

Project title: Integrated Cultivation of Sand worm (*Perinereis nuntia*) and Harpacticoid Copepod in Commercial Culture System (1st phase): Biology and Cultivation of Harpacticoid Copepod

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Abstract

To establish an integrated cultivation system of harpacticoid copepods and sand worm (*Perinereis nuntia*), the biology of harpacticoid copepods with emphasis on environmental factors affecting survival of the copepods in a laboratory was conducted at Sichang Marine Research and Training Station, Chonburi Province, Thailand. Among six species of harpacticoid copepods from 4 genera, 4 families collected from macroalgae *Padina* sp. and *Amphiroa* sp., the copepod *Tigriopus* and harpacticoid copepod from family Laophontidae were the dominant species. Under the mono-species culture, egg-bearing female copepod grew and produced larvae which lived up to the copepodid stage. The multi-species of copepods cultured in a small aquarium with fine sand and seaweed could grow to complete life cycle as indicated by the presence of nauplii, copepodids and newly egg-bearing female copepods.

Survival rates of harpacticoid copepods in the laboratory scale were determined under various conditions of temperature, salinity, food type, grain size and initial density. After 7 days of the experiments, harpacticoid copepods rearing at 30 °C showed the highest survival rate of 46.7±10.1 % followed by the copepods cultivated at 25 °C (21.7±18.9 %). All harpacticoid copepods could not survive when cultivated at 35 °C toward the end of the experiment. Our harpacticoid copepods can survive in brackish water to hyper-saline water between 10 PSU and 40 PSU. However, they showed the highest survival rate (42.8±8.6 %) in 30 PSU seawater and the survival rates of 35.8±16.3 %, 33.3±12.6 % and 26.7±23.1 % were recorded from copepods cultured in 20, 40 and 10 PSU seawater, respectively. Moreover, over 60 % of copepods were dead within 1 hour in freshwater (0 PSU) and all of them were dead within 3 days. Harpacticoid copepods fed by combination of microalgae including *Isochrysis galbana*, *Chaetoceros calcitrans* and *Tetraselmis gracilis* showed high survival rate (44.4±11.7%) in comparison by the treatments fed with mono-species of algae. There was no significantly different (P -value>0.05) in survival rate of copepods rearing in coarse sand, fine sand, vermiculite, sandy clay and without substrate conditions. However, harpacticoid copepod showed preference for fine grain particle since the survival rates of 76.11±2.36 % and 68.33±7.07 % were obtained from the copepods reared in sandy clay and fine sand substrate, respectively. An initial culture density of 100-500 individuals/Litre was the optimal condition for culture of harpacticoid copepods under laboratory scale where the resulting survival rate of more than 50 % was noticed toward the end of the experiment. In addition, co-culture of sand worms and harpacticoid copepods lead to more increased in body weight of sand worm compared to that fed by only commercial food.

Keywords: culture, sand worm, harpacticoid copepod, physical conditions