Studies on Relationship between Length and Weight of *Puntius sarana* (Hamilton) From Godavari River at Nanded Region (M.S.) – India

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Abstract: **Studies on the length weight relationship of fishes have been recognized as an important aspect in fishery biology study. Data on the length and weight of the fish commonly been analyzed to yield biological information. The analysis of length-weight data has usually been directed towards two rather objects. First towards describing mathematically the relation between length and weight primarily so that one may be converted into the other.Secondly to measure the variation from the expected weight for length to measure the variation from the expected weight for the length of an individual fish or relevant group of individual as indications of fatness, well being, gonad development etc.**

Keywords: ***Puntius sarana*, Fish, Godavari River.**

1. INTRODUCTION

Puntius sarana is a freshwater fish commonly known as 'Potis' or 'Punkti' found in Godavari River at Nanded region (Maharashtra State) India. The study on length weight relationship is the most important aspect in biological studies of fish. Such studies were carried out in different fishes previously by Brown, M.E.(1957), Dan, S. and Mojumdar, P.(1978), Dhulkhed, M.H.(1963), Jhingran, V.G.(1959), Lacrene,E.D. (1951), Mojumdar, P. (1971), Mohan, M.V. and Sankaran, I.M. (1988), Narsimahm, K.A. (1970), Pathak, S.G. (1975), Rangrajan, K. (1973), Samuel Olu (1990), Sekharan, K.V. (1968), Sivakami, S. (1987), Victor, A.C.(1978) and many other workers have contributed to length-weight relationship studies in fishes. During present studies investigation were conducted to determine length and weight relationship in the fish *Puntius sarana*.

2. MATERIAL AND METHODS

The present study was carried out for the period of one year i.e. from April 2015 to March 2016 to determine the length-weight relationship in males and females of *Puntius sarana*. For this purpose 600 specimens were taken. Out of 600 specimens 220 were male and 380 were females. Total length of fish was measured in cm and weight in grams individually by removing surface moisture with blotting paper. The mean length and mean weight was calculated by arranging them into 06 groups of 03 cm class intervals. The length-weight relationship was determined by using general parabolic form of equation given by Lacrene. $W = aL^b$ Where W= Average weight of the fish and L= Average length of fish and a and b are constant to be determined.

3. RESULT AND DISCUSSIONS

The male fish length ranges from 11.0 cm to 25.6 cm and weight from 13.36 gm to 176.64 gm. and female fish length ranges from 12.1 cm to 26.6 cm and weight from 17.55 gm to 202.79 gm. These values were then converted to logarithmic values and obtained statistical data and illustrated as an arithmetic plot. Procedure of calculations for length-weight relationship in *Puntius sarana* male.

$\Sigma X = 7.6300$

$\overline{X} = 1.2716$

$\overline{X}^2 = 1.6169$

$\Sigma Y = 11.0097$

$\overline{Y} = 1.8943$

$\Sigma X^2 = 9.7753$

$\Sigma XY = 14.1945$

$N = 6$

$N\overline{X}\overline{Y} = 13.9992$

$NX^2 = 9.7014$

Now the general equation $W = AL^B$ had to be fitted in for above data converting this into logarithms and after substituting y for Log W, x for Log L and a for Log A the equation will be

$Y = a + Bx$

Where the constants a and B to be determined.

$$B = \frac{\Sigma xy - N\,\bar{x}\bar{y}}{\Sigma x^2 - N\,(x^-)^2}$$

$B = 2.6427$

$a = -1.5256$ $A = $ Antilog $a = 0.03356$

$Y = -1.5256 + 2.9024(X)$

Expressing this in terms of W and L the equation will be

$W = aL^b$

$W = 0.03356L^{2.6427}$

Procedure of calculations for length-weight relationship in *Puntius sarana* Female.

$\Sigma X = 7.6463$

$\overline{X} = 1.2743$

$\overline{X}^2 = 1.6238$

$\Sigma Y = 11.5196$

$\overline{Y} = 1.9199$

$\Sigma X^2 = 9.8116$

$\Sigma XY = 14.8651$

$N = 6$

$N\,\overline{X}\overline{Y} = 14.679$

$NX^2 = 9.7428$

Now the general equation $W = AL^B$ has to be filled in for above data converting this into logarithms and after substituting y for log W, x for Log L and a for Log A the equation will be

$Y = a + Bx$

Where,

The constants a and B to be determined

$$B = \frac{\Sigma xy - N\ \bar{x}\bar{y}}{\Sigma x^2 - N\ (\bar{x})^2}$$

$B = 0.2704$

$$a = \frac{\Sigma y - B\Sigma x}{N}$$

$a = 1.5803$ $A = $ Antilog $= 1.3805$

$Y = 1.5803 + 0.2704(X)$

Expressing this in terms of W and L this equation will be

$W = aL^b$

$W = 1.5803L^{0.2704}$

The equation of curve $W = AL^B$ By converting the above equation of curve in the linear form as

$Y = a + Bx$

Where   y = Log W

A = Antilog a

x = Log L

Substituting these values of A and B in the above equation plot a graph for males and females *Puntius sarana* taking average length on x –axis and observed values of average weight along the y-axis.

The nature of graph of length weight relationship in male is curvature it indicates that when the length of male fish increases similarly the weight of male fish also increases.

The nature of graph of length weight relationship in female is curvature, it also indicates that the when the length of female fish increases similarly the weight of female fish also increases.

Table No. 01: Length weight relationship in male *Puntius sarana*

Size Group (cm)	Average Length (cm) 'L'	Average Weight (gm) 'W'	Log L 'X'	Log W 'Y'	X^2	XY	Calculated Y
10.5-13.5	12.54	25.65	1.0983	1.4089	1.2062	1.5473	1.3768
13.6-16.5	14.74	34.44	1.1685	1.5371	13653	1.7961	1.5623
16.6-19.5	18.24	59.59	1.2610	1.7752	1.5901	2.2385	1.8084
19.6-22.5	20.65	87.55	1.3150	1.9328	1.7292	2.5416	1.9495
22.6-25.5	24.03	137.80	1.3807	2.1393	1.9063	2.9537	2.1231
25.6-28.5	25.60	164.60	1.4065	2.2164	1.9782	3.1173	2.1913
			ΣX= 7.63	ΣY=11.0097	ΣX²=9.7753	ΣXY=14.1945	
			X̄=1.2716	Ȳ=1.8349			

Table No. 02: Length weight Relationship in female *Puntius sarana*

Size Group (cm)	Average Length (cm) 'L'	Average Weight (gm) 'W'	Log L 'X'	Log W 'Y'	X^2	XY	Calculated Y
10.5-13.5	13.07	24.09	1.1162	1.3818	1.2459	1.5423	1.8821
13.6-16.5	14.91	59.08	1.1735	1.7715	1.3771	2.0788	1.8976
16.6-19.5	17.69	64.01	1.2477	1.8082	1.5567	2.2560	1.9176
19.6-22.5	20.94	102.77	1.3209	2.115	1.7447	2.7937	1.9374
22.6-25.5	23.70	159.05	1.3747	2.2014	1.8898	3.0262	1.9520
25.6-28.5	25.90	174.51	1.4133	2.2417	1.9974	3.1681	1.9624
			ΣX=7.6463	ΣY=11.5196	ΣX^2 =9.8116	ΣXY=14.8651	
			$\overline{X}$= 1.2743	$\overline{Y}$=1.9199			

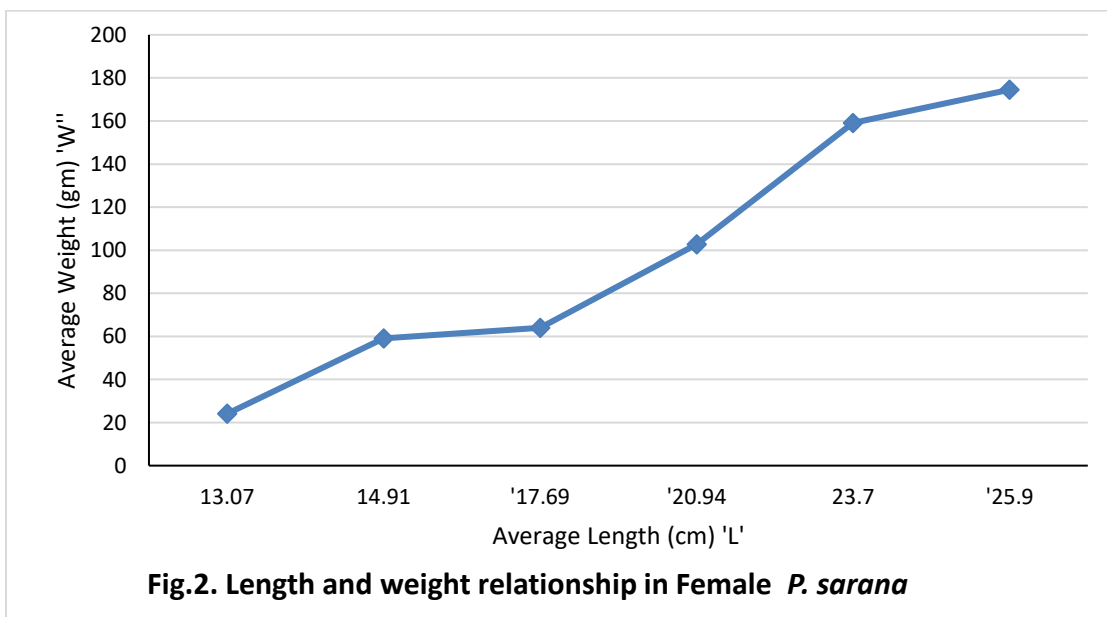Fig.1. Length and weight relationship in male *P. sarana*

Fig.2. Length and weight relationship in Female *P. sarana*

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