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Length-Weight Relationship and Condition Factor of Fish Species of Kanye Reservoir, Kano- Nigeria

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Abstract

The study determined the diversity, length-weight relationship and condition factors of fish species from Kanye Reservoir Kano, Nigeria, was assessed between August, 2016 and July, 2017. Fish species were collected using line nets, cast nets, hooks and traps; weighed to the nearest gram and length measured to the nearest centimeter. A total of 120 fishes comprising of 7 families and 10 species were identified. Family cichlidae was predominant (30%) represented byT. zilli, T. galilaea and Oreochromis niloticus; followed by the Family: Claridae (20%) withC. lazera and C. submarginatus, Polypteridae sp.Schilbeidae sp. Mormyridae sp.Centropomidae sp. and Osteoglossidae sp. represented. Margalef's diversity indexshowed the highest value of 1.848 indicating moderate species diversity. Length – Weight relationship (LWR) had significant correlation(P<0.05) among the fish species from 0.189 to 0.99 in Clarias submarginatus and Lates niloticus respectively. The growth pattern of the fish species was negative allometric with monthly mean b value of 2.15. The mean condition factor (K) for all the fish species was 1.149>1 indicating good condition factor.

Keywords: Condition factor, Kanye Reservoir, Kano, Length-weight relationship, Species diversity

INTRODUCTION

Freshwater ecosystems have been used for the investigation of factors controlling the abundance and distribution of aquatic organisms including fish (Esenowo and Ugwumba, 2010). According to Ita (1993), environmental management of aquatic ecosystems, particularly the inland water bodies have been of great concern to many resource managers and environmentalists in recent times.

In Nigeria, the contribution of reservoirs to fish production is minimal, despite their numbers in the country. This might be due to reasons Miranda (2007) pointed out as fish habitat and environmental degradation, inadequate fish assemblages, inefficient harvesting systems, stakeholders' conflicts, and insufficient institutional and political recognition. Other factors could be lack of proper species stocking, over fishing and improper reservoir management). For sustainability of these aquatic resources, an adequate knowledge of species composition, diversity and relative abundance of the water bodies must be understood (Ahmad *et al*. (2015). Balogun (2005) stated that length- weight relationships provide valuable information on where the fish lives. It provides important clues on climatic and environmental changes in an aquatic ecosystem. However, condition factor provides vital index for monitoring feeding

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intensity, age and growth rates in fish (Balogun, 2005). This study is aimed at assessing the fish species composition, length-weight relationship and condition factor from Kanye Reservoir Kano, Nigeria.

The Study Area

The study was carried out in Kanye Reservoir (Guzu-Guzu) located in the Sudan-savannah of northern Nigeria on latitude 11^0 97N and longitude 8^0 1E with two distinct seasons (Dry and wet). The rainy season period normally last from May to October, while the dry season last from November to April. Kanye Reservoir is approximately about 50 km away from Kano, along Kano –Gwarzo road, in Kabo Local Government Area of Kano State. It is about 11.25km from Kabo town with an area of 11.31km^2. The Reservoir was impounded and commissioned in 1970. It has two major sources that is River Guzu-Guzu and River Kanyan Maja.

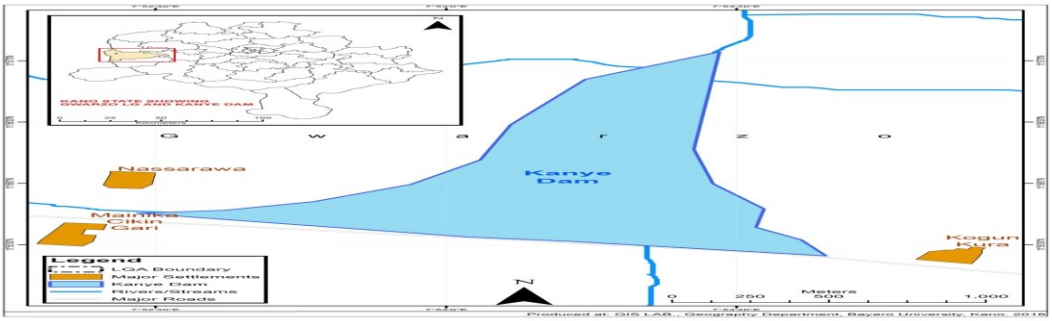

Figure 1: Map showing Kanye Reservoir with marked sampling Sites (Source: Cartography Lab. Dept. of Geography, Bayero University Kano)

Sampling Sites

Three (3) sampling sites were chosen and designated as A, B and C.

Collection and Identification of Fish species

Fish samples were collected monthly for a period of twelve months (August, 2016 to July, 2017) from sampling sites A, B and C using a fishing gear such as gill nets, cast nets, traps and hook with help of fisher men as described by Badamasi (2014). Fish captured were ice block and immediately transported to the laboratory for further analysis. They were counted, weighted to the nearest 0.1g using weighing balance (TF220 Model). The biometric features such as the type of mouth, position of the mouth, fin count, spine count, barbell counts and position, kind of teeth, dorsal and anal fin rays count, gill raker count, body shape, size, colour and shape of the caudal fin were examined on the fish species using identification key by Olaosebikan and Raji (1998).

The length-weight relationship was calculated using the least square regression on log transformation of the equation. The length-weight relationship was expressed by the equation

Log W= log a + b log L

Where:

W = Weight, a = exponent describing the rate of change of weight with length (intercept), b = weight at unit length.

Fulton's condition factor as described by Begenal (1978) was used from the expression

$K = 100w/L^3$.

Where:

K= condition factor, W = total weight (g), L =total length (cm) and the cubic relationship between length and weight

Determination of Biotic Indices

Margalef's diversity index was used to determine the fish species diversity. These was carried out by means of primer software using Margalef's index (1968) (d) with the formula given as:

$$d = \frac{S-1}{lnN}$$

Where d = Margalef's index, S = total number of species in the population. N = total number of individuals in the population

Statistical Analyses

One way Analysis of variance (ANOVA) was used to compare the means between sites and months of fish species to find out if there is significant difference or otherwise. Duncan Multiple Range Test was used to separate the means. Student's t test was used to determine the length and weight relationship.

RESULTS AND DISCUSSION

Species Diversity

A total of 120 fish samples representing 7 families and 10 species were collected and identified between August, 2016 and July, 2017 from Kanye Reservoir; during which family cichlidae was the most abundant consisting of 30% represented by *T. zilli,* T. *galilaea* and *Oreochromis niloticus*. Family Claridae was the second highest in abundance with 20% represented by *C. lazera* and *C. submarginatus*. *Polypteridae, Schilbeidae, Mormyridae, Centropomidae* and *Osteoglossidae* were represented each by one species (Table 1).

The fish diversity identified were corroborates with the finding of Abdullahi and Mukhtar (2015) and Nafiu *et al*. (2017) in Thomas reservoir, Kano, Nigeria. The variation in the number of families could be due to the increased availability of food (plankton), low predation and good spawning ground in the reservoir which enhanced their breeding potentials. Similar observation was reported by Nazeef *et al.* (2018) in Dadin Kowa Dam, Balogun (2005) in Kangimi Reservoir, Kaduna and Dankishiya *et al*. (2012) in Lake Geriyo, Yola, Adamawa State, Nigeria. The present findings is inconsistent with the works of authors within the same ecological zone as reported by Nazifi *et al.* (2018) and Ataguba *et al*. (2014). During the study period Family Cichlidae has the highest abundant identified with 30% followed by Clariidae with 20%. Their high abundance may perhaps be attributed to the high prolific breeding nature of members of these two families as observed byDankishiya and Abdulrahman (2007) in Lake Geriyo, Yola, Adamawa State, Nigeria. The seven (7) families identified were present throughout the study period which indicates the relative abundance of these species in northern Nigeria as reported by Ita (1993).

Condition Factor (K)

During the study period there was no great variation in relative condition factor (K) values observed in all the fish identified. However, it was observed that condition factors (K) obtained for *Physailia pellucida, Clarias submarginatus, Clarias lazera, Gnathonemus senegalensis,* and *Polypterus spp* were of values of less than one, which indicated that the fish are generally not doing well in the Kanye Reservoir. While the condition factors (K) values obtained for *Oreochromis niloticus,Tilapia zilli, Lates niloticus, Heterotis niloticus* and *Tilapia galilaea* were of values of greater than or equal to one, which indicated that the fish are generally doing well in the Kanye Reservoir. This observation was in agreement with those reported by Gesto *et al*. (2017) in River Wudil who reported condition factor (K) ranged from 0.516 from, to 1.809 in ***Clarias gariepinus***, Imam *et al*. (2010) who had a mean condition factor (K) of 1.67 for *O.*

niloticus, 1.84 for *T. zilli,* 1.38 for *L. niloticus,* 1.08 for *H. niloticus* and 2.19 for *T. galilaea* on the studies of the Length-weight relationship and condition factor of four fish species from Wasai Reservoir in Kano, Nigeria and Ahmad *et al*. (2015) who had a mean condition factor (K) of 1.75. Variation of the condition factor may be due to better utilization of nutrients by the fish and among other favorable environmental factors. The result of the Condition factor of *Oreochromis niloticus* obtained in this study were in conformity with Azubuike (2016) who had a mean condition factor (K) of 1.55 in *Tilapia zilli* from Tiga Dam, Kano state Nigeria. The results of *Physailia pellucida* Condition factor obtained in this work 0.82 was slightly lower than those reported by Davies *et al*. (2013) of 0.89.The difference could be due to environmental factors, availability of feed, good fecundity, less disease and good water management. The results of the *Tilapia zilli* Condition factor obtained in this study were in agreement with those reported by Ahmad *et al*. (2015) who had a mean condition factor (K) of 1.75 and Akombo *et al*. (2016) who recorded 1.64 *Synodontis*sp. The difference could be due fish body condition which vary seasonally depending on changes in gonadal development, food availability, and other environmental factors (Keyombe *et al*., 2015). The results of *Clarias submarginatus* Condition factor obtained in this study were lower than those reported by Nyati *et al*. (2012) who had a mean condition factor (K) of 1.05. This may be due to reduced availability of food and prey item. The result of *Clarias lazera* Condition factor obtained in this research was similar to those reported by Imam *et al*. (2010) who recorded 0.76 in four fish species from Wasai Reservoir in Kano, Nigeria.

The results of *Lates niloticus* Condition factor obtained in this study were in agreement to those reported by Keyombe *et al*. (2015)who had 1.57 from *Clarias gariepinus*. This variation may be due to better utilization of nutrients by the fish and different environmental conditions. The higher *Gnathonemus senegalensis* Condition factor values obtained in this study was similar to those reported by Ayindiran and Fawole (2014) who had a mean condition factor (K) of 0.84. Similar observation was reported by Ahmad *et al*. (2015).The result of the *Heterotis niloticus* Condition factor obtained in this study was in conformity with those reported by Ayindiran and Fawole (2014) who had a mean condition factor (K) of 1.15.The results of the *Tilapia galilaea* Condition factor obtained in this study was similar to those reported by Imam *et al*. (2010) who had a mean condition factor (K) of 2.18 on the studies of the Length-weight relationship and condition factors of four fish species from Wasai Reservoir in Kano, Nigeria. The results of the *Polypterus* sp. Condition factor obtained in this study was in agreement with those reported by Keyombe *et al*. (2015) who had a mean condition factor (K) of 0.53.It was observed in this study that condition factor (K) values were high in the larger fishes and it decreased in the small sized fishes. This suggests that the larger sized fishes are better adapted to the ecological status of Kanye Reservoir. The results of the Condition factor obtained in this study were not significantly difference ($P > 0.05$) among the different Fish species.

Table 1: Fish Species Diversity identified from Kanye Reservoir, Kano

Fish Family	Genus	Species	Common Name	Local Name	% by family
Cichlidae	*Oreochromis*	*niloticus*	Nile Tilapia	*Faya/Farar wala*	30
	Tilapia	*zilli*	Redbelly Tilapia	*Karfasa bakin gurbi*	
	Tilapia	*galillaea*	Galilee cichlid/Mango Tilapia	*Zabo/Diska*	
Schilbeidae	*Physailia*	*Pellucida*	Glass fish	*Lulu*	10
Clariidae	Clarias	*submarginatus*	Clarias	*Hana noma*	20
	Clarias	*lazera*	African Cat fish	*Tarwada*	
Centropomidae	Lates	*niloticus*	Nile perch	*Giwan ruwa/Barya*	10
Mormyridae	*Gnathonemus*	*senegalensis*		*Kuma*	10
Osteoglossidae	*Heterotis*	*Niloticus*	African Bony tongue/Heterotis	*Bargi*	10
Polypteridae	*Polypterus*	sp.	Sail-fins of Bichirs	*Gartsa*	10
Margelef's species diversity		1.848			

Table 2: Values of Condition Factor (K) of Fish Species Identified in Kanye Reservoir

S/N	SPECIES	MEAN TOTAL LENGTH (cm)	MEAN WEIGHT (g)	Correlation coefficient r	CONDITION FACTOR (K)
1	*Oreochromis niloticus*	19.0	107.00	0.327	1.560
2	*Physailia pellucida*	18.6	53.00	0.327	0.820
3	*Tilapia zilli*	18.4	107.5	0.240	1.730
4	*Clarias submarginatus*	17.1	46.00	0.189	0.920
5	*Clarias lazera*	28.1	127.0	0.249	0.570
6	*Lates niloticus*	34.2	590.0	0.990	1.470
7	*Gnathonemus senegalensis*	12.4	13.5	0.923	0.71
8	*Heterotis niloticus*	39.8	670.0	0.971	1.06
9	*Tilapia galilaea*	21.8	225.0	0.721	2.17
10	*Polypterus* sp	20.6	42.1	0.982	0.48
	Mean (k) value				1.149

Table 3:- Mean Total Length (cm) of Fish Species In Kanye Reservoir (August, 2016 – July, 2017)

	O. niloticus	P. *pellucid*	*T.zilli*	*C. submarginatus*	*C. lazera*	*L. niloticus*	*Polypterus sp.*	*G. senegalensis*	*Heterotis niloticus*	*Tilapia galilaea*)
Aug.	24.0±0.73^{a}	21.0±0.17^{a,c}	18.3±2.51^{a}	16.4±1.60^{bc}	32.0±0.57^{a}	45.0±2.00^{a}	18.5±0.17^{a}	13.1±1.21^{a}	47.0±0.14^{ab}	14.5±0.41^{a}
Sept.	24.8±0.28^{e}	21.5±0.15^{ac}	18.8±1.52^{a}	16.0±1.47^{a}	31.5±0.02^{a}	46.0±8.07^{a,b}	22.7±0.15^{b}	12.9±0.61^{b}	41.8±0.30^{a}	17.7±058^{b}
Oct.	14.6±1.00^{a}	17.8±0.10^{ab}	16.8±1.53^{a}	16.30±0.72^{b}	23.8±0.58^{a}	24.6±16.20^{c}	18.2±0.10^{a}	12.7±2.00^{e}	30.5±1.13^{a}	29.7±0.01^{a}
Nov.	22.6±1.53^{b}	17.2±0.11^{b}	19.9±1.52^{b}	20.4±1.00^{a}	29.9±0.02^{a}	40.7±1.66^{b}	20.2±0.11^{b}	14.20±1.15^{a}	50.0±0.47^{c}	26.5±0.32^{b}
Dec.	19.4±0.58^{a,c}	20.0±0.40^{a}	18.6±1.52^{b}	30.0±0.21^{a}	42.0±0.02^{d}	40.5±1.64^{a}	23.0±0.40^{a}	11.70±0.00^{b}	43.0±0.37^{a}	21.6±0.01^{b}
Jan.	21.0±0.29^{b}	19.5±0.53^{a}	20.0±1.53^{a}	18.6±0.56^{a}	30.0±0.53^{c}	42±1.66^{a}	23±0.53^{a}	11.7±3.05^{b}	40.0±0.46^{a}	30.0±0.04^{a}
Feb.	20.7±1.43^{a}	19.0±0.30^{a}	21.5±2.65^{c}	19.0±0.90^{a}	28.0±0.01^{b}	40.0±1.10^{a}	21.0±0.30^{a}	11.8±2.88^{a}	40.0±0.52^{c}	30.0±0.59^{b}
March	15.00±0.53^{b}	17.5±0.17^{a}	17.5±3.21^{a}	16.0±0.61^{a}	27.0±0.55^{c}	20.0±0.51^{b}	12.0±0.17^{a}	30.0±0.58^{c}	30.0±0.38^{a}	25.5±0.01^{a}
April	19.0±0.51^{b}	15.5±0.36^{a}	17.8±1.53^{a}	18.0±0.25^{b}	26.5±0.10^{b}	26.0±1.40^{b}	22.0±0.36^{c}	12.5±1.78^{b}	32.5±0.42^{b}	15.5±0.01^{b}
May	16.0±1.40^{b}	18.5±2.80^{a}	18.0±1.10^{a}	19.4±2.02^{b}	28.5.0±1.80^{a}	12.0±0.90^{b}	19.0±1.71^{b}	12.0±1.10^{a}	33.5±1.87^{a}	27.5±1.02^{a}
June	14.2±0.70^{a}	16.0±1.90^{b}	17.0±1.40^{a}	14.0±0.71^{a}	28.0±1.80^{a}	38.5±1.01^{a}	22.0±0.80^{a}	17.0±1.31^{a}	48.0±1.06^{b}	13.0±1.91^{a}
July	17.0±1.82^{a}	20.0±1.74^{b}	16.5±2.61^{b}	15.0±1.10^{b}	20.5±1.01^{a}	18.0±1.79^{a}	20.5±1.40^{a}	11.5±1.01^{a}	36.5±1.07^{a}	23.5±1.90^{a}

Values are mean± standard deviation. Superscript with same letters in a column revealed no significant differences (P >0.0 5), F. crit value = 3.05

Table 4: Mean Weight (G) of Fish Species in Kanye Reservoir (August, 2016 – July, 2017)

S/N	*O. niloticus*	*P. pellucid*	*T.zilli*	*C. submarginatus*	*C. lazera*	*L. niloticus*	*Gnathonemus senegalensis*	*Heterotis niloticus*	*Tilapia galilaea*	*Polypterus sp.*
Aug.	140±1.57^{a}	80±2.56$^{a.}$	110±2.60^{a}	45±1.61^{a}	160±2.40^{a}	950±2.19^{a}	15±0.21^{a}	1000±7.00^{a}	55±2.17^{b}	30±1.04^{b}
Sept.	130±2.60^{ab}	80±0.16^{b}	110±0.58^{a}	45±0.67^{a}	150±1.02^{a}	1000±1.27^{a}	15±1.18^{a}	700±2.11^{a}	160±1.61^{ab}	60±1.77^{a}
Oct.	70±1.67^{ab}	55±1.49^{ab}	90±2.03^{b}	50±0.12^{a}	100±1.08^{a}	180±1.21^{a}	15±1.15^{a}	270±1.70^{a}	390±0.61^{b}	30±1.011^{b}
Nov.	130±1.13^{b}	50±0.31^{ab}	120±1.98^{a}	160±1.73^{a}	150±2.12^{a}	890±1.06^{a}	120±1.61^{a}	46.5±1.90^{ab}	320±1.77^{a}	40±1.62^{a}
Dec.	125±1.38^{a}	60±1.71^{ab}	120±1.02^{a}	50±1.51^{a}	150±1.61^{a}	850±1.07^{a}	120±1.11^{a}	800±1.70^{a}	90±1.60^{a}	50±1.81^{a}
Jan.	130±1.69^{a}	55±1.90^{a}	130±0.91^{a}	50±1.96^{a}	140±1.04^{a}	900±1.80^{a}	10±1.37^{a}	950±0.10^{b}	270±1.06^{a}	250±1.01^{a}
Feb.	130±0.16^{a}	50±1.60^{a}	140±1.01^{a}	50±1.20^{a}	130±0.91^{b}	850±1.09^{a}	15±0.09^{a}	480±1.13^{a}	390±0.91^{c}	50±0.10^{b}
Mar.	80±0.43^{b}	50±0.01^{a}	100±1.16^{a}	45±0.61^{a}	110±0.10^{a}	100±1.01^{a}	15±0.06^{a}	400±0.19^{a}	340±0.19^{a}	40±1.70^{a}
April	120±0.08^{b}	40±0.10^{a}	110±1.08^{b}	50±0.98^{b}	110±1.89^{b}	200±1.09^{b}	13±0.19^{ac}	350±0.67^{b}	60±0.67^{b}	50±1.09^{a}
May	90±1.70^{b}	50±0.85^{a}	100±1.01^{a}	60±0.79^{b}	140±1.00^{a}	280±0.69^{b}	12±1.37^{b}	380±0.07^{a}	360±0.89^{a}	30±1.82^{a}
June	50±1.84^{a}	40±0.89^{b}	80±1.07^{a}	28±0.97^{a}	120±1.80^{a}	800±1.91^{a}	10.0±0.91^{a}	110±1.83^{a}	40±1.06^{b}	35±1.41^{a}
July	80±2.90^{a}	60±1.96^{a}	80±0.01^{a}	30±1.67^{b}	60±1.21^{a}	80±1.37^{a}	10.0±0.10^{a}	500±1.51^{a}	260±1.97^{a}	140±1.05^{a}

Values are mean± standard deviation. Superscript with same letters in a column revealed no significant differences (P >0.0 5), F. crit value = 1.65

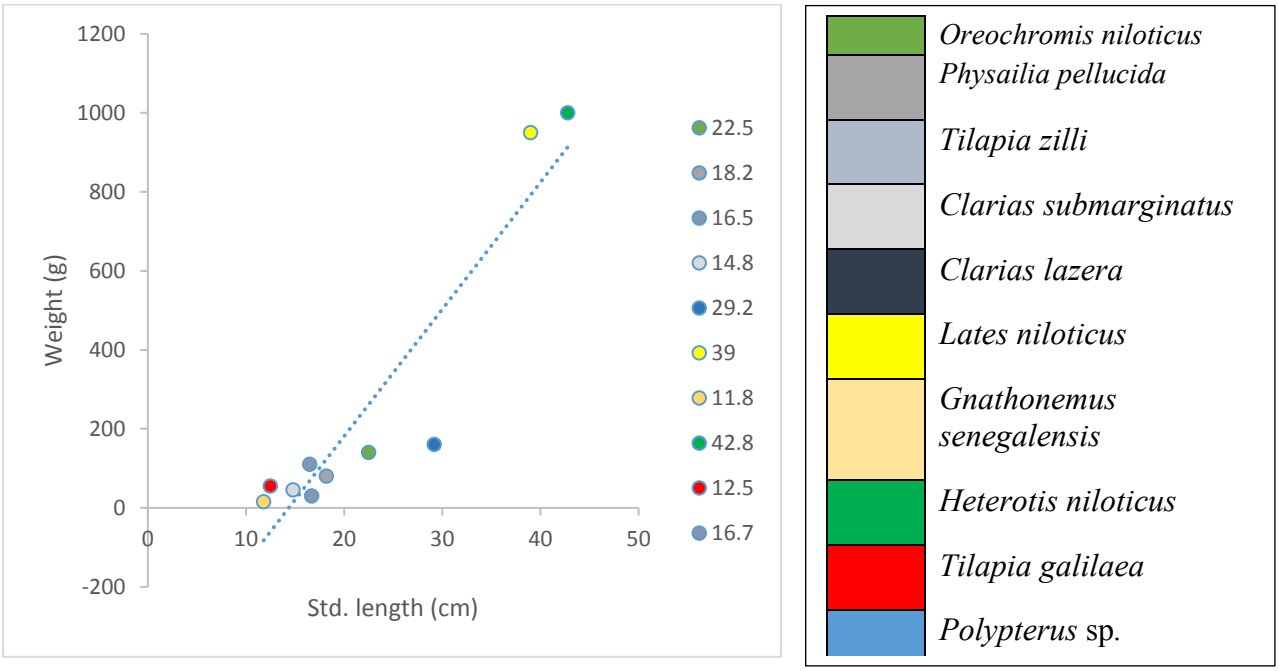

Fig. 2: Length – Weight relationship of fish species in Kanye reservoir in August, 2016

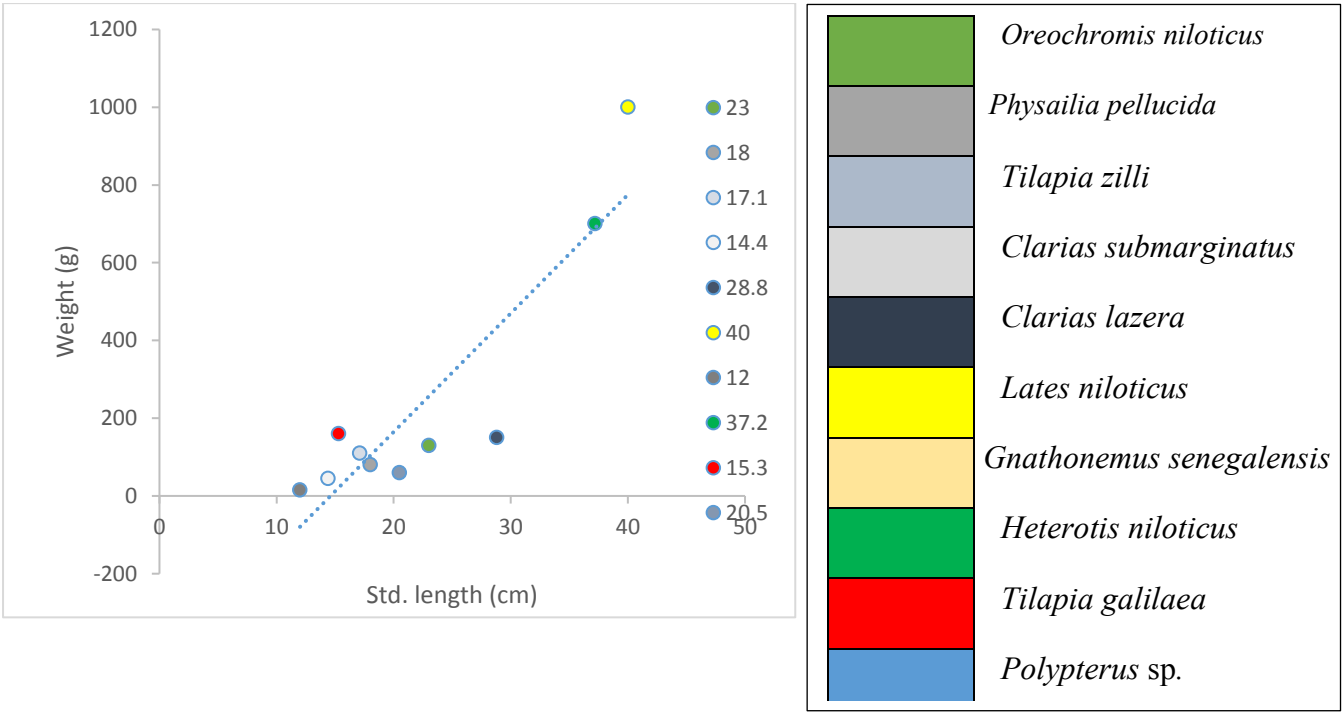

Fig. 3: Length – Weight relationship of fish species in Kanye reservoir in September, 2016

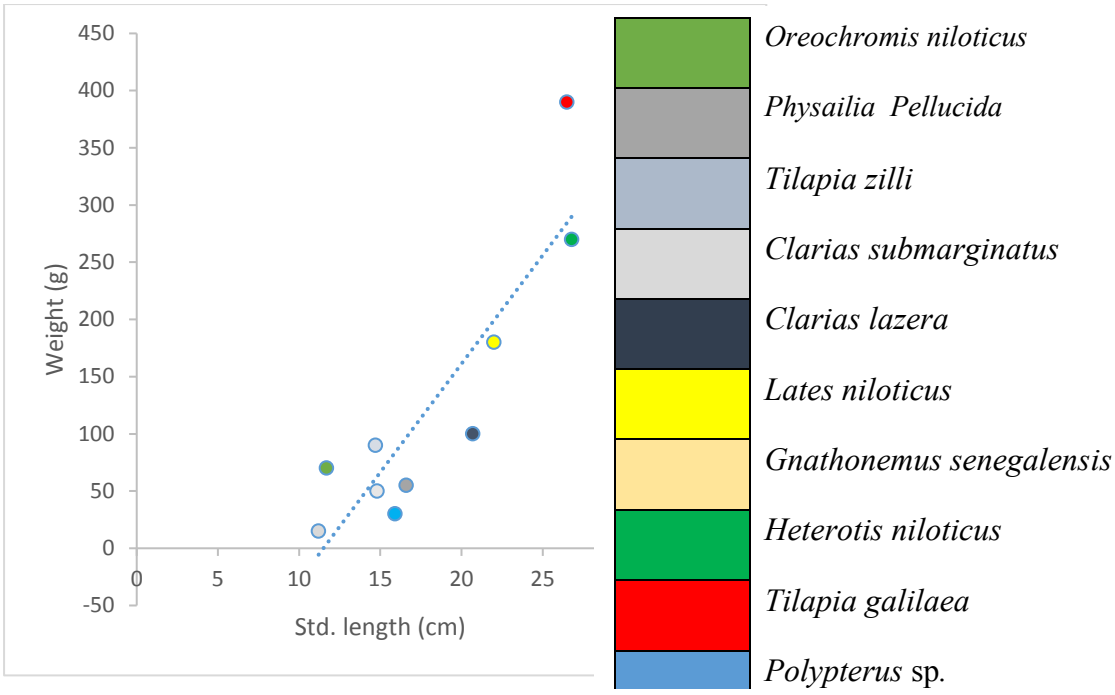

Fig. 4: Length – Weight relationship of fish species in Kanye reservoir in October, 2016

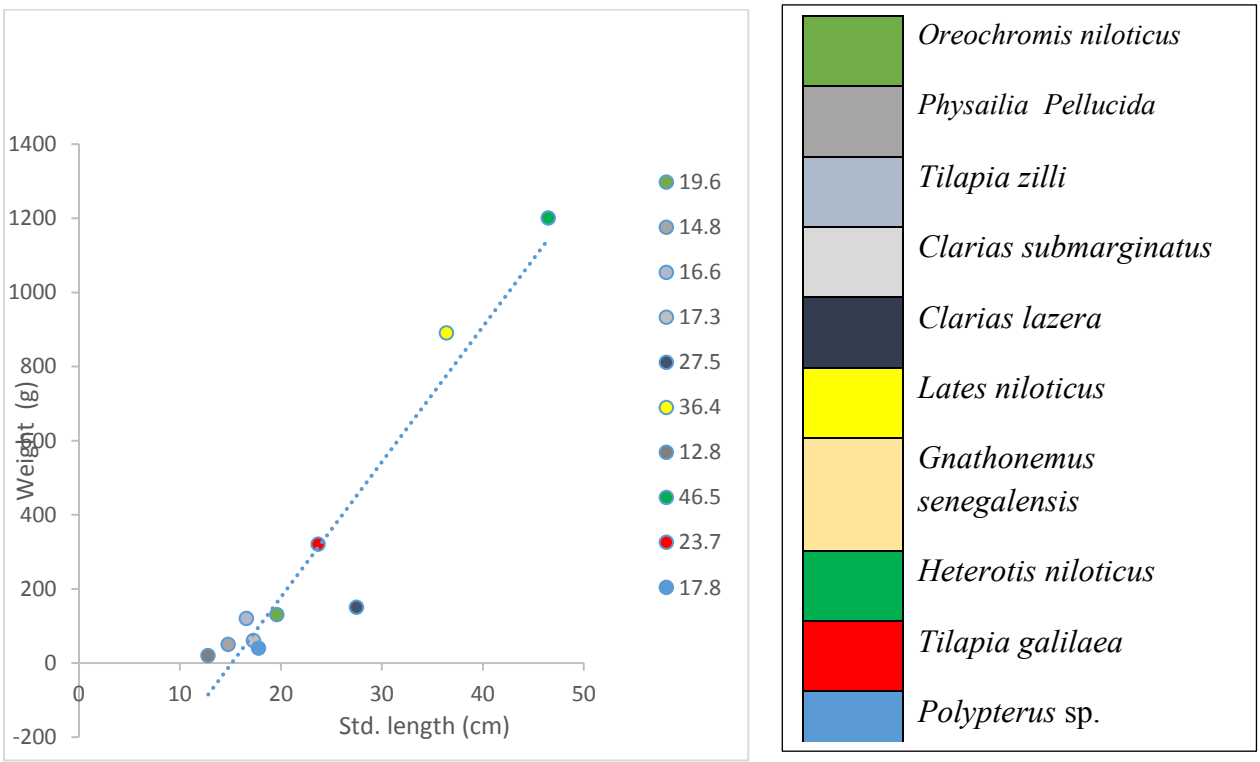

Fig. 5: Length – Weight relationship of fish species in Kanye reservoir in November, 2016

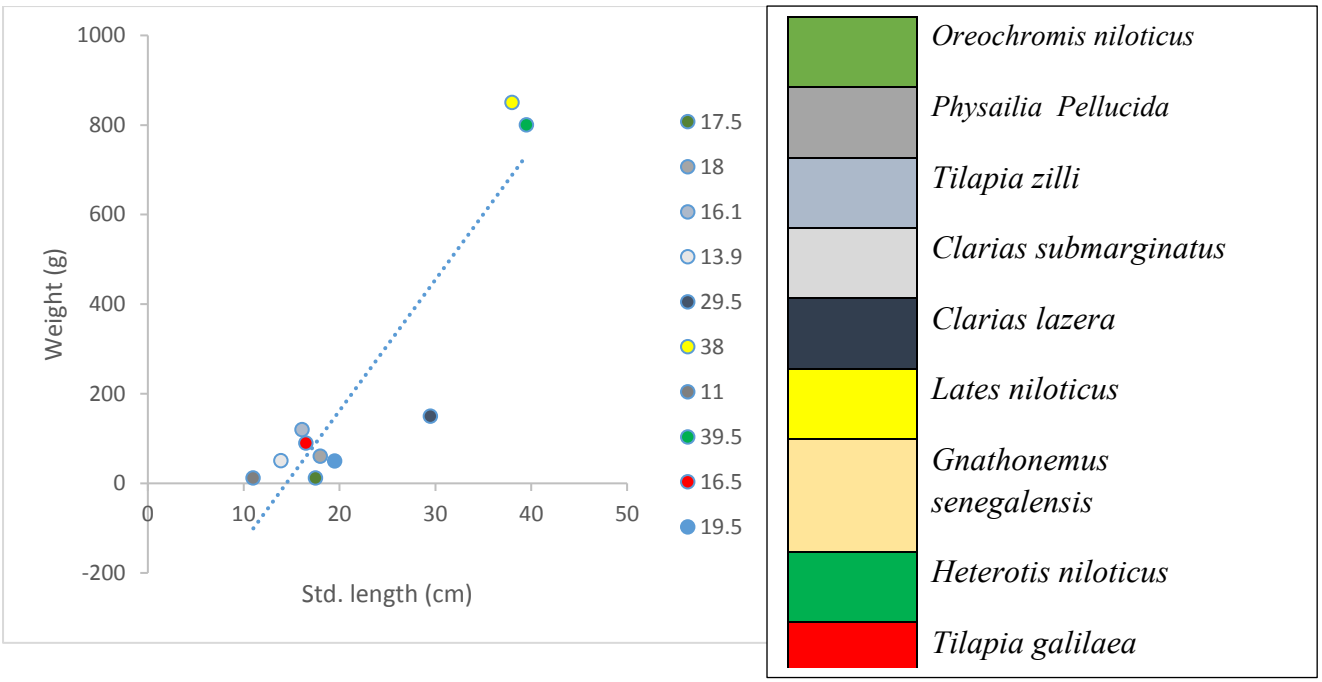

Fig. 6: Length – Weight relationship of fish species in Kanye reservoir in December, 2016

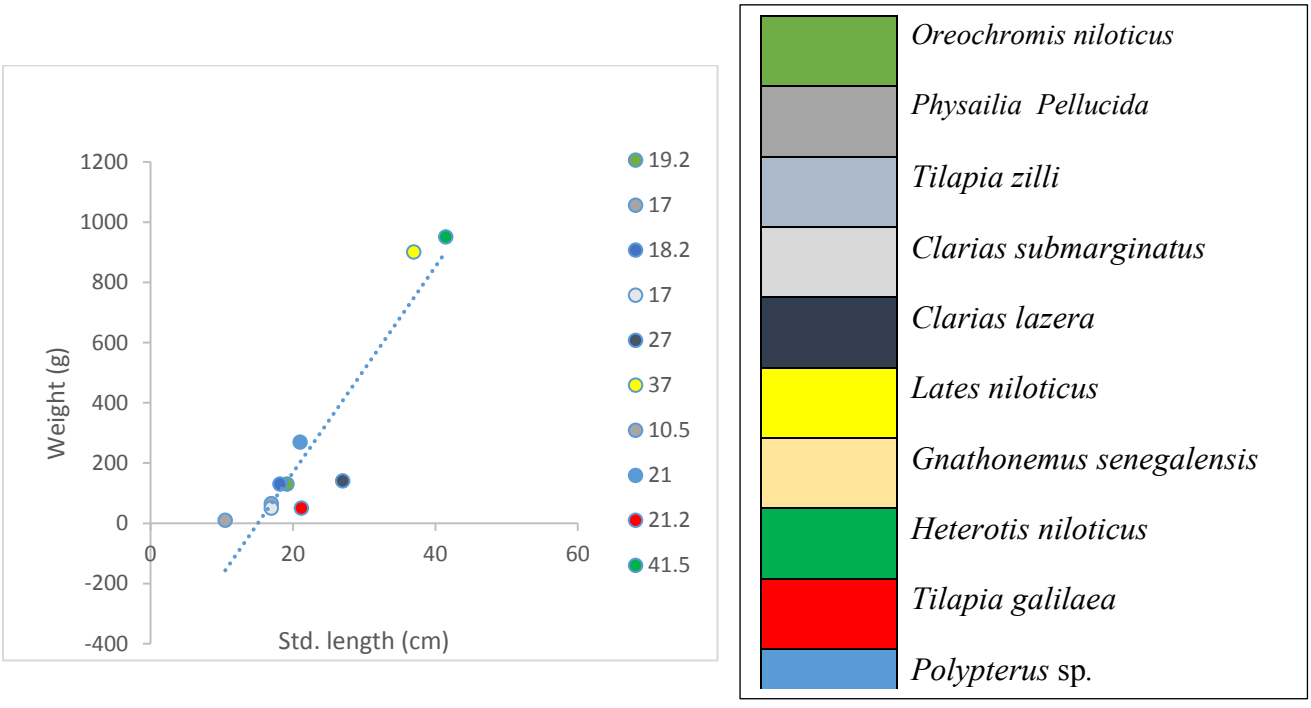

Fig. 7: Length – Weight relationship of fish species in Kanye reservoir in January, 2017

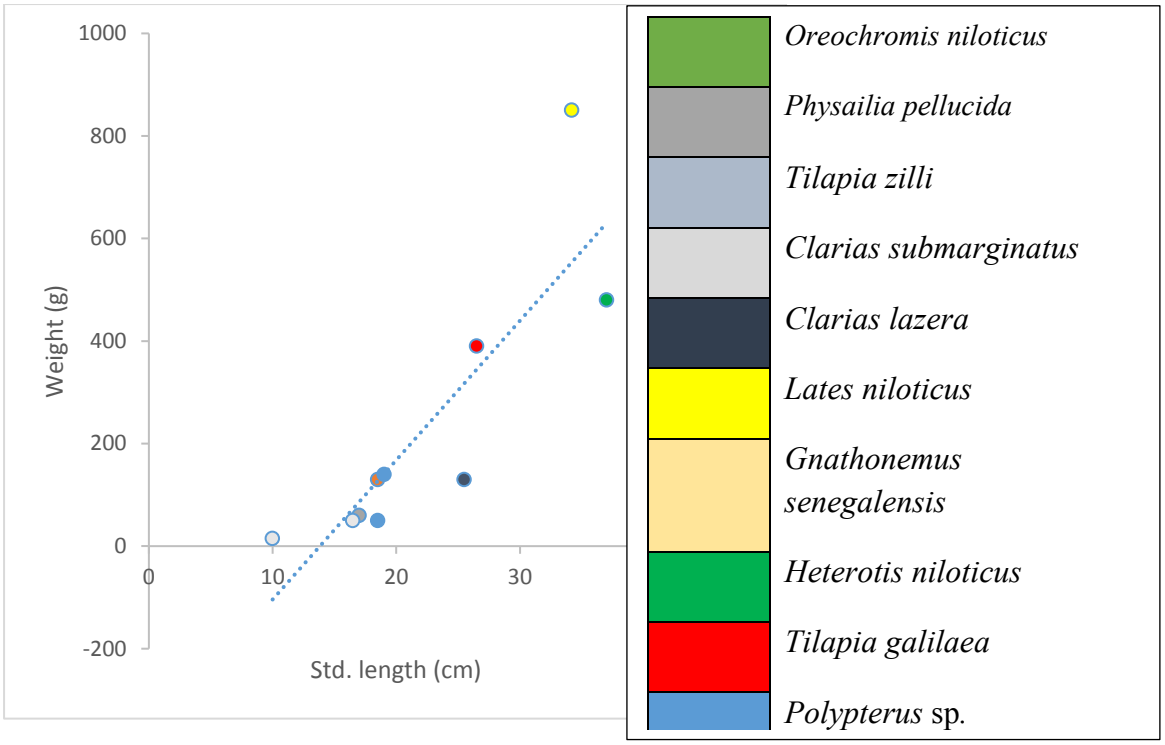

Fig. 8: Length – Weight relationship of fish species in Kanye reservoir in February, 2017

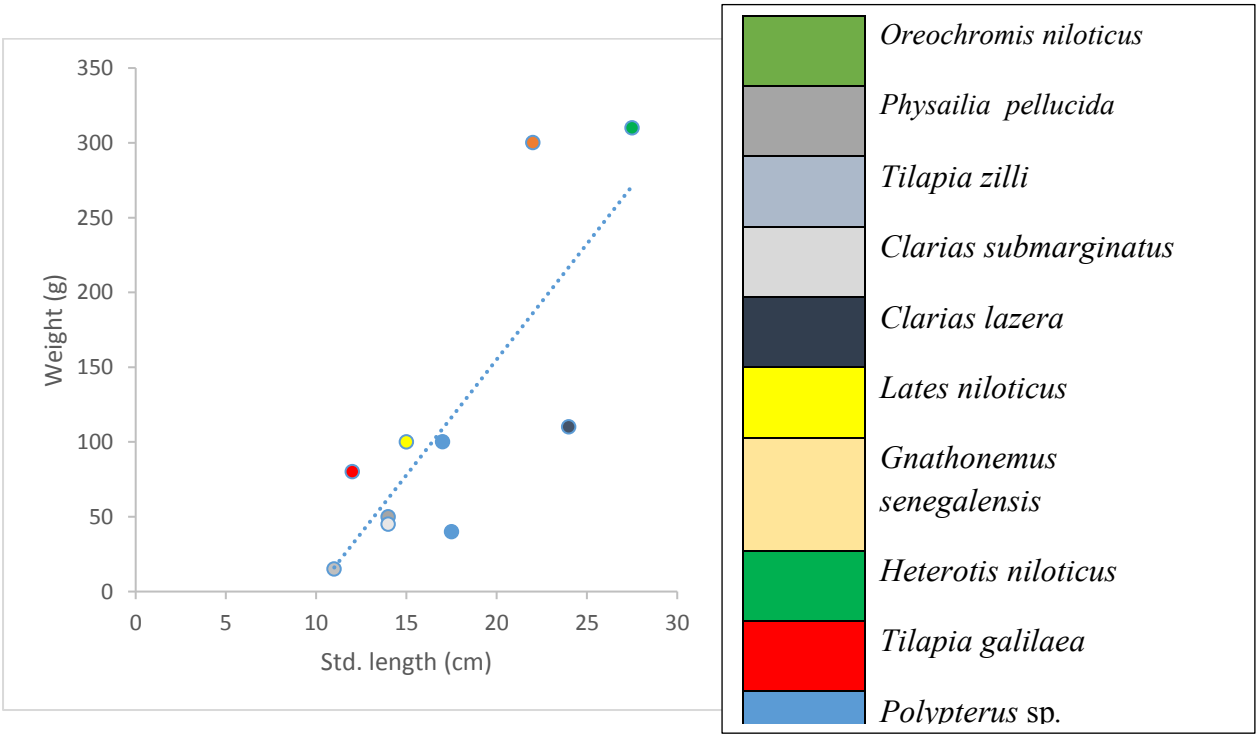

Fig. 9: Length – Weight relationship of fish species in Kanye reservoir in March, 2017

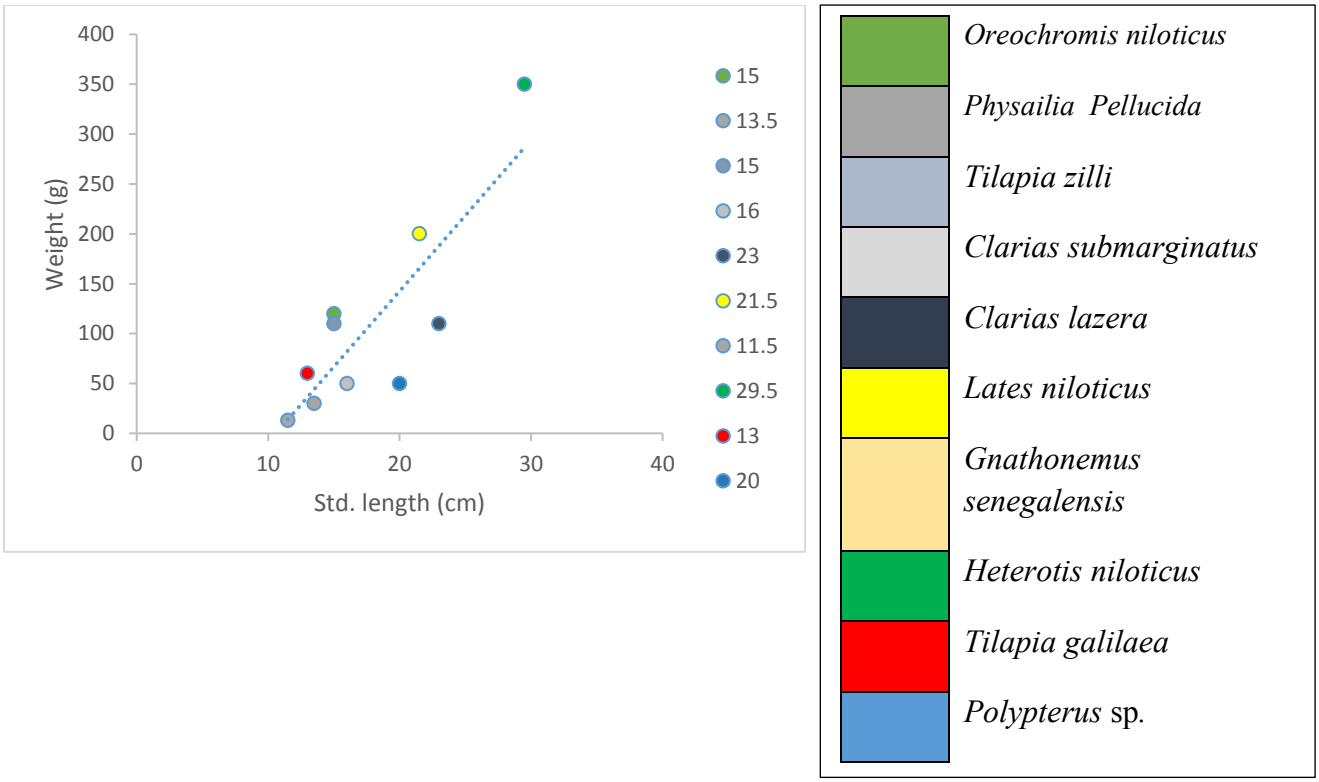

Fig. 10: Length – Weight relationship of fish species in Kanye reservoir in April, 2017

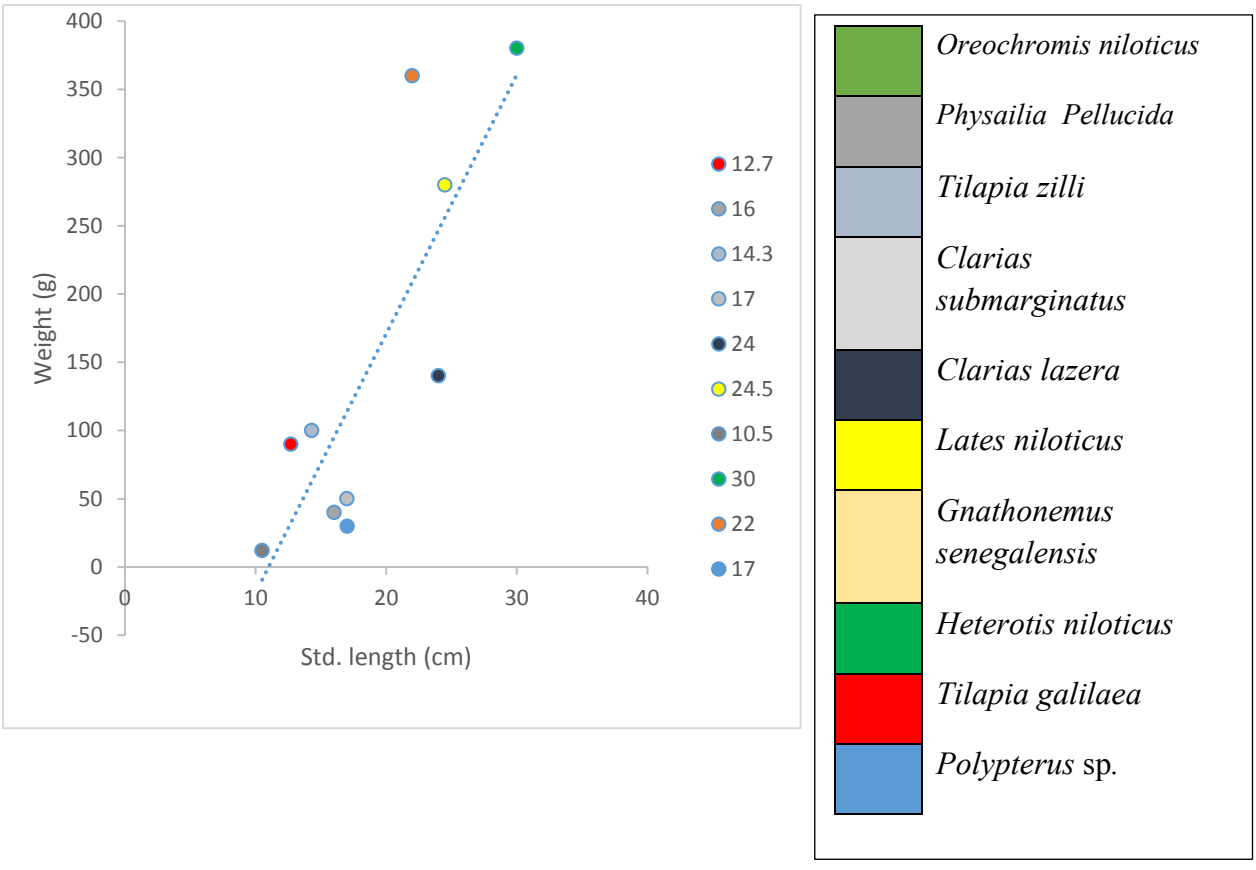

Fig. 11: Length – Weight relationship of fish species in Kanye reservoir in May, 2017

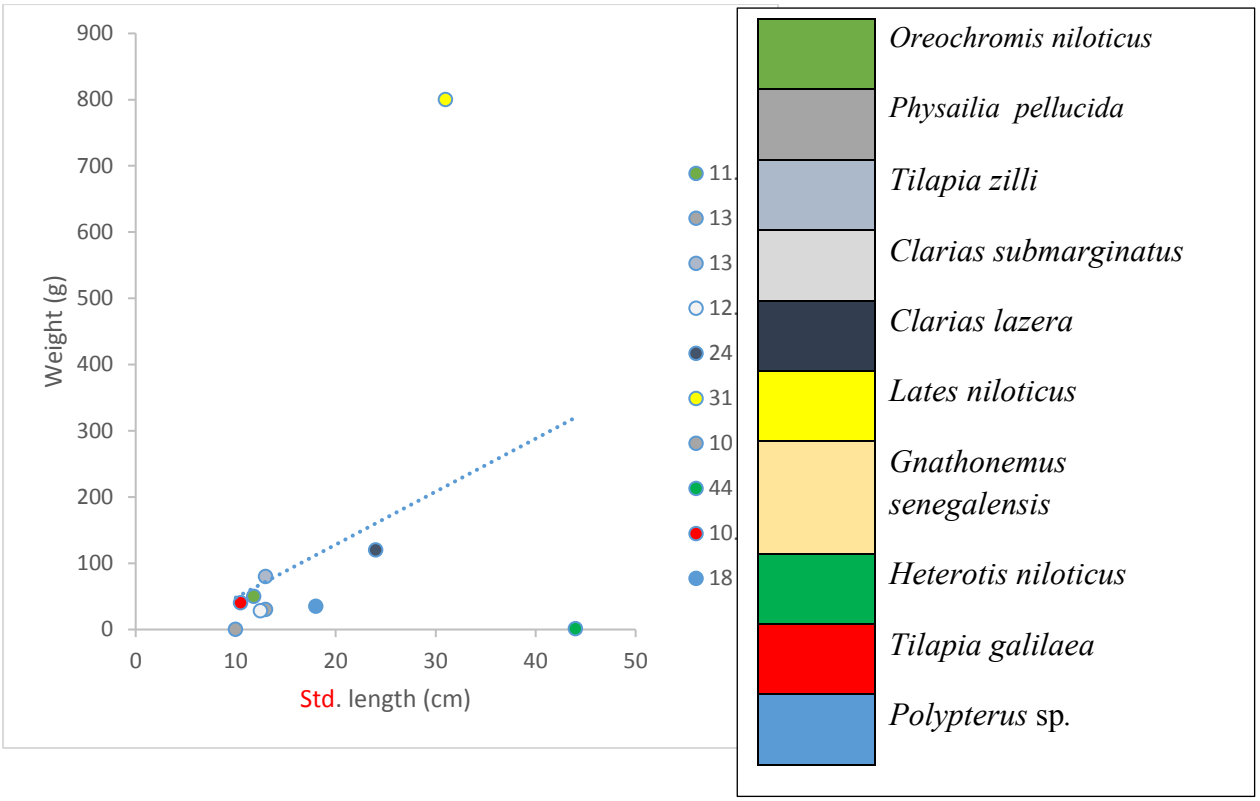

Fig. 12: Length – Weight relationship of fish species in Kanye reservoir in June, 2017

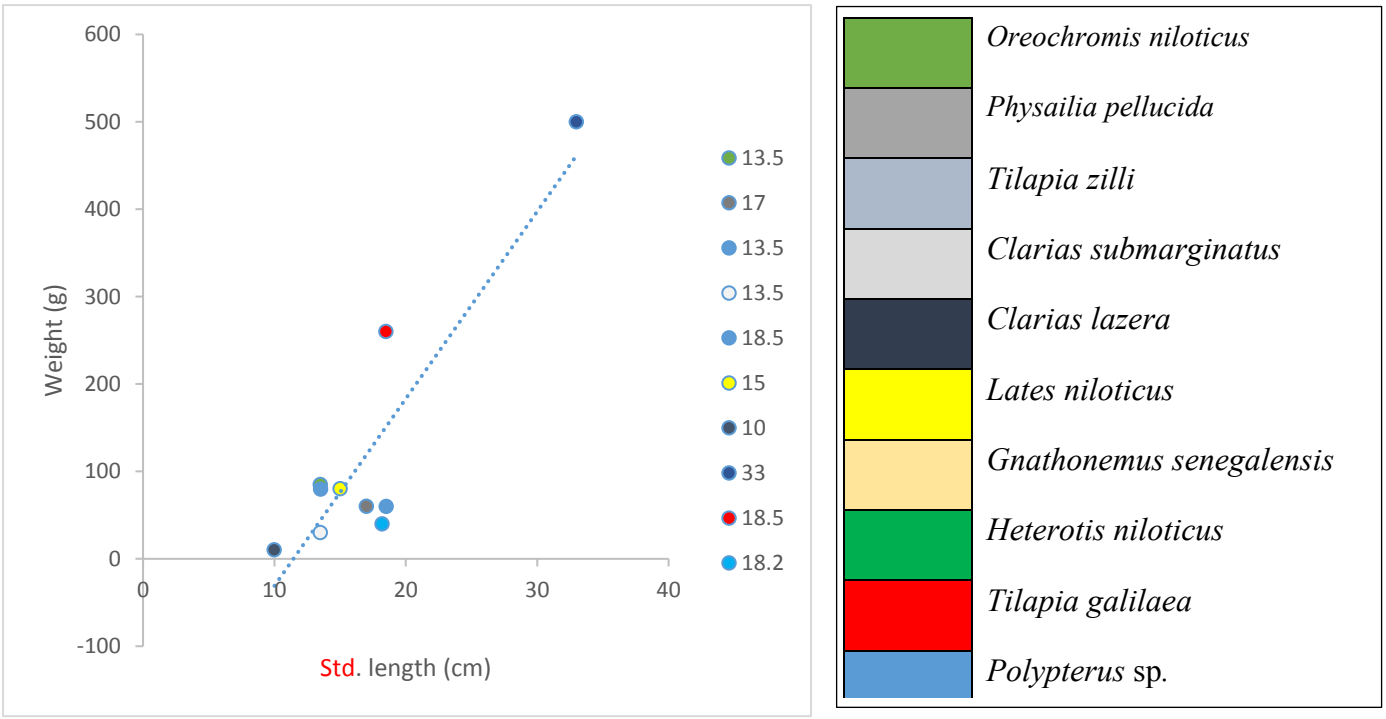

Fig. 13: Length – Weight relationship of fish species in Kanye reservoir in July, 2017

Length and Weight Relationship

Length-weight relationship of fish studied in Kanye Reservoir showed positive isometric b values for the growth in all the fish species under investigation; which implies an increased in weight as

length increases (Figure 2-13). This observation was in agreement by many researchers (Imam *et al*., 2010; Akombo *et al*., 2014 and Ahmad *et al*., 2015). The results of the Total Length, Standard Length and Weight of *Oreochromis niloticus* obtained in this study were similar to those reported by Ayindiran and Fawole (2014) who had mean of Total Length, Standard Length and Weight of 23.65cm, 21.45cm and 142g respectively on the studies of the Seasonal Distribution and Condition Factor of *Clarias gariepinus* from Polluted Oluwa River, Nigeria and Akombo *et al*. (2016) who had mean of Total Length, Standard Length and Weight of 24.20cm, 22.01cm and 143g respectively on the studies of Diversity and Abundance of *Synodontis* (Cuvier, 1816) species in the lower River Benue, Makurdi, Benue, state, Nigeria. The results of the Total Length, Standard Length and Weight of *Physailia pellucida* obtained in this work was slightly higher than those reported by Froese (2006) who had mean of Total Length, Standard Length and Weight of23.25cm, 21.24cm and 140g respectively on the studies of the Cube law, condition factor and Weight-Length Relationship: history, meta-analysis and recommendations but slightly lower than those reported by Davies *et al*. (2013) who had mean of Total Length, Standard Length and Weight of 23.85cm, 21.65cm and 144g respectively on the studies the Length -Weight Relationship, Condition Factor and Sex Ratio of *Clarias gariepinus* of Juveniles Reared in Concrete Tanks. The difference could be due to the water environment and availability of food. The results of the Total Length, Standard Length and Weight of *Tilapia zilli* obtained in this study were in agreement with those reported by Ahmad *et al*. (2015) who had mean of Total Length, Standard Length and Weight of 21.86cm, 19.45cm and 90g respectively on the studies of Some Aspects of the Biology of *Tilapia zilli* in Kanye Dam, Kabo Local Government, Kano State Nigeria and Akombo *et al*. (2016) whohad mean of Total Length, Standard Length and Weight of22.86cm, 20.45cm and 110g respectively studies Diversity and Abundance of *Synodontis* (Cuvier, 1816) species in the lower River Benue, Makurdi, Benue, state, Nigeria. The results of the Total Length, Standard Length and Weight of*Clarias submarginatus* obtained in this study were lower than those reported by Nyati *et al*. (2012) who had mean of Total Length, Standard Length and Weight of 23.86cm, 20.45cm and 120g respectively studies the impacts of Aquaculture at different depths and distances from cage culture site in Batang Ai hydroelectric Dam Reservoir Sarawak, Malaysia. The result of the Total Length, Standard Length and Weight of *Clarias lazera* obtained in this research was similar to those reported by Imam *et al*. (2010) who had mean of Total Length, Standard Length and Weight of31.86cm, 29.55cm and 170g respectively on the studies of the Length-weight relationship and condition factors of four fish species from Wasai Reservoir in Kano, Nigeria. The results of the *Lates niloticus* Total Length, Standard Length and Weight obtained in this study were in agreement to those reported by Keyombe *et al*. (2015) who had mean of Total Length, Standard Length and Weight of 41.86cm, 38.55cm and 960g on the studies of the Length-Weight Relationship and Condition Factor of *Clarias gariepinus* in Lake Naivasha, Kenya and also Akombo *et al*. (2014) who had mean of Total Length, Standard Length and Weight of 42.66cm, 39.76cm and 970g studies the Length-Weight Relationship, Condition factor and Feeding habits of *Synodontis schall* (*Bloch and Schneider*, 1801) in River Benue at Makurdi, Nigeria but higher than those reported by many researches (Froese, 2006;Davies, 2013; Ahmad *et al*.2015; Azubuike, 2016). This may be due to better utilization of nutrients by the fish and different environmental conditions. The higher values of the Total Length, Standard Length and Weight of *Gnathonemus senegalensis* obtained in this study were similar to those reported by Akombo *et al*. (2014) who had mean of Total Length, Standard Length and Weight of 13.74cm, 11.55cm and 17g on the studies of the Length-Weight Relationship, Condition factor and Feeding habits of *Synodontis schall* (*Bloch and Schneider*, 1801) in River Benue at Makurdi, Nigeria and Azubuike (2016) who had mean of Total Length, Standard Length and Weight of 13.86cm, 12.25cm and 18g on the studies of the Studies on the Food and Feeding Habits, Condition Factors of *Tilapia zilli* in Tiga Dam, Kano state. This may be attributed to increase in the availability of food in the reservoir. Similar observation was reported by Imam *et al*. (2010) who studies the Length-weight relationship and condition factor of four fish species from Wasai Reservoir in Kano, Nigeria. The results of the Total Length,

Standard Length and Weight of *Heterotis niloticus* obtained in this study was in conformity with those reported by Ayindiran and Fawole (2014) who had mean of Total Length, Standard Length and Weight of45.65cm, 42.05cm and 1kg on the studies of the Seasonal Distribution and Condition Factor of *Clarias gariepinus* from Polluted Oluwa River, Nigeria. The results of the Total Length, Standard Length and Weight of *Tilapia galilaea* obtained in this study was similar to those reported by Imam *et al*. (2010) who had mean of Total Length, Standard Length and Weight of14.26cm, 12.05cm and 60g on the studies of the Length-weight relationship and condition factor of four fish species from Wasai Reservoir in Kano, Nigeria and Meme *et al*. (2014) who had mean of Total Length, Standard Length and Weight of 14.76cm, 12.52cm and 65g on the studies of the analyses of physical and chemical parameters in surface waters nearby a cement factory in North Central Nigeria. The results of the Total Length, Standard Length and Weight of *Polypterus* sp. obtained in this study was in agreement with those reported by Keyombe *et al*. (2015) who had mean of Total Length, Standard Length and Weight of 18.90cm, 16.50cm and 42g on the studies of the Length-Weight Relationship and Condition Factor of *Clarias gariepinus* in Lake Naivasha, Kenya but slightly lower than those reported by Latifah and Met (2014) who had mean of Total Length, Standard Length and Weight of3.86cm, 15.95cm and 38.50g studies on Ecological evaluation approach for Dam project development in Malaysia. The results of Total Length, Standard Length and Weight of different Fish species obtained in this study were not significantly difference ($P > 0.05$). The equations obtained from the data of this study indicated a positive allometric growth for the fish in Kanye Reservoir. Fish undergoing positive allometric growth is an indication of stoutness of the body with increase in length of the fish and the results obtained therefore indicated a positive adaption by the fish to the Kanye Reservoir. There was no marked differences in *a* and *b* values of the fish in the Kanye Reservoir (Figure 4-15). Similar trend was reported by Ahmad *et al*. (2015) who studies Some Aspects of the Biology of *Tilapia Zilli* in Kanye Dam, Kabo Local Government, Kano State, Nigeria.

CONCLUSION AND RECOMMENDATIONS

The length and weight relationship revealed a negative allometric growth pattern in all the fish species. The mean condition factor (K) for all the fish species was 1.149 greater than 1 indicating good condition factor. Condition factor of the identified fish species revealed that 50% of the species had their K value below 1, whereas the remaining 50% had above, indicating below and average wellbeing of fish. It is recommended that improper fishery management resources in the reservoir need to be addressed by the appropriate authorities with the view of conserving and sustaining the fishery resources of the Reservoir for future exploitation.

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