

Study of Morphometric Characters of *Puntius sarana* (Hamilton) from Godavari River at Nanded region (Maharashtra State)

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Abstract: The present study was carried out to analyze morphometric measurement of *Puntius sarana* fish during April 2015 to March 2016. Fish specimens were collected from local fisherman at Nanded and seven morphometric characters were studied. The total length and weight of *Puntius sarana* were ranged from 11.00 cm to 26.6 cm and 13.6 gm to 231.41 gm respectively. The standard length and height of fish were ranged from 8.5 cm to 21.4 cm and 2.3 cm to 8.2 cm respectively. The head length and intra orbital space were ranged from 2.1cm to 6.0 cm and 0.9 cm to 1.0 cm respectively. Snout to dorsal fin length was ranged from 6.8 cm to 16.6 cm.

Keywords: *Puntius sarana*, Morphometric, Godavari river.

1. INTRODUCTION

Godavari River is India's second largest River after the Ganga River. It's source is in Trimbakeshawar Maharashtra State. *Puntius sarana* (Hamilton, 1822) is a tropical fish belonging to the *Puntius* genus of minnow family. It can be used as both food and ornamental fish. It is omnivorous and widely distributed through the Indian sub continent including India, Bangladesh, Afghanistan, Pakistan, Nepal, Bhutan, Sri-lanka, and Thailand. Morphometric study of fish species is an important tool for exact identification of the species with the help of measuring the length, weight and other parameters (Cavalcanti *et al.* 1999)

2. MATERIAL AND METHOD

In order to study the morphometric measurements total 600 fish specimens were collected on monthly basis (50) from April 2015 to March 2016 from Godavari River at Nanded. The field collection were done with the help of local fisherman. The collected fish samples were preserved in 10% formalin and stored into specimen jar to study the morphometric characters. The selected morphometric measurements were measured with the help of electronic balance (MP-3000 chyo Japan) engineering divider and graduated scale in cm etc. All measurements were taken in the laboratory as Day (1875-78), Talwar and Jhingran (1991) and Jayaram(2010). The weight of all fish samples measured in gram (gm) and other morphometric parameters measure in centimeter (cm). The total length ranging between 11.00 cm to 26.6 cm. On the basis of total length, the fishes were grouped into 3 class intervals.

Observations

(Tables 1 to 6 and Fig. 1 to 5)

In order to know the relationship between any two morphometric measurement, the statistical method proposed by Snedecor (1961) were used in the present study to correlate the variables viz (1) Standard length (2) Head length (3) Diameter of eye (4) Inter orbital space (5) Pre dorsal length (6) Height of body with the total length, the linear regression was used.

$$Y = A + Bx$$

Where Y = Variable, x = Total length B = Regression coefficient.

The values of constants A and B were calculated by the following formula:

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

$$A = \frac{\sum y - B \sum x}{N}$$

Where N = Number of groups

The regression analysis was made separately for each character to observe their relationship with total length as follows:

- 1) Total length (x) and Std. length (y)

$$Y = -2.4143 + (0.9098)(x)$$

- 2) Total length (x) and head length (y)

$$Y = -0.2562 + (0.2303)(x)$$

- 3) Total length (x) and diameter of eye (y)

$$Y = 0.8799 + (0.010)(x)$$

- 4) Total length (x) and intra orbital space (y)

$$Y = 1.0070 + (0.002)(x)$$

- 5) height of body (y)

$$Y = -1.3152 + (0.3528)(x)$$

- 6) Total length (x) and snout dorsal fin length (y)

$$Y = 0.8578 + (0.0475)(x)$$

3. RESULT AND DISCUSSION

The relationships of the above mentioned body dimensions to the total length are shown in tables (1 to 6). When the variables 'y' are plotted against total length 'x', the points are much closed around the linear regression lines as shown in the figures (1 to 6). In the present investigation an attempt has also been made to find out the percentage fluctuations in the development of different body parts in different 3 cm class intervals.

The frequency percentages were calculated by using the formula proposed by Datt (1961)

$$P = \frac{y}{x} \times 100$$

Where P = Percentage of frequency

y = Variables

x = Total length

The percentage relationship of the total length with the variables was found to fluctuate as followed:

- 1) For standard length between = 71.93 and 81.6176
- 2) For head length between = 20.9486 and 22.0201
- 3) For inter orbital space between = 3.4829 and 7.0355
- 4) For snout to dorsal fin between = 57.9446 and 61.1735
- 5) For height of body between = 24.9011 and 30.1857

Table 1: RELATION BETWEEN TOTAL LENGTH AND STANDARD LENGTH OF *Puntius sarana*

Sr. No.	Size Group (cm)	Total length (cm) 'X'	Standard length (cm) 'Y'	Percentage in term of standard Length 'p'	X ²	XY	Calculated Y
1.	10.5-13.5	12.6588	9.7921	71.9367	160.02	123.87	9.1026
2.	13.6-16.5	14.8520	11.47	76.6801	220.52	170.32	11.096
3.	16.6-19.5	17.9411	14.01	77.4804	321.04	251.33	13.9085
4.	19.6-22.5	20.04	16.51	78.8922	401.60	336.80	15.818
5.	22.6-25.5	24.03	18.57	80.8988	577.44	455.84	19.4481
6.	25.6-28.5	25.842	20.12	81.6176	667.70	519.90	21.0967
		$\Sigma X=115.3639$	$\Sigma Y=90.4721$		$\Sigma X^2=2348.32$	$\Sigma XY=1858.06$	
		$\bar{X}=19.2266$	$\bar{Y}=15.0786$				

Table 2: RELATION BETWEEN TOTAL LENGTH AND STANDARD LENGTH OF *Puntius sarana*

Sr. No.	Size Group (cm)	Total length (cm) 'X'	Standard length (cm) 'Y'	Percentage in term of standard Length 'p'	X ²	XY	Calculated Y
1.	10.5-13.5	12.6588	9.7921	71.9367	160.02	123.87	9.1026
2.	13.6-16.5	14.8520	11.47	76.6801	220.52	170.32	11.096
3.	16.6-19.5	17.9411	14.01	77.4804	321.04	251.33	13.9085
4.	19.6-22.5	20.04	16.51	78.8922	401.60	336.80	15.818
5.	22.6-25.5	24.03	18.57	80.8988	577.44	455.84	19.4481
6.	25.6-28.5	25.842	20.12	81.6176	667.70	519.90	21.0967
		$\Sigma X=115.3639$	$\Sigma Y=90.4721$		$\Sigma X^2=2348.32$	$\Sigma XY=1858.06$	
		$\bar{X}=19.2266$	$\bar{Y}=15.0786$				

Table 3: RELATION BETWEEN TOTAL LENGTH AND HEAD LENGTH OF *Puntius sarana*

Sr. No.	Size Group (cm)	Total length (cm) 'X'	Head length (cm) 'Y'	Percentage in terms of Head length 'p'	X ²	XY	Calculated Y
1.	10.5-13.5	12.6588	2.5549	20.9486	160.02	32.3419	2.6591
2.	13.6-16.5	14.8520	3.2269	21.2794	220.52	47.9259	3.1642
3.	16.6-19.5	17.9411	3.7744	21.5719	321.04	67.7168	3.8756
4.	19.6-22.5	20.04	4.701	21.7065	401.60	94.2080	4.359
5.	22.6-25.5	24.03	5.1486	21.9309	577.44	123.7208	5.2779
6.	25.6-28.5	25.842	5.625	22.0201	667.70	145.3612	5.6952
		$\Sigma X=115.3639$	$\Sigma Y=25.0308$		$\Sigma X^2=2348.32$	$\Sigma XY=511.2746$	
		$\bar{X}=19.2266$	$\bar{Y}=4.1718$				

Table 4: RELATION BETWEEN TOTAL LENGTH AND INTRA ORBITAL SPACE OF *Puntius sarana*

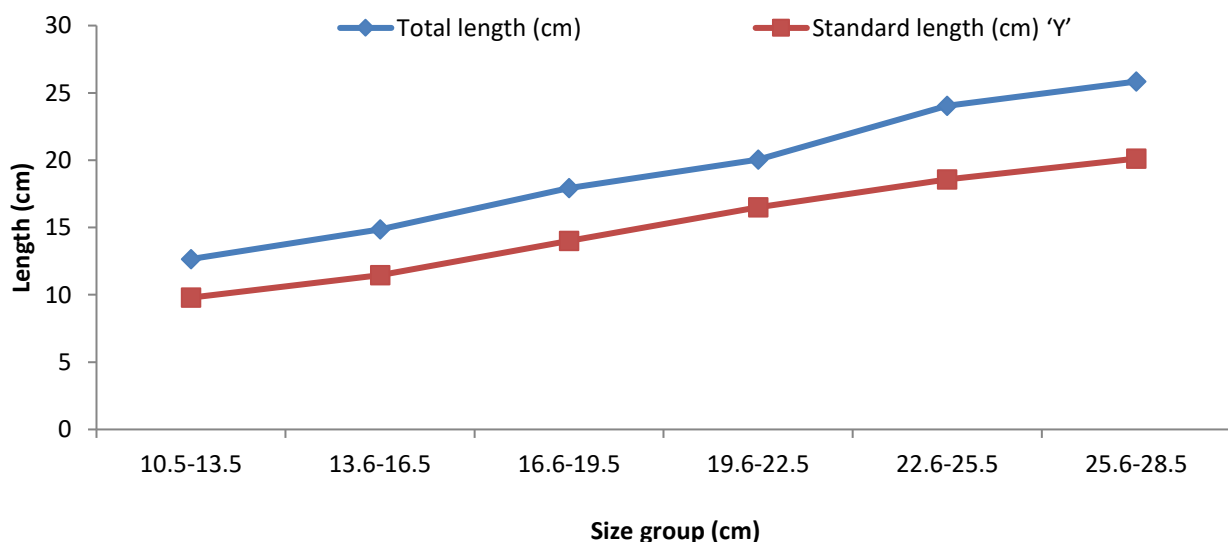
Sr. No.	Size Group (cm)	Total length (cm) 'X'	Intra orbital space (IOS) (cm)	Percentage in terms of intra orbital space 'p'	X ²	XY	Calculated Y
1.	10.5-13.5	12.6588	1.0990	8.6166	160.02	13.9120	1.9023
2.	13.6-16.5	14.8520	1.1205	7.3400	220.52	16.6416	1.0967
3.	16.6-19.5	17.9411	1.0733	6.1315	321.04	19.2516	1.1028
4.	19.6-22.5	20.04	1.094	5.4890	401.60	21.9237	1.1070
5.	22.6-25.5	24.03	1.0837	4.6192	577.44	26.9237	1.1150
6.	25.6-28.5	25.842	1.1625	4.2956	667.70	30.0413	1.1186
		$\Sigma X=115.3639$	$\Sigma Y=6.633$		$\Sigma X^2=2348.32$	$\Sigma XY=128.6939$	
		$\bar{X}=19.2266$	$\bar{Y}=1.1055$				

Table 5: RELATION BETWEEN TOTAL LENGTH AND SNOUT TO DORSAL LENGTH OF *Puntius sarana*

Sr.No.	Size Group (cm)	Total length (cm) 'X'	Snout to dorsal length (cm) 'Y'	Percentage in terms of snout to dorsal length 'P'	X ²	XY	Calculated Y
1.	10.5-13.5	12.6588	6.5100	57.9446	160.21	82.4087	7.3387
2.	13.6-16.5	14.8520	9.0593	58.9225	220.52	134.5487	8.7588
3.	16.5-19.5	17.9411	11.1577	59.9219	321.04	200.1814	10.759
4.	19.6-22.5	20.04	12.996	60.4291	401.60	260.4398	12.1181
5.	22.6-25.5	24.03	14.7810	61.1735	577.44	355.1874	14.7016
6.	25.6-28.5	25.842	15.05	58.3204	667.70	388.9221	15.0748
		$\Sigma X=115.3639$	$\Sigma Y=69.554$		$\Sigma X^2=2348.51$	$\Sigma XY=1421.6881$	
		$\bar{X}=19.2266$	$\bar{Y}=11.5923$				

Table 6: RELATION BETWEEN TOTAL LENGTH AND HEIGHT OF *Puntius sarana*

Sr. No.	Size Group (cm)	Total length (cm) 'X'	Height of fish 'Y'	Percentage in terms of Height of fish 'P'	X ²	XY	Calculated Y
1.	10.5-13.5	12.6588	3.0687	24.9011	160.21	38.8440	3.1508
2.	13.6-16.5	14.8520	3.8840	26.3973	220.52	57.6851	3.9245
3.	16.6-19.5	17.9411	4.9633	27.9204	321.04	89.0470	5.0144
4.	19.6-22.5	20.04	6.155	28.6926	401.60	123.3462	5.7549
5.	22.6-25.5	24.03	7.1756	29.7960	577.44	172.4296	7.1625
6.	25.6-28.5	25.842	7.5625	30.1857	667.70	195.4301	7.8010
		$\Sigma X=115.3639$	$\Sigma Y=32.8091$		$\Sigma X^2=2348.51$	$\Sigma XY=676.782$	
		$\bar{X}=19.2266$	$\bar{Y}=5.4681$				

**Fig. 1. Relationship between total length and standard length of *P. sarana***

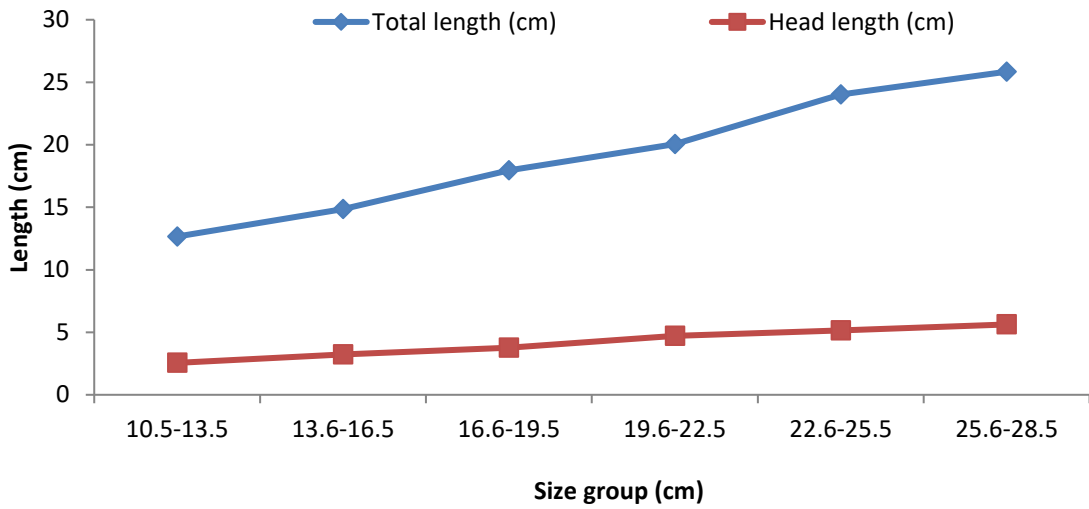


Fig. 2. Relationship between total length and head length of *P. sarana*

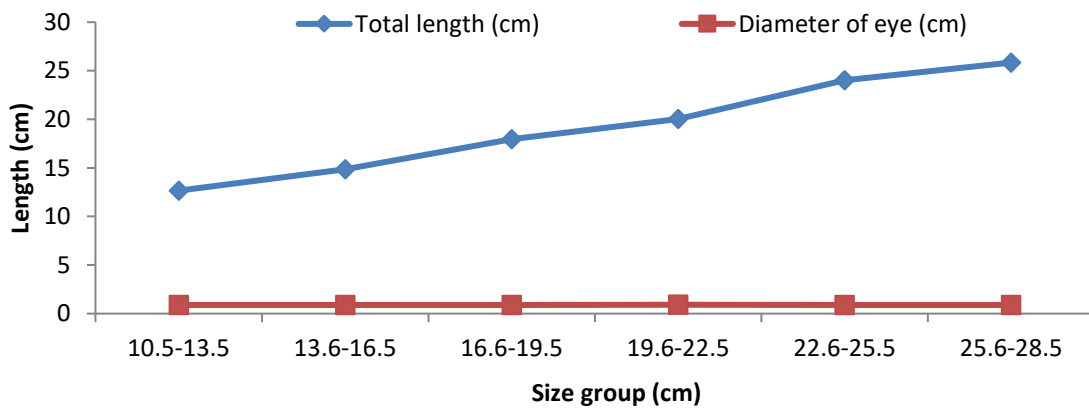


Fig. 3. Relationship between total length and diameter eye of *P. sarana*

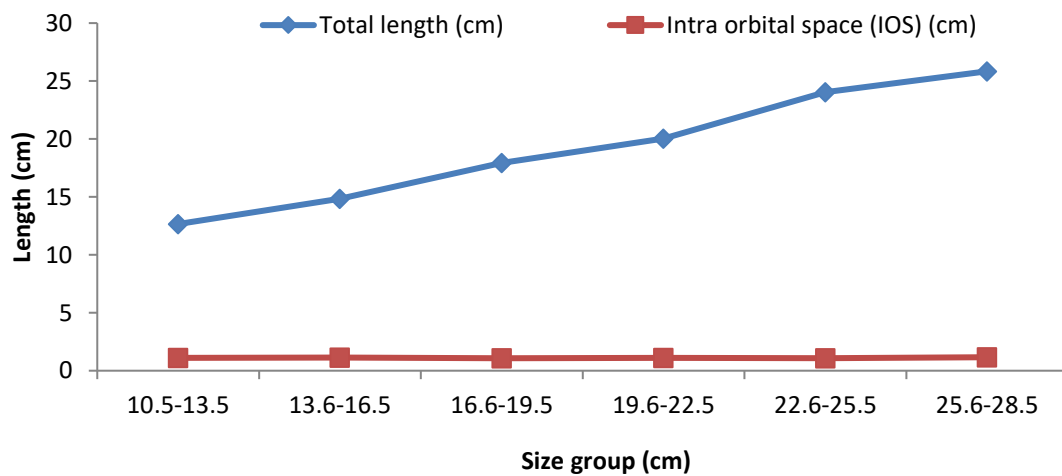


Fig. 4. Relationship between total length and intra orbital space of *P. sarana*

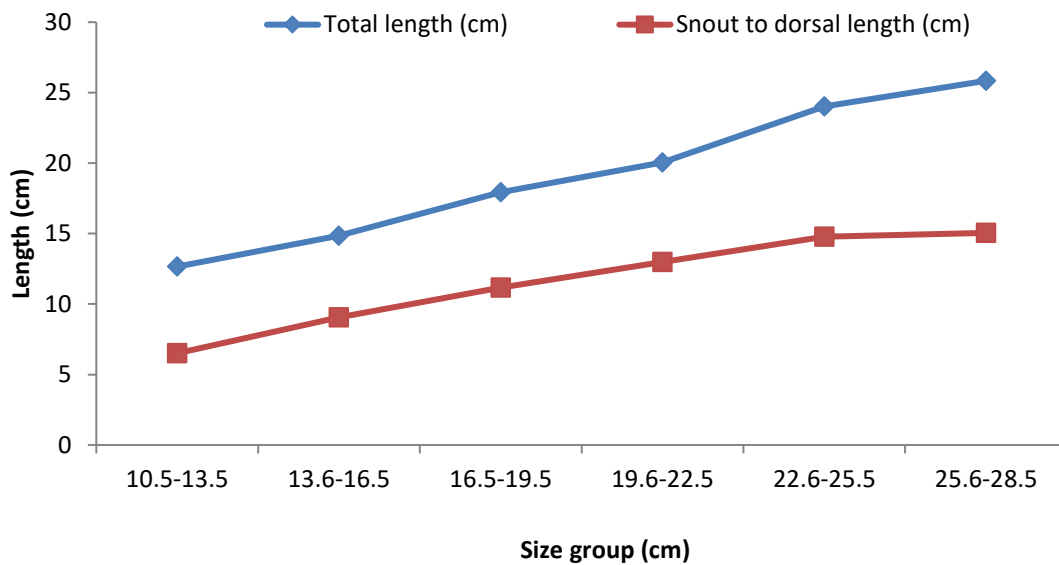


Fig.5. Relationship between total length of snout to dorsal length

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