Acute hepatopancreatic necrosis disease (AHPND)

Acute hepatopancreatic necrosis disease (AHPND) earlier known as early mortality syndrome (EMS) is the most important non-viral disease threat to the shrimp industry. The AHPND is usually characterized by the mass mortality during the first 35 days of culture. The disease is caused by a particular strain of *Vibrio parahaemolyticus* carrying *pir*A gene and *pir*B toxim genes.

Does India have threat of AHPND ?

The disease was first reported in China (2009). Soon, it created havoc among shrimp farming community in many East-Asian countries like Viet Nam, Malaysia and Thialand. In 2017, the disease has also been reported from Bangladesh. Till date the disease has not been reported from India. However considering its catastrophic nature, a high level surveillance and alert is required by both scientific organisations as well as farmers.

What is the causative agent of AHPND ?

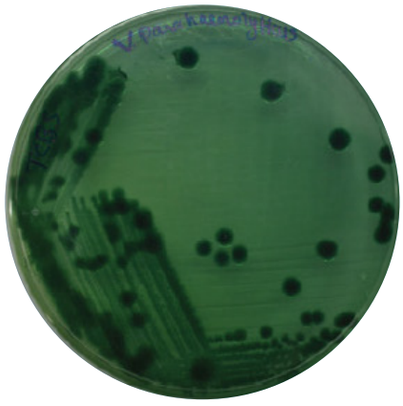
The AHPND is caused by a special strain of *Vibrio parahaemolyticus* carrying *pirAB* toxin (Photorabdus insect related toxin) on its plasmid. The *pirAB* gene synthesizes Pir-A and Pir-B insecticidal toxins. Both Pir-A and Pir-B toxins were found essential for causing AHPND. The recent reports suggest that few strains of other closely related bacterial species such as *V. campbellii* and *V. owenssii* also carry *pirAB* toxin plasmid and may cause AHPND.

Which species of shrimp are affected

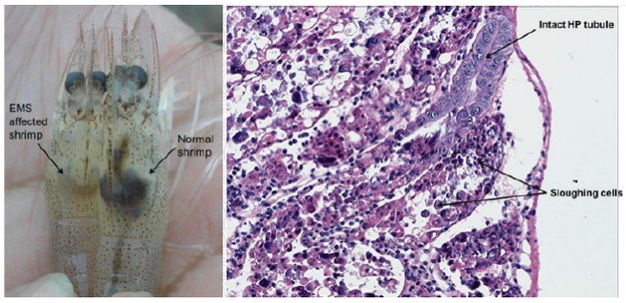
Both, black tiger shrimp (*P. monodon*) and American white leg shrimp (*P. vannamei*) are susceptible for AHPND infection.

What are the symptoms of AHPND/EMS?

- Unusually high mortality occur within about first 35 days of shrimp grow-out culture
- Moribund shrimp sink to bottom of the ponds
- Affected shrimp often have soft shells and partially full or empty gut
- Hepatopancreas (HP) often appears pale to whitish due to loss of pigment.
- The HP of shrimp is significantly shrunken, small or discoloured
- The HP does not squash easily between thumb and finger
- Sometimes black spots or streaks within the HP may be visible.



TCBS plates showing bacterial growth



AHPND affected shrimp and histopathology of hepatopancreas, Courtesy : Lac Tran

Diagnosis of AHPND

Apart from clinical signs, the disease is diagnosed by histopathological examination of hepatopancreas which reveals atrophy, discoloration and growth of bacteria in the hepatopancreas. The confirmatory diagnosis is done by PCR using recently developed AP4 primer methods which target Pir-A and Pir-B toxin gene.

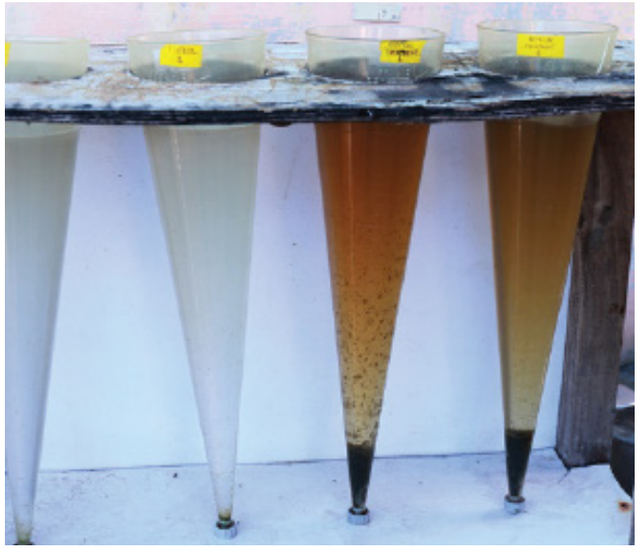
How to Prevent AHPND/EMS?

- Follow strict principles of pond preparation (drying, spraying lime, plowing, etc.). This will help to kill all the bacterial and viral pathogens from previous culture.
- Follow strict biosecurity measures. Use reservoir ponds, bird fencing etc. avoid use of water from common water body
- Test the larvae for AHPND/EMS by PCR before stocking ponds
- Stock larger sized shrimps in the culture ponds after nursery rearing of post larvae
- Avoid high stocking density.
- Monitor the ponds regularly, particularly during the early days after stocking
- Provide optimal quantity of feed, avoid excessive feeding
- Use of probiotic bacteria containing *Bacillus* and *Lactobacillus* during pond preparation and culture period may be helpful.
- Using biofloc technology in shrimp culture appears to be useful in preventing AHPND/EMS outbreak
- Co-culture of tilapia and shrimp or culture with tilapia induced green water would help reduce incidence of this bacterial disease
- Closed re-circulatory systems or zero water exchange practice will help in avoiding contamination

Farmers may consult CIBA to confirm any new disease

Farmers may contact CIBA when they come across symptoms similar to AHPND in grow-out ponds for detailed investigation and confirmation. Samples of affected shrimp showing signs of disease only suitably preserved would be useful for investigation. Dead and frozen samples cannot be processed. Since AHPND is not reported in India so far, it is necessary that EMS like cases require to be investigated thoroughly. On confirmation as positive AHPND, the pond water should be disinfected by chlorination within the pond. The treated water should only be discharged after proper disinfection and deactivation of the disinfectant.

Dried Pond bottom



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