The length-weight relationship and condition factor of *Citharinus citharus citharus* in Lake Kainji, Nigeria

By

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Abstract

The length – weight relationship and condition factor of *Citharinus citharus citharus* was studied for a period of twelve (12) months from Lake Kainji, Nigeria. Nine hundred and eighty-nine (989) fish samples (*Citharinus citharus citharus*) with total length ranging from 100mm to 530mm and weight ranging from 31.00g to 2250.00g were analysed. The results showed that the values of a, b and r were 0.0039, 3.2134 and 0.8997 respectively. The condition factor (K) values varied from 2.9 to 4.5, which means that the growth pattern of the fish is based on the value of 'a'. the fish species are also living well in the Lake as the 'K' are greater than one.

Keywords: Condition factor, *Citharinus citharus citharus*, Length-weight relationship, Lake Kainji,

Introduction

Citharinus citharus citharus (Moon fish) of the family *Citharinidae* is a very important commercial fish in Lake Kainji and Lake Oguta (Nwadiaro, 1989). Worthington (1929) reported that *Citharinus citharus citharus* formed the main catch of the Lake Albert. However, fishes in the tropics and some of the tropical water bodies usually experience frequency growth fluctuations due to so many factors. Some of the factors includes: environmental
changes, availability of food, spawning rate etc.

According to Kulbichi *et al* 1993, to assess the influence of the above mentioned factors, the knowledge of the length-relationship is very essential.

This paper provides information on the length-weight relationships of *Citharinus citharus citharus* in Lake Kainji as it is one of the crucial requirements for fisheries management purposes.

Materials and methods

Monthly specimens of *Citharinus citharus citharus* were randomly collected between Januarys to December, 2006 from the fisher folks catch. Each sampling was conducted between the hours of 7.00am to 2.00pm. Weight in grams, total length and standard length in millimeters were taken using weighing scale and measuring boards respectively. The length-weight relationship was calculated using the conventional formula described by Le cren (1951).

$W = a\,Lb$ ----------1

Equation 1 was transformed to logarithms of the form

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

where W = Weight in grams
L = total length in mm
a = is a constant
b = an exponent

Using Instat statistical package, the values of a and b can be estimated by regression method of analysis.

The condition factor "K" was calculated

for individual fish for each month using the conventional formula described by Worthington and Richard 1930, K = W * 100/L3

K = condion factor, W = body weight in grams, L = standard length in mm.

Results and Discussion

The field investigation covered a period of twelve (12) consecutive months (Januarys to December, 2006). Samples for the twelve (12) were summed (989 specimens) and weighed (484777.97) in order to obtain a rough representative of a stable population structure of the 989 of the *Citharinus citharus citharus* caught during the sampling period.

The total length range from 100.00mm to 530.00mm with the mean length of 360.20mm and weight range from 31.00g to 2250.00g with mean weight of 637.08g. This shows that the species used for the study ranges from late fingerlings stage to matured *Citharinus citharus citharus.*

For the condition factor (CF), the parameters used were a, b, and r of the lengthy – weight relationship of *Citharinus citharus citharus* as indicated in the table below Table 2).

Table 1: Size ranges of *Citharinus citharus citharus* from Lake Kainji

Parameters	Minimum	Maximum	mean	SD
Total length(mm)	100.00	530.00	360.21	1.66
Weight(g)	31.00	2250.00	637.08	9.21

Table 2: Length– weight relationship and condition factor of *Citharinus citharus citharus* from Lake Kainji

Parameters used	Values obtained
A	0.0039
B	3.2134
R	0.8997
Mean condition factor (CF)	1.3723

The value of the exponent b is 3.2134. It portrayed that *Citharinus citharus citharus* exhibits a positive allometric growth i.e as the fish increases in length, it tend to be heavy (weight also increases) in line with the work of Kings (1996). This means that the said fish species increases in length in relation to weight. The difference in growth rate between one part and the whole organism or between one part and another part considered as a standard is termed as allometry of growth. If b = 3, growth in weight is termed isometric and weight growth is proceeding in the same dimension as the cube of the length. This is what happens in fishes whose body form and specific gravity do not change as it grows (Ricker, 1975). However, if b is less than or greater than 3, the growth is allometric.

For the condition factor (CF) of the fish species, Pauly (1984) stated that it concerned with the well-being and the degree of fatness of fish in a water body. The calculated condition factor values ranges from 2.9 to 4.5 and the values are greater than 1. This is an indication that the fishes are doing well in Lake Kainji. The small size group had the highest condition factor of 4.5 while the medium and large size classes had condition factor of 3.9 and 2.5 respectively. Bagenal and Tesch (1978) documented less than 2.9 to

4.9 for matured freshwater fish body weight. This could be due to the differences in weight of individual fish sampled and the period of the sampling.

Conclusion

Based on the results of the study, Lake Kainj is a suitable water body for the growth of *Citharinus citharus citharus*. The reduction of the fish species in the Lake can be attributed to other factors because the condition of the lake is favourable for the survival of the fish.

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