

Research Article

Studies on the length weight relationship of *Labeo rohita* Fish from Rohri canal near Daleel Dero Sakrand Sindh Pakistan

Jamshed Ali¹ and Shaista Jalbani^{1*}

1. Department of Fisheries and Aquaculture, Shaheed Benazir Bhutto University of veterinary and Animal Sciences, Sakrand Sindh, Pakistan

*Corresponding author's email: jalbanishaista@gmail.com

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Abstract

The research on LWR (weight length relationship) of fish is key implement in fish biology examine and has received extensive courtesy. However, growth of fish is influence by many reasons and changed accordingly. Aim of this study was to investigate how fish body profile is affected by various factors by analyzing existing parameters of relationship between body length and weight. For studies on length weight relationship of major carp, *Labeo rohita* total 110 fish samples were analyzed. Samples were collected with the help of local fisherman. Size of male fish was ranging from 25.1-70.0 cm in length and 916g to 2395g in weight and size from 30.1-73.0 cm in length while in case of weight 803 to 2495 gram respectively. It was observed from finding of current research work that *Labeo rohita* was found to be in optimum condition ($b = 2.0$ and 1.9 and where r^2 is 0.99 and 0.99) accordingly. In case of relative condition factor (Kn) it was fluctuating between 1.2 and 1.4 respectively in both sexes. Results of length weight relationship condition factor and also r^2 value indicated that the values of length-weight and coefficient of condition analysis found to be in ideal condition.

Keywords: Daleel Dero; *Labeo rohita*; length; Weight; Sakrand; Sindh

Introduction

Dhambro, *Labeo rohita* (Hamilton) is a specie of fish from family of carp and widely used in aquaculture. It is in arched head, silver- colored fish of typical cyprinid shape. Adults can reach a maximum weight of 4-5 kg and length of 2 meter. It is omnivore with detailed food preferences at different stages of life. During the early lifecycle, it eats zooplankton, as it grows, its preference changed as herbivorous and middle feeder in feeding nature. As Length of fish increases, weight of fish also increases in proportion. Length-weight

relationships can be used to estimate fish biomass from length frequency distributions, to estimate weight of individual from its length, understanding some biological aspects of fishes such as growth and production. Moutopoulos and Stergiou [1] comparison of the population in space and time by Cren [2] and to compare life history and morphological aspects of fish populations inhabiting in different habitats. Imam *et al.* and Zare *et al.* [3, 4] determined that vastly L/W used in fisheries and fish biology. Odedeyi *et al.* and Sarkar *et al.* [5, 6] Variations in 'K'

values indicate the state of sexual maturity, the degree of food source availability and suitability of a specific water body for growth of fish [7]. Pauly [8] stated that length-weight relationship (LWR) provides valuable information on the habitat where the fish live, while Froese [9] stressed the importance of LWR in demonstrating aquatic ecosystems. For proper exploitation and management of the population of fish species, the length-weight relationship is very important parameter [10]. The present study aimed to find out the present status of length-weight relationship and condition factor of *Labeo rohita* inhabiting near Dalel Dero Sakrand Sindh, Pakistan.

Materials and Methods

Collection of specimens

Total of 110 (male and female) of *Labeo rohita* fish were collected from village Dalel Dero near Sakrand Sindh with the help of fisherman during November 2023-January 2024 in order to calculate their length weight relationship and their condition factors. After the collection of the fish samples were temporarily placed in cooling box filled with ice and transport to the Laboratory of Fisheries and Aquaculture, Shaheed Benazir Bhutto University of Veterinary and Animal Sciences, Sakrand Sindh for further studies.

Data analysis

For everyone the (TL, cm) total length and total weight (TW, g) was measured.

The total length (TL) of each fish was taken from tip of snout (mouth closed) to the extended tip of the caudal fin. Lastly, the total weight (TW) in Grams was measured to the nearest 0.1 gram using electronic weighing balance (Table 1 & 2). The statistical significance level of r^2 was estimated, and the b-value for each species was tested by Fisher's LSD (Least Significant Difference) test to verify if it was significantly different from the isometric ($b=3$). All the statistical analyses considered at significance level of 5% ($p<0.05$). The relationship between length (TL) and total weight (TW) of fish was analyzed by measuring length and weight of fish specimens collected from the study area.

$$W = aL^b \quad [11]$$

Which, was transformed to Log 10 as Log $W = \text{Log } a + b \text{ Log } L$,

where, log length was plotted against log weight to obtain a, b and r values. Where: W = body weight of fish (g) L = standard or total body length of fish (cm)

a = intercept b = growth exponent or regression coefficient Association degree between TL and TW was calculated by the determination coefficient (r^2). where as

The condition factor (K) of male, female sex was calculated using the formula:

$$K = 100 \times W \quad [11]$$

Table 1. Length weight relationship of female carp fish *Labeo rohita* from Water bodies of Dalel Dero, Sakrand Sindh, Pakistan

Length group	Mean length (cm)	Mean weight (g)
25.1-30.0	27.6±1.4	916±1.4
30.1-35.0	34.62±1.8	999±1.1
35.1-40.0	38.13±1.7	1000±1.0
40.1-45.0	43.18±1.2	1143±1.7
45.1-50.0	48.8±1.2	1547±1.3
50.1-55.0	53.8±1.2	1636±1.4
55.1-60.0	58.7±1.3	2395±1.5
60.1-65.0	63.55±1.5	2440±1.0
65.1-70.0	67.6±1.4	2510±1.0

Table 2. Length weight relationship of male carp fish *Labeo rohita* from Water bodies of Dalel Dero, Sakrand Sindh, Pakistan

Length group	Mean length (cm)	Mean weight (g)
30.1-35.0	32.6±1.4	803±1.7
35.1-40.0	36.4±1.6	1080±1.0
40.1-45.0	42.3±1.7	1203±1.7
45.1-50.0	47.7±1.3	1410±1.0
50.1-55.0	54.9±1.1	1740±1.0
55.1-60.0	57.9±1.1	2390±1.0
60.1-65.0	63.9±1.1	2395±1.5
65.1-70.0	67.6±1.4	2500±1.0

Results and Discussion

The present studies carried out to determine length weight of commercial important fish, Dhambro, *Labeo rohita* (Hamilton) collected from the pond near the Dalel dero Sakrand Sindh Pakistan. Total 110 samples (both male and female) ranged from 27.6 - 67.63 cm and the total weight of the fish varies between 803-2510 grams individually. After data analysis it has been detected that the length-weight shows a significant correlation between these two parameters and the value of the correlation has been found to be 1.0 and 1.02 for both male and female correspondingly.

It was concluded from finding of the present studies that optimum condition ($b=2.0$ and 1.9 and where r^2 is 0.99 and 0.99) accordingly. In the case of relative condition factor (K_n) found fluctuating between 1.2 and 1.4 respectively in both sexes. Results of length weight relationship condition factor and r^2 value indicated that the v values of length-weight and coefficient of condition analysis in ideal condition.

Many researchers worked on related parameters as on length weight relationship and result reveled nearest to the finding of present data like Bhat *et al.* [12] revealed that the length-weight relationship and condition factor value of regression coefficient for the length-body weight relationship was calculated to be 2.97 ± 0.063 ($\pm 95\%$ CL). This suggests almost an isometric growth form in all the specimen sampled because the values are very close to 3. The coefficient of correlation (r^2) was

calculated to be equal to 0.98 (i.e. > 0.9), which suggests that the two variables, (length and weight) are highly correlated. Farooq [13] observed Length-Weight relationship of Common Carp (*Cyprinus carpio* L., 1758) from Taqtaq Region of Little Zab River, Northern Iraq. They observed $\text{LogW} = -1.007+2.574\text{LogTL}$ ($r^2=0.939$) for combined sexes, $\text{LogW} = -0.971+2.553\text{LogTL}$ ($r^2=0.925$) for females and $\text{LogW} = -1.61+2.607\text{LogTL}$ ($r^2=0.958$) for males. The “b” values calculated for combined sexes (2.574), for females (2.553) and for males (2.607) were smaller than 3. According to “b” values, common carp population living in the Taqtaq Region shows a negative allometric growth. According to Bagenal and Tesch, Ozaydin *et al.* and Mir *et al.* [14-16] parameter b unlikely may vary seasonally, and even daily, and between habitats. Thus, the length-weight relationship in fish is affected by a number of factors including sex, feeding, maturity, specimen number, area, seasonal effects, degree of stomach fullness, habitat, health and general fish condition.

Conclusion

It was concluded from present research work that *Laboe rohita* fish found near water bodies of from Daleld Dero Sakrand Sindh was found to be in ideal condition.

Authors’ contributions

Conceived and designed the experiments: S Jalbani, Performed the experiments: JA Solangi, Analysed the data: JA Solangi, Contributed materials/ analysis/ tools:

SBBUVAS Sakrand, Wrote the paper: S Jalbani & JA Solangi.

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