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Copepods status in seagrass area of Pulau Tinggi Marine Park, Johor, Malaysia

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Abstract. Zooplanktons were extensively studied to investigate species composition and density of copepods. Samples were collected from sea grass area in Pulau Tinggi for three months (April, June and October, 2015). Zooplankton samples were collected using Conically shaped plankton net (with mouth opening size of 0.30 m and 1.00 m length) with 100µm mesh size with an acrylic plastic cod end. Ten sampling stations were established for the collection of water samples. In the present study, a total of 54 species of copepods from 29 genera and 22 families were identified. Calanoids were the dominant group among the copepods. The most observed species were *Paracalanus indicus, Paracalanus elegans, Oithona falax and Corycaeus agilis.* The density of copepods was determined in the month of April, 2015. The highest density was 1245 individuals/m^3 during the study period. The findings of the present study provide valuable information for fisheries authorities and marine controlling departments.

1. Introduction

Zooplankton performs a key role in the aquatic environment. They connect the primary producers, phytoplankton, with higher trophic level living organisms. They occupy the second trophic level as consumers. The communities of Zooplankton react to a wide variety of disturbances including nutrient loading and play a vital role in the food chain of the aquatic environment [1]. Zooplankton is the nourishment of numerous types of planktonic and benthonic invertebrates as well as the food of the juvenile fishes [2]. Most of the fishes feed on zooplankton during juvenile stages and some fishes eat zooplankton during their whole lives [3].

Zooplankton importance as fish food both for adults and fry has been discussed by different researchers [3]. They have a key role in fish nutrition, both in captive fisheries as well as in aquaculture [4]. According to [5], zooplankton plays a pivotal role as bio-indicator and it is an appropriate instrument for understanding water contamination status. The adverse environmental conditions change the occurrence, vitality and responses of zooplankton [6]. Zooplankton reacts rapidly to the environmental changes of water such as the odour, taste pH and colour of water being their short life cycle. That's why used as bio indicator of water quality [3]. Zooplanktons are free floating microscopic aquatic invertebrates often with size that range from several micrometers to a millimetre [7] as shown in Figure 1.

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The coastline of Johor is approximately 436 km. The state government has identified around 72 islands and 13 of them named as Marine Parks. They are collectively known as the Sultan Iskandar Marine Park (SIMP). Johor is situated in the southernmost state of Peninsular Malaysia, the South China Sea is located (on the east coast), the Straits of Malacca (on the west coast) and Johor Straits (on the south) [8].



Figure 1. Zooplankton image was taken under a compound microscope in UTHM laboratory.

2. Material and Methods

Samples collection were done bimonthly between April, June and October, 2015, from Pulau Tinggi Mersing (Marine Park Johor) as shown in Figure 2 A and B. Ten sampling stations were established with coordinates between N 02 16.863 E 104 07.182 and N 02 16.988 E 104 06.804. Plankton net with 100μm mesh size having mouth opening size of 0.30 m and 1.00 m length was used for the collection of water. Sampling was done in the morning and kept the same for each trip. The boat took one hour to reach Pulau Tinggi from Mersing. Six to seven persons took part in sampling during each trip.

2.1. Sampling of water and Laboratory procedures

Samples of water with zooplankton were collected in triplicates from Pulau Tinggi in April, June and October, 2015. Samples were collected by vertical (from the deepest depth) and surface horizontal tows and preserved using 10 percent buffer (pH 8.0-8.2) formalin. Samples were then brought to the laboratory of UTHM and further analyzed to determine biomass and zooplankton density. The water quality parameters such as temperature, conductivity, salinity, dissolved oxygen (DO), pH and turbidity were determined in-situ using a handheld multiparameter probe (Hanna model HI 9829).One part was used for biomass determination and another for identification and enumeration. The collected samples were transferred to a petri dish in the laboratory, observed and sorted through a dissecting microscope. Zooplankton was counted using Sedgewick Rafter counting chamber to measure the density. The counting chamber was used for counting.

2.2. Identification

Copepods were identified following [9]. Identification was carried out by studying the body shape, segments of the antenna and caudal rami of Copepod.

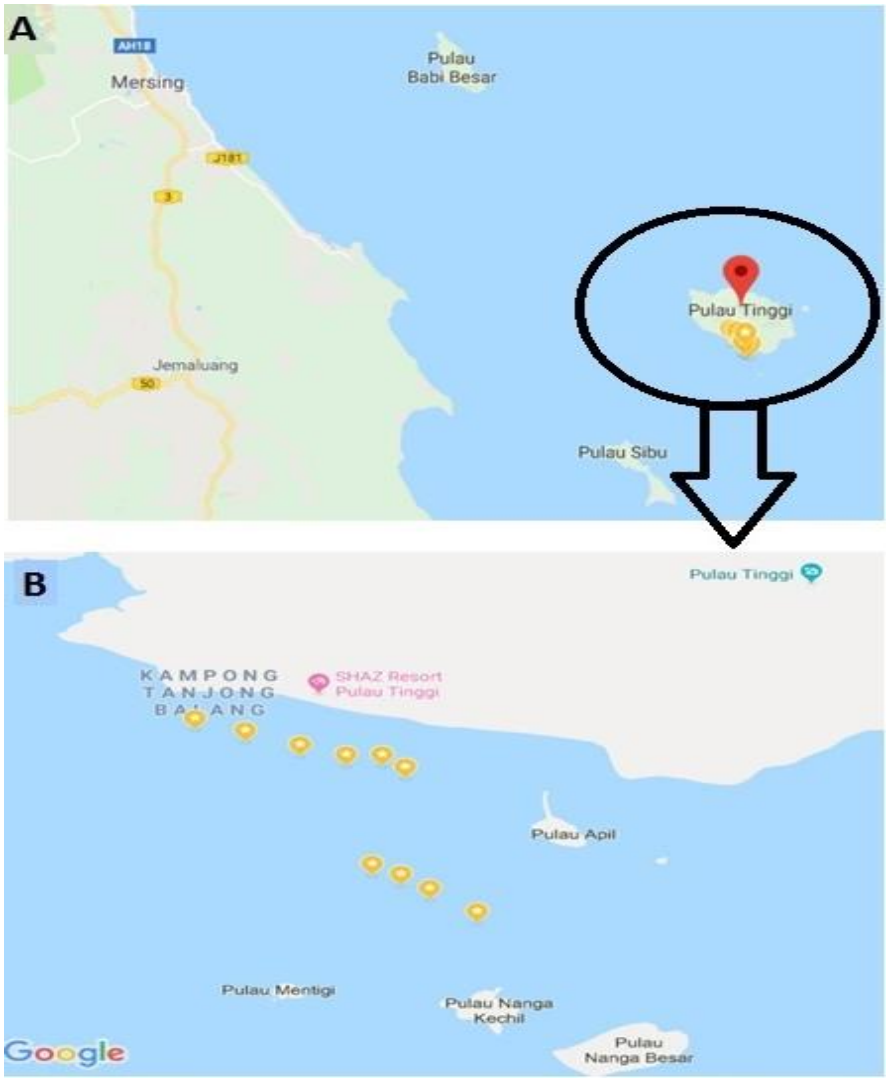


Figure 2. The map (A) shows the sampling site and (B) shows the stations in Pulau Tinggi, Johor

3. Results and Discussion

A total of 54 species of copepods from 29 genera and 22 families were identified. Calanoids were the most abundant group among the zooplankton in all stations. *Paracalanus indicus* have the highest density of 1245 individuals/m^3 among the stations. The family Corycaeidae have seven species of copepods which is the highest species number in the month of April, 2015 as shown in figure 3. In this study, the most diverse group was Calanoid copepods represented by 38 species. In the same way [10] reported that copepods dominate the zooplankton community in the sea grass area in Malaysian coastal waters. Moreover, in the present study, the sea grass area is dominated by *Paracalanus indicus, Paracalanus parvus*, *Paracalanus elegans*. *P. indicus* contributed 38% while P. Parvus and p.elagans contributed 17% and 8% respectively to the copepods abundance. The very small copepods were named as juvenile and it was around 7% of the copepods.

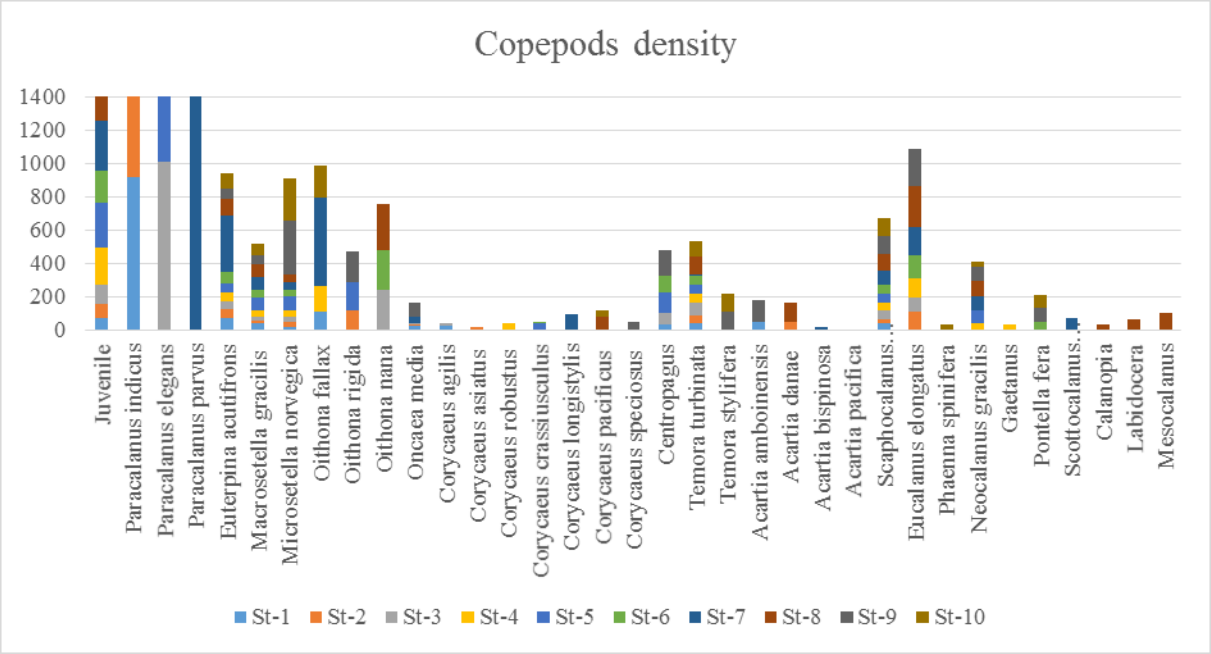


Figure 3. The figure showing the density of copepods samples collected in April 2015 from Pulau Tinggi, Johor.

4. Conclusions

The importance of copepods in the sea grass area is essential. Investigation of their status is rarely assessed. The findings of the present study provide valuable information for fisheries authorities and marine controlling departments.

5. Acknowledgement

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