



Observation on the Morphology and Morphometry of the Glass fish, Chanda Ranga (Hamilton)

Siddiqui M.J. and Kumar Niraj

Post-Graduate Dept. of Zoology, M.S. College, Motihari, B.R.A. Bihar University, Muzaffarpur, East-Champaran, 845401, Bihar, INDIA

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Abstract

Chanda ranga (Ham.) is a small size bony fish commonly called Glass fish. It may be considered as an aquarium fish. 772 specimens of this fish having 3.87 – 5.11 cm male and 3.48 – 4.87 cm female were collected over a period of one year. Body of fish is semi-transparent, spotted with black dots. Mouth is upwardly directed with all small teeth, body covered with minute scales and lateral line straight and complete. The dorsal and ventral profiles in male (3.832 ± 0.074 and 3.828 ± 0.072 respectively) are always greater than that of female indicating that body is deeper in males. All body parameters grow in an isometric fashion. In male dorsal profile shows maximum growth rate ($b = 0.98335$), whereas it is the ventral profile ($b = 79560$) in the female. However, in both sexes eye diameter shows the minimum rate. Correlation co-efficient (r) indicates that all the dependable variables are correlate/highly correlated with independent variable.

Keywords: Glass fish, Chanda ranga, morphometry, morphology.

Introduction

Chanda ranga (Ham.) is a small sized bony fish (Order-Perciformes, Family- Channidae). It is commonly called Indian glass fish and locally called Chanwa (Bihar), Chanari (UP), Chanda (Assam and West Bengal), Nandan (Kerala) or Chandeni (CG). Though the fish is not liked by the people due to its strong spines and scanty flesh, it may be considered as an aquarium fish owing to its small size and beautiful coloration.

Material and Methods

Specimens were collected regularly from catch centres of Dhanauti river, a tributary of river Burhi Gandak near Motihari town, Headquarters of East-Champaran District ($26^{\circ}15'$ to $27^{\circ}01'$ N Latitudes and $84^{\circ}28'$ to $85^{\circ}18'$ E Longitudes). This species is reported abundantly in freshwaters of this area^{1,2}. In all 772 specimen of varying size were collected over a period of one year i.e. from December 2012 to November 2013. Morphological characters were observed with utmost care of colour pattern etc. The growth of different body measurements (parameters) in relation to total length was calculated by using straight line equation as under

$$Y = a + bX,$$

Where Y = dependent variables (body measurements), X = independent variable, a = an intercept of the line i.e. value of Y when X is zero, b = regression coefficient (bY^{λ}).

Coefficient correlation (r) of each parameter in relation to total length was also calculated using scattered diagram relationship to show the significance of results.

Results and Discussion

Morphology of the fish: Chanda ranga (Ham.) is a small sized fish, i.e. male – 3.87 to 5.11 cm and female 3.48 to 4.87 cm in total length in the present study. The colour of the body is white (semi-transparent), spotted with black dots, which increases with the increase of size. Due to body colour the visceral area is apparent from the outside. A dark mark composed of closely set dots is present on the shoulder. Margins of the ventral fins are dark.

The mouth of the fish is upwardly directed with all small teeth. Neither the canines nor the teeth on the tongue found in any specimen. A notch is present on the inter-orbital width. The body is covered with minute cycloid scales. Two continuous dorsal fin inserted behind the ventral fin. The first dorsal fin is serrated whereas the first fin ray of the second dorsal fin is also serrated. Three anal spines starts from the dorsal margin of the operculum. Caudal fin is forked.

Meristic count: $D_{7/1/13-15}$; P_{11-13} ; $V_{1/5}$; $A_{3/14-16}$; C_{17} shows some variations as listed in table-1.

Morphometry of the fish: A comparative account of the data pertaining to the different body measurements with statistical analysis has been observed in table-2, 3 and 4. The following inferences have been drawn from these data:

The dorsal and ventral profiles in males (3.832 ± 0.074 and 3.828 ± 0.072 respectively) are always greater than that of the females (3.715 ± 0.048 and 3.750 ± 0.053 respectively) indicating that body is deeper in males.

Ventral profile of females (3.750 ± 0.053) is greater than the dorsal profile (3.715 ± 0.048), but this could be observed more clearly in rainy season.

Minor variations (low SD) of the ratio indices of all measurements indicate that they grow in an isometric fashion.

Regression analysis gives an idea of the growth rate of different parameters. In the males dorsal profiles shows the maximum growth rate ($b = 0.98335$) whereas it was the ventral profile in the females ($b = 0.79560$). However, in both the sexes eye diameter shows minimum growth rate ($b = 0.07524$ in males and 0.08689 in female).

Correlation coefficient (values of r) indicates that all the dependent variables are correlated/highly correlated with the

independent variable. This implies that the former increases simultaneously with the increase of the latter.

Table-1
Variable meristic characters in Chanda ranga

Characters	No. of Fishes Observed	Range	Mode	Mean
Number of dorsal fin rays	772	13-15	13	13.34
Number of pectoral fin rays	772	11-13	12	11.98
Number of anal fin rays	772	14-16	14	14.22

Table-2
Morphometric measurements of Chanda ranga (Glass fish) – Male

Parameter	Mean (cm)	SD	S.E.M.	R	R.I. (% of T.L.)
Total Length	4.2658	0.3713	0.0689	-	-
Dorsal Profile	3.8322	0.4011	0.0744	0.91051	89.8350*
Ventral Profile	3.8286	0.3914	0.0726	0.90949	89.7502
Standard Length	3.3384	0.3702	0.0687	0.94783*	78.2596
Pre-Dorsal Length	1.5877	0.1602	0.0297	0.80269	37.2200
Body Depth	1.7724	0.1564	0.0290	0.80603	41.5487
Length of Head (LH)	1.0925	0.1351	0.0251	0.83149	25.6123
LH Excluding Snout	0.7868	0.0955	0.0177	0.75462	18.4463
Head Width	1.0336	0.0946	0.0175	0.72606	24.2300
Length of Caudal Peduncle (LCP)	0.4979	0.0594	0.0113	0.64319**	11.6724
Width of Caudal Peduncle (WCP)	0.3939	0.0406	0.0075	0.79775	09.2353
Inter-Orbital Width	0.4324	0.0469	0.0087	0.71754	10.1366
Snout	0.3056	0.0420	0.0078	0.76286	07.1659**
Eye Diameter	0.4050	0.0378	0.0070	0.73787	09.4939

* = Maximum, ** = Minimum, R.I. = Ratio indices

Table-3
Morphometric measurements of Chanda ranga (Glass fish)–Female

Parameter	Mean (cm)	SD	S.E.M.	R	R.I. (% of T.L.)
Total Length	4.1483	0.3912	0.0603	-----	-----
Dorsal Profile	3.7150	0.3164	0.0488	0.94902*	89.554
Ventral Profile	3.7500	0.3435	0.0530	0.90602	90.397*
Standard Length	3.2497	0.3032	0.0467	0.94052	78.338
Pre-Dorsal Length	1.5466	0.1501	0.0231	0.84455	37.284
Body Depth	1.7440	0.1487	0.0229	0.76734	42.042
Length of Head (LH)	1.0507	0.1102	0.0170	0.90129	25.328
LH Excluding Snout	0.7650	0.0846	0.0130	0.84278	18.441
Head Width	1.0100	0.0966	0.0149	0.79510	24.347
Length of Caudal Peduncle (LCP)	0.4523	0.0801	0.0123	0.70418	10.905
Width of Caudal Peduncle (WCP)	0.3685	0.0434	0.0067	0.83596	08.884
Inter-Orbital Width	0.4457	0.0424	0.0065	0.83067	10.744
Snout	0.2850	0.0523	0.0081	0.66689**	06.870**
Eye Diameter	0.3840	0.0445	0.0068	0.76386	09.257

* = Maximum, ** = Minimum, R.I. = Ratio indices

Table-4
Showing Regression Equation in the Glass Fish, Chanda ranga

Male				Female		
Parameters	a	b	Equation	a	b	Equation
Dorsal Profile	-0.36261	0.98335*	-0.36261 + 0.98335.X	0.53111	0.76751	0.53111 + 0.76751.X
Ventral Profile	-0.26303	0.95859	-0.26303 + 0.95859.X	0.44958	0.79560*	0.44958 + 0.79560.X
Standard Length	-0.69191	0.94479	-0.69191 + 0.94479.X	0.22586	0.72894	0.22586 + 0.72894.X
Body Depth	0.32398	0.33953	0.32398 + 0.33953.X	0.53366	0.29177	0.53366 + 0.29177.X
Pre-Dorsal Length	0.10980	0.34646	0.10980 + 0.34646.X	0.20243	0.32404	0.20243 + 0.32404.X
Length of Head	-0.19855	0.30266	-0.19855 + 0.30266.X	-0.00267	0.25393	-0.00267 + 0.25393.X
Length of Head Excluding Snout	-0.4104	0.19408	-0.4104 + 0.19408.X	-0.00875	0.18230	-0.00875 + 0.18230.X
Width of Head	0.24396	0.18511	0.24396 + 0.18511.X	0.19552	0.19633	0.19552 + 0.19633.X
Length of Caudal Peduncle	0.05870	0.10296	0.05870 + 0.10296.X	-0.14627	0.14431	-0.14627 + 0.14431.X
Width of Caudal Peduncle	0.02117	0.08739	0.02117 + 0.08739.X	-0.01634	0.09278	-0.01634 + 0.09278.X
Inter-Orbital Width	0.04553	0.09069	0.04553 + 0.09069.X	0.07203	0.09007	0.07203 + 0.09007.X
Snout	-0.06240	0.08628	-0.06240 + 0.08628.X	-0.08533	0.08927	-0.08533 + 0.08927.X
Eye Diameter	0.08399	0.07524**	0.08399 + 0.07524.X	0.02356	0.08689**	0.02356 + 0.08689.X

* = Maximum, ** = Minimum, X = Total length of fish

Discussion: As per International Commission on Zoological Nomenclature the genus *Chanda* is now restricted to its type – species, *Chanda nama*. All the remaining species come under the genus *Parambassis*. However we have used the scientific name used by previous authors for the sake of convenience. Faunastic survey of several workers³ gave some basic information on the identification of the fish, *Chanda ranga*, however, no detail information is available on the morphology and morphometry of this fish. Morphology is the primary and basic pre-requisite for taxonomic studies and recognition of sub-species. Morphometric relationships differentiate the small taxonomic units and provide pattern of growth as also useful in the selection of species for experiment. Therefore, the present study will certainly add to the new information on *Chanda ranga*. The white colour of the body spotted with black dots makes this fish easily visible to the predator which is against the common colour i.e. grey and silvery. No change in colour pattern with increasing age, as observed in the present fish, finds no favour in most of the other fish type. Position of fins as observed in the present study is in agreement with the previous findings^{3, 4}. Variations in the meristic count observed in the present fish, *Chanda ranga* have also been reported in other fish types^{5, 6}. Relative growth rate of different body measurements differ in different fish groups and also on the parameters chosen for the study and therefore the present result may not be compared in other fish types⁷.

Conclusion

Chanda ranga (Ham.) is a small size bony fish commonly called glass fish. This fish looks semi-transparent with black dots on the body. Mouth is upwardly directed with straight and complete lateral line. The dorsal and ventral profiles of males are always greater than that of females. All body parameters grow in an isometric way. Correlation coefficient indicates that all the dependable variables are correlated/highly correlated with independent variables. Some of the meristic characters are variable viz. number of dorsal, pectoral and anal fin rays. The white colour of the body spotted with black dots makes this fish easily visible to the predators which is against the common colour i.e. grey and silvery.

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