

A Study on the Mangrove Crabs in Batticaloa District for Potential Export Market

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Introduction

Mangrove crabs live in association with mangrove forests and belong to many different species. They have been shown to be ecologically very significant animals which keep much of the energy within the forest by burying and consuming leaf litter. The edible mangrove crab *Scylla serrata* is a well known commercial commodity considered to be among the tastiest of crab species and have a huge demand in South Asian countries. Most of the edible crabs belong to the family Portunidae and are swimming crabs but there are some grapsid crabs which are true dwellers of the mangrove forests that are edible. Grapsid crab, *Episesarma* sp. is such a delicacy consumed by the Thai people and by Chinese people in their cuisines (Ng and Sivasothi, 1999). Some *Uca* species and sesarimid crabs such as *Perisesarma* species which has deep red pincers and iridescent blue or green band across the face are considered as ornamental animals due to their beautiful colourations (Nyawira and Methiga, 1834). *Sesarma bidens* is another mangrove crab which is bred in aquariums as an ornamental animal (www.aquaticcommunity.com).

Extensive mangrove forests are found in association with lagoons and estuaries of Sri Lanka but the studies on their fauna is limited (Priyadarshani, *et al.*, 2008). The crabs dwelling in these mangrove environments are anticipated to have much potential to be utilized in various industries if they could be bred in captivity. Crabs with ornamental value can be bred in captivity and can take up to the ornamental aquaculture markets. The present study was carried out with an aim of finding the diversity and the export potential of the mangrove crabs in the Batticaloa District, Sri Lanka.

Methodology

Three mangrove areas in the Batticaloa (7°43'0"N, 81°42'0"E) district of Sri Lanka were randomly selected as study sites. The selected mangrove forests are situated in the Grama Sewaka divisions of Mankerny, Saththurukkondan and Kokkaddicholai. Three belt transects with a width of 10 m and a length of 50 m were laid perpendicular to the lagoon shore at each site and were subdivided in to 10x10 m² plots. Alternate plots starting from the lagoon shore were selected for detailed studies totaling three sampling plots of 10 m x 10 m per one belt transect. Each sampling plot had three systematic sampling units of 1x1 m² size and all the crabs in such plots were collected, identified and counted.

The crabs were collected by digging the soil up to the water table until the crabs are caught and were picked by hand. The crabs were handled with caution to avoid autotomy which causes difficulties in identification. Soon after the collection the crabs suitable for taxonomic studies were stored in a freezer. The samples for further laboratory references were stored under 4 °C to prevent changes in the physical parameters attributable to the microbial degradation. The crabs were identified to the species level using the available keys and diagnostic characters described by the former taxonomists (Ng and Sivasothy, 1999; Priyadarshani, *et al.*, 2008).

The environmental variables were analyzed quantitatively to find out the distribution of crabs in relation to environmental parameters. The physico-chemical parameters; air and soil and water temperature, conductivity, salinity and pH were measured in each plot to find out their habitat preference. The crabs species collected from the study sites were recorded as edible crabs considering their food value, large size and their acceptance by the Food and Agricultural Organization (FAO) as harmless to human consumption and as ornamental crabs considering their eye catching attributes and minor sizes.

The experiment was designed as a complete randomized block design and the data were analyzed using two-way ANOVA.

Results and discussion

Twelve species of brachyuran crabs of which three species belonging to family Ocypodidae, and nine belonging to family Grapsidae were identified from the three mangrove forests in the Batticaloa district. The species *Episesarma versicolor*, *Episesarma mederi* and *Varuna litterata* are accepted as edible species according to FAO and *Uca annulipes*, *Uca chlorophthalmus*, *Metapograpsus oceanicus*, *Parasesarma plicatum*, *Perisesarma eumolpe*, *Metasesarma obesum* are identified as ornamental crabs. The crabs, *Cleistostoma merguense*, *Metopograpsus thukuhar* and *parasesarma* sp. were identified as not belonging to above two categories.

None of the crabs show a significant relationship with the salinity while three Ocypodid crabs, *Uca annulipes*, *Uca chlorophthalmus*, *Cleistostoma* and *Metapograpsus thukuhar* have shown a significant negative correlation ($P < 0.05$) with the pH. *Episesarma versicolor* showed a positive correlation with the water and air temperature ($P < 0.05$) while *Perisesarma eumolpe* showed a negative correlation ($P < 0.05$) with the water and air temperature. *Episesarma mederi* and *Varuna litterata* showed a positive correlation with the conductivity while *Metasesarma obesum* showed a negative correlation. *Metapograpsus oceanicus* preferred highest mean salinity level (31 ppt) while *Episesarma versicolor* preferred low salinity (8 ppt).

Highest abundance of crabs was observed from Mankerny where average abundance was $59/m^2$ followed by $24/m^2$ in Batticaloa and $18/m^2$ in Kokkaddicholai. Highest species richness was recorded from Mankerny (10 species) followed by Batticaloa (03 species) and Kokkaddicholai (02). Species diversity in Mankerny was very high ($H' = 2.14$) compared to those of Batticaloa ($H' = 0.72$) and Kokkaddicholai ($H' = 0.52$).

Conclusions

It is evident that crabs of Batticaloa area specially in Mankerni have a good export market potential with nine out of twelve species have either a food value or ornamental value. The findings of this research will pave way to emerge various new industries related to mangrove crab fisheries, culture, breeding and processing. Furthermore, such investigation will help many further scholarly progressions regarding taxonomy and diversity. However, accessing of export market has to be done only after the successful breeding programmes for the crabs have been established, to avoid extinction of these valuable resources. It is also crucial to establish government regulations regarding use of mangrove crabs for such purposes.

References

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