

LENGTH-WEIGHT RELATIONSHIP OF *ODONUS NIGER* (RUPPELL, 1836)

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ABSTRACT

Length-weight relationship was studied in Odonus niger collected from the reef islands of Gulf of Mannar by SCUBA diving for a period of six months from January 2004 to June 2004. The slope value (b) estimated for Odonus niger male was found to be 2.1601 and for female 2.2508. The regression equation calculated for female was $\text{Log } W = -2.8161 + 2.2508 \text{ Log } L$, and for male was $\text{Log } W = -2.6605 + 2.1601 \text{ Log } L$. The level of significance was tested and was found to be significant between sexes at 5 % level. The slope values of other balistid species were also compared and discussed.

Key words: *Odonus niger* – length-weight relationship – regression analysis

INTRODUCTION

The Gulf of Mannar marine biosphere reserve has 21 reef islands extending between 08° 47'N 78° 12'E and 09° 15'N 79° 14'E from Pamban to Tuticorin. Among finfishes, this marine province harbours 120 marine ornamental species which finds a good place in domestic aquarium and also for export (Venkataramani et.al. 2004). The precious of ornamental fishes such as clown fish, butterfly fish, wrasse, damsel fish, rabbit fish, scorpion fish and leather jackets were recorded in large numbers in coral reef islands of Gulf of Mannar. About 36 species of balistids are known to occur in the tropical seas across the globe. The study on length-weight relationship of this species in Indian waters has not been attempted so far. This study will be of immense use in estimation of yield per recruit in prediction models, and in the estimation of biomass from length observations.

MATERIALS AND METHODS

Length-weight relationship study was carried out in 122 specimens of *Odonus niger*

ranging from 75 to 254 cm in total length. The specimens were collected from Van island and Kaswari islands 08° 50'N 78° 15'E and 08° 52'N 78° 15'E of Tuticorin coast by undertaking SCUBA diving. The diving was made for six months (thrice in a month - once in 10 days) from January 2004 to June 2004. The total-length was measured from the tip of the snout to the tip of the upper lobe of caudal fin in mm and weight was recorded to the nearest 0.1 gm. Specimen where the tails are broken are rejected. The length-weight relationship was calculated by the method of least squares using the equation $\log W = \log a + \log L$ where W= weight in gm, L total length in mm and 'a' and 'b' are the two constants.

RESULTS AND DISCUSSION

To find out the significant differences in the regression equations of both the sexes, analysis of covariance was used (Snedecor and Cochran, 1967). The linear equation was also fitted separately for males and females. The correlation coefficient derived for the length-weight relationship for males and females are given in Table.1. The regression

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equations derived for both the sexes are presented below

Female Log W = -2.8161 + 2.2508 Log L,

Male was Log W = -2.6605 + 2.1601 Log L.

The results showed significant difference between sexes of the species and the 'F' values was found to be significant at 5 % level (Table-1). The correlation coefficient (r) derived for males and females were 0.90 and 0.95 respectively showing a high degree of significance between length and weight. The observed total length plotted against total weight for males and females are presented in Figure 2 & 3. Comparison of the slope of the regression equation revealed significant differences between sexes of *Odonus niger*. The calculated slope value was 2.16 for males and 2.25 for females. Randall et.al (1990) studied the length-weight relationship of *Odonus niger* and *Balistapus undulates* and reported the slope value of 3.0 and 3.6 for both the sexes. In the present study, slope value was higher in females compared to males. Robins (1986) reported a slope value of 2.87 and 2.93 for both the sexes of *Balistes vetula* and *Xanthichthys ringens*. A good correlation was consistently observed between length and weight by Matsuura (2001) for *Rhinecanthus rectangulus*. Myers (1991) studied more length gain and the recorded a slope value of 2.96 for both sexes. Thus comparing the slope of *Odonus niger* with other species of the balistids, it could be concluded that the slope value is less than 3 for both the sexes of *Odonus niger*.

REFERENCES

- Matsuura, K. (2001). Balistidae. Triggerfishes. p. 3911-3928. In K.E. Carpenter and V. Niem (eds.) FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific. Vol. 6. Bony fishes part 4 (Labridae to Latimeriidae), estuarine crocodiles. FAO, Rome.
- Myers, R.F., (1991). Micronesian reef fishes. Second Ed. Coral Graphics, Barrigada, Guam, p. 298
- Randall, J.E., G.R. Allen and R.C. Steene, (1990). Fishes of the Great Barrier Reef and Coral Sea. University of Hawaii press, Honolulu, Hawaii, p. 506
- Robins, C.R., and G.C. Ray, (1986). A field guide to Atlantic coast fishes of North America. Houghton Mifflin Company, Boston, U.S.A. p. 354
- Snedecor, G.W. and W. G Cochran, (1967). Statistical methods. Oxford and IBH. Publishing co., New Delhi, 593 pp.
- Venkataramni, V.K., P. Jawahar, R.Santhanam and T.Vaitheeswaran (2004). Marine ornamental fishes of Gulf of Mannar. NATP/CGP publication. P. 1- 175

Length-Weight Relationship of *Odonus niger* (Ruppell, 1836)

Table 1

Statistics in the length-weight relationship of males and females of *Odonus niger*

Sex	N	SX	SY	SX ²	SY ²	SXY
Female	70	156.2218	151.2223	375.6456	316.6015	349.9881
Male	52	114.8759	112.127	281.1056	235.2308	259.8469

N = Number of fish
 SX², SY², SXY = Sum of squares and product
 SX, SY = Sum of logarithmic values of length and weight respectively.

Table 2

Regression data for the length-weight relationship of males and females of *Odonus niger*

Sex	Sum of Squares and Products					DF
	DF	X ²	XY	Y ²	B	
Female	70	375.6456	349.9881	316.6015	2.1601	69
Male	52	281.1053	259.8469	235.2308	2.2508	51

DF: Regression freedom B: Regression Co-efficient SS: Sum of Squares

Table 3

Test of Significance

Source of Variation	DF	Sum of Square	Mean Square	Observed F
Deviation from individual with in sexes	1	692.2471	692.2471	160.8829
Difference between Regression	120	516.3361	4.3028	
Deviation from Total Regression	121	1208.5832		Significant at 5% level

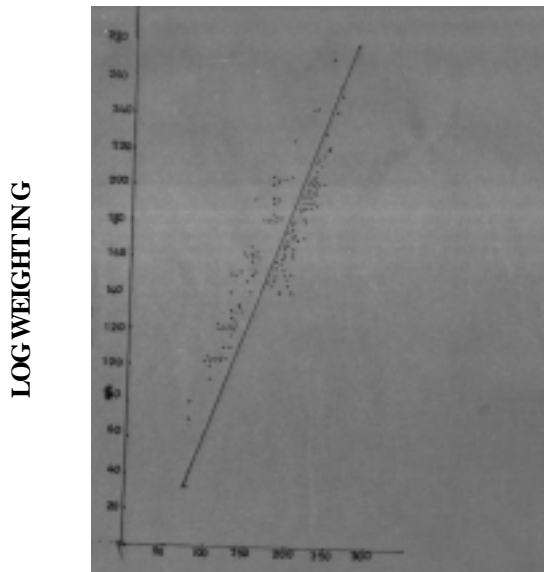


Figure 1

Logarithmic relationship between length and weight of male *Odonus niger* (Ruppell, 1836)

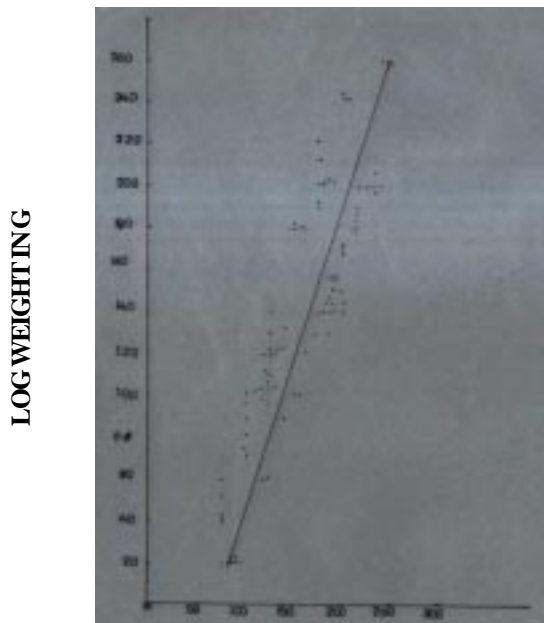


Figure 2

Logarithmic relationship between length and weight of female *Odonus niger* (Ruppell, 1836)