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FOOD AND FEEDING OF THE SESARMID CRAB, *Neoepisesarma brockii* (DE HAAN, 1887) FROM A TROPICAL ESTUARY, SOUTH WEST COAST OF INDIA

A.R. NIKHILA KHANNA[a] AND ANEYKUTTY JOSEPH[b1]

[ab]School of Marine Sciences, Cochin University of Science and Technology, Fine Arts Avenue, Cochin, Kerala, India

ABSTRACT

The present study aims to investigate the food and feeding of the sesarmid crab *Neoepisesarma brockii* from a tropical estuary, south west coast of India. The work was carried out for a period of one year from June 2016 to May 2017. Total 896 crabs were collected for the study which included both male and female. The gut content analysis revealed that their diet includes plant remains, sand debris and other miscellaneous substances. Out of the total stomach analyzed 22.38% were full, 24.42% were 75% full, 23.2% were 50% full, 17.3% were 25% full, 9.8% were below 25% full and 2.9% were empty. Gut content analysis revealed that there is no significant variation between the quantities of food consumed by both the sexes. In both sexes plant matter remains as the dominated food item. The study showed that plant remains was dominated in all the seasons followed by sand debris and miscellaneous items. The majority of crabs with empty stomachs encountered during the study were either in berried condition or in an advanced stage of pre-moult. The results indicated that *N. brockii* can be considered as herbivorous species and they are capable of ingesting plant matters and debris.

KEYWORDS: Food and Feeding; *Neoepisesarma brockii*; Cochin Estuary; Gut Content Analysis; Herbivore

Food and feeding analysis proved major information about diet, position in the food chain and the ecological importance of the species. Most of the mangrove habitats are dominated by brachyuran crabs which includes both sesarmid and fiddler crabs (Kristensen; 2008). Their assemblage structure seems to be influenced by local environmental conditions. Studies of gut contents show that sesarmid crabs consume significant amounts of mangrove detritus (Malley; 1978). They feed on litter and they consume a large proportion of the annual primary production of mangroves (Robertson and Daniel; 1989). The direct grazing of litter by crabs substantially reduces export of leaf litter by tidal transport and accelerates its breakdown (Robertson; 1986).

Neoepisesarma brockii is a major species of sesarmid crab in mangrove ecosystem of Cochin estuary, located at the south west coast of India. Objective of the present study was to determine the in-depth knowledge about the food and feeding habits of this species.

MATERIALS AND METHODS

Crabs for the present study was collected from southern region of Cochin estuary, for a period of one year from June 2016 to May 2017.The crabs were captured using knots made of rachis of coconut leaflet, an indigenous method and simply by hand picking and immediately numbed by freezing. Studies on food and feeding were carried out following a method described by Sukumaran and Neelakantan (1997). After recording the carapace width and length 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%. The foreguts were preserved in 10% formalin for further studies, prior to being cut open and their contents transferred into petridish with distilled water. The food components of the gut contents were separated and identified under a compound microscope.

The percentage of the total volume of the stomach contributed by each food group was determined visually. Importance of food groups was evaluated by ranking them by percentage frequency of occurrence and percentage points. Percentage frequency of occurrence was estimated as:

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

To estimate the volume of the food by food-group, points were assigned to each group as suggested by Stehlik (1993). Percentage points were estimated as:

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

RESULTS AND DISCUSSION

A total of 896 crabs were analysed, being 446 males and 450 females. The diet of *N. brockii* consisted of plant matter, sand debris and miscellaneous items. Out of the total stomach analysed 22.38% were full, 24.42% were 75% full, 23.2% were 50% full, 17.3% were 25% full, 9.8% were below 25% full and 2.9% were empty (Figure 1).

Stomach fullness in different size groups of *N. brockii* are given in figure 2. The highest number of empty

[1]Corresponding Author

stomach was found in size range of 10 – 12 mm. Size range of 30 – 32 mm showed highest number of fullness of stomach. Balasubramanian (1993), reported that the feeding intensity is comparatively low among adult crabs of *Charybdis smithii*. Contradictory result was observed in Devi *et al*. (2013), observed that the number of empty stomachs were found to decrease in lower size classes in *Varuna litterata.*

The diet of *N. brockii* consisted of plant matter (59.9%), sand debris (35.53%) and miscellaneous (4.57%). The points of major food groups (size wise and month wise) were estimated in males and females. In both male and female, plant remains were the dominant food item (58.8% and 51.9%, respectively) followed by sand debris (37.6% and 43.2%, respectively) and miscellaneous items (3.6% and 4.9%, respectively). On analysing the percentage of various food items, it has been found that there were not much differences between sexes. These obervations are agreement with other grapsid crabs, *Sesarma messa* and *sesarma smithii* (Micheli; 1993), and *Metapograpsus messor* (Athira Mol; 2015).

There was no significant difference in the quantity of the food consumed by males and females in the present study, as reported by Williams (1981) in *Portunus pelagicus*, Jewett and Feder (1983) in *Chinoecetes bairdi*, Devi *et al*. (2013) in *V. litterata*, and Athira Mol (2015) in *M. messor*.

Feeding generally take place every day throughout the year, except in berried females and during the days of pre moult and mating, when feeding ceases or is at its minimum. The majority of crabs with empty stomachs encountered during the study either in berried condition or in an advanced stage of pre moult. Similar trend was observed by Choy (1986) in *Liocarcinus puber* and *L. holsatus* and Devi *et al.* (2013) in *V. literata*, reported empty stomachs in gravid females.

The feeding strategies of the crabs are found to be diverse, and the type of food consumed is significantly dependent on their inhabited locality. *N. brockii*, the grapsid crab, was observed to be an inhabitant of region dominated by mangrove patches and are found to be distributed in areas with a sandy substratum. Most of the mangrove crabs were undergoing rapid decline in numbers due to anthropogenic activities of the mangrove ecosystem. Protecting mangrove crabs is as important as protecting mangrove ecosystem since all these are interrelated. They carry a significant role in detritus formation, nutrient recycling and dynamics of the ecosystem together with numerous annelids, bryozoans, tunicates, nematodes etc. living in the sediments The gut content analysis of this species revealed that its habitat has a great influence on its food and feeding habits. The sand and debris found in its gut can be correlated with the sandy substratum they prefer to thrive and may be due to its burrowing activity. From the present study, it is concluded that *N. brockii* is an herbivorous capable of ingesting plant matter and debris. The knowledge of this aspects will be helpful for adopted specific strategies for the conservation of this species.

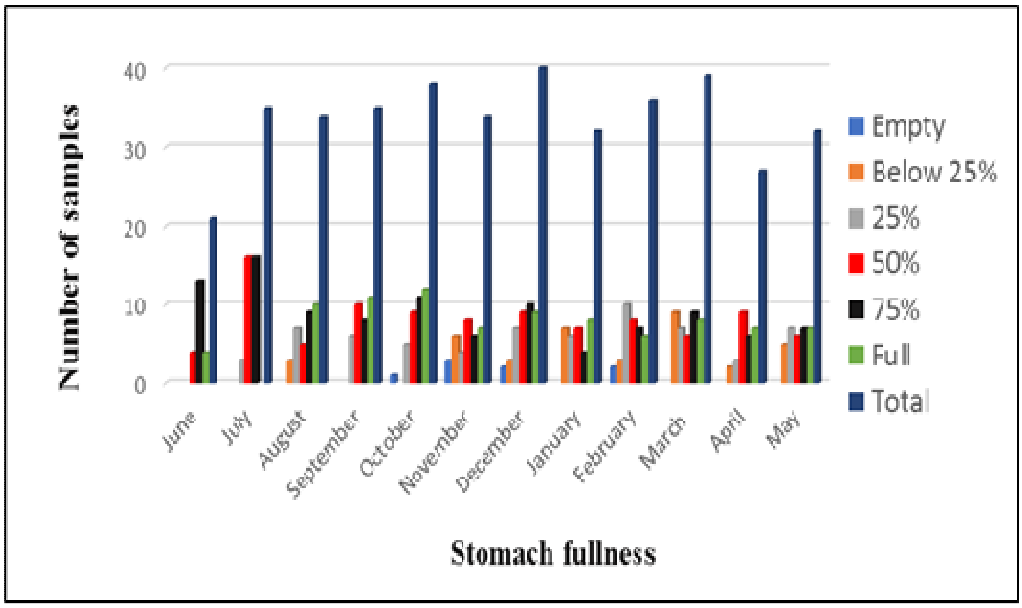

Figure 1: Stomach fullness during various months of *N. brockii*

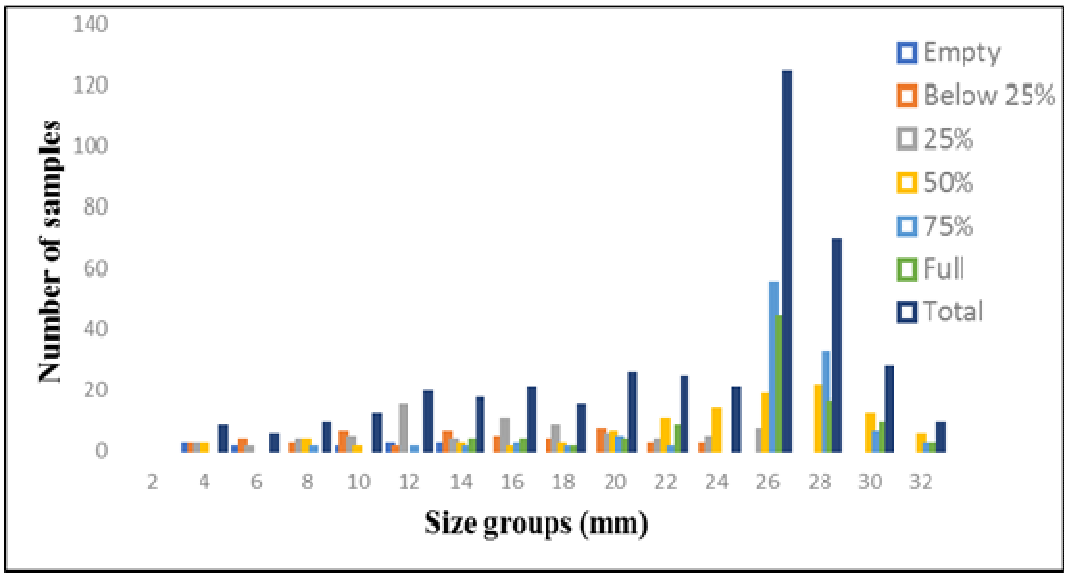

Figure 2: Stomach fullness in different size groups (carapace width in mm) of *N.brockii*

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