

ASSESSMENT OF LENGTH-WEIGHT RELATIONSHIP OF *Oreochromis niloticus* (Nile Tilapia, Cichlidae, LINNAEUS 1758) FROM QUA IBOE RIVER ESTUARY, SOUTHEASTERN NIGERIA

Abstract

Length-Weight Relationship (LWR) of *Oreochromis niloticus* from Qua Iboe River estuary was studied for a period of 12 months: April 2021-March 2022. Fish samples of the species were collected from the catches of artisanal fisheries using various mesh sizes of gill and cast nets. The b values in males ranged from 2.25-3.08 with a mean of 2.7333 ± 0.2743 while that of the females varied between 2.41 and 2.930 with a mean value of 2.7075 ± 0.1804 . The overall growth coefficient in the LWR ($W = aL^b$) ranged from 2.25-3.08 with a mean value of 2.72 ± 0.04 . Both male and female recorded negative allometric growth and the exponents were significantly less than Isometric ($p < 0.05$). Higher b values were recorded in males. There was no significant difference between the b -values of males and females ($p > 0.05$) during this study with the respective exponential relationships. These data indicated that the length-weight relationships were similar in both sexes during the period of study. Higher b -value was recorded in the wet season but there was no significant difference ($p > 0.05$) between the dry (November-March) and wet season (April - October). This study provides the basic information which could enhance production potential of *O. niloticus* and its sustainable development, culture and management in Qua Iboe River Estuary, Nigeria.

Keywords: *Oreochromis niloticus* (Nile Tilapia) Length-weight relationship Qua Iboe River Estuary.

1. INTRODUCTION

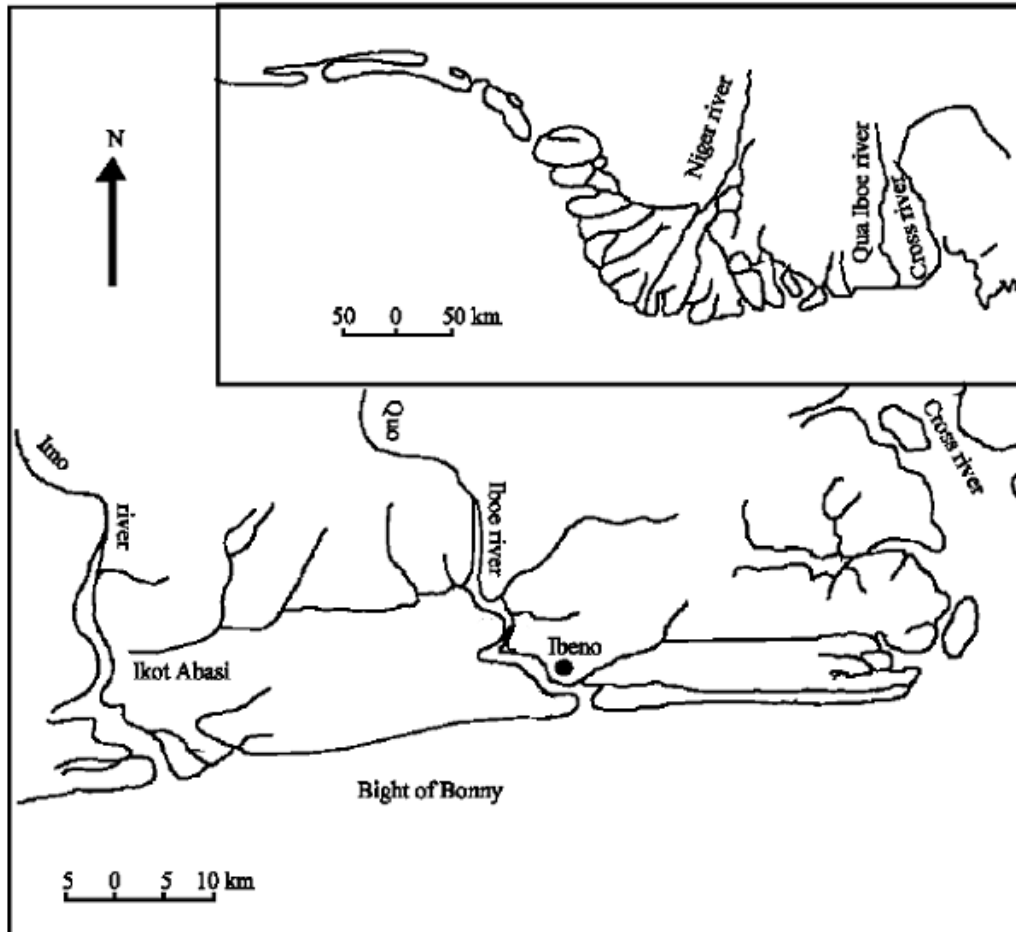
An aspect of fish biology such as Length-weight relationship is important in studying fish biology. Length-weight relationship can be used to predict weight from length measurements made in their yield assessment (Pauly 1993, Nehemia 2012). The relationship between the length and weight may part from cube law value 3 depending on the ecological and physiological condition which may affect their niche.

Fish can either attain Isometric growth, negative allometric growth or positive allometric growth. Isometric growth is when $b = 3$ meaning that the fish is in a stable condition and it associate with no change in body shape as the fish grows. Negative allometric growth indicates that the fish becomes more slender as it increase in weight and finally the position allometric growth implies that the fish become relatively deeper-bodied as it increases in length (Riedel et al 2007).

The study of length-weight relationship of Nile Tilapia (*Oreochromis niloticus*) family (Cichlidae, Linnaeus 1758) is having a crucial importance to fisheries biologist as it serves many purposes. It establishes the mathematics relationship between two variables; length and weight so that the unknown variable can be calculated from the known to solve practical fisheries problem. The relative condition can be estimated to assess the general wellbeing of the fish. Finally, it is used in the estimation of potential yield per recruit in the study of population dynamics (Karal et al 2013).

Tilapias are plastic animal because their growth and maximum obtainable size can be seriously influenced by the physical and biological composition of their environment. Olurin and Aderibigbe, 2006 stated that length and weight of the fish is important yardstick used for the purpose of fish stock assessment in fishery management. Thus, the objective of this study is to determine monthly and seasonal variations in the growth pattern of male and female *Oreochromis niloticus* obtained from Qua Iboe River Estuary in Ibeno Local Government Area, AkwaIbom State Nigeria during April 2021-March 2022 using length weight relationship.

2. MATERIALS AND METHODS



Map1 : Map showing study location

Study Area: This study was carried out at Qua Iboe River Estuary Ibeno Local Government Area, AkwaIbom State Nigeria. Ibeno is located in the Southeastern part of Nigeria ($4^{\circ}.49\ 02.88\text{N}; 7^{\circ}56\ 61.09\text{E}$). It is one of the three major hydrographic feature in AkwaIbom State, it is located in the tropical belt with an equatorial climate regime characterized by dry season (November-March) and wet season (April – October).

The vegetation of the mangrove swamp comprises of the red mangroves (*Rhizophoraharrisonii* (check spelling) *R. Mangle* and *R. racemosa*), white mangroves (*Avicema*

Africana) sand black mangroves (*Lagunculariaracemosa*) and *Nypafruticans* (Karal Marx *et al* 2013).

Fish sampling collection,preservation and measurement

Fish sampling and collection: Specimen collection was done with the help of local fishermen using traditional fishing tools such as hook and line, traps, basket and gillnets from April 2021 March 2022 and was preserved in a container containing 10% formalin solution. Each specimen was measured to the nearest 0.1cm total length (TL) using a measuring board and total weight (TW) was taken to the nearest 0.1g using a top loading mettle PR-series model 2202/E electronic balance PR-series model PR-2202/E OHAUS.

Determination of Length-Weight Relationship

The length-weight (L-W) relationships were computed using empirical allometric equation of the form (Lagler, Bardach, Miller and Passion, 1977; *Tyler and Gallucci, 1980 (not found)*; Dulcic, and Kraijevic, 1996; Ecoutin and Albaret, 2003).

$$W_t = a(TL)^b \dots\dots\dots 1$$

Where W_t = Total weight of fish (g)

TL = Total length of fish (cm)

a = proportionality constant, and

b = Regression exponent

The values of a and b were estimated by least square linear regression using double log transformed weight and length data according to the formula (Khaironizam and Norma-Rashidi, 2002 **check up with references**) below

$$\text{Log wt} = \text{Log } a \pm b \log \text{TL} \dots\dots\dots 2$$

Where: Wt is total weight of fish (g)

TL is total length (cm), a is the intercept on the Y-axis and b is exponent or slope indicating isometric growth when $b= 3$ (Pauly, 1984). Values other than 3 indicate allometric growth. If $b > 3$, its positive allometric and the fish becomes heavier for its length as it grows larger. If $b < 3$, its negative allometric and the fish becomes lighter and thin for its length as it grows larger. The length-weight relationship were tested using linear regression model significant level **($p < 0.05$)** and the confidence limit for the regression coefficient interval.

The exponent (b) of the length-weight relationship were tested for departure from Isometry ($b = 3$) i.e whether b values differ from 3 significantly, using a t-statistic function given in Pauly (1984). The degree of association between the length and weight were expressed by a correlation coefficient “r”. The correlation coefficient could take values ranging between -1 and ± 1 .

When “r” is negative, it means that one variable tends to decrease as the other increases. There is a negative correlation which corresponds to a negative value of “b” in regression analysis. On the other hand, when “r” is positive, it means that one variable increases as the other, which corresponds to a positive value of b in regression analysis (Pauly, 1983). The parameters of this relationship were computed for each sex, months, and season.

Statistical Analysis

Student's t-test (Snedecor and Cochran, 1980 not found) was used to test the means of biological data between dry and wet seasons, male and female. Length-weight data a pair, correlation coefficient (r) was used to examine the strength of the association in length-weight data pairs (Beyer, 1978; Pauly, 1987; Haruna, 2006; Udo *et al.*, 2008). To meet the requirement for normality in parametric statistics, logarithmic transformation were performed on the length-weight data pairs following the methods of Gregory (1974); Ukpong (1995); Nyaku, Okayi, Yem, and Abdulrahman (2008) and Udofia (2011). The Microsoft Excel was employed for the graphical presentation of data. Statistical analyses were performed using Statistical Package for Social Sciences (SPSS, version 19.0) for window, Paleontological Statistical Software, PAST, version 20.0. Data analyzed were presented in summary format in tables, graphs and histograms for easy interpretation of data analyzed.

3. RESULTS

GROWTH OF *O. NILOTICUS* FROM QUA IBOE RIVER

Length-Weight Relationship (LWR)

Tale 1. Variation in LW Parameters of *O. niloticus* for Qua Iboe River estuary (Justify)

		N	M e a n	Std. Deviation	Std. Error	Minimum	Maximum	
N	M a l e	1	2	57.41667	9.317221	2.689650	47.000	76.000
	F e m a l e	1	2	48.16667	7.383438	2.131415	33.000	61.000
	T o t a l	2	4	52.79167	9.482153	1.935536	33.000	76.000
a	M a l e	1	2	.06283167	.042047834	.012138164	.015590	.140860
	F e m a l e	1	2	.05519250	.043635942	.012596612	.013080	.151380
	T o t a l	2	4	.05901208	.042088630	.008591306	.013080	.151380
b	M a l e	1	2	2.73333	.274270	.079175	2.250	3.080
	F e m a l e	1	2	2.70750	.180359	.052065	2.410	2.930
	T o t a l	2	4	2.72042	.227395	.046417	2.250	3.080
R	M a l e	1	2	.87491750	.093997784	.027134823	.669910	.977510
	F e m a l e	1	2	.90523917	.061986518	.017893966	.804230	.988610
	T o t a l	2	4	.89007833	.079392654	.016205958	.669910	.988610

The intersexual variation in Length-weight parameters of *O. niloticus* is presented in Table 1. The b-values in males ranged from 2.25-3.08 with a mean of 2.7333 ± 0.2743 while that of the females varied between 2.410 and 2.930 (mean = 2.7075 ± 0.1804). Both male and female recorded negative allometric values and the exponents were significantly less than isometric ($P < 0.05$). Higher mean b-value was recorded in males, however, there was no significant difference ($P > 0.05$) between the b-values of males and female during the study with the respective exponential relationships.

$$\text{Male: } TW = 0.06283TL^{2.7333}$$

$$\text{Female: } TW = 0.05519TL^{2.7075}$$

These indicated that the LWRs were similar in both sexes during the period of study.

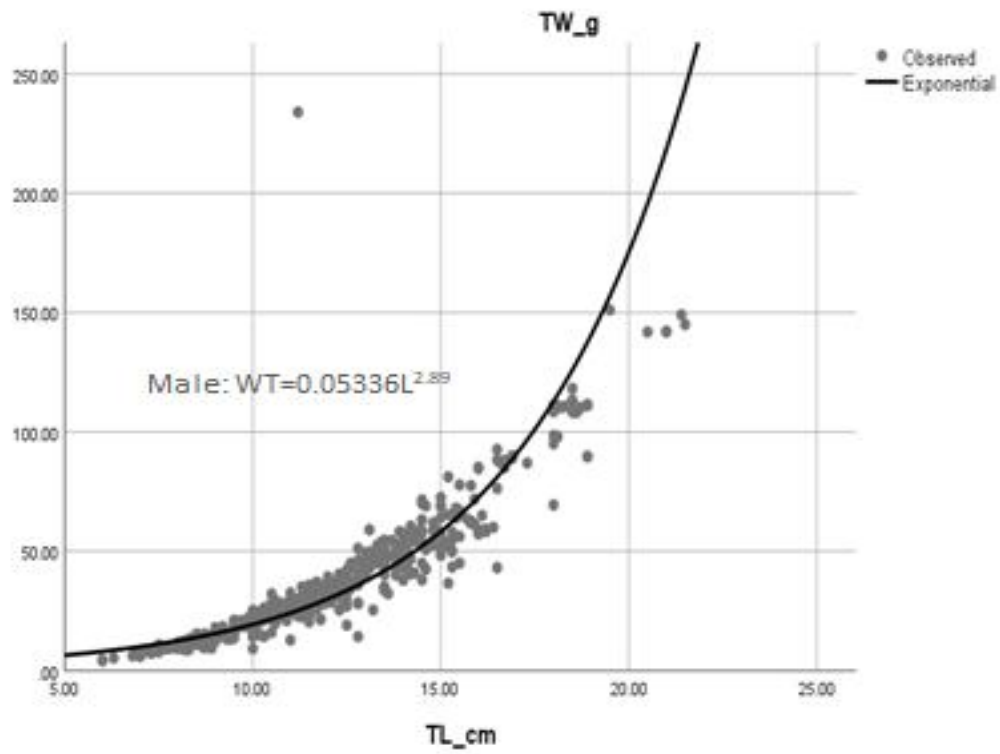


Fig. 1: Length-Weight Relationship of Male *O. niloticus* from Qua Iboe River Estuary

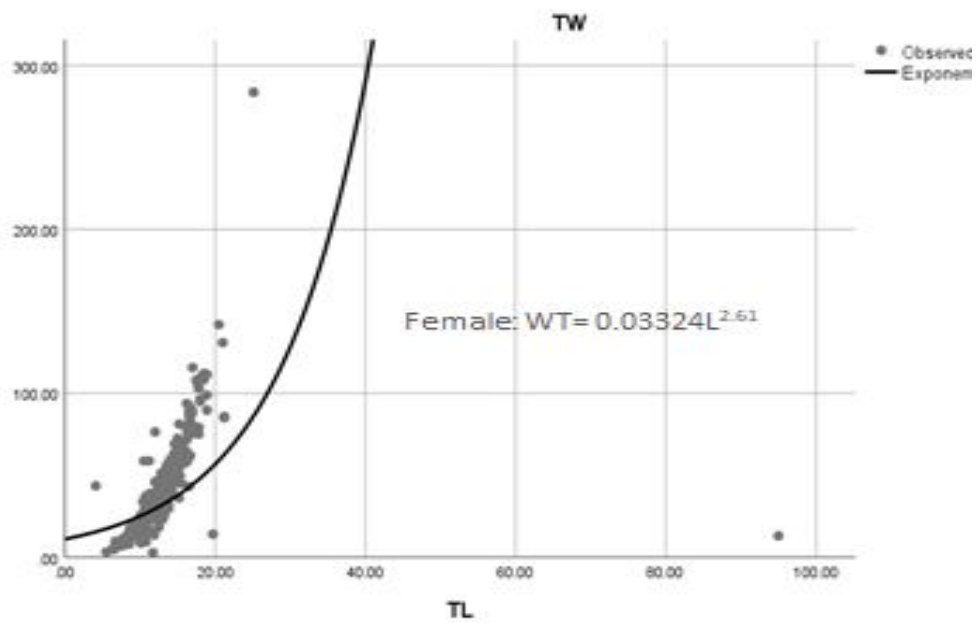


Fig. 2: Intersexual Variation in Length-Weight Relationship of Female *O. niloticus* from Qua Iboe River Estuary

Table 2: Overall Mean Growth Value \pm Standard Deviation, minimum and maximum values of (a intercept, b exponent and R Regression coefficient variables of *O. niloticus*) (Justify)

	Minimum Statistic	Maximum Statistic	S u m Statistic	M e a n Statistic	Std. Error	Std. Deviation Statistic
N	33.000	76.000	1267.000	52.79167	1.935536	9.482153
a	.013080	.151380	1.416290	.05901208	.008591306	.042088630
b	2.250	3.080	65.290	2.72042	.046417	.227395
R	.669910	.988610	21.361880	.89007833	.016205958	.079392654

The b values ranged from 2.25-3.08. The mean value of 2.72 ± 0.04 indicates negative allometric growth. The frequency distribution showed dominance of b-values between 2.80 to 3.00 (Fig 3). There was significant difference ($P > 0.05$) between the b-value obtained here and isometric. This implies that the fish increase in length was not accomplished with increase in body weight resulting in a slim fish.

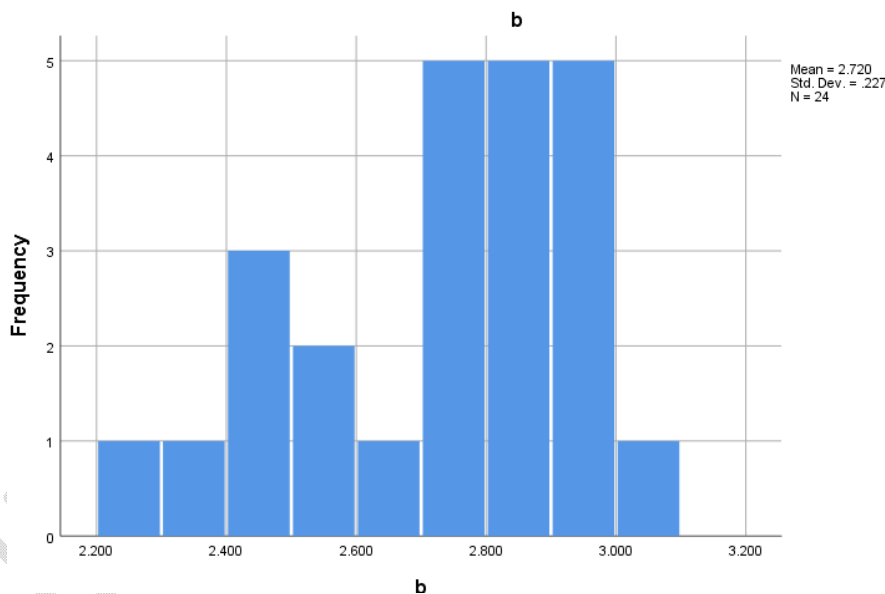


Fig. 3: Length and Weight Frequency Distributions

A plot of total weight (TWg) against total length (TLcm) of pooled specimens of *O. niloticus* during the period of study is shown in Fig. 4. There was a positive correlation between total length and weight with an exponential relationship of the form: $TW = 0.059012TL^{2.7204}$

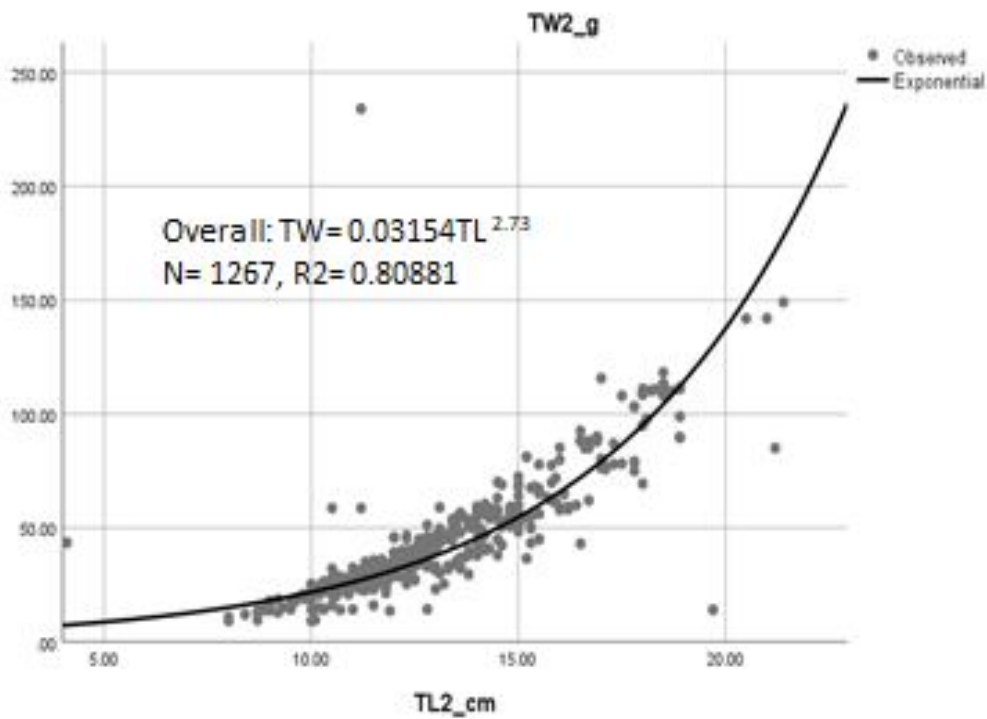


Fig. 4: Length and Weight Frequency Distributions ($TW = 0.059012TL^{2.7204}$)

Seasonal Variation in Length-Weight Parameters of *O. niloticus*

Table 3: Seasonal Variation in Length-Weight Parameters of *O. niloticus* from Qua Iboe River (Justify)

		M e a n	Std. Deviation	Std. Error	Minimum	M a x i m u m
N	wet season	54.21429	12.223424	3.266847	33.000	76.000
	dry season	50.80000	2.529822	.800000	47.000	56.000
	T o t a l	52.79167	9.482153	1.935536	33.000	76.000
a	wet season	.08713643	.032645876	.008724977	.026170	.151380
	dry season	.01963800	.005885341	.001861108	.013080	.028150
	T o t a l	.05901208	.042088630	.008591306	.013080	.151380
b	wet season	2.79286	.188901	.050486	2.410	3.080
	dry season	2.61900	.247002	.078109	2.250	2.950
	T o t a l	2.72042	.227395	.046417	2.250	3.080
R	wet season	.93327071	.049043776	.013107500	.834650	.988610
	dry season	.82960900	.075292841	.023809687	.669910	.918510
	T o t a l	.89007833	.079392654	.016205958	.669910	.988610

During the study, the dry season b values ranged between 2.25 and 2.95 (mean = 2.62 ± 0.24) while the wet season exponents ranged from 2.410-3.080 with a mean value of 2.793 ± 0.18891 . Both seasons recorded negative allometric values as there was a significant departure from isometric. However, higher b-value was recorded in the wet season but there was no significant difference ($P > 0.05$) between the dry and wet season. There was positive relationship between the total weight and total length as shown by the correlation coefficient.

The seasonal exponential relationships can be presented as:

$$\text{Dry season: } TW=0.01964TL^{2.61900}$$

$$\text{Wet season: } TW=0.08714TL^{2.7929}$$

The results indicated that the length-weight data pairs were similar in both season. Plots of total weight (TWg) against total length (TLcm) of pooled specimens of *O. niloticus* in respect to season are shown in Fig. 5a ad b.

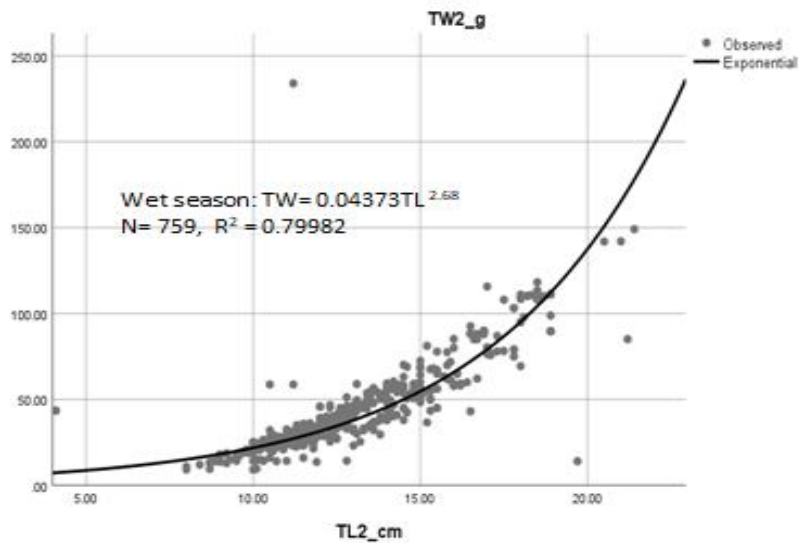


Fig 5a. Wet season graphs of LWR

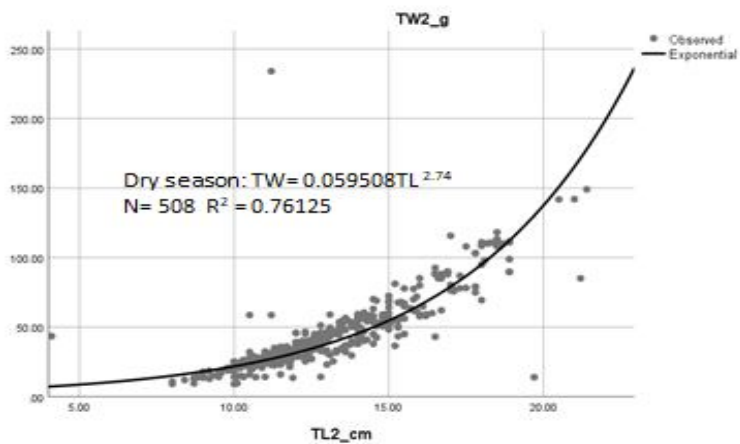


Figure 5b: Dry season graphs of LWR

The monthly variation in mean b-values \pm standard deviation and range of *O. niloticus* is depicted in Table 4.

Table 4: Monthly Variation in Mean b-values \pm Standard Deviation, Minimum and Maximum b Values of *O. niloticus* (Justify)

	N	M e a n	Std. Deviation	Std. Error	Minimum	Maximum
b A p r i l	2	2.57000	. 2 2 6 2 7 4	.160000	2 . 4 1 0	2 . 7 3 0
M a y	2	2.80000	. 0 4 2 4 2 6	.030000	2 . 7 7 0	2 . 8 3 0
J u n e	2	2.77500	. 0 4 9 4 9 7	.035000	2 . 7 4 0	2 . 8 1 0
J u l y	2	2.68500	. 2 4 7 4 8 7	.175000	2 . 5 1 0	2 . 8 6 0
A u g u s t	2	2.93000	. 0 2 8 2 8 4	.020000	2 . 9 1 0	2 . 9 5 0
September	2	2.96000	. 0 4 2 4 2 6	.030000	2 . 9 3 0	2 . 9 9 0
October	2	2.83000	. 3 5 3 5 5 3	.250000	2 . 5 8 0	3 . 0 8 0
November	2	2.78500	. 0 3 5 3 5 5	.025000	2 . 7 6 0	2 . 8 1 0
December	2	2.91000	. 0 5 6 5 6 9	.040000	2 . 8 7 0	2 . 9 5 0
J a n u a r y	2	2.54000	. 1 8 3 8 4 8	.130000	2 . 4 1 0	2 . 6 7 0
F e b r u a r y	2	2.51500	. 2 8 9 9 1 4	.205000	2 . 3 1 0	2 . 7 2 0
M a r c h	2	2.34500	. 1 3 4 3 5 0	.095000	2 . 2 5 0	2 . 4 4 0
T o t a l	2 4	2.72042	. 2 2 7 3 9 5	.046417	2 . 2 5 0	3 . 0 8 0

The results revealed variability in b-values with a peak in October and a trough in March (Fig. 6).

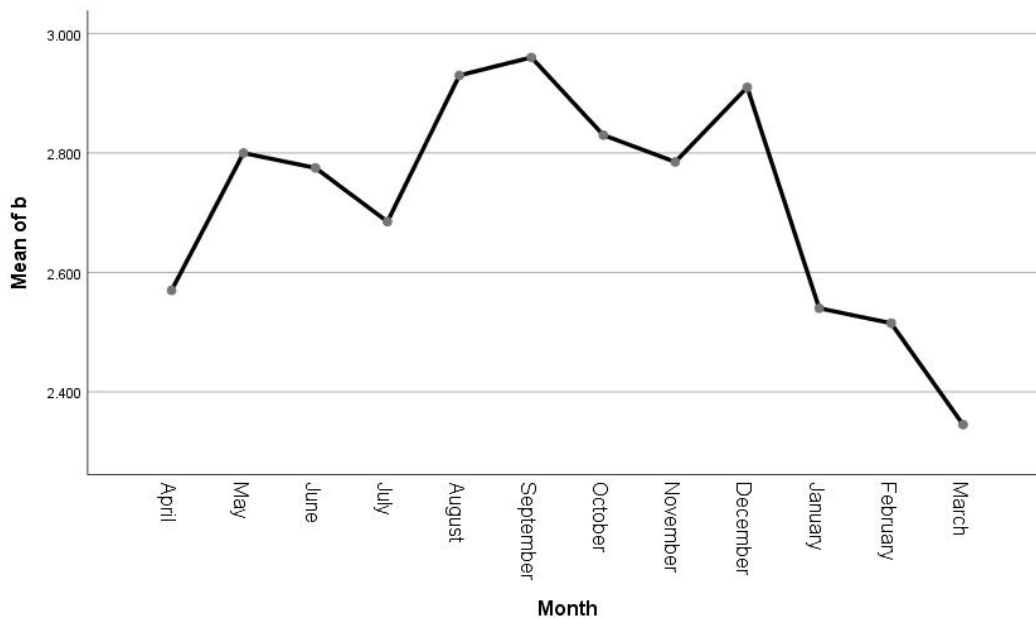


Fig.. 6: Monthly Variation in b Values in *O. niloticus* from Qua Iboe River estuary

Monthly mean b-values ranged from 2.345-2.9600 with a mean of 2.7204 ± 0.2274 . All the months recorded mean b-values that were less than isometric implying that they recorded negative allometric growth.

4. DISCUSSION

Length-Weight Relationship (LWR) of *Oreochromis niloticus* from Qua Iboe River estuary was studied for a period of 12 months; April 2021-March 2022. The b-values in males and females recorded negative allometric growth and the exponents were significantly less than isometric ($P < 0.05$). The exponent values gotten in this study were higher than those of Steve and Okeyo (2019) who recorded b-value of less than 2 for *O. niloticus* in the wild and cage culture. It was also higher than those recorded by Ojuoket al (2000)(not found); Njiruet al (2006)(not found) and Yongoet al (2018) in *O. niloticus* from Lake Victoria, Kenya whose

'b' values were below 2. The results here were also higher than those of a related species, *T. zilli* as was reported by Ibrahim *et al* (2008) in Abu-zaba Lake, Cairo, Egypt.

Negative allometric growth shows that the fish becomes thinner as its body weight increases as opposed to a positive allometric growth which implies that the fish becomes relatively broader and fatter as its length increases. The value of the regression coefficient b in the length-weight relationship of fish is an important bio-indicator in revealing the amount of food intake and the pattern in which the fish is growing which varies depending on the ecological condition of the ecosystem. Negative allometric growth were recorded by other researchers; Bala *et al.* (2009) (not found)? on the study of Ichthyofauna of Dabera reservoir in Katsina State reported a negative allometric growth for *T. zilli* species recording a 'b' value of 2.19. Mossad (1990) (not found)? on biological studies on five fish, species from Lake Qarun, Egypt recorded a 'b' value of 2.9 for *T. zilli* in blackfish water. Ibrahim *et al* (2008) on effect of environmental conditions of Abu-Zabai Lake on some biological, histological and quality aspects of fish in Cairo reported a negative allometric growth with a 'b' value of 2.92 for *T. zilli* in brackish water. Karal Marx *et al* (2013) on Length –weight relationship of Nile tilapia, *Oreochromis niloticus* from Barur Reservoir recorded a slope value (b) estimated for both sexes to be 2.313. Waithaka *et al* (2017) reported a slope b of length-weight relationship of 2.86 for combined sexes of *O. niloticus* from Lake Naivasha, Kenya. Asmamaw *et al.* (2019) (not found)? on length weight relationship and condition factor of Nile tilapia, *Oreochromis niloticus* in Kuka Reservoir, Ethiopia record 'b' values of 3.2095 (males), 2.868 (female) and 3.1703 for combined sexes. Riedel *et al.*, (2007) reported that during various stages in growth, the fish can record an isometric growth ($b=3$), negative allometric growth ($b<3$) or positive allometric growth ($b>3$). The actual relationship between length and weight may part from the cubic value 3 and this may be due to environmental condition in which the animal lives and also due to the physiological condition of animal. Ogunola *et al* (2017) reported that negative allometric growth pattern could be attributed to low food items for fish species in the ecosystem or reduction of their body size to escape predation or high fishing mortality or intensity and adverse effects of oil pollution on their growth (Law, 2000(not found)?, Chilaka *et al.*, 2014(not found)?). It could also be as a result of competition for food resources in the ecosystem which could have affected their growth due to limited nourishment available to individuals. The negative

allometric growth recorded in this study is different from the results of others. Bankole (1989) (not found)? on biological study in selected fish species of Tiga Lake Kano State, reported a 'b' value of 3.10 for *O. niloticus*. Fafioye and Oluajo (2005) who studied the length-weight relationship of the fish species in Epe Lagoon, Lagos, Nigeria and they reported that *O. niloticus* recorded a 'b' value of 3.04. Steve and Okeyo (2019) on assessment of length-weight relationship and condition factor of Nile Tilapia (*O. niloticus*) in cage and open waters in Winam Gulf of Lake Victoria, Kenya reported that the slope "b" of the regression analysis in both habitats revealed a positive allometric growth; 3.16 and 3.09 for wild and Cage respectively. Boghoyinge (1984) (not found)? on some observations on aspects of biology of tilapia marine and culture of tilapia in freshwater ponds in Port Harcourt recorded a 'b' value of 3.21 for tilapia marine. Ojuoket al. (2000) (not found)? reported a b value of 3.14 for *O. niloticus* from Lake Victoria, Kenya. Njimet al (2006) (not found)? recorded a b value of 3.07 – 3.32 for *O. niloticus* harvested from Lake Victoria, Kenya. Yongoet al (2018) recorded a b value of 3.01 for *O. niloticus* from Lake Victoria Kenya. Yongoet al (2018) reported that the b value of the length –weight relationship was 2.98, 3.01 and 3.01 for males, females and combined sexes respectively. Steve Omari Ngodhe et al, (2019) check up, in their studies investigated the difference between the length and weight of *O. niloticus* in cage and open waters. The slope 'b' of the regression analysis in both habitats revealed a positive allometric growth (3.16 and 3.09) for wild and cage. However, the b-values recorded here which was negative allometric but within the limit of 2 and 4 were in agreement with those recorded by Ontaet al (2014) (not found)? and Waithaka et al (2017) on *O. niloticus* from Lake Naivasha, they reported that the b-values recorded 2.30 and 2.86, respectively for combined sexes and Mossad (1990) (not found)? on a related species *T. zilli* from Drackish water in Egypt. Feeding behavior of fish and morphological changes due to age may also cause the coefficient of regression on Logarithm of length to depart substantially from 3. Pauly and Gayannilo (1997) suggested that b-values may range from 2.5 to 3.5 while Hile (1936 check up with Refer.) and Martin (1949) (not found)? observed that the values of the regression coefficient 'b' usually lies between 2.5 and 4.0 and for an ideal fish to maintain its shape b=3 is required. The b values recorded in this study fall within the recommended range of 2.5 to 4.0. Higher mean b-value was recorded in males, however, there was no significant difference between the b-values of

males and female ($p > 0.05$) during the study with the respective exponential relationships. Intersexual, the b-values gotten for males and females in this research were higher than those gotten from the same species by [Asmawa et al \(2019\)\(not found\)?](#) in Kuka Reservoir, Ethiopia; [Waithaka et al \(2018\)](#) in Lake Naivasha and [Yongo et al \(2018\)](#) in Lake Victoria Kenya who recorded b-values of less than 2 for males and females.

The less negative allometric growth in females signify that the rate of weight gain is less than the increase in length probably due to the timing of the batch where females empty their gonad losing energy for egg production hence less weight in relation to their length. The negative allometric growth observed here might be owing to various factors, including seasons, environmental parameters, and the presence of food, feeding ratio, habitat, sex and physiological conditions of the fish. Negative allometric growth pattern could be attributed to low food, items for fish species in the ecosystem or reduction of their body size to escape predator or higher fishing mortality or intensity and adverse effect of oil pollution on their growth. [Chilaka et al \(2014\)\(not found\)?](#) also postulated that negative allometric growth might be as a result of competition for food resources in the ecosystem which could have affected their growth due to limited nourishment available to individuals. [Okeyo \(2019\) \(not found\)?](#) reported that the variation in growth pattern could be due to different ecological parameters during the study periods which comprises of several biotic and abiotic interactions such as gear selectivity, sex and difference season of the year can affect the length-weight relationship. Consequently, higher b-value was recorded in the wet season but there was no significant difference between the dry and wet season ($P > 0.05$). The seasonal b-values recorded here were also higher than those reported for a related species *T. zilli* whose b-values for dry and wet seasons were below two as observed by [Mahomoud et al correct \(2011\)](#) in Lake Timsha, Egypt. However, the b-values obtained here were lower than those obtained for the same species in Lake Victoria, Kenya by [Ojuoket et al \(2000\)\(not found\)?](#) and [Njiru et al \(2006\)\(not found\)?](#) who recorded isometric growth. The b-values were also lower than those gotten for *O. niloticus* by [Bankole \(1989\)\(not found\)?](#) and [Fafioye and Olujo \(2005\)](#) who recorded isometric growth in Tiga Lake, Kano state, Nigeria and Epe Lagoon, Lagos state, Nigeria respectively. [Imam et al. \(2010\)\(not found\)?](#) on length –weight relationship and condition factor of four fish species from Wasai Reservoir in kano, Nigeria recorded a negative allometric growth reporting a ‘b’ figure in *Tilapia zilli* of 1.53 and 2.5

for wet and dry seasons respectively. Haruna (2006) on length-weight relationship of four fish species from Magaga Lake, Kano Nigeria recorded a 'b' value of 2.7 (wet season) and 3.2 (dry season) for *T. zilli*. In Qua Iboe River estuary, the intersexual and seasonal pattern in length-weight relationship of *O. niloticus* revealed that the length-weight exponent for male, female and combined sexes were negatively allometric signifying that the b-values deviated significantly from isometric. The intersexual and seasonal negative allometric growth recorded in this study signifies that the fish did not grow symmetrically as they became thinner with increase in length (Abiaobo *et al.*, 2021) check up with Refere..

The results revealed variability in b-values with a peak in October and a trough in March. All the months recorded mean b-values that were less than isometric implying that they recorded negative allometric growth. A positive correlation coefficients obtained here showed there was correlation between the total length and body weight measurements of the fish, meaning the fish increase in the body weight as it grows in total length. Similar trend were observed in *O. niloticus* by Fafioye and Oluayo (2005) in Epe Lagoon, Lagos; Waithaka *et al* (2017) in Lake Naivasha, Kenya; Ojuoke *et al* (2000); Njiru *et al* (2006) (not found)? and Yongo *et al* (2018) in Lake Victoria, Kenya.

5. Conclusion

The results of the length-weight relationship of *O. niloticus* from Qua Iboe River Estuary, Nigeria exhibited negative allometric growth. The species become thinner as they grow older. The b value shows negative allometric growth $b \leq -3$. The females were sparingly found in the wet season indicating that the wet season is the breeding period of the species while the dry season is fishing time. ~~The results of the length weight relationship of *O. niloticus* from Qua Iboe River Estuary, Nigeria exhibited negative allometric growth. The species become thinner as they grow older.~~ The species exhibited seasonal trend in sex differentiation, size structure, growth pattern and general well-being. These distinctions could serve as precursors for development, culture, management and sustainability of the species in Qua Iboe River Estuary Nigeria. The *Oreochromis niloticus* from Qua Iboe River Estuary, Nigeria is a commercial species of financial value and the species supplement the food and protein need of the surrounding communities. This study provides the basic information which could enhance production potential of *O. niloticus* and its sustainable development, culture and management in Qua Iboe River Estuary Nigeria.

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