

Studies on Length-Length Relationship of Cat Fish *Mystus armatus* from Aurangabad Region

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Abstract: *Mystus armatus* commonly called as katarana. The present study aims to analyze the morphometric character of fish. Length frequency distribution, length-length relationships are presented this work. Length-length relationships were estimated by regression equation method. The results indicated that length-length relationship (LLR) was highly co-related, $r^2 > 0.71$; $p < 0.001$. All the morphometric relationships were linear, positive.

Keywords: Length-length relationship, *Mystus armatus*, total length, standard length, fork length, head length, dorsal length

1. Introduction

A variety of morphological, physiological, behavioral and biochemical characteristics are used to identify and classify the fishes. In practices though, it is more common to use morphometric measurements (i.e. body length, body depth, head length, eye diameter, jaw length) and meristic (i.e. fin ray, scale, teeth, gill raker, and lateral line pore counts). These morphometric measurements are usually presented as a proportion of standard, fork and total length. (Howe, 2002). Morphometric measurements and statistical relationships of fishes are imperative for both fishery biology (Sparre et. al. 1989; Mustafa & Brooks 2008) and taxonomy studies (Tandon et al 1993; Simon et al 2010a). It is very important especially in comparative studies which little information seems to be available for fish species (Froese and Pauly, 2005). Length-length relationship help in inter-conversion of total length data with other morphometric characters (Manimeghalai, 2010)

The present study was undertaken with the objective to estimate length-length relationship in fresh water fish *M. armatus*.

2. Material and Method

Fish samples (fishes) were collected randomly from local fish market. Specimens were preserved in 5% formalin and then identified with the help of Jayaram . Length measurement was taken. Total length was measured from the anterior tip of the longest jaw to the most posterior part of the tail, standard length was measured from anterior tip of the upper jaw to the tip of hypural bone (urostyle), fork length was measured from the anterior tip of upper jaw to

the median point of the caudal fin, dorsal length was measured from anterior tip of upper jaw to the posterior end of dorsal fin, head length was measured from anterior tip of upper jaw to posterior end of head (Laevastu, 1965) to the nearest 0.01 cm.

Length-length relationship was qualified according to Pauly (1983) by regression equation, the relationship equation can be summarized by equation from

$$Y = a + bX$$

Where x and y are two variables. a is intercept and b is slope or regression coefficient. The degree of association between two variables is expressed as the correlation coefficient r, and the coefficient of determination as r^2 which is example of degree of variance.

3. Result and Discussion

The morphometric measurements are represented in table 1. And table 2 summarizes the result of regression equation

Table1: Morphometric measurements of *M. armatus* (n=100)

Morphometric Characteristic	Min	Max	Mean \pm SD	TL % mean
Total length	11.2	32	17.436 \pm 5.480	
Standard length	8.9	26.5	13.631 \pm 4.7241	78.17
Fork length	9.9	28.1	15.015 \pm 5.0697	86.11
Dorsal length	2	10.9	4.891 \pm 2.145	28.05
Head length	1.5	11.6	3.317 \pm 2.2696	19.02

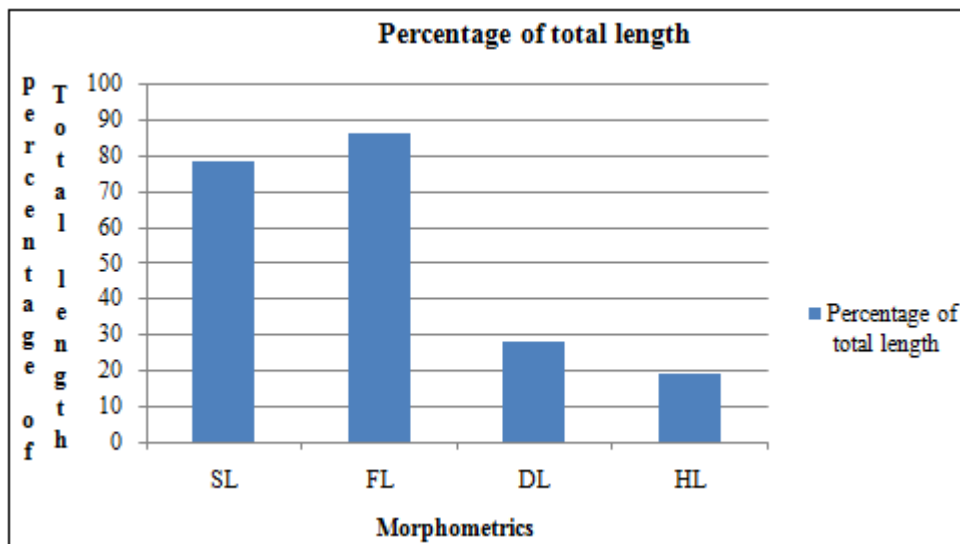


Figure 1: Morphometrics expressed as a percentage total length in *M. armatus*

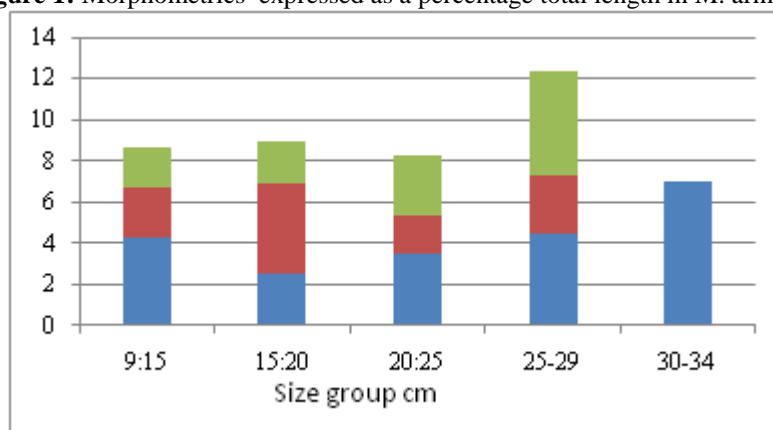


Figure 2: Size frequency distribution of *M. armatus*

The total length of fish ranged from 11.2 to 32 with the mean and standard deviation 17.436 ± 5.480 . mean standard length was 13.631, it was 78.17 percent of total length. The fork length was 86.11 percent to total length whereas dorsal length and head length was 28.05 and 19.02 respectively.

Figure 2 represents the length frequency data. On grouping into 5 groups of 5mm length difference.

Table 2: Regression analysis of length-length relationship f *M. armatus*

Sr.No	X-Axis	Y-Axis	Y=a+bX	R ²	r
1	TL	SL	Y=-0.743+0.824X	0.914	0.821
2	TL	FL	Y= -0.439+0.88X	0.918	0.886
3	TL	DL	Y= -0.905+0.332X	0.713	0.332
4	TL	HL	Y= -2.98+0.361X	0.752	0.36

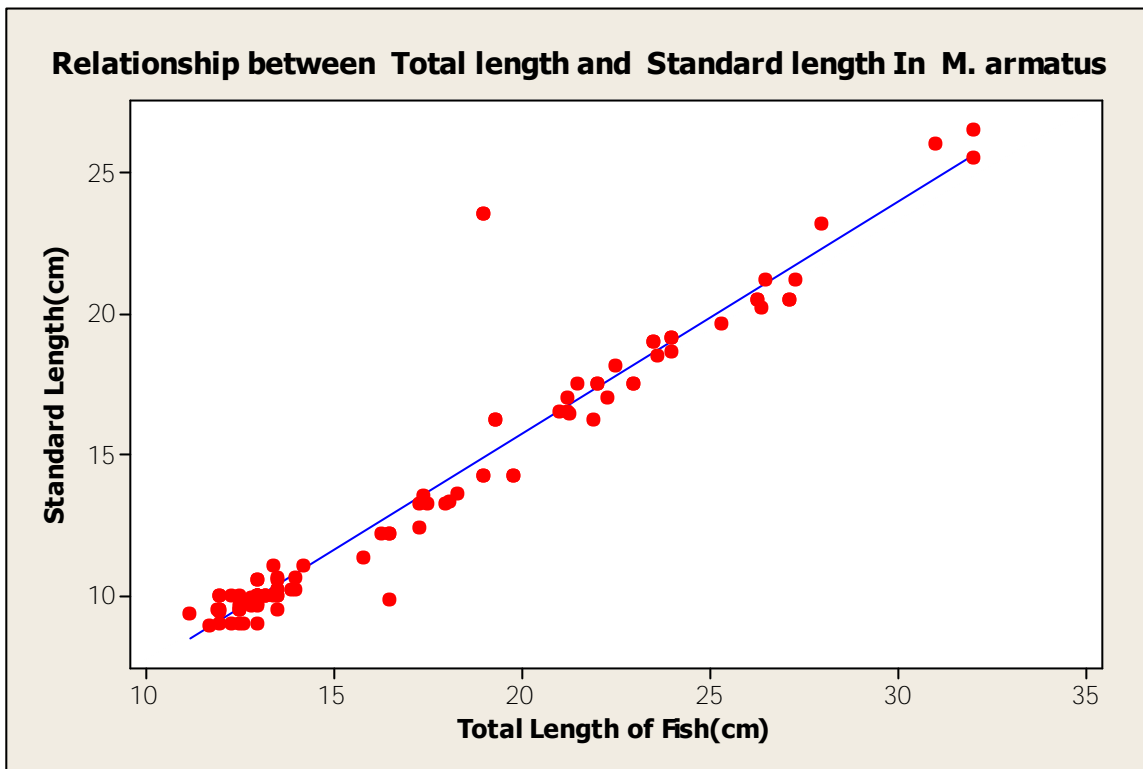


Figure 2: Relationship between Total lengths to Standard length

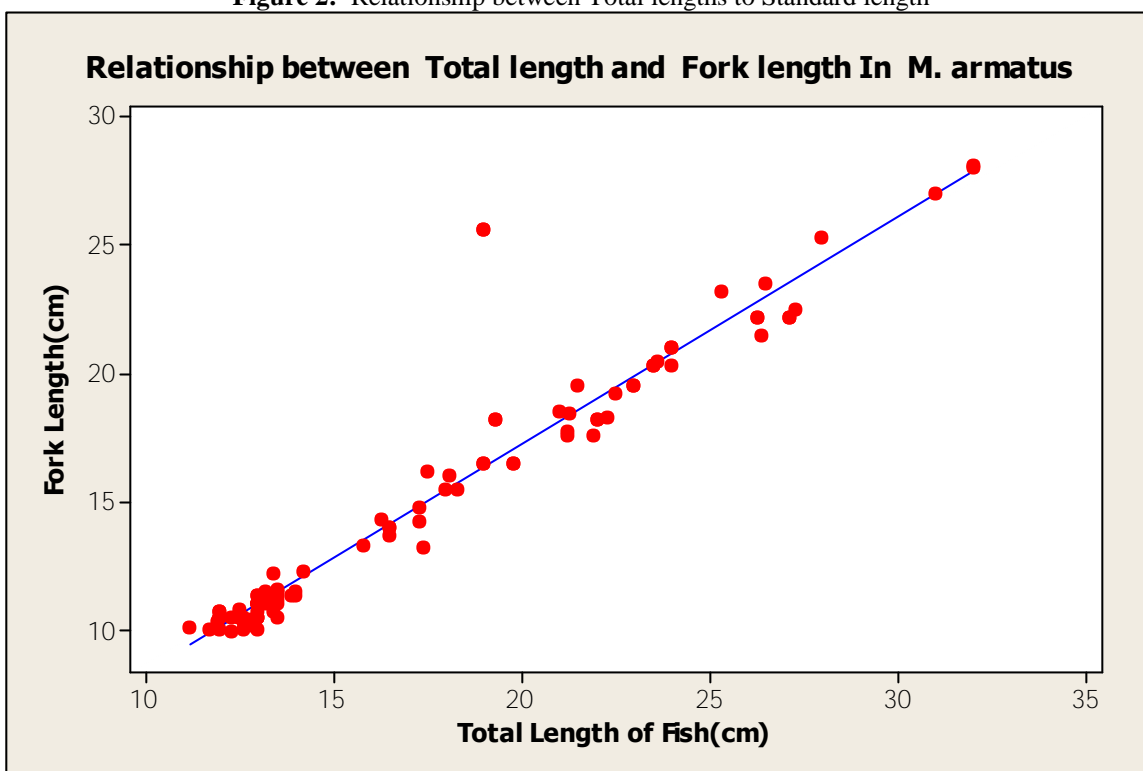


Figure 3: Relationship between Total length to Fork length

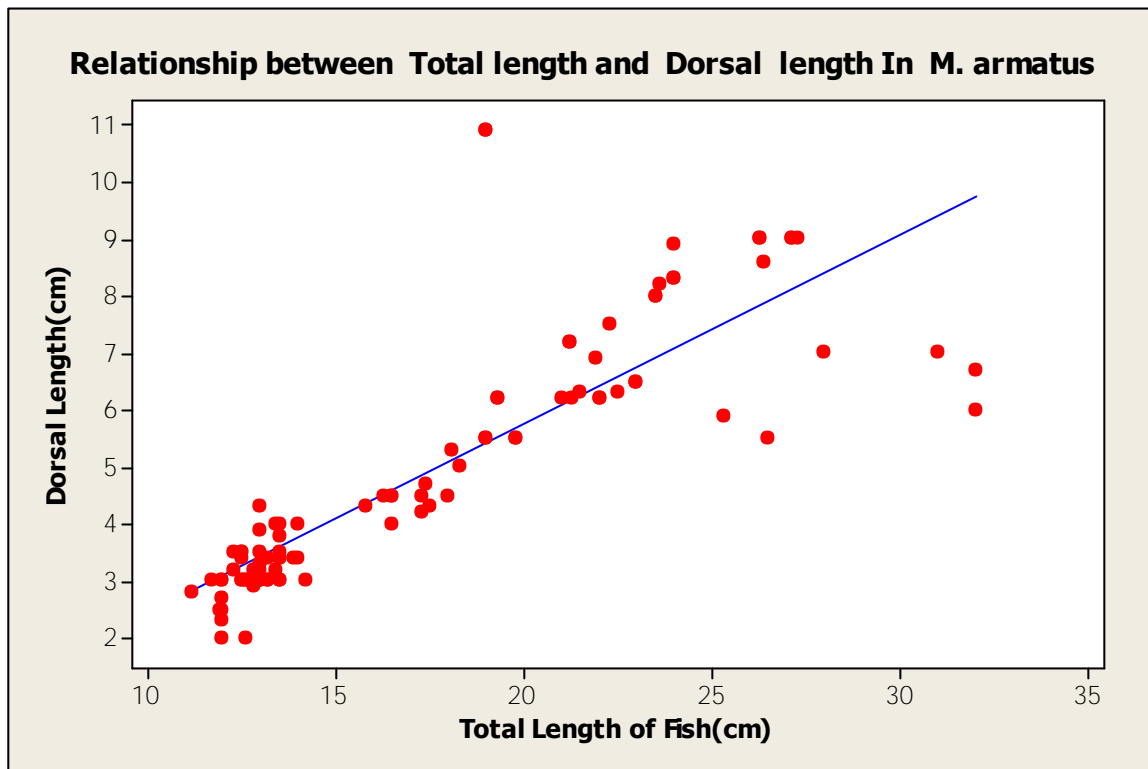


Figure 4: Relationship between Total length to Dorsal length

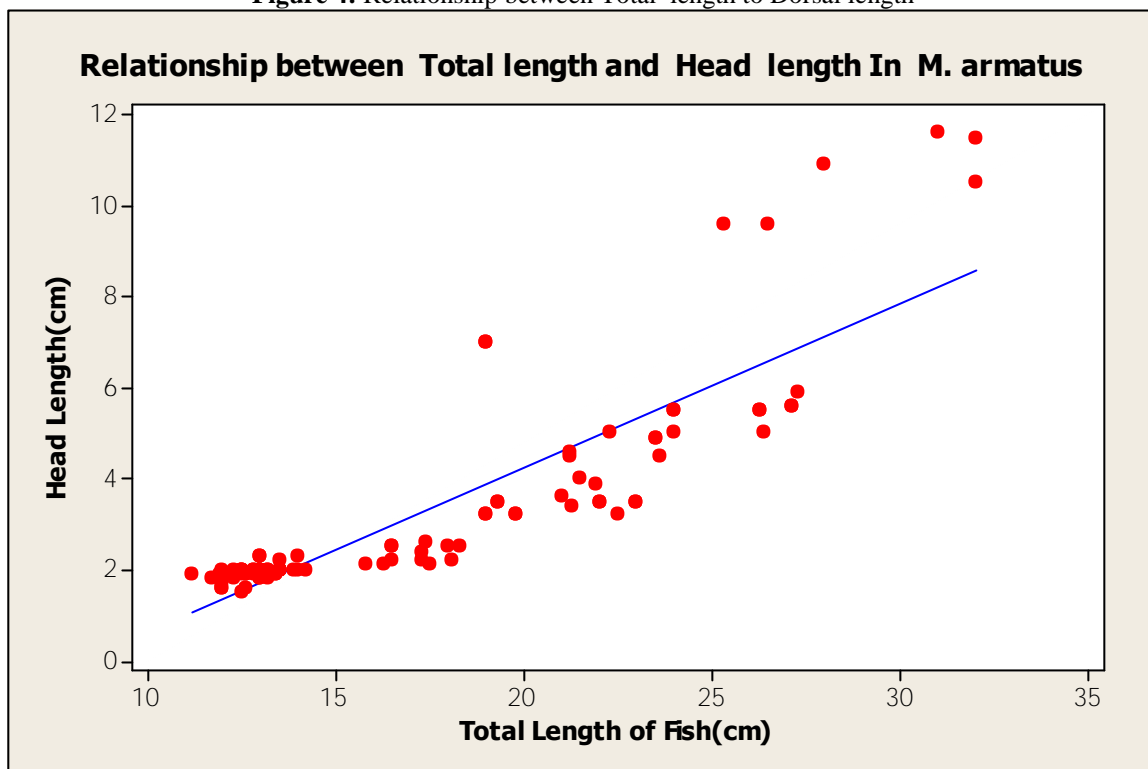


Figure 5: Relationship between Total lengths to Dorsal length

All the observed morphometric characters significance positive correlation. The high values of r^2 in length-length relationships indicate that the length relationships are linear over the observed range of values. A number of factors might affect the proportion total length, standard length, fork length, including growth phase, food availability and quality of food, size ranges, health, general fish condition and preservation technique (Gaygusuz et al., 2006). However, these factors were not considered in the present study. the correlation coefficient between total length, fork length

standard length, dorsal length and head length were significant. This is an accordance with Hussain (2010) that all LLRs were highly correlated.

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