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LENGTH-WEIGHT RELATIONSHIP OF SNOW TROUT *SCHIZOTHORAX RICHARDSONII* (GRAY) FROM THE UTTARKASHI DISTRICT OF UTTARAKHAND STATE, INDIA.

R. K. NEGI AND TARANA NEGI*
DEPARTMENT OF ZOOLOGY & ENVIRONMENTAL SCIENCES,
GURUKULA KANGRI UNIVERSITY, HARDWAR-249 404, INDIA.
DEPARTMENT OF ZOOLOGY, G.P.G COLLEGE, PANCHKULA-134 109, INDIA.
(e-mail : negi_gkv@rediffmail.com)

Growth studies of *Schizothorax richardsonii* (Gray), using length-weight relationship were conducted on 70 specimens collected from the Yamuna and Kamal rivers of Uttarakashi district of Uttrakhand state,India. The statistical relationship between length-weight of the fish was derived as suggested by parabolic equation (Le Cren, 1951). The 'n' value of length-weight relationship has been found to be 2.859. The values obtained for the mean length of pooled data were significant ($p<0.01$). A significant high correlation ($r=0.9840$) was found between the length and weight of the sample under study.

Keywords : *Schizothorax*, snow trout, length-weight, river, Uttarakhand.

INTRODUCTION

The length-weight relationship of fishes is a very important tool in fish bionomics due to its various applications e.g., estimation of standing crop (Morey et al., 2003), overall and seasonal growth (Ritcher *et al.*, 2000), predicting the condition factor, reproductive and life history (Nikolsky, 1963; Wooton, 1992; Pauly, 1993; Erkoyuncu, 1995; Avsar, 1995), population analysis (King, 1996; Goncalves *et al.*, 1997) and the information fish stock composition (Bagenal & Tesch, 1978). In India several attempts have been made on Indian freshwater fish species in this regard (Pasadan,1971; Thakur & Das,1974; Rita Kumar & Nair,1978).

In general the length-weight relationship has been calculated to extrapolate either the length or weight. It is easy to record the length of the fishes in the field than their weights, hence, in most of the cases, when length is known, weight is calculated from this equation. The length-weight relationship is species specific provided the collections are made for longer durations and the sample includes all the phases and both the sexes. The value of the exponent 'n' of the length-weight relationship is often compared within the populations to know the well being of the fishes (Le Cren, 1951; Chonder, 1972)). It must be pointed out here that the study of length-weight relationship is more useful/ applicable on commercial fishes than non-commercial fishes. Considering the above facts, present studies have been undertaken on *Schizothorax richardsonii* a economically important fish inhabiting the waters of the Yamuna and Kamal rivers in the vicinity of Uttarkashi district of Uttrakhand State, India.

MATERIALS AND METHODS

Samples were collected once in a month from the Yamuna and Kamal rivers (30^0 47' 36.8"N 78^0 08' 22.7"E and elevation of 1052 msl and 30^0 53' 19.2" N 78^0 05' 36.2"E and elevation of 1364 msl), respectively. Length-weight relationship of 70 ranging

between 55 to 257mm total fish length and weight between 1.71gm to 106.4gm from the period of April 2007- March 2009 using cast net having the mesh size 2cm. Sampled fish were measured to the nearest 1 mm (TL), and weighed to the nearest 10g. The relationships between total length and weight were determined according to linear regression model. The length-weight relationship, between 55 to 257mm 24total fish length and weight between 1.71gm to 106.4gm from the period of April 2007- March 2009 using cast net having the mesh size 2cm. Sampled fish were measured to the nearest 1 mm. (TL), and weighed to the nearest 10g. The relationships between total length and weight were determined according to linear regression model. The length-weight relationship, $W= aL^n$ was transformed into its logarithmic expression: Log W= Log a + n Log L). The parameters a and b were calculated by least-square regression for pooled samples. Usually the relation between length and weight is expressed by the hypothetical law (Le Cren, 1951):-

$$\mathbf{W = aL^n}$$

Where 'W' represents the weight of the fish, 'L' length,'a' and 'n' are the constants. In fishes the 'n' is often referred as exponent.

The relationship ($W = aL^n$) when converted into the logarithmic form gives a straight line relationship graphically.

$$\mathbf{Log\ W = Log\ a + n\ Log\ L}$$

Where n represents the slope of the line, Log a= constant.

RESULTS AND DISCUSSION

The results of the relationship between total length and weight were determined by using the length measures of 70 snow trout samples. The relationship were significantly linear ($p<0.01$, $r>0.0984$).The specimens for their total length ranged from 55 to 257 mm and weight 1.71 gm to 106.4 gm were considered for present study. The curvilinear relation was observed when original values of weight were plotted with respective total length of the fish (Fig.1). However, linear relationship was obtained when the values were converted into logarithmic values (Fig.2).

An analysis of samples of pooled data was obtained as :

$$\mathbf{Log\ W = -4.756 + 2.859\ Log\ L}$$

$$\mathbf{W = -1.897\ L^{2.859},\ r = 0.984}$$

The value of 'n' of the length-weight relationship of pooled data has been found to be 2.859. This may be attributed to the less number of specimens. According to Hile (1936), the exponent 'n' usually varies between 2-5 but in the majority of cases the value of 'n' comes out to be 3. A perusal of literature have revealed that no literature was available on the length-weight relationship of *Schizothorax richardsonii*. However, length-weight relationship of *Tor putitora* (Ham.) has been described by Lal & Nautiyal (1980); Johal & Tandon (1981); Nautiyal (1985) and Johal *et al.* (2005) for the few of the reverine and reservoir populations. They observed that value of 'n' of length-weight relationship is either 3 or near to 3. The present study shows the value of length-weight near to 3. Hile

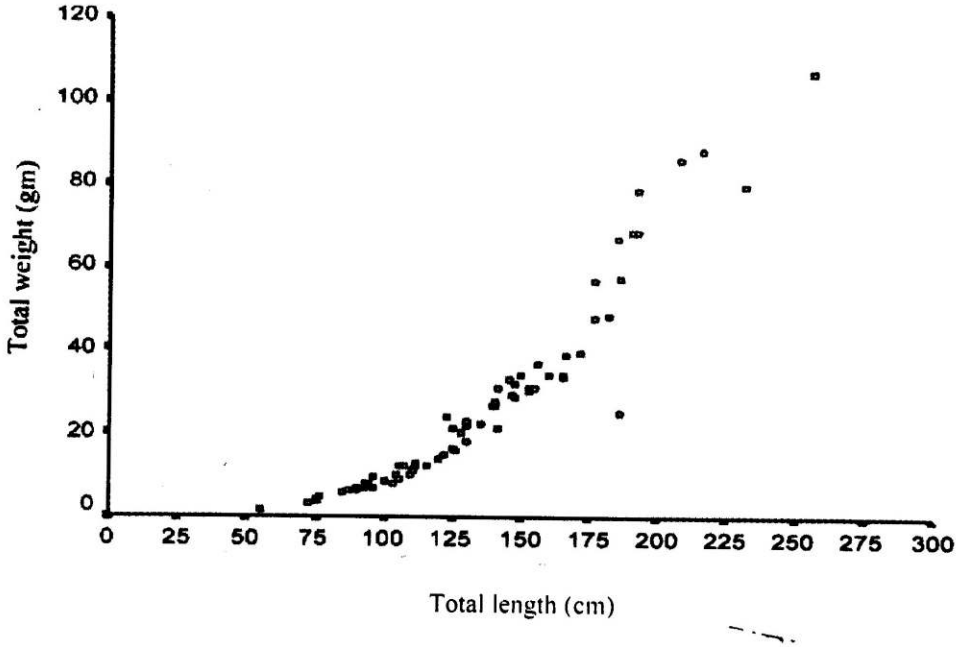

Fig. 1 : Length-weight relationship of *Schizothorax richardsonii* (Gray)

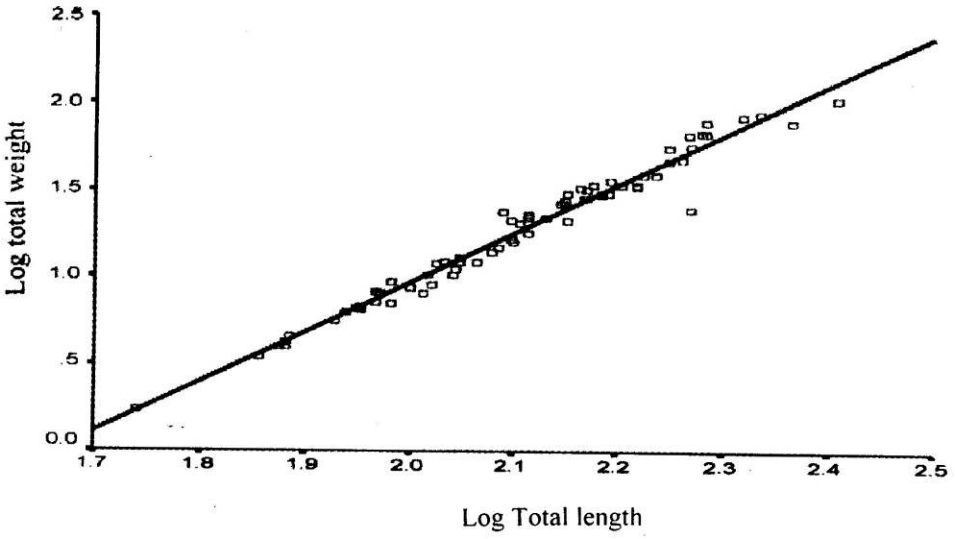

Fig. 2 : Length-weight relationship of *Schizothorax richardsonii* (Gray)

(1936) and Sarojini (1957) in their observation on the length-weight relationship expresses the view that cubic relationship holds good only when the form of the fish and gravity remains constant throughout life.

However, Sultan (1981), Panday (1998), Kulshrestha *et al.* (1993) reported some significant deviations in the length-weight relationship on the basis of cube law as applied for fishes. The fact that weight will be proportional to the cube of any linear dimension has been much discussed.

According to Allen (1938) and Martin (1949), it may vary between 2.5 to 4.0. Mortuza & Rahman (2006) have studied the length-weight relationship of freshwater fish, *Rhinomugil corsula* (Ham.) and reported that the values of regression coefficient for male as 2.942, for female as 3.008 and for combine sex as 2.984.

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