E-ISSN: 2347-5129
P-ISSN: 2394-0506
(ICV-Poland) Impact Value: 5.62
(GIF) Impact Factor: 0.549
IJFAS 2017; 5(1): 70-72
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www.fisheriesjournal.com
Received: 11-11-2016
Accepted: 12-12-2016

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Length-weight relationships of mola carplet *Amblypharyngodon mola* (Hamilton) (Cypriniformes: Cyprinidae) from wetlands of Assam, India

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Abstract
The present study describes the length weight relationships (LWR) of Mola carplet, *Amblypharyngodon mola* in selected wetlands of Assam, India from March, 2015 to Sept, 2016. A total of 440 specimens ranging from 4.1 to 9.0 cm (average 6.1 cm with SEM 0.195) total length (TL) and 0.98 to 8.25 g total weight (TW) (Average 3.3 g with SEM 0.285) were collected. The length-weight relationship of the fish suggested negative allometric growth. The regression models obtained was log W = 2.865 X – 1.785 log L, R^2 = 0.964 for female and logW = 2.381 X -1.403 log L, R^2 = 0.954 for male. Results for length weight relationships ($R^2 > 0.9$) $P<0.001$ indicate that these are highly corrected and highly significant. *Amblypharyngodon mola,* a commercially important small indigenous fish species (SIF) which have high nutritional value. Length–weight relationships of *A. mola* from wild populations had not yet been studied.

Keywords: *Amblypharyngodon mola,* length - weight relationships, wetlands, Assam

1. Introduction
Amblypharyngodon mola (Hamilton) is a small sized freshwater fish (Order- Cypriniformes, Family- Cyprinidae) commonly known as "Indian carplet" or "Pale carplet". *A. mola* is widely distributed in freshwater habitats like ponds, streams, rivers, flood plain wetlands, canal, paddy fields etc. *A. mola* is locally known as "moah" in Assamese. This fish is distributed in India, Bangladesh Pakistan and Myanmar (Talwar and Jhingran, 1991) [5]. It also has good demand as an ornamental fish in the international market [1]. In fishes, generally the growth pattern follows the Cube law [2, 3] but the actual relationship may depart from this [4] either due to environmental factors or condition of fish. The mathematical relationship between length and weight of fishes is a practical index suitable for understanding their survival, growth, maturity, reproduction and general well being [4]. The relationship is also useful in differentiating small taxonomic units, as variations occur within populations of different localities [4]. Studies on length–weight relationships of important fishes are highly significant for management and conservation of populations in natural water bodies. No studies are available in the literature on the biological aspects, especially length–weight relationships, of *A. mola* from different water bodies of Assam, India. Therefore the aim of the study was to investigate certain biometric characters with special reference to length–weight relationship from various wetlands of Assam, India.

2. Materials and Methods
Monthly samples of *A. mola* were collected from wetlands of Dishoi and Neamatighat in Golaghat and Jorhat District respectively of Assam and reared in the culture pond of Fisheries Research Centre, Assam Agricultural University; Jorhat, Assam located at 26º 48'N; 296''N latitude and 94^0 11'961'' E longitudes. Fish samples were collected through local fishers in the size range of 41- 90 mm in total length and 0.98 - 9.0 g in total weight. Fishes were sorted and samples were preserved in 6% formaldehyde solution for further study in the laboratory. The morphology of mature male and female *A. mola* is different. Females were identified by observing their larger size, swollen abdomen and wholesome body, whereas the males were identified by their smaller size, streamlined body. In all seasons the females were comparatively larger than the males. During the breeding season, the females acquire bulging abdomen. A total of 440 specimens were examined for establishing the relationship.

For identification of the fish species, standard literatures like Talwar and Jhingran (1991) and Jayaram (1999) were consulted [5, 6]. Total length (TL) was measured to the nearest 0.01 cm using a slide caliper and body weight (BW) was taken with a digital balance. The length-weight relationships of the fish was calculated by using the formula $W = a L^b$ [4, 7], where W is the total body weight in grams, L is the total length (TL) in cm. Regression parameters 'a' and 'b' of the length–weight relationships were estimated by linear regression equation Log TW = log a + b log TL. 95% confidence limits of 'a' and 'b' and the coefficient of determination (r^2) were estimated. Data were statistically analyzed by using Microsoft Office Excel 2007 and SPSS 18.00 package programmes.

3. Results and Discussion

In fish, which maintains its shape throughout its life, the value of regression coefficient is 'b =3' (Talwar, 1962) [8]. The regression coefficient value 'b' less than '3' or more than '3' indicates allometric growth. The length-weight parameters were estimated for male and female fishes separately and in combination of both sexes of *A. mola has* been given in Table 1 and regression graphs were given in Fig. 1 (a, b, c). The allometric coefficient b for the LWR indicated negative allometric growth (<3.0) in males (y = 2.384x –1.403, R^2 = 0.954) and in females (y = 2.865x –1.785, R^2 = 0.964). The coefficient b value of the overall combined gender indicated negative allometric growth (y =2.595x – 1.558, R^2 = 0.972). The values of b of LWRs for *A. mola* in this study were within the expected range (2.3 - 3.5) [7]. Suresh *et al.* (2007) [9] have studied the same species from wetlands of West Bengal and reported 'b' value 2.982 and 3.057 in male and females respectively. The parameters of fish length weight relationship are affected by a series of factors including season, habitat, gonad maturity, sex, diet, stomach fullness, health and preservation techniques [10, 11].

In conclusion, the present study provides baseline information on length-weight relationship for the fish of conservational importance. It will be useful for researchers and fishery managers.

Table 1: Descriptive statistics and estimated parameters of length-weight relationships of *Amblypharyngodon mola* in Assam, India

Sex	n	Total length(cm)		Body weight (g)		Regression parameters		95% CL of a	95% CL of b	R^2
		Min	Max	Min	Max	a	b			
Male	220	4.1	6.6	0.98	3.18	-1.403	2.381	-1.589 – 1.217	2.123 – 2.640	0.954
Female	220	5.5	9.0	1.72	8.25	-1.785	2.865	-2.015 – 1.556	2.591 – 3.140	0.964
Combined	440	4.1	9.0	0.98	8.25	-1.558	2.595	-1.446 – 1.670	2.452 – 2.738	0.972

n= number of individuals ; Min- Minimum; Max – Maximum; a - intercept; b - slope; CL- Confidence limits; R^2- coefficient correlation

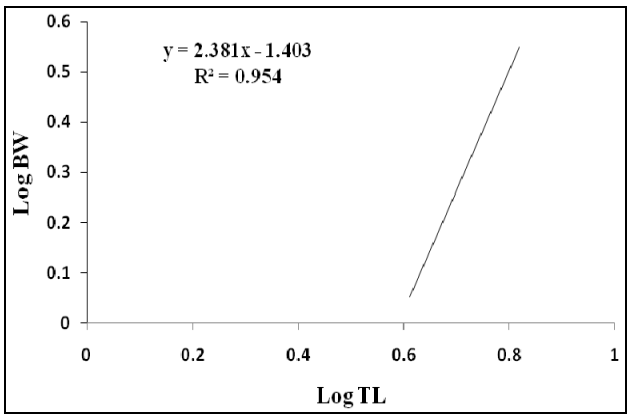

Fig 1(a): Log and Regression graph of male fish

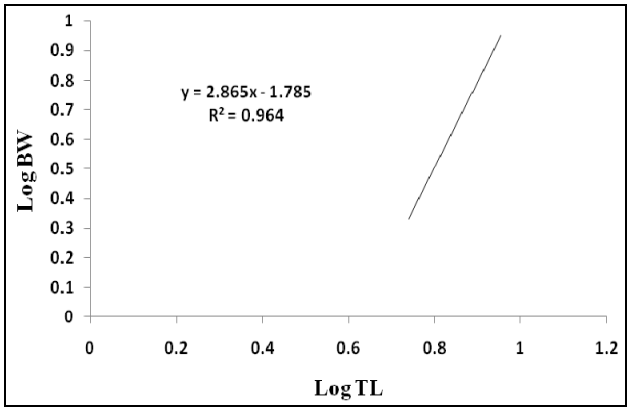

Fig 1(b): Log and Regression graph of female fish

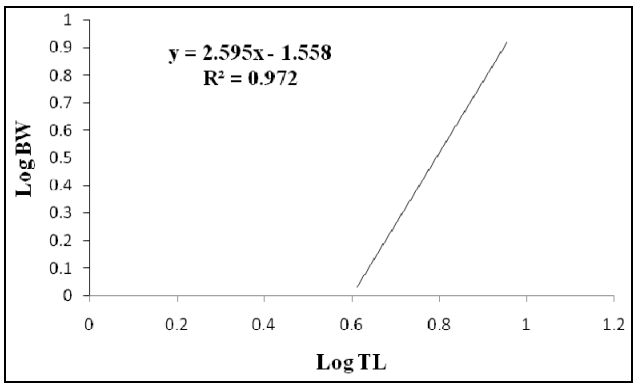

Fig 1(c): Log and regression graph of combined gender

4. Acknowledgements

Authors are gratefully acknowledges the financial assistance provided by University Grants Commission, North Eastern Regional Office, Guwahati, Assam for minor research project scheme (No- F.5 -469/2014-16/MRP/NERO/2338).

5. References

1. Gogoi R, Goswami UC. Morphometric and meristic study of *Amblypharyngodon mola* (Ham-Buch) from different habitats of Assam. Annals of Biological Research. 2015; 6(2):10-14.
2. Brody S. Bioenergetics *and Growth*. Reinhold Publishing Corporation, New York. 1945, 1023.
3. Lagler KF. Freshwater Fishery Biology. W.M.C. Brown Company, Dubyque. Iowa. 1952.
4. Le Cren ED. The length–weight relationships and seasonal cycle in gonad weight and condition in the perch (*Perca fluviatilis*). Journal of Animal Ecology. 1951; 20:201-219.

5. Talwar PK, Jhingran AG. Inland fishes of India and adjacent Countries. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi. 1991; 1(2):1158.
6. Jayaram KC. The freshwater fishes of Indian region. Narendra Publishing House, Delhi. 1999, 471.
7. Froese R. Cube law, condition factor and weight–length relationships: history, meta-analysis and recommendations. Journal of Applied Ichthyology. 2006; 22:241-253.
8. Talwar PK. A contribution to the biology of the halfbeak, *Hyporhamphus georgii* (Cuv. And Val.) (Hemirhamphidae). Indian Journal of Fisheries. 1962; 9(1):168-196.
9. Suresh VR, Biswas BK, Vinci GK, Mitra K, Mukherjee A. Biology of *Amblypharyngodon mola* (Hamilton) from a floodplain wetland, West Bengal. Indian Journal of Fisheries. 2007; 54(2):155-161,
10. Tesch FW. Age and growth. In: Methods for assessment of fish production in fresh waters. W. E. Ricker (Ed.). Blackwell Scientific Publications, Oxford. 1971, 99-130.
11. Bagenal TB, Tesch FW. Age and growth. In: Methods for assessment of fish production in fresh waters, 3rd edn. T. Begenal (Ed.). IBP Handbook, Blackwell Science Publications, Oxford. 1978; 3:101-136.