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## First record of the twobar sea bream *Acanthopagrus bifasciatus* (Teleostei: Sparidae) in the Mediterranean Sea

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### Abstract

In September 2010, one specimen of the twobar seabream *Acanthopagrus bifasciatus* was recorded for the first time in the Mediterranean Sea, off the Islands of Zembra (Gulf of Tunis: 37°07'03"N; 10°48'35"E). This species could have entered the Mediterranean *via* the Suez Canal or alternatively by unintentional human transport.

**Keywords:** Lessepsian migration, ballast waters, Sparidae, Mediterranean Sea, Tunisia.

### Introduction

Seabreams (Sparidae) are common coastal fish species inhabiting tropical and temperate waters throughout the world. To date, 117 of 15 genera have been ascribed to this family (Chiba *et al.*, 2009; Iwatsuki & Heemstra, 2011a,b). In the Mediterranean Sea, seabreams are represented by 21 and 5 species of native and exotic origin, respectively (Quignard & Tomasini, 2000; Dulčić & Kraljevic, 2007). These latter comprise two Atlantic fishes (*Diplodus bellottii* Steindachner, 1882 and *Pagellus bellotti* Steindachner 1882) occasionally captured in the Alboran Sea; two Red Sea species, which are well established in the Eastern Mediterranean (i.e. *Crenidens crenidens* Forsskål 1775; *Rhabdosargus haffara* Forsskål 1775) and *Pagrus major* (Temminck & Schlegel 1843), an occasional aquaculture escapee (Golani *et al.*, 2013; Zenetos *et al.*, 2010).

The twobar seabream, *Acanthopagrus bifasciatus* (Forsskål 1775) is a tropical coastal fish species distributed throughout the Red Sea and the western Indian Ocean (Khalaf & Disi, 1997). Its conspicuous coloration easily distinguishes *A. bifasciatus* from other fish species (Bauchot & Smith, 1984). Iwatsuki & Heemstra (2010) provided additional morphological characters to distinguish it from the closely related *A. berda* (Forsskål 1775) and *A. catena* (Lacepède 1801).

### Methods

On September 3<sup>rd</sup> 2010, a 221 mm TL twobar sea bream (Fig. 1) was caught off the Zembra Archipelago (Gulf of Tunis, Tunisia): co-ordinates are 37°07'03"N; 10°48'35"E. The fish was captured by a local fishing boat, with traps set at 10 m depth on a sandy/seagrass (*Posidonia oceanica* and *Caulerpa racemosa*) bottom. The specimen was photographed a few hours after its capture, measured and identified following Khalaf & Disi (1997) and Al-Bahrana (1986). Morphometric measurements and meristic counts were carried out following



**Fig. 1:** *Acanthopagrus bifasciatus*, 221 mm total length (TL) caught off the islands of Zembra and Zembretta (ref. INAT/Aca-bif.01). Scale bar = 30 mm.

Iwatsuki & Heemstra (2010). Stomach contents and fresh gonad tissue were examined under a stereo and an optical microscope. Finally, the individual was preserved in 10% buffered formalin and deposited in the ichthyological Collection of the Institut National Agronomique of Tunisia, in Tunis, with catalogue number, INAT/Aca-bif.01.

## Results

The 221 mm TL *A. bifasciatus* had a weight of 207.3g and, according to the gonad analysis, it was an immature male. The stomach contained remains of small benthic invertebrates, such as gastropods and crustacean decapods, and debris of algae. The individual had the following features: body deep and compressed; dorsal profile more convex than the ventral; head large, steep and convex with a slight bulge above the anterior part of the eye; operculum with a small spine; preopercle scaled, its flange naked; caudal fin forked; molariform teeth rounded and slightly developed in both jaws. Colour of the body was yellowish above, silvery below; head silvery with two black bars across the head, the first extending below the angle of the jaw, the second wider, extending to the lower edge of the opercle; dorsal, caudal, pectoral fins bright orange-yellow, the two former having no black margins; anal and pelvic fins blackish. Meristic formula: D, XI+12; A, III+10; P, 15; V, I+5; GR, 12. Pored lateral line scales N=49; Scales above lateral line N=5; Scales below lateral line N=9.

## Discussion

All the examined traits of the 221 mm LT *A. bifasciatus* are in agreement with the previous descriptions of this species (e.g. Bauchot & Bianchi, 1984; Bauchot & Smith, 1984; Smith & Heemstra, 1986; Al Baharna, 1986; Khalaf & Disi, 1997) and with the ones given by Iwatsuki & Heemstra (2010; 2011b). According to these authors, *A. bifasciatus* can be distinguished from all the other species of *Acanthopagrus* by the following combination of characters: two conspicuous black bars on the head, one wide bar over the posterior one-third of the head, and a smaller black bar through eye; dorsal-fin soft rays 12–15; dorsal body scales silvery with a black center (Iwatsuki & Heemstra, 2010). Other diagnostic characters are: dorsal and caudal fins yellow, without dense black margin of dorsal-fin or narrow black edge along rear margin of caudal fin; 5 1/2 or 6 1/2 scale rows from 5th dorsal fin spine to lateral line; base of dorsal and anal fins scaly; interorbital area and preopercle flange naked; 2 rows of molars along each side of upper jaw; outer molar teeth row extends to rear end of both jaws basal width of incisor teeth (usually 6) at front of upper jaw smaller, and dorsal-fin rays XI,12–15; no spines elongated; anal-fin rays III,10–11; 2nd and 3rd anal-fin spines subequal, not enlarged (Iwatsuki & Heemstra, 2011b). In both the Red Sea

and Indian Ocean, *A. bifasciatus* occurs in sympatry with the dark-finned black porgy *A. berda*. The latter can easily be distinguished from *A. bifasciatus* since it shows no black bars on the head (Iwatsuki & Heemstra, 2010). Another species morphologically similar to *A. bifasciatus* is *A. catenula*. According to Iwatsuki & Heemstra (2011b), *A. bifasciatus* and *A. catenula* overlap their distribution only along the southern coasts of Oman and Somalia. *A. catenula*, can be distinguished from *A. bifasciatus* for the presence of a wide black margin on the dorsal fin as well as for other morphological characters, such as the number and disposition of molariform teeth (Iwatsuki & Heemstra, 2011b).

Overall, 12 Lessepsian fishes are known to occur in Tunisia, (Bradai, 2000; Bradai *et al.*, 2004). To our best knowledge, no species belonging to the genus *Acanthopagrus* Peters 1955 have so far been reported from these waters nor from the Mediterranean sea (Quignard & Tomasini, 2000; Golani *et al.*, 2013). In the past, other Mediterranean exotic fishes were recorded firstly in Tunisia. This is the case of the Atlantic migrant *Cheilopogon furcatus*, which was observed for the first time in the Gulf of Gabès (Ben Souissi *et al.*, 2005). Similarly, the moontail bullseye *Priacanthus hamrur* Forsskål 1775 was observed for the first time in Tunisian waters (Abdelmouleh, 1981), even if this record is now considered as doubtful (Starnes, 1988; Zenetos *et al.*, 2010; Golani *et al.*, 2013).

The two-bar seabream is a common species in the Red Sea and it could have entered the Mediterranean Sea through the Suez Canal, as well as - at least - another 90 teleosts recorded to date in this basin (Golani *et al.*, 2013). If this is true, it is likely that a small, yet undetected population had spread along the North African coast. Indeed, the possibility for *A. bifasciatus* having travelled large distances (ca. 2000 km from the Suez Canal to the Tunisian coasts) seems to be less likely, even if not completely unrealistic. As an alternative explanation, the occurrence of *A. bifasciatus* in the Gulf of Tunis could be the result of a direct human-mediated introduction, such as through ballast waters or by commercial vessels (Goren *et al.*, 2009; Wonham *et al.*, 2000). This hypothesis could be supported by the relative proximity (ca. 60 km) between the capture location of *A. bifasciatus* and the major Tunisian harbour area.

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