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QUANTITATIVE SEX –WISE OBSERVATION ON THE LENGTH –WEIGHT RELATIONSHIP OF THE BRAIN AND BODY IN A TELEOST, AMBLYPHARYN GODON CHAKIENSIS (BLEEKER)

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ABSTRACT

The quantitative sex-wise observations were made for length-weight relationship like standard length-brain length (SL-BL) and standard length brain weight (SL-BRW) relationship in *Amblypharyngodon chakiensis, a* teleost. Regression coefficient for SL-BL relationship in females is 0.1042 and that of males is 0.0303, while SL-BRW relationship in *A.chakiensis* indicate that in females the regression coefficient is 0.4597 and in males it is 0.4078. Thus the rate of growth of brain length and brain weight is found to be higher in females.

***Keywords: SL** - BL Relationship, Regression Coefficients, Brain Weight, A.Chakiensis.*

INTRODUCTION

Although enough work has been done on the morphology of the brain, references are scarcely available on the detailed statistical analysis of brain and its various internal measurements in fishes. Knowledge of the morphometric analysis is limited to the studies of Geiger (1956),Ridet *et al.*(1973) Bauchot *et al.*(1973 & 1979),Jafri & Noori (1976),Bhatt & Singh (1982), Sherly (1993) and Chin (1999). The present paper deals with the statistical analysis of the sex-wise comparison of the standard length-brain length (SL-BL) and standard length-brain weight (SL-BRW) relationship may be useful in emphasizing sex- wise relationship and variations occurring in other fishes and in higher vertebrates also.

METHODOLOGY AND RESULTS

Monthly sample of *A.chakiensis* includes a total of 102 specimens, 45 males and 57 females,for a period of one year. Fresh specimens were used for the analysis .length- weight measurements of the brain and body were recorded in all the 102 specimens and measurements were done sex- wise. In *A.chakiensis* weight of the fish ranged from 3000 mgms to 11000 mgms, standard length 50-90 mm, brain length 5-12 mm and brain weight 0.12-0.32 mgm. Covariance analysis is used to infer whether the growth pattern is significantly different between the sexes. The regression coefficient (b) and the regression graphs were calculated with the computer by using formula y = bx +a.

Standard length-brain length (SL-BL) *relationship*: The results of the covariance analysis is presented in Fig. 1 and Table I. If the slope given by Fs values is significantly different in SL-BL relationship, a significant Fs clearly indicates a difference in the growth pattern. Here the rate of growth of brain length is greater in female. The regression coefficient (b) =0.1042 in females and 0.0303 in males. The regression line Y= 0.1042x +1.4161 in females and Y=0.0303x +5.8875 in males.

Standard length-brain weight (SL-BRW) *relation ship*: The covariance analysis for this relationship is p resented in Table I and Fig.2. The slope here is not sig nificant but the elevation is found significant and the r ate of growth of the brain weight is found higher in fe males. The regression coefficient (b) = 0.4597 in fema le and 0.4078 in males. The regression line Y =0.4597 x +0.5271 in females and Y = 0.4078x +2.0828 in male

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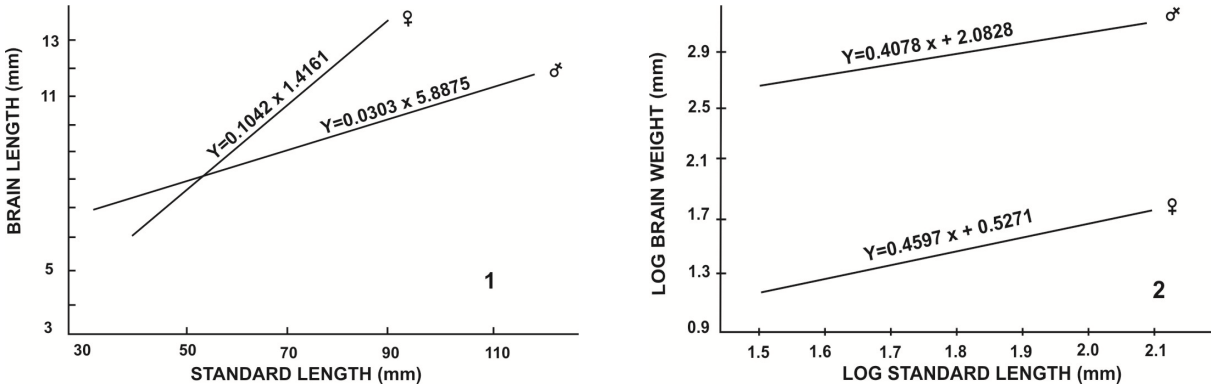

Fig. 1-2: regression graph in *A.chakiensis.*1 Standard length – brain length relationship; 2. Log standard length – log brain weight relationship.

Table I: Results of covariance analysis- standard length, brain length and brain weight relationship in *Amblypharyngodon chakiensis.*

Parameters	df	SL-BL		LOG SL –LOG BRW	
		SS	MSS	SS	MSS
Females	57	112.1264	1.9671	0.5785	0.0101
Males	45	72.6088	1.6135	0.2154	0.0053
	102	184.7352	1.8111	0.7939	0.0108
Pooled	103	202.5058	1.9660	0.7944	0.0081
Difference between slope	1	17.7705	17.7705	0.0005	0.0005
W + B	104			0.9485	0.0095
Between adjusted means	1			0.1540	0.1540
Fs (comparing slopes)		9.8119**		0.0640**	
Fe (comparing elevation)				19.0067	

** = Significant (<0.001)

DISCUSSIONS

The degree of correlation for various measurements of the brain and body can be calculated by quantitative analysis. Some significant allometric coefficients for intra- speciesific , interspecific and interfamiliar variabilities have been determined in a few fish species by Bauchot *et al,(*1973 & 1979),Bhatt & Singh (1982) have studied the quantitative observations on the length-weight relationship of the brain and body in two cold water teleost. According to them the size of brain increases with the growth of the body and this fully agrees with my findings. The regression analysis in *A.chakiensis* indicates the degree of relationship of the brain-length and brain-weight in relation to its standard length which is higher for females than males. Bauchot *et al*. (1986) have created a fish base data. Jafri & Noori (1976) have noticed an increase in brain weight continued even when the growth of brain length and body length is considerably slowed down. This never supports the finding in *A.chakiensis*, as medium sized fishes show highest brain weight ratios than adults. Sherly (2003) showed in the *Glossogobius giuris*, medium sized fishes show larger brains than juveniles. Chin (1966) has developed the photographic atlas of brain in reef fishes. Again Albert *et al.* (1999) presented the brain weight observation table of 77 fishes representing 18 new families. Sex-wise analysis in *A.chakiensis* indicates that brain length and brain weight are directly proportional to its standard length through highest development was found in females. Further females have an average size greater than that of males.

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