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Studies on Diversity of Freshwater Crabs (Decapoda: Parathelphusidea: Potamonautes) Collected from In and Around Paddy Field of Cuddalore District, Tamil Nadu, India.

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Abstract- ***Freshwater ecosystem has an endemic flora and fauna together with freshwater crabs. They are ecologically and medically indispensable macro-invertebrates. This is the first study aimed at contributing to the documentation and conservation of freshwater crabs in southeast India of oriental region. Paddy field of Cuddalore district of Tamil Nadu, during the period from October 2024 to March 2025 with a view to assess the status of freshwater crab resources in the area. The study was made on species diversity, habits and habitat, distribution and economic importance of Brachyuran crabs are very meagre the present study was undertaken. During the last decades, knowledge on biodiversity of freshwater decapods has increased considerably. The study involved investigation of species diversity and distribution. The present communication recorded 10 species of freshwater crabs belonging to 4 genera and 2 families. During collection the "pregnant female and juveniles" were released back into the same field for conservation purpose.***

Key Words: Freshwater Crab, Diversity, Abundance, Paddy Field.

I. INTRODUCTION

Freshwater crabs are true crabs of the Section Brachyura, Order Decapoda. The term "Brachyura" is from the Greek "brachys" for short, and "oura" for tail, alluding to the short abdomen of these animals. Fresh water crabs are fascinating crustaceans that inhabit a wide range of aquatic ecosystem from rivers, streams, river lets, lakes and wetlands. Despite their importance in thus ecosystems, fresh water crabs often remain under studied. These crabs play crucial roles in nutrient cycling, food webs and as indicators of environmental health with thousands of species spread across various families, the biodiversity of fresh water crabs is rich and varied reflecting adaptations to diverse habitats worldwide Kalaimagal *et al.*(2025).

Freshwater crabs are true crabs (Brachyura) and belong to the Order Decapods (Arthropods with ten limbs). Although the great majority of the 8000 or so species of crabs are marine, over 600 species have colonised the freshwater and terrestrial habitat in South America, Europe, Africa, Asia and Australia; Ng (1988) was explained true freshwater crabs are those which spend their entire lives in freshwater, without having to return to the sea for whatever reason. In Southeast Asia, true freshwater crabs belong to three super families the Potamoidea, Gecarcinucoidea and Grapsoidea.

Freshwater crabs are of great economic important moreover. Because these animals from a significant parts of the diet of large number of people in this parts of the continent. Biodiversity is important for human survival and economic interests and for the environmental purpose and stability (Cumberlidge, 1999). The rich biodiversity has a significant role in the maintenance of the ecosystem. Crustaceans are visibly a remarkable group of organisms with a long evolutionary history and prominent adaptability. The decapoda crabs are mostly action animals with complex behavior patterns (Varadharajan and Soundarapandian, 2014). Ba˘na˘rescu (1990)

proposed long distance transoceanic dispersal as an alternative mechanism to explain the largely insular distribution of the Parathelphusidae in Sundaic Southeast Asia. However, this has been challenged by Ng and Rodriguez (1995) who argued that Ba˘na˘rescu's ideas made dubious assumptions about the ecology and origins of the Parathelphusidae (and about the phylogeny of all freshwater crabs).

Crabs are postulated to have had a Gondwanan origin with present day distribution patterns resulting from the breakup of the supercontinent were reported by Yeo and Ng, (1999). Freshwater ecosystems harbor a rich diversity of species and habitats. There are currently a total of 238 genera and 1,476 species of known freshwater crabs from 14 families (including 1, 306 true freshwater crabs species in eight exclusively freshwater families was reported by Martin and Davis (2001).

Siddique and Zafar (2002) reported 13 marine and 3 freshwater species of crabs from Chakaria Sundarban area of Bangladesh. The 13 species of freshwater crabs known from Madagascar give a similar estimated by (Cumberlidge and Sternberg, 2002). Given that 24 of Sri Lanka's 51 freshwater crab species are restricted to montane and sub-montane habitats, poor sloping-land management and unwise land-use change in the highlands continues to be a serious problem were examined Hewawasam *et al.* (2003).

The freshwater crabs, a very diverse group, which is currently comprised by 40 genera and roughly 255 species and subspecies in the neotropics Rodriguez and Magalhaes (2005). Srivastava (2005) was identified of freshwater crabs from Kerala and Tamil Nadu. Tamil Nadu coast, one of the states in India has 404 species of crabs belonging to 26 families and 152 genera (Kathirvel, 2008). The brachyuran crabs and about 1,300 of these have been reported from freshwater habitats (Yeo *et al*., 2008).

II. MATERIALS AND METHODS

In the present study the animals were obtained between October 2024 through March 2025. The freshwater crabs were collected with the help of hand picking methods. Freshwater crab adult samples were collected in the Morning and evening in paddy fields and placed them, as far as possible, in separate plastic bags or vials. During collection the "pregnant female and juveniles" were released back into the same field for conservation purpose. In the laboratory, crabs were removed from the each sample; they were preserved in 70% alcohol. Few specimens were deposited in ZSI Pune, for confirmation of identification of specimen. Little Formalin should not be used for long periods since it tends to harden all the connective tissue making future manipulation difficult.

Samba Paddy crop in over 50,000 acres in Cuddalore districts are cultivated. During this time I collected freshwater crabs in the cultivated paddy field of Cuddalore district, Area 114291, % to State, 5.6, Gross Cropped area, 272159, % of Paddy area to Gross Cropped area, 42.0 Factors such as fertility of land, monsoon behavior, rainfall, irrigation, application of fertilizers, climatic conditions, marketing facilities, prices, availability of agricultural labourers etc. determine the area and productivity of any crop. The crop wise analysis of production between the current year and previous year is presented in the table below. The present study was focused on the taxonomical, diversity of the brachyuran crabs collected from the Cuddalore (Lat.11º 43' N; Long.79º 49' E).

III. RESULT

The Brachyuran crabs collected during the months of October-2024 to March-2025 at early morning. Throughout the present study we identified a total of 1976 individuals and 10 species, 4 Genera under 2 families. According to this study period the Parathelphusidae crab Somannaithelphusa dangi is comparatively high about 250 individuals and followed by the species of Parathelphusa reticulata in the total number of 142 individuals respectively. The species of Parathelphusa celebensis is the very least number of species during the study period 147 individuals were found.

IV. POPULATION DENSITY OF BRACHYURAN FRESHWATER CRAB

The population density of Brachyuran freshwater crabs was observed from the study area. The monthly variation of population density varied from 279 individuals to 375 individuals was observed. The

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maximum was observed during February and minimum was observed during September in study period. The species variation of population density varied from 9 individuals to 53 individuals was reported. The maximum was observed *Somannaithelphusa dangi* and minimum was observed was most dominant species and was *Parathelphusa celebensis* second dominant species during the study period.

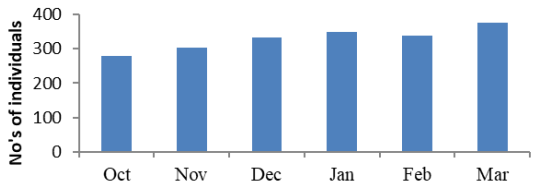

Fig.1. Population density of Brachyuran freshwater crabs

V. ABUNDANCE OF BRACHYURAN FRESHWATER CRAB

The abundance of Brachyuran freshwater crabs varied from 4 to 45 individuals from the stud area. The maximum was observed *Somannaithelphusa dangi* during February and minimum was observed *Parathelphusa celebensis* during September of the study period.

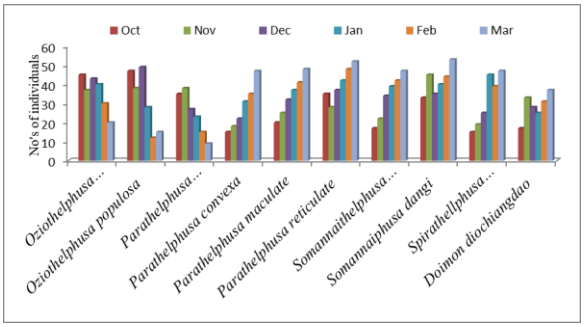

Fig. 2. Abundance of Brachyuran freshwater crabs

VI. PERCENTAGE COMPOSITION OF BRACHYURAN FRESHWATER CRAB SPECIES

The percentage composition of brachyuran marine crabs species varied from 9% to 16% was observed during the study period. The maximum was observed *P. Parathelphusa celebensis* during February and minimum was observed *Somannaithelphusa dangi* during September.

VII. DIVERSITY INDICES OF BRACHYURAN CRABS

Shows the Species diversity varied from 2.36 to 2.198. The maximum diversity was observed during month October 2024 and minimum was observed during month February 2025. Species richness varied from 0.9916 to 0.8818. The maximum richness was observed during month October 2024 and minimum was observed during month September 2025, as in shows the Species evenness varied from 0.9903 to 0.9544. The maximum evenness was observed during month December and minimum was observed during month February.

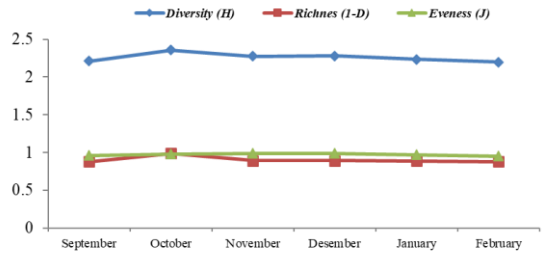

Fig.3. Diversity of Brachyuran Crabs

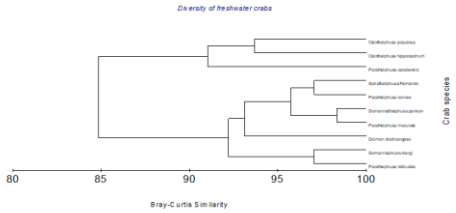

Fig. 4. Cluster analysis of Brachyuran Crabs found in different Species of South India

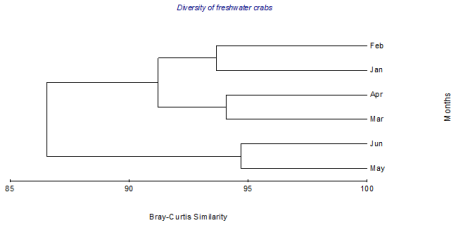

Fig. 5. Cluster analysis of Brachyuran Crabs found in different months of South India

The analysis gave a clear pattern highlighting the similarities in diversity during the study period. The maximum likely hood tree of combined 80%. The minimum similarity of 92% cluster analysis shows the presence of groups of species in a parallel manner across month (Fig. 4). The Bray – Curtis cluster analysis diagram shows the diversity of brachyuran crabs about 80% are collected during the months and its similarity of collected species (Fig. 5).

VIII. DISCUSSION

In the present study 10 species, *Oziotelphusa hippocastanum, Oziotelphusa populosa, Parathelphusa celebenesis, Parathelphusa convexa, Parathelphusa maculate, Parathelphusa reticulate, Somanniathelphusa zanklo, Somanniathelphusa dangi, Spiralothelphusa fernandoi, Diomon diochiangadao* of 4 genera and 2 families in Paddy field at Cuddalore district was recorded.

Sixty eight species of Brachyuran crabs including nine species Parathelphusidae family reported in shallow Freshwater crabs and estuarine water from southern Bahia coast of Brazil (Almeida *et al*., 2010). Hundred and sixty two species of brachyuran crabs recorded in the state of Bahia in eastern Brazil comprises more than 12% of the entire Brazilian coast (Almeida and Coelho, 2008).

Crabs of the infra-order Brachyura are among the most diverse groups of crustaceans with over 7,000 described species in 98 families, occurring in marine, freshwater and terrestrial habitats (Ahyong *et al*., 2011). The relationships among the Brachyuran families are poorly understood, however, due to the high morphological diversity of the group.

IX. SUMMARY AND CONCLUSION

The study was carried out on the diversity of freshwater crabs in and around paddy field of Cuddalore district, south India. Ten species of fresh water crabs, *Oziotelphusa hippocastanum, Oziotelphusa populosa, Parathelphusa celebenesis, Parathelphusa convexa, Parathelphusa maculate, Parathelphusa reticulate, Somanniathelphusa zanklo, Somanniathelphusa dangi, Spiralothelphusa fernandoi, Diomon diochiangadao* of 4 genera and 2 families in Paddy field at Cuddalore district was recorded for taxonomy and diversity.

A phylogeny of Brachyura topology provides important new insights into the evolution and systematic of Brachyura. Biodiversity of Brachyuran fresh water crabs to understand the endemic species.

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