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BACTERIAL AND VIRAL DISEASES IN SHRIMP LARVAE AND JUVENILES : THEIR SYMPTOMS, TREATMENT AND PREVENTIVE MEASURES

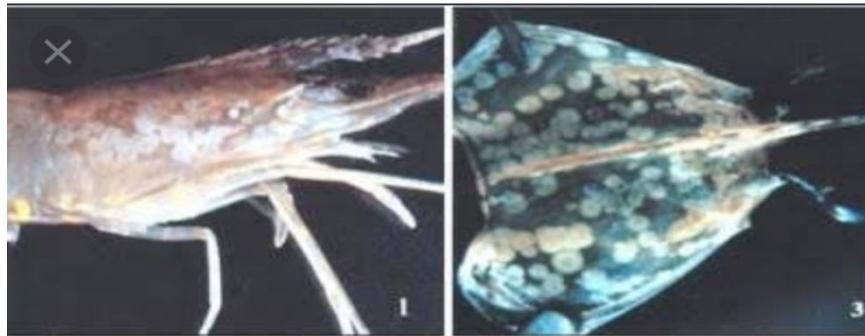
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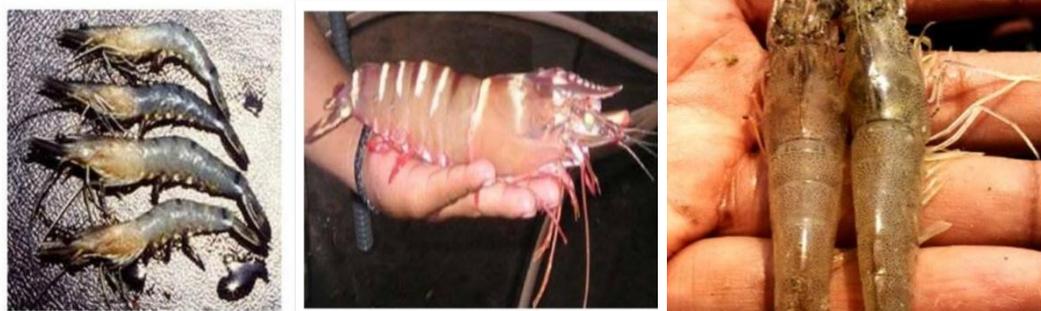
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Shrimp is not only among the world's most valuable aquaculture species, but also a species that encounter higher economic losses due to diseases. Shrimp has been one of the most successful species during the blue revolution. Aquaculture industry especially the shrimp industry has been witnessing decline in production in last few decades



White spot disease in shrimp

White spots on the cephalothorax



due to outbreak of various disease. The effect of these diseases are mainly observed in the early stages of life (juvenile and post larvae) leading to mortality and cleaning of entire stocked population. Series of practices has to be done in pre and post management stocking practices in order to prevent and overcome such viral and bacterial diseases.

Bacterial Diseases

1. Vibriosis

Among the vibrio species 14 of them have been reported in shrimp culture. They are *Vibrio harveyi*, *V. splendidus*, *V. orientalis*, *V. fischeri*, *V. pelagicus*, *V. ordalii*, *V. mediterrani*, *V. anguillarum* etc. Among these *V. harveyi* are considered to cause 80-100% mortality in *Penaeus monodon* hatcheries by releasing exotoxins.

★ Symptoms of Vibriosis in shrimp Larvae & juveniles

Symptoms of Vibriosis in post larvae and young juveniles are characterized by redness of pleopods, pereopods and gills. The post larvae shows mortality within 48 hours. The eyeball colour of infected shrimp changes into brown colour and leads to mortality in few days. In case of Shell disease caused by vibrio species lesions of cuticles are observed, these lesions are brown or black and also found on gills and appendages. Moreover many species of Vibrio like *harveyi* and *Splendidus* renders luminescence that make shrimp visible during night making them available for predators. In case of systemic vibriosis septic hemocytic nodules are formed in lymphoid organs, hepatopancreas, heart, muscles and in connective tissue of gills. Infected hepatopancreas are observed to be vacuolated showing reduced lipid and glycogen reserves. In *P. monodon* spheroids are formed in lymphoid organ.

★ Treatment for Vibriosis

Bacterial disease like Vibriosis is caused due to poor water quality and unhygienic environment. The main controlling factor is the continuous water management and improved sanitation that will ultimately reduce stress on shrimp larvae and juveniles. Proper site selection and pre stocking management is very essential. Water exchange at regular interval and partial harvesting. Since it is a bacterial disease probiotics like BioRemid- Aqua, ultrazyme PFS are supplied into the water directly or given via feeds. AscoSol-C an immuno-stimulant has also been found effective. In case of luminescent Vibriosis the eggs are washed by iodine and formaldehyde. Chlorine dioxide are used for cleaning the water column of *V. harveyi*. 40 ppm copper prevent the growth of *V. harveyi*, decreasing luminescence.

★ Preventive measures

Vibrio species get accumulated in water and in the biofilms that may be formed at the contacts surface of different structures at hatcheries and farms, resulting in damaging quality of water. Hence cleaning of hatchery, structure to be used and exchanging water at regular interval should be done. Regular monitoring of the shrimp should be done to cure injury. Feed should be checked while supplying. Keep the stressed ones separate for monitoring.

2. Brown Spot Shell Disease

Brown spot disease are caused by Vibrio species and pseudomonas species, mostly in freshwater prawn and Penaeus species cultured in India.

★ Symptoms observed

Brown to black spots and eroded area appears on the body surface and appendages of the infected shrimp. Exoskeleton appear eroded with stooped posture. Inflammation along with necrosis can also be observed.

★ Treatment for White spot shell disease

For cure the infected shrimp Tetramycin is Incorporated with the feed @ 0.45 mg per kg of feed and it is given for two weeks. Addition to this bath treatment with 0.05-1 mg malachite green per litre of water is also found beneficial.

★ Preventive measures

Regularly exchange of water at proper interval and cleaning the filter and tank properly helps in preventing this disease. Moreover avoiding overcrowding by removing the infected prawn prevents the mass mortality. Flake food should be supplied with within one month of opening. Equipments like net should be used after disinfecting.

Viral Diseases

1. Yellow Head Disease

Yellow head disease is caused by single ssr RNA, rod-shaped, enveloped Yellow head virus. This disease has reduced the shrimp consumption widely.

★ Symptoms observed

Infected post larvae and Juvenile shrimp seems to have pale body,swollen cephalothorax, yellowish gills and hepato-pancreas. Many of them appear to swim slowly near the surface of the dyke and stay motionless afterwards. Within 3 to 5 days from the onset of disease 100% of the population face mortality.

★ Treatment for Yellow Head Disease

There is no treatment for Yellow head disease is yet available.

★ Preventive measures

The most effective preventive measures for this virulent disease is the appreciate selection off post larvae. Time to time monitoring and avoiding horizontal transmission has to be practiced. Pond and equipment has to be disinfected with 30 ppm chlorine solution. The water quality should be well managed and the feed has to be well checked.

2. White spot Disease

It is caused by white spot syndrome virus that is a baculovirus like agent. It is also and enveloped rod to elliptical shaped virus. The susceptible species of this disease is on growing shrimp juvenile from 1 to 3 months old mostly.

★ Symptoms observed

The infected juvenile appears to have broken antenna and white spot ranging upto to 1 mm in size in the cuticle. Red discoloration may also be seen. Guts seem empty and swelling in lymphoid organ and fouling of the cuticular epibiont are observed. The infected juveniles aggregate motionless at the dyke. 80-100% of mortality can be observed within 2 to 7 days.

★ Treatment for White spot Disease

No treatment for this disease is yet found.

★ Preventive measures

The best preventive measure for white spot disease is the avoidance of infection by white spot syndrome virus. Also keep the culture environment contamination free.

3. **Monodon Baculovirus Disease**

The disease originating in Taiwan has been distributed worldwide and along the Indo Pacific coast of Asia is caused by enveloped, rod-shaped, double stranded DNA Monodon-type baculovirus in *Penaeus monodon*. It is observed at all life stages including post larval and young juveniles.

★ Symptoms observed

The shrimp faces anorexia and appears to be lethargic. The growth rate is retarded and the shrimp loses its appetite and has dark coloration. Infected shrimp have fouling of appendages and gills. Due to many other secondary infections the epithelial cells of hepatopancreas are damaged and lost.

★ Treatment for MBV disease

There has been no particular treatment so far available for this disease.

★ Preventive measures

Proper management and monitoring can help in controlling this disease. Although the best preventive method for this disease is the screening of the post larvae of monodon before stocking it into the pond.

4. **Hepato Pancreatic Parvo Virus Disease**

Around 7 penaeid shrimp species like *P.japonicus*, *P.esculentus* get this infection by hepatopancreatic Parvo-like virus.

★ Symptoms observed

The major symptom is the retarded growth rate in penaeid juveniles. The abdominal musculature seems to become opaque. Due to many other secondary infections the hepatopancreas becomes whitish and atrophied. The body gets discoloured and fouling of gills is seen.

★ Treatment for Disease

No treatment is available for hepatopancreatic Parvo virus disease.

★ Preventive measures

Similar to monodon baculovirus disease in this disease also the best preventive method is the screening of post larvae prior to stocking into the pond for culture.

Conclusion

The imbalance in the relationship of host pathogen and environment leads to disease. In case of all bacterial and viral diseases discussed for shrimp larvae and Juvenile have been the result of poor water quality and unhygienic environment. Bacterial disease has got treatment like potassium permanganate, copper sulphate and immuno-stimulants but for viral disease only preventive measures can be taken to avoid the outbreak of disease.

Reference

- Flegel, T.W., (2006). Detection of the major penaeid shrimp viruses in Asia, a historical perspective with emphasis on Thailand. *Aquaculture* 258, 1-33.
- Lightner, D.V., (1996). A hand book of shrimp pathology and diagnostic procedures for diseases of penaeid shrimp. World Aquaculture Society, Baton Rouge, LA, USA, 304.
- FAO (2012). Species Fact Sheets-Penaeus monodon (Fabricius, 1798).