

Length-Weight Relationship of *Dasyatis kuhlii* in Kurunahar Waters, Sri Lanka

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Abstract

The present investigation was carried out to identify the length-weight relationship and growth pattern of *Dasyatis kuhlii* from the Kurunahar waters which is the part of the Jaffna estuary. *D. kuhlii* is commonly known as blue spotted stingray. Random samples were collected in every month, from January to December 2012 from Kurunahar fish landing centre, Northern of Sri Lanka. A total of 285 specimens were analyzed. Covariance analysis for length-weight relationships of male and female *D. kuhlii* reveals that there was a significant relationship between logistic values of length and weight of male and female ($P < 0.000$), ($P < 0.000$), respectively. The estimates of the regression parameters and equation for male and female of *D. kuhlii* were $TW = 0.00229 * DW^{3.084}$ ($N = 129$, $R^2 = 0.946$) and $TW = 0.0344 * DW^{2.967}$ ($N = 156$, $R^2 = 0.972$), respectively. The exponent value, $b = 3.084$ for males and $b = 2.967$ for females, different from 3. Males expressed positive allometric growth whereas females reflect a negative allometric growth. The results will help to establish the yield and convert variables as it is often required during field measurement.

Key words: Allometric growth, Covariance analysis, *Dasyatis kuhlii*, Length-weight relationship, Regression analysis

Introduction

Batoids are cartilaginous fishes. Stingrays, electric rays and skates belong to this group of fishes. Batoids have adapted to a wide range of habitats, occurring in all the oceans and they are commonly found in shallow estuarine, coastal, and shelf regions and in depths up to 3000m (McEachran and Fechhelm, 1998; McEachran and Aschliman, 2004). Although most batoids are marine, the family Potamotrygonidae and some species in the family Pristidae occur in fresh water (McEachran, and Fechhelm, 1998).

The living batoids are grouped into 20 families and six orders that contain at least 513 species (McEachran and Dunn 1998; McEachran and Fechhelm 1998). Although apparently none are the object of a special fishery, many species are a regular item in the by-catch resulting from other fisheries and some are sufficiently abundant and tasty to be exploited more or less regularly in small-scale coastal fisheries. The flesh (of the disc) is usually salted, while other parts are used in the preparation of gelatin and oil.

Five species of Family Dasyatidae were identified waters around Jaffna peninsula, which are *Dasyatis kuhlii*, *Himantura walga*, *H. uarnak*, *H. gerrardi*, and *Pastinachus sephen* (Ajantha, 2011.) *Dasyatis kuhlii* is a stingray which possesses a sting on its tail region and they are commonly referred to as blue spotted sting ray. *Dasyatis kuhlii* could be easily identified by dark blue spots found on their disc. Among identified batoid fishes waters around Jaffna peninsula the *D. kuhlii* showed highest percentage of occurrence and it was the only species observed in all study areas during the period of investigation (Ajantha, 2011.).

Generally fish stocks are over exploited by fishermen making them endangered in future. Basic biological data needed for stock assessment are size values (i.e. minimum, maximum, and mean) and size relationships/conversions (i.e. length- weight). These data are essential for understanding growth rate, age structure and other aspects of population dynamics.

Length-weight relationships give information on the condition and growth patterns of fish (Bagenal and Tesch, 1978). Fish are said to exhibit isometric growth when length increases in equal proportions with body weight for constant specific gravity. The regression coefficient for isometric growth is '3' and values greater or lesser than '3' indicate allometric growth. Condition factor studies take into consideration the health and general well-being of a fish as related to its environment; hence it represents how fairly deep bodied or robust fishes are (Reynold, 1968).

The present study aims at collecting information on the length-weight relationship and condition factor of *D. kuhlii* in Kurunahar waters with a view of determining whether the fishes are in good condition.

Materials and Methods

Samplings took place in Kurunahar waters from 2012 January to December. The length weight data of blue spotted stingrays were collected from commercial fishermen. All specimens were measured (Disc width/Pelvic length- DW/PL) to the nearest 0.1 cm, and weighed to nearest 1gram. Sex was easily identified macroscopically. The relationship between length-weight of fish is generally demonstrated as an exponential relation (Tıraşın, 1993). The form of the equation is:

$$W = aL^b$$

Where, W is total weight (TW) in gram, L is disc width (DW) in cm, and a is the condition factor and b is the

exponent value and both are constants for each species.

$W = aL^b$, was converted into its logarithmic expression: $\ln W = \ln a + b \ln L$. The parameters a and b were found from the linear regression, as was the coefficient of correlation (R^2). Significance of constant b differences in relation to the hypothesis of isometric growth ($b = 3$) was tested.

Results and Discussion

The sample size, length range, weight range a and b of the length-weight relationship and coefficient of correlation R^2 of males and females are presented in the Table 1. Males of *D. kuhlii* show positive allometric growth where $b > 3$, whereas females show negative allometric growth where $b < 3$. The values of R^2 reveal that there are a significant relationship between logarithmic values of disc width and total weight. The application of all length weight relationships should be limited to the observed length ranges.

Reference

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Table 1. Some parameters of *D. kuhlii* from Kurunahar waters during 2012 January to 2012 December

Parameters	Male	Female
Sample size	129	156
Disc width range	15.1cm-36.2cm	16.5cm-34.5cm
Weight range	82g-1561g	110g-2100g
Condition factor (a)	0.0229	0.0344
Exponent value (b)	3.084	2.967
Coefficient of correlation (R^2)	0.946	0.972

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