

Ichthyophonosis

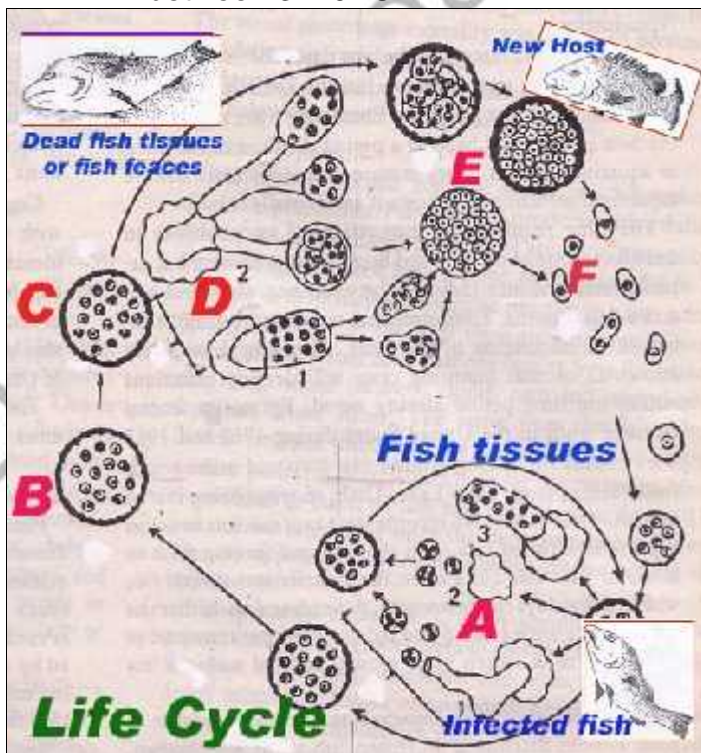
Swinging disease, Ichthyophonus Disease

Definition "One of chronic systemic granulomatous disease affect freshwater, brackish water, marine water, and aquarium fishes characterizing by systemic granuloma, emaciation, shallow skin ulcers, sandpaper-like texture to the skin, vertebral and spine curvature (Scoliosis & Lardiosis), swinging and chronic mortality in some endemic coldwater areas."

Etiology *Ichthyophonus hofri*, Obligatory fungal pathogen, resting stage (encysted stage) usually present in the host tissues, and discharged with its excreta, circular in shape, double walled each contains hundreds of endo-spores, 10~30µm (may be reached 250µm). The resting stage (**Quiescent cysts**) needs several months to ripe and become able to produce mature **amoeboblasts** as **infective** stage.

The germinating spores are flask shaped, with neck that consists of Aseptated hyphae that breaks through the outer wall.

The optimum temperature for outbreaks is 10° C, but it can be grow between 3~20° C.



| | A | B, C & D | E & F |
|-------------------|--|--|---|
| | Inside infected fish tissue | In dead fish tissues or feces of the infected fish | Alimentary tract of a new host |
| Life cycle | Reproduction occurs by: 1. Filamentium. 2. Direct endospores. 3. Plasmoium. | Formation of the resting stage or " Quiescent cysts " ↓ " Ripened cyst (C) " ↓ Germination (D) Plasmodial G. and/or Filamentous G. | Amoeboblast (E) Amoeboid embryos (F) |

Susceptibility Almost all fishes are susceptible to catch the disease; in particular cold-water fishes are more susceptible.

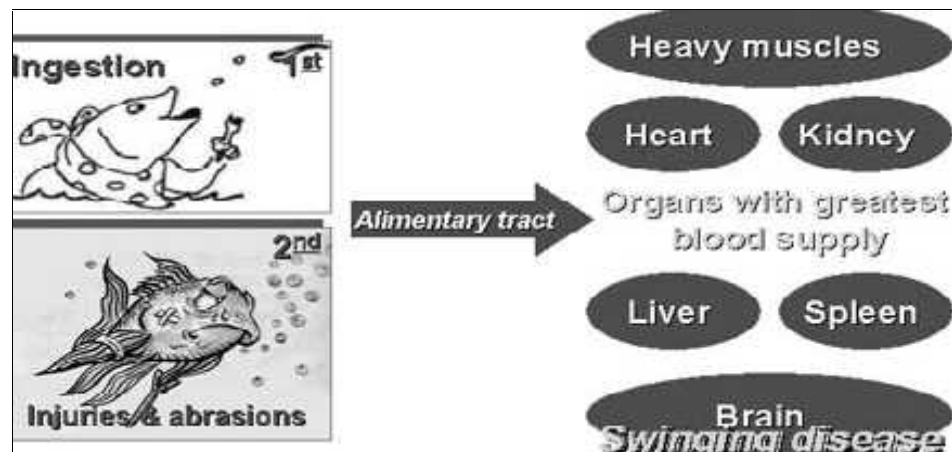
- Presence of large amount of organic matter and water blooms.
- Nutritional deficiencies and malnutrition.
- Injuries of the gills either by trauma or ectoparasites.
- Low temperature variation (3~20° C).
- Sub-lethal level of toxic substances in the water (pollution).

Predisposing Causes (stressors)

Source of infection

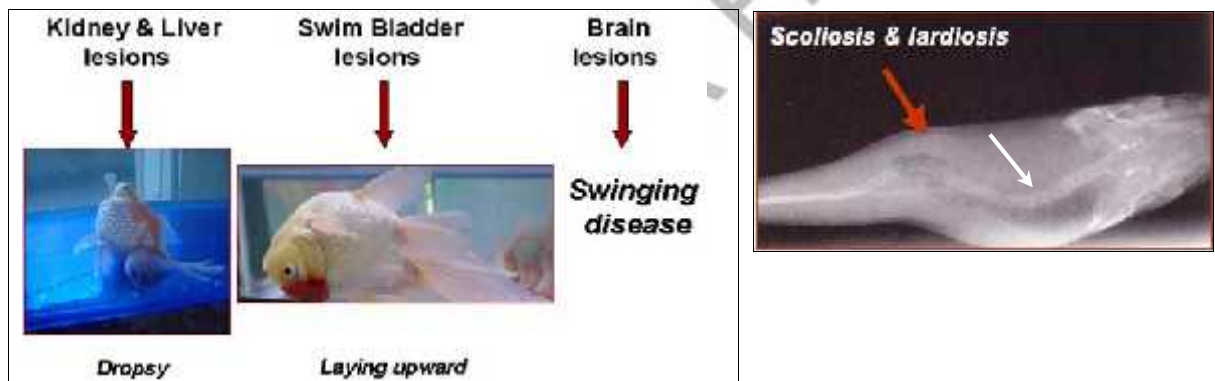
- Infected fishes (carriers) disseminating the infection with their excreta.
- Copepods and plankton organisms harboring the infective stage.
- Fish eating birds and mammals.
- Dead infected fishes.

Mode of infection & Pathogenesis



- Slight to moderate infected fish demonstrate no external signs.
- In advanced cases, the texture of skin become *sandpaper-like*, due to formation of granulomatus nodules in the dermal and sub-dermal layers.
- Some skin granuolomatus lesions may rupture leaving open skin.
- Convulsion and swinging due to brain lesions.
- Exophthalmia, erected scales and dropsy due to liver and kidney affections.
- Loss of equilibrium together with laying upward due to affection of the swim bladder.
- Scoliosis & lardiosis.
- Emaciated carcasses.

Disease signs



Postmortem Findings

- According to the severity of infection the gross lesions, darken skin, sandpaper texture of the skin, swollen kidney, liver, spleen, heart, brain, and gills together with presence of whitish to grayish granular nodules.
- Muscles have purulent necrotic lesions filled with cellular debris, muscle fibers, and the fungal elements.



Microscopic Pathology

Granular nodules within the infected tissues and inflammatory cells enclosed developing fungal stages in four layers that are,

epithelioid cells, giant Macrophages, lymphocytes, and a thin layer of fibrous tissue.

Diagnosis

I. Case history revealed that:

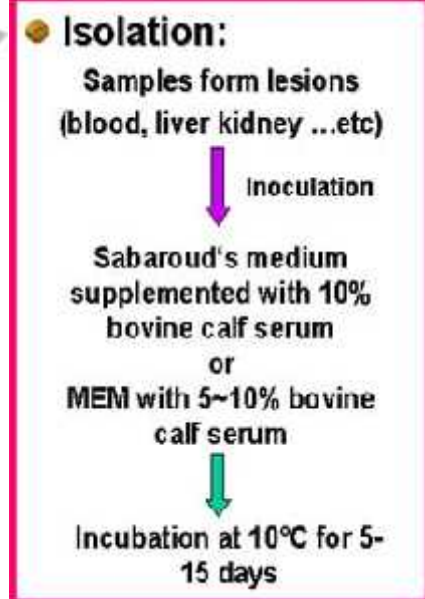
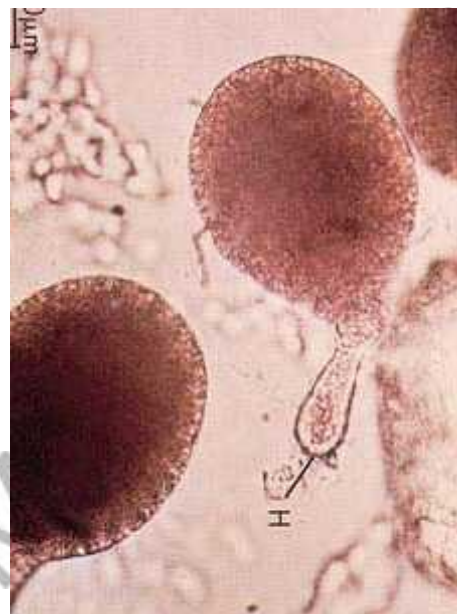
- Emaciation and abnormal swimming.
- *sandpaper-like* texture of the skin of the fish on handling.
- Season temperature variation.

II. The disease signs (as mentioned above).

III. P. M. findings.

IV. Laboratory diagnosis:

- Samples: different tissues including skin and internal organs from dead and dying fishes.
- Direct examination of gills tissue under microscope using compressed slide to detect the presence of fungal elements (spores and / or hyphae).



- Histopathological findings: As aforementioned.

Therapy & Control

Chemotherapy:

Up to date there is no therapy, for the reason, preventive hygienic measures are recommended to control the disease.

Good hygiene and removal of all stressors is the proper way for disease control this can be achieved through:

- Quarantine and restriction of the fishes from infected areas.
- Complete drainage of the pond and draying till the soil cracks.
- Perfect disinfection using quick lime 1.5 ~ 4.0 tons/acre.

- Avoid feeding of infected fish offal.
- Improve all hygienic measures.
- Proper disposal of dead and dying fishes either by burning or burying.
- Control of aquatic animals such as reptiles and amphibians.
- Proper disposal of infected fish if in small number.
- Proper drainage, drying, and disinfectant of the pond (Perfect disinfections using quick lime 1.5 ~ 4.0 tons / acre)

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