TAXONOMY AND ULTRASTRUCTURE OF PHYTAL HARPACTICOID COPEPODS FROM MALAY PENINSULA

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Dedication

To Mohd Noor Hafiz, from whom I have no secrets. Well, not many...

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu (UMT) is fulfillment of the requirement for the Degree of Master of Science.

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Aquatic vegetation is the main breeding area for marine life, and harpacticoida are often dominant taxon in marine algae. They are associated with sessile epibenthic macrofauna and microphytes, where they can make up a large of the phytal meiofauna. Thus, a study on taxonomy and ultrastructure of phytal harpacticoid copepods was conducted in Malay Peninsula. The objectives of this research were to do a taxonomic identification of the dominant species of harpacticoid copepods associated with seaweed and seagrass in Malay Peninsula; and to determine the ultrastructure of phytal harpacticoids using Scanning Electron Microscope (SEM).

Field sampling was carried out from May 2005 to April 2006 at 3 different areas. They were Pulau Bidong, Terengganu (5°37.3′N, 103°04′E); Pulau Besar, Melaka (02°06.640′N, 102°19.960′E) and Port Dickson, Negeri Sembilan (2°25N′, 101°46′E). Samples were collected by hand, processed and preserved in laboratory according to standard method of decantation and preservation. A total of 14 species,

representing 13 genera from 7 families of harpacticoid copepods were identified. They were *Diarthrodes* sp., *Dactylopusia crassicornis*, *Phyllothalestris sarsi*, *Rhynchothalestris rufocincta*, *Robertsonia knoxi*, *Paramphiascella robinsoni*, *Amphiascopsis coralicola*, *Metamphiascopsis hirsutus*, *Metamphiascopsis hirsutus bermudae*, *Paralaophonte brevirostris*, *Tisbe bermudensis*, *Harpacticus clausi*, *Lourinia armata* and *Porcellidium poorei*. Out of 14 species, 9 species were considered new record in Malaysian coast. For all species, description, illustration, taxonomic notes and SEM micrographs were given. Keys to the order, genus and species were also compiled from taxonomy literature. Characters of leg 1, setal formula for leg 2,3 and 4 and characters of leg 5 was found very important to distinguish between families besides to confirm the species.

Differences in morphology between species of harpacticoid were discussed; together with the identification of some characters that observed with scanning electron microscope. In this study, some critical characters in terms of morphology of harpacticoid were shown through SEM micrographs. The characters were somehow overlooked or have not been described in details in previous studies.

Different species found at different locality suggesting the role played by environmental factors in determining the distribution. It is important to widen the scope of phytal harpacticoid copepods and the relationship between the species and the morphology of vegetation, and life cycle or population of harpacticoid copepods.

Abstrak thesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu (UMT) sebagai memenuhi syarat untuk mendapatkan Ijazah Sarjana Sains.

TAKSONOMI DAN ULTRASTRUKTUR COPEPODA HARPACTICOIDA YANG BERASOSIASI DENGAN TUMBUHAN DARI SEMENANJUNG MALAYSIA

Oktober 2007

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Kawasan tumbuhan akuatik merupakan kawasan pembiakan utama bagi hidupan marin, dan harpacticoida merupakan kumpulan taxa dominan pada alga marin. Ia berasosiasi dengan makrofauna epibentik sesil dan mikrofit, di mana ia membentuk kumpulan meiofauna yang besar yang berasosiasi dengan tumbuhan. Justeru, satu kajian tentang taksonomi dan struktur ultra harpacticoida yang berasosiasi dengan tumbuhan telah dijalankan di Semenanjung Malaysia. Objektif kajian ini adalah untuk mengenalpasti taksonomi spesies copepoda harpacticoida dominan yang berasosiasi dengan rumput laut dan rumpai laut di Semenanjung Malaysia dan menentukan struktur ultra pada harpacticoida yang berasosiasi dengan tumbuhan dengan menggunakan kaedah Mikroskop Pengimbas Elektron.

Kajian telah dilakukan dari bulan Mei 2005 hingga April 2006 di tiga tempat berasingan iaitu di Pulau Bidong, Terengganu (5°37.3′N, 103°04′E); Pulau Besar, Melaka (02°06.640′N, 102°19.960′E) dan Teluk Kemang, Port Dickson (2°25N′, 101°46′E). Sampel-sampel tersebut diambil dengan menggunakan tangan, diproses dan

disimpan di dalam makmal mengikut teknik piawai. Sejumlah 14 spesies mewakili 13 genera dari 7 famili harpacticoid copepod telah dikenalpasti iaitu *Diarthrodes* sp., *Dactylopusia crassicornis*, *Phyllothalestris sarsi*, *Rhynchothalestris rufocincta*, *Robertsonia knoxi*, *Paramphiascella robinsoni*, *Amphiascopsis coralicola*, *Metamphiascopsis hirsutus*, *Metamphiascopsis hirsutus bermudae*, *Paralaophonte brevirostris*, *Tisbe bermudensis*, *Harpacticus clausi*, *Lourinia armata* and *Porcellidium poorei*. Daripada 14 spesies, 9 spesies telah dikenalpasti sebagai rekod baru di perairan Malaysia. Setiap spesies diberi penerangan, ilustrasi , nota-nota taksonomi dan mikrograf SEM turut disertakan. Kekunci kepada order, genus dan spesies daripada rujukan taksonomi dikepilkan bersama. Ciri kaki pertama, formula seta bagi kaki ke 2, ke 3 dan ke 4 dan ciri kaki ke 5 didapati penting untuk membezakan antara famili selain spesies.

Perbezaan morfologi antara spesies harpacticoida dibincangkan, dan beberapa ciri penting telah dikenalpasti dengan mikroskop pengimbas ultra (SEM). Dalam kajian ini, beberapa ciri morfologi Harpacticoida Copepoda telah ditunjukkan melalui mikrograf. Ciri-ciri ini tidak dibincangkan secara terperinci dalam kajian-kajian sebelumnya.

Spesies berlainan yang dijumpai di lokasi berbeza telah menunjukkan faktor persekitaran adalah penting dalam menentukan taburan spesies. Adalah penting untuk memperluas skop kajian Harpacticoida Copepoda; dan kaitan antara spesies dengan morfologi tumbuhan, kitaran hidup dan populasi Harpacticoid Copepod.