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Condition Factor of Tilapia Species in Ebonyi River, Southeastern Nigeria

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Abstract

Study on the condition factor for four species of Tilapia, *Tilapia zilli*, *Oreochromis niloticus*, *Oreochromis mossabicus* and *Oreochromis aureus* from Ebonyi River was conducted between (January - June, 2011) using mathematical and statistical analysis. Overall mean condition factor (K) value for *T. zilli* was 2.1. The highest K and lowest K values were 5.0 and 0.2 respectively. Overall mean K value for *O. niloticus* was 1.9 with highest and lowest K values as 4.5 and 0.2 respectively. Overall mean K value of *O. aureus* was 2.0. Highest K value was 4.8 while lowest K value obtained was 0.8. Overall mean K value for *O. mossabicus* was 1.9. Highest K value was 4.6 while lowest K value obtained was 0.5. The mean K values recorded for males from the four species were higher than the females indicating that males were in a better state of wellbeing than the females. From the result, the general observation of the condition of the fishes was the sampled fishes were in good condition and sustainable management should not be neglected.

1. Introduction

Tilapia is both a genus of fishes in the cichlid family and the common name for nearly up to 100 species of freshwater and some brackish water cichlid fishes belonging to the three genera (Chapman, 1992). Tilapia cichlid inhabits the fresh water and brackish waters of much of Africa and Middle East. True tilapias however are native only to African and Middle Middle East. Tilapias are fish that are surrounded by fascinating facts (Baker, 1998). They have played an important role in the past and continue to play an important role these days in increasing food supply at affordable prices (Baker, 1998). Tilapia inhabits a variety of fresh and less commonly brackish water habitats, from shallow streams and ponds through the rivers, lakes and estuaries. Tilapias are hardy species produced by several culture methods under a wide range of environmental condition (Getahun, 2003). Tilapias are known to be produced in many countries, but most production is made in tropical and subtropical region in developing countries. Tilapias are also important in local and export markets as well as food fish by rural farmers (Appler, 1985). Historically, they have been of major importance in artisan fishing in Africa and the relevant and are of increasing importance in aquaculture. Tilapia can become problematic invasive species in new warm water habitat, whether deliberately or accidentally introduced. Tilapia is the fifth most important fish in fish farming, with production reaching 1505, 804 metric tonnes in 2000. This is because of their large size rapid growth and palatability (Chapman, 1992). Therefore this study seeks to provide information on the condition factor of four Tilapia fishes for sustainable management of this cichlid fishery.

2. Materials and Methods

2.1. Study Area

This study was conducted in Ebonyi River, a tropical river Izzi Local Government Area, Ebonyi state, Southeastern Nigeria (Fig. 1). The vegetation of the river compares mainly tall trees, bamboo plants, palm trees and elephant grasses. The bottom of the river is of fine sand and the surface is colonized randomly by water weeds which form protective covers for the water organisms. The river is subjected to the annual flooding from April to October (rainy season) during which most of the area is flooded. During the flood, when the level of water becomes increasingly high, active farming becomes increasingly intensified. However, towards the end of the flooding regime, the above cycle alternates with the resumption of fishing activities which get to the peak during the dry season.

2.2. Sample and Data Collection

A total number of 320 fresh Tilapia fishes with standard

length ranging from 6cm to 10cm were purchased from Ebonyi River fish landing site. The fishes were serially numbered the total length (TL) was taken from the tip of the head to the tip of the tail respectively using a meter rule calibrated in centimeter. Their corresponding body weights were also measured with table top weight balances to the nearest gram. Specimens were stored in coolers containing ice and were transported to the laboratory of the department of Applied Biology, Ebonyi State University, Abakaliki, Nigeria for further analysis.

2.3. Data Analysis

The mean length and weights of the classes were used for data analysis the condition factor (K) of the experimental fish was estimated from the relationship.

$$K=100W/L^3$$

Where K=Condition factor
 W=Total weight (g) of fish
 L=Total length (cm) of fish

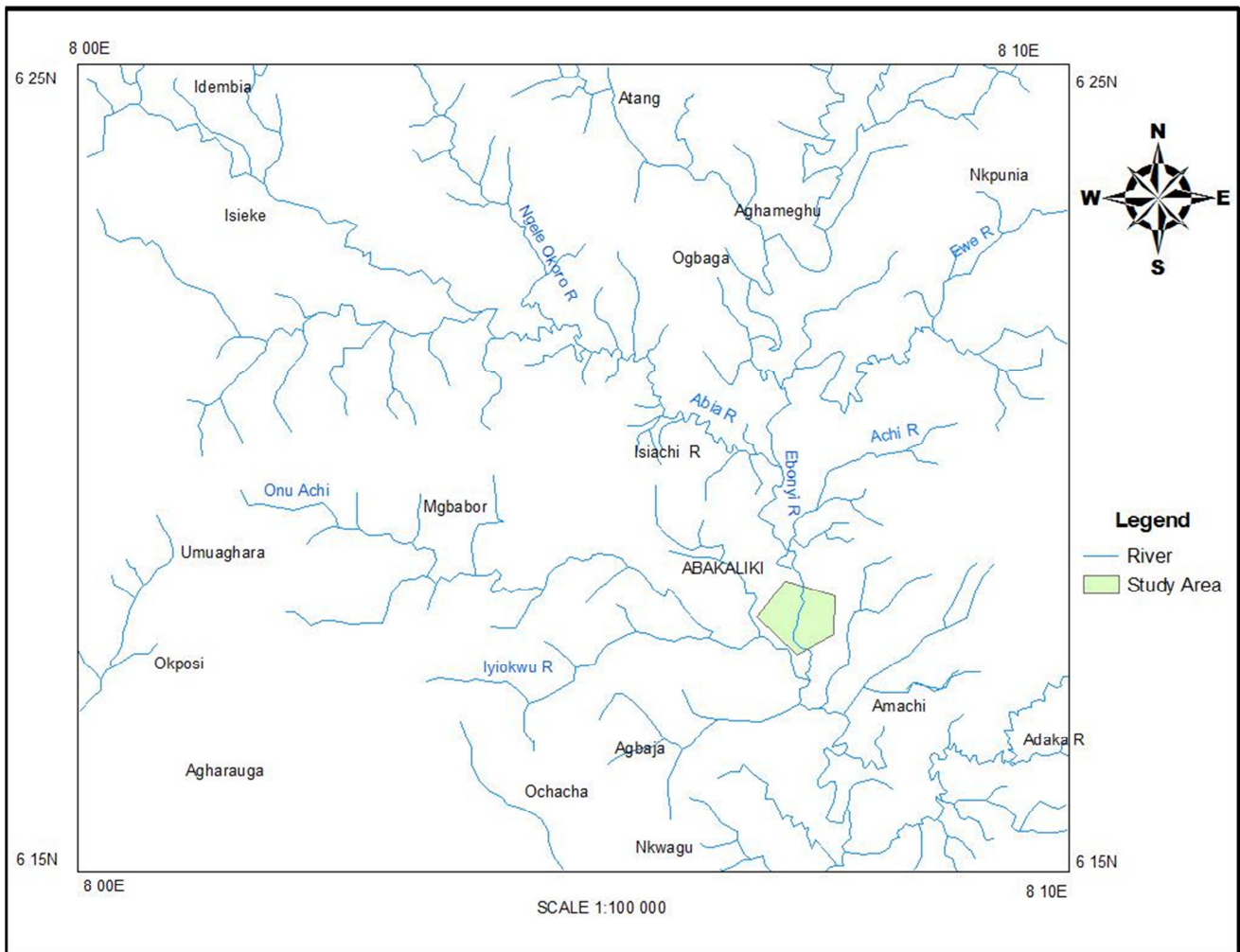


Fig 1. Map of Ebonyi river showing study area.

3. Results

The overall monthly condition factor values in the respective abundance of the *Tilapia zilli*, *Oreochromis niloticus*, *Oreochromis mossabicus* and *Oreochromis aureus* in Ebonyi River showed that the highest K value (5.0) was in the month of June in *T. zilli* while the lowest K (0.2) value occurred in January, March and April in *O. aureus*, *T. zilli* and

O. niloticus (Table 1). Condition factor values in relation to the sex of the four species of *Tilapia* revealed that male samples had highest K value of 5.0 and lowest K value of 0.4 while the mean K values were 2.4, 2.2, 2.1 and 2.2 for *T. zilli*, *O. niloticus*, *O. aureus* and *O. mossabicus* respectively. Female samples had highest K value of 3.5 and lowest K value of 0.2 while the mean K values were 1.7, 1.6, 1.6 and 1.7 for *T. zilli*, *O. niloticus*, *O. aureus* and *O. mossabicus* respectively (Table 2).

Table 1. Monthly condition factor of the four *Tilapia* species.

Months/Species	<i>T. zilli</i>			<i>O. niloticus</i>			<i>O. mossabicus</i>			<i>O. aureus</i>		
	Hv	Lv	Mv	Hv	Lv	Mv	Hv	Lv	Mv	Hv	Lv	Mv
January 2011	2.5	0.5	1.6	2.6	0.6	1.4	2.6	0.6	1.4	2.7	0.2	1.5
February 2011	3.0	0.4	1.8	2.8	0.6	2.0	2.9	0.4	1.5	3.0	0.3	2.1
March 2011	3.5	0.2	1.5	3.2	0.5	1.8	3.0	0.5	1.8	2.9	0.4	1.8
April 2011	3.7	0.4	1.7	3.2	0.2	1.6	3.0	0.4	2.0	3.0	0.6	2.0
May 2011	4.0	1.0	2.2	3.9	0.5	1.9	3.5	0.9	1.7	4.0	1.2	2.6
June 2011	5.0	0.6	2.3	4.5	0.6	2.7	4.8	0.6	2.3	4.6	0.6	2.5
Overall K value	5.0	0.2	2.1	4.5	0.2	1.9	4.8	0.4	1.9	4.6	0.2	2.0

Hv = Highest value

Lv = Lowest value

Mv = Mean value

Table 2. Condition factor value in relation to the sex of the four species of *Tilapia*.

Species/Sex	Sample size	Male			Female		
		Hv	Lv	Mv	Hv	Lv	Mv
<i>T. zilli</i>	80	5.0	0.4	2.4	3.5	0.2	1.7
<i>O. niloticus</i>	80	4.5	0.8	2.2	3.2	0.2	1.6
<i>O. mossabicus</i>	80	4.6	0.5	2.1	3.0	0.2	1.6
<i>O. aureus</i>	80	4.8	0.8	2.2	3.5	0.4	1.7

Hv = Highest value

Lv = Lowest value

Mv = Mean value

4. Discussion

A total of three hundred and twenty (320) tilapia species that composed of eighty (80) each of *Tilapia zilli*, *Oreochromis niloticus*, *O. aureus* and *O. mossabicus* which are in the family of cichlid were collected during the study period (January -June, 2011). Monthly mean K values of all the four species indicate that these populations in Ebonyi River were in good condition as K value was greater than 1. Condition factor values in relation to the sex of the four species of *Tilapia* indicated that males had higher condition factor values than females; thus male samples were in a better state of wellbeing than the females which is in agreement with the findings of Mahomound *et al.* (2011). With respect to highest and lowest k values among these species populations, lowest values revealed K as being below one, indicating poor condition of some samples within the populations. The result obtained on *O. niloticus*, is below K values recorded from the works of Haruna and Bala (2006). It is above the result obtain in the work of Olurin and Adeighe (2006) although it is below

that of Bagenal and Tesch (1978) which indicated a range of 2.9-4.8 as the ideal range of K value for the normal growth and utilization of nutrients by a normal fresh water fish. *T. zilli* showed a relatively more improved performance in terms of growth in which maximum K value of 5.0 but it is comparatively lower than the K value obtained from the studies of Haruna and Bala (2006). The K value comfortably fall within the ideal set of Bagenal and Tesch (1978) and Uneke (2013) but the result of *T. zilli* was lower than that of Anene (2005). *O. mossabicus* K values fell barely within the range obtained in the work of Haruna and Bala (2006). The maximum K factor of *O. mossabicus* and *O. aureus* in the current study was within the range recommended by Bagenal and Tesch (1978). In this study efficient sampling was carried out to include the widest possible range of lengths, which are generally obtained using non-selective fishing techniques the variation in specimens to fully sample matured specimens. In conclusion, mean K values recorded in this study indicate four thriving cichlid populations in good condition in which their sustainable management should not be neglected.

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