International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Length-Weight Relationship in *Glossogobius giuris* (Ham.) from Sukhna Lake, Chandigarh

Veerpal Kaur[1], Y. K. Rawal[2]

[1]Research Scholar, Division of Fisheries, Department of Zoology, Panjab University, Chandigarh – 160014, India

[2]Assistant Professor, Division of Fisheries, Department of Zoology, Panjab University, Chandigarh – 160014, India

Abstract: ***Length Weight Relationship (LWR) has been estimated for fresh water fish species, Glossogobius giuris (Ham.) from Sukhna Lake, Chandigarh. The value of correlation coefficient (r) and exponent 'b' has been found to be 0.892** and 3.18 respectively for Glossogobius giuris (Hamilton), thereby signifying a positive allometric growth.***

Keywords: Length-Weight Relationship, *Glossogobius giuris* (Ham.), Allometric growth, Sukhna Lake, Chandigarh.

1. Introduction

"Lakes have been defined as a body of standing water occupying a basin and lacking continuity with sea" [1]. Lakes support a variety of flora and fauna amongst which fishes are the most important aquatic inhabitants. Length-weight relationship (LWR) is of great importance in fishery assessments [2] as it can give information on the life span, mortality, growth as well as total production [3]. Length-weight relationships allow us to convert growth-in-length equations to growth–in-weight equations in stock assessment models [4]. In addition, it is important in estimating the average weight at a given length group [5] and for assessing the relative well being of a fish population [6], [7]. There is no documentation on study of length weight relationship of fish species from Sukhna Lake. So, in the present investigation, LWR has been studied for *Glossogobius giuris* (Hamilton) collected from Sukhna Lake, Chandigarh.

2. Study Area

Sukhna Lake, Chandigarh (Figure 1) is an artificial lake created at the foothills of the Himalayas, the Shiwalik hills in 1958. It was created by damming the Sukhna Choe, a seasonal stream coming down from the Shivalik Hills. Sukhna Lake is roughly kidney shaped and is located at 32°42' N Latitude and 76°54' E Longitude with its concavity facing the Shiwalik Himalayas. The Lake is 1.52 km long and 1.49 km wide with initial storage capacity of 1,074 ha-m of water. The submergence area is 228 ha (565 acres) at a maximum lake level of 353.57 m (1,160ft) above msl.

Figure 1: Photograph of Sukhna Lake, Chandigarh

3. Material and Methods

The data for length-weight analysis was collected during the different months of study period i.e. June 2012-May 2014 from Sukhna Lake, Chandigarh. A total of 46 specimens of *Glossogobius giuris* (Hamilton) have been analysed. Fishes were caught by using cast and gill net with hired help of fisherman through permission of Department of Animal Husbandry and Fisheries, U.T. Chandigarh. Data was measured by a single person so as to avoid handling errors of any kind and up to an accuracy of 0.1 cm and 0.1 gms [8]. The length-weight relationships were calculated by using Le Cren equation [9]. Linear transformation was made by using the natural logarithm of the observed lengths and weights [10].

4. Results

The study of LW data of this fish species will be helpful in fishery management. The sample size along with range of observed total length and total weight for fish species is shown inTable1.

Table 1: Total Length, Number of specimens, Total Weight, correlation coefficient (r) of *Glossogobius giuris* (Ham.) collected from Sukhna Lake, Chandigarh.

Total Length (cm)	Number of specimens	Total Weight (gms)	Correlation coefficient „r"
4.10-10.20	46	0.81-10.60	0.892**

Curvilinear graphs have been obtained for *Glossogobius giuris* (Hamilton) when plotted between actual length and weight. The total length and total weight values have been converted to logarithmic scale in order to simplify data interpretation (Figures 2-3). Regression equation has been observed to be:

Log TW = -2.35+ 3.18 Log TL *Glossogobius giuris* (Ham.)

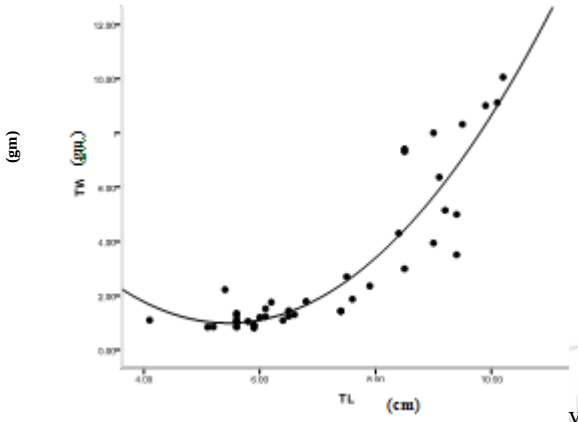

Figure 2: Relationship between observed Total Length (TL) (cms) and Total Weight (TW) (gms) of *Glossogobius giuris* (Hamilton) from Sukhna Lake, Chandigarh

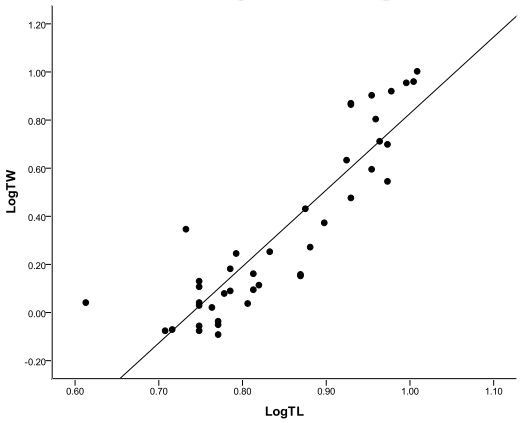

Figure 3: Relationship between Log Total Length and Log Total Weight of *Glossogobius giuris* (Hamilton) from Sukhna Lake, Chandigarh

5. Discussion

In recent years, great emphasis has been laid by fishery biologist to find out possible mathematical relationship between length and weight of fish species in order to study growth and general well being of fish population. The growth pattern of the fish is measured by the value of exponent „b" using length-weight equation [9]. The value of constant „b" is also known as „n" value or exponent value is a measure of robustness of the fish. The increase in weight of any individual is not due to a single factor but various factors [11], [12]. Length-weight relationship may help to determine whether growth is isometric "b"=3 or allometric (negative allometric: "b"<3 or positive allometric: "b">3) [13], [14].

Present observations have been found to be in strong correlation to studies of different researchers [15], [16] who worked on *Glossogobius giuris* as „b" value in the present case has been observed to be 3.18 (Table 1), showing positive allometric growth. The growth of fish which is usually indicated through increase in length and weight is the most appropriate characteristic to determine the population analysis at a particular time. These values are used for prediction of growth parameters and fish mortality rate which are essential for fish stock assessment [17].

6. Conclusion

This preliminary study revealed that *Glossogobius giuris* (Hamilton) from Sukhna Lake, Chandigarh exhibited positive allometric growth pattern. The correlation coefficient of the LWR indicated significantly high positive correlation. This study provides first basic and baseline information on LWR of *Glossogobius giuris* (Hamilton) from Sukhna Lake, Chandigarh that would be beneficial for fishery biologist and conservationists to impose adequate regulations for sustainable fishery management and conservation of biodiversity.

7. Acknowledgements

The authors are highly grateful DST-PURSE and Chandigarh Administration for the financial assistance to carry out the present work. The authors are also grateful to the Chairperson, Department of Zoology for providing the necessary facilities. Thanks are also due to Prof. M.S. Johal for his constant guidance throughout the work.

References

[1] F.A. Forel, "Le Leman" in Monographie limnologique, 3 vols. Lausanne, 1892.
[2] M. Haimovici, G. Velasco, "Length-weight relationship of marine fishes from southern Brazil," *The ICLARM Quarterly*, 23(1), pp. 14-16, 2000.
[3] D.K. Moutopoulos, K.I. Stergiou, "Weight-length and length-length relationships for 40 fish species of the Agean Sea (Hellas)," Journal of Applied Ichthyology, 18, pp. 200-203, 2000.
[4] O. Ozaydin, E. Taskavak, "Length-weight relationship for 47 fish species from Izmir Bay (eastern Aegean Sea, Turkey)," Acta Adriatica, 47(2), pp. 211-216, 2006.
[5] J.E. Beyer, "On length-weight relationships. Part I: Computing the mean weight of the fish of a given length class," Fishbyte, 5, pp. 11-13, 1987.
[6] T.B. Bagenal, F.W. Tesch, "Age and growth," in Methods of Assessment of Fish Production in Fresh Waters. IBP Handbook No. 3, 3rd ed. Oxford Blackwell Scientific Publication, London, 1978.
[7] T. Bolger, P.L. Connoly, "The selection of suitable indices for the measurement and analysis of fish condition," Journal of Fish Biology, 34, pp. 171-182, 1989.
[8] K.C. Jayaram, The Fresh Water Fishes of Indian Region, Narendra Publishing House, New-Delhi, India, 2010.
[9] E.D. Le Cren, "The length-weight relationship and seasonal cycle in weight and condition in perch, *Perca*

fluviatilis from the opercular bone*,"* Journal of Animal Ecology, 20, pp. 201-219, 1951.
[10] J.H. Zar, Biostatistical Analysis*,* Prentice Hall, New Jersey, 1984.
[11] H.L. Silvia, P.F. Schwarmborn, B.P. Ferreira, "Age structure and growth of a dusky damselfish, *Stegates fuscus*, from Tamandare reefs, Pernambuco, Brazil," Environment Biology of Fishes, 63, pp. 79-88, 2002.
[12] C.R, Townsend, L.V.F. Silva, B. Baldisserotto, "Growth and survival of Rhamdia quelen (Siluriformes, Pimelodidae) larvae exposed to different levels of water hardness," Aquaculture, 215, pp. 103-108, 2003.
[13] W.E. Ricker, "Computation and interpretation of biological statistics of fish population," Bulletin Fishery Research Board of Canada, 191, pp. 1-382, 1975.
[14] M.R. Spiegel, Theorite et applications de la statistique. McGraw-Hill, Paris, 1991.
[15] M.Y. Hossain, J. Ohtomi, Z.F. Ahmed, A.H.M. Ibrahim, S. Jasmine, "Length– weight and morphometric relationships of the tank goby *Glossogobius giuris* (Hamilton, 1822) (Perciformes: Gobiidae) in the Ganges of northwestern Bangladesh," Asian Fisheries Science, 22, pp. 961-969, 2009.
[16] M.S. Alam, M.S. Hossain, M.M. Monwar, M.E. Hoque, F.M. Taimur, "Check-list of bony fish collected from the Upper Halda River, Chittagong, Bangladesh," Aquaculture, Aquarium, Conservation and Legislation International Journal of the Bioflux Society, 6 (4), pp. 333-338, 2013.
[17] P. Sparre, and S.C. Venema, "Introduction to Tropical Fish Stock Assessment, Part 1: Manual," FAO Fisheries Technical Paper 306/1, pp. 433, 1998.

Author Profile

Veerpal Kaur received the B.Sc. degree from Government College for Women, Ludhiana and M.Sc. degree from Zoology Department, Panjab University, Chandigarh with specialization in Fisheries and now working as PhD research scholar in Zoology Department, P.U. Chandigarh.

Y.K.Rawal received the B.Sc. (Honours School) and M.Sc. (Honours School) degrees from Zoology Department, Panjab University, Chandigarh in 1994 and 1997 respectively. He did his Ph.D. with specialisation in Fish and Fisheries from the Department of Zoology, Panjab University, Chandigarh in 2002. He has been working as an Assistant Professor in Panjab University since 2007 and is working on the biodiversity of freshwater fishes of Northern India.