LENGTH-WEIGHT RELATIONSHIP IN *PENNAHIA MACROPTHALMUS* (BLEEKER) AND *JOHNIUS CARUTTA* (BLOCH)

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ABSTRACT

No significant difference was noticed between the length-weight relationships in males and females in both *Pennahia macropthalmus* and *Johnius carutta*. Hence a common equation for both sexes in each species has been given.

The sciaenids *Pennahia macropthalmus, Johnius carutta* and *Pennahia argentata,* together forming about 10-15% of the demersal fish landings of the exploratory trawlers, are important in the commercial fisheries at Waltair. Rao (1977) has dealt with the sciaenid resources of north-Andhra and Orissa coasts. The present account deals with the length-weight relationship in *P. macropthalmus* and *J. carutta*.

The material for the study was collected during the period 1964-66 from the catches obtained from M. T. Ashok and M .V. Champa, operated off Andhra and Orissa coasts. Samples were taken at the time of unloading of the catches at the jetty. Total length, weight, sex and maturity of individual specimens were recorded in fresh condition.

For studying the length-weight relationship, 512 specimens of *P. macropthalmus* of size range 10-24 cm and 222 specimens of *J. carutta* of 4-22 cm in total length were taken into consideration.

The length measurements were grouped into 1-cm classes and the average weight in each group determined. The average length and the average weight thus obtained were transformed into logarithms and the relationship was estimated by the method of least squares.

A scatter diagram for males and females for each species was obtained by plotting the length against weight of each fish (Figs. 1 & 2). From the parabolic nature of the plot, it appears that there existed a good relationship between length and weight and the relationship was derived by using LeCren's exponential formula $W = aL^n$ (where W is the weight of fish, 'L' the length, 'a' and 'n' are
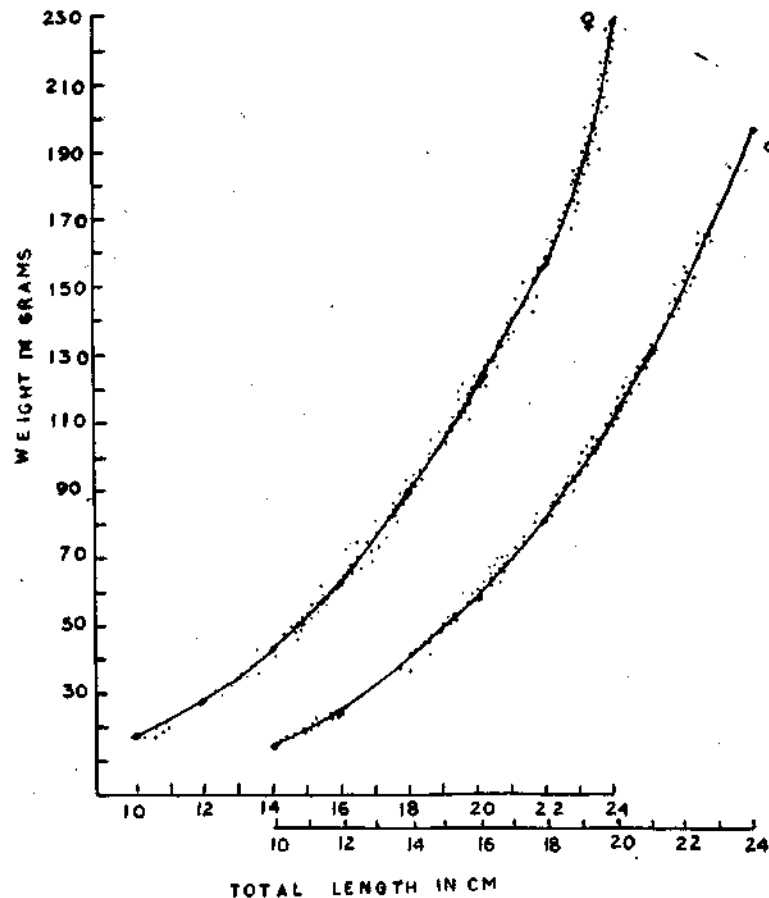

FIG. 1. Scatter diagram for males and females of *P. macropthalmus*.

constants (LeCren 1951). Taking logarithm of both sides the equation will became: Log W = log 'a' + 'n' log L. Estimates for the constants 'a' and 'n' are obtained by usual method of least squares.
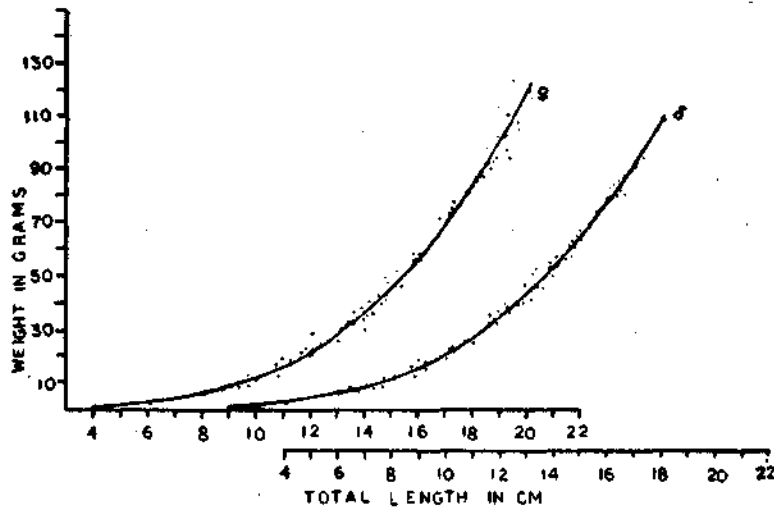

FIG. 2. Scatter diagram for males and females of *J. Carutta*.

The equations obtained were as follows:

P. Macropthalmus

| Males | : | $W = 0.02392 \ L^{2.8382}$ |
| Females | ; | $W = 0.02204 \ L^{2.8684}$ |

and the logarithmic transeformations were:

| Males | : | $\log W = 1.6213 + 2.8382 \log L$ |
| Females | : | $\log W = 1.6569 + 2.8684 \log L$ |

J. Carutta

| Males | : | $W = 0.008630 \ L^{3.1575}$ |
| Females | : | $W = 0.006017 \ L^{3.3030}$ |

An analysis of covariance by the method of Snedecor (1961) was conducted to test the significance of variation between the regression coefficients and the adjusted means for males and females and the results are shown in table 1.

It was found that in both the species the regression coefficients of the males and females and the adjusted means were not significant at 5% level. Hence the following equations describe the length-weight relationship of the species studied.

P. macropthalmus:

$$W = 0.02336 \ L^{2.8459}$$

or

$$\text{Log } W = - 1.6317 + 2.8459 \text{ Log } L$$

J. carutta:

$$W = 0.006135 \ L^{3.2821}$$

or

$$\text{Log } W = 2.2122 + 3.2821 \text{ log } L.$$

TABLE 1. *Analysis of covariance to test the difference between males and females of Pennahia macropthalmus and J. carutta.*

Source	DF	Mean square	F. value	Remarks	
P. macrophthalmus					
Males	290				
Females	212				
Within	502	0.940	0.0005	Not significant	(259)
Difference due to regression co-efficient	1	0.0009			
Common	503	0.0938			
Adjusted mean	1	0.0012	0.0127	Not Significant	(254)
Total	504				
J. Carutta					
Males	145				
Females	77				
Within	222	0.0018	0.1666	Not significant	(254)
Difference due to regression co-efficient	1	0.0003			
Common	223	0.0018	19.2222	Not significant	(254)
Adjusted mean	1	0.0346			
Total	224				

LeCren, C. E. 1951. *J. Anim. Ecol* 20: 201-209.

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Snedcor, C. W. 1961. *Statistical methods applied to experiments in Agriculture and Biology* dition). Applied Pacific Private Ltd., Bombay, 534 pp.