

Satit Prasertsri 2010: Microsporidiosis in Cultured Pacific White Shrimp (*Litopenaeus vannamei* Boone, 1931). Doctor of Philosophy (Fisheries Science), Major Field: Fisheries Science, Department of Fishery Biology. Thesis Advisor: Associate Professor Chalor Limsuwan, Ph.D. 110 pages.

Microsporidiosis in cultured Pacific white shrimp (*Litopenaeus vannamei*) which emphasis on severity of this disease on growth, survival rate and seasonal variation on the prevalence of infection was studied. Application of calcium hypochlorite for water preparation prior to stocking postlarvae (PL) as the prevention measure was also studied. Morphology of microsporidia and histological changes of infected shrimp were examined under light microscopy, scanning electron microscopy (SEM), and transmission electron microscopy (TEM). Experimental transmission of microsporidia was carried out in laboratory condition to determine whether fishes can become intermediate host of this parasite. Microsporidian infection was investigated in three earthen ponds (8000 m²) with the stocking density of PL10 at 125 PL/ m² and the salinity was 30-35 parts per thousand (ppt). Shrimp were first observed to be infected with microsporidian parasites between 20-25 days after stocking. The highest prevalence of infection between 25-28 % was found at day 60 in all growthout ponds. Subsequently, the prevalence of infection decreased until the shrimp were harvested at day 120 when only 3-5 % of shrimp remained microsporidian infection from the three rearing ponds. Shrimp infected in both hepatopancreas and abdominal muscle had the lowest weight which was significantly different ($P<0.05$) from shrimp infected in only abdominal muscle and the uninfected shrimp. The culture period between October 2007 to February 2008 had the highest prevalence of microsporidian infection at 27 % which higher than the culture period between October 2007 to February 2008 with the highest infection was only 16 %. The percentage infection probably due to lower temperature during the winter and environmental changes from the northeast monsoon season which affected intermediated host of this microsporidian. The efficacy of calcium hypochlorite (60 % active ingredient) at 18 mg/l for water treatment before stocking PL at the density of 80 PL/ m² into five growthout ponds (6,400 m²) was compared to five control ponds without calcium hypochlorite treatment. Results showed that the average highest percentage of microsporidian infection in the treatment pond was 5 % significantly lower than 25 % in the control ponds ($P<0.05$). Examination of fresh smear spores with light microscopy revealed each sporophorous vesicle containing eight spores which had an ellipsoidal or oval shape. Histopathological changes in diseased shrimp revealed that white masses of microsporidian parasites had partially replaced the hepatopancreas, stomach, lymphoid organs, heart, gills, antennal gland, hemopoietic tissue and abdominal striated muscle but there were no apparent host encapsulation or xenoma formation. The transmission electron microscopy revealed that this microsporidian spores had the polar filament and eight coils at the end of spore. Description of this characteristic indicate that this microsporidia belonging to *Thelohania penaei* and confirmed by PCR method which gave positive result. Microsporidiosis could not be transmitted experimentally to PL10 after fed with microsporidian infected shrimp or feces from fishes (species found in reservoir of infected-farm) that fed infected shrimp for two months. This study indicated that fish may not be the first intermediate host of this microsporidian parasite. In conclusion, this study revealed that the seasonal variation affected the prevalence of microsporidiosis. This disease had negative effect on growth and survival rate of shrimp. Calcium hypochlorite at the concentration of 18 mg/l which is commonly used for water treatment and eradication of wild crustaceans before stocking PL significantly reduced the prevalence of microsporidian infection.

Student's signature

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