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Short Communication

Length–weight relationship of the endemic velvet leatherjacket, *Lalmohania velutina* (Hutchins, 1994) inhabiting Gulf of Mannar waters (southeast coast of India)

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Length–weight relationship (LWR) of an endemic fish, velvet leatherjacket, *Lalmohania velutina* (Hutchins, 1994) inhabiting Gulf of Mannar (GoM), southeast coast of India was determined during the present study. A total of 131 individuals (male n = 84; females n = 47) were collected from bycatch of shore seines in GoM and used for establishing LWR of this endemic species. The calculated value for parameter '*b*' of LWRs were 2.5189, 2.6174 and 2.5614 for male, female and for total individuals (pooled), respectively. Maximum total length (TL) recorded for a female individual (TL_{max} = 13.4 cm) is the new report of maximum TL in *L. velutina*. The present study is the first reference on the length-weight relationship and the new maximum length recorded for *L. velutina*.

[**Keywords**: Endemic fish, Growth, India, Monachid species, New maximum length]

Introduction

With rich biodiversity, Indian aquatic waters harbor 980 freshwater and 1784 marine fishes out of which 195 species are endemic to India[1]. The family monacanthidae comprises of 27 genera which included 102 different species occurred in marine waters worldwide[2] and 13 species have been recorded so far from Indian marine waters[3]. The velvet leatherjacket, *Lalmohania velutina*[4] is the only monacanthid fish endemic to Gulf of Mannar (GoM) region, which has been recently reported from Palk Bay, southeast coast of India[5]. Due to their poor swimming capabilities, these fishes easily get captured in the fishing gears like shore seines and bottom trawlers. Their rare and seasonal occurrence makes many biological characteristics to be remaining unknown[5].

The length-weight relationship (LWR) studies allow the conversion of growth-in-length equations to growth-in-weight as well as stock assessment models in fisheries research[6,7]. Considering no data available on LWR of *L. velutina*, in the present study, attempt was made to provide LWR of *L. velutina* inhabiting GoM region of southeast coast of India.

Material and Methods

During the present study, specimens of *L. velutina* were collected from Pudumadam coast, GoM, southeast coast of India (9°27′32″ N and 78°99′07″ E) from November 2016 to April 2017. Fishes caught as bycatch by local traditional fishermen operating shore seines formed the study material for the present study. The shore seine operations usually occur in the shallow water of Pudumadam coast especially during the months of August to March, due to the low tidal amplitude which persists in the GoM region. The 'U' shaped shore seines are operated in the study area with a bag-shaped center cod end (mesh size of 5 mm), whereas the mesh size of the wing side of the net varies between 10 to 50 mm. The shore seine net covers semi-circularly along the near shore area, up to 2 km from the beach and by deploying 15 to 20 peoples to drag the net continuously from both ends. The habitat and bottom topography where *L. velutina* were caught mostly comprised of seagrass beds, rocky substratum with seaweed cover. A total of 84 male and 47 female individuals were used for LWR studies. Total length (TL, cm) was taken with the help of caliper with 0.1 mm precision, while weight (W, g) measurements of individuals were taken on an analytical balance to the nearest 0.01 mg. The sex ratio of male: female *L. velutina* was observed to be 1.7:1 during present study.

The LWR in *L. velutina* was established, separately for males, females and for pooled samples, using the formula $W = a*TL^b$ and linear regression analysis, $\log W = \log a + b \log TL$, where '*a*' is the intercept of the regression curve and '*b*' is the regression coefficient (slope). The degree of association between the variables was computed by the determination coefficient, r^2. A Student *t*–test was applied to determine whether '*b*' values obtained from the linear regression differed significantly and a significant difference was tested at $P < 0.05$ level.

Table 1 — Descriptive statistics, length-weight relationship (LWR) for the *Lalmohania velutina* collected from Gulf of Mannar, southeast coast of India. (n: sample size; W: wet weight (g); min: minimum; max: maximum; TL (cm): total length (cm); S.D: standard deviation; '*a*': intercept of the regression; '*b*': slope of the regression; S.D.: standard deviation; C.I.: confidence interval; slope; r^2: coefficient of determination).

Sex	n	TL, mean ± S.D (TL_{min} – TL_{max})	W, mean ± S.D (W_{min} – W_{max})	'*a*'	'*b*'	LWR	Coefficient of determination (r^2)	(95% CI of '*b*')
Males	84	8.53 ± 1.34 (5.4 – 12.1)	13.89 ± 6.00 (2.8 – 32.9)	–0.7421	2.5189	$W= –0.7421*TL^{2.5189}$	0.8296	2.2682 – 2.7696
Females	47	9.50 ± 1.50 (6.10 – 13.4)	18.93 ± 7.57 (5.50 – 30.50)	–1.0153	2.6174	$W= –1.0153*TL^{2.6174}$	0.8537	2.2921 – 2.9427
All individuals	131	8.87 ± 1.47 (5.4 – 13.4)	15.57 ± 6.82 (2.8 – 32.9)	–1.1363	2.5614	$W= –1.1363*TL^{2.5614}$	0.8531	2.3762 – 2.7465

Results

Table 1 summarized the descriptive statistics of length-weight measurements, regression parameters ('*a*' and '*b*'), '*b*' with their 95 % confidence limits and regression coefficient r^2 for all male, female and total numbers of individuals. The '*b*' value showed negative allometric growth pattern in both genders of *L. velutina* which reported to be 2.5189, 2.6174 and 2.5614 for males, females and total individuals respectively. No significant differences ($P > 0.05$) in '*b*' values between male and female *L. velutina* was observed.

Discussion

The information obtained from the present study will provide baseline information on LWR and the new maximum length recorded for the velvet leatherjacket, *L. velutina* inhabiting GoM, southeast coast of India. The estimated slope of the linear regression '*b*' for male, female and pooled individuals was also found within the proposed range of 2.5–3.5[ref. 8]. Hutchins[4] reported the maximum standard length of *L. velutina* was 7.2 cm while recently Murugan *et al.*[5] reported the maximum standard length of 7.37 cm and 6.61 cm for *L. velutina* collected from Palk Bay and GoM respectively. Maximum total length reported during present study was 13.4 cm for a female *L. velutina* which is the highest size recorded till date. These findings provide an important database for future studies of the ecological dynamics of this endemic velvet leatherjacket.

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Conflict of Interest

The authors have declared that no competing interest exists.

Author Contributions

AM and SVS: Conceptualization, Supervision, Writing original draft and Writing – review and editing; SVS: Software; and SVS, BR and SA: Formal analysis.

References

1 Froese R & Pauly D, *FishBase*, World Wide Web electronic publication. www.fishbase.org, (10/2018), Retrieved from https://www.fishbase.org.

2 Matsuura K, Triacanthidae, Balistidae, Monacanthidae, Ostraciidae, Tetradontidae and Diodontidae. In: *Fishes of northern Gulf of Thailand*, edited by T Yoshida, H Motomura, P Mushikasinthorn & K Matsuura, (National Museum of Nature and Science, Tsukuba, Research Institute for Humanity and Nature, Kyoto and Kagoshima) 2013, pp. 224–234.

3 Kapoor D, Dayal R & Ponniah A G, *Fish diversity of India* (National Bureau of Fish Genetic Resources, Lucknow, India) 2002.

4 Hutchins J B, Description of a new genus and species of monacanthid fish from India, *Rec West Aust Mus*, 16 (1994) 567–574.

5 Murugan A, Ramkumar B, Jayasingh M & Ramakritinan C M, Morphological observations on the endemic velvet leatherjacket, *Lalmohania velutina* Hutchins, 1994 (Family: Monocanthidae) and updated distributional records after three decades from its discovery in Gulf of Mannar, Tamil Nadu coast, India, *Indian J Geo-Mar Sci*, 47 (2018) 409–414.

6 Pauly D, Fishbyte Section, Editorial, Naga, *ICLARM Quart*, 16 (1993) pp. 26.

7 Petrakis G & Stergiou K I, Weight–length relationships for 33 fish species in Greek waters, *Fish Res*, 21 (1995) 465–469. https://doi.org/10.1016/0165-7836(94)00294-7

8 Froese R, Cube law, condition factor and weight-length relationships: history, meta-analysis and recommendations, *J Appl Ichthyol*, 22 (2006) 241–253. https://doi.org/10.1111/j.1439-0426.2006.00805.x