

BIODIVERSITY POTENTIAL OF MARINE FISHES IN NAGAPATTINAM COAST, TAMIL NADU, INDIA

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ABSTRACT

The Study of biodiversity has become very essential for scientific data banking as unexpected abrupt climatic changes occurring regularly. This is mainly due to unchecked anthropogenic activities happening in the name of development. Fish fauna is considered as a good indicator of water quality. The aim of this study was to assess the influence of environmental factors on the fish distribution status in Nagapattinam coastal waters, southeast coast of India. Monthly surveys were conducted from September 2017 to August 2018, in which 101 fish species were recorded, belonging to 25 orders and 44 families. The dominant family was Engraulidae which were represented by 10 species. Various physico-chemical parameters and nutrients were found to be suitable for growth of plankton and stocking of fish species.

Key words: Marine fish, Diversity, Engraulidae, Nagapattinam coast,

INTRODUCTION:

Fishes are an important vertebrate group of the animal world and contribute overwhelmingly to global biodiversity. Fishes are used as a food source and contain many vital vitamins and fatty acids. The study of fish and their stability is important because fish populations vary significantly from year to year. They play an important role, as they are not only useful for food and recreation, but also act as a tool for biological control by feeding upon the planktonic population and aquatic vegetation [1]. The basic facts of

diversity through species discovery and description are mostly complete for some areas of the world and for many families of fishes. Fishes constitute more than half of all vertebrates, with over 31,000 valid species, and of these over half are marine fishes [2].

Biodiversity is the life sustaining system and the biosphere has intrinsic value and its components have ecological, social economic, scientific education culture and aesthetic value [3]. Coastal region is a place of hectic human activity owing to urbanization and industrialization resulting in human interference of rapid development. In recent years, the coastal ecosystems have become highly disturbed and very much threatened and attributed to problems like pollution, siltation, erosion, flooding, salt water intrusion and storm surges [4]. A data base on fish biodiversity is essential as a decision making tool for conservation and management of fish germplasm, declaration of part of the rivers as aquatic sanctuaries, protection and preservation of endangered species [5]. Hence the present investigation aimed to assess the diversity of marine fishes in the selected study sites in Nagapattinam coastal waters, southeast coast of India.

2. MATERIALS AND METHODS

The study site of Nagapattinam landing centre is situated at (Lat 10°45'37.45"N Lon 79°51'09.07"E) during the Sep- 2017 to Aug- 2018 (Figure 1).

Figure 1: STUDY AREA



Fish collections were done in three seasons [6] (pre monsoon from February to May, monsoon from June to September and post monsoon from October to January) for a period of one year (2017-2018) with the help of local fishermen using a variety of gears including cast nets, gill nets, drag net, scoop nets and traps. The fishes were preserved in 10% formaldehyde solution for taxonomic analysis, identified by the method followed [7-9]. The identified fishes were properly labeled and arranged in the racks of Zoology museum maintained in our Department.

3.0. RESULTS

The fish species available in Nagapattinam coastal waters with their scientific name, family and order and their status in the biodiversity were given in the table 1.

A total of 101 species of fishes were recorded belonging to the 25 orders and 44 families in the Nagapattinam coast during study period.

Table 1: List of Predominant families with total no. of genera and species

Family	Species	Order	Author
1. Anguillidae	1. <i>Anguilla bengalensis</i>	Anguilliformes	J. E. Gray, 1831
2. Ariidae	2. <i>Arius arius</i>	Siluriformes	Hamilton, 1822
3. Bregmacerotidae	3. <i>Bregmaceros macclellandi</i>	Gadiformes	Thompson, 1840
4. Carangidae	4. <i>Alectisciliaris</i>	Perciformes	Bloch, 1787
	5. <i>Alectis indica</i>		Rüppell, 1830
	6. <i>Caranx ignobilis</i>		Forsskål, 1775
	7. <i>Caranx sem</i>		Cuvier, 1833
	8. <i>Decapterus macrosoma</i>		Bleeker, 1851
	9. <i>Scomberoides tol</i>		Cuvier, 1832
	10. <i>Trachinotus blochii</i>		Lacépède 1801
5. Chanidae	11. <i>Chanos chanos</i>	Gonorynchiformes	Forsskål, 1775
6. Chirocentridae	12. <i>Chirocentrus dorab</i>	Clupeiformes	Forsskål, 1775
7. Clupeidae	13. <i>Anodontostoma chacunda</i>		Hamilton, 1822
	14. <i>Escualosa thoracata</i>		Valenciennes, 1847
	15. <i>Sardinella fimbriata</i>		Valenciennes, 1847
	16. <i>Sardinella gibbosa</i>		Bleeker, 1849
	17. <i>Sardinella longiceps</i>		Valenciennes, 1847
8. Congridae	18. <i>Conger cinereus</i>	Anguilliformes	Rüppell, 1830
9. Cynoglossidae	19. <i>Cynoglossus arel</i>	Pleuronectiformes	Bloch & Schneider, 1801
	20. <i>Cynoglossus macrostomus</i>		Norman, 1928
10. Dasyatidae	21. <i>Himantura imbricata</i>	Myliobatiformes	Bloch &

			Schneider, 1801
11. Diodontidae	22. <i>Diodon hystrix</i>	Tetraodontiformes	Linnaeus, 1758
12. Drepaneidae	23. <i>Drepane punctata</i>	Perciformes	Linnaeus, 1758
13. Dussumieriidae	24. <i>Dussumieria acuta</i>	Clupeiformes	Valenciennes, 1847
14. Engraulidae	25. <i>Encrasicholina heteroloba</i>		Rüppell, 1837
	26. <i>Encrasicholina punctifer</i>		Fowler, 1938
	27. <i>Stolephorus commersonii</i>		Lacépède, 1803
	28. <i>Stolephorus indicus</i>		Van Hasselt, 1823
	29. <i>Stolephorus insularis</i>		Hardenberg, 1933
	30. <i>Thryssa purava</i>		Hamilton, 1822
	31. <i>Thryssa dussumieri</i>		Valenciennes, 1848
	32. <i>Thryssa malabarica</i>		Bloch, 1795
33. <i>Thryssa mystax</i>	Bloch & Schneider, 1801		
34. <i>Thryssa setirostris</i>	Broussonet, 1782		
15. Epinephelidae	35. <i>Epinephelus bleekeri</i>	Perciformes	Vaillant, 1878
	36. <i>Epinephelus diacanthus</i>		Valenciennes, 1828
	37. <i>Epinephelus hexagonatus</i>		Forster, 1801
	38. <i>Epinephelus tauvina</i>		Forsskål, 1775
16. Exocoetidae	39. <i>Cheilopogon spilopterus</i>	Beloniformes	Valenciennes, 1847
	40. <i>Exocoetus volitans</i>		Linnaeus, 1758
17. Fistulariidae	41. <i>Fistularia commersonii</i>	Syngnathiformes	Rüppell, 1838
18. Gerreidae	42. <i>Gerres abbreviatus</i>	Perciformes	Bleeker, 1850
	43. <i>Gerres filamentosus</i>		Cuvier, 1829
19. Haemulidae	44. <i>Pomadasys maculatus</i>		Bloch, 1793
20. Hemiramphidae	45. <i>Hemiramphus far</i>	Beloniformes	Forsskål, 1775
21. Latidae	46. <i>Lates calcarifer</i>	Perciformes	Block, 1790
22. Leiognathidae	47. <i>Gazza minuta</i>		Bloch, 1795
	48. <i>Leiognathus bindus</i>		Valenciennes, 1835
	49. <i>Nuchequulablochii</i>		Valenciennes, 1835
	50. <i>Leiognathus brevisrostris</i>		Valenciennes, 1835
	51. <i>Leiognathus daura</i>		Cuvier, 1829
	52. <i>Leiognathus dussumieri</i>		Valenciennes, 1835
	53. <i>Aurigequula fasciata</i>		Lacépède, 1803
54. <i>Secutor insidiator</i>	Bloch, 1787		
23. Lutjanidae	55. <i>Aphareus rutilans</i>		Cuvier, 1830
	56. <i>Lutjanus argentimaculatus</i>		Forsskål, 1775

	57. <i>Lutjanus lutjanus</i>		Bloch, 1790
	58. <i>Lutjanus malabaricus</i>		Bloch & Schneider, 1801
	59. <i>Lutjanus rivulatus</i>		Cuvier, 1828
	60. <i>Lutjanus fulviflamma</i>		Forsskål, 1775
24. Mugilidae	61. <i>Mugil cephalus</i>	Mugiliformes	Linnaeus, 1758
	62. <i>Upeneus bensasi</i>		Temminck & Schlegel, 1843
25. Mullidae	63. <i>Upeneus moluccensis</i>	Perciformes	Bleeker, 1855
	64. <i>Upeneus sulphureus</i>		Cuvier, 1829
	65. <i>Upeneus vittatus</i>		Forsskål, 1775
26. Narcinidae	66. <i>Narcine brunnea</i>	Torpediniformes	Annandale, 1909
	67. <i>Pseudorhombus elevatus</i>		Ogilby, 1912
27. Paralichthyidae	68. <i>Pseudorhombus javanicus</i>		Bleeker, 1853
	69. <i>Pseudorhombus triocellatus</i>	Pleuronectiformes	Bloch & Schneider, 1801
28. Platycephalidae	70. <i>Platycephalus indicus</i>	Scorpaeniformes	Linnaeus, 1758
29. Plotosidae	71. <i>Plotosus canius</i>	Siluriformes	Hamilton, 1822
	72. <i>Ilisha megaloptera</i>		Swainson, 1839
30. Pristigasteridae	73. <i>Ilisha elongata</i>		ennett, 1830
	74. <i>Ilisha kampeni</i>	Clupeiformes	Weber & de Beaufort, 1913
31. Psettodidae	75. <i>Psettodes erumei</i>	Pleuronectiformes	Bloch & Schneider, 1801
32. Scaridae	76. <i>Scarus ghobban</i>	Perciformes	Forsskål, 1775
33. Sciaenidae	77. <i>Otolithes ruber</i>		Bloch & Schneider, 1801
	78. <i>Rastrelliger kanagurta</i>	Scombriformes	Cuvier, 1816
34. Scombridae	79. <i>Scomberomorus guttatus</i>		Bloch & Schneider, 1801
	80. <i>Epinephelus lanceolatus</i>		Bloch, 1790
35. Serranidae	81. <i>Epinephelus malabaricus</i>		Bloch e Schneider, 1804
36. Siganidae	82. <i>Soganus javus</i>		
	83. <i>Sillago aeolus</i>	Perciformes	Jordan & Evermann, 1902
37. Sillaginidae	84. <i>Sillago ingenuua</i>		McKay, 1985
	85. <i>Sillago sihama</i>		Forsskål 1775
38. Soleidae	86. <i>Zebrias quagga</i>	Pleuronectiformes	Kaup, 1858
	87. <i>Sphyraena barracuda</i>		Edwards, 1771
39. Sphyraenidae	88. <i>Sphyraena forsteri</i>	Perciformes	Cuvier, 1829
	89. <i>Sphyraena jello</i>		Cuvier, 1829
	90. <i>Sphyraena obtusata</i>		Cuvier, 1829
40. Stromateidae	91. <i>Pampus argenteus</i>	Scombriformes	Euphrasen, 1788
	92. <i>Pampus chinensis</i>	Perciformes	Euphrasen, 1788
	93. <i>Hippocampus kuda</i>	Syngnathiformes	Bleeker, 1852
41. Syngnathidae	94. <i>Saurida tumbil</i>	Aulopiformes	Bloch, 1795

	95. <i>Trachinocephalus myops</i>	Synodontidae	J. R. Forster, 1801
42. Terapontidae	96. <i>Terapon jarbua</i>	Perciformes	Forsskål, 1775
	97. <i>Terapon puta</i>		Cuvier, 1829
	98. <i>Lagocephalus lunaris</i>	Tetraodontiformes	Bloch & Schneider, 1801
43. Triacanthidae	99. <i>Triacanthus biacculatus</i>		Bloch, 1786
44. Trichiuridae	100. <i>Lepturacanthus savala</i>	Perciformes	Cuvier, 1828
	101. <i>Trichiurus lepturus</i>		Linnaeus, 1758

List of Predominant families with total no. of genera and species

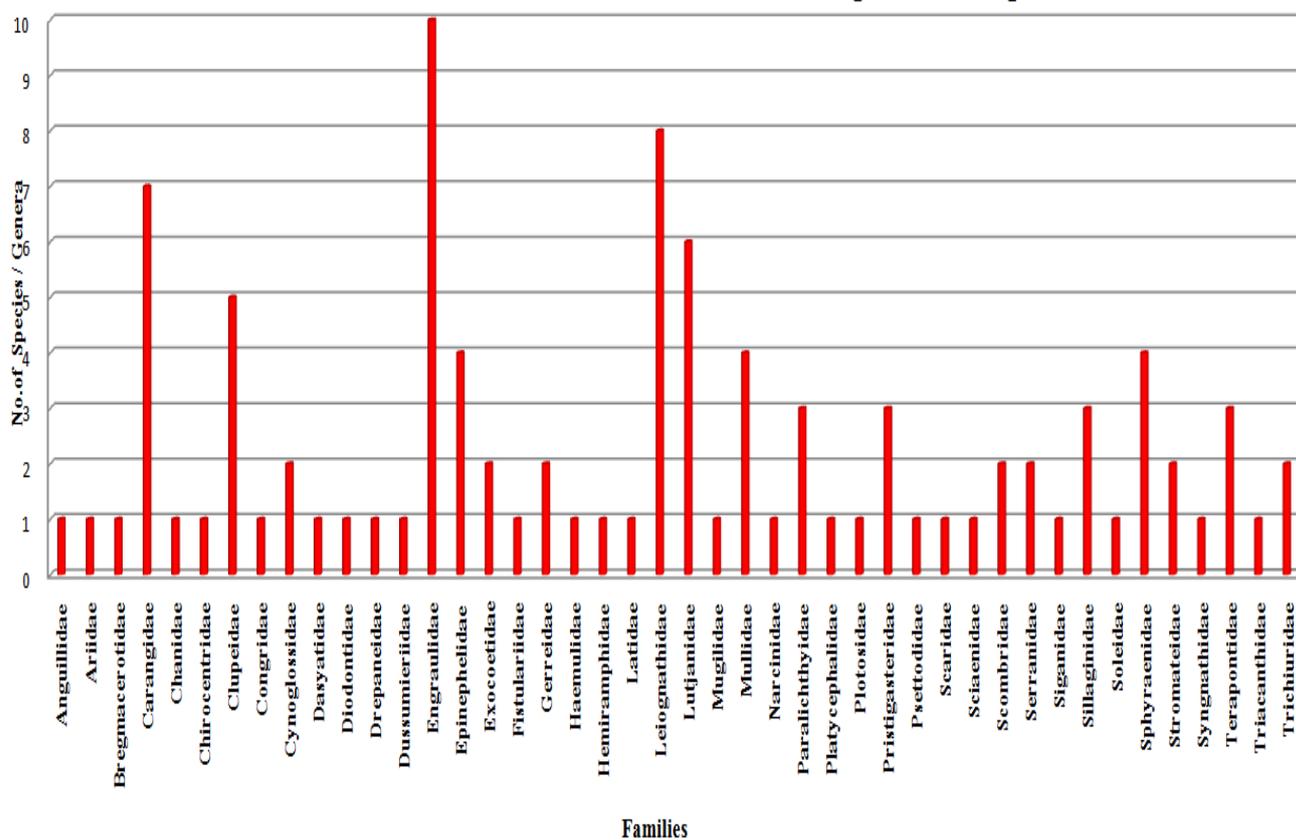


Fig 2: Number of species and genus along the Collection sites

4.0. DISCUSSION

Coastal ecosystems are complex adaptive systems composed of interconnected groups of living organisms and their habitats [10]. Tamil Nadu has a very rich marine and estuarine fish fauna and its ichthyofauna is characterized by unique elements of Indian Ocean origin [11-12]. The marine and estuarine fish diversity of Tamil Nadu constitute about 51.25% to the total fish diversity of India [12] and 4.76% to the total fish diversity of world [13]. The fish families and genera are expanding with newly described species from Tamil Nadu. The increase in species year after year indicates that there are many new yet to

discover from the diverse marine and estuarine ecosystems. Of this total marine and estuarine fish diversity of Tamil Nadu, primary marine fishes (1075 species) constitute 44.0 percent to the total marine fish diversity of India [12]. The present scrutiny was document the distribution of marine fishes along the Nagapattinam coastal waters and totally 101 different species were identified belonging to 25 orders and 44 families from collection site, southeast coast of India (Figure 2). The above findings are in concord with [14] collected 46 species in Parangipettai and 51 in Cuddalore coastal waters as well as [15] identified 66 species in Mallipattinam coastal waters, Southeast coast of India. At the same time as 95 species are documented among the Nagapattinam coastal waters [16]. In the present study totally 101 species were recorded belonging to 25 orders and 44 families where the diversity of fish is based on the environmental condition.

5.0. CONCLUSION

Tamil Nadu is endowed with rich marine fish diversity. Fish diversity is considered as plentiful aquatic resources for supporting food and income source. This present study clearly illustrates that marine fish diversity of Nagapattinam coast is the richest fish diversity zone was identified and the need of conservation to protect them for future research works like aquaculture, ornamental fish production and ecotourism development. Available data indicated the lack of scientific studies on marine fishes from the locality of Nagapattinam coast. Hence research need to be conducted on fish identification, taxonomic diversity, patterns of distribution and conservation status in Tamil Nadu for planning appropriate conservation strategies.

6.0. CONFLICT OF INTEREST STATEMENT

We declare that we have no conflict of interest.

7. 0. ACKNOWLEDGEMENT

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