Length Weight Relationship and Relative Condition Factor of Sebarau, *Hampala macrolepidota* (Van Hasselt) in Kenyir Lake, Malaysia

Mohammad Zaidi Zakaria, Jalal, K.C.A and Ambak, M.A
Faculty of Applied Science and Technology Universiti Putra Malaysia Terengganu, 21300 Kuala Terengganu, Malaysia

**Abstract:** A study on length-weight relationship and relative condition lector of Sebarau, *Hampala macrolepidota* (Van Hasselt) was conducted at four main rivers and Dam site of Kenyir Lake, Malaysia from January 1997 to December, 1997. The overall length-weight relationship was In W = 2.884 In L - 4.216 or W = 0.0148 L^{2.884}. The spawning periods, the length at maturity based on relative condition factor (Kn) and factors that might governed their spawning seasons have been analyzed and discussed. These might be one main spawning period that could occurred at this place probably February; the spawning period could be due to the North East Monsoon which bring heavy rain. The length at first maturity is found to be at 160 mm and their spawning season might be mostly related to the rainy seasons.

**Key words:** Length-weight relationship, relative condition factor, *Hampala macrolepidota*, length at first maturity, spawning period, freshwater fish

**Introduction**

The length-weight relationship of fish has numerous practical applications in fishery research such as required for visual censuses (Kulbic et al., 1993), estimating the mean weight of fish of a given length class, conversion of a growth equation for length into a growth equation for weight, i.e., prediction of weight from age, as required, e.g., for yield per-recruit models and morphological comparisons between population of the same species, or between species, and related investigations (Caillouet, 1993). It can monitor the value of "a" whereby the value of "a" is related to the condition factor leg. The sex, the stage of maturity, time of the year, the stomach content and others). This value is also been considered as the factor for fish health and can be to know the spawning period of the fish and therefore it is useful in monitoring the natural population.

Lake Kenyir’, the largest man-made lake in Malaysia, was impounded in 1985 to generate electricity. The lake is located in the state of Terengganu on the East Coast of Peninsular Malaysia. It covers an area of 36,900 ha, has a maximum depth of 145 m and comprises of more than 300 islands. Lake Kenyir appears to harbour a variety of fish population. More than 28 species of fish were commonly found in Kenyir Lake and some of those can be considered to be good sport fish (Zakaria et al., 1997). More than 50% of the catch was represented by two species of sport fish such as *Myrus nemurus* (C & V) and *Hampala macrolepidota* (van Hasselt). The other sport fish species commonly found are *Tor tambroides* (Blacker), *Acr ossochelius hexagonolepis* (Mc Clelland) and *Dianna microptes* (C & V) (Jalal, 1996; Ambak and Jalal, 1998).

Based on the available resources the Lake Kenyir has the potential for the development of sport fish such as *H. macrolepidota*, locally known as Sebarau. Although some studies have been carried out on artificial breeding (Ambak et al., 1982) and food and feeding habit of this fish (Aizam and Ang, 1984), but no studies has been done on the natural spawning period of this tropical fish. Realizing the general paucity of information, the present study was conducted for the sustenance of this popular sport fish in this man-made lake.

**Materials and Methods**

The sampling was conducted once a month from January 1997 to December, 1997. The specimen *H. macrolepidota* was collected by using the gillnet, trammel net, seine net and cast net from the rivers Berua, Petang, Petuang, Buai and Darn site near river Lasir (Fig. 1). Sampling was done to assess fish spawning periods to cover both riverine and lacustrine environment in both monsoon and nonmonsoon seasons. The total length of the individuals were measured from the anterior tip of mouth to the end of the caudal fin, to the nearest millimeter on a measuring board. Weight was taken to the nearest 0.1 g with gonad and viscera intact on an automatic balance.

The relative condition factor (Kn) for different months and length class were worked out per Le Cren (1951) using the formula

\[
K_n = \frac{W_o}{W_c}, \quad \text{where } W_o \text{ is the observed weight and } W_c, \text{ is the calculated weight.}
\]

The value of correlation coefficient, r was calculated. The length-weight relationship was determined by using the formula

\[
W = 0.0148 L^{2.884} \quad \text{or} \quad \ln W = 2.884 \ln L - 4.216
\]

with very high coefficient of correlation (r^2 > 0.97) for pool data.

Rile (1936) found that the exponent 'b' usually lies between 2.5 and 4.0 and 3 is the ideal value of b (isometric growth) while deviation from 3 shows the allometric growth. The studies show that the value of exponent 'b' is slightly lower for *H. macrolepidota* than the ideal value of isometric growth suggesting thereby that the condition of this fishery in this area bears a closer relationship to the cube of the length. The value of 'b' lies between 2.7 to 2.8 during the normal period and increased up to 2.9 during the development of gonad and suddenly the value decrease upto 2.3 after spawning occurred which might suggest that the development of gonad and somatic growth play an important role in the length-weight relationship during certain months of the year. From December to February the value of 'b' rises rapidly to the range of 2.8 - 3.0 from the lowest value of 2.3 might due to the fish eat a much as possible to attain the energy in order to recover their losses after spawning followed by a normal growth.
Fig. 1: Map showing the location of sampling side at Kenyir lake
Fig. 2: Length-weight relationship of Sobareu, *Hampala cacrolepidota* from Lake Kenyir

Fig. 3: Monthly relative condition factor of *H. macrolepidota* from January to December, 1997

Fig. 4: Relative condition factor according to midlength class of *H. macrolepidota* from Kenyir lake in 1997
Table 1: Monthly length-weight relationship and relative condition factor for Sebarau, *Hampala macrolepidota* of Kenyir Lake in 1997

<table>
<thead>
<tr>
<th>Month</th>
<th>Length-weight relationship</th>
<th>n</th>
<th>Total length range</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>$Ln W = 2.821 \ln L - 4.056 r^2 = 0.92$</td>
<td>231</td>
<td>6.1 - 33.0</td>
</tr>
<tr>
<td>February</td>
<td>$Ln W = 3.040 \ln L - 4.713 r^2 = 0.98$</td>
<td>262</td>
<td>15.5 - 46.5</td>
</tr>
<tr>
<td>Mac</td>
<td>$Ln W = 2.798 \ln L - 3.962 r^2 = 0.91$</td>
<td>122</td>
<td>16.5 - 26.5</td>
</tr>
<tr>
<td>April</td>
<td>$Ln W = 2.992 \ln L - 4.569 r^2 = 0.95$</td>
<td>294</td>
<td>14.6 - 52.5</td>
</tr>
<tr>
<td>May</td>
<td>$Ln W = 2.862 \ln L - 4.181 r^2 = 0.98$</td>
<td>134</td>
<td>7.5 - 43.5</td>
</tr>
<tr>
<td>June</td>
<td>$Ln W = 2.968 \ln L - 3.962 r^2 = 0.91$</td>
<td>122</td>
<td>16.5 - 26.5</td>
</tr>
<tr>
<td>July</td>
<td>$Ln W = 2.729 \ln L - 3.677 r^2 = 0.95$</td>
<td>51</td>
<td>15.8 - 26.3</td>
</tr>
<tr>
<td>August</td>
<td>$Ln W = 2.945 \ln L - 4.371 r^2 = 0.95$</td>
<td>64</td>
<td>17.6 - 40.5</td>
</tr>
<tr>
<td>September</td>
<td>$Ln W = 2.733 \ln L - 3.732 r^2 = 0.92$</td>
<td>132</td>
<td>16.1 - 47.7</td>
</tr>
<tr>
<td>October</td>
<td>$Ln W = 2.673 \ln L - 3.521 r^2 = 0.92$</td>
<td>79</td>
<td>16.3 - 30.5</td>
</tr>
<tr>
<td>November</td>
<td>$Ln W = 2.346 \ln L - 2.549 r^2 = 0.77$</td>
<td>274</td>
<td>15.5 - 31.7</td>
</tr>
<tr>
<td>December</td>
<td>$Ln W = 2.923 \ln L - 4.362 r^2 = 0.89$</td>
<td>217</td>
<td>17.2 - 28.6</td>
</tr>
</tbody>
</table>

**Monthly relative condition factor:** The mean monthly changes in the relative condition factor of *H. macrolepidota* from Kenyir Lake is given in Fig. 3. The relative condition factor varies from 1.0224 to 1.2596. The studies on the monthly fluctuations in $K_v$ value indicated that the relative condition is maximum during February, May and September, because of an increase in the body weight either due to tissues growth or egg mass development, and low during Mar, July and November, indicating the spawning period. Their spawning period have been compared with the data of the water level of the dam and the weather obtained from "Tenaga National Berhad", Kenyir Lake, Malaysia. It was found that the fish contained matured eggs and sperms when it was wet season with a peak of the spawning period might occur in February followed by May and September. The wet season was brought by the North East monsoon. The effect of water level on spawning was not much understood and studies should concentrate more on the effect of water level especially in relation to their habitat for spawning.

**Relative condition factor according to length:** Figure 4 shows the fluctuation of the relative condition factor against total length. These rapid changes are generally associated with the attainment of sexual maturity. This figure suggested that the length at first maturity of *H. macrolepidota* might occurred at 155 mm in total length while the dissection of fish shows that the sex was difficult to identified when their total length was less than 155 mm. Spawning may take place from then onwards. The subsequently mode and trough may represent second, third etc. (as indicated by the number peaks and trough in the relative condition curve) of the maturity stages of the fish. The results showed that although the fish breed round the year (Aizam, 1983), but at least they have one special spawning periods in Kenyir Lake which coincide with the rainy season i.e., February while May and September, represent their second and third period of spawning.

**Acknowledgment**

The financial assistance for this study was provided by Universiti Pertanian Malaysia(Research Grant No. 1-07-05-0111). Technical assistance from Johan Mohd Nor, Fazil Mohd Noh, Ab. Rashid, Ab. Manaf Mat Diah and Zamhuri Abdul Aziz are gratefully acknowledged.

**References**


