Density and Distribution of Marine Benthos in the Cambodian Water

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Abstract

The density and distribution of marine benthos were examined between 7-18 November 2016 from 24 Stations with the aimed of studying the benthos community in terms of abundance and species diversity. There are 18,953 individual samples collected by Smith Mc-Intyre grab with dimension of 0.1089 m^2 A. total of 5 groups were identified. Total marine benthos abundance was recorded 3,783 ind./m^2, 3,673 ind./m^2 and 2,094 ind./m^2 respectively in station 8, station 24 and station 15. The Crustacea (10,395 ind./m^2) was dominant all the study station (except in station 4, 12 and 23) in the Cambodian Water. The overall composition of marine benthos are Crustacea (54.7 %), Polychate (33.3 %), Mollusca (4.3 %), Echinidermata (2.0%) and Other groups. The present study reveals that the marine benthos and their abundance are variable among the Cambodia Water. The obtained information can be use for the further study of seasonal change of marine benthos and conserve biodiversity of the Cambodia Water.

Key Words: Density, Distribution, Marine benthos, Smith Mc-Intyre grab, Cambodian water

Introduction

Cambodia Water is one of the large marine ecosystems, which coast of Cambodia is along the Gulf of Thailand from Thai border in the northwest to the Vietnamese border to southeast. The coastal area includes several large bays and extends across the provinces of Kon Kong and Kampot and the municipalities of Sihanoukville and Kep. The offshore marine area contains numerous islands. The coast covers a length of some 435 km along Gulf of Thailand, and the EEZ of approximately 55,600 km^2 (Chamchang,2008) and relatively shallow with an average depth of about 50 meters.

The collaborative research project between SEAFDEC's Training department (TD) in Thailand, Fisheries Administration (FiA), National Fisheries University (NFU) have initiated a research programmed survey on biological oceanography in Cambodian Water aim at providing a necessary information for management of the environment and fishery resources which the study marine benthos is part of the biological oceanographic in Cambodian Water. Here to fore, on attempt has been made to collect marine benthos in the Cambodia Water. Therefore this study should be the baseline about information of benthos on Cambodia area. Despite the importance of marine benthos in the marine environment, particularly in the Cambodia Water, information on the species composition and abundance of marine benthos in Cambodia Water is still lacking.

Material and Method

Study area

The survey was carried out during 7-18 November 2016 in the Eastern gulf of Thailand under jurisdiction of Cambodian Water.

Sampling method

The sample was collected by Smith McIntyre grab (area coverage 0.1 arge) at 24 stations. The sediment is wash through a set of sieves, which mesh sieve of 1 mm. and 0.5 mm. The large benthos were removed during the washing process and placed directly in plastic preservation containers. The sediment sample remaining on the sieve was sorted out and fixed in 10% formaldehyde solution and mixed with "rose Bengal" in sea water on board and were subsequently sorted and preserved in 70% ethyl alcohol in laboratory. The sorted marine benthos was identified and counted separately for each group. The number of individuals of five (5) taxonomic groups.

Biological index

Shannon-weiner (H′)

$$H=\sum \left(\frac{Ni}{N}\right) \log 2 \left(\frac{Ni}{N}\right)$$

Result

The density and distribution of marine benthos

The overall density of marine benthos in Cambodian water was 18,953 ind./m^2. The Five (5) groups of marine benthos found in Cambodian water are Crustacea, Polychate, Mollusca, Echinodermata and Other groups. Crustacea (10,211 ind./m^2) dominated group in

the benthic communities, followed by Polychaete (6,208 ind./m^2), Mollusca (808 ind./m^2), Echinodermata (367 ind./m^2) and Other groups (1,065 ind./m^2) were observed consistently throughout the station in the investigated area. The total average density of marine benthos varied from 0 to 3,783 ind/m^2 . High density areas of the total marine benthos occurred at station 8 and low density in station 18 and 23.

Distribution of the four dominant marine benthos

Crustacean

The crustacea dominated and occurred at 21 out of 24 sampling station, most of them situated in high oxygen near shore.

Polychaeta

The polychaete was the second most density group of marine benthos. They were observed at 21 out of 24 sampling station. The highest density occurred at station 8 and the lowest in station 6, 11 and 23. The distribution of polychaete mostly discovered along the coastal zone where the oxygen is higher than other area.

Mollusca

The molluscs were observed at 9 out of 24 sampling station. It was mostly of small size and not economically significant. The highest density at station 8 and the lowest in station 2, 7 and 10. They were more distributed near shore wth high oxygen.

Echinodermata

The echinoderm was found at 16 out of 24 sampling station. The amount of echinoderm which was found from each station is approximate.

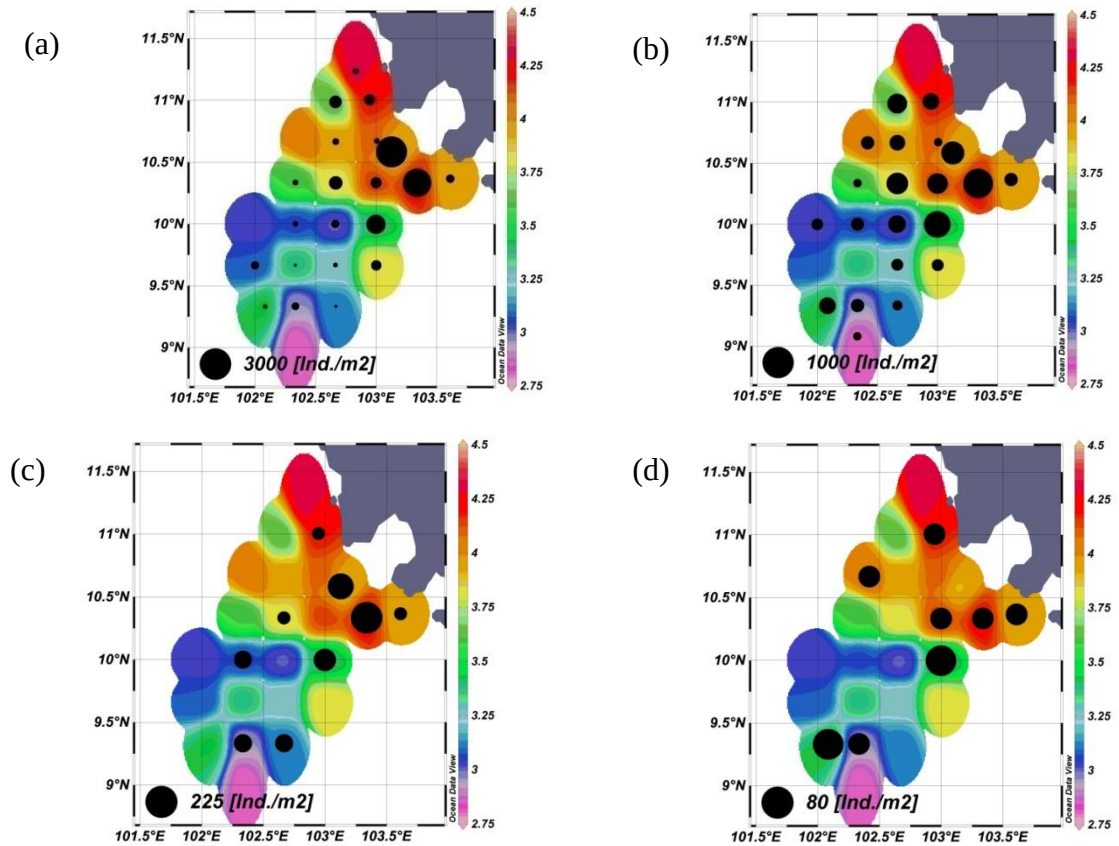

Fig.5 Distribution of four (4) marine benthos a) Crustacean b) Polychaeta c) Mollusca

and d) Echinodermata

Ecological index

The average diversity index was 0.87 in the survey area. The highest value of diversity index (H') found in station 22 (1.32), follow by station 13 (1.24) and 21 (1.22), while the lowest was at station 1 (0.00052)

Discussion

The marine benthos is important for enhancing of aquatic resources and also play an important role in food chain of Marine Ecosystem (Quasin S et al, 2009). Sea floor environment probably affect the composition and abundance of marine benthos but this survey not analyze composition of sediments and not classified size of marine benthos.

This survey was the total marine benthos belonging to five (5) groups 18,953 individuals observed in Cambodian water. The results showed that the crustacean species dominated this survey,and polychaete second in density. Due to this first time study survey of marine benthos in Cambodian water, so this is compared to the data of density of marine benthos of nearby area. Ibrahim et.al. (2006) carried out survey at Karah Island, Terengganu, Malaysia found that polychaete was the most density. Piamthipmanus (1997) carried out in survey in Gulf of Thailand and Peninsular Malaysia reported that polychaete dominated the area, followed by crustacea.

This first study report for analysis diversity index in Cambodian water. Comparing to nearby area studies by Piamthipmanus (1997) it was found that the average diversity index in Gulf of Thailand was 3.03 which was higher than in Cambodian water (diversity index was 0.83). Factors that can contribute the difference of diversity index are food and availability, predator abundance, sea floor and physical condition. This information is based for study in future.