

## NORTHERNMOST OCCURRENCE OF THE WHITE GROUPER, *EPINEPHELUS AENEUS* (PERCIFORMES: SERRANIDAE), IN THE MEDITERRANEAN AREA

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Dulčić J., Tutman P., Čaleta M. 2006. Northernmost occurrence of the white grouper, *Epinephelus aeneus* (Perciformes: Serranidae), in the Mediterranean area. *Acta Ichthyol. Piscat.* 36 (1): 73–75.

**Abstract.** On 5 March 2006 an adult specimen of white grouper, *Epinephelus aeneus* (Geoffroy Saint-Hilaire, 1817), was caught with long-line gear off the Island Dugi otok (between islets Mužanj and Sakarun, eastern Adriatic Sea, Croatian coast, 44°06'46.9"N; 14°53'47.08"E) on a soft, sandy bottom at a depth of 40 meters. The capture location is around 400 km north of the northern range of distribution in the Adriatic and around 800 km north of the northern limit of distribution published earlier. This is the northernmost occurrence of the white grouper in the Mediterranean area. As a top carnivorous species and among the largest coastal fish species, groupers could probably influence ecology of many native fish species and affect local artisanal fishery.

**Keywords:** fish, zoogeography, *Epinephelus aeneus*, groupers, Serranidae, northernmost record, Mediterranean, Adriatic, Croatia

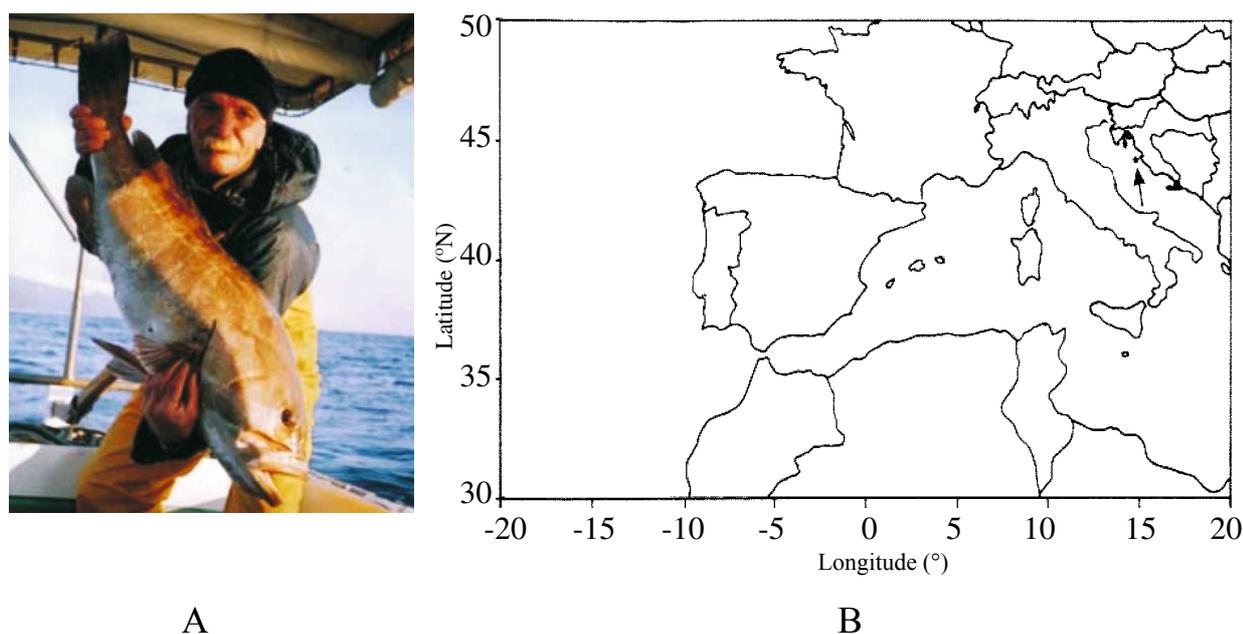
Groupers of the genus *Epinephelus* are mostly tropical species and their distribution in subtropical and temperate waters is limited, and only five species are native to the Mediterranean waters (Heemstra and Randall 1993). The recent expansion of some species, such as *Epinephelus marginatus* (Lowe, 1834), to colder waters of the Mediterranean and Adriatic seas, and their possible reproduction in these new areas, has been suggested to be a consequence of warming of Mediterranean waters (Francour et al. 1994, Dulčić and Lipej 1997, Zabala et al. 1997). The white grouper, *Epinephelus aeneus* (Geoffroy Saint-Hilaire, 1817), is very rare in the Adriatic and has hitherto been not included in the most recent list of the Adriatic ichthyofauna (Jardas 1996). The first record of this species was on 22 February and in September 1999 (two specimens), just a few kilometres off Dubrovnik (42.5°N latitude) (southern Adriatic) (Glamuzina et al. 2000). The capture location was around 400 km north of the northern limit of known distribution, published earlier (Tortonese 1986, Heemstra and Randall 1993).

The presently reported finding constitutes therefore, the northernmost occurrence of the white grouper in the Mediterranean area.

On 5 March 2006, an adult specimen of *Epinephelus aeneus* (Fig. 1A) was caught on a long-line hook

off the Island Dugi otok (between islets Mužanj and Sakarun, eastern Adriatic, Croatian coast, 44°06'46.9"N; 14°53'47.08"E) on a soft sandy bottom at a depth of 40 meters (Fig. 1B). The identification was done based on the main species characteristic for distinguishing *E. aeneus* from other grouper species which is 3 or 4 pale blue (or white) lines across the operculum. Some meristic characters of caught specimen were: dorsal fin rays XI + 16, anal fin rays III + 8, Pectoral fin rays 18. All other important characters fit well with the species description in Heemstra and Randall (1993). The specimen was 107.8 cm long (total length) and it weighed 15 780 g. The capture location is around 400 km north of the northern limit of distribution in the Adriatic Sea (Glamuzina et al. 2000) and around 800 km north of the northern limit of distribution published earlier (Heemstra and Randall 1993). According to Heemstra and Randall (1993) the species distribution was limited to 40°N. This is the second documented record of this migrant from the southern part of the Mediterranean to the northern part (Adriatic). It is the largest specimen of this fish species recorded in the Adriatic Sea. The previous ones were 28 and 21.5 cm long (TL) and they weighed 150 and 109 g, respectively (Glamuzina et al. 2000). This record in the last six years could be a sign that the white grouper is in the process of colonization of new areas in

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**Fig. 1.** (A) White grouper, *Epinephelus aeneus* ( $W = 1578$  g,  $TL = 107.8$  cm) caught on 5 March 2006, off the Island Dugi otok, Eastern Central Adriatic; (B) Map showing where the herein reported specimen of *Epinephelus aeneus* was collected off Island Dugi otok, Croatia

the Northern Mediterranean and Adriatic. The same situation has occurred, in the Adriatic, with the dusky grouper, *Epinephelus marginatus* (Lowe, 1834), (cf. Dulčić and Lipej 1997); the mottled grouper, *Mycteroperca rubra* (Bloch, 1793), (cf. Glamuzina et al. 2002), and the orange-spotted grouper, *Epinephelus coioides* (Hamilton, 1822), (cf. Parenti and Bressi 2001). The colonisation of new areas by different grouper species could lead to significant changes in the ichthyofauna composition in new areas. As a top carnivorous species and among the largest coastal fish species, groupers could influence the behaviour and ecology of many native fish species and affect local artisanal fishery (Glamuzina 1999). The presently reported finding does not permit any confident comment to be made regarding whether or not this species has established a breeding population in the area. In any event, the impact of successful colonization by these and other exotic fish species would, at least, represent a significant change in the composition of the native ichthyofauna.

Over the past decade several investigators have reported the occurrence of new fish species and their northern range extension in the Mediterranean Sea (see Dulčić et al. 1999, Dulčić and Grbec 2000). The most remarkable change in population structure was observed recently with three species: grey triggerfish, "*Balistes carolinensis*" (= *Balistes caprisicus* Gmelin, 1798); ornate wrasse, *Thalassoma pavo* (L.); and parrotfish, *Sparisoma cretense* (L.). These were observed only at very rare occasions, mostly in the southern part of the Adriatic, and today those species are an established part of the rocky coastal ichthyofauna of the entire Adriatic. Faunal changes observed in the Adriatic are related to "Adriatic ingressions" (influx of eastern Mediterranean waters into the Adriatic), climate change,

and water warming (Pallaoro 1988, Dulčić et al. 1999, Dulčić and Grbec 2000, Parenti and Bressi 2001). Glamuzina and Skaramuca (1999) pointed out that faunal changes observed in the southern Adriatic could be used to forecast biological changes in the waters of the central and northern Adriatic.

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Received: 22 March 2006

Accepted: 3 June 2006