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Studies on length-weight relationship of Pearl spot *Etroplus suratensis* (Bloch, 1790) (Family: Cichlidae) Chennai coast of Tamil Nadu (13°25' 41.18" N and 80°18' 31.79" E)

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Abstract

Length-Weight relationship was studied in *Etroplus suratensis* collected from Jameelabad, Pulicat Lake, Southeast coast of India. The slope value (b) estimated for *E. suratensis* of both sexes was found to be 1.0368. The regression equations calculated for female was $\text{Log } W = -0.7292 + 1.0368 \text{ Log } L$. The correlations coefficient was found to be significant ($P < 0.01$). The significant difference between sexes of the species 'F' value was at 1% level. The slope value was compared here could be very useful for comparison with the brackishwater species in other geographical locations.

Keywords: *Etroplus suratensis*, length-weight relationship, regression analysis, population dynamics, Southeast coast of India

Introduction

The members of the family Cichlidae comprises over 700 species, occurs in both fresh and brackish-waters [1]. Among the cichlid group *Etroplus* is the only genus endemic to India and three species have been reported from Indian backwaters, viz., *Etroplus canarensis* *E. maculatus*, and *E. suratensis*. *E. maculatus* and *E. suratensis* have potential for both food and ornamental markets [1]. In India, it is widely distributed and traditionally cultured in the brackish water and freshwaters along the coastal regions from South Canara to Thiruvananthapuram on the West coast and later introduced to the east-coast regions, such as Chilka Lake, Orissa and Kakdwip, West Bengal [2]. The length-weight (LWR) relationships are applied for basic uses to assess fish stocks and populations [21]. The length-weight relationships help evaluate the condition, reproduction history, life cycle and the general health of fish species [18] and are also useful in local and interregional morphological and life historical comparisons in species and populations. Length and weight data are useful standard results of fish sampling programs [14]. In fish, size is generally more biologically relevant than age, mainly because several ecological and physiological factors are more size-dependent than age-dependent. Consequently, variability in size has important implications for diverse aspects of fisheries science and population dynamics [4]. Length-weight regressions have been used frequently to estimate weight from length because direct weight measurements can be time-consuming in the field [22]. One of the most commonly used analyses of fisheries data is length-weight relationship [12]. The estimation of yield per recruit in prediction models, and in the estimation of biomass from length observations and limited studies has been made on population dynamics. As no work has been done on this species thereafter from Chennai region, in the present study, an attempt has been made to study the length-weight relationship in *E. suratensis* of this region.

Characters

Body is deep and laterally compressed, mouth small and terminal with a small cleft. Snout is spout-like, eyes large and lateral, lips thin and jaws equal. Teeth villi form, present on both jaws. Palate is edentulous. Dorsal fin is inserted above the pectoral fin base; caudal fin is emarginated while fin is characterized with one spine. Scales are weakly ctenoid. Lateral line is interrupted and thereafter continuing as small open pores in each side.

Colour

Body is light greenish with eight yellowish oblique bands, the first passing through the occipital part of head and last across base of the caudal. Scales above lateral line have a central pearly spot; and possess some triangular black spots on the abdomen. Fins, except the pectorals are of dark leaden colour while the pectoral is yellowish with jet black base. Anal fin possesses 12-13 spines and 11 or 12 soft rays. Specimens from salt waters have a deep purple colour and bands are almost black. Fingerlings possess a conspicuous ocellus on the dorsal fin.

Materials and Methods

Fish specimens were collected from Jameelabad, Pulicate Lake (13°25' 41.18" N latitude and 80°18' 31.79" E longitude), Southeast coast of India. Length of fishes were measured with mm scale and weighed with an electronic balance to the nearest 1 mm and 0.1g respectively. The length-weight relationship was estimated by using the linear formula $W = aL^b$ as $\log W = \log a + b \log L$; where W = weight of the fish, L = length of the fish and a = proportionality constant and b = exponent. For this, the observed length and weight of specimens were transformed into logarithmic values and regression analysis was carried out to calculate the 'a' and 'b' values. The 't' test was employed to confirm, whether the 'b' value obtained in the linear regression was significantly different from the isometric value three.

Results and Discussion

Length weight relationship of 120 individuals of *E. suratensis*, 3.5 – 10.5 cm total length and 2.0 – 34.0 gm total weight were analysed. The linear equation was also fitted separately for both sexes. The correlation coefficient derived for the length-weight relationship for both sexes are given in Table.1. The regression equations derived for both the sexes are presented below Table.2. Thus in the present study the total weight in relation to total length of *E. suratensis* follows allometric growth pattern.

$\log W = - 0.7292 + 1.0368 \log L$

The results showed significant between sexes of the species and the 'F' values were found to be significant at 1% level (Table 3). The observed total length plotted against total weight males and females are presented in (Figure 1).

The calculated 'b' value for *E. suratensis* was 1.03 for both sexes, the present observation indicates that the length-weight relationship in *E. suratensis* does not follow the cubes law or exhibit an allometric growth. Several authors [7, 20, 3, 13] have

observed such departures of the cubes law a variety of fishes. A similar variation for cubes law was also reported for *E. suratensis* in Veli Lake [6], although a more drastic and significant departure was indicated for female fishes [8]. Indicated that this may be considered only as either seasonal or regional fluctuations [11] probably due to the influence of environmental conditions [16]. It is also inferred that higher b values imply relatively productive environmental conditions [5] and if so LWR data appear to reflect the poor growing condition of the fish in these waters. Even though the change of b values depends primarily on the shape and fatness of the species, also depends upon various factors like temperature, salinity, food (quantity, quality and size), sex and stage of maturity [17, 23]. Values of the exponent b provide information on fish growth. When b=3, increase in weight is isometric. When the value of b is other than 3, weight increase is allometric, (positive allometric if b>3, negative allometric if b<3). The null hypothesis of the isometric growth (H0: b =3) was tested by t – test, using the statistic: $t_s = (b-3)/S_b$, where S_b is the standard error of the slope, for $\alpha=0.05$ for testing significant differences among slopes (b) between two regressions for the same species [12]. The present study provides baseline information on the regression status *E. suratensis* that will be useful for researchers in future study.

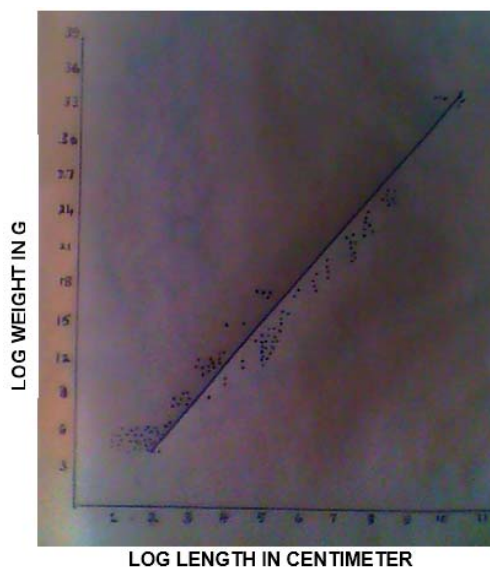


Fig 1: Logarithmic relationship between length and weight of males and females *Etroplus suratensis* (Bloch, 1790)

Table 1: Statistics in the length-weight relationship of males and females of *Etroplus suratensis* (Bloch)

Sex	N	SX	SY	SX ²	SY ²	SXY
Both Sexes	120	208.3176	92.7482	370.0198	82.2470	165.0463

N= Number of fish

SX², SY², SXY = Sum of squares and product

SX, SY = Sum of logarithmic values of length and weight respectively.

Table 2: Regression data for the length-weight relationship of males and females of *Etroplus suratensis* (Bloch)

Sex	Sum of Squares and Products				DF
	X ²	XY	Y ²	B	
Both Sexes	370.0198	165.0463	82.2470	1.0368	118

DF: Regression freedom

B: Regression Co-efficient

SS: Sum of Squares

Table 3: Test of Significance

Source of Variation	DF	Sum of Square	Mean Square	Observed F
Deviation from individual with in sexes	1	452.2668	452.2668	1680.6644
Difference between Regression	118	452.2668	0.2691	
Deviation from Total Regression	119	904.5336		Significant at 1% level

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