



Food and Feeding Habits of *Gerres filamentosus* (Cuvier, 1829) from Kodungallur - Azhikode Estuary, Kerala, India

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Abstract

Study on the food and feeding habits of *Gerres filamentosus* showed that it is an omnivore, showing more preference towards animal materials as food. Presence of sand and mud in the gut content indicates the bottom feeding habit of the species subsisting mainly on crustaceans, tunicates, polychaetes, filamentous algae, diatoms, molluscan shell, fish scales and miscellaneous items. Analysis was carried out by using both occurrence and volumetric methods. Index of preponderance worked out for *Gerres filamentosus* showed that crustaceans were the dominant items that contributed 27% of the total gut content on both qualitative and quantitative basis. There was no appreciable difference in the intensity of feeding between males and females. Twelve percent of the guts examined was three-fourth full, 20% half full, 36% empty, 30% one-fourth full and 2% contained full stomachs. Feeding index in relation to maturity stages depicted that in the third stage, the fishes showed more feeding intensity.

Key words: Food and feeding, *Gerres filamentosus*, index of preponderance, gastrosomatic index

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Introduction

Food is one of the important factors regulating or influencing growth, fecundity, migration and abundance of fish stocks. Seasonal and diurnal

abundance of favourite food organisms may be responsible for the horizontal and vertical movements of the fish stocks. The food and feeding habits can lead to an awareness of even minor differences in the structure and position of mouth (Keast & Deirdre, 1966).

Gerres filamentosus also known as silver biddies, of the family Gerreidae is an economically important food fish species. The importance of the species of the genus *Gerres* as food and ornamental fish is significant in the context of sustainable use of the resource and conservation of the endemic fish germplasm. The food and feeding habits of *Gerres oblongus* (Abeyrami & Sivashanthini, 2008), *Gerres macracanthus* (Badrudeen & Pillai, 1996) and population dynamics of *Gerres abbreviatus* (Kuganathan, 2006) and *Gerres setifer* (Sivashanthini et al., 2004) were reported. However, there is very little information available on the food and feeding of *G. filamentosus*. Hence the food and feeding habits of *Gerres filamentosus* from Kodungallur - Azhikode Estuary in Kerala was studied and reported in this communication.

Materials and Methods

Fresh fish samples were collected weekly during May 2008 to October 2008 from Anappuzha region, Azhikode estuary, Kerala, India (Latitude 10° 11' 53" N and Longitude 76° 12' 13" E) known for fishing activities. The fresh specimens were brought to the laboratory for analysis and after recording their length, weight and sex, their guts were dissected out, their fullness noted and preserved in 4% formaldehyde. Guts of 50 specimens of *Gerres filamentosus* were analyzed. Analysis was carried out by using both occurrence and volumetric methods. The volume of the whole gut contents was calculated by deducting

the volume of the empty stomach from the volume of the stomach with contents (Pillay, 1952).

The stomach contents were analysed by the modified points method (Pillay, 1952; Hynes, 1950; Frost, 1943). In the present study, the occurrence method (Hynes, 1950) was employed to express the percentage of occurrence. In this method the number of guts containing a particular item of food was expressed as a percentage of the total number of guts examined each week.

Depending on the relative volume of the food items, points were given to each food item. From these points, volume of each food item and its percentage in the total volume of all stomach contents were calculated in each week. Similarly the percentage occurrence of different items of food was determined from the total number of occurrence of all items in each week. To evaluate the importance of each food item, the 'index of preponderance' proposed by Natrajan & Jhingran (1961) was followed. This method simultaneously took into account both volumetric as well as occurrence methods and values were substituted in the following formula and the index of preponderance values were worked out.

$$Ip = ViOi * 100 / \sum ViO$$

Where, Ip is the 'Index of Preponderance', Vi and Oi represent the percentage volume and occurrence of particular food (i) respectively.

The intensity of feeding was determined by examining the conditions such as the distention of the stomachs and the amount of food in it. The stomachs were classified as full (20 points), ¾ full (15 points), ½ full (10 points), ¼ full (5 points) and empty (zero points) (Pillay, 1952).

$$\text{Feeding index} = X * 100 / N * 20$$

X = Total points allotted after grading the guts that were examined

N = Number of guts examined

20 = Total points allotted to the gut in full condition

The gastrosomatic index (GSI) was calculated to find out the feeding intensity using the formula (Desai, 1970);

GSI = weight of gut/total weight of fish

Relative gut length (RLG) gives an idea of the nature of food consumed. The value of RLG was calculated by simply taking the ratio of gut length to total body length (Al-Hussaini, 1949).

$$RLG = \text{Length of the gut} / \text{Total body length}$$

Results and Discussion

The gut content analysis showed that crustaceans (26%) were the dominant food for *Gerres filamentosus* followed by tunicates (18%), miscellaneous (13.4%), filamentous algae (12.6%), polychaetes (10.6%), molluscan shells (7.7%), fish scales (6.2%) and diatoms (5.3%). Food items in the miscellaneous group include plant matter, stems, parts of crustaceans and molluscs (shells, appendages, bones and flesh), sand and mud. The pattern of food and feeding habits of *G. filamentosus* was studied by Renuka & Bhat (2011) and found that the fish was an omnivorous bottom feeder and crustacean form the main food item. Percentage of occurrence of food items of *G. filamentosus* showed that crustaceans, tunicates and polychaetes (64%) were dominant items followed by miscellaneous items (62%), filamentous algae (60), diatoms (56%), fish scales (54%) and molluscan shell (50%). Index of preponderance worked out for *Gerres filamentosus* indicated that crustaceans were the dominant items that contributed 27% of the total gut content on both qualitative and quantitative basis. The second major item was tunicates contributing 19% followed by other food items such as miscellaneous items, filamentous algae, polychaetes, molluscan shell, fish scales and diatoms contributing 14, 12, 11, 6, 6 and 5% respectively.

There was slight difference in the intensity of feeding between males and females (Fig. 1). A

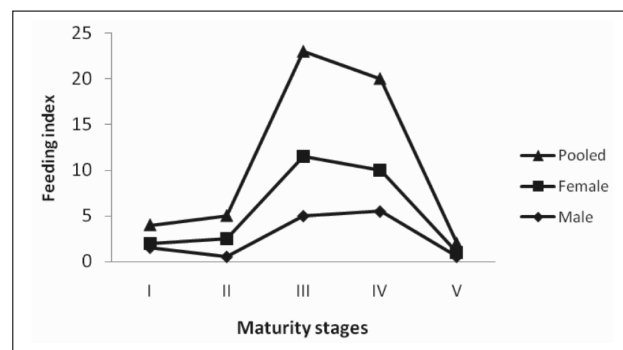


Fig. 1. Feeding index in relation to maturity stages of *Gerres filamentosus*

similar observation was reported in *Nemipterus japonicus* by Raje (2002). However, studies by Ambily & Nandan (2010) in *Arius subrostratus* showed no appreciable difference in the intensity of feeding between males and females. Twelve percent of the guts examined was three fourth full, 20% half full, 36% empty, 30% one fourth full and 2% full stomachs. Fishes with empty stomachs and poor feeding activity are common in several species of tropical fishes (Kalita & Jayabalan, 2000; Zacharia, 2003; Renjini & Nandan, 2010).

Feeding index in relation to maturity stages depicted that in the third stage, the fishes showed more feeding intensity (11.5) followed by stage IV (10), stage II (2.5) and stage I (2). Thus feeding intensity might be related to maturation of gonads and spawning activity (Fig. 2). These results agree with those reported by Jayaprakash (2000) and Bindu & Padmakumar (2008). The gastroscopic index of *Gerres filamentosus* of different length frequencies varied from 0.008 – 0.024. GSI was high for fishes of length range of 15 – 17 cm and low for fishes of 21 – 23 cm length range (Fig. 2). The RLG values of *G. filamentosus* in the present study ranged from 0.837 – 0.918 (Fig. 3). Dasgupta (2004) observed that the RLG value increased with the increase of vegetable matter as food and decreased with the increase of animal matter. The adaptations of the alimentary canal and certain external morphology of the species greatly influence the biology and ethology of the food and feeding regimes (Sinha, 1986). The shape of the body and the sub terminal mouth and dentition system in *Gerres filamentosus* describe its column feeding habits.

According to the diversity in the type of food consumed, Nikolsky (1963) classified fishes into

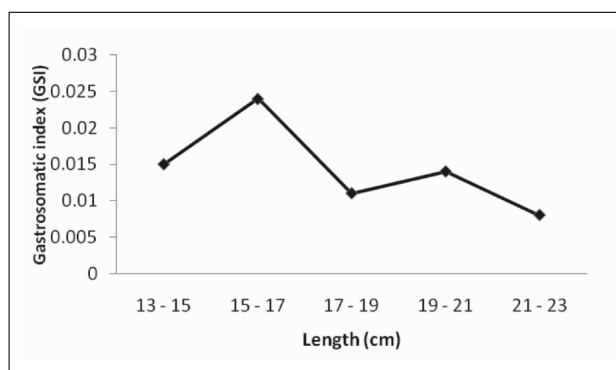


Fig. 2. Mean gastroscopic index of *Gerres filamentosus*

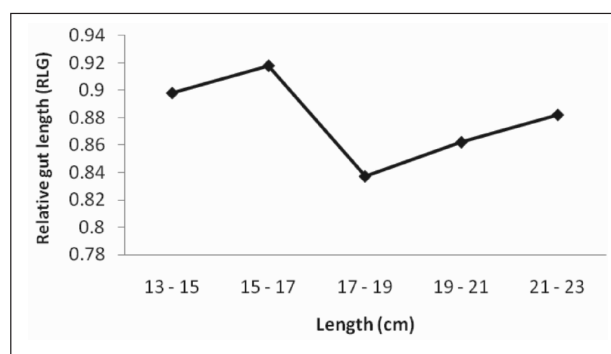


Fig. 3. Relative gut length in relation to length group of *Gerres filamentosus*

three viz., (1) euryphagic – feeding on variety of food, (2) stenophagic – feeding on few different food types and (3) monophagic – feeding only on one type of food. Based on this classification, the present study of *Gerres filamentosus* reveals it as a stenophagic feeder. The study of stomach content of *Gerres filamentosus* reveals that it is an omnivore and feeds mainly on animal matter. Presence of sand and mud in the gut contents indicates the bottom feeding habit of the species.

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