An outbreak of SEMBV and MVB infections in cultured *Penaeus monodon* in Tamil Nadu

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ABSTRACT

An outbreak of SEMBV and MBV infections in 40 days postlarvae of *Penaeus monodon* in Tamil Nadu is reported. The particulars pertaining to the outbreak, viz. clinical signs and symptoms, gross and microscopic lesions are described. The presence of SEMBV by TEM as well as light microscopy has been established.

Systemic ectodermal and mesodermal baculoviral (SEMBV) disease is caused by a non-occluded baculovirus belonging to the family Baculoviridae. This disease was first identified by Wongteerasupaya et al. (1995). The virus was reported to be one of the penaeid primary pathogenic viruses causing widespread epizootics with high mortality rate. Monodon baculovirus (MBV) infection is another widely prevalent disease, particularly affecting juveniles of *P. monodon* (Lightner et al., 1983 and Fegaon et al., 1991). Sundararaj et al. (1996) have recorded MBV infections in Tamil Nadu, but reports on simultaneous occurrences of both of these pathogenic viruses causing high mortality are sparse. This paper puts on record an outbreak of SEMBV and MBV infections in *P. monodon* in Tamil Nadu.

The materials for this study comprised of 40 days postlarvae of *P. monodon* collected in an outbreak in a commercial shrimp farms, located near Pudukottai, Tamil Nadu, during 15-19 July, 1996. Information pertaining to the outbreak were collected. Tissue pieces as well as whole organs were preserved in Davidson’s fixative (Humason, 1972) for histopathological studies, processed as per standard technique and thin sections of 5 μm thickness were cut and stained with haemotoxylin, eosin and phloxin stains. Similarly tissue pieces were also fixed in 2.5% cold glutaraldehyde in 0.1 M phosphate buffer (pH 7.2) for transmission electron microscopy. They were embedded in epon and ultrathin sections were cut using diamond knife and stained by uranyl acetate and lead citrate.

The epizootic resulted in 90% mortality in 5 days. At the time of outbreak the day temperature of pond water was 32°C, salinity 35 ppt, pH 8.5 and

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dissolved oxygen 5.4 ml/l. The stocking density was 1,46,000/a.

The salient clinical signs noticed in the larvae were frequent surfacing and rolling over to the bottom of the pond, erratic movements and reduced feed intake. Majority of the affected shrimps had small greyish white foci of less than 1 mm in diameter on the exoskeleton, predominantly on the carapace. In a few cases the hepatopancreas was greyish to creamy white in colour. Both exoskeleton and gills harboured epicommensals like *Zootammum* sp. In a few cases gills revealed a few dark spots.

Histologically, multifocal necrosis were observed in a wide range of tissues of mesodermal and ectodermal origin. Necrosis was evident in the cuticular epidermis, hepatopancreas, gills, gut epithelium, lymphoid organ and muscles. Haemocytic infiltration was also noticed in these organs. In general, the affected cell was enlarged with hypertrophied nucleus containing characteristic intranuclear eosinophilic inclusion bodies. They were observed in gill epithelium (Fig. 1) along with *Zootammum* sp. also (Fig. 2). Similar inclusions were noticed in the heart muscles (Fig. 3) as well as in cuticular epithelium (Fig. 4). In some cases these eosinophilic inclusion bodies were seen

Fig. 1. Gill showing intranuclear eosinophilic inclusion bodies. H & EP x 800.

Fig. 2. Gill showing both inclusion bodies as well as *Zootammum* sp. H & EP x 80.

Fig. 3. Heart muscle showing necrosis and inclusion body (H & EP x 800).

Fig. 4. Cuticular epithelium showing intranuclear eosinophilic inclusion bodies. H & EP x 800.
along with basophilic inclusions and the transition from eosinophilic to basophilic staining character could be well appreciated (Fig. 5). Apart from these lesions the tubular epithelial cells of hepatopancreas also revealed presence of numerous occlusion bodies characteristic of MBV (Fig. 6). These occlusion bodies were also seen within the lumen of hepatopancreatic tubules.

Wongteerasupaya et al. (1995) have observed haemocyte infiltration of gills, hepatopancreatic haemal sinuses and wide spread focal necrosis in tissues of ectodermal and mesodermal origin with intranuclear eosinophilic inclusion bodies which, during later stages, became lightly basophilic. Similar lesions were recorded in the present outbreak also. Electron microscopic examination of tissue samples obtained from gills revealed epithelial cells with markedly hypertrophied nuclei containing elliptical, enveloped virions (Fig. 7) characteristic of SEMBV. The virions which were both tangentially and crossly cut, showed well developed trilaminar envelope. The ultrastructural features of virions observed in the present study simulated those reported by Wongteerasupaya et al. (1995) who described the rod shaped to elliptical enveloped virions measuring 276 x 121 nm excluding the appendage, and placed this virus in the family Baculoviridae, sub family Nudibaculo virions as Pm NOB11 and named it as SEMBV.

The clinical signs, mortality pattern, gross lesions and histomorphological features of various tissues clearly indi-
cated the presence of both SEMBV and MBV infections. Further, the transmis-

sion electron microscopy revealed the characteristic features of SEMBV implic-
iating that this virus is also capable of producing systemic fatal disease and high mortality among commercial shrimps.

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