Short Communication

Length-weight relationship and condition factor in giant harpiosquillid Mantis shrimp, *Harpiosquilla raphidea* (Crustacea: Stomatopoda) in Banten Bay waters, Indonesia

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Abstract: Length-weight relationship of *Harpiosquilla raphidea* from Banten Bay waters was studied from 146 males and 186 females ranging from 38 to 354 and from 37 to 348 mm, respectively. The following equations were obtained Ln W = 5.164 + 2.478 Ln X (for males), Ln W = 5.333 + 2.596 Ln X (for females) and Ln W = 5.264 + 2.549 Ln X, Ln X (pooled). The 'b' values (2.5497) found not near to 3 indicating allometric growth being matched up with the cube law. The ANCOVA indicated not much variation between the 'b' values for males and females. In general, the growth rate of the mantis shrimp *H. raphidea* almost the same or not much different from other mantis shrimp species of the order Stomatopoda.

Introduction

Stomatopods are a group of crustaceans coming under the class Malacostraca and commonly known as 'mantis shrimp'. The spearer mantis shrimp, *Harpiosquilla raphidea* lives on muddy bottoms in coastal waters around Indonesia. In a mudflat develop in the Banten Bay of Province Banten, this species is exploited commercially, mainly by small bottom-trawlers and gill net due to its economic value. Little is known about this group and distribution of the adults.

Weight of the fish is a function of length. Information on length-weight relationship is essential for studies on growth and sexual maturity of animals. Our literature review shows that except few works by Antony et al. (2004) in *Harpiosquilla harpax*; Sukumaran (1987); James and Thirumilu (1993); Tanuja (1996) in *Oratosquilla nepa* and Lyla et al. (1993) in *Harpiosquilla melanoura*, the works concerned with the assessment of weight-length relationship in mantis shrimps from the Indian waters are scanty. Moreover no work has so far been carried out on the length weight relationship of *Harpiosquilla raphidea*. Thus, the present study aimed to explain the mathematical relationship between two variables namely the length and the weight. The present study provides detailed information on the biology of *H. raphidea* along Banten Bay waters.

Materials and methods

Around 146 males ranging from 38 to 354 mm and 186 females ranging from 37 to 348 mm were collected from the Banten Bay waters from December 2011 to January 2012. The length was measured from the tip of the rostrum to the end of telson using vernier calipers. The weight was measured to the nearest 0.01 g using an electronic balance. The length-weight relationship was calculated separately for each sex as well as the pooled. The logarithmic equation for this relationship is ln (W) = ln a + b ln (L) i.e., Y = a +

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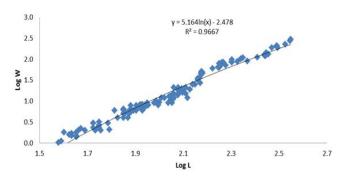E-mail address: mulyonomugi@gmail.com

Figure 1. Logarithmic relationship between the length and weight in male *Harpiosquilla raphidea*.
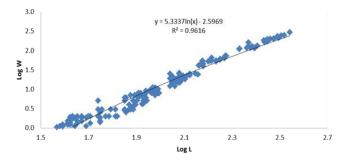

Figure 2. Logarithmic relationship between the length and weight in female *Harpiosquilla raphidea*.

bX, according to Wardiatno and Mashar (2010), where 'W' is weight (in gram), 'a' and 'b'value are the constant and the regression coefficient, which were estimated using the least-squares regression analysis. The condition factor (K) determines the effects of seasonal and habitat difference in the robustness and general well-being of the species being calculated using the equation $K = 100W/L^3$ (Gayanilo and Pauly, 1997), where: L = Length (cm); W = Weight (g); K = Condition factor (g/cm3). The linear equation was fitted separately as well as pooled for males and females of *H. harpax*. Analysis of covariance (ANCOVA) was employed to test the significance of difference between regression coefficients (b) of both sexes (Welcome, 2001).

Results

The log values corresponding to the length and weight of males and females are plotted in the Figures 1 and 2. There was linear relationship between the weight and length. The following relationships were found:

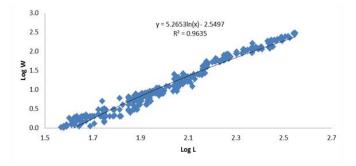Males: Ln W = 5.164 + 2.478 Ln L
Females: Ln W = 5.333 + 2.596 Ln L

Figure 1. Logarithmic relationship between the length and weight in male *Harpiosquilla raphidea*.

There were differences in the condition factors for males and females, i.e. the K values for females and males were 1.21 and 1.19, respectively. The K value for the combined sexes was 1.20. The results of covariance analysis on the length-weight equation revealed significant difference between the regressions of males and females at 5% level (F = 2.8134; *P*>0.05). Also, the length-weight relationship of the pooled was found:
Pooled: Ln W = 5.265 + 2.549 Ln L.

Discussion

The 'b' values of both males and females were less than 3, which is in agreement with Antony et al. (2004) in *Harpiosquilla harpax* of Parangipettai waters of India and Sukumaran (1987) who also described an allometric pattern of growth in *O. nepa* of South Kanara coast.

Rocket et al. (1984) investigated the length-weight relationship in *Squilla empusa* in the northwestern Gulf of Mexico, where they concluded that the species shows an isometric growth pattern as the 'b' values (2.9574 for males and 2.9362 for females) did not deviated much from the cube value 3. Giovanardi and Manfrin (1984), Tanuja (1996) and Lyla et al. (1998) also presented separate equations for males and females in different species of stomatopods.

James and Thirumilu (1993) also recorded a similar kind of observation in *O. nepa* off the Madras coast and found a similar equation for males and females (b value, 2.9661).

The mean condition factor obtained from this study showed significant difference between sexes, thus, indicating sex dependent between female and male.

Acknowledgement

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