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Research article

Maximum length record of the grey triggerfish, (*Balistes capriscus* Gmelin, 1789) for Aegean Sea

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Abstract: One specimen of the grey triggerfish, *Balistes capriscus* (Gmelin, 1789), was caught in April 2020 in the Gökova Bay (the south-eastern Aegean Sea) along the Turkish coast. Its total length was 53.5 cm and weight was 1727.13 g, the maximum observed length for the Aegean Sea. It is expected that findings of this study will contribute to the size and distribution data of grey triggerfish occurrence of which is highly low in the Aegean Sea.

Keywords: Maximum length, Balistidae, Mediterranean, fish morphometry, spearfishing, coastal waters

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Introduction

The family Balistidae is known to be comprised of 12 genera and 42 species. *Balistes capriscus* (the grey triggerfish), which is a marine species, wide spread throughout Atlantic, Indian and Pacific Oceans (Nelson et al., 2016). It is a common species also in the Mediterranean Sea and Adriatic Sea, and it is stated that climatic and hydrographic changes are enhancing species' abundance in Adriatic Sea (Dulcic and Soldo, 2005). *Balistes capriscus* mostly occurs in rocky or stony habitats and depths 0-100 meters (Ray and Robins, 1986). According to Işmen et al. (2004), *B. capriscus* is not a commercial species on the Mediterranean coast of Turkey. However, *B. capriscus* has been started to bought and consumed by people in recent years. On the other hand, there is no direct species specific fishing method for this species and it is captured as by-catch by fishermen. Although species' presence in the Aegean Sea is lower compared to other marine ecosystems mentioned above, there is a study which presents a new record of *B. capriscus* from the Northern Aegean Sea (Cengiz and Paruğ, 2020).

Data on maximum length and age provide useful data to assess stocks together with models. Hence, renewing the current maximum size information of fish is crucial for inferring the biological, ecological and commercial future of stocks (Dulcic and Soldo, 2005; Akyol and Şen, 2008). In this study, the maximum length record of the grey triggerfish fish for Aegean Sea is presented.

Material and Methods

Balistes capriscus specimen was harpooned by a spear-gun at 15 m depth in April 2020 on the coast of Gökova Bay, in the southern Aegean Sea (Fig. 1). Captured specimen was stored in ice and brought to laboratory. The total, fork and standard lengths (TL, FL, SL) of the specimen were measured to the nearest 0.1 cm and weighed (W) to the nearest 0.01 g. Other metric characteristics were measured with a caliper and meristic characters were also recorded.

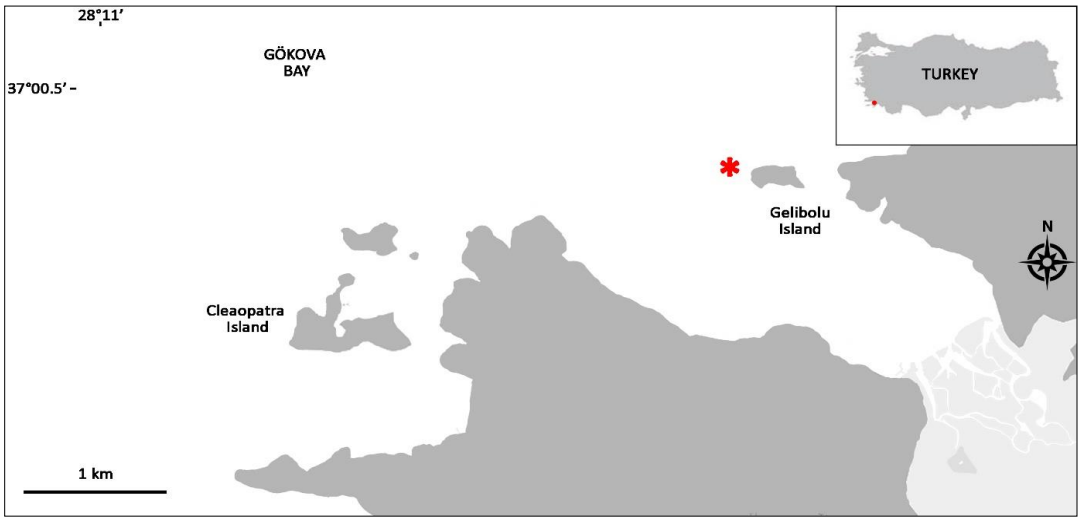

Figure 1. Sampling area (37°00'176" N, 28°14'191" E)

Results

According to morphometric measurements, total length was measured as 53.5 cm and total weight was weighed as 1727.13 g (Fig. 2, Table 1).

Figure 2. *Balistes capriscus* (Total length 53.5 cm)

Table 1. Morphometric measurements of *Balistes capriscus* (length in cm and weigth in g)

Measurements	Value
Total length	53.5
Fork length	42.9
Standard length	34.5
Predorsal length	11.52
First dorsal fin length	7.61
Second dorsal fin length	8.65
Body depth	11.06
Snout length	7.39
Ocular diameter	2.23
Pectoral fin length	6.96
Anal fin length	9.16
Caudal peduncle length	2.81
Caudal peduncle height	3.05
Head length	11.76
Head height	14.66
Weight	1727.13

Discussion

Balistes capriscus could grow up to 60 cm in total length (Harmelin-Vivien et al., 1990). According to the species related literature, while some of the researchers work with total length, some of them use fork length. Therefore, our comparisons are on both length measurements. In addition to this, there is no healthy length-length relationship study in the literature to convert TL to FL or FL to TL. Santos et al. (2002) reported the longest (TL; 59 cm) specimen in the world. In the Mediterranean, Dulcic and Soldo (2005) reported 52.5 cm total length specimen in the eastern Adriatic, our specimen. However, (Kacem et al., 2015) in the Mediterranean basin, the highest FL of this species was found as 45.6 cm in the southern Tunisia. According to our knowledge, our specimen is the second maximum-length specimen in the Mediterranean. Öğretmen et al. (2005) and Cengiz and Paruğ (2020) captured 22.4 cm TL and 36.4 cm TL specimens, respectively. However, our specimen is the longest record in the Aegean Sea (Table 2).

Growth coefficient of the *B. capriscus* varies regionally; Işmen et al. (2004) (Turkey): 0.257 y^{-1}, Caverivière (1982) (Senegal): 0.45 y^{-1}, Allman et al. (2018) (USA): 0.55 y^{-1}. This variation could be originated from physical and environmental conditions. However, growth coefficient of *B. capriscus* is relatively higher than the many other species. This feature of *B. capriscus* could mean it has a rapid growth rate and it could reach high total lengths. On the other hand, there is no direct fishing pressure on this species. Furthermore, there are six different marine protected areas (MAPs) in Gökova Bay. All these MPAs are no-take zones and they could be sheltered habitats for *B. capriscus*. Thus, the species could

have a chance to reach higher lengths than common lengths.

In conclusion, due to the biological processes of fish are size-specific, estimates made for maximum length determination are important. The maximum size of fish is closely linked to metabolic rate, food intake, hatch, size at sexual maturation and longevity (Pope et al., 2005). Therefore, maximum size measures taken from nature may add significant knowledge to these estimates and stock assessments. On the other hand, the population trend of *B. capriscus* is mentioned to be decreasing, and its IUCN Red List status is denoted as "Vulnerable (VU)" which suggests field researchers might need more data regarding the species' natural attributes (Liu et al., 2015).

Table 2. Comparison of total and fork lengths of the *Balistes capriscus* (All length measurements are in cm)

N	TL	TL_{min}	TL_{max}	FL	FL_{min}	FL_{max}	Area	References
1	53.5			43.0			Gökova Bay, Southern Aegean Sea	Present study
1	36.4						Saros Bay, Northern Aegean Sea	Cengiz and Paruğ, 2020
5		20.0	22.4				Gökova Bay, Southern Aegean Sea	Öğretmen et al., 2005
1	52.5						Eastern Adriatic	Dulcic and Soldo, 2005
751					11.3	45.6	Tunisia, Mediterranean	Kacem et al., 2015
10		30.0	45.0				Middle Adriatic	Dulcic et al., 2012
1	24.5						Mallorca, Western Mediterranean	Alós et al., 2008
84		12.7	52.0				Gulf of Guinea, Atlantic	Aggrey-Frynn, 2007
3		17.52	19.8				Iskenderun Bay, Eastern Mediterranean	Çekiç et al., 2005
3		17.9	23.8				Iskenderun Bay, Eastern Mediterranean	Başusta and Erdem, 2000
97		21.3	46.7				Brazil	Frota et al., 2004.
35		22.5	43.5				Portugal, Atlantic	Mendes et al., 2004.
692					13.9	35	Colombia	Duarte et al., 1999.
123		5.9	40.9				Turkey, North-Eastern Mediterranean	Sangun et al., 2007.
40		25.9	50.2				Portugal, Atlantic	Gonçalves et al., 1997.
233					15.8	53.6	South-Eastern U.S., Caribbean, Atlantic	Bohnsack and Harper, 1988.
119					19.7	36.9	Brazil	Frota et al., 2004.
1170					14.0	46.0	Brazil	Castro et al., 2005.
3		22.0	38.0				North East Atlantic, Scotland	Coull et al., 1989.
123		20.6	59.0				Portugal, Atlantic	Santos et al., 2002.
66					13.5	25.0	Brazil	Vianna et al., 2004.

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Ethical Approval

The authors don't declare ethical approval.

Conflicts of Interest

The authors declare that they have no conflict of interest.

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