

SEA CUCUMBERS IN PULAU BIDONG WATERS: THE STUDY OF  
SPECIES DIVERSITY AND ABUNDANCE

MOHD AMRI BIN MASLAN

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU  
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**SEA CUCUMBERS IN PULAU BIDONG WATERS: THE STUDY OF  
SPECIES DIVERSITY AND ABUNDANCE**

**By**

**Mohd Amri Bin Maslan**

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**JABATAN SAINS MARIN  
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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

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Disahkan oleh:

Penyelia Utama

Nama: Yusri Yusuf

Cop Rasmi:

**YUSRI YUSUF**  
Pensyarah  
Institut Oseanografi  
Universiti Malaysia Terengganu (UMT)  
21030 Kuala Terengganu, Terengganu.

Tarikh: 9/5/08

Ketua Jabatan Sains Marin

Nama: Dr. Razak Zakariya

Cop Rasmi:

**DR. RAZAK ZAKARIYA**  
Ketua Jabatan Sains Marin  
Fakulti Pengajian Maritim dan Sains Marin  
Universiti Malaysia Terengganu  
(UMT)

Tarikh: 12/5/08

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## LIST OF ABBREVIATIONS

UMT	Universiti Malaysia Terengganu
m	Meter
N	North
E	East
cm	Centimeter
MgCl	Magnesium chloride
%	Percentage
ANOVA	Analysis of variance
SPSS	Statistical Package for the Social Sciences
T1	Transect 1
T2	Transect 2
T3	Transect 3
H'	Shannon-Wiener diversity index
J'	Evenness index
a.m.	<i>ante meridiem</i> (before noon)
p.m.	<i>post meridiem</i> (after noon)
P	Significant value
°C	Degree Celcius
‰	Parts per thousand



## ABSTRACT

A total of nine sea cucumber species were recorded along the period of study. Three of the species were encountered within transects, which were *Holothuria (Halodeima) atra*, *Holothuria (Halodeima) edulis*, and *Stichopus chloronotus*. Other collected specimens were identified as *Actinopyga lecanora*, *Actinopyga miliaris*, *Bohadschia vitiensis*, *Cercodemas anceps*, and *Stichopus vastus*. One specimen was identified only to the genus *Stichopus*, due to the insufficient scientific references accessed to this species. All identified species were confirmed to be tropical Indo-Pacific sea cucumber species, and had been recorded in previous studies in Pulau Bidong, Pulau Redang, Pulau Perhentian, and Spermonde Archipelago, Indonesia. A total of 86 individuals were encountered in transects, with T3 in sandy area has the highest abundance (45 individuals), followed by T2 in coral reef area (39 individuals), and T1 in intertidal area nearest to the beach (two individuals). T3 has the highest diversity (four species) with the other two transects only recorded two species. T3 recorded the highest average (n=6) diversity index ( $0.937 \pm 0.336$ ) followed by T1 ( $0.167 \pm 0.236$ ) and T2 ( $0.130 \pm 0.290$ ). T3 has the highest average (n=6) evenness index ( $1.213 \pm 0.929$ ), followed by T1 ( $0.333 \pm 0.471$ ), and T2 ( $0.130 \pm 0.290$ ). Univariate ANOVA showed that high significant differences ( $P < 0.001$ ) in individual abundance, total species, diversity and evenness factors between transects. The highest sea cucumbers found in transects was during 3<sup>rd</sup> sampling session (12-2 p.m.) with 44 individuals, while the lowest was during 2<sup>nd</sup> sampling session (10 a.m. –12p.m.) with two individuals.

# GAMAT DI PERAIRAN PULAU BIDONG: KAJIAN TERHADAP KEPELBAGAIAN SPESIS DAN KELIMPAHANNYA

## ABSTRAK

Sebanyak sembilan spesies gamat telah direkodkan sepanjang tempoh kajian. Tiga spesies ditemui dalam transet, iaitu *Holothuria (Halodeima) atra*, *Holothuria (Halodeima) edulis*, dan *Stichopus chloronotus*. Spesimen lain telah dikenal pasti sebagai *Actinopyga lecanora*, *Actinopyga miliaris*, *Bohadschia vitiensis*, *Cercodemus anceps*, dan *Stichopus vastus*. Satu spesimen cuma dapat dikenal pasti sehingga genera *Stichopus*. Semua spesies telah dikenal pasti sebagai spesies gamat tropika Indo-Pasifik. Sebanyak 86 individu telah ditemui dalam transet, dimana T3 di kawasan berpasir mempunyai kelimpahan individu tertinggi (45 individu), diikuti oleh T2 di kawasan terumbu karang (39 individu), dan T1 di kawasan pasang-surut (dua individu). T3 mempunyai kepelbagaian tertinggi (empat spesies) dimana kedua-dua transet lain mencatatkan hanya dua spesies. T3 mencatatkan purata ( $n=6$ ) indeks kepelbagaian tertinggi ( $0.937 \pm 0.336$ ) diikuti T1 ( $0.167 \pm 0.236$ ) dan T2 ( $0.130 \pm 0.290$ ). T3 mempunyai purata ( $n=6$ ) indeks kesamaan tertinggi ( $1.213 \pm 0.929$ ), diikuti T1 ( $0.333 \pm 0.471$ ), dan T2 ( $0.130 \pm 0.290$ ). Ujian Univariate ANOVA menunjukkan perbezaan signifikan yang tinggi ( $P < 0.001$ ) terhadap kelimpahan individu, jumlah spesies, faktor kepelbagaian dan kesamaan antara transet. Bilangan tertinggi gamat dalam transet direkodkan pada sesi penyampelan ketiga (12-2 petang) sebanyak 44 individu, manakala bilangan terendah direkodkan pada sesi penyampelan kedua (10 pagi – 12 tengah hari) sebanyak dua individu.