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TAXONOMIC STUDY ON THE INTERTIDAL GREEN MUSSEL AND THEIR ECOLOGY FROM THE MOHESHKHALI CHANNEL, COX'S BAZAR, BANGLADESH.

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Abstract: The green mussel inhabiting Moheshkhali jetty within the Moheshkhali channel has been identified as *Perna viridis* (Linn. 1758). Occurrence of *P. viridis* from the channel has been reported for the first time. The physico-chemical parameters of the habitat water have also been studied for one year between November, 1990 and October, 1991. The recorded physico-chemical parameters were suitable for the growth of the species.

Key words: Taxonomy; Green mussel, *Perna viridis*, Ecology, Moheshkhali channel, Cox's Bazar

Introduction

Now a days mussels are of greate interest to the ecologists and bioscientists as well as to the people as food and ornamental objects. In many parts of the world they are included as delicate food items and have considerable potential as a cheap protein source for many developing countries. Proper identification before any further study is imperative. Error in the identification of green mussel (up to species level) is common due to analogous morphological characters of different species even under different genus or family (Bayne, 1976). For instance, *Perna viridis* has been referred as *Mytilus viridis* and *M. smaragdinus* for a long time in South and South-east Asian countries (Bal and Rao, 1984).

Taxonomic study of the green mussel from the Indian sub-continent was first conducted by Hornell in 1922. Since then, Gravely (1941), Rao (1974) and Kuriakose (1980) have studied the taxonomy and distribution of green mussel from Indian waters. Coomans (1940) provided the first taxonomic account of selected molluscs from St. Martin's Island, Bangladesh. Later Ali (1975), Ali and Aziz (1976) reported the systematics of molluscan fauna from the St. Martins island. Ahmed *et al*. (1978) and Ahmed (1990) provided the systematics and distribution with ecological features of the molluscan fauna from Cox's Bazar, Teknaf and other coastal regions of the Bay of Bengal of

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Bangladesh. Elsewhere in the world the taxonomy and ecology of green mussels have been studied by many workers (Hornell, 1951; Bayne, 1976; Kuriakose *et al.*, 1988; Sreenivasan *et al*., 1988).

The physico-chemical aspects of the Moheshkhali channel have been reported by Ali *et al*. (1985). The present study has been made to identify the green mussel settled on the newly built Moheshkhali jetty within the Moheshkhali channel and to know some the basic physico-chemical factors of their habitat water.

Materials and Methods

The study was conducted during November, 1990 to October, 1991. Specimens were collected randomly by hand picking from the steel coated concrete pillar of the Moheshkhali jetty (built in 1989). The jetty is located at Gorokghata, about half a kilometer south east from the Moheshkhali Thana (between latitudes 21°31'N and longitude 91°85'E, Fig.- 1).

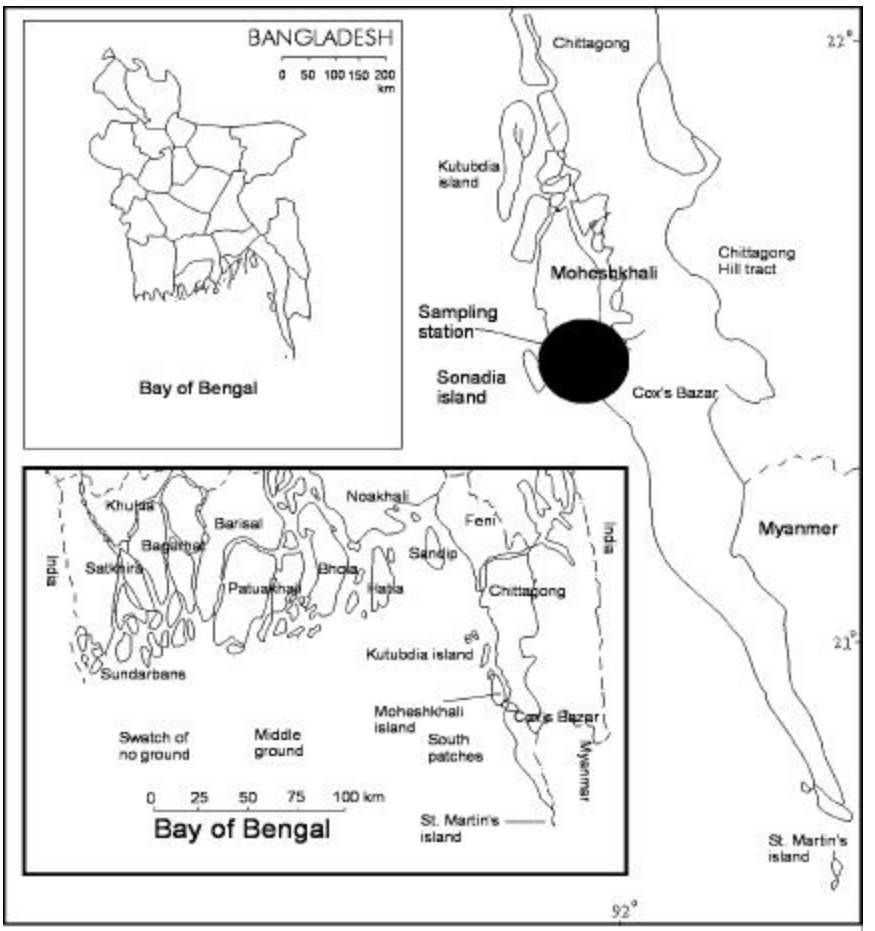

Fig.- 1. Map of Bangladesh, coastal zone and sampling station.

Identification of individuals of the green mussels was carried out based upon the morphological features following Bayne (1976), Kuriakose (1980), and Bal and Rao (1984).

To determine the physico-chemical features of water at the jetty area, water samples from 1m depth were collected monthly during the study period using a Nansen bottle. Water temperature was recorded *in situ* with a reversible thermometer attached to the Nansen bottle. Water pH was recorded with a pen pH meter. Salinity and dissolved oxygen content of water were determined by the standard Mohr-Knudsen method (Barnes 1959) and Winkler's method (APHA 1976) respectively. Turbidity of water was determined with the Formazine Turbidity Tubes following APHA (1976). Rainfall data were obtained from the meteorological station at Cox's Bazar.

Results and Discussion

General morphological and identifying characters have been shown in Fig.- 2. The total length of the mussels varied between 4.78 mm and 97.8 mm. The animal was found to attach by byssal threads, secreted from the base of its foot. The mussel was found to be thin and elongated in the posterior region with a corresponding reduction of the anterior region. The hinge ligament was situated externally. The umbo was at the anterior extremity of the shell. The posterior adductor muscles were greatly enlarged. The outer surface of the shell was covered by a smooth periostracum and sculptured by radial ribs. All these features are the characteristics of the family Aviculidae of the order Mytiloida under the class Pelecypoda.

The pedal retractor muscle of the animal was found at the anterior end of the shell and the anterior adductor muscle was absent. The number of hinge teeth were not more than two on each valve. The posterior byssal retractor muscles were split into two widely separated bundles. These features are similar to the characteristics of the genera *Perna* under the family Aviculidae.

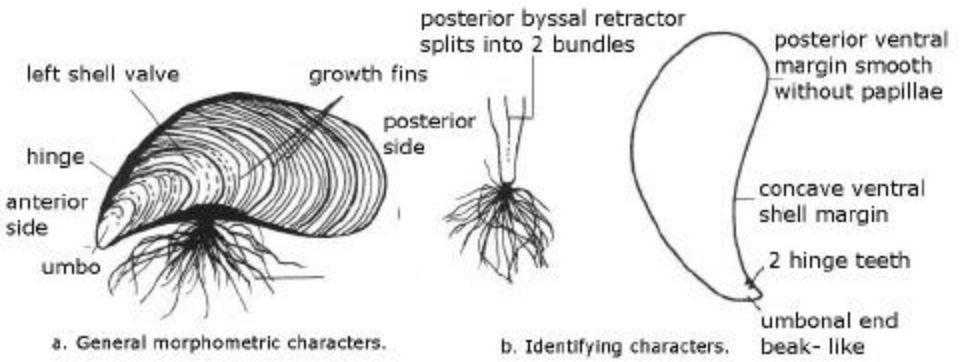

Fig.- 2. Morphometric and identifying characters of Perna viridis from Moheshkhali channel.

The umbonal end at the anterior extremity of two shells was found bent, beak-like and directed downwards. Two hinge teeth on the left and one on the right valve were recorded. The ventral shell margin was found concave. The posterior ventral margin of the mantle was smooth without any papillae. The colour of the shell was light at the outer margin and darker towards the center. All these features resemble the characteristics of the species *Perna virdis* Linn. (1758). Only one species of green mussel has been found during the present study.

The recorded physico-chemical parameters are shown in Table- 1. The highest rainfall was recorded during the monsoon period. The maximum and minimum rainfall were 1095.56 mm in August, and 5.18 mm in April, respectively. The highest water temperature recorded was 30.54 ^{o}C in April, and the lowest in January (23 ^{o}C). The turbidity values were found to vary from 5 to 95 FTU, the highest value was in August and the lowest in April. Salinity was found to vary between 21 ppt and 29.5 ppt. The highest salinity was recorded in April and the lowest in August. The dissolved oxygen content was found to be the highest (7.4 mg/L) in November and the lowest (5.15 mg/L) in August. The maximum pH value 8.5 was recorded in January and the lowest 7.1 in July and August.

Discussion

From Bangladesh, 2 species of green mussel under the genus *Perna* (*P. viridis* and *Perna* spp.) have been reported by Ahmed (1990) from St. Martin's island and Shahporir dwip. Ali (175), Ali and Aziz (1976) and Ahmed *et al*. (1978) reported the green mussel as *Mytilus viridis*. It is evident from the present investigation that what Ali (1975), Ali and Aziz (1976) and Ahmed *et al*. (1978) reported as *Mytilus* was the genus *Perna*. Identified *P. viridis* has been widely reported as *Mytilus viridis* or *M. smaragdinus* by various workers (Hornell, 1922; Rao *et al*., 1975; Qasim *et al*., 1977; Phromanon, 1982) from abroad. Misleading identification of the green mussel could be attributed to local and geographical variations in morphological features.

Table- 1. Monthly values of some physico-chemical parameters of Moheshkhali channel water at the jetty area.

Month	Water temp (^{o}C)	Salinity (ppt)	DO (mg/l)	pH	Turbidity (FTU)	Rainfall (cm)
Nov. '90	29.95	28.60	7.40	8.0	40	190.15
Dec. '90	24.40	29.20	7.00	8.2	35	103.26
Jan. '91	23.00	29.50	7.10	8.5	10	10.57
Feb. '91	24.50	28.56	6.80	8.4	30	70.38
Mar. '91	26.95	27.15	5.70	7.8	15	25.00
Apr. '91	30.54	29.80	5.90	7.5	05	05.18
May '91	29.75	24.17	5.80	7.4	50	405.72
Jun. '91	29.30	23.06	5.90	7.2	90	1015.32
Jul. '91	29.52	22.06	6.15	7.1	80	950.67
Aug. '91	28.06	21.00	5.15	7.1	95	1095.56
Sep. '91	29.85	24.10	6.80	7.2	55	430.16
Oct. '91	27.60	26.50	6.40	7.3	20	35.45

The species was found to be attached by byssal threads to each and every pole of the jetty between the high and low tide marks. The abundance of the mussel was confined to poles located in comparatively deeper water. The deposition of the mussel colony was much denser on the upper side of the pillars than on the lower. *P. viridis* has been reported to occur abundantly on the rocky substratum or close to oyster beds between the low tide level and the 3 fathom line around St. Martin's Island (Ali and Aziz, 1976) and from the Shahporir dwip at Teknaf (Ahmed, 1990). In the present investigation, the occurrence of *P. viridis* has been reported for the first time from the Moheshkhali channel of the Bay of Bengal.

The physico-chemical parameters recorded throughout the year were apparently suitable for the growth of *P. viridis*. Similar observations have been reported by Ali *et al*. (1985) from the same channel. Qasim *et al*. (1977), Rangarajan and Narasimham (1980), Chatterji *et al*. (1984) and Sreenivasan *et al*. (1988) provided similar ecological conditions in the natural beds and during their experimental culture of green mussels. The occurrence of *P. viridis* on the newly built jetty may be considered an indicator of its culture potentiality within this channel.

Conclusion

Perna viridis is the most abundant green mussel in the Moheshkhali channel. Its morphological characters are quite distinctive than those of other spp. of green mussels. The ecological parameters studied from the channel are suitable for the growth and abundance of *P. viridis.*

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