

REVIEW ARTICLE

Disease Management for the Post Larvae of Fresh Water Cultivable Prawn, *Macrobrachium malcolmsonii* (H. Milne Edwards, 1844)**P. Soundarapandian* and D. Varadharajan***Centre of Advanced Study in Marine Biology, Annamalai University, Parangipettai – 608 502, Tamil Nadu, India*

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ABSTRACT

Macrobrachium malcolmsonii is the second largest among fresh water prawns and has a great potential for culture in Tamil Nadu. More yields can be obtained by stocking of good quality, healthy and disease free hatchery produced post larvae. The common diseases occurring in the post larvae include infestation of ciliates, bacterial, fungal and viral diseases as well as MCD (Midcycle Disease), EED (Exuvia Entrapment Disease) and IMN (Idiopathic Muscle Necrosis). All these diseases can be effectively treated and controlled in the hatchery itself for producing healthy post larvae. The disease management largely depends on the use of disinfected water free of pathogens, good quality feeds and general hygiene.

Key words: Monsoon river prawn, disease, symptoms, culture management.**INTRODUCTION**

The freshwater prawn, *Macrobrachium malcolmsonii* is second largest and commercially important fresh water prawn of India, Bangladesh and Pakistan. It is reported to be a possible candidate species for culture and is highly suitable species for both mono and polyculture with carps in Tamil Nadu^[1,2]. This is competed promisingly with other freshwater prawns in several respects like growth rate, feeding habits, lower cannibalistic tendencies and cultivability in impounded freshwater, euryhaline adaptability in breeding, fairly good fecundity, larval hardiness in withstanding starvation and heavy turbulence^[3]. It is generally claimed that *Macrobrachium* spp are less susceptible to disease. However, shrimp larval stages are more susceptible to diseases as a result of their high stocking densities in hatcheries with heavy organic loading associated with daily feeding^[4]. The known diseases of *M. malcolmsonii* are caused by ciliates, bacteria, fungi, viral and nutritional deficiencies^[5], as well as Mid Cycle Disease (MCD), Exuvia Entrapment Disease (EED) and Idiopathic Muscle Necrosis (IMN). All the disease causing organisms are probably present in the rearing water and only affect post larvae when they are stressed due to inadequate feeding, overcrowding and poor water quality. In running a successful hatchery, good management and monitoring measures are to be

taken care so to get a healthy and good quality seeds.

MID CYCLE DISEASE (MCD)

Mid cycle disease is so called because it occurs roughly at the mid cycle of the larval phase. Mortality sets in around the end of last third of the larval stage of larval rearing cycle, say day 10^[6]. Mortality increases quickly for 3-5 days, then ceases or dramatically decreases. Post larval production may be reduced to 1 or 2 PL/L.

Symptoms

- The larvae swim weakly, often in a corkscrew or spiral manner,
- Loss of appetite and poor feed consumption,
- Moribund individuals are eaten by the healthy larvae,
- The larvae turn bluish gray.

Control Measures

MCD does not respond to any tested antibiotics. Under this situation it is advisable to discard the infected larvae and disinfect the affected tank. The disease condition can be reversed by reducing stocking density and improving pond husbandry and sanitation^[7]. During this period, larvae should be provided with good quality *Artemia* nauplii^[8]. If the infection spreads through the hatchery, general disinfection through washing the tanks, filters and equipment with formalin and / or

chlorinated water, followed by drying for at least one week is necessary.

EXUVIA ENTRAPMENT DISEASE (EED)

This disease affects stage XI larvae and early post larvae. It is also known as the metamorphosis moult mortality syndrome. Mortality usually ranges from 20-30% [7,8]. Nutritional deficiencies are the principle cause of this disease.

Symptoms

- Infected larvae are unable to free their appendages, eyes or rostrum from their exuviae during moult and become entrapped.
- The larvae generally have malformed appendages and die shortly after moult.

Control Measures:

Adding lecithin to the prepared feed may help to prevent or reduce EED [9].

IDIOPATHIC MUSCLE NECROSIS (IMN)

This disease is also known as white muscle disease, muscle necrosis, spontaneous muscle necrosis, muscle opacity or milky prawn disease and causes massive larval mortalities in hatcheries. IMN causes mortalities up to 40 to 60% in the post larvae [10].

Symptoms:

- This disease appears as focal and multifocal diffused opacity of striated muscle [9-11].
- This disease is considered to be associated with environmental stressors including salinity and temperature fluctuations, hypoxia, hyper activity and overcrowding [10, 11].
- IMN may occur within 1 or 2 days following stocking in production ponds due to stressful conditions.
- [12] suggested that the prevalence of IMN in a population of PL could serve as a useful indicator of their general health.

Control Measures

In hatcheries, in general, if the necrosis has not progressed extensively, the disease can be reversed by changing the water [9]. There is no effective treatment for this disease besides minimizing the environmental stressors. IMN may occur within one or two days following stocking in production ponds due to stressful conditions. Stocking PL in nursery ponds before releasing into grow-out ponds may reduce this problem.

INFESTATION BY MICROORGANISMS

Infestations by microorganisms including microscopic epibiont disease (MED) by a variety of ciliates, which are found attached to the exoskeleton of larvae, are *Zoothamnium* sp., *Epistylis* sp., *Vorticella* sp. and *Acineta* sp. Bacterial Necrosis (BN) caused by bacteria, and the diseases caused by fungi and virus won't cause much damage to the older larvae and post larvae.

Microscopic Epibiont Disease:

Symptoms: A variety of Protozoa may be found attached to the exoskeleton of the larvae (*Zoothamnium* sp., *Epistylis* sp., *Vorticella* sp. and *Acineta* sp). It brings slight opaqueness in body colour. Some species may attack the eggs of brood stock. Others interfere with the feeding and moulting of larvae.

Control Measures: These can be generally controlled by formalin treatment. Treatment with 20-30 ppm formalin for 24h in a static bath is effective and safe in controlling larval *Zoothamnium* infection [13]. Repeated treatment of 2-ppm acetic acid for 1-minute dip is recommended for *Epistylis* sp.

Bacterial Necrosis:

Symptoms:

Larvae affected by this disease turn bluish and stop feeding and the weak larvae sink to the bottom. Brown spots may appear on the antennae and newly formed appendages. The intestinal tracts become empty. Small black spots and lesions are seen on the exoskeleton.

TREATMENT

All these diseases can be effectively treated and controlled in the hatchery itself for producing healthy post larvae. The disease management largely depends on the use of disinfected water free of pathogens, good quality feeds and general hygiene. MCD does not respond to any tested antibiotics. The best procedure is to discard the larvae and disinfect the infected tanks. If the infection spreads through the hatchery, general disinfection may be required. Disinfection requires thorough washing of all tanks, filters and equipment with formalin and/or chlorinated water, followed by drying for at least one week. [7] reported that, the disease can be controlled by low stocking density and improving pond husbandry and sanitation. It is believed that nutritional deficiencies are the principle cause of EED. Adding lecithin to the prepared feed may help to prevent or reduce EED [9]. There is no effective

treatment for Idiopathic Muscle Necrosis (IMN) besides minimizing the environmental stressors. Stocking PI in nursery ponds before releasing into grow-out ponds may reduce this disease. The ciliates can be controlled by either formalin or acetic acid treatments. Bacteria, fungi and virus can be effectively treated with antibiotics like, Bipenicillinstreptomycin, Furnace, Erythromycin Phosphate, Chloramphenical and Novobiocin^[9].

MANAGEMENT MEASURES

The good quality seeds can be obtained by good management measures. Maintaining stable water conditions in the hatchery is what ensures successful larval rearing. If any, infection spreads through the hatchery, general disinfection through washing the tanks, filters and equipment with formalin and/or chlorinated water, followed by drying for at least one week is necessary.

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