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Length-Weight Relationship of *Sepia ramani*, Neethiselvan (Class: Cephalopoda) from Thoothukudi Coast, Southeast Coast of India

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Abstract: The length-weight relationship of the cuttlefish *Sepia ramani* was studied. The regression equations for males and females of *S. ramani* were fitted to indicate the relationship and the level of significance was tested by the covariance method. It was observed that the growth in weight in relation to length is allometric. Its slope values are 2.5023 for male and 2.5685 for female and there is no significant difference between male and female.

Key words: *Sepia ramani* % Length-Weight Relationship % Regression Analysis

INTRODUCTION

The study of length-weight relationship (LWR) of fish are important in fisheries biology and population dynamics where many stock assessment models require the use of LWR parameters [1]. As length and weight of fish are among the important morphometric characters, they can be used for the purpose of taxonomy and ultimately in fish stock assessment [2]. The actual relationship between length and weight may depart from the cubic value 3 and this may be due environmental condition in which the animal lives and also due to the physiological condition of the animal. The relationship is expressed by the equation $W=aL^b$ [3].

Sepia ramani was erected by the Neethiselvan at Thoothukudi coast [4]. It is closely related to *Sepia pharaonis* in morphological characters such as fins, funnel, head, buccal membrane and colour. However, *S. ramani* could be distinguished from *S. pharaonis* in certain morphological characters such as long tentacles, more number of suckers in the tentacular club, enlarged suckers almost subequal in size, left ventral arm in the male hectocotylised, basal 14-16 series of quadriserial suckers normal, hectocotylised part with 7-10 series of suckers.

Since *S. ramani* is a newly erected species and there is no report on the length-weight relationship of this species. The present investigation was undertaken to elucidate the length-weight relationship of this newlyerected species, which form a good fishery throughout the year in trawl catches of Thoothukudi coast.

MATERIALS AND METHODS

Specimens for the present study were collected weeklyfrom Thoothukudi fish landing centre. The study was based on 200 specimens (100 males and 100 females) collected from April 2007 to September 2007. Dorsal mantle length (DML) was taken for each specimen nearest to millimeters and the whole body weight was recorded to the nearest gram. To study the length-weight relationship, sexes were treated separately and the relationship was calculated by the method of least squares using the equation $\log w = \log a + b \log L$ where, w= weight in gram, L=total length in mm and 'a' and 'b' are constant. The level of significance was tested by covariance method [5].

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Table 1: Regression analysis of the length-weight relationship of males and females of *S. ramani*

	Sum of squares and products			
sex	x^2	xy	y^2	Regression coefficient
Female	2.5211	6.4752	16.8262	2.5685
Male	2.7389	6.8534	18.5633	2.5023

Table 2: Analysis of covariance

Source of variation	Degree of freedom	Sum of square	Mean square	Observed F	Table F value
Deviation from regression	1	0.0057	0.0057	0.6951	At 5% 3.91 (1,150)
Due to regression	196	1.6097	0.0082		3.89 (1,200)
Total	197	1.6154			Insignificant at 5% level.

Table 3: Regression equation between length and weight of squids and cuttlefishes of Thoothukudi coast

Sl. No.	Species	Sex	Regression equation	Author
1	*Loligo duvauceli*	Male	Log w= -2.8979 + 2.1958 log L	
		Female	Log w = -2.6714 + 2.3016 log L	Neethiselvan (1999)
2	*Sepioteuthis lessoniana*	Male	Log w= -3.2040 + 2.4936 log L	
		Female	Log w = -3.0335 + 2.6017 log L	Neethiselvan (1999)
3	*Doryteuthis sibogae*	Male	Log w= -2.2065 + 1.9986 log L	
		Female	Log w = -2.0335 + 2.6017 log L	Neethiselvan (1999)
4	*Sepia pharaonis*	Male	Log w= -3.1358 + 2.4256 log L	
		Female	Log w = -3.0217 + 2.6312 log L	Neethiselvan (1999)
5	*Sepia aculeate*	Male	Log w= -3.4796 + 2.5958 log L	
		Female	Log w = -3.2523 + 2.7238 log L	Neethiselvan (1999)
6	*Sepiella inermis*	Male	Log w= -2.6640 + 2.1532 log L	
		Female	Log w = -2.2261 + 2.3215 log L	Neethiselvan (1999)
7	*Sepia ramani*	Male	Log w= -2.9136 + 2.5023 log L	
		Female	Log w = -3.0310 + 2.5685 log L	Present study

RESULTS AND DISCUSSION

The regression equation for males and females of *S. ramani* is given below.

For males, log w= -2.9136 + 2.5023 log L
For females, Log w = -3.0310 + 2.5685 log L

The regression equation of males and females of *S. ramani* were subjected to analysis of covariance and the results are presented in Tables 1 and 2. Insignificant differences were obtained on comparing the regression equation of males and females.

In the present observation, the calculated slope value was found to be almost similar in female and male but slightly higher value was obtained in female. It is also interesting to note that in both sexes of *S. ramani*, the slope value deviates from the cubic value. The slope values of length weight equations of male and female were less than 3, indicating the allometric growth of this species.

According to Moreno *et al*. [6] there was no significant difference between the sexes of *Loligo forbesi*, although the slope was higher for females as observed presently. Silas [7] reported the slope value was more in female compare to male for the cuttlefish, *Sepia pharaonis* and squid, *Loligo duvauceli*. Higher slope value in females was reported for *L. duvauceli* in Madras [8] and *Sepia inermis* at Mandapam Coast [9]. Neethiselvan and Venkataramani [10] observed the lesser slope value for *Doryteuthis sibogae* closer to 2 and the value was 1.9986 for male and 2.6017 for female. The low slope value for male compare to female was evident in *Loligo duvauceli, Sepia lessoniana, Sepia pharaonis, Doryteuthis sibogae, Sepia aculeate* and *Sepia inermis* of Thoothukudi coast [11]. Thus it is evident that all male cuttlefish species of Thoothukudi coast showed lesser slope value compared to female inferring heavier weight of ovary in female compared to testis in male.

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