



Short Communication

Length-weight relationship of four species of *Epinephelus* Bloch, 1793 in the catches off Visakhapatnam, east coast of India

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Abstract

The length-weight relationship (LWR) was estimated adopting the exponential equation $W = aL^b$ for four species of groupers belonging to the genus *Epinephelus* Bloch, 1793 in the catches landed at Visakhapatnam, east coast of India. The LWR was worked out as $W = 0.0000212 L^{2.8425}$ for *E. epistictus*, $W = 0.00002395 L^{2.9355}$ for *E. latifasciatus*, $W = 0.00001461 L^{3.2676}$ for *E. magniscuttis* and $W = 0.00001602 L^{3.1719}$ for *E. radiatus*.

Keywords: Length-weight relationship, *Epinephelus* spp.

Introduction

Groupers form a sizable portion of the fishery after extension of trawl operations to distant waters. A total of 16 species of the subfamily Epinephelinae were reported by Sujatha (2004) from Visakhapatnam and one more species was added to the list by Sujatha *et al.* (2008). The relationship between body length and weight is of great importance in fishery biology studies (Sparre *et al.*, 1989) to estimate the mean weight of fish based on a known length (Beyer, 1987). Length - Weight Relationship studies (LWRs) have several other applications especially in fish biology, physiology, ecology and fisheries assessment (Sangun *et al.*, 2007) and to carry out comparative studies on life history and morphological characters between different species or between different fish populations from different habitats (Gonçalves *et al.*, 1997).

In India studies on LWR of *E. diacanthus* were carried out by Chakraborty (1994), Abdarahaman *et al.* (2004), Manoj Kumar (2005) and Sivakami and Seetha (2006). We made an attempt to find out the LWR of four closely related species of groupers belonging to genus *Epinephelus* namely *Epinephelus epistictus* (Temminck and Schlegel, 1842), *E.*

latifasciatus (Temminck and Schlegel, 1842), *E. magniscuttis* Postal, Fourmanior and Guézé, 1963 and *E. radiatus* (Day, 1867) that are represented in the catches landed at Visakhapatnam, east coast of India.

Material and Methods

Samples of groupers were collected from the trawl catches off Visakhapatnam fishing harbour, east coast of India during the period from December 2006 to March 2009. Total length in mm and weight in grams were recorded. The study is based on a total of 588 specimens for four species of groupers (Table 1). The length-weight relationship was calculated by the method of least square employing the equation of Le Cren (1951).

$$W = aL^b$$

where, W = body weight (g); L = total length (mm); 'a' is a coefficient related to body form and 'b' is an exponent indicating isometric growth when equal to 3 (Edwards, 1976; Draper and Smith, 1981; Beverton and Holt, 1996). The same in the logarithmic form can be written as $\log W = \log a + b \log L$.

In the present study samples used for LWR includes both males and females. Sexes were not

Table 1. Length range and length-weight relationship of four species of genus *Epinephelus* from the catches off Visakhapatnam

Species	Length range (mm)	n	Log a	b	W-L equation	Determination Coefficient (r)	Growth Type
<i>E. epistictus</i>	215-561	32	-4.3383	2.8425	$W = 0.0000212 L^{2.8425}$	0.9742	Allometric(-)
<i>E. latifasciatus</i>	148-978	378	-4.6991	2.9355	$W = 0.00002395 L^{2.9355}$	0.9575	Isometric
<i>E. magniscuttis</i>	214-699	38	-5.6351	3.2676	$W = 0.00001461 L^{3.2676}$	0.9422	Allometric (+)
<i>E. radiatus</i>	220-506	140	-5.3143	3.1719	$W = 0.00001602 L^{3.1719}$	0.9252	Allometric (+)

considered separately as males were rarely represented in the catches.

Results and Discussion

The regression coefficient (b) for *E. epistictus* was found as 2.8425, which differs significantly from the hypothetical value (3), indicating negative allometric growth (Table 1). The regression coefficient for *E. latifasciatus* indicated isometric growth; that of *E. magniscuttis* and *E. radiatus* showed positive allometric growth.

Generally, under the condition of isometric growth, the weight of the fish is considered as an exponential function to length and their relationship could be expressed by the cube-law, i.e., weight = a x length³.

A perusal of literature shows that the regression coefficient for groupers exhibits inter and intraspecific variations. Mathew and Samuel (1987) estimated the regression coefficient (b) as 3.088 for *E. latifasciatus* indicating isometric growth. In the present study the exponent value for this species recorded as 2.9355 is less than that from Kuwait waters. The values of exponent (b) for *E. magniscuttis* and *E. radiatus* reported by Brouard and Grandperrin (1984) were 2.7545 and 2.624, which are less than the values determined in the present study. This variation may be because of the difference in ecological condition of the habitats.

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