



UNIVERSITI PUTRA MALAYSIA

***COMPOSITION AND SEASONAL VARIATION OF CRAB LARVAE IN
THE MATANG MANGROVE FOREST, PERAK***

NORIZAN BINTI IBRAHIM

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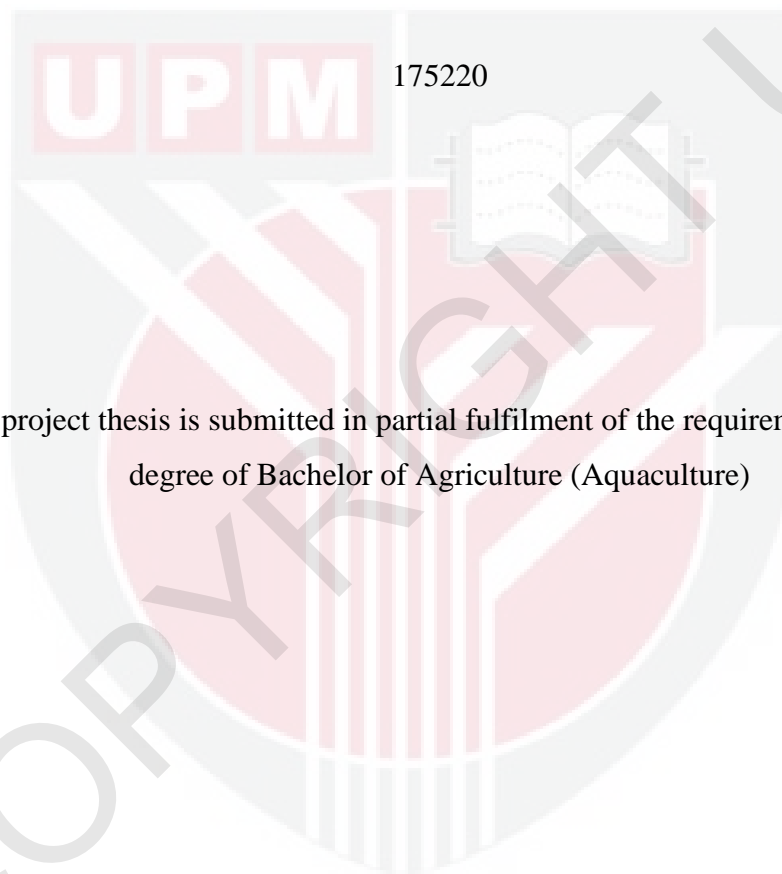
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COMPOSITION AND SEASONAL VARIATION OF CRAB LARVAE IN THE
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NORIZAN BINTI IBRAHIM



This project thesis is submitted in partial fulfilment of the requirements for the
degree of Bachelor of Agriculture (Aquaculture)

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2016

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This is to certify that I have examined the final year report and all corrections have been made as recommended by the panel of examiners. This report complies with the recommend format stipulated in the AKU 4999 project guidelines, Department of Aquaculture, Faculty of Agriculture, Universiti Putra Malaysia.

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ABSTRACT

A study was conducted to investigate the composition and seasonal variation of crab larvae in the Matang Mangrove Forest, Perak from June 2015 to January 2016. The sampling areas were divided into station 1 (MO), considered as least disturbed mangrove, station 2 (MT), was considered as moderately disturbed mangrove and station 3 (MS), was considered as most disturbed mangrove. In total, 9,952 individuals were observed under the microscope for identification. The analysis of water parameter data showed that there were significant ($p < 0.05$) variations in salinity among the stations and between the seasons. Total catch comprised of 3 major families namely: Leucosiidae (3.19%), Sesarmidae (24.48%) and Porcellanidae (1.40%), with the rest as unidentified (71%). Sesarmidae larvae were the most abundant family, which appeared in every month with the maximum density in December. It was observed that the highest mean density (303.12 ± 150.26 individual/ 100m^3) of crab larvae was at moderately disturbed mangrove (MT) and the lowest mean density (73.22 ± 33.46 individual/ 100m^3) was found in least disturbed mangrove (MO). It is also revealed that highest crab larval density was found in wet season (405.72 ± 154.12 individual/ 100m^3) compared to larval density in dry season (11.18 ± 10.86 individual/ 100m^3). There was a significant ($p < 0.05$) difference between the dry and wet seasons on the basis of all diversity indices of crab larvae.

ABSTRAK

Satu kajian dijalankan untuk menyiasat komposisi dan kejadian bermusim larva ketam di Hutan Paya Bakau Matang, Perak telah dijalankan dari Jun 2015 hingga Januari 2016. Kawasan persampelan dibahagikan kepada stesen 1(MO), dikatogerikan sebagai paya bakau kurang terancam, stesen 2 (MT), dikatogerikan paya bakau sederhana terancam dan stesen 3 (MS), dikatogerikan sebagai paya bakau paling terancam. Sebanyak 9, 952 larva ketam telah di identifikasi menggunakan mikroskop. Analisis data parameter air menunjukkan terdapat perbezaan bererti ($p < 0.05$) kemasinan air diantara stesen and diantara musim. Jumlah tangkapan terdiri daripada 3 famili yang utama iaitu: Leucosiidae (3.19%), Sesarmidae (24.48%) dan Porcellanidae (1.40%), selebihnya dikatogerikan sebagai tidak dikenalpasti (71%). Oleh itu, larva Sesarmidae adalah family yang paling banyak muncul dalam setiap bulan dengan kepadatan maksimum pada bulan Disember. Purata kepadatan larva ketam yang paling tinggi (303.12 ± 150.26 individu/ 100m^3) adalah di paya bakau sederhana terancam (MT) dan purata kepadatan yang paling rendah (73.22 ± 33.46 individu/ 100m^3) adalah paya bakau paling kurang terancam (MO). Kajian ini juga mendedahkan bahawa kepadatan tertinggi (405.72 ± 154.12 individu/ 100m^3) larva ketam adalah ketika musim hujan berbanding dengan musim kering (11.18 ± 10.86 individu/ 100m^3). Terdapat perbezaan bererti ($p < 0.05$) kehadiran larva ketam diantara musim kering dan musim hujan berdasarkan semua indeks kepelbagaian.

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LIST OF ABBREVIATION

$^{\circ}\text{C}$	Degree Celsius
ANOVA	Analysis of variance
DO	Dissolved oxygen
m^3	Cubic meter
mg/L	Milligram per liter
pH	Measure of acidity of a solution
PRIME	Plymouth Routine Multivariate Ecological Research
SPSS	Statistical Package for Social Science
SE	Standard Error
%	Percentage
<	Less than
>	More than
H	Shannon-Wiener index
J	Pielou's Evenness index
D	Family richness
N	Number
μm	Micrometre
SD	Standard deviation

CHAPTER 1

INTRODUCTION

Malaysia has around 645,852 ha of mangrove which is the largest in the Asia Pacific region (Azahar and Nik Mohd Shah, 2003). The Matang Mangrove Forest in Perak, Peninsular Malaysia roughly covers a land area, about 40,711 ha (Roslan and Nik Mohd Shah, 2014). The productive woods represents 85% of the region and has been suitably managed since the 19th century (Tanouchi *et al.*, 2000). In addition, the ecosystems of mangroves forest and brackish water in the surrounding area provide habitats for aquatic animals, such as crabs and fish to grow and reproduce. Therefore, those involved in fisheries are able to enjoy benefits from mangrove forests.

The present study on the composition of crab larvae will provide valuable data on what types of families or species of crab larvae available in Matang Mangrove Forest. Generally, the planktonic larvae of many estuarine invertebrates often may be retained in estuaries (Christy and Stancyk, 1982) and contribute importantly to adult populations (Gaines and Bertness, 1992). This include many brachyurans where they invade mangrove area as a transitional stage between the planktonic zoea, megalopa and the benthic adult (Sandifre, 1975; Dittel and Epifanio, 1990; Epifanio *et al.*, 1984). According to Kristensen (2008), mangrove is the perfect habitat for sesarmid crab, fiddler crab, and mud crab.

Generally, many studies have been done on the abundance and distribution pattern of crab larvae. Most of the researchers agreed that the abundance and distribution of crab larvae are related to the hydrological parameters (Ingles and Braum, 1984; Mense and Wenner, 1989; Dittle and Epifanio, 1990; Little and Epifanio, 1991; Watanabe *et al.*, 1992; De Vries *et al.*, 1994; Lochmann *et al.*, 1995; Johnson and Perry, 1999). It can be concluded that the dispersal of the crab larvae can be attained by horizontal current in coastal and estuarine systems (Young, 1995). Forward *et al.* (2003) explained that in specific environments such as estuaries, crab larvae migration is usually synchronised with 'selective tidal stream transports'. In addition, Ingles and Braum (1984) emphasises that currents and water circulation seem to be the most important influence on the horizontal distribution of the larvae. Kingsford *et al.* (2002) stated that the dispersal of crab larvae can also be attained by self-propulsion. In other words, crab larvae can perform significant vertical migration (Mileikovsky, 1973; Schmalenbach and Buchholz, 2009) and perform 'partial navigations' (Kingsford *et al.*, 2002) by arranging their vertical position and staying at specific layers of the water column.

A number of papers such as in Singapore, Russia, Bangladesh, Australia and Japan were published by the author from the recent work (Javed *et al.*, 2001; Korn and Kornienko, 2015; La Sara *et al.*, 2006), which provided data on the composition, season of occurrence and distribution larvae of true crabs (Decapoda: Brachyuran). However, the data on crab larvae that inhabit these areas are not available. The present study was conducted to provide information regarding crab larvae occurrence in Matang Mangrove Forest, Perak.

The general objectives of this work are to:

1. Identify the crab larval composition up to family level found in the Matang Mangrove Forest, Perak
2. Investigate spatio-temporal variation of crab larvae in the Matang Mangrove Forest, Perak.



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