

THE LENGTH-WEIGHT RELATIONSHIP IN *SARDINELLA SIRM* WAL
FROM THE ANDAMAN SEA

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INTRODUCTION

Length-weight relationship of the Indian oil sardines *Sardinella longiceps* has been studied by Dhulkhed (1963). However, literature on study of fish stock from the Andaman and Nicobar Sea in the Bay of Bengal is very scanty, and therefore, the studies on the length-weight relationship of *S. sirm* Walbaum, a prominent fishery of the Andaman Sea, was undertaken at Port Blair during the period 1979-80. A preliminary account is presented here.

MATERIAL AND METHODS

In all 300 specimens were collected during the course of observation from the beach seine catches. Specimens chosen for the study were random and ranged from 43 to 257 mm in length. The fishes were weighed individually with an accuracy of 0.1 g.

The data collected were grouped in following six groups 50-99, 100-149, 150-199, 200-249 and 250-300 mm, for comparison.

S. sirm maintains a proportionate body shape throughout its life. The length-weight relationship of this fish has been determined by the formula $W=aL^n$ as used by Hile (1936), Allen (1938), and Martin (1949) or in logarithmic form $\text{Log } W = \log a + n \log L$, where W is the weight of the fish, L the length and a and n are the values obtained by usual method of least squares. The observed values of length and weight of individual fish were transformed into logarithmic values and equations were calculated by the method of least squares.

RESULTS AND DISCUSSIONS

The length distribution of the samples studied is given in Fig 1. The minimum size was 43 mm and maximum was 257 mm. The fishing is seasonal and varies during different months. These samples were collected from the commercial fishery.

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Maintaining the specific shape, the weight of a particular length of a fish cannot increase or decrease beyond a limit disproportionately. Like other animals, with advancement in age beyond a certain stage the rate of growth of a fish both in length and weight becomes slower. Mean weight of fish when plotted against the mean length of different groups of fishes, generally result in a curvilinear relationship. The present studies have also shown a similar trend.

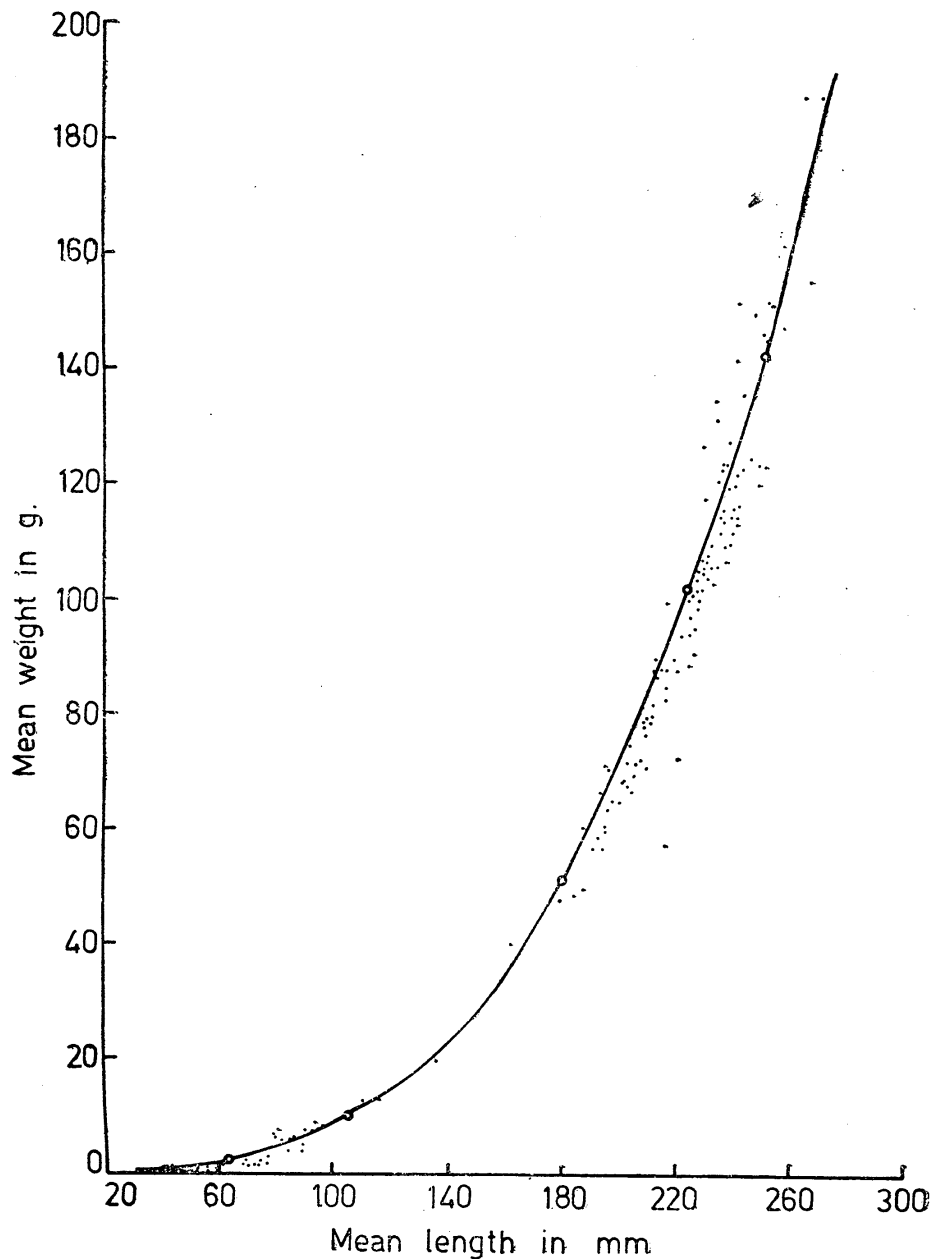


Fig. 1. Length-weight relationship of *S. sirm* from the Andaman Sea.

The length of a fish is often more rapidly and accurately measured than weight. It is very convenient to determine the weight when length is only known and occasionally it may be useful to reverse the process. Besides providing a means for calculating the weight from the length it may also give indications of taxonomic differences and events in the life history, such as metamorphosis and onset of maturity (La Cren, 1951). This information is valuable for forecasting the recruitment and potential yield of different year classes which are basic to the management of the fishery.

With a view to further analyse the data statistically the least squares method was used and logarithmic form of the general formula $W = aL^n$ was used where W is the weight of fish and L is the length and n is an exponent lying between 2.5 to 4 for the fishes which maintain a particular shape.

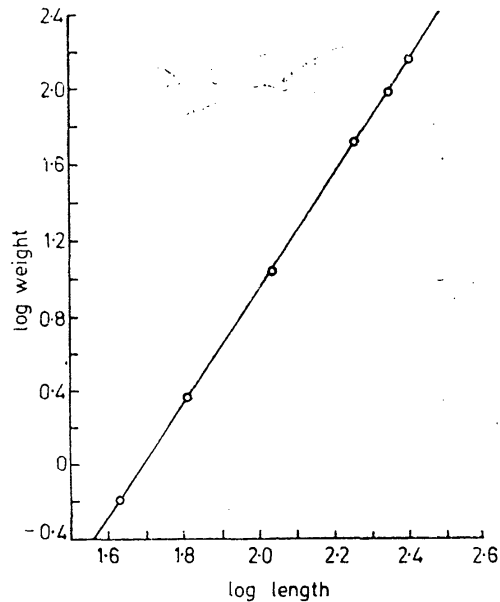


FIG. 2

Fig. 2. Log length & log Weight relationship of *S. sirm* from the Andaman Sea.

The log of weight was plotted against the log of length (Fig. 2) and a linear relationship was obtained. The constant was determined by using the formula :

$$a = \frac{\sum y}{n} - \frac{\sum x}{n} \cdot b$$

and value of -5.1651 was obtained while the value of b was determined by the formula :

$$b = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}}$$

value of x, y, xy and x^2 are given in Table 1. A value of 3.0458 was obtained for b . W was thus calculated :

$$W = 0.00001462 L^{3.0458}$$

Table 1 : Log values (x, y, xy^2) of average length and average weight of *Sardinella sirm*:

Length (mm)	x	y	xy	x ²	y—bx-a
53	1.6335	(-)0.2366	-0.3864	2.6683	(-) .1898
65	1.8129	0.4150	0.7523	3.2866	0.3566
109	2.0374	1.0414	2.1217	4.1509	1.0404
183	2.2625	1.7160	3.8824	5.1189	1.726
225	2.3522	2.0128	4.7345	5.5328	1.9992
257	2.4099	2.1584	5.2015	5.8076	2.1749
Total	x12 5084	y 7.107	xy16.306	x ² 26 5651	

The results have indicated that the fish *S. sirm* grows in proportion to length, weight, and girth, in other words, the growth in weight of this fish with respect to its length is isometric, the exponent being very close to 3. It is an ideal fish retaining its proportional shape through out its life. It appears that the group of fish studied composed of the same population and did not reveal any sub species or sub-variety. The value of exponent $b=3.0458$ suggests a healthy growth of this important fishery of Andaman waters. This also indicates that the area is productive.

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