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A Study of the Fish Diversity Associated with Different Mangrove Species of Ayiramthemgu Region in Kollam, Kerala, India

Nisha Thomas Panikkaveetil

Dept of Zoology, Fatima Mata National College, Kollam, Kerala, India
Email: nisha.thomasp@rediffmail.com

Abstract

Mangrove ecosystems are considered as the repositories of biological diversity. Synonymous to the tropical rain forests, efforts are currently on to preserve and perpetuate mangroves and their dependent species diversity. In Kollam, specifically, Ayiramthengu is the most major mangrove hotspot and was severely affected during the 2004 Tsunami. The current study was to link the ichthyofaunal diversity to six different mangrove species in the Ayiramthengu area. Representatives of Muraenidae, Scatophagidae, Teraponidae, Batrachidae, etc., were new finds as against the usual Mugilidae, Carangidae and Cichlidae, Ambassidae, Gerreidae and Siganidae fish species, which could be due to increasing salt intrusion in the region.

Keywords: Ayiramthengu, Biodiversity, Mangroves, Fish, Anthropogenic destruction

1. Introduction

Mangroves consist of a wide variety of tropical trees or woody shrub-like plants growing at the interface between sea and land (intertidal zone) and form a highly productive and ecologically important ecosystem, often found in combination with coral reefs and seagrass beds (Kathiresan *et al*., 2001). Mangrove ecosystems are rich in biodiversity and harbour several floral and faunal species. They also act as nurseries for finfish, shellfish, crustaceans and molluscs. The species richness of mangroves in many geographical areas decreases with time due to the destruction of mangrove forests and exposure to various anthropogenic stresses. The area and floristic composition of mangrove forests in Sri Lanka has also decreased rapidly during the last few decades (Dahdouh-Guebas *et al.*, 2000), possibly leading to the local extinction of some rare species.

The study area was Ayiramthengu mangrove (lat. 9° 02'-9° 16' N and long. 76° 20' - 76° 32' E) which is situated in Kollam district of Kerala, India. The mangrove ecosystem is a part of Kayamkulam estuary (lat. 9° 07' - 9° 16' N and long. 76° 20' - 76° 28' E), which is a narrow stretch of tropical backwater on the west coast of Peninsular India. Ayiramthengu mangrove forest was declared an environmental hot spot after being ravaged by the Tsunami in 2004 and threatened with extinction. Individual studies on mangrove diversity or its faunal diversity have been conducted. The study is intended to understand the species diversity associated with different mangrove species in the Ayiramthengu region of Kollam.

2. Materials and Methods

Fish and other edible species from each Site were collected using traps and fishing nets. The different mangrove species and species of fishes (Day,1978) and other organisms collected were identified using suitable keys.

3. Results and Discussion

Mangrove vegetation in Ayiramthengu, Kollam occurs adjacent to the backwater channels and along the banks of estuarine water bodies, in the form of narrow patches or continuous belts. A total of 15 pure mangroves and 33 mangrove associates have been recorded from the entire coastal area of Kerala (Vidyasagaran *et al*., 2014).

Six sites of Alappad panchayath with six different species of mangroves were identified, the most abundant mangrove species being *Rhizophora apiculata*. *Bruguiera cylindrica, Rhizophora mucronata, Avicennia marina* and *Exocaria agallocha* were the other mangrove species identified and chosen for the study. The ichthyofaunal species common to all six sites are the *Etroplus* species. The species diversity in all the 6 sites is summarised in Table 1. They include fish species, prawns, crabs, mussels, etc.

At the west coast in Ayiramthengu mangroves, Kollam district, Kerala, 27 species belonging to 17 families have been reported. Of the 17 families, Mugilidae has the highest representation with 4 species, followed by Carangidae and Cichlidae with 3 species each and Ambassidae, Gerreidae and Siganidae with 2 species each. The remaining11 families were represented by a single species (Jisha *et al*., 2004). Besides the families mentioned earlier, the representatives in Muraenidae, Scatophagidae, Teraponidae, and Batrachidae were also recorded.

Previous literature related to the biodiversity of ichthyofauna concerning different mangroves was negligible. Based on the little information available, our observations noted a decline in the fish species obtained from the various mangrove sites. From the fishes collected from the five sites i.e. Site 1 to 6, 3 species from Cichlidae-*Etroplus suratensis* and *Etroplus maculatus* were obtained. The discussion with elderly fishers revealed that representatives from Carangidae Ambassidae, Siganidae,

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SITE I
Rhizopora apiculata

SITE II
Bruguiera cylindrica

SITE III
Rhizophora mucronata

SITE IV
Avicennia marina

SITE V
Exocaria agallocha

SITE VI
Aegiceras corniculatum

Fig. 1. Showing the mangrove species in the various selected sites

Table 1. Species diversity in the five mangrove sites in Alappad, Kerala

Sl.No.	Mangrove species	Species Diversity
Site I	*Rhizopora apiculata*	*Etroplus suratensis* , *Etroplus maculatus, Oreochromis mossambicus* [*Cichlidae] Scatophagus argus,[Scatophagidae]Mugil cephalus[Mugilidae], Ambassis gymnocephalus[Ambassidae], Batrachocephalus mino[Batrachidae], Clupea sciendensis[Clupeidae], Sillago sihama[Sillaginidae], Metapenaeus monoceros, Penaeus monodon* [Penaeidae], *Scylla serrata* [Portunidae]
Site II	*Brugeria cylindrical*	*Etroplus suratensis ,Etroplus maculatus, Oreochromis mossambicus* [Cichlidae], *Scatophagus argus*,[Scatophagidae], *Mugil cephalus* [Mugilidae], *Rita Buchanani* [Bagridae], *Metapenaeus affinis* [Penaeidae].
Site III	*Rhizopora mucronata*	*Etroplus suratensis, Etroplus maculatus, Oreochromis mossambicus* [*Cichlidae], Mugil cephalus* [Mugilidae], *Ambassis gymnocephalus* [Ambassidae], *Therapon jarbua* [Terapontidae], *Paphia malabaricus* [Veneridae], M*etapenaeus monoceros* [Penaeidae].
Site IV	*Avicennia marina*	*Etroplus maculatus*[Cichlidae], *Mugil cephalus* [Mugilidae], *Therapon jarbua* [Terapontidae], *Muraena Punctata fasciata* [Muraenidae], *Caranx affinis* [Carangidae], *Paphia malabaricus* [Veneridae].
Site V	*Exocaria agallocha*	*Etroplus maculates* [Cichlidae], *Ambassis gymnocephalus* [Ambassidae], *Clupea scendensis* [Clupeidae], *Gerres filamentosis* [Gerridae] and *Caranx malabaricus* [Carangidae].
Site VI	*Aegiceras corniculatum*	*Mugil cephalus* [Mugilidae],*Clupea scendensis* , [Clupeidae], *Gerres filamentosis* [Gerridae], *Therapon jarbua* [Terapontidae], *Muraena Punctata fasciata* [Muraenidae], *Paphia malabaricus* [Veneridae], M*etapenaeus monoceros*[Penaeidae].

etc., also showed a declining trend, and there is, in general, a decline in fish diversity. One reason could be the blockage of water channels preventing water flow from the lake and sand mining for construction purposes. An increase in salinity levels is also detrimental to fish breeding. Subramanian (2002) reports that coastal urbanization, conversion to aquaculture, changes in the local hydrology are the biggest threats to mangroves.

4. Conclusion

Our observations of the ichthyofauna of Ayiramthengu indicated a decline in fish species due to overfishing. Even though efforts to increase the mangrove population are high, this has not led to an expected increase in fish species. The reason for this is exploitation or harvesting at a grossly unsustainable scale. Other reasons for the decline could be attributed to introduction of alien species, habitat destruction, environmental pollution and climate change. Anthropogenic causes of species extinction do not operate in isolation, but rather tend to act with and exacerbate one another resulting in fragmentation of habitats and populations. The small fragmented populations are then exposed to deleterious effects of inbreeding and demographic instability. Consequently the populations decline further and in course of time all the small populations disappear and with them, the species. The present study noted a decline in several fish species in Alappad, Ayiramthengu. Whether this decline has reached serious levels of extinction needs to be further ascertained. It was observed that many of the reasons cited above could serve as plausible reasons. The study revealed that fish species were specific to certain mangrove species and that preservation of the mangrove species is necessary to maintain these fish species. But this study is only a preliminary study and requires regular observation to substantiate the current observations.

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