

LENGTH-WEIGHT RELATIONSHIP IN THE ASIAN SEABASS, *LATES CALCARIFER* (BLOCH) UNDER CULTURE CONDITION

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ABSTRACT

Asian seabass, *Lates calcarifer* (Bloch) - a catadromous centropomid perch, is a good candidate species for brackishwater aquaculture in India. The length-weight relationship and the relative condition of *L. calcarifer* were assessed under culture condition. The length of the fish samples ranged from 25 to 240 mm and the relative condition (w_p) of the fish for different length groups ranged from 99.54 to 104.39, indicating the good condition of the fish. The regression analysis of log-transformed length-weight data was carried out and the 'b' coefficient indicates the good condition of fish showing an isometric growth in the juvenile phase under culture condition.

Keywords: Asian seabass, *Lates calcarifer*, length-weight relationship

INTRODUCTION

Length-weight data of fish have generally been used either to mathematically describe the relationship between weight and length for purposes of conversion from one to another or measuring individual variation from an expected weight at a given length as an indicator of condition (Le Cren, 1951; Bolger and Connolly, 1989). Asian seabass, *Lates calcarifer* (Bloch) - a catadromous centropomid perch, is a candidate species for brackishwater aquaculture in India and its potential for farming has increased after the successful induced breeding (Thirunavakkarasu *et al.*, 2001). In the present study, the length-weight

relationship and the relative condition of the fish were assessed under culture condition.

MATERIAL AND METHODS

The fry of *L. calcarifer* were collected from the Central Institute of Brackishwater Aquaculture (CIBA), Chennai, and transported to the Kakinada Centre of the Central Institute of Fisheries Education (CIFE). The fry (4000 numbers) were reared initially for 15 days in three 1-t fibreglass reinforced plastic (FRP) tanks with a weaning diet prepared at CIBA.

After the successful weaning, 600 fry each with average initial weight of 1.73 ± 0.43 g and initial length 21.20 ± 1.50 mm were randomly stocked in three ponds of 0.08 ha each (pond no. 11 - 13). Fortnightly sampling was done by drag netting to assess the biomass and the feed quantity was adjusted accordingly. During sampling, length and weight of the fish were measured. The total length of the fish was taken from the tip of the snout to the end of caudal fin. Daily feeding was done at 6.00 A.M., 12.00 noon, 6.00 P.M. and 10.00 P.M. in four equal divided doses with the grow-out mash feed (CIBA). Initially, the amount of feed given was 20% of the biomass and later, it was reduced to 10%.

The length-weight relationship and relative condition in different lengths were analyzed using the SPSS statistical software package.

RESULTS AND DISCUSSION

The length of the samples ranged from 25 to 240 mm. The relative condition values ranged from 99.54 to 104.39 (Table 1) indicating the good condition of the fish. Analysis of variance for different length groups revealed that there is no significant difference in relative condition of fishes between the length groups. Fishes above or below the value of 100 are considered in relatively better or worse condition than a standard fish, respectively, depending on their distance from the benchmark value (Marwitz and Hubert, 1997; Porath and Peters, 1997).

Table 1: Relative condition (W_r) of *L. calcarifer* for different length groups

Length group (mm)	Mean (mm)	Standard deviation	S
< 40	104.39	26.80	267
40-80	99.54	15.21	643
80-120	100.76	11.70	654
120-160	101.52	7.86	281
>160	102.32	11.50	15
Total	100.99	15.60	1860

Strong correlations have been found between w_r and proximate fat content in walleye (Rose, 1999), white crappie (Neumann and Murphy, 1991) and hybrid striped bass (Brown and Murphy, 1991). Thus, w_r is a relative index of fat measures and as such, might be a good indicator of short-term growth potential or potential for resistance to nutritional stress (Murphy *et al.*, 1991). In addition, the utility of the w_r index is that it provides a rapid, non-invasive measure of the physiological status of fish (Brown and Murphy, 1991; Neumann and Murphy, 1992).

As there was no significant difference in relative condition of fishes between length groups, the overall length-weight relationship of *L. calcarifer* was calculated and is presented in Fig. 1. Anderson and Neumann (1996) noted that length-weight statistics are cornerstones in the foundation of fisheries management and research. It is often advantageous to mention the length-weight relationship of a population to describe changes in body form 'b', an exponent usually between 2.5 and 4.0 (a fish growing isometrically or maintaining

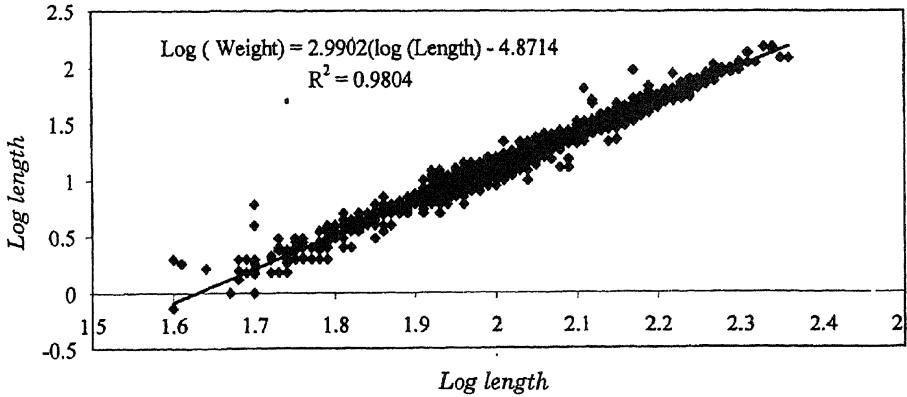


Fig. 1. Length-weight relationship of Asian seabass fed with mash feed

same shape across length categories has an exponent of 3.0). Logarithmically transformed length-weight data almost always relate in a highly significant, linear fashion. The log-transformed data can be used to compare relative condition differences among populations (Cone, 1989). Carlander (1969) suggested that a slope with 3.0 indicates favourable condition. Accordingly, the data was log-transformed and regression analysis was carried out:

$$\log W = 2.9902 \log L - 4.8714 \quad (n = 1860; R^2 = 0.9804)$$

It can be observed from the above equation that the slope/b coefficient is 2.99 indicating the good condition of the fish population. In other words, *L. calcarifer* has shown an isometric growth in juvenile stage under culture condition. Length-weight relationship in *Puntius denisonii*, a cyprinid fish, the regression equation was $\log W = 3.04 \log L - 1.7032$ (Annamercy *et al.*, 2002) and for *Horabagrus brachysoma*, a catfish, it was $\log W = 3.077 \log L - 2.040$ (Kumar *et al.*, 1999). This type of relationship is found in fishes, which

maintain a constant body shape (Brody, 1945; Lagler, 1952; Reddy, 1981).

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