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PRELIMINARY STUDY OF CONDITION FACTOR (K) AND RELATIVE CONDITION FACTOR (KN) OF TOR PUTITORA FROM JHAJJAR STREAM, TRIBUTARY OF RIVER CHENAB, J&K

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ABSTRACT

The condition factor (K) and relative condition factor (Kn) data were recorded for 61 fish samples of Tor putitora in three different seasons (summer, monsoon and winters) as well as for different size groups from March, 2012 to Feb, 2013 from Jhajjar stream, a tributary of river Chenab in Jammu region. The condition factor was found to be maximum (1.214) in winters whereas relative condition factor was found maximum in summers (1.018). For different size groups, the condition factor was found maximum (1.174) in size group IV and minimum (0.988) in size group II which however, accounts for maximum relative condition facto (1.034). The relative condition factor value for different size groups and seasons ranged from (0.981 – 1.034), which indicated the fish is under stress in this water body and is not satisfactory.

KEYWORDS: Condition Factor, Relative Condition Factor, Stress.

INTRODUCTION

The golden mahseer, Tor putitora, is a member of family Cyprinidae. It is considered as an important game fish. This species is widespread through India, Myanmar, Bangladesh and Pakistan. In India it occurs all along the Himalayan foothills from Kashmir to North-eastern states. The condition factor is an organism level response and is quantitative parameter of well being state of fish which reflects its feeding condition as well as its reproductive status. It also indicates to what extent the fish is healthy and helps to assess the experimental improvements in an environment for an existing fish and for purpose of new stockings. Fish condition can be extremely important to fisheries managers. Plump fish may be indicators of favourable environmental conditions (e.g., habitat conditions, ample prey availability), whereas thin fish may indicate less favourable environmental conditions. Thus, being able to monitor fish well-being which can be extremely useful for fisheries biologists to make management recommendations concerning about fish populations.

The weight length relationship provides an opportunity to calculate and index the fish which is commonly used by fish biologists to compare the condition factor and well being of fish (Weatherly1972). This index is condition factor (K). The fish with high K value are heavy for its length and vice versa (Bagenal and Tesch, 1978). Condition factor varies according to influences of physiological conditions and developmental stage of fish. Condition factor also decreases with increase in length (Fagade, 1979). The Relative condition factor (Kn) is also significant in fishes for understanding their nutritional and biological cycles (Le Cren, 1951). According to Swingle and Shell (1971) Kn have its greatest application in studies involving fish population in lentic Waters.

The habitat of fish is deteriorating day by day due to various environmental and anthropological factors which have become a debatable question for ecologists for significant environment quality and better fish health (Burke et al., 1993). Therefore there is a need in field of conditions too increase our horizons on the ecological realism (Vidal, 2008). Thus, the purpose of present study was to analyse the seasonal condition factor (K) as well as relative condition factor (Kn) for different length groups.

Methodology:

The fishes were collected by cast net monthly from Jhajjar stream, a tributary of river Chenab located at distance 35 km from Jammu between $32^0$49'6'' to $32^0$52'20'' North latitudes and $74^0$57'49'' to $75^0$4'34'' East longitude. The study area is shown in figure 1. To assess the stoutness of fish, ponderal index or condition factor was evaluated by Fultons formula i.e.

$$\textit{Ponderal Index } (K) = \frac{W \times 10^5}{L^3}$$

Where W = Total weight of fish in grams

L = Total length in millimetres

10^5 = It has been introduced to bring the value of ponderal index near the unity.

The relative condition factor 'Kn' was calculated by Le Crens (1951) Formula. This Kn value is used to compare conditions between species and within their size classes (Omogoriola et al, 2011).

$$\textit{Relative condition factor } (Kn) = \frac{W}{\acute{W}}$$

Where Kn = relative condition factor

W = weight of fish in grams (Observed weight)

Ẃ = calculated weight

Ẃ is calculated as

$Ẃ = aL^b$

Where W is weight of fish; L is length of fish; 'a' is intercept and 'b' is slope.

For practical purpose this relationship was expressed in logarithmic form as:

Ẃ = Log W = Log a + b Log L

Results:

The condition factor and relative condition factor were determined for Tor putitora in different seasons and different size groups which are shown in table 1 and 2. The month wise condition factor calculated for different seasons was 0.912 in summers, 1.1298 in monsoons and 1.214 in winters. Relative condition factor also accounts for 1.018, 0.981 and 1.006 for summer, monsoon and winter respectively. The condition factor was found maximum in winters (1.214) and minimum in summers (0.912) where as relative condition factor was found maximum in summer (1.018) and minimum (0.981) in monsoon.

Seasons	Condition Factor (K)	Relative condition Factor (Kn)
Summer	0.912	1.018
Monsoon	1.129	0.981
winter	1.214	1.006

Table 1: Seasonal variation of condition factor (K) and relative condition factor (Kn)

The K and Kn for different size groups almost showed similar trend except for size group II which showed opposite trend i.e. K showed a slight fall in size group II (figure 2) where as Kn showed slight rise in peak for size group II (Figure 3). The maximum K value (1.174) was recorded for size group IV and minimum (0.988) for size group II where as Kn is same for almost all groups ranging between 1.002 – 1.034. The K value however was much low for size group II, K value in summer and Kn in monsoon which all accounts for insignificance.

Discussion:

The condition factor (K) and relative condition factor (Kn) recorded for 61 fishes of Tor putitora from Jhajjar stream for different seasons and size groups is shown in table 1 and 2. The variation in K and Kn for different seasons account for reproductive period as fish use

energy for gonadal development and spawning behaviour (Shulman, 2002). The K value was low in summer due to less availability and abundance of food as well feeding intensity of fish along with high temperature and high stress of fishing. It then rises a little in monsoon due to rise in water level as well favourable conditions starts prevailing.

Size groups (cms)	No. of Specimens	Mean±SD (Length)	Mean±SD (Weight)	Condition Factor (K)	Relative condition Factor (Kn)
Size group I (8-10)	6	9.7±0.39	10.45±0.53	1.132	1.002
Size group II (10-12)	24	10.95±0.521	23.95±2.802	0.988	1.034
Size group III (12-14)	19	12.91±0.68	25.2±7.507	1.156	1.030
Size group IV (14-16)	9	14.98±0.782	39.7±8.631	1.174	1.017
Size group V (16-18)	3	16.8±1.045	48.7±9.87	1.016	1.004

Table 2: condition factor (K) and Relative condition factor (Kn) of Tor putitora for different size groups

The value of K is high in size group I (1.132) and then it shows decline in size group II (0.988) and after that increased up to size group IV. Since K increases with increase in length and after a certain length it remains unchanged. High Kn value was recorded for size group II and then starts declining to size group V which may be due to gonadal activity and high productivity of fishes as Kn value is dependent on physiological factors like maturity, spawning and other environmental factors. According to Wootten, 1998 the value of K varies when the average weight of fish does not increase in direct proportional to the cube law of its length, but increase with increasing length. In present study K also appears to almost increase with increase in length. However, in certain cases there is decrease of weight with decreasing length which accounts for less value of condition factor thus insignificant.

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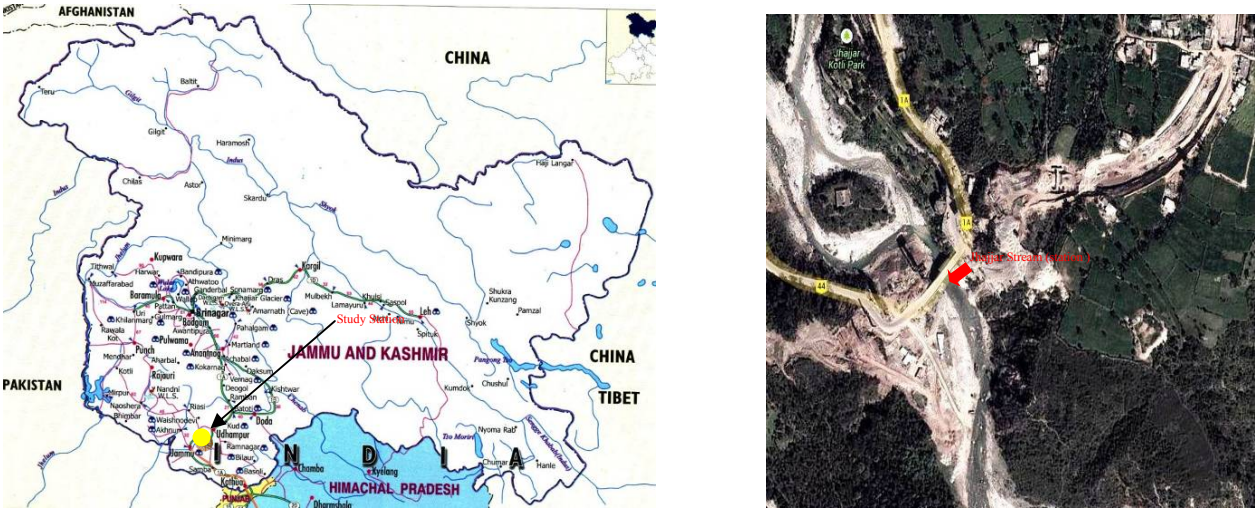

Figure 1: Study area showing Jhajjar Stream

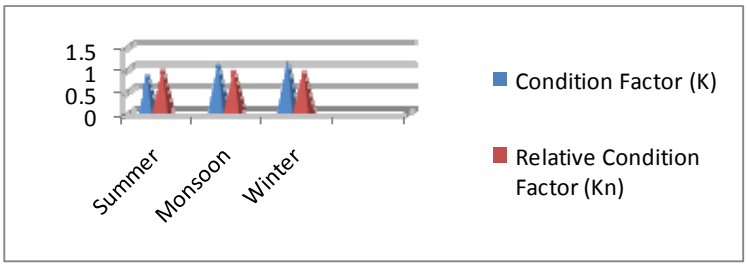

Fig2:Seasonal variation of K and Kn in Tor putitora

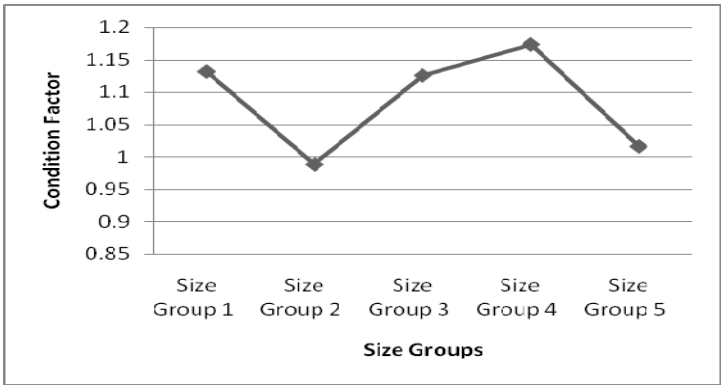

Fig 3: Condition factor (K) for different size groups

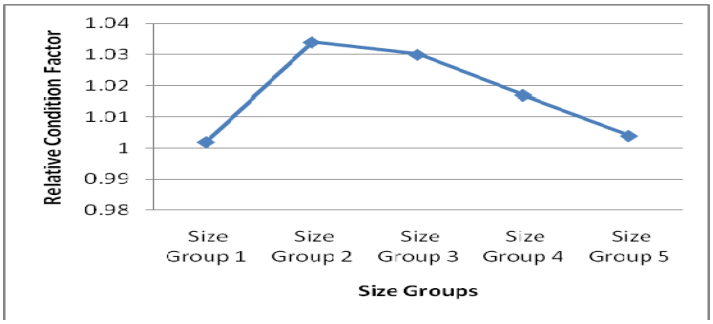

Fig 4: Relative condition factor (Kn) for different size groups

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