

A STUDY ON THE POPULATION DYNAMIC, DISTRIBUTION, AND FOOD
SOURCES OF *Faunus ater* (THIATIDAE: GASTROPODA) IN A SEMI-
ENCLOSED LAGOON AREAS OF UNIVERSITY MALAYSIA TERENGGANU (UMT)

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UNIVERSITI MALAYSIA TERENGGANU

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A STUDY ON THE POPULATION DYNAMIC, DISTRIBUTION, AND FOOD SOURCES OF *Faunus ater* (THIARIDAE: GASTROPODA) IN A SEMI-ENCLOSED LAGOON AREA OF UNIVERSITY MALAYSIA TERENGGANU (UMT)

By

Eric Chong Hon Shung

**Research Report submitted in partial fulfillment of
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**DEPARTMENT OF MARINE SCIENCE
FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU**

**DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled:

A study on the population dynamic, distribution, and food sources of *Faunus ater* (Thiaridae: Gastropoda) in a semi-enclosed lagoon area of University Malaysia Terengganu (UMT) by Eric Chong Hon Shung Matric No. UK17067 have been examined and all errors identified have been corrected. This report submitted to the Department of Marine Science and as a partial fulfillment toward obtaining the Degree of Marine Biology, Faculty of Maritime Study and Marine Science, University Malaysia Terengganu, Terengganu, Malaysia.

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LIST OF ABBREVIATION

g	-	Gram
mg	-	Milligram
mm	-	Millimeter
mL	-	Milliliter
ppt	-	Part per thousand
°C	-	Celcius
min	-	Minute
ϕ'	-	Growth Performance Index
L_{∞}	-	Asymptotic length
K	-	Growth coefficient
Z	-	Total mortality
M	-	Natural mortality
F	-	Fshing mortality
E	-	Exploitation level
No. ind	-	Number of individual

DO	-	Dissolved oxygen
TOC	-	Total Organic Carbon
$K_2Cr_2O_7$	-	Potassium dichromate
$K_2Cr_2O_7$	-	Sulfuric acid
$FeSO_4 \cdot 7H_2O$	-	Ferrous Sulphate
BF_3	-	Boron Trifluoride

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ABSTRACT

Population dynamic, distribution and the food sources of *Faunus ater* along the semi-enclosed lagoon area of Universiti Malaysia Terengganu were investigated in this presence study. Population parameters such as asymptotic length ($L_{\infty} = 60.38$), growth coefficient ($K = 0.71$) of the von Bertalanffy growth function (VBGF) and the growth performance index ($\phi' = 3.41$) were analyzed by ELEFAN-1 in the FiSAT software. Besides, the length-weight relationship shows the strong significant allometric growth of *F. ater*. Length converted catch curve method shows the total mortality, natural mortality, fishing mortality and exploitation rate. On the other hands, distribution of *F. ater* shows that amongst all five selected of UMT lagoon stations, there were no significant difference ($P > 0.05$) of mean densities (No of ind/m²) of *F. ater* when sampled during April 2010, but shows a significant difference ($p = 0.001 < 0.05$) when sampled during July 2010. The density of *F. ater* has strongly correlated ($P < 0.05$) with silt (%), but not clay- and sand- sediment types. In addition, the density of *F. ater* and TOC (%) were increase when the sediment type was clay loam-silt, and tend to decreases when the sediments types change to sandy form. The fatty acids concentration in three samples, sediments, suspended particulate materials, and animals' tissues were determined by using one step method and were used as markers to identify the food sources of *F. ater*. Presence study has used markers C18:2 ω 6 and C18:3 ω 3 as mangrove leaves; markers C16:1, C20:5 ω 3, C22:6 ω 3, and C18:4 ω 3 as microalgae; C15:0, C17:0, and ood-BrFAs as bacteria; and marker C20:1 as zooplankton. Generally, *F. ater* were distributes along the semi-enclosed lagoon area of UMT. The presence of this species in every month indicates

that they could survive in the environmental changes such as wet and dry weather. Since, fatty acid plays important role in energy storage thus, the fatty acid in the tissues of *F. ater* allows them to grow even there were lack of nutrient surrounding. This is called negative allometric growth where the shell of gastropods increase when there is no food uptakes. As a conclusion, the growth, distribution and food sources of *Faunus ater* was influenced by the environmental condition of the semi enclosed lagoon

Dinamik Populasi, Taburan dan Sumber Makanan Bagi *Faunus ater* (Thiaridae: Gastropoda) di Sepanjang Separa-tutup Lagun Kawasan Universiti Malaysia Terengganu (UMT)

ABSTRAK

Suatu kajian mengenai dinamik populasi, taburan dan sumber makanan bagi *Faunus ater* di sepanjang separa-tutup lagun kawasan Universiti Malaysia Terengganu telah dijalankan. Parameter populasi seperti panjang asimtotik ($L_{\infty} = 60.38$), koefisien tumbesaran ($K = 0.71$) bagi 'von Bertalanffy growth function' dan indeks prestasi pertumbuhan ($\phi' = 3.41$) telah dianalisis menggunakan kaedah ELEFAN-1 melalui perisian FiSAT. Selain itu, perhubungan panjang-berat sepanjang tahun menunjukkan kekuatan yang signifikan bagi tumbesaran alometrik *F. ater*. Kaedah panjang-ditangkap-lengkungan digunakan untuk menganggarkan jumlah kematian, kematian semulajadi, kematian tangkapan, dan kadar eksploitasi. Selain itu, taburan bagi *F. ater* di kelima-lima stesen terpilih menunjukkan bahawa tidak terdapat perbezaan yang signifikan ($P > 0.05$) bagi purata densiti *F. ater* pada bulan April 2010, tetapi menunjukkan signifikan perbezaan ($P < 0.05$) pada bulan Julai 2010. Terdapat korelasi yang kuat bagi densiti *F. ater* ($P < 0.05$) dengan tanah kelodak, tetapi tidak dengan tanah liat dan pasir. Densiti dan Jumlah Karbon Organik (%) menunjukkan peningkatan apabila jenis tanah adalah tanah liat-kelodak, dan cenderung untuk berkurangan apabila jenis tanah adalah pasir. Komposisi asid lemak bagi tiga sampel, tanah, bahan zarah terapung, dan tisu haiwan telah dikaji dengan menggunakan kaedah satu-step sebagai petunjuk

untuk mengenalpasti sumber makanan bagi *F. ater*. Kajian ini telah menggunakan penunjuk C18:2 ω 6 dan C18:3 ω 3 sebagai sumber daun mangrove; tanda C16:1, C20:5 ω 3, C22:6 ω 3, and C18:4 ω 3 sebagai microalga; tanda C15:0, C17:0, dan ood-BrFAs sebagai bacteria; dan tanda C20:1 sebagai zooplankton. Secara umumnya, *F. ater* didapati tertabur di sepanjang separa-tutup lagun kawasan UMT. Kehadiran spesies ini di setiap bulan menunjukkan bahawa spesies ini boleh mengadaptasi di kawasan persekitrannya walaupun terdapat perubahan cuaca seperti cuaca panas dan hujan di sepanjang tahun. Memandangkan asid lemak memainkan peranan yang penting sebagai penyimpanan tenaga maka, asid lemak di dalam tisu *F. ater* membolehkan siput ini membesar walaupun tidak terdapat nutrien yang cukup di persekitarannya. Tumbesaran ini dipanggil tumbesaran allometrik negative dimana kerang siput boleh memanjang walaupun tidak mengambil nutiren. Sebagai kesimpulan, tumbesaran, taburan, dan sumber makanan bagi *Faunus ater* dipengaruhi oleh keadaan persekitaran lagun tersebut.