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Research Paper

Study on Condition Factor of Catfish Macrones Vittatus (Bloch, 1794) from Bhategaon Dam, District Hingoli (M. S.).

Zoology

KEYWORDS : Catfish, Macrones vittatus, Condition factor.

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ABSTRACT

The condition factor of Macrones vittatus (Bloch, 1794) from Bhategaon dam was studied over a period of 12 months (January to December 2011). Condition factor 'K' ranged between 0.046 to 0.831 from size group 86 mm to 155 mm in males while for females it ranged between 0.065 to 0.878 from size group 86 mm to 165 mm. Studies on relative condition factor 'K' of Macrones vittatus (Bloch, 1794) revealed that the fluctuations in 'K' values can be attributed to spawning cycle as well as feeding intensity. In the present study female specimens had higher condition factor than males.

INTRODUCTION

The condition factor or Ponderal index, or co-efficient of correlation expresses the condition of a fish, such as the degree of well being, relative robustness, plumpness or fatness in numerical terms. In fisheries science, the condition factor is used in order to compare the "condition", "fatness" or wellbeing of fish. And it is based on the hypothesis that heavier fish of a particular length are in a better physiological condition Bagenal, (1978).

Ponderal index or condition factor is also a useful index for the monitoring of feeding intensity, age, and growth rates in fish Oni *et al*., (1983). It is strongly influenced by both biotic and abiotic environmental conditions and can be used as an index to assess the status of the aquatic ecosystem in which fish live Afamdi, (2005). The ponderal index gives a good idea of a broad outline of the seasonal cycle of a species Jaiswal, (2005).

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.

Le Cren, (1951), 'Kn' greater than 1 indicated good general condition of fish. Investigation on the ponderal index and its relation with the seasonal cycle and feeding intensity of *M.vittatus* has been carried out by Bhatt, (1971). Narasimham, (1972, 1976) has reported the condition factor of *Trichiurus lepturus* and *E. muticus* from Kakinada, east coast of India. Pandey & Sharma, (1997) studied the condition of four exotic carps. Studies on relative condition factor (Kn) of *Schizopyge esocinus* revealed that the fluctuations in 'Kn' values can be attributed to spawning cycle as well as feeding intensity Ahmad *et al.,* (2012). Fluctuations in the condition factor have been found in both the sexes of *L. savala* and *E. muticus*. k value of the former species was highly affected by gonadal maturation than feeding activity where as k value of latter species was highly linked up with feeding intensity than sexual maturity Anees *et al.,* (2012).

MATERIAL AND METHODS

The study of ponderal index of *Macrones vittatus* (Bloch, 1794) was carried out by examination of total 419 fishes, in which 91 males ranging between 86 mm to 155mm in size were as 328 females ranging between 86mm to 175mm in total length during the period of 12 months from January 2011 to December 2011. Condition factor was determined by month, length and sex. With a view to study the fluctuations in 'K' values in relation to size at first maturity and growth of the fish, in both the sexes, the data were analysed separately for males and females into 10 mm size groups. In order to study the seasonal fluctuations in 'K' values and their relation to the spawning cycle, the average 'K' values were calculated on month wise basis also. In the present investigation the 'K' values were calculated by the formula :

$$K = \frac{W}{L^3} 100$$

Where,

W= Weight

L= Length

K = Condition factor.

RESULTS AND DISCUSSION

'K' values in different size groups:

In Table-1 and Graph-1 it is seen that the 'K' value decreases with increasing length in males and in females 'K' value shows fluctuation, recording peak of males at 86 mm to 95 mm size group and in females at 96 mm to 105 mm size group. According to the size group 'K' values of females are slightly higher than the males. This may be due to the larger size of the females than that of males. Suggesting there by that the females gain more weight than the males. Similar observations were made by Gupta, (1967) and Narasimham, (1972), in ribbonfishes.

However, the present study revealed the fall in 'K' values from 96 mm to 105 mm size group in males and 106 mm to 115 mm in females is more conspicuous there by indicating the increased metabolic strain of spawning in older fishes (Hart, 1946; Menon, 1950; Qayyum and Qasim, 1964 and Jaiswal, 2005).

Seasonal variations in conditional factor:

The variations in the 'K' values during different months are shown in Table-2 and Graph-2. High 'K' value were recorded in males during October to March 2011, but from April 2011 fluctuation were seen in the 'K' values. In females high 'K' value recorded were during January 2011. The values fluctuate widely after that but keep a general downward trend. In this fish also the increase and decrease of 'K' values gives no indication of spawning season of the fish. A comparison, however, with the rate of feeding will reveal that monthly fluctuations in the condition factor are more closely related to the feeding rhythm than with the cycle of gonad weight.

The influence of the female gonad weight, which forms about ¼ th of the total body weight in ripe condition, on the 'K' values cannot be ignored. Although the seasonal variation in 'K' values could not be strictly correlated with the gonad weight, its effect on 'K' is clearly noticed in some months. Since the gonad weight of males is not closely related to the feeding rhythm than those of the females. However, to a large extent feeding intensity overshadows the effects of increase and decrease of gonad weight on the 'condition factor'.

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Fluctuations in the condition factor of many fishes were observed in relation to their reproductive cycle (Neelakantan & Pai, 1985; Narejo *et al*, 2002), feeding rhythms Sharma (1997) or physico-chemical factors of environment, age, physiological state of fish or some other unknown factors (Kurup and Samuel, 1987; Kurup, 1990; Kalita & Jayabalabn, 1997).

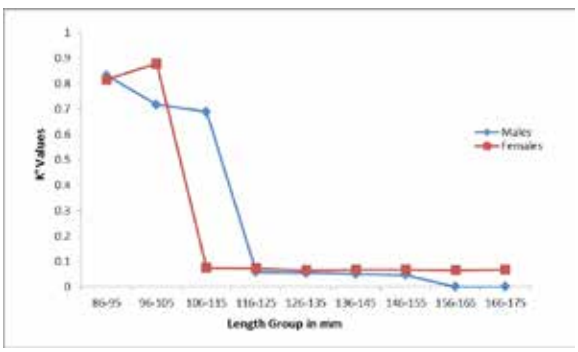
In *Macrones seenghala* Bhatt (1970) studied that in June, although the ovaries are in a far advanced condition (Ripening), the 'K' values is at its lowest. Similarly in September, although the ovaries are in a spent condition, the 'K' value records next to the highest. In these two months feeding is at its lowest and highest respectively. Similar results were recorded by Reuben, *et al.,* (1994) in *Upeneus sulphureus*. Begum *et al.*, (2010) studied in *Mystus gulio* the condition factor which shows that the increase and decrease in 'K' values with the increasing length may be due to metabolic strain during maturation or spawning as well as changes in feeding activity. Similar condition was observed in several species of fish by earlier workers (Jhingran, 1972; Barua *et al*., 1988; Gupta, 1988; Dhanze *et al.*, 2005).

Table - 1: Ponderal Index of Male and Female *Macrones vittatus* (Bloch, 1794) in each 10 mm size group

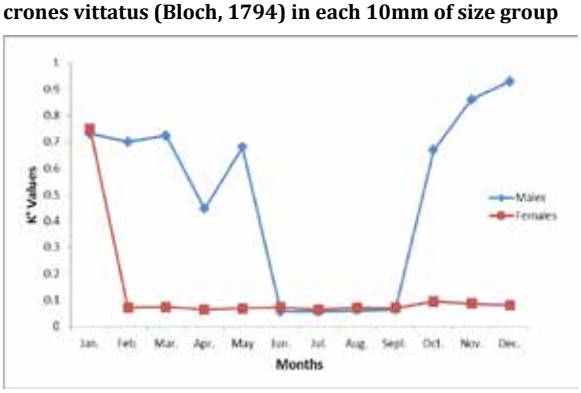
Size group in mm	Males		Females	
	No. Examined	k' values	No. Examined	k' values
86-95	4	0.8316	3	0.8158
96-105	19	0.7166	33	0.8788
106-115	18	0.689	78	0.075
116-125	32	0.0589	70	0.0728
126-135	14	0.0558	45	0.0663
136-145	3	0.051	43	0.0689
146-155	1	0.0468	42	0.0682
156-165	0	0.0000	13	0.0658
166-175	0	0	1	0.0687

Table- 2: Ponderal Index of Male and Female *Macrones vittatus* (Bloch, 1794) during the months of the year 2011

Months of 2011	Males		Females	
	No. Examined	k' values	No. Examined	k' values
January 2011	3	0.73054	39	0.74933
February 2011	19	0.6996	44	0.07093
March 2011	4	0.7237	22	0.07297
April 2011	2	0.446	42	0.0633
May 2011	5	0.6799	9	0.06858
June 2011	18	0.0568	45	0.07216
July 2011	17	0.0559	34	0.06372
August 2011	4	0.0603	22	0.07089
September 2011	12	0.0623	5	0.06971
October 2011	2	0.6679	7	0.09483
November 2011	4	0.8608	54	0.08652
December 2011	1	0.9285	5	0.0799



Graph-1: Showing Ponderal index in Male and Female Macrones vittatus (Bloch, 1794) in each 10mm of size group



Graph-2: Showing month wise Ponderal index in Male and Female Macrones vittatus (Bloch, 1794)

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