

## LENGTH-WEIGHT RELATIONSHIP AND CONDITION FACTOR OF *Protopterus annectens* (OWEN) IN IDAH AREA OF RIVER NIGER, NIGERIA

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### ABSTRACT

*A total of 62 samples of Protopterus annectens (Owen) were examined for this study from Idah area of River Niger between August and November 2008. The length-weight relationship calculated for species gave a b-value of 2.55 which is indicative of negative allometric growth. It attained a length of 59cm and weight of 397g. The condition factor varied from 0.23 to 0.76 with a mean of 0.39±0.08 and showed that the fish was well and in good environment for growth and survival.*

**Keywords:** *Protopterus annectens*, Allometric growth, Survival, Length-weight relationship, Condition

### INTRODUCTION

Fish found in tropical and sub-tropical water system experience frequency growth fluctuations due to changes in food composition, environmental variables and spawning conditions among others. Length-weight and length-length relationships can be used to assess the influence of these factors in fish. Kulbicki *et al.* (1993) and King (1996) reported that fish growth, mean weight at a given body length of fish and the relative wellbeing in fish can be known through this relationship. Length-weight, length-length relationship studies have been for fishes in different water bodies. Notably among these are the report on some Nigerian fresh water fishes, Taiwo and Aransiola (2001) on *Chrysichthys* species in Asejire Lake, Fafioye and Oluajo (2005) on five fish species in Epe Lagoon, Nigeria and Laleye (2006) on *Oreochromis niloticus* in Oeume River in Benin.

*Protopterus annectens* commonly known as African lungfish is the only species of primitive family Lepidosirenidae found in West African freshwaters (Reed *et al.*, 1967). Holden and Reed (1972) reported that the ancient fish did not form any significant part of commercial catches and that the flesh is tasty but many traditional taboos prevent the eating of the species among the Hausas of Nigeria.

The study present information on the length-weight relationships and the condition

factor of *P. annectens* in order to aid its management in the river.

### MATERIALS AND METHODS

**Study Area:** The study area is Idah area of River Niger in Idah Local Government Area of Kogi State, Nigeria. The river extends from Lokoja via Ajaokuta, Itobe to Idah. The river is located on latitude 7°07'N and longitude 6°44'E. The water temperature range between 22°C and 31°C, Idah has a tropical savannah climate with two clearly marked season of wet between (April and October), and dry between (November and March). The cold harmattan wind is experienced between (November and February) when the hot season start and last until the rain begins. The highest water levels are between August and September and the lowest are between March – April. River Niger serves as a boundary between Kogi State and Edo State. Idah town is a commercial nerve centre between the two states where fisheries and aquaculture is practice.

**Sampling:** Fish samples were collected from the fishermen catches using gill nets and Malian traps between August and November 2008. Total length (cm) and weight (g) were taken using measuring board and top loading balance. Length-weight relationship was calculated using the formula:  $W = aL^b$  which was transformed to

**Table 1: Length and weight distribution of *Protopterus annectens* at Idah area of River Niger, Nigeria**

Species	Total length (cm)			Body weight (g)			
	n	Min	Max	Mean $\pm$ S.D	Min	Max	Mean $\pm$ S.D
<i>Protopterus annectens</i>	62	22.30	59.20	34.27 $\pm$ 3.33	19.70	397.90	158.00 $\pm$ 78.97

**Table 2: Condition factor (CF) of *Protopterus annectens* at Idah area of River Niger, Nigeria**

Parameters	Values
a	0.0183
b	2.552
r	0.9229
<b>Mean condition factor (CF)</b>	<b>0.39<math>\pm</math>0.08</b>

a, b = regression coefficient; correlation coefficient

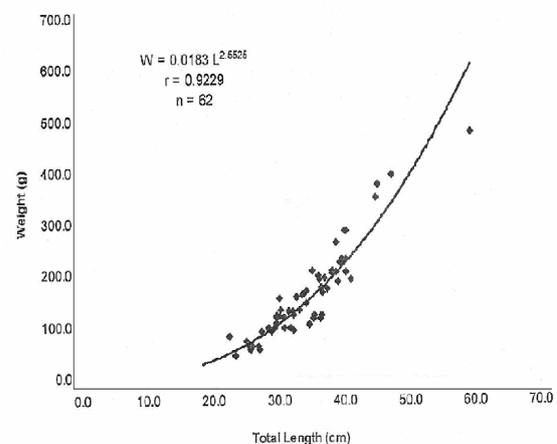
logarithm of the form  $\text{Log } W = \text{Log } a + b \text{ log } L$ , where  $W$  = body weight of the fish (g),  $L$  = total body length of fish (cm),  $a$  and  $b$  = values estimated by regression formula. The condition factor ( $k$ ) was calculated using the formula:  $K = 100w/L^3$  (Pauly, 1984), where  $K$  = condition factor,  $L$  = total body length of fish (cm) and  $W$  = body weight of fish (g).

## RESULTS AND DISCUSSION

A total of 62 species of *P. annectens* were collected for the study. The total length ranged between 22.30cm and 59.2cm with a mean of  $34.27 \pm 6.33$  and weigh between 19.70g and 397.9g with a corresponding mean of  $158.0 \pm 78.79$  (Table 1). This showed that the species used for the study were relatively matured. Condition factor (CF), parameter of  $a$ ,  $b$  and  $r$  of the length weight relationship of *Protopterus annectens* were as shown in Table 2 and Figure 1.

The exponent of ( $b$ ) value of 2.553 showed that *P. annectens* exhibited negative allometric growth. This indicated that growth in length increase as weight increases and also the rate of increase in body length was not proportional to the increase in body weight. This result is different from the one obtained by Oniye *et al.* (2006) when he obtained the  $b$ -value for male and female *P. annectens* in Jachi dam, Nigeria to be 3.12 and 3.22 respectively. This could be due to the condition of the fish caught during different season, location, sex,

sample site and nature of the water body. The regression coefficient of 0.9229 compares favourably with the 0.86 and 0.84 obtained by Oniye *et al.* (2006) for *P. annectens* male and female respectively which suggested that the findings of this study was valid. Fafioye and Oluajo (2005) also obtained a condition factor of 1.00 for some other fish species from Epe Lagoon.



**Figure 1: Length-weight relationship of *Protopterus annectens* at Idah area of River Niger, Nigeria**

**Conclusion:** The result of this study shows negative allometric growth pattern and it is a bit difficult to say if the environment is supportive of the growth, reproduction and survival of *P. annectens* especially as the specie is a threatened freshwater species (Bankole *et al.*, 1994). This couple with the condition factor obtained ( $0.39 \pm 0.08$ ) for it in Idah area which showed that the fish is not faring well.

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