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Length-Weight Relationship of *Glyptothorax ngapang* Vishwanath & Linthoingambi and *Channa punctata* (Bloch)

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Abstract: ***The Length-weight relationship of Glyptothorax ngapang Vish. & Linthoi, 2007 and Channa punctata (Bloch, 1793), collected from the Senapati District of Manipur, have been studied. Based on 120 specimens of Glyptothorax ngapang (42.6mm to 124.7mm total body length and 65.0g to 123g in weight) and 50 specimens of Channa punctata (124mm to 185mm total body length and 20.0g to 58.0g in weight), the regression equations were calculated to be Log W= 42.4424 + 6.7109 Log L for Glyptothorax ngapang and Log W = -51.1305 + 5.827 Log L for Channa punctata. The graphs for the weight of fish plotted against total length show an exponential curve in both species. The average relative condition factor (Kn) in both cases was found to be 1, indicating their well-being.***

Keywords: Regression equations, exponential curve, condition factor

1. Introduction

The natural aquatic ecosystems of Manipur are subject to considerable stress due to environmental changes and various human activities, with the consequence being a decrease in fish populations. Study of length-weigth (L-W) relationship of fishes has wide applications in delineating the growth patterns during their developmental pathways and yields. Many workers have studied the L-W relationships of freshwater fishes from different water bodies. Organisms generally increase in size (length, weight) during development. The key factors that influence the growth of fish are the quantity of food available, the number of fish utilizing the same food source, temperature, oxygen, and other water quality factors, besides the size, age, and sexual maturity of the fish. Every animal in its life exhibits growth both in length and in weight and the relationship between these two has both applied and basic importance. The length-weight relationship is one of the standard methods that yield authentic biological information and is of great importance in fishery assessments. It establishes the mathematical relationship between the two variables, length and weight, and helps in assessing the variations from the expected weight for the known length groups. This is particularly useful for computing the biomass of a sample of fish from the length-frequency of that sample (Somy K. 2014). From this relationship, weight could be computed from a given length and vice versa through a mathematical equation. The length-weight relationship can be extended to estimate fish condition, assuming that a heavier fish of a given length is in better condition. However, studies on L-W relationship of hill stream fishes from North-eastern river systems are rare (Devashish Kar et.al, 2005). The present investigation has been taken up to study the L-W relationships of two hill stream fishes viz. *Glyptothorax ngapang* Vish. & Linthoi, 2007 and *Channa punctata* (Bloch, 1793) collected from Iril and Imphal rivers running in the Senapati District of Manipur.

2. Material and Method

Samples were collected through experimental fishing employing cast nets and electric fishing devices. L-W relationships of *Glyptothorax ngapang* was established based on 120 specimens (42.6mm to 124.7mm total length and 65.0g to 123g in weight) and that of C*hanna punctata* was based on 50 specimens (124mm to 185mm total length and 20.0g to 58.0g in weight). Total length of the fish was measured from tip of snout to longest axis of the caudal fin in millimeters (mm). Fishes were dried using blotting paper before weighing and the weights were recorded in grams (gm) by an electronic balance. The values were rounded to the second decimal place. The L-W relationship was established by fitting to the general equation $W = aL^b$. The logarithmic form of the equation is LogW= Log a + b LogL, where L= total length, a and b are constants and W= expected weight. The coefficient of correlation between measured length and expected weight of each fish was calculated with the help of statistical formulae. Relative Condition Factor (Kn) was calculated following LeCren (1951).

3. Results

Glyptothorax ngapang: Length-weight relationship of *Glyptothorax ngapang* was established. The regression equation was calculated as Log W= 42.456 + 0.671 Log L. The LeCren's condition factor (Kn) ranges from 0.66 to 1.25, the average being 1.

Channa punctata: Length-weight relationship of *Channa punctata* was also established. The regression equation was calculated to be Log W= -51.125 + 0.5827 Log L. The LeCren's condition factor (Kn) ranges from 0.57 to 1.66, the average value being 1.

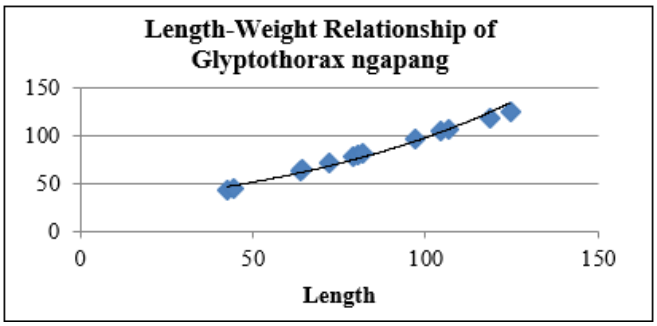

Figure 1: Graph of Weight (W) against Total Length (L) in *G. ngapang*

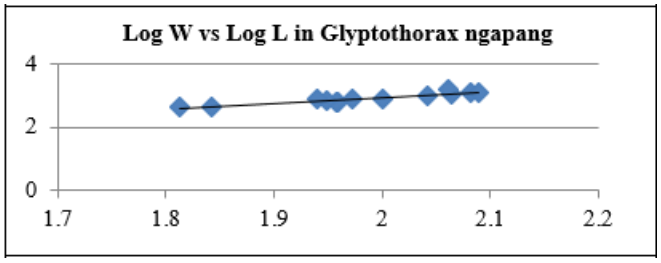

Figure 2: Graph of Log W against Log L in *G. ngapang*

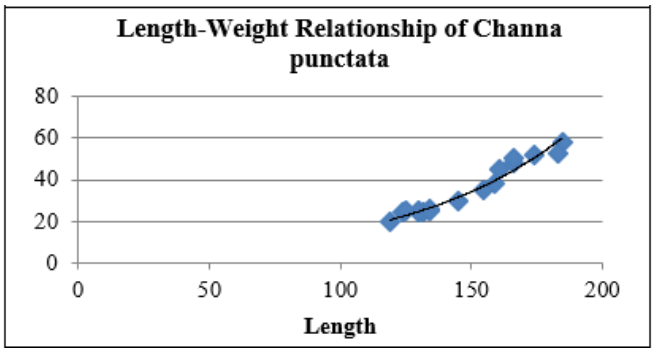

Figure 3: Graph of Weight (W) against Total Length (L) in *C.punctata*

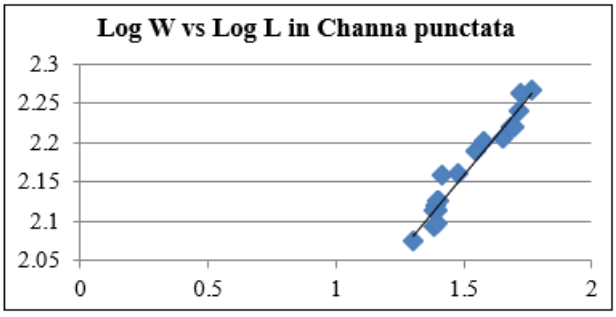

Figure 4: Graph of Log W against Log L in *C.punctata*

4. Discussion

The present investigation of Length-weight relationship of *Glyptothorax ngapang* and *Channa punctata* shows that weight increases as power of length and the graphs between the two variables assume an exponential curve in both cases. When depicted in terms of logarithms, both assume straight lines. This confirms the applicability of the general formula, $W = aL^b$. This finding is similar to the observations made by Natarajan & Jhingran (1963), Reddy & Rao (1992), James & Badruddeen (1981), Kosygin & Vishwanath (2005) and Devashish Kar *et al*. (2005).

The present study of L-W relationship revealed that the general cube law holds good for *Glyptothorax ngapang* and *Channa punctata*. The value of average Le Cren's condition factor Kn indicates that the species is living well in its natural habitats in the Senapati District of Manipur. The fish exerts a high positive correlation of regression between Length and Weight, being coefficient of correlation 0.9669 in *Glyptothorax ngapang* and 0.979 in *Channa punctata*.

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