

Prevalent Bacterial Diseases in Fishes and Treatment

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A field-based observational survey on prevalent bacterial diseases affecting fish in cultural ponds and ornamental aquariums was carried out in the Ranchi district of Jharkhand. Ranchi is recognized for its substantial fish production through both cultural ponds and the ornamental fish trade. The state has experienced an overall increase in fish production, particularly in aquaculture, with a remarkable rise from 14,000 metric tonnes annually in 2000 to 3.11 lakh metric tonnes in the year of 2023-24. Like humans and other animals, fish are vulnerable to a variety of diseases and parasites. The defences that fish utilize against these health threats can be classified into specific and non-specific mechanisms. Non-specific defences include the skin and scales, as well as the mucus layer secreted by the epidermis, which functions to trap microorganisms and prevent their growth. If pathogens breach these protective barriers, fish may trigger inflammatory responses that increase blood flow to the affected areas and mobilize white blood cells to eliminate the pathogens.

Specific defences, conversely, are specialized responses to particular pathogens identified by the fish's immune system, forming adaptive immune responses. In recent years, the adoption of vaccines has become popular in both aquacultures particularly in the ornamental fish sector. Bacterial infections are responsible for a range of fatal diseases in fish, such as furunculosis, columnaris, fin and tail rot, vibriosis, dropsy, cotton mouth disease, and tuberculosis.

1. Furunculosis Disease

Furunculosis is induced by *Aeromonas salmonicida* in goldfish and other cyprinids like salmonid species. This bacterium is non-motile and classified as gram-negative. The disease is commonly observed in fish inhabiting polluted

waters rich in decomposing organic matter.

Symptoms:

The initial signs of this disease include the emergence of boil-like lesions. Additional symptoms consist of bloodshot fins, blood discharge from the vent, haemorrhages in muscular and other tissues, and renal necrosis. The rupture of these boils facilitates the transmission of the disease among other fish and creates favourable conditions for fungal growth. Fish that are heavily infected with the bacteria often succumb in significant numbers.

Treatment:

- ❖ Isolate the severely infected fish from the pond and provide feed containing antibiotics such as Sulfonamides or Nitrofurans.
- ❖ Sulfonamides, including sulfadiazine or sulfaguanidine, should be administered orally with food at a dosage of 22 g per 100 kg of fish per day.
- ❖ Other antibiotics, such as Chloromycetin and Tetracycline, are most effective at a dosage of 5-7.5 g per 100 kg of fish per day. Additionally, disinfect the eggs using a 0.015% solution of Methiolate or a 0.185% solution of Acriflavin.
- ❖ Oxytetracycline 50-75 mg/kg fish weight/day for 10 days. Sulfamerazine 150-220 mg/kg fish weight/day for 10-14 days (Ravi and Jithender, 2007)

2. Columnaris Disease

Columnaris disease is attributed to the presence of *Chondroccus columnaris* and *Cytophaga columnaris* in various freshwater aquarium fish species. This condition is characterized by a long, slender, flexible, gram-negative slime bacterium belonging to the mycobacterial order. It is frequently linked to low oxygen levels in

the aquatic environment.

Symptoms: The disease initially manifests as greyish-white or yellowish-white patches on the fish's body. Over time, these skin lesions can progress to ulcerations, and the fins may exhibit fraying. The destruction of gill filaments ultimately leads to the decease of the affected fish.

Treatment:



- ❖ The introduction of 1 ppm copper sulphate into the pond has proven effective in managing this disease.
- ❖ For controlling this disease application of Tetramycin orally with food at a dosage of 3 g per 100 pounds of fish per day for a duration of 10 days is highly effective.
- ❖ A dip treatment in Malachite green (1:15000) for 10-30 seconds, followed by a one- hour bath in 1 ppm furanase, is also very effective in controlling this disease.



3. Fin and Tail Rot Disease

Fin and Tail Rot disease is caused by *Aeromonas salmonicida* an airborne pathogen and *A. hydrophila*, although protozoans and fungi may also play a major role. This condition is characterized by the appearance of white lines along the edges of the fins, with opacity typically progressing toward the base, leading to erosion and haemorrhaging.

Symptoms:

Initially, the fin rays become brittle and eventually break, resulting in the complete destruction of the fins. The infection may also extend to the body surface. Fin and tail rot is often associated with poor hygienic conditions in fish ponds and water pollution in natural habitats.

Treatment:

- ❖ Early-stage fin and tail rot can be mitigated by immersing fish in a 0.5% copper sulphate solution for 2 minutes.
- ❖ Control can be achieved using 10-50 ppm Terramycin and 1-2 ppm of benzalkonium chloride.

4. Vibriosis Disease

Vibrio bacteria are the causative agents of vibriosis disease in many fish species. This disease is likely to occur when fishes face low oxygen levels in their environment. These bacteria are small, gram-negative bacilli that are characteristically curved.

Symptoms: Affected fish display large, brightly colored, bloody lesions on their skin and muscles, along with haemorrhaging. Gills may bleed with slight pressure, and inflammation of the intestinal tract.

Treatment:

Sulfamethazine administered at a dosage of 2 g per 100 pounds of fish per day yields favourable outcomes. Additionally, a dosage of 3 to 4 g per 100 pounds of fish per day over a period of 10 days using Tetramycin also produces satisfactory results (Mishra et al., 2017).

5. Dropsy Disease

The disease is caused by *Pseudomonas punctata*. It is characterized by the accumulation of yellow fluid within the body cavity, protruding scales, and significant exophthalmic conditions, commonly referred to as "Intestinal Dropsy."

Symptoms: In cases of ulcerative dropsy, ulcers manifest on the skin, spinal deformities occur, and abnormal jumping is observed. This disease is considered fatal in aquaculture systems.



Control: Preventive measures include the removal and destruction of infected fish, followed by draining, drying, and disinfecting the pond with lime.

Treatment: Infected fish may be treated with a 5-ppm potassium permanganate dip bath for 2 minutes. Streptomycin and Oxy-tetracycline have shown effective results (Vajargah, 2022).

6. Cotton Mouth Disease

The causative agent of this disease is the filamentous bacteria known as Flexi bacteria.

Symptoms: The primary symptom is the formation of fungus-like tufts around the mouth.

Treatment: This condition can be addressed with antibiotics such as 10 ppm Chloramphenicol for a duration of 2 to 5 days and 0.3 ppm furazolidone for a prolonged bath.

7. Bacterial Gill Disease

Myxobacteria are responsible for this disease in fish.

Symptoms: Numerous bacteria are present in the swollen gill lamellae, leading to epithelial proliferation, with symptoms including a lack of craving.

Treatment: This disease is transmitted through water from infected fish and can be treated with 1-2 ppm Timson or 1 ppm Copper sulphate.

Reference:

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