

Rapid Communication

First record of the Red Sea spotted grouper, *Epinephelus geoffroyi* (Klunzinger, 1870) (Serranidae) in the Mediterranean

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Abstract

On January 2015 a specimen of the Red Sea spotted grouper *Epinephelus geoffroyi* (Klunzinger, 1870) was recorded for the first time from the Mediterranean Sea. This species apparently entered the Mediterranean via the Suez Canal (Lessepsian migrant) and is the fourth Red Sea grouper found in this region.

Key words: exotic, fish invasion, Lessepsian migration

Introduction

The influx of Red Sea organism into the Mediterranean, following the opening of the Suez Canal in 1869 is an ongoing process showing no cessation. It was termed "Lessepsian migration" in honor of Ferdinand de Lesseps, the enterprising engineer of the Canal. Lessepsian migration encompasses almost all marine taxa, including more than six hundred species (Zenetos 2010), with close to 90 fishes reported so far (Golani et al. 2013).

Methods

On 25 January 2015, a 391 mm SL (468 mm TL), 1947 g wet weight, specimen of *Epinephelus geoffroyi* (Klunzinger, 1870) (Figure 1) was speared in rocky habitat at a depth of 12 m near Ga'ash, Israel (32°13'50"N, 34°48'59"E). The specimen was deposited in the Fish Collection of the National Natural History Collections of the Hebrew University and received the catalogue number HJ 20396.

Results and discussion

Short description of the specimen

Body moderately elongated, its depth 2.9 times in SL. Head 2.7 times in SL. Snout moderately pointed (3.6), small eye (7.8) and wide interorbital (4.6) all times in Head length. Lower jaw slightly projected. Maxilla reaches back to the vertical of central eye. Two canine teeth in front of upper jaw with a patch of small sharp teeth behind them and an outer row of sharp teeth and inner band of small teeth. The teeth in the lower jaw similar to upper jaw but the patches behind the canine teeth are much smaller. A reversed V-shaped vomer patch with teeth. Two narrow palatine patches with small teeth. Preoperculum edge finely serrated with five large serra at the angle. Three flat spines on the posterior part of the operculum, the middle spine is the largest. Eight gill rakers on upper limb of the first arch and 17 on the lower limb (including the raker at the angle). The three rakers at the angle are the longest, their length 1.5 times the length of the gill filament. No small bony plates on the sides of the first gill

Figure 1. *Epinephelus geoffroyi*, 391 mm (SL), HUIJ 20396, 25 January, 2015, speared at 12 m. Ga'ash, Mediterranean coast of Israel. Photograph by D. Golani .



arch. Continuous dorsal fin with 11 spines and 17 rays. Anal fin round with three spines and eight rays. Caudal fin emarginate. Pectoral fin round with 17 rays. Ventral fin with one spine and five rays. Lateral line with 51 scales; scale series 103.

Colour: Body overall beige with close-set small dark-brown spots covering the entire body, head, and fins. Lower spots are orange. Belly without spots. Posterior margin of caudal fin contains a single row of dark spots. Eye: Pupil is black surrounded by a thin golden ring on a bronze background.

The morphometric characters and colour pattern, except for the rounded anal fin (see remarks below), are very close to or agree with the description of *Epinephelus geoffroyi* given by Randall et al. (2013).

Remarks

Epinephelus geoffroyi is endemic to the Red Sea and the Gulf of Aden. It inhabits rocky and coral substrate at depths 3–32 m.

This species is the fourth Red Sea grouper to be found in the Mediterranean together with: *Epinephelus coioides* (Hamilton, 1822) and *Epinephelus malabaricus* (Bloch and Schneider, 1801) reported by Heemstra and Golani (1993) and Golani (2010); and *Epinephelus fasciatus* (Forsskål, 1775) reported by Bariche and Heemstra (2012) on the basis of photographic documentation from Lebanon. The first two species can be distinguished from *E. geoffroyi* by having 4–5 wide dark bars on the body, numerous small bony plates on the sides of the first gill arch (none in *E. geoffroyi*) and a round caudal fin (vs. emarginate). *E. fasciatus* also has a round caudal fin and no spots on the body. The colour pattern

distinguishes *E. geoffroyi* from all other Mediterranean co-familial species. *E. geoffroyi* was first described by Klunzinger (1870) under the generic name *Serranus*. Boulenger (1895) synonymized *E. geoffroyi* with *E. chlorostigma* (Valenciennes, 1828) and was followed by many authors (Randall and Ben-Tuvia 1983; Randall and Heemstra 1991). Randall et al. (2013) resurrected *E. geoffroyi* and distinguished it from *E. chlorostigma* by having more gill rakers 25–29 (vs 23–26), spots on the belly being more widely separated and a vertical row of spots on the caudal fin posterior margin (vs. white margin in *E. chlorostigma*). Therefore, they concluded that previous records of *E. geoffroyi* from the Red Sea were misidentified as *E. chlorostigma* (see: Randall and Heemstra 1991; Heemstra and Randall 1993; Golani and Bogorodsky 2010; Craig et al. 2011). The round anal fin of the Mediterranean specimen was the only character that does not match with the description of *E. geoffroyi*. We examined 20 specimens of *E. geoffroyi* from the Red Sea that were deposited in the Hebrew University Fish Collection. We found that the shape of the anal fin is variable; some specimens had pointed and others had round anal fins. Hence, it appears that the shape of the anal fin is not a stable character, decisive for the identification of this species. Finally, *E. geoffroyi* can be confused with the Red Sea *Epinephelus areolatus* (Forsskål, 1775) but this species has larger spots on the body, sub-equal to the pupil (vs. much smaller than pupil in *E. geoffroyi*).

Comparative Red Sea material

HUIJ 5051, 367 mm SL, Eritrea, 1957; HUIJ 5068, 284 mm SL, Sharm esh Sheikh, 31 Dec. 1956; HUIJ 5539, 209 mm SL, Eritrea, 1957; HUIJ 5548

(8 spec.), 69-186 mm SL, A-Tur, Gulf of Suez, 12 Sept. 1968; HUI 5619 (3 spec.), 120-294 mm SL, A-Tur, Gulf of Suez, 20 Jan. 1972; HUI 5623, 162 mm SL, Massawa, Eritrea, 25 Oct. 1957; HUI 8331, 412 mm SL, Nuweiba Gulf of Aqaba, 2 Aug. 1976; HUI 8339, 356 mm SL, Nuweiba Gulf of Aqaba, 2 Aug. 1976; HUI 8972, 299 mm SL, Um el Abek, Eritrea, 6 Apr. 1962; HUI 8996, 251 mm SL, Ras Sudar, Gulf of Suez, 23 Nov. 1972; HUI 9027, 270 mm SL, Eritrea, 6 Apr. 1962.

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References

- Bariche M, Heemstra PC (2012) First record of the blacktip grouper *Epinephelus fasciatus* (Teleostei: Serranidae) in the Mediterranean Sea. *Marine Biodiversity Records* 5: e1–e3, <http://dx.doi.org/10.1017/S1755267211000509>
- Boulenger GA (1895) Catalogue of the Perciform Fishes in the British Museum. 2nd edition. London, British Museum. 394+19 pp
- Craig MT, Sadovy de Mitcheson YJ, Heemstra PC (2011) Groupers of the World. A Field and Market Guide. NISC. Grahamstown, 356+48 pp
- Golani D (2010) Colonization of the Mediterranean by Red Sea fishes via the Suez Canal – Lessepsian migration. In: Golani D, Appelbaum-Golani B (eds), Fish Invasions of the Mediterranean Sea: Change and Renewal. Sofia: Pensoft, pp 145–188
- Golani D, Bogorodsky SV (2010) The fishes of the Red Sea – reappraisal and updated checklist. *Zootaxa* 2463, Magnolia Press, Auckland, New Zealand, 135 pp
- Golani D, Orsi-Relini L, Massuti E, Quignard JP, Dulčić J, Azzurro E (2013) CIESM Atlas of Exotic Fishes in the Mediterranean. <http://www.ciesm.org/atlas/> (Accessed on 5 November 2014)
- Heemstra PC, Golani D (1993) Clarification of the Indo-Pacific groupers (Pisces: Serranidae) in the Mediterranean Sea. *Israel Journal of Zoology* 39: 381–390
- Heemstra PC, Randall JE (1993) FAO species catalogue Vol. 16. Groupers of the world (Family Serranidae, Subfamily Epinephelinae). An annotated and illustrated catalogue of the groupers, rockcod, hind, coral grouper and lyretail species known to date. *FAO Fisheries Synopsis* 125 (vol. 16). Rome, FAO, 382 pp
- Klunzinger CB (1870) Synopsis der Fische des Rothen Meeres. I. Theil. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien* 21: 441–688
- Randall JE, Ben-Tuvia A (1983) A review of the groupers (Pisces: Serranidae: Epinephelinae) of the Red Sea, with description of a new species of *Cephalopholis*. *Bulletin of Marine Science* 33(2): 373–426
- Randall JE, Heemstra PC (1991) Revision of the Indo-Pacific groupers (Perciformes: Serranidae: Epinephelinae), with description of five new species. *Indo-Pacific Fishes* 20: 1–322
- Randall JE, Bogorodsky SV, Krupp F, Rose JM, Fricke R (2013) *Epinephelus geoffroyi* (Klunzinger, 1870) (Pisces: Serranidae), a valid species of grouper endemic to the Red Sea and Gulf of Aden. *Zootaxa* 3641(5): 524–532, <http://dx.doi.org/10.11646/zootaxa.3641.5.2>
- Zenetos A (2010) Trend in alien species in the Mediterranean. An answer to Galil, 2009, "Taking stock: inventory of alien species in the Mediterranean Sea". *Biological Invasions* 12: 3379–3381, <http://dx.doi.org/10.1007/s10530-009-9679-x>