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LENGTH-WEIGHT RELATIONSHIP AND RELATIVE CONDITION FACTOR OF THE RIBBON FISH, *LEPTURACANTHUS SAVALA* (CUVIER, 1829) FROM THE BAY OF BENGAL, BANGLADESH

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ABSTRACT

Length-weight relationship of 1119 specimens of *Lepturacanthus savala* (Cuvier 1829) from the Bay of Bengal, Bangladesh, was found to be curvilinear ($W=0.0003612 TL^{3.18}$) and linear ($\text{Log}W= -3.44+3.18 \text{ Log}TL$) for both the sexes combined in arithmetic and logarithmic scales, respectively. The values of regression co-efficient (b) ranged from 3.002 to 3.337 ($\beta \pm 0.167$) at 95% confidence limit. The regression 'b' value (3.18) followed the cube law and did not significantly ($P>0.05$) differ from the cube. The growth of the fish was found to be isometric. Relative condition factor (Kn) was also within the ideal range (0.9695 to 1.1155, mean 1.001 ± 0.033). Seasonal or in different length groups no dramatic changes in relative condition factor were observed. Length frequency distribution was found to be normal with maximum number of fish in mid length groups and minimum in the lowest and highest length groups.

Key words: Length-weight relationship, Relative condition factor, *Lepturacanthus savala*, Bay of Bengal, Bangladesh.

INTRODUCTION

Analysis of length-weight relationship of the Ribbon fish, *Lepturacanthus savala*, was carried out to detect the physical well-being of the fish and to establish the fact whether the growth of the fish is isometric or not, because knowledge about the growth of fish is the most important part of the study of population dynamics and also for its cultural purposes. Relative condition factor (Kn) was also calculated to see whether the growth of the fish was ideal or not. The condition factor of the relationship (Le Cren 1951) was used as an useful index for assessment of various important biological and nutritional cycle, while the mathematical relation between the length and the weight has valuable use in estimating the weights of fish of known lengths or known weights. The length-weight study of fishes gives an idea on the seasonal changes in their specific

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gravity. A considerable number of works has been done on the length weight relationship and relative condition factor of different fish species in Bangladesh and India by different authors (Jhingran 1968, Basirullah and Kader 1970, Shafi and Quddus 1973, 1974a, 1974b, Chondar 1973, Chatterji *et al.* 1977, Das 1977, Kader and Rahman 1978, Quddus *et al.* 1987, Quddus and Dewan 1988, Barua *et al.* 1988, Azadi *et al.* 1988, Mahmood *et al.* 1989, Azadi and Nasiruddin 1990, Banu *et al.* 1992, Azadi *et al.* 1992, Azadi and Naser 1996, Nabi *et al.* 1999, Mamun and Azadi 2004, Azadi and Rahman 2007). Except two short works (Basirullah and Kader 1970, Mustafa and Begum 1994) no detailed work is available on the length-weight relationship and relative condition factor of *Lepturacanthus savala* from the Bay of Bengal.

MATERIALS AND METHODS

For the study of length-weight relationship and relative condition factor a total of 1119 specimens of *L. savala* were collected from the biggest Bay fishing landing station namely “Fishery Ghat” at Iqbal Road, Chittagong, Bangladesh, during March 2003 to February 2004. The total body length and weight of each fish was measured to the nearest centimeter and gram from the tip of the snout to the tail end of the body, and with a pan balance sensitive up to 0.1 g, respectively. The length-weight relationship and relative condition factor (*Kn*) were derived using the widely known formula of Le Cren (1951). The Co-efficient of regression for Y (Weight) on X (Total length) was calculated by least square method. Monthly size frequency distribution was also analysed.

RESULTS AND DISCUSSION

Length-weight relationship

Total length varied between 27.1 cm and 106.4 cm, and the weight between 15 g and 1230 g. The length-weight relationship for both the sexes combined was found to be positive curvilinear ($W=0.0003612TL^{3.18}$) and linear ($\text{Log } W = -3.44 + 3.18 \text{ Log } TL$) in arithmetic and logarithmic scales, respectively (Figs.1a and 1b). The relationship was highly significant ($r = 0.996$, $t = 44.47$, groups = 17) at 0.1 %. The regression coefficient ‘b’ value was 3.18 and ranged from 3.00 to 3.34 ($\beta \pm 0.167$) at 95% confidence limit, and followed the cube law ($P > 0.05$), which agreed with Martin (1949), Carlender (1969, 1977), Shafi and Quddus (1974a, 1974b), Rao (1983), Azadi *et al.* 1992 and Nabi *et al.* (1999) in other fishes. According to Pauly (1984), the exponent b lies between 2.5 and 3.5, usually close to 3. Thus, the growth of *L. savala* was found to be isometric and

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ideal in the Bay of Bengal, which indicated that a congenial environment existed in the Bay water for the fish. Earlier no detailed work on the length-weight relationship and relative condition of *L. savala* was done from the Bay of Bengal except some short works by Basirullah and Kader (1970) and Mustafa and Begum (1994). Basirullah and Kader (1970) found regression 'b' values less than 1.0 for male and 2.19 for female *L. savala* while Mustafa and Begum (1994) found 'b' values 1.9 for male and 2.004 for female *L. savala*, which were not acceptable. It might be due to very small and short sized data or data were collected or measured erroneously (Carlender 1969). The authors (Basirullah and Kader 1970) admitted that it might be due to the effect of preservative formalin which squeezed the fish and offered erroneous length measurement. Carlender (1969, 1977) has demonstrated from a large number of length-weight data, stemming from a wide variety of fishes, that values of 'b' <2.5 or >3.5 are generally based on a very small range of sizes or that such values of 'b' are most likely erroneous.

Relative condition factor (Kn)

Kn values of *L. savala* in different months and different length groups are shown in Figs.2 and 3. The highest Kn value 1.1155 was found at 25 to 30 cm length group and lowest 0.9695 at 40 to 45 cm length group with a mean of 1.001 ± 0.033 . Monthly highest Kn value was found in January 2004 (1.005 ± 0.028) and lowest in May 2003 (0.998 ± 0.014). In different months the fluctuations of Kn values were very negligible. The monthly mean Kn values were always around 1. Except for a slight variation in only one lowest size group (25-30 cm), no major variation was found in different length groups. It clearly indicated that the growth pattern of the fish was ideal in the Bay of Bengal. Kn values generally fluctuated with changing seasons, amount of food supply, and maturity of gonads (Doha and Dewan 1967, Basirullah and Kader 1970, Azadi and Barua 1999, Nabi *et al.* 1999). In the present study no such effect was observed on Kn values due to the ribbon shaped long body and gonads; no major effect was also resulted due to the maturity of the gonads.

Size frequency distribution

The highest number of fish frequency ($\Sigma f = 215$) was observed in 70 cm to 75 cm length group and the lowest ($\Sigma f = 2$) in 105 cm to 110 cm length group (Fig.4). However, the distribution was found to be normal with minimum numbers in lowest and highest length groups and maximum in mid length groups. Similar type of size frequency distribution was also recorded in other fishes by Mamun and Azadi (2004).

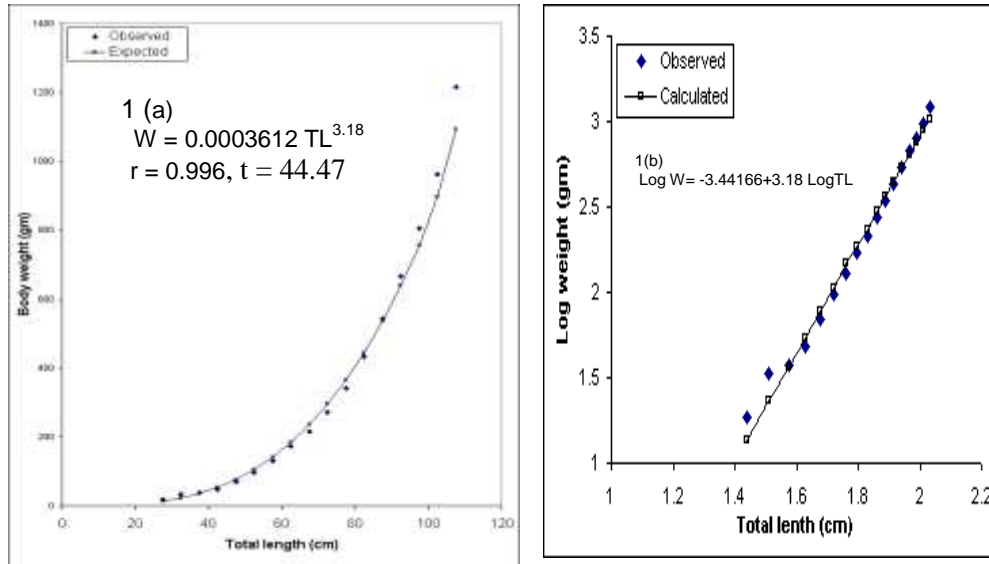


FIG.1. LENGTH-WEIGHT RELATIONSHIP OF *L. SAVALA*. IN ARITHMETIC (A) AND LOGARITHMIC SCALES (B).

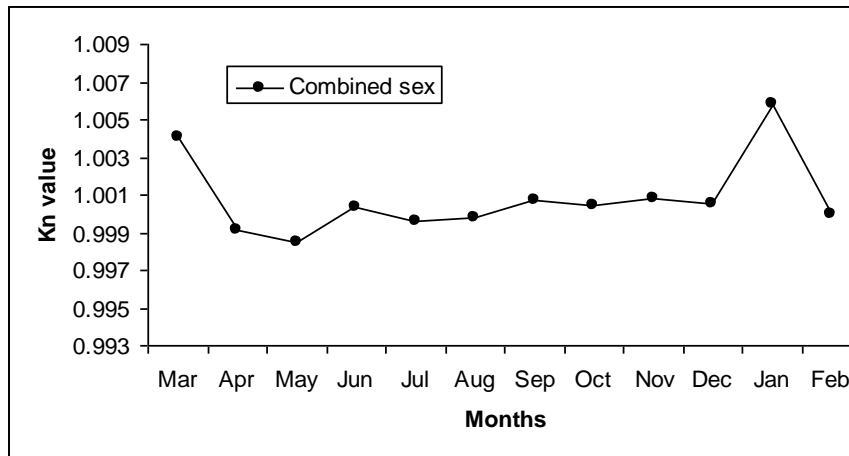


FIG. 2. RELATIVE CONDITION FACTOR (*KN*) OF *L. SAVALA* IN DIFFERENT MONTHS.

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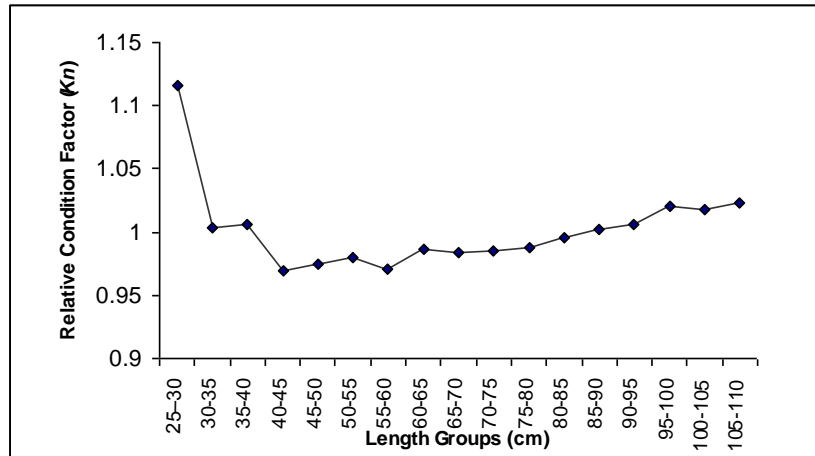


FIG. 3. RELATIVE CONDITION FACTOR (Kn) OF *L. SAVALA* IN DIFFERENT LENGTH GROUPS

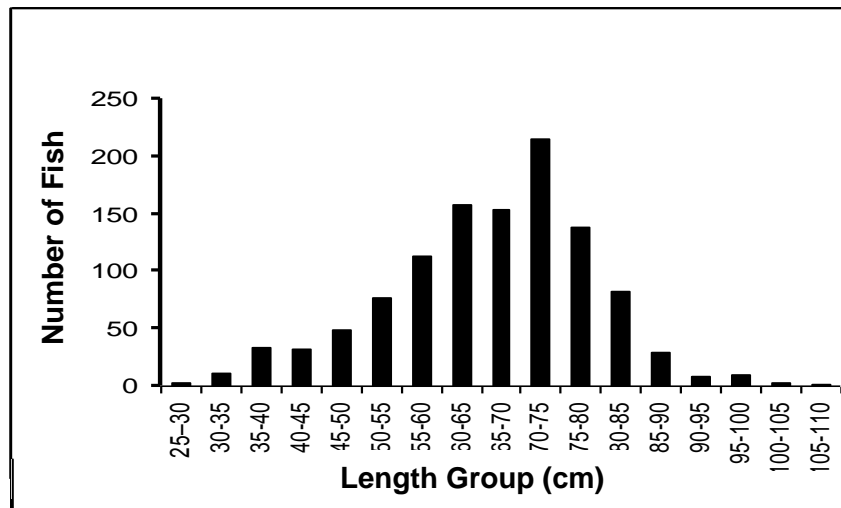


FIG. 4. SIZE FREQUENCY DISTRIBUTION OF *L. SAVALA*.

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