

## LENGTH-WEIGHT RELATIONSHIP AND CONDITION FACTOR OF FISH *CHANNA STRIATA* FOUND IN PENGANGA RIVER, WASHIM DISTRICT, MAHARASHTRA

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### Abstract

The present study investigated the length–weight relationship (LWR) and condition indices of *Channa striata* inhabiting the Penganga River system in Washim District, Maharashtra, India, during October–December 2025. A total of 60 specimens were collected from river-connected rice-field irrigation channels and subjected to morphometric analysis. The length–weight relationship was estimated using the allometric equation  $W = aL^b$  following log-transformed regression analysis. Results revealed negative allometric growth ( $b < 3$ ) in both sexes, with  $b$  values of 2.11 for males, 2.29 for females, and 2.25 for pooled samples ( $r^2 = 0.84$ ), indicating that length increased at a faster rate than weight. The relative weight ( $Wr$ ) ranged from 81.19 to 124.57, with a mean value of 100.31, suggesting balanced population condition. Fulton's condition factor ( $K$ ) ranged from 0.55 to 1.35, with a mean of 0.84, indicating satisfactory physiological condition of the fish and suitability of the habitat. These findings provide baseline biological information for fisheries management and ecological monitoring of *C. striata* in the Penganga River system.

**Keywords:** Length–weight relationship, condition factor, *Channa striata*, Penganga River

### Introduction

Length–weight relationships (LWR) and condition factors are fundamental tools in fisheries biology for estimating biomass, comparing populations across habitats, and assessing growth patterns and environmental suitability (Sani et al., 2010; Teixeira de Mello et al., 2006). These parameters also assist in understanding life-history traits such as maturation, feeding intensity, and habitat quality (Froese, 2006; Singh et al., 2011).

*Channa striata* (Bloch, 1793), commonly known as snakehead fish, is widely distributed in freshwater ecosystems including rivers, ponds, swamps, flooded rice fields, and slow-moving streams. The species is well adapted to hypoxic conditions and exhibits considerable ecological plasticity (Olurin & Aderibigbe, 2006).

Fish growth is generally categorized into three patterns: isometric ( $b = 3$ ), negative allometric ( $b <$

3), and positive allometric ( $b > 3$ ) (Pauly, 1993; Riedel et al., 2007). Condition factors provide insight into fish health, nutritional status, and environmental stress, influenced by sex, season, food availability, and gonadal development (Khallaf et al., 2003). The present study aims to assess the length–weight relationship and condition factor of *C. striata* from the Penganga River system.

### Materials And Methods

#### Study Area and Sampling Period

Fish samples were collected from the Penganga River–connected rice-field irrigation channels in Washim District, Maharashtra, India, between October and December 2025. Sampling locations were selected based on local fishers' knowledge of snakehead abundance.



**Fig. Penganga River**

**Sample Collection**

A total of 60 specimens of *C. striata* were collected over nine sampling events (three sessions per month). Fish were captured using baited fishing rods during early morning (06:00–08:00) and evening (19:00–21:00) hours. Specimens were transported live in aerated containers to the Zoology Laboratory of R. A. Arts, Shri M. K. Commerce & Shri S. R. Rathi Science College, Washim, for analysis.

**Morphometric Measurements**

Total length (TL) was measured to the nearest 0.1 cm using a digital caliper, and body weight (W) was recorded to the nearest 0.1 g using an electronic balance. Sex was determined through external morphology and gonadal examination.

**Data Analysis**

The length–weight relationship was estimated using the equation:

$$W = aL^b$$

or in logarithmic form:

$$\log W = \log a + b \log L$$

where *W* is weight (g), *L* is total length (cm), *a* is the intercept, and *b* is the growth exponent. The significance of deviation of *b* from isometric growth (*b* = 3) was tested using a *t*-test (*p* < 0.05). The coefficient of determination (*r*<sup>2</sup>) assessed model fit.

Relative weight (Wr) was calculated following Rypel and Richter (2008):

$$Wr = \frac{W}{W_s} \times 100$$

where *W<sub>s</sub>* is predicted weight from the LWR equation.

Fulton’s condition factor (K) was calculated as:

$$K = \frac{W}{L^3} \times 100$$

Statistical analyses were performed using Microsoft Excel and SPSS.

**Results and Discussion**



**Fig. Length-Weight of Channa striata**

A total of 60 specimens were analyzed, with total length ranging from 14 to 19 cm and body weight from 22 to 100 g. Monthly and sex-wise distribution of samples is presented in Table 1.

**Table 1. Monthly distribution of Channa striata**

Month	Length (cm)	Weight (g)	Male	Female
October 2025	14–19	22–100	8	12
November 2025	16–18	22–96	11	9
December 2025	15–17	23–98	13	7

The length–weight relationship showed negative allometric growth for males (*b* = 2.11), females (*b* = 2.29), and pooled samples (*b* = 2.25; *r*<sup>2</sup> = 0.84), indicating that weight increased at a slower rate than length. Similar growth patterns have been reported for *C. striata* by Kusmini et al. (2018) and Shasia et al. (2021).

**Table 2. Growth and condition parameters of Channa striata**

Parameter	Range	Mean
Total length (cm)	14–19	16.5
Total weight (g)	22–100	61
Predicted weight, W <sub>s</sub> (g)	21.30–112.06	66.68
Relative weight (Wr)	81.19–124.57	100.31
Fulton’s condition factor (K)	0.55–1.35	0.84
Coefficient of determination ( <i>r</i> <sup>2</sup> )	—	0.84
<i>b</i> value (Male)	—	2.11
<i>b</i> value (Female)	—	2.29
<i>b</i> value (Combined)	—	2.25

Wr values close to 100 and K values approaching unity indicate a generally healthy population and favorable environmental conditions, with observed

variations likely related to sex, feeding intensity, and gonadal development.

### Conclusion

The length–weight relationship of *Channa striata* from the Penganga River system exhibited a negative allometric growth pattern ( $b < 3$ ) for both males and females, indicating that length increased faster than body weight. The relative weight ( $Wr = 100.31$ ) and Fulton's condition factor ( $K = 0.84$ ) suggest that the fish population is in satisfactory physiological condition and that the habitat provides suitable environmental conditions for growth. These findings contribute valuable baseline information for sustainable fisheries management and conservation of *C. striata* in the region.

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