ORIGINAL RESEARCH PAPER

Zoology

Volume - 7 | Issue - 3 | March - 2017 | ISSN - 2249-555X | IF : 4.894 | IC Value : 79.96

STUDY OF LWR OF FISHES AT BANSAGAR DAM (M.P.)

KEYWORDS

LWR, Fishes and Bansagar dam.

Dr. S.N. Shukla

Prof. and HOD, Deptt. of Zoology, Govt.Model Science College, Rewa (M.P.)

ABSTRACT The study of growth index in fishes is of considerable importance in the fishery work. It has two objectives (i) to determine the type of mathematical relationship between the two variables. So that if one variable is known the other could be computed and (ii) to known the well-being of fish and also type of growth i.e. whether isometric or allometric.

INTRODUCTION:

The relationship has been referring by Haimovici and Velasco (2000) and Costa and Araajo (2003) as a very important key which has widely used in the fish biology with several purposes. This useful tool provides important information concerning with the structure and function of fish populations (Anderson and Neumann, 1996).

The LWR of fish was usually estimated by using the equation W =aLb, where 'a' is the intercept and 'b' is the allometry growth coefficient. After logarithmic transformation, Parameters 'a' and 'b' were determined via least –squares linear regression (Zar, 1999). The value of 'b' gives information of the kind of growth of fish. The growth is isometric if b = 3 and the growth is positive allometric if b > 3 and negative allometric if b<3. The general expectation is that the weight increases as cube of length. Pathak (1975), Al-Nasiri and Mukhtar (1988); Azadi and Naser (1996) studied the LWR of fishes in different water bodies.

DESCRIPTION OF STUDY AREA

The Bansagar project envisages constructed on a dam across the Son river. The dam site is situated near Deolond bridge on Rewa-Shahdol road, at a distance of 50.7 km from Rewa.

Bansagar dam is a multipurpose project which construction was began in 14 May 1978 and started in 25 Sept. 2006. Its salient features are as follows-

Salient Features:

1. Location	:	Madhya Pradesh, District – Satna & Shahdol
2.Latitude	:	24°11'30" Toposheet 63-H/8
3. Longitude	:	81°17'15"
4. River	:	Son
5. Catchments area upto dam site	:	18648 sq. km.
6. Maximum water level	:	342.97 m.
7. Full reservoir level	:	341.40 m.
8. Dead storage level	:	323.10 m.
9. Water spread at FRL	:	51684.00 ha
10. Gross storage at FRL	:	0.637 mham
11. Dead storage	:	0.096 mham
12. Live storage	:	0.541 mham
13. Top of dam	:	345.95 m
14. Crest level	:	326.14 m
15. Number of crest gates	:	14
16. Length of left bank	:	5182 m
17. Length of right bank	:	1768 m
18. Height	:	67 m
19. Length	:	1020 m
20. Spillway capacity	:	47742 m^3/s
21. Sub mergence area	:	587.54 km^2
21. Sub mergence area	:	587.54 km^2
22. Population affected	:	250000 persons (54686 families)
23.Village sub merged	:	336

MATERIAL AND METHODS

The LWR of fish was usually estimated by standard methods used in fishery science. Huxlley (1924) first proposed the allometric growth formula to describe the relationship between length and weight in the form of

$$W = {}_aL^b$$

where W stands for weight, L for length, 'a' is constant and 'b' is the exponent.

This equation can be expressed logarithmically as suggested by Le Cren (1951).

$$\log W = \log a + b \log L$$

where 'a' is constant being initial growth and 'b' is the growth coefficient. The values of 'a' and 'b' are to be determined by the formula:

$$a = \bar{y} - b\bar{x} \text{ and}$$

$$b = \frac{\sum xy - n\bar{x}\bar{y}}{\sum x^2 - n(\bar{x})^2}$$

where n = total number of lengths groups

$\bar{x}$ = mean of x (length)

$\bar{y}$ = mean of y (weight)

The regression of log weight on log length has been calculated by the method of least squares by grouping the sample data into several short length groups and fitting the regression of logarthmic value of the average weight of fishes belonging to each size group.

Test length-weight regressions for determining the degree of adherence to the theoretical cube in response to growth in weight to growth in length. The coefficient of correlation 'r' can be calculated using the following formula:

$$r = \frac{\sum xy - n\bar{x}\bar{y}}{\sqrt{[(\sum x^2 - n\bar{x}^2)(\sum y^2 - n\bar{y}^2)]}} r$$

RESULTS AND DISCUSSION:

During the study period 54 species were identified which belong to 14 different families and 6 orders, following commercially important

Volume - 7 | Issue - 3 | March - 2017 | ISSN - 2249-555X | IF : 4.894 | IC Value : 79.96

fishes contribute a major part of fish production in Bansagar dam.

1. *Notopterus notopterus*
2. *N. chitala*
3. *Catla catla*
4. *Cirrhinus mrigala*
5. *Labeo rohita*
6. *C. pongusia*
7. *L. Bata* (iFkjpVh] ckVk½
8. *Mystus bleekeri* (Vsxjk½
9. *Channa gachua* (lkSj½
10. *Silonia silondia* (flyan½

Inspite of above fishes, Bigger head, *Ompok pawada*, *L.calbasu, Wallago attu, Mystus* species were also recorded in good quantity during investigation. The length-weight relationship were calculated using the method given by Le Crene (1951) and depicted in table 1.

In Bansagar dam 1015 specimens of *Catla catla* were examined. The average length and weight of examined fishes were 64.00 and 6.32 kg.

When the mean values of length and weight were put into logarithmic transformed formula, the calculation of length-weight relationship for *Catla catla* was 'a' = -2.153, b=3.025 and r = 0.999. During the investigation period four species of *Labeo rohita* contribute a major part of fish production. It was observed that the 'b' for all the species of Labeo were near to 3 and r values were significance (Table 1).

During the study period 755 specimens of *Cirrhinus mrigala* were studied, which average length was 58.75 and 2.678 kg average weight were calculated. The calculated relationship between length and weight showed a = -2.153, b = 2.908 and r = 0.999 which is depicted in table 1.

Notopterus production in Bansagar dam is a remarkable characteristics. *Notopterus notopterus* and *N. chitala* showed isometric growth in Bansagar dam. Though Notopterus species considered as minor carp but their market value specially in West Bengal is high. In Bansagar dam 835 specimens of *N.notopterus* and 930 specimens of *C. chitala* were examined for length and weight relationship. The values of a = -2.013, b = 2.71, r = 0.972 for *N. notopterus* and a = -1.979, b = 2.90 and r = 0.999 were calculated for *N. chitala*.

It has been found that the 'b' value for *Mystus bleekari, Ompok pawada, Wallago attu, Channa gachua* and *Silonia silondia* were 2.762, 2.531, 3.478, 2.901 and 3.054 respectively.

Keen observation of growth pattern of commercial fishes in Bansagar dam showed significant positive correlation between length and weight. It was also noted that when the examined data were put into logarithmic transformed formula, the calculated 'b' value were more than 2.50, which was indication of good growth in the dam.

Table 1 Descriptive statistics estimated parameter of Length-weight relationship at Bansagar dam.

S.No.	Name of species	No. of specimens examined	Avg. total length (cm.)	Avg. Weight (kg.)	Parameters of length-weight relationship		
					'a' value	'b' values	'r' values
1.	*Notopterus notopterus*	835	30.350	210.72	-2.013	2.710	0.972
2.	*N. chitala*	930	76.40	2800.508	-1.979	2.902	0.999
3.	*Catla catla*	1015	64.00	6.32	-2.153	3.0205	0.999
4.	*Cirrhinus mrigala*	755	58.75	2.678	-2.738	2.9085	0.999
5.	*Labeo rohita*	690	68.20	4.778	-1.786	2.970	0.736
6.	*L. pungusia*	925	36.27	0.750	-1.979	3.018	0.910
7.	*L. bata*	875	24.00	0.120	-1.537	2.852	0.873
8.	*L. calabasu*	630	36.00	0.653	-1.754	2.927	0.996
9.	*Mystus bleekari*	725	51.00	0.560	-2.325	2.762	0.827
10.	*Ompok pawaa*	400	30.50	0.125	-1.647	2.531	0.725
11	*Wallago attu*	530	70.00	2.020	-3.253	3.478	0.999
12.	*Channa gachua*	1120	67.25	2.182	-1.972	2.901	0.999
13.	*Silonia silondia*	730	67.04	2.818	-2.308	3.054	0.998

CONCLUSION:

The Length Weight Relationship (LWR) as estimated by using the equation W = aLb, where b is the allometry growth coefficient. General expectation is the weight increases as cube of length. During the study period 54 species belonging to 14 families and 6 orders were identified. Out of them Notopterus notopterus, N.chitala, Catla catla, Cirrhinus mrigala, Labeo rohita, L. pongusia, L.bata, Mystus bleekeri, Channa gachua and Silonia silondia contributes the major parts of fish production.

ACKNOWLEDGEMENT:

I would like to thanks University Grants Commission – Central Regional Office Bhopal for providing the financials assistance of Minor Research Project entitled "Ecological study and growth index of commercial fishes with special reference to Bansagar dam" I also thanks to Shri Dileep Singh Project Manager, Bansagar and Shri Sidhamuni Gupta for cooperation and providing the relevant informations to complete the project. Last but not least I would like to thanks Principal Govt Model Science College Rewa and my staff members for support.

REFERENCES:

1. Al-Nasiri, S.K. and M.A. Mukhtar 1988. On the biology of sbour Hilsa ilisha (Pisces, Clupeidae) from Ashar canal, Basrah. Pakistan. J. Zool., 20: 97-103.
2. Anderson, O.R. and R.M. Neumann 1996. Length, weight and associated structural indices. In Nielsen, L.A. Johnson, D.L. (Eds.) Fisheries techniques. Bethesda, Amer. Fish. Soc., 447-482.
3. Azadi, M.A. and A. Naser 1996. Length-weight relationship and relative condition factor of a carp, Labeo bata (Ham.) from Kaptai reservoir, Bangladesh. Chittagong Univ. Stud., Part II: Sci., Vol. 20(2): 19-25.
4. Costa, da, Araajo, F.G. 2003. Length-weight relationship and condition factor of Micropogonias furnieri (Desmarest) (Perciformes, Sciaenidae) in the Sepetiba Bay, Rio de Janeiro State, Brazil. Revista Brasileira de Zoologia, 20(4): 685-690.
5. Haimovici, M. and G. Velasco 2000. Length-weight relationship of marine fishes from southern Brazil. The ICLARM Quarterly 23(1): 14-16.
6. Huxlley, L.S. 1924. Constant differential growth-ratios and their significance. Nature 114: 895-896.
7. Le Cren, E.D. 1951. The length-weight relationship and seasonal cycle in gonad-weight and condition in the pearch (Perca fluviatilis). J. Anim. Ecol. 20 : 201-219.
8. Pathak, S.C. 1975. Length-weight relationship, condition factor and food study of Labeo calbasu (Hamilton) from Loni reservoir (M.P.). J. Inland Fish. Soc. India, vii. 58-64.
9. Zar, J.H. 1999. Biostatistical Analysis. 4th edition: Prentice-Hall, Englewood Cliffs, New Jersey, 662p.