

Short communication

First Estimate of the Length–Weight Relationship of *Diaphus watasei* Jordan and Starks, 1904 Caught off the Southwest Coast of India

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Abstract

The length-weight relationship of the myctophid fish species, *Diaphus watasei*, caught from waters off the southwest coast of India in the depth range of 300-400 m was estimated as male $W=0.0026 L^{3.39}$ and females $W= 0.0063 L^{3.06}$. The length–weight relation between the males and the females were found to be significantly different.

Introduction

Myctophids or lanternfishes of the Family Myctophidae are key components of mesopelagic communities. In India, myctophids are caught as bycatch by deep sea trawlers off the southwest coast and *Diaphus watasei* Jordan and Starks, 1904, is the most dominant species (Pillai et al. 2009). The length-weight relationship provides a means for calculating weight from length of fish and can indicate taxonomic differences and events in the life history of fish (Venkataramanujam and Ramanathan, 1994). The objective of this work was to derive the length-weight relationship of *D. watasei*.

Materials and Methods

Samples of *D. watasei* were collected from trawl bycatch by arrangement with commercial deep sea shrimp trawler operators off the southwest coast of India between Latitude 8° 00' N - 9° 07' N and Longitude 74° 00' E - 75° 58' E during the period May 2009- May 2011, except the trawl ban period from 15 June to 31 July. Deep sea shrimp trawl nets with a head rope length of 32.4 m were used in fishing operations. Their mesh size ranged from 30 to 50 mm in the belly and 26 mm in the codend. The myctophid species were caught from the depth range of 300-400 m. After hauling and segregation, samples from the last trip of multi-day fishing trips were stored in ice until analysis (about 2 days). Total length (TL) to the nearest mm and total weight (TW) to the nearest 0.5 g were

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recorded for each fish. The sex of each individual fish was recorded based on gonad morphology (Dalpadado, 1988). The relationship between weight (W ; g) and length (L ; cm), $W = aL^b$, was converted to its logarithmic form, $\text{Log}_{10} W = \text{Log}_{10} a + b \text{Log}_{10} L$. This represents a general linear equation and the value of 'a' and 'b' were estimated by the method of least square regression (Zar, 1984). Analysis of covariance (ANCOVA) was used to identify significant differences in the length-weight relationship between the sexes (Karuppasamy et al. 2008). t-test was used to determine if the slope of regression line differs significantly from a value of 3, which would be indicative of allometric growth. R, version 2.12.0 was used for the data analysis.

Results and Discussion

The sizes of *D. watasei* ranged from 10 cm to 18 cm, with a mean length of 14.2 cm; weight ranged from 5 g to 43 g, with a mean of 21.9 g. The length-weight relationships are shown in Table 1 and Fig. 1. The length-weight relationship differed significantly between males and females of the species (ANCOVA, $P=0.005$). The exponential value (b) for males differed significantly from 3 (t-test, $P<0.001$), indicating a positive allometry. The exponential value for females did not differ significantly from 3 (t-test, $P=0.47$), indicating isometric growth.

Table 1. Length, weight and length-weight regression summaries for *D. watasei* males, females and both sexes combined.

Sex	n	Length (cm)		Weight (g)		Parameters of the relationship				
		Min	Max	Min	Max	Log (a)	b	S.E (a)	S.E. (b)	R ²
Male	226	10	18	5	43	-2.591	3.391	0.085	0.075	0.900
Female	163	10	17	7	40	-2.199	3.062	0.098	0.084	0.891
Combined	389	10	18	5	43	-2.481	3.299	0.063	0.055	0.901

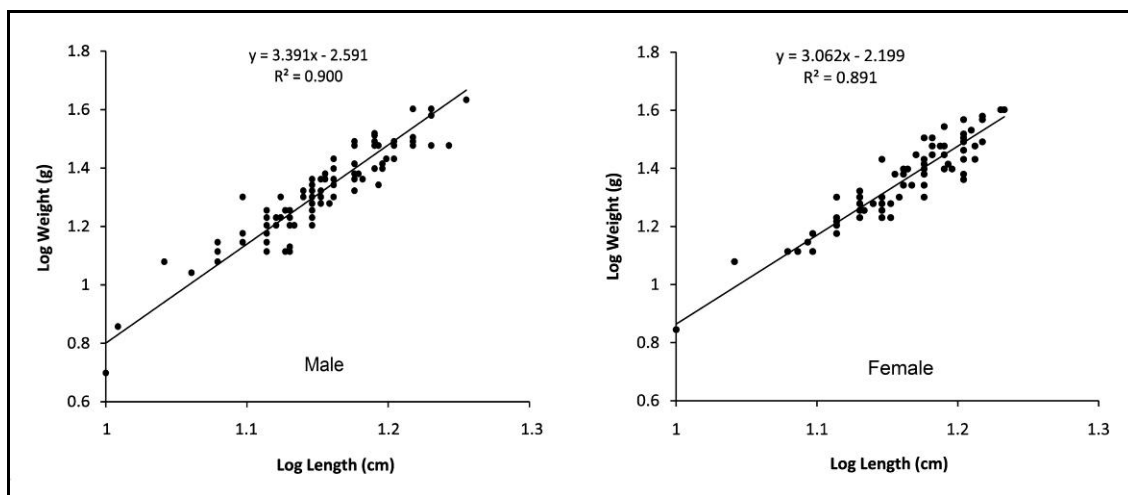


Fig. 1. Length-weight relationship of male and female *D. watasei*.

Seasonal variations in the length-weight relationships were not considered in the study, since the samples were aggregated for the analysis. Seasonal variations in the relationships with respect to sexes could provide a more accurate representation of the length-weight relationships for *D. watasei*.

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