

## LENGTH-WEIGHT RELATIONSHIP IN *DECAPTERUS DAYI* WAKIYA

P. V. SREENIVASAN

Central Marine Fisheries Research Institute, Cochin - 18.

### ABSTRACT

Length-weight relationship in *Decapterus dayi* was worked out. Comparison of the regression coefficient  $b$  of fish belonging to different stages of maturity among males and females showed that variations were not significant in the former and significant only at 5% level in the latter. There was also no difference between males and females but both of them differed significantly from those of indeterminate. Therefore, a common equation for the males and females ( $\log w = -4.7669 + 2.9886 \log l$ ) and a separate one for indeterminates ( $\log w = -5.2628 + 3.1691 \log l$ ) were proposed.

As information on Length-weight relationship is not available on the carangid fish *Decapterus dayi* Wakiya an attempt was made and the results are presented in this account.

Samples of fish collected from Vizhinjam fish landing centre during the years 1971-1975 were considered for the study. Fork length of the fish measured from tip of the snout to tip of the shortest caudal ray was taken as standard. Weight of fish was taken up to the nearest 0.1 g.

Since the regression coefficient  $b$  in the formula  $W = aL^b$  may vary between different stages of maturity, both males and females were classified into immature (Stages I and II of I.C.E.S.) mature (Stages III, IV, V and VI) and spent (Stage VII). Existence of difference was also tested between indeterminates, males and females. All the statistical comparisons were made by analysis of covariance (Snedecor 1955).

Length-weight relationship in the indeterminate and also in all the three stages of maturity of male and female was found out after taking logarithms of lengths and weights. The linear relationships in logarithmic values of length and weight in immature, mature and spent males and females are given in Figs. 1 and 2, respectively. Correlation coefficients ( $r$ ) in all the cases were found to be highly significant.

To find out whether the same relationship between length and weight exists for all these groups, tests were done between stages of maturity of males (Table 1) and females (Table 2) separately. It was observed that there were no

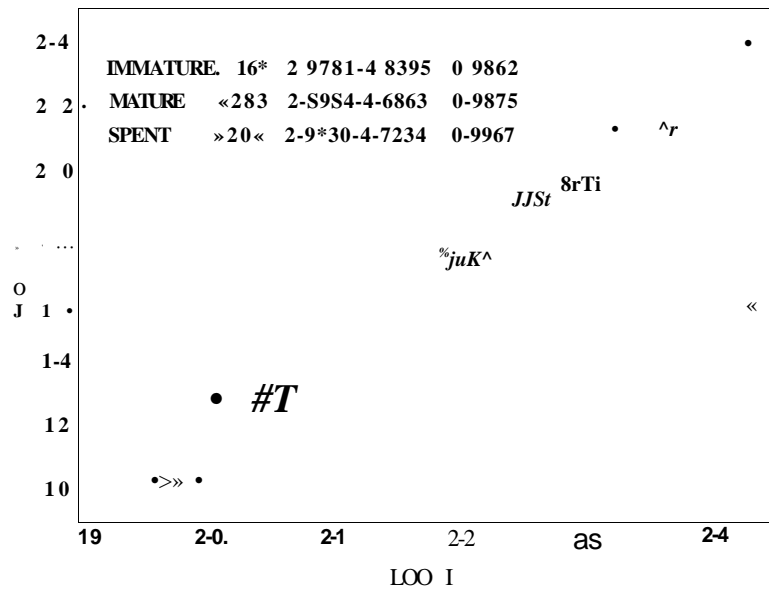


FIG. 1. Length-weight relationship among immature, mature and spent stages of males of *D. dayi* ( $n$  = number of observations;  $r$  = Correlation coefficient,  $a$  and  $b$  = regression coefficients).

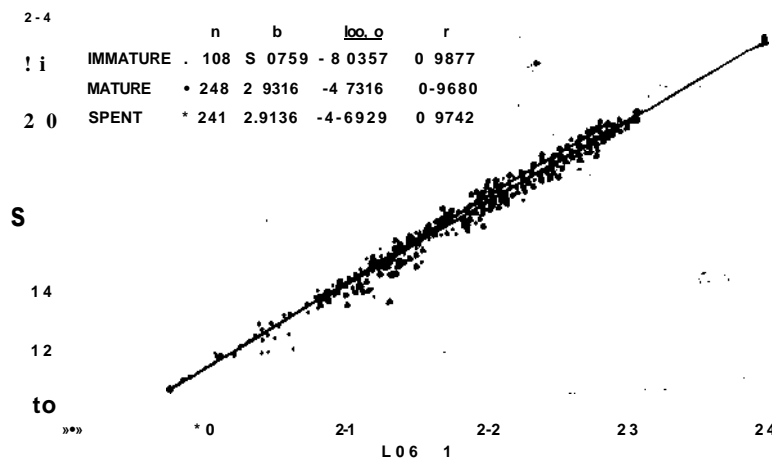


FIG. 2. Length-weight relationship among immature, mature and spent stages of females of *D. dayi*.

significant differences at 5% level. Hence all stages were combined sexwise and length-weight relationship of males, females and indeterminate were found out (Fig. 3). While testing the identity of regression lines of the above three groups, it was observed that significant differences exist even at 1% level. However, tests of equality of  $b$  values (Table 4) showed that for males and females

TABLE 1. Regression lines of log weight on log length in different stages of maturity in males of *D. dayi* (Testing the regression coefficient b)

Group	D.F.	Sx <sup>2</sup>	Sy <sup>2</sup>	Sxy	D.F.	s.s.
Immature	168	1.1024	10.0315	3.2797	167	0.2742
Mature	284	1.0436	8.9911	3.0248	283	0.2239
Spent	205	0.5871	5.4809	1.7161	204	0.4647
					656	0.9628
With groups	657	2.7331	24.5033	8.0206	656	0.9908
Variations due to	D.F.	s.s.	m.s.	F.	F. ratio	Significant at
Combined					1% 5%	
Between groups	2	0.0033*	0.00165	1.10	4.61-3.00	Not
Within groups	654	0.96218	0.00150			Significant

TABLE 2. Regression lines of log weight on log length in different stages of maturity of female in *D. dayi* (Testing the regression coefficient b)

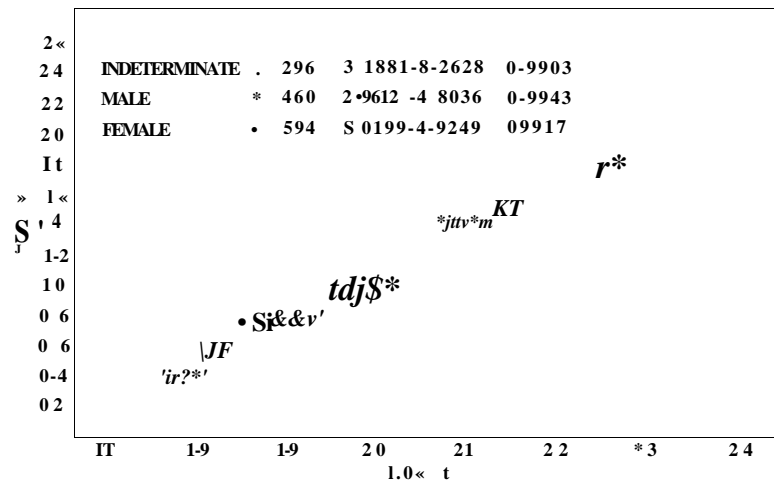
Group	D.F.	Sx <sup>2</sup>	Sy <sup>2</sup>	Sxy	D.F.	s.s.
Immature	107	0.5018	4.18664	1.5435	106	0.1189
Mature	244	0.5804	5.3403	1.7041	243	0.3369
Spent	240	0.5542	4.9574	1.6147	239	0.2529
					588	0.7087
With groups	591	1.6364	15.1641	4.8623	590	0.7166
Variations due to	D.F.	s.s.	m.s.	F.	F. ratio	Significant at
Combined					1% 5%	
Between groups	2	0.0079	0.0039	3.25	4.61-3.00	5%
Within groups	588	0.7087	0.0012			

TABLE 3. Regression lines of log weight on log length in indeterminate, male and female of *D. dayi* (Testing the regression coefficient b and a)

Group	D.F.	Sx*	Sy'	Sxy	D.F.	s.s.
Indeterminate	297	3.6743	37.6261	111.6441	296	0.7252
Male	659	31.51104	31.77131	10.3951	658	0.9908
Females	593	2.1-821	20.6492	6.5898	592	0.7484
	1549	9.3668	90.0484	28.6290	1546	2.4644
Within groups	1551	22.7750	227.3676	71.5051	1550	2.6707
Variations due to	D.F.	s.s.		F.	F. ratio	Significant at
Combined:					1%	
Between groups	4	0.2063	0.0516	32.25	3.32	
With groups	1546	2.4644'	0.0016			
Between male and Female						
Between groups	2	0.0222	0.0111	7.93	4.61	1%
Within groups	1250	11.7392	0.0014			
Between indeterminate and female						
Between groups	2	0.0664	0.0332	19.53	4.61	1%
Within groups	888	1.4736	0.0017			
Between indeterminate and male						
Between groups	2	0.1405	0.0703	39.05	4.61	1%
Within groups	954	1.7160	0.00118			

TABLE 4. Regression of log weight on log length in *D. dayi* (Testing the equality of the regression coefficient *b* between indeterminate, male and female).

Variations due to	D.F.	s.s.		F.	F. ratio	Significant at
						1% 5%
<b>Combined:</b>						
Between groups	2	0.0814	0.0407	25.44	4.61-3.00	M
Within groups	1546	2.4644	0.0016			
<b>Between male and female:</b>						
Between groups	1	0.0047	0.0047	3.35	6.63-3.84	Not
Within groups	1250	1.7392	0.0014			Significant
<b>Between indeterminate and male:</b>						
Between groups	1	0.0775	0.0775			
Within groups	954	1.7160	0.0016	43.06	6.63-3.84	1%
<b>Between indeterminate and females:</b>						
Between groups	1	0.0305	0.0305	17.94	6.63-3.84	1%
Within groups	8*8	1.4736	0.0017			



KEG. 3. Length-weight relationship among indeteminates, males and females of *D. dayi*.

the- *b* values are not different at 5% level (Table 3). This clearly indicated the possibility of having two relationships, one for indeterminates and another for adults (both for males and females), which are as follows:-

$$\text{Indeterminate : } \log w = -5.2628 + 3.1619 \log t$$

$$\text{Both male and female : } \log w = -4.7669 + 2.9886 \log t$$

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