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LENGTH-WEIGHT RELATIONSHIP AND CONDITION OF INDIGENOUS CATFISH, *RITA RITA* (HAMILTON) FROM CEMENTED PONDS UNIVERSITY OF SINDH, JAMSHORO

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Abstract

Length-weight relationship and relative condition factor (Kn) was measured of indigenous catfish, *Rita rita* (Hamilton) collected from the stock maintained in the cemented cisterns at the University of Sindh, Jamshoro, Sindh, Pakistan. A total of 213 (171 male and 42 female) specimens ranging from 139-417mm in length (TL) and 32.7-779.6 g in weight were used for the analyses during June to November 2008. Length-weight relationship is described by the following equations:

Log W= -3.02 + 3.87 log L (for male)

Log W= -0.92 + 2.34 log L (for female) and

Log W= -2.62 + 3.56 log L (for combined sexes)

The relative condition factor (Kn) values were found to be 0.99, 0.81 and 0.94 for male, female and combined sexes respectively. The length-weight relationship and relative condition factor (Kn) values indicated that the male of *R. rita* was found to be in good condition than that of female from the experimental cemented pond.

Keywords: Catfish, *Rita rita*, Cemented pond, Condition factor, length-weight relationship.

1. Introduction

Rita rita (Hamilton) is fresh water fish and is commonly known as catfish. It is locally called as "Khagga" in Pakistan. This fresh water specie found in streams, rivers, canals and ponds, occurs mainly in shallow waters (Mirza 1982). Young fishes are greenish brown above and silvery brown on back of body. *Rita. rita* is a bottom and column feeder, feeds on aquatic algae and higher plants as well as insects, crustaceans and rotifers. It survives well in all fresh water below an altitude of approximately 549m. It is extremely slimy when captured (Rahman1989). The study of length-weight relationship of any fish species has two purposes: (a) serves as basis for the calculation of unknown weight from known length or vice versa and (b) to determine the coefficient of condition or condition factor (Ali 1999). At present no published information is available on length-weight relationship and condition factor of this commercially important fish from Pakistan. Only Sandhu and Lone (2003) published information on food and feeding habits of *Rita rita*. Few isolated studies like Devi *et al*., (1990) reported age and growth. Devi *et al*., (1992) studied food and feeding habit of *Rita rita* from India. The results of the length-weight study would be useful in future for the artificial propagation and stocking of this species in cemented ponds.

2. Materials and Methods

Fish samples were collected month wise during June to November 2008 from the stock maintained in the cemented ponds of the Department of Fresh Water Biology and Fisheries, University of Sindh, Jamshoro. A total of 213 specimens (171male and 42 female) of *Rita rita*, ranging size from 139-417 mm in total length (TL) and 32.7-779.6g in weight were used for the analyses. Length of fishes was measured on the fish measuring board to the nearest mm and weight up to g by using a portable battery operated balance (Model BX3200H Shimadzu

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corporation, Made in Japan). The sex of measured fish was determined after dissection. The length-weight relationship of fish was calculated from the logarithmic formula:

$W = aL^b$. Where W= weight, L= length and a and b are constant.

This expression can be transformed logarithmically as suggested by LeCren (1951) to log W= loga + b logL.

Relative condition factor (Kn) was calculated separately for male, female and combined sexes of different length groups. It was calculated for each 50 mm length interval. The smoothed mean weight W, for each length group has been computed from the Log modified formula given by LeCren (1951)

$Kn = \hat{W}/W$, where $\hat{W}$= observed weight and W= calculated weight to be computed from length-weight equations.

Table 1. Data of length-weight relationship of indigenous catfish, *Rita rita* (Hamilton) from cemented ponds, University of Sindh, Jamshoro.

Male						Female					Sexes combined				
Length group (mm)	No of Male	Mean Length (mm)	±	Mean Weight (g)	± SD	No of Female	Mean Length (mm)	± SD	Mean Weight (g)	± SD	No of Specimen	Mean Length (mm)	± SD	Mean Weight (g)	± SD
101-150	18	139	0.83	32.7	6.29	Nil	Nil	Nil	Nil	Nil	18	139	0.83	32.70	6.29
151-200	36	180	2.28	78.2	12.66	Nil	Nil	Nil	Nil	Nil	36	180	2.28	78.20	12.66
201-250	65	229	2.07	124.3	5.14	8	.232	2.49	153.7	4.47	73	230		139.0	
251-300	44	264	2.70	252.7	4.93	11	274	1.82	252.2	4.56	55	269	2.70	342.4	4.93
301-350	08	317	0.57	425.9	18.56	16	324	0.88	432.2	17.99	24	320		429.0	
351-400	Nil	Nil	Nil	Nil	Nil	5	371	2.56	668.1	5.0	5	371	2.56	668.1	5.0
401-450	Nil	Nil	Nil	Nil	Nil	2	417	0.14	779.6	42.78	2	417		779.6	
Total	**171**					**42**					**213**				

3. Results

Length-weight relationship

The length-weight equations were computed separately for male, female and combined sexes of *Rita rita* from cemented pond. The samples were divided in to 50 mm length groups (**Table1**). The length-weight relationship equation for male, female and combined sexes were observed as follow.

Log W= -3.02 + 3.87 log L (for male)
Log W= -0.92 + 2.34 log L (for female) and
Log W= -2.62 + 3.56 log L (for combined sexes)

The values of regression co-efficient found to be ideal in case of male and combined sexes (b= 3.87 and 3.56) respectively, while in case of female the regression co-efficient values shows satisfactory growth (b= 2.34). When the empirical values of lengths were plotted against their respective weight on an arithmetic scale, smooth curved were obtained (**Fig.1**) (empirical value). A plot of weight against length on double logarithmic paper however, yielded a straight line (**Fig. 2**) (log value) as expected.

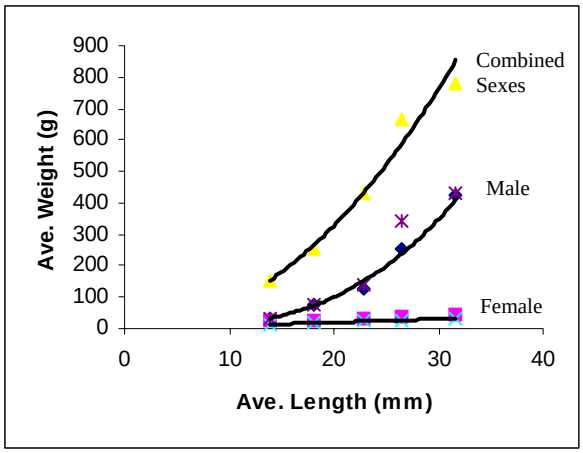

Fig.1. Length-weight relationship of male, female and combined sexes of indigenous catfish, *Rita rita* (Hamilton) from the cemented pond, University of Sindh, Jamshoro, Pakistan. (Empirical values)

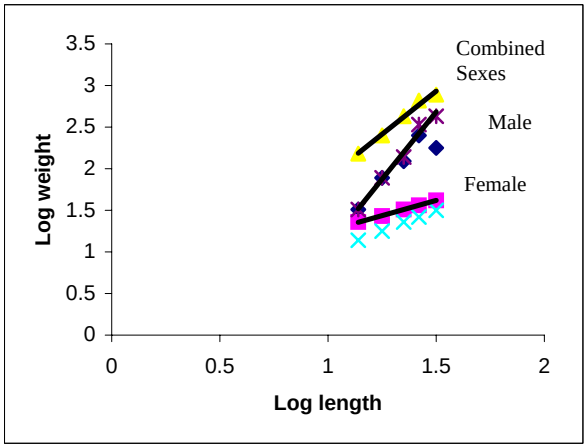

Fig.2. Logarithmic length-weight relationship of male, female and combined sexes of indigenous catfish, *Rita rita* (Hamilton) from the pond cistern, University of Sindh, Jamshoro, Pakistan.

Relative condition factor

The values of relative condition factor (Kn) for all fish samples were determined from the average lengths and weights of 50 mm interval of total length groups (**Table.2**). The (Kn) values ranged from 0.82 to 1.27, 0.8 to 1.18 and 0.78 to 1.22 with mean values of 1.10, 0.98 and 0.90 of male, female and combined sexes respectively. The maximum relative condition factor value was observed in male (1.10). On average, the male were found to be slightly in better condition (mean Kn=1.10) than the female (mean Kn 0.98).

Table 2. Relative condition factor (K_n) values for male, female and combine sexes of *Rita rita* from cemented

Male				Female			Sexes combined		
Length group (mm)	Obsereved weight (g)	Calculated Weight (g)	K_n	Observed Weight (g)	Calculated Weight (g)	K_n	Observed Weight(g)	Calculated Weight (g)	K_n
101-150	32.70	26.91	0.82	Nil	Nil	Nil	32.70	26.91	0.82
151-200	78.20	67.60	0.86	Nil	Nil	Nil	78.20	67.60	0.86
201-250	124.3	158.48	1.27	153.7	181.97	1.18	139.0	169.82	0.92
251-300	252.7	295.12	1.16	252.2	263.02	1.04	342.4	269.15	0.78
301-350	425.9	602.55	1.41	432.2	407.38	0.94	429.0	524.80	1.22
351-400	Nil	Nil	Nil	668.1	537.03	0.80	668.1	537.03	0.80
401-450	Nil	Nil	Nil	779.6	741.31	0.95	779.6	741.31	0.95
Total			1.10			0.98			0.90

5. Discussions

Length has an important function for the weight of fish (Weatherley and Gill, 1987). The specific gravity of fish flesh is known to undergo changes, while LeCren (1951) stated that the density of fish might be maintained in the surrounding water by means of swim bladder. Hence change in weight is due to changes in form but not in specific gravity. Cube law is not confirmed for all fishes because growth causes for the change of their shape (Ali 1999). Wootton (1990) also described that a value less then 3.0 indicated that fish becomes lighter (negative allometric) and greater then 3.0 as heavier (positive allometric) for a particular length as it increase in size. In the present study it was observed that the length and weight of *Rita rita* increases at the rate of cube. The values of b=3.87 and 3.56 in case of male and combined sexes respectively; the values of b showed positive allometry in the fish (*Rita rita*) in relation to length and weight. In case of female the value was observed b=2.34 in the present study. These values are in accordance with the findings of Mia (1984) reported regression coefficient of catfish *Heteropneustes fossilis* 2.61 for male, 2.80 and female from Bangladesh. Narejo *et al*., (2002) reported b= 3.13, 3.30 and 3.13 from male, female and combined sexes respectively in fresh water air-breathing mud eel, *Monopterus cuchia*. The value of "b" may be different due to feeding, sex and maturity state. If the fish retains same shape and specific gravity remains unchanged during lifetime, it indicated positive allometry and value of exponent "b" would be 3.0 and values significantly larger or small then 3.0 is allometric (Wootton, 1990) that supports the findings of the present study.

The (Kn) values of *Rita rita* in the study was ranged from 1.10, 0.98 and 0.90 of male, female and combined sexes respectively. The values of Kn showed variation in all length groups in males and females. These values were lower in small fishes in case of males, while in females higher values of (Kn) found in small fishes. Similar observation reported by number of authors in different fish species: Shafi and Quddus (1974a) in *Cirrhinus mrigala*, Shafi and Quddus (1974b) in *Hilsa ilisha*, Mia (1984) in *Heteropneustes fossilis*, Narejo *at el*., (2001) in snake eel *Pisodonophis boro* and Narejo *at el*., (2002) in mud eel, *Monopterus cuchia*. The length-weight relationship and relative condition factor in the present study showed that the growth of experimental fish *Rita rita* from the cemented pond found to be quite satisfactory.

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