

LENGTH-WEIGHT RELATIONSHIP OF THREE SPECIES OF BELONIDS AND A HEMIRAMPHID FROM THE GULF OF MANNAR

ABSTRACT

Length-weight relationship and relative condition factor of *Tylosurus crocodilus crocodilus*, *Strongylura leiura*, *Ablennes hians* and *Hemiramphus marginatus* have been studied. The regression lines of these species have been found to be significantly different from each other. All the four species exhibit isometric growth following cubic law. The relative condition factor for all the four species shows values around unity almost throughout the size range examined except for the young ones of *Ablennes hians* indicating a healthy and robust condition and good combatibility to these species with the habitat.

THE BELONIDS and hemiramphids constitute important pelagic fisheries in the Gulf of Mannar and Palk Bay. Although many species of belonids and hemiramphids have been reported to occur along the Tuticorin coast in Gulf of Mannar, only *Tylosurus crocodilus crocodilus* (Peron & Le Sueur), *Strongylura leiura* (Bleeker) and *Ablennes hians* (Valenciennes) among belonids and *Hemiramphus marginatus* (Forsk.) and *Rhynchorhampus georgii* (Valenciennes) among hemiramphids constitute a regular fishery by drift gill net at Tharuvaikulam, a fishing village situated about 18 km on the northern side of Tuticorin. Studies on these groups of fishes are very limited in India. They are by Devanesan (1937), Job and Jones (1938), Chidambaram and Menon (1948), and Talwar (1960, 1962 a & b). Information on the length-weight relationship of these fishes is limited to a single species of the halfbeak *Hyporhamphus georgii* by Talwar (1962 b). Hence the length-weight relationship and condition factor of three species of belonids and one species of hemiramphids are presented in this account.

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The material used for this study comprised 339 specimens of *Tylosurus crocodilus crocodilus*, 338 specimens of *Strongylura leiura*

and 545 specimens of *Ablennes hians* among belonids, and 285 specimens of *Hemiramphus marginatus* among hemiramphids. Fork length taken in mm from the tip of the prolonged snouts to the fork of the caudal fin for belonids, and from the tip of the upper jaw to the fork of the caudal fin for hemiramphids along with its wet weight in g were utilized in this study. The size range of fish varied from 501 mm to 1259 mm for *Tylosurus crocodilus crocodilus*, from 380 mm to 649 mm for *Strongylura leiura*, from 440 mm to 934 mm in *Ablennes hians* and from 210 mm to 304 mm for *Hemiramphus marginatus*. The fork length and wet weight of individual fish were converted into logarithmic values and then subjected to mathematical analysis as per Least squares method. Analysis of covariance (Snedecor and Cochran, 1967) was carried out to find whether the length-weight relationship of these four species are significantly different from each other or not. The relative condition factor K_n has been estimated from the relation $K_n = \frac{W}{w}$ where W is the observed weight and w is the calculated weight.

The length-weight relationship of the four species may be described in the following equations:

Tylosurus crocodilus crocodilus:

$$\log W = -6.1051 + 3.1321 \log L$$

$$r = 0.9960$$

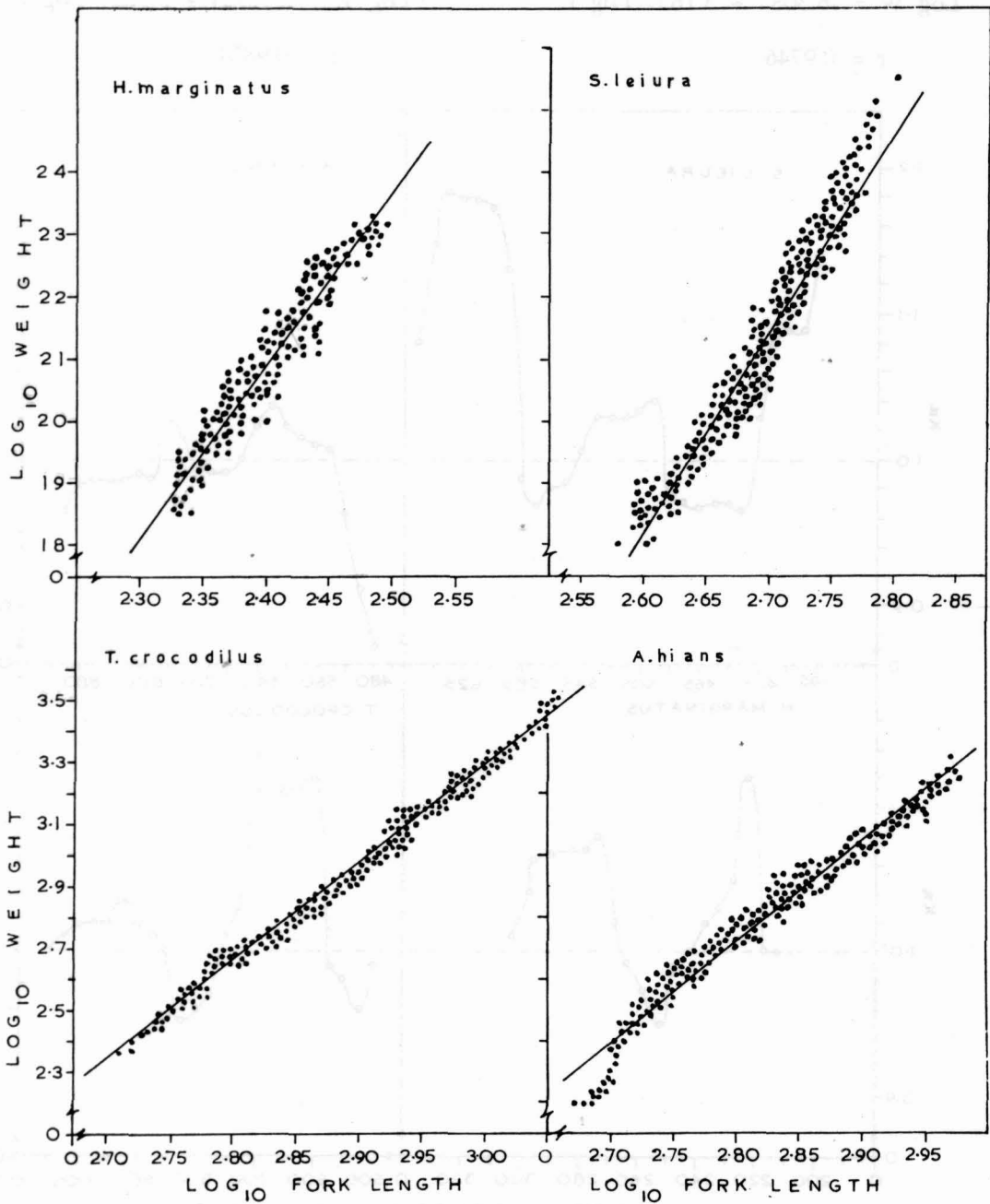


FIG. 1 The length-weight relationship curves fitted through the observed weights in \log_{10} as per the regression equations is obtained by least square method for *Hemiramphus marginatus*, *Strongylura leiura*, *Tylosurus crocodilus crocodilus* and *Ablennes hians* landed by drift gillnets at Tharuvaikulam.

Strongylura leiura :*Ablennes hians* :

$$\text{Log } W = -6.3087 + 3.1657 \text{ Log } L$$

$$\text{Log } W = -6.7624 + 3.3227 \text{ Log } L$$

$$r = 0.9746$$

$$r = 0.9874$$

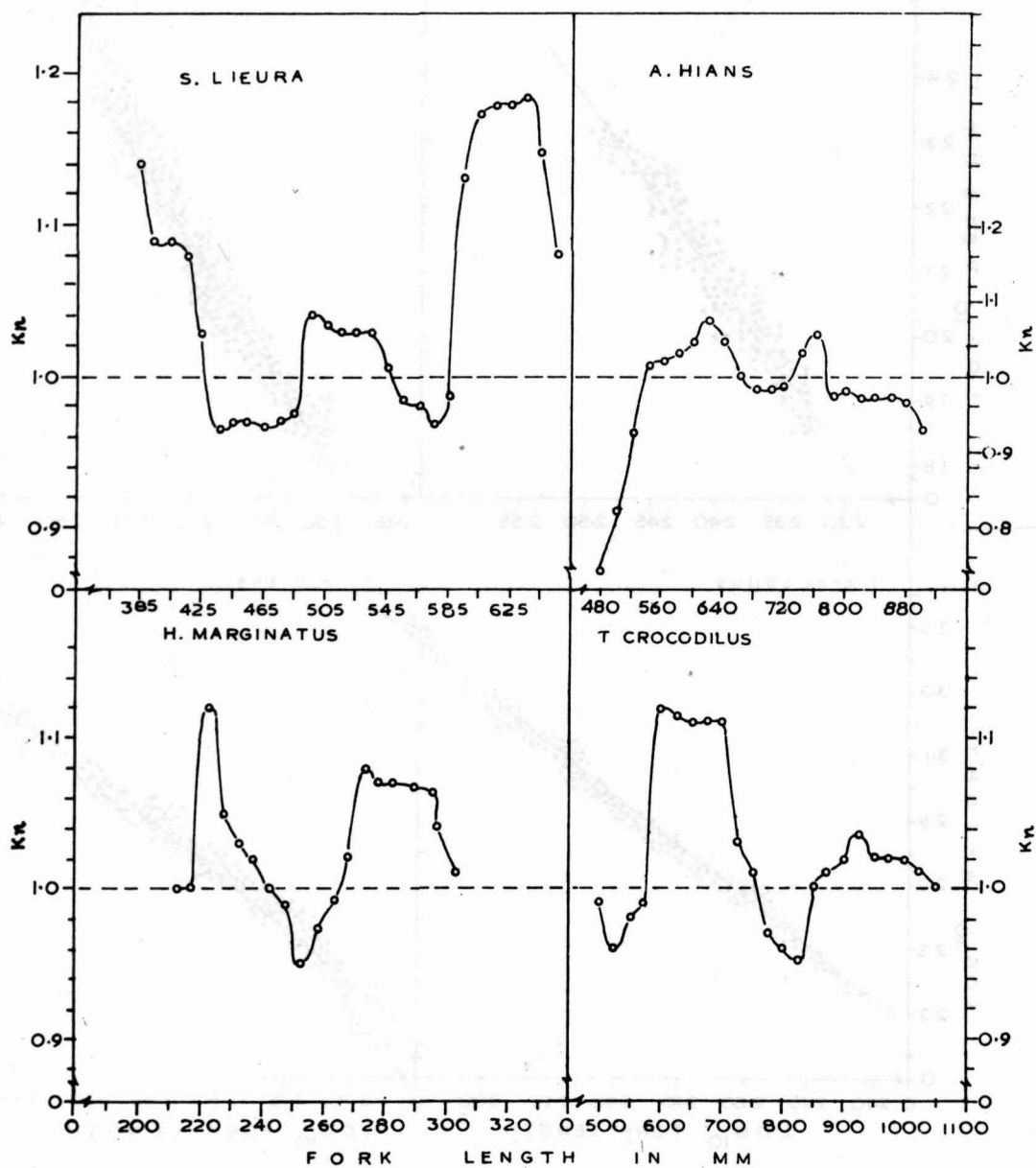


FIG. 2 Estimated relative condition factor (K_n) at different size ranges for three species of belonids and one species of hemiramphid exploited off Tharuvaikulam.

Hemiramphus marginatus :

$$\text{Log } W = -4.5806 + 2.7799 \text{ Log } L$$

$$r = 0.9253$$

The length-weight relationship curves along with the observed weights for the four species are depicted in Fig. 1. The high values of 'r' indicate the regression estimated for each species describe the length-weight relationship adequately well. The 't' test carried out on the 'b' value of all these four species show that the 'b' values are not significantly different from the theoretical value of 3 indicating that all the four species exhibit isometric growth as per the cubic law.

To test statistically the difference in the significance of the regression lines of the four species, the sum of squares of all the four species have been subjected to analysis of covariance. The F ratio obtained is 15359.2 which is higher than the 0.01% F value for a

degrees of freedom of 1502, 3. This indicates that the regressions of all the four species are significantly different from each other. Thus separate formula proposed for each species could be expected to describe satisfactorily the length weight relationship of the species concerned.

Talwar (1962 b) described the length weight relationship of *Hyporhamphus georgii* by proposing separate formulae for male and female. He observed that the cubic law is very nearly obeyed by females but not by the males.

The estimated relative condition factor (K_n values) obtained for the four species of different size ranges are illustrated in Fig. 2. Examination of these values indicate that all the four species exhibit healthy and robust condition almost throughout the size range examined, excepting for the youngones of *Ablennes hians* showing good compatibility with the environment.

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