Length-Weight Relationship of *Lambis lambis* (Mollusc: Gastropoda) from Tuticorin Coastal Waters, Gulf of Mannar, Southeast Coast of India

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Abstract: Length – Weight relationship (LWR) of *Lambis lambis* were analyzed from Vaan Island, Tuticorin coastal waters, Gulf of Mannar, southeast coast of India. Totally 811 specimen were collected for this study (March 2002 to February 2003). Parameters **a** and **b** of the length (**L**) weight (**W**) relationship by using the formula $\mathbf{W = aL^b}$. An estimate of b value was 2.3765. The Length - Weight relationship in *Lambis lambis* expressed an allometric growth.

Key words: Length-weight relationship · *Lambis lambis* · Gulf of Mannar water · Tuticorin

INTRODUCTION

The Length - Weight relationship (**LWR**) studies are made to determine mathematically the relationship between the two variables enable to calculated the length, if weight is known and vice versa. The identity of fish stock can often be ascertained by morphometric and meristic studies [1]. A statistical analysis of morphometric characters gives a better idea of relationship within the species, at the same time to compare with the same species in different geographical locations [2]. Length and Weight are two basic components in the biology of species at the individual and population levels, Information on length weight relationship (**LWR**) is essential for proper assessment and management of these fisheries [3]. The Length – Weight relationship (**LWR**) is a useful tool to convert length to weight and vice versa. In some cases it is easier to take measurements of weight rather than length, such as for cephalopods [4]. In mollusks, the growth rate of various parts is not uniform [5]. The growth of one part in relation to the whole organisms is termed allometric growth. The concepts of allometry are useful since expected weight for various length groups can be calculated in organisms known to change their form or shape during growth [5]. The present

investigation was carried out to study the Length - Weight relationship (**LWR**) of the; Spider conch *Lambis lambis* from Tuticorin coastal waters, Gulf of Mannar.

MATERIALS AND METHODS

A sample of 811 specimen of *Lambis lambis* were collected from Vaan island (Fig 1) area of Tuticorin coastal waters, Gulf of Mannar for a period of one year (March 2002 – Feb 2003.) The length (**L**) was measured using a caliper (0.1mm accuracy) Values expressed in mm [11]. The weight (**W**) was determined using a weighing balance and the values expressed in grams.

The parabolic equation $\mathbf{W = aL^b}$ can be given in the logarithmic forms as,

$$Y = a\,bx$$

Where, a = log a, b=b, y = log W and x = log L

Linear equation was filled by regression analysis as per least square method [6]. The length weight relationship of this species is described by the following equation.

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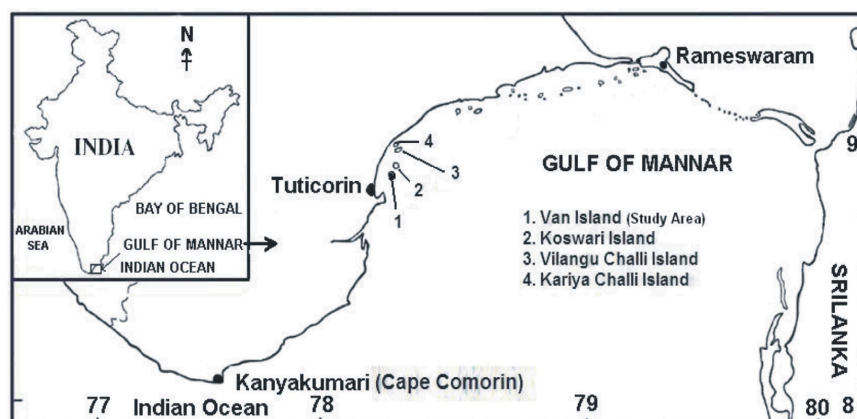ECR Road, Chennai 115, India. Mob: +919941563955.

Fig. 1: Map showing the Study area of Length - Weight relationship in *Lambis lambis* in Tuticorin Coastal Waters of Gulf of Mannar, Southeast coast of India

$$Log\ Wt = log\ a\ b\ Log\ L$$

The relative condition factor was calculated by the equation $Kn = W/w$, where W represents the observed weight and w calculated weight.

Test of significance (t test): The variants of the estimate of regression co-efficient (b) can be shown to be $sb = S_{yx}/\Sigma x^2$. Where, S_{yx} is the variance among y s for the same x (called the residual variance in y after adjusting for regression on x). The estimate of s_{yx} can be derived from the following equations.

$$\Sigma d_{yx}^2\ \Sigma y^2 - (\Sigma xy)^2 / \Sigma x^2$$
$$S_{yx}^2 = \Sigma dyx^2 / (n-2)$$
$$S_{yx} = Gv\Sigma dyx^2 / (n-2)$$
$$s_b - S_{yx}\ v\Sigma x^2$$

Then the t is estimated from S_b from the equation.

$t = b / sb$ for degrees of freedom n-2 [6] Student – *t* test [7] was used to assess the relative growth pattern was studied.

RESULTS AND DISCUSSION

Total length of the collected animals ranged from 91 to 245 mm and the weight from 40 g to 580 g. For Length-Weight analysis for *Lambis lambis* were fitted by linear equation by regression analysis as per least square method [6] was adopted.

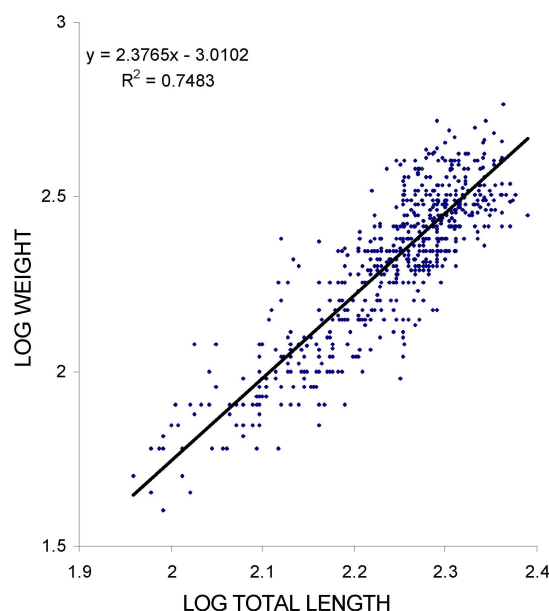The regression equations for *Lambis lambis* are follows.

Fig. 2: Scatter diagram-showing Length - Weight relationship in *Lambis lambis*.

Lambis lambis Log W = - 3.0102+2.3765L

The regression analysis showed linear relationship between length and weight of *Lambis lambis*. The value at b was 2.3765. The value of exponent **'b'** was found to be less than 3 but still expressed allometric growth. The **'r'** value was 0.86504. Scatter diagrams of Length - Weight relationship for *Lambis lambis* are given in (Fig. 2). The results of the correlation co-efficient **(r)** and regression co-efficient **(b)** of *Lambis lambis* showed highly significant at >0.001 level (Table 1). Results of the student – *t* test (9.95) revealed that LWR of *Lambis lambis* was allometric at 95 per cent confidence limit.

Table 1: Result of test of significance of correlation co-efficient (r) and regression co-efficient (b) for *Lambis lambis.*

Species name	No of animals	r	df	b	df
Lambis lambis	811	49.04	1.809	97.75	1.809

Highly significant as >0.001 level.

In this study showed a magnificent variation was found in Length –Weight relationship in *Lambis lambis.* Maruthamuthu and Kasinathan reported significant difference in length – weight relationship between males and females of *Littorina scabra* from Porto Novo waters [8]. Park and Oh recorded the Length – Weight relationship of bivalves from coastal waters of Korea, the reported was isometric in most of the species [3]. Jones reported the LWR may change seasonally, So the length-weight data were taken throughout the annual cycle [9]. While Benny reported for Length – Weight relationship in *Chicoreus ramous* was having allometric growth [10]. The rate of growth *P. radiate* was higher for small sizes than for large animals [12]. It was recommended that management strategies for *Lambis* fishery must be initiated because of some indications of unstable and overexploited populations for this commercial gastropod [11]. This study revealed that the Length - Weight relationship of *Lambis lambis* showed an allometric growth.

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