SindhUniv. Res. Jour. (Sci. Ser.) Vol. 51 (04) 741-744 (2019)
http://doi.org/10.26692/sujo/2019.12.117
SINDH UNIVERSITY RESEARCH JOURNAL (SCIENCE SERIES)

Studies on Length-Weight Relationship and Condition of Fish from Sonmiani Balochistan, Pakistan

N. BALOCH, N.T. NAREJO*, HAMEEDA. KALHORO, P. K. LASHARI, HALEEMA KALHORO** F. HASHIM***

Government College of Balochistan, Pakistan

Received 11th November 2018 and Revised 10th July 2019

Abstract: An investigation was designed to elucidate the relationship between length versus weight and condition of fish from Sonmiani Balochistan, Pakistan during January to May 2016. In total 884 fish samples were analyzed from the catch of local fisher folk. The relationship of four common fish species were calculated as below.

Acanthopagrus berda: Log a -2.89+3.90
Sillago sihama: Log a -1.07 +2.21
Liza subviridis: Log a -0.89 + 2.15
Sardinella longicep: Log a -1879+2.95

It has been noted from the above regression equations that the three experimental fish exhibited b= value less than < 3except *Acanthopagrus berda* showed value above ideal >3. The condition factor was calculating for each species separately and ranged within 1.0 – 1.18, while *Sardinella longicep* was found slightly in better condition (Kn=1.18) in relation to other three species.

Finally, it was concluded that the environmental conditions of Sonmiani lagoon supports the fish potential positively as indicated both the values of relationship between length versus weight and coefficient of condition values of experimental fish termed as satisfactory or positive allometric type of growth. In case of *Acanthopagrus berda* was found in ideal condition in comparison of other species.

Keywords: Length-weight, condition factor, Sonmiani lagoon, Balochistan

1. INTRODUCTION

Area- wise the Balochistan Province is termed as largestin Pakistan with 347,190 km^2 of area, it is exceptional due to geo-political worth consists of 44 percent of Pakistan`s land mass and has 770 km long coast line (Baig and Iftikhar, 2010). The coast of Sonmiani is located at the north-most point of the Arabian Sea. The beach is one of the most popular spot for tourist and noted for its space research and development. The Sonmiani bay is playing important role in the area as main center for fishing activities around the coast line of Makran (Baig and Iftikhar, 2010).Up till now no data were available on any aspect of the biology of common fish available in Sonmiani lagoon. Hence the present study has been initiated to furnish the biological information about the relationship between length versus weight and condition of common fishes available at Sonmiani.

2. MATERIALS AND METHODS

The experimental fish was collected during April to September 2016 from the catch of local fisher folk of the area of four sampling sites of Sonmiani.

Sampling sites/stations were
Safe dora (St.1)
Marolidora (St.2)
Bad kashi (St.3)
Bhera (St.4).

The distance between jetty and St.1 is about 7km, Jetty and St.2 is about 9km ,Jetty and St.3 is about 30 km, Jetty and St.4 is about 8 km. Samples of fish were collected during 9.00 AM and 6.00 PM by use of commercial net and with a boat towing a plankton net. After collection fish samples were preserved in ice and brought to the laboratory department of Freshwater Biology and Fisheries, University of Sindh, Jamshoro. The sampled fish were identified up to specie level by using different keys and by the use of website. www.fishbase.org/. After identification samples were preserved in 10% formalin for long term preservation.

3. LENGTH AND WEIGHT STUDIES

Sampled fish were examined in terms of size and weight, after that the sampled fish were preserved in formalin solution with an individual sample tag. 91 species were procured and analyzed at size groups 5.0 cm each ranged from 2.3 - 40.0 cm. The regression coefficient n (slope of regression line of weight to length) was calculated using (Le Cren, 1951) equation, $W= {}^aL^n$.

4. RESULTS

Present research was taken into account to investigate the relationship between length versus weight and condition of four dominant fish namely *Liza subviridis*, *Sardinella longiceps*, *Sillago sihama* and *Acanthopagrus berda*. The data on length and weight

Email: naeem.tariq@usindh.edu.pk, lashari.punhal@usindh.edu.pk, hameeda.kalhoro@usindh.edu.pk
*Department of Freshwater Biology and Fisheries, University of Sindh, Jamshoro
**Department of Anatomy and Histology, Sindh Agriculture University, Tando Jam
***Government Girls College, Panjgoor, Balochistan

and condition factor was recorded and presented in **(Table 1 and 2).** The regression co efficient was computed for each species separately and the equations are given below:

Acanthopagrus berda: Log a -2.89+3.90
Sillago sihama: Log a -1.07 +2.21
Liza subviridis: Log a -0.89 + 2.15
Sardinella longicep: Log a -1879+2.95

It has been noted from the above regression equations that the three experimental fish exhibited b= value less than < 3 except *Acanthopagrus berda* showed value above ideal >3. The condition factor was calculating for each species separately and ranged within 1.0–1.18, while *Sardinella longiceps* was found slightly in better condition (Kn = 1.18) in relation to other three species.

Table 1. Data on length weight relationship of four dominant fish species from Sonmiani Lagoon, Balochistan

Length group	*Acanthopagrus berda*		*Sillago sihama*		*Liza subviridis*		*Sardinella longiceps*	
(cm)	Mean length (cm)	Mean weight (g)	Mean length (cm)	Mean weight (g)	Mean length (cm)	Mean weight (g)	Mean length (cm)	Mean weight (g)
0.1-5.0	4.4 ± 0.6	2.6 ± 1.4	4.8 ± 0.2	3.1 ± 1.9	4.1 ± 0.9	2.9 ± 0.5	4.4 ± 0.6	2.3 ± 0.7
5.1-10.0	8.3 ± 0.7	9.7 ± 1.3	8 ± 0.5	9.1 ± 0.9	8.8 ± 0.2	8.9 ± 1.0	8.9 ± 0.1	9.1 ± 1.9
10.1-15.0	12.5 ± 1.5	46.2 ± 2.8	14.7 ± 0.3	23.9 ± 1.1	11.1 ± 1.9	41.4 ± 2.6	12.5 ± 0.5	30.9 ± 2.9
15.1-20.0	18.3 ± 1.7	77.9 ± 3.1	16.9 ± 1.1	50.9 ± 2.1	17.1 ± 1.9	59.9 ± 2.1	18.7 ± 1.3	69.5 ± 2.5
20.1-25.0	22.8 ± 2.2	130.8 ± 2.2	21.7 ± 1.3	79.5 ± 2.5	23.1 ± 1.9	98.4 ± 2.6	23.7 ± 1.3	90.6 ± 2.4
25.1-30.0	27.10 ± 2.0	190.50 ± 2.5	-	-	29.50 ± 0.5	190.00 ± 1.0	26.00 ± 0.6	119.50 ± 0.6
30.1-35.0	31.5 ± 2.5	280 ±2.0	-	-	34.1 ± 0.9	210 ± 1.0	-	-
35.1-40.0	-	-	-	-	35.9 ± 1.1	310 ± 2.0	-	-

Table 2. Condition factor (Kn) of four dominant fish species from Sonmiani Lagoon, Balochistan.

Length group	***Acanthopagrus berda***			***Sillago sihama***			***Liza subviridis***			***Sardinella longiceps***		
(cm)	Observed weight (g)	Calculated Weight	Kn	Mean weight (g)	Calculated Weight	Kn	Mean weight (g)	Calculated Weight	Kn	Mean weight (g)	Calculated Weight	Kn
1.0 - 5.0	2.6	2.9	0.89	3.1	1.5	2.06	2.9	2.21	1.31	2.3	1.2	1.91
5.1-10.0	9.7	9.33	1	9.1	11.2	0.81	8.9	10.8	0.8	9.1	9.12	0.99
10.1-15.0	46.2	39.8	1.16	23.9	23.5	1	41.4	41.1	1	30.9	33.1	0.93
15.1-20.0	77.9	80.1	0.97	50.9	50.1	1	59.9	69.1	1.15	69.5	58.4	1.19
20.1-25.0	130.8	134.4	0.97	79.5	80.2	0.99	98.4	109	1.1	90.6	81.2	1.11
25.1-30.0	190.50	200	0.95	-	-	-	190.00	200.00	1.05	119.50	118.9	1
30.1-35.0	280	267.5	1.04	-	-	-	210	202	0.96	-	-	-
35.1-40.0	-	-	-	-	-	-	310	288	1.07	-	-	-
Mean			**1.00**			**1.17**			**1.06**			**1.19**

5. DISCUSSION

Present research was taken into account to investigate the length weight relationship and condition factor of four dominant fish species namely *Liza subviridis*, *Sardinella longiceps*, *Sillago sihama* and *Acanthopagrus berda*. During the present investigations the b (regression coefficient) varied from 2.15 to 3.90, highest was observed in *Acanthopagrus berda* (b= 3.90) while lowest (b=2.15) was recorded in *Liza subviridis.* Similar observation was noticed by Jamali *et al.* (2018) and Hamid *et al.*, (2015). Lot of researchers have estimated correlation in various fish and found less than ideal 3 like Narejo and Jafri (2000) in *Gudusia chapra*. Narejo *et al*., (2001) in *Pisodonophis boro,* Gaygusuz *et al*., (2013) and Ayyildiz, *et al* (2014) 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* 2006, Narejo *et al.*,2002) suggested that the value of the exponent (b) is 3 when fish grows isometric ally 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. Values of condition analysis of the four fish during the course of investigations were calculated, values for *Liza subviridis* (Kn=1.06), *Sardinella longiceps* (Kn=1.19), *Sillago sihama* (Kn=1.17) and *Acanthopagrus berda* (Kn=1.00). The highest values of Kn were noticed from *Sardinella longiceps* (Kn=1.19) followed by *Sillago sihama* (Kn=1.17) and lowest was recorded was *Acanthopagrus berda* (Kn=1.00). (Jamali *et al.* 2018), (Ahmed, and Aziz 2011 and Ibrahim *et al.*, (2012) calculated the coefficient values less than 1 in different fish species. Condition values obtained during the course of present investigations found to be higher that resulted that the experimental fish is in good condition in the Sonmiani Lagoon, Balochistan which is in accordance with (Narejo *et al* 2006 and Jamali *et al.*, 2018).

6. CONCLUSIONS

It is concluded that the better growth was observed in *Acanthopagrus berda* (b=3.90) followed by *Sardinella longicep* (b=2.95) while lowest (b=2.15) was recorded in *Liza subviridis.* In case of condition factor (Kn) *Sardinella longicep* (Kn=1.19) exhibits better condition than that of other experimental fish species.

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