SOME BIOLOGICAL ASPECTS OF LESSEPSIAN
SARGOCENTRON RUBRUM (FORSSKÅL, 1775)
IN THE NORTH CYPRUS, MEDITERRANEAN SEA

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Abstract

This study was carried out by trammel nets in the waters of North Cyprus, 0-50 m, between January - November 2016. The size frequency distribution and length/weight relationships of Sargocentron rubrum were determined. A total of 148 individuals of lessepsian fish species were sampled during the study. Length and weight of the samples varied between 11.1 - 20.1 (15.1 ± 2.6) cm total length and 23.73 - 153.33 (66.19 ± 33.66) g respectively. The relation between total length (L) and weight (W) was determined as \( W = 0.0138L^{3.0915} \) \( R^2 = 0.9773 \). It was determined that Sargocentron rubrum showed positive allometric growth.

Key words: Lessepsian fish, Sargocentron rubrum, biological aspects, North Cyprus, Mediterranean Sea.

INTRODUCTION

Since the opening Suez canal about 130 red sea species have become successful colonizers of the Mediterranean Sea (Safriel and Ritte, 1986). Some lessepsian fish species in the eastern Mediterranean were very well colonized, such as Indo-Pacific species Sargocentron rubrum, Siganus rivulatus, Etrumeus teres Fistularia commersonii, Lagocephalus sceleratus in the eastern Mediterranean.

Sargocentron rubrum is one of lessepsian fish species can be found between the depths of 1-84 m, in the Mediterranean Sea (Randall, 1998). It is inhabits in caves and cracks (Kuiter and Tonozuka, 2001); coastal reefs (Lieske and Myers, 1994), silty reefs, wreck in lagoons, bays, and harbours (Randall, 1998). This species feed on the small fishes, shrimps, and crabs (Randall et al., 1990; Göthel, 1992). This species is distributed in Red Sea to the western Pacific (from southern Japan to New Caledonia, Vanuatu and New South Wales, Australia) (Randall et al., 2003). It can reach maximum 32 cm in length (Williams and Greenfield, 2016).

In this present study, some less known properties (population dynamics and growth performance) of lessepsian fish species S. rubrum in the Cyprus, eastern Mediterranean Sea were reported.

MATERIALS AND METHODS

The study was carried out from 4 different stations (Table 1) in the north Cyprus (Figure 1), eastern Mediterranean Sea, between January and November 2016. Samples of S. rubrum (Figure 2) were caught by the trammel nets (22 mm mesh) from the depths 0 - 50 m. 4 - 6 m fishing boats (20 - 30 HP) were used to catch the fish species. The bottom structure of the four fishing ground were rocky.

<table>
<thead>
<tr>
<th>Stations</th>
<th>Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35°14'44.5&quot;N, 33°57'04.1&quot;E</td>
</tr>
<tr>
<td>2</td>
<td>35°24'12.8&quot;N, 32°55'12.6&quot;E</td>
</tr>
<tr>
<td>3</td>
<td>35°21'10.5&quot;N, 33°09'44.9&quot;E</td>
</tr>
<tr>
<td>4</td>
<td>35°33'26.2&quot;N, 34°13'04.9&quot;E</td>
</tr>
</tbody>
</table>

A total of 10 fishing operation were performed. Trammel net used in the study had 22 mm bar length in the inner panels and consisted of PA multifilament webbing made of 210 d/2 and 60 meshes depth with a hanging ratio of 0.59. The outer panels had a mesh size of 100 mm with 8.5 meshes depth those used by local commercial fishers were used in the north Cyprus. Float lines of the nets were equipped...
with PP Ø4 no floats and 30 g lead sinkers. The experimental trammel net with a total length of 210 m was obtained using one sheet of each mesh size in 70 m long.

Samples were caught and total length (TL) was taken from tip of snout to caudal fin end (TL) measured to the nearest centimeter and then weighed to the nearest grams in the laboratory. In the laboratory, fishes were identified to species level, based on following Smith and Heemstra (1986).

In the study, the relationship between length and weight were calculated by using the formula $W = a TL^b$, in which $W$ is the total weight (g) and TL is the total length (cm). The parameters $a$ and $b$ were estimated by functional regression. In the equal $b$ value for each species was tested by t-test at the 0.05 significance level to verify that it was significantly different from isometric growth (Froese, 2006).

RESULTS AND DISCUSSIONS

A total of 148 specimens of *S. rubrum* were caught and analyzed during the research period.

The mean length was estimated as $15.06 \pm 2.56$ cm, ranging from $11.1$ cm to $20.1$ cm TL; and weight was $66.19 \pm 33.65$ g, varying from $23.7$ g to $153.3$ g. The length and weight frequency distribution diagrams were given in Figure 3, 4.

The length/weight relationships were calculated and showed in Figure 5. According to table the length-weight relationship curves, allometry in growth is observed positive.
The largest individual of *S. rubrum* caught in the present study was recorded as 20.1 cm TL (153.33 g).

In the previous study, Krishna et al. (2015) were estimated the minimum and maximum lengths, the length/weight parameters a and b, coefficient of determination ($r^2$) in Table 2.

### Table 2. Length-weight relationship for sargocentron rubrum in the north Cyprus, Mediterranean Sea

<table>
<thead>
<tr>
<th>Specification</th>
<th>n</th>
<th>Length range (cm)</th>
<th>a</th>
<th>b</th>
<th>$r^2$</th>
<th>Growth type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Study</td>
<td>14</td>
<td>11.1-20.1</td>
<td>0.0013</td>
<td>3.0915</td>
<td>0.9773</td>
<td>+</td>
</tr>
<tr>
<td>Krishna et al., 2015</td>
<td>44</td>
<td>11.1-21.2</td>
<td>0.0089</td>
<td>3.102</td>
<td>0.849</td>
<td>+</td>
</tr>
</tbody>
</table>

Our results for *S. rubrum* were found similar with the findings of Krishna et al. (2015), from Visakhapatnam coastal waters, India.

Generally, parameters of length/weight relationships can be affected by several factors such as season, sample size, habitat, gonad maturity, sex, diet and stomach fullness, health, fish activities, seasonal growth rates and preservation techniques (Benegal and Tesch, 1978).

Even if both studied fishing ground were far from each other, similar results were recorded for *S. rubrum*.

### CONCLUSIONS

Even if, *S. rubrum* has a minor commercial value in the Mediterranean Sea, present study results are provided the basic information on the length-weight relationships of *S. rubrum* from the north Cyprus rocky substrate can be useful for the management of fishery resources.

### REFERENCES


Smith M.M., Heemstra P.C., Smith’s Sea Fishes. Springer-Verlag publication, Berlin, 509-537.