Length – Weight, Length – Length Relationship and Condition Factor of *Synodontis resupinatus* At Idah Area of River Niger, Nigeria.

ADEYEMI, Samuel Olusegun

Department of Biological Sciences, Kogi State University, P.M.B. 1008, Anyigba
E-mail: sadeyemi2003@yahoo.com
Tel: +2348062221968

Received 23rd August, 2010, Accepted 19th December, 2010

Abstract
Length-weight, length-length relationship and condition factor of male, female, combined sex and juvenile of *Synodontis resupinatus* from Idah area of River Niger, Nigeria was studied. A total of 143 fish samples were collected from the fishermen catches using gill nets and Malian traps between August and December 2007. Length-weight relationship was calculated using the formula \( W = aL^b \) which was transformed to base 10 logarithm. Fish sampled had total length ranging from 8.20cm to 16.60cm and weight between 2.25g and 76.05g. Results showed that the male, females, combined sex and juveniles had regression coefficient (b-value) of 3.02, 3.23, 3.13 and 2.19 respectively, while the condition factor of all the sampled population varied from 1.03 to 2.55. Females were in better condition than males and there was no significant difference (\( P>0.05 \)) between sex. The Idah area of River Niger in Kogi State is a good environment for growth, reproduction and survival of the fish species.

Keywords: Length-weight relationship, Length-length relationship, Condition factor, *Synodontis resupinatus*.

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 of (1996) on some Nigerian fresh water fishes, Taiwo and Aransiola (2001) on *Chrysichthys* species in Asejire Lake, Fafioye and Oluojo (2005) on five fish species in Epe Lagoon, Nigeria and Laley (2006) on *Oreochromis niloticus* in Oume River in Benin. *Synodontis* accounts for important parts of the commercial catches in Northern Nigeria and, according to Reed *et al* (1967), they are available through out the year. In the River
Niger, *Synodontis* accounted for 18.00% by number and 18.68% by weight of the total fish caught (Mortwani and Kanwai 1970). The study present information on the length-weight, length – length relationship and condition factor of this valuable fish species and will 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 $7^\circ07'N$ and longitude $6^\circ44'E$. The water temperature range between $22^\circ C$ and $31^\circ C$, 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 December 2007. All sampled fishes were identified to species level using Reed *et al* (1967). 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 logarithm of the form

$$\log W = \log a + b \log L,$$

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).

**Result and Discussion**

A total of one hundred and forty three species of *Synodontis resupinatus* were collected for the study. The length and weight distribution of *S. resupinatus* were males 8.20 and 15.00cm/9.00 to 48.00g, females 8.70 and 16.60cm8.75 to 76.05g, combined sex 8.20 to 16.60cm/8.75 to 76.5g and the juvenile had 4.70 to 9.30cm/2.25 to 12.00g (Table 1).
Table 1: Length and weight distribution of *Synodontis resupinatus* at Idah area of River Niger, Nigeria

<table>
<thead>
<tr>
<th>Sex</th>
<th>Standard length (cm)</th>
<th>Body weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Min</td>
</tr>
<tr>
<td>Male</td>
<td>42</td>
<td>8.20</td>
</tr>
<tr>
<td>Female</td>
<td>45</td>
<td>8.70</td>
</tr>
<tr>
<td>Combined sex</td>
<td>87</td>
<td>8.20</td>
</tr>
<tr>
<td>Juveniles</td>
<td>56</td>
<td>4.70</td>
</tr>
</tbody>
</table>

n = Number, Min = Minimum, Max = Maximum, SD = Standard Deviation.

The length-length relationship also had a regression coefficient (b – values) of 1.5645, 2.8015, 1.968 and 0.9668 respectively for males, females, combined sex and juveniles (Table 3).
The condition factor (K) ranged between 1.24 to 2.00, 1.20 to 2.16 and 1.03 to 2.55 for all the sex’s with the females being significantly (P<0.05) larger than males (Table 4).

The b – values obtained were 3.02, 3.23, 3.13 and 2.19. This indicated that while males and females showed positive allometric growth, juveniles exhibited negative allometric growth based on Bagenal and Tesch (1978) criteria of 3. Similarly Paul (1984) reported that b – values of greater than 3 denotes allometric growth; this is similar to the findings of Entusa-Mensah et al (1995) that recorded b – values of 2.9 for males. Ofori-Danson et al (2002) did report b-value of 3.01 for females which suggest that the findings of this study is valid. The b-value of this study is also similar to the findings of Olatunde (1989) for Synodontis schall. This showed that Synodontis resupinatus obeyed the cube law of growth (Le Cren, 1951) which is not commonly obeyed by most fishes. Etim (2000) and Fafioye and Oluajo (2005) respectively reported b – value of 2.951 and 3.042 for Chrysichthys nigrodigitatus. The b-value recorded during this study were similar with 1.53 to 2.55 reported by Ekanem (2006) for Chrysichthys nigrodigitatus (Laceped) from Cross River and also higher than 0.79±0.15 which is less than 1.0 as reported by Fafioye and Oluajo (2006) for C. nigrodigitatus from Epe lagoon, this could be due to difference in the condition of the habitat. Females have better condition factor than the males during the period of this study.
References

---

**Fig 1:** Length-weight relationship of male *Synodontis resupinatus* at Idah area of River Niger in Kogi State

**Fig 2:** Length-weight relationship of female *Synodontis resupinatus* at Idah area of River Niger in Kogi State

**Fig 3:** Length-weight relationship of combined sexes of *Synodontis resupinatus* at Idah area of River Niger in Kogi State

**Fig 4:** Length-weight relationship of juveniles *Synodontis resupinatus* at Idah area of River Niger in Kogi State