Scientific Papers. Series D. Animal Science. Vol. LX, 2017
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

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

Yaşar ÖZVAROL, Aysu TATLISES

Akdeniz University, Faculty of Fisheries, Pinarbaşı bulvarı, 07059 Antalya, Turkey

Corresponding author e-mail: ozvarol@akdeniz.edu.tr

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 1. Coordinates of stations in the Mediterranean Sea

Stations	Coordinates
1	35°14'44.5"N, 33°57'04.1"E
2	35°24'12.8"N, 32°55'12.6"E
3	35°21'10.5"N, 33°09'44.9"E
4	35°33'26.2"N, 34°13'04.9"E

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.

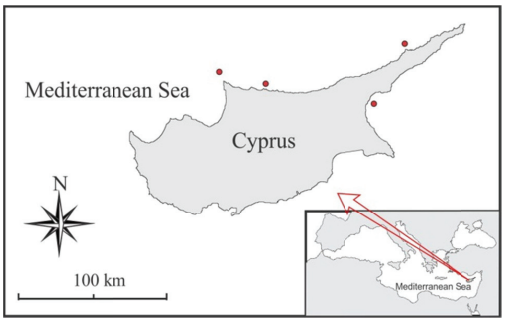

Figure 1. Sampling areas

Figure 2. Research material *Sargocentron rubrum*

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 ± 2,56 cm, ranging from 11.1 cm to 20.1 cm TL; and weight was 66.19 ± 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.

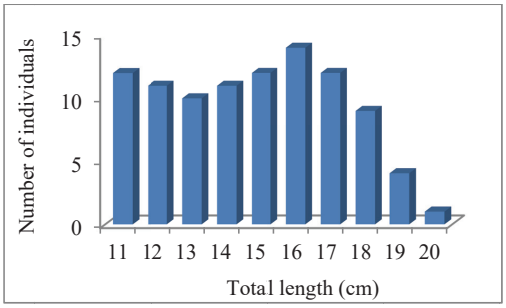

Figure 3. Length frequency distribution of *Sargocentron rubrum*

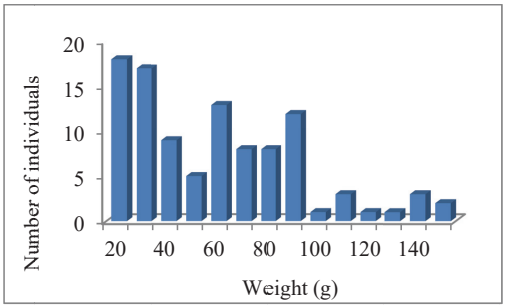

Figure 4. Weight frequency distribution of *Sargocentron rubrum*

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.

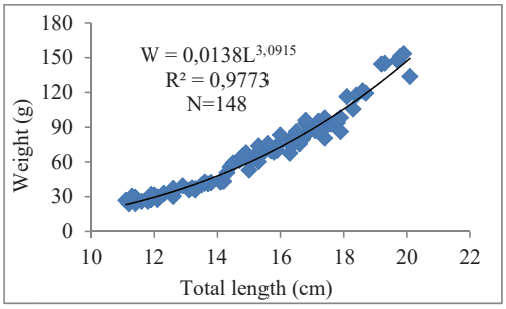

Figure 5. Length-weight relationship of *Sargocentron rubrum* in the North Cyprus

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

Specifi-cation	n	Length range (cm)	a	b	R^2	Growth type
Present Study	148	11.1-20.1	0,0013	3,0915	0,9773	+
Krishna et al., 2015	44	11.1-21.2	0.0089	3.102	0.849	+

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

Bagenal T.B., Tesch F.W., 1978. Age and Growth. In: Bagenal T. (Ed.), Methods for Assessment of fish production in freshwater. IBP Handbook 3. Blackwell Scientific Publication, Oxford, UK, 101-136.

Froese R., 2006. Cube law, condition factor and weight-length relationships: history, meta-analysis and recommendations. Journal Applied Ichthyology, 22: 241–253.

Golani D., Ben-Tuvia A., 1985. The biology of the Indo-Pacific squirrelfish, *Sargocentron rubrum* (Forsskal), a Suez Canal migrant to the eastern Mediterranean. Journal Fish Biology, 27:249-258.

Göthel H., 1992. Fauna marina del Mediterráneo. Ediciones Omega S.A., Barcelona, 319.

Muddula Krishna N., Govindarao V., Venu D., 2015. Length –Weight relationships for some rock pool fishes off Visakhapatnam, East Coast of India. International Journal of Fisheries and Aquatic Studies, 2(3):139-140.

Kuiter R.H., Tonozuka T., 2001. Pictorial guide to Indonesian reef fishes. Part 2. Fusiliers - Dragonets, Caesionidae – Callionymidae. Zoonetics, Australia. 304-622.

Lieske E., Myers R., 1994. Collins Pocket Guide. Coral reef fishes. Indo-Pacific and Caribbean including the Red Sea. Harper Collins Publishers, London, United Kingdom, 400.

Randall J.E., 1998. Revision of the Indo-Pacific squirrelfishes (Beryciformes: Holocentridae: Holocentrinae) of the genus *Sargocentron*, with descriptions of four new species, Indo-Pacific Fishes, Honolulu, 27, 105.

Randall J.E., Allen G.R., Steene R.C., 1990. Fishes of the Great Barrier Reef and Coral Sea. University of Hawaii Press, Honolulu, 506.

Randall J.E., Williams J.T., Smith D.G., Kulbicki M., Tham G.M., Labrosse P., Kronen M., Clua E., Mann B.S., 2003. Checklist of the shore and epipelagic fishes of Tonga. Atoll Research Bulletin, 502:1-37.

Safriel U.N., Ritte U., 1986. Population biology of Suez Canal migration—which way, what kind of species and why? In S. Karlin and E. Nevo (eds) Evolutionary processes and theory. Orlando, FL: Academic Press, New York, USA, 561–582.

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

Williams I., Greenfield D., 2016. *Sargocentron rubrum*. The IUCN Red List of Threatened Species 2016: e.T18124179A69052059.