

An Overview on the Prominent Bacterial Diseases of Fishes with Zoonotic Potential: A Brief Review in the Perspective of Sustainable Aquaculture

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Abstract-- Bacterial diseases are responsible for epidemic outbreaks in aquacultured finfishes. Contaminated water, disposal of organic wastes in pond water, temperature fluctuations, stressful conditions during handling and transportation of the fishes are responsible for the disease outbreaks in fish populations. Bacteria affecting the fishes are mostly aerobic in nature and gram negative in character.

Keywords-- Aquaculture, Bacteria, Fish, Zoonoses

I. INTRODUCTION

i. *Aeromonas*, *Pseudomonas* and *Vibriosis*

Vibriosis, *Pseudomonas* and *Aeromonas* infections in the fishes cause haemorrhagic septicemia which is characterized by haemorrhagic peritoneum and viscera. It shows variable mortality rates. Ulcerative lesions are salient features in this infection and antibiotic treatment is recommended. *Aeromonas*, *Pseudomonas* and *Vibrio spp.* are the common etiology.^[1]

Aeromonas salmonicida, a gram-negative, non-motile rod, is the etiology for goldfish ulcer disease and furunculosis in salmonids and is a very important disease of koi and goldfish. Acute form of the disease is characterized by haemorrhagic lesions in the muscles, gills, fins, tail and internal organs.

Chronic forms are evident by tissue haemorrhages and necrosis with the formation of crateriform abscesses and liquefactive necrosis in viscera. Quarantine measures are recommended for controlling the spread of the disease. Commercial vaccines are available against *A. salmonicida*.^[2]

ii. *Edwardsiella*

Edwardsiella ictaluri is commonly associated with disease in channel catfish. Transmission of the infection occurs by direct contact with infected subjects and through contaminated water source. Clinical symptoms are evident with the formation of haemorrhagic lesions on skin and gills with enlargement of spleen. *Aeromonas* also infects the fishes under such predisposing conditions.^[3]

iii. *Flavobacterium*

Flavobacterium columnare causes Columnaris disease in warmwater finfishes. Strains of bacteria may be mild to highly pathogenic. Acute conditions leads to mortality of the population affected.^[4]

II. GRAM POSITIVE BACTERIAL INFECTIONS

Some of the bacterial etiologies are *Enterococcus*, *Lactococcus* and *Vagococcus*. These infections are generally chronic in nature with very low mortality. Species known to be susceptible include salmonids, sea bass, tilapia, sturgeon, and striped bass. Even many ornamental fishes are also susceptible to this infection. The disease is characterized by neurologic symptoms like spinning or spiraling in the water column. *Streptococcus iniae* has been isolated from tilapia and aquarium fish which is of zoonotic importance. The zoonotic gram-positive bacterium *Erysipelothrix rhusiopathiae* remains associated with rostral ulceration in cyprinids.^[5]

III. MYCOBACTERIUM INFECTIONS

Mycobacteriosis occurs in acute or chronic forms causing granulomatous and systemic disease of cultured and aquarium fishes.

Poor dissolved oxygen level and contamination of the water with organic wastes are predisposing factors for this infection. Etiology includes *Mycobacterium chelonae*, *M. marinum*, and *M. fortuitum*. The organisms are acid fast in nature and can be cultured in the laboratory by Middlebrook or Löwenstein-Jensen media after 3–4 weeks' incubation at 25°C. Symptoms include emaciation, ascites, exophthalmos and skeletal deformities with lesions in the form of skin ulceration and hemorrhages. Grossly the lesions resemble tumorous masses in viscera. Mycobacteria are responsible for causing zoonoses and there exists human health risk in handling the affected fishes by aquarists. Disinfection of the pond or aquarium can be done by bleaching and application of alcohol or phenolic compounds in optimum concentration.^[6-7]

IV. CONCLUSION

Confirmatory diagnosis can be done by bacterial isolation in selective media. Even antibiotic sensitivity tests are also recommended for arriving to a conclusion regarding the etiology involved.

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