

AGE AND GROWTH OF AN ECOTYPE CICHLID “WESAFU” IN EPE LAGOON, LAGOS, NIGERIA.

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ABSTRACT

A sample of 150 specimens of “Wesafu” in the size range of 78mm and 414mm were collected from Epe Lagoon. The period of collection spanned August to November 2003 and April to May 2004 for age and growth pattern determination of this Ecotype Cichlid of Epe Lagoon. 900 scales were examined and another 232 rejected/discarded because they were regenerated or irregular. Growth rings were counted and scale radii measured. The study showed a mean range of observed lengths to be 181 ± 12.5 ; 265 ± 11.6 ; 305 ± 1.6 and 337 ± 3.4 for the successive years of growth. The most rapid growth in length occurred during the first year in life [181mm, (+1yr.)] thereafter decrease to only 32mm in the fourth year (+4yr.). The T-test suggests that there was no significant difference between mean back-calculated body length of male and female samples for age 1+ to 3+. However, in the age group 4+, male specimens were significantly larger than the female. The fact that the fish is highly demanded and commands premium price may result in over exploitation. This explain why only 5 of the 150 specimens were of the age 4+, representing only 3.33% of total specimens which raises serious conservation question and the need for domestication and aquaculture of this highly valued fish in Lagos, Nigeria.

KEYWORDS: Age and Growth, Ecotype Cichlid, Epe-Lagoon, Nigeria.

INTRODUCTION

Previous studies on “Wesafu” were mainly concerned with morphometric and meristic characters (Fadu 2002; Fashina-Bombata *et al.* 2005), food and feeding habits, Fashina-Bombata *et al.* 2006). No work has yet been documented on age and growth of this ecotype species. Knowledge of the age and rate of growth of a fish is of great biological interest. Certain tropical freshwater fishes show seasonal growth marks that correspond to the onset of the dry season and could be used to determine growth (Lowe, 1952).

Beyond the biology of this fish is the potential use in aquaculture, which is of commercial importance since tilapia culture is almost non-existent in the country. The genetic application of this strain for possible improvement and hybridization is also of scientific interest. Nigeria needs to diversify her aquaculture industry, which is based on mud catfish *Clarias gariepinus* to the neglect of other culturable species like *Tilapia*, Carp and *Chrysichthys spp.*

SAMPLE COLLECTION

Age and Growth Determination

A total number of 150 specimens in the range of 78mm and 414mm total length were used to determine the age and growth pattern of the fish. The total length, standard length and body weights of all samples were determined. Six scales

(900 in all) were removed with a pair of forceps from each of the specimens just above the lateral line directly beneath the leading edge of the dorsal fin and on the left-side of the fish. (Daget, 1962) and examined with a Scale Projector and binocular microscope at X20 magnification. Body length at the time of formation of the last (most recent) annulus was calculated for each fish using the formula:

$$L_i = c + \frac{S_i(L - c)}{S} \quad (\text{Ricker, 1968}).$$

RESULTS AND DISCUSSION

The means of total length, standard length and body weight of 150 specimens of “Wesafu” were calculated and presented in table 1. It shows the different age groups and percentage of all specimens examined; while Table 2 shows the length-frequency distribution of the age groups and indicated a considerable overlap in age group for any given length.

The growth of ‘Wesafu’, a Cichlid from Epe-Lagoon, Nigeria as shown in Figs. 1 and 2 reveals that it has greater culture potentials than others in the family. The largest specimen that was recorded during this study measured 414mm TL and weighed 1500g. These are far higher than the ones reported by other workers for the other members of the family (Holden and Reed, 1978; Lee 1980; Riehl and Baensch, 1991).

Table 1: Mean Total Length, Standard Length and Weight of “Wesafu” From Epe Lagoon

Age (mm)	Total length (mm)	Std. length (g)	Body weight	No. of Fish	% total
0+	103	85	79.1	69	46
1+	165	138	115.9	21	14
2+	326	268	804.1	42	28
3+	330	274	844.2	13	8.6
4+	353	294	1030.0	5	3.3

Table 1 above shows that all the fish species collected fall into five age group i.e. 0+, 1+, 2+, 3+ and 4+.

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Table 2: Length-Frequency distribution of the Age group of “Wesafu”

Total Length (mm)	Age (yr.)					Total No.
	0+	1+	2+	3+	4+	
397 – 425			1			
368 –396			2	1	2	5
339 –367			8	4	1	13
310 – 338			20	5	2	27
281 – 309			8	3		11
252 – 280			3			3
223 –251		3				3
194 – 222		2				2
165 – 193		5				5
136 –164	2	6				8
107 – 135	22	3				25
78 – 106	45	2				47
No. of Fish	69	21	42	13	5	150

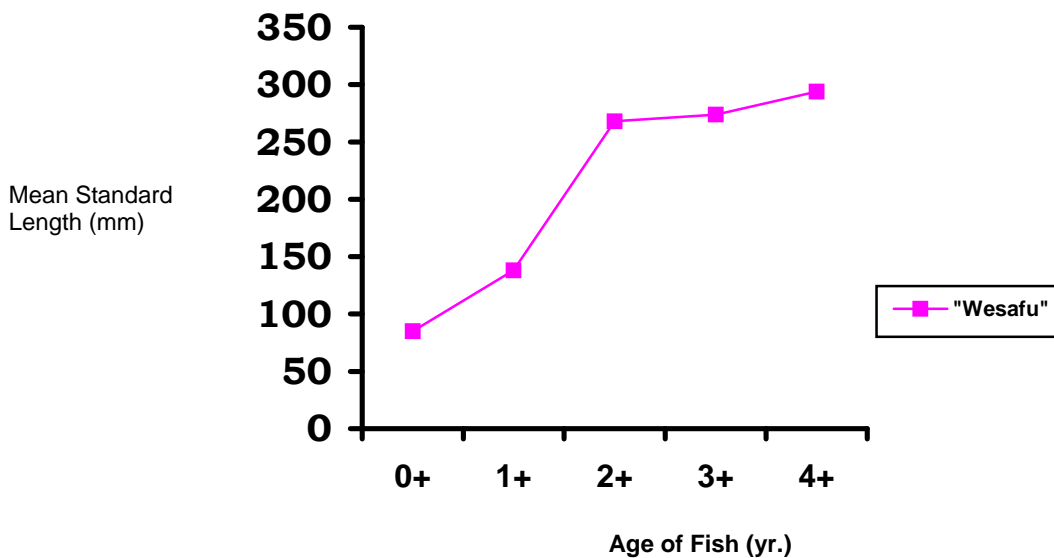


Fig. 1: Mean Standard Length/Age of “Wesafu”

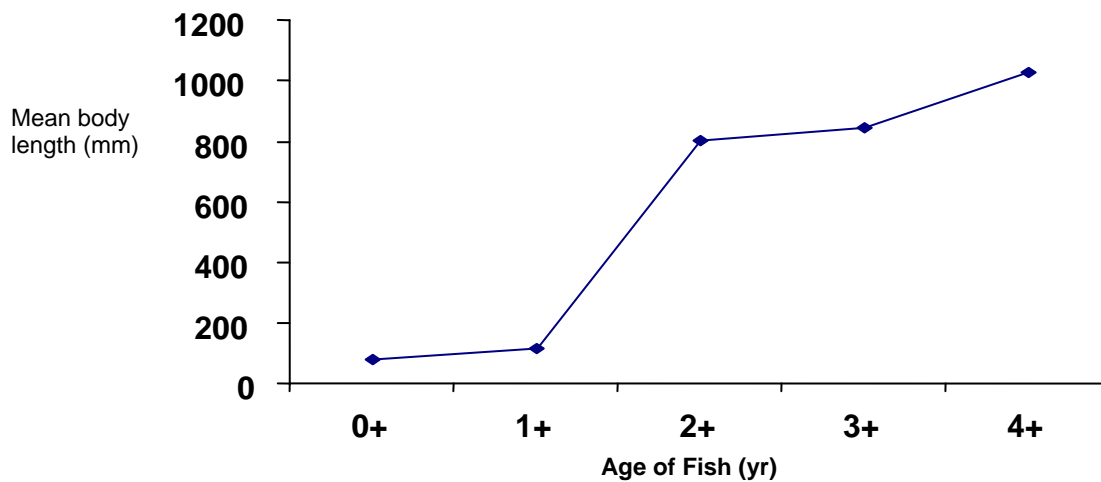


Fig. 2: Mean body length/Age of “Wesafu”

Sex data collected revealed no remarkable difference in the male:female for all age groups (Table 4). The male:female was 72:78, being approximately 1:1. This agrees with earlier report of Brutton and Allanson (1974) on *Oreochromis mossambicus*.

The age of “Wesafu” was determined with the assumption that one scale ring was formed per year. This is in line with the work on *Oreochromis niloticus*, *Tilapia zillii* and *Sarotherodon gallilaeus* by Baijot *et al.* (1997). Certain tropical freshwater fishes show seasonal growth marks that correspond to the onset of the dry season and could be used to determine growth, Lowe (1952).

The relationship between the scale radius and fish length was found to be linear i.e. the growth is isometric. Regression line was drawn from these data which cuts the abscissa at 38.88mm. The functional regression (Ricker, 1968) of scale radius on body length provided a good fit to the scale radius-total length data (Fig. 3).

This line was therefore used as the basis of total length back-calculations. It has been suggested that in *Tilapia* under conditions of stress such as starvation, body growths and scale are not necessarily isometric (De Bont, 1966).

Although fig. 5 shows a linear relationship between total length and scale radius, the slope of this curve many differ under different conditions of stress.

The total lengths of fish at the time of annulus formation were also obtained by back-calculation (Table 3). Comparisons were made between observed total lengths and back-calculated lengths for males and females (fig. 4 and fig. 5). The back –calculated lengths correspond with their respective body lengths in both males and females “Wesafu”. No significant difference between the mean back - calculated total lengths of males and females was obtained for age classes 1+ to 3+. In age class 4+ males were significantly longer than females which indicate a difference in growth rate.

The growth of fish is highly variable because of its great dependence on interactions of environmental factors such as water temperature, level of dissolved oxygen and ammonia and photoperiod (Brett *et al.*, 1969). There has not been any report of drastic environmental changes other than the annual seasonal fluctuations and since Bombata *et al.* (2006) reported that the fish feed on variety of food found to be abundant in the lagoon, genetics of the fish remains the only suspect for the good growth.

Table 3: Relationship between Back-calculated and observed total lengths of “Wesafu” (Sexes combined)

Age	Mean Total length at Capture (mm)	Mean Total length at Annulus Formation (mm)				No. of fish
		I	II	III	IV	
0+	103					69
1+	165	145±0.5				21
2+	326	204±0.9	258±1.1			42
3+	330	188±1.8	244±1.7	303±1.4		13
4+	353	185±1.4	267±3.8	306±3.7	337±3.4	5
Average calculated Total length		181±12.5	265±11.6	305±1.6	337.34	150

Table 4: Sex composition of “Wesafu” in each age group

Age	Male	Female	Combined	Percentage (%)	
				Male	Female
0+	32	37	69	46.38	53.62
1+	12	9	21	57.14	42.86
2+	19	23	42	45.25	54.76
3+	7	6	13	53.83	46.15
4+	2	3	5	40.00	60.00
Total	72	78	150	48.00	52.00

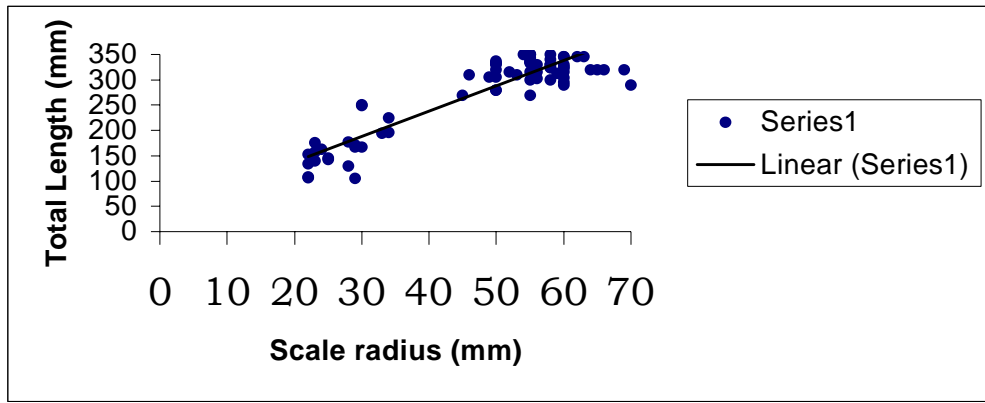


Fig.3: Relationship between fish total length (mm) and scale radius (mm). The scale radius cum fish length relationship was found to be linear. The regression line drawn from these data cut the abscission at 38.88mm.

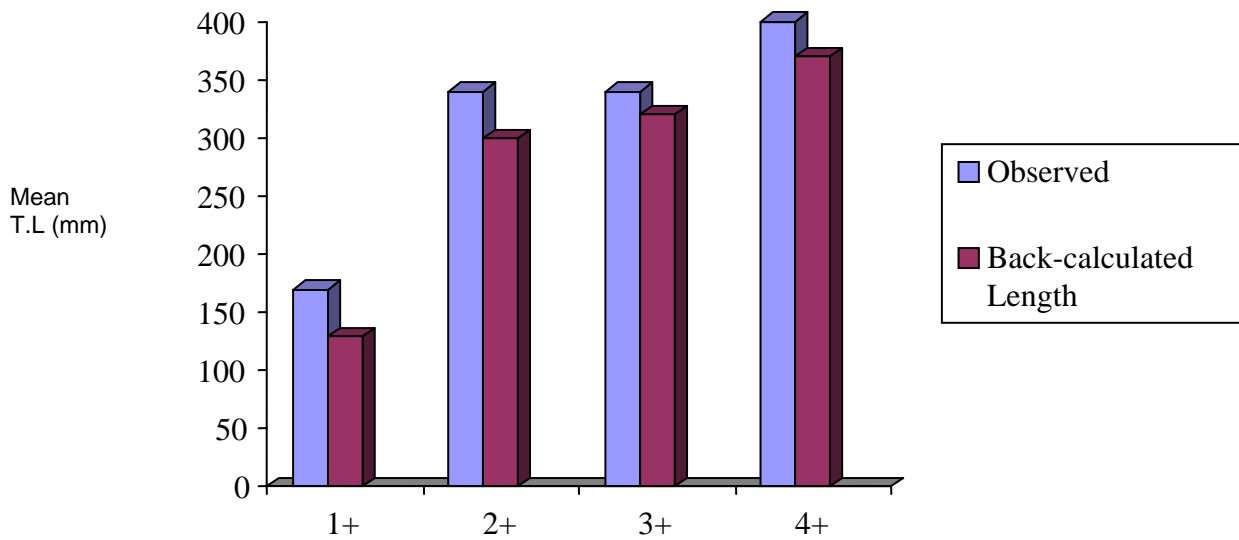


Fig. 4: Mean Observed total length and Back-calculated length from scales of female "Wesafu".

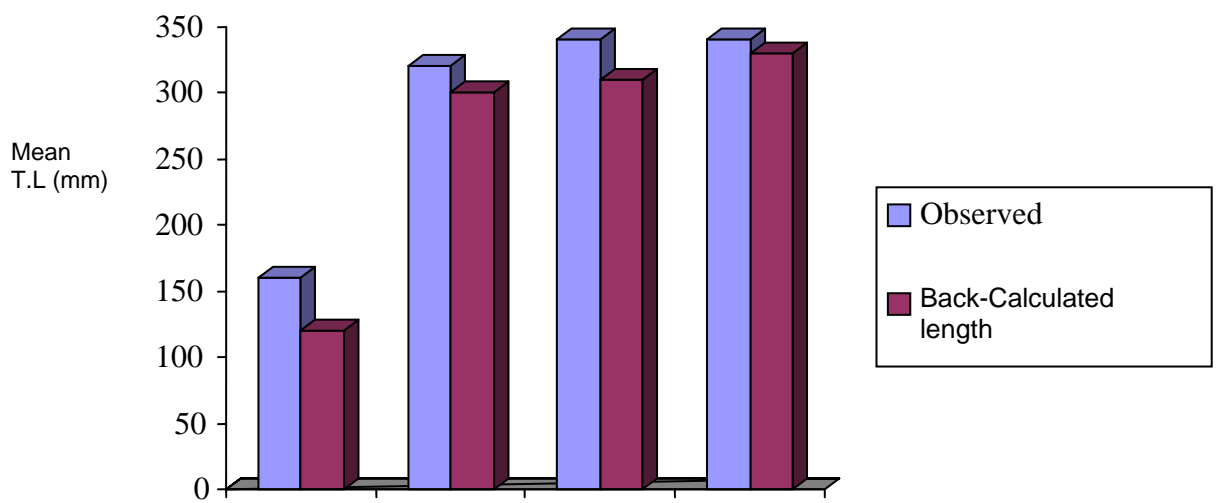


Fig. 5: Mean Observed total length and Back-calculated length from scales of female "Wesafu".

CONCLUSION

- The study shows that the maximum growth rings observed did not exceed four and as such less than five years. The fact that the fish is highly demanded and commands high price may result in over exploitation.
- This explains why only 5 of the 150 specimens were of the age 4+, representing only 3.33% of total number of specimens which raises serious conservation issue.
- The growth rate recorded for this study provide evidence that food is not a limiting factor for the growth of the "Wesafu"
- Aquaculture of this fish shall not only ensure the survival but commercial wxploitation of its genetics. This could form the future focus of works on this strain of Epe-Lagoon Cichlid in addition to proper identification and naming of the fish

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