LENGTH FREQUENCY DISTRIBUTION AND LENGTH-WEIGHT RELATIONSHIP OF *Schilbe mystus* FROM LEKKI LAGOON IN LAGOS, NIGERIA

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ABSTRACTS

Length-weight relationship and length-frequency distribution of 6months samples of *Schilbe mystus* from Lekki Lagoon were estimated. The length range was 10.1 – 20.7cm for both sexes. The young fish did not constitute the highest percentage of all the catches. The parameters a and b of length-weight relationship were -2.075 and 2.938, that is, the regression constant and the regression presented an inverse relationship. The species exhibited negative allometric growth. The importance of the estimated length-weight relationship parameters to the assessment of *Schilbe mystus* in Lekki Lagoon was highlighted.

Key words: Allometric growth, Epe, modal length.

INTRODUCTION

The Lekki Lagoon artisanal fisheries are dependent on the Lagoon fisheries resources of which *Schilbe mystus* is a major resource. The livelihood of artisanal fisherman therefore depends on the continual availability of the Lagoon resources. Schilbeids are found in African and Asian freshwaters[1]. *Schilbe mystus* is important both in ecological and economical terms, playing salient role in determining the dynamics and structure of aquatic ecosystem and is valued as food for man; serving as delicacy for many low income earners as it is cherished for its taste and affordable price.

Length frequency distribution measurements are fundamental to many aspects of fisheries science. The required precision of length sample depends on the purpose of the sampling. But regardless of the type of assessment that is used, the shape of the length frequency is of interest, rather than simple summary of statistics such as mean or variance.[2] Length frequency distribution of any fish is important to know the status of the size structure of that fish population in nature. It is the first step to evaluate gear selectivity of catches made by different kinds of gear fished in the same water[3].

One of the most commonly used methods in the analysis of Fisheries data is length-weight relationship[4]. In fisheries research, length-weight relationships are important for the estimation of weights where only length data are available[5] and it is an index of the condition factor of the fish[6,7]. It is of great importance in studies on fisheries biology[8] and on the evaluation of fish stocks[9,10]. Furthermore, standing crop biomass can be estimated[11] and seasonal variations in fish growth can be tracked using length-weight relationship[12].

The ability to determine the age of fish is important in fishery biology. Age data in conjunction with length and weight measurements, can give information on stock composition, age at maturity, life span, mortality and production.

The objective of this study is to examine the length frequency distribution and length-weight relationship of *Schilbe mystus* in the Lekki Lagoon with the view of obtaining information required for scientific management of this resource.

MATERIALS AND METHODS

This study was carried out in the Lekki Lagoon, which is part of the Lagoon system in the western coast of Nigeria which is part of the Lagoons of Guinea coast of West Africa stretching from Cotonou, Republic of Benin up to Warri, Delta state, Nigeria[13]. It is a large expanse of shallow freshwater covering an area of 247 square kilometers. It lies between longitude $4^{o}\ 00^{1}$ and $4^{o}\ 15^{1}$E and latitude $6^{o}\ 25^{1}$ and $6^{o}\ 37^{1}$N. It receives water from River Oni in the North eastern part and from Rivers Oshun and Saga in the North western part of the Lagoon. It opens into the sea through the Lagos Lagoon and Lagos harbor.

The specimens for this study were collected between January and June, from the fish depot at Epe. Identification of the species was done using the technique proffered by Olatunde[14]. The fish were chilled with ice-blocks in an ice-chest and transported to the laboratory where they were preserved by deep-freezing prior to examination. Specimens were weighed (±0.1g) using Top loading weighing balance (Model P12OON). Measurements of the total and standard lengths were taken for each specimen after excess water on each has been drained with filter paper. Measurement of length was taken to the nearest 0.1cm using a fish measuring board. The total length of the fish (TL) is measured as the distance from the tip of the snout of the fish, with the mouth closed, to the tip of the longest caudal fin ray while the standard length (SL) is taken as the distance from the tip of the snout of the fish, with the mouth closed, to the end of the caudal peduncle. The data from samplings were grouped into length classes of 2cm interval for subsequent analysis.

The length-weight relationship was estimated using the equation

$W = aL^{b}$

Where,

W = Weight

L = Total length

a = Regression constant

b = Regression coefficient

The values of constant 'a' and 'b' were estimated from log transformation values of length and weight as shown below.

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

The analysis was carried out using Microsoft Excel.

RESULTS AND DISCUSSION

ranging from 10.1 – 20 16.7cm. Specimens with total length range of 10-11.9cm were only collected in January and they made up of 20% of January collection. Specimens with total length range of 12 – 21.9cm were collected in March and April. In June, specimens with total length less than 14cm were absent while in January specimens with total length more than 19.9cm were absent. Between April and June, the samples collected were dominated by specimens with total length range of 16-17.9cm. The length-frequency distribution shows a prominent peak with a preponderance of specimens of total length range of 17-18.9cm over others (Fig. 1).

Figures 2 and 3 are the plots of the raw data and the logarithmic transformation of the length-weight relationship for the species respectively. A scatter plot of the body weight against total length is a curvilinear relationship showing an increase in weight with increasing body length. The length-weight relationship obtained for *Schilbe mystus* is Log W = -2.075 + 2.938 Log L. There is linear relationship, however, between the length and weight as indicated by the high correlation (r) of 0.959. The value of 2.938 for b shows that the growth of the species is allometric.

Length-weight relationship data are important for fishery management. An exponent (b) value of 3 in length-weight relationship of fishes is said to be isometric, that is, the fish does not change its form along the ontogenetic growth[15]. If b value is different from 3, the growth is said to be allometric, that is, the fish changes shape as it grows bigger. Allometric growth is positive when it is greater than 3 and negative when it is lesser than 3. If the fish gets thinner as it grows bigger, the growth is negative and if it becomes plumber as it grows, it is positive allometry. This indicates that growth rate, growth dynamics and the condition of fish population can be obtained from the length-weight relationship and these will be useful in the management of the species.

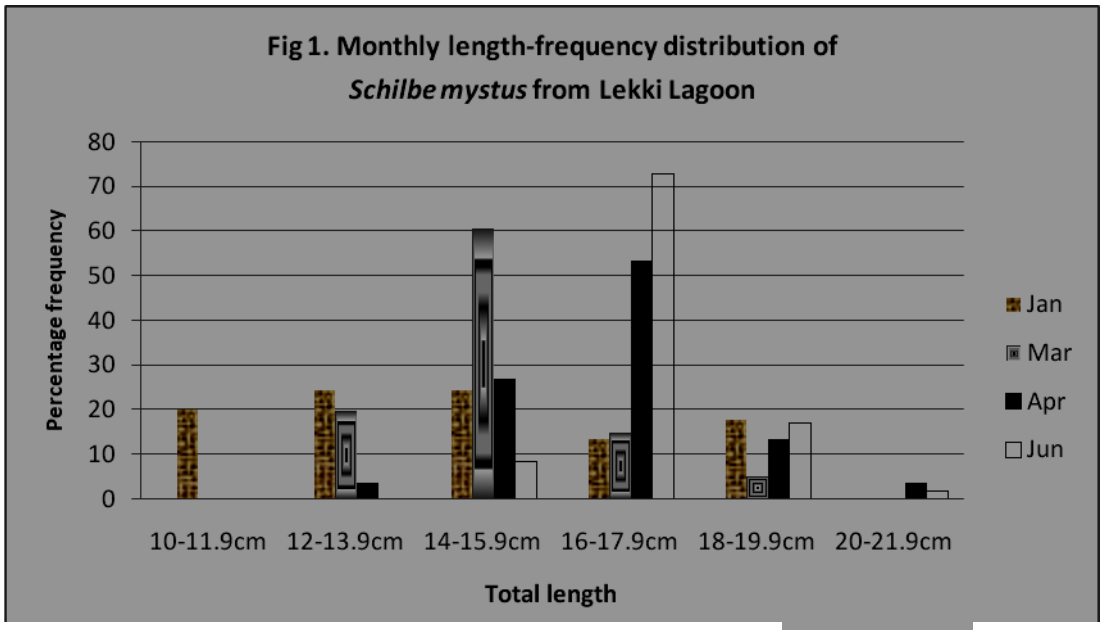


Fig 1. Monthly length-frequency distribution of
Schilbe mystus from Lekki Lagoon
Percentage frequency
80
70
60
50
40
30
20
10
0
10-11.9cm
12-13.9cm
14-15.9cm
16-17.9cm
18-19.9cm
20-21.9cm
Total length
Jan
Mar
Apr
Jun

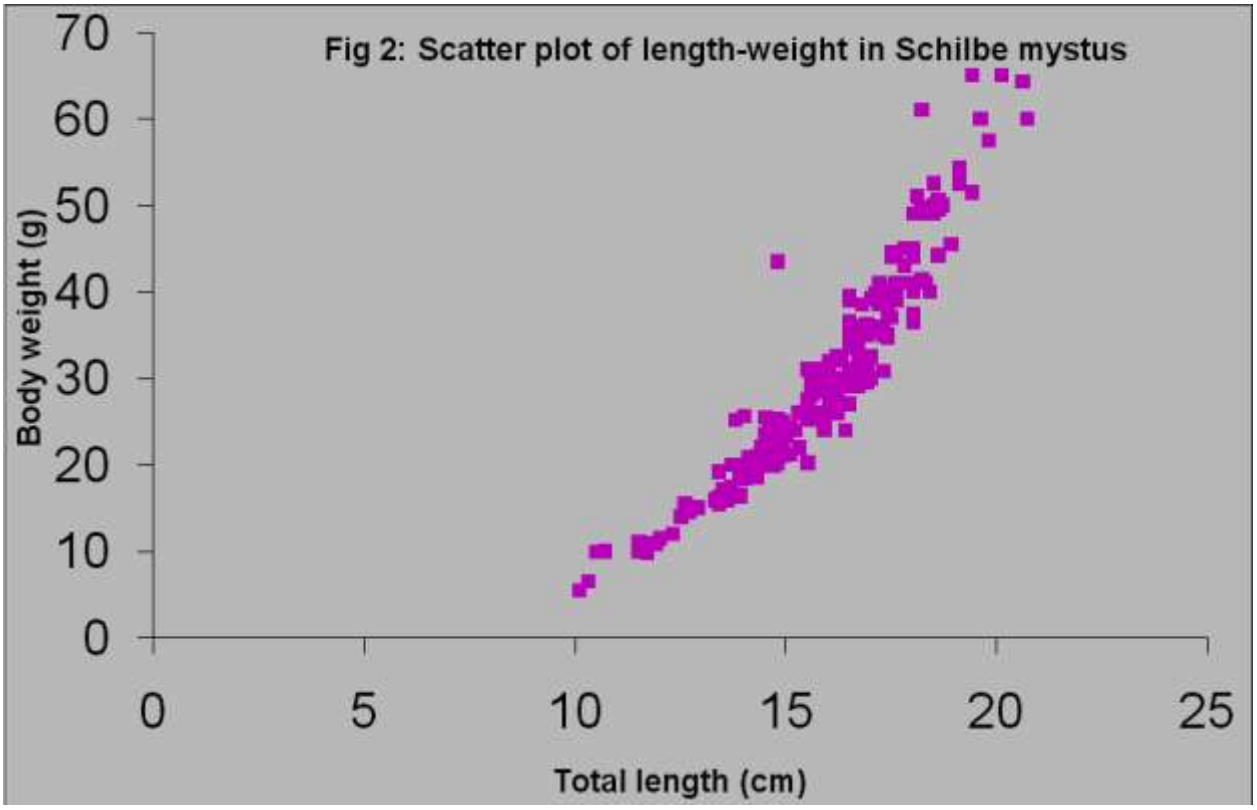
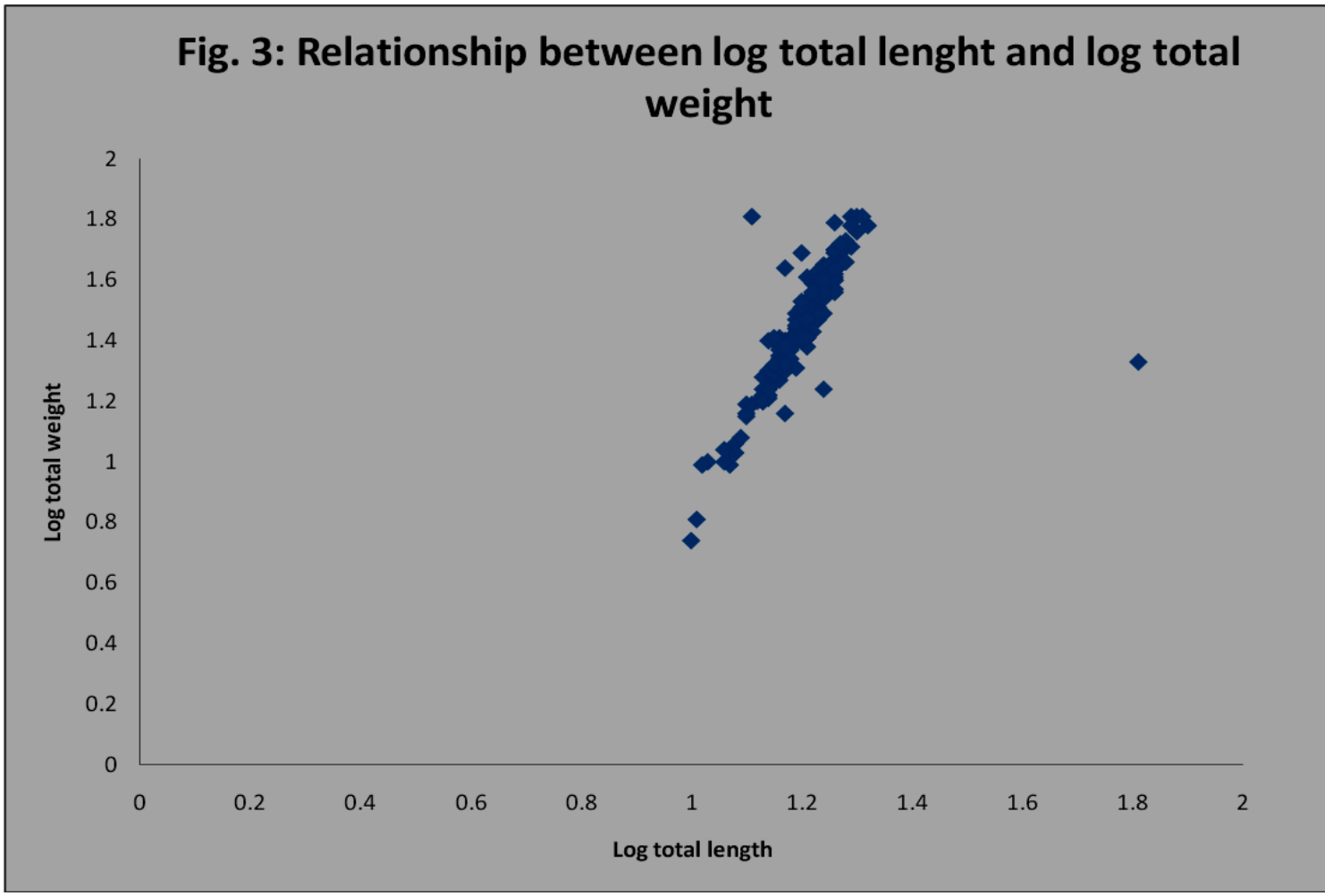


Fig 2: Scatter plot of length-weight in Schilbe mystus
Body weight (g)
70
60
50
40
30
20
10
0
0
5
10
15
20
25
Total length (cm)



The length frequency distribution is useful in the determination of age and growth. The length composition of a population often exhibits modes among fishes with short spawning season and a rapid and uniform growth, from which the modal length of the first few age groups can be easily determined [3]. *Schilbe mystus* though has short spawning season[16], the result obtained for length-frequency distribution did not give any tangible information since the modes were not pronounced among the young ones. This is expected since out of 225 specimens used in this study, only 9 specimens were below 12cm total length and this may be explained as being due to the fishing gears used in collecting the specimens which may be said to be biased particularly for fish above 12cm total length. This finding has management implication for resource sustainability. However, further research is needed in this area using selective gears to determine and establish the true picture of the length frequency distribution of *Schilbe mystus* in Lekki Lagoon.

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