progressing to a corkscrew swimming motion. It is important to note that not all of the signs may be present, particularly during the earliest and very late stages of a disease outbreak.

### **Post-Mortem Findings**

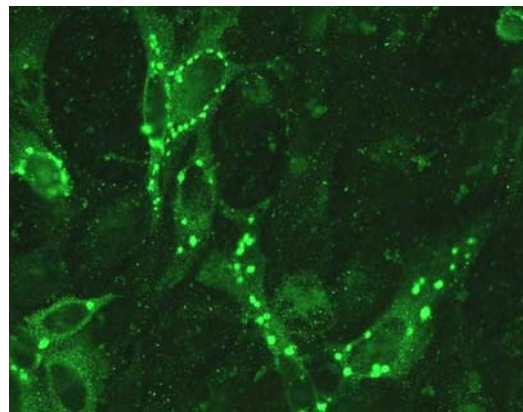
On gross post-mortem examination pinpoint haemorrhages may be visible on the internal organs. The gut may be empty apart from a yellow exudate. Microscopic changes may be observed particularly in the pancreas and kidney.

### **Diagnosis**

Presumptive diagnosis is based on the clinical signs but as these are not always present, the diagnosis is confirmed by laboratory isolation of the virus. The virus grows readily in cell cultures, where its presence can be confirmed by electron microscopy and immunolabelling (Figure 1) Once isolated, the strain type can then be determined.



**Figure 1a. IPNV particles observed by electron microscopy**



**Figure 1b. Immunolabelling of IPNV growing in cell cultures**

### **Wild Fish**

Available evidence suggests that IPNV does not have a significant impact on wild salmonids. While infection can be transmitted from farmed fish to wild fish, it appears that infection does not spread readily between the wild fish. As a consequence infection seems to disappear following removal of farmed infected fish. Sampling of wild salmonids undertaken as part of the investigations into the two recent NI cases failed to find any infected fish. Testing of other marine species adjacent to the salmon farm also failed to detect virus.

### ***Treatment and Control***

There are no available treatments for IPN, and no vaccines are currently licenced in the UK. Prevention of infection is therefore the most important means of control. Every effort should be made to maintain the health status of Northern Ireland fish stocks in relation to IPNV through the implementation of effective biosecurity measures. In particular, care should be taken when sourcing fish or eggs from outside Northern Ireland, both in relation to the farm of origin and the transportation used. Fish should only be purchased from vendors who can provide certification of freedom of IPNV for their farms. Ideally, egg suppliers should also be able to provide this certification. If this is not possible, eggs should come from brood stock that have been individually tested for IPNV. However, it must be recognised that such testing cannot give a 100% guarantee. Efforts should be directed at minimizing losses by providing the best possible environment for affected fish. In addition to movements of fish or eggs, infection may also be introduced from wild fish or escapees, shellfish and crustaceans, seabirds and aquatic mammals, and indirectly by contaminated vehicles, personnel, feed, equipment and processing. If use of site-specific equipment is not practicable, all shared equipment should be thoroughly cleansed and disinfected before use.

Where salmonid fish are brought onto farms sites for processing, such facilities should ideally be located as far as possible from fish ponds and tanks. Processing waste, including water, should be disposed of safely.

Fisheries Division, on behalf of the Department of Agriculture and Rural Development, remains committed to maintaining the highest health status practicable in both farmed and wild fish stocks in Northern Ireland. Any unusual mortalities should be investigated by the fish Diseases Unit. It is the Department's policy, under the Diseases of Fish Act (NI) 1967, to continue to take necessary measures to prevent, control and eradicate future cases.

***For further information please contact:***

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