



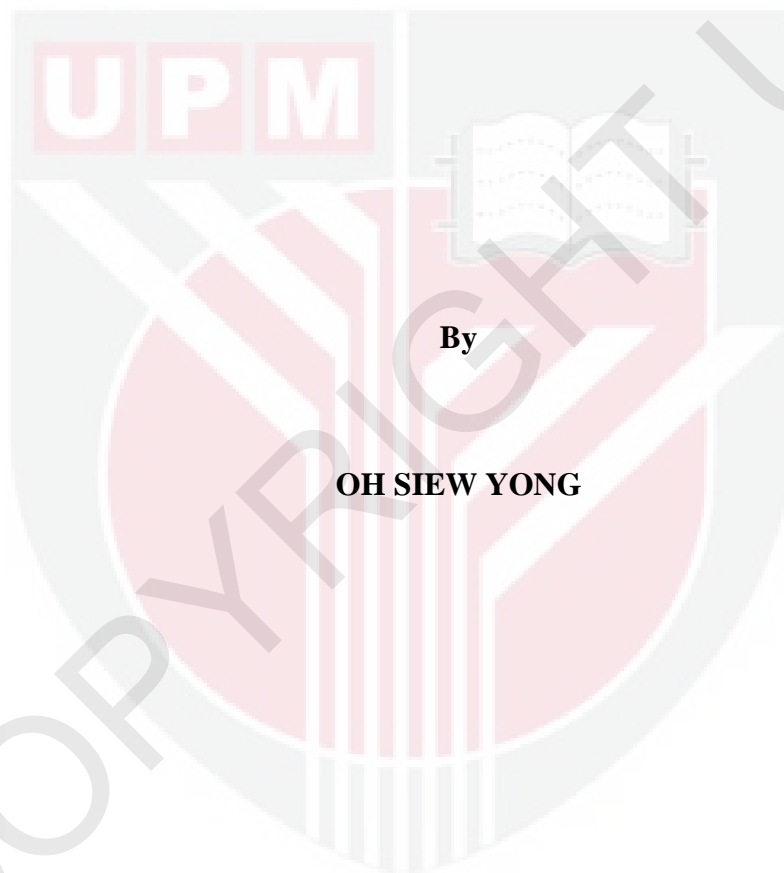
**UNIVERSITI PUTRA MALAYSIA**

**STOMACH CONTENT IN RELATION TO SPAWNING AND  
POPULATION CHARACTERISTICS OF *Acetes serrulatus* Krøyer  
(DECAPODA: SERGESTIDAE) IN THE COASTAL WATERS OF  
PONTIAN, MALAYSIA**

**OH SIEW YONG**

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MALAYSIA**



**By**

**OH SIEW YONG**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfillment of the Requirements for the Degree of Master of Science**

**September 2011**

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

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CHARACTERISTICS OF *Acetes serrulatus* Krøyer  
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**September 2011**

**Chairman: Aziz Arshad, PhD**

**Faculty: Institute of Bioscience**

Marine shrimps of genus *Acetes* Milne-Edwards, 1980 are ecologically and commercially important. Systematic studies on *Acetes* in Malaysia indicate that *Acetes serrulatus* was the most abundant species in Johor waters. Thus, the biology and population dynamics of *A. serrulatus* from coastal waters of Pontian, Johor, Peninsular Malaysia during April 2008 to April 2009 was specifically investigated. The results showed that the mean total length and total weight was  $20.53 \pm 0.04$  mm and  $43.03 \pm 0.23$  mg respectively for males while  $22.82 \pm 0.04$  mm and  $61.47 \pm 0.36$  mg were recorded for the females. Significant differences were observed between mean total length of males and females as well as annual size frequency distributions ( $p < 0.05$ ). The relationship between total length and total weight of *A. serrulatus* was  $W = 0.0098 TL^{2.7706}$  ( $r^2 = 0.83$ ) for males and  $W = 0.0073 TL^{2.8846}$  ( $r^2 = 0.82$ ) for females. Negative allometric nature of growth ( $b < 3$ ,  $p < 0.05$ ) was observed. *Acetes serrulatus* is omnivorous and feed on phytoplankton, zooplankton and microcrustaceans. Majority of the stomach sacs

examined (88.72%) were filled up with food while only 11.28% were empty. The overall sex ratio was found to be 1:1.4 (male:female). Based on the monthly ovary maturation, *A. serrulatus* is a continuous spawner with peak breeding activities during June - July and December in agreement with changes in the Gonadosomatic Index (GSI) value. The asymptotic length ( $L_{\infty}$ ) and growth coefficient (K) was estimated as 28.35 mm and  $1.75 \text{ yr}^{-1}$  for males while 29.40 mm and  $1.50 \text{ yr}^{-1}$  for females. The growth performance index ( $\phi'$ ) was estimated at 3.13 with maximum life span ( $t_{\text{max}}$ ) of 1.86 year. The recruitment pattern was continuous throughout the year. Higher total mortality (Z) rate was observed in males ( $Z = 5.27 \text{ yr}^{-1}$ ) than females ( $Z = 4.97 \text{ yr}^{-1}$ ). Fishing mortality (F) for males was  $2.66 \text{ yr}^{-1}$  while  $2.63 \text{ yr}^{-1}$  for females. Natural mortality (M) was estimated at  $2.61 \text{ yr}^{-1}$  and  $2.34 \text{ yr}^{-1}$  for males and females, respectively. The exploitation rate (E) of 0.52 indicated that the stock of *A. serrulatus* was exploited. This *Acetes* research warrants greater attention for better management of the resources and effective conservation measures for their sustainability.

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

**KANDUNGAN ISIPERUT BERHUBUNGAN DENGAN CIRI PENELURAN  
DAN POPULASI *Acetes serrulatus* Krøyer (DECAPODA: SERGESTIDAE) DI  
PERAIRAN PONTIAN, MALAYSIA**

Oleh

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Udang marin genus *Acetes* Milne-Edwards, 1980 penting dari segi ekologi dan komersil. Kajian sistematik *Acetes* di Malaysia memperihalkan kelimpahan *Acetes serrulatus* yang paling tinggi di perairan Johor. Jadi, biologi dan dinamik populasi bagi *A. serrulatus* di perairan Pontian, Johor, Semenanjung Malaysia dari April 2008 hingga April 2009 khususnya telah dikaji. Keputusan kajian ini menunjukkan bahawa nilai min panjang keseluruhan dan berat badan adalah  $20.53 \pm 0.04$  mm dan  $43.03 \pm 0.23$  mg masing-masing bagi yang jantan manakala  $22.82 \pm 0.04$  mm dan  $61.47 \pm 0.36$  mg bagi yang betina. Perbezaan bererti diperhatikan pada min panjang keseluruhan antara betina dan jantan serta taburan frekuensi saiz tahunan ( $p < 0.05$ ). Hubungan panjang-berat *A. serrulatus* adalah  $W = 0.0098 TL^{2.7706}$  ( $r^2 = 0.83$ ) bagi yang jantan dan  $W = 0.0073 TL^{2.8846}$  ( $r^2 = 0.82$ ) bagi yang betina. Pertumbuhan semulajadi allometrik negatif ( $b < 3$ ,  $p < 0.05$ ) telah diperhatikan. *Acetes serrulatus* merupakan haiwan omnivor dan ia makan fitoplankton, zooplankton dan mikro-krustasea. Sebahagian besar perut (88.72%)

yang diuji mengandung makanan manakala hanya 11.28% perut adalah kosong. Nisbah seks keseluruhan adalah 1:1.4 (jantan:betina). Berdasarkan kematangan bulanan ovari, *A. serrulatus* bertelur berterusan dengan puncak aktiviti pembiakan pada bulan Jun-Julai dan Disember 2008 selari dengan perubahan nilai Indeks Gonadosomatic (GSI). Panjang asimptot ( $L_{\infty}$ ) dan pekali pertumbuhan (K) dianggarkan pada 28.35 mm dan 1.75 setahun bagi yang jantan sementara 29.40 mm dan 1.50 setahun bagi yang betina. Nilai Indeks Pertumbuhan ( $\phi'$ ) dianggarkan sebagai 3.13 dengan panjang hayat maksimum ( $t_{\max}$ ) 1.86 setahun. Corak pengrekrutan adalah berterusan sepanjang tahun. Nilai jumlah kematian (Z) yang lebih tinggi diperhatikan pada yang jantan ( $Z = 5.27$  setahun) berbanding dengan yang betina ( $Z = 4.97$  setahun). Kematian penangkapan (F) bagi yang jantan adalah 2.66 setahun manakala 2.63 setahun bagi yang betina. Kematian semulajadi (M) dianggarkan pada 2.61 setahun dan 2.34 setahun bagi yang jantan dan betina masing-masing. Tahap eksploitasi (E) 0.52 menunjukkan bahawa stok *A. serrulatus* mengalami eksploitasi. Kajian *Acetes* memerlukan perhatian yang lebih besar bagi tujuan pengurusan sumber perikanan yang lebih baik dan perencanaan tindakan pemuliharaan yang lebih berkesan demi kelestarian sumber ini.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Master. The members of the Supervisory Committee were as follows:

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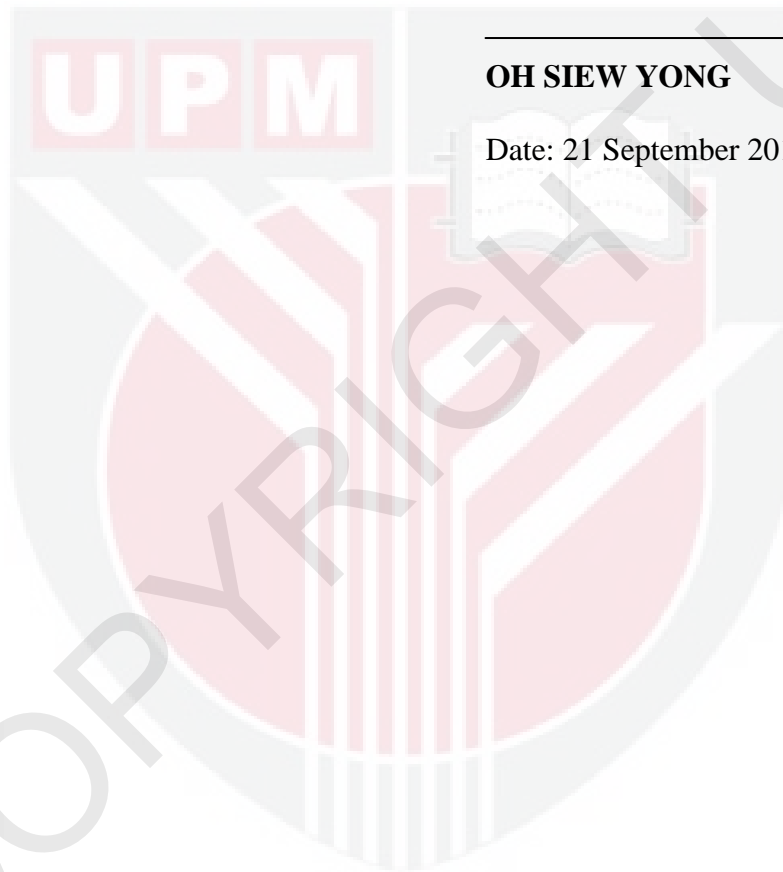
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## DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.



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