



VIRAL DISEASES IN FISHES



Dr . G. B. CHAND

Associate Professor

Department of Zoology

Aquatic Toxicology laboratory

Patna University, Patna

Email : gbchand@rediffmail.com



VIRAL DISEASES IN FISHES

Fish Diseases & Their Control

Development & adoption of various scientific technologies in fisheries & aquaculture practices have led them to transform it from traditional nature to an important economic activity in India. The anthropogenic pressure & identification in aquaculture has created some problem in the form of environmental stress resulting in out break of disease. There are many types of fish diseases known so far affecting the fishes externally as well as internally.

Based upon pathogens & etiologies fish diseases can be of following category:

Fish Diseases

Diseases caused by Virus/Bacteriophage

- eg. a. Viral hemorrhagic Septicemia (VHS) of Rainbow trout
- b. Infectious hematopoietic necrosis (IHN)
- c. Infectious pancreatic Necrosis (IPN)
- d. Spring Viremia of carp
- e. Channel cat fish viruses
- f. Sockeye Salmon virus disease of (retrovirus)

Diseases caused by Bacteria

- eg. a. Piscine tuberculosis
- b. Bacterial hemorrhagic septicemia / Myxobolera hepatic syndrome
- c. Red pest of fresh water ocl
- d. Red spot of fresh water fish
- e. Ulcerosis / Pike pest
- f. Frunculosis
- g. Bacterial tail rot
- h. Columnaris disease
- i. Pondicle disease
- j. Bacterial gill disease
- k. Bacterial kidney disease
- l. Ulcer diseases
- m. Eye diseases of C. Catla
- n. Dropsy diseases

Disease caused by fungus

- eg. a. Ichtyosporidium
- b. Saprolegnia mycosis (gill rot)
- c. Saprolegniasis & Achthyasis

Disease caused by parasite

- A. Disease caused by protozoan
- I. Ciliates
- eg. a. Ichthyophthiriasis
- b. Trichodiniasis
- c. Childonella

Sporozoa

- a. Nodular coccidiosis in the intestine of carp
- b. Enterococcidiosis in carp
- c. Whirling disease (Sporozoasid)
- d. Nodular disease (Sporozoasid)
- e. Plistoplerosis (Myolytic Sporozoasid)
- f. White gill spot disease
- g. White scale spot disease in Catla

Worm diseases

Disease caused by Helminthes (Helminthiasis)

- i) Trematoda
- Monogenea
- eg. a. Dactylogyosis
- b. Gyrodactylasis (Diplozoan)
- ii) Cestoda
- eg. a. Ligulosis (Ligula)
- b. Schistocephalus
- c. Diptheriocephalus
- d. Triaenophorus

Digena

- eg. a. Diplostomum sp.
- b. Sanguinicola
- c. Neodiplostomum cuticola (Black spot disease)

Disease caused by Acanthocephale

- eg. Acanthocephalasis
- by Acanthogyrus
- Acanthasantis

Disease caused by Crustacean parasite

- eg. a. Argulosis
- b. Ergasilosis
- c. Lernaeosis
- d. Achtheres

Disease caused by Nematoda (Capillaris sp)

- eg. a. Sphylon
- f. Sarcoptosis (Cirrripides)

Disease caused by chemical/physical factors (Intrinsic factor)

- eg. a. Hypoxia & anoxia
- b. Gas bubble disease
- c. pH acidosis & alkalosis
- d. Intoxication
- e. Vitamin deficiencies or hypervitaminosis

VIRAL DISEASES IN FISHES

① Hereditary disease

② Tumours

- eg. a. Tumour of hereditary
- b. Constitutional dropsy
- c. Deformities

- Benign tumours
- eg. a. Epitheliomas
 - b. Epithelioma papiliosum (Corp por)
 - c. Papillomas
 - d. Fibrosia / Osteoma /
 - e. Chondromas

- Malignant tumours
- eg. a. Carcinomas
 - b. Hepatoma
 - c. Melanoderma

③ Disease caused by Dianoflagellates

- eg. a. Coral fish disease (*Oodinium oscellatum*)
- b. Velvet disease (*Oodinium pillularis*)

Fig. Schematic representation of various fish diseases (After Lourey & Heerman 1990)

⇒ VIRAL diseases / Diseases caused by VIRES

BACTERIOPHAGES :-

Heterogenous (100 to 800 nm)

Viruses are ultramicroscopic heterogeneous bodies, capable of reproducing in living tissues. They join together to form filaments or networks or crystallized in isolated macromolecules. They are nucleoproteinaceous in nature in which proteins resemble albumin while nucleic acid can be DNA or RNA. Besides these may be lipid / lipid protein.

Fish diseases due to virus have not yet been reported in India but some of the major fish viral diseases of world are -

A) Viral haemorrhagic Septicemia of Rainbow Trout (VHS) / Enteric hepatocellular syndrome / Infectious trout anaemia / Extrad disease :-

Pathogen :-

→ Causative agent - Viral haemorrhagic septicemia Virus (Johsen 1963). The size of VHS virus is 500nm x 80nm (Zwillenberg 1965). VHS was firstly considered as a viral disease by Schaper Claus (1954).

- Organism / fish affected - Trout
- Organs affected - Kidney (nephrotropism), liver (hepatotropism) & intestine (enterotropism).
- Pathological forms & their etiology -

Klinger differentiated three pathological forms -

1) Chronic / Sub acute form (fairly easy recognition and diagnosis) -

- Symptoms -
- Listlessness, little effort made to escape.
 - Slow swimming at surface of water.
 - Tendency to congregate at the edge of tank.
 - Darkish colouration.
 - Anemia, grey-brown paleness of skin / gills.
 - Swelling of belly, yellowish coloured anus.
 - Spongy textured dorsal muscle, retarded growth & fish death one by one.

2) Acute / Hyper acute form (fairly easy to diagnose) -

- Symptoms -
- Whirling movements (going head over heels, as it whirls or rotating on the longitudinal axis of the body).
 - Muscular spasm, wide open mouth & extremely rapidly occurring rigor mortis.

3) Latent form (very difficult to diagnose) -

- Symptom -
- Slight exophthalmos and incipient anemia & quick death.



VIRAL DISEASES IN FISHES

* Various authors considered the deficiency of Vit B, Vit B₁₂ & Vit E as the principal cause of disease and outbreak in trout. VHS is widespread & it confers an immunity which w last for several yrs. The outbreak is chiefly during colder months. The loss of fry may be upto 78%.

Histopathology - The parenchymatous organs viz - liver, kidney, brain & muscles show edema. The cells display a clear case of toxic degeneration & there is a barely visible defensive inflammatory reactions in the connective tissue.

- Kidney - Shows edema of lacunae of lymphoid tissue as well as to its lack of pigmentation.
- Liver - Shows fatty degeneration, hepatocytes hypertrophied & have the appearance of vesicle with vacuolar degeneration & atrophied nuclei.
- Muscles - Cardiac & skeletal muscles contain edematous spaces. Besides RBC count, Hb conc is considerably decreased in infected fish.

B) Infectious haematopoietic necrosis (IHN)

Causative agent - Infectious Haematopoietic Necrosis virus (IHNV).

Organism affected - Sockeye Salmon, Rainbow trout

Etiology -

- Affected fishes are lethargic with occasional increased activity and dark coloured with exophthalmia & distended abdomen.
- Fine haemorrhages at the base of fins.
- Flushed fished gastrointestinal tract & a long off white trailing fecal matter. Distension of stomach & intestine with watery fluid.

Histopathology - Major changes occur in kidney - haemorrhagic tissues, liver, spleen and pancreas.

C) Infectious Pancreatic Necrosis (IPN)

(M'Gonigle, 1940)

Causative agent - Reoviridae. IPN virus (Wolf et al 1960).

Organism affected - An acute disease of very young salmonids, Atlantic Salmon, Brook Trout & Rainbow trout.

Organ affected - Pancreas, Spleen, liver & striated muscles.

Etiology - Whirling symptom, at time fishes exhibit a paralyzed swimming, suggestive of severe pain.

Histopathology - The spleen & liver may be almost colourless.

- Pancreas - Severe necrosis.
- Striated (skeletal muscle) - Hyaline degeneration.

(+) The anterior abdominal mass at the location of pancreatic tissues show area of punctate haemorrhage.

D) Spring viraemia of carp

Causative agent - Rhabdovirus carpio (Fijan et al 1971).

Organism affected - Carp

Organs affected - Skin and gills.

Etiology -

- The colour of affected fishes darken with petechial haemorrhages in skin & gills. There is loss of balance & abdominal distension.
- There is petechial haemorrhages over viscera and necrotic enteritis.

VIRAL DISEASES IN FISHES

E) Channel Cat fish virus :-

Causative agent - Channel cat fish virus, a herpes virus type (Egan 1968)

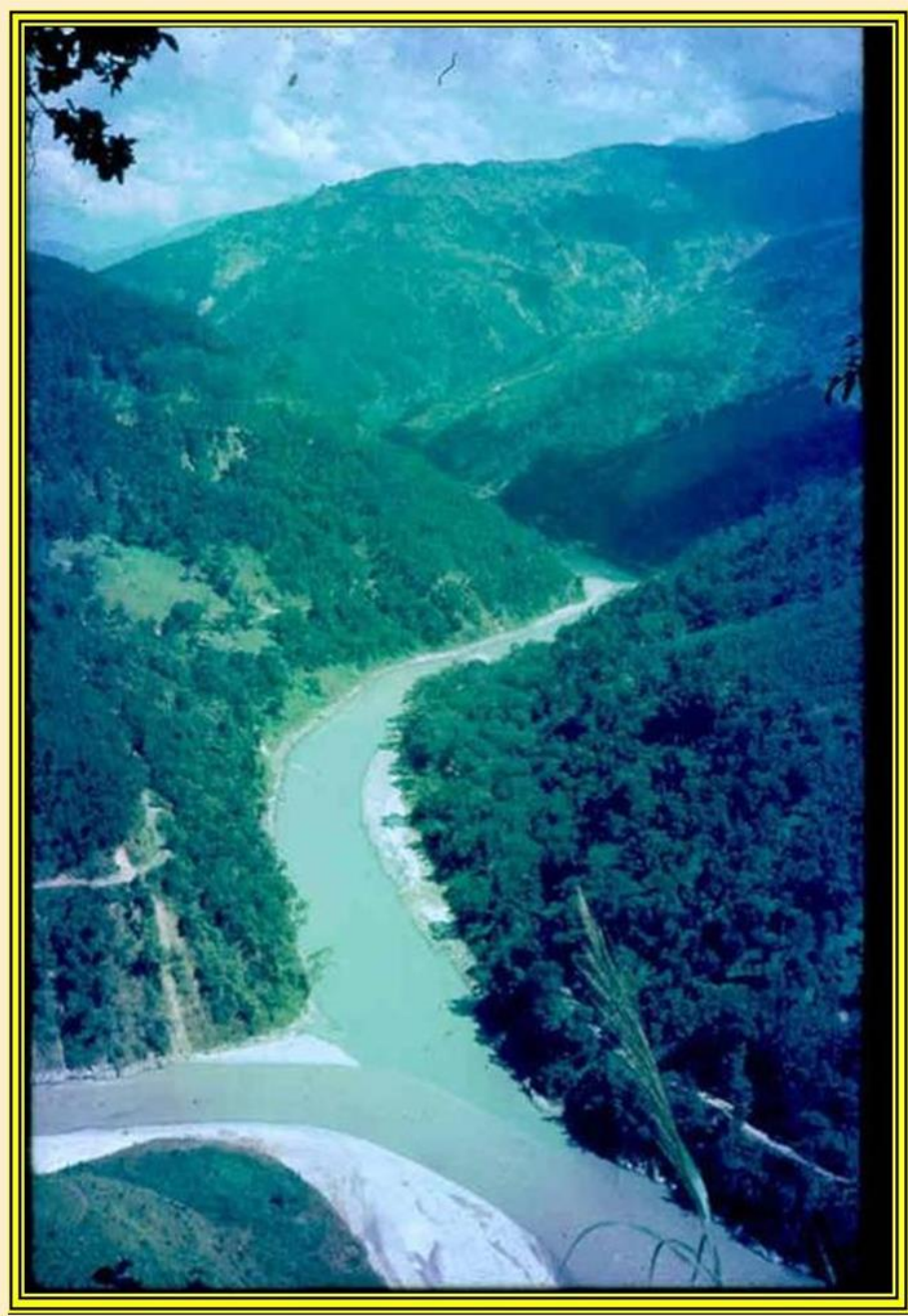
Organism affected - Channel cat fish.

Etiology -

- Affected fishes lose their balance, hanging vertically in the water.
- Abdominal distension & haemorrhages of skin & gills occur.
- Lesions are visible in posterior kidney. Necrosis of renal haematopoietic tissue occur.

Treatment measures for fish viral disease :-

- Avoidance of an infection & chemotherapy with synthetic Polynucleotides (Ruberts 1978).
- Raising the temp. of ambient water to control IHNV infection (Amend 1970)
- Immunization of the stocking material with toxicated antigen or *in vivo* virulent strain i.e. live antigen.
- Mass vaccination by immersing the stocking material in hyperosmotic solution containing the antigen (Amend & Funder 1976).
- Betaeins & vaccines for controlling infectious diseases of fishes (Eyer et al 1972).



THANK YOU