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SHORT COMMUNICATION

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First record of yellowbar angelfish *Pomacanthus maculosus* (Pomacanthidae) from the Syrian coast (eastern Mediterranean Sea)

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Abstract: On 16 June 2022, two specimens of *Pomacanthus maculosus* (Forsskål, 1775) were observed in the Syrian marine waters. One specimen was captured and classified, measured, preserved in formaldehyde and deposited at Tishreen University. It is a second substantiated record in the Levant Basin, and the first for the Syrian coast. The successful establishment of a viable population of *P. maculosus* in the Mediterranean Sea remains a suitable hypothesis which cannot be totally ruled out.
***Keywords*:** Pomacanthidae; morphometric measurements; meristic counts; Lessepsian migrant; Levant Basin

Sažetak: PRVI NALAZ VRSTE *POMACANTHUS MACULOSUS* (POMACANTHIDAE) U SIRIJSKIM OBALNIM VODAMA (ISTOČNO SREDOZEMNO MORE). Dana 16. lipnja 2022. godine, dva primjerka vrste *Pomacanthus maculosus* (Forsskål, 1775) zabilježena su u sirijskim morskim vodama. Jedan primjerak je uhvaćen, identificiran, izmjeren, sačuvan u formaldehidu te pohranjen na Sveučilištu Tishreen u Siriji. To je drugi potvrđeni nalaz ove vrste za područje Levanta te prvi za sirijske vode. Uspješna uspostava i održive populacije vrste *P. maculosus* u Sredozemnom moru ostaje prikladna hipoteza koja se ne može potpuno odbaciti.
Ključne riječi: Pomacanthidae; morfometrija; meristika; lesepsijski migrant; Levant

INTRODUCTION

Yellowbar angelfish *Pomacanthus maculosus* (Forsskål, 1775) is naturally distributed in the eastern coast of Africa from Mozambique to Kenya, reaching the Persian Gulf, the Gulf of Oman and the Arabian Peninsula (Pyle *et al*., 2010). The species is also recorded in the Red Sea and as a Lessepsian migrant (*sensu* Por, 1971) it occurs in some regions of the Mediterranean Sea such as the Levant Basin (Bariche, 2010; Salameh *et al*., 2012), the Egyptian coast (Al Mabruk *et al*., 2021) and westward in the waters surrounding Malta Islands (Evans *et al.*, 2016).

Additionally, *Pomacanthus maculosus* was reported outside of its natural range in areas such as the eastern central Pacific, off Mexico (Balzaretti-Merino *et al*., 2021), the western Brazil and Florida (Zavala-Jiménez, 2022) and the eastern Atlantic Ocean, from the Canary Islands (Brito *et al*., 2005). The aim of the present paper is to describe the collected specimen of *Pomacanthus maculosus* with comments on the species distribution in the study area and the Mediterranean Sea.

MATERIAL AND METHODS

On 16 June 2022, two specimens of *Pomacanthus maculosus* were recorded from the Syrian marine waters, 2 km off Banias harbour, 35° 13' 42" N; 35° 55' 31" E (Fig. 1). A diver observed the first specimen and captured the second one using a spear gun at a depth of 3 m below the surface, in an area with a total depth of about 80 m.

The collected specimen was examined following the recommendations of Bello *et al*. (2014) for reporting first records. All measurements were recorded to the nearest millimetre and are also reported as percentages of total length (%TL), together with meristic counts and total body weight (Table 1). The specimen was preserved in 10% formaldehyde, and deposited in the Ichthyological Collection of Environmental Research Higher Institute, Tishreen University, Syria, under the catalogue number 33-2022.

RESULTS AND DISCUSSION

The collected specimen measured 275 mm in total length (TL), 222 mm in standard length (SL), and its total body weight was 602 g. It was identified as *Pomacanthus maculosus* by the combination of the following morphological characters: body deep and compressed, almost circular; head deep, snout short; mouth small, with brush-like teeth, preopercle with a large spine at its angle and vertical margin, smooth; bone between

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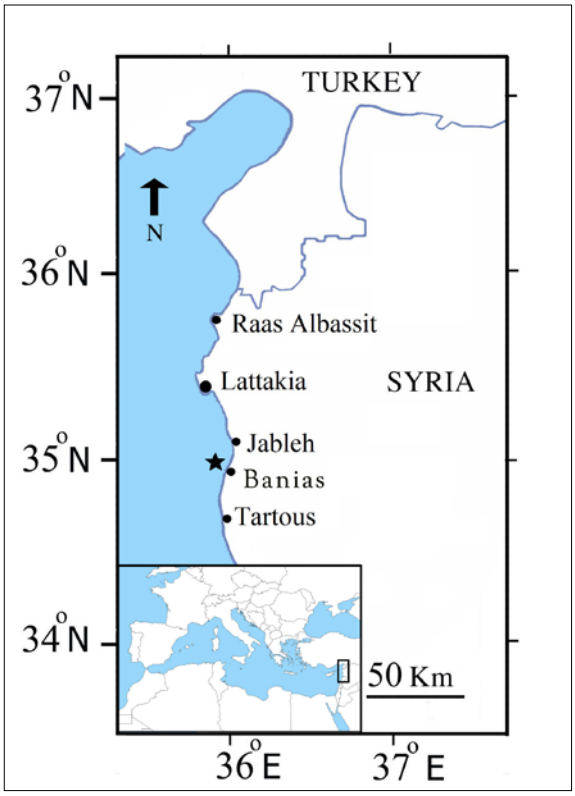

Fig. 1. Map of the Syrian coast with black star indicating the capture site of *Pomacanthus maculosus*. Insert showing the Mediterranean Sea, with rectangle indicating the Syrian coast.

preopercle and operculum without spines; bone under eye without large, rear-pointing spines, front soft rays of dorsal and anal fin both with filaments; first 5-7 dorsal fin spines deeply notched; 4th and 5th dorsal rays and 4th and 5th anal rays very elongated; tail fin rounded, body with large and small scales, irregularly arranged, very rough, with distinct ridges on the exposed part, scales extend out onto the median fins; without "axillary process" (an enlarged scale) at the base of the pelvic fins; lateral line complete. Colour of the body is violet blue, exhibiting a narrow, vertical yellow oval bar along the middle of the body; scales on forehead and nape dark blue; tail fin yellowish-white with blue marks (Fig. 2). This colour is characteristic of adult specimens following Golani *et al.* (2021) who noted that in juvenile specimens the body is dark blue with fine, vertical light blue and with lines, center of body with yellow mark on upper side and transparent tail fin.

Fig. 2. *Pomacanthus maculosus* (catalogue number 33-2022) captured from the Syrian coast, scale bar = 40 mm.

Table 1. Morphometric measurements in mm and as percentages of total length (%TL), meristic counts and total body weight recorded in the specimen of *Pomacanthus maculosus* (catalogue number 33-2022), captured off the Syrian coast.

Morphometric measurements	mm	%TL
Total length (TL)	275	100.0
Standard length (SL)	222	80.7
Body depth	150	54.5
Head length	60	21.8
Eye diameter	12	4.4
Snout length	35	12.7
Upper jaw length	9	3.3
Lower jaw length	10	3.6
Dorsal fin length	212	77.1
Pectoral fin length	62	22.5
Pelvic fin length	86	31.3
Anal fin length	155	56.4
Caudal fin length	53	19.3
Pre-dorsal length	75	27.3
Pre-pectoral length	63	22.9
Pre-pelvic length	83	30.2
Pre-anal length	143	52.0
Total body weight (g)	602	
Meristic counts		
Dorsal fin	XII+21	
Pectoral fin	17	
Pelvic fin	I+5	
Anal fin	III+19	
Caudal fin	15	
Rows above the lateral line	5	
Rows under the lateral line	18	
Number of gill-raker on the first branchial arch	17(5+12)	

Morphology, morphometric measurements, meristic counts and colour are in agreement with previous descriptions of the species reported by Bariche (2010), Salameh *et al.* (2012), Evans *et al.* (2016), Al Mabruk *et al.* (2021) and Golani *et al.* (2021). The present finding constitutes the first record of *Pomacanthus maculosus* from the coast of Syria and the species could be included at present in the checklist of Syrian ichthyofauna (Ali, 2018). Additionally, *P. maculosus* is the second species of the genus *Pomachantus* Lacépède, 1802, ocurring in the Syrian marine waters, the first species being emperor angelfish *P. imperator* (Bloch, 1787)

recorded by Capapé *et al.* (2018). *P. imperator* differs mainly from *P. maculosus* in colour pattern. Specifically, *P. imperator* displays diagonal alternative stripes of narrow yellow and wider bluish-purple, a black mask with bluish margin on the eye, and yellow ends of dorsal and caudal fins (Golani *et al*., 2021). Other distinctive morphological characteristics of *P. imperato*r that allow for distinction from *P. maculosus* include the lack of anal fin filament, first 5-7 dorsal fin spines deeply notched, and very elongated 4th and 5th dorsal rays and 4th and 5th anal rays.

Salameh *et al*. (2012) noted that the presence of *Pomacanthus maculosus* in the Mediterranean could be attributed to Lessepsian migration. The captures of the species in different regions of the Mediterranean Sea indicate that a substantial population is at present successfully established in this sea, at least in its eastern and central areas as suggested by Golani *et al.* (2021). The present finding represents also the expansion of the species distribution range in the Levant Basin. Conversely, a possible escape or a release from aquarium, or possibly an introduction via ship's ballast water cannot be totally ruled out (Zavala-Jiménez, 2022). These are the main pathways that already explained some records of introduced species outside their natural range (Yapici, 2021), and *P. maculosus* is an example of it (Zavala-Jiménez, 2022). Pomacanthid species have a morphology that makes them poor swimmers and are not prone to large migrations, such as from the Red Sea into the Mediterranean through Suez Canal. However, the warming of the Mediterranean waters (Francour *et al*., 1994) enhances the tropicalization process and this pattern is confirmed by the number of occurrences of alien fish species established in this sea (Golani *et al*., 2021).

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