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# Length-weight relationship of *Turriculajavana* (Linnaeus, 1767) from Mudasalodai coastal waters, southeast coast of India

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# ABSTRACT

The present studies have been observed the length-weight (LWR) relationship and seasonal distribution of the Turriculajavanafrom the Mudasalodai coastal waters, Southeast coast of India.The hypothetical maximum length group of male species was between 38 and 48 mm and female was 28-38 mm, while the total weight ranged between 1.23 and 5.18 g. The relationship of the total length to total width, aperture length and aperture width are linear. The condition factor varied significantly in male and female T. javana. These results are in agreement with the previous reportsof other snail species.The mean condition factor for males and females was 2.65 and 2.27 respectively. The condition factor decreased with increase in individual dimension.

Keywords:total length, Vernier, growth, turrids

# INTRODUCTION

Assessment of distribution of marine mollusks arebecome a new necessity as the coastal ecosystems face increased intimidation of loss and impairment from human activities. Knowledge of length weight relationships in the molluscanhas both pragmatic and intrinsic value. The ecological attention is being focused on the standing crop (biomass) and productivity parameters of natural populations and here length dry weight conversion equations have found considerable utility [13]. Furthermore, information on the values of proportionality constants obtained in these types of equation may give valuable insight into the underlying nature of shell geometry.

Elaiyaraja et al. (2012) studied the seasonal distribution of turrids among the Tamil Nadu coastline, India. The length and weight is two basic components in the biology of species and population levels. LWR measurements are in conjunction with age at maturity, life span, mortality, growth and production [4, 5]. A statistical analysis of morphometric characters gives a better idea of relationship with the same species in different geographical locations[12]. 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. The pragmatic relationship between the length weights of the turrids enhances the knowledge regardingthe commercially important turrid species. Unfortunately, limited works have been done on the length weight relationship of *T.javana*collectedfrom the trash fish of Mudasalodai landing centre, southeast coast of India.

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# MATERIALS AND METHODS

#### Study area

The samples of *Turriculajavana* were collected from Mudasalodaicoastal waters(Lat. 11°29'06.73"N, Long. 79°46'28.14"E), Southeast coast of Indiafrom April 2011 to March 2012 (Fig. 1). More than 200 trawlers engaged in Mudasalodai for the daily fishing activities.

#### Sampling and analysis

About340 individuals of *T. javana*(Male-162; Female-178) were collected from the trash fish of Mudasalodai fish landing center and the total length (TL), total width (TLW), aperture length (AL), aperture width (AW)and total weight (TW) were measured using verniercalipersin nearest millimeter. Measured snails were segregated depends on size groups and histogram plots showed normal distribution of length. Normality was tested at 95% confidence level. These histograms used to estimate the possible life span of *T. javana*snails.

The length-weight relationship (LWR) was estimated by using the equation, W=aLb; where W= weight (g), L= total length (cm), a = constant, b= growth exponent. A logarithmic transformation was used to make the relationship linear log W=log a + log bL.The relationships of the shell length to shell width, aperture length, aperture width and shell weight were studied using regression analysis.

# **RESULTS AND DISCUSSION**

The frequency distribution of total length of the collected turrids signifies the presence of five length groups of *T. javana*. Maximum length group of male species was between 38 and 48 (mm) and female were 28-38 (mm) (Figure2). Geographic patterens of total size have been documented in several species of turrids [15, 16]. Hulings (1987) reported that *M. dama* collected for exposure studies in the Gulf of Aqaba ranged from 13.2 to 21.0 mm in length. The limpet *Cellanaradiata*, from the Gulf of Aqaba grew at a rate of 4.0-9.0 mm annually [7]. Water temperature can also affect the growth rate [2].Discrepancy in condition factor with size for male and female *T.javana*(48-58 mm) are in better condition than others. For these species, there is zilch statistical difference between the 'k' factor of the smaller and larger sized turrids. Moreover, body condition provides an alternative to the *in-vitro* proximate analyses of tissues [18].



Figure 1. The map showing the study area



Figure 2. Frequency distribution of estimated length group of T. javana.

Table 1.	Mean condition	factor (K)	in relation to	o size for	male T. javana.
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Length group (mm)	No of specimens	Range of K-factor	Mean	T- stat
18-28	23	1.37-2.84	$2.62\pm0.15$	
28-38	33	0.52-2.82	$2.17 \pm 0.48$	
38-48	41	1.05-2.8	$2.16\pm0.30$	-1.54
48-58	15	1.33-4.13	$2.86\pm0.43$	
58-68	-	-	-	

Table 2.Mean condition factor (K) in relation to size for female T. javana.

Length group (mm)	No of specimens	Range of K-factor	Mean	T- stat
18-28	19	1.37-3.09	$2.48\pm0.10$	
28-38	45	0.41-3.05	$2.00\pm0.11$	
38-48	41	1.05-2.80	$2.17 \pm 0.08$	-2.61
48-58	20	1.32-4.15	$2.87 \pm 0.14$	
58-68	3	1.77-2.79	$2.38\pm0.31$	

The changeability in 'K' value might be either related to other parameters like breeding cycle [14], feeding rhythms [3] and environment [20]. It is clear that the dissimilarity in all the morphological relationships between the two sexes of *T. javana* is much tapered. Thus it is clear that these snails sustain its body shape throughout its life with slow growth rate. Geometric morphometric techniques are turning into a standard approach to dilucidate the pattern of shell shape variation in *Brachidontessp*[1], *Chameleagallina* and *Chamelea*[17].

The relationships of the total length to body and total weights are curvilinear [8]. The regression analysis showed the linear relationship between LWR of *T. javana* and the b value of male and female was 0.942 and 1.234 respectively (Figures 3). Scatter diagrammed observed the relationship of the shell length to shell width (y = 0.892x-0.184;  $R^2=0.914$  for male and y = 0.917x-0.223;  $R^2 = 0.935$  for female), aperture length (y = 0.987x-0.263;  $R^2=0.991$  for male and y = 0.987x-0.260;  $R^2 = 0.984$  for female) and width (y = 0.954x-0.717;  $R^2 = 0.914$  for male and y = 1.005x-0.797;  $R^2 = 0.882$  for female) of male and female *T. javana* (Figures 4 A-C and 5 A- C).



The correlation coefficient (r=0.754 for female and 0.694 for male) of *T. javana*showed significant at 0.005 level. The somatic growth depends on changes that covariate with shell morphology [19]. Changes in the habitual allometry of length weight relationships are associated with the increase in size and sexual maturity as observed in some other molluscan species from Porto Novo waters [10, 11]. The relationships of the shell length to shell width, aperture length and aperture width were linear for both *M. praemorsa* and *D. cornus* [9]. However, linear regression equations were different for both snails. Similarly the shell length to shell width relationship of *C. radiate* was also linear [7].



#### CONCLUSION

The present study provides baseline information on importance and length weight relationship of *Turriculajavana* and thus can enhance the management, conservation, culture of these species for the purification of peptides from its venom. The LWR relationship between total length, total weight, aperture length and aperture width can be used for scrutinize the growth of this species in the natural stipulation.

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