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Length – Weight Relationship of *Otolithes ruber* (Schneider, 1801) from Thoothukudi coast, Tamil Nadu, India

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ABSTRACT

The 'b' value of *Otolithes ruber* was calculated along the Thoothukudi coast during July 2006 to June 2007. The 'b' value (2.8347) of *O. ruber* departed significantly from 3 using student's *t* - test which indicates allometric growth.

Keywords: *Otolithes ruber*, length and weight relationship, sciaenids, Thoothukudi

1. Introduction

Length weight relationship is a vital factor for estimating fish stock assessment and studying biology of fishes. The length weight relationship is used to estimate the average weight of the animal of a given length group by establishing a mathematical relationship between the two variables and also to find out the relative well-being of the fishes. Sciaenid species are important group in the commercial trawl net catch in Indian waters. At Thoothukudi, they are also caught by trawl net followed by shore seines and gill nets. Among the sciaenid species *O. ruber* is the most important catch exploited next to the *Nibea maculata* in the Gulf of Mannar region. *O. ruber* is locally known as *Panna* in Thoothukudi region [1]. *Nibea maculata* (92%) and *Otolithes ruber* (7.9%) were the dominant species constituting the sciaenid fishery at Thoothukudi [2]. Biology of *Otolithes ruber* has been studied by several workers [3, 4, 5]. Many researchers studied the length weight relationship and relative condition factor of several sciaenids in different part of Indian region [6, 7, 8, 9, 10, 11, 12]. However the length – weight relationship of *O. ruber* in Gulf of Mannar region is very limited except, Jayasankar, 1990 [13]. Hence the present study has been carried out for *O. ruber* at Thoothukudi coast of Gulf of Mannar.

2. Materials & methods

Present study has been taken for the period of 12 months from July 2006 to June 2007. The sample of *O. ruber* was collected frequently from commercial trawlers operated up to the depth of 30-40 meters in the Thoothukudi fishing harbour and also from the gill net and shore seine catches during the lean months. The total of 250 fishes ranging in the total length from 11.2 cm to 42.5 cm and weighing 20g to 850g in fresh condition. The total length of *O. ruber* was measured nearest to centimeter and weight nearest to gram. The length weight relationship of *O. ruber* was worked out by the least square method using the following equation.

$$W = aL^b$$

Where,

W – Weight of the fish (in grams),
L – Total length (in cm),
a & b – Constants

The 'b' value of *O. ruber* was tested against '3' by using student's *t* – test.

3. Results

In Gulf of Mannar region, the catch of *Otolithes ruber* was observed throughout the year.

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The length group ranged from 11.2 cm to 42.5 cm (Fig.1) was represented in the catch. Smaller sized animals were recorded during September, October, March and June, whereas large sized animal were recorded during the month of April. The length weight relationship was calculated based on the representative length samples taken from group ranged from 11.2 cm to 42.5 cm. The length weight relationship of *O. ruber* was calculated from 250 species represented in the catch of the

Thoothukudi coast (Fig. 2) obtained as follows:

$$\text{Log } W = 0.018 + 2.8347 \log L; r^2 = 0.885$$

The 'b' value (2.8347) of *O. ruber* was tested by student's t – test which indicated that 'b' value of the species was significantly at 5% level with 248 degrees of freedom. The t – test table of *O. ruber* was described below (Table. 1).

Table 1: The t –test table of *O. ruber*

Source of variation	DF	SS	MS	F	(b-3) t = ----- SE(b)	Table 't' value	
						5%	1%
Due to regression	1	15.2598	15.2598	1916.0974	2.5525*	1.960	2.526
Error	248	1.9751	0.007964	-	-	-	-
Total	249	17.2349	-	-	-	-	-

*5% significant

$\Sigma x = 316.8193; \Sigma y = 492.9932$

$\Sigma xy = 592.1241; \Sigma x^2 = 403.3971 ; \Sigma y^2 = 874.6875$

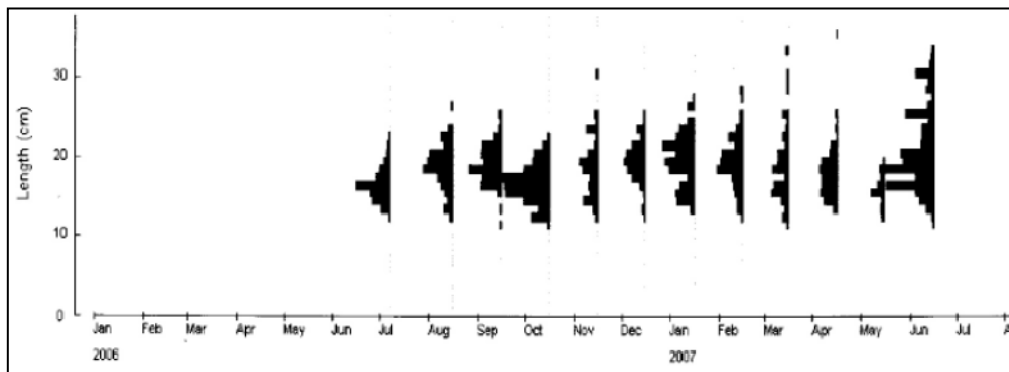


Fig 1: Length frequency distribution and seasonal occurrence of *O. ruber* (July 2006 – 2007)

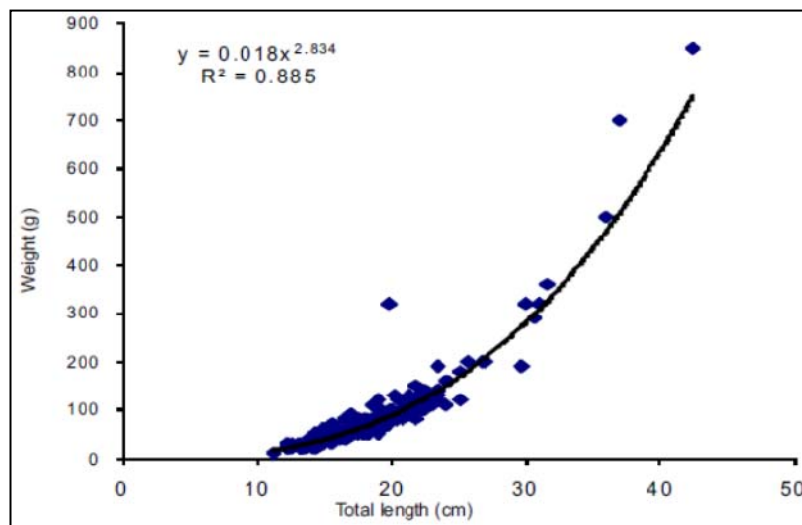


Fig 2: Length-Weight relationship of *O. ruber*

4. Discussion

The length frequency study on sciaenid fishes are limited at Thoothukudi coast and the present observation will give base idea about their exploited size range. During the present study, *Otolithes ruber* was observed throughout the year in Thoothukudi coast. They were mainly caught by trawl net followed by gill net and shore seine with the length range from 11.2 cm to 45.2 cm. The observation of the larger specimen was about 45 cm during the month of April in Thoothukudi coast. Capture of larger specimen in deeper part by trawlers was observed during this study. The periodic observation during the study period revealed that *Nibea maculata*

represented heavily among the sciaenid fishery followed by *O. ruber* and *O. ruber* catch constitutes roughly 12% of the total sciaenid catch. The catch analysis of gears revealed that sciaenid fishes were mainly caught by trawl net at Thoothukudi region. Present study based on the one year length frequency reveals that, fair number of smaller fishes caught during September to October and March to June which indicates that, *O. ruber* is a multiple spawner in Thoothukudi region. Earlier studies revealed the spawning of *O. ruber* during August to September in Gulf of Mannar region [14] and in Bombay coast spawning season of *O. ruber* was observed during July to October [3]. This species spawns once in a year

in East and West coasts of India which deviates from our study. The 'b' value of '3' indicated that isometric growth and fair number of seems to approach this ideal value ^[15]. The calculated 'b' value of 2.8347 exhibit allometric growth in *O. ruber*. The present calculated 'b' value is significantly differs from the earlier observation (3.2744) for the same species observed at Mandapam region ^[13]. This variation could be due to the narrow range of specimens used to study the relationship at Mandapam where the trawlers operate at a lower depth. It may also be due to the geographical and ecological difference in water quality parameters and food availability that are responsible to alter growth as well as overall condition of the fish ^[16]. The observed 'b' value for other sciaenid species like *Atrubucca nibe* ^[17], *Johnieops vogleri* ^[9], *Pennahia macrophthalmus* and *Johnius carutta* ^[10], *Nibeia maculata* ^[12], *Otolithoides biauritus* ^[18], *Johnieops sina*, *Dendrophysa russelli*, *Johnius dussumieri* and *Johnius macropterus* ^[19], *Johnius macrorhynus* ^[20] ranged from 2.6460 to 3.3981 in east and west coasts of India. This observation of 'b' value for *O. ruber* falls in between these ranges. The study on the significant 'b' using student's 't' test revealed that significant deviation was found in *O. ruber* at Thoothukudi coast and revealed allometric nature of growth. From the present study, it can be concluded that the growth of *O. ruber* in length and weight is relatively lower when compared to the growth in weight.

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