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Length-weight relationship and condition factor in *Channa punctata* of the River Manu in Tripura

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Abstract

The present study attempts to develop a comprehensive Length-Weight relationship and relative condition Factor (K_n) of *Channa punctata* collected from River Manu in Tripura. The value of exponent 'n' in the equation $W = cL^n$ was found to be 2.818 for the species *Channa punctata*. The computed 't' value indicated that the 'n' value of the species is not significantly different from the expected value '3' and hence the Cube Law $W = cL^3$ hold good in the case of *Channa punctata*. The computed co-relation co-efficient (r) in *Channa punctata* was found to be 1 indicating that there is high positive correlation between length and weight in the species. The relative Condition Factor (K_n) remained greater (1.01) than 1 for the species indicating their general well being to be good in Manu river in Tripura.

Keywords: Length-weight relationship, Relative condition factor, *Channa punctata*, River Manu, Tripura.

1. Introduction

The knowledge length-weight relationship of a fish is essential, since various important biological aspects, viz., general well being of fish, appearance of first maturity, onset of spawning etc., can be assessed with the help of condition factor, a derivative of this relationship, moreover, the length-weight relationship (LWR) of fish is an important fishery management tool because they allow the estimation of the average weight of the fish of a given length group by establishing a mathematical relationship between the two^[1, 2]. As length and weight of fish are among the morphometric characters, they can be used for the purpose of taxonomy and ultimately in fish stock assessment^[3]. In fisheries Science, the condition factor is used in order to compare the 'condition', 'fatness' or well being of fish and it is based on the hypothesis that heavier fish of a given length are in better condition. Condition factor has also been used as an index of growth and feeding intensity^[4, 5, 6]. An extensive research on length-weight relationship of commercial freshwater fishes from different water bodies in India is already reported. This study reports the LWR of *Channa punctata* of Manu River in Tripura, India.

2. Materials and Methods

The actual relationship between length and weight may depart from the ideal value due to environmental conditions or condition of fish.

In this study, a total 15 fish specimens comprises of *Channa punctata* ranged from 98-151 mm in length and 11.61-39.23 gm in weight were studied for the length weight relationship. The species were identified by using the key provided by Jayaram^[7]. 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. Fish weight was measured after blot drying. The LWR was established by fitting equation of the form

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

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

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

$$n = \frac{\sum \text{Log } W - N \text{Log } C}{\sum \text{Log } L}$$

Weights were estimated for different lengths using relationship equation. The relation between length and weight for each fish was computed with help of statistics. The Fulton's Condition Factor (K) was computed by using the formulae, as given below:

$$\text{Condition Factor (K)} = \frac{\text{Weight (g)}}{(\text{Length})^3 (\text{cm})} \times 100$$

3. Results and Discussion

The formula correlating L-W of *Channa punctata* is given below:

$$\text{Log } W = -4.560 + 2.818 \text{ Log } L$$

It is evident from the result that the 'n' value of length-weight relationship was found 2.818, represents fish that becomes less routed as length increases, indicating the allometric pattern of growth in the fish.

The Condition factor (K_n) is an indication of general well being of fishes. The Le Cren's condition factor (K_n) of *Channa punctata* was found to be 1.01. Thus, indicating their general well being to be good.

4. Conclusion

The samples collected from River Manu are suggested of a close relationship between length and weight in *Channa punctata* but this fish follow the cube law strictly and the weight increase was a rate of the cube of its length in all the samples collected from spatially and geographically different places characterized by different environmental conditions. The condition factor (K) reflects, through its variations, information on the physiological state of the fish in relation to its welfare. The result showed that an almost isometric mold of growth in the studied habitat and the present conditions exists in the collection site is conducive for the feeding and most favourable growth of the fish^[8,9]. The current interpretation of the parameters resulting from the LWR of the species could disclose information which may be is useful to the study of fishery biology and management of fishes^[10,11,2,3].

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