



**UNIVERSITI PUTRA MALAYSIA**

**SPECIES DIVERSITY AND DISTRIBUTION OF PLANKTONIC  
COPEPODS IN THE STRAITS OF MALACCA**

**JOHAN BIN ISMAIL**

**FSAS 2001 1**

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MASTER OF SCIENCE  
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**SPECIES DIVERSITY AND DISTRIBUTION OF PLANKTONIC COPEPODS  
IN THE STRAITS OF MALACCA**

**By**

**JOHAN BIN ISMAIL**

**Thesis Submitted in Fulfillment of the Requirements for the Degree of  
Master of Science in the Faculty of Science and Environmental Studies  
Universiti Putra Malaysia**

**November 2001**



**DEDICATION**

**To my**

**Wife, Nolly,**

**Son, Jazli,**

**Mom and Dad**

Abstract of the thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirements for the degree of Master of Science

**SPECIES DIVERSITY AND DISTRIBUTION OF PLANKTONIC COPEPODS  
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**Chairman : Drs. Idris Abd. Ghani**

**Faculty : Science and Environmental Studies**

Planktonic copepods were collected from 18 stations during JICA/MASDEC Malacca Straits Scientific Expedition, in November 1998 (Northeast monsoon) and April 1999 (Presouthwest monsoon). A total of 88 species of copepods, comprised 4 orders, 17 families and 24 genera were recorded in the Straits of Malacca. Amongst them eleven species were new records to Malaysian waters. They were *Eucalanus subtenuis*, *Delius nudus*, *Scolecithricella minor*, *Clausocalanus farrani*, *Euchaeta wolfendeni*, *Centropages* sp., *Pseudocalanus* sp., *Lucicutia flavicornis*, *Candacia tuberculata*, *Corycaeus longisyttis*, and *Copilia lata*. The abundance of the copepod fauna was higher during the presouthwest monsoon (35,429 ind/m<sup>3</sup>) as compared to the northeast monsoon (20,023 ind/m<sup>3</sup>). In both monsoon periods, the abundance of



copepods were higher in coastal waters and generally higher in the middle and southern zone of the Straits. The copepod composition was dominated by herbivorous species from the family Paracalanidae, Euterpinidae and Oithoniidae that were distributed especially in the coastal waters. Rare copepod species showed a more distinct pattern of abundance occurring only in certain areas of the Straits. The abundance pattern also showed that the middle and the southern zones were the most heterogenous areas where fluctuations of abundance were evident. This could be seen through the low values of richness and diversity indices. Comparatively, the northern zone was more homogenous and stable.

The diversity and richness index in the northern zone was the highest compared to the other zones during both monsoon seasons. Dominant copepod species formed distinct ecological groups, each species assemblages represented relatively stable units in which each species had a particular niche. Three areas could be identified to be most distinct and heterogenous which were the coastal waters of Matang mangrove forest reserve (st. 14), Port Klang (st. 18) and South Johore (st. 24). The copepods recorded their highest abundance in these areas and can be reflected as areas of very high productivity.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains

**DIVERSITI SPECIES DAN TABURAN KOPEPODA PLANKTONIK  
DI SELAT MELAKA**

**Oleh**

**JOHAN ISMAIL**

**November 2001**

**Pengerusi : Drs. Idris Abd. Ghani**

**Fakulti : Sains dan Pengajian Alam Sekitar**

Kopepoda planktonik disampel di 18 stesen semasa Ekspedisi Selat Melaka JICA-MASDEC, di bulan November 1998 (Monsun Timur Laut) and bulan April 1999 (Monsun Pra Barat Daya). Sebanyak 88 species dikenalpasti terdiri daripada empat order, 17 families dan 24 genera. Sebelas species dikenalpasti sebagai rekod species baru di perairan Malaysia. Copepoda ini terdiri daripada *Eucalanus subtenuis*, *Delius nudus*, *Scolecithricella minor*, *Clausocalanus farrani*, *Euchaeta wolfendeni*, *Centropages* sp., *Pseudocalanus* sp., *Lucicutia flavicornis*, *Candacia tuberculata*, *Corycaeus longisytis*, dan *Copilia lata*. Densiti copepoda didapati lebih tinggi pada monsun prabarat daya (35,429 ind/m<sup>3</sup>) berbanding monsun timur laut (20,023

ind/m<sup>3</sup>). Pada masa kedua-dua monsun, density adalah lebih tinggi di kawasan persisiran pantai berbanding laut terbuka dan secara umumnya lebih tinggi di zon tengah dan zon selatan Selat Melaka. Komposisi copepoda didominasi oleh family Paracalanidae, Euterpinae dan Oithonidae terutamanya di kawasan persisiran pantai. Kopepod resesif menunjukkan corak taburan density yang lebih unik di mana ia hadir hanya di kawasan tertentu sahaja. Corak density kopepoda menunjukkan zon tengah dan zon selatan adalah kawasan paling bersifat heterogenous. Ini boleh dilihat dari nilai-nilai indeks diversity dan richness yang rendah di kawasan ini. Zon utara adalah kawasan yang lebih homogenous dan stabil.

Pada kedua-dua monsun, semua indeks diversity menunjukkan nilai yang lebih tinggi di zon utara berbanding zon tengah dan zon selatan. Kopepod dominan membentuk kumpulan ekologi di mana setiap kumpulan memperlihatkan unit yang stabil di mana setiap species mempunyai niche yang tersendiri. Tiga kawasan dikenalpasti sebagai kawasan paling heterogenous yang merangkumi kawasan perairan hutan simpan bakau Matang (st.14), Pelabuhan Klang (st.18) dan Johor selatan (st.24). Kawasan ini boleh dilihat sebagai kawasan sangat produktif kerana mempunyai density yang tinggi.



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This thesis submitted to the Senate of Universiti Putra Malaysia has been accepted as fulfillment of the requirement for the degree of Master of Science.

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AINI IDERIS, Ph.D.,  
Professor,  
Dean of Graduate School,  
Universiti Putra Malaysia.

Date:

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