



International Journal of Fisheries and Aquatic Studies

ISSN: 2347-5129

IJFAS 2015; 2(5): 30-31

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www.fisheriesjournal.com

Received: 21-02-2015

Accepted: 30-03-2015

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Brachyuran crab diversity in Muthupettai mangroves on southeast coast of Tamil Nadu

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Abstract

The purpose of the present study was to investigate the biodiversity, relative abundance and frequency of decapod crustaceans in the marine mangrove ecosystem at Muthupettai mangroves, Tamil Nadu, India. The species present on the substratum and on the vegetation area were recorded in quadrant each measuring 1 meter square. There are about 14 crabs species are distributed in the Muthupettai mangrove environment. Crabs belonging to the family Grapsidae and Ocypodidae are most dominant forms. Substrate suitability, effects of tidal inundation and distribution of mangrove plants were the possible factors that could influence zonation and abundance of the crabs in the Muthupettai mangroves. These results contribute to the knowledge of the decapod fauna inhabiting mangroves.

Keywords: Muthupettai, Mangroves, Brachyuran crabs, Sesarmidae, Grapsidae

1. Introduction

Globally, mangroves are distributed across tropical and subtropical forests; they are predominant in the tropical region. Asia and Australia present the greatest diversity in mangrove species. Out of 18 million hectares of mangrove forests, more than 40% are found along Asian coasts. Mangrove ecosystem is considered ecologically and economically important, perhaps due to its high productivity. However, due to the lack of proper scientific knowledge as well as the rapid increase in various developmental pressures along the coastal region of India, mangrove resources have been over exploited. This has led to tremendous degradation of not only mangrove forests, but also several mangrove dependent systems. Among benthic communities, crustaceans are important members because more number of species present for human consumption and a tremendous variety of small species contribute to the complexity and functioning of tropical ecosystems^[1]. Brachyuran crabs are it eroparous species which present a high diversification^[2]. These organisms play a significant role in the dynamics of the mangroves. In addition to their role as important participants in the trophic web, certain crustaceans constantly excavate burrows in the mud to obtain shelter and to store food. By digging in the sediment, they transport organic matter from the underlying strata to the surface^[3, 4]. The crustaceans also participate in the cycling of nutrients, controlling the remineralization of detritus in the forest^[5].

Tropical and subtropical regions have more number of crab species compared to temperate and cold regions^[6, 7]. In India 705 brachyuran crab species, 28 families, 270 genera have been reported^[8]. Tamil Nadu coast, one of the states in India has 404 species of crabs belonging to 26 families and 152 genera^[9]. Maximum percentages of crab catches are landed from Gulf of Mannar, Palk Bay, Nagapattinam and Puducherry landings of Tamil Nadu coast in India^[10]. Chennai coast has witnessed an annual crab landings were over 1500 t^[11]. The purpose of the present study was to investigate the biodiversity of decapod crustaceans inhabiting the muthupettai mangroves and to compare these findings with those of other studies in marine and estuarine areas.

2. Materials and methods

The study are were selected from Muthupettai lagoon (Lat. 10°46'N, Long 79°51'E) in ramakottam area randomly for crab collection. Hand picking method was adopted for the collection of crab while for burrowing crabs, diluted formalin was poured in the burrow and when the crab comes out of burrow it was collected. All the collected specimens were preserved in 10% formalin for further identification purpose. The preserved specimens were

identified to the species level using different identification keys available in the published literature. For the further conformation about the identification of the species, all the specimens were examined and compared with the photos and information available on Marine Species Identification Portal Website and NIO marine fauna information website. The latest scientific names and classification of the species were adopted.

3. Results and Discussion

In the present study, total 14 species were recorded belonging to 11 genera and 9 families. The number of species recorded for different families varies in numbers. Three species were recorded from families like macropthelmidae and ocypodidae each. More number of species were recorded from family grapsidae. Crab species like *Uca lacteal annulipes*, *Uca dussumieri*, *Scylla serrata*, *Parasesarma plicatum*, *Macrophthalmus dentipes*, *Macrophthalmus depressus*, *Cardisoma carnifex* were reported from the study site. Few species of crabs like *Uca vocans*, *Grapsus intermedius*, *Macrophthalmus dilatatus* were reported from the study sites. Limited number of *Metopograpsus messor* were reported. Crabs belonging to the family Grapsidae and Ocypodidae were the most dominant forms, which play a vital role in recycling the nutrients enhancing the role of decay of plant materials and litter processing crab population was high during monsoon and post monsoon months in mangroves.

Factors such as low salinity, possible physical changes in the substrate composition and availability of maximum organic carbon during monsoon and post monsoon seasons may be attributed for greater abundance. Among all the crabs in Muthupettai mangroves the dominant representatives were Sesarmid group of crabs. It includes 5 species. The dominant species of Sesarmidae were *Sesarma quadratum*, *Parasesarma plicatum*, *Perisesarma bidens*, *Episesarma tetragonum*, *Sesarma brooki*. The other crabs species recorded from these zones were *M. latifrons*, *M. albolineatus*, *Uca triangularis* and *U. annulipes* were commonly found.

Present study gave a reference state of the species composition and zonation of the mangrove communities along the south east coast of Tamil Nadu. Of all benthic macro fauna inhabiting the mangrove swamps brachyuran crabs are the most important taxa with regard to species diversity and total biomass. Among the crab species *Sesarma* and *Uca* species were dominant in almost all the stations. Grapsid crabs were the most dominant species. Neritic and Avicennia Zones showed more number of crab species and less number of species was noted in the lightly salinity zone.

Biodiversity and community structures are now recognized to be important determinants of ecosystem functioning^[12]. Monitoring of species diversity is a useful technique for assessing damage to the system and maintenance of good species diversity is a positive management objective. Decapod crustacean forms a significant portion of aquatic food resources of the world and conservation of these resources is important from a commercial as well as ecological point of view^[13]. Bandekar *et al.*,^[10] reported 15 species of crabs in Karwar mangrove environment and have shown that population of commercially important mangrove crabs are declining day by day due to indiscriminate fishing of berried females and fishing of undersized crabs. So increase in pollution around mangrove ecosystem by manmade chemicals due to aquaculture practices is now adding pressure on crab population hence conservation of mangrove crabs is important. An effective conservation strategy for mangrove needs to be

supported by a better understanding of the processes operating within mangrove ecosystems.

4. Acknowledgements

Authors would like to thank the Science and Engineering Research Board, Department of Science and Technology, New Delhi, India (SB/YS/LS/254/2013) for funding this project.

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