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ON THE OCCURRENCE OF AREOLATE GROUPER, *EPINEPHELUS AREOLATUS* (EPINEPHELIDAE) IN SYRIAN MARINE WATERS (EASTERN MEDITERRANEAN SEA)

SUMMARY

A specimen of the non-indigenous species areolate grouper *Epinephelus areolatus* (Forsskål, 1775) was collected from the coastal waters off Latakia, Syria. This new finding of *E. areolatus* constitutes the second substantiated record of the species from the marine Syrian waters and the sixth for the Levant Basin and the entire Mediterranean Sea where a viable population appears to be successfully established at present.

INTRODUCTION

Areolate grouper *Epinephelus areolatus* (Forsskål, 1775) is known in Red Sea, the eastern coast of Africa and displays a wide distribution in the Indo-Pacific (GOLANI *et al.*, 2021). The first Mediterranean record of the species occurred in the Levant Basin (ROTHMAN *et al.*, 2016) and furtherly it was found off the Lebanese coast (BARICHE and EDDE, 2020; BARICHE and RICKE, 2020). *E. areolatus* was firstly recorded *via* social media from the Syrian marine waters by AL MABRUK *et al.* (2021), but the first substantiated record was reported by SAAD *et al.* (2023).

Epinephelus areolatus lives in seagrass beds and on sandy-muddy bottoms near rocky reefs, at depth between 6 to 200 m (HEEMSTRA and RANDALL, 1993). The species feeds on teleost species and large invertebrates, it is protogynous hermaphrodite, female mature at 200 mm and male at 300 mm total

length (TL), respectively, eggs and larvae are planktonic (GOLANI *et al.*, 2021). Additionally, HEEMSTRA and RANDALL (1993) noted 400 mm as maximum TL.

Investigations regularly monitored in the area together with the assistance of local fishermen allowed to collect a specimen *E. areolatus* which is described in the present paper with comments about the species in the region and the Mediterranean Sea.

MATERIAL AND METHODS

On 26 May 2023, a specimen of areolate grouper *Epinephelus areolatus* was captured using demersal gill net, on rocky bottom at depth of 20m, at about 2km off the fishing port of Banias city, $35^{\circ} 11' 03''$ N and $35^{\circ} 55' 00''$ E (Fig. 1). Morphometric measurements were recorded to the nearest millimetre and are summarized in Table 1, together with meristic counts and total body weight in gram. The specimen was preserved in 10% buffered formalin, and deposited in the Ichthyological Collection of Environmental Research Higher Institute, Tishreen University, under the catalogue number ERHI 35-2022.

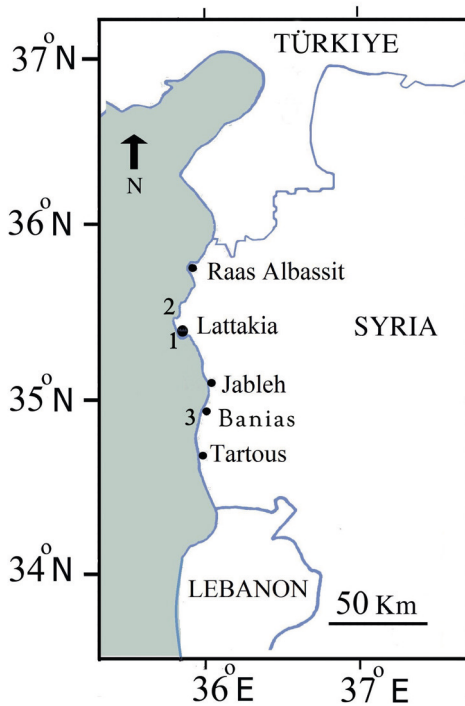


Fig. 1 - Map of the Syrian coast indicating the capture sites of *Epinephelus areolatus*. **1**: first record (AL MABRUK *et al.*, 2021). **2**: first substantiated record (SAAD *et al.*, 2023). **3**: second substantiated record (this study).

Tab. 1 - Morphometric measurements in millimetre (mm) and as percentages of total length (%TL), meristic counts and weight in gram recorded in the specimen of *Epinephelus areolatus*, captured off Baniyas, from the Syrian coast (ref. ERHI, this study) and compared with the first substantiated record (ref. 11/2022, SAAD *et al.*, 2023).

References	ERHI 35-2022		MSL 11/2022	
	mm	%TL	mm	%TL
Morphometric measurements				
Total length	250	100	297	100
Standard length	207	82.8	242	81.4
Body depth	67	26.8	73	24.5
Head length	60	24	86	28.9
Eye diameter	12	4.8	14	4.7
Snout length	15	6	25	8.4
Length of dorsal fin base	123	49.2	133	44.7
Length of anal fin base	43	17.2	39	13.1
Pre-dorsal length	70	28	80	26.9
Pre-pectoral length	77	30.8	82	27.6
Pre-pelvic length	84	33.6	84	28.2
Pre-anal length	139	55.6	155	52.1
Meristic counts				
Dorsal fin spines	XI		XI	
Dorsal fin soft rays	17		17	
Pectoral fin spines	-	-		
Pectoral fin soft rays	17		16	
Ventral fin spines	I		I	
Ventral fin soft rays	5		5	
Anal fin spines	III		III	
Anal fin soft rays	8		9	
Total body weight (gram)	200		285	

RESULTS AND DISCUSSION

The specimen of *E. areolatus* (ERHI/35-2022) measured 250 mm in total length (TL) and weighed 200 g (Fig. 2). It was identified following main morphological characters such as: body depth gill rakers of first gill arch 9 on the upper limb and 16 on lower limb, preopercle with 5 enlarged serrate at the angle caudal fin truncate or slightly emarginate, colour of head, body, and fins pale, covered with numerous brownish yellow spot, posterior edge of

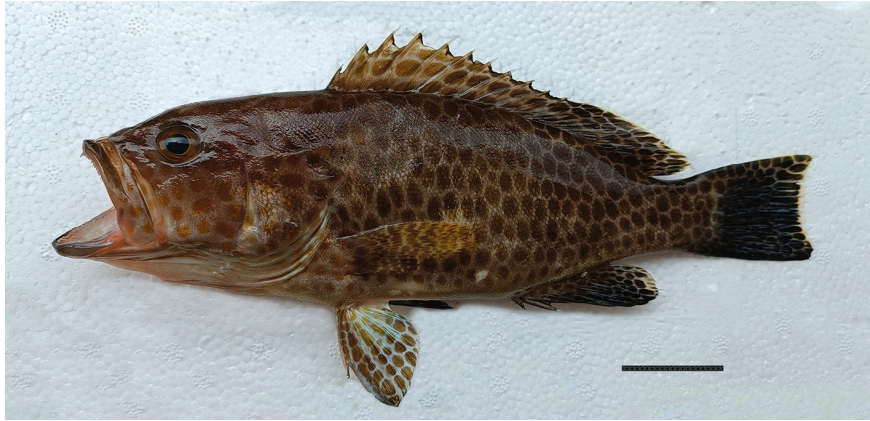


Fig. 2 - *Epinephelus areolatus* collected off Baniyas from the Syrian coast, scale bar = 30 mm.

caudal fin with a distinct white margin. Following SAAD *et al.* (2023), *E. areolatus* could be confused with another alien serranid species which recently occurred in the Mediterranean Sea, the spotted grouper *E. geoffroyi* Klunzinger, 1870. SAAD *et al.* (2023) noted that this latter species does not exhibit a whitish margin on the posterior margin of caudal fin and, conversely, presents more numerous and smaller dark brown spots covering the entire body.

Morphology, morphometric measurements, meristic counts and colour recorded in the present specimen of are in agreement with previous descriptions of *E. areolatus* such as HEEMSTRA and RANDALL (1993), ROTHMAN *et al.* (2016), BARICHE and EDDE (2020), AL MABRUK *et al.* (2021) and SAAD *et al.* (2023). Additionally, it appears in Table 1 that percents of TL are similar in the specimen of SAAD *et al.* (2023) and the present specimen. The latter constitutes the sixth record of *E. areolatus* in the entire Mediterranean Sea.

The occurrence of *Epinephelus areolatus* in the Syrian marine waters is due to the vicinity of the Red Sea where the species is caught in relative abundance. Such vicinity enhances migrations of the species into the Mediterranean Sea through Suez Canal (HEEMSTRA and RANDALL, 1993). On the other hand, the species probably finds in its new environment sufficient resources to live and probably to reproduce (SAAD, 2005; ALI, 2018). However, transport of the species *via* ballast waters cannot be totally ruled out as it is the case for other non-indigenous species (GOLANI *et al.*, 2021).

It appears that the captures of *Epinephelus areolatus* are rather restricted in an eastern Mediterranean region, the Levant Basin, where at present a viable population appears to be successfully established. With special regard to the Syrian coast, *E. areolatus* is one of the six species belonging to the genus *Epinephelus* Bloch, 1793 present in the Syrian marine waters (ALI, 2018; SAAD *et al.*, 2023). These species display an important economical interest for local

fisheries and they are targeted since several decades to date (GRUVEL, 1931; FOULQUIÉ and DUPUY DE LA GRANDRIVE, 2003; SAAD, 2005; ALI, 2018). A management plan should be locally included to avoid a possible extinction of these species, despite the fact that some of them such as *E. areolatus* progressively invade the area incoming from the Red Sea.

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