3) Condition Factor:

The Fulton's condition factor, K was computed for the various size classes of *Oreochromis niloticus* using the method of Bagenal, (1978)

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

K = Fulton's condition factor

W = Weight of fish

L^3 = Cube length of fish

Results

The results of the combined data for male and female *Oreochromis niloticus* is shown in Table 2. The regression values (r) were between 0.4and 0.5 for male and female respectively. When the data was transferred for the various size classes the result is shown in Table 3.

Fulton's condition factor K (Bagenal, 1978) was computed for the five size classes as well as for sexes of *Oreochromis niloticus* under culture condition. The results are summarized in table 4. K values ranged from between 1.30 and 6.531. Statistical evaluation showed that there was insignificant difference in the conditions of various size and sexes of Oreochromis niloticus (P.0.01) (X.70 df7)

Table 1:

Values of growth exponent, the intercepts a and correlation r between total length and body weight of *Oreochromis niloticus* under by size and under culture condition.

Size class (cm)	N	A	B	R	A	R	B
5.0 – 7-9	19	-8.30	2.01	0.393	-0.375	0.422	20.83
8.0 – 10.9	58	-31.00	6.31	0.542	-1.275	0.053	2.78
-11.0 – 10.9	43	-8.77	4.23	0.560	-0.077	0.837	1.42
14.0-16.9	69	-32.00	8.00	0.620	-0.552	0.280	1.000
17.0 – 19.9	10	-48.20	2.00	0.0026	-0.1568	0.027	0.265
Pooled	199	-16.58	2.68	0.490	-1.680	0.010	1.163

Where N = Number of samples

A = Length

B = Weight

a =Intercept

r = regression

b =Slope

Table 2: Values of growth exponent (b), the intercept a and the correlation (r) between total length standard length and body weight by sex of *Oreochromis niloticus* under culture condition (long transformed data).

Sex	N	Standard	T. length	R	A	r	B
Male	87	-56.441 (-1.0475)	8.876 (2.473)	0.436	- 53.74 (-0.769)	10.899	10.899 2.445
Female	89	-60.30 (-1.0567)	8.597 (0.482)	0.560	-47.35 (0.272)	0.533	11.056 (1.937)
Combined Sex	176	-24.56 (-1.126)	4.180 (0.7810)	0.420	-12.56 (-1-112)	0.077	2.880 (1.431)

Table 3: Summary of length – weight relationship by size class of *Oreochromis niloticus* under culture obtained Umuagwo, Imo State.

Size of class (cm)	Regression Equation	Log transformation Version	Parabolic Equations
5.0 – 7.9	r = -8.30 + 2.01TL	Logk = 30.83 logTL $^{-0.0375}$	a = 0.422L$^{2.01}$
8.0 – 10.9	k = 31.0± 6.31TL	Log^{-a} = 2.78logTl $^{-1.275}$	k = 0.053L$^{0.31}$
11.0 – 13.9	f = 6.77 ±4.25Tl	Logf = 1.00logTL$^{0.55}$	H = 0.8571$^{4.23}$
14.0 – 16.9	H = -32.00+8.00TL	Log H= 1.00logTL$^{0.551}$	H = 0.0241$^{8.00}$
17.0 – 19.9	W = -48.20 r = 2.00TL	Log w = 0.265logTL$^{1.568}$	W = 0.027L$^{2.00}$

Table 4: Fulton's condition factor (k) by size class and sex computed for *Oreochromis niloticus* under condition in, Umuagwo, Imo state.

Size of class	N	Mean length	Mean weight	K
5.0 – 7.9	19	7.00	22.40	6.531
8.0 – 10.9	58	9.50	29.0	3.382
11.0 – 13.9	43	11.60	40.9	2.620
14.0 – 16.9	69	15.10	54.8	1.592
17.0 – 19.9	10	18.50	82.7	1.306
Sun total	199			
Sex				
Male	87	11.80	47.9	2.915
Female	89	11.79	47.7	2.966
Combined sex	176			
Grand total	375			

Discussions

The length – weight relationship has practical value in Fisheries biology because it makes it possible to convert length to weight verse versa (Lagler, 1956). According to Bagenal (1978), during development fish typically pass through several stages, each of which may have its own length – weight relationship of *Oreochromis niloticus* under culture condition were evaluated with references to five size classes, each representing a development stage of the fish.

The value of growth exponent 'b' in the length-weight relationship shows that at early stage (larval, fingerlings) and senility stage (old), the fish exhibits negative allometric growth (b = 2.01 and 2.00) respectively. This is opposed to the intermediate stages (juvenile, sexually mature and adult) of development in which the growth is positively allometric (b = 6.31, 4.23 and 8.00) respectively. The overall (pooled) growth exponent 'b' of 2.68 and 2.47 computed for the male and female fish fit favourably with 3.0 and 2.70 reported by Fagade, 1978 for *Tilapia guinenesis* at Lekki Lagos Lagoons. The growth exponent of 6.31 and 8.00 recorded for *Oreochromis* niloticus belonging to 8.0 – 10.9cm and 14.0 – 16.9cm size class appear to be too high and do not fall within the range of b = 2.0 and 4.0 suggested by Le Cren (1951). However, Bagenal; 1978 had observed that the values of growth exponent are usually higher when evaluated in terms of different size classes than pooled values. Generally, the values of length – weight relationship of various classes of *Oreochromis niloticus* under culture condition, computed in this study reflect the different pattern of growth of each development stage of the fish.

According to Robert et al, (1978), the pattern of growth can be divided with at least four different stages namely the larval stage during which rapid growth brings change in the body shape and size, the Juvenile stage which experiences rapid growth in size and body but change in length-weight occurring in a mot linear relationship, at sexual maturity, energy for growth is divided to gonadal development and growth occurs after spanning is completed. At senility (old) stage of the fish, most of the energy is utilized for the maintenance with little growth. The above explanation accounts for the variation in values of the exponent recorded for the various size classes of *Oreochromis niloticus* in captivity. The growth pattern of the fish is generally asymmetrical.

The condition factor, K is a measure of the deviation of a given fish, the average length-weight relationship for its size group (Weatherly, 1973). It is suitable for investigating seasonal changes in the condition of the fish such as food availability and water condition, in the present study, Fulton's condition factor K, ranged from 1.306 for 17.0 – 19.9cm size class to 6.531 for 5.0 – 7.9cm size class.

Except for individuals of 5.0 – 7.9cm size class in which k values of 6.531 was recorded, values of K for other sizes confirmed favourably to values of K reported of Fulton's workers. Oni et al (1983) reported k value of Fulton's condition factor between 0.1-4.03 for *Tilapia zilli*, 1.97 – 3.27 for *Synodontis*, *Schall* and 11.09 – 2.12 for *Alestes nurse*. Ajayi; 1972 had also reported k value in the range of 1.53-2.55 *for Chrysichthys auratus*. The abundance of plankton in the richly fertilized pond supplemented with artificial feedstuff accounts for good condition of

Oreochromis niloticus under culture condition. This may also have accounted for high k values of 6.531 recorded for larval stage of the fish which fed mostly on abundant planktons in the enriched pond. Based on the result of the study, where the Length –Weight relationship has been established of *Oreochromis niloticus*, using the least square regression method and also using Chi-square test X^2 to confirm the authenticity of the result, the Length – Weight can be converted effectively and versa-versa where one of the variable is not known as an index of determining production of the fish.

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