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LENGTH WEIGHT RELATIONSHIP OF SOLE *EURYGLOSSA ORIENTALIS* (BL. & SCHN.) (FAMILY: SOLEIDAE) FROM KARACHI COAST, PAKISTAN

ABSTRACT

The length weight relationship of *Euryglossa orientalis* (Bl. & Schn.) collected from commercial landings at Karachi Fish Harbour and Korangi creek between April 1987 to June 1988 showed linear relationship. Separate equation for describing the length weight relationship for male and females are justified.

THE FLAT FISH *Euryglossa orientalis* (Bloch and Schnider) (Soleidae: Pleuronectiformes) is the most widely distributed along the Indo Pakistan Coast (Day, 1878, 1888); (Norman, 1928;

Table 1. *Length-weight relationship in E. orientalis.*

Sex	N	TL range (mm)	Weight range (g)	a	b	S.E (a)	S.E (b)	r
Male	456	87-315	8.3-532.9	-5.0132	3.0988	0.0857	0.0370	0.969
Female	289	103-350	16.0-900	-5.1586	3.1674	0.0862	0.0365	0.980
Combined	745	87-350	8.3-900	-5.1274	3.1506	0.06078	0.02607	0.975

Table 2. *Analysis of covariance for comparison of regression lines of length-weight relationships of males and females of E. orientalis*

S.V.	d.f.	Σxi^2	$\Sigma x^2 y^2$	Σyi^2	Reg. Coeff.	d.f.	Deviation from regression	MS
Male	455	2.5002	7.7465	25.5630	3.0984	454	1.5615	0.000964
Female	288	1.4464	4.5813	15.0664	3.1674	287	0.5557	0.001936
						741	2.1172	0.002900
Pooled	743	3.9466	12.3278	40.6294	3.1237	742	2.1217	0.0028594
		Difference between slope				1	0.0035	0.0035
Total	744	4.2750	13.4691	44.5952	3.1507	743	2.1591	0.002906
		Difference between adjusted means				1	0.0374	0.037400

$$\text{Comparison of slopes } 'F' = \frac{0.0035}{0.002900} = 1.2069 \text{ (d.f. 1,741)-not significant}$$

$$\text{Comparison of elevation } 'F' = \frac{0.0374}{0.002900} = 13.081 \text{ (d.f. 1,742) significant p (<0.001)}$$

Munro, 1955; Misra, 1962; Fischer and Bianchi, 1984). They are bottom living and their morphological variation is a result of wide distribution and adaptation to the different environments (Valandykov, 1934; Tanning, 1944). Among all animal group differences in relative rates of increase in organs or body parts can produce changes in body proportion during the course of growth that can produce significant changes of body form.

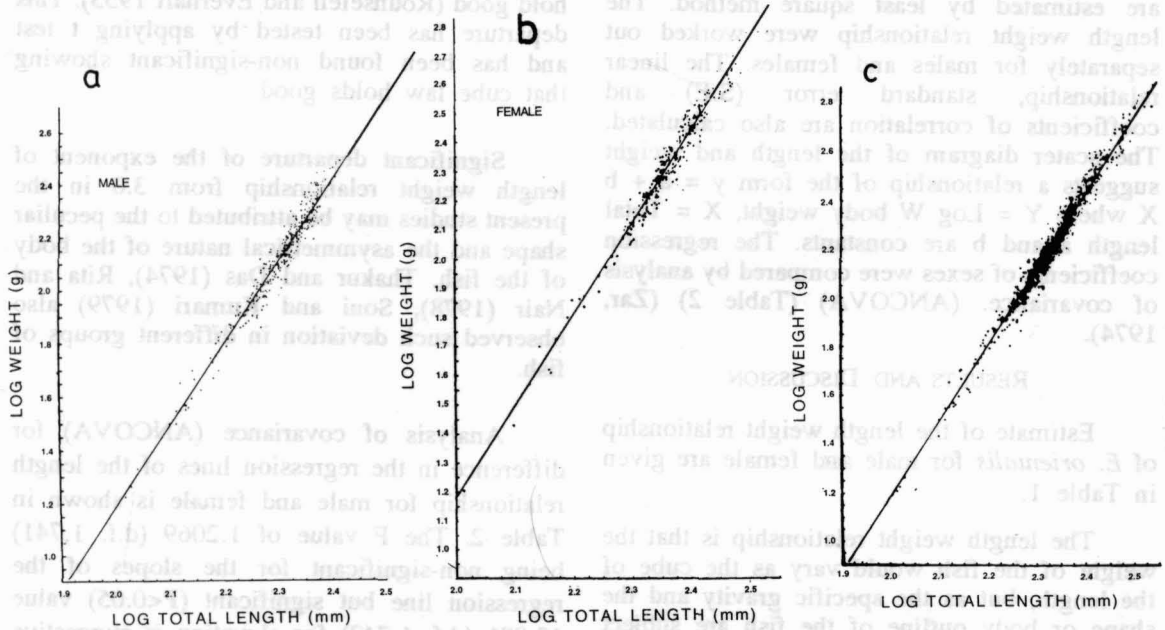

FIG. 1 *a-c Length weight relationship for male and female.*

Length weight relationship provides a means of converting measurements of length and weight. It can be an indication of some important events in the life history of fishes such as maturity and growth. The length weight relationship, which is an important information for fisheries management, has not been reported for *Euryglossa orientalis* in Pakistan. Observations on various aspects of body asymmetry encompassing morphology and anatomy of different groups of flat fishes are those of (Ochiai, 1966; Datta and Das, 1985; Das and Datta, 1987; Das and Mishra 1989) The present communication is an attempt to study the length weight relationship of *E. orientalis* to observe how far the peculiar form of their body has deviated from the generalised cube law applicable to the typical teleosts (LeCren, 1951).

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MATERIAL AND METHODS

A total of 745 fish, the size range and weight of male and female is as follows., male size range is 87 - 315 mm and weight range is 8.3 - 532.9g, female size range is 103-350 mm and weight range is 16.0-900g. *Euryglossa orientalis* were obtained from the commercial landing at Karachi Fish Harbour and Korangi creek over a period of 15 months (April 1987 to June 1988).

After removing the surface moisture each fish was measured and weighed nearest to 0.1 mm and 0.5g accuracy respectively.

The weight of the fish (LeCren 1951) is expressed as a function of its length $W = axL^b$ where W = weight (gm), L = Total length, and a and b are constants.

The constants 'a' and 'b', the former measuring the initial growth index and the latter representing the slope of the regression line are estimated by least square method. The length weight relationship were worked out separately for males and females. The linear relationship, standard error (S.E) and coefficients of correlation are also calculated. The scater diagram of the length and weight suggests a relationship of the form y = a + b X where Y = Log W body weight, X = Total length a and b are constants. The regression coefficients of sexes were compared by analysis of covariance. (ANCOVA) (Table 2) (Zar, 1974).

Results and Discussion

Estimate of the length weight relationship of *E. orientalis* for male and female are given in Table 1.

The length weight relationship is that the weight of the fish would vary as the cube of the length, but as the specific gravity and the shape or body outline of the fish are subject to changes, the 'cube law' need not hold always (Rounsefell and Everhart, 1953). Sekharan (1968) and Hoda (1987) found significant departure from the 'cube law' in the case of *Sardinnella albella* and *S. gibbosa* and *Boleopthalmus dentatus* and *B. dussumieri* respectively. The significance of the variation in the estimates of coefficient b from the expected 'cube law' was tested by t test (t = 3 b/S.E b). The value for male and female are 2.670 (d.f. 456) and 4.586 (d.f. 289) which are significant ($p<0.05$). The t values in combined length weight relationship is 5.776 (d.f. 745) which is also significantly different from 3 ($p<0.01$) showing that the cube law does not hold for *E. orientalis*.

The value of regression coefficient of *E. orientalis* males 3.0988 and females 3.1674 (Table 2). The two regression coefficients were found to be significantly different (t = 5.776, $p<0.001$). It shows that females are heavier than males of the same length probably because of differences in fatness and gonad development (LeCren 1951). Generally the value of b is 3 in the length weight relationship of fishes, but due to changing specific gravity and shape of the body contour the cube law need not always hold good (Rounsefell and Everhart 1953). This departure has been tested by applying t test and has been found non-significant showing that cube law holds good.

Significant departure of the exponent of length weight relationship from 3.0 in the present studies may be attributed to the peculiar shape and the asymmetrical nature of the body of the fish. Thakur and Das (1974), Rita and Nair (1978), Soni and Kumari (1979) also observed such deviation in different groups of fish.

Analysis of covariance (ANCOVA) for difference in the regression lines of the length relationship for male and female is shown in Table 2. The F value of 1.2069 (d.f. 1,741) being non-significant for the slopes of the regression line but significant ($P<0.05$) value 13.081 (d.f. 1,742) for elevation is suggestive of separate equations of the length weight relationship for male and female shown in Fig. 1a, b.

The t-test used to detect the pattern of growth indicated an allometric form of growth. However by pooling all the data, a general relationship was obtained (Fig. 1c).

Log W = 5.1274+3.1506 log T.L. (Table 1). As 'a' value depend upon the obesity of the fish (LeCren 1951) by comparing the log a values it becomes obvious that the general fatness in the sexes is not significant.

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