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# STUDY OF PONDERAL INDEX OF FISH NOTOPTERUS NOTOPTERUS (PALLAS) FROM GODAVARI RIVER, AT NANDED REGION, MAHARASHTRA, INDIA.

Zoology

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## ABSTRACT

Study of Pondral index of fresh water fish Notopterus notopterus (Pallas) from Godavari River at Nanded region, Maharashtra State were observed from July 2016 to June 2017. The obtained results showed Notopterus notopterus Condition factor follows a pattern of seasonal cycle related to feeding intensity and spawning activity. Low feeding was observed from Jully to September and high feeding intensity was noted during Octomber to June.

## KEYWORDS

Ponderal index, Notopterus notopterus

## INTRODUCTION

Ponderal index condition factor or coefficient of condition forms an important biological measures usually used in fish biology research to express the relative condition of a fish and provide additional information on various aspects such as maturity, spawning, feeding intensity etc. related to the well being of a fish.

The coefficient of condition is generally denoted by 'K' is an important biological measure. The ponderal index is also adopted to study the condition of the fish during different seasons and different stages of growth,

The changes in condition have usually been analysed by means of condition factor or coefficient of condition 'Ponderal index' etc. Theompson (1942), Hile. (1936). Tins is calculated as a ratio between the observed weight and that expected from the observed length. The basis of the expected weight is that for an ideal fish in whose length weight relationship formula (1) $W = aLn$ , $n = 3$ and thus obeys the cub law. Various types of condition factor have been used, but in one of the original ones the condition was measured by the constant c. equivalent to a in (1) $W - cL^3$ , therefore $c = c = \frac{W}{L}$ As however c when calculated is often awkward decimial number the average value of c found by formula nad a new condition factor 'K' found that would vary about unit $K = \frac{W}{cL^3}$

The value of c depends partly on the units used for weighing and measuring the fish. In instances where the original value of c chosen was found to have only limited application, and K was found to average about some value approximating to, but not exactly I,c has been further altered to a. convenient round number and often changed in to its reciprocal.

$$K = \frac{CW}{L^3}$$

$$\text{For example} = \frac{100W}{L^3} \text{ (Hile, 1936)}$$

Where L is in centimeters and W in grams.
According to Heacht (1916), condition factor studies correspond to the cyclic changes that the species undergoes in the nutrition and reproduction. Several workers like Menon (1950), Piliay (1954), Sarojini (1957) and others have correlated the condition factor with the attainment of maturity and feeding instensity of the hake and herrings. In Sardinella pilchardus he observed that the condition was low before and high after spawning due to sexual cycle and feeding activity respectively.

Kesteven (1947), pointed out that a true ponderal index should be obtained by comparing volume of fish with its weight in which form it will be a measure of relative density or weight peer unit volume, the latter being a function of the fish volume which is a cubic function of its linear dimensions.

LeCren (1951) remarks "The ponderal index forms an important part of fishery research and has often been issued to provide additional information about spawning, feeding and other aspects related to the well being of a fish.

Kagwade (1968), states that the weight of the fish is aid to vary with the cube of its length. Any deviation from this relationship has been attributed to physiological changes in the fish. Changes in the condition factor may be due to the season and size.

Several other workers have been made investigations on the condition factor of different species and correlated the variation in 'K' values with various factor in life of fish. Hickling (1930, 1940), Hille (1936), Thompson (1943), Menon (1950), LeCren (1951), have correlated the ponderal index with spawning cycle and feeding intensity in johnius dussumieri.

Review of literature shows that there is no information regarding the condition factor of Notopterus notopterus as it is recently investigated by Palls. Therefore the present investigation was undertaken with a view to study the condition factor of this fish.i.e.Notopterus notopterus.

## MATERIAL AND METHODS

In the present study 190 males and 36 femals ranging between 13 cm to 30 cm in total length were analysed by adopting the formula

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

Proposed by LeCren (1951), where "W" is the weight and 'L' is the total length of the fish. After calculating the 'K' values individually the data were analysed separately for males and females in 3cm class intervals, with a view to study the fluctuations in 'K' values in relation to size at first maturity and growth of the fish and the spawning sesons.

## RESULTS AND DISCUSSION

The mean K values of different length groups and represented in the table 1 and fluctuations during different months of the year in the table 2.

It is seen from the tables that 'K' values for males were higher than those of females which may indicate that the better condition of male than that the female (Parulekar and Bal, 1970) in Bregmacerous mcClellendi, Mehta (1974) in Ophiocephal usgachua.

The lowest 'K' values for male 0.6833 and for female o.7377 recorded at 28 cm -30 cm size group in male and 19 cm – 21 cm size group in female. From the table showing 'K' values during different months, it can be seen that 'K' values for the Females were slightly lower than those for male. Table 2. Shows that the 'K' values fluctuated between 0.7370 and 0.2630 in male in the month of july 2016 and February 2017 respectively. In females the 'K' values fluctuated, 0.6935 in Octomber 2016 and 0.7205 in April 2017.

From the table showing the 'K' values for male and female it can be seen that the values were highest during February in both the sexes decline gradually, thereafter, upto September. In October 'K' values in

both the sexes were minimum which can be attributed to the spent condition of the fishes which have undergone spawning exertion, and hence the condition is poor, such a fall is indicative of the onset of spawning as the fish undergoes exertion due to spawning which affects the 'K' values. The values for 'K' in both the sexes increased from November onwards which may' be due to the recovering condition from spawning and high feeding intensity of the fish. From January to May the fishes are approaching full maturation and hence are in good condition showing highest 'K' values in male and female respectively.

The decrease in 'K' values is more significant from June to September as consequence of the active spawning of the species. The decreases in the 'K' values can be attributed to the increased metabolic strain of spawning. It can be seen from the table that the highest 'K' values (0.7980) was recorded in 16 cm – 18 cm size group in male. In female the highest 'K' value (0.7263) was seen in (25,27) cm size group. The 'K' values for the females are slightly higher than that of those for males thus indicating that female gain more weight than the males. Hart: (1943), in the report on the trawling on the Patagonian continental shelf has slated that the ponderal index may give a very good idea of the broad outline of the seasonal cycle of the species. He states " Apart from the seasonal variations in the condition which this method is particularly adopted to show there is superimposed upon it a secondly variation related to the length (here the mean) of the fish. Older (longer) fishes tend to show a slightly lower level of condition throughout the seasonal cycle consequent upon the increased metabolic strain of spawning. The point of inflexion on a curve showing this diminution of 'K' with increasing length is thus a good approximate indication of the length at which sexual maturity is attained".

Butt (1968), while studying the biology of Heteropneustes fossilis states "the increase and decrease the fish". He further states that the fluctuation in the 'K' values of H.Fossilis were more closely related to the feeding rhythm than to the cycle of gonad weight. Narasimham (1970), observed similar results in Trichirus leptarus.

The availability of food, level of intensity of feeding and other environmental' conditions may influence the rising or lowering the metabolic activity and thereby raise or lower the level of 'condition' prior to and during spawning.

In Notopterus notopterus the condition factor follows a pattern of seasonal cycle related to feeding intensity and spawning activity. Low feeding was observed from July to September and high feeding intensity was noted during October to June. Monthly variations in 'K' vaues are dependent upon the feeding intensity of the fish.

**Table – 1 Fluctuations in 'K' Values of Notopterus notopterus in each 3cm length groups**

| Size Group in Cm | Male | | Female | |
|---|---|---|---|---|
| | No of Fishes Examined | 'K' Values | No of Fishes Examined | 'K' Values |
| 13 to 15 | 20 | 0.7752 | | |
| 16 to 18 | 70 | 0.7980 | 1 | 0.8141 |
| 19 to 21 | 50 | 0.7569 | 3 | 0.7262 |
| 22 to 24 | 28 | 0.6888 | 24 | 0.7562 |
| 25 to 27 | 16 | 0.7036 | 3 | 0.7263 |
| 28 to 30 | 06 | 0.6833 | 5 | 0.7377 |
| Total | 190 | | 36 | |

**Table – 2 Monthly Fluctuation in 'K' Values of Notopterus notopterus**

| Year and Month | Male | | Female | |
|---|---|---|---|---|
| | No of Fishes Examined | 'K' Values | No of Fishes Examined | 'K' Values |
| July-2016 | 11 | 0.7370 | 14 | 0.7208 |
| August-2016 | 21 | 0.7692 | 8 | 0.7241 |
| September-2016 | 28 | 0.8423 | 1 | 0.8141 |
| Octomber-2016 | 8 | 0.7301 | 2 | 0.6935 |
| November-2016 | 10 | 0.8284 | -- | -- |
| December-2016 | 23 | 0.7523 | 2 | 0.7546 |
| January-2017 | 14 | 0.7393 | 1 | 0.7896 |
| February-2017 | 16 | 0.2603 | 2 | 0.7546 |
| March-2017 | 10 | 0.8284 | -- | -- |
| April-2017 | 14 | 0.7467 | 4 | 0.7205 |
| May-2017 | 15 | 0.8636 | -- | -- |
| June-2017 | 16 | 0.7763 | 2 | 0.7546 |
| Total | 190 | -- | 36 | -- |

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