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BIOMETRIC STUDIES OF DWARF GOURAMI, *COLISA LALIA* (HAMILTON, 1822) OCCURRING ALONG RIVER HOOGLY, EAST COAST, INDIA

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ABSTRACT
Morphometric and meristic characters and their interrelationships of 100 specimenns of *Colisa lalia* were studied. The range of length and weight they belonged were between 3.5 to 4.7cm and 1.02 to 1.98 g. The fish shows allometric growth. Highest Correlation Coefficient (0.93) was observed between Total Length (TL) and Standard Length (SL) and lowest Correlation Coefficient (0.18) was observed between Total Length (TL) and Eye Diameter (ED) out of the nine characters studied in relation to TL. The range and mode of the meristic characters were also found out the fin formula of *Colisa lalia* (D. XV-XVII/7-9, P_1. 9-10, P_2. 1, A. XVII-XX/15-17).

KEY WORDS: *Colisa lalia*, Dwarf gourami, Biometric studies, morphometric characters.

INTRODUCTION

Dwarf gourami, *Colisa lalia* is native to North East India and it is the most popular of the gouramis (Sinha and Mahapatra, 2012). This species belongs to phylum Chordata, class Actinopterygii, order Anabantiformes, family Osphronemidae, genus Colisa /Trichogaster and species lalia /lalius. Presently this species is also known as *Trichogaster lalius.* This study intends to delineate the general biology of this species, which mainly includes the study of morphometric and meristic characters. The body shape can be well described by the morphometric aspects. Meristic counts are the countable structures like rays and fins. Morphomeristics is commonly used for taxonomical identification and differentiation of individual species and species from different stocks (Lourie *et al*., 1999; Doherty and McCarthy, 2004; Jayasankar *et al*., 2004). Similarly, length-weight relationship of fishes are important in fisheries biology because they allow the estimation of the average weight of the fish of a given length group by establishing a mathematical relation between them (Beyer, 1987). A minute morphomeristic work is done in this particular dwarf gourami species.

MATERIAL AND METHODS

Collection of Samples

100 specimens were collected from Hoogly River, West Bengal, ranging in total length from 3.5–4.7cm and weight in range of 1.02–1.98g, and were studied for this present work. The specimens were preserved in 10% formalin solution.

Morphometric Characters Studies

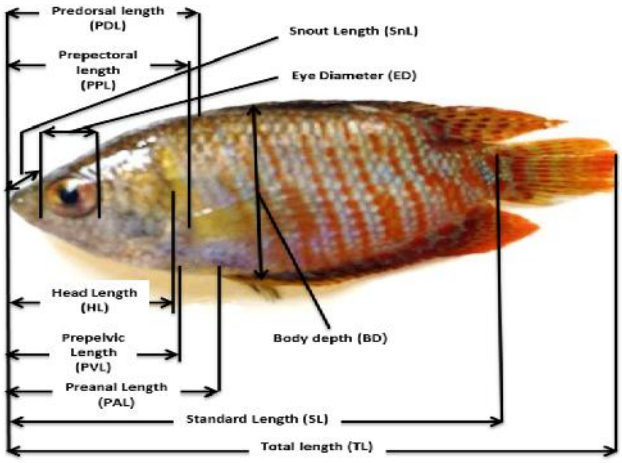
For morphometric studies a divider and mm *vs* cm scale was used and the measurements were taken to nearest mm. Ten morphometric characters are studied following Apparao (1966) and Dwivedi and Menezes (1974). Total length (TL) was measured by taking the maximum elongation from snout to tip of the caudal rays. Standard Length (SL) was measured from the tip of the snout or premaxilla to the base of the caudal fin (hypural joint), where a groove forms. Predorsal Length (PDL) is measured from anterior most part of the body to the first dorsal fin ray. Preanal length (PAL) is measured from anterior most part of the body to the first anal fin ray. Prepectoral length (PPL) is measured from anterior most part of the body to the base of the pectoral fin. Pre pelvic / ventral length (PVL) is measured from anterior most part of the body to the base of the pelvic fin. The pair of pelvic fins in this fish is long and thin, modified to antenna like structures. Head length (HL) is measured between the snout or premaxilla & the posterior most edge of the opercular bone. Body Depth (BD) is measured as the distance between the dorsal & ventral surface at the deepest point. Eye Diameter (ED) is measured between the anterior & posterior rims of the eye in the longitudinal axis. Snout Length (SnL) is measured from anterior most part of the body to the front margin of the eye orbit.

Meristic Characters Studies

Amongst the meristic characters Dorsal Spines (DS) , Dorsal Soft Rays (DSR), Anal spines (AS), Anal Soft Rays (ASR), Pelvic Fins (PF), Pectoral Fin (PcF) and Caudal Fin (CF) were counted and studied.

Statistical Analysis

The mean, standard deviation, minimum range, maximum range and range difference were calculated of all the ten morphometric characters. Correlation Coefficient, R^2 value and Regression Equation were worked out in comparison to total length (TL). Relationships were analyzed using a standard linear regression expression Y = a + b X, where 'Y' is the dependent variable, 'X' is the independent variable (TL), 'a' is the constant (Y intercept) and 'b' (slope) is the regression coefficient, were fitted for all the variables for different localities. The goodness of fit of the relationship between the variables was derived from the coefficient of correlation.



Morphometric measurements of *Colisa lalia*

RESULT AND DISCUSSION

Morphometric Characters Studies

Ten morphometric characters were measured, which having Mean value for Total length (TL) = 4.06, Standard Length (SL) =3.25, Predorsal Length (PDL)=1.42, Preanal length (PAL)=1.57, Prepectoral length (PPL)=1.15, Prepelvic / ventral length (PVL) =1.17, Head length (HL) =1.12, Body Depth (BD) =1.51, Eye Diameter (ED) = 0.30 and Snout Length (SnL)=0.28. Similar work on morphometric and meristic study was carried out by Dube and Dubey (1986-87) on *Tor tor* from Narmada river. Table 1. also gives information about standard deviation (SD), Maximum (Max) limit, Minimum (Min) limit and their range difference of all samples.

TABLE 1. Mean, Standard Deviation, Minimum and Maximum range and range difference of different Morphometric Characters of dwarf gourami, *Colisa lalia* (Hamilton, 1822)

Morphometric Characters	Mean	SD	Min	Max	Range Difference
Total length (TL)	4.06	0.21	3.5	4.7	1.2
Standard Length (SL)	3.25	0.18	2.8	3.7	0.9
Predorsal Length (PDL)	1.42	0.11	1.2	1.7	0.5
Preanal length (PAL)	1.57	0.11	1.3	1.8	0.5
Prepectoral length (PPL)	1.15	0.07	1.0	1.3	0.3
Prepelvic / ventral length (PVL)	1.17	0.07	1.0	1.4	0.4
Head length (HL)	1.12	0.07	1.0	1.3	0.3
Body Depth (BD)	1.51	0.10	1.3	1.8	0.5
Eye Diameter (ED)	0.30	0.02	0.3	0.4	0.1
Snout Length (SnL)	0.28	0.04	0.2	0.3	0.1

TABLE 2. Correlation Coefficient, R^2 Value and Regression Equation between different Morphometric Characters of dwarf gourami, *Colisa lalia* (Hamilton, 1822)

In Comparison with Total Length (TL)	Correlation Coefficient	R^2 Value	Regression Equation
Standard Length (SL)	0.93	$R^2 = 0.8642$	$y = 0.8108x + 0.0403$
Predorsal Length (PDL)	0.47	$R^2 = 0.2213$	$y = 0.2412x + 0.4413$
Preanal length (PAL)	0.63	$R^2 = 0.3919$	$y = 0.3285x + 0.2352$
Prepectoral length (PPL)	0.55	$R^2 = 0.2999$	$y = 0.1919x + 0.3705$
Prepelvic / ventral length (PVL)	0.45	$R^2 = 0.2055$	$y = 0.1602x + 0.5196$
Head length (HL)	0.53	$R^2 = 0.2769$	$y = 0.1699x + 0.4284$
Body Depth (BD)	0.59	$R^2 = 0.3438$	$y = 0.2783x + 0.3788$
Eye Diameter (ED)	0.18	$R^2 = 0.0333$	$y = 0.0191x + 0.2274$
Snout Length (SnL)	0.31	$R^2 = 0.0953$	$y = 0.0621x + 0.0261$
In Comparison with Head Length (HL)			
Eye Diameter (ED)	0.19	$R^2 = 0.0375$	$y = 0.0627x + 0.2347$
Snout Length (SnL)	0.23	$R^2 = 0.0539$	$y = 0.1448x + 0.1165$

Correlation Coefficient, Regression Equation and R^2 Value were found out of nine morphometric characters in relation with Total Length (TL), shown in Table 2. Highest relation was observed in case of Standard length (SL) where R^2 value was 0.8642 and lowest in case of Eye Diameter (ED) where R^2 value was 0.0333. In *Tor putitor*a Bhatt et al. (1998) reported eye diameter as a least correlated variable. In this case too least relation was observed between ED and HL. There is a positive correlation between all the characters. This means when

one character increases in size, the other morphometric characters too increases in size, but the frequency of growth rate among them varies. Thus the fish shows allometric growth.

TABLE 3. Variations of Meristic Characters of dwarf gourami, *Colisa lalia* (Hamilton, 1822)

Meristic Characters	Range	Mode
Dorsal Spines (DS)	15 - 17	15
Dorsal Soft Rays (DSR)	7 - 9	8
Anal spines (AS)	16 - 19	17
Anal Soft Rays (ASR)	14 -17	15
Pelvic Fin (PF)	2 – 2	2
Pectoral Fin (PcF)	8 - 10	8
Caudal Fin	14 - 16	14

Meristic Characters Studies

Differences in the meristic characters of *Colisa lalia* are given in Table 3. Table 3 gives information regarding the range and mode. Based on the observation, we can get the fin formula of this fish (D. XV-XVII/7-9, P_1. 9-10, P_2. 1, A. XVII-XX/15-17) which is supported by the results of (Shafi and Quddus, 1982), (Rahman, 2005) and (Talwar and Jhingran, 2001) for same fish. In the present study there is variation in the meristic count, which is may be due to the variation in the size of the fish. There are many reports on differences in meristic characters in many fishes such as *Crossocheilus latius latius* (Brraich and Akhter, 2015), *Pseudobagrus ichikawai* (Watanable, 1998), *Pterophyllum scalare* (Bibi *et al*., 2008), *Nematalosa nasus* (AlHassan, 1987).

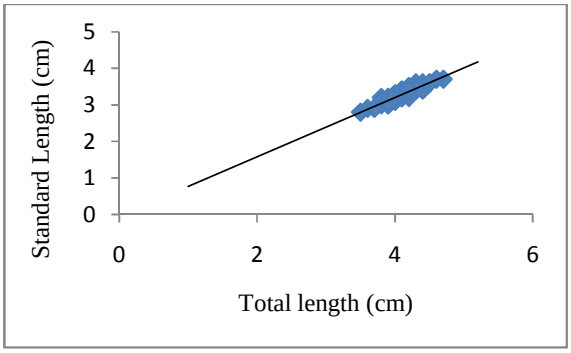


Fig. i

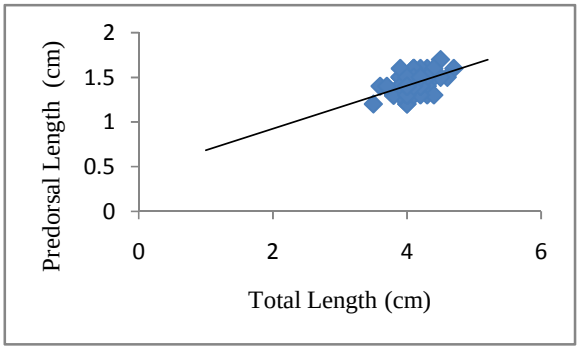


Fig. ii

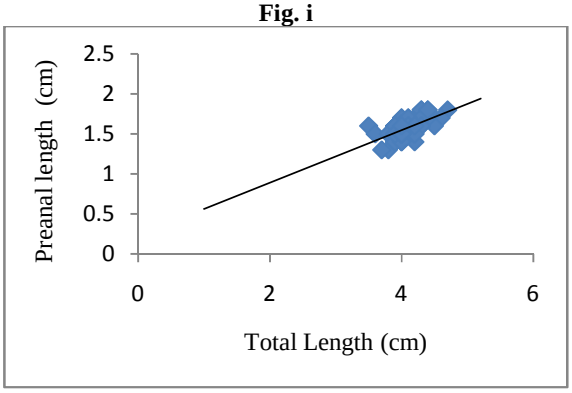


Fig. iii

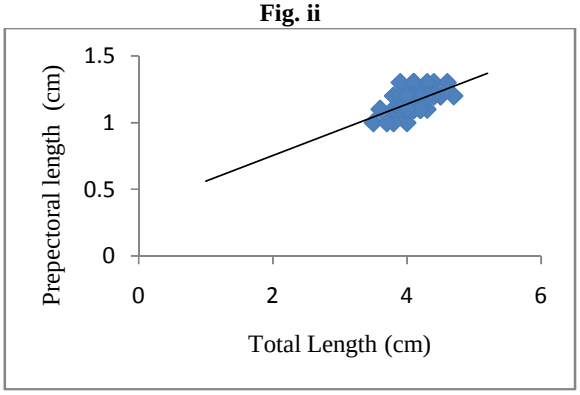


Fig. iv

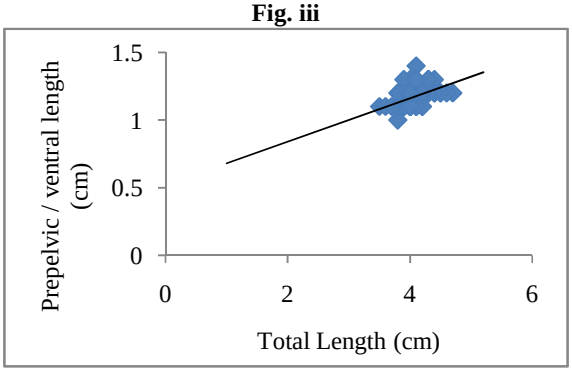


Fig. v

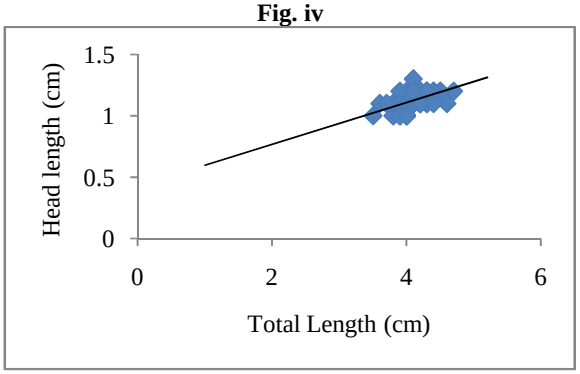


Fig. vi

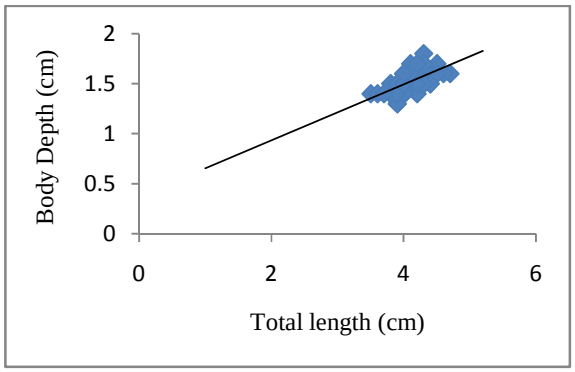


Fig. vii

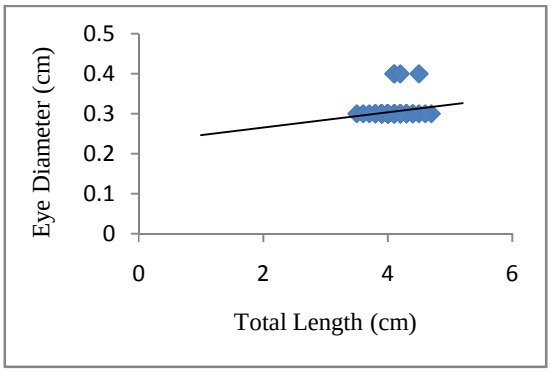


Fig. viii

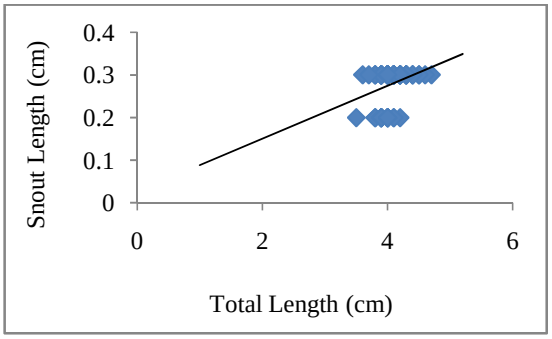


Fig. ix

FIGURE i, ii, iii,iv,v,vi, vii, viii and ix shows graphical representation of the relationship of different morphometric characters in relation to total length of *Colisa lalia*.

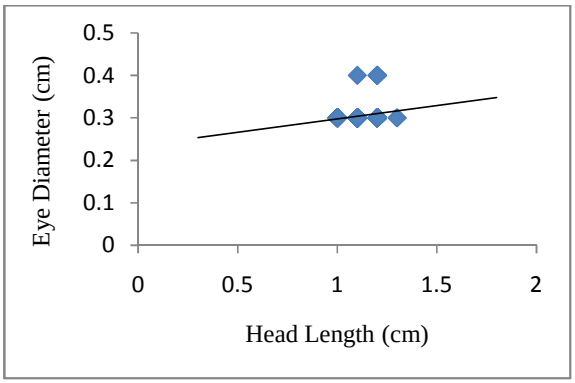


Fig. x

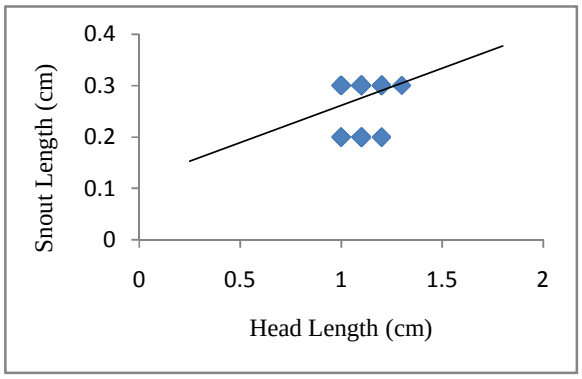


Fig. xi

FIGURE x and xi shows graphical representation of the relationship of two morphometric characters in relation to head length of *Colisa lalia*.

CONCLUSION

The *Colisa lalia* shows allometric growth, this means when one character increases, the other morphometric characters too increase which have direct proportionality, but the degree of growth rate among them varies.

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