LENGTH - WEIGHT RELATIONSHIP AND CONDITION FACTOR OF SOME FISH SPECIES IN OWERRINTA AREA OF IMO RIVER, NIGERIA.

Ikwuemesi, J.C[1] and Adaka, G. S.[2]
[1]Department of Fisheries and Aquatic Resources Management
Michael Okpara University of Agriculture Umudike, Abia state Nigeria
[2]Department of Fisheries and Aquaculture Technology, Federal University of Technology Owerri, Imo State

ABSTRACT
This study describes the length–weight relationship (LWR) and condition factor (K) of 3 fish species found in Owerrinta area of Imo River, which is of ecological and economic importance. These species includes; "*Alestes macrolepidotus* (Aza), *Gymnarcus niloticus* (Asa/Olili), and *Oreochronics niloticus"* (Mpupa/Ifunu). A total number of 170 fishes were caught using local fishing gears from Novermber 2016 to July 2017 and the fish species recorded were sampled at two weeks interval. The length-weight relationship exhibited negative allometric growth for all the species. The highest condition factor recorded was 3± 0.22 while the lowest is 1.22± 0.54(values range from 0 – 4). The results indicate that the status of the fish species sampled was influenced by anthropogenic activities in the area and as such Owerrinta area of Imo River may be unfavorable to the fishes.
Key words: Imo River, condition factor, length-weight relationship, freshwater

INTRODUCTION

Fishes are highly important in the development of Nigeria both economically and health-wise as source of protein with low cholesterol content. Knowledge of some quantitative aspects such as length–weight relationship (LWRs) are often used to estimate biomass of the standing stock (Martins-Smith, 1996), condition indices, ontogenetic change (Safran, 1992) and growth studies (Craig *et al.*, 2005).
Length to weight relationship is important for proper exploitation and management of the population of fish species (Anene, 2005). Length–weight relationships allow fisheries scientist to convert growth in length equations to growth in weight in stock assessment models (Morato *et al*., 2001), estimate biomass from length frequency distributions (Petrakis and Stergiou, 1995), compare life history and morphological aspects of populations inhabiting different regions (Stergious and Moutopoulos, 2001).
In fisheries sciences, the condition factor is used in order to compare the "condition", "fatness" or well being of fish. It is based on the hypothesis that heavier fish of a particular length are in a better physiological condition (Ashiq *et al.*, 2013). Several studies have been carried out on the length – weight relationship and condition factor of several fish species (Abowei, 2010; Imam *et al*., (2010); Ogamba *et al.*, 2014; Getso *et al*., 2017). This study seeks to provide information on the wellbeing status of some commonly captured fish species in Owerrinta area of Imo River.

MATERIALS AND METHODS

STUDY AREA

The location of Owerrinta of Imo River in Isiala-Ngwa South Local Government Area of Abia state lies on Latitude $5^{0}18^{1}$N of the equator and longitude $7^{0}17^{1}$ E. The major tributaries of the Imo River include, the Rivers Ibu, Iyiba, Uchu, Anamiri, Iyeachara, Eme and Otamiri (Ita, 1993). The River serves the following functions for the communities settling close to the water body; source of water for domestic uses, source of sand for building activities, fishery, recreational activities and agricultural irrigation program (Adaka, *et al.,* 2015).

Sample collection

Samples were collected biweekly from the fisher folks from November 2016 to July 2017. Assessment involved the counting of the fishes caught by the fishers and identifying the species using identification key and photographs of species were taken *in-situ*. The fishes were transported to the laboratory in 4% formalin solution in separate bottles for identification with aid of Boulenger (1916), Holden and Reed, (1972) and Froese & Pauly, (2010) and measurements were carried for Total Length (TL), Standard Length (SL) in centimeter (cm) and Body Weight (BW) in grams (g) based on Fafioye and Oluajo, (2005).

The condition factor (K) of the experimental fishes was estimated from the relationship:

$$K=\frac{100\ W}{L^{3}} \quad (1)$$

Where K= Condition factor, W = Weight of fish (g),
L = Length of fish (cm)
The relationship between the length (L) and weight (W) of fish was expressed by equation (Pauly, 1983):
$W= aL^{b}$ (2)
Where
W=Weight of fish in (g)
L= Total Length (TL) of fish in (cm)
a=Constant (intercept)
b=The length exponent (slope)
Correlation and regression analysis were the statistical tools used for analysis. The ''a'' and ''b'' values were obtained from linear regression of the length and weight of fish. The correlation (r^2) that is the degree of association between the length and

weight was computed from the linear regression analysis.

$R = r^2$

RESULTS AND DISCUSSION

Length-Weight Relationship

An analysis of length-weight relationship and related parameters of male and female species is succinctly explained in the tables below. In Table 1, the b values of all the species sampled are not equal to 3 **(b ≠ 3, b < 3)**. Thus, the growth pattern of the fish is negatively allometric. The fish do not grow symmetrical i.e. the fishes are less robust with increase in length. This may infers that catabolism of the fish exceeds anabolism and by implication, the fish may become slender as they increase in weight. In line with the findings of this study, several researchers have reported negative allometric growth for different fish species. Ikongbeh *et al*. (2013) reported b-values of 2.47 and 2.50 for male and female *Auchenoglanis occidentalis* from Lake Akata, Benue State, Nigeria. Peter and Diyawere (2014) also reported b-values of 0.50 and 1.22 for female and male *Clarias gariepinus* caught from Luhu reservoir in Adamawa State, Nigeria. However, variations in these values and that obtained in this study could be attributed to the fact that these are different fish species. Furthermore, there is high heterogeneity of the intercept 'a' among the sampled population of fish.

TABLE 1: **Length-Weight Relationship and Condition Factor (*k*) of Species**

Species	Sex	A	B	R	Number	k (x)
Alestesmacrolepidolus	*F*	1.384428	0.935971	.861	66	3±1.22
	M	1.210779	0.083065	.817	19	1.22±0.54
Gymnacus niloticus	*F*	0.769551	1.101761	.699	22	1.55±0.6
	M	0.797057	-0.09851	.962	13	1.77±0.59
Oreochromisniloticus	*F*	1.999766	0.810032	.900	45	2.78±0.58
	M	1.752394	0.860172	1	5	2.40±0.58

TABLE 2: **Seasonal variation in condition factor and coefficient of variation (COV)**

Species	Condition Factor Dry Season	Wet Season	T-Value	Coefficient of Variation % Dry Season	Wet Season
			A. macrolepidolus		
M	3.71±0.49[a]	3.83±0.58[b]	1.55	13.20[a]	15.14[b]
F	2.75±1.52[a]	3.26±1.04[b]	1.45	55.27[a]	31.9[b]
M & F	3.00±1.39[a]	3.38±0.99[b]	1.22	46.33[a]	29.29[b]
			Gymnacus niloticus		
M	1.67±0.50[a]	2.33±0.58[b]	2.00	29.94[a]	24.89[b]
F	1.69±0.63[a]	1.33±0.55[b]	1.89	37.27[a]	41.35[b]
M & F	1.68±0.57[a]	1.58±0.67[b]	0.36	33.93[a]	42.40[b]
			O.niloticus		
M	2.40±0.55[a]	2.00±0.00[b]	1.00	22.92[a]	0
F	2.82±0.53[a]	2.75±0.59[b]	1.00	18.79[a]	21.45[b]
M & F	2.73±0.55[a]	2.70±0.60[b]	0.22	20.15[a]	22.22[b]

*a and b indicate INSIGNIFICANT corresponding means at **.05** level of confidence*

From Table 2, the coefficient of variation from the wet season (CV = 15.14%) was not significantly different from the dry season (CV = 13.20%) (t = 1.55, P > .05). Apart from the *A. Macrolepidolus* specie whose k mean value depict a slight increase from dry season to wet season in both male and female (3.71±0.49 - 3.83±0.58, 2.75±1.52 - 3.26±1.04, 3.00±1.39 - 3.38±0.99), every other species fluctuate around same k mean value throughout the seasons. The k mean value of all species tested statistically insignificant. This result may not be unconnected with disruption of the ecosystem by sand mining in the upper region of the river which makes the water turbid and reduces food production via photosynthesis. K mean value in Distichodus species was also reported to be higher during the wet season and lower during the dry season (Nwani, 2006). The higher k mean value in wet season might be associated with increased food availability, occasioned by flood; and gonadal development associated generally with fish during the flood season while the low k mean value recorded in dry season could be attributed to physiological stress due to changes in physical and chemical condition of the habitat, and reduced availability of food (Nwani, 2006).

CONCLUSION

This study has shown the status of these three fish species in Owerrinta area of Imo River. The negative effect of human activities in the river which distorts the ecosystem and impacts negatively on the wellbeing of these fish species has been revealed.

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