



Morphometric and Meristic Analysis of Endangered Catfish, *Rita rita* from Indus River near Jamshoro, Sindh, Pakistan

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Received 8th October 2015 and Revised 16th February 2016

Abstract: The experiment was conducted to investigate the morphometric and meristic analysis of critically endangered catfish, *Rita rita*. Total 190 specimens of both sexes were collected during March – August 2015 from Indus River near Jamshoro, Sindh, Pakistan and analyzed in the laboratory of the Department of Freshwater Biology and Fisheries. Measurement of different body parameters was considered by using cm scale. Significant curvilinear relationship was obtained between total length and other parameters and head length verses eye diameter. Relationship between total length and other morphometric parameters were highly significant ($p < 0.01$) except the relationship between total length of 1st and 2nd dorsal fin length in male. In case of meristic counts like dorsal pectoral, pelvic, anal and caudal fin rays were counted and found to be more or less similar except slight difference was observed in case of caudal fin rays of both the sexes. Finally concluded that there was single homogenous stock of catfish *Rita rita* is available in the Indus River, near Jamshoro.

Keywords: Endangered, Morphometric, Meristic, Catfish, *Rita rita*, Indus River

1. INTRODUCTION

Measurement of various morphological body parts have been used in identification of the species of the fish (Lashari *et al* 2004). Morphometric measurement of the various body parameters and their statistical relationship in fish are imperative for both fishery biology and taxonomic studies (Tandon, *et al.*, 1993). It based on a set of measurement which represents size and shape variations (Sparre *et al.*, 1989). It represents one of the major key for determining their systematic growth variability and various population parameters. Information on the morphometric measurement of fishes and statistical relationship among them are essential for taxonomic work (Narejo, 2010). Although morphological characteristics are phenotypical plasticity and are influenced seasonally by the physical environmental factors during spawning and early juvenile stages (Jalbani *et al.*, 2014). The general health of a fish population can be accessed through the growth features. So possible variations in the measurable and countable characters will reveal the adaptation to environmental condition and help in clarifying their identity in the location of the population (Dars *et al* 2012). Generally, species of fish that have different origin are morphologically differentiated from each other. *Rita rita* is commercially important catfish farming a good fishery in major rivers of the indo-genetic place it a well admire food fish as having good taste and a rich protein content recently it has also been considered as ornamental fish and has been documented as indigenous ornamental fish from different countries.

It is greenish brown carnivorous fish widely distributed in south- Asia. It is one of the critically endangered species in Bangladesh (ICUN, 2003) the abundance of this commercially important specie has been reported to decline day by day because of over-exploitation and due to ecological changes in the natural ecosystem (Jafri *et al* 1998). Purpose of present research work is to know the identical stock of critically endangered catfish, *Rita rita* from Indus river, near Jamshoro.

2. MATERIALS AND METHODS

For morphometric study total 190 specimens out of which 110 were male and 80 were female were analyzed size ranged from 14.4- 47.0 cm and 44.75 – 985.0 g in total length and weight respectively collected from Indus River near Jamshoro, Sindh, Pakistan. Identification of species was taken into consideration by presence of genital papillas which are cone like projection on the genital aperture of the males and absent in female. Total length was measured in cm with the help of measurement board. Small specimens were put in 5% formalin while larger one was injected with formalin on the muscles and abdomen. In total 11 morphometric parameters and 5 meristic counts were analyzed namely Total length , 2) Standard length , 3) Fork length ,4) Girth,5) Head length,6) Eye diameter,7) 1st Dorsal fin length8) 2nd Dorsal fin length, 9) Pectoral fin length 10) Pelvic fin length and Anal fin length and counts were made of Dorsal fin rays. Pectoral fin rays, Pelvic fin rays anal fin rays caudal fin rays. The counts were determined the help of hand magnifying glass.

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3. STATISTICAL ANALYSIS

Each species treated minimum and maximum size range mean, standard derivation, and standard error for all the morphometric characters and meristic counts of two species were recorded. All sorts of statistical analysis were calculated by using of SPSS version 5.0 software SPSS Inc , 2004; Simon *et al.*, (2011).

4. RESULTS

The different morphometric parameters and their relationship with total length (Independalbe variable) among different body lengths of male and female specimen like Standard Length, Fork Length, Head Length, E.D., 1st DFL, 2nd DFL, PEC.FL, Pel. FL and AFL showed in (Table 1and 2). Their result exhibits that all parameters were highly significant with total length except eye diameter, 1st dorsal fin length and 2nd dorsal fin length (0.86, 0.74 and 0.88) in case of female. The result of different meristic counts like 1st dorsal fin, pectoral fin, pelvic fin, anal fin and caudal fin rays were counted and presented in (Table 3). Results of these parameters reveled that there is no any significant

($p < 0.05$) difference between male and female *Rita rita*. Finally concluded that population of *Rita rita* specie found to be identical or homogenous stock from Indus River near Jamshoro.

5. DISCUSSIONS

The study was under taken to investigate some morphometric characters of *Rita rita* in terms of total length with other parameters and correlation coefficient of male and female specimen. The values of coefficient correlation showed that the relationship between total length with various body parameters of this fish was highly significant at ($p > 0.01$) level except the relationship between total length 1st dorsal fin length and 2nd dorsal fin length of female and eye diameter versed head length of female ($p > 0.05$) again relationship between different parameters of male and female was highly significant ($p > 0.01$). From the present investigation it was inferred that there was single homogenous stock of *Rita rita* from Indus River. Similar observation was reported by (Jafri *et al* 1998

Table.1 Data on morphometric measurement of various parameters with total length of male endangered catfish, *Rita rita* from Indus River near Jamshoro

S. No.	Parameters	Mean Stvd.	Regression analysis	Coefficient of correlation	% of total length
01	Standard Length	18.11± 8.3.26989	0.13+1.02	0.97	78.67
2	Fork length	20.35±5.178031	0.16+0.84	0.96	88.40
3	Head length	5.68±1.419375	-0.3+0.7	0.98	24.67
4	Eye diameter	0.32±0.04	0.27+0.5	0.95	5.63
5	1 st Dorsal Fin length	2.16±0.361109	0.2+0.39	0.93	9.31
6	2 nd Dorsal fin length	2.06±0.233238	-0.83+2.15	0.90	9.38
7	Pectoral fin length	0.78±0.146969	-0.83+1.17	0.94	8.94
8	Pelvic Fin length	0.8±0.167332	-1.1+1.42	0.95	3.38
9	Anal fin length	2.14±0.553534	0.2+0.05	0.96	9.29

Table. 2 Data on morphometric measurement of various parameters with total length of female endangered catfish, *Rita rita* from Indus River near Jamshoro

S. No.	Parameters	Mean Stvd.	Regression analysis	Coefficient of correlation	% of total length
01	Standard Length	22.64±5.960537	-0.5+1.29	0.97	81.36
2	Fork length	24.84 ±6.680045	-0.15 1.07	0.97	89.28
3	Head length	6.8±1.930026	-0.65+1.02	0.96	24.22
4	Eye diameter	0.34±0.089443	-0.6+1.16	0.86	5.0
5	1 st Dorsal Fin length	2.46±0.527257	-0.2+0.42	0.74	8.84
6	2 nd Dorsal fin length	2.28± 0.630079	-1.85+1.55	0.88	7.90
7	Pectoral fin length	0.78±0.216795	-2.95+2.66	0.95	2.80
8	Pelvic Fin length	0.925±0.15	-3.5-2.77	0.96	3.30
9	Anal fin length	2.26±0.512835	-1.1+1.01	0.96	8.12

Table. 3. Data on meristic counts of male and female Endangered Catfish *Rita rita* from Indus River, near Jamshoro, Sindh, Pakistan.

S.No.	Parameters	Male		Female	
		Range	Mean	Range	Mean
1	1 st Dorsal Fin Rays	6-8	7±1.0	6-8	7±1.0
2	Pectoral Fin Rays	8-10	9 ± 1.0	7-10	8±1.0
3	Pelvic Fin Rays	7-8	7.5 ±0.5	7-8	7.5 ± 0.5
4	Anal Fin Rays	8-12	10 ± 2	8-12	10± 2.0
5	Caudal Fin Rays	17-22	19.5±4.5	16-20	18±2.0

and Amin, 2010) from Indus River and Bangladesh respectively. The relationship between total length with length was highly significant ($p > 0.01$) in this experiment total length verses different parameter length of this fish was found to be straight line in logarithmic scales Davi *et al* (1991). Morphometric characters as recorded from Male and female showed in table 1 and 2 from these characters it was observed that % of Fork length 88.10 and standard length 80.84 of female was higher than male (86, 80.15) again pectoral fin length in female 17.85 was higher than male (16.53) a close examination of the values of character revealed that strong homogeneity among the sexes. Female was broader in anterior part of the body at pectoral fin in relation to males. The males were having longer head then the female regarding other character fork length, and standard length of the female were longer than those of the male. Thus it may be inferred that male showed faster linear growth at anterior part while female showed faster linear growth at posterior part of the body (Chatterji *et al* 1977; Tariq *et al* 1977; Kumar 1985). These all values were in agreement of the present research work. Meristic counts like dorsal fin rays, pectoral fin rays, pelvic fin rays anal fin rays and caudal fin rays were enumerated and their ranges were 6-8, 8-10, 7-8, 8-10 and 17-22 respectively in the present research work. These ranges were in agreement with the finding of (Jafri *et al* 1998 and Amin, 2010) in *Rita rita* from River Indus and Bangladesh respectively.

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