Journal of the Indian Fisheries Association
27, 2000, 79-82

LENGTH-WEIGHT RELATIONSHIP OF A HILL-STREAM FISH, GLYPTOTHORAX TELCHITTA (HAM.) FROM SAPTAKOSHI RIVER OF NEPAL

BHARAT RAJ SUBBA & TAPAN KUMAR GHOSH*

The length-weight relationship of a hill-stream fish, *Glyptothorax telchitta* from Saptakoshi river of Nepal was analysed using the formula $W=aL^b$. The exponential values computed for total length and standard length in relation to body weight were 2.991 and 2.888 respectively.

Key words; Hill-stream fish, *Glyptothorax telchitta*
Length-weight relationship« Nepal.

The study of length-weight relationship is performed to obtain information of biological significance such as maturity, taxonomic differences in species, population dynamics, suitability of habitat etc. In fishes, generally the growth pattern follows the cube law (Allen, 1938; Brody, 1945) but sometimes values of the relationship may depart from this (Le Cren, 1951) either due to environmental factors or the condition of fish. Several workers have used the equation $W=aL^b$ to determine the length-weight relationship In different fishes.

Information is available on the length-weight relationship of certain hill-stream fishes (Lal, 1980; Lal and Mishra, 1980; Kumar and Lal, 1994 Pandey and Lal, 1990; Rita Kumari and Nair, 1978 etc.). However, information on the length-weight relationship of *Glyptothorax telchitta* is lacking.

The present paper gives an account of the length-weight relationship of a hill-stream fish, *Glyptothorax telchitta* (Ham.). It is locally known as "Kare', 'Kotel', is a Siluroid hill-stream game fish of fast flowing rivers. The fish normally inhabits the stony beds and crevices of the rocks of fast flowing waters.

Specimens used for the study of length-weight relationship of *Glyptothorax telchitta* were procured from the Saptakoshi river near Barahkshetra, Nepal. A total of 155 fishes of mixed sexes were measured for analysis. Each fish was measured from the tip of the snout to the tip of the tail in cm. for its total length and for standard length, the fish was measured from the tip of the snout to the base of the caudal fin. The weight was measured in g. in fresh condition after removing the moisture from the body. Specimens ranging from 4.9 cm to 16.5 cm in total length and weighing between 0.79 and 33. 1 g, were divided into 15 groups. The mean values of total length, standard length and body weight for all the 15 groups have been compiled. An application of logarithmic transformation

* Corresponding author Ichthyology Research Laboratory Universiy Department of Zoology, T.M. Bhagalpur University Bhagalpur - 812 007.

of the data was made to establish the relationship equation by least square method.

The body weight of *Glyptothorax telchitta* (Ham.) showed an increasing trend with increase in body length. When the logarithmic values of weight were plotted on the coordinate (y-axis) against those of respective length on the abscissa (x-axis), they always gave a straight line (Fig-1).

The regression co-efficient or the slope(b) values came to be 2.991 for total length and 2.888 for standard length. The relationship equation is as follows :

For total length

$W = 0.0066TL^{2.991}$

Or

Log W = -2.1777 + 2.991. LogTL

For standard length

$W = 0.0157SL^{2.888}$

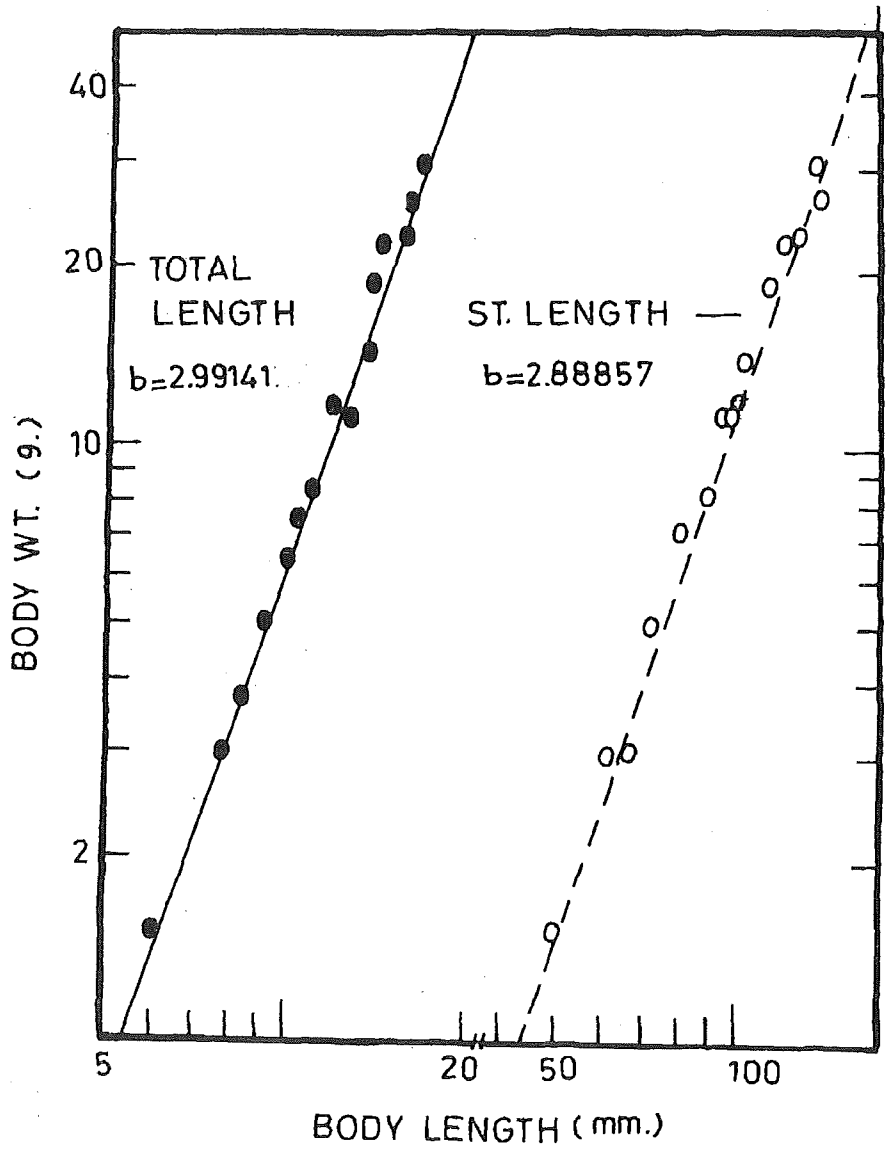

Fig. 1 : Graph showing the relationship between body weight and standard and total length.

Or

Log W = -1.803 + 2.888. LogSL

Where,

W = Weight of the fish

TL = Total length of the fish

and SL = Standard length of the fish

The body weight positively and significantly correlated with the total and standard length. Correlation coefficients are 0.998 ($p<0.001$) and 0.997 ($p<0.001$).

It has been suggested that the weight will be proportional to the cube of any linear dimension.

An ideal fish which maintains a constant shape, the slope value 'n'or 'b' will be 3 (Allen, 1938). However, Hile (1936) and Martin (1949) were of the opinion that it may vary between 2.5 and 4.0.

In the present Investigation the regression values of 2.991 and 2.888 for total length and standard length clearly indicate that the fish follows a general parabola but not the 'cube law' as the slope values are slightly lower than the isometric value of 3. Such deviations in the slope values have been reported in *Schizothorax richardsonii,* (Lal, 1980), and *Puntius sarana* (Khumar and Siddiqui, 1991). The slope values more than 2.991 and 2.888 have also been reported in other hill-stream fishes viz. *Noemachellus multifasciatus,* (Kumar and Lal, 1994), *Nemacheilus triangularis,* (Kumari and Nair, 1978), *Barilius bendelisis* and *B. vagra,* (Pandey and Lal, 1994) and *Schizothorax richardsonii* (Lal, 1980).

Glyptothorax telchitta did not strictly follow the isometric growth pattern though its value In relation to total length was very close to the isometric value of 3. A slight deviation in the value in relation to its standard length may be attributed to their habitat especially during the time of collection. During June to August the water level of the river undergoes great fluctuations and it was only when the flood water recedes and the river becomes quiet, the fishing of *G. telchitta* was possible. During this period availability of food in the river water seem to go down due to heavy siltation. This may be attributed to its deviation (2.888) from the ideal condition of isometric value (3.0).

Though it is desirable for proper estimation of the growth pattern of fishes to include separate studies on the length-weight relationship of different sexes and different life cycle stages viz. juveniles and adults, but because of the following reasons, attempts were not made towards these:

I. *Glyplothorax telchitta* is rare and to catch them live is extremely difficult. Moreover, it was thought unwise from the conservation point of view to catch them in plenty.

II. Collection of fish was only possible during a particular season after the floods (June-August), hence procurement of different life cycle stages was very difficult.

One of us (B.R.S.) is thankful to the University Grants Commission, Nepal for partial financial assistance to carry out the present work and for granting study leave.

REFERENCES

Allen, K.R. 1938 Some observations on the biology of the trout *(Salmo trutta)* In wider mere. J. *Anim.Ecol.,* **7:** 333-349.

Brody, S.1945 *Bioenergetics and Growth,* Reinhold publishing Corporation, New York, pp. 1023.

Hile, R. 1936 Age and growth of the Cisco, *Leucichthys artedi* (Le Sueur) In the lakes of the north-eastern high-lands, Wisconsin. *Bull. U.S. Bur. Fish.,* **8:** 311-317.

Khumar, F. and Siddqui, M.S. 1991 Length-weight relationship of the carp *Puntius sarana* (Ham.) of a reservoir and three riverine ecosystems in North India. J. *Freshwater Biol.,* **3(l):** 81-88.

Kumar, S and Lal, M.S. 1994 Biology of *Noemacheilus multifasciatus* 1. Length-weight Relationship, J. *Freshwater Biol.,* **6(4)** 337-340.

Lal, M. S. 1980 Eco-biological studies of some Hill-stream Pishes of Garhwal Himalayas IV. Length-weight relationship of *Schizothorax plaglostomus* (Gray) *Ind. J. Zool.,* **21 (l-3) :** 79-81.

Lal, M.S. and Mishra, M. (1980): Eco-biological studies of some Hill-stream Fishes of Garhwal Himalayas. V. Length-weight relationship of *Schizothorax richardsonii* (Heckel). *Ind.* J. *Zool.,* **21(l-3):** 83-85.

Le Cren, E.D. 1951 The length-weight relationship and seasonal cycle in gonad weight and condition in the perch *(Perca fluviatilis).* J. *Anim. Ecol.,* **20**: 201-219.

Martin, W.R. 1949 The mechanics of environmental control of body form in fishes. Univ. Toronto stud. Biol. 58, *Ont. Fish. Res. Lab.,* **70**: (1-91).

Pandey, K.K. and Lal. M.S. 1999 Length-weight Relationship of Hill Trout *Barilius* species (B. *bendellsis* (Ham.) and *B. vagra* (Ham.-Buch.) from Garhwal Himalaya. J. *Freshwater Biol.,* **6(4):** 3»9-352.

Rita Kumari, S.D. and Nair, N.B. 1978 Length-weight relationship of the Loaches *Noemacheilus triangularis* (Day) and *Lepidocephalus thermal is* (Cuv. & Val.). *Matsya* **4** : 52-58.