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Feeding Biology Analysis as a Preliminary Step for the Cultivation of *Mystus Gulio (*Hamilton-Buchanan)

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Abstract: ***The success of effort to introduce and cultivate a species as a part of conservation will depend on quantitative information about the food and feeding of that species. Fishes, Mystus gulio (Hamilton-Buchanan) were collected from Vattakkayal, a part of Ashtamudi Lake, Kollam district, South India during the period February 2014 to January 2015. Examination of gut contents analysis revealed that this fish feed on a variety food items. Food items could be assorted into nine categories namely crustaceans, insects, oligochaetes, protozoans, eggs, algae, diatoms, fishes, detritus and miscellaneous. Crustaceans (36%) were the most predominant dietary item recorded from the stomach of the fish round the year. It is followed by insects (16.60 %), oligochaetes (10.36%), detritus (11.14%)), Eggs (10.11%), Protozoans (5.46%)), Diatoms (5.06 %)) fishes (4.65%) and algae (4.25 %) are occurred in minor quantities. This helps to determine cultivation of desirable species combinations in culture system with minimum interspecies competition for the natural food. It also provides vital clues in developing supplementary feed for the species. Hence it is able to conserve these endangered fish in artificial methods by providing these food items.***

Keywords: Mystus gulio, Endangered, Artificial breeding

1. Introduction

Food is the main source of energy and plays an important role in determining the population levels, rate of growth and condition of fishes. Food and feeding habits of fishes have a great significance in aquaculture practice. It helps to select such species of fishes for culture which will utilize all the available potential food of the water bodies without any competition with one another but will live in association with other fishes.

Mystus gulio (Ham.) is a native catfish of family Bagridae distributed around India to Malay Archipelago, especially estuarine and tidal waters (Jhingran, 1997). Despite of its enormous importance in brachish water aquaculture, the food and feeding habits of this valuable species has not been adequately studied except some observations made by Pandian (1966), Sarker *et al.* (2002), Alam *et al.* (2006a & 2006b) and Islam *et al.* (2007) on the feeding and reproductive cycle, fecundity, induced spawning, spawning behavior and larvae rearing. Other workers who worked on food and feeding habits of other fishes include these of Bhuiyan (1988), Bhuiyan & Haque (1985) and others. However, for developing culture technologies, biological studies of this species are indispensable. Therefore, this work was carried out to identify the food and feeding habits of *M. gulio* to generate the base line information for facilitating the sustainable aquaculture especially in the coastal belt of the country.

2. Materials and Methods

A total of 230 fishes of different size, maturity and sex groups were collected randomly from Vattakkayal, a part of Ashtamudi lake during the period of February, 2014 to January, 2015. Immediately after collection the fishes were preserved in 10% formalin solution to prevent the breakdown of the food materials. The different food items eaten by the fishes were identified under microscope by following the keys by Pennak (1953), Ward & Whipple (1959), Prescott (1962) and Needham & Needham (1962).

To study the gut content each stomach was analyzed separately. The stomach of individual fish was cut open and removed on to petridish with the help of very fine forceps. The percentage of occurrence of a particular food item was calculated on the basis of the following

Formula:

$$\text{Percentage of occurrence of a food type} = \frac{100 \times \textit{Total no of gut analyzed}}{\textit{Number of gut where the food occurred}}$$

3. Results and Discussion

General diet composition of *M.gulio*

The various food items recorded from the stomach of *M. gulio* during the study period are presented in fig 1. Examination of gut contents analysis revealed that the fish feed on a variety food items. Food items could be assorted into nine categories namely Crustaceans, insects, oligochaetes, protozoans, eggs, algae, diatoms, fishes, detritus and miscellanious.

Crustaceans (36%) were the most predominant dietary item recorded from the stomach of the fish round the year. Followed by insects (16.60 %), Oligochaetes (10.36%),

detritus (11.14%)), Eggs (10.11%), Protozoans (5.46%)), Diatoms (5.06 %)) fishes (4.65%) and algae (4.25 %) are occurred in minor quantities.

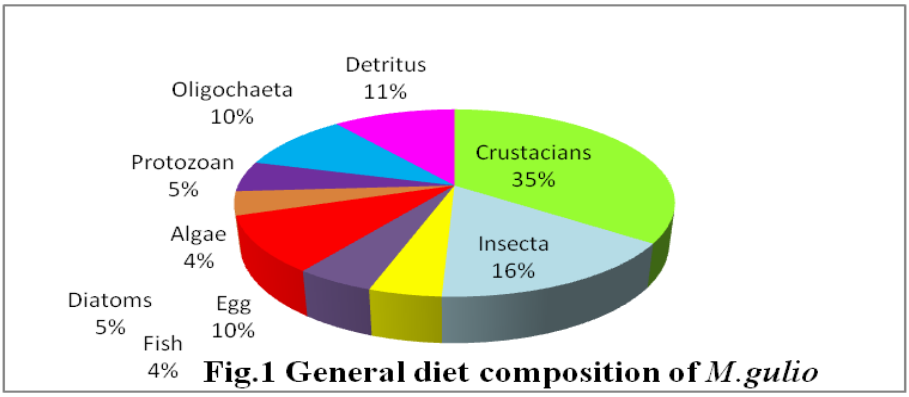

Fig.1 General diet composition of *M.gulio*

Variation in diet composition of males and females

The food of males and females were analysed separately to find out the differences. The percentage composition of different food items of males and females are given in fig 2 and 3 respectively. The study revealed that the food preference of male and female were similar with variations in the magnitude of different food items consumed. The preference for crustaceans was found to be higher in females (39.91 %) than males (32.11%). Insects formed the favorite group of food for both males (18.29 %) and females (14.91%). Eggs (10.88 %) were more abundant in females than (9.43%) in males. Oligochaetes (13.82 %) are more abundant in males than in females (6.85 %) whereas protozoans were found to be 13.82 % in both males and females. Percentage composition of fishes and diatoms were found to be 4.87 % and 5.28 % in males. In females it was found that 4.43% and 4.83% respectively. Digested matter constitutes 13.82 % in males and 8.46 % in males and females respectively.

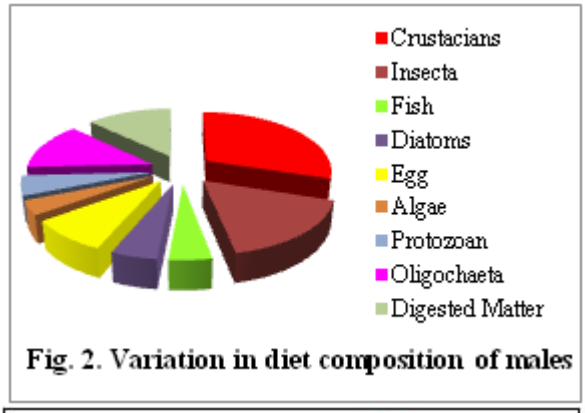

Fig. 2. Variation in diet composition of males

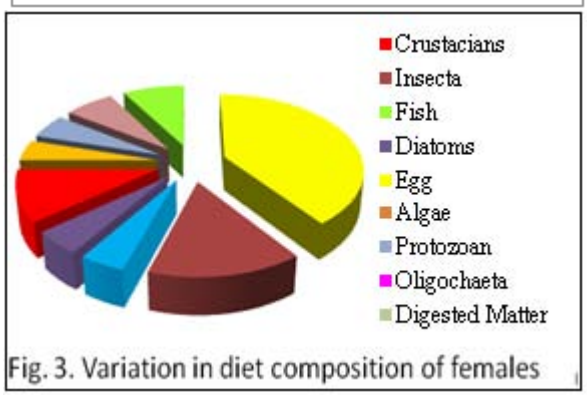

Fig. 3. Variation in diet composition of females

The food items in the stomach of *M. gulio* suggest that they are euryphagous (i.e. feeding on a wide range of organisms). It was also observed that *M. gulio* can be classified as an omnivorous feeder as the diet covers a wide spectrum of food ranging from various types of plankton to invertebrates and plants. The fish also exhibits an overlapping in food and feeding habits in order to avoid inter and intra specific competition for available food. This is an important strategy for survival and an advantage over the fish species competing for a specific food item. This explains the availability of *M. gulio* all the year round. Such an eryphagous feeding behaviour is documented in many of the catfishes (David, 1963; Thomas, 1966). The determination of food habit was also reported by Mustafa *et al*. (1980) for *Nandus nandus*, Bisht and Das (1981) for *Puntius ticto, Cyprinus carpio, Tor tor, Nemaechilus rupicola* and *Channa gachua.* Bhuiyan and Rahman (1983) for *Channa gachua*, Reddy & Rao (1987) for *M. vittatus*, Khan e*t. al.* (1988) for *M. nemurus*; Bais *et al*. (1994) for *Channa punctatus*, Dutta (1994) for *Channa punctatus* and Ali *et. al*. (2003) for Mastacembelidae. They categorized these fishes either as carnivore or omnivore. From the above findings it can be concluded that the different food groups varied monthly in their abundance in the gut contents of the fish where it showed some seasonal preference to certain food groups. The adult fish preferred to feed insects and crustaceans where the immature and juvenile fish preferred to feed on diatoms, copepods, cladocerans and rotifers.

This helps to determine cultivation of desirable species combinations in culture system with minimum interspecies competition for the natural food. It also provides vital clues in developing supplementary feed for the species. Hence it is able to conserve these endangered fish in artificial methods by providing these food items.

4. Conclusion

The different food items in the gut of *Mystus gulio* showed monthly variations in their abundance where it showed some seasonal preference to certain food groups. The adult fish preferred to feed insects and crustaceans where the immature and juvenile fish preferred to feed on diatoms, copepods, cladocerans and rotifers. This helps to determine cultivation of *Mystus gulio,* an endangered species in culture system

with minimum interspecies competition for the natural food. It also provides vital clues in developing supplementary feed for the species. Hence it is able to conserve these endangered fish in artificial methods by providing these food items.

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