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Occurrence of Dusky Grouper *Epinephelus marginatus* (Lowe, 1834) from the Black Sea: Is it the Mediterranization Process of the Black Sea?

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Abstract

A single specimen of Dusky Grouper *Epinephelus marginatus* (Lowe, 1834) on 14 November 2021 at a depth of about 10 m from the southwestern Black Sea (Amasra, Turkey) was captured by a fisherman with fishnet. In this study, dusky grouper Epinephelus marginatus was recorded for the first time from the Black Sea as a new Mediterranean species for the Black Sea fish fauna.

Keywords:
Epinephelus marginatus, Dusky Grouper, Black Sea, Mediterranization
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Introduction

Low species diversity due to low competition combined with high habitat diversity such as availability of potential niches in the Black Sea provides favourable conditions for non-native species. The invasion of new species into the Black Sea can disturb the stability and functioning of ecosystems and represent the biggest threat to biodiversity. There have been increasing numbers of Mediterranean species in the Black Sea since the first records of Mediterranean species in the Black Sea in the 1920s. Therefore, the diversity of the Black sea ichthyofauna is increased due to the intrusion of fish from the Mediterranean Sea "Mediterranization" (Pusanov, 1967; Turan et al., 2009). Besides, fish from the Indian Ocean, coming to the Mediterranean Sea through the Suez Canal (Lessepsian migrants) and further to the Black Sea, as well as accidentally and intentionally

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introduced species, and small specimens of fish brought with ballast waters make part of this group (Turan et al., 2016).

Grouper species belonging to Ephinephelus genera of Serranidae family are the most exploited and valuable fish species in Turkish marine waters distributed in the Mediterranean Sea and Aegean Sea and are represented with 10 species (Kovacic et al., 2021); *E. aeneus*, *E. marginatus*, *E. caninus*, *E. costae*, E. areolatus (Rothman et al., 2016), *E. coioides* (Heemstra & Golani, 1993), *E. fasciatus* (Bariche & Heemstra 2012), *E. geoffroyi* (Golani et al., 2015), *E. malabaricus* (Heemstra & Golani, 1993) *E. merra* (Lelong (2005). The Dusky grouper *E. marginatus* is one of the most voluble and threatened species of fish of the genus Epinephelus. Slow to develop and mature, dependent on special habitats for breeding, also suffers intense fishing has reduced their regional populations drastically in numbers in many areas.

In this study, we reported dusky grouper *E. marginatus* from the southwestern Black Sea coast as a first occurrence in the Black Sea and present a new Mediterranean species in the Black Sea fish fauna.

Materials and Method

One specimen of dusky grouper *Epinephelus marginatus* from Bartın, Amasra, Turkey, South Black Sea coast 41.767725, 32.419053, (Fig.1; Fig. 2) on 14 November 2021 at a depth of about 10 m was captured by fisherman, Reşat Fındık with fish net The specimen was from fisherman and deposited in the fish collection of Duzce University, Faculty of Arts and Sciences, Department of Biology (catalogue number: DUFC/2021-001), morphometric and meristic characters of the captured *E. marginatus* specimen were taken, and morphometric measurements of the specimen was made to the nearest 0.01 mm using a digital calliper. All morphological descriptions and colorations of the captured specimen were agreed with previous descriptions are given by Whitehead et al. (1986) and Nelson (2006).

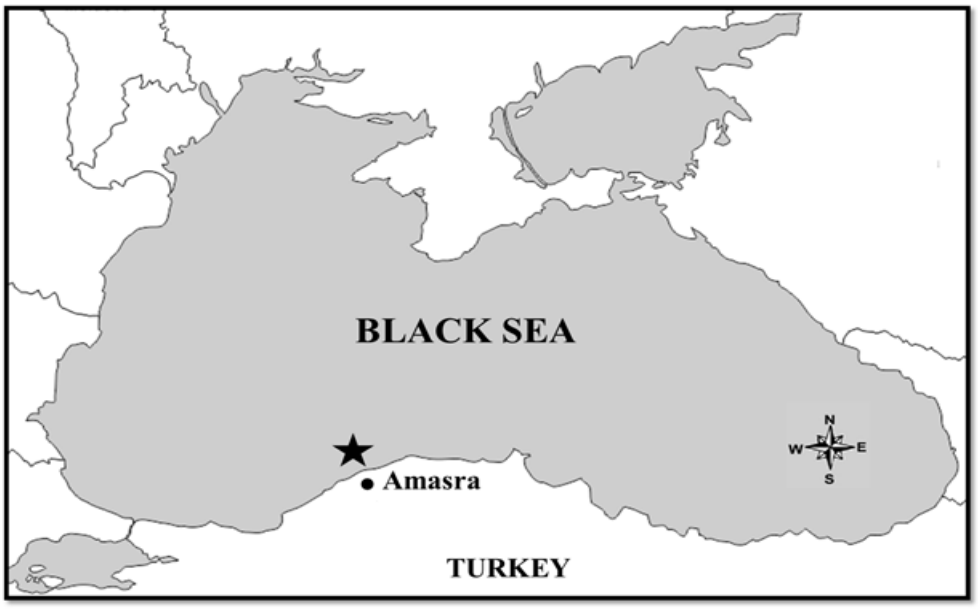

Figure 1. Black star indicate captured location of *E. marginatus* from the Black Sea

Figure 2. Dusky grouper, *E. marginatus*, captured from Amasra, the southwestern Black Sea, Turkey

Results

The body of *E. marginatus* is flat and oval on the side, its head and mouth are large, and its skin is covered with thick small scales. The 1st dorsal fin is higher and fused with the 2nd dorsal fin. There are greenish-yellow spots and vertical bands on the head, back, and sides that appear while alive and disappear when they die. The gill covers are spiny, the caudal fin is rounded.

The captured specimen was 34.86 mm in total length, 31.20 mm in standard length, and 663.96 g in total weight. Meristic data of *E. marginatus* specimen were as follows: dorsal fin rays XI + 15; anal fin III + 8; pectoral fin rays 16; pelvic fin rays I, 5; scales of line lateral 68; gill rakers 21.

Discussion

E. marginatus was catalogued in the red list by International Union for Conversation of Nature and Natural Resources (IUCN) and evaluated as an endangered (EN) (Cornish, & Harmelin-Vivien, 2011) species.

The occurrence of the Atlanto-Mediterranean species in the Black Sea has previously been reported several times (Yaglioglu et al., 2014; Lipej et al., 2017). Lessepsian fish migrating to the Turkish coast of the Black Sea have also been reported for the first time (Turan et al., 2017). In the president study, dusky grouper *E. marginatus* is reported as the first grouper fish species in the Black Sea. The increase in water temperature has been considered as the main reason for the increasing entry of the Mediterranean species (Ben Rais Lasram et al., 2010; Golani, 2010; Turan et al. 2016). Turan et al. (2016) reported that there is an increasing trend of temperature for the Black Sea due to global climate change which may increase the number of Mediterranean-Atlantic and lessepsian fish species in the Black Sea.

While the captured one specimens of *E. marginatus* do not necessarily indicate the existence of an established population in the Black Sea, but this species seems to migrate from the Marmara Sea via the Istanbul Strait (Bosphorus) to the Black Sea. Therefore, the Sea of Marmara is an important biological corridor for migratory species since it serves as an "acclimatization zone" for transition species, allowing those from the Mediterranean to adjust to the different environmental conditions in the Black Sea.

The abundance and expansion of *E. marginatus* should be monitored to see its relation with native fauna in the Black Sea. Moreover, the settlement process of *E. marginatus* in the Black Sea will probably be accelerated or facilitated by the increasing trend of water temperature due to global climate change as the Mediterranization process of the Black Sea.

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Author Contributions

All author contributions are equal for the preparation research in the manuscript.

Conflict of Interest

The authors declare that they have no competing interests.

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