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ORIGINAL ARTICLE

LENGTH – WEIGHT RELATIONSHIP of *Murex trapa* and *Meretrix meretrix* FROM MUTHUPET COASTAL WATERS IN TAMILNADU, INDIA.

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ABSTRACT

The present work carried out on the length – weight relationship of two commercially important mollusks *Murex trapa* and *Meretrix meretrix* were analysed from Muthupet coastal waters in TamilNadu, India. Totally 430 specias of *M.trapa* and 352 species of *M.meretrix* were collected for this study during July 2014 to June 2015. Parameters of the length (L) and weight (W) relationship by using the formula $W = aL^n$. The length – weight relationship in *M. Trapa* and *M. Meretrix* expressed an allometric growth.

Keywords: Length–weightrelationship, *Murextrapa*, *Meretrixmeretrix*, Coastal water.

1.INTRODUCTION

Majority of the molluscs are known by their shell, but in some forms the shell is absent. Molluscs have been classified based on their morphological, anatomical and biological features and they are second only to Arthropod in numerical abundance. The number of species identified under phylum molluscs varied from 80,000 to 1, 00, 000 (Shanmugam and vairamani, 2009). They are more abundant in the littoral zones of tropical seas. Though seven classes of molluscs are available, gastropods and bivalves constitute 98% of the total population of molluscs and they inhabit land, freshwater and marine environments. The other classes of molluscs are exclusively marines (Srinivasan, 1999).

The bivalves comprise about 10,000 living species. They have two valves made of calcium carbonate in a hard called “aragonite” connected by a flexible pigment and an ‘adductor muscles” for closing the valves tightly, the mantle cavity is enlarged enclosing the visceral mass and other internal organs (Jaramillo *et al*., 2007).

Gulf of Mannar has 428 and Lakshadweep has 424 species. Of the total species, eight species of oysters, two species of mussels, 17 species of clams, six species of pearl oysters and other gastropods such as sacred chank, *Trochus turbo* as well as 15 species of cephalopods are being exploited for commercial purpose from Indian marine region (Venkataraman and Mohideen Wafar, 2005; Appukuttan, 2008).

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As that of biodiversity assessment, length and weight relationship (LWR) is also assume great significance in fishery resource assessment (Haimovici and Velasco, 2000) and further the length and weight are the two basic components in the biology of species at the individual and population levels. Length and weight measurement in conjunction with age data can give information on the stock composition, age at maturity, life span, mortality, growth and production (Diaz *et al*., 2000). The growth lines on the shells of temperate molluscs are said to be the valuable pointers of age. But in the tropical waters on the account of lack of distinct seasons and limited variations environmental parameters, much differences in growth lines is not discernible (Laxmilatha, 2008; Kesavan, 2012).

In molluscs, the growth rate of various body characteristics is not uniform, with the results that the relative proportions of the body change in growth rate between one part and the whole organism is termed as allometry. The concept of allometry is pointed out by Seed (1968), in as much as only two parameters are compared at any time. It is also useful to know the variations from expected weights for various length groups as some organisms are known to change their form or shape during growth (Lecren, 1951).

Hence it is essential to know the inter relationships between the gastropod and bivalve molluscs. The present study on the length – weight relationship of selected molluscs of southeast coast of Muthupet, TamilNadu, India, during July 2014 to June 2015.

2.MATERIALS AND METHODS

Various size groups ranged between 20-115 mm in length have been taken for this purpose. Totally 430 species of *Murex tapa*, each 215 male and 215 female and totally 352 species of *Meretrix meretrix*, each 176 male and 176 female were collected from Athirampattinam and Muthupet coastal waters during the (July – 2014 to June - 2015) study period. The shell was measured using a Vernier caliper corrected to 0.1 mm for their total length, total width and shell height. The total weight, wet weight and shell weight were estimated using a monopan electrical balance (Model ER-180A, Japan) the wet tissue of the individual animals were kept in a hot air oven for drying at a constant temperature of 60 ^{0}C and the dry weight also taken using the same monopan electrical balance.

To study the length- weight relationship, the Parabolic equation $W= a L^n$ was used which can be also be expressed in the logarithmic form as;

$$\text{Log } W = \log a + n \log L$$

i. e., $Y= a+bx$

where,

a= log a: b= n;

Y= log n and X= log L

Which is a linear relationship between Y and X. at the same time, the general equation Y= a+bx was used to study the allometric relationship between all the body characters that can be also expressed in its logarithmic form as log Y= log b+ log x (Wilbur and Owen, 1964).

Where, Y is some measures of the whole body or a part, X is a measure of the whole body and b is a constant.

The relationship between the length (TL), total width (TW), aperture length (APL), aperture width (APW), opercular length (OPL) opercular width (OPW), whole live weight (WW), shell weight (SW) and body dry weight (DW) of the male and female *M.trapa* and *M.meretrix* were studied in all combinations using linear regression technique and correlation co- efficient (Shanmugam, 1996).

3.RESULTS

The regression equation for the male and female *Murex trapa* and *Meretrix meretrix* showed the exponential relationship between total length and weight. The regression for male and female were worked out. Based on the analysis of covariance, a common regression equation was worked out by combining both male and female data during study period (July 2014 to June 2015)

Murex trapa

The length-weight relationships of male and female of *M. trapa* during the study period were analyzed. The female and male comprising of 215 animals was used for this study. The linear relationship between length and weight is shown in Fig. 1&2. The monthly data obtained for one year was pooled and obtained the regression equation of female (Log W = -0.819 +1.325 Log 'L' and correlation coefficient (r^2) = 0.828) and Male (Log W = -0.761+1.315 Log L and r^2 = 0.841).

Meritrix meritrix

The length-weight relationship of males and female of *M. Meritrix* during the study period were analyzed. The female and male comprising of 176 animals was used for this study. The linear relationship between length and weight is shown in Fig. 3&4. The monthly data obtained for one year was pooled and obtained the regression equation of female (Log W = - 0.575+1.172 Log 'L' and correlation coefficient (r^2) = 0.777) and Male (Log W = - 0.582+1.185 Log L and r^2 = 0.746).

Fig. 1. Scatter diagram of length weight relationship of *M .trapa* (Female)

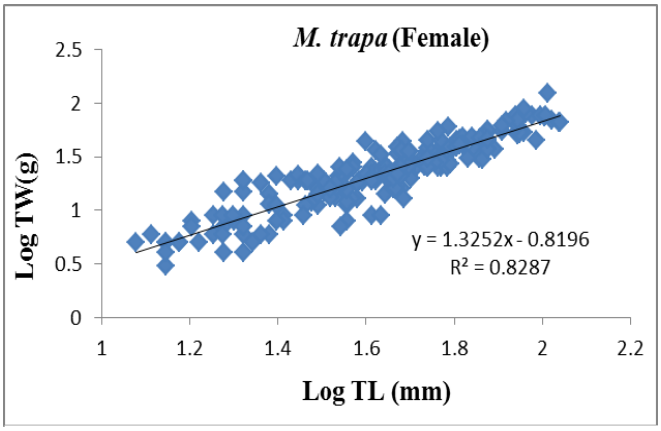


Fig. 2. Scatter diagram of length weight relationship *of M. trapa* (Male)

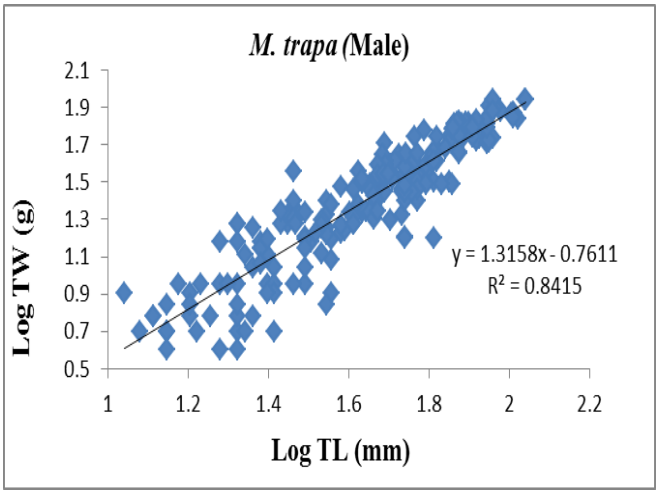


Fig. 3. Scatter diagram of length weight relationship of *M. meretrix* (Female)

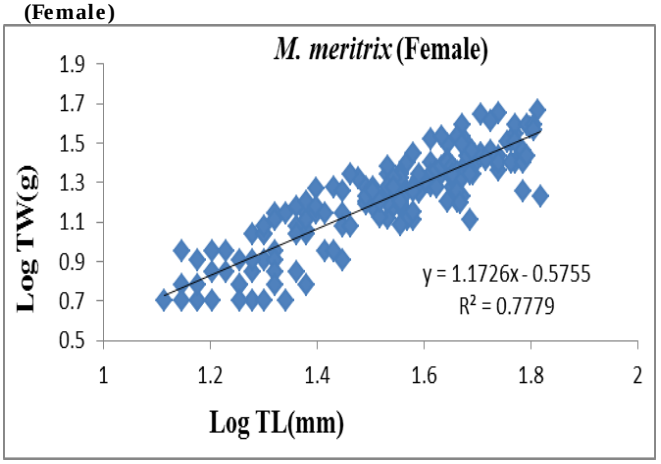
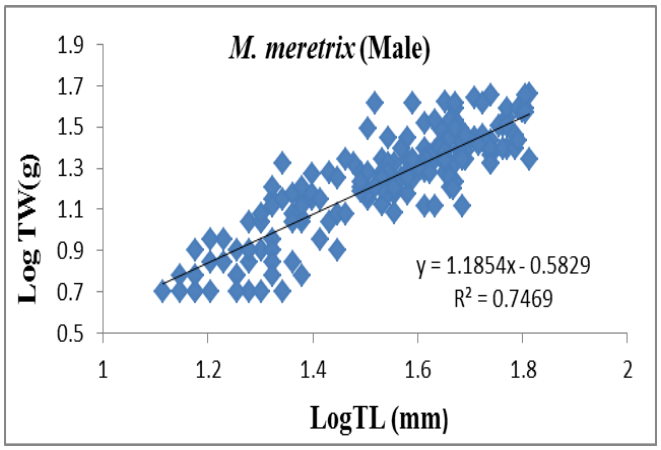


Fig. 4. Scatter diagram of length weight relationship of *M.meretrix* (Male)



4.DISCUSSION

As an animals grows, the resultant increase in size, shape and volume can be measured as length and weight relationship has become a standard practice in fishery studies obtained the correlation co-efficient values (r^2) of 0.9095 and 0.9819 for male and female *T. brunneus* between length and weight whose shell shape is categorized under the equiangular spire model (Ricker, 1973; Ramesh and Ravichandran, 2008).

Marimuthu and Kasinathan (1986) reported significant difference in length-weight relationship between males and females of *Littorina scabra* from Portonovo waters. Park and Oh (2002) recorded the length- weight relationship of bivalves from coastal waters of Koriea, and they reported isometric in most of the species biometric relationship has been observed for relationships involving heights and other linear measurement. Isomertry occurs in *M. meretrix* (Narasimham *et al*. 1988; Bolger and Connoly, 1989), Positive allometry occurs in *P. viridis* (Gaspar *et al*., 2001).

Kasinathan *et al*. (1987) also observed a significant difference in growth between the male and female and also reported significant differences between length weight and opined that the differences appears to be due to sexual maturity and also due to increase in size of the sexes.

Shell size and weight along with age is an important factor which determines bioaccumulation and has been reported by several researchers (Quensen and Woodruff, 1997). Present study revealed that the length – weight relationship of *M. trapa* and *M. meretrix* showed an allometric growth.

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