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## Research Article

# ANALYSIS OF MORPHOMETRIC AND MERISTIC CHARACTERISTICS OF *MYSTUS BLEEKERI* FROM THE NERMADA RIVER

Archana Lalwani\*<sup>1</sup>, Ragini Gothalwal<sup>1</sup> and Nidhi Tripathi<sup>2</sup>

<sup>1</sup>Department of Biotechnology, Barkatullah University, Bhopal M.P - 462026, India

<sup>2</sup>Department of Biochemistry, Career College, Bhopal M.P – 462023, India

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### ABSTRACT

Identification of an organism is mandatory for classification and taxonomical studies. Due to identification problems that exist between the fish species there is need of characterisation of morphometric and meristic characters of fish species. In present studies the fish species taken is *Mystus bleekeri*. A total of 15 species of *M. bleekeri* are taken from the Narmada River. The identification of *Mystus* species and confirmation of the identified species is done by using morphometric meristic characteristics features. The linear regression analysis is done. The correlation between the total length and other parameters is found highest for fork length and lowest for pre pelvic length. There is the proportional increase in growth with the increase in total length. The results show positive allometry. The study of morphometric relationships is required for the taxonomic and phylogenetic studies.

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### INTRODUCTION

*Mystus* belongs to the family Bagridae and the order is Siluriforms. The prominent features of this family are that they have elongated body, depressed head, barbells which are of four pairs (Talwar & Jhingran, 1991). It's an important food fish in central India. The species of this genus easily get adapted in various environmental conditions (Radhakrishnan *et al.*, 2016). The importance of this fish lies in the two factors, one is its occurrence in different ecological habitat and the other is its high demand as a food. The *Mystus* spp. Have many similarities morphologically, which makes its identification difficult. There is Taxonomic ambiguity in the *Mystus* species (Darshan *et al.*, 2013) So there is need of morphometric and meristic analysis of *Mystus* species. Prosanta Chakrabarty & Heok Hee Ng (2005) studied the identification of new species from Myanmar similar to the *Mystus cavasius* by studying the morphometric and meristic characters. The study of morphometric of fish is crucial as it provide the detailed information for taxonomic and evolutionary studies (Mwita C. J. 2015). In the present study the fishes from the Narmada River is taken. Narmada is the longest river in Madhya Pradesh. Narmada River is the highly valued river as it is the most important natural resource and highly rich in ecological diversity (Bhaumik U., Mukhopadhyay M. K.,

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Shrivastava N. P., Sharma A. P. & Singh N. 2017). Total 15 samples of the *Mystus bleekeri* ([www.fishbase.com](http://www.fishbase.com)) are taken for the study. The abundant presence throughout the large geographical area of Central India and its high rate of consumption make this fish ideal for the study.

### MATERIAL AND METHOD

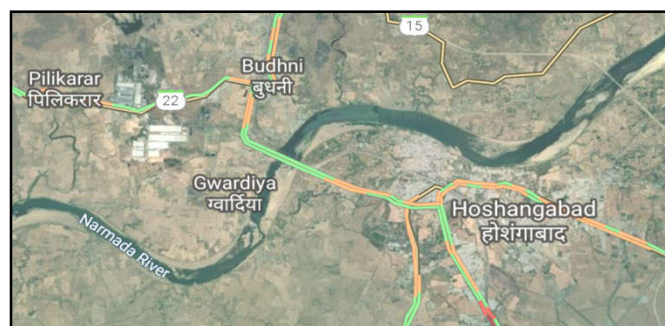


Fig 1 Budhni Ghat, Hoshangabad ( Narmada River )  
([www.google.co.in/maps/place/Narmada+River](http://www.google.co.in/maps/place/Narmada+River)).

### Sampling sites

Specimens were collected from Budhni Ghat, Hoshangabad, located 22.75 latitude and 77.72 longitudes (Fig 1). It is

\*Corresponding author: Archana Lalwani

Department of Biotechnology, Barkatullah University, Bhopal M.P - 462026, India.

situated at the central area of Nermada River. Samples were collected during January 2017 to February 2017.

**Sample Collection and Preservation**



Fig 2 Lateral view of *Mystus bleekeri*

Specimens of *Mystus bleekeri* were collected from Nermada River with the help of local fishermen using variety of nets. The preservation of the fish done immediately at the time of collection in the 10% formalin solution.

**Experimental Work**

The meristic and morphometric characteristic features were determined by using Vernier caliper (Least count = 0.01 mm), magnification glasses and geometric scale. And the key books Day, 1878; Jayaram, 1999, are used for the identification of fishes up to the species level.

**Data Analysis**

The morphometric and meristic characters are measured. The fish sample data were grouped in range and by using the raw data in excel format. The mean standard deviation is calculated. The linear regression ( $Y = a + bX$ ) is calculated to find the regression and correlation coefficient between different parameters (Jawad *et al.*, 2016; Chakravorty, *et al.*, 2016)

**RESULTS**

Total 15 specimens with the total length ranging from 12 cm – 18cm is taken for morphometric and meristic characterisation. The statistical values of morphometric and meristic characters of different parameters are given in table 1 & table 2 respectively.

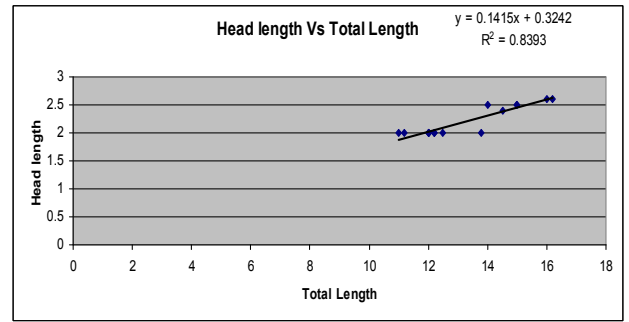


Fig 3 Relation between head length & total length

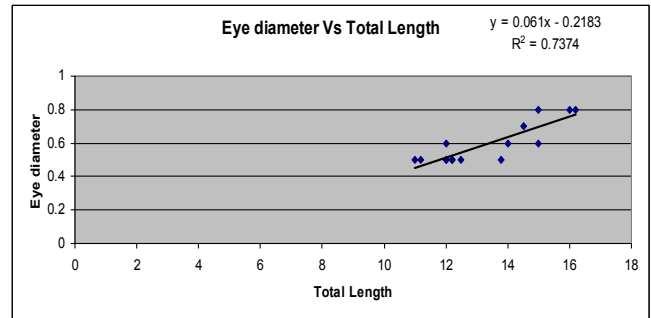


Fig 4 Relation between eye diameter & total length

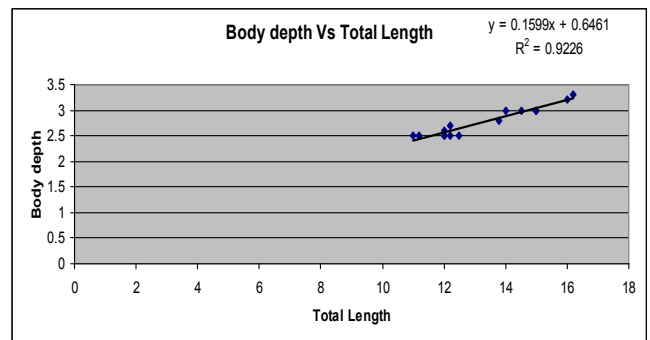


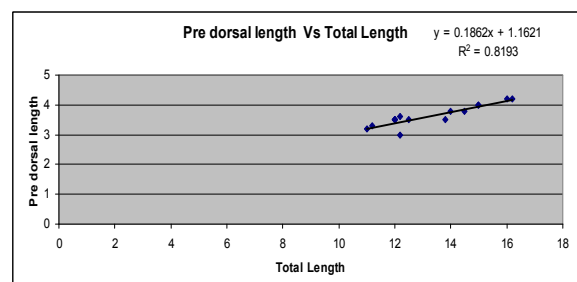
Fig 5 Relation between body depth & total length

**Table: 1** Morphometric analysis of *Mystus bleekeri*

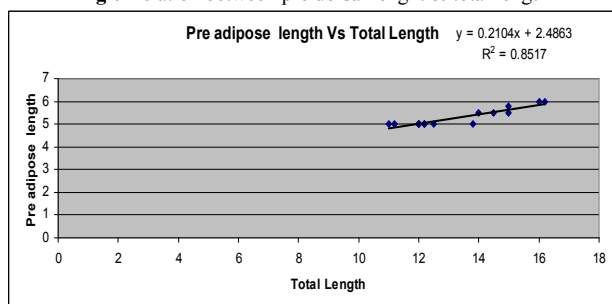
S.No	Morphometric characters	Mean	Standard Deviation	Correlation(r)	Regression (Y= a + bX)
1	Total Length ( TL)	13.31	1.72	-	-
2	Fork Length ( FL)	10.69	0.60	0.93	FL=6.4179 + 0.3213TL
3	Standard Length ( SL)	9.82	0.74	0.73	SL= 5.6224 + 0.3155TL
4	Head Length ( HL)	2.21	0.27	0.92	HL = + 0.3242 + 0.1415TL
5	Eye Diameter ( ED)	0.59	0.12	0.86	ED= - 0.2183 + 0.061TL
6	Body Depth ( BD)	2.77	0.29	0.96	BD = 0.6461 + 0.1599TL
7	Pre dorsal length ( PrDL)	3.64	0.35	0.90	PrDL= 1.1621 + 0.1862TL
8	Pre adipose length (PrADL)	5.29	0.39	0.92	PrADL= 2.4863 +0.2104TL
9	Pre pectoral length (PrPL)	2.35	0.39	0.33	PrPL = 1.3704 + 0.0739TL
10	Pre ventral length( PrVL)	3.92	0.88	0.10	PrVL = 1.9218 + 0.1321 TL
11	Pre anal length (PrAL)	7.40	1.64	0.12	PrAL= 5.8509 + 0.1164TL
12	Max barbel length (MBL)	7.99	0.95	0.93	MBL = 1.1328 + 0.5156TL

**Table 2** Meristic characteristics of *Mystus bleekeri*

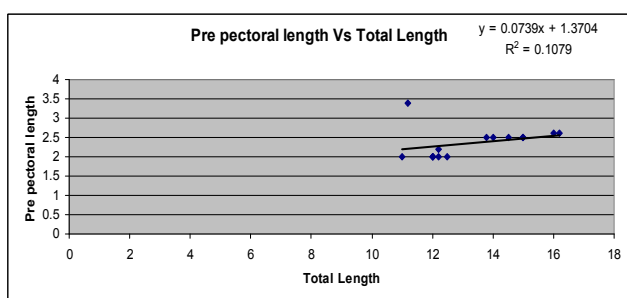
S.No	Morphometric characters	Range
1	Dorsal fin I	7
2	Pectoral fin (soft rays)	7-8
3	Pelvic fin (soft rays)	6
4	Anal fin (soft rays )	9
5	Caudal fin (soft rays)	18-20



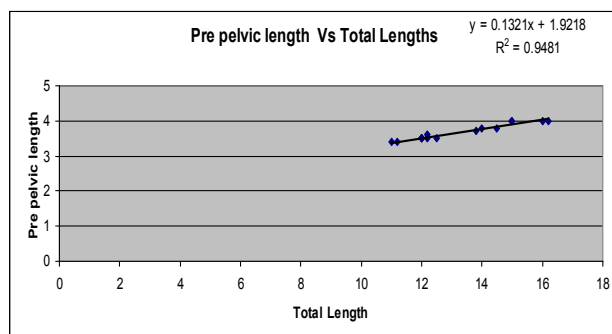
**Fig 6** Relation between pre dorsal length & total length



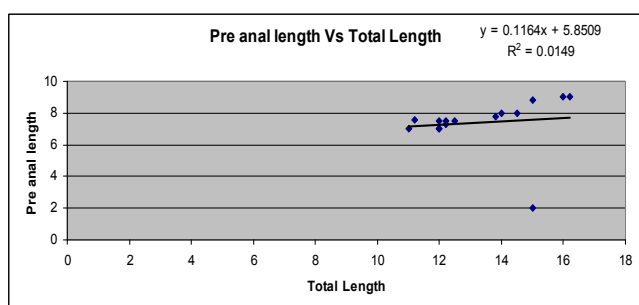
**Fig 7** Relation between adipose length & total length



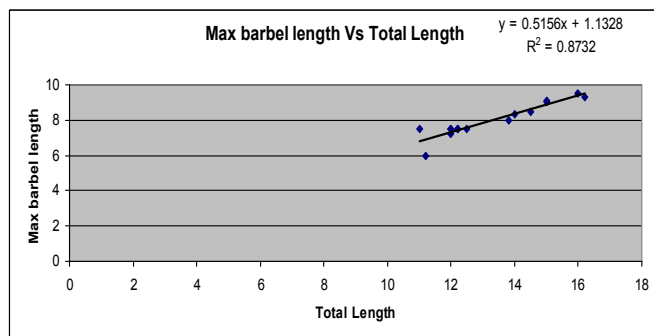
**Fig 8** Relation between pre pectoral length & total length



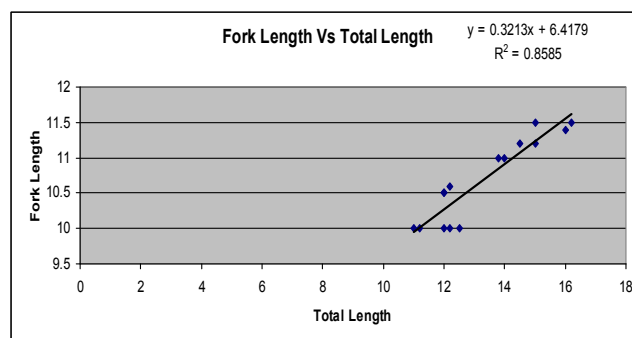
**Fig 9** Relation between pre pelvic length & total length



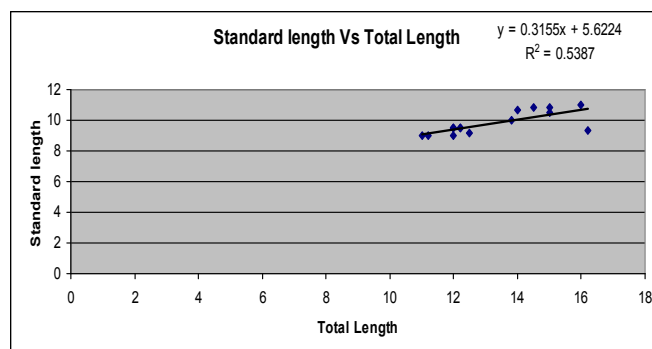
**Fig 10** Relation between pre anal length & total length



**Fig 11** Relation between Max barbell length & total length



**Fig 12** Relation between fork length & total length



**Fig 13** Relation between Standard length & total length

The graph of regression coefficient between the morphometric variables (Y) and the total length (X) gives the significant positive correlation in all parameters with total length. The highest correlation showed between the parameter the most highly correlated parameter with total length is Fork length (0.93) and Body depth (0.96) respectively and the lowest correlated parameter with total length is Pre Pelvic Length (0.10). The correlation analysis shows that all morph metric traits change proportionally with increase in total length. The positive allometry (Fig 3 to 13) is shown by all the morphometric characters with relative to the total length. In present study among the meristic characters the number of 1<sup>st</sup> dorsal fin, pectoral fin, pelvic fin and anal fin are constant only slight variation is seen in the number of caudal fin in spite of variation in the size of different individuals. These results gave us the concrete data to identify the *Mystus bleekeri* through morphometric and meristic characterization.

## DISCUSSION

The present study showed that the high correlation in morphometric measurement. It indicates that the growth of the *Mystus bleekeri* in one part of body is directly related to the growth in other part of body. Body depth and Fork length shows the close relationship with total length as compared to other morphometric parameters. Generally the functional parameters of growth are the length and weight. Statistical analysis of these parameters helps to define the formulae for length verses body measurements. These results are similar to the results given by Soma Goswami *et al.* (2007) in the study on fish *Nandus nandus* (Hamilton) obtained Data for the work which serve as template in systematic study and taxonomy fishes. Badkur. R & Parashar A (2015) also reported the positive correlation coefficient (r) when the comparative analysis is done between the total length and different morphometric parameters. Comparative analysis of the *Mystus*

species by using different morphometric and meristic parameter help to identify the species more accurately. Manimegalai M *et al* study on the *E. maculatus*, a fresh water cichlid fish support our study that how Morphometric and meristic parameters can be used as tools to differentiate between the different variants. The similar finding are reported by Sharma N. K., Mir J. I., Pandey N. N., Akhtar M. S., Bashir A. & Singh R (2014); The further work can be done by using the molecular marker like mitochondrial DNA cytochrome oxidase I (Herbert N *et al.*, 2008; Khedkar G. K. *et al.*, 2014) or through RAPD analysis (Hasan & Goswami 2015). The use of combined research on morphometric characterization and molecular characterization is required for more accurate results.

## References

- Badkur. R & Parashar A (2015) Morphometric Approach towards Growth Performance of Mahseer (Tor tor) in River Narmada Near Hoshangabad (M.P), *Indian Journal of Pharmaceutical and Biological Research (IJPBR)* 3(2):66-72
- Bhaumik U., Mukhopadhyay M. K., Shrivastava N. P., Sharma A. P. & Singh N. (2017), A case study of the Narmada River system in India with particular reference to the impact of dams on its ecology and fisheries, *Aquatic Ecosystem Health & Management*, 20:1-2,
- Chakravorty. K. Pathak J., Goswami M. (2016), Study of the Morphometry and Meristic Analyses of Three *Mystus* species from the Chandubi Beel, Kamrup District, Assam, *IJLSSR*, 2(4):478-487
- Chakrabarty & H. H Ng, (2005) The identity of catfishes identified as *Mystus cavasius* (Hamilton, 1822) (Teleostei: Bagridae), with a description of a new species from Myanmar, *Zootaxa* 1093: 1-24
- Darshan A., Mahanta P.C., Barat A. & Kumar P. (2013), Redescription of the Striped Catfish *Mystus tengara* (Hamilton, 1822) (Siluriformes: Bagridae), *India Journal of Threatened Taxa* 5(1): 3536-3541.
- Goswami S and Dasgupta (2007), Analysis of the morphometric and meristic characters of the fish *Nandus nandus* (Hamilton) from the new alluvial zone of West Bangal, *Rec. zool. Surv*, 107(Part-1) : 81-90.

- Hasan I and Goswami M (2015), Genetic Variation among cat fish *Mystus vittatus* Population assessed by Randomly Amplified Polymorphic (RAPD) Markets from Assam, India, *Agriculture Research and Development*, 6(4)
- Hubert N, Hanner R, Holm E, Mandrak NE, Taylor E, Burrige M, Watkinson D, Dumont P, Curry A, Bentzen P, Zhang J, April J, Bernatchez L (2008). Identifying Canadian freshwater fishes through DNA barcodes, *PLoS One*. 3(6):e2490
- Jawad L. A, Muhammad I. G and Al-Janabi (2016), Morphometric characteristics of catfish *silurus triostegus* (Heckel, 1843) from the Tigris and Shatt Al-Arab Rivers, Iraq, *Croatian Journal of Fisheries*, 179-185.
- Jayaram K. C (1999). The freshwater fishes of the Indian region. Narendra Publishing House. New Delhi. 509pp
- Khedkar G. K., Jamdade R., Naik S., David L., Haymer D(2014), DNA Barcodes for the Fishes of the Narmada, One of India's Longest Rivers, *Plos One*
- Manimegalai M (2010), Morphometric analysis – Tool to identify the different variants in a fish species: *E. maculatus*, *International Journal of Environmental sciences*, 1(4)
- Maurya A. K., Radhakrishnan K. V., Sahu. P., Prasad P., Jag Pal & Shukla B. N. (2018). Length weight relationship and condition factor of *Mystus bleekeri* (Day, 1877) in Rudrasagar Lake, a Ramsar site in Tripura, *Journal of Entomology and Zoology Studies*; 6(2): 2500-2503
- Mwita C. J. (2015) Morphometric Relationships among the Clariid Fishes of the Lake Victoria Basin, Tanzania *Open Journal of Marine Science*, 5: 26-32
- Sharma N. K., Mir J. I., Pandey N. N., Akhtar M. S., Bashir A. & Singh R(2014), Meristic and Morphometric Characteristics of *Crossocheilus diplochilus* (Heckel, 1838) from the Poonch Valley of Jammu and Kashmir, *India World Journal of Zoology* 9 (3): 184-189
- Talwar, P.K. and Jhingran, A.G. (1991) *Inland Fishes of India and Adjacent Countries*. Oxford-IBH Publishing Co. Pvt. Ltd., New Delhi, 1158
- www.fishbase.com
- Crossocheilus diplochilus from a tributary of Indus River basin, India. [www.google.co.in/maps/place/Narmada+River](http://www.google.co.in/maps/place/Narmada+River).

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