

Length-Length and Length-Weight relationships of Blue Spotted Stingray (*Dasyatis kuhlii*) (Muller and Henle, 1841) from West Coast of Sri Lanka

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Abstract

Dasyatis kuhlii is a species of stingray of the family Dasyatidae. The body of *D. kuhlii* is dorsoventrally flattened in a disc shape. They are found in shallow estuarine, coastal and shelf regions up to about 90 m. The present study discusses some morphometric relationships of this species including length-weight relationship. The length-weight relationship studies of fish are important for fishery biological investigations and to estimate the biomass of length distribution. Morphometric measurements were obtained from 111 *D. kuhlii* in the west coast of Sri Lanka. Total Length (TL), Disc Width (DW) and Disc Length (DL) of the individuals were measured to the nearest centimeter, whereas the Body Weight (W) was measured to the nearest gram (g). The estimated length-length relationships of combined sexes of *D. kuhlii* were $DW = 0.516 TL + 0.598$ ($R^2=0.95$), $DL = 0.427TL + 0.236$ ($R^2=0.95$) and $DL = 0.842 DW - 0.181$ ($R^2=0.93$). The estimated length-weight relationships for females and males *D. kuhlii* were $W = 0.007L^{2.93}$ ($R^2=0.91$) and $W = 0.005L^{2.98}$ ($R^2=0.90$) respectively. Growth of *D. kuhlii* was negative allometric and length-weight relationships were found to be significantly different between male and female.

Keywords: *Dasyatis kuhlii*, morphometric measurements, length-length relationship, length-weight relationship, Sri Lanka.

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Introduction

Biological data of fish is important for fisheries management (Hossain, 2009). Also, knowing the length-weight and length-length relationships of fish is useful for fish stock assessments (Hussain et al. 2012). *D. kuhlii* is a species of stingray of the Dasyatidae family. Stingrays are found in all tropical and subtropical seas. Maximum reported total length of *D. kuhlii* is 70 cm (Bray, 2011). Maximum reported disc width is 40 cm in Sri Lanka (De Bruin et al. 1994). *D. kuhlii* is widely caught in Sri Lanka by single day fishing boats operated using bottom set gillnets (5-6 inches mesh size).

Materials and Methods

Total 111 *D. kuhlii* individuals were obtained between August and November 2014 at Negombo and Chilaw fish landing sites in the west coast of Sri Lanka. Total Length (TL), Disc Width (DW) and Disc Length (DL) of the individuals were measured to the nearest centimeter and the Body Weight (BW) was measured to the nearest gram. The length-weight (L-W) and length-length (L-L) relationships were obtained using the least squared method.

Results

Among the examined specimens, 56 (50.45%) were males and 55 (49.55 %) were females. Table 1 summarizes the length and weight measurements of *D. kuhlii*. The estimated relationships for combined sexes of *D. kuhlii* Disc width (DW), Total length (TL) and Disc length (DL) were: $DW = 0.516 TL + 0.598$ ($R^2 = 0.95$), $DL = 0.427TL + 0.236$ ($R^2 = 0.95$) and $DL = 0.842 DW - 0.181$ ($R^2 = 0.93$). All relationships were significant at 0.01. The estimated L-W relationships for female and male *D. kuhlii* were $W = 0.007L^{2.93}$ ($R^2 = 0.91$) and $W = 0.005L^{2.98}$ ($R^2 = 0.90$) respectively. According to the t-test, a significant difference was noted between the two L-W relationships estimated for males and females ($p < 0.05$) (Zar, 1984).

Table1. Recorded minimum and maximum total length, disc width, disc length and body weight for male and female *D. kuhlii*.

Sex	TL (cm)		DW (cm)		DL (cm)		BW (g)	
	Min	Max	Min	Max	Min	Max	Min	Max
Male	29	66	8.8	36	7	30	100	1800
Female	16.5	77	8.8	39	7	34	50	2400

Discussion

Observed maximum values of the length and weight parameters of female *D. kuhlii* was greater than that of males (Table 1). Carpenter and Niem (1999) reported maximum total length is 67cm and the reported maximum disc width is 38cm in the Western Central Pacific area. Therefore, it can be concluded that larger individuals are still found in Sri Lankan waters. However, previously reported maximum disc width of *D. kuhlii* in Sri Lankan waters (40cm) was slightly higher than this value (De Bruin *et al.* 1994).

The males mature at about 25 cm disc width (Carpenter and Niem, 1999). Accordingly, it can be considered that almost 89 % of the investigated male specimens under the present study are mature. The estimated b values in the L-W relationship for male and female of *D. kuhlii* were 2.98 and 2.93 respectively. Since b values for both sexes are lower than 3, the growth of blue spotted stingray is negative allometric.

Conclusion

The present study provides useful information about the length-weight (L-W) and length-length (L-L) relationships of *D. kuhlii*. The results could be used when further assessments on this species are conducted. A detail assessment is required in order to understand the stock status correctly and to propose necessary management measures for the conservation and sustainable use of this species.

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