

LENGTH-WEIGHT RELATIONSHIP AND CONDITION OF *Sarotherodon galilaeus* FROM RIVER BENUE, YOLA, ADAMAWA STATE, NIGERIA

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ABSTRACT

Sarotherodon galilaeus formally known as *Tilapia galilaeus* were obtained from River Benue on monthly basis over a period of 12 months. Fish were caught using cast net, set net and drag net. The lengths and weight of the samples were measured using a meter rule and a weighing balance respectively. The mean length of all the fish sampled was 7.62 ± 1.71 . The mean length for males was found to be 7.93 ± 1.75 while that of the female, 7.30 ± 1.63 . The results also revealed that the mean weight of all the fish sampled was 37.80 ± 17.36 . The mean weight of the male was 35.42 ± 16.85 g while that of the female, 40.17 ± 17.86 g. The correlation coefficient for males was 0.9633 while that of the female, 0.8982. The correlation coefficient for both male and female were highly significant ($P < 0.05$). The fish were in a relatively stable condition. With these sizes and good condition factor exhibited by this fish in the wild, it shows that the fish could grow to sizes better than this if put into culture condition.

Key Words: Length- weight relationship, condition, *Sarotherodon galilaeus*, River Benue

INTRODUCTION

Inland waters in West Africa contain more than 200 species of fish (Holden and Reed, 1972). The inland waters include Niger, Volta, Senegal, Benue and many others. Besides, there are innumerable small tributaries and streams. Nigeria has well over 150 different species in which 50 are regarded as being commercially important (Holden & Reed 1972). Dankishiya (1991) observed that *Tilapia zilli*, *Sarotherodon galilaeus*, *Oreochromis niloticus* and *Clarias ganiepinus* are common species found in Lake Geriyo and river benue. Many scientists have studied aspects of the biology of tilapia species, like food and feeding habits. Age, growth, length-weight relationship, condition factors and gonad development in different water bodies, {Ufodike (1986) Botros (1970). Fryer and iles, (1972), Akintunde (1975), Okekere (1982), Ofojekwu and Ejike, (1992), Ugwumba (1990), Abubakar (1996), Ja'afaru (2001) Abubakar and Edward (2002), Abubakar and Emmanuel

(2001) and Abubakar and Ishaya (2000)}. This work deals with the length-weight relationship and condition of *Sarotherodon galilaeus* in River Benue. The results will provide base line information for the management of this resource.

Material and Methods

Study Area

Adamawa State is located at the North Eastern part of Nigeria. It lies between latitude 7° and 11° N of the equator and between longitude 11° and 14° E of the Greenwich Meridian. River Benue rises from the highlands of Cameroon and flows southwards through Wurobokki, Njoboliyo, Yola and Numan to join Niger River at Lokoja (Adebayo and Tukur 1999) (Figure 1)

Sample of *Sarotherodon galilaeus* were caught from River Benue on monthly basis using various gears like set net, drag net and cast net and brought to the laboratory in a plastic container. Each fish was labeled using a masking tape for cross-

reference. A weighing balance (Sartorius, 1219Mp) was used in weighing the fish. The standard length was measured from beginning of the snout to the beginning of the tail while the total length was measured from the beginning of the snout to the end of the tail using a meter rule.

The condition factor was calculated using the formula:

$$K = \frac{w \times 100}{L^3}$$

Where K = condition factor, W = weight in grams and L = standard length in cm.



Fig 1 Map of Adamawa State showing sampling sites

RESULTS

The range of standard length of the fish samples was 4.80cm_ 13.56cm. with the mean of 7.62 ± 1.70 . The range of the standard length for males was 6.30cm – 13.56cm with the mean of $7.93 \text{ cm} \pm 1.75$. That of the female ranged from 4.80cm – 9.80cm with the mean of $7.3 \text{ cm} \pm 1.63$. The weight range of the fish sampled was 4.63-94.0 with the mean of $37.80 \text{ g} \pm 17.36$. The weight range of the males was 4.63g – 86.20g with the mean of $35.42 \text{ g} \pm 16.85$ while that of the female varied from 6.34g – 94.0g with mean weight of $40.17 \text{ g} \pm 1.7.86$. The length – weight relationship of *S. galilaeus* male in River Benue is shown in Figure 2 while that of the female is shown in figure 3. The correlation coefficient for male was 0.9633 (Figure 2), while that of the female was 0.8982 (Figure 3). The mean monthly condition factor for *S. galilaeus* in River Benue is shown in Table 1. There was a slight decrease in the mean condition factor in the months of May – August while September – April showed high values.

DISCUSSION

The result shows that the male fish were bigger than the female ones. There was no significant different ($P > 0.05$) between the sizes of male and female *S. galilaeus* in River Benue. This result agrees with Holden and Reed (1972) who worked on *Tilapia species* where males were larger than the females. The result also agrees with Abubakar and Ishaya (2000) who worked on *Oreochromis niloticus* in Lake Geriyo. Abubakar (1996) and Abubakar and Emmanuel (2001) found that there was no significant difference ($P > 0.05$) between the size of the male and female *Oreochromis niloticus* in River Kaduna and *Tilapia zillii* in Lake Geriyo respectively. This could be due to the fact that energy that would have been meant for growth is spent in egg production in females, hence the smaller sizes. This

results contrast with that of Fagade (1979) on *Tilapia guineensis* and Fagade and Balogun (1986) on *Lates niloticus* in Lekki Lagoon where female fish were larger than the males. The length- weight relationship of males and females *Sarotherodon galilaeus* showed correlation values of 0.9633 and 0.8982 respectively which were highly significant ($P < 0.05$). The result showed a linear relationship between length and weight meaning that the longer the fish the heavier it is. The results agree with that of Fagade and Olaniyan (1972) Botros (1970) Abubakar (1996), Ayuba (1997) Abubakar and Ishaya (2000) and Abubakar and Edward (2002) who worked on various *Tilapia species* and found that the weight of fish increases with length. The mean monthly condition factor showed that fish were in a relatively stable condition. There was an increase in condition factor in the dry season. This could be attributed to the fact that the water is clear during this period and more light penetrates the water and photosynthetic plants flourish. The productivity of the river is therefore enhanced thus increasing the condition factor of the fish. This results contrast that of Abubakar (1996) who found a decrease in condition factor in the dry months in *O. niloticus* in River Kaduna. Olatunde (1983) also noted that there was a fall in condition factor of *Clarias lazera* in Zaria in the dry season. Fagade and Olaniyan (1972) found high condition factor between January and May in *Ethmalosa fimbriata* in Lagos lagoon.

CONCLUSION

The results obtained from this study has revealed the size distribution, correlation coefficient and condition factor in relation to sex of *Sarotherodon galilaeus* from River Benue. The data generated has provided base line information for the management of this resource.

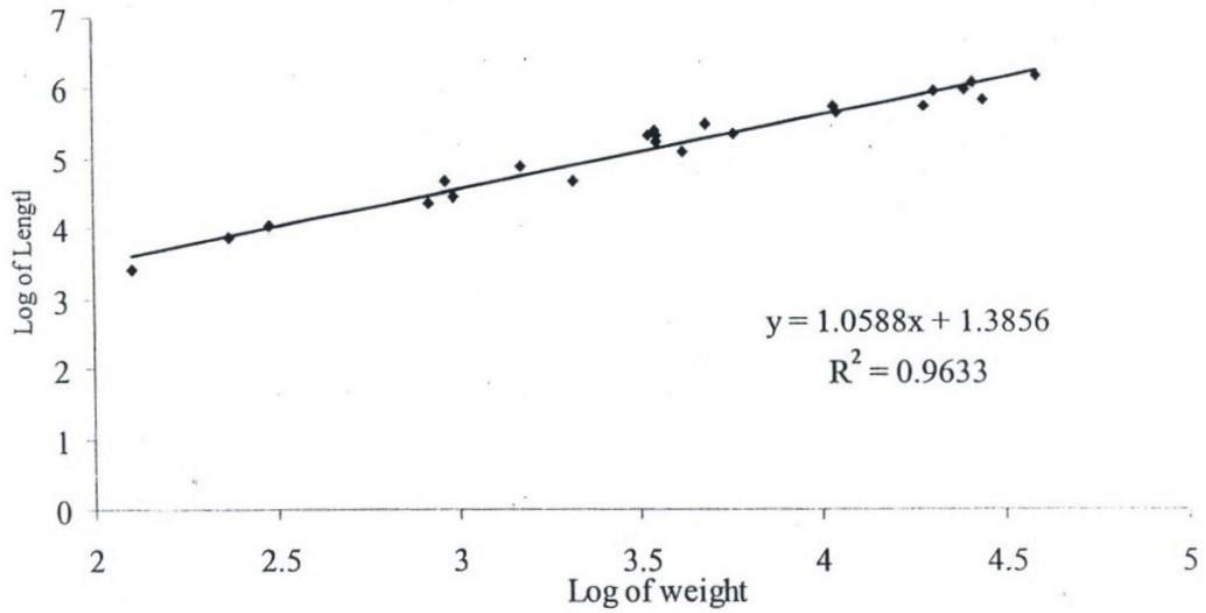


Figure 2. Length-weight relationship of male *Sarotherodon galilaeus* in River Benue

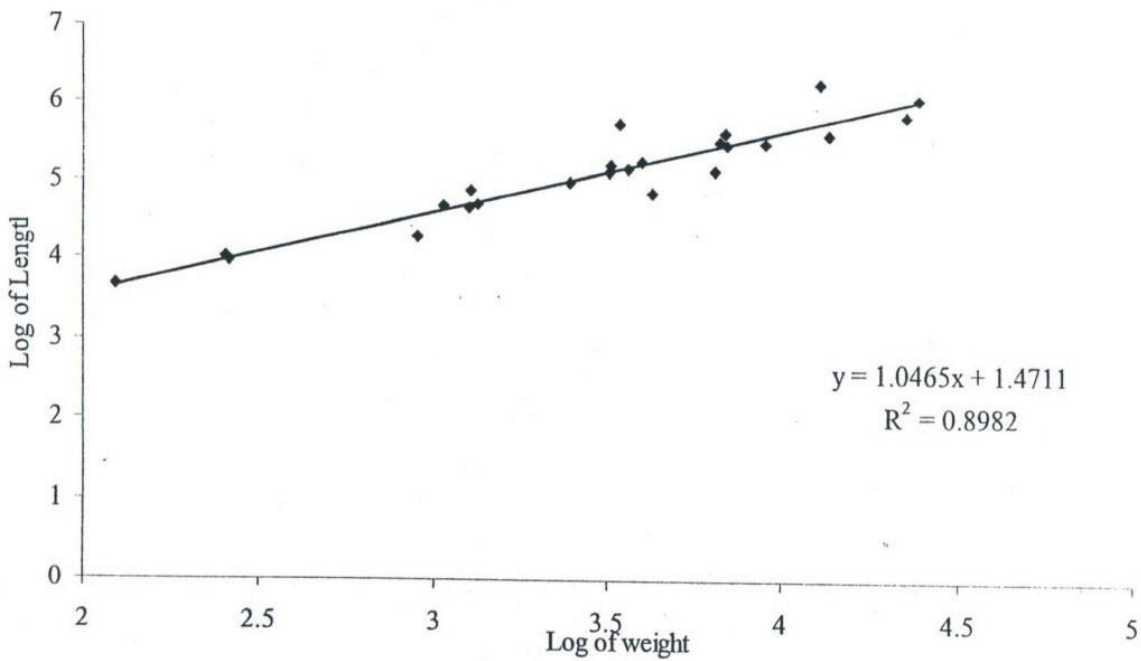


Figure 3. Length-weight relationship of female *Sarotherodon galilaeus* in River Benue

Table 1: Mean monthly condition factor for *Sarotherodon galilaeus* in River Benue

Fish species	<i>S. galilaeus</i>	
Month of the year		mean condition factor S.D.
June	2.36	± 0.26
July	2.93	± 0.83
August	2.75	± 0.43
September	3.13	± 0.38
October	3.88	± 0.46
November	3.56	± 1.23
December	3.12	± 1.85
January	3.68	± 1.84
February	3.18	± 1.26
March	3.33	± 1.43
April	3.18	± 1.48
May	2.72	± 0.29

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