

## FOOD HABITS OF MUGLIDS FROM WATERS AROUND PORT HARCOURT

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### ABSTRACT

The food habits of four species of Mugilidae, consisting of *Liza grandisquamus*, *L. falcipinus*, *Mugil curema* and *M. bananensis*, were investigated using the frequency of occurrence and numerical methods of analysis. Also, Relative Gut Length (RGL) of fish specimen measured was calculated from fish gut length. Generally, the food consisted mainly diatoms, blue – green & green algae and detritus. Other food items included annelid, crustacea, nematode, insect parts, dinoflagellates and unidentified organisms. *M. curema* had the least Species Richness Index (2.827) while *L. grandisquamus* had the highest (4.088). The Shanon – Wiener Diversity Index ranged 0.91 in *M. curema* to 1.03 in *L. falcipinus*, while Shanon's Index ( $H'$ ) ranged from 2.095 (*M. curema*) to 2.372 (*L. falcipinus*). The male *M. bananensis* had the least mean RGL of  $2.48 \pm 0.17$  while female *L. falcipinus* and *L. grandisquamus* had the highest mean RGL of  $3.31 \pm 0.13$ . The food items observed and the RGL suggest that the muglids studied were herbivorous or omnivorous.

### INTRODUCTION

Fishes belonging to the Family Mugilidae (Order: Mugiliformes) commonly known as grey mullets have a wide distribution in the tropical and subtropical regions. They are highly valued commercial food fish in the tropics (Alfred – Ockiya and Njoku, 1995). Many workers have variously described the mullets as plankton feeders, herbivores, slime feeders, foul feeders, bottom feeders, illiophagous, omnivorous, etc. (Gupta, 1981; Tandel *et al.*, 1986; Wijeyaratne and Costa, 1987; Khan and Fatima, 1994). Limited studies have been carried out on them in the Niger Delta, some of which include, *inter alia*, FAO (1969), George (1985) and King, (1986). This study is therefore aimed at providing more information to complement existing ones and help in the management of this all important food fish.

### MATERIALS AND METHODS

The specimens used in this study were collected fresh from local fishers at Enugu and Ogu water fronts in Port-Harcourt (longitude  $7^{\circ} 00' E$  and Latitude  $4^{\circ} 15' N$ ). Both water fronts are linked to the creek leading to the Marine Base axis as well as the Okrika Creek and Bonny River which were the fishing grounds of the fishers; a brackish water environment predominantly consisting of *Avicenia spp.* and *Rhizophora spp.* The specimens were obtained fresh from fishers at the Enugu and Ogu water fronts in Port Harcourt and later stored in deep freezer for laboratory analysis. The fish were caught with cast nets that ranged between 250-300cm in diameter and 3cm mesh size. Prior to examination in the laboratory, the fish were allowed to thaw, identified into their various species and sex using Albaret (1990) and each was later weighed on a top loading balance and measured for total length (cm) on a measuring board. Each specimen was dissected and the gut length measured in cm. The stomach content was emptied into a petri – dish, and 5ml of water was added to make a slurry. About 1ml of it was taken and examined under microscope. Stomach contents were sorted into categories and analyzed using the Frequency of Occurrence (FO) and Numerical (NM) Methods (Hyslop, 1980). In the Frequency of Occurrence Method, the frequency of a particular food item in all stomachs was expressed as a percentage of the frequencies of all the food items. For the Numerical Methods, count is made of the individuals of each kind of food item occurring in a stomach and expressed as a percentage of all food items. The food items were identified with the aid of keys (Jeje and Fernando, 1986; Chindah and Pudo, 1991). Calculation of indices to show dietary relationship was made using the following formulae provided by Ogbeibu (2005):

$$\text{Species Richness (d)} = \frac{S - 1}{\ln N}$$

Where: S is the total number of species, N is the total number of individuals,  $\ln$  is the natural logarithm

$$\text{Shanon - Wiener Index (H)} = \frac{N \log N - \sum fi \log fi}{N}$$

Where;  $N$  is total number of individuals,  $fi$  is number of individuals in group  $i$

$$\text{Shanon' Index (H'}) = 2.3026(H)$$

Where; H is the Shanon - Wiener Index

The gut length of individual fish was used to determine relative gut length index using the formula:

$$\text{Relative Gut Length} = \frac{\text{Gut Length}}{\text{Total length}}$$

## RESULTS AND DISCUSSION

The food composition in the guts of muglids is given in Tables 1 and 2. Of the total 152 specimens of muglids examined, 92.16% of *L. grandisquamus*, 95.45% of *L. falcipinus*, 89.66% of *M. bananensis* and 92.86% of *M. curema* contained various food items in their guts. The food habit of Mugilidae in this study is in agreement with Brusle (1981) that mullet is herbivorous, omnivorous or planktophagous as well as mud and detritus eater. The results from the Frequency of Occurrence and Numerical Methods revealed that Diatoms, Blue - green & green algae and detritus occurred predominantly in the food of all the species of Mugilidae. Apart from Bacteria and Protozoans, these were the major food items observed also in the food of various juvenile muglids that enter the Elmina Lagoon in the Cape Coast District of Ghana (Blay Jr, 2006). Among the diatoms, *Navicula spp.*, *Nitzschia spp.* and *Coscinodisus spp.* predominant, while *Climacosphonia spp.* and *Thalassiothrix spp.* were observed in the diet of only *M. bananensis*.

In the Numerical method, blue - green & green algae constituted 3.05%, 7.6%, 4.9% and 2.65% of the diets of *L. grandisquamus*, *L. falcipinus*, *M. bananensis* and *M. curema* respectively while in the Frequency of Occurrence Method, it was 4.36%, 7.88%, 6.29% and 6.48% respectively. Among the Blue - green & green algae, *Phormidium* (1.12%) dominated (NM) in *L. grandisquamus*, *Oscillatoria* (5.38%) dominated in *L. falcipinus*, while *Oscillatoria* and *Anabaena* dominated in *M. curema* and *M. bananensis*. *M. curema* had the least Species Richness Index (2.827) while *L. grandisquamus* had the highest (4.088). The implication is that *L. grandisquamus* consumed a wider spectrum of food items than the other muglids. The Shanon - Wiener Diversity Index ranged 0.91 in *M. curema* to 1.03 in *L. falcipinus*, while Shanon's Index (H) ranged from 2.095 (*M. curema*) to 2.372 (*L. falcipinus*). The Shannon - Weiner Diversity Indices of the muglids indicate a high diversity of food intake.

The mean gut length and mean relative gut length of the muglids studied are given in Table 3. Male *M. bananensis* had the least mean RGL of  $2.48 \pm 0.17$  while female *L. falcipinus* and *L. grandisquamus* had the highest mean RGL of  $3.31 \pm 0.13$ . However, there was no significant difference between the males and females of all the species, both in gut length and relative gut length. The intestine is variable in length according to the diet of the fish species. It is short in carnivores, very long and coiled in herbivores and is intermediate in length in omnivores (Hickman *et al.*, 2001). The RGL index of the specimens studied indicated the mullets in the waters around Port Harcourt as herbivorous or omnivorous. This is because, in general, a fish is carnivorous when RGL is less than 1, while the fish is herbivorous or omnivorous when RGL is greater than 1 (Bagarinao and Thayaparan, 1986; Takeuchi, 1991).

The results showed that the muglids found in waters around Port Harcourt are herbivorous or omnivorous. There is also the need to study the feeding habits of the different sizes of the mullets.

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