UNIVERSITI PUTRA MALAYSIA

FEEDING HABITS, RECRUITMENT AND STATUS OF SERGESTID SHRIMPS (*Acetes intermedius* Omori) STOCK IN BINTULU, SARAWAK

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By

MASITAH SAINI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the degree of Master of Science

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

FEEDING HABITS, RECRUITMENT AND STATUS OF SERGESTID SHRIMPS (*Acetes intermedius* Omori) STOCK IN BINTULU, SARAWAK

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Chairperson: Professor Dr. Aziz Arshad, PhD

Faculty: Agriculture

Growth, mortality, feeding habits, recruitment and status of the stock of *Acetes intermedius*, whom locally known as 'udang geragau', from the coastal waters of Bintulu, Sarawak (N 03˚ 20' 12" and E 113˚ 02' 01") were examined during February 2009 to December 2010. The study conducted using push net or known locally as Sungkor, as mentioned by Omori (1975). It is a triangular shape net with dimensions between 5-6m in length, 4.0-4.5m in wide, and 3.0-3.5m in height. The mean mesh sizes were 3.2±0.27 cm at the anterior section, 0.75±0.0 cm at the middle and 0.5±0.008 at cod end if stretched.

Approximately, two kilograms of *Acetes* samples were taken for each month. The samples were fixed in 70% alcohol at the collection site before transported to UPM Serdang, Selangor. Upon arrival, the samples were rinsed with tap water for twenty minutes before fixed in 10% formalin and analyzed after 2-3 days of preservation.

According to simple resultant index (%SRI), the highest percentage of food items was zooplankton (28.13%) followed by plant matter (13.72%), unidentified item (13.19%), sand and mud (13.01%), debris (11.79%), phytoplankton (10.91%) and algae (9.26%). The various composition of food items proved that *A. intermedius* is an omnivore. *A. intermedius* can switch their major food preference depends on the abundant types of food available and food competition between marine animals.

The growth, mortality, recruitment and relative yield per recruit of *A. intermedius* were investigated based on monthly length-frequency data, using FiSAT software. The average natural mortality (2.21 yr^{-1}) was higher than the average value of fishing mortality (1.73 yr^{-1}) indicates the imbalance position in the stock. The average value for exploitation level (E) was 0.43. This indicates that the fishery of *A. intermedius* in the coastal waters of Bintulu is under exploited. This is based on the assumption that a stock is optimally exploited when fishing mortality (F) equals natural mortality (M), or E = (F/Z) = 0.5. The annual recruitment of *A. intermedius* showed continuous recruitment with two major peaks in April to May and August to September (2009) and March to April and August to September (2010). This indicates that there are two major cohorts produced per year. The peaks were affected by environmental factors and the availability of food source. Although the fishery of *A. intermedius* is under exploited, precautionary measures should be taken in order to maintain the stock balance of *A. intermedius* in Bintulu coastal waters.

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

TABIAT PEMAKANAN, PEREKRUTAN, DAN STATUS STOK UDANG SERGESTID (*Acetes intermedius* Omori) DI BINTULU, SARAWAK

Oleh

MASITAH SAINI

Februari 2013

Pengerusi: Profesor Dr. Aziz Arshad, PhD

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Pertumbuhan, kadar kematian, tabiat pemakanan, pemulihan, status bagi stok A*cetes intermedius*, yang juga dikenali sebagai udang geragau, telah dikaji di perairan Bintulu, Sarawak (N 03˚ 20’ 12” dan E 113˚ 02’ 01”) dari Februari 2009 hingga Disember 2010. Kajian dijalankan menggunakan pukat sungkor dengan saiz dimensi 5-6m panjang, 4.0-4.5m lebar dan 3.0-3.5m tinggi. Purata potongan mata pukat adalah 3.2±0.27cm pada seksyen anterior, 0.75±0.0 pada bahagian tengah dan 0.5±0.008 pada bahagian hujung jika diregang.

Secara purata, dua kilogram sampel diambil pada setiap bulan. Sampel kemudian diletakkan di dalam 70% alcohol pada tapak pengambilan sample sebelum dipindahkan ke UPM Serdang. Kemudian, sampel diletakkan di dalam 10% formalin. Sampel dianalisa selepas 2-3 hari diawet.

Berdasarkan 'Simple Resultant Index' (SRI%), makanan dalam isi perut *A. intermedius* terdiri daripada zooplankton (28.13%), bahagian tumbuhan,(13.72%) bahagian yang tidak dapat dikenal pasti (13.19%), pasir dan lumpur (13.01%), debris (11.79%), fitoplankton (10.91%), alga (9.26%). Kepelbagaian komposisi makanan di dalam isi perut *A. intermedius* membuktikan bahawa udang tersebut merupakan jenis pemakan omnivore. *A. intermedius* boleh menukar pemilihan makanan utama bergantung kepada kelimpahan jenis makanan yang tersedia dan persaingan di antara haiwan marin.

Pertumbuhan, kadar kematian dan pemulihan bagi spesis *A. intermedius* telah dikaji berdasarkan data frenkuensi panjang bulanan dengan menggunakan perisian FiSAT. Kadar kematian secara semula jadi (2.21 yr^{-1}) bagi *A. intermedius* lebih tinggi berbanding kekerapan tangkapan (1.73 yr^{-1}) yang diperhatikan dari kajian ini menunjukkan ketidakseimbangan pada stok. Aras eksploitasi (E) adalah 0.43. Ini menunjukan perikanan *Acetes* di perairan Bintulu adalah di bawah kadar eksploitasi. Ini berdasarkan kepada andaian bahawa stok dieksploitasi secara optimum apabila kekerapan tangkapan (F) bersamaan dengan kadar kematian (M), atau E=(F/Z)=0.5. Kajian ini menunjukan corak pemulihan *A. intermedius* adalah berterusan dengan dua kohot besar setahun berlaku pada April hingga Mei dan Ogos hingga September (2009) dan Mac hingga April dan Ogos hingga September (2010). Hal ini dipengaruhi oleh keadaan persekitaran dan kelimpahan makanan yang tersedia. Walaupun perikanan *A. intermedius* berada pada tahap selamat, langkah berjaga-jaga harus diambil bagi mengekalkan keseimbangan stok *A. intermedius* di perairan Bintulu, Sarawak.

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I certify that an Examination Committee has met on **20th February 2013** to conduct the final examination of **Masitah Binti Sidi @ Saini** on her **master degree** thesis entitled **Feeding Habits, Recruitment and Status of Sergestid Shrimps (*Acetes intermedius* Omori) Stock in Bintulu, Sarawak** in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science (Aquaculture).

Members of the Examination Committee were as follows:

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

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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.

MASITAH SAINI

Date: 20 FEBRUARY 2013

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