LENGTH-WEIGHT RELATIONSHIPS AND CONDITION FACTOR OF *Citharinus citharus* AND *Alestes baremoze* FROM ANAMBRA RIVER BASIN, NIGERIA

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ABSTRACT

The length-weight relationships and conditions of Citharinus citharus and Alestes baremoze from Anambra River were investigated from September 2007- March 2008. Analysis of the size ranges of the two fishes showed that C. citharinus was heavier than A. baremoze but A. baremoze was long than C. citharus. Both fishes showed only one peak each in their size distribution indicating that they belonged to the same size or year class. There was highly significant relationship between the body weights and standard lengths of C. citharinus and A. baremoze (P < 0.001). The Kn values for the two fishes were fairly equal but the mean K. values showed that C. citharinus was more robust and in a better state of "well being" than A. baremoze. The results were discussed of similar studies, particularly the importance of the condition factor in the study of the biology of the fish population.

Keywords: *Citharinus citharus, Alestes baremoze*, Anambra River, Length-weight, Condition factor

INTRODUCTION

Information on the fish and fisheries of the Anambra river system is fast accumulating. Aspects of the culture fisheries were investigated by Awachie (1975) who reported that over 70% of the fish species sold in the local market at Otuocha are 'cultured' in about 52 perennial ponds lakes scattered in the basin. Other aspects of the fisheries, particularly the biology of the component species, have been studied (Awachie *et al.,* 1977; Ilozumba, 1980 and Ezenwaji, 1982). *A. baremoze* and *Citharinus citharus* are commercially important fresh water fishes. Both fishes are very abundant from June to December in the Anambra river basin. During this period, these fishes constituent a significant part of the fish diet of the local inhabitants. In this way, they provide a source of animal protein.

However, when smoke-dried. *C. citharus* is highly cherished and palatable fish bit its numerous fine bones prelude women wishing to grind them to fine powder and then use as food condiment. *C. citharus* is a cultural species but is not hardly and extreme care is, therefore needed in its culture. *A. baremoze* has not been cultured in Nigeria. During the period of abundance of *C. citharus* and *A. baremoze*, the fisheries earn substantial income. Okpala (1985) reported that fisherman engaged in cast not fishing in which *C. citharus* and. *A. baremoze* are caught. Report of sales from fishers showed

monthly earnings of between ₦6, 360: 00 - ₦20, 720: 00. In spite of the large amount of these and other fishes caught on the inland waters of Nigeria, fish supply is still lagging behind demand (Olayide and Akinwumi, 1980). In order to meet this demand, fishermen harvest all sizes of fish without regard to the sustenance of the fishery. Fish can only be harvested at the maximum sustainable yield (MSY) when all the biological parameters are known.

Of prime importance to the fishery industry are length-weight relationship and condition which help to predict the best length and time suited to harvest a particular species of fish.

This study is, therefore, an attempt to provide information on the length-weight relationship and condition of *C. citharinus* and *A. baremoze.*

MATERIALS AND METHODS

Study Area: The sample was carried out at Anambra river basin, Otuocha, a major fish landing port in the state. The fishes were from canoe men and sometimes from market women at Otuocha. Thirty (30) specimens of *Alestes baremoze* and thirty (30) specimens of *Citharinus citharus* of various sizes were randomly sampled between September 2007 to March 2008. The identification keys of the recent systematic version of *Alestes baremoze and Citharinus citharus* (Teugels *el al.,* 1992) was used for identification of both species.

Table 1: Size ranges of *Alestes baremoze* and *Citharinus citharus* from Anambra River Basin

Parameters	Number of fish examined	Maximum	Minimum	Mean	SD	SE
Alestes baremoze						
Standard length	30	22.7	12.2	16.0385	2.4828	0.6886
Body weight	30	120	25	50.2308	23.8193	6.6063
Citharinus citharus						
Standard length	30	15.9	7.2	12.9455	2.1429	0.4569
Body weight	30	105	15	62.6818	24.0166	5.1204

Table 2: Length-weight relationships and regression between *Alestes baremoze* and *Citharinus citharus* from Anambra River

Species	Number	Measurements	A	b	R	E
A. baremoze	30	W = -76.25 99-10.7329	0.0347	2.6037	0.964	<0.001
C. citharus	30	W =-98.961- 9.3021	0.1361	2.3716	0.9115	<0.001

Table 3: The mean relative and Fulton's condition for *Alestes baremoze* and *Citharinus citharus* from Anambra River

Species	Number	Maximum kn	Minimum Kn	Mean Kn	SD	SE
Males						
A. baremoze	30	1.2065	0.8303	1.0047	0.0993	0.0275
C. citharus	30	1.145	0.8815	1.0027	0.0757	0.0161
Females						
A. baremoze	30	1.4238	0.9772	1.1407	0.132	0.0366
C. citharus	30	4.0188	2.24	2.7575	0.3254	0.694

Total length (TL) and standard length (SL) of each freshly caught fish were measured to the nearest millimetre using a standard fish measuring rule. A triple beam balance was used to measure the fresh weight (w) of all fishes and to the nearest 0.10 gram. The sex of each fish was determined by examining the genital papilla which is pointed in males and short in females. In small fishes, where the sexes could not be externally identified were dissected to examine the reproductive organs in order to confirm the sex. Fulton condition factor (K) was calculated using the cube law, $K = W \times 100 / L^3$, Where K = condition factor, W = fresh weight of fish in grams and L = standard length of fish in cm.

RESULTS

The length and weight ranges of the 30 *Alestes baremoze* and 30 *Citharinus citharus* examined in this study are shown in Table 1. The length frequency distribution of *A. baremoze* and *C. citharus* respectively shows that there is only one peak each, at 15 cm standard length for *A. baremoze* and at 12 and 13 cm for *C. citharus*. The length–weight relationships of A*. baremoze* and *C. citharus* are shown in Table 2. There was high significant relationships between the body weight and standard lengths of *C. citharus* and *A. baremoze* (P<0.001). *Citharinus citharus* was more robust than *A. baremoze* because the Fulton's condition factor

2.7575 was higher than that of *A. baremoze* (Table 3).

DISCUSSION

The heavier mean body weight of *Citharinus citharus* and longer mean length of *A. baremoze* showed that *C. citharus* are more robust than *A. baremoze*. In this study, most of the *C. citharus* and *A. baremoze* used were recruited into the fishery during the raining season and so were in their first year of life. Thus, there was only one peak in the length frequency distribution of each of the species. The mean length of *C. citharus* during the first year was 12.9455 cm. This is close to the mean length (13.58 cm) of *C. citharus* in their first year in Senegal River. Similar fast growth in length in the first year has been recorded in other species of fish, Bruton (1979) in *Clarias gariepinus*; Bruton and Allanson (1974) in *Tilapia mossambica*; and Welcome (1979) in *C. citharus*.

The highly significant relationships between the body weight and standard lengths of *C. citharus* and *A. baremoze* indicated that the body weight of the species could be estimated with a fairly high degree of accuracy (P < 0.001) from known standard lengths. The exponents, 2.6037 and 2.3716 for *A. baremoze* and *C. citharus* respectively indicated that growth is allometric, and so *C. citharus* and *A. baremoze* are among the majority of fishes in which,

according to the LeCren (1951) obedience to the cube law (isometric growth) was rare. In spite of the importance of length-weight relationship in growth studies. Oni *et al.* (1983) have pointed out that the condition factors is a better indicator of growth and physiological 'well being' of a fish species, was better in *C. citharus* than in *A. baremoze*, indicating that the former was more robust than the latter. Other studied robust fish with high K values are *T. zilli* (Oni *et al.*, 1983), *Oreochromis niloticus, T. zilli* and *Heterotis niloticus* (Thomas, 1966). The two fishes were in relatively good condition because they were caught at the period when feeding was intense and the gonads well elaborated. Ezenwaji (1982; 2004) had shown that *Clarias* species of the Anambra river basin develop their gonads in preparation for the next spawning season during this period. Thus, the condition factor, K, is a useful index in monitoring food supply, breeding season, growth, physiological state, relative robustness and the general 'well being' of intra and inter populations.

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