

Aquatic Invasions Records

Occurrence of the Malabar grouper *Epinephelus malabaricus* (Bloch & Schneider, 1801) (Actinopterygii, Perciformes, Serranidae), in the Maltese Islands

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Abstract

The capture of a single specimen of the Malabar grouper *Epinephelus malabaricus* (Bloch & Schneider, 1801) from inside the breakwater at the entrance to the Grand Harbour at Valletta, Malta in July 2011 is reported here. Previously this Lessepsian immigrant species was only known from Israeli waters where it is established but rare. On the presently available evidence, the Maltese specimen has to be considered as a casual, most likely transported by shipping.

Key words: Epinephelinae, Malta, central Mediterranean, non-indigenous species, Lessepsian immigrant

Introduction

Groupers of the subfamily Epinephelinae are represented by nine species in the Mediterranean, of which six – *Epinephelus aeneus* (Geoffroy Saint-Hilaire, 1817), *Epinephelus caninus* (Valenciennes, 1843), *Epinephelus costae* (Steindachner, 1878), *Epinephelus haifensis* Ben-Tuvia, 1953, *Epinephelus marginatus* (Lowe, 1834), and *Mycteroperca rubra* (Bloch, 1793) – are native to the sea (Heemstra and Randall 1993); two species, *Epinephelus coioides* (Hamilton, 1822) and *Epinephelus malabaricus* (Bloch & Schneider, 1801), are Lessepsian immigrants (Golani et al. 2002); a third species, *Cephalopholis taeniops* (Valenciennes, 1828), has entered the Mediterranean from the Atlantic through the Strait of Gibraltar (Guidetti et al. 2010). There is also a record of a tenth species, *Epinephelus merra* Bloch, 1793, from off the coast of Île des Embiez, France (Lelong 2005). Apart from the last named species, whose native range is the Indo-Pacific excluding the Red Sea and which has only been recorded once, probably from an aquarium release, the other non-indigenous species have extended their range into the Mediterranean autochthonously.

The most recent species to do so is the African hind, *Cephalopholis taeniops*, first reported off the coast of Libya in 2002 (Ben Abdallah et al. 2007), and then in 2009 at Lampedusa (Guidetti et al. 2010)

and Malta (photographs and record published in FishBase and reported in a Maltese newspaper; Froese and Pauly 2011; Vassallo 2009), although one of us (PJS) knows of an earlier (2008) unpublished record from Malta. The species seems to have become established in the Sicily Channel (Guidetti et al. 2010).

Epinephelus coioides was first recorded from the Mediterranean (misidentified as *Epinephelus tauvina* (Forsskål, 1775); see Heemstra and Golani 1993 and Heemstra and Randall 1993) in 1969 (Ben-Tuvia and Lourie 1969) and since then has been occasionally caught off the Israeli coast, where it is considered to be established but rather rare (Golani et al. 2002; 2006). There is also a single record of this species from the Adriatic Sea off the Trieste coast (1998; Parenti and Bressi 2001), however, it does not seem to have become established there.

The first record of *Epinephelus malabaricus* from the Mediterranean is usually attributed to Ben-Tuvia and Lourie (1969) (e.g. Golani et al. 2002; Mavruk and Avsar 2008) who reported *Epinephelus tauvina* which was later corrected to *Epinephelus malabaricus* by Randall and Ben-Tuvia (1983). However, Heemstra and Randall (1993 p. 185) showed that this specimen was actually *Epinephelus coioides*. The earliest Mediterranean record of *Epinephelus malabaricus* is of a specimen collected at Nahariya, Israel in June 1966 (Heemstra and



Figure 1. The individual *Epinephelus malabaricus* caught from inside the breakwater at the entrance to the Grand Harbour at Valletta, Malta on 16th July 2011 (Photograph: © Reno Tonna).

Table 1. Meristic parameters and ratios for the specimen of *Epinephelus malabaricus* caught from the Grand Harbour, Valletta, Malta.

Parameter	mm
Total length	532.4
Standard length (SL)	45.8
Body depth	13.8
Body width	9.9
Head length	17.4
Snout length	3.5
Jaw length	5.5
Eye width	2.0
Interorbital distance	4.5
Pectoral fin length	10.0
Pelvic fin length	7.8
Ratio	
SL to body depth	3.3
Body depth to body width	1.4
SL to head length	2.6
Upper jaw length to snout length	1.6
Head length to interorbital distance	3.9
Upper jaw length to interorbital distance	1.2
SL to jaw length	8.4
Head length to pectoral fin length	1.8
Head length to pelvic fin length	2.2

Randall 1993 p. 185). To date, in the Mediterranean, this species has only been recorded from the Israeli coast where it is regarded as established but very rare (Golani et al. 2002; 2006).

Here we report the occurrence of a single specimen of *Epinephelus malabaricus* from the island of Malta in the central Mediterranean.

Record

A single individual (Figure 1) was captured by spearfishing on 16th July 2011 inside the Grand Harbour at Valletta, Malta very close to the breakwater at its entrance. The fish was solitary and was swimming at a depth of ca 5m close to the algae-covered rocky bottom. The fish had a total length of 53 cm and weighed ca 2.5 kg. The body was elongate with a large head and mouth; Table 1 gives meristic parameters and ratios for the specimen.

The meristic formula was D, XI + 16; A, III + 8; P, 21; V, I + 6; LL, 57; GR 27. The posterior edge of the preoperculum was serrate with the largest serrae at the angle; the upper posterior edge of the operculum had three spines. The maxilla extended posteriorly to just beyond the level of the posterior edge of the orbit; the upper jaw had five rows of canine teeth midlaterally, which became reduced to three rows, then two, laterally. The ground colour was dark brown dorsally becoming a lighter brown ventrally. The body was covered with dark spots mostly dark brown on the upper part of the head and body, accompanied by white spots and whitish blotches ventrally on head and body, and on the pectoral and pelvic fins and the tail. The body was also marked with at least five or six vertical dark bands, some of which divided ventrally.

These morphological characteristics agree well with the description of *Epinephelus malabaricus* as given in Heemstra and Randall

(1993 pp. 184–186) and particularly diagnostic as regards differentiation from other Mediterranean Epinephelinae is the presence of white spots and blotches on the head and body (but no orange-brown spots, a character particular to *Epinephelus coioides*).

Discussion

Groupers are intensely targeted by spearfishing sports divers and given that this is a very popular pursuit in the Maltese Islands and due to the large numbers of such divers, it is unlikely that had the Malabar grouper occurred for some time, it would not have been recorded previously. Therefore, it seems that this species is a very recent introduction. As only a single specimen has been recorded so far, then for the present this species must be regarded as either ‘casual’ (using the nomenclature of Zenetos et al. 2005) or an ‘unestablished alien’ (using the nomenclature of Occhipinti-Ambrogi and Galil 2004).

This is the first record of *Epinephelus malabaricus* outside its previously known range in the Mediterranean, which is the coast of Israel, where it has become established since its introduction in the mid-1960s (Golani et al. 2002). There are a number of possible scenarios to explain the sudden appearance of this fish in the Sicily Channel, some 1,960 km west of its known Mediterranean range. We rule out deliberate or accidental introduction via the aquarium trade and aquaculture as unlikely: there are no reports of this species being used in aquaculture in the Mediterranean, and enquiries made with the main aquarium-fish suppliers in Malta determined that this species is not one which they have imported recently or in the past; moreover, the size of the specimen caught is such that keeping such a fish in captivity is beyond the capability of most hobby aquarists.

Transport by shipping is a realistic possibility given that the Maltese Islands are on the main east to west shipping route and that a huge number of commercial, cruise and leisure vessels call at the Maltese Islands or pass close to them. In this regard, the locality of capture of the specimen, inside one of the major harbours in Malta, may be significant since harbours are a key point of entry of non-indigenous species transported by shipping. In fact, a number of recently recorded non-indigenous species were first reported from the Valetta harbours area (Schembri et al. 2010a, b). We rule out transport

in ballast water; however, transport in a sea-chest or similar water-filled space in a large vessel, such as postulated in the case of *Oplegnathus fasciatus* (Schembri et al. 2010a) is a distinct possibility. It is also possible that the fish travelled in association with the fouling growth on the hull of a vessel, although in this regard, a slow moving barge or drilling platform is a more probable vector than a ship (see discussion in Galil 2008). In addition, the Maltese Islands are important staging points for drilling platforms, and these occasionally remain moored in coastal waters for weeks, giving ample opportunity for movement of biota associated with the platform to inshore waters.

Autochthonous range expansion from the Levantine population is only a remote possibility given that there are no intermediate populations between the Levantine coast and the Sicily Channel as well as the prevailing surface currents. Parenti and Bressi (2001) report finding a single specimen of *Epinephelus coioides* off the coast of Trieste, northern Adriatic. This report has remained the only one of this species outside its Mediterranean area of distribution along the Levantine coast and in their case, Parenti and Bressi (2001) attribute the occurrence of this species to larval transport. Although these authors do not state whether they think this transport was ship-mediated or was autochthonous, the implication is the latter. Conceivably, such a phenomenon may be possible given the right set of rare circumstances, since the prevailing surface current travels along the eastern and north-eastern seaboard of the East Basin anticlockwise into the Adriatic. However there are no currents that can transport larvae from the Levantine coast to the central Mediterranean and the possibility of such transport is even more remote in the present case.

On the other hand, it may well be that intermediate populations of *Epinephelus malabaricus* do exist but are as yet undiscovered, although it is unlikely that any such populations have been established for any length of time given that the Malabar grouper is a large and conspicuous fish with a distinctive coloration and that commercial and leisure fishing activity is as intense along most coasts of the eastern Mediterranean basin as it is in the Maltese Islands. On the basis of the available evidence, transport by shipping remains the most likely mode of introduction of *Epinephelus malabaricus* into the Maltese Islands.

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