



Bacterial and Fungal Diseases in Shellfish

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INTRODUCTION

Shellfish includes the exoskeleton bearing aquatic invertebrates that are mostly harvested from the salt water, although some are also known in fresh water. Among the several diseases reported in shellfish, bacterial and fungal diseases are discussed in this article.

BACTERIAL DISEASES

1. Black Gill Disease

- **Host:** All shrimp species at all stages (larvae, juvenile and adult).
- **Cause:** Heavy organic load on pond bottom due to faecal matter, uneaten feed and debris, siltation in high amount, deficiency of ascorbic acid and chemical contamination by Cu, Zn, Cd, O₃, NO₂, NH₃ and KMnO₄.
- **Symptoms:** Gills become reddish brown to black, gill filaments affected, dorsal body surface appears foggy, appetite loss, physical deformities and ultimately mortality.
- **Effects on host:** Accumulation of silt and hematopoietic cells in gill filaments leads to difficulty in respiration, blackening of gills and secondary infection by numerous pathogens.
- **Prevention:** Frequent water change, avoid overfeeding, removal of black soil after harvest, supplementation of ascorbic acid, flashing out of ponds and no discharge of heavy metals.

2. Black or Brown Spot Disease

- **Host:** All stages of *Penaeus monodon*.
- **Symptoms:** Brown or black spot on appendages, fragile appendages and carapace erosion.
- **Effects on host:** Erosion of exoskeleton moves progressively after the entry and multiplication of bacteria.

- **Cause:** Deteriorated water quality allows the rapid multiplication of *Vibrio* sp.
- **Prophylactic treatment:** Maintaining good quality of water by keeping organic load at low levels, adequate diet and preventing injuries on the exoskeleton that can otherwise become an entry site for pathogen.
- **Therapeutic treatment:** Erythromycin or oxytetracycline can be applied for 5 days at the rate of 500-1,000 mg/kg food treatment and 50-90 mg/l bath treatment.

3. Filamentous Bacterial Disease

- **Host:** *Leucothrin* sp.
- **Symptoms:** Fine, colorless thread like growths on body, gills turn black and filamentous bacteria cause respiratory problems.
- **Effects on host:** Gills blockage and discoloration, filamentous outgrowths interfere with locomotion.
- **Prevention:** Low stocking density and optimal water quality.

- **Treatment:** Application of 5-10 ppm KMnO_4 for one hour.

4. Septic Hepatopancreatic Necrosis

- **Host:** *P. monodon*
- **Symptoms:** Several portions of hepatopancreas degenerate and become black in color.
- **Cause:** Water quality deterioration allows the proliferation of *Vibrio* sp. in the culture water which then infects the hepatopancreas of the shellfish.
- **Treatment:** the habitat should be improved and scientific management practices should be used.

5. Luminous Bacterial Disease

- **Host:** The shellfish is affected at egg, larval or post larval period.
- **Symptoms:** Weak body form of larvae and color becomes opaque/white.
- **Prevention:** proper sanitation, siphoning debris from bottom, utilization of chlorinated water during spawning and the infected juveniles must be burned out.



Figure 1: Shellfish affected with bacterial disease

FUNGAL DISEASES

1. *Fusarium* Disease

- **Host:** *P. duorarum* and *P. japonicus*.
- **Pathogen:** *Fusarium* sp.
- **Symptoms:** Gills infested with fungal hyphae become black in color, lesions

developed on damaged tissue become melanized.

- **Effect on host:** The mode of entry of the pathogen is via the cracks in the exoskeleton. The pathogenicity can be due to the mycotoxin released by the

pathogen. Inflammatory response is shown by the host.

- **Treatment:** Good management practices are the only solution as there is no effective chemotherapy.

2. *Lagenidium* Disease (Larval mycosis)

- **Host:** *P. aztecus* and *P. setiferus* (eggs, larvae and early post larvae).
- **Pathogen:** *Lagenidium* sp.
- **Symptoms:** Initially hyphae visible only at appendages which later on spread to whole body.

- **Effect on host:** Rapid proliferation of fungus, motile spores when comes in contact of another shrimp undergo encystment. Thin exoskeleton allows for the development of germ tube to the body which promotes proliferation in the whole body. Mortality usually occurs within 2-3 days.
- **Treatment:** In larval rearing water, 0.006 mg malachite green should be added.