
DIET AND DIETARY HABITS OF *Labeo senegalensis* IN A TROPICAL FRESHWATER ECOSYSTEM

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ABSTRACT

The food composition and dietary habit of Labeo senegalensis at Idah area of river Niger was carried out between January and February, 2010. 155 samples were obtained from artisanal fishermen and brought to biological sciences laboratory for analysis. Fish samples were dissected and the stomach contents emptied into Petri-dishes containing 10% saline solution and observed under a dissecting microscope. The food items were counted and the stomachs were scored according to its fullness. The result shows that the fish feed mainly on mud (4.31%), sand particles (6.00%), plant materials (80.65%), fish remains (5.81%), insect parts (2.58%) and small gravel (0.65%) respectively. L. senegalensis in Idah area of River Niger is a herbivorous detritivore feeding more on plant materials.

Keywords: Food items, Feeding habits, Stomach contents, Herbivorous detritivore

INTRODUCTION

Life processes includes reproduction, growth and development are done at the expense of food eaten by living organisms including fish. In various studies aimed at understanding the feeding regimes, food preference, migrations, growth and breeding patterns of fish, diet has been found to be an important factor, especially in governing their growth, condition factor, fecundity and migration patterns (Rao, 1974; Adeyemi *et al.*, 2009a).

Feeding habits of fish provide essential information of bionomic studies of single species; the analysis of stomach contents in fish is a common method for investigating the diet of fish, and thus describing food chains and webs shared by different species. Such studies also reveal interactions among species (Kenneth *et al.*, 2004).

Accurate quantification of fish diets is an important aspect of fisheries management (Quinton *et al.*, 2007).

Studies on the aspect of biology of fishes such as growth pattern, reproduction and nutrition are necessary as they would furnish relevant information for the formulation of fisheries management policies (Adedolapo *et al.*, 2008). Recent studies carried out on the feeding habits of fish species in Nigerian aquatic ecosystem include that of Adedolapo *et al.* (2008) and Adeyemi *et al.* (2009b).

Labeo is the largest genus of carp fishes (Order: Cypriniformes) of the family Cyprinidae. The families Cyprinidae are fusiform fishes which are slightly compressed. They have an inner surface of lips with transverse folds; snout with discrete tubercles short barbell at the corners of mouth; they

have naked head with body covered by cycloid scales (Balogun, 2006).

MATERIALS AND METHODS

Study Area: The tropical freshwater ecosystem studied was Idah area of River Niger in Kogi State, Nigeria (Figure 1). The area is located on latitude 7°06'N and longitude 6°43'E of the Greenwich meridian in the Guinea Savannah vegetation zone of Nigeria. The study area experienced two weather conditions, dry season which starts from November to April and wet season which starts from April to October (Adeyemi *et al.*, 2009a).

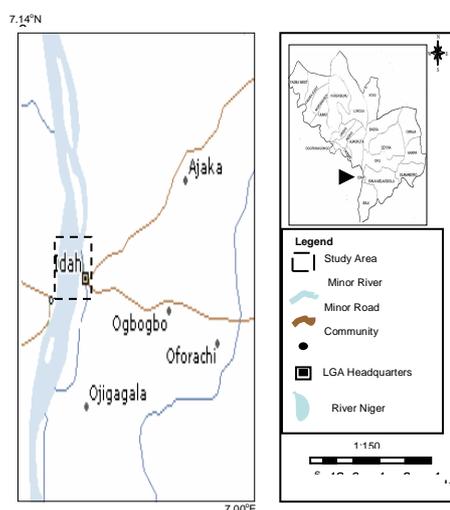


Figure 1: The map of Idah showing the study area

Sampling: A total of one hundred and fifty five (155) samples of *Labeo senegalensis* were purchased from fishermen at Idah area of River Niger between January and February, 2010. The fish sampled were transported in plastic buckets to the Biological Sciences Laboratory, Kogi State University, Anyigba for analysis those that could not be treated were preserved in a freezer until the next day. They were sorted and identified up to species level using the guides of Teugels *et al.* (1992), Olaosebikan and Raji (1998), Idodo-Umeh (2003) and Paugy *et al.* (2004).

Stomach Content Analysis: Each stomach was dissected and split open and the contents emptied into Petri-dishes containing 10%

saline solution and observed under a dissecting microscope.

The food items were counted and the stomachs were scored 0, 25, 50, 70 and 100% according to its fullness as described by Olatunde (1978).

Analysis: The stomach contents were analyzed by frequency of occurrence as described by Hynes (1950) and Bagenal (1978). In the frequency of occurrence method each food item was identified and number of stomach in which each food occurred was counted and expressed as a percentage of stomach containing food. The method showed the proportion of individuals eating a particular food item in a species. The occurrence of each food item was expressed as a percentage of all stomach with food. That is, $P = (b/a) \times 100$ where a = Total number of fish examined with food in the stomach; b = number of fish containing a particular food; P = percentage of occurrence of each food item.

RESULTS

The six food items obtained from the stomach of the fish were; fish remains (5.81%), mud (4.31%), sand particles (6.00%), plant materials (80.65%), insect parts (2.58%) and small gravel (0.65%) (Table 1).

The stomach fullness classification of *Labeo senegalensis* based on the degree of fullness indicated that eighteen males (11.61%) had food in their stomach while 2 (1.29%) had no food in their stomach. There was food in 127 (81.94%) stomachs of female while 8 (5.16%) had no food. The males had 1 (0.65%) full stomach, 8 (5.16%) almost full, 6 (3.86%) half full, 3 (1.93%) almost empty and 2 (1.30%) empty. The female had 11 (7.10%) full stomach, 50 (32.30%) almost full, 43 (21.94%) half full, 32 (20.65%) almost empty and 8 (5.16%) were empty. There was no significant difference ($p > 0.05$) in the degree of stomach fullness of the fish. Overall, 145 (93.55%) of the sample had food in their stomach while 10 (6.45%) were

empty stomach. This indicated a high feeding intensity (Table 2).

Table 1: Percentage frequency of food items in the stomach of *Labeo senegalensis* from Idah area of River Niger

Items	Frequency of Occurrence (%)
Fish remains (bones, flesh, particles)	5.81
Mud	4.31
Sand particles	6.00
Plant materials	80.65
Insect parts	2.58
Small gravel	0.65

Table 2: Stomach contents classification of *Labeo senegalensis* based on degree of fullness at Idah area of River Niger

Sex	Male n = 20	Female n = 135	Combined n = 155
%	18	127	145
% Stomach with food	(11.61)	(81.94)	(93.55)
% Stomach without food	2	8	10
	(1.29)	(5.16)	(6.45)
% Degree of fullness			
Full (4/4)	1	11	12
	(0.65)	(7.10)	(7.75)
Almost full (3/4)	8	50	58
	(5.16)	(32.30)	(37.46)
Half full (1/2)	6	43	49
	(3.86)	(21.94)	(25.80)
Almost empty (1/4)	3	32	35
	(1.93)	(20.65)	(22.58)
Empty (0/4)	2	8	10
	(1.30)	(5.16)	(6.46)

DISCUSSION

Qualitative and quantitative composition of fish diets is important to growth, maturity and fecundity changes in fish amongst other factors. Study of dietary habits of fish, based on stomach content analysis, is widely used in fish ecology as an important means of investigating trophic relationship in the aquatic communities (Fagbenro *et al.*, 2000). This

study showed that the items found in the diet of this species include fish remains (bones, flesh, particles), mud, sand particles, plant parts and insect parts. Ayotunde *et al.* (2007) reported whole worm, worm part, nematode, mud, plant part, unidentified items, and detritus in the gut of *Labeo coubie*, another member of the family Cyprinidae. Other food items present in small quantities includes Rotifera (*Kerattela* sp., *Polyarthra* sp. and *Philodina* sp.) and Crustacean (*Copepod* sp., *Decapods* sp. and *Daphnia* sp.). The presence of plant tissues (68.7% occurrence) according to their findings showed that *Labeo coubie* is able to digested plant matter, making it also herbivorous. This is in line with the findings of this study where 80.65% of items were plant materials.

The worms were the single most prominent food group. It is likely that being a detritivorous or herbivore it could also be a benthic feeder. *Labeo senegalensis* forages the river bottom. In the process it catches worm and this may account for the prominence of worm and worm parts in its food.

Conclusion: The findings of this study showed that 80.65% of items in the diet of *Labeo senegalensis* were plant materials with other materials forming 19.35% of the components. *Labeo senegalensis* in Idah area of River Niger of Kogi State could therefore termed a herbivorous detritivore feeding more on plant materials.

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