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LENGTH-WEIGHT RELATIONSHIP IN FOUR SPECIES OF THREADFIN BREAMS FROM MADRAS

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ABSTRACT

The regression coefficients of length-weight relationship of males and females of *N. mesoprion* are significantly different at 5% level. In *N. tolu, N. delagoae* and *N. luteus*, the differences are not significant. Hence, a regression equation common to both sexes is recommended for each of the latter three species.

INTRODUCTION

APART from providing a mathematical relationship between the two measurements, length and weight, a regression of weight on length is required for incorporation in a yield equation of Beverton and Holt type. For this purpose, it is a prerequisite to examine whether separate regression equations for males and females are necessary or one equation for each species will suffice. In the present note, the length–weight relationships of four species of threadfin breams, *viz.*, *Nemipterus mesoprion* (Bleeker), *N. tolu* (Valenciennes), *N. delagoae* Smith and *N. luteus* (Schneider) are reported.

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MATERIAL AND METHODS

Samples of the 4 species were collected from the trawl landing centre at Kasimedu, Madras during the years 1981 and 1982. Data on total length (from tip of snout to tip of lower caudal lobe) and weight (to nearest mm and 0.5 g respectively) were recorded separately in males and females.

The length-weight relationship was calculated by method of least squares using the equation

$$\log W = \log a + b \log L$$

where W= weight in g, L= total length in mm, and 'a' and 'b' are constants. The significance of difference at 5% level between b values of the sexes in each species was tested by Analysis of Covariance (Snedecor and Cochran, 1967).

RESULTS

N. mesoprion

The study is based on 167 males ranging in total length from 93 to 195 mm and 245 females ranging from 97 to 185 mm collected during 1982. The equations obtained are:

Males: $\log W = -4.7926 + 2.9692 \log L$; $r^2 = 0.964$

Females: $\log W = -3.0602 + 2.1570 \log L$; $r^2 = 0.746$

The ANOCOVA test of significance revealed that the difference is significant (Table 1). In

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Figure 1, the regression lines are plotted separately for males and females. Murty (1982), however, did not find significant difference between regression coefficients of males and females of *N. mesoprion* collected from Kakinada.

Females: log W = -4.7395+ 2.9230 log L; $r^2 = 0.960$

The difference between regression coefficients of males and females is not significant (Table 1). Hence the data on sexes were pooled and a

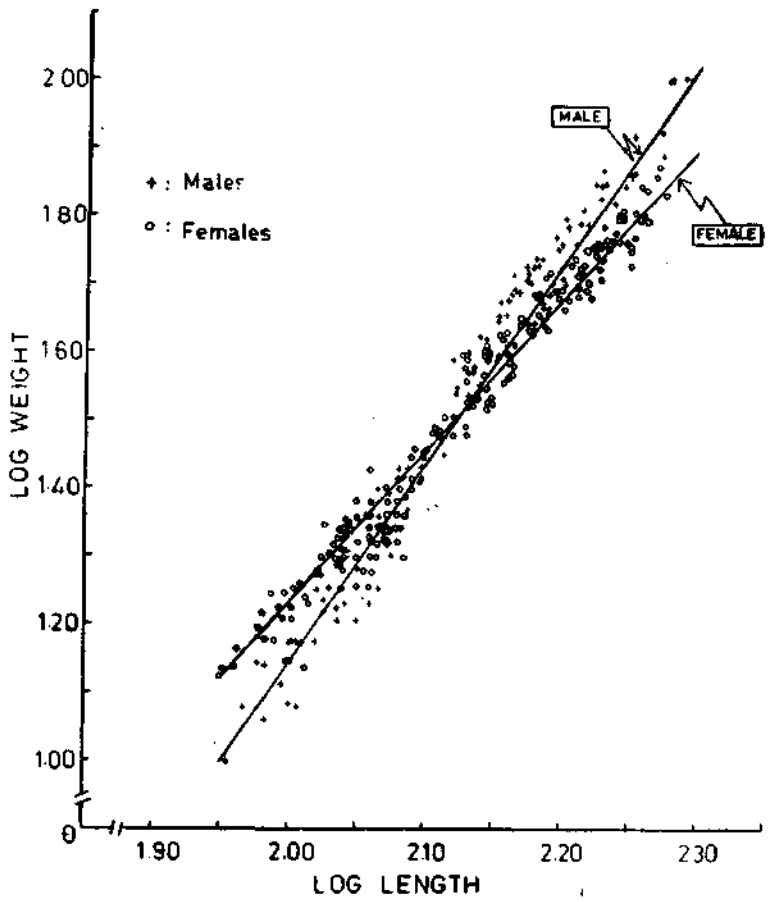

Fig. 1. Length-weight relationship in *N. mesoprion*.

N. tolu

The regression equations of 119 males (range: 108-230 mm) and 154 females (range: 95-216 mm), collected during 1981 are:

Males: log W = -4.7659 + 2.9341 log L; $r^2 = 0.962$

single equation calculated for *N. tolu* from Madras:

log W= -4.7462+ 2.9274 log L; $r^2 = 0.958$

N. delagoae

The following are the regression equations of 143 males (range: 118–223 mm) and 200

females (range: 115–214 mm) collected during 1981:

TABLE 1: *Comparison of regression lines of males and females of different species by ANOCOVA*

Source of variations		Deviation from df	SS	regression MSS
N. mesoprion				
Within				
	Males	165	1.471374	0.0089174
	Females	243	16.075556	0.0661546
		408	17.546930	0.0430072
	Pooled	409	19.666955	0.0480855
		1	2.120025	2.1200250
	F=49,295;	df=1,	408;	Significant
N. tolu				
Within				
	Males	117	0.133234	0.001140
	Females	152	0.525343	0.003460
		269	0.658577	0.002450
	Pooled	270	0.658705	0.002440
		1	0.000128	0.000128
	F=0.052;	df=1,	269;	Not significant
N. delagoae				
Within				
	Males	141	1.311694	0.0093028
	Females	198	1.529910	0.0077268
		339	2.841604	0.0083823
	Pooled	340	2.841681	0.0083579
		1	0.000077	0.0000770
	F=0.009;	df=1,	339;	Not significant
N. luteus				
Within				
	Males	214	0.801066	0.0037433
	Females	123	1.413506	0.0114919
		337	2.214572	0.0065714
	Pooled	338	2.238496	0.0066228
		1	0.023924	0.0239240
	F=3.641;	df=1,	337;	Not significant

Males: log W= -4.9770+ 3.0149 log L; r^2= 0.963

Females: log W = - 4.9602+ 3.0240 log L; r^2=0.914

The difference between regression coefficients of males and females is not significant (Table 1). Hence the data on sexes were pooled and a single equation calculated for *N. delagoae*

log W= - 4. 9659+ 3.0186 log L; r^2 =0.937

N. luteus

The regression equations of 216 males (range: 118–225 mm) and 125 females (range: 118-209 mm) collected during 1981 are:

Males: long W= - 4.5995 + 2.8740 log L; r^2= 0.963

Females: log W= - 5.0355 + 3.0836 log L; r^2 = 0.862

The difference between regression coefficients of males and females is not significant (Table 1). Hence the data on sexes were pooled and a single equation calculated for *N. luteus:*

log W= - 4.6706+ 2.9138 log L; r^2=0.925

DISCUSSION

For a fish having an unchanging body form and specific gravity, the value b=3, which describes "isometric growth." A fair number of species seem to approach this "ideal" (Ricker, 1958). But as the specific gravity and shape of the fish are subject to changes, this cube law need not hold good always. The values of regression coefficients of males and females separately for *N. mesoprion* and those of the other three species were tested against the theoretical value of 3 by the t-test. This is necessary to enable the use of the appropriate

form of Beverton-Holt yield equation. It was found that the b values are not significantly different from 3 in all cases except females of *N. mesoprion*.

References

MURTY, V. S. 1982. Observations on some aspects of biology of threadfin bream *Nemipterus mesoprion* (Bleeker) from Kakinada. *Indian J. Fish.*, **28**: 199-207 (1981).

RICKER, W. E. 1958. Handbook of computations for biological statistics of fish populations. *Bull. Fish. Res. Bd. Canada*, **119**: 300 pp.

SNEDECOR, G. W. AND W. G. COCHRAN 1967. *Statistical Methods*. Sixth Edition. Oxford & IBH Publishing Co., New Delhi, 593 pp.