

DEVELOPMENT OF FEEDING REGIMES FOR  
BLUE SWIMMING CRAB, *Portunus pelagicus*  
(Linnaeus, 1758) LARVAE.

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MASTER OF SCIENCE  
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**DEVELOPMENT OF FEEDING REGIMES FOR BLUE SWIMMING  
CRAB, *Portunus pelagicus* (Linnaeus, 1758) LARVAE.**

**REDZUARI BIN ALIAS**

**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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## ABSTRACT

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

### DEVELOPMENT OF FEEDING REGIMES FOR BLUE SWIMMING CRAB, *Portunus pelagicus* (Linnaeus, 1758) LARVAE

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Blue swimming crabs, *Portunus pelagicus* (Linnaeus, 1758) is an important source of income for fishermen in Malaysia and shows substantial potential as a candidate species for aquaculture. To date, the literature offers no information on larvae feeding requirements for *P. pelagicus* larvae culture. This study was to identify the optimum density and appropriate of live food requirement for the crab larvae. The importance of optimum density and appropriate of live food in the larval stages that can give the additional knowledge about the amount of food eaten by crabs larvae which it can reduce the mortality of live food in larvae rearing tanks. The experiment was conducted to determine if the presence of *Artemia* nauplii influences the ingestion rate of *Brachionus* sp. by the individual *P.*

*pelagicus* larvae. This study was also aimed to determine food preferences and feeding regimes. Larval diets of *Brachionus* sp. only, *Artemia* nauplii only and a combination of both were provided.

The timing of the introduction of *Artemia* nauplii from the larvae was also examined. This involved three different feeding treatments with *Artemia* nauplii only, *Brachionus* sp. only, and with both *Artemia* nauplii and *Brachionus* sp. This study shows the estimated ingestion rate of *Artemia* nauplii and *Brachionus* sp. after 24 hours by the individual *P. pelagicus* larvae. For Zoea 1, there are 0 *Artemia* nauplii, 35-36 *Brachionus* sp.; for Zoea 2, 1-2 *Artemia* nauplii, 37-38 *Brachionus* sp.; 8-15 *Artemia* nauplii, 38-40 *Brachionus* sp.; for Zoea 3, 12-18 *Artemia* nauplii, 27-37 *Brachionus* sp.; for Zoea 4 stages, 32-35 *Artemia* nauplii and 16-30 *Brachionus* sp. for Megalopa stages. Food intake requirement for 24 hours for every crab larvae stages were used in the 2<sup>nd</sup> experiment. First Zoea stage (Z1) were reared under 6 feeding treatments using either *Brachionus* sp. only, *Artemia* only, or a combination of both, as food (4 replicates per treatment) till they metamorphosed to Megalopa and molt to successive stages was monitored. Results showed that Treatment 3 (*Brachionus*, Zoea 1 to Megalopa; *Artemia*, Zoea 2 to Megalopa) gives the best survival, growth and development rate of Megalopa. Larvae fed solely with *Artemia* nauplii died at Zoea 2 stages while those fed purely with *Brachionus* sp. showed low survival rate to the Megalopa stage.

It is also shows that the individual *P. pelagicus* larvae ingested more *Artemia* nauplii during Zoea 3 to Megalopa stages as compared to Zoea 1 to Zoea 2 stages. Meanwhile, Zoea 1 to Zoea 2 stages ingested more

*Brachionus* sp. as compared to Zoea 3 to Megalopa stages. The study shows that the presence of *Artemia* nauplii did not influence the consumption of *Brachionus* sp. by the individual *P. pelagicus* larvae at every larval stage. Feeding regime of combination diet of *Brachionus* sp. (Zoea 1 to Megalopa) and *Artemia* (Zoea 2 to Megalopa) appeared to be the most suitable condition for the rearing of larvae of *P. pelagicus*.

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## ABSTRAK

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

### PERKEMBANGAN REGIM MAKANAN UNTUK LARVA KETAM BIRU, *Portunus pelagicus* (Linnaeus, 1758)

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Ketam renjong, *Portunus pelagicus* adalah sumber yang penting sebagai punca pendapatan nelayan di Malaysia dan menunjukkan potensi yang besar sebagai spesies untuk akuakultur. Sehingga kini, tidak ada penulisan tentang maklumat mengenai keperluan pemakanan larva bagi *P. pelagicus* larva. Kajian ini adalah untuk mengenal pasti kepadatan optimum dan keperluan makanan yang bersesuaian oleh larva ketam. Kepentingan kepadatan optimum dan keperluan makanan di peringkat larva yang dapat memberi pengetahuan tambahan mengenai jumlah makanan yang dimakan oleh larva ketam, di mana dapat mengurangkan kadar kematian makanan hidup dalam tangki pemeliharaan larva. Satu eksperimen telah dijalankan untuk menentukan jika kehadiran *Artemia* nauplii mempengaruhi

pemakanan *Brachionus* sp. oleh individu larva *P. pelagicus*. Kajian ini juga bertujuan untuk menentukan pilihan utama makanan dan regim pemakanan. Pemakanan larva *Brachionus* sp. sahaja, *Artemia* nauplii sahaja dan gabungan kedua-duanya telah disediakan.

Masa pemberian makanan *Artemia* nauplii dari larva juga dikaji. Ini melibatkan tiga kawalan makanan yang berbeza iaitu dengan *Artemia* nauplii sahaja, *Brachionus* sp. sahaja, dan dengan kedua-dua *Artemia* nauplii dan *Brachionus* sp. dalam tangki ternakan. Kajian menunjukkan bahawa anggaran kadar pemakanan *Artemia* nauplii dan *Brachionus* sp. selepas 24 jam oleh individu larva *P. pelagicus* iaitu 0 *Artemia* nauplii, 35 - 36 *Brachionus* sp.; untuk Zoea 2, 1 - 2 *Artemia* nauplii, 37 - 38 *Brachionus* sp.; 8 - 15 *Artemia* nauplii, 38 - 40 *Brachionus* sp.; untuk Zoea 3, 12 - 18 *Artemia* nauplii, 27 - 37 *Brachionus* sp.; untuk peringkat Zoea 4, 32 - 35 *Artemia* nauplii dan 16 - 30 *Brachionus* sp.; untuk peringkat Megalopa. Keputusan keperluan pengambilan makanan selama 24 jam untuk setiap peringkat larva ketam akan digunakan dalam eksperimen ke-2. Peringkat pertama Zoea (Z1) telah diternak di bawah 6 rawatan yang diberi makanan menggunakan *Brachionus* sp. sahaja, *Artemia* sahaja, atau gabungan kedua-duanya, sebagai makanan (4 replikasi setiap rawatan) sehingga bertukar kepada Megalopa dan bersalin kulit untuk setiap peringkat telah dipantau. Keputusan menunjukkan bahawa Rawatan 3 (Rotifer, Zoea 1 hingga Megalopa, *Artemia*, Zoea 2 hingga Megalopa) memberi kadar kelangsungan hidup yang terbaik, pertumbuhan dan perubahan daripada Megalopa. Larva yang makan dengan *Artemia* nauplii sahaja mati di peringkat Zoea 2

manakala larva yang makan dengan *Brachionus* sp. sahaja menunjukkan kadar kelangsungan hidup yang rendah ke peringkat Megalopa.

Ini juga menunjukkan individu *P. pelagicus* larva telah memakan banyak *Artemia* nauplii semasa peringkat Zoea 3 hingga Megalopa berbanding dengan peringkat Zoea 1 hingga Zoea 2. Sementara itu, peringkat Zoea 1 hingga Zoea 2 *P. pelagicus* memakan banyak *Brachionus* sp. berbanding peringkat Zoea 3 hingga Megalopa. Kajian menunjukkan bahawa kehadiran *Artemia* nauplii tidak mempengaruhi pemakanan *Brachionus* sp. oleh individu larva *P. pelagicus* di setiap peringkat larva. Regim pemakanan diet kombinasi *Brachionus* sp. (Zoea 1 hingga Megalopa) dan *Artemia* nauplii (Zoea 2 hingga Megalopa) adalah yang paling sesuai untuk ternakan larva *P. pelagicus*.