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CHECK LIST OF GASTROPODS AND BIVALVES AMONG TRASH FISH ALONG THE SOUTH WEST COAST OF INDIA

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ABSTRACT

Molluscs are one of the earliest taxa used to investigate latitudinal trends in marine biodiversity. The phylum molluscs are a large assemblage of animals having diverse shape, sizes, habits and occupy different habitats. In is endowed with rich and diverse bio resources and the molluscs are not an exception. Molluscs were exploited for edible, industrial and ornamental purposes and the history of exploitation way back to the time immemorial. Hence the present study was focused to investigate the biodiversity of mollusc among trash fishes along the south west coast of India.

KEYWORDS

Mollusc, Trash fishes, Kadiapatinam, Colachel and Biodiversity.

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INTRODUCTON

India has a long coast line of 8129 km and has rich marine fishery resources consisting chiefly of fishes, crustaceans and molluscs. But even after three and a half decades of fisheries development in India, the seafood export industry still depends for its export earnings on frozen shrimp, though other items like lobster, squids, cuttle fish and fishes like pomfret earn foreign exchange to some extent (Samuel, 1988)[1].

Molluscs form a valuable source along the east and west coast of India and Andaman and Nicobar Islands, providing source of food, lime, pearl, decorative shells for shell handicraft trade, raw material for calcium carbide industry and constituent for medicinal preparations. In recent years, due to greater demand of molluscan meat, both in internal market and for export,

there is a considerable pressure in fishing efforts leading to increased molluscan landings forming 4-5% of the total fish landings (Appukuttan, 1996)[2]. Shell fish play a vital role in India's economy and their popularity is increasing due to their delicacy and food value (George and Mathew, 1996)[3].

The present state of knowledge on the conservation status of marine molluscan is poor. The criteria for assessing the conservation status of marine species are largely based on terrestrial situations and are generally not considered appropriate for marine taxa (Allison *et al.*, 1998[4]; Ponder, 1998[5]; Chapman, 1998[6]). There is currently little understanding of the rarity of marine invertebrates or threats to marine habitats. Therefore, it is essential that understanding of these factors is developed, in order to conserve marine biological diversity. Research aimed at improving the baseline data through systematic assessment of marine biota is necessary.

The establishment of marine reserves may play an important role in the management of shell resources by ensuring protection of breeding populations. The main priority, however should be the provision of basic data on taxonomy, ecology and population biology of mollusc so proposals for proper management plans can be drafted. Hence this study was undertaken to assess the biodiversity of gastropods and bivalves among the trash fishes in two landing centres of Kanyakumari Coast such as Kadiapatnam and Colachel.

Description of study area

Kadapatinam (8.87^{o} N 77.19^{o}E) is located on the South West Coast of India where, Valliyar river and Arabian Sea meets. It is guarded by many rocks with Arabian Sea in its South; Velli mali in West; Mandakadu in North and Muttom in East. It is about 18 km away from Nagercoil, Headquarters of Kanyakumari District. In olden days, it was called as 'Kadialur' and 'Kadiyalpatinam'.

Colachel (8.15°N 77.14°E) is one of the most important fish landing centres of the Kanyakumari coast. It is the natural Port on the west coast of Tamilnadu, which is about 22km from Nagercoil, Headquarters of Kanyakumari District. The Port being ancient was re-modeled during the period of Maharaja Rama Varma in the 18th century. It is a port on the Malabar Coast, 20 km north-west of Kanyakumari (Cape Comorin), the southernmost tip of peninsular India. It is an ancient port town; Vasco da Gama called it 'Colachi'.

MATERIAL AND METHOD

Collection of Samples

The present investigation was carried out for a period of one year (February 2011-January 2012). The molluscs were collected fortnightly among the trash fishes from the two landing centres. The collected specimens (molluscs) were brought to the laboratory and cleaned with fresh water.

Identification of Mollusc

The molluscs were identified up to species level with appropriate manuals (Fernando and Oliva, 2002)[7] and the collected data was pooled seasonally. The twelve months of the year were grouped into three seasons viz., non-monsoon (February to May) south west monsoon (June to September) and north east monsoon (October to January).

Diversity indices

The species diversity (H') of mollusc was calculated using the following Shannon Weiner diversity index (Pielou, 1975[8], Magurran, 1988)[9].

Species richness index of the molluscs was calculated to find out the richness of the gastropods occurring in the different stations during different months following the formula of Margalef index (Clifford and Stephenson, 1975)[10].

The evenness index of the species of molluscs was calculated to find out the distribution pattern of the gastropods using the formula suggested by Pielou (1969)[11].

RESULTS

The distribution of molluscs is illustrated in Table No.1. A total of 27 species of gastropods and 6 species of bivalves were collected from two different landing centres. At Station I, 20 species of gastropods and 6species of bivalves were recorded and 19 species of gastropods and 2 species of bivalves were collected from Station II.

The trends in the regional and seasonal fluctuations of Shannon Weiner diversity index, Evenness index and

Richness index were calculated for molluscs and are furnished in Tables No.2, 3 and 4.

In station I the highest value of diversity index (4.188) of molluscan population was registered during the North East Monsoonal month of December followed by February (Table No.2). The diversity index was maximum (3.723) during the Nonmonsoon season of February at station II.

Richness index of gastropod and bivalves in two different stations were illustrated in Table No.3. The value of richness index was highest in December (5.022) in Station I whereas it was observed in February (4.086) in Station II. The seasonal average richness index ranged between 6.25 and 10.25.

Evenness index of molluscan population occurring in two different stations was observed to be ranged from 0.912 to 0.953 (Table No.4). The highest value of this parameter could be registered in the months of August and November (0.953) in Station I and April (0.990) in Station II. The evenness index remained highest throughout the study period.

DISCUSSION

Trawling in earlier time was not very detrimental to organisms of no commercial value that were trapped incidentally in the trawl, as they were thrown back into the natural system. But now due to extensive use of many organisms either as food or for ornamental purposes, all animals caught in the trawl, whether they are edible or not are brought back to shore, if there is high demand in local market. This practice is disadvantageous as they will finally result in disturbing the stock of several organisms along with shrimps and bottom fishers (Babu, 2009)[12]. The development has not touched the molluscan resources such as bivalves and gastropods. More focus should be given to the molluscan fishery for the sustainable harvest and utilization.

The present study revealed that the trash fish (except finfish, shrimp and crustaceans) is composed of gastropods and bivalves. A total of 27 species of gastropods and 6 species of bivalves were collected from two different landing centres with 20 species of gastropods and 6species of bivalves from Station I and 19 species of gastropods and 2 species of bivalves from Station II. Babu (2009)[12] recorded 59 species of gastropods and 11 species of bivalves from Mudasalodai and 57 gastropods and 10 species of bivalves in Cuddalore landing centre. Arjunan Babu *et al* (2011)[13] recorded 21 ornamental gastropods and 5 bivalves among trash fishes from Parangipettai Coast and the results of the present study were in accordance with the above report. A total of 1417 gastropods were observed from Mallipattinam by Chinnaiyan *et al*, (2012)[14] which was more or less similar to the present investigation at Station I and they reported 400 individuals belonging to 56 species of gastropods from Kottaipattinam. Saravanakumar *et al* (2007)[15] recorded 17 species of gastropods and 16 species of bivalves in the Arid Zone Mangroves of Gulf of Kutch. Anandaraj *et al* (2012)[16] recorded 20 species of gastropods and 20 species of bivalves from east coastal area of Thanjavur District and among them five species like *C. ramosus, M. trapa, N. tigrina, O.gibbosa* and *T.dollium* were dominant. In the present study *C. ramosus* and *T. bufo* were the maximum contributed gastropod species at both stations among the trash collections. The distribution of molluscan species in the coastal region of India was reported by earlier workers (Melvill and Stander, 1878[17], Ramesh *et al*, 1996[18], Oliver and Cheshey, 1997[19], Hornell, 1949[20] and Suominen *et al*, 2003)[21]. Prabhakar (2012)[22] recorded 55 species of molluscs from the mangrove ecosystem of Uran, West coast of India. The topographical features of kadiyapatinam (station I) with more rocky substratum harbor more molluscs. It was supported by the view of Kanna and Yadav (2004)[23] who reported that rocks pool in the mid tide zone were usually well stocked with molluscs, both large and minutes.

Palaniswamy and Anisha (2012)[24] reported that Shannon weiner diversity of gastropods was ranged between 0.65-1.49 in Pondicherry Coast. In our present observation Shannon Weiner diversity ranged from 1.824 to 4.188 in station I and 2.249-3.723 in station II. The evenness index of molluscs too high in the present investigation and was ranged between 0.912 and 0.953 in station I and 0.870-0.990 in station II, which may be due to the even distribution of the species. Chinnaiyan *et al*., (2012)[14] reported the Shannon weiner index of turrids (gastropoda) from 4

stations viz., Kasimedu, Cuddalore, Mudasalodai and Pazhayar. The Shanon weiner index of turrids (gastropoda) ranged between 1.25 and 1.544 in Kasimedu, 0.685-1.09 in Cuddalore, 1.31-1.60 in Mudasalodai and 0.692- 1.99 in Pazhayar. The evenness index of turrids from 4 stations viz, Kasimedu, Cuddalore, Mudasalodai and Pazhayar ranged from 0.742-0.901, 0.71-0.98, 0.67-0.82 and 0.71-0.86 respectively. Palaniswamy and Anisha, (2012)[24] reported the evenness index of gastropod from Pondicherry coast was at the range of 0.20-0.73. The richness index of molluscs was found to be ranged from 1.207 to 5.022 in station I and 1.661 to 4.086 in station II in the present observation. The richness index of gastropods recorded by Palaniswamy and Anisha (2012)[24] it was ranged from 0.25 to 0.75 at Pondichery coast.

Table No.1: Distribution of molluscan species in selected landing centres

S.No	Species	Station I	Station II
1	*Architectonica perspectiva*	+	+
2	*Trochus radiatus*	+	+
3	*Tibia curta*	-	+
4	*Lyncina vitellus*	+	-
5	*Mauritia arabica*	+	+
6	*Mauritia eglantine*	+	+
7	*Talparia talpa*	+	+
8	*Phalium glaucum*	+	+
9	*Tonna dolium*	-	+
10	*Lotoria perryi*	+	-
11	*Linatella caudate*	+	+
12	*Bursa rana*	+	-
13	*Bursa tuberculata*	+	-
14	*Chicoreus romosus*	+	+
15	*Drupa rubusidaea*	-	+
16	*Thais bufo*	+	+
17	*Babylonia spirata*	+	+
18	*Babylonia zeylanica*	+	+
19	*Bullia lineolata*	-	+
20	*Bullia digitalis*	-	+
21	*Bullia melanoides*	-	+
22	*Bullia vittata*	-	+
23	*Fasciolaria filamentosa*	+	-
24	*Fusinus colus*	+	-
25	*Oliva gibbosa*	+	-
26	*Oliva vidua*	+	-
27	*Harpa conoidalis*	+	-
28	*Pinctada fucata*	+	+
29	*Pinctada chemnitzii*	+	+
30	*Pinna atropurpurae*	+	-
31	*Vasticardium assimile*	+	-
32	*Vasticardium flavum*	+	-
33	*Grafrarium divaricatum*	+	-

(+: Recorded; -: Not Recorded)

Table No.2: Shannon-Weiner diversity index of mollusc in two different stations

S.No	Months	Station I	Station II
1	February	3.424	3.723
2	March	2.844	2.876
3	April	3.015	2.558
4	May	2.832	2.919
5	June	2.936	3.668
6	July	2.940	3.412
7	August	3.022	2.610
8	September	2.972	3.045
9	October	1.824	2.556
10	November	2.859	2.542
11	December	4.188	2.716
12	January	3.327	2.249

Table No.3: Richness index of the molluscan fauna in two stations

S.No	Months	Station I	Station II
1	February	3.552	4.086
2	March	2.149	2.203
3	April	2.493	1.661
4	May	2.251	2.345
5	June	2.355	3.496
6	July	2.590	2.994
7	August	2.336	2.151
8	September	2.300	2.393
9	October	1.207	2.022
10	November	2.138	1.862
11	December	5.022	1.971
12	January	3.244	1.857

Table No.4: Evenness index of the molluscan fauna in two stations

S.No	Months	Station I	Station II
1	February	0.925	0.953
2	March	0.948	0.959
3	April	0.951	0.990
4	May	0.944	0.973
5	June	0.926	0.939
6	July	0.927	0.952
7	August	0.953	0.930
8	September	0.938	0.961
9	October	0.912	0.910
10	November	0.953	0.983
11	December	0.939	0.967
12	January	0.928	0.870

CONCLUSION

In biodiversity conservation point of view, million tons of trash fish have been discarded every day. It is a foremost disaster to marine ecosystems, suggesting the fishermen to catch the targeted species only. After harvesting the trash, they may be utilized for food, value added products, drugs, fish feed, manure etc. The information regarding the diversity of molluscs might assist the researchers towards better understanding in the utilization of bio resources.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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