

Bacterial Diseases of Shrimp

1. Necrotizing hepatopancreatitis (NHP) —

- Initially referred to as Texas Pond Mortality Syndrome (McVey, 1993),
- NHP was first observed in Texas, USA, in 1985 in *Litopenaeus vannamei* (Pacific white shrimp) populations.

Causative agent:-

NHP-bacterium (NHPB). NHPB is a member of the α -subclass of proteobacteria and is a gram-negative, pleomorphic, obligate intracellular rickettsia-like pathogen. Target organ:- hepatopancreas tissue

Clinical signs:-

- 95% mortality,
- Reduced feed intake,
- Empty mid- and hind-gut,
- Heavy fouling from external parasites,
- Black gill,
- Soft shells, flaccid bodies, and lethargy.

Control and prevention:

- Formalin-
150-200 ppm – bath for 1 hr
50-100 ppm- for 4 hr in pond
- KMnO_4 -
1-5 ppm- bath for 1 hrs
2 ppm in pond
- Iodine component- 1-2 lit/ 1000 sq m in pond

2. Luminous disease

- An important disease of hatchery-reared *Penaeus monodon* and grow out pond (Lavilla-Pitogo et al., 1990).
- The disease usually occurs during the first month of culture and can cause more than 50% mortality (Leano et al., 1998).

Causative agent :- *Vibrio harveyi*

- In Ecuador, *V. harveyi* has been implicated with mass mortalities of *Penaeus vannamei* larvae, in the disease condition referred to as Bolitas negricans (Robertson and Austin, 1998).

Clinical sign:-

- Luminescent in dark,
- Juveniles in affected ponds were found near the edge of the ponds,
- Swam with their heads poised near the water surface,
- The hepatopancreas appeared dark in color

Control and prevention:

- Formalin-
150-200 ppm – bath for 1 hr
50-100 ppm- for 4 hr in pond
- KMnO_4 -
1-5 ppm- bath for 1 hrs
2 ppm in pond
- BKC-
1-2 lit/ 1000 sq m pond

3.Vibriosis

- Vibriosis is a serious threat to the aquaculture industry, responsible for massive mortality of cultured penaeids worldwide (Baticados et al. 1990).

This disease is mainly caused by specific strains of

Vibrio anguillarum,

V. alginolyticus,

V.parahaemolyticus,

V. harveyi,

V. penaeicida,

V. campbellii,

Vibrio act as opportunistic or secondary pathogens that can cause mortality from a few to 100% in affected populations under stress (Lightner 1988).

Severity of infection depends on

- Species
- Strain of Vibrio involved
- Stage of development and age of shrimp, and
- Environmental conditions(Jayasree et al., 2006)

Clinical sign:-

- The affected shrimp larvae show necrosis of appendages,
- Expanded chromatophores,

- Empty gut, absence of faecal strands and poor feeding.

Control and prevention:

- Formalin-
150-200 ppm – bath for 1 hr
50-100 ppm- for 4 hr in pond
- KMnO_4 -
1-5 ppm- bath for 1 hrs
2 ppm in pond
- Iodine component- 1-2 lit/ 1000 sq m in pond

4. Early mortality syndrome (EMS) or Acute hepatopancreatic necrosis disease (AHPND)

- AHPND was first reported in China in 2009 (FAQ, 2013)
- The Global Aquaculture Alliance, (2003) has estimated that losses to the Asian shrimp culture sector amount to USD 1 billion.
- Susceptible species are *Litopenaeus vannamei*, *Penaeus monodon* and *P. chinensis* (NACA, 2012; FAO, 2013)
- This syndrome typically appears in the first 30 days after the shrimp are released to ponds, and mortality can be as high as 100% (NACA, 2012; FAO, 2013).

Causative agent:-

Unique strain of *Vibrio parahaemolyticus*.(Tran *et al.*, 2013)

Target organ- Hepatopancreas

Clinical signs:-

- Pale to white Hepatopancreas (HP)
- Atrophy of the HP that may reduce the expected size of the organ by 50% or more.
- Black streaks or spots (due to melanin deposition from haemocyte activity) appear in the HP

Control and prevention:

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