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## Research Article

# Growth Characteristics of *Pollimyrus isidori* (Mormyridae) in Warri River at Agbarho, Delta State, Nigeria

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## Abstract

**Background and Objective:** Information on the biology of *Pollimyrus isidori* is scarce in Warri River at Agbarho despite its abundance and usefulness. The study was conducted to fill in gaps in knowledge on the biology of *Pollimyrus isidori* with emphasis on the length weight relationship and condition factor. **Materials and Methods:** The growth characteristics of *Pollimyrus isidori* (Mormyridae) in Warri river at Agbarho, Delta state, Nigeria was studied between April and August, 2015. The Length-weight relationship (LWR) of the fish was evaluated using the equation:  $W = a L^b$  while the condition factor of the fish was determined using the equation:  $K = 100 W L^{-b}$ . **Results:** The parameters 'a' and 'b' of the length-weight relationship of *Pollimyrus isidori* were 1.37 and 2.30 for immature, 1.03 and 2.72 for female and 1.20 and 1.00 for male, respectively. The "b" value reflected negative allometric growth pattern. The condition factor, k values were 0.84, 0.829 and 0.692 for immature, male and female, respectively. **Conclusion:** The study of the length-weight relationship and condition factor of *Pollimyrus isidori* of Warri river at Agbarho indicated that the fish became thinner as it increased. A further ecological investigation over a much longer study duration is recommended.

**Key words:** Growth pattern, *Pollimyrus isidori*, Agbarho, Warri river, Delta state

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**Competing Interest:** The authors have declared that no competing interest exists.

**Data Availability:** All relevant data are within the paper and its supporting information files.

## INTRODUCTION

Information on the growth characteristics of this mormyrids species *Pollimyrus isidori* is scarce in Warri river at Agbarho despite its abundance and usefulness. Available works on mormyrids in Nigeria include those of King<sup>1</sup>, Ikomi<sup>2</sup>, Nwani<sup>3</sup>, Nwani *et al.*<sup>4</sup> and Olopade<sup>5</sup>. The present study is intended to fill in gaps in knowledge on the biology of mormyrids with emphasis on the length weight relationship and condition factor.

Mormyrids are abundant in Warri River at Agbarho and can be said to be a major economically important family in the water body. Among the common species are the trunkfish, *P. isidori*. *Pollimyrus isidori* possesses black spots on the body which are distinct and numerous in the head region<sup>6</sup>. According to Idodo-Umeh<sup>6</sup>, this species grows to the size of 9 cm, weighs about 7.5 g and feeds on detritus, algae and insect larvae in lakes, streams, rivers and swamps. Their flesh is very tasty and is an essential source of protein for humans. They are also useful diet components for livestock, serve as bait for fishermen and used as exotic fishes in aquariums.

Length-weight relationship is an important tool which provides information on the function and structure of fish

populations<sup>7</sup> while condition factor (K) indicates the general welfare/well being of a fish. It is calculated from the length and weight values and can be used to understand changes in the life cycle of fish species<sup>8,9</sup> and their nutritional condition<sup>10</sup>.

## MATERIALS AND METHODS

**Study area:** The study was carried out in Warri river at Agbarho in Delta state, Nigeria. Warri river lies within latitude 5°21'-6°00' N and longitude 5°24'-6°2' E (Fig. 1). The river is fed principally by ground seepage from an aquifer in the thick rainforest of Utakwa-Uno in Ndokwa, southern-Nigeria and runs in a southwest direction passing between Ovierie and Ovu-inland and southwards at Odiete through Agbarho to Otokutu and Ugbolokposo<sup>11</sup>. It turns southward to Effurun and forms a 'W' between Effurun and Warri.

**Collection and preservation of fish samples:** Fresh specimens (55 samples in total) of *P. isidori* were collected from fishermen at Agbarho from April-August, 2015. They were identified to species level using the fish guide of

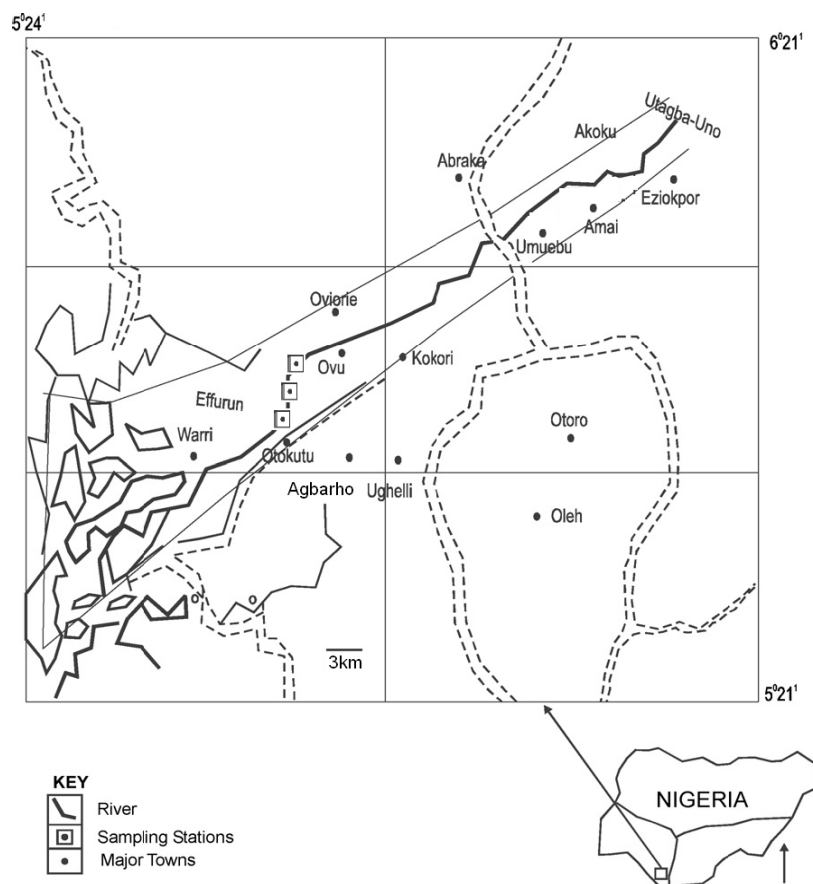


Fig. 1: Map of the study area showing the sampling stations in Warri river at Agbarho

Table 1: Parameters of length-weight relationship of *Pollimyrus isidori*

Sex	n	Length range (cm)			Weight range (g)			a	b	r	k
		Min	Max	Mean	Min	Max	Mean				
Immature	18	7.5	14.50	11.04	4.5	17	11.43	1.37	2.30	0.5335	0.84
Female	17	8.5	17.00	10.00	5	18	8.29	1.03	2.72	0.3800	0.829
Male	20	8.5	17.00	12.56	5	36	13.72	1.20	1.00	0.9112	0.692

n: Number examined, a: Intercept, b: Slope, r: Correlation coefficient, k: Condition factor, Min: Minimum, Max: Maximum

Idodo-Umeh<sup>6</sup>. The standard and total length of each was measured to the nearest of 0.1 cm using a measuring standard board and weighed to the nearest 0.1 g using an Shimadzu electronic weighing balance manufactured in India. Biometric data taken were used to evaluate growth pattern and condition factor (K).

The Length-weight relationship (LWR) of the fish was evaluated using the equation<sup>12</sup>:

$$W = a L^b \quad (1)$$

Where:

- W = Weight (g)
- L = Standard length (cm)
- a = Regression constant
- b = Regression coefficient

The parameters a and b were estimated by linear regression logarithmically transformed weight and length data to give the equation<sup>13</sup>:

$$\text{Log } W = \text{Log } a + b \text{ Log } L \quad (2)$$

For each of the species, the data collected were authenticated by the analysis of the graph corresponding to length-weight relationships<sup>14</sup>. The degree of association existing between the variables was obtained by the determination coefficient (r). The regression coefficient (b) value was used to determine the condition factor of the fish using the equation<sup>15</sup>:

$$K = 100 W/L^3 \quad (3)$$

Where

- K = Condition factor
- W = Total body weight (g)
- L = Standard length (cm)
- b = Growth exponent

## RESULTS

The length-weight relationship, coefficient of correlation (r) and condition factor (k) for the immature,

female and male *P. isidori* are shown in Table 1. The intercept (a) ranged from 1.03-1.37 showing high heterogeneity among the species. The growth exponent (b) ranged from 1.00-2.72 indicating negative allometric growth. The r value ranged from 0.3800-0.9112 for the three different categories showing a poor to very good relationship between length and weight. The condition factor ranged from 0.692-0.84 with the immature having the highest recorded value.

## DISCUSSION

Length/weight relationship (LWR) of values obtained for *P. isidori* during the study was fairly poor to very good correlation in the increase in length and gain in weight. This information is vital for adequate management of the species in the river<sup>8,9</sup>. The mean "b" and "r" values recorded for the species during the study was lower than records from rivers in south-eastern region of Ivory Coast<sup>16</sup>. However, the "a" value observed in this study was higher than the value reported by Konan *et al.*<sup>16</sup>. According to Andrade and Campos<sup>14</sup>, the value of the coefficient estimated for a species is likely to vary between areas. The immature mormyrid exhibited relatively higher k values compared to the matured female and male categories. "K" values, is not constant for species or families but is subject to wide variations for fish of an average natural condition<sup>17</sup>. According to Nehemia *et al.*<sup>18</sup>, the differences in "K" values between and within species can be attributed to the differences in stress level, season, sex and availability of feeds, as well as the water quality parameters. The overall mean "K" value observed in this study is lower than the value recorded from Challawa Gorge Dam in Kano<sup>19</sup>.

## CONCLUSION

The study of the length-weight relationship and condition factor of *P. isidori* of Warri river at Agbarho indicated that the fish became thinner as it increased in size and were not in the best of conditions. More research investigations possibly for a much longer duration together with the physical and chemical characteristics of the water are recommended.

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