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Morphometric Characters Of Freshwater Fish Cyprinus Sp Collected From River Jhelum, Kashmir

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Abstract: ***Morphometric characters of fresh water fish, Cyprinus sp have been studied from Kashmir valley. The study of morphometric characters was conducted on 25 samples of Cyprinus sp. Eighteen characters have been studied in percentage of total fish length from which three characters were genetically controlled, thirteen characters were intermediate and two characters were environmentally controlled. Out of eighteen characters, ten characters show high values of correlation coefficient indicating that these characters are directly proportional to each other and eight characters show moderate correlation coefficient. In percentage of head length five were genetically controlled and two are intermediate. Three characters show least correlation coefficient and four shows moderate correlation. The morphometric characters were classified into genetically (Narrow range), intermediate (Moderate range) and environmentally (Vast range) controlled characters. Characters belonging to the genetically controlled show minimum range of variation, characters belonging to intermediate show moderate range and the characters belonging to environmentally controlled shows maximum range of variation.***

Keywords: ***Cyprinus, morphometric, range, variation, Kashmir.***

I. INTRODUCTION

The morphometric analysis of fish is an important key in the study of biology of fish. In many fish, changes in the relative growth of the various body parts are known to occur at different stages of development and particularly at sexual maturity (Bhuiyan and Islam 1990). Growth of the body parts is proportional to the growth of the total length. So, morphometric measurement of fishes and the study of statistical relationship among them are essential for taxonomic study of a species (Tandon *et al.*1993).

Length measurements can be obtained quicker and under a large range of circumstances than weight measurements, therefore a limited number of weight observations are often used to construct a length-weight relationship (Gerritsen and MacGrath 2007). This relationship can be used to convert length distribution into weights for biomass estimates. Further, length-weight relationships of fish are often used to estimate the biomass of length distribution or to obtain indices of condition (Gerritsen and MacGrath 2007). Length-weight relationships are needed to estimate weight from length because direct weight measurements can be time consuming in the field (Martin-Smith 1996, Koutrakis and Tsikliras 2003, Sinoveic *et al.* 2004). These parameters are important in fish biology and can give information on stock condition (Bagenal and Tesch 1978, Gonzalez *et al.* 2004). Knowledge of the length-weight relationship of a fish is essential for stock assessment modeling and when evaluating the relative condition of fish among populations (Lai and Helser 2004). Further length-weight relationships are useful in fishery management for both applied and basic use (Pitcher and Hart 1982, Moutopoulos and Stergiou 2002).

Condition factor is a quantitative parameter of the state of well being of the fish that will determine present and future population success by its influence on growth, reproduction and survival. The condition of a fish reflects recent physical and biological circumstances and fluctuates by interaction among feeding conditions, parasitic infection and physiological factors (Le-Cren 1951). It is a numerical index by which weight and length in particular samples are usually compared under standard conditions (Ricker 1975), and to detect seasonal variations in the condition of fish which may vary with food abundance and average reproductive stage of the stock (King 1995).

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Cyprinus sp is cultured and easily available in fresh water of Kashmir valley and from the view of local consumption, this fish is rather economically important one. But there is little information about different aspects of the fish. Keeping in view the overall importance of size frequency distribution, length-length relationship, relative condition factor along with other biological studies for successful farming and economic exploitation of any economically important species or delicious food fishes, the present work has been planned and analyzed critically to every possible aspects of size frequency distribution, length-length relationship, length-weight relationship, condition factor, relative condition factor of *Cyprinus* sp. The morphometric characters were classified into genetically (Narrow range), intermediate (Moderate range) and environmentally (Vast range) controlled characters.

II. MATERIAL AND METHODS

A total number of 25 specimens of *Cyprinus sp* were collected from river Jhelum of Kashmir Valley .The specimens were preserved in 10% formaldehyde solution on the spot. Fishes were brought to the laboratory for further analysis. Measurements and weight of the collected fishes were taken with the help of a measuring board fitted with a meter scale and a sensitive pan balance respectively in the laboratory. The morphometric measurements were recorded following (Holden and Raitt 1974, Jayaram 1071). The statistical calculations such as regression equation and correlation coefficient have been calculated following (Snedecor and Cochran 1967).

III. RESULTS AND DISCUSSION

Different morphometric have been measured for population dynamics which includes proper identification of the fishes. These kinds of studies may help for making proper conservation measures for the fishes. Different morphometric characters which are expressed in the percentage of total fish length and head length have been taken for statistical analysis like mean, standard deviation, range, range difference, correlation coefficient and regression equation (table-1).

IN PERCENTAGE OF TOTAL FISH LENGTH: Eighteen characters have been studied in percentage of total fish length from which three characters were genetically controlled, thirteen characters were intermediate and two characters were environmentally controlled. Out of eighteen characters, ten characters show high values of correlation coefficient indicating that these characters are directly proportional to each other and eight characters show moderate correlation coefficient (table-1).

IN PERCENTAGE OF HEAD LENGTH: Seven morphometric characters have been under taken for correlation coefficient it has been observed that three characters show least correlation coefficient and four characters moderate correlation coefficient (table-1). The characters like head depth and preorbital distance have been found to be intermediate where as eye diameter, interorbital distance, and postorbital distance, have been genetically controlled (table-1).

S.No	In % age of total fish length	Mean	S.D	Range	Range difference	Correlation coefficient	Regression Equation
1.	Standard length	9.30	1.46	6.6-11.9	5.3	0.977	Y=0.778-0.045X
2.	Head length	2.50	0.49	2-3.8	1.8	0.895	Y=0.236-0.336X
3.	Head depth	1.64	0.38	1.2- 2.8	1.6	0.856	Y=0.175-0.467X
4.	Predorsal distance	4.40	0.66	3.2-5.7	2.5	0.956	Y=0.342+0.294X
5.	Post dorsal distance	2.76	0.54	2-3.8	1.8	0.629	Y=0.180+0.583X
6.	Length of dorsal fin	1.91	0.31	1.2-2.6	1.4	0.902	Y=0.154+0.060X
7.	Depth of dorsal fin	2.70	0.43	2-3.7	1.7	0.938	Y=0.221+0.042X
8.	Length of anal fin	0.94	0.15	0.6-1.3	0.7	0.835	Y=0.066+0.134X
9.	Depth of anal fin	2.06	0.35	1.4-2.8	1.4	0.936	Y=0.180-0.103X
10.	Preanal distance	7.18	1.10	6-9.6	3.6	0.957	Y=0.574+0.281X
11.	Length of pectoral fin	2.21	0.29	1.7-3	1.3	0.911	Y=0.144+0.480X
12.	Length of ventral fin	2.13	0.34	1.5-2.9	1.4	0.943	Y=0.176+0.009X
13.	Minimum body depth	1.34	0.21	1-1.9	0.9	0.538	Y=0.061+0.600X
14.	Maximum body depth	2.24	0.38	1.7-2.6	0.9	0.910	Y=0.189-0.042X
15.	Distance between pectoral and ventral fin	2.93	0.49	2.2-4.3	2.1	0.880	Y=0.239+0.059X
16.	Distance between pelvic and anal fin	2.59	0.47	1.9-3.6	1.7	0.887	Y=0.225-0.119X
17.	Length of caudal fin	2.78	0.47	2-3.8	1.8	0.928	Y=0.236-0.049X
18.	Length of caudal peduncle	1.27	0.27	0.8-1.9	1.1	0.810	Y=0.120-0.173X
	In %age of head length						
19.	Eye diameter	0.40	0.04	0.3-0.5	0.2	0.123	Y=0.008+0.373X
20.	Interorbital distance	1.06	0.17	0.8-1.4	0.6	0.825	Y=0.282+0.353X
21.	Preorbital distance	1.35	0.30	0.9-2.2	1.3	0.854	Y=0.528+0.024X
22.	Post orbital distance	0.79	0.11	0.6-1.1	0.5	0.432	Y=0.094+0.552X
23.	Head depth	1.64	0.38	1.2-2.8	1.6	0.834	Y=0.647+0.019X

Table 1: Showing Mean, S.D., Correlation coefficient (r), Range, Range Difference and Regression equation (Y=a+bX) between different morphometric charterers of Cyprinus sp.

IV. DISCUSSION

On the basis of range differences the morphometric characters are classified into genetically (narrow range), intermediate (moderate range) and environmentally controlled characters (vast range) (Johal *et al.*, 1994). Characters belonging to the genetically controlled show minimum range of variation, characters belonging to intermediate show moderate range and the characters belonging to environmentally controlled shows maximum range of variation.

During the present investigation, 3 characters were genetically controlled, 13 characters were intermediate and 2 characters were environmentally controlled in percentage of

total length and in percentage of head length 2 characters were intermediate and 5 characters were genetically controlled.

These reports are in agreement with the studies conducted elsewhere In the *Barilius bendelisis* and *Barilius vagra*, the majority of their morphometric characters showed narrow range and were genetically controlled (Negi and Nautiyal 2002). In *Tor putitora* 11 characters were genetically controlled, 5 haracters were intermediate and 2 characters were environmentally controlled (Johal and Negi 2003). In *Barilius bendelisis* all the characters show linear relationship and 13 characters were genetically controlled, 4 characters were of intermediate and 2 characters were environmentally controlled from hill streams of Himachal Pradesh (Johal and Kaur 2005). In *Gudusia chapra* and *Gonialosa manmina* linear relationship have been observed between both dependent and independent characters (Azadi and Rahman 2008). In *Schizothorax richardsonii* 19 characters were genetically controlled, 1 character was intermediate and 1 character was environmentally controlled (Negi and Negi 2010).

V. CONCLUSION

Eighteen characters have been studied in percentage of total fish length from which three characters were genetically controlled, thirteen characters were intermediate and two characters were environmentally controlled. Surprisingly, the intermediate characters are observed highest in this fish which indicates that these characters are not very much stable in nature from this place. So there is a great chance for these characters to be controlled environmentally if proper conservation strategies have not been planned for this fish. Out of eighteen characters, ten characters show high values of correlation coefficient indicating that these characters are directly proportional to each other and eight characters show moderate correlation coefficient. In percentage of head length five were genetically controlled and two are intermediate. Three characters show least correlation coefficient and four shows moderate correlation.

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