



Length-weight relationship of four glassy perchlets from a tropical lake along the south-west coast of India

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Short communication

Abstract

Fishes of the family Ambassidae commonly known as glassy perchlets are represented by three genera in the Indian subcontinent: *Ambassis*, *Chanda* and *Parambassis*. Glassy perchlets are small to medium-sized semitransparent fishes commonly used for aquarium purposes. The present study provides the length-weight relationships (LWRs) of four glassy perchlet species collected from Vembanad lake, south-west coast of India. The species studied were *Parambassis dayi* (Bleeker, 1874), *P. thomassi* (Day, 1870), *Ambassis ambassis* (Lacepe'de, 1802) and *A. gymnocephalus* (Lacepe'de, 1802). The fish specimens were collected from the catches of gill nets and seine nets operated in the lake during the period 2015-2016. The *b* values in the LWRs varied from 2.75 to 3.27. No previous information is available on LWRs for these fish species from Vembanad Lake. The findings of the present study will be useful for the conservation and sustainable management of the glass fishes.

Keywords: *Ambassidae*, *Vembanad Lake*, *glass fishes*, *length-weight relationships*, *conservation*

Introduction

The Ambassid fishes commonly known as glassy perchlets are represented by three genera in the Indian subcontinent: *Ambassis*, *Chanda* and *Parambassis* (Nelson *et al.*, 2016; Verma *et al.*, 2019). They are small to medium-sized semitransparent fishes inhabiting estuarine and freshwater ecosystems. Glassy perchlets are commonly used for aquarium purposes with a high market value (Dawes, 2001). Length-weight relationships (LWRs) of the fishes is an important tool in fisheries science having a wide range of uses in fishery biology, ecology, fish stock and population assessments (Le Cren, 1951; Froese, 2006). It provides information on their growth, life history, survival as well as the overall condition of the fish (Le Cren, 1951; Christensen and Walters, 2004). It can be commonly used to calculate the biomass from the length and convert length measures into weight and vice versa (Froese, 2006; Froese *et al.*, 2011; Baitha *et al.*, 2018).

Estuarine ecosystems are unique and dynamic and have an important role in supporting ideal environments to sustain rich and diverse ichthyofauna. Vembanad Lake the largest estuarine system located on the south-west coast of India supports high diversity of fish fauna which contribute significantly to the exploited fishery of the country (Kurup *et al.*, 1995). 150

species of fish belonging to 100 genera and 56 families are known to occur in Vembanad lake (Kurup and Samuel, 1985). There is no information, however, regarding the length-weight relationships (LWRs) of glassy perchlet species encountered in Lake Vembanad, apart from previous studies by Roshni *et al.* (2017) and Roshni and Renjithkumar (2021), but they only focused on commercially important fish species. The present study provides the length-weight relationships (LWRs) of four glassy perchlet species namely *Parambassis dayi* (Bleeker, 1874), *P. thomassi* (Day, 1870), *Ambassis ambassis* (Lacepe'de, 1802) and *A. gymnocephalus* (Lacepe'de, 1802) collected from the lake.

Material and methods

Study area

The Vembanad Lake (Lat. 9°28'&10°10'N and Long. 76°13'&76°31' E) is a shallow, complex bar-built micro-tidal estuary, covering an area of 241 km² (Martin *et al.*, 2011). It extends to a length of 96.5 km from Azheekode in the north to Alappuzha town in the south. The lake owing to high biological productivity, prompt salinity gradients, tropical climate and availability of several micro-habitats like backwaters, low-lying swamps, tidal creeks and mangrove patches supports a unique and diverse assemblage of estuarine, marine and freshwater species and was listed as a Ramsar site (No. 1214) by the Convention of Wetlands of UNESCO in 1981 (Menon *et al.*, 2000).

Sample collection

Fish specimens were collected from the catches of gill nets (mesh size, 1.5-3.0 cm) and seine nets (mesh size, 1.0-2.0 cm) operated in the lake during the period June 2015 to May 2016. Samples were preserved in 10% formalin and brought to the laboratory for further analysis. Fishes were identified using Talwar and Jhingran (1991) and Jayaram (2009) and scientific names were confirmed with FishBase (Froese and Pauly, 2019). The total length (TL) was measured to the nearest 0.1 cm using vernier caliper and body weight (BW) was taken to an accuracy of 0.1 g using an electronic balance.

The LWRs were estimated by using the formula given by Le Cren (1951):

$$W = aL^b,$$

After logarithmic transformation of length-weight data, this equation expressed as:

$$\log W = \log a + b \log L$$

where *W* is the whole body weight (g), *L* is the total length (cm) and parameters *a* and *b* are the regression parameters (Le Cren, 1951; Froese, 2006). The 95% confidence limits for the parameters of *a* and *b* and co-efficient of determination (*r*²) were estimated. Extreme outliers were removed from the regression analysis as per Froese (2006). All the statistical analysis was done using Excel 2010.

Results and discussion

A total of 320 individuals representing four fish species were analyzed. Estimated parameters of length-weight relationship including sample sizes, regression parameters *a* and *b* and their 95% confidence limits and the coefficient of determination (*r*²) are shown in Table 1. The plot of log weight versus log length for four fish species are shown in Fig.1a -1d. The *b* values of the four species collected from the Vembanad Lake were within the normal range of 2.5-3.5 as suggested by Froese (2006). The *b* value ranged from 2.75 (*A. ambassis*) to 3.27 (*P. thomassi*). *P. thomassi* and *A. gymnocephalus* showed a positive allometric growth with the *b* values greater than 3. However, *A. ambassis* and *P. dayi* exhibited a negative allometric growth with *b* values less than 3. The LWR study of *P. dayi* (*b*=3.01) and *P. thomassi* (*b*=3.14) from Pampa River, India by Renjithkumar *et al.* (2017) differs from the present study (*b* value of 2.97 and 3.27 respectively). Karna *et al.* (2020) reported a *b* value of 3.01 for *A. ambassis* and 3.0 for *A. gymnocephalus* from Chilka Lake, India which also showed some variation from the present findings. The value of *b* for *A. gymnocephalus* in our study was higher than that reported 2.98 in South African estuaries (Harrison, 2001) and 2.93 in Amoy Bay, East China Sea (Huang *et al.*, 2018). On the contrary the *b* value of *A. ambassis* in this study

Table 1. Total body length and weight, length-weight relationship (LWR) parameters and allometric condition factor for samples of four fish species collected from the Vembanad Lake, Kerala (India) during June 2015 -May 2016

Species	n	Total length (cm)		Total weight (g)		Regression parameters		Confidence limits		
		Min	Max	Min	Max	a	b	95% CL of a	95% CL of b	r ²
<i>P. dayi</i>	97	67	148	5	55	0.03	2.97	0.008-0.01	2.89-3.04	0.98
<i>P. thomassi</i>	76	65	118	4.2	28	0.02	3.27	0.004-0.005	3.21-3.32	0.99
<i>A. ambassis</i>	76	67	145.3	10	82	0.02	2.75	0.015-0.019	2.70-2.79	0.99
<i>A. gymnocephalus</i>	71	65	115	5.3	28	0.05	3.06	0.006-0.009	2.95-3.17	0.97

n, number of individuals; a, intercept; b, slope; CL, confidence limits; r², coefficient of determination

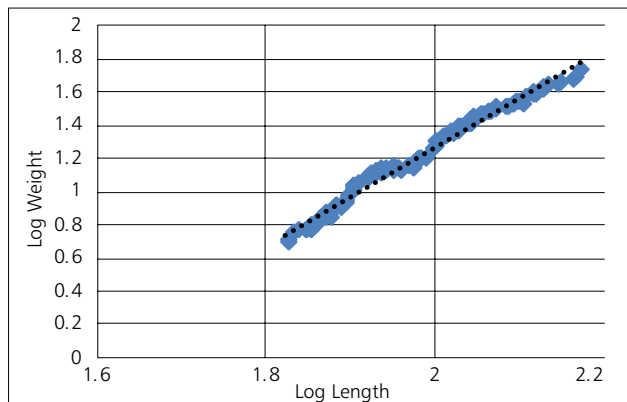


Fig. 1a. Logarithmic relation between length and weight of *P. dayi*.

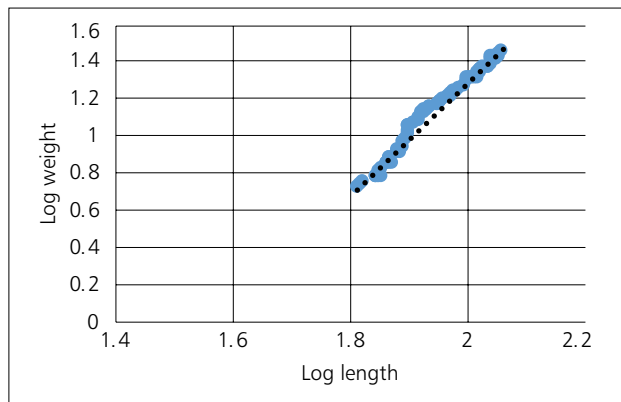


Fig. 1d. Logarithmic relation between length and weight of *A. gymnocephalus*.

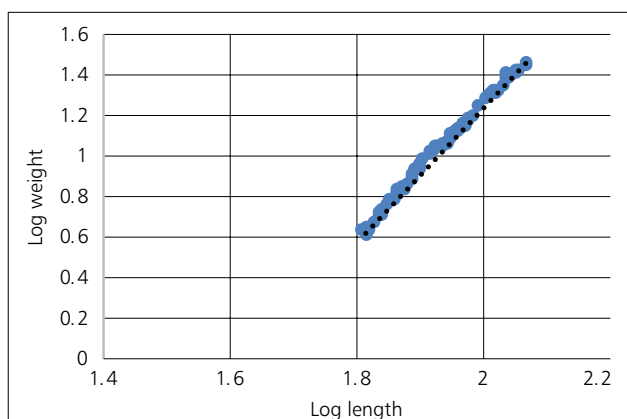


Fig. 1b. Logarithmic relation between length and weight of *P. thomassi*

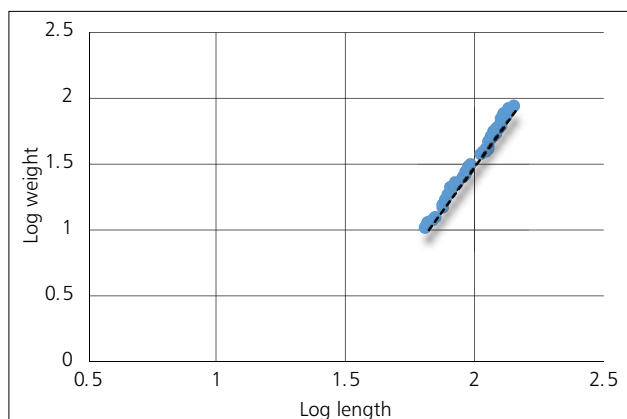


Fig. 1c. Logarithmic relation between length and weight of *A. ambassis*

was lower than 2.98 reported from Mandovi-Zuari estuarine system (Hari *et al.*, 2019). Variations in the *b* values for same fish species are usually attributed to certain factors like number of specimens examined, length range, habitat, season, sex, diet and gonadal maturity (Bagenal and Tesch, 1978; Froese, 2006; Hossain *et al.*, 2014).

In conclusion, our study provides new basic information on LWRs of four Ambassid fish species from Vembanad Lake. The results of the study could be useful for further assessment of stock and also biological parameters of these fishes in the Vembanad Lake that will help in their conservation and management.

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