Length-Weight Relationship and Condition Factor of *Pomadasys Jubelini* in the New Calabar-Bonny River, Nigeria

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Abstract: 413 samples of *Pomadasys jubelini* were obtained from the New Calabar-Bonny River and examined over a period of twenty four months. The length ranged from 8.50cm - 47.60 and the weight from 17.00g - 2320g. Females were longer and heavier than males. There was a strong and positive relationship between fish length and weight (r) = 0.91 for males and 0.99 females, and b value (b<3) indicating a negative allometric growth.The monthly condition factor (K) ranged from 0.00 – 1.16 for males and 0.01 – 2.15 for females. Generally, the fish were in good condition when caught however the conditoon factor varied among different sizes of the fish.
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Key words; Length – weight relationship, conditionn factor, *Pomadasys jubelini*

Introduction:

Pomadasys jubelini commonly called the grunter is of the family Pomadasyidae (curvier 1830). Three species are available to this family: *Pomadasys perotiti*, *P. rogeri* and *P. jubelini*. Of these species *P. jubelini* has been found in the New Calabar –Bonny River and constitute about 10% of its commercial catches (Idodo Umeh 2003). It is therefore necessary to provide information on the length - weight realtionship and condition factor of this species in order to provide and increase the knowledge of the stock available. The length-weight relationship of a fish is basically a measure of its growth pattern and or age. It also helps to evaluate the condition, reproduction history, life cycle and the general health of the fish species (Pauly, 1993). Growth is an important factor of biological production, which affects the overall production. Negative changes in growth rates may result in increased risk of predation and mortality (Fafioye and Oluajo, 2005). Studies on the length – weight relationship provides the basis for estimation of the average weight of fish of a given length group and also provides the understanding of morphorlogical comparisms between populations (Pauly, 1993). When the b-value is < 3, a fish has negative allometric growth, when = 3 it is said to have isometric growth, and when > 3 it has positve allometric growth. (Freose, 2006). It was further stated that for fish to maintain their shape as they grow their b-value must be equal to 3 however, the isometric value b=3 is for fishes that maintain a three dimentional equality (Froese, 2006).

Pomadasys jubelini as reported in Sierra Leone had "a'' value of 0.0328 and "b'' of 2.966. The fish studied exhibited a negative allometric growth (Froese, 2011).

Condition factor is an estimation of the general well being of fish, it is based on the hypothesis that heavier fish of given length are in better condition than those of lesser weight (Bagenal and Tesch, 1978 and Jones *et.al*., 1999). The condition factors of different populations of the same species give some information about the abundance of food environment al condition and duration of breeding (Ikomi and Odum, 1998).

The condition factor (K = 0.45) of *P. pellucida* of the lower Nun River revealed that the fish does not grow fast and approaches its maximum length at a relatively slow rate (Allison, 2006). He further suggested that the growth potential of a fish may be determined by factors such as genetic makeup, fishing regime and diet type.

Ogbe *et al*. (2006) reported a condition factor of K (1.51) for *Bagrus bayed* indicating that the fish were in good condition throughout the experimental period which was likely attributed to favourable environmental conditions and especially, availability of food. They also reported a b value of 3.92 which shows that the fish weight increased isometrically. Other studies on growth parameter K carried out on the Banded jewel (*Auchenoglanis occidentalis*) and *Clarias gariepinus* had + K values with b-values greater than 3. An indication that allometric growth was obtained (Oniye *et al*., 2006 and Useni, 2010).

The length – weight relationship of the same species may be different in the population because of feeding, reproduction activities and fishing. It is therefore necessary to know the length weight relationships of fish which are captured in a given place and given time. Information of the length - weight relationships of *Pomadasys jubelini* is scarce hence this study is conducted for the purpose of

establishing the length weight relationship of *Pomadasys jubelini* in the New Calabar – Bonny River, Rivers State Nigeria.

Materials and Methods:

Pomadasys jubelini were collected from catch landings of fishermen using hooks, gill net, traps and calabashes monthly, from June 2011 to May 2013 (24) calendar months from the New Calabar-Bonny River. The fish were transported in an insulated box containing ice chips to the fisheries laboratory of Department of Fisheries and Aquatic environment, Rivers State University of Science and Technology, Porthacourt, where the fish were identified and the standard length (cm) and total length (cm) and weight (g) of the fish was determined. The length-weight relationship of the fish was estimated by the equation $W = aL^b$; where W= weight (g), L= length of fish (cm), a and b = regression coefficient and slope respectively. The logarithm-transformed data will give the linear regression equation:

$$\text{Log } W = \log a + b \log L$$

Condition Factor (K) was estimated by the relationship $K = \frac{W \times 100}{L^3}$

Where K = condition factor, L= Total length (cm), W = Weight of fish (g)

Results

The length of *Pomadasys jubelini* sampled ranged from 8.50cm - 47.60cm (SL) while the weight ranged from 16.0g – 2320.0g. The largest male fish weighed 890.1g, while the largest female fish weighed 2320.0g. Females were longer and heavier than males. Correlation coefficients (r) for male and female fish were 0.68 and 0.97 respectively. The regression coefficient b for male and female fish were 0.79 and 0.59 respectively (Table 1), generally it was observed that fish weight increased as its length increased though b values were not greater than 3. The mean monthly condition factor (K) ranged from 0.01 – 1.87. The highest values were obtained in December, January and February. The variation in condition factor is given in Figure 1. Individual condition factor of fish increased with increase in size of fish irrespective of sex.

Table 1. Length – weight relationship of male and female *Pomadasys jubelini*

Sex	a	b	r	r^2
Male	0.23	0.79	0.68	0.46
Female	0.31	0.59	0.97	0.94
Combined	0.31	0.59	0.96	0.93

a = regression intercept, b = regression coefficient, r = correlation coefficient.

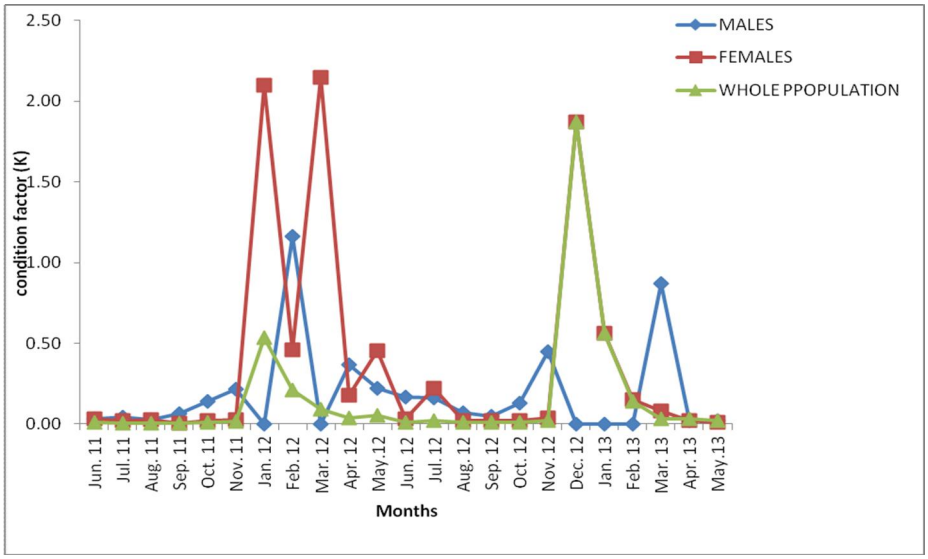

Figure 1. Condition factor for *P. jubelini* in the New Calabar – Bonny River

Discussion:

The maximum length of *Pomadasys jubelini* obtained in this study (55.30cm) and weight (2320g) are much higher than the lengths of 20 – 30cm and 50cm in Lake Kianji. In Senegal, length and weight of 32.10cm and 882.4g have also been reported in River Ase (Nigeria) (Reed *et al*., 1967, Idodo-Umeh, 2003, and Froese and Pauly, 2013). This variation in length and weights may be related to the growth stages, the level of exploitation of the fish species in different water bodies, predation by other fish species, nature of the aquatic environment and abundance of food for the fish species. Although King (1996) stated that the maximum size attainable for a fish is generally location specific.

The length - weight relationship of *P. jubelini* showed positive correlations in both sexes, indicating an increase in weight with increase in length. The regression exponent (b<3) for both sexes indicates a negative allometric growth pattern, that is the fish becomes heavier for its length as it grows longer (Tesch, 1968), or more preferably, an increase in stoutness as the fish increases in length (Pauly, 1984). Similar findings were made by Abowei and Davies (2009), and Deekae *et al*. (2010), where negative allometric growth (b=0.88 and b=2.88) for the studies of *Clarotes laticeps* in the water reaches of the lower Nun River, Niger Delta and *Alectis alexandricus* in Bonny River, Nigeria, respectively. Negative allometric growth pattern were also observed by Bahar *et al*. (2008) in the study of *Arnoglossus thori* and *Solea solea* in the Aegean Sea. This result is in contrast with the findings of Onimisi and Oniye (2010), were b (b>3) in the study of *Auchenoglanis occidentalis* in Zaria and that of Ikomi and Odum (1998) were isometric (b=3) growth pattern was obtained for *Chrysichthys auratus* in River Benin. The length-weight relationship of fish are affected by a number of factors such as season, habitat, gonad maturity, sex, diet and annual differences in environmental conditions (Bagenal and Tesch, 1978). Such differences in b values could be attributed to or combination of the difference in the number of species, sizes of species, geographical location and season (Froese, 2006).

The mean condition factor (K) varied during the different months and was higher during the dry months which coincided with the period when larger sizes but fewer numbers of fish were caught. The smaller sizes though more in number which were obtained in the wet season (May – September) had very low K values. In the study of *Chrysichthys nigrodigitatus* in Epe Lagoon, the K values obtained ranged from 0.15 – 0.79 (Fafioye and Oluajo, 2005) and *Alectis alexandricus* in Bonny River with K = 0.126 ± 0.02 (Deekae, 2010). The results of condition factor in this study did not tell the well being of the fish especially as the fish increases in stoutness as the fish grows larger. However, months with fewer samples of fish gave higher condition factor value. The condition factor of fish as stated by Bagenal and Tesch (1978) also varies among same species in different locations.

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