

FOOD AND FEEDING HABIT OF THE MANGROVE CRAB *Neopisesarma mederi* (H. MILNE EDWARDS, 1854) FROM COCHIN ESTUARY, SOUTH - WEST COAST OF INDIA**ARDRA M. APPUKUTTAN^a AND ANEYKUTTY JOSEPH^{b1}**^{ab}School of Marine Sciences, Cochin University of Science and Technology, Fine Arts Avenue, Cochin, Kerala, India**ABSTRACT**

Food and feeding habits of mangrove crab *Neopisesarma mederi* were investigated from Cochin estuary for a period of one year (June 2016-May 2017). A total of 515 samples analyzed with a carapace width between 6-26 mm sizes and the samples were analyzed sex wise and size wise. Examination on the fullness of stomach revealed that out of 515 crabs, 234 numbers (45.45%) with 100% full, 168 numbers (32.49%) with 75% full, 19 numbers (3.63%) with 50% full, 67 numbers (12.98%) with 25% full and 28 numbers (5.45%) with empty stomach. Gut content analysis revealed that their diet includes plant debris, sand debris, miscellaneous items and crustacean remain. The dominant food item was plant debris followed by sand debris and miscellaneous items. The study revealed that there was a difference in the fullness of stomach with respect to size group. There was no significant difference between sexes in the frequency of occurrence of food items. The point of percentage of food items were studied on monthly basis. The present work reveals the herbivorous feeding habit of *N. mederi* as well as the importance of conservation of mangroves for the sustainability of mangrove associated life of the species.

KEYWORDS: Food and Feeding, *Neopisesarma mederi*, Gut Content Analysis, Mangroves, Cochin Estuary.

Studies on the food and feeding habits of brachyuran crab in an ecosystem are of great importance for the understanding of biotic relationship among such organisms (Albertoni *et al.*; 2003). Knowledge about the species diets and trophic position are fundamental to understanding food web and dynamics of ecosystem. *Neopisesarma mederi* is a brachyuran crab (Family: Grapsidae) inhabiting along the South-west coast of India. Research in the past decade established that, the mangrove crabs have an important role in the ecological functioning of the mangrove ecosystem because they consume a large proportion of the annual primary production of mangroves (Robertson and Daniel; 1989 and Lee; 1998). Review of literature revealed that little information on the diet and preferred food items of this species. Therefore, an attempt has been made to study the diet and preferred items of *N. mederi* from Cochin estuary, south – west coast of India.

MATERIALS AND METHODS

The samples were collected from mangrove patches in Aroor, southern part of Cochin estuary, India from June 2016 to May 2017. The collected samples immediately numbed by freezing and brought to the laboratory for analysis. The specimens were identified and sexed. A total of 515 samples were analyzed, of these 376 were males and 139 were females. After recording the carapace width and the total weight of the crab, the dorsal side of the body was cut open and the foregut was removed carefully. The fullness of the stomach was visually examined and assessed as 0%, 25%, 50%, 75%, or 100% according to the degree of fullness. The foreguts were transferred in 70% alcohol and all the stomachs were

subsequently opened and their contents were washed with alcohol into a petridish and gut contents were separated and identified into different food groups under a binocular microscope.

For each specimen, the whole stomach content was segregated according to food-groups, and each group's contribution was determined visually. Dominance of food groups was evaluated by ranking them by their percentage frequency of occurrence and so-called percentage points. The percentage frequency of occurrence was estimated following the method described by Williams (1981)

Percentage frequency of occurrence = $\frac{\text{No. of stomachs with particular food group}}{\text{Total no. of stomachs with food}} \times 100$

Volume of the food-group was estimated as per Stehlik (1993).

Percentage points of food item = $\frac{\text{Point of the particular food group}}{\text{Total points of all food groups}} \times 100$

Total points of all food groups

RESULTS AND DISCUSSION

Devi *et al.*, (2014) identified the presence of *N. mederi* from mangrove systems adjacent to Cochin estuary. In the present study, the experiment animals were available throughout the sampling period. Among 515 stomachs examined, 234 (45.45%) were fully filled with food content, 168 (32.49%) were 75% full, 19 (3.63%) were 50% full, 67 (12.98%) were 25% full and 28 (5.45%) were empty (Figure-1). 100% stomach fullness of *N. mederi* were obtained throughout the year whereas below 25% and below 50% stomach fullness showed a random

pattern. In the case of female samples with empty stomach were obtained more in number during post monsoon season. Stomach fullness of *N. mederi* on monthly basis was described in the figure – 2.

Crabs are opportunistic omnivores with preferences for animal prey, but rarely fed on more mobile prey such as fish and prawns (Williams; 1982). The food group content analysis (month wise and sex wise) of this study revealed that, the diet of *N. mederi* consist of plant matter (59.4%), sand debris (33.70%), miscellaneous (6.60%) and crustacean remains (0.2%) group of food items (Figure-3). In *Metopograpsus messor*, a grapsid crab similar observation was reported by Athiramol (2016). Lakshmi *et al.*, (2013) described that *V. litterata*, another grapsid crab which showed opportunistic omnivorous feeding habit, the crustaceans being the most dominant food item followed by sand, debris and plant remains. Warner (1977) is also for the opinion that crabs carry over the primitive behaviour of being opportunistic omnivores with a preference of animal food in conjunction with predatory propensity.

The sand and clay found in the stomach might have been incidentally ingested with the leaf materials. The presence of sand and other sediments in the stomach of decapod crustaceans has been reported by many authors, especially by accidental ingestion with preys (Branco and Moritz-Junior; 2001; Abayomi *et al.*; 2011). The sand ingestion can occur as a carbonate source or to help in the food maceration in response to the absence of gastric mill in the stomach. The ‘miscellaneous’ group mainly comprised crushed plant materials, algae, detritus, silt, clay etc. The present observation of only a small amount of crustacean remains (0.2%) in the stomach contents was probably due to accidental consumption of small animals together with the leaves or when fallen leaves were insufficient in the crab surroundings. No significant differences in feeding between sexes occurred (Figure-4).

The results obtained from the present study revealed that, *N. mederi* was an herbivorous crab capable of ingesting mangrove litter and decayed plant matter. Grapsid crabs nevertheless can consume large percentages of fresh mangrove litter and help retain mangrove productivity within the forest. Acting as initial processors of mangrove leaves litter, grapsid crabs mediate significant physical, and potentially chemical and biological changes to mangrove organic production.

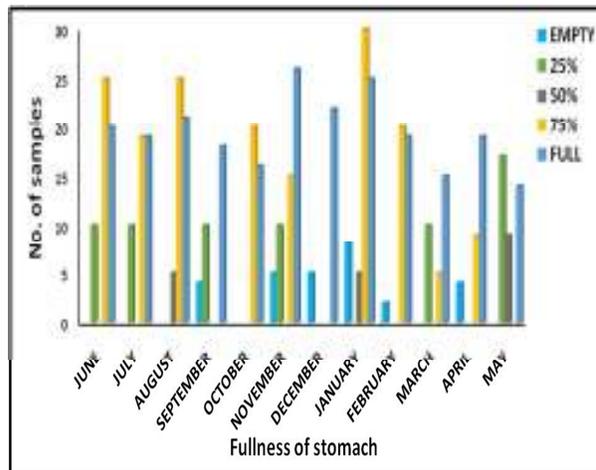


Figure 1: Stomachs fullness during various months in *N. mederi* during June 2016- May 2017.

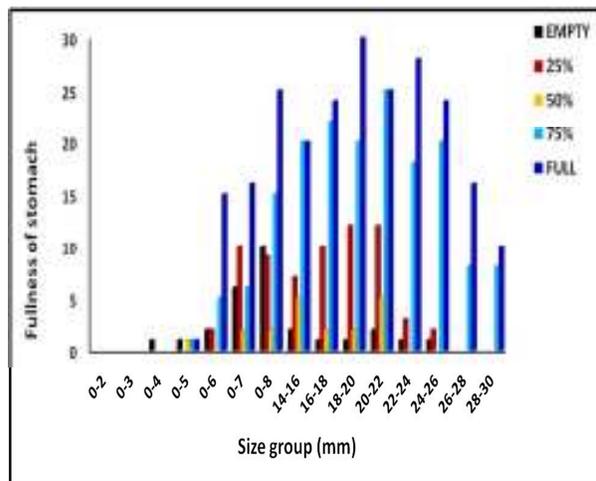


Figure 2: Stomach fullness in different size groups (carapace width in mm) of *N. mederi* during June 2016- May 2017

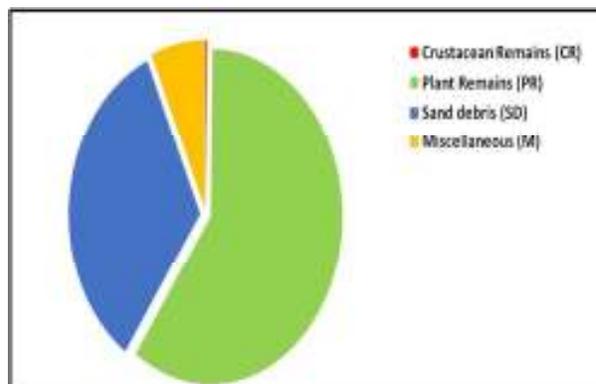


Figure 3: Percentage of frequency of occurrence of major food items in *N. mederi* during June 2016- May 2017

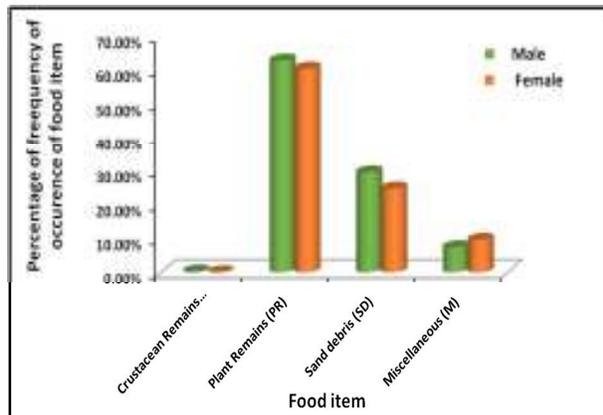


Figure 4: Food items consumed by males and females of *N. mederi* sampled from June 2016-May 2017

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