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MASTER OF SCIENCE

2018

**AGE AND GROWTH ESTIMATION USING
GROWTH BAND COUNTS OF ORANGE MUD
CRAB, *Scylla olivacea* (HERBST, 1796) FROM
SETIU WETLANDS, PENINSULAR MALAYSIA**

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ORANGE MUD CRAB, *Scylla olivacea* (HERBST, 1796) FROM
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**Thesis Submitted in Fulfillment of the Requirement for the Degree of Master of
Science in the Institute of Tropical Aquaculture
Universiti Malaysia Terengganu.**

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DEDICATION

I dedicate this thesis to my beloved mother, late father and families for all their endless supports, encouragement and unconditional love throughout my studies and also to all my supervisors and beloved friends for all their supports, ideas and inspirations.

Thank you

“Knowledge doesn’t come but you have to go to it” – Imam Malik.

ABSTRACT

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfilment of the requirement for the degree of Master of Science.

AGE AND GROWTH ESTIMATION USING GROWTH BAND COUNTS OF ORANGE MUD CRAB, *Scylla olivacea* (HERBST, 1796) FROM SETIU WETLANDS, PENINSULAR MALAYSIA

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Institute : Institute of Tropical Aquaculture, UMT

Orange mud crab, *Scylla olivacea* (Herbst, 1796) is an important fishery products in Malaysia. Age study is important to generate the information on growth, recruitment, longevity, mortality for mud crab stock assessment. The aim of this study is to investigate the Growth Band Counts (GBC) deposited in thin sections of gastric mill of *S. olivacea* as age indicator for this species. A total of 90 wild caught *S. olivacea* were sampled from Setiu Wetlands, Peninsular Malaysia (February – October 2016) and 25 individuals of *S. olivacea* were reared in the hatchery of Institute of Tropical Aquaculture, Universiti Malaysia Terengganu for one year (March 2016 - March 2017). The periodicity of GBC in gastric mill of *S. olivacea* was validated using reared of known age samples. The results revealed that the presence of one GBC in reared *S. olivacea* were parallel to the age one year old of *S. olivacea* absolute age. One to three GBC were present in wild caught *S.*

olivacea which indicated the age of one to three years old, respectively. There was a significantly positive relationship between Carapace Width (CW) and age, as the number of growth bands increased with putative age. The accuracy of bands counting was assessed by lower coefficient of variation values of reared and wild caught *S. olivacea* with 6.00 – 6.23% and 8.52 – 8.40%, respectively. Using the von Bertalanffy Growth Model equation, the growth parameters of *S. olivacea* was estimated and growth curves was fitted to CW at age data. The growth parameters such as asymptotic CW (CW_{∞}), growth coefficient ($K \text{ year}^{-1}$) and initial condition parameter (t_0) of the known age *S. olivacea* were narrower at 20.07 cm, 0.31 year^{-1} and - 0.20 than the wild samples at 28.01 cm, 0.36 year^{-1} and - 0.73 for female and at 29.34 cm, 0.38 year^{-1} and - 0.79 for male, respectively. The age composition suggested that *S. olivacea* population found in the Setiu Wetlands, Peninsular Malaysia has at least reached the age of 2 years old. The findings obtained from this study would substantially improve the direct age - based assessment for biological and ecological studies of mud crabs.

ABSTRAK

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk Ijazah Sarjana Sains.

PENENTUAN ANGGARAN UMUR DAN TUMBESARAN MENGGUNAKAN BILANGAN JALUR TUMBESARAN PADA KETAM NIPAH, *Scylla olivacea* (HERBST, 1796) DARI TANAH BENCAH SETIU, SEMENANJUNG MALAYSIA

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2018

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Ketam nipah, *Scylla olivacea* (Herbst, 1796) adalah produk perikanan yang penting di Malaysia. Kajian umur adalah penting untuk menghasilkan maklumat mengenai tumbesaran, penambahan, jangka hayat dan kematian untuk penilaian stok ketam nipah. Tujuan kajian ini adalah untuk mengkaji bilangan jalur tumbesaran (GBC) yang tersimpan di dalam “gastric mill” *S. olivacea* bahagian yang nipis sebagai petunjuk umur untuk spesis ini. Sebanyak 90 ekor ketam liar *S. olivacea* ditangkap dari Tanah Bencah Setiu, Semenanjung Malaysia (Februari – Oktober 2016) dan 25 individu *S. olivacea* (umur diketahui) dipelihara di hatceri Institut Akuakultur Tropika, Universiti Malaysia Terengganu, (Mac 2016 – Mac 2017) selama satu tahun. Jangka masa GBC di dalam “gastric mill” *S. olivacea* telah disahkan menggunakan sampel yang diketahui umurnya. Keputusan kajian menunjukkan kehadiran satu GBC pada ketam peliharaan dan wujud

persamaan dengan satu tahun umur *S. olivacea*. Satu hingga tiga GBC dikenal pasti terdapat pada ketam liar *S. olivacea* yang juga berumur dari satu hingga tiga tahun. Didapati terdapat hubungan yang positif antara saiz karapas (CW) dan umur dimana terdapat peningkatan bilangan jalur tumbesaran dengan umur jangkaan. Ketetapan bilangan jalur tumbesaran dikira dengan “coefficient of variation” dan didapati *S. olivacea* peliharaan adalah lebih rendah berbanding *S. olivacea* liar iaitu masing-masing dengan 6.00 – 6.23% dan 8.52 – 8.40%. Menggunakan persamaan model tumbesaran von Bertalanffy, parameter pertumbuhan *S. olivacea* telah dianggarkan dan lengkung pertumbuhan telah sepadan dengan data CW pada umur. Anggaran parameter pertumbuhan seperti “asymptotic CW” (CW_{∞}), “growth coefficient” ($K \text{ year}^{-1}$) dan “initial condition parameter” (t_0) pada *S. olivacea* yang diketahui umurnya adalah lebih rendah pada 20.07 cm, 0.31 tahun^{-1} dan -0.20 jika berbanding dengan sampel *S. olivacea* liar pada 28.01 cm, 0.36 tahun^{-1} dan -0.73 bagi ketam betina dan pada 29.34 cm, 0.38 tahun^{-1} dan -0.79 bagi ketam jantan. Komposisi umur mencadangkan populasi ketam *S. olivacea* yang terdapat di Tanah Bencah Setiu, Semenanjung Malaysia adalah berusia 2 tahun lebih. Penemuan yang diperolehi daripada kajian ini akan membantu meningkatkan maklumat penilaian umur secara tepat untuk kajian biologi dan ekologi ketam nipah.