Edible Crustaceans Of Nagapattinam, Southeast Coast Of India

J. Gopalsamy, R. Dineshkumar, A. Arumugam, S. Bragadeeswaran

Abstract: India is blessed with extensive coastline and diverse ecosystems. It is one of the major sea food producing countries and occupies the third place among them. The demand of the sea food is increasing steadily day by day. The fishing activities have been intensified to fulfill the need of growing global population. It is very essential to study the present scenario of the edible crustaceans diversity for the proper management and conservation. In the present study nearly 22 species belonging to 4 families of prawns, 6 species belonging to 2 families of lobsters, 9 species belonging to 2 families of crabs were collected from Nagapattinam coast. The maximum population density was observed during post monsoon and summer months. Species diversity, species richness and evenness were also maximum during summer and minimum during monsoon months. Among crustaceans prawn population was more than that of crabs followed by lobsters.

Index Terms: Edible crustaceans, diversity, Population density, Nagapattinam coast.

1 Introduction

The marine and coastal ecosystems of India are rich, distinct and diverse. These encompass a variety of marine and coastal species and open sea habitats and ecosystems and the wealth of ecological processes that support all of these resources (Venkataraman, 2008). India is one among the major sea food producing countries blessed with an extensive coastline of 8,129 km. India with a fishery production of around 6.57 million metric tons of both capture and culture resources is ranked 3rd among the fish producing countries and it occupies the 17th position among the top seafood exporting countries of the world (Srinivasa Gopal, 2013). Shell fish fishery includes the crustaceans and molluscs which contribute one third of the total Indian fishery (Boby Ignatius, 2005). Shell fish fishery is the very expensive, when compared to fin fish fishery (Chikuni, 1983). They provide valuable protein to feed at least 500 million people every year meeting their basic needs of nutrition, food security and sustainable livelihood (Ajay Bhaskar, 2002). The crustaceans include, crabs, prawns and lobsters, which are contributing more to the shell fish fishery. The group comprises almost 52,000 described species (Kaestner, 1972). Prawn is the leading decapod crustacean of world fishery (Bowman 1982). Lobster fishery is costlier than other shell fish fishery (Holthuis, 1972). The crab fishery in India is yet to be recognized as major fishery despite the abundant occurrence of edible crabs all along the Indian coast. There are about 600 crab species occurring in Indian waters. However, only few of them are used for human consumption. The Scylla serrata, commonly called as mud crab or green crab forms the main stay of crab fishery of India and is economically most important (MPEDA Export Review, 1989-1990).

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The present study was carried out at Nagapattinam, South east coast of India (Long: 79o 50' E: Lat: 10o 46' N), which is a sea shore town and the head quarters of Nagapattinam district having 76 km coast line. It is the main fishing harbour of the district and one of the major fishing harbour of the Tamilnadu State.

Fig. 1 *Map of the Study Area*

The study was conducted for one year (October, 2016 to September, 2017) and the months were separated based on the North-East monsoon namely summer (April, May, June), premonsoon (July, August, September), monsoon (October, November, December) and post-monsoon (January, February, March). Trawling is one of the fishing methods used in commercial demersal fish exploitation. About 1512 mechanized and non-mechanisedboats are engaged in fishing at Nagapattinam. Mostly medium sized vessels (38'- 40') operate trawl net to exploit marine crustaceans from inshore to deep-sea grounds targeting shrimps, crabs and lobsters are caught as bycatch. Trawlers are employed in deep sea fishing up to 400 m depth. Shrimp trawl nets, deep-sea trawl nets are administered to catch specific target fish groups. Data were collected fortnightly. The specimens were collected directly from fishermen at the landing centre and the species were identified by using FAO Field guides. The Collected data were analyzed by univariate statistical mehods, viz., Shannon – Weiner's formula (1949) for Species diversity and Margalef index, Simpson index and Pielou's evenness index for Species richness. All these indices were calculated using the computer statistical software SPSS.

3 RESULTS:

Nearly 22 species belonging to 4 families of prawns, 6 species belonging to 2 families of lobsters, 9 species belonging to 2 families of crabs were collected from Nagapattinam coast. The systematic position of identified animals is listed as follow

Systematic Position of edible crustaceans recorded from Nagapattinam coast from October 2016 to September 2017.

Prawns

Phylum : *Arthropoda*
Class : *Crustacea*
Family : *Hippolytidae*
Genus : *Exhippolysmata*
Species : *ensirostris* (Kemp, 1914)
Family : *Palaemonidae*
Genus : *Macrobrachium*
Species : *Equidens* (Dana, 1852)
Species : *M. rosenbergii* (De, Man, 1879)
Species : *M. rude* (Heller, 1862)
Genus : *Nematopalaemon*
Species : *tenuipes (Henderson, 1893)*
Family : *Pandalidae*
Genus : *Heterocarpus*
Species : *woodmasoni (Alcock, 1901)*
Family : *Penaeidae*
Genus : *Metapenaeopsis*
Species : *stridulans (Alcock, 1905)*
Species : *M. toloensis (Hall, 1962)*
Species : *M. lysianassa (De Man, 1888)*
Genus : *Parapenaeopsis*
Species 1 : *coromandelica (Alcock, 1906)*
Species 2 : *P. maxillepedo* (Alcock, 1905)
Species 3 : *P. sculptilis* (Heller, 1862)
Species 4 : *P. stylifera* (H. Milne-Edwards, 1837)
Species 5 : *P. tenella* (Bate, 1888)
Species 6 : *P. uncta* (Alcock, 1905)
Genus : *Penaeus*
Species 1 : *indicus* (H. Milne-Edwards, 1837)
Species 2 : *P. merguensis* (De Man, 1888)
Species 3 : *P. canaliculatus* (Olivier, 1811)
Species 4 : *P. latisulcatus* (Kishinouye, 1896)
Species 5 : *P. monodon* (Fabricius, 1798)
Species 6 : *P. semisulcatus* (De Haan, 1844)
Family : Solenoceridae
Genus : *Solenocera*
Species : *crassicornis* (H. Milne-Edwards, 1837)

Lobsters

Phylum : Arthropoda
Class : Crustacea
Family : Palinuridae
Genus : *Panulirus*
Species 1 : *homarus* (Linnaeus, 1758)
Species 2 : *P. longipes* (A. Milne-Edwards, 1868)
Species 3 : *P. ornatus* (Fabricius, 1798)
Species 4 : *P. penicillatus* (Olivier, 1791)
Species 5 : *P. polyphagus* (Herbst, 1793)
Species 6 : *P. versicolor* (Latreille, 1804)
Family : Scyllaridae
Genus : *Scyllarides*
Species : *haani* (De Haan, 1841)
Genus : *Thenus*
Species : *orientalis* (Lund, 1793)

Crabs

Phylum: Arthropoda

Class : Crustacea

Family : *Xanthidae*

Genus : *Etisus*

Species : *utilis*(Jacquinot, 1852)

Family : Portunidae

Genus : *Charybdis*

Species : *feriatus*(Linnaeus, 1758)

Species : *C. natator* (Herbst, 1789)

Genus : *Podophthalmus*

Species : *vigil* (Farbricius, 1798)

Genus : *Portunus*

Species : *pelagicus*(Linnaeus, 1758)

Species : *P. sanguinolentus* (Herbst, 1783)

Species : *P. trituberculatus* (Miers, 1876)

Genus : *Scylla*

Species : *olivacea* (Herbst, 1796)

Species : *S. serrata* (Forskal, 1775)

Genus : *Thalamita*

Species : *crenata* (Latreille, 1829)

TABLE.1 *DIVERSITY INDICES OF PRAWN LANDING*

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JULY 2017	AUG 2017	SEP 2017
Dominance_D	0.4133	0.4259	0.3836	0.3523	0.2965	0.3288	0.441	0.2954	0.2396	0.2023	0.2107	0.254
Evenness_ *J'*	0.5392	0.535	0.5014	0.5428	0.6099	0.5762	0.4798	0.6782	0.7481	0.8319	0.8138	0.7455
Menhinick	0.006122	0.007211	0.005107	0.00448	0.004427	0.004523	0.005953	0.009075	0.00856	0.006367	0.00592	0.006962
Margalef	0.363	0.3718	0.4153	0.4079	0.4073	0.4085	0.4243	0.385	0.3815	0.365	0.3612	0.3699
Equitability_J	0.6553	0.6509	0.6453	0.686	0.7459	0.7167	0.6226	0.7833	0.838	0.8973	0.885	0.8361

TABLE.2 *DIVERSITY INDICES OF CRAB LANDING*

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JULY 2017	AUG 2017	SEP 2017
Dominance_D	0.5469	0.7125	0.6593	0.6523	0.7064	0.4681	0.4279	0.4363	0.4342	0.4385	0.4178	0.3968
Evenness_ *J'*	0.5429	0.4177	0.4643	0.4818	0.4448	0.6124	0.7003	0.679	0.6411	0.6249	0.6494	0.6853
Menhinick	0.006426	0.00521	0.005017	0.004691	0.004997	0.005865	0.0195	0.0211	0.006748	0.00678	0.00701	0.006939
Margalef	0.2332	0.2258	0.2245	0.2223	0.2244	0.2299	0.2818	0.286	0.2349	0.2351	0.2363	0.236
Equitability_J	0.5594	0.3702	0.4465	0.4732	0.4157	0.6463	0.743	0.7207	0.6793	0.6608	0.6886	0.7274

TABLE.3 *DIVERSITY INDICES OF LOBSTER*

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JULY 2017	AUG 2017	SEP 2017
Dominance_D	0.9348	0.8733	0.8818	0.9838	0.9339	0.5141	0.8498	1	0.7844	0.7214	0.7618	0.8404
Evenness_ ***J'***	0.5794	0.641	0.6327	0.5243	0.5804	0.9859	0.6636	1	0.7258	0.7854	0.7471	0.6727
Menhinick	0.01676	0.03508	0.03864	0.01229	0.0113	0.04376	0.02473	0.04513	0.01564	0.01863	0.01607	0.01515
Margalef	0.1046	0.1237	0.1267	0.0982	0.0966	0.1308	0.1138	0	0.1031	0.1069	0.1037	0.1024
Equitability_J	0.2127	0.3583	0.3396	0.06834	0.215	0.9795	0.4084	0	0.5376	0.6515	0.5794	0.4279

TABLE 4: *EDIBLE CRUSTACEAN LANDINGS OF NAGAPATTINAM COAST*

EDIBLE CRUSTACEAN LANDINGS				
October 2016 - September 2017 (Units in Numbers)				
S. No	**Month**	**Prawns**	**Crabs**	**Lobsters**
1	October-16	9598000	774826	14238
2	November-16	6919500	1178794	3251
3	December-16	18785000	1271434	2679
4	January-17	24407000	1454252	26468
5	February-17	24996500	1281620	31318
6	March-17	23948000	1130426	13077
7	April-17	13820500	84146	6543
8	May-17	4369200	71906	491
9	June-17	4908200	702700	16350
10	July-17	8875000	696060	11519
11	August-17	10264500	61280	15481
12	September-17	7420500	664652	17436
	Grand Total	**15831190**	**9372096**	**158851**

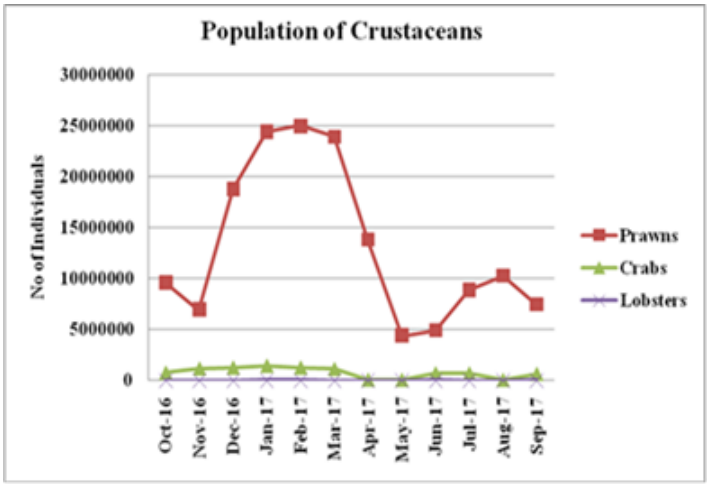

Fig 1: *Edible Crustaceans Population of Nagapattinam Coast*

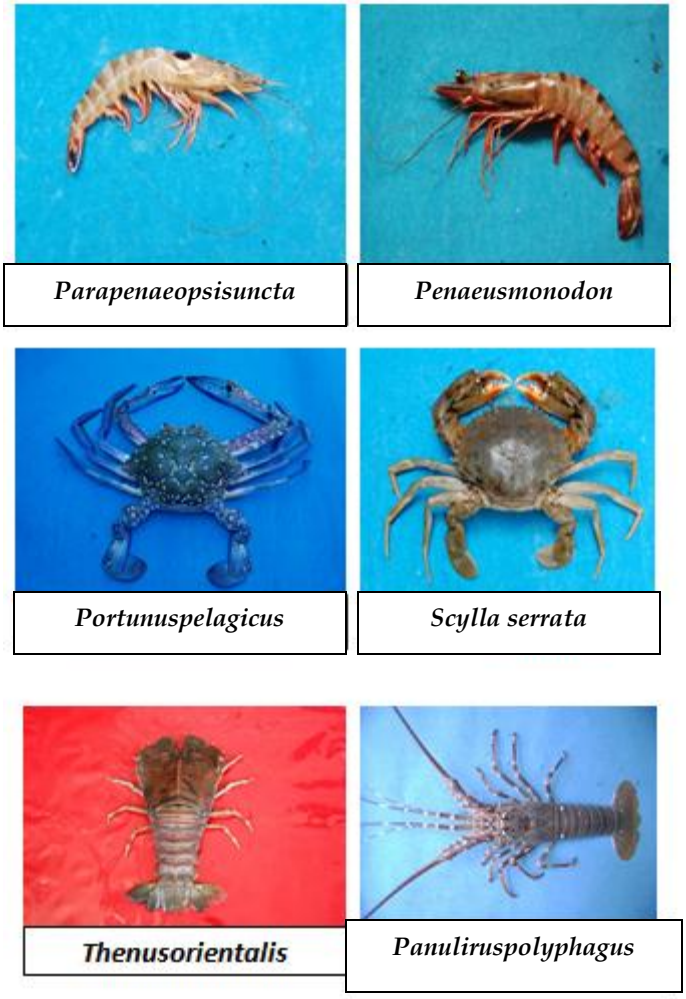

Fig. 2: *Images of some edible Crustaceans*

4 Discussion

Population density of prawn was high during post-monsoon season, Similar results were reported by Ayyakannu (1992). He observed the maximum population density was during post monsoon and summer season. Species richness and diversity are indicative of the stability of a community. Richness (number of species) recorded in a particular area is a function of effort, sample size and area of coverage (Magurran, 2004). Species diversity, species evenness and species richness was also maximum during premonsoon for shrimps. Similar results were recorded by Patterson Edward and Ayyakannu, (1991). The species richness and evenness during certain months might be due to large scale periodic migration, influenced by slight change in water temperature. Warmer temperature, availability and stability of food result in high level of diversity. Diversity is said to be maximum when all species that make up the community are equally abundant. Crabs are one of the fascinating groups in Decapoda. They have developed a successful relationship between the environment and the biological mechanisms involved in evolutionary process. (Warner, 1977). The population density of prawns, crabs and lobsters collected for four seasons showed significant variation ($p<0.05$). The mean value of species dominance of prawn landings showed the same result that of the observation made by Wenner (1981) in decapod crustaceans from the Winyah Bay estuarine system, Roberts (1986) in the pink shrimps of Tortungas sanctuary, Cartes et al., (1992) in Decapod crustaceans in the deep Catalan sea, King et al., (2000).

5 CONCLUSION

The natural population of crustaceans which support commercial fisheries is damaged in several ways. The present study provides baseline information on the diversity and abundance of crustacean. Various kinds of human activities also affect the crustacean fauna and their resources. This study is the baseline data for the proper management and conservation of the edible crustaceans along this coast and future comparative study.

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