

A STUDY OF LENGTH-WEIGHT RELATIONSHIP OF *Labeo rohita* (Ham.)

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ABSTRACT

Labeo rohita is common edible fish in Saran district. The present study aims to evaluate and identify the condition of fish. Length - weight relationship is an important tool for fishery management . It will be able us to know about size, structure, age and also to assess the health of the host. The fish collected from the pond Jatai Pokhra is located at 4 km from the comissionary head quarter of Chapra, Saran. We have recorded the exponent value of 'b' of pooled fishes *Labeo rohita* i.e juvenile and adult to be 2.782 which is nearer to 3 and it indicates that there is a negative isometric growth.

KEYWORDS- *Labeo rohita* , Juvenile, adult, negative isometric growth.

INTRODUCTION

Length – weight relationship is an important tool for fishery management. It will able us to know about size, structure, age and also to assess the health of the host. They are also useful for assessing the relative well being of the fish population (Bolger and Conolly, 1989). Like any other morphometric characters, the length-weight relationship can be used as a character for the differentiation of taxonomic units and this relationship is seen to change with various development events in life such as metamorphosis, growth and the onset of the maturity. Besides this, the length – weight relationship can also be used in setting yield equations for estimating the number of fish landed and comparing the population in space and time (Beverton and Holt, 1957).

Length and weight measurement are cornerstones of fisheries management and research and can be used to describe the condition of fish in good condition are expected to have fast growth rates, high reproductive potential, and or high survival (Anderson and Neumann, 1996), which indicates favourable habitat conditions, and ample pery availability (Blackwell *et al.*, 2000).

This relationship is also useful to obtain information on the growth condition of the fish and to find out the prey wether the growth is isometric or allometric (Le Cren, 1951; Ricker, 1975). India is one of the mega – biodiversity country for fishes as well as water resources so it is very much necessary to do length – weight analysis.

Present study relates to the length – weight relationship of *Labeo rohita* (Ham.) because such studies are lacking in our region.

MATERIAL AND METHODS

Fishes for length – Weight relationship were investigated from the local market Sadha Dhala, Chapra. Fishes were supplied from Jatai Pokhra pond, Chapra, during morning hours. Fish materials were collected during Nov–Dec (2018). Fishes were captured by the different types of nets such as Cast net, Pheka jal, & Mahajal etc.

Fishes were first of all grouped length wise with an interval of 5cm. The total length and standard length of the fish *Labeo rohita* was measured with the help of scale in cm corresponding weight of the fish were measured by the help of Mono Pan Balance.

All entries were made in a tabular form. The regression coefficient ‘b’ were determined after converting the value in logarithm form with the help of formula.

$$b = \frac{\sum dx \cdot dy - \frac{\sum dx \cdot \sum dy}{N}}{\sum dy^2 - \frac{(\sum dy)^2}{N}}$$

STUDY AREA

The pond Jatai Pokhra is located at 4 km from the commissioner's head quarter of Chapra, Saran. The area is situated at 25°36' to 26°13' north latitudes and 84°24' to 85°15' east longitudes. People of the area like fish as their meal. The sale of the fish *Labeo rohita* which is a delicious food fish is in bulk from Jatai Pokhra. Regular catch of fish is made from this pond during morning and evening hours by local fishermen and sold in the nearby fish market of Chapra.

RESULT & DISCUSSION

Several researchers have done work on length- weight relationship of different fishes of different length group. Notable among them are described as follows-

Das *et al.* (2014) has done work on length – weight relationship of *Labeo rohita* and *Labeo gonius* (Hamilton Buchnam) from Sone Beel, the biggest wetland of Assam, India. They have found that the length – weight relationship of the same species may be different in the population because of feeding, reproductive activities and fishing. It is therefore necessary to know the length – weight

relationship of fish which are captured in a given place and given time. conducted for the purpose of establishing the length – weight relationship of four Cyprinid species in India. The species are *Cirrhinus mrigala*, *Catla catla*, *Labeo rohita* and *Labeo fimbriatus*. Their results of the length – weight relationship was $W=0.01123L^{3.355}$ for *Cirrhinus mrigala*, $W=0.07354L^{3.299}$ for *Catla catla*, $W=0.04066L^{3.313}$ for *Labeo rohita* and $W=0.11489L^{2.732}$ for *Labeo fimbriatus*.

Bhat (2011) has done work on length – weight relationship and condition factor of *Labeo rohita* (Cyprinidae) in Pahunj Reservoir, Jhansi, U.P. India. The value of regression coefficient for the length and body weight relationship was calculated to be 2.97 ± 0.63 ($\pm 95\%$ CL).

Negi (2013) has done work on length – weight relationship and condition factor of *Labeo rohita* from Bhagwanpur fish pond Roorkee, Uttarakhand, India. They have found that sampling done between April 2012 to June 2012 the result showed that the ‘b’ is significantly more than 3.0 . The species exhibit an isometric pattern.

For an ideal fish which maintains dimensional equality, the isometric value of ‘b’ would be 3. This has occasionally been observed (Allen 1938). The slope (b) value less than 3 indicates that a fish becomes more slender as it increases in length. A slope value greater than 3 denotes stoutness or allometric growth (Pauly 1984). However, deviation from isometric growth is often observed, as most fish change their body shape as they grow.

Negi and Negi (2009) reported that value of regression coefficient in *Puntius* was 3.0 from lake of Nainital India.

The value of the exponent ‘b’ in *Labeo rohita* have been found to be 3.109 clearly indicating that the species increase in weight is much more the cube law (Negi 2013). Negi and Mourya (2015) have studied length – weight relationship of *Labeo rohita* and *Hypophthalmichthys molitrix* during different seasons of the year in two fish ponds around Roorkee, Haridwar, Uttarakhand. The ‘b’ value ranged from 2.07 to 3.13 in *Labeo rohita*. The value of ‘b’ was maximum in winter season and lower values were recorded during summer. The higher value of ‘b’ showed a positive isometric growth but in our present investigation we have recorded the exponent value of ‘b’ of pooled fishes *Labeo rohita* i.e. juvenile and adult to be 2.782 which is nearer to 3 and it indicates that there is a negative isometric growth. Whetherley (1972) stated that even among the members of one population, sampled on the same single date, there may be considerable variation in condition with length.

Sr. No.	L(x)	W(y)	Dx	Dy	dx.dy	Result
1	14	31	10.25	30019	310.39	b=2.782
2	14.1	35	10.15	296.14	306.29	
3	15.5	60	8.75	271.4	279.89	
4	17.3	80	6.95	251.14	258.09	
5	19.8	130	4.45	201.14	205.59	
6	20.1	110	4.15	221.14	225.29	
7	23.1	140	1.15	191.14	192.29	
8	24.1	300	0.15	31.14	31.29	
9	25.8	450	3.85	118.86	457.61	
11	30.2	400	5.95	68.86	409.75	
12	33	450	8.75	118.86	1040.02	
13	36.3	900	12.05	568.86	6854.76	
14	38.2	950	13.95	618.86	8633.09	

Table 1 - Showing length – weight relationship of L.rohita

Shehena Shafi (2012) stated that ideally, the value of 'b' usually fluctuates between 2 to 4 and in majority of cases it is not found equal to 3 (Hile, 1936). Le Cren (1951) pointed out that the variation in 'b' value is due to environment factors, season, food availability, sex, life stage and other physiological factors.

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