

COMPARATIVE ACCOUNT OF GROWTH RATE OF BODY PARTS WITH TOTAL LENGTH IN *RITA PAVIMENTATA* (GUNTHER)

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ABSTRACT

The paper deals with sex-wise growth rate of different body parts in relation to total length in *Rita pavementata* (Gunther). Growth rates calculated on pooled data by using the common regression coefficient 'b' reveals isometric and homogeneous nature in sexes.

Keywords : *Rita*, isometric, regression, Narmada, India

Morphometric characters are the most useful taxonomic tools. However, the study of growth rate of different body parts has become the modern trend for the morphometric study of the fish by ichthyologists. It has been given due importance because the statistical models describing multiple regression of different body parts are essential in the isolation of different races and stocks of different fish species (Marr, 1995).

Rita pavementata, a common freshwater teleost, has a wide distributional range in the river Narmada and its tributaries. It is one of the most important fish species of river Narmada. It contributes major share in the group of catfish and about 43% in the total fish catch of river Narmada. Previous studies on the species are limited to the food and feeding, breeding, length-weight relationship and its fishery. There is no detailed morphometric study on *R. pavementata* of river Narmada. The

present study is an effort to find out the growth rate of different body parts in relation with total length in male and female *R. pavementata* river Narmada.

A total of 404 specimens ranging from 90 to 348 mm in total length (175 males ranging 98-348 mm and 229 females ranging 90-347 mm) of *R. pavementata* collected from Hoshangabad fish markets during the period 2000-01 were used for the present study. Linear measurement of the body parts like Total length (TL), Furcal length (FL), Standard length (SL), Pre-anal length (PAL), Pre-ventral length (PAL), Pre-dorsal length I (PDF₁ L), Pre-dorsal length II (PDF₂ L), Head length (HL) and Snout length (SnL) were measured on a fish measuring board to the nearest millimetre. The maximum body depth (BD) was measured with the help of fine dividers near pectoral fin with 1 mm precision.

Growth rates of all the body parts were compared with that of total length. The regression of different body parts on total length was studied applying the method of Snedecore (1956). The regression equation of linear form, *i.e.*, $Y=a + bx$ (where 'a' is intercept and 'b' is the regression coefficient), was used, and the values of 'a' and 'b' and the co-efficient of correlation 'r' were calculated empirically using the least square method. The analysis of covariance was used to test the homogeneity of values of regression co-efficient 'b' of male and female. The growth rate of different body parts (b) in relation to the TL was calculated on pooled data.

The values of 'a', 'b' and 'r' of various body parts were calculated both for male and female *R. pavimentata* and are given in Table 1. The results indicate no significant differences in the growth rates ('b') of different body parts (Table 2). The

calculated 'b' values of the pooled data of different body parts (Table 3) indicate that the highest growth rate was recorded in FL (0.93) followed by SL (0.87), PCL (0.79), PDL (0.64), PAL (0.63), PVL (0.46) PD₁L (0.35), HL (0.25), PPL (0.18), BD (0.16), SnL (0.07) and ED (0.03). The pooled values of correlation co-efficient 'r' ranged from 0.723 to 0.997 for different body parts (Table 3), indicating a close and positive correlation between total length and body parts.

The result of the present study indicates no marked difference in the growth rate of various body parts in relation to the total length in female and male *R. pavimentata*. There is no record of research work on the study of the growth rate of different body parts on total length in *R. pavimentata*. Many investigators have studied the growth rate of different body parts in relation to the total length of different fish. Choudhary and Dwivedi (1983-84) on *Lactarius*

Table 1 : Value of 'a', 'b', and 'r' in male and female *R. pavimentata*

Body parts	Female			Male		
	'a'	'b'	'r'	'a'	'b'	'r'
TL/FL	1.180	0.920	0.997	-0.985	0.930	0.996
TL/SL	-2.475	0.870	0.997	-2.003	0.870	0.996
TL/PCL	-0.617	0.790	0.995	1.328	0.790	0.994
TL/PDF ₁ L	-3.996	0.340	0.984	-6.427	0.350	0.983
TL/PDF ₂ L	-2.602	0.640	0.985	-3.531	0.650	0.987
TL/PPL	3.909	0.180	0.883	8.950	0.170	0.777
TL/PVL	1.686	0.460	0.931	-2.744	0.470	0.975
TL/PAL	-7.600	0.640	0.950	-1.211	0.630	0.979
TL/ED	0.800	0.030	0.890	0.730	0.030	0.885
TL/HL	-5.106	0.250	0.970	-3.991	0.250	0.960
TL/Sn.L	1.399	0.080	0.880	2.417	0.070	0.880
TL/BD	1.921	0.150	0.940	-0.228	0.160	0.940

Table 2: 'ANACOVA' of different body parts on TL in male and female *R. pavementata*

Body parts	Variations due to deviation from individual regression			Residual		Calculated
	DF	SS	MS	DF	MS	'F'
FL	400	6872.751	17.18188	1	8.672984	0.50
SL	400	6679.855	16.69964	1	5.664454	0.34
PCL	400	9142.504	22.85626	1	3.581128	0.16
PD ₁ L	400	5969.974	14.92493	1	1.330061	0.09
PD ₂ L	400	7028.116	17.57029	1	2.32482	0.13
PPL	400	9142.504	22.85626	1	3.581128	0.16
PVL	400	11331.77	28.32943	1	10.55152	0.37
PAFL	400	15627.85	39.06961	1	2.768606	0.07
ED	400	30626.84	76.5671	1	14.96111	0.20
HL	400	3633.167	9.082917	1	4.489471	0.49
Sn.L	400	13091.62	32.72904	1	1.433798	0.04
BD	400	47933.79	119.8345	1	17.0163	0.14

Table 3: Regression values of different body measurements and their correlation coefficients (pool)

Y =	Regression Equation			TL	Correlation coefficient
	a	+	b		'r'
FL =	-0.08	+	0.93	TL	0.99
SL =	-2.48	+	0.87	TL	0.997
PCL =	-0.11	+	0.79	TL	0.99
PDF ₁ L =	-4.89	+	0.35	TL	0.98
PDF ₂ L =	-2.94	+	0.64	TL	0.99
PPFL =	5.87	+	0.18	TL	0.84
PVFL =	0.64	+	0.46	TL	0.95
PA =	-0.08	+	0.56	TL	0.98
PAFL =	-5.34	+	0.63	TL	0.96
E.D. =	0.79	+	0.03	TL	0.89
HL =	-4.69	+	0.25	TL	0.96
Sn.L =	1.84	+	0.07	TL	0.89
BD =	0.92	+	0.16	TL	0.94

NOTES

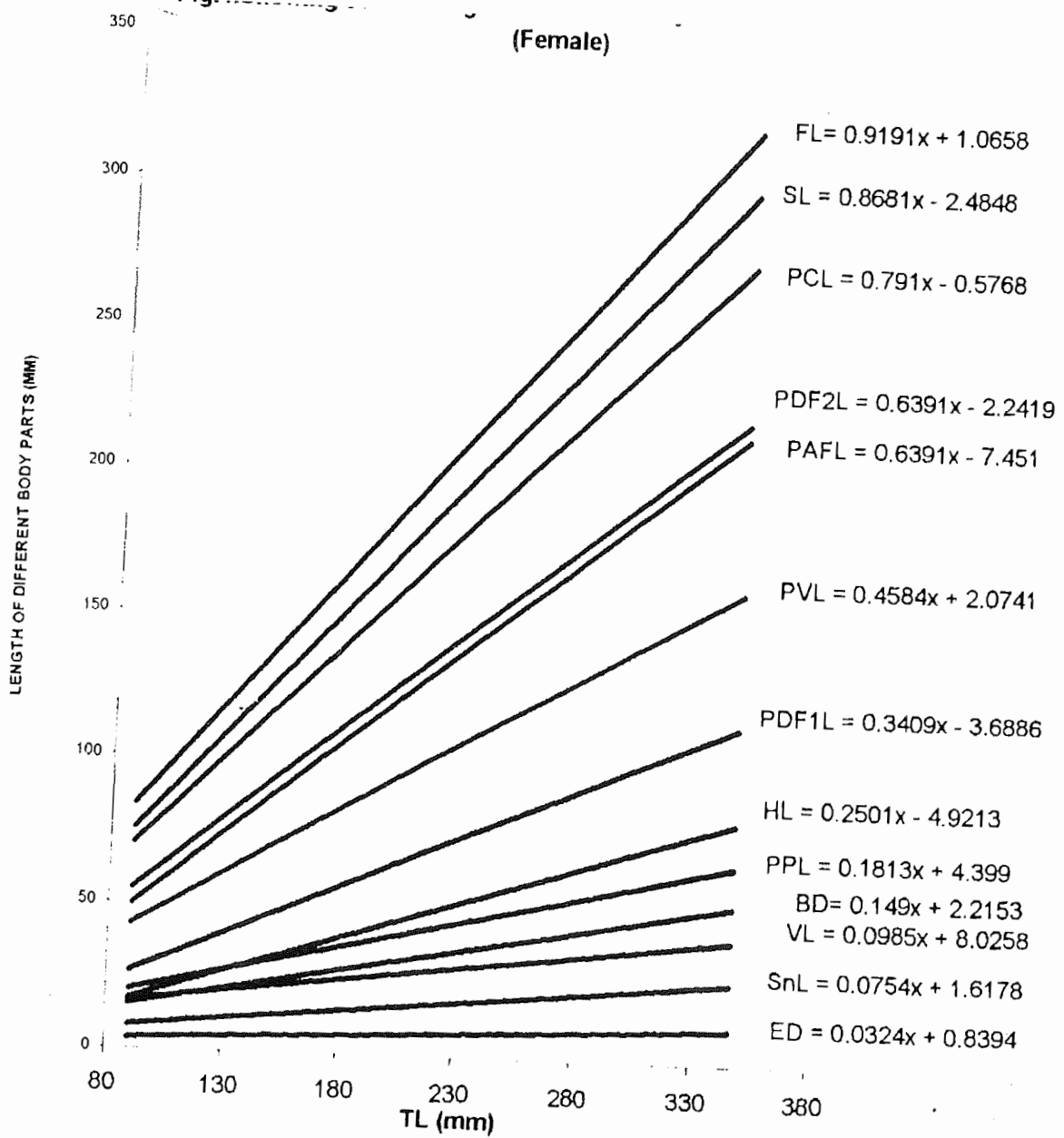


Fig. 1: Showing scatter diagram between body measurements and TL (female)

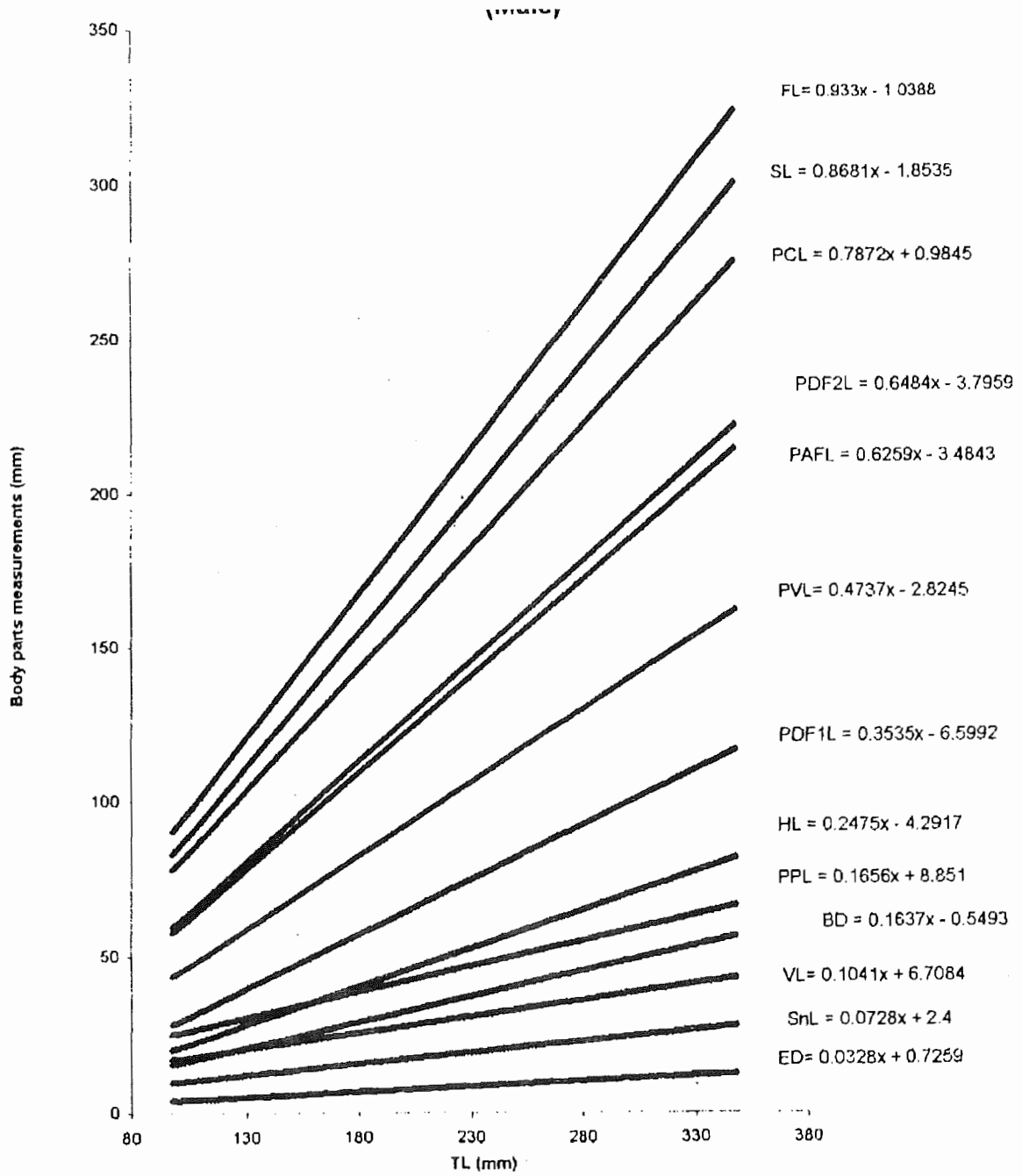


Fig. 2 : Showing scatter diagram of body parts and total length (male)

lactarius, Jaiswar and Davaraj (1989) on *Megalopsis cordyla*, Sultan and Shamsi (1981) on *Puntius sarana*, Singh *et al.* (1995) on *Saurida tumbil*, and Dutt and Kumar (2001) in *P. sarana* observed similar pattern of growth of different body parts.

Straight line (linear) relationships were observed between various body parts and total length, which explain the isometric growth in the species. The values of 'r' for different body parts in relation to the total length in female and male ranged between 0.88 and 0.997, and 0.77 and 0.996, respectively, indicating a close positive correlation between the body parts and total length.

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