

# Morphometric Relationship And Intermuscular Bones Of *PIARACTUS BRACHYPOMUS* (Cuvier, 1818)

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**Abstract**—The present study assessed the morphometric relationship and intermuscular bones (IBs) of *Piaractus brachypomus* (Cuvier, 1818) cultured under intensive conditions. Farmed fish samples were collected from a local earthen, laterite-lined composite fish culture pond and reared on an isonitrogenous and isocaloric formulated pelleted feed. One-year-old fish specimens recorded an average length of  $34.10 \pm 0.92$  cm and an average weight of  $1129.67 \pm 111.43$  g. The length–weight relationship followed the equation  $W = aL^b$ , with calculated weight showing significant similarity to observed weight ( $a = 0.0267$ ;  $b = 3.0178$ ). The average relative condition factor (KR) was 1.00, while the Fulton condition factor (KF) was 2.8, indicating good health and robustness of the cultured fish. Intermuscular bone analysis revealed 14 S-pin and 50 Y-pin bones in a specimen measuring 33.1 cm in length and 1050 g in weight. The findings provide baseline data on growth performance, condition status, and intermuscular bone characteristics of farmed *Piaractus brachypomus* (Cuvier, 1818).

**Index Terms**—*Piaractus brachypomus*; Length–weight relationship; Condition factor; Intermuscular bones; Intensive aquaculture

## I. INTRODUCTION

The pirapitinga (*Piaractus brachypomus*) is a migratory freshwater fish closely related to the tambaqui (*Colossoma macropomum*), though its migratory behaviour is not fully understood. Spawning occurs during the early flood season (November–February), with larvae inhabiting whitewater rivers and adults primarily occupying flooded forests and floodplains across both nutrient-rich and nutrient-poor river systems. Unlike tambaqui, pirapitinga is also found in the headwaters of nutrient-poor rivers, reflecting wider ecological adaptability (Menon, 1987, 1992; Day 1986; Jayaram 2010).

Pirapitinga feeds mainly on fruits and seeds but displays opportunistic feeding on zooplankton, insects, crustaceans, and small fish, particularly during the dry season. A higher proportion of intact seeds pass through its digestive tract compared to tambaqui, making it an efficient seed disperser (Talwar and Jhingran, 1991). Nutritionally, the species is rich in omega-3 fatty acids and essential vitamins, including Vitamins A, B, C, and D, with Vitamin D playing a crucial role in preventing osteoporosis (Eschmeyer and Fricke, 2011). However, like many freshwater fishes, pirapitinga possesses intermuscular bones, which pose consumer health concerns and have prompted research aimed at improving product safety (Elliot *et al.*, 2023).

In this concern, present paper aims to study the length–weight relationship, condition factor and the intermuscular bones of fish *Piaractus brachypomus* (Cuvier, 1818).

## II. MATERIALS AND METHODS

The specimens were collected from local fish market of Akot city. Akot is a city in the Vidarbha Region that is the district headquarters of the Akola district in the Indian state of Maharashtra. Akot is located at  $21.1^\circ\text{N}$   $77.06^\circ\text{E}$  (Akola Gazetteer 2022). Fish specimens of one year culture and each of 1100-1200 g weight range were selected. Specimens were brought to laboratory and identified using available literature (Day 1986, Jayaram 2010; Menon 1987, 1992; Talwar and Jhingran 1991, Eschmeyer and Fricke 2011). Length–weight relationships (LWRs) and relative condition factor are of great importance in fishery assessment studies since it provides information about the growth of the fish, its general wellbeing, and fitness in culture system. The log transformation

formula of was used to establish LWRs (Ricker and Carter, 1958; Zargar *et al.*, 2012). The condition factor was calculated as per the standard method of Le Cren (1951).

For inter muscular bones, The fishes were taken to post-harvest laboratory, sacrificed and bled. The whole fish was cooked for few minutes for both the sides. The whole fish after cooking were chilled and placed on a dissecting tray, the skeleton and pin bones were dissected out using needle and artery forceps (Sahu *et al.*, 2012).

The statistical analyses were performed following Zar (1999) using the SPSS version 10 (SPSS Inc., Chicago, IL, USA; Kinneer and Gray 2000).

III. RESULTS AND DISCUSSION

The average length of specimens was 34.10+0.92 cm while average weight was 1129.67+111.43 g (Table 1). The calculated weight was significantly similar to observed weight. The obtained *b* value for the experimental fishes was observed to be greater than 3 showing a positive allometric growth and reflecting optimum conditions for growth. Length weight relationship is significant at  $p < 0.05$ . These findings are in well agreement with the findings of previous studies of Sarder *et al.*, (2011), Kumaresan (2011), Saima *et al.*, (2013), Ujjania *et al.*, (2013), Roshni *et al.*, (2014), Javaid *et al.*, (2015), Bhatt *et al.*, (2016), Soni and Ujjania (2017), Balai *et al.*, (2017), Rathore and Sharma (2017), Taymaa *et al.*, (2018), Chandrvanshi *et al.* (2019), Soni and Ujjania (2019), Nimat *et al.* (2020), Andrabi *et al.* (2021), Beata *et al.* (2022) and Elliot *et al.*, (2023).

Table 1: Length weight relationship *Piaractus brachypomus* (Cuvier, 1818)

Sr. No.	Total Length <sup>X</sup>	Observed Weight <sup>Y</sup>	Length-Weight Relationship		
			a	b	Calculated W
1	33.1	1050	0.0267	3.0178	1030.128
2	34.3	1082			1147.007
3	34.9	1257			1208.633
Length-Weight Relationship equation			$Y=0.0267X^{3.0178}$		
Linear regression equation			$Y=102.38X-2361.5$		
$r=0.8421$		$r^2=0.7091$	$p=0.0496$		

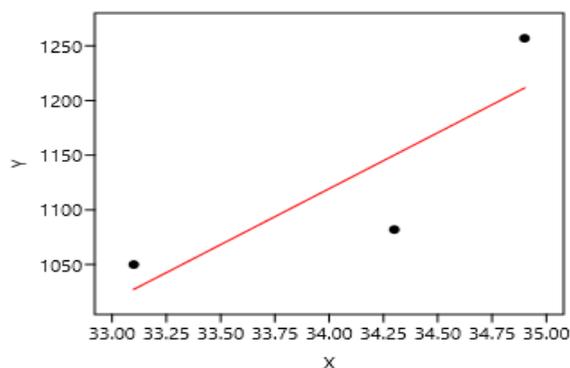


Figure 1: Length weight relationship *Piaractus brachypomus* (Cuvier, 1818)

The average length of specimens was 34.10+0.92 cm while average weight was 1129.67+111.43 g. The average Relative Condition Factor (KR) was observed to be 1.00 while Fulton condition factor equation (KF)

was observed to be 2.8 indicating the robustness or well-being of experimental fish (Table 2). The present findings are in well agreement with the findings of previous studies of Ujjania *et al.*, (2013), Roshni *et al.*, (2014), Bhatt *et al.*, (2016), Soni and Ujjania (2017), Balai *et al.*, (2017), Rathore and Sharma (2017), Chandrvanshi *et al.* (2019), Nimat *et al.* (2020), Andrabi *et al.* (2021).

Table 2: Study on condition factor *Piaractus brachypomus* (Cuvier, 1818)

Sr. No.	Total Length	Observed Weight	KR	KF
1	33.1	1050	1.0193	2.8954
2	34.3	1082	0.9433	2.6813
3	34.9	1257	1.0400	2.9571

The fish with length 33.1 cm and weight 1050 g was taken to laboratory, sacrificed and bled. The whole fish

was cooked for few minutes for both the sides. The whole fish after cooking were chilled and placed on a dissecting tray, the skeleton and pin bones were dissected out using needle and artery forceps. In studied fish 14 Spins and 50 Y Pins intermuscular bones were observed (Table 4.3). The number of intermuscular bones (IBs) are related with length and weight of specimens and have a significant concern among consumers. These views are in well agreement with the findings of previous studies of Sahu *et al.*, (2012), Roshni *et al.*, (2014), Sahu *et al.*, (2014), Beata *et al.* (2022) and Elliot *et al.*, (2023).

Table 3: Study on intermuscular bones of *Piaractus brachypomus* (Cuvier, 1818)

Sr. No.	Total Length	Observed Weight	S Pins	Y Pins
1	33.1	1050	14	50



Figure 2: *Piaractus brachypomus* (Cuvier, 1818)



Figure 3: Inter-Muscular Bones of *Piaractus brachypomus* (Cuvier, 1818)

#### IV. CONCLUSION

The present investigation demonstrates that *Piaractus brachypomus* (Cuvier, 1818) cultured under intensive pond conditions exhibits a stable length-weight

relationship, optimal condition factor values, and good overall health status. The near-isometric growth pattern, along with satisfactory relative and Fulton condition factors, reflects favourable culture conditions and effective nutritional management. However, the presence and distribution of intermuscular bones, particularly the higher number of Y-pin bones, remain a significant concern from a consumer safety and product acceptability perspective. Overall, the study highlights both the culture potential of *Piaractus brachypomus* and the need for further research focusing on intermuscular bone reduction strategies to enhance its market value.

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