



Occurrence of *Plotosus lineatus* (Thunberg, 1787) from the northeastern Mediterranean coast of Turkey

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ABSTRACT

A single specimen of striped eel catfish *Plotosus lineatus* (Thunberg, 1787) has been captured in August 2022 from Mersin Bay, at 3 m depth. This study reveals a new locality record from Turkish waters and the occurrence from the northeastern Mediterranean coast of Turkey. This species has been formed in this region, indicating that its trend has the potential to spread westward along the northern side of the coast of Turkey. Besides, this species is also the successive alien plotosid recorded from the Mediterranean marine waters of Turkey. All measurements and counts as well as color descriptions of *P. lineatus* agree with previous descriptions.

Keywords

Striped eel catfish
Non-indigenous species
Venomous
Expansion
Mediterranean Sea

Introduction

Since the opening of the Suez Canal in 1869, it has provided a significant and suitable pathway for the invasion of many alien species that penetrated the Mediterranean. To date, more than 600 invasive species, among them 104 fish species, have spread into the Mediterranean, establishing populations in their new habitat (Golani et al., 2020).

The striped eel fish *Plotosus lineatus* (Thunberg, 1787), belongs to the family Plotosidae that consists of 10 genera and 42 valid species (Nelson, 1994), is an inshore benthic fish species with an original distribution range of 1 to 60 m. It dwells in sandy and rocky substrate sheltered reef areas (Taylor and Gomon, 1986; Myers, 1999). Adult specimens are solitary or occur in smaller groups; on the other hand, juvenile specimens are dense ball-shaped schools that are found in coral reefs, usually in a hide under ledges during the day (Kuitar and Tonozuka, 2001), and estuary areas and tide pools (Froese and Pauly, 2022). It feeds on commonly benthic invertebrates, crustaceans, and small fish (Golani et al., 2021; Froese and Pauly, 2022). It reaches

sexual maturity within 1-3 years, at a maturity length of 140 mm (Thresher, 1984). Its eggs are demersal and larvae planktonic. Adults are known to hide under cavities and ledges during the day.

P. lineatus is distributed from the Red Sea and east Africa to Japan, including Australia, and also Palau and Yap in Micronesia (Myers, 1991). It sometimes enters the freshwaters of East Africa (Lake Malawi) and Madagascar (Taylor and Gomon, 1986).

P. lineatus was previously known only from the Red Sea (Goren and Dor, 1994). This species was later recorded from Mediterranean waters (Golani, 2002; Golani et al., 2020). According to Golani (2002), *P. lineatus* was entered through Suez Canal into the Mediterranean Sea and it is recorded second alien catfish after *Arius parki* in the Mediterranean waters.

In the Mediterranean Sea, the first record of *P. lineatus* was reported by Golani (2002) and subsequently, then several specimens were collected from the Israel coasts by Golani et al. (2021) from Israel (Tel Aviv). Later, the species was recorded

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from Lebanon Bitar (2013), Egypt (Temraz and Ben Souissi, 2013), Syria (Ali et al., 2015), and Tunisia (Ounifi-Ben Amor et al., 2016). In Turkish marine waters, *P. lineatus* was firstly reported from Iskenderun Bay (northeastern Mediterranean) by Doğdu et al. (2016).

This paper, presents a second captured record as the range expansion of *P. lineatus* in Turkish marine waters. Besides, the current specimen represents a new locality record from Mersin Bay (northeastern Mediterranean), Turkey. In addition, this study elucidated that *P. lineatus* was the first plotosid species successively recorded from the Mediterranean coasts of Turkey.

Materials and Methods

A single specimen of *P. lineatus* was caught by a fishing rod at a depth of 3 m from Arpacbahsis coast, Mersin Bay (Coordinate: 36° 38' N, 34° 21'E) on 13 August 2022 (Figure 1). The morphometric measurements of the samples were taken using a digital caliper to the nearest 0.01 mm and weighed to the nearest 0.1 g for the total body.

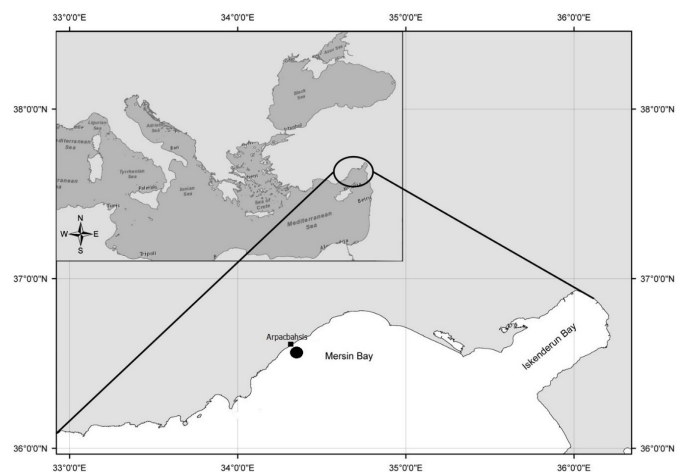


Figure 1. Map showing the capture site (●) of *P. lineatus* in the Mersin Bay (N.E. Mediterranean)

The description of the present specimen agrees with the description given by Golani (2002) and Ali et al. (2015). The specimen was stored in a deep-freezer and was deposited in the Museum of the Faculty of Marine Sciences and Technology, Iskenderun Technical University (Figure 2), (MSM-PIS/2022-1).

Results

The specimen had a total length (TL) of 127.8 mm and a weight of 11.905 g. The diagnostic features of the specimen were as follows: First dorsal fin rays I +4, Second dorsal fin rays 83, anal fin rays 66, pectoral fin rays I+ 10.

The body depth is 14.01% of TL; head length is 20.98% of TL; eye vertical diameter is 1.53% of head length; eye horizontal diameter is 1.98% of head length; pre-dorsal length is 24.52% of TL; pre-pectoral length is 17.88% of TL; pre-pelvic length is 34.18% of TL; pre-anal length is 44.50% of TL; dorsal fin ray is 12.59% of TL; pectoral fin ray is 12.35% of TL; pelvic



Figure 2. The specimen of striped eel catfish *P. lineatus* (Thunberg, 1787), captured from Mersin Bay (Arpacbahsis), Turkey

fin ray is 8.84% of TL; anal fin ray is 57.62% of TL; first dorsal fin spine length is 6.87% of TL and pectoral fin spine length is 6.06% of TL. Its body is elongated, and smooth without scales. The head is large and broad. The eye is moderately large. Four pairs of barbels (one nasal and one maxillary barbel) extend slightly beyond the posterior borders of the eye. The dorsal and anal fins are continuous with the caudal fin. The distribution of the *P. lineatus* previous and present capture records in the Mediterranean Sea was given in Table 1.

The color of the fresh specimen was the body brown with two narrow white stripes. The second dorsal fin and anal fins are paler than the rest of the body with a black margin. The ventral side of the body was whitish and light brownish. All measurements and counts as well as color descriptions of *P. lineatus* agree with Golani (2002), Ali et al. (2015), and Doğdu et al. (2016).

Discussion

The present range expansion record represents the second observation of *P. lineatus* in the Mediterranean coasts of Turkish marine waters. The main reason why non-indigenous alien species are increasing their entry into the Mediterranean and expanding their range is considered to be the increase in water temperature caused by global warming (Turan et al., 2016).

Today, many invasive alien species entering the Mediterranean cause damage to some important marine habitats and community structures (Turan et al., 2018), it is likely that they will affect the food webs in the future, resulting in drastic changes in Mediterranean biodiversity (Arndt et al., 2018).

P. lineatus is a non-commercial venomous species. The venomous serrated spine at the beginning of the first dorsal and each pectoral fin is dangerous and causes painful and in rare cases even fatal injuries (Myers, 1991). It is also known that this species is opportunistic, possibly one of the top predators, and is able to adapt to different new ecological habitats. *P. lineatus*

Table 2. Collected records of *Plotosus lineatus* from the Mediterranean Sea covering the period 2002-2022

References	Number of Samples	Record Date	Location/Country	Sampling Gear	Depth (m)	Total Length (mm)
Golani (2002)	17	11.11.2001	Ashod and Ashqelon (Mediterranean Sea), Israel	Trawl	20	152-177
Temraz and Ben Souissi (2013)	7	10.2012	offshore Damietta coast, Egypt	Trawl	-	112-137
Rizkalla and Akel (2015)	28	09.2014	El Arish, Egypt	Trawl	51-67	80-100
Ali et al. (2015)	3	09.2014	Balteem, Egypt	Trawl	21	80-100
Ali et al. (2015)	2	29.10.2014	Tartus, Syria	Spear gun	3	174-181
Doğdu et al. (2016)	3	04.04.2016	Cevlik, Iskenderun Bay, Turkey	Spear gun	20	216-245
Ali et al. (2017)	4	14.05.2015	off Latakia, Syria	Bottom cage net-Beach seine	20	156.8-186.2
Present study	1	13.08.2022	Arpacbahsis, Mersin Bay, Turkey	Fishing rod	3	127.8

was also listed among the 100 worst invasive species to enter the Mediterranean by Streftaris and Zenetos (2006).

In this study, *P. lineatus* was sampled at night by scale fishermen. Although the presence of only one specimen of *P. lineatus* was reported in the study, according to the information given by the fisherman, it was stated that this species was seen many times in the region (Personal comm.). Similarly, Turan et al. (2022) reported one group of the striped eel cat fish *P. lineatus* was underwater observed from Kizkalesi and Bogsak region in the Mersin Bay. Edelist et al. (2012) stated that this species may rapidly become a dominant component of the benthic habitat. Besides, the present observation of this species strongly suggests that it has been established in the northeastern Mediterranean and could be a threat to local biodiversity by expanding its range over time.

Conclusion

In the present paper, we report the occurrence of *P. lineatus* from the Mediterranean coasts of Turkey and the new locality record from Mersin Bay. The distribution trend in this area indicates that this species may have the potential for spread

along the Mediterranean and Aegean Sea coast of Turkey in the near future. Thus, further monitoring studies are needed for non-indigenous alien species and spreading in the Mediterranean.

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COMPLIANCE WITH ETHICAL STANDARDS

Authors' Contributions

Authors contributed equally to this paper.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Approval

For this type of study, formal consent is not required.

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