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Collective Article A

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New Alien Mediterranean Biodiversity Records (August 2022)

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Abstract

In this Collective Article on alien and cryptogenic diversity in the Mediterranean Sea we report a total of 19 species belonging to nine Phyla and coming from nine countries. Several of these records concern fish species, and of particular interest are the first records of: *Terapon puta* for Italian waters; *Pteragopus trispilus* from Malta; *Plotosus lineatus* from Cyprus; and the northernmost Mediterranean record of *Lagocephalus sceleratus*. The northernmost Mediterranean record was also reported for the sea urchin *Diadema setosum*. The portunid crab *Thalamita poissonii* was recorded for the first time in Libya. The copepod *Pseudodiaptomus marinus* was recorded for the first time in the Marmara Sea. The polychaete *Branchiomma luctuosum* was recorded for the first time from the Mediterranean coast of France. The alien anemone *Diadumene lineata* was recorded for the first time from Slovenia. The macroalgae *Sargassum furcatum* was recorded for the first time from Italy. The new Mediterranean records here reported help tracing abundance and distribution of alien and cryptic species in the Mediterranean Sea.

Introduction

The Mediterranean Sea is the most invaded marine basin in the world, with about 1000 alien species (Katsanevakis *et al.*, 2014; Zenetos *et al.*, 2022). Biological invasions are one of the main threats for biodiversity worldwide (Bellard *et al.*, 2017), although the impacts of invasive alien species (IAS) is a problem (Tsirinantis *et al.,* in press). Based on this, the study and monitoring of alien species in the Mediterranean Sea covers a key role in biological invasions' management, and is very important in order to create updated lists and taxonomic inventories useful for long-term comparisons (Crocetta *et al.*, 2015; Thomson *et al.*, 2018). In this context, the contribution of citizen science revealed of great utility in the basin for early detection of alien species (Tiralongo *et al.*, 2019; Langeneck *et al.*, 2022).

Since 2011, the *Mediterranean Marine Science* journal through Collective Articles facilitates the collection and dissemination of new distributional data on alien and uncommon species in the Mediterranean Sea. In the present Collective Article A, a total of 19 species belonging to nine Phyla and recorded from nine countries are reporterd (Fig.1, Table 1). In particular, a total of five species were recorded from Turkey (*Abudefduf* cf. *saxatilis*, *Scarus ghobban*, *Diadema setosum*, *Pseudodiaptomus marinus* and *Acteocina mucronata*); four from Greece (*Microcosmus squamiger*, *Celleporaria brunnea*, *Tricellaria inopinata* and *Caprella scaura*); four from Italy (*Terapon puta*, *Percnon gibbesi*, *Paraleucilla magna* and *Sargassum furcatum*), and one from France, Malta, Croatia, Slovenia, Libya and Cyprus *(Branchiomma luctuosum*, *Pteragogus trispilus*, *Lagocephalus sceleratus*, *Diadumene lineata, Thalamita poissonii* and *Plotosus lineatus*, respectively). These additional records will help to understand colonization processes and expansion of NIS in the Mediterranean Sea, and consequently and consequently to develop adequate measures for mitigation and control of biological invasions in the basin.



Fig. 1: Location of new Mediterranean records of alien and cryptobenthic species. Location numbers (LN) correspond to Table 1.

Table 1. List of species/records reported in this Collective. SC = Subchapter; in Area, WMED = Western Mediterranean Sea; CMED = Central Mediterranean Sea, EMED = Eastern Mediterranean Sea, ADRIA = Adriatic Sea, MARM = Sea of Marmara; LN = Location number.

	SC	Area	Latitude	Longitude	Country	LN
Chordata	-					
Abudefduf cf. *saxatilis*	8.2	EMED	36.84616	30.75658	Turkey	17
Lagocephalus sceleratus	4.1	ADRIA	43.88120	15.40450	Croatia	6
Microcosmus squamiger	6.1	EMED	35.34330	25.13661	Greece	10
Plotosus lineatus	9.1	EMED	35.58160	34.68270	Cyprus	18
Pteragogus trispilus	3.1	CMED	35.98848	14.32765	Malta	5
Scarus ghobban	8.3	EMED	36.84666	28.38472	Turkey	15
Terapon puta	2.1	CMED	45.20503	12.26090	Italy	3
Echinodermata						
Diadema setosum	8.4	EMED	38.44248	26.32371	Turkey	13
Diadema setosum	8.4	EMED	38.41751	26.31482	Turkey	13
Bryozoa						
Celleporaria brunnea	6.3	EMED	40.84417	25.88196	Greece	12
Tricellaria inopinata	6.3	EMED	40.84307	25.87779	Greece	12
Arthropoda						
Caprella scaura	6.2	EMED	40.84380	25.88230	Greece	11
Caprella scaura	6.2	EMED	40.63340	22.93730	Greece	11
Percnon gibbesi	2.4	CMED	37.52055	15.11444	Italy	8
Pseudodiaptomus marinus	8.1	MARM	40.74558	29.62407	Turkey	16
Thalamita poissonii	7.1	EMED	32.34696	23.08363	Libya	9
Annelida						
Branchiomma luctuosum	1.1	WMED	43.10740	5.91371	France	1
Mollusca						
Acteocina mucronata	8.5	EMED	36.33319	26.31776	Turkey	14
Cnidaria						
Diadumene lineata	5.1	ADRIA	45.51312	13.59068	Slovenia	4
Porifera						
Paraleucilla magna	2.3	WMED	39.89260	8.51080	Italy	2
Paraleucilla magna	2.3	WMED	39.22120	9.08930	Italy	2
Ochrophyta						
Sargassum furcatum	2.2	CMED	37.63750	15.18110	Italy	7

1. FRANCE

1.1 First record of the *Sabellid Branchiomma luctuosum* (Grube, 1870) on the French Mediterranean coast

Robin P.M. GAUFF, Flavia NUNES and Marc BOUCHOUCHA

The genus *Branchiomma* Kölliker, 1858 contains 30 accepted species (Licciano & Giangrande, 2008). As a distinguishing characteristic from other sabellids, the presence of paired stylodes on the radioles constitutes a key feature for identifying individual *Branchiomma* species (Licciano & Giangrande, 2008). Seven species have been identified in the Mediterranean Sea, including three introduced species: *B. boholense* (Grube, 1878), *B. brandi* (McIntosh, 1885) and *B. luctuosum* (Langeneck *et al.*, 2020; Licciano & Giangrande, 2008). Due to its dispersion linked to anthropic activities, the latter is spreading throughout the Mediterranean (Spain, Morocco, Tunisia, Albania, Greece, Turkey) and Atlantic since its first detection in 1978 in Italy (Langeneck *et al.*, 2022). We here provide the first record of *B. luctuosum* on the French Mediterranean coast.

We collected three *B. luctuosum*, present in high densities (up to 50 ind.m^{-2}, Fig. 2A) from the harbours of Toulon Bay, France (43.107400° N, 5.913709° E). The individuals were present on vertical and horizontal hard substrates of different materials (seawalls, floating pontoons). They were identified in the laboratory using Licciano & Giangrande (2008) and a ZEISS SteREO Discovery.V12 microscope coupled to a Axiocam 506 mono camera and visualized in ZEISS Zen2.3. They were then stored in absolute ethanol. DNA was extracted using the Nucleo-Spin DNA RapidLyse kit (Macherey-Nagel). PCR was conducted with primers mlCOIintF/jgHCO2198 and cycle sequencing conditions from Leray *et al.* (2013), using the Q5U polymerase (New England Biolabs). PCR products were purified with ExoCleanUp FAST (VWR) and Sanger sequenced for forward and reserve strands at Eurofins Genomics.

The individuals ranged from 5.3 to 7 cm with a crown length from 1.5 to 2.3 cm. They had 3-7 thoracic and 90-100 abdominal chaetigers and a large gap in the dorsal collar. Radioles were more numerous than in reference literature (28 - 48). Short, fine digitiform stylodes (20 - 22) protruded from the middle of radiolar segments, not covering the radiolar eyes (Fig. 2B). Dorsal lips were slender and between 1/3 and 1/2 of the crown length. The body was khaki (#77774A), sparsely blotched black. The crown cilia were velvet (#4F1E32), radiole branches were orange fluorescent (#FF8800) with sometimes whitish or blackish stripes (1/3 of radiolar segment length).

We provide three reference sequences, which are the first COI sequences (313 bp) on GenBank and BOLD (Accession numbers: ON911309-ON911311). These sequences may help monitor the spread of *B. luctuosum* elsewhere, as metabarcoding may be a powerful tool for the early detection of NIS (Couton *et al.*, 2022).



Fig. 2: Three *Branchiomma luctuosum* individuals in their habitat (A) and zoom on the digitiform stylodes as identification characteristic (B). Photo credit (A) Olivier Dugorney, IFREMER.

2. ITALY

2.1 First record of *Terapon puta* Cuvier, 1829 in the central Mediterranean Sea: a contribution from citizen science through social media

Francesco TIRALONGO and Aylin ULMAN

In the Mediterranean region, several citizen science initiatives are successfully contributing to the early detection of rare and non-indigenous fauna. This is possible thanks to the use of social media, Facebook in particular, a virtual place in which citizens can quickly share their observations and participate in citizen science projects, such as AlienFish and Oddfish (e.g., Azzurro & Tiralongo, 2020; Tiralongo *et al*., 2020). Here, based on a series of photos posted to the Facebook group of the AlienFish project (Fauna Marina Mediterranea) on 3rd November 2021, we report *Terapon puta* Cuvier, 1829 for the first time from the central Mediterranean Sea (Italy, Adriatic Sea). Another two specimens were caught in the same location by the same fisher consecutively on 4th and 5th November 2021. *Terapon puta*, commonly known as the "small-scaled terapon", is a Lessepsian fish from the Indo-West Pacific range. It is a small-sized fish and inhabits shallow waters < 30 m, and can be observed also in brackish and fresh waters (Manasirli & Mavruk, 2021). Its first record in the Mediterranean Sea dates back to 1973 in Egypt (Ben-Tuvia, 1976). Although other records were subsequently reported in the Mediterranean Sea, the species remained confined to the easternmost part of the basin, and only recently was recorded in Turkey (Bariche & Fricke, 2020; Manasirli & Mavruk, 2021 and references therein).

The specimens reported here (Fig. 3) were caught by a fisher in the Venetian Lagoon (45.20503° N, 12.26090° E) with a particular trap net called "*cogollo*", at a depth of about 2 m. All specimens were given to an aquarist who noted the "strange-looking" appearance of the fish and contacted experts of the AlienFish project through the Facebook group "Fauna Marina Mediterranea". The species was easily identified and distinguished from the other two species of the genus (*T. jarbua* and *T. theraps*) also present in the Mediterranean (Manasirli & Mavruk, 2021) by the presence of thin dark stripes along the body (wider and darker in *T. jarbua* and *T. theraps*; curved in *T. jarbua,* and straight in the other two species) that extend to the caudal fin, and by a slender body and a more pointed snout (Manasirli & Mavruk, 2021).

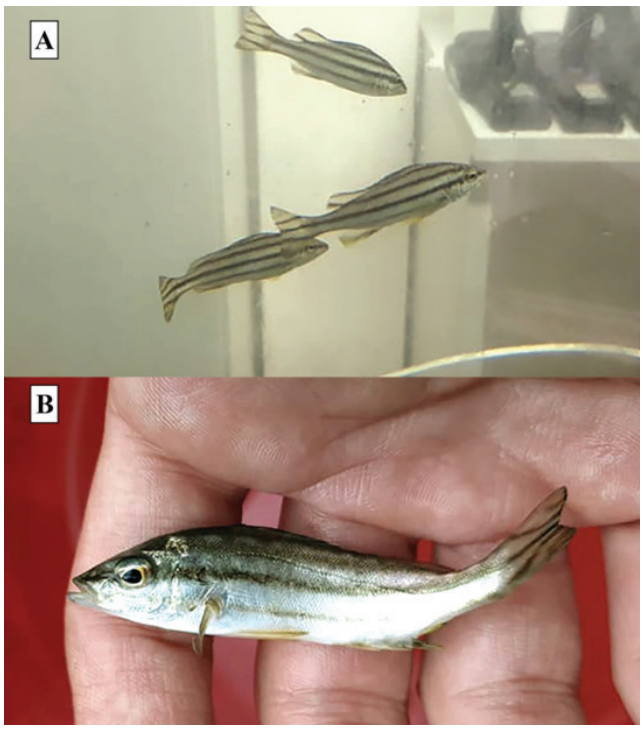


Fig. 3: The three specimens of *Terapon puta* caught in the Venice Lagoon and kept in aquarium (A); a specimen in the hand of the aquarist (B) (Photos by Francesco Balbini).

Although a secondary dispersal from an established population in the eastern Mediterranean cannot be ruled out, it seems unlikely. On the other hand, the presence of *T. puta* in the Venice Lagoon could be the result of a secondary introduction through ballast water. In light of this, the role of multiple introductions in the Mediterranean Sea should be further investigated. Furthermore, considering the excellent results obtained, the collaboration between researchers and citizens and the involvement of local people in citizen science projects should be furtherly improved and expanded upon.

2.2 A new record of *Sargassum furcatum* Kützing (Ochrophyta, Fucales) in the Mediterranean Sea

Giuliana MARLETTA and Andrea LOMBARDO

The species of the genus *Sargassum* C. Agardh are canopy-forming macroalgae mostly distributed in tropical and subtropical waters (Aouissi *et al*., 2018). In the Mediterranean Sea, there are nine species belonging to this genus, currently accepted: *Sargassum acinarium* (Linnaeus) Setchell, *S. desfontainesii* (Turner) C. Agardh, *S. flavifolium* Kützing, *S. furcatum* Kützing, *S. hornschuchii* C. Agardh, *S. muticum* (Yendo) Fensholt, *S. ramentaceum* Zarmouh & Nizamuddin, *S. trichocarpum* J. Agardh and *S. vulgare* C. Agardh (Cormaci *et al.*, 2012).

Sargassum furcatum was described for St. Thomas, Virgin Islands by Ehrenberg (Kützing, 1843). This species is mainly distributed in the western Atlantic (Mexico, Costa Rica, Cuba, Brazil, Venezuela, Antilles, Trinidad

and Tobago, and Virgin Islands), in the eastern Atlantic (Azores, Canary Islands, Madeira, Savage Islands) and in the Pacific Ocean (Philippines) (Guiry, 2021). In the Mediterranean Sea, this species was only reported in 1995 by Flores-Moya & Conde (1998) in the Chafarinas islands (Spain, western Mediterranean) (Aouissi *et al.*, 2018).

On 12th February 2021 a thallus of *Sargassum* (Fig. 4A) was found at 27 m of depth in the site of "Acque Fredde" (37.6375° N, 15.1811° E), located along the central-eastern coast of Sicily (Italy, Ionian Sea). The thallus was photographed through an Olympus TG-6 underwater camera. Then it was collected and examined at the stereomicroscope. It matched with the description of Flores-Moya & Conde (1998), and Cormaci *et al*. (2012). The thallus was fixed to the substrate through a basal disc from which a short smooth axis originated (Fig. 5A). The primary branches were muriculate (Fig. 5B) and brought lanceolate leaves branched up four times, with toothed or smooth margin, and crossed by an evident midrib, dichotomously divided 1-4 times (Fig. 5C). The cryptostomata were usually located on both sides of the midrib. As in the specimen observed by Flores-Moya & Conde (1998), also the thallus found by us did not show air vesicles. After this first finding, this species was found several times in the same and in other nearby areas sited along the central-eastern coast of Sicily, "Scalo Pennisi" (37.6397° N, 15.1846° E) and "Santa Maria La Scala" (37.6129° N, 15.1753° E), suggesting a possible expansion of this macroalga. On 7th June 2021, three fertile thalli were detected and photographed at "Scalo Pennisi" (Fig. 4B-C): two on a rocky seabed at a depth of 22 m and another one in a crevice of a rocky wall at 4 m of depth. The receptacles were warty, branched and

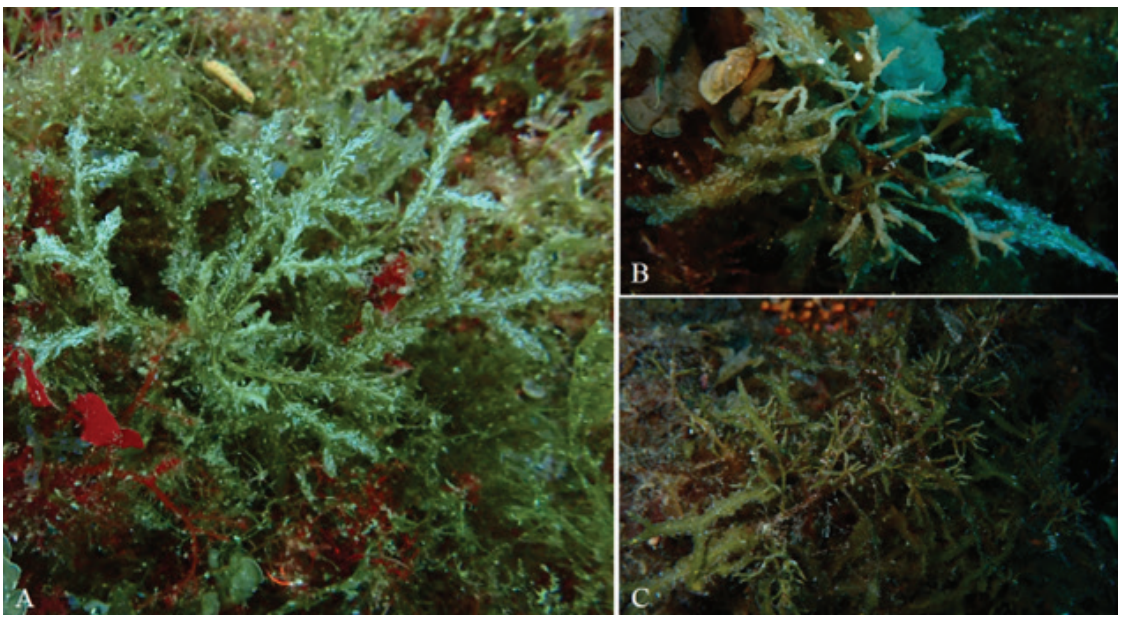


Fig. 4: *Sargassum furcatum*. A. The thallus found at "Acque Fredde" in February. B. A fertile thallus found at "Scalo Pennisi" in June. C. Another fertile thallus in the same site (Photos by G. Marletta).

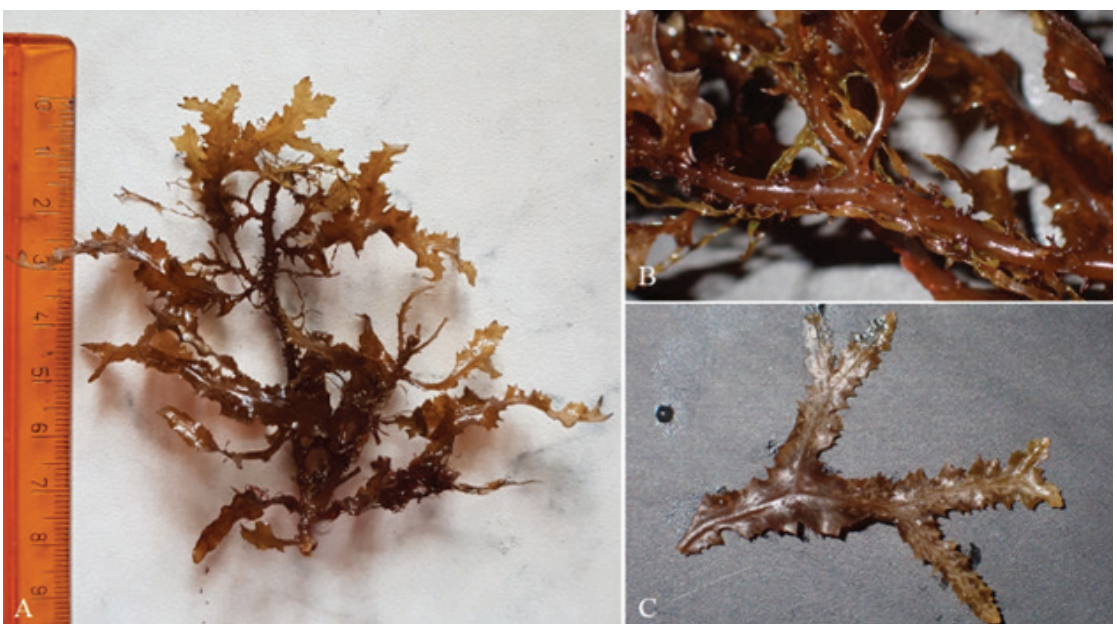


Fig. 5: *Sargassum furcatum*. A. General habitus of a thallus. B. Detail of the muriculate primary branches. C. Detail of the lanceolate leaves branched up four times, with a toothed margin and an evident midrib (Photos by A. Lombardo).

situated at the axilla of the branches.

The finding of *S. furcatum*, a warm affinity species, might be further evidence of the warming trend of the Mediterranean waters. Given the distribution of this species, it is likely that it was entered the Mediterranean through the Strait of Gibraltar and it was transported drifting by the currents and the wave motion to the investigated area. Considering the regression of the canopy-forming species (particularly *Cystoseira s.l.* species) in the Mediterranean Sea, *S. furcatum* could substitute the ecological niche of these species, indicating a possible shift in the local flora.

2.3 First record of *Paraleucilla magna* (Porifera, Calcarea) in Sardinian waters, Western Mediterranean Sea

Daniele GRECH and Egidio TRAINITO

This paper reports the first record of *Paraleucilla magna* Klautau, Monteiro & Borojevic, 2004 in Sardinian waters. The examined specimens were collected, in February 2019, first from a rope colonized by mussels in the Oristano Gulf, 2.5 m deep (39.8926° N, 8.5108° E, WGS84), and then close to a mussel farm in the Gulf of Cagliari channel (39.2212° N, 9.0893° E). The collected sponges had the typical morphology of *P. magna* according to Longo *et al*. (2007), Longo & Pronzato (2011) and Gerovasileiou *et al*. (2017). White to light cream coloured, they had friable consistency (Fig. 6A, B). The sponge results prickly, with smooth surface and foliaceous body shape with short tubes ending in oscular openings. The characteristic skeleton and spicules dimensions (Fig, 6C. Table 2) are consistent to those reported in literature (Klautau *et al.*, 2004; Longo & Pronzato *et al*., 2011; Gerovasileiou *et al*., 2017).

The species has been firstly observed in the NE Sardinia since 2011 (40.8812° N, 9.6369° E, unpublished data) and, in the subsequent years, settling on shallow rocks, artificial substrates and *Cymodocea nodosa* (40.9145° N, 9.5861° E; Fig. 6A). In the Gulf of Oristano, probably some samples of this species stranded along the coastline in 2018 after a medicane (Grech *et al*., 2020) but its identification failed due to the limited and damaged material. Finally, the sponge has been reported in 2021 in the framework of a collaborative mapping initiative involving local fishermen along Oristano coastline. They reported the presence of a "sea bread like" sponge in Oristano harbour (39.8637° N, 8.5693° E) and Santa Giusta lagoon linking channels (39.8646 N, 8.5741° E).

This sponge is abundant in eutrophic environments where it can reach high values of abundance, but it also lives in oligotrophic conditions. It can be a prominent component of the fouling community but it can settle also on Alismatales (Plantae: Tracheophyta, Fig. 6A).

The geographical locations of the findings here described suggest that shipping and aquaculture are the

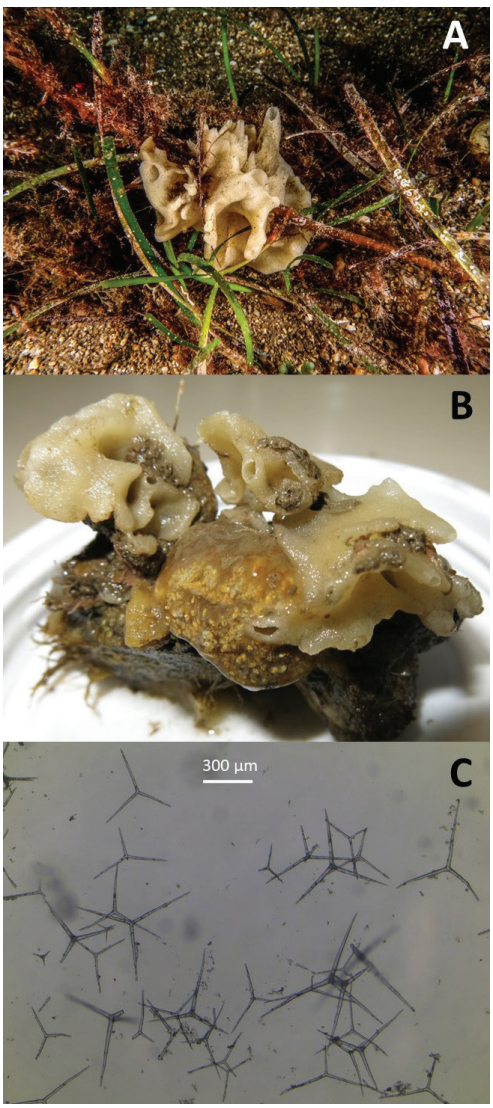


Fig. 6: Specimens of *Paraleucilla magna* collected from Sardinia, Italy. A, specimen *in situ* at Lido del Sole, Olbia. B, Fresh sample, Gulf of Oristano. C, Spicules at light microscope.

Table 2. Spicule measurements of *Paraleucilla magna* (average ± se = standard error).

Spicule	Actin length (µm)	se	Actin width (µm)	se	n
Cortical triactines	271.7	8.6	28.1	3.4	21
Cortical tetractines	412.2	12.7	35.3	1.3	7
Subatrial triactines	351.5	16.6	27.2	1.2	20
Subatrial tetractines	296.2	13.7	36.4	8.8	17
Atrial triactines	225.6	14.3	20.1	0.8	12

most probable vectors for introduction in the study area (Longo *et al*., 2007; Zammit *et al*., 2009) and its recent expansion due to the strong invasive potential that could be linked to climate change (Lanna *et al*., 2015).

At the moment, the unique known reported potentially negative effect is the cover of commercial bivalves (fouling), but further investigation/implication about aquaculture hampering and its eventual quantification are worth of further investigations.

2.4 Evidence of predation on the invasive crab *Percnon gibbesi* (Brachyura, Plagusiidae) by two fish species in the Ionian Sea

Pietro BATTAGLIA and Danilo SCUDERI

Invasive alien species are a significant threat for biodiversity by competing with or predating native species and altering the trophic relationships and community structure (Tiralongo *et al*., 2021). *Percnon gibbesi* is a non-indigenous crab that has recently appeared in the Mediterranean (Relini *et al*., 2000) and has rapidly colonized many areas of the basin, expanding its distribution range (Katsanevakis *et al*., 2011). *Percnon gibbesi* is usually found in the submerged part of the intertidal as well as in the infralittoral zone. It has a flexible diet, which includes algae and benthic invertebrates. Among the reasons of its successful establishment, it was also suggested the absence of substantial competition and predation (Sparrow *et al*., 2001; Katsanevakis *et al*., 2011). However, despite its wide distribution in Mediterranean, there is little knowledge about its trophic relationships with potential predators. Up to date, only Tiralongo *et al*. (2021) directly observed the predation by *Gobius paganellus* (Gobiidae) on juvenile individuals of *P. gibbesi*, whereas Noè *et al*. (2018) demonstrated that in marine protected areas the higher diversity and abundance of native predator assemblages directly affect the invasion success of this crab. It is therefore of relevant importance to understand what other predators can contribute to the biological control of this species.

We report here, for the first time, two predation events on adult *P. gibbesi* (about 3-4 mm of carapace length) by the Mediterranean moray (*Muraena helena*; on 2014 February 24) and dusky grouper (*Epinephelus marginatus*; on 2017 September 1). These predators were caught by speargun during free divings in the Sicilian coast of the Ionian Sea (37.52055 N, 15.11444 E), on a rocky bottom at 15-20 m depth. The moray was about 1 kg and, after catch, regurgitated a crab (Fig. 7A, 7B), but the stomach did not contain other prey. The dusky grouper weighed 2 kg and the stomach inspection showed that this fish preyed on two individuals of *P. gibbesi*. These two records were only fortuitous and no precise study plans were prior performed. Inside the recorded area during the last 5-10 years the abundance of *M. helena* seems increased and the presence of numerous young specimens of *E. marginatus* remained almost stable, notwithstanding the high fishing pressure. This could be linked to the massive presence of the alien crab, on which these species may feed on. Our contribution for the first time shows the evidence that *M. helena* and *E. marginatus* may reduce the pressure of this crab on coastal habitats.

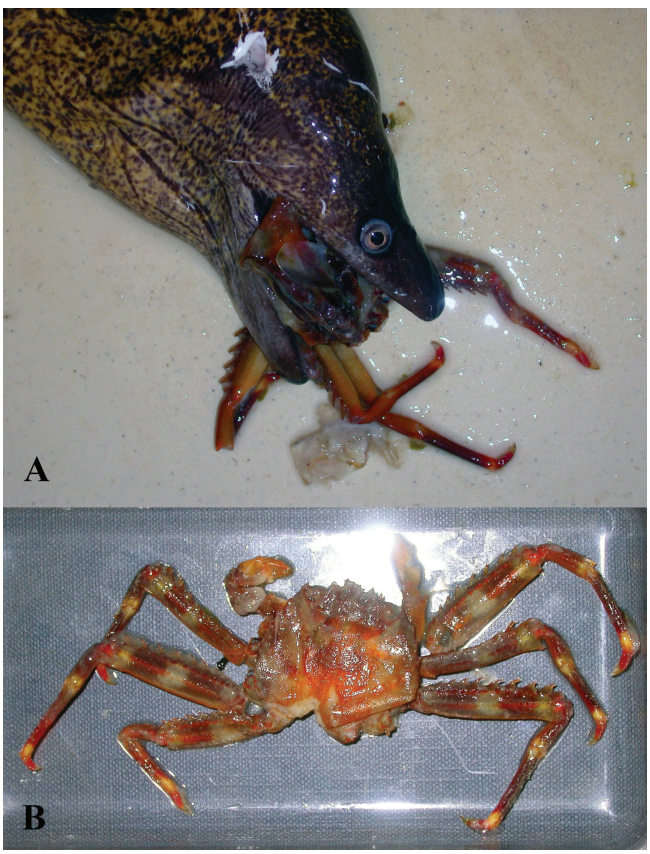


Fig. 7: A. A specimen of *Muraena helena,* caught by speargun, that regurgitated a *Percnon gibbesi.* B. The close-up photo of *Percnon gibbesi* preyed upon by moray eel in the Ionian Sea.

3. MALTA

3.1 First record of *Pteragogus trispilus* (Actinopteri, Labridae) from Malta

Joseph A. BORG and Julian EVANS

The wrasse *Pteragogus trispilus* Randall, 2003 is native to the Gulf of Aqaba and Gulf of Suez in the Red Sea. It also occurs as a non-indigenous fish in the Mediterranean Sea, where it was first recorded (originally as *P.*

pelycus) from Israel in 1991. This Lessepsian immigrant was subsequently recorded from various localities in the Levantine and south-eastern Aegean Seas, including Egypt, Syria, Lebanon, Turkey (Levantine and Aegean coasts), Cyprus and Greece (Rhodes Island and Crete), and has well-established populations in the eastern Mediterranean (Hamed *et al.*, 2018, and references therein). In 2016, *P. trispilus* was recorded from the Gulf of Tunis (Hamed *et al.*, 2018) and more recently from eastern Libya in 2021 (Fitori *et al*., 2021).

On 16th January 2022, an unusual wrasse was spotted during SCUBA diving at Ċirkewwa (35.988478°N, 14.327650°E), off the northwestern coast of the island of Malta, in the central Mediterranean (Fig. 8). The fish was observed swimming at a depth of 10 m, over a rocky reef with low-growing photophilic algae. The sea water temperature was 16°C. Although the specimen was not captured, high resolution photographs were taken which allowed its correct identification as *P. trispilus*, based on the following features visible in the images which agree with the diagnostic characters given by Randall (2013): moderately deep and compressed body, with a nearly straight head profile; single continuous dorsal fin with rays longer than spines; relatively long and rounded caudal fin; complete lateral line which angles sharply downwards below the caudal fin rays then continues horizontally onto caudal peduncle; overall orange-brown background colour, with a series of elongated dark red-brown blotches and white dots along the lateral line; scattered small black spots behind eye and on nape; pupil with a thin orange rim and iris surrounding pupil having seven spoke-like dark lines; distinct grey-black elliptical ocellus edged in yellow on gill cover; double white bar on cheek (one bar on each side of the posterior edge of the preopercle).

The presence of *P. trispilus* in the Gulf of Tunis has been attributed to unaided autonomous dispersal from the already established populations in the eastern Mediterranean (Hamed *et al.*, 2018; Zenetos & Galanidi, 2020).



Fig. 8: *Pteragogus trispilus* as photographed at Cirkewwa, Malta in January 2022. The fish is estimated to be approximately 8-10 cm in total length.

Given the relative proximity of Malta to the Gulf of Tunis (ca. 350 km), it is likely that the same introduction pathway is responsible for the presence of this species in Maltese waters. *Pteragogus trispilus* therefore joins an ever-growing list of Lessepsian immigrants that have successfully dispersed to the central Mediterranean Sea. The sea surface temperature of Maltese waters rarely drops below 14°C, making conditions suitable for survival of this species, whose lower limit of tolerance appears to be around 12-13°C (Hamed *et al.*, 2018, and references therein). Furthermore, according to Zenetos and Galanidi (2020), the northwards shift in the distribution range of *P. trispilus* in the Aegean and its westward shift along the coast of North Africa indicate that it is pushing the lower limits of its thermal envelope in the Mediterranean. This, coupled with the general warming trend of Mediterranean surface waters, will render the central Mediterranean more conducive to establishment of this species. As noted in Cyprus, this could result in negative impacts on some native species, possibly due to competition for food resources (Michailidis *et al*., 2019).

4. CROATIA

4.1 The northernmost record of *Lagocephalus sceleratus* in the Mediterranean Sea

Jakov DULČIĆ and Branko DRAGIČEVIĆ

Lagocephalus sceleratus (Gmelin, 1789) is an invasive Lessepsian species, native of tropical Indian and Pacific Oceans. First recorded in Turkey in 2003 (Filiz & Er, 2004), it reached Adriatic waters in October 2012 when it was recorded on the northern side of Jakljan Island (Croatia, southern Adriatic) (Šprem *et al*., 2014). Subsequent sporadic occurrences in Adriatic followed, however, since 2017 there were no confirmed records of this species (Carbonara *et al*., 2017).

One specimen of *L. sceleratus* (Fig. 9) was caught with trammel net south of the island of Košara (43.881204° N, 15.404500° E) (near the island of Pašman, eastern Adriatic, Croatian coast) at a depth of 4 m on 6th February, 2022. The individual weighed approx. 1500 g and was dead in the moment of capture. It was photographed and thrown back into the sea by the fisher. The photo was sent to the Institute of Oceanography and Fisheries in order to determine the species. Although the photographs featured only dorsal view of the specimen, it was identified on the basis of conspicuous features such as peculiar body shape, black dots dorsally and dorsal fin originating posteriorly beyond the body midline. Present record can be considered as the northernmost record of *L. sceleratus* in the Adriatic Sea so far, but also in the Mediterranean basin (excluding Black Sea), given the fact that the previous one was near Tribunj (Dulčić *et al*., 2014).

In addition to confirming the occasional occurrence of this species in the Adriatic, this record also confirms



Fig. 9: The specimen of *Lagocephalus sceleratus* caught near Island Pašman, Croatia in February 2022 (Photo by Juraj Jurićev).

that citizen science is an important method to track the occurrence of non-native species. According to Roy *et al*. (2018), development and implementation of citizen science should help in advancing scientific understanding of dynamics of alien species and inform decision-making process in various efforts aimed at understanding and minimizing potential effects of alien species, even at legislative level for example through EU Regulation 1143/2014. In Croatia, various scientific projects have conducted campaigns aimed at raising public awareness of the potential threats posed by this species and the importance of monitoring the occurrence of various non-indigenous species in general, but such campaigns are usually limited in both time and scope. In this context, it should be mentioned that the fisher who caught the reported specimen was unaware of the species, suggesting that additional efforts should be made to inform the public, and fishers in particular, about the dangers of this, as well as other invasive species. The risk assessment conducted by Galanidi *et al*. (2018a) suggests the possibility that future temperature increases may also increase the likelihood of *L. sceleratus* introduction and spread in areas that currently provide less favourable climatic conditions for the species' winter survival and summer spawning, such as the northern Adriatic Sea. Future scenarios for the Adriatic Sea also predict increased risks associated with damage to fisheries and human health.

5. SLOVENIA

5.1 First record of alien anemone *Diadumene lineata* (Verrill, 1869) in Slovenian sea

Domen TRKOV and Ana FORTIČ

Diadumene lineata (Verrill, 1869) is a small sea anemone native to the northwestern Pacific Ocean that has spread worldwide by humans, probably through ship hull fouling and the oyster trade (Podbielski *et al*., 2016 and references therein). This potentially invasive species generally reproduces asexually by longitudinal fission outside of its native range and thus often occurs in unisexual, mono- and multiclonal populations (Newcomer *et al*., 2019 and references therein). It is commonly found in the intertidal zone on hard substrates, often in harbours and waters with variable salinity and temperature (Hancock *et al*., 2017 and references therein). The high tolerance to a wide range of salinities (from 5 to 35) and temperatures (from 0 °C to 40 °C; Shick, 1976) may explain their colonization success in patchy areas of the world with widely varying environmental conditions. *Diadumene lineata* feeds primarily on small crustaceans, but could also feed on larvae of economically important taxa (e.g., mussels and oysters). However, ecosystem impacts in invaded areas are not yet known.

Diadumene lineata is widely distributed in the northwestern Mediterranean Sea (Hancock *et al*., 2017). In the Adriatic, the species has been reported from the Venice Lagoon (Italy) and other localities in the northern Adriatic (e.g., Duino) as *Haliplanella luciae* or *Diadumene luciae* (Birkemeyer, 1996 and references therein). To our knowledge, the following findings are the first records of *D. lineata* in the Slovenian sea. The anemone was recognized by its olive-green column with distinct orange or whitish-yellow longitudinal stripes and olive-green oral disk with orange to white pigmentation around the mouth (Fig. 10), although there is considerable colour variation in this species (Birkemeyer, 1996). The column reaches about 8-10 mm in diameter, is smooth, and consists of scapus and capitulum. The animal has up to 100 tentacles, which are long and irregularly arranged and covered with white specks. When threatened, it ejects acontia (Birkemeyer, 1996).

We observed this species as part of alien species monitoring using a rapid assessment method (scraping the fouling community in different habitats). First, on 5 May 2020, three specimens of *D. lineata* were found on the mussel *Mytilus galloprovincialis* Lamarck, 1819 attached to a pontoon jetty in Portorož (45.513123° N, 13.590687° E). Second, on 6 April 2022, about 30 specimens were found just below the waterline on the oyster *Magallana*

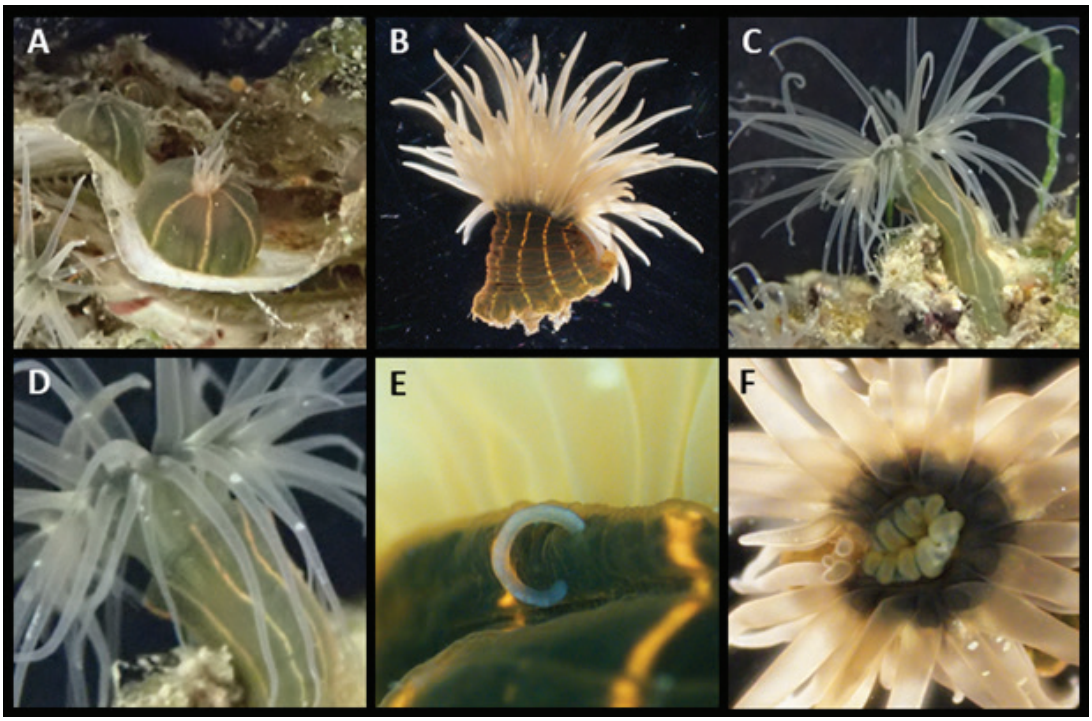


Fig. 10: *Diadumene lineata.* A) Contracted specimens attached to a valve of an oyster. B) Partially contracted specimen, showing typical coloration of the column and tentacles. C) and D) Specimen with erect column showing capitulum and completely extended tentacles with white specks. E) Acontium protruding through a cinclid. F) A specimen from above, showing the oral disk.

gigas (Thunberg, 1793) attached to a wooden pile (salinity 32.9) in the Jernej Channel (45.49696° N, 13.59853° E), into which freshwater flows. The average basal diameter of the 20 specimens measured was 5.55 ± SD 1.17 mm.

6. GREECE

6.1 New record of the non-indigenous species *Microcosmus squamiger* Michaelsen, 1927 (Tunicata, Ascidiacea) within a Greek marina

Federica MONTESANTO and Francesco MASTROTOTARO

Microcosmus squamiger is a solitary ascidian native from Australia (Rius *et al*., 2012), which inhabits shallow rocky littoral habitats, particularly bays and harbours (Mastrototaro & Dappiano, 2008). This species was first reported in the Mediterranean Sea in 1963 as *Microcosmus exasperatus* Heller, 1878 in Bizerte (Tunisia) (Mastrototaro & Dappiano, 2008 and references therein). *Microcosmus squamiger* has been frequently confused with the very similar species *M. exasperatus* (Turon *et al*., 2007), indeed the two species differ only in some particular internal characteristics, such as the shape of siphonal spines.

Microcosmus squamiger is characterized by having high invasive potential and it has been recorded in almost all the western basin of the Mediterranean Sea along Spanish, French, Italian and Tunisian coasts (Turon *et al.*, 2007 and references therein). Recently, *M. squamiger* has been recorded also in the eastern basin, in İzmir Bay (Eastern Aegean Sea, Turkey) (Aydın Onen, 2020).

Here we report a further finding of this species in the Eastern Mediterranean basin, in Heraklion marina (35.343300° N; 25.136614° E, Crete, Aegean Sea) in October 2019. Recent studies highlighted the occurrence of numerous NIS in this marina, including ascidians (Ragkousis *et al.*, 2020; Montesanto *et al.*, 2021).

In detail, several individuals were observed and collected from ropes and piers by SCUBA diving at a depth of 1-4 m. Specimens were relaxed with menthol crystals in seawater for approximately four hours (until no contraction of the zooids was detected) and preserved in a 4% formaldehyde solution in seawater. In order to photograph the siphonal spines, a portion of the siphon was immersed in 2-3% sodium hypochlorite for two days, then rinsed with distilled water, air-dried on aluminium stubs, and then sputter-coated with gold-palladium and observed at the scanning electron microscope (SEM).

Specimens appear ovoidal and about 5 cm in height, characterized by a leathery tunic, purple in colour on the inner side. The branchial sac shows a variable number of folds, usually about 8 (8 complete or 7 complete + one incomplete) or 9 (8 complete + 1 incomplete or 7 complete + two incomplete) on each side (Fig. 11A). A highly convoluted dorsal tubercle (Fig. 11B) is placed above the neural gland and the oral opening is characterized by

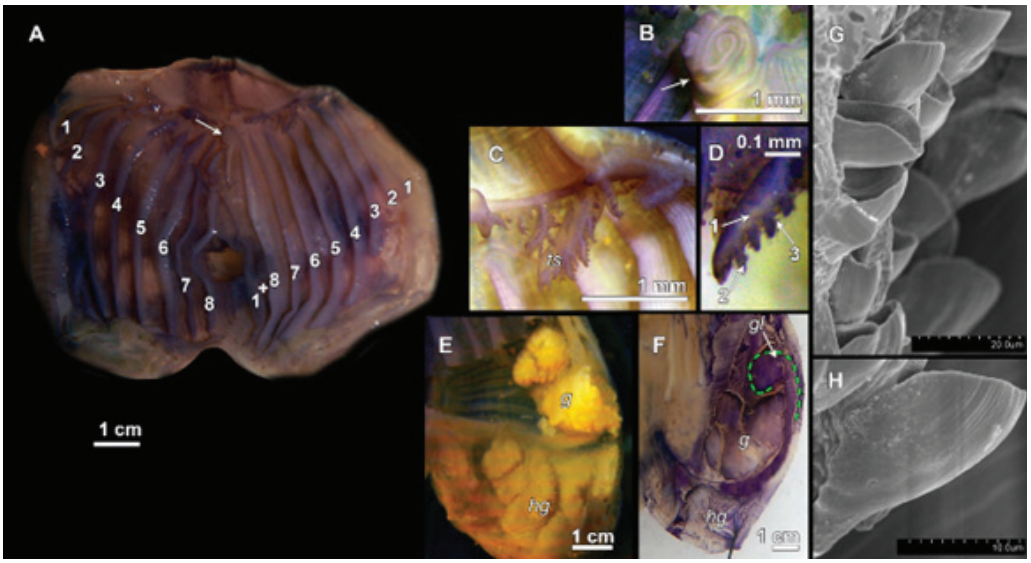


Fig. 11*: *Microcosmus squamiger. A: Specimen of M. *squamiger* extracted from the tunic showing 8-9 folds on each side of the body (arrow points out the dorsal tubercle). B: Magnification of the highly convoluted dorsal tubercle. C: Ramified oral tentacles (*ts*). D: Magnification of the three orders of branching of a tentacle. E: Gonads (*g*) divided in masses and the hepatic gland (*hg*) showing the parallel lamellae with papillated rims. F: Strongly bent secondary loop of the gut (*gl*) (green lines point out the bent secondary loop), with gonads (*g*) and hepatic gland (*hg*). G-H: Siphonal spines with the characteristic fingernail shape.

ramified tentacles (up to 3rd order branching) (Fig. 11C-D). A large hepatic gland is present, consisting of parallel lamellae with papillated rims (Fig. 11E). Above the hepatic gland, the gonads are composed of 2-3 masses and placed inside the strongly bent secondary loop of the gut (Fig. 11E-F).

The main diagnostic character to distinguish this species from its very similar con-generic *M. exasperatus* consists in the shape of the siphonal spines. Indeed, *M. squamiger* spines are short (15-25 µm in length), with a characteristic fingernail shape with serrated rims (Fig. 11G-H), while those belonging to *M. exasperatus* present longer pointed spines (about 40-50 µm in length) (Mastrototaro & Dappiano, 2008).

The present record confirms that the global marine invasive species *M. squamiger* is actually undergoing an expansion within the Eastern Mediterranean Sea. It is highly likely boating and aquaculture represent the main pathways of introduction and spread of this species in the eastern basins, since both records are from marinas and several aquaculture facilities are situated in the Aegean Sea basin.

6.2 *Caprella scaura* expanding its distribution to North Aegean Sea, Greece

Constantinos G. GEORGIADIS and Dimitra-Lida RAMMOU

The caprellid amphipod *Caprella scaura* Templeton, 1836 was originally described from Mauritius in the Indian Sea and has been recorded from numerous areas from all over the world (Martinez & Adarraga, 2008). It is among the introduced species with the largest distribution in the Mediterranean Sea (Chebanee *et al*., 2018) while its introduction is probably due to ship transport or aquaculture (Eleftheriou *et al*., 2011). *Caprella scaura* has been found on artificial structures such as harbours and marinas and has been associated with bryozoans and occasionally with hydroids and seaweeds (Ros *et al*., 2014).

The aim of the present study is to confirm the presence of *Caprella scaura* in the port of Alexandroupolis, Thracian Sea, NE Aegean Sea, Greece (40.8438° N, 25.8823° E) in May 2020 and the port of Thessaloniki, Thessaloniki Bay, NW Aegean Sea, Greece (40.6334° N, 22.9373° E) in June 2020. Benthic macrofauna was collected using a modified hand-held quadrate scrape sampler with an attached net bag (mesh size 1 mm, surface area 625 cm^2).



Fig. 12: *Caprella scaura* adult male (from the port of Alexandroupolis, NE Aegean Sea, Greece).

Samples were stored, preserved in ethylic alcohol 70%, and transferred to the Benthic Ecology Laboratory of the Fisheries Research Institute in Kavala (Greece). Speci-

mens were identified and photographed under an Olympus BX60 stereomicroscope.

Caprella scaura can be immediately distinguished from other European species of the *Caprella* genus by the well-developed dorsal acute projection on the head in both sexes (Martinez & Adarrada, 2008). Thorough identification was based on the morphological description provided by Krapp *et al*. (2006), Martinez and Adarraga (2008) and Chebaane *et al*. (2018). Forty-one specimens (Fig. 12) were found among the bryozoans *Bugula neritina* Linnaeus, 1758, *Tricellaria inopinata* d'Hondt & Occhipinti Ambrogi, 1985, and the bivalve *Mytilus galloprovincialis* Lamark, 1819 in the port of Alexandroupolis and two specimens among *M. galloprovincialis* in Thessaloniki's port.

6.3 First records of the bryozoans *Tricellaria inopinata* and *Celleporaria brunnea* from the Greek waters of the North Aegean Sea

Constantinos G. GEORGIADIS and Athanasios EVANGELOPOULOS

Tricellaria inopinata (d'Hondt & Occhipinti Ambrogi, 1985) and *Celleporaria brunnea* (Hincks, 1884) are cheilostome bryozoans often found in port environments and considered to be non-indigenous species (NIS) in the Mediterranean Sea (Dyrynda *et al*., 2010; Lodola *et al*., 2015; Ulman *et al*., 2017). The first record of *T. inopinata* in the Mediterranean was in the Venice Lagoon in 1982. This species is assumed to be of North Pacific origin and considered invasive in New Zealand and cryptogenic in Pacific coastal waters of North America, Japan, and Australia (Dyrynda *et al*., 2010). Its presence in the Mediterranean Sea is expanding along the coasts of Tunisia, Italy, France, Greece (Ulman *et al*., 2017 and references therein) and Slovenia (Fortič *et al*., 2019). *C. brunnea* was first described as *Cellepora brunnea* in British Columbia (Canada) and has a wide distribution in the Pacific Ocean (Lodola *et al*., 2015). In the Mediterranean Sea this species has been reported from several localities in Croatia, Italy, Lebanon, Turkey, Spain, France, Malta, and Greece (Ulman *et al*., 2017 and references therein) and Slovenia (Fortič *et al*., 2019).

Specimens of *T. inopinata* and *C. brunnea* were found in the port of Alexandoupolis, Thracian Sea, North Aegean Sea, Greece on the 30th of May of 2020. Samples were scraped off the quay walls from a depth of 0.5 m using a modified hand-held quadrate scrape sampler with an attached net bag (mesh size 1 mm, surface area 625 cm^2). They were preserved in 70% ethyl alcohol and transferred in the Benthic Ecology Laboratory of the Fisheries Research Institute in Kavala (Greece) where they were identified and photographed under an Olympus BX60 stereomicroscope.

Species identification of *T. inopinata* (Fig. 13) was based on the morphological descriptions of d'Hondt & Occhipinti Ambrogi (1985) and Dyrynda *et al*. (2010), while the identification of *C. brunnea* (Fig. 14) followed descriptions of Lodola *et al*. (2015).

T. inopinata was found in five out of ten sampling sites along the platforms of the marina (40.84307° N, 25.87779° E), the commercial port (40.84417° N, 25.88196° E) and the passenger port (40.84053° N, 25.88026° E). Arborescent colonies grew on the bivalve *Mytilus galloprovincialis* (Lamarck, 1819), the ascidian *Styela plicata* (Lesueur, 1823) and the chlorophyte *Codium fragile* (Suringar) (Hariot, 1889) covering a minimum of 6 cm^2 to a maximum of 25 cm^2 of total surface area per sample. Ovicellate autozooids were present but no embryos were observed.

A single colony of *C. brunnea* was found at the passenger port of Alexandroupolis. A grey – brown incrustation was covering an area of 4 mm^2 on a *M. galloprovincialis* shell. Wide open, hood-shaped ovicells were present, but no embryos were observed.

This is the first time that both species are being reported from the North Aegean Sea. Their presence in Greece was detected in Heraklion, Crete in 2015 (Ulman *et al*., 2017), and their discovery by scientists in additional areas in Greece was expected (Zenetos *et al*., 2020).

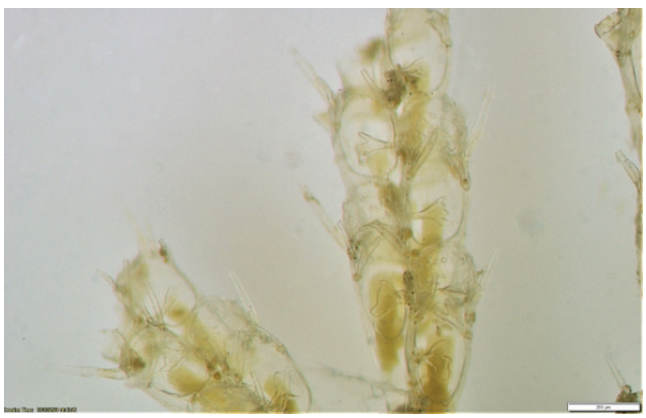


Fig. 13: *Tricellaria inopinata* collected from the port of Alexandroupolis, Thracian Sea, North Aegean Sea, Greece.

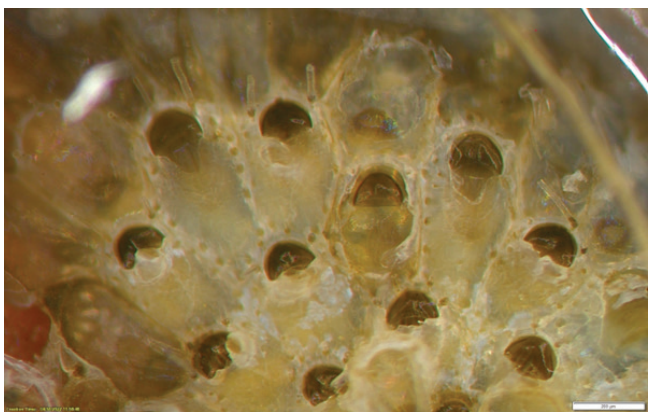


Fig. 14: *Celleporaria brunnea* collected from the port of Alexandroupolis, Thracian Sea, North Aegean Sea, Greece.

7. LIBYA

7.1 *Thalamita poissonii* in Libya

Sara A.A. AL MABRUK and Fabio CROCETTA

The portunid crab *Thalamita poissonii* (Audouin, 1826) (Crustacea: Malacostraca: Decapoda: Portunidae) is a middle-sized brachyuran species that originates in the western Indian Ocean, including the Red Sea; known from the Suez Canal, it is considered a Lessepsian immigrant in the Mediterranean Sea, having been recorded from Israel, Cyprus, Lebanon, Syria, Turkey, and Greece (Apel & Spiridonov, 1998; d'Udekem d'Acoz, 1999; Crocetta *et al.*, 2021 and references therein). It usually lives on sandy and sandy-muddy bottoms up to 80 m depth, although it is more common in the intertidal or the immediate subtidal (0–5 m), where it usually hides under rocks (Apel & Spiridonov, 1998).

On the 20th November 2021, while collecting baits with a hand rake from tide level up to 1.50 m depth, the professional fishermen Ashour Al-Slaedie found three odd crab specimens in the Al Tamimi harbour, Libya (32.346963ºN, 23.083628ºE), the biggest of which was ~2.5 cm in carapace length (Fig. 15). As the fisherman was apparently not familiar with the samples, he soon sent them to the Facebook group Marine Biology in Libya (https://www.facebook.com/MarineBiologyinlibya) for a consult. All crabs resulted to be conspecific. Notwithstanding limitations in identifying samples based on photographs alone, they were soon identified by the group experts as belonging to the genus *Thalamita* Latreille, 1829, and very likely to the species *T. poissonii* based on the peculiar characters of the species, which include a smooth carapace with few ridges, a bilobed front, and five anterolateral teeth, with the first broadest, the fourth smallest, and the fifth longest and curved, and a brown-red coloration of the carapace with brighter pereiopods (Apel & Spiridonov, 1998). Moreover, *T. poissonii* is the only species of the genus known so far as invading the Mediterranean basin.

Thus, the present sighting accounts for the first record of *T. poissonii* in Libya and in the North African waters, significantly widening the known distribution of this alien species in the Mediterranean Sea. No certainties occur about a possible pathway of arrival. However, the Al Tamimi harbour lays in eastern part of the country and is quite far from any sort of commercial or even touristic routes, and thus an arrival through shipping is unlikely. On the other hand, despite the species was still not recorded in the nearby Mediterranean countries (e.g., Egypt and Tunisia), and not even in Crete Island (Greece), its established presence in the eastern Mediterranean is well ascertained till decades, and thus the occurrence of this species is presumably more widen than what reported in the literature (e.g., d'Udekem d'Acoz, 1999; Kondylatos *et al.*, 2020; Crocetta *et al.*, 2021). All this suggests that the species presumably reached Libya through natural dispersal from still undetected populations. Whatever is the true, further field research may confirm whether the species is locally established or the present sighting will account for an ephemeral one.



Fig. 15: *Thalamita poissonii* from Al Tamimi harbour (Libya).

8. TURKEY

8.1 First occurrence of the epibenthic copepod *Pseudodiaptomus marinus* (Sato, 1913) in the Marmara Sea

Tuba TERBIYIK KURT, Ximena VELASQUEZ and Tamar GUY-HAIM

Until the 1950s, the distribution of *Pseudodiaptomus marinus* (Sato, 1913) was restricted to the boreal waters of northern Japan and to the coastal and estuarine waters of eastern Asia (Ohtsuka *et al.*, 2018). Since then, *P. marinus* has been reported from coastal waters of Indo-Pacific region and, over the past fifteen years, it has also been

documented in European seas (see Sabia *et al.*, 2015). In the Mediterranean Sea, *P. marinus* was first reported from the northern Adriatic Sea in November 2007, and in the following years, it spread rapidly in different regions of the Mediterranean Sea (coasts of France, Sicily, Gulf of Naples, and Tunisia) and the Black Sea (Sevastopol Bay) (reviewed in Sabia *et al.*, 2015 and Uttieri *et al.*, 2020). Currently, the range of *P. marinus* continues to expand. It was recently found in samples collected in 2015 in İzmir Bay (Aegean Sea), and has since established resident populations there (Beşiktepe, Ş., personal communication). Here we report the first record of *P. marinus* in the Marmara Sea. The coastal area of the Marmara Sea has been monitored under the "Integrated Marine Pollution Monitoring 2020-2022 Programme". However *P. marinus* was not found in previous studies carried out in the same area.

This study is based on a zooplankton sample collected by a vertical haul of WP2 plankton net (200 µm mesh size) from around 3 m above the bottom to the surface at station IK4 (40.74558° N; 29.62407° E) on 19 August, 2020 during daytime. This station is located near the town of Hereke, offshore İzmit Bay (Marmara Sea), in a water column of 106 m depth. Only two male specimens (Fig. 16) and three copepodites of *P. marinus* were found in the sample and separated for genetic analysis. The total length of the male specimens was 975 µm. Total DNA was extracted from four specimens of *P. marinus* preserved in ethanol (2 individuals were pooled in each sample) using the DNEasy Blood and Tissue Kit (QIAGEN, Germany) according to the manufacturer's instructions. The mitochondrial cytochrome *c* oxidase subunit I (*COI*) gene was amplified using the primer pairs LCO1490F (5'-GGTCAACAAATCATAAAGATATTGG-3') / HCO2198R (5'-TAAACTTCAGGGTGACCAAAAAATCA-3'). PCR conditions were as follows: 95 ºC for 5 min, 30 cycles of 95 ºC for 1 min, 45ºC for 1 min, 72 ºC for 1 min, and a final cycle of 72 ºC for 7 min. The PCR products were purified and sequenced by Hy Labs Ltd (Israel). The obtained sequences were edited and corrected using BioEdit and deposited in GenBank (https://www.ncbi.nlm.nih.gov/) (accession numbers OK287162.1, OK287163.1). The species identity was validated using blastn (https://blast.ncbi.nlm.nih.gov/) of *COI* sequences showing a 99.5-99.8% identity between the specimens collected in this study and sequences of *P. marinus* collected in the native distribution range (East China Sea, Sea of Japan) and in other invaded regions (Northeast Pacific Ocean, North Sea, Mediterranean Sea, Northeast Atlantic Ocean).

Pseudodiaptomus marinus is an epibenthic copepod species in coastal and estuarine habitats, alternating between the water column during night-time and over the seabed during daytime. It is typically found in shallow coastal waters of tropical and temperate seas, living in estuarine and inland waters. The euryhaline and eurythermal nature of *P. marinus* as well as its behavioural plasticity allow it to quickly acclimatize to regions outside its native areas (Uttieri *et al.*, 2020). These attributes are especially important in İzmit Bay, a natural extension of the Marmara Sea, having a permanent two-layered water system. The upper layer originates from less saline Black Sea waters (18.0–22.0), whereas the lower layer originates from the Mediterranean Sea waters (37.5–38.5). The mesozooplankton community inhabiting the bay is highly similar to the Black Sea communities (Isinibilir *et al.*, 2008). İzmit Bay is exposed to intense urban, industrial and maritime transport pressures. This bay is geographically important and economically active port region where many large and small ports are located. The introduction of *P. marinus* into İzmit Bay can probably be linked to shipping activities, as former species introductions indicated (Çinar, 2016). The impacts of this species in the introduced areas are not known yet. Further observations and experiments are needed to determine whether *P. marinus* competes with native plankton species for food, potentially leading to changes in the recipient ecosystem.

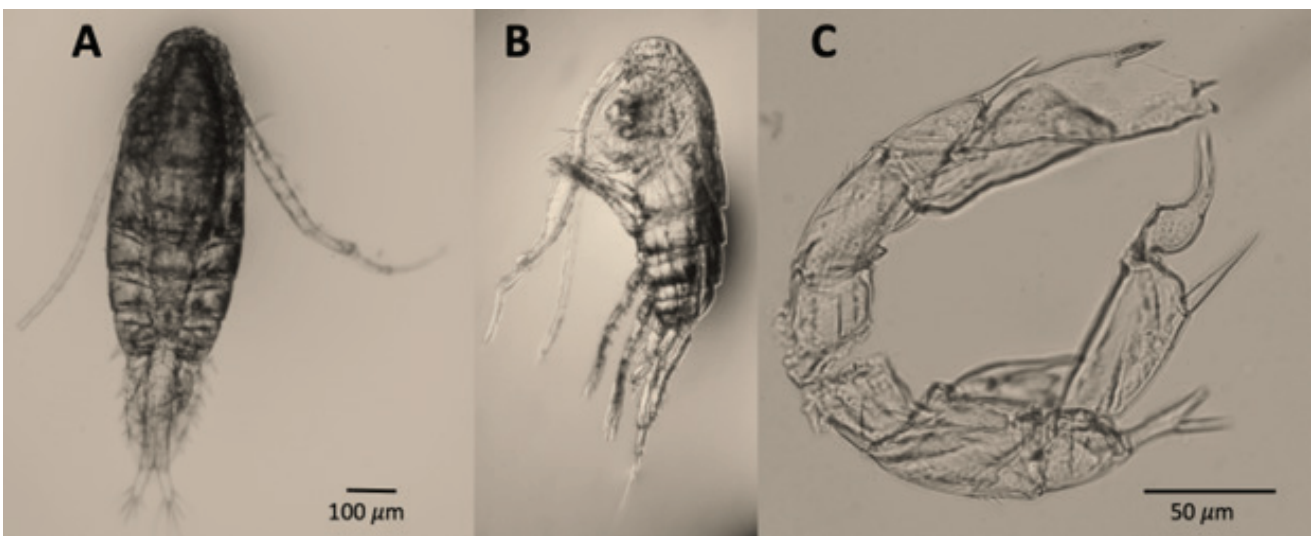


Fig. 16: *Pseudodiaptomus marinus*, adult male, A: Dorsal view, B: Lateral view, C: P5 (fifth swimming legs).

8.2 First record of *Abudefduf* cf. *saxatilis* in the Gulf of Antalya, Turkey

Mehmet GÖKOĞLU

In recent studies, it has been reported that the number of multicellular species migrating to the Mediterranean is approaching 1000 (Zenetos, 2019; Dragičević *et al*., 2021). Being directly connected with the Suez Canal, Lessepsian immigrants are generally most common and abundant is the Eastern Mediterranean. In this region, as well as in the Mediterranean Sea in general, the number of alien species is increasing (Dragičević *et al*., 2021).

Damselfishes are represented today by 423 valid species, mostly living in shallow nearshore waters of tropical and temperate seas (Dragičević *et al*., 2021). In the Mediterranean, the only native species belonging to the family Pomacentridae is *Chromis chromis* (Linnaeus, 1758). In addition, seven more species belonging to the family Pomacentridae are reported to have migrated to the Mediterranean (Dragičević *et al*., 2021). Among these, *Abudefduf saxatilis* (Linnaeus, 1758) and *Abudefduf vaigiensis* (Quoy & Gaimard, 1825) are two very similar species; their distinction is based on some morphological external characters (Bilecenoğlu, 2016). *Abudefduf saxatilis*, of Atlantic origin, was first recorded in the Mediterranean off the coast of Tarragona, Spain, and later reported from different parts of the Mediterranean (for distribution details see Zenetos & Miliou 2020; Dragičević *et al*., 2021, Bitar, 2021).

A professional diver (Hakan Erdön) observed and video recorded an unknown fish species (approximately 10 cm in length) in Antalya cliffs (36.846158° N, 30.756583° E), at 2-3 m depth. Later, the diver sent us the video recordings of the fish and asked us to identify it. In personal interview with the diver, he reported that he noticed the fish in the same spot many times. For this reason, we dived in the same area (8 August 2021) and took underwater photos of the fish (Fig. 17).

Species identification was made according to Bilecenoğlu (2016) and Lipej *et al*. (2019), based on photographs and video footage. The fish was provisionally identified as *Abudefduf* cf. *saxatilis* because distinction based on chromatic pattern is no longer a valid diagnostic trait at species level.



Fig. 17: *Abudefduf* cf. *saxatilis* recorded at 2-3 m water depth in Antalya Cliffs. Red arrows indicate five black bars running vertically on its sides (the first from dorsal fin origin to pectoral fin base, the fifth from the posterior margin of dorsal and anal fin); two black spots are prominent on the caudal peduncle; and pectoral fins bear a black dot at the upper base. However, these characters are no longer considered a valid diagnostic feature (Photo by Adnan Büyük).

Indeed, Dragičević *et al*. (2021), in their critical study on *Abudefduf* spp. in the Mediterranean, stated that the identifications made on photographs could mislead researchers and that these species could be *Abudefduf* cf. *saxatilis/vaigiensis/troschelii*. For this reason, it has been emphasized that it will be extremely useful to document for future studies on the *Abudefduf* genus in the Mediterranean with molecular studies combined with quality images for detailed morphological descriptions.

This is the first record of the genus from the Levantine coast of Turkey, and documents a further range expansion of this genus in the Mediterranean Sea.

8.3 Blue-barred parrotfish, *Scarus ghobban* (Scaridae) has reached the Aegean coasts of Turkey

Okan AKYOL and Vahdet ÜNAL

Scarus ghobban Forsskål, 1775 is widely distributed over the Indo-Pacific region, including the Persian Gulf, the Red Sea and Algoa Bay, South Africa, southern Japan, and other regions, such as New South Wales, Ecuador, the Gulf of California, and the Eastern Mediterranean Sea (Golani *et al*., 2006; Froese & Pauly, 2021). This protogynous hermaphroditic species inhabits rocky habitats in shallow waters and feeds by scrapings algae from rocks, and engulfing pieces of rock and coral, grinding with its pharyngeal teeth (Golani *et al*., 2006; Froese & Pauly, 2021).

Scarus ghobban entered the Mediterranean from the Red Sea via the Suez Canal, and initially, only a few specimens were reported off Israeli and Lebanese coasts (Golani *et al*., 2006). After the first record of *S. ghobban* in the Mediterranean Sea in 2001 from Israel (Goren & Aronov, 2002), the fish expanded its range to Katellorizo Island, Greece (Apostolopoulos & Karachle in Karachle *et al.*, 2016) and to Uluburun Cape, Kaş at the border of the Aegean Sea (Tüney-Kızılkaya & Akyol, 2021). Finally, this fish has reached the Aegean Sea after 20 months. Therefore, this ichthyological note presents the first record of *S. ghobban* in the Turkish Aegean coasts.

On 6th January 2022, one specimen of *S. ghobban* was caught by trammel net (collected by V. Gedik) in Aksaz Cove, Marmaris (lat. 36.84666° N, long. 28.38472° E), south-eastern Aegean Sea, at a depth of 25 m. The sample

(Fig. 18) has been brought to Urla Laboratory in Izmir and fixed in a 6% formaldehyde solution for preservation in the fish collection of the Fisheries Faculty, Ege University (ESFM-PIS/2022-02).

The morphological and colour analysis, combined with morphometric and meristic measurements reported in Table 3 are in agreement with those reported by Golani *et al*. (2006), Froese & Pauly (2021) and Tüney-Kızılkaya & Akyol (2021).

Scarus ghobban has established population in the Levant since 2014 (Zenetos *et al*., 2020), and continues to expand western wards into the Mediterranean Sea. However, the number of records of this species in the Mediterranean Sea is still pretty low, although further investigations are needed to better assess the current status of this Lessepsian fish.



Fig. 18: *Scarus ghobban*, captured from Aksaz Cove, Marmaris, south-eastern Aegean Sea. Scale bar: 50 mm (Photo by V. Gedik).

Table 3. Morphometric measurements as percentage of total length (TL%) and meristic counts recorded in *Scarus ghobban*, captured from south-eastern Aegean Sea.

Measurements	**Size (mm)**	**Proportion (TL%)**
Total length (TL)	295	
Standard length (SL)	250	84.7
Maximum body depth	81	27.5
Pre-dorsal fin length	76	25.8
Pre-anal fin length	148	50.2
Pre-pectoral length	72	24.4
Head length	78	26.4
Eye diameter	12	4.1
Preorbital length	24	8.1
Interorbital length	28	9.5
Meristic counts		
Dorsal fin rays	IX-9	
Anal fin rays	III+9	
Pectoral fin rays	15	
Ventral fin rays	I+5	
Weight (g)	426.4	

8.4 On the way to the north: *Diadema setosum* (Echinodermata) in Ildırı Bay (Aegean Sea)

Melih Ertan ÇINAR and Aytaç ÖZGÜL

On the 21th of February 2022, a cruise to the Ildırı Bay (Aegean Sea, Turkey) was performed to assess the health status of sponge species in the area. Scuba diving was carried out at two locations, namely Yatak Odası (38.42248° N, 26.32371° E) and Uzun Island (38.41751° N, 26.31482° E). Eight specimens of *Diadema setosum* (Leske, 1778) were observed only in Uzun Island (Fig. 19A). This species is mainly characterized by having five spots on the interambullacral plates and the orange ring on the periproctal cone (Fig. 19B, C). Only 2 individuals stood side by side in a rock cavity; other individuals hid in shaded crevices of rocks and a concrete block at 7-12 m depths. The horizontal diameter of the text was around 5.5 mm. The spines were black, but a specimen with dark brownish and white spines was also observed (Fig. 19B, C). This species was previously known from the south Aegean Sea, very abundant in Gökova Bay and other southern localities (personal observations, MEÇ) and its northern limit was reported to be around in Agathonissi Island, close to Dilek Peninsula by Vafidis *et al*. (2021). The previous northernmost records of this species in the Saroz Bay (north Aegean Sea, Turkey) and Sea of Marmara were proved to be dubious (see Çinar *et al*., 2021). This report constitutes the northernmost distribution range of the species. The presence of seven individuals of this species in one small locality (around 400 m^2) indicated that it has established in the area. As the species seems to spawn in summer when seawater temperature is around 25 °C in temperate areas (Pearse, 1970), it is possible that it would further expand its distribution to the

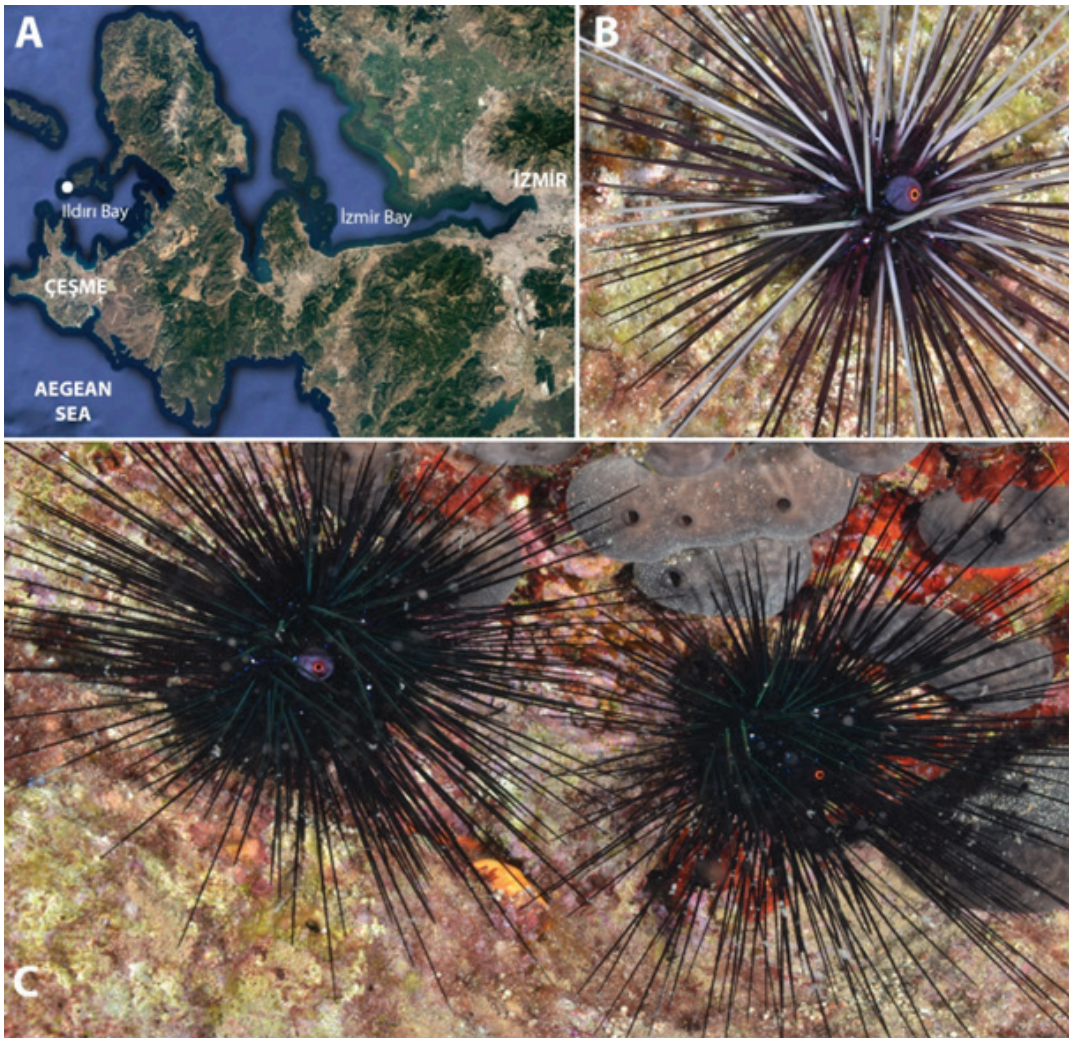


Fig. 19: A. Map of the studied area with the indication of sampling station (white dot in Ildırı Bay), B. A specimen with white and dark brownish spines, C. Specimens with black spines.

northern areas. It is a venomous species (Karachle *et al*., 2017) and can result in dramatic changes on benthic communities by implying grazing pressure on algae (Çinar *et al*., 2021), thus immediate precautions including removal of the species from the wild should be undertaken at least in areas where the invasion has just begun.

8.5 New record of the *Acteocina mucronata* (Philippi, 1849) (Gastropoda, Mollusca) from the Aegean coasts of Turkey

Banu BITLIS and Bilal ÖZTÜRK

Acteocina mucronata (Philippi, 1849), which originated from the Red Sea, was recorded for the first time in the Mediterranean Sea from Israel, Lebanon and South Turkey by van Aartsen *et al*. (1990). It was transported to the Mediterranean Sea through the Suez Canal and expanded its distribution to Cyprus, Greece and Tunisia (Zenetos *et al*., 2004). In Turkey, a dozen specimens belonging to this species were collected from the Mersin Bay and Kız Kalesi (southern Turkish coasts) in 1986 (van Aartsen *et al*., 1990). In 2002 empty shells on the species were found in Datça-Bozburun (Aegean coast of Turkey) by Crocetta & Tringali (2015). Finally, a living specimen of *A. mucronata* was encountered in a sandy habitat at 1.5 m depth in Çeşme (36.33319° N, 26.31776° E) in June 2017 (Aegean coast of Turkey) in this study (Fig. 20).

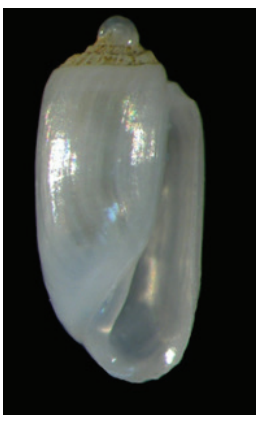


Fig. 20: *Acteocina mucronata*; ventral view of a specimen (h = 2.3 mm) (Photo by B. ÖZTÜRK).

9. CYPRUS

9.1 First record of *Plotosus lineatus* (Thunberg, 1787) from Cyprus

Damla BETON and Mehmet Fatih HUSEYINOGLU

The striped eel catfish, *Plotosus lineatus* (Thunberg, 1787) is an Indo-Pacific reef-associated marine fish, inhabiting shallow coastal waters up to 60 m depth, with a distribution from the Red Sea and East Africa to Samoa, north to southern Japan, southern Korea, and the Ogasawara Islands, south to Australia and Lord Howe Island, Palau and Yap in Micronesia (Myers, 1991). Its dorsal (69-115 soft rays), anal (58-82 soft rays) and caudal fins are fused together. *Plotosus lineatus* has a single highly venomous serrate spine at the beginning of the first dorsal fin, as well as each of the pectoral fins, with a painful and potentially dangerous sting.

In the Mediterranean, *P. lineatus* was first recorded as from a trawler catch in Israel, then successfully invaded the Israeli coast (Edelist *et al*., 2012). Further records are reported from Syria, Turkey and Tunisia (Galanidi *et al*., 2019). Its expansion in the eastern Mediterranean was foreseen by Karachle *et al*. (2017) while Galanidi *et al*. (2019) analysed its likelihood to extend in the Mediterranean and Black Sea through natural dispersal.

Recently, about 17 specimens of *P. lineatus* were caught by a fisher off Rizokarpaso Peninsula in Cyprus (35.5816° N, 34.6827° E) on 27 April 2022 (Fig. 21). Three specimens were obtained from this catch and the fisher was stung during handling, with pain persisting for more than one month. All specimens were all identified as *P. lineatus* as the only representative of Plotosidae in the Red Sea. Brown coloration with longitudinal cream white lines were present with four pairs of barbels on each jaw. Total length for the three fish sampled were 168, 170 and 173 mm, which might suggest that a similar size schooling behaviour was also being practiced. *Plotosus lineatus* is known to extensively occupy crevices and cracks (Edelist *et al*., 2012), which might be an indication of additional pressure on the native fauna through competition for shelter. Its socio-economic impacts as well as impacts on biodiversity are extensively documented in Galanidi *et al*. (2018b).

Continuous monitoring and campaigns to increase awareness of fishers and health workers are necessary in order to provide information on health and safety implications, appropriate first aid and treatment for the protection from the hazardous sting of this species.



Fig. 21: *Plotosus lineatus* specimen on the measuring table.

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data of *Thalamita poissonii*. Jakov Dulčić and Branko Dragičević are thankful to Mr. Juraj Juricev for providing us data and the photo of the specimen. Daniele Grech was supported by the PO-FEAMP 2014-2020 project ECOGESTOCK "Approccio ECOsistemico per la tutela e la GEStione delle risorse biologiche e STOCK ittici nelle acque interne" Priorità 1, Misura 1.44, par. 6 "Pesca nelle acque interne e fauna e flora nelle acque interne". The same author would like to thank the colleagues Gianni Brundu, Barbara Loi and Anuta Chindris for field and lab support (IMC, International Marine Centre). The work of Constantinos G. Georgiadis and Dimitra-Lida Rammou has been funded by the Greek Ministry of Environment and Energy within the framework of Marine Strategy monitoring Project (2018-2023; OPS 5010856). The authors would like to thank Dr. Sotiris Orfanidis. The work of Georgiadis and Evangelopoulos has been funded by the Greek Ministry of Environment and Energy within the Marine Strategy Framework Directive. The authors would like to thank Dr. Sotiris Orfanidis. Damla Beton and Mehmet Fatih Huseyinoglu thank the fisher Hasan Sarı for providing information and specimens of *Plotosus lineatus* from Cyprus.

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