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Research paper

Preliminary Observations of Zooplankton in Pulau Tinggi, Marine Park, Johor, Malaysia

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Abstract

Zooplankton was studied in Pulau Tinggi, Marine Park, Johor, Malaysia for their abundance and species diversity. Water samples were collected within three months, April, June and October 2015.Ten sampling stations were established during the study period. A total of 54 species of copepods from 29 genera and 22 families were identified. An average of 86.70 % copepods and 15.84% non-copepods were recorded among the zooplankton groups. The water quality parameters such as depth, dissolved oxygen, pH, temperature, turbidity, and salinity were measured in situ. The present study was taken to observe the abundance and diversity of zooplankton in Pulau Tinggi, Johor. This research will be helpful for fisheries authorities and marine controlling departments. The effect of different physico-chemical parameters on the biomass and density of zooplankton will be discussed in the coming paper.
Key words: Zooplankton, Copepods, Pulau Tinggi, Salinity.

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1. Introduction

Zooplanktons are microscopic organisms present in almost all types of the water body. Most planktonic organisms are cosmopolitan in distribution. Zooplankton plays an important role in the aquatic ecosystem. They link the primary producers, phytoplankton with higher trophic level organisms. They occupy the second trophic level as consumers [1]. Zooplankton communities respond to a wide variety of disturbances including nutrient loading and play a key role in the aquatic food chains [2 and 3]. Zooplankton is considered as the main food source of several species of planktonic and benthonic invertebrates as well as commercially important fish (larvae, juveniles and adults) [4]. Nearly all kind of fish depend on zooplankton for their food during their larval phases and some fishes continue to eat zooplankton in their entire lives [5]. Zooplanktons are free floating aquatic invertebrates often considered as microscopic because of their usually small size that range from a few to several micrometers and rarely exceeding millimeter [6].
Johor has approximately 436 km of coastline. There are approximately 72 islands identified by the state government, with 13 islands gazetted as Marine Parks, collectively known as the Sultan Iskandar Marine Park (SIMP). Johor is the southernmost state of Peninsular Malaysia, and is surrounded by the South China Sea (on the east coast) the Johor Straits (south) and the Straits of Malacca (on the west coast) [7]. The present study was taken to observe the abundance and diversity of zooplankton in Pulau Tinggi, Johor. This research will be helpful for fisheries authorities and marine controlling departments.

2. Materials and Methods

2.1. Sampling site

Pulau Tinggi Mersing (Marine Park Johor) was selected for samples collection, as shown in Fig 1 (A). Ten sea grass sampling stations were established with coordinates between N 02 16.863 E 104 07.182 and N 02 16.988 E 104 06.804 as shown in Figure 1.



Fig. 1: The mape showing sampling site in Pulau Tinggi, Johor.

2.2. Sampling of water

Zooplankton samples were collected using conically shaped (with mouth opening size of 0.35 m and 1.00 m length) plankton net with 100µm mesh size with an acrylic plastic cord at the end. Samples for zooplankton were collected from Pulau Tinggi in April, June and October, 2015. Triplicate samples for biodiversity

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and biomass analysis will be collected by vertical (from the deepest depth) and surface horizontal tows. Samples were preserved using 10 percent buffer (pH 8.0-8.2) formalin. The participants for sampling stayed around 10 minutes on each station. The samples were taken from that area having sea grass. The diver first confirmed the sea grass area as shown in Figure 2 and then water collected from that area. Water quality parameters such as temperature, pH, Salinity, dissolved oxygen (DO), conductivity and turbidity were measured in situ using a handheld multiparemeter meter (Hanna model HI 9829).



Fig. 2: showing the diver observation in the sea grass area

2.3. Laboratory procedures

Samples were brought to the laboratory of UTHM and further analyzed for biomass determination and counting of zooplankton.

2.4. Sample processing

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 and were seen through dissecting microscope. The samples were sorted out under a dissecting microscope (Olympus model SZX16) as shown in Figure 3.

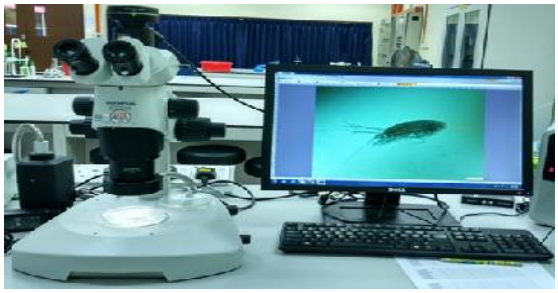

Fig. 3: Shows the measurement of zooplankton size using computer.

The water samples were collected in 250 ml bottle. Each bottle was divided in to two parts through Folsom plankton splitter [8].

2.5. Identification

Copepods were identified following [9]-https://copepodes.obs-banyuls.fr/en/. Identification was carried out by studying the body shape, segments of the antenna and caudal rami of Copepod [10].

3. Results and Discussion

In the present research zooplankton was classified in to eight taxonomic groups. Copepods were further identified and a total of 54 species of copepods from 29 genera and 22 families were recorded during the study duration. Copepods were abundant having an average value of 86.70 % and non-copepods were 15.84% (Figure 4) in the three months (April, June and October, 2015). The same results for copepods were reported by Matias-Peralta and Yusoff, 2015 from Merambong Seagrass Meadow, Johor. The highest percentage of copepods were observed in the month of October followed by June in the present study. Larvacians were the second abundant group after copepods.The highest percentage of larvacians was noted in April, 2015.

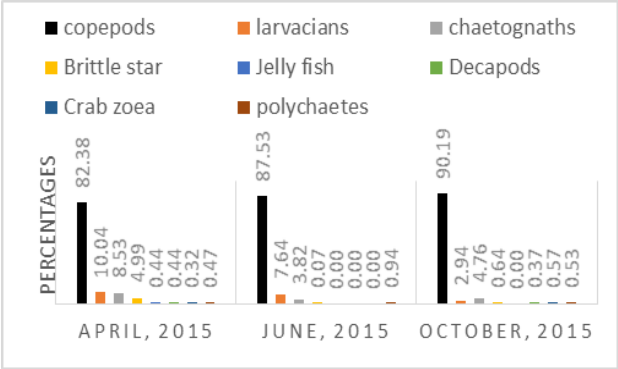

Fig. 4: shows the percentages of zooplankton groups during the study period (April, June and October, 2015) in Pulau Tinggi, Johor.

4. Conclusion

The importance of copepods is essential as the abundance of copepods is rarely investigated in the seagrass area. This research will be helpful for fisheries authorities and marine controlling departments especially in the sea grass ecosystem.

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