



Food and Feeding Habits of *Liza falcipinnis* from Forcados River Estuary, Niger Delta, Nigeria

*Ogidiaka, E.; Bekederemo, B.O.; Atadiose, J.

Department of Fisheries and Fisheries Technology, Delta State School of Marine Technology, Burutu, P.M.B, 1060 Warri, Delta State.

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*Corresponding Author

Ogidiaka, E.

E-mail: Efeogis@yahoo.com

Phone: +234 8063777441

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ABSTRACT

The food and feeding habits of *Liza falcipinnis* in Forcados river estuary was studied from April 2012 to March, 2014. Stomach content was analysed using frequency of occurrence (Fi) and volumetric method. A total of 1267 stomachs of *L. falcipinnis* from Forcados river estuary were analysed. 1212 (95.73%) of these stomachs had food items while 55 (4.26%) had empty stomachs. Mud had the highest percentage (38.56%) by numerical while Detritus had the highest by occurrence method of analysis (99.65%). From this research findings, *L. falcipinnis* feeds more on detritus and mud in the water body. The food and feeding habits of this fish species should be continuously monitored for sustainable management of the water body and its resources.

INTRODUCTION

Mugilidae are abundant in Forcados river estuary and can be said to be a major economically important family in the water body. Among the common species are the *Liza falcipinnis*. *L. falcipinnis* has silvery-dark colour on its back, side and belly (Idodo-Umeh, 2003). According to Idodo-Umeh (2003), it feeds on algae, detritus, zooplanktons and diatoms. Fishes can be grouped into broad categories according to their dominant feeding habits (Wootton, 1979).

Information on the food and feeding habits of *L. falcipinnis* is scarce in Warri River at Forcados river estuary. Available works on *L. falcipinnis* in Nigeria

include those of Lawson *et al.* (2010), Lawson and Jimoh (2010) and Ikomi and Okosuwei (2012). This study would provide information and fill in gaps in knowledge on the dietary composition of this species in Forcados River estuary.

MATERIALS AND METHODS

The study area

The study was carried out in Forcados River estuary, between Burutu and Forcados in the Niger Delta Area of Nigeria (latitude 5° 21' - 5° 35' N and

longitude 5° 31' - 5° 51' E). The area is known to have both rainy and dry seasons. The dry season starts from November to April while the rainy season stretches from May to October (Opote, 2000). The vegetation covers include *Eichhornia crassipes*, *Pistia*, *Pennisetum purpureum*, *Nymphaea spp*, *Trapa spp*, *Ceratophyllum spp*. Human activities here include offloading and selling of goods and petroleum products, jetty operations, boat movement, laundering and washing of boats, log movement, dumping of organic and inorganic waste, bathing and swimming.

Collection and preservation of fish samples

Samples were collected monthly between April 2012 and March 2014 from artisanal fisher folks and taken to the laboratory for analysis. 1267 stomachs of *L. falcipinnis* were analysed. The fish were sorted and identified to the species level using the keys of Fischer *et al.* (1981); Schneider (1990); Paugy *et al.* (2003); Idodo-Umeh, G. 2003.

Stomach content analysis

The abdomen of some economic fish was slit open and the content placed in a petri dish. The aggregate of food items was dispersed in water. Aliquot samples were taken with a dropping pipette from a stack and placed in a small petri dish, spread out evenly and subjected to stereomicroscopic examination (10 - 100x). Large food organisms such as prawns, bivalve mollusc and fish were counted directly whenever encountered. The remaining microscopic organisms were counted using a binocular zoom microscope, and the number of food items present was counted directly. Stomach content was analysed using the occurrence frequency (Fi) method and volumetric analysis index (Hynes, 1950; Hyslop, 1980; Junior and Goitein, 2001; Oso, 2006; Agbabiaka, 2012).

Occurrence Frequency (Fi) Method

The number of stomachs in which each food items occurred was noted and expressed as a percentage of the entire stomachs examined. This method gives the proportion of the population of fish that feeds on a particular food item.

$$F_i = 100n_i/n$$

Description;

F_i = occurrence frequency of food i

n_i = number of food i

n = total number of a digestive tract containing food

Volumetric Analysis Index uses the formula:

$$V_i = 25M_i$$

Where:

V_i : Volumetric Analysis Index of the i food item in the samples;

25 : multiplication constant to obtain the percentage;

M_i : mean of the points ascribed for the i food items.

Using the Index of Preponderance the main food that was eaten was determined, an integration of occurrence frequency method and volumetric analysis index. Preponderance index was determined following Natarajan and Jhingran (1961): Description:

$$IP = \frac{V_i \times O_i}{\sum (V_i \times O_i)} \times 100$$

V_i = percent volume of food i

O_i = percent occurrence frequency of food i

$\sum (V_i \times O_i)$ = Total of $V_i \times O_i$ of all food types

IP = Index of Preponderance (%).

RESULTS

A total of 1267 stomachs of *L. falcipinnis* from Forcados river estuary were analysed. 1212 (95.73%) of these stomachs had food items while 55 (4.26%) had empty stomachs. Table 1. shows that Mud had the highest percentage (38.56%) by numerical while Detritus had the highest by occurrence method of analysis (99.65%) The least of 1.71% and 3.03% by numerical and occurrence methods were recorded for bony fish and Crustacean in Forcados river estuary.

Mud recorded the highest Index of Preponderance value.

Table 1: Summary of food items consumed by *L. falcipinnis* during the study period.

	% O_i	% V_i	$V_i \times O_i$	IP
Mud (FPOM)	38.56	10.01	385.98	46.81
Detritus (CPOM)	15.55	9.33	145.08	17.59
Blue green algae				
Oscillatoria sp	3.20	5.21	16.67	2.02
Plant materials	6.67	10.72	71.50	8.67
Green filamentous algae				
Closterium	4.98	4.31	21.46	2.60
Rivularia	2.44	3.58	8.74	1.05
Desmids	17.03	3.67	62.50	7.6
Diatoms	7.82	2.44	19.08	2.31
Invertebrates				
<i>Macrobrachium sp</i>	2.05	20.2	41.41	5.02
Vertebrates				
Bony fish	1.71	30.53	52.21	6.33
$\Sigma (V_i \times O_i)$			824.63	

Keys ► V_i = percent volume of food i , O_i = percent occurrence frequency of food i , IP = Index of Preponderance (%).

DISCUSSION

The success of mullets as earlier reported lies in their feeding habits and the abundance of their food. The detritus found in the stomachs of the fish was picked alongside other food item and indicates that the fish is a benthic feeder. This is in line with reports by Idodo-Umeh (2003), Lawson *et al.* (2010), Lawson and Jimoh (2010) and Ikomi and Okosuwei (2012). Of a total of 1267 stomachs of *L. falcipinnis* examined from Forcados river estuary, 1212 (95.73%) had food items indicating that the fish were active feeders and took good advantage of the available resources as buttressed by the Index of Preponderance value.

CONCLUSION

The study indicated that *L. Falcipinnis* fed on detritus and mud as a major diet. The food and feeding habits of this fish species should be continuously monitored for sustainable management of the water body and its resources.

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