



Full Length Research Article

LENGTH-WEIGHT RELATIONSHIP OF FRESHWATER FISHES *CATLA CATLA* AND *LABEO ROHITA*

***Kumaresan, T.**

Department of Zoology, Annamalai University, Tamil Nadu, India

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ABSTRACT

Length-weight relationship of fish *Catla catla* and *Labeo rohita* were studied for six months in Chidambaram area Cuddalore district, India. In the present observation, 80 specimens were collected during January 2010 to June 2010. The relationship between body weights, total length in total specimens were measured maximum and minimum. The body weight varied from *Catla catla* 113.25 to 1025.82 grams and *Labeo rohita* 106.81 to 843.17 grams. Total length of *Catla catla* fishes ranged from 7.47 to 27.04 cm and *Labeo rohita* 7.07 to 23.21 cm respectively. The maximum body weight and total length were noted June 2010 and minimum body weight and total length were recorded January 2010 during the study period. The comparatively highest values of total body weight and total body length of fish *Catla catla* were observed.

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INTRODUCTION

Fish play an important role in human nutrition in India, particularly to people of coastal areas. Good and adequate nutrition plays a very important role in the expression of mental, physical and intellectual qualities in humans. To ensure access to the nutritionally adequate food for the improvement in the quality of diet of a poor person in the society, fish is the only medium which can serve the very purpose. They have the ability to reduce blood lipid level, particularly serum triglycerides (Boberg, 1990) and also have a good source for human nutrition due to their therapeutic role in reducing certain cardiovascular disorders (Stickney and Hardy, 1989; Ahmed, 2011). The length-weight relationship forms an important criterion for studying the growth of fish populations (Agarwal and Saxena, 1979). The exponential value must be exactly 3, but in reality, the actual relationship between length and weight may depart from the ideal value due to environmental conditions or condition of fish (Le-Cren, 1951). Both the length-weight relationship and condition factor are important tools (Brody, 1945; Lagler, 1952). The weight-length and condition factor parameters of hatchery reared Golden Mahseer, *Tor macrolepis* were analyzed. Log transformed regressions were used to test the growth performance. The condition factor (K) shows statistically significant relationship with both length and weight i.e. as fish grows K increases with increasing length or weight were

studied by Anser Mahmood Chatta and Muhammad Ayub, (2010). The weight-length and condition factor relationship of fish *Catla catla*. The earlier study has applied value in fish biology (Salam *et al.*, 2005). The weight-length relationship provides a parameter to calculate an index commonly used by fisheries biologists to compare the "condition factor" or "well being" of a fish (Bagenal and Tesch, 1978). Several studies on length-weight relationship have been carried out in other parts of the world (LeCren, 1951; Jhingran, 1952 1968; Chakraborty and Singh, 1963). Length-weight data of fish have in general used moreover to systematically express the relationship between weight and length for purposes of exchange from one to another or measuring individual difference from an expected weight at a given length as an index of condition. Asian seabass, *Lates calcarifer* (Bloch) - a catadromous centropomid perch, is a competitor species for brackish water aquaculture in India and its prospective for farming has increased after the successful induced propagation (Thirunavakkarasu *et al.*, 2001). *Tilapia mossambica* could be easily identified by dark bands or stripes found on their bodies are most prominent in mature forms. They occupy freshwater and water body of low salinity, as is unique of most *Tilapia species* (Olurin and Aderibigbe, 2006). Length - weight relationship (LWR) parameters are valuable in fisheries science in several ways, to estimate weight of individual fish from its length, to calculate condition indices, to evaluate life history and morphology of populations belonging to diverse regions (Sani *et al.*, 2010). Length-weight relationship is of great importance in fishery assessments.

*Corresponding author: Kumaresan, T.,

Table 1. Length and weight relationship of freshwater fishes *Catla catla* and *Labeo rohita* collected from Chidambaram area Cuddalore district, India (January 2010 to June 2010)

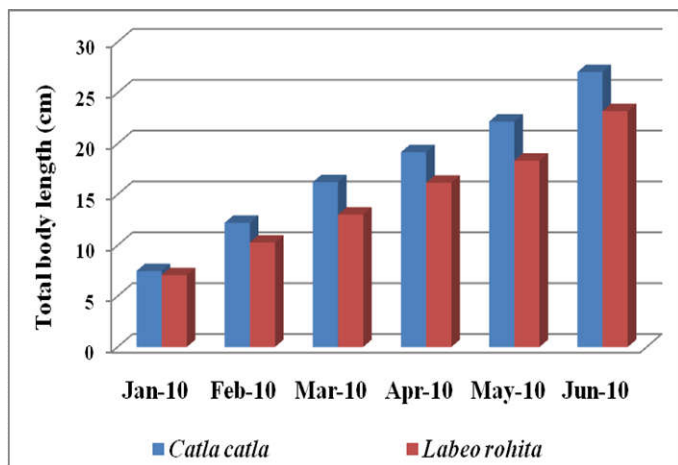
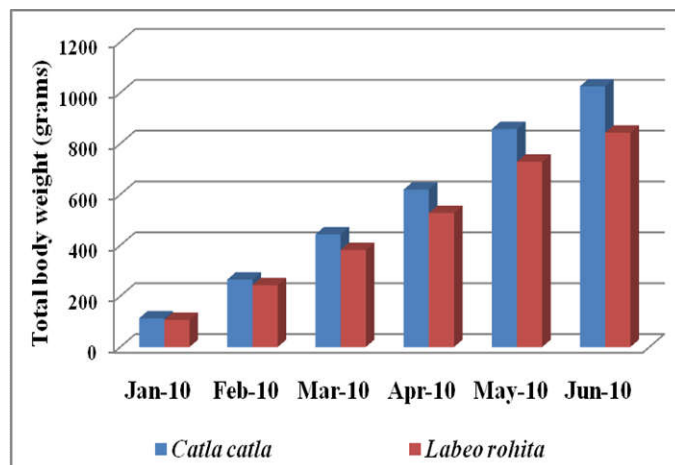
Month and Year	<i>Catla catla</i>		<i>Labeo rohita</i>	
	Length	Weight	Length	Weight
Jan. 2010	7.47 ± 0.74	113.25 ± 6.65	7.07 ± 0.76	106.81 ± 4.57
Feb. 2010	12.21 ± 0.81	265.72 ± 18.05	10.28 ± 1.09	243.52 ± 15.01
Mar. 2010	16.22 ± 0.54	443.67 ± 18.68	13.02 ± 0.76	381.82 ± 29.15
Apr. 2010	19.16 ± 0.37	619.39 ± 7.15	16.17 ± 0.37	526.95 ± 14.41
May. 2010	22.18 ± 0.78	857.77 ± 21.64	18.33 ± 0.32	729.26 ± 10.92
Jun. 2010	27.04 ± 0.43	1025.82 ± 20.51	23.21 ± 0.73	843.17 ± 12.73

Each value is the mean ± S.D. of four observations

Table 2. Biochemical characterization of bacterial isolates from infected fish *Catla catla*

S.No	Grams staining	Motility	Shape	Indole	Methyl red	VP	Citrate	Urease	TSI	Catalase	Oxidase	H ₂ S Production	Carbohydrate Fermentation			Identification of bacterial
													Sucrose	Glucose	Mannitol	
1	-	+	Rod	-	-	-	-	+	A/A	+	+	-	+	+	+	<i>Escherichia coli</i>
2	-	+	Rod	+	-	-	+	-	K/A	-	+	+	+	+	+	<i>Proteus mirabilis</i>
3	-	+	Rod	+	+	+	+	-	K/A	-	-	+	+	+	+	<i>Pseudomonas aeruginosa</i>
4	-	+	Rod	-	+	+	+	-	A/A	+	-	-	+	+	+	<i>Yersinia species</i>
5	-	-	Rod	-	-	+	+	-	A/A G	+	-	-	+	+	+	<i>Enterobacter aerogen</i>

(+) Positive, (-) Negative, (A/A) acid slant and acid butt, (A/k) acid slant and alkaline butt, (K/A) alkaline slant and acid butt.

**Fig 1. Total body length of freshwater fishes (cm) *Catla catla* and *Labeo rohita* (January 2010 to June 2010)****Fig 2. Total body weight of freshwater fishes (gm) *Catla catla* and *Labeo rohita* (January 2010 to June 2010)**

The relationship indicates the taxonomic differences and events in the life history, such as metamorphosis and the onset of maturity. It also denotes the fatness and general well-being of a fish or groups of fishes.

MATERIALS AND METHODS

Fish samples *Catla catla* and *Labeo rohita* were collected from Chidambaram area, Cuddalore District India, which is located at latitude 11° 05' North South and longitude 79° 5' East West on Southern part of India. These characters include variations easurements of fish body weight, total fish length. Conventionally, the measurements are taken with the help of shape, pointed needle-like dividers or dial-reading calipers. For accurate readings, a stainless steel ruler with measurements to millimeters is recommended (Gupta and Gupta, 2006). The morphometric measurement of the study fishes *Catla catla* and *Labeo rohita* were recorded from January 2010 to June 2010. The lengths (cm) of fishes were measured by using scale and weights (g) of fishes were measured by using electronic digital top-pan balance (Chyo, Japan).

RESULTS

The length-weight relationship of fishes *Catla catla* and *Labeo rohita* were calculated as Table 1. The initial and final total length of carp *Catla catla* values were recorded as 7.47, 12.21, 16.22, 19.16, 22.18 and 27.04 cm during January 2010 to June 2010 and minimum length was recorded in the month of January 2010 and maximum length was noted in the month of June 2010 (Table 1 and Fig. 1). The initial and final length of *Labeorohita* values were recorded as 7.07, 10.28, 13.02, 16.17, 18.33 and 23.21 cm during January 2010 to June 2010. The maximum total length (42.4cm) was recorded in the month of June 2010 and minimum total length was recorded in the month of January 2010 (Table 1 and Fig. 1). The initial and final total weight of *Catla catla* values were recorded as 113.25, 265.72, 443.67, 619.39, 857.77 and 1025.82 gm during the period from January 2010 to June 2010. The maximum total weight (1025.82 gm) was recorded in the month of June 2010 and minimum total weight (113.25 gm) was recorded in the month of January 2010 (Table 1 and Fig. 2). The initial and final total weight of *Labeo rohita* were noted as 106.81, 243.52, 381.82, 526.95, 729.26 and 843.17

gm during the period from January 2010 to June 2010. The maximum total weight (843.17 gm) was recorded in the month of June 2010 and minimum total weight (106.81gm) was recorded in the month of January 2010 (Table 1 and Fig. 2).

DISCUSSION

The length weight relationship is an important tool analysis of fish populations. In the present study the growth performances were recorded in the freshwater carp fishes *Catla catla* and *Labeo rohita*. The length and weight relationship were noted during the period of January 2010 to June 2010 at freshwater fish culture pond. Similar trend was also reported by (Hussain *et al.*, 2011). It applications vary from simple estimates of an individual's weight to indication of fish body condition factor (Javed *et al.*, 1993). The reported maximum length for *Oreochromis mossambicus* species is 30 cm (Eccles, 1992). *O. variabilis* attains the maximum length of 30 cm was recorded at Lake Victoria (Van Oijen, 1995). Length and weight relationship studies are important to analyze growth, age and other components of fish studies. Similar studies have been carried out by Mourad *et al.* (2008). Fish with high value K are heavy, while fish with a low K value are lighter for its length (Shakir *et al.*, 2008). It is universal that growth of fishes or any animal increases with the increase in body length. Thus it can be said that length and growth are inter related, length weight relationship is expressed by the cube formula $W = aL^3$ earlier workers (Rao *et al.*, 2005; Kurup and Samuel, 1992). The length weight relationship presented here may assist fish biologists to derive weight estimates for fishes that are measured but not weighted. This information is obligatory by most of models of stock assessment to estimate fishing mortality, population of cohorts and population of spawning stock as well as this investigation could strongly helpful to the researchers and policy makers for the preparation of very helpful and sustainable management plans of fishery resources of the freshwater systems. Length-weight relationships of five fish species were estimated by (Fafioye and Oluajo, 2005). In the present investigation, comparatively maximum total body length and weight were observed in the fish *Catla catla*. This may be due to the diet which they consume and their ecological conditions.

Conclusion

The present basic information of the length-weight relationship would form a useful tool for further. The comparatively highest values of body weight, total length of fishes *Catla catla* were observed. This finding has a great importance in future research.

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