

MONITORING OF PESTICIDE HARBORING COPEPODS
FROM TERENGGANU COAST

MARILINDA BT. AHMAD ISHAK

DEPARTMENT OF BIOLOGY

FACULTY OF SCIENCE DAN TEKNOLOGI

KUALA LUMPUR UNIVERSITY OF SCIENCE DAN TEKNOLOGI MALAYSIA

1997

1100030748

PERPUSTAKAAN KOLEJ UNIVERSITI SAINS & TEKNOLOGI MALAYSIA (KUSTEM)			
Pengarang Nurul Huda bt Ahmad Ismail.		No. Panggilan hp 6 PST 15 2007	
Judul taxonomy of Digital			
Tarikh	Waktu Pemulangan	Nombor Ahli	Tanda tangan
7/4/05	1/00 pm	UK 7989	[Signature]
17/7/05	2/00 pm	UK 9119	[Signature]
2/10/05	12/30 pm	UK 9119	[Signature]

**TAXONOMY OF PHYTAL HARPACTICOID COPEPODS FROM
TERENGGANU COAST**

By

Nurul Huda bt. Ahmad Ishak

**Research Report submitted in partial fulfilment of
the requirements for the degree of
Bachelor of Applied Science (Biodiversity Conservation and Management)**

**Department of Biological Sciences
Faculty of Science and Technology
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
2004**



**JABATAN SAINS BIOLOGI
FAKULTI SAINS DAN TEKNOLOGI
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA**

**PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK
PENYELIDIKAN I DAN II**

lalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: 'Taxonomy Of Phytal
arpacticoid Copepods From Terengganu Coast' oleh Nurul Huda Bt Ahmad Ishak, No.
atrik UK5321 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan.
aporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian
aripada keperluan memperoleh **Ijazah Sarjana Muda Sains Gunaan (Pemuliharaan Dan
engurusan Biodiversiti)**, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan
eknologi Malaysia.

Disahkan oleh,

Penyelia Utama

Nama: Dr. Zaleha Kassim

Cop Rasmi:

Dr. Zaleha Binti Kassim
Pensyarah

Jabatan Sains Samudera
Fakulti Sains dan Teknologi
Kolej Universiti Sains dan Teknologi Malaysia
21030 Kuala Terengganu.

Tarikh: 14/4/04

Disahkan oleh,

Penyelia Kedua

Nama: Cik Faridah Mohamad

Cop Rasmi:

FARIDAH MOHAMMAD
Tahap Penyelidikan
Fakulti Sains dan Teknologi
Kolej Universiti Sains dan Teknologi Malaysia
21030 Kuala Terengganu, Terengganu.

Tarikh: 14/4/04

Disahkan oleh,

Ketua Jabatan Sains Biologi

Nama: Prof. Dr. Chan Eng Heng

Cop Rasmi:

PROF. DR. CHAN ENG HENG
Head

Dept. of Biological Sciences
Faculty of Science & Technology
University College of Science & Technology Malaysia
(KUSTEM)
21030 Kuala Terengganu.

Tarikh: 14/4/04

ACKNOWLEDGEMENTS

With the name of Allah, the most gracious and merciful..

All praises are to Allah whose countless blessings enabled me to accomplish this study. I am very grateful to my supervisor, Dr. Zaleha Bt. Kassim for her concern, encouragement and continuous guidance during this study. I also thank Cik Faridah as my co-supervisors for her useful comments and suggestions during the study. I want to thank my parents, Encik Ahmad Ishak B Ngah Ismail and Puan Suheir Bt Abdul Muttalib for guiding me in this game of life, and for being compassionate and understanding as I grow as a person. And for the siblings, Azam, Amin and Hassan, the closer and closer we are, the stronger we become and there ain't no thing that can put us back on a string. B, for always being beside me, behind me and there to guide me through the normal trials of life, for being active in breaking down divisions and stereotypes. Fie, thanks for always being there for me with your constant love, understanding and advice. To the rest of my friends, Ruhil, Aida and Sya, may Allah grant us the Serenity to accept the things we cannot change, the Courage to change the things we can, and the Wisdom to know the difference.. Respect to all copepodologist who struggle to be creative, you make the world a better place..

Jazakallah.. ← *na sialole*

TABLE OF CONTENTS

TITTLE	PAGE
ACKNOWLEDGEMENTS	i
TABLE OF CONTENTS	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF SYMBOLS	viii
LIST OF APPENDICES	ix
ABSTRAK	x
ABSTRACT	xi
1.0 INTRODUCTION	
1.1 Objectives	1
2.0 LITERATURE REVIEW	
2.1 General morphology of harpacticoid copepod	2
2.2 Habitat of harpacticoid copepod	2
2.3 The importance of harpacticoid copepods	3
2.4 The biology of harpacticoid copepod	4
2.5 The importance of studying taxonomy	6
2.6 The significance and relationship between harpacticoid copepods with vegetated areas	7
2.7 Status of taxonomic study on harpacticoid copepods	

2.7.1	International	8
2.7.2	Malaysia	9
2.8	Classification of harpacticoid copepods	9
2.9	Tropical species of harpacticoid copepods	10
3.0	MATERIALS AND METHODS	
3.1	Sampling area	12
3.2	Field sampling	16
3.3	Laboratory work	21
3.3.1	Taxonomic Study	21
3.3.2	Dissection of Harpacticoid Copepods	22
3.3.3	Keys of identification	23
3.3.4	Comparison between the abundance of identified species and species of seagrass and seaweed	23
4.0	RESULTS	
4.1	Description of diagnostic characteristic of identified species	24
4.2	The Abundance of phytal Harpacticoid Copepods in different vegetation area	41
4.2.1	Harpacticoid Composition	41
5.0	DISCUSSION	
5.1	Species identified	46
5.2	Harpacticoid Composition	47
5.3	Taxonomic Finding	49

6.0 CONCLUSION

52

REFERENCE

APPENDICES

LIST OF TABLES

TABLE		PAGE
Table 5.1 :	Setal formula for the harpacticoid copepod species from Coastal Water of Peninsular Malaysia.	50

LIST OF FIGURES

FIGURE		PAGE
Figure 3.1	Sampling location at Teluk Keke, Pulau Perhentian, Terengganu	13
Figure 3.2	Sampling location at Setiu Lagoon, Kg. Gong Batu, Setiu, Terengganu	15
Figure 3.3	<i>Enhalus ecoroides</i>	17
Figure 3.4	<i>Thalassia hemprichii</i>	17
Figure 3.5	Scrap sampling used at study area	18
Figure 3.6	Core sampling used at study area	18
Figure 3.7	<i>Halodule pinifolia</i>	19
Figure 3.8	Patches of <i>Halodule pinifolia</i> at Setiu wetland	20
Figure 4.1	<i>Amphiascoides subdebilis</i> (Nicholls). Female. A. Leg 1. B. Leg 2. C. Leg 3. D. Leg 4..	26
Figure 4.2	<i>Amphiascoides subdebilis</i> (Nicholls). Female. E. Leg 5. F. Caudal rami. G. Antennule. H. Antenna	27
Figure 4.3	<i>Paralaophontae octavia</i> (Monard, 1935). Female. A. Leg 1. B. Leg 2. C. Leg 3.	29
Figure 4.4	<i>Paralaophontae octavia</i> (Monard, 1935). Female. D. Leg 4. E. Leg 5. F. Antenna. G. Antennule.	30
Figure 4.5	<i>Longipedia</i> Claus, 1863. Female. A. Leg 1. B. Leg 2. C. Leg 3	32
Figure 4.6	<i>Longipedia</i> Claus, 1863. Female. D. Leg 4. E. Caudal rami.	33
Figure 4.7	<i>Longipedia</i> Claus, 1863. Female. F. Antenna. G. Antennule.	34
Figure 4.8	<i>Phyllothalestris mysis</i> (Sars). Female. A. Leg 1. B. Leg 2.	36

	C. Leg 3.D.Leg 4.	
Figure 4. 9	<i>Phyllothalestris mysis</i> (Sars). Female. E. Leg 5. F. Caudal rami. G. Antenna. H. Whole body.	37
Figure 4.10	<i>Eudactylopus andrewii</i> (A.Scott). Female. A. Leg 1. B. Leg 2. C. Leg 3. D. Leg 4.	39
Figure 4.11	<i>Eudactylopus andrewii</i> (A.Scott). Female. E. P5. F. Urosome.	40
Figure 4.12	Percentage of relative abundance to the total harpacticoid fauna.	41
Figure 4.13	Percentage of meiobenthos composition at Station 1, Pulau Perhentian.	42
Figure 4.14	Percentage of meiobenthos composition at Station 2, Pulau Perhentian	42
Figure 4.15	Percentage of meiobenthos composition at Station 3, Pulau Perhentian	43
Figure 4.16	Percentage of meiobenthos composition at Alur Juna, Setiu wetland.	43
Figure 4.17	Percentage of meiobenthos composition at Alur Gemia, Setiu wetland.	44
Figure 4.18	Percentage of meiobenthos composition at Tebing Tinggi, Setiu wetland.	44
Figure 4.19	Percentage of meiobenthos composition at Pulau Stopa, Setiu wetland.	45
Figure 4.20	Percentage of meiobenthos composition at Pulau Semut, Setiu wetland.	45

LIST OF SYMBOLS

mm	millimeter
μ	micron
°	degree
"	minute
'	second
%	percent
P1	periopod 1
P2	periopod 2
P3	periopod 3
P4	periopod 4
P5	periopod 5
R1	replicate 1
R2	replicate 2
R3	replicate 3
Fig.	Figure
CMCP-9	Mounting Media Low viscosity, colourless mountant. Refractive index about 1.40

LIST OF APPENDICES

Appendix 1 Percentage of meiobenthos composition at sampling area

ABSTRACT

The objectives of this research were i) to do a taxonomic identification on the dominant species of harpacticoid copepod associated with seaweed and seagrass; and ii) to investigate the abundance of harpacticoid copepod in different vegetation area. A study on the taxonomy and of phytal meiobenthic harpacticoid copepods found in coastal water of east coast of Peninsular Malaysia was conducted from July 2003 to February 2004. The taxonomic study was carried out using specimens collected from Perhentian Island and Setiu Wetland, by scrap sampling and core sampling. A total of 5 species, representing 5 genera from 4 families of harpacticoid copepods were identified. All the 5 species were unrecorded species in Malaysian east coast. For all species, description, illustration and taxonomic notes were given. Harpacticoid copepods were the dominant group of meiobenthos found in the studied areas. In the study, the most dominant species of harpacticoid found in Setiu were *Paralaophonte octavia* and *Longipedia sp.* They contributed about 5.3% and 5% on the total meiobenthos composition at Tebing Tinggi, Pulau Stopa and Pulau Semut Station, while at Alur Gemia and Alur Juna, they contributed about 8.5% and 4.5% on the total meiobenthos composition. The most dominant species of harpacticoid found at Teluk Keke, Pulau Perhentian was *Phyllothalestris mysis*. It contributed 2.67% of the total meiobenthos composition. The abundance of harpacticoid copepods in vegetated sediment was relatively higher than the bare sediment.

ABSTRAK

Objektif bagi kajian ini adalah untuk i) mengenalpasti taksonomi pada spesies copepoda harpacticoida dominan yang berasosiasi dengan rumput laut; dan ii) mengkaji kelimpahan di kawasan tumbuhan yang berlainan. Satu kajian mengenai taksonomi Copepoda Harpacticoida meiobentik yang berasosiasi dengan tumbuhan yang terdapat di perairan persisir Terengganu telah dijalankan mulai Julai 2003 sehingga Februari 2004. Kajian taksonomi telah dilakukan menggunakan spesimen yang diperolehi daripada Pulau Perhentian dan Tanah Bencah Setiu. Sejumlah 5 spesies, mewakili 5 genera daripada 4 famili Copepoda Harpacticoida telah dikenalpasti. Kesemua 5 spesies itu adalah spesies yang belum direkodkan di perairan Pantai Timur Semenanjung Malaysia. Kesemua spesies diberikan penerangan, ilustrasi dan nota-nota taksonomi. Copepoda Harpacticoida telah dikenalpasti sebagai kumpulan meiobenthos paling dominan di kawasan kajian. Dalam kajian ini, spesies paling dominan yang dijumpai di Setiu adalah *Paralaophonte octavia* dan *Longipedia sp*. Mereka menyumbang 5.3% dan 5% daripada jumlah keseluruhan komposisi meiobenthos di Stesen Tebing Tinggi, Stesen Pulau Stopa dan Stesen Pulau Semut. Di Alur Gemia and Alur Juna, mereka menyumbang 8.5% and 4.5% daripada jumlah keseluruhan komposisi meiobenthos. Spesies harpacticoida yang paling dominant di Teluk Keke, Pulau Perhentian ialah *Phyllothalestris mysis*. Ia menyumbang 2.67% daripada jumlah keseluruhan komposisi meiobenthos. Kelimpahan Copepoda Harpacticoida di kawasan sedimen yang ada tumbuhan secara relatif adalah lebih tinggi daripada sedimen tanpa tumbuhan di kawasan kajian.