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Length - Weight Relationship of A Riverine Fish *Barilius barila* (*Gunther*)

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Abstract

The length-weight relationship of a fish *Barilius barila* (Gunther) was studied which was collected from Wainganga river located 20'48º N 79'38º E. The entire length-weight data were analyzed by least square method. The length-weight relationship of *Barilius barila* was studied in 258 fishes under three categories as male, female and common. Their corresponding parabolic representations are male B. barila W = 0.008167 $L^{2.8829}$, female *B. barila* W = 0.005931 $L^{3.1223}$ and common *B. barila* W = 0.006415 $L^{3.0373}$. The equilibrium constant 'b' is found to be 2.8829 in males, 3.1223 in females and 3.0373 common. The females are heavier than males at equal length. The equilibrium constant does not obey the cube law because it deviates from 3. The value of common fish was found to be more than 3 indicates the environment of Wainganga river was good for healthy development of fishes.

Keywords: Length-weight relationship; *Barilius barila*; Riverine fish

Introduction

World facing the problem of proteinous food material and fish is one of the major sources of protein rich food. World's one sixth animal protein comes only from fish. As far as India is concerned, there is an increase in the population rate as compare to food production rate and due to that there is a problem of protein deficient malnutrition. Almost nearly ¾th of our population is suffering from the same problem. If the fish is used as food for more extent the problem of malnutrition can easily be solved. Hence fishery production becomes the matter of more concern.

For increasing the production of fish in both marine and inland area of water it is essential to explore water resources. Infact the world fish production is about 90% in marine and 10% in inland water. In India this ratio is 60 and 40 percent respectively. To develop the fish industry it has become very essential to know the biology of fish for satisfactory management. The length-weight relationship is one of the important parameter in biology of fish. According to [11] the weight of the fish proportionately increases to the length of fish. If the value of equilibrium is constant, it is 3. It means fish obeys the cube law [8]. But the physical and chemical factor affects the growth and changes the value of equilibrium constant 'b'.

Materials and Methods

The fishes *Barilius barila* were collected from Wainganga River at Pauni, Bhandara district, Maharashtra located at 20'48º N 79'38º E. The random samples were collected of variable lengths. Fishes were brought to laboratory as for as possible in fresh condition and preserved in 10% formalin. The lengths of the fishes were measured from their tip of the snout to the last ray of the caudal fin in centimeter. After measuring the fishes, they were weighed on a single pan balance of 0.1 sensitivity. The sex of each fish was determined after giving an incision on midventral line. They were categorized in the group of 0.5 centimeters and data obtained was fitted to the formula Y=a+bX in order to test the difference between regression coefficient for male, female and common.

Results and Discussion

The length-weight relationship was expressed in the equation W = a L^b where as, W and L represents weight and length of fish, 'a' is the initial growth index and 'b' is the equilibrium constant. In the present study 258 fishes comprising 123 males and 135 females ranging from 3.8cm to 9.1cm and weight 3.8 to 9.0 gm were utilized. The data of length-weight relationship of *Barilius barila* was categorized in three groups i.e., male, female and common.

The general equation W = a L^b can be written as Log W = Log a + b Log L i.e., Y = a + bX. The linear equation was fitted separately and the logarithmic equation of the length-weight relationship in *Barilius barila* found to be

Male *Barilius barila*	Log Y = -2.0879 + 2.8879 Log X
Female *Barilius barila*	Log Y = -2.2269 + 3.1223 Log X
Common *Barilius barila*	Log Y = -2.1928 + 3.0373 Log X

Their corresponding parabolic form of equation is

Male *Barilius barila*	W = 0.008167 $L^{2.8829}$
Female *Barilius barila*	W = 0.005931 $L^{3.1223}$
Common *Barilius barila*	W = 0.006415 $L^{3.0373}$

Hence the cubic formula W = a L^b represents the length-weight relationship for *Barilius barila* is not proper. The value of 'b' variable was 2.8879 in males, 3.1223 in females and 3.0373 common. These values did not obey the cube law because values were deviating from 3. The significance of variation for length-weight relationship of *Barilius barila* was carried out and these were not significant at 5% level.

The length-weight relationship was studied by many workers in variable fishes in India and abroad like [8] in *Lencicthys artadi*, [1] in *Salmon trutta*, [3] in *Tuna*, [2] in *Sardinella longicep*, [4] in *Labeo gonius*, [7] in *Oreochromis mossambicus*, [6] in *Liza tade*, [5] in *Chela bacaila*.

In length-weight relationship the growth coefficient 'b' of the fish should be close to 3.0. It may range between 2.4 and 4.0 as reported by [8,12,5]. The value of 'b' in females was higher than the males as reported by [9,10,5]. The difference in the 'b' value of male and female indicated that the females were heavier than the males of the same length. In *Barilius barila* the value of 'b' is 2.8829 in males and 3.1223

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in females and common is 3.0373. It means the value of 'b' in males was less than the cube law and females was more than the cube law, while the commons value was found to be more than 3. It indicates the environment of Wainganga River was found good for healthy development of fishes.

Acknoledgement

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