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THE COMPARATIVE ECOLOGY OF TWO SYMPATRIC SPECIES OF *OXYURICHTHYS* BLEEKER (PISCES : GOBIIDAE) FROM THE ENNORE ESTUARY, MADRAS

1. Length-weight relationsnip of *O. microlepis* (Bleeker) and *O. tentacularis* (Cuv. & Val.)

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ABSTRACT

Oxyurichthys microlepis (Bleeker) and *O. tentacularis* (Cuv. & Val.) co-exist in the shallow waters of the Ennore estuary. The length-weight relationship of *O. microlepis* and *O. tentacularis* during the period, 1975-76 were studied to find out whether the regressions differed between the two species and between the sexes. The analysis indicated significant difference between the two species. The regression coefficients of the two species were, however, found to conform to the cube law. The analysis showed no difference in the relationship betweeu the sexes and the prediction equation for both sexes combined are (Log W= −5.3133+3.024 Log L) and (Log W= −5.1910+ 2.9541 Log L) for *O. mircolepis* and *O. tentacularis* respectively.

INTRODUCTION

The length-weight relationships for *O. microlepis* and *O. tentacularis* of Ennore estuary has been worked out. It is generally accepted that the weight of fishes varies as cube of their lengths. Many species follow this condition. This view has a biological basis in that it represents an isometric growth. Nevertheless, deviations from the hypothetical value are not uncommon. In the case of the two species studied the regression coefficients were found to conform to the cube law but the rate of growth was different and the adult size varies between the species, which is considered as an important factor in the ecology of these species.

MATERIAL AND METHODS

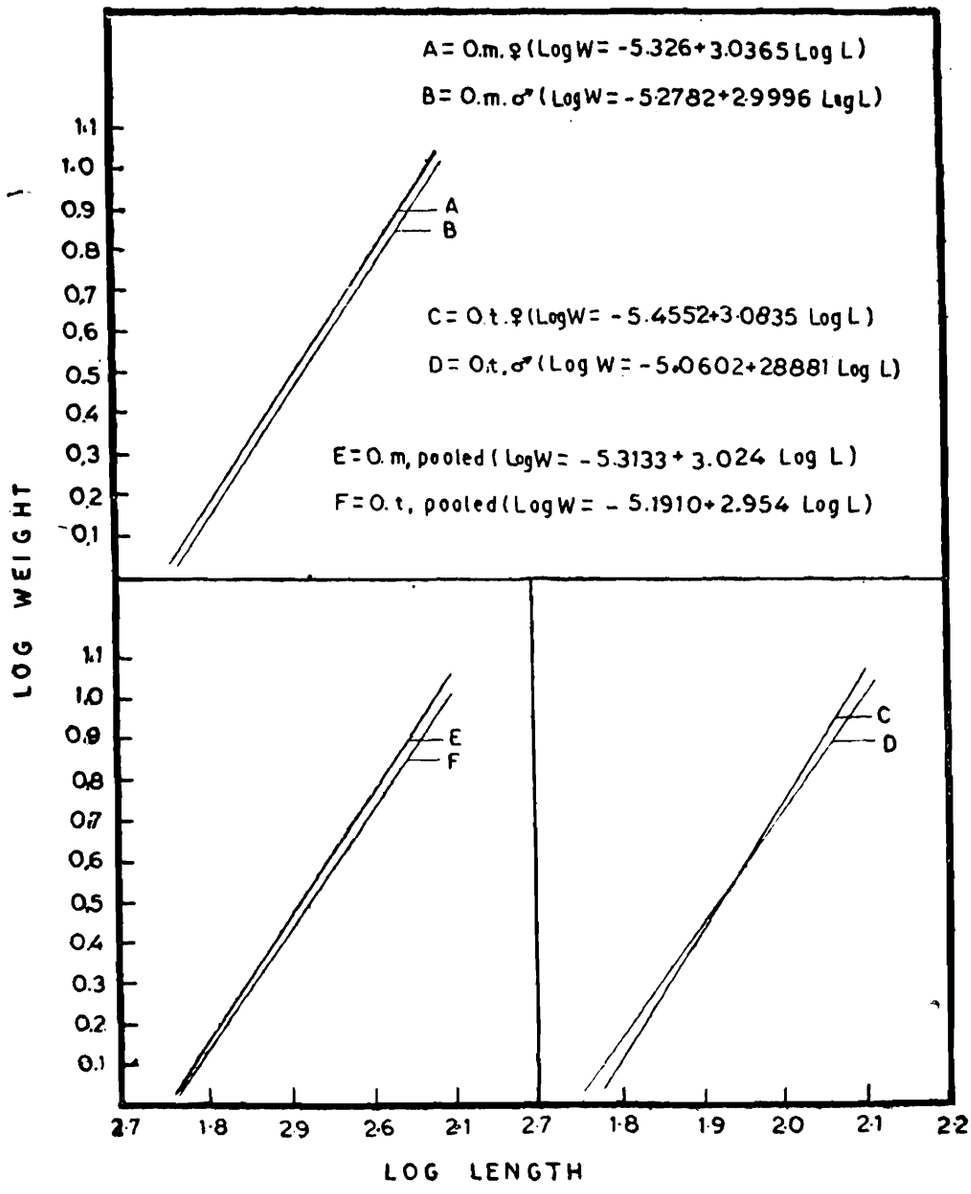
Material for the present study was collected from the Ennore estuary during the years 1975 and 1976. 586 specimens of *O. microlepis* consisting of 413 females, 56·0 mm. to 125·0 mm. in T. L. and 173 males, 56.0 mm to 125.0 mm in T. L. and 153 specimens of *O. tentacularis* consisting of 111 females, 81·0 mm. to 145·0 mm. in T. L., and 42 males, 56·0 mm. to 145·0 mm. in T. L. were analysed with class interval of 5 mm. Total length was measured to the nearest mm. and weight to the nearest 0·01 gm. The length-weight data was analysed according to Le Cren (1951). The length-weight relationship can be expressed by the formula $W = aL^b$ of Log W = log a + b log L,

where W = weight, L = length and a and b are constants which were calculated by the method of least squares. The length-weight regressions for the different sexes and species were tested by the method of analysis of co-variance and the t-test (Snedecor, 1961) was used to test whether the regression coefficient was significantly different from the cube law.

Results

The length-weight relationships obtained are given in Table 1. The data of the length-weight relationship for male and female *O. microlepis* and *O. tentacularis* analysed to test the significance of variations between the regression coefficients (b) showed that between the sexes the regression coefficients are not significant at 5% level of significance. Hence a length-weight equation common to both sexes is justified as follows.

$$\text{Log } W = -5{\cdot}3133 + 3{\cdot}024 \text{ Log } L$$



and Log W = − 5·1910 + 2·9541 Log L for *O. microlepis* and *O. tentacularis* respectively. Between the two species the regression coefficients were significant at 5% level of significance showing a difference in growth rate between the two species *O. microlepis* being more robust than *O. tentacularis* of the same length (Fig. 1 E & F). The statistical analyses are given in Table 2. Within *O. tentacularis* the female is lighter than the male when small and as it matures it becomes heavier than male, the point of intersection being the length at which the female matures. (Fig. 1 C & D)

The extent of association of length and weight was again gauged from the coefficient of correlation (r) (Table 1). In *O. microlepis* female r = 0·9098 (d. f. 12, r 5% = 0·532 and r 1% = 0·661) in *O. microlepis* male r = 0·9067 (d. f. 12, r 5% = 0·532 and r 1% = 0·661), in *O. tentacularis* female r = 0·9749 (d. f. 11. r 5% = 0·553 and r 1% = 0·684) and in *O. tentacularis* male r = 0·9340 (d. f. 15, r 5% = 0·482 and r 1% = 0·606). This shows that in both the sexes of the two species, r is significant and hence a perfect relationship exists between the length and weight.

With a view to see whether the regression coefficient (b) differs from 3, the 't' test was employed. In *O. microlepis* t is found to be 0·6046 (d. f. 12, t 1% = 3·055, t 5% =

TABLE 1. Regression equations for Length-weight relationship

SOURCE		EQUATION	r
A. *O. microlepis*	♀	Log W= −5.326+3.0365 Log L	0.91
B. *O. microlepis*	♂	Log W= −5.2782+2.9996 Log L	0.91
C. Pooled		Log W= −5.3133+3.024 Log L	0.91
D. *O. tentacularis*	♀	Log W= −5.4552+3.0835 Log L	0.97
E. *O. tentacularis*	♂	Log W= −5.0602+2.8881 Log L	0.93
F. Pooled		Log W= −5.1910+2.9541 Log L	0.93

TABLE 2. Comparison of the regression lines

SOURCE	d. f.	$S x^2$	$S xy$	$S y^2$	Deviation from Regression		
					Sum of Squares	Mean Sum of Squares	d. f.
A	13	0.1397	0.4245	1.2871	0.0024	0.000199	12
B	13	0.1355	0.4077	1.2248	0.0018	0.000146	12
C	13	0.1375	0.4158	1.2547	0.0029	0.00021	12
D	12	0.0706	0.2177	0.6854	0.0142	0.00129	11
E	16	0.2057	0.5941	1.7226	0.0068	0.00045	15
F	16	0.2071	0.6118	1.8093	0.0021	0.000138	15

2·179) and in *O. tentacularis* t is 1·6326 (d. f. 15, t 1% = 2.947, t 5% = 2·131). Thus in both the species the length-weight relationship does not differ from 3, indicating thereby that they strictly follow the cube law. However, there is difference in growth rate between the species as shown by the increased regression coefficient in *O. microlepis*. The adult size varies between the species 125·0 mm. and 145·0 mm. being the maximum sizes observed in *O. microlepis* and *O. tentacularis* respectively. The b values in the females of both the species are slightly higher than the males and may be attributed to the unisometric growth of their ovaries during maturation.

References

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