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LENGTH-WEIGHT RELATIONSHIP, DIET COMPOSITION AND CONDITION FACTOR OF *CLAROTES LATICEPS* FROM LOWER RIVER BENUE

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ABSTRACT

Length weight relationship, diet composition and condition factor of 240 samples comprising of 79 male and 161 female of C. laticeps from Lower River Benue was determined. The mean total length, standard length, body weight, and condition factor of male Clarotes laticeps were 33.30±1.10, 27.70± 1.07, 464.30±465.03, and 1.05±0.05 respectively while the mean total length, standard length, body weight and condition factor of the female counterpart were 35.80±1.13, 29.33±1.05, 528.20±467.85 and 0.97±0.04 respectively. There was no significant difference (p > 0.05) in the mean total length, standard length, body weight and condition factors between the male and female Clarotes laticeps. Female Clarotes laticeps had better 'b' value (3.13) than the males (3.01). Of the 240 C. laticeps examined, 35.00% samples had empty stomachs while 65.00% samples had different food items in their stomachs. Out of the 65.00% stomachs containing different food items, 31.40 % had full stomachs, 26.30 had half-full stomachs, 19.20% had quarter stomach while 23.10% had three quarter-full stomachs. Varieties of food items found in the stomachs C. laticeps ranged from plant to animal materials as well as sand and detritus. The most frequently food item consumed by C. laticeps was algae (85.90%) while insect part (20.12 %) had the least. Numerically, algae (37.24 %) had the highest while digested food particles (6.90%) was the least food item consumed.

Key words: Length-weight, Diet composition, *Clarotes laticeps*, Condition factor and River Benue

INTRODUCTION

Clarotes laticeps, is a ray-finned (Actinopterygii), freshwater, demersal and anadromous fish (Reide, 2004) that stays in the tropical region with an adapted temperature range of 20°C-26°C (Baensch and Riehl, 1991). Its diet has been found to consist of Crustaceans, insects, mollusks, small fishes and detritus (Bailey, 1994; Idodo-Umeh, 2003). It grows to a maximum standard length of 80cm and weight of 10kg (Eceles, 1992; Idodo-Umeh, 2003).

Clarotes laticeps is commonly found in African waters such as Rivers Nile, Niger, Benue, Ase, Senegal and lakes Volta and Chad (Risch, 2003; Idodo-Umeh, 2003). Human activities have fragmented and simplified the tropical wetland habitat. Resources enjoyed by the wetland communities are systematically being destroyed. Sustainable management and conservation of the wetland resources are urgently required.

One of the most commonly used in the analysis of Fisheries data is length- weight relationship (Mendes, *et al.*, 2004. Accurate fisheries statistics in the water body and its adjourning flood plains is vital for the formulation of a sound fisheries management programme but, there is dearth of this information on *Clarotes laticeps* from Lower River Benue, this study therefore aimed at determining the length-weight relationship, food and feeding habits and condition factor of *Clarotes laticeps* from Lower River Benue as this fish

species is readily available in the catches of the people of Benue State.

Among the catches of fishermen from Lower River Benue, *Clarotes laticeps* forms one of the major commercially important fishes but there is dearth of information on the length-weight relationship, diet composition and condition factor of this fish species from Lower River Benue therefore, this work aimed providing useful information on length-weight relationship, diet composition and condition factor of this species from Lower River Benue.

MATERIALS AND METHODS

Study Area

This study was carried out in Makurdi, the Capital of Benue State. The state is bounded by Taraba State to the East, Nassarawa to the North, Kogi to the West, Enugu to the South East and Cross River to the South. This area lies between longitude 8^o and 9^o East and latitude 7^o and 8^o North estimated population of 600,000 (2002 estimated) Benue State.

River Benue has great influences on the commercial activity of the area, since some of the people take to fishing as a means of livelihood because of the numerous fish fauna that abound in the River.

Fish Sampling

A total of 240 samples of *Clarotes laticeps* were collected on monthly basis for a period of five months from Wadata landing site in Benue State, Makurdi and transported in ice block to the Fisheries Laboratory, University of Agriculture, Makurdi.

Length - weight measurements, identification of food items and gut contents analysis of the sampled fish

Fish samples were identified and sorted into male and female (Idodo-Umeh, 2003 and Nwani, 2004).

The total and standard lengths measured were recorded to the nearest centimetres (cm) while the weight was measured to the nearest grams (g) using an electronic weighing balance. Length weight relationship was calculated using the formula:

$W = aL^b$.

The body weight increased more rapidly than the total length, the formula was therefore logarithmically transformed for the purpose of data analysis according to (Nwani *et al.*, 2006 and Erhijowvho, 2007) as thus:

$\text{Log } W = \text{Log } a + b \text{ Log } L$.

Where 'a' = proportionality constant, 'W' = weight of fish in grams (g), 'L' = total length of fish in centimetre (cm) and 'b' = allometric growth coefficient.

Condition factor of the fish samples

Condition Factor of the fish samples was calculated using the formula:

$K = 100W/L^3$

Where K = Condition factor, W = weight of the Fish and L = Length of the Fish

Determination of food items of the sampled fish

Gut of each specimen was dissected out and its contents emptied into separate

Petri dishes with the items identified to the lowest taxonomic level according to the method described by Ugwumba, and Adebisi (1992). The contents were analyzed instantly using Numerical (N) and Frequency of Occurrence (O) methods as described by (Odun and Anuta, 2001; Inyang and Nwani, 2004) as thus:

Frequency of occurrence = $\frac{\text{Sum of each food item in each gut} \times 100}{\text{Total number of all food items}}$

Frequency of occurrence = $\frac{\text{total number of stomachs with the particular food item} \times 100}{\text{Total number of stomach with food}}$

Statistical Analysis

Data on Length and weight were subjected to regression analysis using Microsoft word Excel while data on morphometric measurements were subjected to analysis of Variance (ANOVA) and descriptive statistics using SPSS Version 17.

RESULTS

Morphormetric parameters and condition factor of *Clarotes Laticeps* from Lower River Benue

Results of the mean values of morphmetric characteristics of male and female *Clarotes laticeps* from Lower River Benue are shown in Table 1. The mean total length, standard length, weight of the body, and condition factors of male *Clarotes laticeps* were 33.30±1.10, 27.70± 1.07, 464.30±465.03, and 1.05±0.05 respectively while the mean total length, standard length, weight of the body, and condition factors of the female counterpart were 35.80±1.13, 29.33±1.05, 528.20±467.85 and 0.97±0.04 respectively. There was no significant difference ($p > 0.05$) in the mean total length, standard length, weight of the body, and condition factors between the male and female *Clarotes laticeps.*

Table 1: Mean value of morphometric characteristics of *Clarotes Laticeps* from Lower River Benue

PARAMETERS	MALE	FEMALE	P-VALUE
TL ± SE	33.30±1.10	35.80±1.13	0.12
SL ± SE	27.70± 1.07	29.33±1.05	0.28
WT ± SE	464.30±465.03	528.20±467.85	0.34
K ± SE	1.05±0.05	0.97±0.04	0.94

Note:
TL = Total length, SL = Standard length, WT = weight, K = condition factor and SE = Standard error of means.

Results of the length-weight relationship of male, female and combined sexes of *Clarotes laticeps* used for the study are as shown in figures 2, 3 and 4 respectively. The 'b' values for males, females and combined sexes are 3.01, 3.13 and 3.05 respectively. Female *Clarotes laticeps* had better 'b' value (3.13) than the males (3.01).

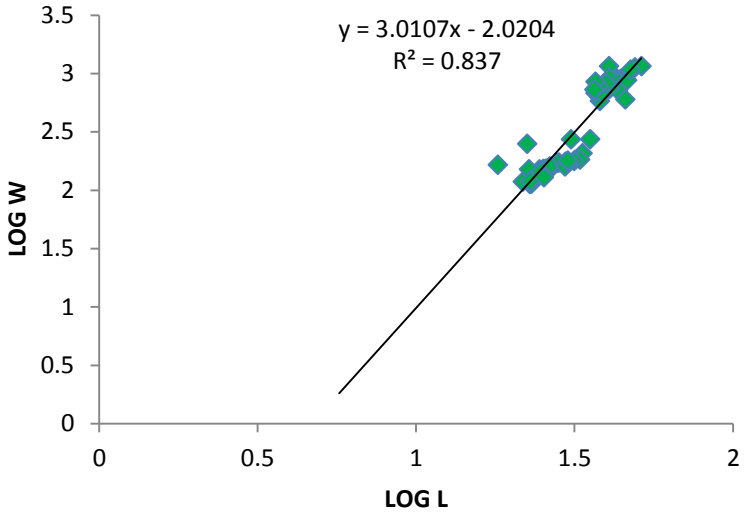

Fig. 2: Length-weight relationship of male *C. laticeps* from Lower River Benue.

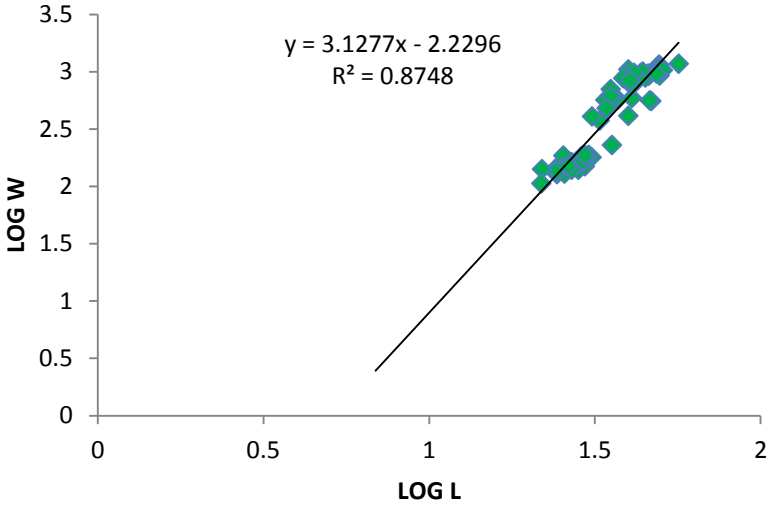

Fig. 3: Length-weigth relationship of female *C.laticeps* from Lower River Benue.

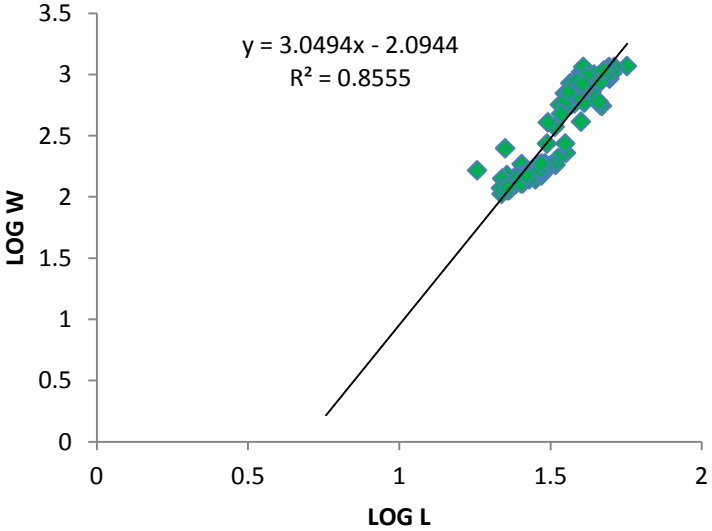

Fig. 4: Length-weight relationship of combined sexes of *C.laticeps* from Lower River Benue.

Diet composition of *Clarotes laticeps* from Lower River Benue

Of the 240 *C. laticeps* examined, 84 (35.00 %) samples had empty stomachs while 156 (65%) samples had different food items in their stomachs. Out of the 156 (65.00%) stomachs containing different food items, 49 (31.40 %) had full stomachs, 41 (26.30) had half-full stomachs, 30 (19.20%) had quarter stomach while 36 (23.10%) had three quarter-full stomachs.

Results of the diet composition found in the stomachs of the sampled *C. laticeps* are presented in Fig.5. The variety of food items found in the stomachs ranged from plant to animal materials as well as sand and detritus. The most frequently food item consumed by *C. laticeps* was algae (85.90%) while insect part (20.12 %) least had the last. Numerically, algae (37.24 %) had the highest while digested food particles (6.90%) was the least food item consumed.

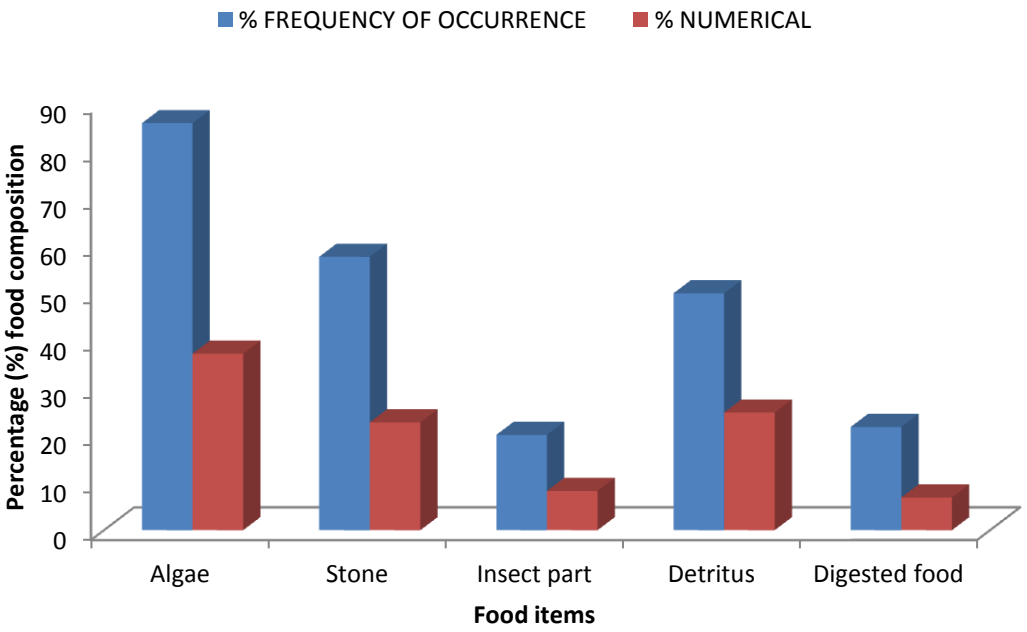

Fig. 5 Percentage food composition in the stomach of the sampled *C. laticeps* from Lower River Benue.

DISCUSSION

Length-weight relationship and condition factor of *C. laticeps* from Lower River Benue was examined. High positive correlation (r = 0.91 for males, 0.93 females and 0.92 combined sexes) were exhibited by the sampled fish. This could be attributed to the fact that as length of the fish increased, its body weight also increased as a result of the availability of quality and quantity of food and plankton yield resulting from the water body. Peepple and Ofor (2011) had made similar observation. According Kurtakis and Tsikliras (2003), allometric coefficients may range from 2 to 4. The 'b' values for males, females and combined sexes obtained in this present work fell within the range of 'b' values reported by Kurtakis and Tsikliras (2003).

The Length-weight relationship parameters (a and b) of fish are affected by a series of factors such as season, habitat, gonad maturity, sex, diet, stomach fullness, health, preservation techniques and annual differences in environmental conditions (Froese, 2006). Differences in value 'b' could be attributed to one or a combination of most of the factors including differences in the number of sampled species examined.

The condition factor of *C. laticeps* from Lower River Benue was relatively high though varied between the male and female. High condition factor recorded in this work could be an indication that the species fared well in the Lower River Benue. The variations in K-values between the male and female sampled fish species could be an indication of food abundance, adaptation to the environment and gonad development. This agrees with the reported findings of Soyinka and Adekoya (2011) and Frota *et al* (2004) who

reported that variations of K may be indicative of food abundance, adaptation to the environment and egg/gonad development in fish. Peepple and Ofor (2011) had made similar observation.

The sex ratio for the sampled fish was in favour of females than the males. The sex ratio that favoured females than the males may account for their reproductive success in Lower River Benue. Larger number of females was available to fewer males for reproduction and this may account for presence of these fish species all year round. Similar observations had been made by Soyinka and Adekoya (2011)

The size frequency distribution of the sampled fish indicated that the fish samples were of different weight, age and size classes. Varieties in food and feeding habits of fishes occur as a result of these factors (Omorinkoba and Fatuiti 2009). Understanding the relationship between body structures and fish diet was important for predicting fish diet and their mechanisms of feeding. Hence the type of food found in an area influenced the distribution, abundance and rate of growth (size) of the fish (Ogheneochuko, 2007).

Food items identified were of plant and animal origins as well as stones and detritus, suggesting that the fish was an omnivore. This assertion was supported by Malami *et al.*, (2004), Olele, (2011). The presence of detritus in the diets of the fish could be an indication that *C. laticeps* is also a bottom-benthic feeder, feeding actively on bottom deposits containing falling organic debris. This agrees with the reported work of Owolabi (2008) who reported *S. membranaceu* as a bottom-benthic feeder, feeding actively on bottom deposits containing falling organic debris.

The overall results of gut fullness revealed that 35.00% of guts were empty, while varied quantities of food items were found in 156 (65.00 %) of guts. The occurrence of higher non empty guts may have resulted from the immediate arrest of food digestion through the injection of formalin into the gut region of the fish before its conveyance to the laboratory after capture. This observation is in line with the reported work of (Malami *et al*, 2004). The greater number of guts with food was attributed to good feeding strategy adopted by the specimens (Haroon, 1998 and Nwani 2007) and probably due to food abundance during the period of study.

CONCLUSION

The ability of *C. laticeps* to feed on wide range of organisms at different trophic levels (food chain) could be the possible reason which makes them promising candidates for commercial purposes. Since the species are widely accepted and used as human food throughout the area in which they occur, they could be easily incorporated into local polyculture systems with less expensive feed.

Recommendation

C. laticeps are widely accepted and used as human food throughout the area in which they occur, they should be easily incorporated into local polyculture systems with with less expensive feed.

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