

ECOLOGY OF MARINE HARPACTICOID  
COPEPOD AND DISTRIBUTION OF POTENTIAL  
HARPACTICOID COPEPOD CYST IN THE  
COASTAL WATERS OF PENINSULAR MALAYSIA

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**MAY 2010**

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Harpacticoid copepod has been widely used as tools for environmental monitoring and it is considered as a good candidate for live food source in mariculture industry. However, the study on ecology of tropical harpacticoid copepod has not been well studied and still limited. The present study will provide the information on the distribution and environmental factors which affecting the harpacticoid copepods and potential harpacticoid copepod cysts distribution in the coastal waters of Peninsular Malaysia as a whole. This is the first report on the distribution of harpacticoid copepod at pre-diapause stage in tropical area.

An ecological study of harpacticoid copepod was carried out in the East Coast areas of Peninsular Malaysia at Setiu lagoon, Pekan beach and Balok beach. In the West Coast, the sampling areas include Lido beach, Sungai Pulai estuary and Port Dickson beach. The sediment samples were collected

during the lowest tide using a hand core with 3.6 cm inner diameter and environmental parameters; such as salinity, temperature, dissolved oxygen and pH were measured *in situ* at each sampling location. The total organic carbon (TOC), chlorophyll *a* concentration and grain size of the sediment have been analysed in laboratory.

The potential harpacticoid cyst has been recorded at Setiu lagoon, Balok beach, Pekan beach and Lido beach. Their occurrence and distribution were observed as the response of harpacticoid copepods towards the environmental stress condition in their habitat. Salinity, temperature, dissolved oxygen, dessication and sediment type were found to induce the occurrence of potential harpacticoid cyst with orange oil droplet. The mean density of the potential harpacticoid copepod cyst recorded lowest at Setiu lagoon (2.2 to 60.5 ind.10 cm<sup>-2</sup>) and highest at Lido beach (2.2 to 158.3 ind.10 cm<sup>-2</sup>). Their density at Balok beach (4.5 to 103.5 ind.10 cm<sup>-2</sup>) slightly lower compared to Pekan beach (13 to 149 ind.10 cm<sup>-2</sup>).

Harpacticoid copepod mean density recorded highest at Balok beach (9 to 825 ind.10 cm<sup>-2</sup>) and Pekan beach (122 to 1057 ind.10 cm<sup>-2</sup>). At Setiu lagoon, the significant differences in the distribution of harpacticoid copepod density (11.2 to 144.7 ind.10 cm<sup>-2</sup>) was significantly related to grain size ( $p < 0.01$ ), salinity ( $p < 0.01$ ) and temperature ( $p < 0.05$ ). At Lido beach, their significant differences in the distribution (4 to 145.1 ind.10 cm<sup>-2</sup>) was significantly related to salinity ( $p < 0.05$ ) and concentration of chlorophyll *a* ( $p < 0.05$ ). Meanwhile at Sungai Pulai estuary (21.5 to 115.6 ind.10 cm<sup>-2</sup>), the

density of harpacticoid copepod was significantly related to salinity ( $p < 0.01$ ) and chlorophyll a ( $p < 0.01$ ). The mean density of harpacticoid copepod was recorded lowest at Port Dickson beach (26.5 to 80.1 ind.10 cm<sup>-2</sup>) and it was significantly related with salinity ( $p < 0.01$ ). The spatial and temporal distribution pattern of harpacticoid copepod community in coastal waters of Peninsular Malaysia was significantly affected by sediment grain size, salinity, temperature and food availability.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk ijazah Master Sains.

**EKOLOGI HARPACTICOIDA COPEPODA MARIN DAN TABURAN  
POTENSI SISTA KOPEPOD DI PERAIRAN SEMENANJUNG MALAYSIA**

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Harpacticoida copepoda telah digunakan secara meluas sebagai alat untuk pemantauan alam sekitar dan ianya dianggap sebagai calon yang baik untuk dijadikan sumber makanan hidup dalam industri marikultur. Namun, kajian terhadap ekologi harpacticoida copepoda tropika masih belum dikaji dengan terperinci dan kajiannya masih kurang. Kajian ini akan memberikan maklumat mengenai taburan dan faktor persekitaran yang mana mempengaruhi taburan harpacticoida copepoda dan potensi sista harpacticoida di perairan Semenanjung Malaysia secara keseluruhannya.

Kajian ekologi harpacticoida copepoda telah dijalankan di kawasan Pantai Timur lagun Setiu, pantai Balok dan Pekan. Kawasan pensampelan di kawasan Pantai Barat termasuklah Pantai Lido, muara Sungai Pulau dan pantai Port Dickson. Pensampelan sedimen dilakukan semasa air surut dengan menggunakan tiub pengorek PVC yang bergaris pusat 3.6 cm dan parameter persekitaran; seperti kemasinan, suhu, oksigen terlarut dan pH

diukur bacaannya secara *in situ* pada setiap lokasi pensampelan. Jumlah karbon organik (TOC), kepekatan klorofil *a* dan saiz butiran sedimen dianalisis di dalam makmal.

Potensi sista harpacticoida telah direkodkan di lagun Setiu, pantai Balok, Pekan dan Lido. Kejadian dan taburan mereka adalah didapati daripada tindak balas terhadap keadaan tekanan persekitaran di habitat mereka. Kemasinan, suhu, kepekatan oksigen terlarut, kekeringan dan jenis sedimen didapati mencetuskan kejadian potensi harpacticoida copepoda yang mempunyai butiran oren berminyak. Purata kepadatan potensi sista harpacticoida direkodkan terendah di lagun Setiu (2.2 to 60.5 ind.10 cm<sup>-2</sup>) dan tertinggi di pantai Lido (2.2 to 158.3 ind.10 cm<sup>-2</sup>). Kepadatan mereka di pantai Balok (4.5 to 103.5 ind.10 cm<sup>-2</sup>) sedikit rendah berbanding dengan pantai Pekan (13 to 149 ind.10 cm<sup>-2</sup>).

Purata kepadatan harpacticoida copepoda direkodkan tertinggi di pantai Balok (9 to 825 ind.10 cm<sup>-2</sup>) dan Pekan (122 to 1057 ind.10 cm<sup>-2</sup>). Hasil kajian di lagun Setiu, mendapati perbezaan beerti pada taburan kepadatan harpacticoida copepoda (11.2 to 144.7 ind.10cm<sup>-2</sup>) adalah berkait rapat dengan saiz butiran sedimen ( $p < 0.01$ ), kemasinan ( $p < 0.01$ ) dan suhu ( $p < 0.05$ ). Hasil kajian di pantai Lido juga menunjukkan, perbezaan beerti pada taburan kepadatan mereka (4 to 145.1 ind.10cm<sup>-2</sup>) adalah berkait rapat dengan kemasinan ( $p < 0.05$ ) dan kepekatan klorofil *a* ( $p < 0.05$ ). Manakala di muara Sungai Pulai, kepadatan harpacticoida copepoda adalah berkait rapat dengan kemasinan ( $p < 0.01$ ) dan kepekatan klorofil *a* ( $p < 0.01$ ). Purata



kepadatan harpacticoida copepoda direkodkan terendah di pantai Port Dickson (26.5 to 80.1 ind.10 cm<sup>-2</sup>) dan berkait rapat dengan kemasinan ( $p < 0.01$ ). Taburan komuniti harpacticoida copepoda mengikut tempat dan ruang di perairan Semenanjung Malaysia adalah dipengaruhi oleh butiran saiz sedimen, kemasinan, suhu dan sumber makanan.

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