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Length-weight Relationship and Condition Factor of Five Carp Species from Keenjhar Lake, District Thatta, Sindh, Pakistan

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Abstract: In current investigations on the relationship of length and weight of 5 carps were presented, total 256 fish were caught between September 2016 and August 2017 from Keenjhar Lake District Thatta, Sindh. *Cyprinus carpio* were 77 out of which 50 males and 27 females, with total length ranging from 34.3 to 36.6 cm 33.7 to 37.4 cm respectively, *Labeo rohita* were 75, 45 males and 30 females with total length ranging from 32.0 to 39.0 cm, and 40.9 to 45.7cm respectively.*Cirrhinus mrigala* was 45 out of which 20 males and 25 females, with a total length ranging from 41.3to 43.2 cm, and 43.4 to 46.6 cm respectively. In case of *Hypophthalmichthys molitrix* the total number was 33 which of 15 males and 18 females with the total length ranging from 39.3 to 41.9 cm and 42.3 to 44.2 cm respectively and 26 were *Catla catla* 14 males and 12 females with total length ranging from 33.7 to 36.2 cm from 42.5 to 44.9 cm respectively.The length weight relationships andcorrelation of co efficient was analyzed for either sex separately. In the present studies values of b varied from 3.11 and 2.81 male and female of *Cyprinus carpio*, for*Labeo rohita* 2.79 and 2.65 respectively,3.94 and 2.87 male and female of *Cirrhinus mrigala*of the b value of *Hypophthalmichthys molitrix* in male 2.85 and 2.65 in female for *Catla catla* in male and female 2.70 and 2.77.Calculated coefficient of condition in *Cyprinus carpio* found to be 1.04, 0.94 in male and female respectively, *Labeo rohita* 0.97, 1.17 for male and female respectively, in *Cirrhinus mrigala* found to be 1.07, 0.98 in male and female respectively, for *Hypophthalmichthys molitrix*and *Catla catla* 0.89, 0.91, 0.93, and 0.97male and female respectively. The studies reveled that *Cirrhinus mrigala* showed better growth and pursued cube law (b=3.94) followed by *Cyprinus carpio* (b=3.11) while *Labeo rohita* (b=2.79) and *Catla catla* (b=2.70) exhibited closed to ideal and *Hypophthalmichthys molitrix* showed poor b values (b=1.85). L/W values and coefficient of condition showed ideal growth of five carp species from Keenjhar Lake, District Thatta, Sindh, Pakistan.

Keywords: Length- weight, Condition factor. Carp species, Keenjhar Lake.

1. INTRODUCTION

Fish considered as marvelous diet due to considerable protein contents rich in vitamins and moderately in rich with mineral and fats (Narejo *et al.*, 2016). It is highly recommended for the patients of coronary diseases due its low fat made up of Omega-3. It also contains vitamins A and D that is good for new born (Fasakin, 2006). The study of length and weight is termed asand attempt usually applied in the management of fisheries (Bagenal and Tesch, 1978). It is used to calculate length from the weight also useful for the estimation of coefficient of condition. In fish the co efficient of condition commonly used to estimate of biological state in relation to ecology (Le Cren, 1951). It also helps to compare populations their feeding intensity, behavior, density, and certain environment conditions (Naeem *et al.*, 2015). Therefore, the estimation of condition factor is considered as important to resolve conservation and strategic management policy of Keenjhar Lake for the conservation of sustainable fishery resources of lake (Narejo *et al.*, 2006). The purpose of initiating the present investigations is to assess the growth pattern and stock of Keenjhar Lake.

2. MATERIALS AND METHODS

This study was conducted for 12 months from September, 2016 and August, 2017 from Keenjhar Lake. The experimental fish were obtained from the catch of local fishermen then transported to Fresh water Biology and Fisheries University of Sindh for further analysis and measurement. Sampled fish were measured in terms of size and weight gram and cm. L/W was calculated by method $W=aL^b$ (Ricker 1973). Where W weight and L length, coefficient of condition was assessed from the relationship $K=100W/L3$ to calculate condition

3. RESULT

Total 256 fish of five different carp species were taken in to account for the present study among them *Cyprinus carpio* were 77 out of which 50 males and 27 females, with total length ranging from 34.34 to 36.66 cm 33.77 to 37.45cm respectively,*Labeo rohita* were 75 45 males and 30 females with total length ranging from 32 to39 cm, and 40.95 to 45.72cm respectively, 45 were *Cirrhinus mrigala* 20 males and 25 females, with a total length ranging from41.35 to 43.26 cm, and 43.46 to 46.66 cm respectively, In case of

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Hypophthalmichthys molitrix the total number was 33 which of 15 males and 18 females with the total length ranging from 39.36 to 41.92cm and 42.32 to 44.28 cm respectively and 26 were *Catla catla* 14 males and 12 females with total length ranging from 33.77 to 36.22cm from 42.52 to 44.92 cm respectively **(Table 1 and Table 2).**

In the present studies values of b varied from 3.11and 1.81 male and female of *Cyprinus carpio* for *Labeo rohita* 2.79 and 2.65 respectively, in of the b value of 3.94 and 1.87 male and female of *Cirrhinus mrigala* for *Labeo rohita* 2.79 and 2.65 respectively, in of the b value of *Hypophthalmichthys molitrix* in male 2.65 and 2.65 in female for *Catla catla* in male and female 2.70 and 1.77 respectively. The calculated condition factor (K) of *Cyprinus carpio* was 1.04, 0.94 in male and female respectively,*Labeo rohita* 0.97, 1.17for male and female respectively, for*Cirrhinus mrigala* was 1.07, 0.98in male and female respectively, *Hypophthalmichthys molitrix*and *Catla catla*0.89,0.91, 0.93, and 0.97male and female respectively **(Table 3).**

Table1. Length-weight relationship parameters offive different carp male species from Keenjhar Lake district Thatta Sindh Pakistan

Fish species	N	Lenght characteristics range (cm)				Weight characteristics range (g)				**a**	**B**	**r^2**
		Max	Min	Mean	SD	Max	Min	Mean	SD			
Cyprinus carpio	50	36.66	34.34	35.5	2.96	591.79	514.25	556.62	28.54	-2.1	3.11	0.95
Labeo rohita	45	39	32	35.5	2.62	441.66	353.33	395.66	31.91	-1.77	2.79	0.99
Cirrhinus mrigala	20	43.26	41.35	44.61	2.25	960	746.6	871.93	75.9	-3.6	3.94	0.94
Hypophthalmichthys molitrix	15	41.92	39.36	40.68	0.90	730	563.9	644.12	58.84	-0.21	2.85	0.98
Catla catla	14	36.22	33.77	35.16	0.92	815	657.5	740	58.47	-1.33	2.70	0.94

Table2. Length-weight relationship parameters of five different female carp species from Keenjhar Lake district Thatta Sindh Pakistan.

Fish species	N	Lenght characteristics range (cm)				Weight characteristics range (g)				**a**	**B**	**r^2**
		Max	Min	Mean	SD	Max	Min	Mean	SD			
Cyprinus carpio	23	37.45	33.77	35.85	1.33	665	571.25	617.5	32.44	-0.02	2.81	0.97
Labeo rohita	30	45.72	40.95	43.39	1.72	606.25	517.5	549.85	33.15	-1.59	2.65	0.91
Cirrhinus mrigala	25	46.66	43.46	45.02	1.18	508.33	430	468.33	28.67	-0.36	2.96	0.96
Hypophthalmichthys molitrix	18	44.28	42.32	43.32	0.70	898	732	812	61.04	-0.16	2.83	0.96
Catla catla	12	44.92	42.52	43.93	0.87	840.71	645.71	744.28	71.00	-0.06	2.77	0.99

Table 3.Condition factor of five different carp species according to sexes from Keenjhar Lake

Fish species	**Male**			**Female**		
	Mean observed weight (g)	Mean calculated Weight (g)	Kn	Mean observed weight (g)	Mean calculated Weight (g)	Kn
Cyprinus carpio	552.25	576.79	1.04	1139	1074.84	0.94
Labeo rohita	395.86	385.59	0.97	550.3	648.47	1.17
Cirrhinus mrigala	872.03	937.46	1.07	968.33	919.66	0.98
Hypophthalmichthys molitrix	644.2	574	0.89	839	771.47	0.91
Catla catla	735	687.72	0.93	744.28	726.44	0.97

4. DISCUSSION

Length-weight relationship

In the present studies values of b varied from 3.11and 1.81 male and female of *Cyprinus carpio*for *Labeo rohita* 2.79 and 2.65 respectively, 3.94 and 2.87 male and female of *Cirrhinus mrigala*respectively of the b value of *Hypophthalmichthys molitrix* in male 2.85 and 2.65 in female for *Catla catla* in male and female 2.70 and 2.77 respectively. Similar observation was noticed by Hamid *et al.*, (2015). Lot of researchers have estimated correlation in various fish and found less than ideal 3 like Narejo *et al*., (1999) in *Tenualosa ilisha*. Narejo *et al.*, (2000) in *Gudusia chapra.* Narejo *et al.*, (2001) in *Pisodonophis boro.* Gaygusuz *et al*., (2013), Ayyildiz *et al*., (2014) and Evran *et al.*, (2015) in *C. erhani.* The results of the mention workers accord with the current observation. Khan *et al* (1991) stated that the exponent values can be contrary with the environment. While Salam and Mahmood (1993) commented that the exponent values greater than 3.0 indicate that the fish becomes heavier for its length as it increases in size. Moreover, Narejo *et al.*, (2003)

suggested that the value of the exponent (b) is 3 when fish grows isometrically and values different than 3 indicated allometric type of growth. Joadder, (2009) observed that the values of exponent lie between 2 to 4 any deviation resulted as poor environmental condition species and sex variation.

Condition factor

The condition factors (K) of the five carp species in the present study were calculated condition factor (K) of *Cyprinus carpio*was 1.04, 0.94in male and female respectively, *Labeo rohita*0. 97, 1.17 for male and female respectively, *Cirrhinus mrigala*1.07, 0.98in male and female respectively, for *Hypophthalmichthys molitrix*and *Catla catla*0.89,0.91, 0.93, and 0.97male and female respectively. Also Johnson and Ndimele (2011); Ahmed *et al.,* (2011); Ibrahim *et al.,*(2012) calculated coefficient values less than 1 in different fish species. The mean K-values of species sampled had value greater than 1 which was an indication that the fish species were doing well in the Keenjhar Lake which is in accordance with Narejo *et al* (2006).

5. CONCLUSION

It is concluded that *Cirrhinus mrigala* showed better growth and pursued cube law (b=3.94) followed by *Cyprinus carpio* while *Labeo rohita* and *Catla catla* exhibited closed to ideal and *Hypophthalmichthys molitrix* showed poor b values.

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