Length-weight Relationship of Mudskippers (Gobiidae: Oxudercinae) in the Coastal Areas of Selangor, Malaysia

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Abstract

Parameters **a** and **b** of the length-weight relationship (LWR) were estimated for eleven species of mudskippers caught in the coastal areas of Selangor, Malaysia. The values of **b** ranged from 2.56 to 3.50 with the mean **b** equal to 2.95 (n=11; sd=0.302). A normal distribution of the calculated LWR exponent **(b)** was obtained.

Introduction

Oxudercine gobies are euryhaline fishes commonly referred to as mudskippers. They are amphibious, highly active during low tides and spend most of their time out of water in mangrove habitats. Mudskippers are a delicacy among the people of Taiwan and Japan and are highly priced, selling for as high as US$20/kg (Ip et al. 1990). The mudskippers have a high density on tidal mudflats that are formed in creeks and estuaries and on mangrove forest floors. Mangrove forests and their waterways are important in supporting the fish population because they provide organic matter and detritus as food sources (Sasekumar and Chong 1998).

Ricker (1968) expressed the importance of length-weight relationships in population assessments. Some examples of studies on LWR include King 1996a; Kulbicki et al. 1993; Garcia et al. 1998; Haimoivici and Velasco 2000. A similar study on the mudskipper *Periophthalmus barbarus* was conducted by King and Udo (1996) in Nigeria. Aspects of population dynamics were investigated by King (1996b) and Etim and Arntz (1996). The objective of this paper is to make available LWR parameters for mudskippers caught in coastal waters of Selangor, Malaysia.

Materials and Methods

Specimens were obtained from intensive field samplings, conducted from October 1998 to July 2000 in the mangrove areas of the Selangor coast (Fig. 1). Fishes were caught by hand net on mudflats, riverine areas and mangroves. The species description given in Murdy (1989) and Murdy and Takita (1999) were used for taxonomic identification. Fish samples were preserved in 10% formalin and washed with water and dried before measuring. The total length (TL) and standard length (SL) were measured to the nearest 0.1 mm using a caliper. Fish were weighed to the nearest 0.1 g.

The length-weight relationship was calculated using the formula:

$$W = a \cdot L^b \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

and transformed to :

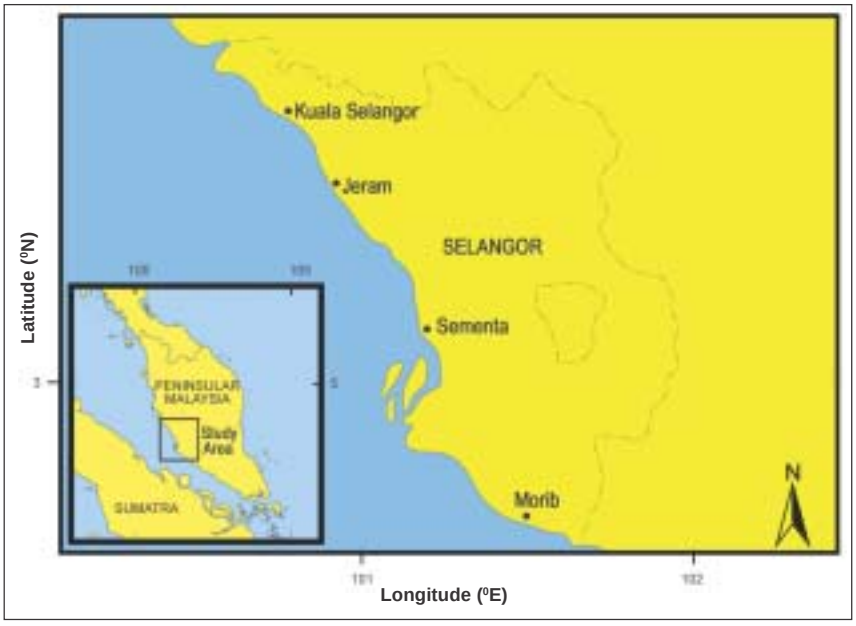

Fig. 1. Map showing the location of the study area.

Table 1. Length-weight relationships and related statistics of mudskippers caught off Selangor, Malaysia.

Species	n	Equation ($W=a \cdot L^b$)	r	SL (mm)	
				Min	Max
Periophthalmus chrysospilos	315	$W= 6.546 \times 10^{-5} \cdot SL^{2.56}$	0.982	18.2	83.2
Periophthalmus gracilis	110	$W= 3.296 \times 10^{-5} \cdot SL^{2.80}$	0.974	20.5	42.7
Periophthalmus novemradiatus	299	$W= 5.117 \times 10^{-5} \cdot SL^{2.67}$	0.989	18.3	70.2
Periophthalmus argentilineatus	15	$W= 4.375 \times 10^{-6} \cdot SL^{3.34}$	0.990	43.0	71.6
Periophthalmus spilotus	29	$W= 2.660 \times 10^{-6} \cdot SL^{3.50}$	0.995	40.3	71.4
Periophthalmodon schlosseri	20	$W= 1.766 \times 10^{-5} \cdot SL^{3.06}$	0.989	79.5	207.0
Periophthalmodon septemradiatus	22	$W= 2.710 \times 10^{-5} \cdot SL^{2.90}$	0.969	47.1	68.5
Boleopthalmus boddarti	128	$W= 1.556 \times 10^{-5} \cdot SL^{3.00}$	0.977	30.0	128.4
Scartelaos histophorus	97	$W= 4.325 \times 10^{-5} \cdot SL^{2.62}$	0.984	32.8	81.2
Pseudapocryptes elongatus	84	$W= 2.541 \times 10^{-5} \cdot SL^{2.81}$	0.991	20.1	133.6
Unidentified species	70	$W= 8.994 \times 10^{-6} \cdot SL^{3.20}$	0.996	34.7	132.4

$$\log W = \log a + b \log L \ldots.(2)$$

where **b** is an exponent with the value nearly always between 2 and 4, and often close to 3. The value **b**=3 indicates that the fish grows symmetrically or isometrically (provided its specific gravity remains constant). Values other than 3 indicate allometric growth: if **b**>3, the growth is called positive allometric and if **b**<3, it is called negative allometric. Pauly (1993) reported that **b** values must be equal to 3 if fishes have to maintain their shape as they grow, but there is no theory that says in which case the estimated **b** values can be expected to be negatively or positively allometric. Garcia et al. (1998) reported that biological interpretation of the numerical values of the parameters **a** and **b** is not straightforward, except that when growth is isometric, **a** can be interpreted as a condition factor. When growth is allometric, the role of **a** as the condition factor is questionable. The length-weight data pairs were analyzed using ordinary least squares regression (95% confidence), using STATISTICA version 5.0.

Results and Discussion

Results of the LWR analysis of eleven species of goby are summarized in Table 1. The **b** value estimator indicates that *Periophthalmodon schlosseri* and *Boleophthalmus boddarti* followed isometric growth, while *Periophthalmus argentilineatus*, *Periophthalmus spilotus* and an unidentified species indicated allometric growth with positive allometry (**b**>3.0).The rest of the species exhibited negative allometry (**b**<3.0). The mean **b** value from the eleven species was 2.950 (n=11; sd=0.302) and not significantly different from **b**=3 (t-test; df=10, p>0.05). Fig. 2 shows the normal distribution of exponent (**b**) of the eleven species that were analyzed.

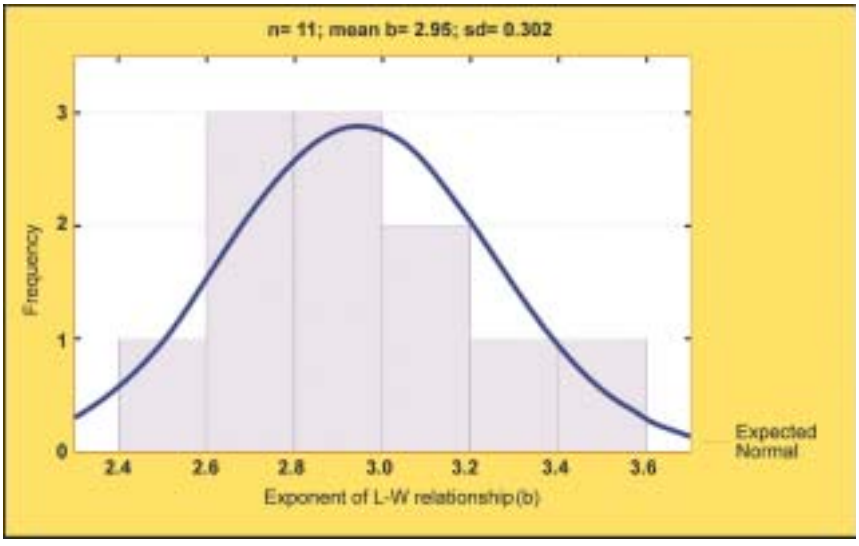

Fig. 2. Distribution of** b **values of the LWR for eleven species of mudskippers caught in the coastal area of Selangor, Malaysia.

Acknowledgments

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