Study of Relative condition factor (Kn) of minor carp *L. boggut* from Kalu dam, Ahmednagar district, Maharashtra, India.

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ABSTRACT

The study of relative condition factor (Kn) showed an increase in the Kn value from 134.5 mm to 144.5 mm in the males probably due to the intensive feeding activity and decrease from 134.5 to 144.5 mm in the females of *L. boggut*. There was decrease in the Kn values from 154.5 mm to 164.5 mm in both the sexes. Kn increases from 174.5 mm in male whereas it decreases from 174.5 mm in female. Kn from 184.5 mm, 194.5 mm, 204.5 mm, 214.5 mm in both sexes were more or less similar. Increase from 224.5 mm in male and female possibly indicated the onset of maturity and also probably is related to the sexual activity and further recovery. The Kn values for different length groups showed that the condition was high at lengths 134.5, 144.5, 154.5, 224.5, 234.5, 244.5 and 254.5 mm for males and at lengths 124.5, 144.5, 154.5, 234.5, 244.5 and 254.5 mm for females. The peak at 144.5 mm in male and in female 244.5 mm was likely due to the intensive feeding activity and the simultaneous maturation of gonads. Subsequently decrease was perhaps due to spawning and lysis of the gametes. Further low value at 214.5 mm in case of females may be due to intensive spawning. Very low level of Kn at 164.5 mm in males was due to intensive spawning. The monthly variations in Kn values showed that in female values were high during January, March, April and May while in male Kn values were high during January, June, July and August. The low Kn values were during July and August in females and during April and May in males. High Kn values may be considered as indications of preponderance of ripe gonads and time of breeding and feeding, while the low Kn value is indicative of the spawning. The fluctuations in the Kn values could be attributed to both spawning cycle and feeding intensity. The mean Kn values in *L. boggut* for different length groups were 1.0108 and 1.0120 for males and females respectively and for different months were 0.9683 and 1.0014 for males and females respectively showed that females gain weight at faster rate in relation to its length when compared to males. This study indicated good condition of the fishes in the Kalu dam and also implies that food is not a limiting factor in the dam.

Key words : *L. boggut*, Relative condition factor.

INTRODUCTION:

Study of the relative condition (Kn) can yield information on many interesting events in the life history of a fish. A scrutiny of the relative condition factor at different body lengths can give valuable information regarding the maturation and spawning in the life span of the fish whereas a close look at the conditions at different months may give definite clues regarding the breeding seasons (Philip and Mathew, 1996).

Le Cren (1951) proposed relative condition factor (Kn) in preference to 'K' as the former considers all the variations like those associated with food and feeding, sexual maturity, etc., while the latter does so only if the exponent value is equal to 3. Thus 'K' factor measures the variations from an ideal fish, which holds the cube law while 'Kn' measures the individual deviations from the expected weight derived from the length-weight relationship. The length-weight relationship of cyprinids from India has been studied by many.

However, similar studies were conducted on various other fishes by number of authors. Some of the recent studies in this line are that Pandey and Sharma (1997), Sarkar et al., (1999), Sunil (2000) and Geol et al., (2011). Even

though studies on food and feeding, maturation, spawning and age and growth of this species revealed its good aquaculture potential as a better substitute for grass carp in composite fish culture. No attempt has so far been made to study the relative condition factor of *L. boggut* from this dam. Hence, it was felt essential to undertake this study.

MATERIAL AND METHOD:

Monthly samples of *Labeo boggut* were procured from the fish habitat with the help of fishermen by using a dip net located from Kalu dam, Ahmednagar district, Maharashtra, India.

All the fishes measured for the total length in the study of growth in length and weight were individually weighed nearest to 0.1 gm immediately after each catch. The data obtained on each month was grouped in 10 mm class interval, i.e. from 130-259 mm size groups separately for males and females. Sex was ascertained externally. The data was then pooled for males and females separately in 10 mm class interval. Length-weight regressions for males and females were calculated separately by the formula $W = aL^b$, when W is weight in grams, L is length up to caudal fork in mm and 'a' and 'b' are constants. From regression equations, the values of log W for the various length groups were calculated, the logarithmic transformation of above equation is Log W = Log a + b Log L. The regression analysis ANACOVA on the regression equation was carried out as per standard statistical procedures Bailey (1959) and Snedecor (1961).

The relative condition factor 'Kn' as an indicator or robustness of the fish (Le Cren, 1951) was estimated for male and female separately using the formula $Kn = W/ \hat{W}$ where 'W' is the observed weight and '$\hat{W}$' is the expected weight derived from the length-weight relationship 'Kn' values for the various length groups were calculated after obtaining the mean lengths and mean weights for the corresponding length groups.

RESULTS:

Month wise relative condition factor (Kn) estimated separately for males and females are expressed in table 1 and fig. 1 and 2.

In males of *L. boggut*, the Kn value was 1.1437 at mean length 134.5 mm, it slowly increased to peak value 1.2334 at mean length 144.5 and then declined 1.1017 and 0.7693 at length 154.5 and 164.5 mm respectively.

At mean length 174.5 mm it increases to 0.9137, and then declined to 0.8617 at mean length 184.5 mm. From mean length 194.5, 204.5, 214.5, 224.5, 234.5 and 244.5 mm, the Kn value increased gradually to 0.8900, 0.8541, 0.8954, 1.0622, 1.0712 and 1.1374 respectively and reached another peak value of 1.2064 at mean length 254.5 mm.

The lowest Kn value was observed at the mean length 164 mm and the highest at the mean length 144.5 mm. The average Kn value was 1.0108.

In females of *L. boggut*, the Kn value was 1.2132 and 1.0800 at the mean length 134.5 and 144.5 mm respectively. The value increased to 1.0857 at mean length 154.5 mm and then declined gradually to 0.9890, 0.9136 and 0.8177 at mean length 164.5, 174.5 and 184.5 mm respectively. The Kn gradually increased to 0.8467 at mean length 194.5 mm, further it steadily decreased to 0.8431 and the lowest value (0.8137) at mean length 204.5 and 214.5 mm respectively. The Kn value showed sudden increase to 0.9715, 1.0786 and peak (1.2922) at mean length 224.5, 234.5 and 244.5 mm respectively and then decreased to 1.2105 at mean length 254.5 mm. The average Kn value was 1.0120.

Table 1. Monthly Changes in the mean Relative condition factor of *L. boggut*.

Sr. No.	Months	Relative condition factor (Kn)	
		L. boggut	
		Female	Male
1	November - 2014	0.9793	0.9491
2	December	0.9904	0.9534
3	January - 2015	1.0005	1.0210
4	February	0.9942	0.9393
5	March	1.0455	0.9308
6	April	1.0502	0.9126
7	May	1.0452	0.9124
8	June	0.9973	1.0530
9	July	0.9686	1.0588
10	August	0.9597	1.0082

11	September	0.9959	0.9473
12	October	0.9897	0.9333
	Mean	**1.0014**	**0.9683**

Fig. 1 Monthwise Variation of realtive conditin factor (Kn) of male and female *L. boggut*.

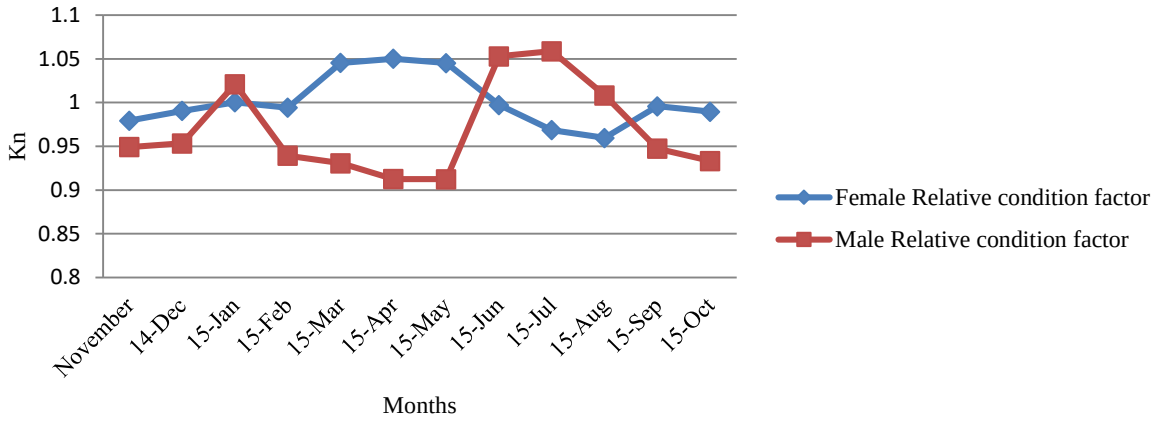
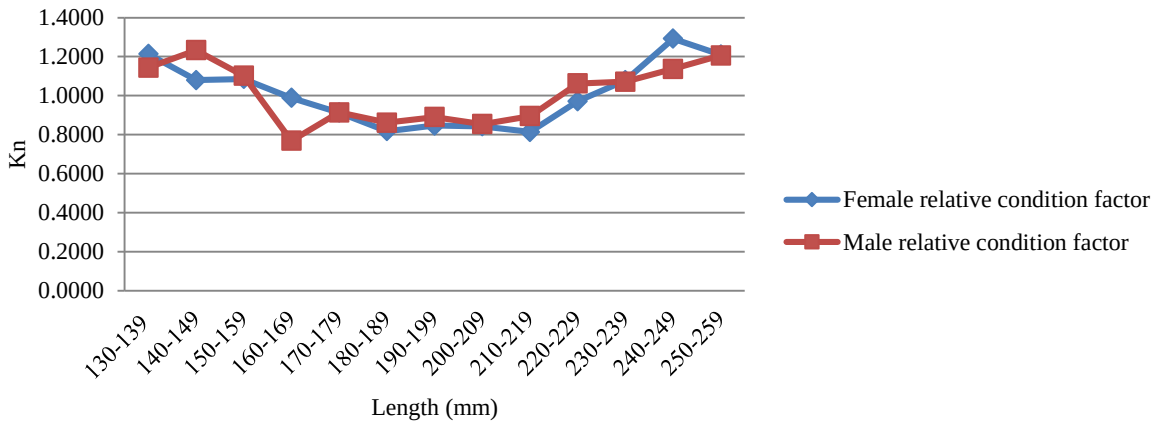


Fig. 2. LengthwiseVariation of relative condition factor (Kn) of male and female *L. boggut*.



Study of monthly changes in mean Kn values of *L. boggut* showed that in the males of *L. boggut* the Kn value was 0.9491 in November. The value was increased to 0.9534 and 1.0210 in December and January respectively, and then decreased to 0.9393, 0.9308, 0.9126 and 0.9124 from February to May respectively. In June the Kn values increased gradually to 1.0530 and reached to the highest value (1.0588) during July. In August, the value decreased to 1.0082 and again decline rapidly to 0.9473 and 0.9333 during September and October. The average Kn value during the study period was 0.9683.

In the females of *L. boggut*, the Kn value was 0.9793 in November, slightly increased to 0.9904 and 1.0005 in December and January respectively and then, slightly decreased to 0.9942 in February. The value increased to 1.0455 in March and reach to peak value at1.0502 in April respectively. The Kn value decreased sharply to 1.0452, 0.9973, 0.9686 and 0.9597 from May to August respectively. The Kn value increased to 0.9959 in September and declined to 0.9897 in October. The average Kn value was 1.0014.

The study revealed that, the fluctuation of Kn values of both the sexes in species for different length groups and different months showed somewhat similar trends. Only in female species the average Kn was found to be more than one where as it is below one (0.9683) in male.

DISCUSSION:

In the present study on *L. boggut* from Kalu dam it was observed that an increase in the Kn value from 134.5 to 144.5 mm in the males was probably due to the intensive feeding activity and decrease from 134.5 mm to 144.5 in the females of *L.boggut*. There was decrease in Kn values from 154.5 to 164.5 mm in both the sexes. Kn value decreases

from 174.5 to 184.5 mm in female. Kn slightly less in female from 194.5 mm to 204.5 mm, also which was further less at 214.5 mm. High condition value from 174.5 mm in the male and less at 184.5 mm, then high at 194.5 mm and less at 204.5 mm. High Kn value from 224.5 mm, 234.5 mm and 244.5 mm in the female possibly indicated the onset of maturity. Kn was slightly less at 254.5 mm in female. Kn value high at 224.5 mm, 234.5 mm, 244.5 mm and 254.5 mm in the male possibly indicated the onset of maturity. The gradual decline in Kn value in both the sexes was probably related to the sexual activity and further recovery. The Kn value was very high likely due to the intensive feeding activity and the simultaneous maturation of the gonads. The high Kn value coincided with 50% level of the maturity. Subsequent decrease was perhaps due to spawning / lyses of the gametes. The major peak signifies, after the breeding probably attributed to very high feeding intensity in this species. The highest value in small size group 144.5 mm of male was also possibly due to high feeding activity.

The relative condition, Kn, was studied for *L.boggut* from Kalu dam to know the well being of fish, its relative robustness and suitability of habitat in the dam. The estimated data showed that the value of Kn in the males ranged between 0.7693 and 1.2334 with a mean value 1.0108 and in the females it ranged between 0.8137 and 1.2922 with a mean value 1.0120. This indicated good condition of the fish in the dam, and also this implies that food was not limiting in the dam. In the present study the reasons for the fluctuations in Kn values could be attributed to both the spawning cycle and the feeding intensity. Similar reports are available on relative condition factor in *Glossogobius giuris* (Pawar and Mane, 2006), *Macrones bleekeri* (Pawar and Mane, 2007), *Cirrhinus reba* (Shendage, 2007), *Puntius sophure* (Shendage, 2008), *Schizothorax richardsonii* (Roopma et al., 2008), *Thenus orientalis* (Lund, 1793) (Saha et al., 2009), *Macrones bleekeri* (Pandarkar et al., 2010), *Notopterus notopterus* (Shendage et al., 2011). But on the contrary, in *Plotosus canius* (Sinha, 1981) and in *Channa punctata* (Reddy and Babu Rao, 1992), the fluctuations in relative condition factor resulted mainly due to changes in gonad conditions, while in *Pomatoschistus minutes* (Bouchereau et al., 1990) and in *Priacanthus hamrur* (Philip and Mathew, 1996), the fluctuations in Kn values were mainly influenced by feeding intensity rather than the cyclic change taking place in the gonads.

Similar findings have been reported while studying the *Daysciaena albida* (Cuv.) and *Gerres filamentosus* (Cuv.) from Cochin (Kurup and Samuel, 1987). The relative condition factor (Kn) was also calculated for the above two species by the authors. In *D. albida* the reasons for the fluctuations of Kn values were possibly attributed to both the spawning cycle as well as the feeding intensity, whereas in *G. filamentosus* it synchronised mainly with the spawning cycle.

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