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

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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 ln W = 2.884 ln L - 4.216 or W = 0.0148 $L^{2.884}$. The spawning periods, the length at maturity based on relative condition factor (K_n) 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 factdr, *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 (Kulbicki *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 *Mysrus nemurus* (C & V) and *Hampale macrolepidota* (van Hasselt). The other sport fish species commonly found are *Tor tambroldes* (Blacker), *Acrossocheilus hexagonolepsis* (Mc Clelland) and *Dianna micropeltes* (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 laccustrine environment in both monsoon and nonmonsoon seasons. The total length of the individuals were measured from the anterior tip of the 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 (K_n) for different months and length class were worked out per Le Cren (1951) using the formula $K_n = W_o/W_c$, where W_o is the observed weight and W, is the calculated weight. The value of correlation coefficient, r was calculated. The length-weight relationship was determined by using the formula $W = aL^b$ and the logarithmic transformation of this formula gives rise to a straight line relationship of the form, ln W = ln a+b ln L, where W is weight, L is the total length and "a" is the weight at unit length and "b" is the exponent describing the rate of change of weight with length.

Results and Discussions

Length-weight relationship: A total of 2057 specimens of Sebaiau (*H. macrolepidota*) were used to described the length-weight relationship ranging from 7.5 cm to 55.5 cm in total length and 4.6 g to 2140,0 g in weight (Fig. 2). The monthly length-weight relationship are presented in in Table 1. It was observed from the scatter diagram that weight bears a curvilinear relationship with length which becomes linear after transformation into logarithmic (Fig. 2). The relationship confirmed the general formula W = 0.0148 $L^{2.884}$ or 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.

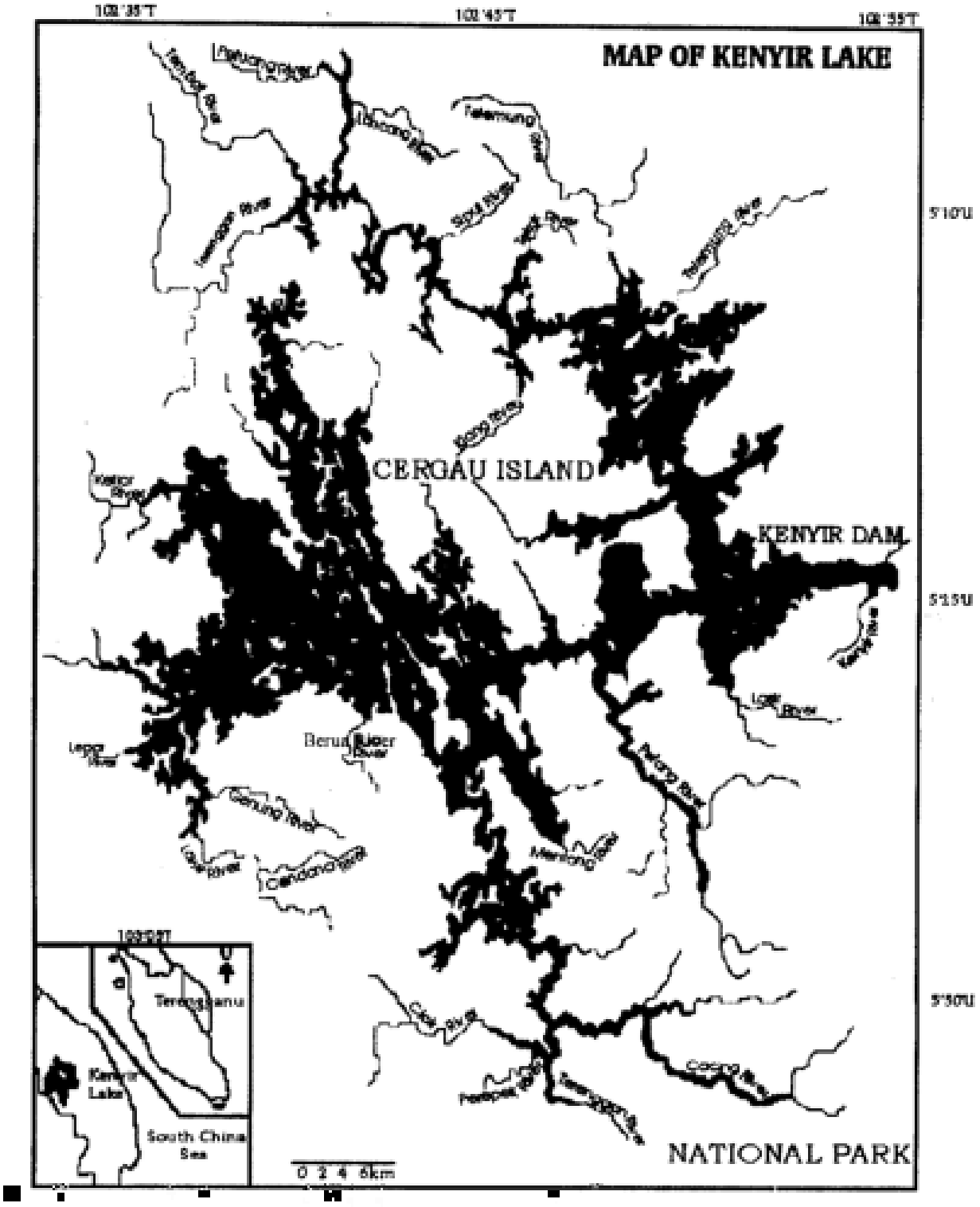

Fig. 1: Map showing the location of sampling side at Kenyir lake

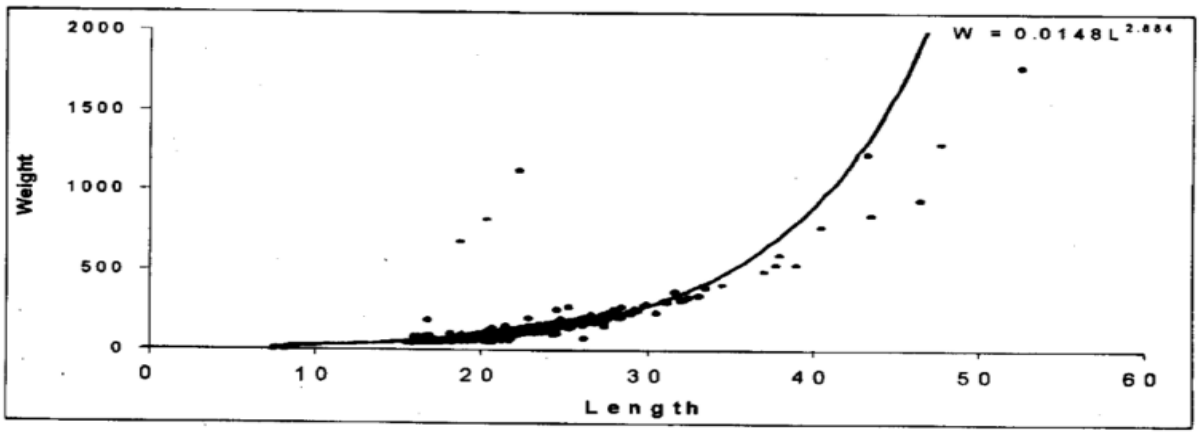

Fig. 2: Length-weight relationship of Sobareu, *Hampala cacrolepidota* from Lake kenyir

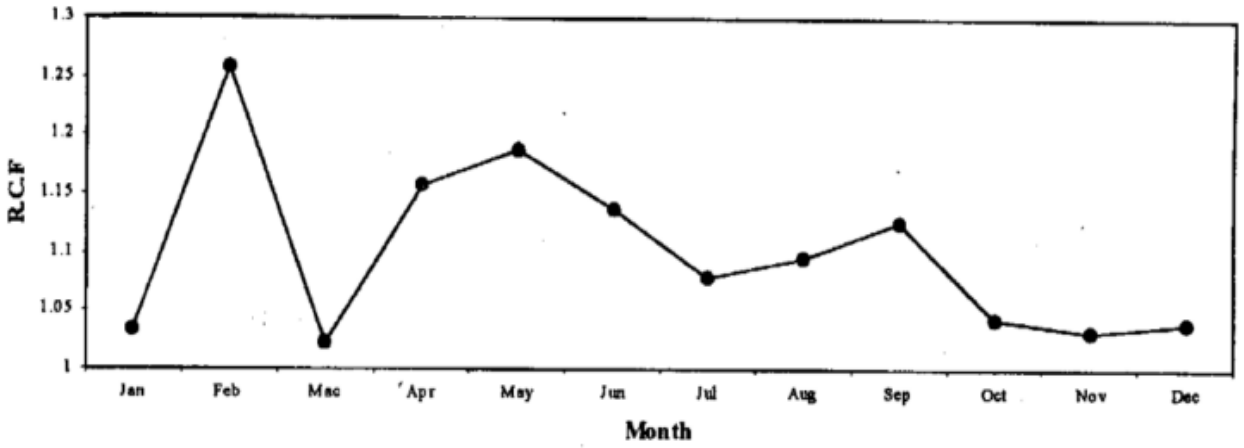

Fig. 3: Monthly relative condition factor of *H. macrolepidota* from January to Decemher. 1997

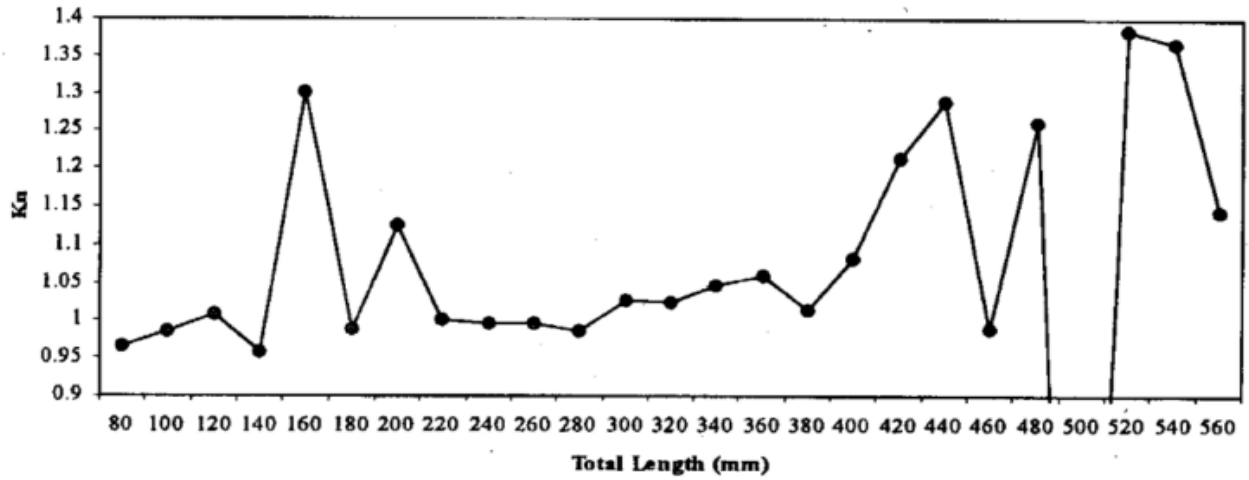

Fig. 4: Relative conditiion factor according to midlength class of *H. macrolepidota* from Kenyir lake in 1997

Table 1: Monthly length-weight relationship and relative condition factor for Sebarau, *H. macrolepidota* of Kenyir Lake in 1997

Month	Length-weight relationship	n	Total length range
January	Ln W = 2,821 In L - 4.056 r^2 = 0.92	231	6.1 - 33.0
February	Ln W = 3.040 In L - 4.713 r^2 = 0.98	262	15.5 - 55.5
Mac	Ln W = 2,798 In L - 3.962 r^2 = 0.91	122	16.5 - 26.5
April	Ln W = 2.992 In L - 4.569 r^2 = 0.95	294	14.6 - 52.5
May	Ln W = 2.862 In L - 4.181 r^2 = 0.98	134	7.5 - 43.5
June	Ln W = 2.968 In L - 4.460 r^2 = 0.97	197	9.8 - 54.0
July	Ln W = 2.729 In L - 3.677 r^2 = 0.95	51	15.8 - 26.3
August	Ln W = 2.945 In L - 4.371 r^2 = 0.95	64	17.6 - 40.5
September	Ln W = 2.733 In L - 3.732 r^2 = 0.92	132	16.1 - 47.7
October	Ln W = 2.673 In L - 3.521 r^2 = 0.92	79	16.3 - 30.5
November	Ln W = 2.346 In L - 2.549 r^2 = 0.77	274	15.5 - 31.7
December	Ln W = 2.923 In L - 4.362 r^2 = 0.89	217	17.2 - 28.6

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_n 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 tho 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.

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