



Estimation of Length-Weight Relationship (LWR) and Condition Factor (CF) of certain fishes of Barak Valley region belonging to order Perciformes

Sayon Paul¹, Joydeep Chandra Das², Nabajit Roy³, Mrinmoy Choudhury⁴ and Devashish Kar⁵

Department of Life science & Bioinformatics, Assam University, Silchar-788011, Assam, India.

Email: sayonpal911@gmail.com. Mob. +91- 7002431744

¹Corresponding author

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ABSTRACT

The study aimed to investigate the Length-Weight Relationship (LWR) and Condition factor (CF) of three different fishes viz, *Anabas testudineus*, *Channa punctata* and *Colisa fasciata* from the Katakhal drainage system of Barak Valley region. The value of the exponent 'n' in the following equation $W = c L^n$ were found to be 0.674 for *Anabas testudineus*; 0.662 in case of *Channa punctata* and 0.558 for *Colisa fasciata*, thus indicating the allometric pattern ($n < 3$) of fish growth. The Condition factor (K) of the three fishes were found to be 1.465, 1.014 and 1.811 respectively, which follows the Cube Law ($K = W/L^3$) strictly, thus indicating their general well-being to be good in the given aquatic system.

Keywords: Length- Weight Relationship, Condition Factor, *Anabas testudineus*, *Channa punctata* and *Colisa fasciata*.

INTRODUCTION

Every animal in its life exhibit growth both in length and in weight and the relationship between these two has both applied and basic importance. The Length-Weight Relationship (LWR) of fishes is one of the most standard methods that yield authentic biological information with two main basic objectives- firstly, it establishes the mathematical relationship between the two variables, i.e. length and weight, so that, to know the variations from the expected weight for the known length groups and, secondly, this, in turn, reflects its fitness, general well-being, gonad development and suitability of environment of the fish. By analyzing the length and weight of the fishes, the purpose of taxonomy and in fish stock assessment can be clearly known.

In fisheries Science, the condition factor (CF) is used in order to compare the 'condition', 'fitness' or well-being of the fishes. Condition factor are used to determine the index of growth and feeding intensity of various

Ichthyofaunal diversities. There are numerous research works carried out on the length-weight relationship of commercial freshwater fishes from different water bodies all over India. The present study mainly focusses on the LWR and CF of three fish's viz. *Anabas testudineus*, *Channa punctata* and *Colisa fasciata* of Katakhal drainage system of Barak Valley region.

MATERIALS AND METHODS

In this study, a total of about 30 numbers of fish specimens, 10 from each family i.e., Anabantidae, Channidae and Osphronemidae were collected from the Katakhal drainage system of Barak Valley, Assam, in the month of March 2019. The family-Anabantidae comprises of *Anabas testudineus*, Channidae comprises of *Channa punctata* and Osphronemidae comprises of *Colisa fasciata*. The specimens were preserved in 4% buffered alcohol-formalin, packed in bottles and transported to the laboratory. The species were identified by using the key provided by Jayaram (2010), Kar (2007). The total length of the fish was measured from the tip of the anterior part of the snout to the end of the caudal fin by using a meter scale. Fish weight was measured after blot drying by using digital weighing balance. The LWR can be formulated by establishing the following equation-

$$W = c L^n$$

The parameters 'c' and 'n' were estimated by linear regression on transformed equation:

$$\text{Log } W = \text{Log } c + n \text{ Log } L$$

The estimates of the constants 'c' and 'n' were obtained empirically by using the formulae, as given below:

$$\text{Log } c = \frac{\sum \log W \times \sum (\log L)^2 - \sum \log L (\sum \log L \times \log W)}{N \times \sum (\log L)^2 - (\sum \log L)^2}$$

$$n = \frac{\sum \log W - N \log n}{\sum \log L}$$

Weights were estimated for different lengths using relationship equation. The relation between length and weight for each fish can be assessed easily with the help of statistical analysis. The Fulton's Condition Factor (K) can be analyzed by using the following formulae, as given below:

$$\text{Condition Factor (K)} = (W \times 10^3) / L^3$$

RESULT AND DISCUSSION

The formula correlating LWR of *Anabas testudineus*, *Channa punctata* and *Colisa fasciata* are as follows-

$$\text{Log } W = -0.005 + 0.674 \text{ Log } L \text{ (A. testudineus)}$$

$$\text{Log } W = -0.001 + 0.662 \text{ Log } L \text{ (C. punctata)}$$

$$\text{Log } W = -0.0003 + 0.558 \text{ Log } L \text{ (C. fasciata)}$$

It is evident from the result that the 'n' value of LWR of these three fishes were found to be 0.674, 0.662 and 0.558 respectively represents that fish become less routed as length increases, indicating the allometric pattern of fish growth.

The Condition factor (Kn) determines the general well-being of fishes. The Fulton's condition factor (Kn) of *Anabas testudineus*, *Channa punctata* and *Colisa fasciata* was found to be: 1.465, 1.014 and 1.811 respectively. Thus, indicating their general well-being to be good.

The Log L and Log W of these three fishes are plotted in the following graphs as follows.

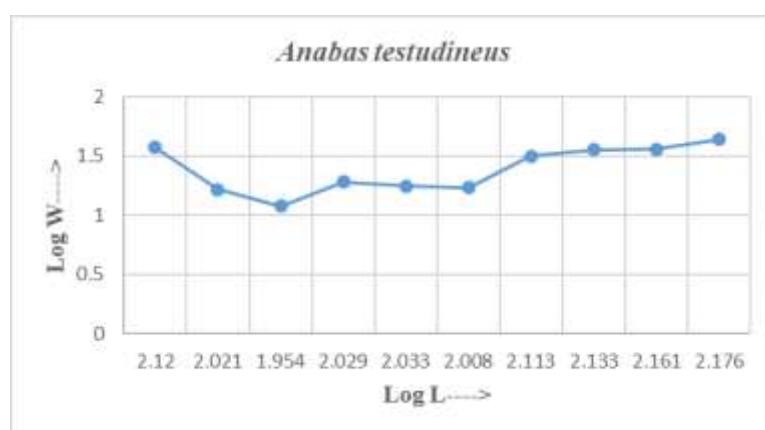
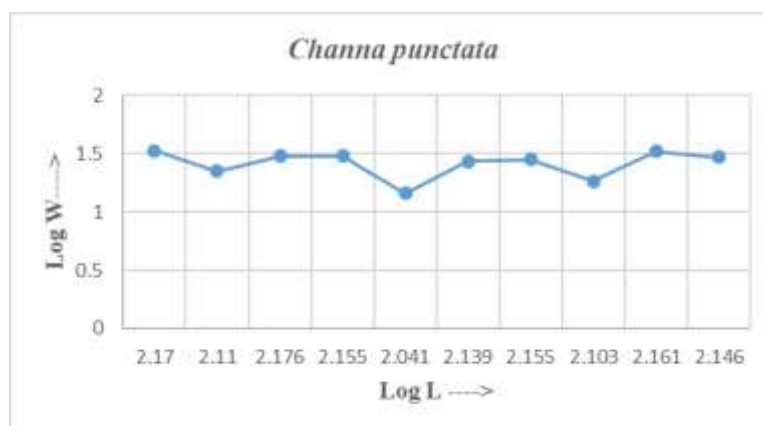
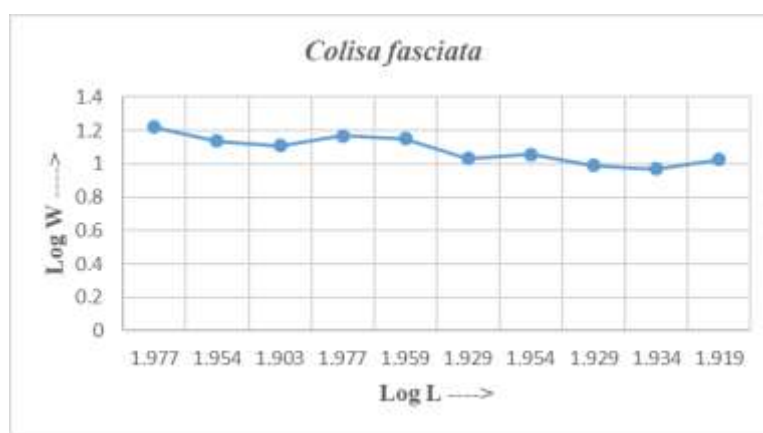


Fig 1: LWR of *Anabas testudineus*


Fig 2: LWR of *Channa punctata*

Fig 3: LWR of *Colisa fasciata*

CONCLUSION

Based on the above results obtained from LWR and Condition Factor, it can be concluded that the fishes of the family Anabantidae (*Anabas testudineus*), Channidae (*Channa punctata*) and Osphronemidae (*Colisa fasciata*) strictly follows the Cube Law and are found to be in good environmental condition in the Katakhal basin, thus, providing necessary hints to the fishery Scientists and other conservation agencies for sustainable fishery management.

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