

AETIOLOGY

CLASSIFICATION OF THE CAUSATIVE AGENT

Suggested virus family: Orthomyxoviridae.

RESISTANCE TO PHYSICAL AND CHEMICAL ACTION

Temperature: Isolated virus inactivated by 56°C for 5 minutes; infective tissue homogenate by 60°C for 5 minutes.

pH: Isolated virus sensitive to pH <5.0; infective tissue homogenate sensitive to pH <4.0 for 24 hours.

Chemicals: Inactivated by ether and chloroform.

Disinfectants: Infective tissue homogenate inactivated by sodium hypochlorite for 15 minutes (residual chlorine >5 mg/litre), UV light (45 mJ/cm²) and ozone (residual ozone 0.1 mg/litre after 3 minutes).

Survival: At least 14 days at 4°C for isolated virus; 24 hours in sea water at 10°C for infective tissue homogenate.

EPIDEMIOLOGY

- Contagious.
- Daily mortality ranging from 0.05% to ≥1% and total mortality ranging from 15% to 100% in affected cages.

HOSTS

- Atlantic salmon (*Salmo salar* L.).
- Virus replicates in sea trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*) and Atlantic herring (*Clupea harengus*) after experimental infection.

TRANSMISSION

- Water-borne transmission.
- Vertical transmission has been suspected.
- Biological vector: Sea lice have been suggested.

SOURCES OF THE VIRUS

- Reservoir not known.
- Organic material from infected fish.
- Waste water from slaughterhouses and processing industries.

OCCURRENCE

Infectious salmon anaemia (ISA) has been diagnosed in Norway since 1984 in fish farms producing Atlantic salmon. The disease has also been identified in Canada (1997) and Scotland (1998) in the same species.

For detailed information on occurrence, see recent issues of *World Animal Health* and OIE Web site.

DIAGNOSIS

CLINICAL DIAGNOSIS

- Increased mortality
- Lethargic fish
- Gill pallor due to anaemia
- Haemorrhage in the anterior eye chamber
- Exophthalmia

LESIONS

Haematology

- Low haematocrit (<10).
- Degenerated and vacuolised erythrocytes.
- Lymphocytopenia and thrombocytopenia.

Macroscopic findings

- Dark and congested liver and spleen usually present. Liver should be darker than the heart. Alternatively, livers become yellow with haemorrhagic spots or may be pale.
- Petechiae in visceral fat.
- Ascites.
- Dark and congested foregut, sometimes present.

Microscopic findings

- Focal congestion and dilatation of hepatic sinusoids.
- Multifocal, haemorrhagic hepatic necrosis.
- Interstitial haemorrhages in the kidneys and occasionally tubular necrosis.

DIFFERENTIAL DIAGNOSIS

- Cardiac myopathy syndrome (CSM).
- Winter ulcer.
- Other anaemic conditions.

LABORATORY DIAGNOSIS

Procedures

Identification of the agent

- Immunofluorescence on tissue imprints or on cryostat sections.
- Isolation of virus in cell culture (SHK-1 cells or in other susceptible cell lines) followed by immunofluorescent staining.
- Reverse-transcriptase polymerase chain reaction (RT-PCR) for detection of viral RNA.

Serological tests

- Enzyme-linked immunosorbent assay (the method is currently being tested for diagnostic purposes).

Samples

Identification of the agent

- Kidney, heart and liver samples.

- Fresh kidney, heart and liver for tissue immunofluorescent staining.
- Pieces of liver and other tissues are fixed for histopathological examination.
- A portion of the kidney is placed in transport medium for virus isolation and for RT-PCR. Alternatively, tissue samples are stored at -80°C until examination.

Serological tests

- Heparinised blood samples.

PREVENTION AND CONTROL

- No medical treatment.

SANITARY PROPHYLAXIS

- Legislative measures, such as restrictions on movements and transportation of fish, disinfection of offal and waste water from slaughterhouses, enforced sanitary slaughtering and restrictions on affected, suspected and neighbouring farms, have shown to be efficient in reducing the incidence of ISA in Norway.

MEDICAL PROPHYLAXIS

- No commercial vaccine available.

REFERENCES

Chapter 2.2.4. in the OIE *Diagnostic Manual for Aquatic Animal Diseases*, OIE, Paris, France.

Chapter 2.2.4. in the OIE *International Aquatic Animal Health Code*, OIE, Paris, France.

OIE Reference Experts and Laboratories in 2000	
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