LENGTH-WEIGHT RELATIONSHIP IN THE SNAPPER, *LUTIANUS KASMIRA* (FORSKAL)

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The length-weight relationship in *Lutianus kasmira* has been worked out from samples collected at Port Blair, Andamans during the years 1966-68. The value of the exponent 'n' in the parabolic equation was found to be very nearly 3.0. The relation between length and weight in this species could be expressed by the hypothetical cube law. The observed and calculated weights for the corresponding lengths showed a close relationship. No significant variation in the regression coefficient was noticed between the two sexes or between the years.

The relation between length and weight in a fish could be expressed by the hypothetical cube law, $W = cL^3$, where 'W' represents the weight of the fish, 'L' its length and 'c' a constant. Le Cren (1951), however, has pointed out that it is better to fit a general parabolic equation which has the form $W = aL^n$ and which expresses the relation between the two factors better than the cubic formula where 'W' and 'L' represent the weight and length of the fish respectively, 'a' is a constant equivalent to 'c' and the value of the exponent 'n' is to be determined from the data. The value of the exponent 'n' in the parabolic equation usually lies between 2.5 and 4.0 (Hile, 1936; Martin, 1949). For an ideal fish which maintains a constant shape, $n = 3.0$ (Allen, 1938). It has been pointed out by Beverton and Holt (1957) that departures from the isometric growth ($n = 3.0$) are rather rare.

In the present study a total of 792 fishes comprising of 352 females and 440 males, ranging in total length from 70 mm to 303 mm were utilized. These were collected during 1966-1968 at Port Blair, Andamans. The total length in mm was measured from snout to the tip of the tail and the weight was taken in grams for each specimen.

The general equation $W = aL^n$ can be written as $\log W = \log a + n \log L$, i.e., $Y = A + BX$ where $A = \log a$; $B = n$; $Y = \log W$ and $X = \log L$ which is a linear relation between Y and X. This linear equation was fitted separately

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for the two sexes to the data collected during the three year period. The estimates of the parameters 'A' and 'B' for each case were obtained by the method of least squares.

The analysis of covariance was employed to test if the regression of Y and X are significantly different between the males and females in each year and the results are given in Table 1.

TABLE 1. *Analysis of covariance between sexes in* Lutianus kasmira *for the years* 1966-68

Source of variation	*Degrees of freedom*	*Sum of squares*	*Mean square*	*Observed F*	*5% F*
Deviation from individual regressions within sexes during 1966	286	0.388359	0.0013579	23.0153	253-254
Difference between regressions	1	0.000059	0.000059		
Deviation from average regression	287	0.388418			
Deviation from individual regressions within sexes during 1967	233	0.370100	0.001588	45.3714	253-254
Difference between regressions	1	0.000035	0.000035		
Deviation from average regression	234	0.370135			
Deviation from individual regressions within sexes during 1968	261	0.4078848	0.00156278	4.8715	253-254
Difference between regressions	1	0.0003208	0.0003208		
Deviation from average regression	262	0.4082056			

As may be seen from the table the difference between the regression and the mean square is less than that of deviation from individual mean square and hence the differences in the length-weight relationship between the sexes was found to be not significant.

The analysis of covariance was again employed to test whether the differences in length-weight relationship for each sex between years is significant or not. The result of the analysis is given in Table 2 and it was found that the differences was not significant.

TABLE 2. *Analysis of covariance in females of* Lutianus kasmira *between years*

Source of variation	*Degrees of freedom*	*Sum of squares*	*Mean square*	*Observed F*	*5% F*
Deviation from individual regression within years	346	0.565853	0.0016354	5.1905	19.5
Differences between regressions	2	0.000630	0.000315		
Deviation from average regression	348	0.566483			

Analysis of covariance in males of Lutianus kasmira *between years*

Deviation from individual regression within years	434	0.600500	0.0013836	4.9877	19.5
Differences between regressions	2	0.0005548	0.0002774		
Deviation from average regression	436	0.6010548			

As no significant differences existed in the regression coefficients between sexes in each year, the data for both sexes were pooled for each year and a common length-weight relationship was fitted for each year separately. The analysis of covariance to test if the regression of Y and X are significantly different for each year for the pooled data has been given in Table 3. No significant differences were found in the regression coefficient between years.

TABLE 3. *Analysis of covariance for the pooled data of* Lutianus kasmira

Source of variation	*Degrees of freedom*	*Sum of squares*	*Mean square*	*Observed F*	*5% F*
Deviation from individual regressions within years	786	1.173200	0.0014926	4.6644	19.5
Differences between regressions	2	0.000640	0.000320		
Deviation from average regression	788	1.173840			

Thus the equation for the three years were found to be:—

1966: $W=0.00001139 \quad L^{3.0475}$

1967: $W=0.00001030 \quad L^{3.0715}$

1968: $W=0.00001046 \quad L^{3.0667}$

The corresponding logarithmic equation may be represented as:—

1966: $\log W = -4.9435+3.0475 \log L.$

1967: $\log W = -4.9872+3.0715 \log L.$

1968: $\log W = -4.9804+3.0667 \log L.$

As there was no variation between the years or between the sexes, the entire data for the two sexes for the three years were pooled and a general relation between log W and log L was calculated. It was found to be

$$W=0.00001063 \quad L^{3.0632}$$

The corresponding logarithmic equation may be represented as

$\log W = -4.9735+3.0632 \log L.$

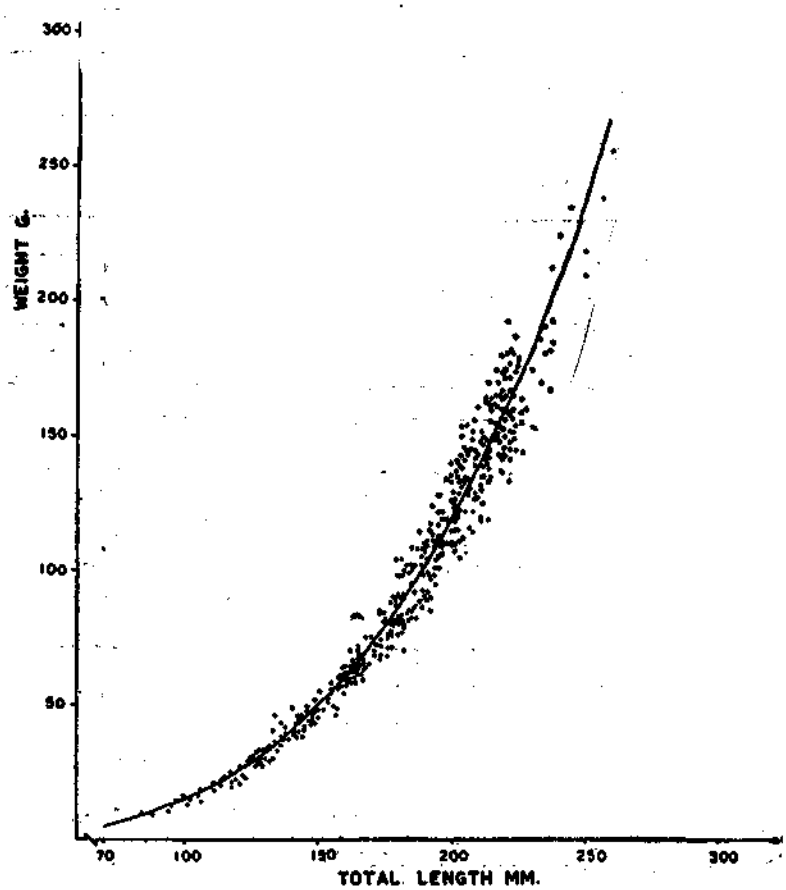

FIG. 1. Length-weight relationship of the snapper.

The observed values of length and weight of *Lutianus kasmira* were plotted and the calculated length-weight curve fitted to the data (Fig. 1).

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