Length-Weight Relationship of Longtail Hillstream catfish *Olyra longicaudata* (McClelland, 1842)

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**Abstract**

The present study reports the length weight relationship of *Olyra longicaudata* from Chisang River, Nepal. Study was carried out in 30 fishes collected from April 2019 to Jul 2019. The body weight ranged from 0.8 to 5.2 g and total length from 6.1 to 13.4 cm. Regression analysis was done to analyze the data. The growth performance of length-weight relationship is found to be highly significant ($r=0.936$). The fish was found to show isometric growth pattern with exponential value (b) equal to 2.5115.

**Keyword:** Length-Weight relationship, Negative allometric growth, *Olyra longicaudata.*

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**Introduction**

It is common that growth of fish or any other organism increases with the influence in body length. When an organism grows, its length and weight increases simultaneously; as growth is a function of length and weight (Dars et al., 2010). Generally, fishes grow isometrically obeying the Cube law ($W=L^3$) (Brody, 1945, Lagler, 1952). But there is every possibility of deviation of length weight relationship from Cube’s law due to different environmental factors that changes the physico-chemical parameters of water where different species of fishes reside.

Thus, Le-Cren(1951) modified Cube’s law as $W=axL^b$ to get a satisfactory result from the calculation of data obtained from the measurement of length and weight for their relationship throughout the life history stages of fishes. Several workers viz, Subba and Gosh (2000), Soomro et al.(2007), Muchlisin et al.(2010), Saikia et al.(2011), Dan-Kishiya (2013), Rahaman et al.(2015), Farado-nbeh et al.(2015), Panda and Datta (2017), Singh and Serajuddin (2017), Subba et al.(2018), Sinha et al.(2018), etc. have studied the length-weight relationship in different fish species. In fishery ractice, knowledge of length weight relationship reveals the poundage of fish caught, measure of produce from data on number and sizes of fish and also helps in easy assessment of growth rate, appearance of first maturity, time of spawning, status of stock variation, growth dynamics, general well-being of fishes etc. An already established length-weight relationship may be useful for assessing the data that contains only length frequency measurements and also helpful in setting up of yield equations, estimate the number of fishes landed and for comparing the population over space and time (Beverton and Holt,1957).

*Olyra longicaudata* (McClelland, 1842) is a freshwater longtail hillstream catfish native to India where it occurs in Darjeeling Himalaya and Assam, and Myanmar, where it occurs in Tenassarim, also found in Thailand. In Nepal it was reported from the Kadya river (a tributary of Trijuga river), in Saptari district and from
Chisang river basin, Letang, Morang (Subba, 1995 and Subba et al. 2017). It is locally named as Sanosinghi. This species grows to a length of 15 cm in total length. This fish is usually a bottom dweller and inhabits in streams and hides under rocks and gravels (Kachari et al. 2014). The fish prefers shallow and clear cold running water with high level of dissolved oxygen enriched with larval and aquatic insects, crustaceans, annelids, molluscs, etc. (Kachari et al. 2014).

Indent the present study, while searching the fish around the potential habitats, the fish was found in the watercress, Rorippa nasturtium-aquaticum (simsag) cultivated terraces, hidden under the plant roots and small creeks. It is listed as least concerned fish in IUCN red list category (2010). The data on length-weight relationship is considered to be scanty for this species so the present study was aimed to predict the length weight relationship and provides the guideline information.

**Materials and methods**

**Study area**

Study site was Chisang river basin of Letang (Lat 26°45’ 46.3”N and Long. 87°30’ 01.5” ) close to Lamitar, at elevation of 291 m.

**Sample collection**

A total 30 species were collected from April 2019 to July 2019. Taking into consideration as a rare fish of Nepal, less number of fish were caught. Total length of the fish (from snout to tip of caudal fin) was measured using a scale (cm), while weight was determined as total weight (Wt.) including gut and gonads using a digital balance.

**Data analysis**

The length-weight relationship of the fish under investigation was worked out as per cube law given by Le- Cren (1951).

\[ W = aL^b \]

Where, \( W \) is the weight of the fish, \( L \) represents the observed total length of the fish, ‘a’ is the regression intercept and ‘b’ is the regression slope.

The logarithmic transformation of the above equation is,

\[ \log W = \log a + b \log L \]

The length-weight relationships were determined by linear regression analysis. Relationship equations were determined by using least square method and the coefficient of correlation \( (r) \) was calculated by standard statistical formula. Scatter plot diagrams were plotted for total weight and lengths of the fishes. Statistical analysis was done in Excel.

**Results**

In present study, the body weight of Olyra longicaudata showed increasing trend with the increase in total body length. The body weight ranged from 0.8 to 5.2 g and total length from 6.1 to 13.4 cm.

When the values of weight were plotted on the co-ordinate(y-axis) and those values of total length on abscissa(x-axis) they gave straight line as shown in figure 1.

Regression equation for length-weight

\[ WT=0.0099TL^{2.5115} \]

\[ \log Wt = 2.5115 \log TL -2.003 \]

The exponent b value for total length weight relationship is 2.5115. Froese (1998) recommended that the exponent (b) of the length weight relationships should fall within the expected range of 2.5-3.5.
Discussion
The calculated b value in the present study is 2.5115 which shows the negative allometric growth (b<3). Variation in ‘b’ value can be attributed due to feeding (Le-Cren, 1951), sex (Hile and Jobes, 1940), developmental stages of gonads, specially the ovary affect the weight (Hile, 1936) and state of maturity (Frost, 1945). However, these factors were not accounted for in the present study. Similar finding was reported by Dan-Kishiya (2013) in Tilapia zilli, Tilapia mariae, Oreochromis-niloticus, Barbus occidentalis and Barilius loa. Negative allometric growth was also observed on some freshwater fish species (Sarkar et al., 2013). Indent the present study provides an information on Length weight relationship for Olyra longicaudata.

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