Research Article

Diversity of edible and non-edible marine fishes in East Coastal Region villages at Chennai, Tamil Nadu, India.

Kuppan. A[1], Martin. P[1], Kalaichelvi.N[1], Srinivaasu. S[2], Sivamani.S[1]

[1]Post Graduate and Research Department of Zoology, Government Arts College for Men (Autonomous), Nandanam, Chennai-600035, and India
[2]Zoological Survey of India, MBRC, Chennai-28

Abstract

Fish diversity study was carried out at East Coastal Region of Chennai, Tamil Nadu during the year 2015. The fishes were caught by using hook and line and gill nets. Totally 54 fishes were collected, 35 fishes were found under edible fishes and the remaining 19 as non-edible category. Under the edible fishes, 25 species were found under the food fish followed by 10 species as ornamental fish. Among the edible fishes most abundant families were Clupeidae, Carangidae, Scombridae and Soleidae. Number of food fishes collected under the order Perciformes (16 species) followed by Clupeiformes (5 species), Pleuronectiformes (2 species), Beloniformes (1 species), Siluriformes (1 species). The number of ornamental fishes found under the order Perciformes (8 species) and Aulopiformes (2 species). On the other hand non-edible fish category, Apogonidae family was the more diverse group followed by Pempheridae. Maximum number of species were noticed under the order Perciformes (9 species) followed by Tetraodontiformes (5 species). The present study clearly reveals that Perciforme group of fish were abundant in the Chennai coast which can be used as food and ornamental purposes.

Keywords: fish diversity, edible category, ornamental category, East Coast Chennai,

1. Introduction

Oceans contain the largest living volume of the ''blue'' planet, inhabited by approximately 235–250,000 described species, all groups included. They only represent 13% of the known species on the Earth, but the marine biomasses are really huge (Boeuf, 2011). The number of valid marine species is around 16,764, that is about equal to the freshwater fishes (15,170). The increase in knowledge of marine fish biodiversity over the last 250 years is commendable. Biodiversity is essential for meeting human needs. Diversity of organisms within the natural environment is important. Marine fish families fall into several groups, although some fishes fall into more than one category (William *et al.,* 2010). The US National Oceanic and Atmospheric Administration estimated

that 95% of the world's ocean area is unexplored. Many believed that there are more than 5000 marine species (O'Dor, 2003). The overwhelming value of biodiversity is an indication of environment health and for the functioning of ecosystems (Aarts and Nienhuis, 1999, Bengtsson *et al*., 1997, Culotta, 1996, Grime, 1997). The declining trend of deep sea fishes in the marine ecosystem is due to anthropogenic activities and overexploitation of marine resources (Alina *et al*., 2012). Progressive anthropogenic impacts on these habitats and their biota have seriously affected the sustenance of the resources and even forcing them into endangered species. No attempt has been made in the diversity of edible and non-edible fish population in East Coastal Region villages of Chennai and hence the

present investigation aimed to assess the diversity of edible and non-edible fishes in the selected study sites in East Coast Region villages of Chennai, Tamilnadu, India.

2. Materials and Methods

2.1 Sample collection

Fishes were collected early in the morning from different region of East Coastal Region villages (Kovalam, Kanathure, Panaiyur, and Nochikuppam) of Chennai, Tamil Nadu (Fig.1). Fishing vessels were

equipped with icing systems and fish were kept at lower temperature to keep it fresh. All fish samples were collected before sorting to avoid biasness on size. After collection, they were immediately preserved with ice in the ice box and transported to the laboratory. Samples were collected during the year 2015. The collected fish were transported to Zoological Research Laboratory, Government Arts College, Nandanam, Chennai-35. The fishes were identified with the help of manual and books (Smith and Heemstra, 1986, Munro, 1955, Day, 1878)**.** The identified fishes were properly labeled and arranged in the racks of Zoology museum maintained in our Department.
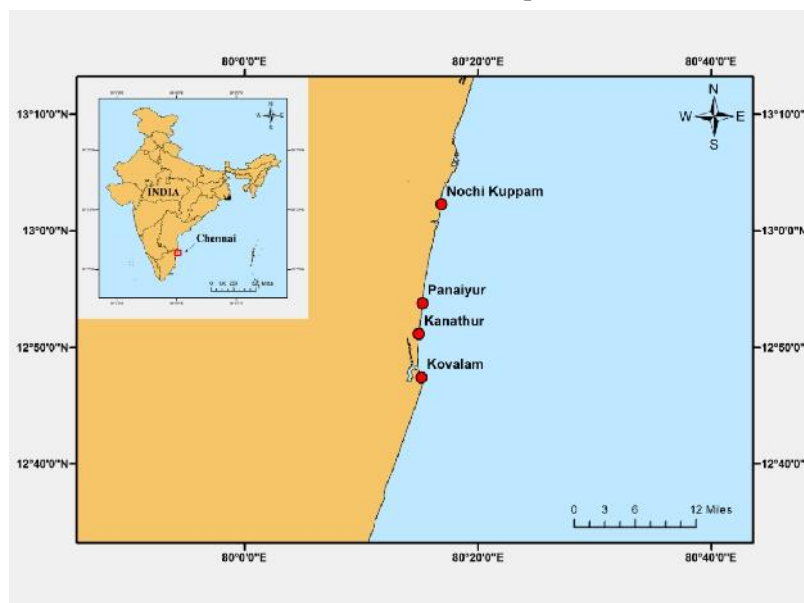

Fig. 1. Map showing the study area

3. Results and Discussion

3.1 Edible fishes

For the present investigation, 54 marine edible species were collected from Chennai East Coastal Region. They were categorized into three groups namely food fishes, ornamental fishes and trash fishes. Out of these 54 fishes, 35 fishes were found under edible fishes and the remaining 19 as non-edible category. Under the edible fishes, 25 species were found under the food fishes followed by 10 species as ornamental fish. Food fishes were predominant in the order Perciformes (16 species) followed by Clupeiformes (5 species), Pleuronectiformes (2 species), Beloniformes

(1 species), Siluriformes (1 species). The total number of ornamental fishes collected under the Perciformes was 8 species and in Aulopiformes it was 2 species (Table.1). The most abundant families were Carangidae, Clupeidae, Gerreidae, Liognathidae, Sphyraenidae, Terapontidae, Lutjanidae, Siganidae and Synodontidae. The fishes belonged to the family *viz.* Clupeidae and Engraulidae, Belonidae and Scombridae were found abundant seasonally. Clupeidae and Engraulidae fishes were abundant during the period from January to May 2014, whereas Scombridae and Belonidae fish occurrence was maximum from October to December of 2014 (Kuppan and Martin, 2015).

Table.1 Edible fishes collected from East Coast Region, Chennai during the year 2015.

Category	Species collected	Family name	Order	Status
Food fish	*Tylosurus crocodilus crocodiles*	Belonidae	Beloniformes	**
	Sardinella fimbriata	Clupeidae	Clupeiformes	**
	Dussumieria acuta	Dussumieriidae	Clupeiformes	**
	Pellona ditchela	Pristigasteridae	Clupeiformes	*
	Stolephorus indicus	Engraulidae	Clupeiformes	**
	Sardinella albella	Clupeidae	Clupeiformes	*
	Atule mate	Carangidae	Perciformes	**
	Sphyraena putnamae	Sphyraenidae	Perciformes	*
	Trichiurus lepturus	Trichiuridae	Perciformes	*
	Terapon jarbua	Terapontidae	Perciformes	*
	Sphyraena obtusata	Sphyraenidae	Perciformes	*
	Secutor insidiator	Leiognathidae	Perciformes	*
	Alepes djedaba	Carangidae	Perciformes	**
	Pomadasys maculates	Haemulidae	Perciformes	**
	Tripterodon orbis	Ephippidae	Perciformes	*
	Terapon puta	Terapontidae	Perciformes	**
	Mugil cephalus	Mugilidae	Perciformes	*
	Gerres filamentosus	Gerreidae	perciformes	-
	Gerres erythrourus	Gerreidae	perciformes	-
	Secutor ruconius	Liognathidae	perciformes	*
	Rastrelliger kanagurta	Scombridae	Perciformes	**
	Sillago sihama	Sillaginidae	Perciformes	*
	Psettodes erumei	Psettodiadae	Pleuronectiformes	-
	Synaptura commersonii	Soleidae	Pleuronectiformes	**
	Plotosus lineatus	Plotosidae	Siluriformes	-
Ornamental fish	*Synodus dermatogenys*	Synodontidae	Aulopiformes	-
	Trachinocephalus myops	Synodontidae	Aulopiformes	-
	Cephalopholis formosa	Serranidae	Perciformes	*
	Acanthurus mata	Acanthuridae	Perciformes	*
	Siganus argenteus	Siganidae	Perciformes	**
	Siganus canaliculatus	Siganidae	Perciformes	-
	Monodactylus kottelati	Monodactylidae	Perciformes	-
	Lutjanus lutjanus	Lutjanidae	Perciformes	*
	Lutjanus quinquelineatus	Lutjanidae	Perciformes	*
	Upeneus vittatus	Mullidae	Perciformes	*

** Most abundant; *abundant; -rare

3.2 Non- edible fishes

In the present investigation, 19 non- edible fish species belonging to 9 families and 6 orders were recorded (Table 2). Maximum number of fish species were collected under the order Perciformes (52.6%) followed by Tetraodontiformes (26.3%), Beryciformes (10.5%), Scorpaeniformes (5.2%) and Syganidae (5.2%). The predominant number of species collected under the family Apogonidae followed by Pempheridae, Diodontidae, Holocentridae, and Tetraodontidae. Majority of non-edible fishes were collected under Tetraodontiformes and Beryciformes. Out of 19 non-edible fishes, maximum number of non-edible species (17 species) were used for ornamental purposes which belongs to the order Perciformes. Number of fish species caught under different families *viz.* Holocentridae (2 species), Chaetodontidae (1 species), Labridae (1 speceis), and Pempharidae (3 species) Tetraodontidae (2 species). Some species were noticed occasionally and they belong to the family Fistulariidae under the order Syngnathiformes. Most of the ornamental fishes were collected from rocky and reefy area where the quantity of reef fishes were abundant and they belong to the families such as Pempharidae, Holocentridae, and Labridae. Deep-reef species were defined as those fishes which are associated with coral reefs and lives below 50 meters to 500 meters (William *et al.,* 2010)**.**

Table.2 Diversity of non-edible fishes collected from East Coastal Region Chennai during the year 2015.

Species	Family	Order	Status	Category
Myripristis botche	Holocentridae	Beryciformes	**	
Sargocentron rubrum	Holocentridae	Beryciformes	**	
Apogon multitaeniatus	Apogonidae	Perciformes	*	
Apogonichthyoides nigripinnis	Apogonidae	Perciformes	*	
Apogonichthyoides pseudotaeniatus	Apogonidae	Perciformes	*	
Chaetodon decussates	Chaetodontidae	Perciformes	**	
Iniistius bimaculatus	Labridae	Perciformes	**	
ostorhinchus aureus	Apogonidae	Perciformes	*	Ornamental
Pempharis mangula	Pempheridae	Perciformes	**	
Pempharis molucca	Pempheridae	Perciformes	**	
Pempheris mangula	Pempharidae	Perciformes	**	
Choridactylus multibarbus	Synanceiidae	Scorpaeniformes	*	
Diodon histix	Diodontidae	Tetraodontiformes	*	
Diodon holocanthus	Diodontidae	Tetraodontiformes	*	
Lagocephalus lunaris	Tetraodontidae	Tetraodontiformes	**	
Malichthys indicus	Balistidae	Tetraodontiformes	*	
Takifugu oblongus	Tetraodontidae	Tetraodontiformes	*	
Tryssa malabaricus	Engraulidae	Perciformes	*	Trash
Fistularia commersonni	Fistulariidae	Syngnathiformes	_	

** Most abundant; *abundant; -rare

Variety of fishes were collected using different mesh size of gill net. The predominant species in the study area are Anchovy, Sardine, and Mackerel. The seasonal fish are more economically important for fisherfolk. Present findings are coinciding with the earlier findings of Raghu Prasad and Ramachandran Nair (1973). They reported that out of 2.5 million tonnes of fishes collected from Indian Ocean consisting of Herrings, Sardines, Anchovies and related forms contribute about 28% of the total catch from the Indian Ocean. The group mackerels, billfishes, etc account for 8.6% of the fishes caught (Anon, 1967). Veleppan Nair (1953) reported that the Clupeid fishes are second to none in the commercial fisheries of India and they contribute more than one third of the total marine fish production of the country. The sardine, hilsa, anchovies, white baits etc. are more important fishes of the group which support the very rich fisheries of our water. In general, the total marine fish production of India has been in increasing trend, but considerable fluctuations are noticed in the annual landings in certain years. Three fisheries viz, oil sardine, Bombay duck and mackerel constitute nearly forty two per cent of the total catch and the landings of each of these shows wide variations.

Conclusion

Aesthetic nature of marine ecosystem was reduced drastically by involving much anthropogenic activities in coastal area. The declining trend was noticed in marine fish diversity. Variety of fishes collected must be graded consumable and non consumable fishes at spot of catch itself. Consumable fishes can reach consumers and non consumable fishes must be thrown back. This present findings envisage the diversity of non-edible fishes in the specified catchment area is the first report. From the findings fishes at East Coastal Regions can be categorized into food fish, ornamental fish and trash fishes. The present study is the preliminary attempt made by the researchers. Further extensive research is needed for the diversity and conservation of fishes species in East Coastal Region.

Acknowledgments

References

1. Aarts GW and Nienhuis PH, 1996 Ecological sustainability and biodiversity. International Journal of sustainable Development and World Ecology. (2): 89-102.
2. Alina, M., Azrina, A., Mohd Yunus, A.S., Mohd Zakiuddin, S.,Mohd Izuan Effendi, H. and Muhammad Rizal, R. 2012, Heavy metals (mercury, arsenic, cadmium, plumbum) in selected marine fish and shellfish along the State of Malacca, International Food Research Journal 19(1): 135-140.
3. Anon. 1967, Wetlands of Assam. Assam Remote Sensing Application Centre, Guwahati. In G.R. Margarate, M. Obbert, Jr. and C.L. Wolf. Glossary of geology. American Geological Institute, Washington, DC.
4. Bengtsson, J., Jones, H. and Setala, H. 1997, The value of biodiversity. Trends in Ecology and Evolution 12 (9), 334-336.
5. Boeuf, G. 2011, Marine biodiversity characteristics, C R Biol. 2011 May; 334(5-6):435-40.
6. Culotta, E. 1996, Exploring biodiversity's benefits. Science 273, 1045-1046.
7. Day, F. 1878, The fishes of India: being a natural history of fishes known to inhabit the seas and fresh water of India, Burma and Ceylon.
8. Grime, J.P. 1997, Biodiversity and ecosystem function: the debate deepens. Science 277, 1260-1261.
9. Kuppan, A and Martin, P. 2015, Seasonal availability of fish population in coastal village Kanathure Reddy Kuppam at Chennai, Proceedings of State level Seminar on Environmental Conservation and Water Resource Management held at Nandanm Chennai.35.(23):164-167(2015).
10. Munro, I.S.R., 1955, The marine and freshwater fishes of Ceylon, Canberra, 349 pp.
11. O'Dor, R. 2003, The Unknown Ocean: The Baseline Report of the Census of Marine Life Research Program. Washington, DC: Consortium for Oceanographic Research and Education; p. 28.
12. Raghu Prasad, R and P. V. Ramachandran Nair, 1973, India and the Indian Ocean fisheries, J. Mar. Biol. Ass. India vol.15.no.1.
13. Smith, M.M and P.C.Heemstra, 1986, Smiths sea fishes. Macmillan South Africa, Johannesburg. xx+ 1047 pp.
14. Velappan Nair, R. 1953, Key for the field identification of the common Clupeoid fishes of India, Journal of the Zoological Society of India, vol. no.1.
15. William, N., Eschmeyer, Ronald Fricke, Jon D. Fong and Dennis A. Polack, 2010, Marine fish diversity: history of knowledge and discovery (Pisces), Zootaxa 2525: 19–50.