Study of Marine Crustaceans from the Gulf of Cambay

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ABSTRACT

The occurrences, abundance and percentage frequency of different marine crustaceans were studied from Bhavnagar, Ghogha, Alang and Jafrabad coastal line of Gulf of Cambay during 1999-2002. The study revealed the occurrence of 35 species belonging to 14 families that include the species crabs, prawns, lobster and balanus. Jafrabad was found the richest site as maximum numbers of species (35) were found at this study site in comparison to all four study sites.

KEYWORDS: Marine Crustaceans, Gulf of Cambay

INTRODUCTION

Gujarat state is located on the north western shores of India, lying between Latitude 23.2167° N and Longitude 72.6833° E, having long coastal lie of 1640 km.

The coastal line of Gujarat consists of Gulf of Kutchh and Gulf of Cambay. All the four study site at the Gulf of Cambay. This is highly indented by estuarine mouth of major rivers like Sabarmati, Mahi, Dhandhar and Narmada. Its sediment is silty muddy having sandy clayed substrate.Widh of littoral zone is 2 to 2.5 km., which is muddy & silty, having high tide range of 1 to 10m., having hyposaline turbid water. The maximum tidal current recorded 6 knots in the Gulf of Cambay. The crustaceans are popular invertebrates all over the world due to its remarkable diversity and wide range of economical, commercial fishery value. Crustaceans are comes under phylum Arthropoda and in the class Crustacea. The animals in the phylum Arthropoda possess jointed appendages, with metameric segmented body. Another characteristic feature of the phylum Arthropoda is the presence of a hard cuticular covering on the surface of the body, termed exoskeleton, except in Onychophora. The hardness of this covering does not allow expanding the body hence it ruptured and casted off periodically. Chhapgar B.F. and Borgaonkar(1985,1995) studied the crabs from the west coast of India, Gulf of Kutchh was studied by several workers viz., Srivastva 1953, Gideon and Menon 1957 ,Ramamurthy 1963 , 1967, Wagh A.B. 1974, Deshmukh 1975.A fishery aspect of prawn was studied by Karamchandani et.al., 1967; Trivedi et.al., 1979.

The class Crustacea commonly includes the crabs, prawns and lobsters. There are great scopes for increasing production of crustaceans to combat the scarcity of food. Crustaceans form an important diet of man, which has great nutritive value. Prawns, shrimps, lobsters, crabs are the chief item consumed by man. In India, mechanized fishing on modern lines has been introduced in recent times and prawns are exported in thousands of tones fetching corers of rupees worth of foreign exchange. Thousands of people are engaged in prawn fishery and their economic conditions have improved considerably.

The crustaceans have received the considerably attention for the study on the fishery and various biological characteristics, especially because of the high economic value of the components groups such a shrimps, prawns, crabs and lobsters.

MATERIAL AND METHOD

The crustaceans species were collected twice in a month during lowest low tide from the intertidal

zone. Crustaceans comprise diverse type of animals, occurred in varied habitats. Various methods were employed to collect the fauna. Quadrate and belt transect methods were introduced for sampling of specimens. The quadrate of 10m×10m is laid down at each study sites bimonthly and then divided in to 1m×1m ($1 \times 1m^2$) quadrate to observe and collect the crustaceans. Available species were collected from quadrates and calculations were made to find out density, abundance and percentage frequency. Other methods like hand picking, digging for burrowing animals, use of small sized nets like plankton nets, scoop nets were also employed in shallow water or in creeks and ditches to collect the fauna. Information also collected from the local fisherman regarding the catch of prawns, crabs and other crustaceans to know the edible value of the fauna & to know the commercially important fauna of the study sites.

Animals were preserved in 5% formaldehyde containing one drop of 0.2% rose Bengal and were identified by using key characteristics features with the help of references like Prawn and Prawn fisheries of India by Kurian and Sebastian (1986), Marine Biology by John Reseck (1979). The identification was confirmed by Dr.K.L.Jetani, Head Fisheries Research Center, Okha and K.K.Joe, Scientist CMFRI, Veraval.

RESULT AND DISSCUSSION

The equation for the estimation of Shannon -Wiener Index or Shannon Index is H= - sum[Pi log (Pi)]. Where Pi = the number of given species divided by the total number of species observed. The minimum value 0 and maximum value log (1/ no. of categories) for the Shannon – Wiener Index. Pi log (Pi) is calculated with the scientific calculator. It has particular key to calculate Pi lnx and also log table are available for that. Lnx is also known as Naperian logarithms. Naperian was the mathematician who has established the natural log.
Bhavnagar coast is a muddy coastal line of Gulf of Cambay. At Bhavnagar total 14 species of crabs, 4 species of prawns and 2 species of balanus were found.

The study of crustaceans has been resulted in identification of 35 species belonging to 14 families that includes the species of crabs, prawns, lobsters and balanus. In the study site total count of species was found as follows.

Scylla serrata and Sesarma quadrata were the most abundant species of crabs found at Bhavnagar due to muddy habitats. Out of 20 species 11 species were below or equal to value of Pi^2 shows the low diversity in particular study site.

35>30>21>20 i.e. Jafrabad>Ghogha>Alang>Bhavnagar

At Ghogha out of 30 species 21 species were below or equal to the value of Pi^2 (0.001), shows the low diversity.

Alang study site was most polluted due to ship breaking activity is going on for decades. Out of 21 species 3 species were below or equal to value of Pi^2 shows the low diversity in Alang. The value of Shannon-Weiner Index (2.728) for crustaceans species shows the high species diversity at Jafrabad. The species richness at Jafrabad was 35 as total count of species at Jafrabad was 35. So it can be concluded by looking at all four sites that Jafrabad has most productive area and Alang is less productive site as per the species count of the respected area.

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APPENDIX: 1

List of Crustaceans found in Gulf of Cambay.

FAMILY: PENAEID

1. Ariesteus alcocki Ramdan
2. Parapenaeopsis acclivirostris (Alcock)
3. Metapenaeus brevicornis (Milne Edwards)
4. Metapenaeus monoceros (Fabricius)
5. Metapenaeus kutchensis (George and Rao)
6. Metapenaeus affinis (Milne Edwards)

FAMILY: Sergestidae

7. Acetes indicus (H.Milne Edwards)

FAMILY: Hippolytidae

8. Hippolysmata ensirostris kemp.

FAMILY: Palaemonidae

9. Palaemon (Nematopalaemin) tenuipes (Henderson)

FAMILY: Calappidae

10. Matuta lunaris (Forscal)
11. Matuta planipes Fabricius
12. Doclea gracilipes stimpson

FAMILY: PORTUNIDAE

13. Scylla serrata
14. Neptunus sanguinolentus (Herbst)
15. Charybdis cruciata (Herbst)
16. Charybdis lucifera (Fabricius)
17. Charybdis annulata (Fabricius)
18. Charybdis callianassa (Herbst)
19. Charybdis hoplites
20. Thalamita crenata (Milne Edwards)

FAMILY: XANTHIDAE

21. Attergatis intergerrimus (Lamarck)
22. Pilumnus vespertillis (Fabricus)
23. Eucarcinus orientatis (Milne Edwards)

FAMILY: CYONEPLACIDAE

24. Litochira angustifrons (Alcock)
25. Litocheira setosa (Milne Edwards)

FAMILY: OCYPODIDAE

26. Ocypoda cordimana (Desmarest)
27. Ocypoda rotundata (Miers)
28. Gelasimus marionis (Desmarest)
29. Gelasimus dussmieri (Milne Edwards)
30. Macrophthalmus pectinipes (Guerin)
31. Panulirus polyphagus (Herbst, 1973)

FAMILY: CIRRIPEDAE

32. Balanus amphitrite
33. Balanus tintnnabulum

FAMILY: GRAPSIDAE

34. Metopograpsus messor
35. Sesarma quadrata