

“ISA”

Methods for the detection and the control of Infectious Salmon Anaemia

*Infectious salmon anaemia (ISA) is an infectious disease of Atlantic salmon (*Salmo salar*) caused by an orthomyxo-like virus. Atlantic salmon is the only susceptible fish species known to develop the disease, but, following experimental infection, the ISA virus (ISAV) may survive and replicate in sea trout and brown trout, and in rainbow trout, which thus may act as carriers of the virus for an unknown period of time.*

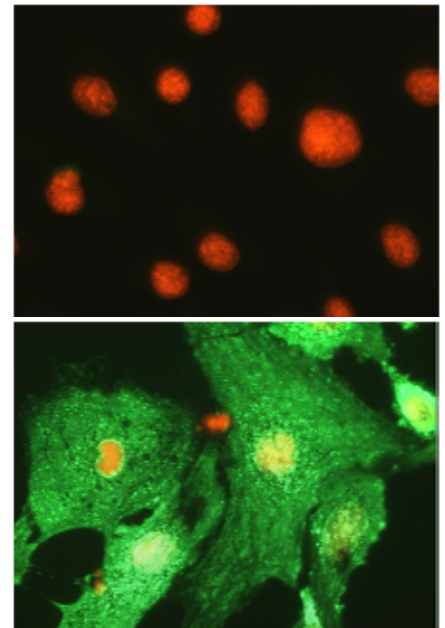
Since the first reports of this disease in Norway in 1984, ISA has occurred in many salmon-producing countries within the European Union and the Americas. Economic losses resulting from this disease can be severe.

Rapid and reliable diagnostic methods are essential for the study of the epidemiology of ISA, and for the development of effective control measures. Cell culture isolation procedures have been developed for the detection of ISAV, together with molecular-based techniques including RT-PCR. However, the **sensitivity and specificity of currently available diagnostic procedures are limited**, and, consequently, the development of improved methods is urgently required.

The objectives of the ISA project were to **develop and standardise rapid methods to detect the infectious salmon anaemia virus.**

The genome sequence of the virus was revealed. Following this, monoclonal antibodies against the virus were produced and used as a basis for developing two virus detection methods, an indirect fluorescent antibody test (IFAT) and an immunohistochemistry test (IHC). Other methods studied included real-time nucleic acid amplification (RT-PCR and NASBA) and serology (ELISA). Once established and optimised, these methods were used to investigate aspects of the epidemiology of ISA, including the role of wild fish as carriers, assessing the risk of vertical transmission (“from mother to child”), and to

determine whether persistent infection with ISAV may occur.



DETECTION OF ISAV USING AN IFAT TEST.
SOURCE: R. RICHARDS/UNIVERSITY OF STIRLING.

In the final phase of the project, diagnostic protocols were standardised. In addition, recommendations on control strategies were formulated and provided to the EU and the World Organisation for Animal Health (OIE, www.oie.int).

These included the following bullet points:

- All broodfish should be screened for ISAV carriage, so as to reduce the risk of vertical transmission of the disease.

Project acronym:

ISA

Full title of Project:

Infectious Salmon Anaemia - development and standardisation of diagnostic methods to detect ISAV and aspects of the epidemiology of ISA

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- Before launching into the sea, all smolt should be screened for the virus.
- The disease should be stamped out of net pens before they are brought into the sea.
- Wild salmonids in close proximity of affected farms should be removed before emptying the farms.
- Infected farms should be surrounded by nets to prevent a close contact between infected salmon and wild salmon.

restrictions on affected, suspected and neighbouring farms, have shown to be efficient in reducing the incidence of ISA in Norway.

The results and recommendations stemming from the ISA project have contributed to a better understanding of the disease and strategies for its prevention and control. Moreover, the results are also applicable to the diagnosis of diseases caused by other pathogens of fishes, such as nodavirus, infectious pancreatic necrosis virus, and viral haemorrhagic septicaemia.

In 2003, the Commission adopted Decision 2003/466/EC, which establishes the sampling plans and diagnostic methods for the detection and confirmation of infectious salmon anaemia (ISA), as well as the criteria for zoning and official surveillance following suspicion or confirmation of the presence of ISA. Those methods and criteria are laid down in the Annex to the Decision which, on the other side, integrates the provisions and definitions of Directives 91/67/EEC and 93/53/EEC.

Legislative measures, such as restrictions on movements and transportation of fish, disinfection of offal and waste water from slaughterhouses, enforced sanitary slaughtering and

**“RECOMMENDATIONS ON
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