Length-Weight Relationship and Condition Factor of Soldierfish *Myripristis Murdjan* From Cuddalore Coast, South East Coast of India

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**Abstract:** The length weight relationship (LWR) and relative condition factor (Kn) of *Myripristis mordjan* along the south east coast of India was studied. Four hundred and one fishes of *M. mordjan* consist of 194 males and 207 females. The relationship for males and females was expressed by Log W = -1.7895 + 3.0942 Log L (r=0.9529) and Log W = -1.858 + 3.1723 Log L (r=0.9514). The monthly mean values of Kn was 2.0-3.9 in male and 2.2-2.3 in female respectively. The ‘r’ value revealed a very good correlation between length and weight. By testing the regression coefficients against the isometric growth value it was found that there was no significant variation between sexes of both the species. Both the species showed isometric growth. The relative condition (Kn) in *M. mordjan* was studied for the first time. The analyses both size group wise and season wise indicated that the variations in Kn value are related to the maturity cycle and spawning in this species.

**Keywords:** Length – weight relationship, South East Coast, soldierfish

**INTRODUCTION**

The length weight relationship is particularly important in parameterizing yield equations and in estimations of stock size. This relationship is helpful for estimating the weight of a fish given length and can be used in studies of gonad development, rate of feeding, metamorphosis, maturity and condition (Le Cren, 1951). Biomass estimates obtained from the widely used analytical models, such as virtual population analysis (Pope, 1972), require the calculation of mean weight of individuals per age or length class through the length weight relationship. Soldier fish of the genus *Myripristis* are valued in small scale fisheries throughout the tropics. The life history and species biology of these soldier fishes is poorly known (Dec and Parrish, 1994). Early studies on the length weight relationship of this genus were (L Tahouer et al., 1998) New Caledonia (Font et al., 2004) Central Brazilian coast.

This is the first study to report these parameters in *M. mordjan* collected by trawl fishery along Indian waters. Hence the present study was carried out on the length-weight relationship and condition factor of *M. mordjan* are discussed.

**MATERIALS AND METHODS**

The present study was based on the length and weight data of 401 specimens of *M. mordjan* ranging from 6 to 25.3 cm total length (Fig. 1). They were collected from Cuddalore fish landing centre (Lat 11° 42'N; Long 79° 43' E) where trawlers are operated with trawl net. The sampling was carried out twice a month from January - December 2008. In the month of May there were no samples because of fishing holidays. Total length was measured from tip of the snout to the tip of the longest caudal fin lobe was recorded in centimeters and weight was recorded in gram. Damaged specimens were rejected.

The length weight relationship was calculated by the least square method applying the Le Cren (1951) formula \[ W = aL^{b} \text{ or its logarithmic form } \log W = \log a + b \log L \] where \( W \) = weight, \( L \) = length and ‘a’ and ‘b’ are constants. The significance of difference between the regression coefficients for males and females was tested by the method analysis of covariance (Snedecor and Cochran, 1967). The tested by employing student’s ‘t’ test. The relative condition factor (Kn) was calculated employing the formula \( Kn=\frac{W}{L} \) where \( W \) = observed weight, \( L \) = expected weight derived from the length – weight relationship.

**RESULTS AND DISCUSSION**

The estimation of the length weight relationship of *M. mordjan* for male and female are given in (Table 1 and 2). The length-weight relationship in *M. mordjan* and the logarithmic transformations are as follows:

For females \( \log W = -1.858 + 3.1723 \log L (r=0.9514) \)
For males \( \log W = -1.7895 + 3.0942 \log L (r=0.9529) \)

The regression equation of males and females of *M. mordjan* subjected to analysis of covariance showed insignificant differences in ‘b’ values between sexes at 5% level was found. The logarithmic values of observed length and corresponding weight of *M. mordjan* plotted for (Fig. 2 and 3) the unchanging body form and specific gravity of a fish are supposed to yield a regression coefficient (b value) of 3, where fish exhibits isometric growth. The ‘b’ value of *M. mordjan* subjected to’t’ test

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Table 1: Regression data on the length weight relationship of males and females of *Meriprion murdjan*

<table>
<thead>
<tr>
<th>Category</th>
<th>DF</th>
<th>X²</th>
<th>Sum of squares and products</th>
<th>Y²</th>
<th>b value</th>
<th>DF</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>194</td>
<td>3.8799</td>
<td>12.0054</td>
<td>39.0428</td>
<td>3.0942</td>
<td>193</td>
<td>1.8951</td>
</tr>
<tr>
<td>Females</td>
<td>209</td>
<td>4.3118</td>
<td>13.6779</td>
<td>45.5332</td>
<td>3.1723</td>
<td>206</td>
<td>2.1442</td>
</tr>
<tr>
<td>Pooled</td>
<td>401</td>
<td>8.1917</td>
<td>25.6833</td>
<td>84.576</td>
<td>3.1399</td>
<td>399</td>
<td>4.0393</td>
</tr>
</tbody>
</table>

D.F. = Degrees of Freedom, b = Regression coefficient, SS = Sum of squares

Table 2: Test of significance

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>DF</th>
<th>Sum of squares</th>
<th>Mean square</th>
<th>Observed 'F'</th>
<th>5% F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation from individual regression</td>
<td>399</td>
<td>4.0393</td>
<td>0.0101</td>
<td>1.21*</td>
<td>3.0</td>
</tr>
<tr>
<td>Deviation from average individual regression</td>
<td>400</td>
<td>4.0516</td>
<td>0.0123</td>
<td>0.6123</td>
<td>3.0</td>
</tr>
</tbody>
</table>

*Not significant at 5% level

Fig 1: Sampling of specimen *M. murdjan*

Fig 2: Logarithmic relationships between length and weight of male *M. murdjan*

Fig 3: Logarithmic relationships between length and weight of female *M. murdjan*

Fig 4: Month-wise relative condition factor (Kn) for *M. murdjan*

has been recorded by Le Cren (1951). Beverton and Holt (1957) recorded that cubic relationship between length and weight existed and suggested that the value of ‘b’ is almost always near to 3.0. Ricker (1958a) observed that a fair number of species seem to approach this ideal. The monthly mean values of Kn calculated separately for males and females are given in Fig. 4. Seasonal variation in relative condition factors shows high values in February and low value observed in June 2008 in both sexes. The relative condition factor corresponding to the different size groups in both sexes showed that a steep fall in the Kn values was observed at 140 - 160 cm and 165-185 mm which indicated high feeding activity, growth and maturation. A gradual decrease from 190 mm and considerable steep drop at 210 mm showed spawning activity.
CONCLUSION

No attempts have been made to study the length-weight relationship of M. mardjun from any part of the Indian waters. The information provided in this aspect would be very much constructive for the study of biology and distribution along the Indian waters.

ACKNOWLEDGEMENTS

The authors express their thanks to Prof. T. Balasubramaniyan, Director, CAS in Marine Biology and the authorities of Annamalai University for providing facilities.

REFERENCES
