LENGTH-WEIGHT RELATIONSHIP IN CATFISH *TACHYSURUS TENUISPINIS* (DAY)

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ABSTRACT

The length-weight relationship in the cat-fish, *Tachysurus tenuispinis* obtained from two zones, the north (off False Point) and the south (off Visakhapatnam), was worked out. The deviations in regression co-efficients in respect of sexes as well as zones were not significant. Hence a formula common to both sexes and regions was justified.

INTRODUCTION

The Cat-fishes, *Tachysurus thalassinus, T. tenuispinis* and *T. coelatus* together form 20% of the demersal fish stocks of north-east coast (Sekharan et al, 1973). Among the above three species *T. tenuispinis* is most important and contributes more than 60% of the total catfish catches along the Andhra-Orissa coasts (Sekharan, 1973). The depth distribution of this species along the north western part of the Bay of Bengal has been dealt with by Sekharan (1972). Mojumder (1971) studied the length-weight relationship of *T. thalassinus*. The present investigation, part of a comprehensive programme on the biology of this species, deals with the length-weight relationship of *T. tenuispinis*.

MATERIAL AND METHODS

The material for this investigation was collected during two periods, 1964-65 and 1973, and from two regions, the northern region off False Point and the southern region off Visakhapatnam, respectively, from the catches of the Government of India trawlers. Samples were collected either at the time of unloading of catches or on board at the time of fishing by the trawlers. Total length, total weight, sex and maturity etc., of each fish were recorded in fresh condition. The length was measured in mm and the weight in g. Samples consisted of 109 males and 161 females in 1964-65; and 164 males and 259 females in 1973, called hence-forth, respectively, the northern zone samples and the southern zone samples.

Scatter diagrams each for male and female of both zones were drawn separately by plotting the weight of the individual fish against length (Figs. 1

& 2). $W = aL^b$ could be fitted to the data, where W = weight of the fish, L = total length of the fish, a and b are two constants.

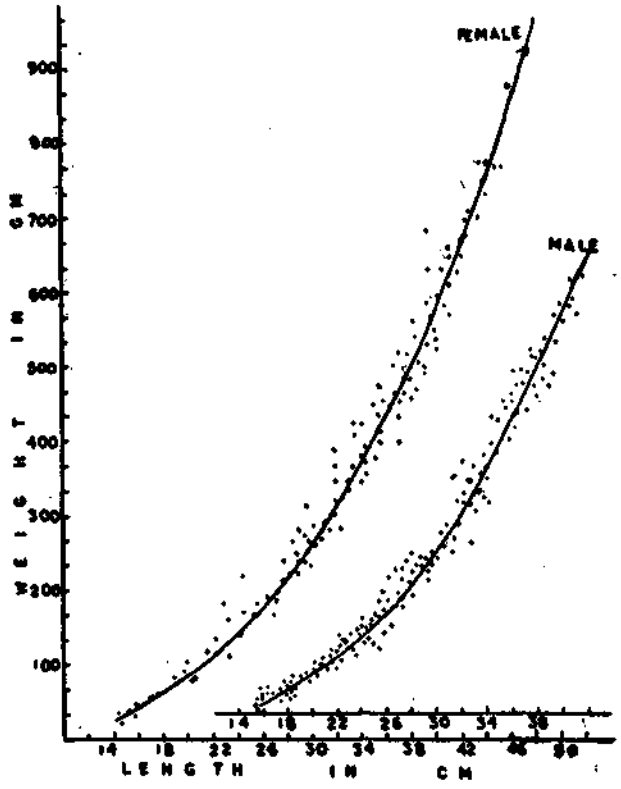

FIG. 1. Length-weight relationships in *Tachysurus tenuispinis*. (Northern zone)

Logarithmic transformation of the formula gives a straight line relationship of the form,

$$\text{Log } W = \text{Log } a + b \text{ Log } L$$

Log a and the regression co-efficient (b) were estimated by the usual method of least sqares.

RESULTS

The extent of association between the measures length and weight separately for males and females as well as for different zones was gauged from the co-efficient of correlation (r) obtained from statistical analysis of the data. The co-efficient of correlation for male was 0.9915 and for female 0.9921 in northern zone; and for the southern zone were 0.9050 and 0.9555 for males

and females respectively, which show that a very good relationship between the measures length and weight exist.

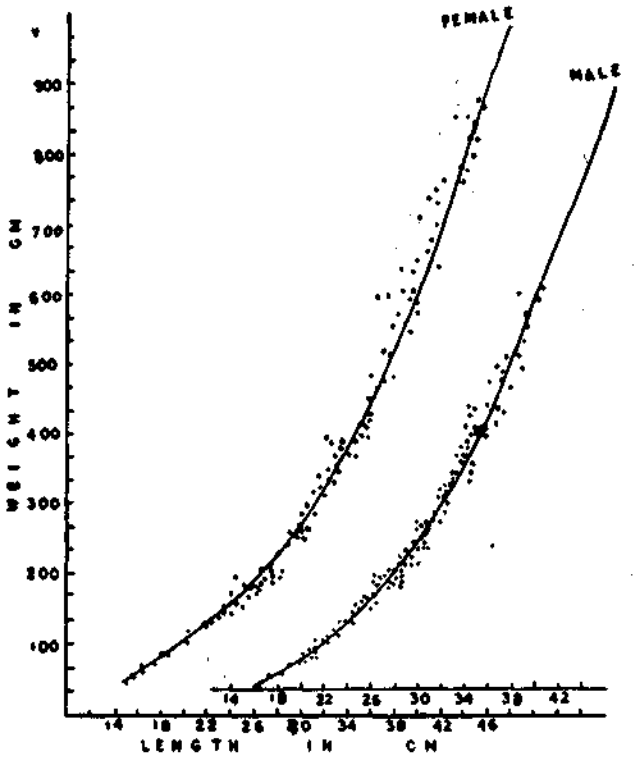

FIG. 2. Length-weight relationship in *Tachysurus tenuispinis*. (Southern zone)

Having thus determined the intensity of association, the data were further analysed to enumerate the value of the constants 'a' and 'b'. The equations obtained were:

Northern zone:

1. Males: Log W = -4.4619 + 2.7724 Log L &
2. Females: Log W = -4.7381 + 2.8888 Log L.

Southern zone:

1. Males: Log W = -4.6249 + 2.8359 Log L &
2. Females: Log W = -4.4507 + 2.7816 Log L.

The significance of variation between the four regression lines were tested (Table 1) by the analysis of covariance (Snedecor 1961). It was found that

TABLE 1. *Analysis of covariance for testing differences in regression in length-weight data of* T. tenuispinis *between sexes and zones.*

Region	Degree of Freedom	Corrected sum of square and product			Deviation from regression co-efficient (b)	Regression		Mean square	F value	value at 5% level	Remarks
		x^2	xy	y^2		Degree of freedom	$\Sigma y^2 - \frac{(\Sigma xy)^2}{\Sigma x^2}$				
North (Male)	108	1.2869	3.5678	11.4864	2.7724	107	1.5950				
North (Female)	160	2.8098	8.1170	23.8671	2.8888	159	0.4186				
South (Male)	163	0.5528	1.5677	5.0242	2.8359	162	0.5783				
South (Female)	258	1.0002	2.7824	8.6432	2.7818	257	0.9030				
Within difference due to regression co-efficient						585	3.4949	0.0060	1.13	8.54	Not significant at 5% level.
Common	689	5.6497	16.0349	49.0249		688	3.5108	0.0051			
Adjusted mean						3	0.0363		2.37	2.62	—do—
Total	692	7.2060	20.5629	62.2250		691	3.547†	0.0121			

there was no significant difference at 5% level, in the regression lines. Hence a common length-weight relationship formula was fitted and found to be:

$$\text{Log } W = -4.7347 + 2.8860 \text{ Log } L \text{ and the parabolic}$$

equation was: $W = 0.00001842\ L^{2.8860}$

As was the value of the exponent 'b' in the equation $W = aL^b$ should be 3 for an ideal fish which maintains constant shape (Brody 1945, Lagler 1952, Rounsefell and Everhart 1953, Brown 1957), the significance of variation from the expected value for an ideal fish (3.0) was tested by the 't' test by the following fomula.

$$\frac{B - b}{ab} = \frac{3.0000 - 2.8860}{0.0269} = 4.2$$

and was found to be significant at 5% level. Hence the cubic fomula $W = aL^3$ will not be a proper representation of the length-weight relationship for *T. tenuispinis*. This departure from the cubic relation has been recorded by Le Cren (1951) Sekharan (1968) and James (1967) in the case of perch (*Perca fluviatilis*, Sardines (*S. gibbosa* and *S. allella*) and ribbon fish (*E. intermedins*) respectively.

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