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New records of rarely reported species in the Mediterranean Sea (March 2024)

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Abstract

This Collective Article presents information about 30 species with records in eight countries (Greece, Israel, Italy, Montenegro, Slovenia, Spain, Syria and Türkiye) and six ecoregions extending from the Alboran to the Levantine Seas. The recorded species belong to eight Phyla (4 Chlorophyta, 1 Rhodophyta, 1 Porifera, 3 Cnidaria, 2 Platyhelminthes, 2 Arthropoda, 2 Mollusca and 15 Chordata) as follows: **Chlorophyta:** *Didymosporangium repens*, *Ochlochaete hystrix* and *Phaeophila hirsuta* are reported for the first time from the Aegean coasts of Türkiye and *Penicillus capitatus* is firstly recorded in Slovenian coastal waters; **Rhodophyta:** *Ptilophora dentata* is recorded for the first time in Turkish coasts, from the entrance of a marine cave; **Porifera:** *Tethya meloni* is reported from Montenegrin waters; **Cnidaria:** *Savalia savaglia* and *Dendrophyllia ramea* are firstly observed north of the Almeria-Oran front in the southeastern Iberian Peninsula, while *Spinimuricea* cf. *atlantica* is firstly recorded in the Gulf of Lion constituting the easternmost record of the species in the Mediterranean Sea; **Platyhelminthes:** the polyclad flatworms *Thysanozoon brocchii* and *Planocera graffi* are reported for the first time from Greek waters, observed inside marine caves; **Mollusca:** *Ascobulla fragilis* is firstly reported from the Eastern Levantine Sea while the blanket octopus *Tremoctopus violaceus* is recorded in Izmir Bay constituting its fifth sighting in the Aegean Sea after a quarter of a century; **Arthropoda:** the copepod *Ditrychocorycaeus africanus* is firstly recorded in the Ionian Sea while the tufted ghost crab *Ocypode cursor* is detected further north in the Tyrrhenian Sea; **Chordata:** the bothid flounder *Arnoglossus grohmanni* is firstly reported in Spain while specimens of the rare bythitid *Bellottia apoda* are presented for the Adriatic Sea; the chondrichthyans *Chimaera monstrosa*, *Dalatias licha*, *Heptranchias perlo*, *Leucoraja circularis*, *Mustelus mustelus*, *Oxynotus centrina*, *Squatina aculeata* and *Torpedo marmorata* are presented as collected within 13 continuous years in the bathyal zone of the Antalya Bay; the speleophilic fish *Grammonus ater* is firstly recorded in the Alboran Sea, observed in a marine cave; the critically endangered sandy ray *Leucoraja circularis* is reported from the eastern Ionian Sea; the crested oarfish *Lophotus lacepede* is reported for the first time from Sardinia, based on evidence dating back 20 years; the white trevally *Pseudocaranx dentex* is firstly recorded in Tremiti Islands (Adriatic Sea, Italy) while the phaeton dragonet *Synchiropus phaeton* and the gobid *Zebrus pallaoroi* are firstly reported from Syrian and Italian waters, respectively.

Introduction

The Mediterranean Sea constitutes the largest and deepest semi-enclosed basin on Earth. It is a marine biodiversity hotspot with high rates of endemism, hosting more than 17,000 marine species and with estimates that Mediterranean macrophytes and metazoans represent 6.4% of their global counterpart (Coll *et al*., 2010). Being among the most intensively studied seas, with its geological history opulent in environmental changes and a present-day variety of climatic and hydrologic situations, the Mediterranean Sea hosts both temperate and subtropical biota (Bianchi & Morri, 2000). However, knowledge on the geographical and bathymetrical distribution of its biota is still incomplete, especially for small-sized species with cryptic behaviour (Kovačić *et al*., 2012) and difficult to observe pelagic species, while autochthonous thermophilous species extend their distribution northward, favoured by the increasing water temperature (Bo *et al*., 2020 and therein references).

The Collective Article Series B "New records of rarely reported species in the Mediterranean Sea" of *Mediterranean Marine Science* journal aims to fill gaps regarding those records that remain unpublished by providing a platform for periodically reporting new records of rarely encountered species in the Mediterranean Sea. In the current article, new records of 30 rarely reported species, as well as species of special interest (e.g., protected and/or threatened taxa), are presented in separate sub-chapters authored by the respective contributor(s). The sub-chapters are classified by phylum (Chlorophyta, Rhodophyta, Porifera, Cnidaria, Platyhelminthes, Mollusca, Arthropoda, and Chordata). These records span across eight countries and six ecoregions of the Mediterranean Sea (Table 1) dating from 1994 to 2023 and covering a depth range of 0.4 to 899 metres.

The herein reported species were recorded and documented using a wide variety of methods and information sources. Eleven fishes and one copepod were caught by professional or recreational fishers, using various types of fishing gear (e.g., vertical and bottom net trawling, spearfishing, fishing hauls), four chlorophytes, one rhodophyte, one sponge, two corals, two polyclad flatworms and two fishes were recorded during SCUBA diving or snorkelling surveys while the gorgonian *Spinimuricea* cf. *atlantica* was recorded and collected with a Remotely Operated Vehicle (ROV).

For twenty-two species, the identification was based on morphological analysis of captured specimens while two fishes (*Arnoglossus grohmanni* and *Zebrus pallaoroi*) were also molecularly identified. Specimens for three fish species (*Arnoglossus grohmanni*, *Belotia apoda*, *Zebrus pallaoroi*) were deposited in zoological collections under a reference code. Eight species (*Savalia savaglia*, *Dendrophyllia ramea*, *Thysanozoon brocchii*, *Planocera graffi*, *Tremoctopus violaceus*, *Grammonus ater*, *Lophotus lacepede*, *Pseudocaranx dentex*) were photographically identified. Five records (*Savalia savaglia*, *Dendrophyllia ramea*, *Tremoctopus violaceus*, *Ocypode cursor*, *Lophotus lacepede*) were provided from citizen science initiatives, and specifically from the contribution of two fishers, one SCUBA diver and a citizen, highlighting the importance of communication between the scientific community and non-scientists (Tiralongo *et al*., 2020a).

Seven of the herein reported species are endemic in the Mediterranean Sea (*Didymosporangium repens*, *Phaeophila hirsuta*, *Ptilophora dentata*, *Tethya meloni*, *Ascobulla fragilis*, and *Arnoglossus grohmanni*). Eleven species (*Penicillus capitatus*, *Ptilophora dentata*, *Tethya

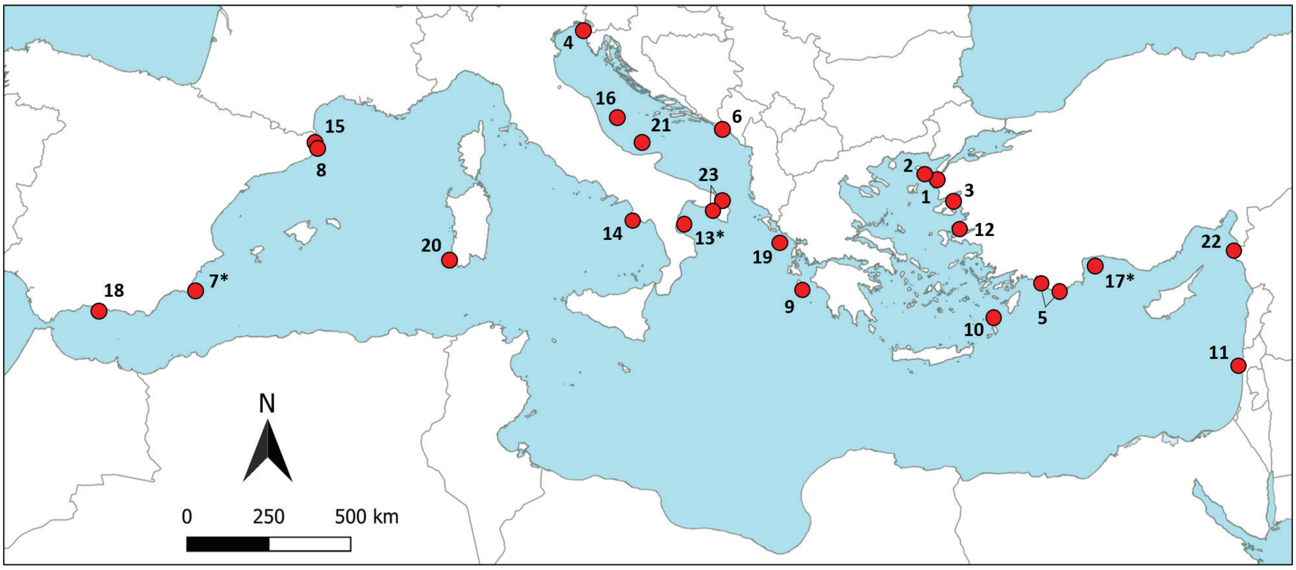

Fig. 1: Approximate locations of records for the species presented in the current article. Location numbers (LN) correspond to those on Table 1 (*: multiple records of the same species in the broader area).

meloni, *Savalia savaglia*, *Dendrophyllia ramea*, *Ocypode cursor*, *Leucoraja circularis*, *Heptranchias perlo*, *Mustelus mustelus*, *Oxynotus centrina*, and *Squatina aculeata*) are protected as being included in the list of endangered or threatened species (Annex II) of the SPA/BD Protocol of the Barcelona Convention or/and the lists of strictly protected flora (Appendix I) and fauna species (Appendix II) of the Bern Convention for the conservation of European wildlife and natural habitats or according to national legislations (e.g., *Penicillus capitatus*). Twelve species (*Ptilophora dentata, Savalia savaglia, Dendrophyllia ramea, Spinimuricea* cf. *atlantica*, *Thysanozoon brocchii*, *Planocera graffi*, *Ascobulla fragilis*, *Tremoctopus violaceus*, *Ocypode cursor*, *Arnoglossus grohmanni*, *Grammonus ater*, and *Zebrus pallaoroi*) were recorded within Marine Protected Areas (MPAs), including marine Natura 2000 sites, across five Mediterranean countries.

Regarding the habitat, *Ocypode cursor* was captured from a sandy beach; *Zebrus pallaoroi* was collected from a shallow brackish-water pond and from inside a hollow stone; *Ascobulla fragilis* was collected from *Caulerpa* turfs in a shallow intertidal pothole. The chlorophytes *Didymosporangium repens* and *Ochlochaete hystrix* were epiphytic on red algae, while *Phaeophila hirsuta* was endophytic in red algae. The chlorophyte *Penicillus capitatus* was recorded on a rocky boulder of the upper infralittoral zone. The anthozoans *Savalia savaglia* and *Dendrophyllia ramea* were recorded on the rocky bottom of seamounts. The sponge *Tethya meloni* was found on large stones overgrown by algae and on silty-sandy substrate. The species *Spinimuricea* cf. *atlantica*, *Arnoglossus grohmanni* and *Synchiropus phaeton* were collected from soft sediments. The species *Ditrychocorycaeus africanus*, *Tremoctopus violaceus*, *Lophotus lacepede* and *Pseudocaranx dentex* were captured or photographed in the water column. The fish species *Bellottia apoda*, *Chimaera monstrosa*, *Dalatias licha*, *Heptranchias perlo*, *Leucoraja circularis*, *Mustelus mustelus*, *Oxynotus centrina*, *Squatina aculeata* and *Torpedo marmorata* were captured from waters deeper than 200 m. The rhodophyte *Ptilophora dentata* was collected from the entrance of a marine cave (coralligenous habitat) while the polyclad flatworms *Thysanozoon brocchii* and *Planocera graffi* and the speleophilic fish *Grammonus ater* were photographed in darker sections of marine caves.

To conclude, the above records have increased our knowledge of the regional biodiversity in several Mediterranean areas and the ecological traits of several species (e.g., depth range, habitats and morphology). In addition, they have considerably expanded the known distribution range of many species, including nine species firstly recorded from a country (Spain: *Arnoglossus grohmanni*; Italy: *Ditrychocorycaeus africanus* and *Zebrus pallaoroi*; Greece: *Thysanozoon brocchii* and *Planocera graffi*; Slovenia: *Penicillus capitatus*; Türkiye: *Ptilophora dentata*; Israel: *Ascobulla fragilis*; Syria: *Synchiropus phaeton*) and eight species firstly recorded from a Mediterranean ecoregion (Alboran Sea: *Grammonus ater*; Aegean Sea: *Ochlochaete hystrix* and *Planocera graffi*; Western Mediterranean: *Spinimuricea* cf. *atlantica* and *Arnoglossus grohmanni*; Ionian Sea: *Thysanozoon brocchii* and *Ditrychocorycaeus africanus*; Adriatic Sea: *Belotia apoda*).

None of the herein presented records is from the southern coasts of the Mediterranean Sea confirming the trend of a relative data scarcity on the Mediterranean coasts of North African countries, an aspect that hampers knowledge and conservation measures, as well as species distribution modelling and considerations for maritime spatial planning purposes (Grech *et al*., 2023 and therein references).

Table 1. Information about species records by phylum. Sub-chapters (SC), basin (WMED – Western Mediterranean, CMED – Central Mediterranean, ADRIA – Adriatic Sea, and EMED – Eastern Mediterranean), ecoregion (*sensu* Spalding *et al*., 2007), country, and location number as in Figure 1 (LN) [*: more than one site in the broader area].

Taxon	SC	Basin	Ecoregion	Country	LN
Phylum Chlorophyta					
Didymosporangium repens	1.1	EMED	Aegean Sea	Türkiye	1
Ochlochaete hystrix	1.1	EMED	Aegean Sea	Türkiye	2
Phaeophila hirsuta	1.2	EMED	Aegean Sea	Türkiye	3
Penicillus capitatus	1.1	ADRIA	Adriatic Sea	Slovenia	4
Phylum Rhodophyta					
*Ptilophora dentat*a	2.1	EMED	Levantine Sea	Türkiye	5
Phylum Porifera					
Tethya meloni	3.1	ADRIA	Adriatic Sea	Montenegro	6
Phylum Cnidaria					
Dendrophyllia ramea	4.1	WMED	Western Mediterranean	Spain	7
Savalia savaglia	4.1	WMED	Western Mediterranean	Spain	7*
Spinimuricea cf. *atlantica*	4.2	WMED	Western Mediterranean	Spain	8
Phylum Platyhelminthes					
Planocera graffi	5.1	EMED	Aegean Sea	Greece	9
Thysanozoon brocchii	5.1	CMED	Ionian Sea	Greece	10
Phylum Mollusca					
Ascobulla fragilis	6.1	EMED	Levantine Sea	Israel	11
Tremoctopus violaceus	6.2	EMED	Aegean Sea	Türkiye	12
Phylum Arthropoda					
Ditrychocorycaeus africanus	7.1	CMED	Ionian Sea	Italy	13*
Ocypode cursor	7.2	CMED	Western Mediterranean	Italy	14
Phylum Chordata					
Arnoglossus grohmanni	8.1	WMED	Western Mediterranean	Spain	15
Bellottia apoda	8.2	ADRIA	Adriatic Sea	Italy	16
Chimaera monstrosa	8.3	EMED	Levantine Sea	Türkiye	17*
Dalatias licha	8.3	EMED	Levantine Sea	Türkiye	17*
Grammonus ater	8.4	WMED	Alboran Sea	Spain	18
Heptranchias perlo	8.3	EMED	Levantine Sea	Türkiye	17*
Leucoraja circularis	8.3	EMED	Levantine Sea	Türkiye	17*
	8.5	CMED	Ionian Sea	Greece	19*
Lophotus lacepede	8.6	WMED	Western Mediterranean	Italy	20
Mustelus mustelus	8.3	EMED	Levantine Sea	Türkiye	17
Pseudocaranx dentex	8.7	ADRIA	Adriatic Sea	Italy	21
Oxynotus centrina	8.3	EMED	Levantine Sea	Türkiye	17*
Synchiropus phaeton	8.8	EMED	Levantine Sea	Syria	22
Squatina aculeata	8.3	EMED	Levantine Sea	Türkiye	17*
Torpedo marmorata	8.3	EMED	Levantine Sea	Türkiye	17*
Zebrus pallaoroi	8.9	ADRIA	Adriatic Sea	Italy	23
	8.9	CMED	Ionian Sea	Italy	23

1. CHLOROPHYTA

1.1 First records of three minute and rare marine chlorophytes in Türkiye: *Didymosporangium repens*, *Ochlochaete hystrix* and *Phaeophila hirsuta*

Ergün TAŞKIN and Öznur Yazılan ÇAMLIK

In the present study, three minute and rare marine green algal species, *Didymosporangium repens* F.D.Lambert, *Ochlochaete hystrix* Thwaites and *Phaeophila hirsuta* (Ercegovic) R.Nielsen, are reported for the first time from the Aegean coasts of Türkiye. Samplings were conducted in Gökçeada Island, Yeniköy and Ayvalık in February 2023. The algal material was collected by snorkelling and SCUBA diving, and specimens were preserved in 4-5% formalin in seawater. The identification of the samples was made on the basis of the descriptions by Cormaci *et al*. (2014).

Didymosporangium repens (Chlorophyta, Chlorophyceae, Chaetophorales, Chaetophoraceae) was collected from the coast of Yeniköy (Çanakkale: 39.9232º N; 26.1506º E) in the Aegean Sea in February 2023. Thalli were epiphytic on the red alga *Antithamnion* sp. at the depth of 5 m and in squash preparation the thallus consisted of short, prostrate and slightly branched filaments (10-20 cells) (Fig. 2 A). Cells of filaments are cylindrical in shape, 15-20 µm long and 4-5 µm broad. Sporangia were present, formed by transformation of vegetative cells of the median or terminal parts of the filament, and conical or pyriform in shape (Fig. 2 B). *Didymosporangium repens* is endemic to Mediterranean Sea, and it is known from France, Greece, Italy, Spain, Tunisia, Cyprus and the Levant Basin (Guiry & Guiry, 2024).

Ochlochaete hystrix (Chlorophyta, Ulvophyceae, Ulvales, Ulvaceae) was found in the coast of Gökçeada Island (40.2359º N; 25.9042º E) in the Aegean Sea in February 2023 at the depth of 1 m. Thalli were epiphytic on the red alga *Pterothamnion* sp. (Fig. 2 C). Thalli were minute, consisted of irregularly shaped, diffuse filaments, branched, initially monostromatic, later polystromatic with some unassociated filaments at the edges. They sometimes developed as rosette-shaped masses of cells composed of short, densely intertwined filaments. The shape and size of the cells of the discoidal mass were rounded or oval, 10-12.5 µm in diameter (Fig. 2 D). The vegetative cells had a long hyaline hair (Fig. 2 D, arrowhead). *Ochlochaete hystrix* is known from the Atlantic

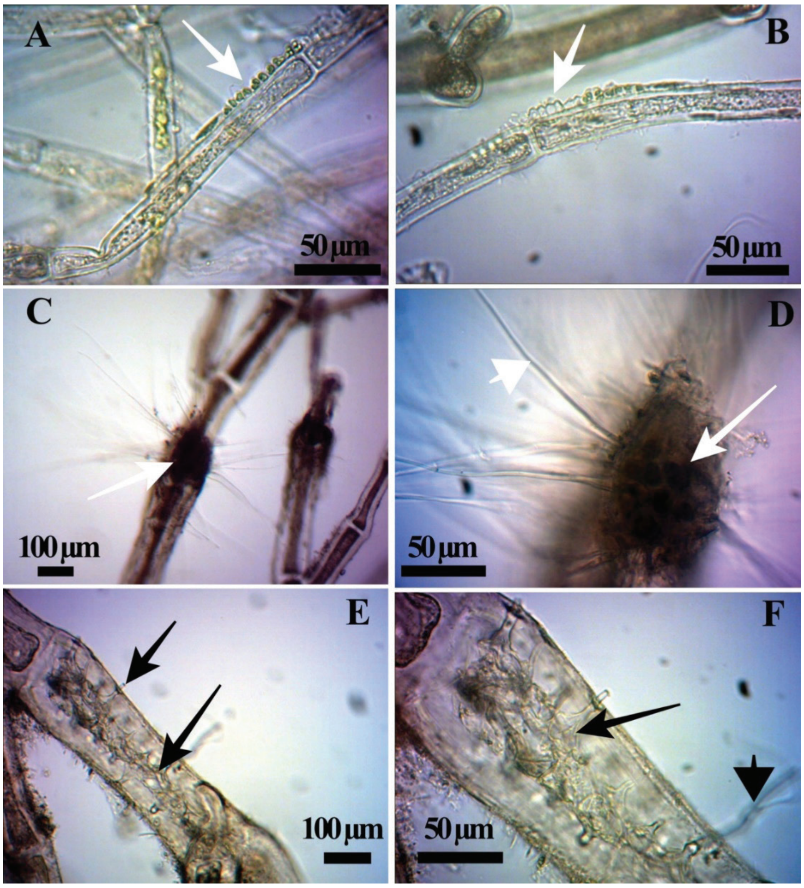

Fig. 2: The green alga *Didymosporangium repens* (A: epiphytic on *Antithamnion* sp. and B: empty sporangia), *Ochlochaete hystrix* (C: general view of the epiphytic thallus on *Pterothamnion* sp., D: vegetative cells and hyaline hair) and *Phaeophila hirsuta* (E: endophytic thallus in Ceramiaceae, F: cells and hair) pointed by black arrows, from Türkiye.

Ocean (Western Atlantic, Greenland, Iceland, Canary Islands, Britain, Sweden, Baltic Sea, Denmark, Ireland, Norway, Germany), Arctic, Australia, New Zealand, South Africa and the Mediterranean Sea (Spain, France, Corsica, Adriatic Sea, Italy, Libya) (Guiry & Guiry, 2024).

Phaeophila hirsuta (Chlorophyta, Ulvophyceae, Ulvales, Phaeophilaceae) was found in the coast of Ayvalık (39.3435º N; 26.6978º E) in the Aegean Sea in February 2023 at the depth of 6 m. Thalli were filamentous, minute and endophytic in the red algal family Ceramiaceae (Fig. 2 E). Filaments were short and irregularly branched. The cells were 20-30 µm long and 15-20 µm wide, irregular or subglobose, elongated, bulbous in shape, and irregularly protruding in various directions (Fig. 2 F). The cell wall was thick. *Phaeophila hirsuta* is endemic to the Mediterranean Sea, and it is known from the Adriatic Sea, Italy and Greece (Guiry & Guiry, 2024). *Phaeophila hirsuta* differs from *P. dendroides* in having thick-walled cells with short hairs (less than 80 µm, arrowhead in Fig. 2 F) (Cormaci *et al*., 2014).

1.2 First record of *Penicillus capitatus* (Chlorophyta, Bryopsidales) from Slovenian coastal waters

Martina ORLANDO-BONACA, Leon Lojze ZAMUDA and Borut MAVRIČ

In the Mediterranean Sea, *Penicillus capitatus* Lamarck (Bryopsidales, Halimedaceae) lives exclusively in the infralittoral belt (Bilecenoglu *et al*., 2013). It was reported from several Mediterranean regions, including Spain, France, Italy, Greece, and even from the coasts along the Levant (sources in Guiry & Guiry, 2024). Additionally, it was also found in Maltese waters (Bilecenoglu *et al*., 2013). In the Adriatic Sea, it has been reported only twice in the scientific literature, firstly in its southern basin near Brindisi (Italian waters; Cormaci & Furnari, 1991) and secondarily in the northern basin near Savudrija (Croatian waters; Buosi, 2015). However, it is listed as “strictly protected” in Croatian waters, suggesting that it has been found earlier, but the species does not appear in the marine Chlorophyta checklist for the eastern Adriatic coast (Antolić *et al*., 2001).

Here we report the first occurrence of this species in Slovenian waters. We found *P. capitatus* during a monitoring survey on July 27, 2023. Several thalli of *P. capitatus* were growing on a boulder measuring about 30 cm x 40 cm (Fig. 3 A), covered with sediment, in the upper infralittoral belt (3 m depth), in front of the Marine Biology Station in Piran (45.5177° N, 13.5680° E). They were surrounded by other macroalgae, mainly *Padina pavonica* (Linnaeus) Thivy. The abundance was estimated to be about 50 thalli.

According to the available literature, the unconsolidated filiform phase is found throughout the year, while

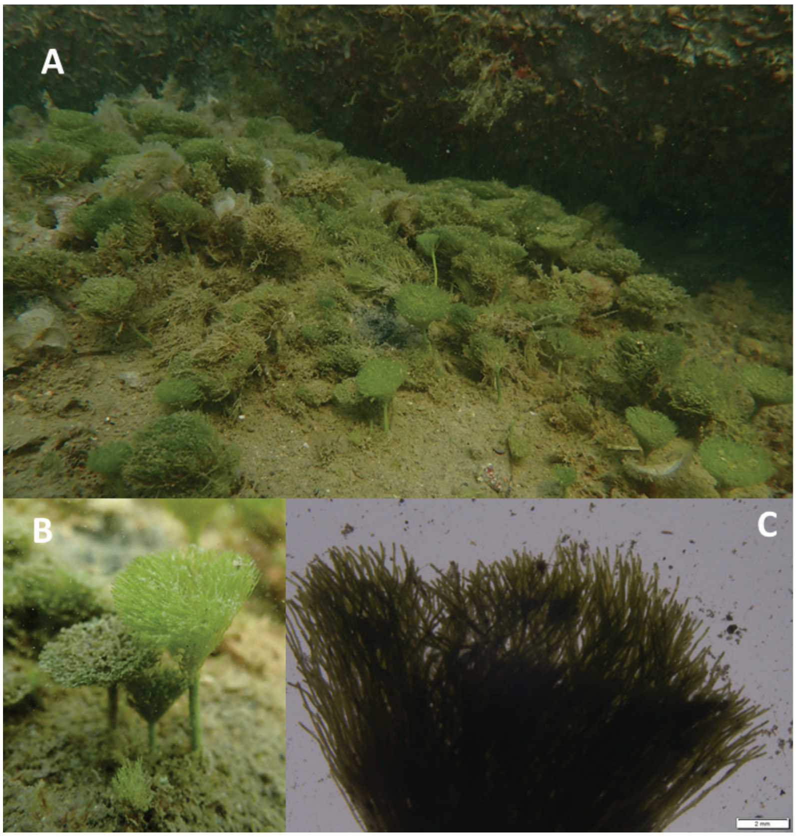

Fig. 3: *Penicillus capitatus* from Slovenia. A: several thalli were found on a boulder in the infralittoral belt; B: unicellular siphonoceous thalli have a tree-like shape; and C: characteristic brush-like apical part composed of filaments (scale bar of 2 mm). Photo credit: Leon Lojze Zamuda (A, B), Martina Orlando-Bonaca (C).

the feathery thalli are present only in summer (Bilecenoglu *et al.*, 2013). When well developed, it is an unmistakable species. The unicellular, siphonoceous thalli have a tree-like shape (Fig. 3 B) and are up to 3-10 cm tall (Sfriso, 2011). They consist of a multiaxial cylindrical stipe with the basal part fixed to the substrate by a rhizoid tuft, and a characteristic brush-like apical part composed of free, dichotomously branched filaments (Fig. 3 C). The thalli are often encrusted with calcium carbonate. Multiple thalli of different ages can often be grouped with a common rhizoidal part that gives the alga a proliferating appearance (Sfriso, 2011).

The finding of *P. capitatus* in Slovenian waters suggests that the species has extended its range northward. However, there are no data to confirm the hypothesis that it is a thermophilic alga that has expanded its range due to the global increase in sea temperature that we are facing.

2. RHODOPHYTA

2.1 First record of the Mediterranean endemic rhodophyte *Ptilophora dentata* (Kützing) Alongi, Cormaci & Furnari in Turkish coasts

Emine Sukran OKUDAN and Inci TUNEY

The rhodophyte genus *Ptilophora* Kützing (phylum Rhodophyta) comprises 21 species which inhabit subtidal environments in temperate and warm waters (Guiry & Guiry, 2024). The genus is predominantly distributed in the Indian Ocean, while four species occur in west Pacific and only one is known from the Mediterranean Sea (Guiry & Guiry, 2024). *Ptilophora dentata* (Kützing) Alongi, Cormaci & Furnari stands out as an endemic species of the eastern Mediterranean Sea with a small number of published occurrence records. The species has previously been recorded as *Phyllophora aegei* Giaccone, *Beckerella mediterranea* H.Huvé and *Beckerella dentata* (Kützing) Athanasiadis along the coasts of Greece (Athanasiadis, 1987; Tronchin *et al.*, 2003; Tsiamis & Panayotidis, 2019), and as *Ptilophora mediterranea* (H. Huvé) R.E.Norris from Lebanon (Guiry & Guiry, 2024). Taxo-

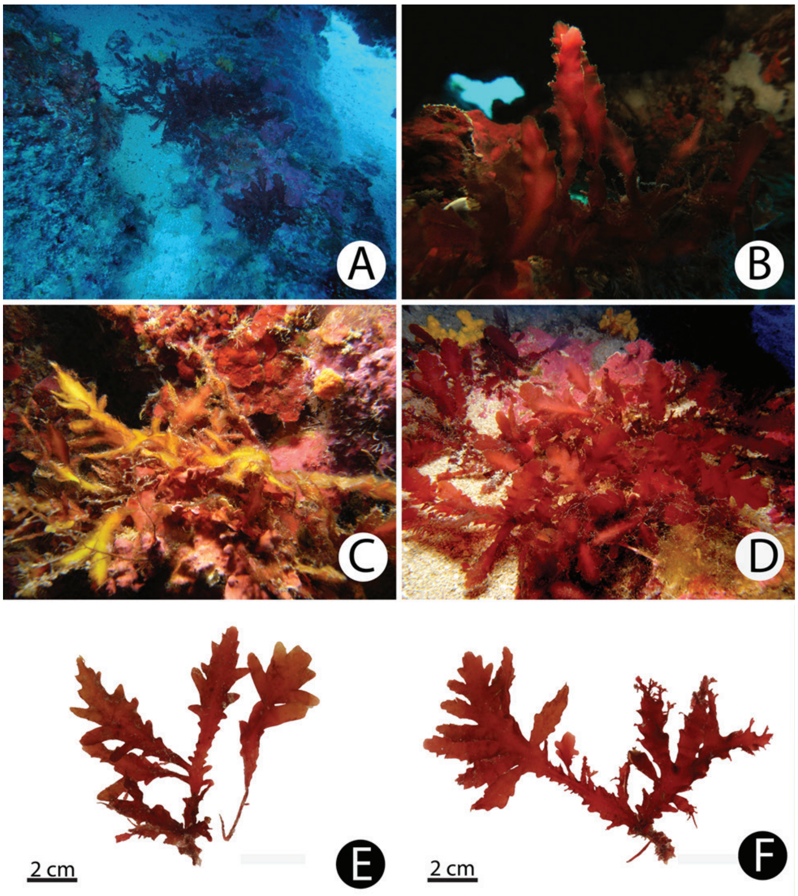

Fig. 4: A, B: Entrance of an underwater cave in Fethiye where the samples were collected; C, D: *Ptilophora dentata* in coralligenous communities of the cave entrance; E, F: General view of the collected *P. dentata* samples. Photo credit: Emine Sukran Okudan.

nomic descriptions are limited and additional challenges arise due to the species' restricted range and its association with specific and intricate habitats, in combination with its small size.

Ptilophora dentata exhibits sensitivity to pollution and has become extinct in degraded regions. Moreover, *P. dentata* displays a high sensitivity to alterations in water column composition, particularly in response to changes in water turbidity and excessive sedimentation (Verlaque *et al*., 2019; Cormaci *et al*., 2020). Notably, the species is listed in Appendix I (strictly protected flora species) of the Bern Convention and Annex II (endangered or threatened species) of the SPA/BD Protocol of the Barcelona Convention.

Ptilophora dentata is a sciaphilous species residing in depths ranging from 20 to 125 m, favoured by clean waters within shaded environments such as rocky crevices, caves and coralligenous communities. Here we present the first record of this species from Turkish waters. Samplings were implemented with SCUBA diving at depths of 40-45 m at an underwater cave entrance (coralligenous habitat) (Fig. 4 A-D) in Fethiye Bay (36.548455° N, 29.022869° E) and Kaş (36.150408° N, 29.626605° E) in July 2023. Our samples present the typical morphology of this species, comprising creeping cylindrical stolons attached by branching rhizoids and flattened erect distich branches with spiny-dentate edges, intersected by a prominent midrib. The dark red to yellow-coloured erect axes, measure 10-15 cm in length and are compressed with a distinct decurrent rib and a serrated margin featuring acute, sub-triangular teeth (Fig. 4 E, F). Irregularly arranged primary branches give rise to secondary branches and distichous branchlets produced from the tips of the margin teeth. The morphological characteristics described here align with the description of Cormaci *et al*. (2020).

This study is the first record of Mediterranean endemic *P. dentata* along the Turkish coasts. Further research and documentation of *P. dentata* in the Mediterranean Sea will enhance our understanding of its distribution and contribute valuable insights into its ecological dynamics.

3. PORIFERA

3.1 Occurrence of *Tethya meloni* Corriero, Gadaleta & Bavestrello, 2015 (Porifera, Demospongiae, Tethyida) in Montenegrin waters

Slavica PETOVIĆ and Nikola ĐORĐEVIĆ

The genus *Tethya* Lamarck, 1814 contains a large number of species widely distributed (Heim *et al*., 2007). Globally, the highest diversity of the genus *Tethya* is found in tropical waters, especially in coral reefs (Sarà, 1998). Until 2015, two species *Tethya citrina* Sarà & Melone, 1965 and *Tethya aurantium* (Pallas, 1766) were known from the Mediterranean area. In the frame of Barcelona Convention, the Protocol concerning specially protected areas and biological diversity in the Mediterranean (SPA/BD Protocol) included *Tethya* spp. in the list of endangered or threatened species (Annex II). Corriero *et al*. (2015) described a new species named as *T. meloni* Corriero, Gadaleta & Bavestrello, 2015, analysing samples from several locations across the Adriatic, Ionian and Tyrrhenian Seas, collected from the depth range of 0.2-123 m.

In summer 2023, the sponge species *T. meloni* was recorded at two locations within the Boka Kotorska Bay (Montenegro) during fieldwork carried out with SCUBA diving, as part of the national monitoring program of Montenegro. At the Sopot site (42.509819° N, 18.679589° E) two specimens were found on a substrate composed of large stones overgrown by algae at a depth of 7 m. Although the species was described relatively recently, it has been previously reported from this area based only on external morphological features, identified *in situ* (Trainito, 2019; Đorđević & Petović, 2020). Therefore, this represents the second record for the locality Sopot while at the Kumbor site (42.434634° N, 18.609969° E), one specimen was recorded for the first time at a depth of 10 m on a silty-sandy substrate.

All of the examined specimens showed a spherical shape (Fig. 5 A) with well-developed cortex (Fig. 5 B), with *in vivo* diameter varying from 5.5 cm (Kumbor) to 7.5 cm (Sopot). The colour of living specimens varied from cream to pale yellow, while the surface had mostly flattened tubercles. Consistency was moderately hard and compressible with an osculum well visible *in vivo*. Analyses of skeleton showed the presence of spicules, characteristic for the species in shape and size as described by Corriero *et al*. (2015): bundles of strongyloxeas, megasters (oxyspherasters) as well as micrasters (Fig. 5 C). Size of strongyloxeas is varied in length from 580-2200 µm and 10-35 µm in thickness; oxyspherasters 63-118 µm in diameter, with 12-16 rays and micrasters 14-16.5 µm. As noted by Corriero *et al*., (2015) *T. meloni* differs from the two other known Mediterranean *Tethya* species (*T. citrina* and *T. aurantium*) according to the following traits: larger body size and well-developed cortex; colour (cream); shape and size of megasters; distribution pattern of micrasters. In particular, *T. meloni* has the same type of megaster (oxyspheraster) and micrasters with *T. citrina*, but they differ in size in favour of *T. meloni*. Regarding to the similarities and differences between *T. meloni* and *T. aurantium* they are reflected in the type of megaster as well as their size. *Tethya aurantium* contains spherasters while in *T. meloni* oxyspherasters are present. As far as micrasters are concerned, there are two categories in *T. aurantium* (cortical and choanosomal), while in *T. meloni* there is only one category both in cortex and choanosome.

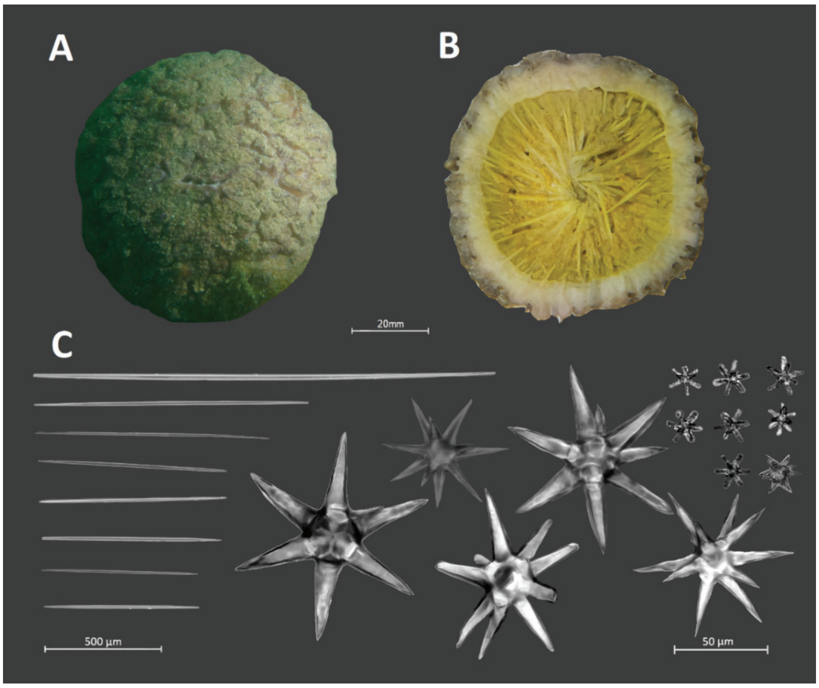

Fig. 5: A: *Tethya meloni* photographs in situ, Sopot, Boka Kotorska Bay, Montenegro; B: dissected specimen with well-developed cortex; C: Spicules: megascleres-strongyloxeas, megasters-oxyspherasters and micrasters.

4. CNIDARIA

4.1 A new Mediterranean spot for the gold coral *Savalia savaglia* (Bertoloni, 1819) and *Dendrophyllia ramea* (Linnaeus, 1758): the cape of Palos

Víctor ORENES-SALAZAR, Juan Manuel RUÍZ and José Antonio GARCÍA-CHARTON

Savalia savaglia (Bertoloni 1819) is a rare Atlanto-Mediterranean parasitic parazoanthid with a wide geographical distribution and a thermophilous chorology. This long-living species creates elevated and three-dimensional biogenic structures, which may play an important role as a structural component of the Mediterranean coralligenous assemblage (Cerrano *et al*., 2010). Owing to its rarity, the species is included in the list of endangered or threatened species (Annex II) of the SPA/BD Protocol of the Barcelona Convention and in the list of strictly protected Fauna species (Appendix II) of the Bern Convention for the conservation of European wildlife and natural habitats. *Dendrophyllia ramea* (Linnaeus, 1758) is a poorly known arborescent azooxanthellate scleractinian coral with an Atlanto-Mediterranean distribution. In the Mediterranean Sea, this species is known from a few sites mainly located in Sicilian waters and the Alboran Sea. Our knowledge about the species is deficient and fragmented, coming from colonies at different locations and depths, and on diverse substrates (Salvati *et al*., 2021, 2023). *Dendrophyllia ramea* is currently listed as Vulnerable in the Mediterranean IUCN Red List and listed in Annex II of the Barcelona Convention.

The distribution areas of *S. savaglia* and *D. ramea* were recently assessed by Pulido Mantas *et al*. (2022) and Salvati *et al*. (2021), respectively. To the authors' knowledge, neither of the two species has been cited in scientific or technical reports from the southeastern Iberian Peninsula, north of the Almeria-Oran front. Here, we provide a graphical document on the presence of *S. savaglia* and *D. ramea* near the cape of Palos (south-east Spain, southwest Mediterranean Sea, 37.635º N, 0.691º W), with brief notes on the ecology of both species in the area.

Savalia savaglia colonies were found in three different seamounts within the marine reserve of Cape of Palos - Hormigas Islands. The species was always observed in the form of isolated colonies, separated in space by tens of metres, always on rocky bottom, at depths between 30 and 45 metres, although deeper colonies in areas not frequented by divers cannot be excluded. The species exhibits a golden colour that can vary from pale to bright (Fig. 6 A, B), and typically appears interspersed within gorgonian forests of the species *Eunicella singularis* (Esper, 1791) and *Paramuricea clavata* (Risso, 1827), which are the dominant components of the underwater landscape in the marine reserve (Orenes-Salazar *et al*., 2023). Popula-

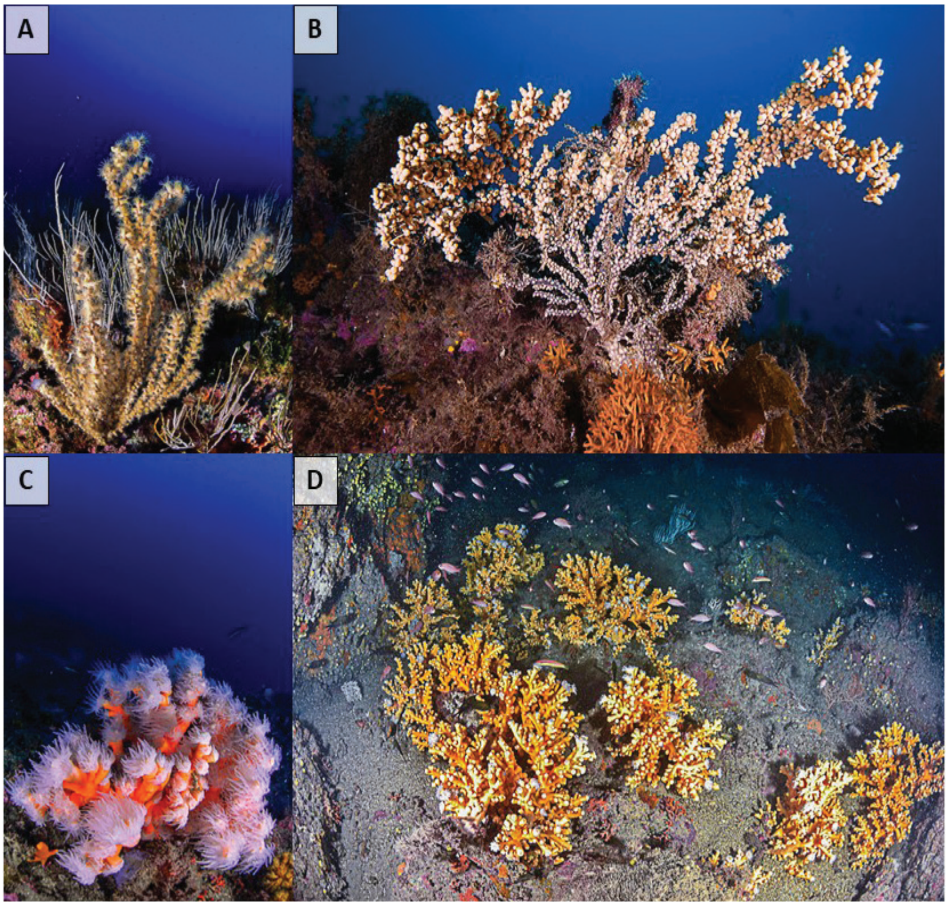

Fig. 6: Underwater photographs of *Savalia savaglia* and *Dendrophyllia ramea* from the marine reserve of Cape of Palos - Hormigas Islands. A: Colony of *S. savaglia* (with open polyps) within a gorgonian forest of *Eunicella singularis*. B: Colony of *S. savaglia* embedding a *Paramuricea clavata* colony (here with closed polyps). C: Orange arborescent colony of *D. ramea*. D: Overview of *D. ramea* congregation on a sediment-rich rocky bottom at the depth of 48 m. Photo credit: Javier Ferrer.

tion estimates based on periodic dives suggest a population of dozens of individuals, perhaps reaching a hundred in total in the protected area, although specific surveys in the area are needed to provide more precise data on the size of the resident population.

Dendrophyllia ramea is also exclusively found within the marine reserve of Cape of Palos - Hormigas Islands (Fig. 6 C). The bulk of the population is concentrated in a small area (Fig. 6 D), at depths between 40 and 50 metres, where strong currents enhance food accessibility. This population, composed of around 25-30 colonies, appears on hard bottom covered by a thick layer of sediment of several centimetres. Within the entangled network of *D. ramea* colonies, which vary in size from a few centimetres to 30 cm, some fish species are common such as *Symphodus doderleini* Jordan, 1890, *Chromis chromis* (Linnaeus, 1758), *Serranus cabrilla* (Linnaeus, 1758), *Anthias anthias* (Linnaeus, 1758) and *Coris julis* (Linnaeus, 1758), which often use the larger colonies as shelter. Other accompanying species that occur in the area are the hexacoral *Leptopsammia pruvoti* Lacaze-Duthiers, 1897, the bryozoan *Myriapora truncata* (Pallas, 1766), the sponge *Phorbas tenacior* (Topsent, 1925), and the gorgonians *Leptogorgia sarmentosa* (Esper, 1791), *Eunicella verrucosa* (Pallas, 1766) and *P. clavata*.

Given the potential effects of invasive species and other human stressors on habitat-forming deep-water species, especially in the Mediterranean Sea, it is of utmost importance to collect all available data on their distribution and ecology.

4.2 First report of *Spinimuricea* cf. *atlantica* (Johnson, 1862) (Malacalcyonacea: Paramuriceidae) in the Gulf of Lion (North-Western Mediterranean Sea)

Marina BIEL-CABANELAS and Andreu SANTÍN MURIEL

In the central and northern Catalan margin (Northwestern Mediterranean Sea) fifteen no-take areas (290 km^2) have been recently established, permanently restricting fishing activities with the aim to help the recovery of fish stocks and benthic communities. Within monitoring activities using Remotely Operated Vehicles (ROV) in these Marine Protected Areas (MPAs) several colonies of *Spinimuricea* cf. *atlantica* (Johnson, 1862) were recorded in the "Mars D'Enterra" MPA, located in front of Palamós, Spain (41.789538° N, 3.181085° E) at a

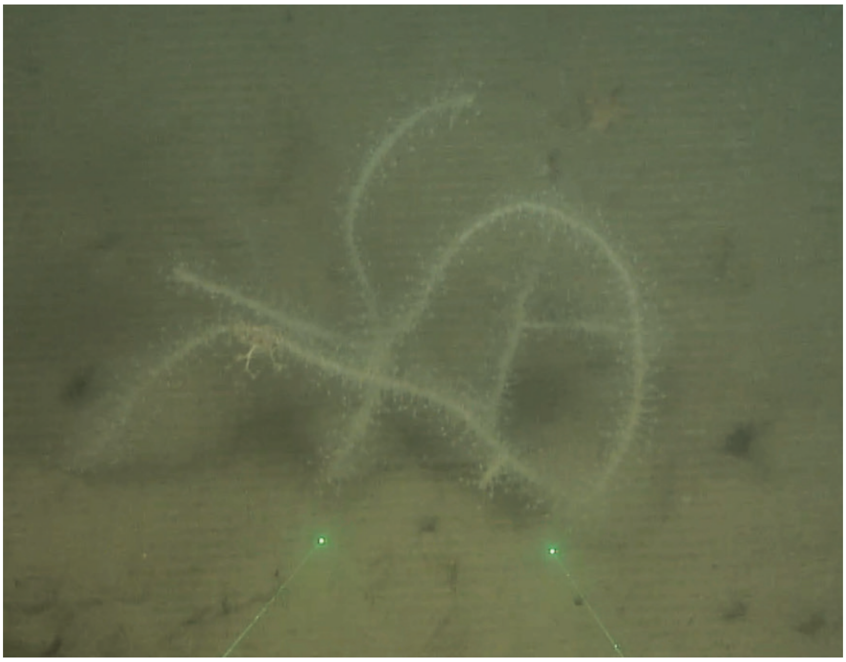

Fig. 7: Image of *Spinimuricea* cf. *atlantica* spotted in the MPA area obtained by means of ROV. Laser's separation of 10 cm. Photo credit: ICM-CSIC.

depth range of 80 to 100 m, on soft sediment (Fig. 7). One specimen was collected for further examination. Primarily occurring in soft substrates on the continental shelf, *S. atlantica* is a fairly unacquainted octocoral, with little to no information available other than sporadic records on the east Atlantic, from Galicia to Guinea Gulf (Ocaña *et al*., 2017). Regarding the Mediterranean Sea, previously the species had never been recorded outside the margins of the Alboran Sea (Ocaña *et al*., 2017), thus the current record constitutes its first report for the basin outside said area.

Currently, only two species of *Spinimuricea* Grasshoff, 1992 are recognised worldwide, *S. atlantica* and *Spinimuricea klavereni* (Carpine & Grasshoff, 1975), both occurring in the North-East Atlantic and the Mediterranean Sea. While both are arguably close, *S. atlantica* is differentiated from *S. klavereni* by a more ramified external morphology of colonies and the main presence of ramified spindles in the coenenchyma as opposed to *S. klavereni*, which are predominantly unramified (Carpine & Grasshoff, 1975). While current material fits well with the definition of *S. atlantica*, the presence of non-ramified spindles was noted alongside that of ramified ones; hence, the present specimen is rather assigned as *S.* cf. *atlantica* pending clarification. In this sense, an integrative taxonomy approach would be advisable to properly elucidate the relationships between *S. atlantica* and *S. klavereni*.

Interestingly, the genus *Spinimuricea* is largely absent from the western Mediterranean Sea (Yokeş *et al*., 2018), whereas *S. klavereni* is abundant in the eastern Mediterranean, particularly in the Sea of Marmara (Topçu & Öztürk, 2016), and *S. atlantica* has been consistently reported in the Alboran Sea for almost 50 years (Ocaña *et al*., 2017). In the Catalan margin the species was not found in any of the surrounding trawl bottoms explored, outside a single MPA, agreeing with suggestions of *Spinimuricea* spp. being affected by bottom contact fishing practices (Ocaña *et al*., 2017; Yokeş *et al*., 2018) which, potentially, could have contributed to its limited distribution in the western Mediterranean. The presence of several colonies of *Spinimuricea* cf. *atlantica* in this MPA suggests a potential candidate for future active restoration actions in the area (Santín *et al*., 2022). Bridging the significant knowledge gap regarding its taxonomy, biology, ecology, and role in benthic ecosystems is crucial for the success of any future restoration attempts and overall species conservation.

5. PLATYHELMINTHES

5.1 Occurrence of polyclad flatworms in marine caves of Greece

Markos DIGENIS, Mehrez GAMMOUDI and Vasilis GEROVASILEIOU

Polyclad flatworms (Polycladida: Platyhelminthes) are usually found in cryptobenthic habitats, being among the first animals studied in Mediterranean marine caves by the Austrian zoologist Rupert Riedl (1959). This study reports on the occurrence of two polyclad species in marine caves of Greece: *Thysanozoon brocchii* (Risso, 1818)

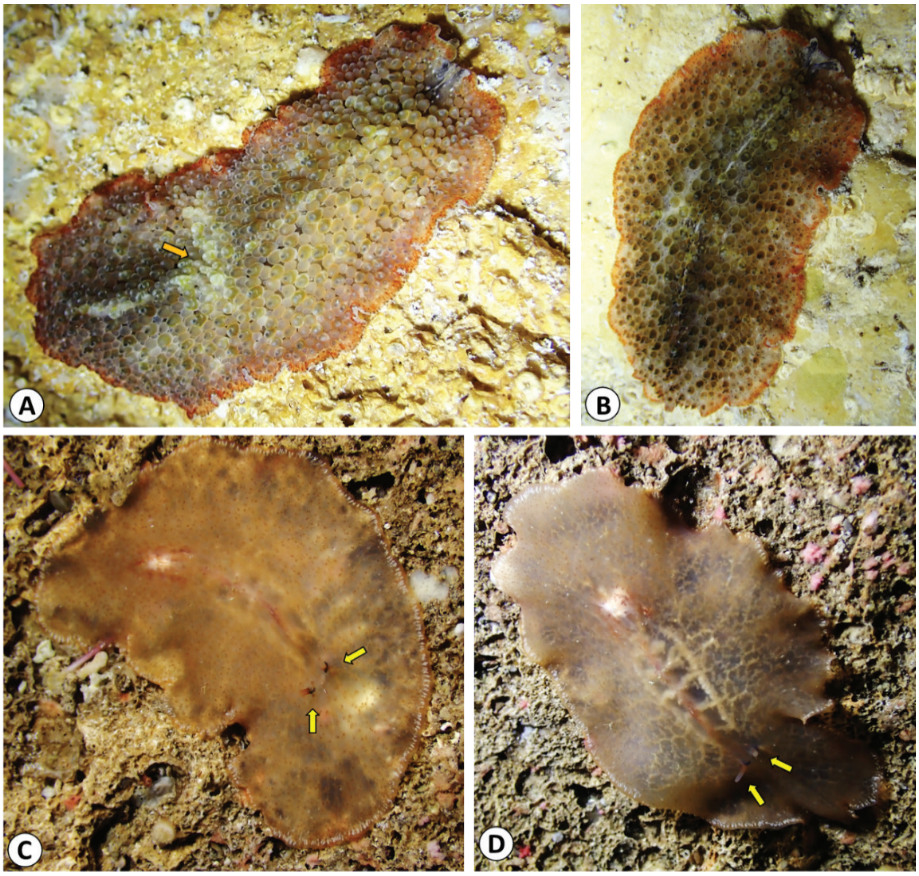

Fig. 8: A, B: Different individuals of *Thysanozoon brocchii* photographed on the rocky walls of a dark cave passage in Zakynthos Island, Ionian Sea, Greece with A: the cross-shaped whitish mark pointed by an orange arrow. C, D: *Planocera graffi* photographed in the semidark zone of a marine cave of Saria Island, Aegean Sea, Greece with yellow arrows indicating its nuchal tentacles. Photo credit: Markos Digenis.

and *Planocera graffi* Lang, 1879, with the former being recorded for the first time in a marine cave (Riedl 1959), increasing platyhelminth diversity in Mediterranean marine caves (Gerovasileiou & Bianchi, 2021). To the best of our knowledge, both *T. brocchii* and *P. graffi* constitute new records for Greece.

Thysanozoon brocchii is a cosmopolitan species reported in the Mediterranean Sea, the Atlantic, Pacific and Indian Oceans in a variety of habitats (Cuadrado *et al*., 2017; Pitale & Apte, 2017). In November 2022, four individuals of *T. brocchii* were recorded during a SCUBA diving survey in a semi-submerged cave within the National Marine Park of Zakynthos Island, Ionian Sea, Greece (37.6614ºN, 20.8586ºE). Three individuals were photographed crawling on the rocky walls of a narrow dark passage in the blind end of the cave, at a depth of 0.5-1 m, while the fourth individual was observed in the semidark zone of the same cave at the depth of 2 m.

All recorded individuals were approximately 3-4 cm long by 1-2 cm wide with an oblong, oval shaped body, dorsally covered with characteristic cylindrical and acorn-like yellowish brown to dark brown papillae (Fig. 8 A, B). The papillae from the median longitudinal line had a lighter colour while, in some individuals, the characteristic cross-shaped whitish mark was also visible (Fig. 8 A). In accordance with the description of Pitale & Apte (2017) and Cuadrado *et al*. (2017), the margin of the body presented a dotted pinkish to orange tint ended with a white dotted line on the rim while the pharynx was ruffled, and a single pair of eye clusters were present at the margin of two erect, simply folded, cream brown pseudotentacles with white tips.

Originally described as a molluscan species (*Tergipes brocchi* Risso, 1818), this flatworm has about twenty synonyms previously given to different species (Pitale & Apte, 2017). It remains unknown whether the same species presents polymorphism across the world or if there are different closely related synonymised species. In this context, revision of this species is required based on molecular data and reproductive anatomy (Pitale & Apte, 2017).

Planocera graffi was originally described in the Gulf of Naples and has been previously reported from marine caves by Riedl (1959). However, Marquina *et al*. (2014) suggested that this species could be synonymised with the cosmopolitan species *P. pellucida* (Mertens, 1833) which occurs in the Atlantic, the North Sea and the Pacific Ocean.

In May 2023, one individual of *Planocera graffi* was recorded during a SCUBA diving survey in the semidark zone of a semi-submerged marine cave in Saria Island (Natura site GR4210003), Aegean Sea, Greece (35.8545ºN, 27.1927ºE), at the depth of 6 m. The recorded individual had a broadly oval, almost round body shape approximately 30 mm long by 20 mm wide. The body had yellow-orange cream colour but was translucent and frail in appearance, with a reddish net-like accumulation of pigment granules at its midline and along the intestine branches and a broad ruffled pharynx occupying its central region. It had slightly ruffled margins with white terminal ramifications on the dorsal side and two conspicuous conical nuchal tentacles located near the brain but far from the margins (Fig. 8 C, D). Numerous basal ring-shaped tentacular eyes surrounded the tentacles in an orderly (stereotypical) manner differentiating it from the congeneric species *P. ceratommata* (Palombi, 1936) whose tentacular eyes have an irregular arrangement (Marquina *et al*., 2014; Cuadrado *et al*., 2017).

6. MOLLUSCA

6.1 First report of *Ascobulla fragilis* (Jeffreys, 1856) (Sacoglossa, Volvatellidae) from the Eastern Levantine Sea

Razy HOFFMAN

During a BioBlitz survey, which took place on 27 October 2019 at Dor Habonim beach nature reserve located in central Israel (32.6369°N, 34.9213°E), a large, turfed specimen of the non-native green siphonous seaweed *Caulerpa mexicana* Sonder ex Kützing was collected from the sandy bottom of a shallow intertidal pothole ca. 40 cm deep.

Observation of the specimen at the lab revealed a minute, undefined species of mollusc hiding inside the algal turf. While checking the gastropod and gently irritating it with needle, a jet of greenish liquid was squirted out of its shell, interpreted as a noxious fluid obtained from its diet on the toxic algal species. The gastropod found had a cylindrical, lightly calcified (almost transparent), fragile shell with concave spiral apex (Fig. 9 A, B) and cephalic shield lobes with space between them, which indicates the genus *Ascobulla* Ev. Marcus, 1972. Its overall length, including the cephalic shield, is 8.8 mm. Shell dimensions are 6.4 mm long and 1.8 mm broad and it is externally marked with a flexible sutural slit (Fig. 9 A). The gastropod was identified as *Ascobulla fragilis* (Jeffreys, 1856) based on the features and comparison with other four species of the genus published by Laetz *et al*. (2014) along with the fact that this endemic Mediterranean species is the only species of the genus found in this sea. However, it was not reported previously from the Levantine Mediterranean shore of Israel nor from the nearby eastern Levantine countries (Barash & Danin, 1992). Moreover, the only countries in the region with reports of this gastropod are Türkiye and Greece and specimens found there were collected from the Ionian (Thompson *et al*., 1985), Aegean Sea (for details see Crocetta *et al*., 2015) and the northwestern part of the Levantine Sea (Öztürk *et al*., 2014).

Literature indicates that *A. fragilis* feeds solely on *Caulerpa* species that grow mainly on soft substratum in the subtidal at 5-50 m depth (Thompson *et al*., 1985, Öztürk *et al*., 2014). The evidence that it was found grazing on this seaweed in the shallow intertidal might suggests that its distribution depends on its diet and not depth.

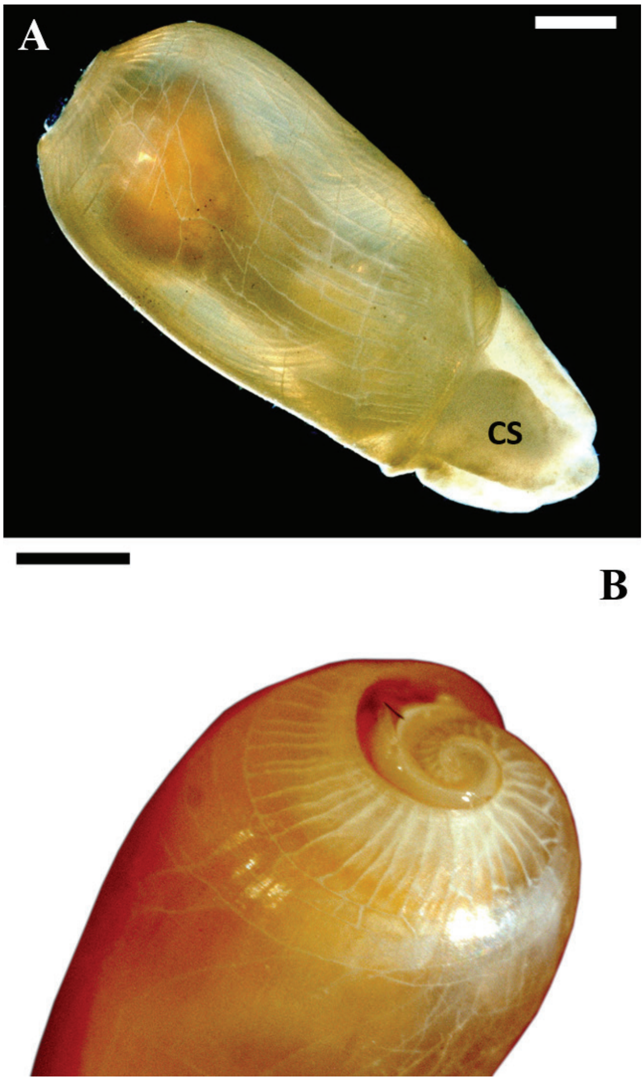

Fig. 9: The first specimen of *Ascobulla fragilis* collected from the Levantine Mediterranean shore of Israel. A: general view indicating the sutural slit and cephalic shield (CS); B: concave apex of shell. Scale bars: 0.5 mm.

6.2 Recent observation on the blanket octopus *Tremoctopus violaceus* (Tremoctopodidae: Cephalopoda) in Izmir Bay (North-eastern Aegean Sea)

Okan AKYOL and Zafer TOSUNOĞLU

The blanket octopus, *Tremoctopus violaceus* delle Chiaje, 1830 (family Tremoctopodidae, class Cephalopoda) is one of four related families of pelagic octopus (i.e., Argonautidae, Ocythoidae, Alloposidae) that show sexual size-dimorphism with small to miniature males (Norman *et al*., 2002). In the Mediterranean Sea, only four Argonautoidea cephalopods have been documented, i.e., *Argonauta argo* Linnaeus, 1758, *Ocythoe tuberculata* Rafinesque, 1814 and *Tremoctopus violaceus* delle Chiaje, 1830, which are considered native Mediterranean species, and the non-indigenous *Tremoctopus gracilis* (Souleyet, 1852). Battaglia *et al*. (2023) emphasised that all these species can be infrequently observed in the Mediterranean Sea.

Female *T. violaceus* (like the other tremoctopods) attains a large size, reaching 1 m in total length, while the mantle length of dwarf males seldom exceeds 15 mm (FAO, 2016). However, a male specimen has been caught off the northern Great Barrier Reef, Australia, and it was 24 mm in total length and weighed 0.25 g (Norman *et al*., 2002). *Tremoctopus violaceus* feeds on pteropod molluscs and small fishes (FAO, 2016). As a rarely encountered pelagic species that inhabits the open ocean only occurs in the Atlantic Ocean between latitudes 40°N and 36°S, and the Mediterranean Sea (FAO, 2016; Battaglia *et al*., 2023). This study aims to report the additional presence of *T. violaceus* in the North-eastern Aegean Sea, expanding the knowledge of migration behaviour about this rare cephalopod.

On 22 June 2022, a female *T. violaceus* specimen (Fig. 10) was observed on the shore of Kamukent, Mordoğan in Izmir Bay (38.48805° N, 26.63555° E) at a depth of 7 m on a sandy bottom with *Posidonia* seagrass. The recreational angler took photos of the species.

We interviewed the angler, who said that the blanket octopus suddenly appeared, while he was anchored on the shore, swam around the boat for a while and came close enough to touch the boat (Fig. 10 B). About 1 minute later, it first ascended to the sea surface (Fig. 10 A), then dived to the bottom, and disappeared. Its movements were slow and unhurried (Ö. Güler, pers. comm.).

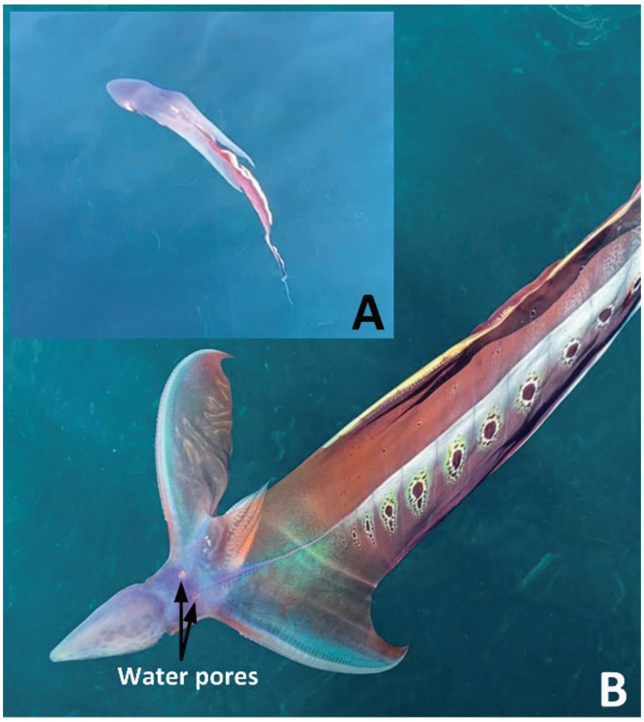

Fig. 10: *Tremoctopus violaceus* off Mordoğan, Izmir Bay, NE Aegean Sea. A: Moving away at the sea surface; B: Near the boat with black arrows indicating the water pores of the species. Photo credit: Ömer Güler.

Lefkaditou *et al*. (2003) have listed *T. violaceus* both from Epidauros Gulf (Greece, South-western Aegean Sea) and from Izmir Bay (Türkiye, North-eastern Aegean Sea) which is the same location as this study. Relatively, these recordings are old, and all were given in the early or mid-1990s. Salman *et al*. (2002) reported four specimens of *T. violaceus* from Izmir Bay, and therefore, the finding presents the fifth northernmost record along the Aegean Sea after a quarter century (Table 2). A striking situation in this study is that all individuals are observed only in Izmir Bay during June and July. The seasonal appearance of *T. violacea* specimens may indicate a reproductive migration. However, further investigation is needed as data about this species are scarce in the Mediterranean.

Table 2. Previous records of *Tremoctopus violaceus* from the Turkish Aegean Sea.

Date	Number of individuals	Maximum Length in mm	Sex	Area	References
06 July 1990	1	91	♀	Karaburun, Izmir Bay	Salman *et al*. (2002)
14 July 1991	1	95	♀	Güzelbahçe, Izmir Bay	Salman *et al*. (2002)
09 July 1992	1	120	♀	Urla, Izmir Bay	Salman *et al*. (2002)
22 July 1996	1	84	♀	Urla, Izmir Bay	Salman *et al*. (2002)
22 June 2022	1	?	♀	Mordoğan, Izmir Bay	This study

7. ARTHROPODA

7.1 First record of the copepod *Ditrychocorycaeus africanus* (Dahl F., 1894) in Ionian Sea (Central Mediterranean)

Jessica VANNINI and Iole DI CAPUA

Both male and female individuals of *Ditrychocorycaeus africanus* (Dahl F., 1894) (Fig. 11 A, C) were identified for the first time at two sites along the Calabrian coast in the Ionian Sea (Amendolara Bank: 39.880466 °N, 16.724383 °E, 50 m depth, and Corigliano harbour area: 39.67475 °N, 16.5435 °E, 55 m depth). Historically, *D. africanus* has been reported from the Atlantic Ocean, from Congo, Angola, Portuguese Guinea, Senegal, Brazil, Venezuela, as well as in the Indian Ocean, notably Madagascar (Vives & Shmeleva, 2007). In the Mediterranean, this species has only been recorded in the Alboran Sea in the western Mediterranean (Kovalev & Shmeleva, 1982; Greze *et al*., 1985). Vives & Shmeleva (2007) described this species as an epiplanktonic and sub-superficial species found only in small numbers. Our recent survey conducted in 2023 is the first documented record of *D. africanus* in the Ionian Sea (central Mediterranean).

Zooplankton samples were collected within the scope of the CRIMAC-CALYPSO Project, utilizing a WP2 net (200 µm) for vertical trawling. Sampling was conducted from a depth of 5 m above the seafloor to the surface. The samples were preserved in ethanol. The identification process involved a meticulous examination of *D. africanus* individuals under a stereomicroscope (Leica, MZ125) and microscope (Zeiss, Axiophot). Adult females and males (Fig. 11 A, B) were isolated and identified based on specific morphological features.

Starting from the two divergent setae on the endopod of the P4, we initially identified the genus *Ditrychocorycaeus* (Fig. 11 C). To differentiate among the three closely resembling species within this genus, *D. brehmi* (Steuer, 1910), *D. anglicus* (Lubbock, 1857) and *D. africanus*, we conducted observations on the inner distal margin of the first endopodal segment of the antenna in both sexes: in female, two teeth are present, while the male exhibits a single sharp tooth (Fig. 11 D, E). Additionally, we measured the relative proportions of urosomites and caudal rami: in females, the caudal rami are longer than the genital segment, the combined length of the genital segment and anal segment is similar to that of the caudal rami, whereas in males, the genital segment's length is approximately equal to that of the caudal rami (Dahl,

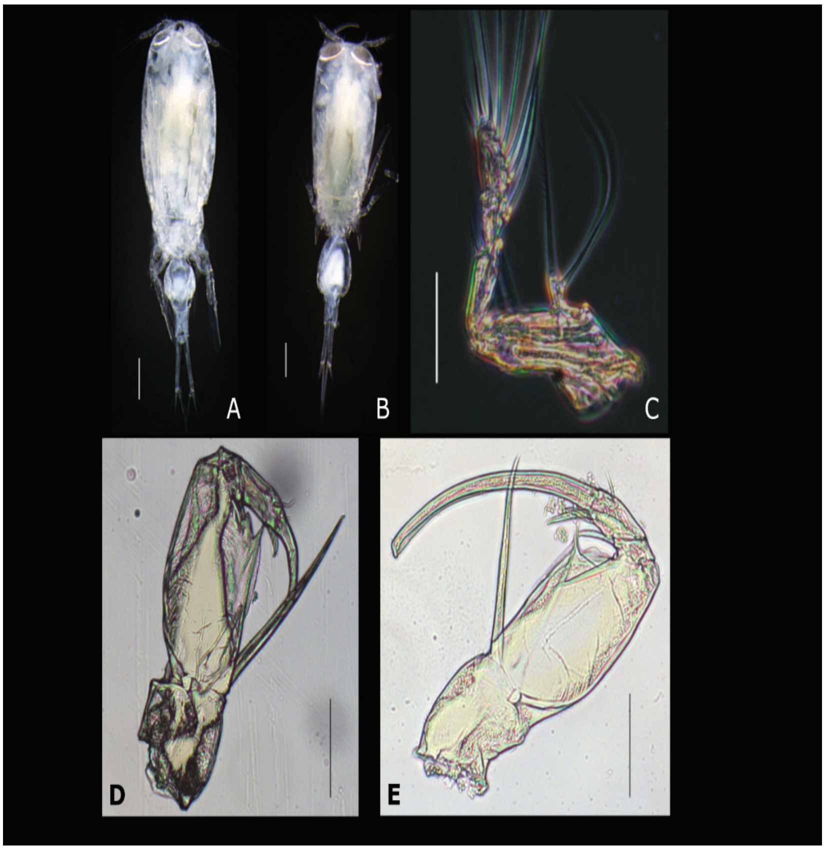

Fig. 11: Morphological features of *Ditrychocorycaeus africanus* collected in the Ionian Sea. A: female and B: male individuals in dorsal view (scale bar: 100 µm); C: details of female swimming leg P4; D, E: details of male and female antenna A2 respectively (scale bar: 50 µm).

1912; Razouls *et al*., 2005-2023).

The total abundance of *D. africanus* ranged between 2 and 17 individuals per cubic metre, as reported in Table 3. Total body length including caudal rami of specimens analysed is 0.89 mm for female and 0.77 mm for male. Remarkably, the presence of this species with a consistent abundance in all collections in different months suggests a stable population in the central Mediterranean, while further studies will be needed to depict the patterns of its introduction in this basin.

Table 3. Total abundances of *Ditrychocorycaeus africanus*, expressed in individuals per m^3, in two sites along Calabrian coasts, in three different months in 2023.

Month	Site	Abundance
March	Amendolara bank	17
	Corigliano harbour	9
May	Amendolara bank	2
September	Amendolara bank	14
	Corigliano harbour	5

7.2 *Ocypode cursor* (Linnaeus, 1758): a thermophilic decapod species detected further north in the Tyrrhenian Sea

Fabio CROCETTA and Francesco TIRALONGO

The tufted ghost crab *Ocypode cursor* (Linnaeus, 1758) is one of the nine marine crustacean species protected in the Mediterranean, being listed among the Endangered or Threatened Species (Annex II) of the Barcelona Convention (1995) and among the Strictly Protected Fauna Species (Annex II) of the Bern Convention (1996–1998). It is the only species of the family Ocypodidae Rafinesque, 1815 living in the Mediterranean Sea, and is characterised by a general pale to light yellow colouration, a subquadrangular carapace with a narrow front, asymmetrical chelipeds, long pereiopods, and the presence of a tuft of bristles at the end of its eyestalks, a character that allows an easy distinction of this taxon from the majority of the congeneric species (Deidun *et al.*, 2017; Santín *et al.*, 2021). It lives in the intertidal zone of sandy beaches and, until recently, showed a disjointed distribution, occurring in the Atlantic and mostly in the eastern and central Mediterranean. However, whereas its presence from Egypt across the Levant to Türkiye and southern Greece has been known for centuries, its presence in the central Mediterranean only dates back to 1987, when two specimens were first found in Lampedusa Island (Deidun *et al.*, 2017). Since then, and mostly in the last decade, the tufted ghost crab has widely colonised the area, with records from Tunisia, Algeria, Malta, and several Italian localities (Deidun *et al.*, 2017; Karaa *et al.*, 2019; Mancinelli *et al.*, 2019; Di Martino & Stancanelli, 2020; Santín *et al.*, 2021). In Italy, the species is now widespread along the southern and eastern coast of Sicily (Tiralongo *et al.*, 2020b), but is also known through additional sporadic occurrences in the mainland, mostly located in the Ionian Sea of Apulia and Calabria regions (Mancinelli *et al.*, 2019; Santín *et al.*, 2021), with a single occurrence in the southern Tyrrhenian Sea, at Palmi (Santín *et al.*, 2021).

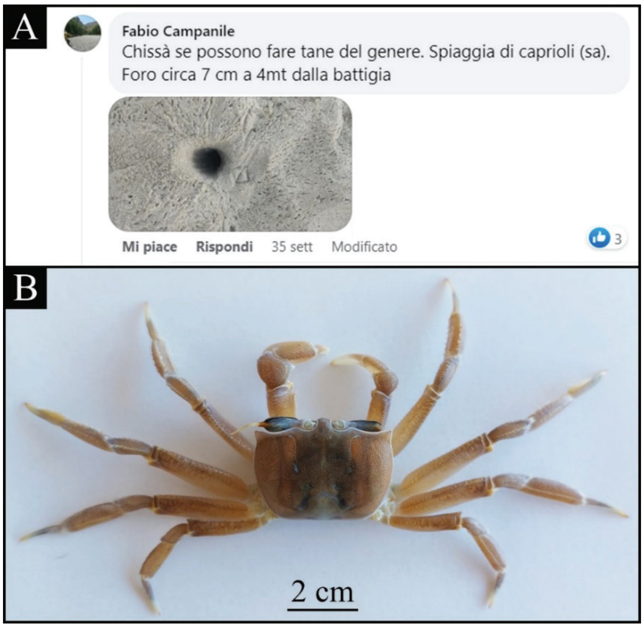

Fig. 12: *Ocypode cursor* from Caprioli-Palinuro (Salerno, Italy). A: The post by Fabio Campanile on the Facebook group “Fauna Marina Mediterranea” showing a ghost crab burrow at Le Saline beach (6th of August 2022). B: The single ghost crab specimen found in the same area on the 27th of August 2022.

On the 6th of August 2022, a user of the Facebook group “Fauna Marina Mediterranea” (https://www.facebook.com/groups/230601830399549) posted a picture of a burrow in the sand unusual to him (Fig. 12 A), observed at Le Saline beach (between Caprioli and Palinuro, Salerno, Italy) (40.061874° N, 15.278749° E). This was soon identified by one of us (F.T.) as belonging to *O. cursor*. A few weeks later (27th August 2022), a thorough research held by one of us (F.C.) along the entire beach (~2 km) led to the discovery of a single adult male specimen (CW×CL: 3.9×2.9 cm), walking during the night nearby its burrow (Fig. 12 B). The same area was further investigated by the same author on the 8th of March 2023, but no other specimens were found.

Although the present sighting is based on a single specimen, it accounts for the northernmost record of this species in the Mediterranean Sea and in its entire distributional range. It is also consistent with the only previous record known from the Tyrrhenian Sea, again based on a single specimen. As *O. cursor* is among the most successful thermophilic species of the last decade, a future establishment in the central Tyrrhenian Sea is highly possible, especially in the light of the growing sea surface temperatures and the general tropicalization of the Mediterranean Sea. Finally, it also confirms the usefulness of citizen science in detecting rare, range-expanding, and alien species.

8. CHORDATA

8.1 First record of *Arnoglossus grohmanni* (Bonaparte 1837) for Spain

Julien P. RENOULT and Laure BENOIT

Arnoglossus grohmanni (Bonaparte 1837) is a flounder (Teleostei: Bothidae) endemic to the Mediterranean and Black Sea. *Arnoglossus grohmanni* was formerly known as *A. kessleri* Schmidt 1915, a name now considered a junior synonym in the Eschemeyer's Catalog of Fishes (CoF) (Fricke *et al*., 2023). For the sake of clarity, we here follow the CoF but the systematics of this genus is unclear and future works may revise the names. Despite several records on the Global Biodiversity Information Facility (GBIF), and the species being mentioned in Lloris (2015; under the name *A. kessleri*), it is not listed on the checklist of the fishes from Spanish waters (Báez *et al*., 2019), because no specimen has been formally identified so far.

On 28th August 2020, a specimen of *A. grohmanni* was photographed during night snorkelling at Castelló d'Empúries, Province of Girona, on the Spanish Mediterranean coast (Fig. 13) (42.253724° N, 3.146156° E), at the depth of 2 m, on bare fine sand. The specimen was collected with a hand-net, a piece of muscle was removed and stored in 96° ethanol and the specimen fixed in formaldehyde 4%. The specimen (47 + 10 mm, D: 72, A: 53) is kept at the Center for Functional and Evolutionary Ecology in Montpellier, France, with code JR280820-02. The eyes on the left side of the body, the pelvic fin on the ocular side beginning at the tip of the isthmus, the lateral line weakly developed on blind side, the eyes separated by a bony ridge, head length 2.16 time in standard length, the scales on the ocular side cycloid, and the maxillary longer than eye diameter allow to identify it as belonging to genus *Arnoglossus* (Hensley & Amaoka, 2001). The combination of 8 long rackers on lower part of the gill, less than 81 dorsal-fin rays and less than 61 anal-fin rays are diagnostic of species *A. grohmanni* within the Mediterranean Sea and the Eastern Atlantic.

We also sequenced a 652 base pairs of the cytochrome oxidase subunit 1 (COI) mitochondrial gene for specimen JR280820-02 (BOLD n°: JPR002-22) and for another specimen collected in Frontignan, Southern France, on 13th July 2013 by Ph. Geniez, and used to illustrate the species *A. kessleri* in Louisy *et al*. (2022; BOLD n°: JPR003-22). DNA purifications were performed using the 96-Well Plate Animal Genomic DNA Miniprep Kit (Biobasic, Canada) from pieces of muscle. We performed PCR amplification using the primer cocktail C_Fish-F1t1-C_FishR1t1. The sequence of the two specimens showed 99% similarity, confirming that they belong to the same species, but a BLAST of the sequence against the NCBI nucleotide library did not return any match with >90% identity. At the time of analyses, the library did not include any sequence labelled as either *A. grohmanni* or *A. kessleri*. The present finding thus represents the first record of *A. grohmanni* from Spanish waters.

Fig. 13: An individual photographed in 2020 in Castelló d'Empúries (Mediterranean coast) representing the first record of *Arnoglossus grohmanni* for Spain.

8.2 Finding of five rare adult specimens of *Bellottia apoda* (Ophidiiformes, Bythitidae) in the Adriatic Sea (Mediterranean Sea)

Filippo DOMENICHETTI, Lorenzo ZACCHETTI and Michela MARTINELLI

Bellottia apoda Giglioli, 1883 is a small fish belonging to the family Bythitidae which includes all the viviparous genera (Nielsen, 1990). *Bellottia apoda* is the only member of its genus found within the Mediterranean Sea. This species was documented in the Eastern Mediterranean, namely in the western Aegean Sea, Saronikos Gulf, and Evoikos Gulf, extending to the Turkish coast (Gramitto & Coen, 1997). It is considered rare in the Adriatic Sea (Dulčić & Kovačić, 2020), however, its sighting could be underestimated given the generally small size of the specimens. The first finding of this species in the Adriatic Sea dates back to 1979 by Jardas (1979); almost three decades after the first report in the Pomo Pits (Central Adriatic Sea; Gramitto & Coen, 1997), new specimens were caught on April 03, 2022, in the same area during a biyearly trawl survey conducted by CNR-IRBIM, employing an experimental net. The specimens were captured at a depth of 246 metres (coordinates 42.84° N, 14.72° E). Following capture, the samples were preserved in sea water within a freezer maintained at -20°C until they underwent morphological identification, in according with the methods described in Dulčić & Kovačić (2020) and Whitehead *et al*. (1984-1986). In total 5 animals of which 2 females and 3 males were caught; their lengths ranged from 40 to 29 mm, and their weights from 1 to 0.4 grams. The pectoral rays were between 22 and 23, the anal rays between 70 and 75, and the dorsal fin rays between 89 and 92. In all the analysed specimens, 4 spines on the preopercular margin and 4 elongated gill rakers were found. Several black colour scores were dispersed throughout the body, the overall tone was grey-brown (Fig. 14 A). After being removed, the otoliths were compared with those described in the Aforo database (http://aforo.cmima.csic.es/index.jsp) (Fig. 14 B). The samples are kept in the CNR-IRBIM collection (Cat. No.: 01-05 *B. apoda* 04/2022) and preserved in 4% formalin solution. This finding is a significant step forward in the understanding of the distribution of this rare species.

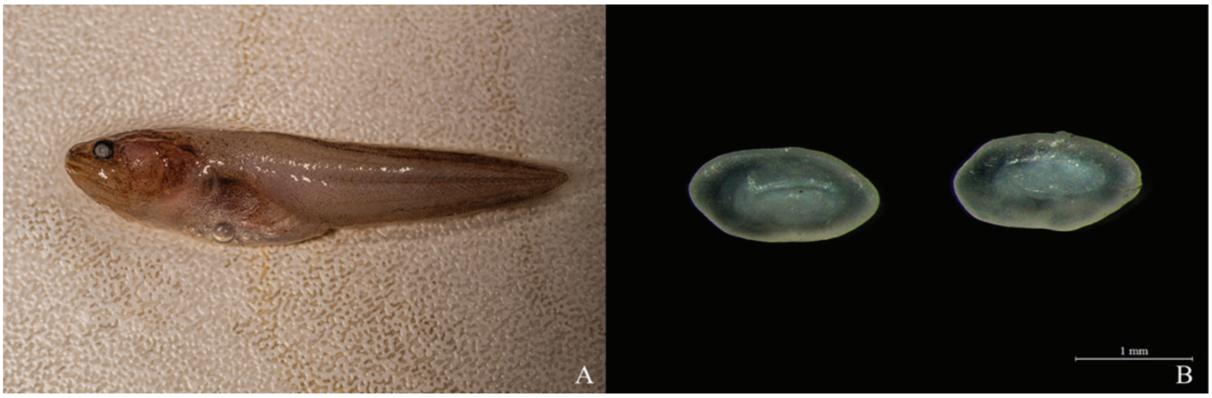

Fig. 14: *Bellottia apoda* specimen collected in the Pomo Pits area (central Adriatic). A: whole body; B: otolith from both sides. Photo credit: Lorenzo Zacchetti.

8.3 Distribution of rare demersal chondrichthyan species in the bathyal of the Antalya Bay (northern Levant Sea)

Mehmet Cengiz DEVAL

The Mediterranean Sea has a rich diversity of at least 88 species of chondrichthyans (Serena *et al*., 2020), and the IUCN Red List estimates that about half of these species are threatened with extinction (vulnerable, endangered or critically endangered) (Dulvy *et al*., 2016). In the last three decades, deep-water trawl fisheries have been developed in Antalya Bay, mainly targeting the giant red shrimp *Aristaeomorpha foliacea* (Risso, 1827) and the blue-red shrimp *Aristeus antennatus* (Risso, 1816) (Deval *et al*., 2020). Depending on the operating depth in the Antalya Bay, the most frequently caught and discarded chondrichthyan species in the red shrimp fishery are *Etmopterus spinax* (Linnaeus, 1758), *Dipturus oxyrinchus* (Linnaeus, 1758), *Scyliorhinus canicula* (Linnaeus, 1758), *Galeus melastomus* Rafinesque, 1810 and *Raja clavata* Linnaeus, 1758 (Deval *et al*., 2016).

Samples of rare chondrichthyans were collected during various scientific surveys conducted between 2009 and 2021 using the R/V Akdeniz Su (26.5 m, 160 GRT, 670 kW) in the Antalya Bay. A standard polyethylene otter trawl (codend equipped with a polyamide cover with 24 mm stretch mesh) was used in 255 hauls, deeper than 200 m. In each haul, the chondrichthyans were sorted by species and the total length (TL, in 0.1 cm) of all specimens was measured with a slide calliper, while the total weight (TW, in 1 g) of 60 out of 83 specimens (according to the surveys) was weighed with a digital balance. Density indices (D in n/km^2) were estimated from the number (n) of individuals from the swept area for each haul and stratum. The swept areas were calculated according to the wingspread of the otter trawl (17.5 m) and the start-end point algorithm (Mutlu *et al*., 2022).

Eight rare chondrichthyan species belonging to eight families (5 sharks, 2 batoids and 1 chimaera) presented in this paper (Table 4), were found in 255 hauls covering an area of 32.799 km^2. A total of 83 individuals were found in 18.3% of these hauls (in 47 hauls) between 200 and 1,000 m strata (Table 5), and no individuals were caught in the two deepest strata (900 and 1,000 m). Five of the eight species reported here are of conservation concern and are listed as Critically Endangered (3 species) and Vulnerable (2 species). The spatial distribution of the density of positive hauls for each species is shown in Figure 15 and Table 5. The kitefin shark *Dalatias licha* (Bonnaterre, 1788) was the most widely distributed species in the bathyal stratum, between 400 and 899 m, with a dominance of 4.3%. The sharpnose sevengill shark *Heptranchias perlo* (Bonnaterre, 1788) had the highest dominance (7.1%) and average density (1.19 n/km^2) with a total of 39 individuals, although it was found in a 200 m band (between 400 and 500 m strata).

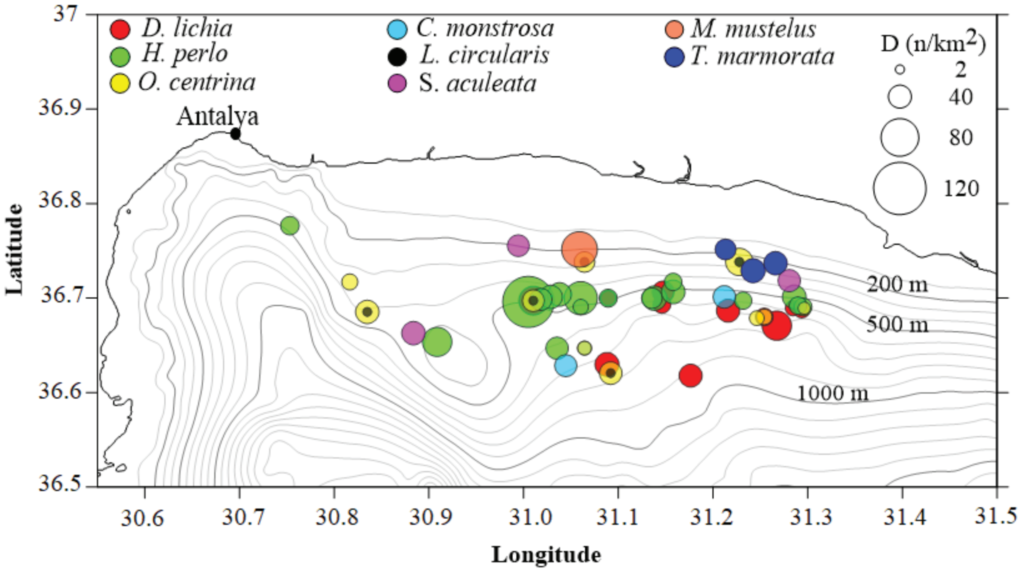

Fig. 15: Spatial distribution of density indices (D) in n/km^2, of eight chondrichthyan species for each positive haul during surveys conducted in Antalya Bay.

Table 4. The density (n/km^2) of rare chondrichthyan species for each depth stratum in the bathyal zone of Antalya Bay (Eastern Mediterranean) during different surveys throughout the years 2009-2021. MRL: Mediterranean Regional Red List category (CR: Critically Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least concern, DD: Data Deficient) according to IUCN, Dulvy *et al*., 2016), n_1: sampled specimens, n_2: measured specimens, D% (Dominance): the percentage of positive hauls out of all hauls, TL: Total Length, TW: Total Weight.

						Density (n/km^2) in each depth strata (m)							Mean	TL (cm)	TW (g)
Familia	**Species**	**MRL**	n_1	n_2	**D%**	**200**	**300**	**400**	**500**	**600**	**700**	**800**		min / max	min / max
Chimaeridae	*Chimaera monstrosa* Linnaeus 1758	NT	3	2	1.2				0.09	0.55			0.09	65.4 / 70.4	466 / 505
Rajidae	*Leucoraja circularis* (Couch, 1838)	CR	6	6	2.0			0.33	0.17				0.15	44.5 / 82	460 / 3180
Torpedinidae	*Torpedo marmorata* Risso, 1810	LC	3	1	1.2	0.80	0.25						0.09	15.1	78
Dalatiidae	*Dalatias licha* (Bonnaterre 1788)	VU	15	7	4.3			0.45	0.35	1.11	1.19	1.29	0.46	34.5 / 97	173 / 5800
Hexanchidae	*Heptranchias perlo* (Bonnaterre 1788)	DD	39	26	7.1			3.12	0.96				1.19	27 / 105.3	60 / 3560
Triakidae	*Mustelus mustelus* (Linnaeus 1758)	VU	3	3	0.4	1.20							0.09	42 / 51	-
Oxynotidae	*Oxynotus centrina* (Linnaeus 1758)	CR	11	11	3.9		0.85	0.45		1.11			0.34	24.1 / 61.7	92 / 3680
Squatinidae	*Squatina aculeata* Cuvier, 1829	CR	3	2	1.2	0.40	0.25	0.11					0.09	67 / 80.4	-

Table 5. Species caught at different sampling stations and their densities (number of individuals / haul).

Sampling station		**Chondrichthyan species**							
Latitude	**Longitude**	***C. monstrosa***	***D. licha***	***H. perlo***	***L. circularis***	***O. centrina***	***S. aculeata***	***T. marmorata***	***M. mustelus***
36.71750	30.81617					1			
36.73760	31.22790					2			
36.62917	31.08800		1						
36.68650	31.21533		1						
36.69167	31.28933			1	1				
36.70667	31.15817			1					
36.71700	31.15833			1	2				
36.73817	31.06433					1			
36.77600	30.75317			1					
36.69933	31.06028			8					
36.69440	31.32520				1				
36.68750	31.29333		2						
36.64760	31.06410	1				1			
36.70033	31.13558			2					
36.64730	31.03590			3					
36.69350	31.14617		1						
36.65320	30.90880			2					
36.69717	31.23193			1					
36.69840	31.01850			1					
36.70680	31.14680		2						
36.62800	31.04450	1							
36.75190	31.21300							1	
36.61730	31.17580		1						
36.67890	31.24580					1			
36.68010	31.25450		1			1			
36.67110	31.26680		2						
36.70130	31.21190	1							
36.69590	31.00500			8					
36.62030	31.09140					1			
36.70170	31.02880			1					
36.75510	30.99450						1		
36.70330	31.03750			2					
36.70030	31.13780			1					
36.70333	31.17633				1				
36.68942	31.28500		1						
36.68967	31.29633					1			
36.69000	31.29500			2					
36.70000	31.09000		1	2	1				
36.69100	31.06050			1					
36.69717	31.01023		2			1			
36.72900	31.24167							1	
36.73667	31.26650							1	
36.70167	31.28550			1					
36.66258	30.88367						1		
36.71867	31.28117						1		
36.75167	31.05938								3
36.68592	30.83517					1			
	∑=	3	15	39	6	11	3	3	3

8.4 First record of the speleophilic fish *Grammonus ater* in the Alboran Sea

Markos DIGENIS and Carlos NAVARRO-BARRANCO

Grammonus ater (Risso, 1810) is a highly cryptic fish, endemic to the Mediterranean Sea, and the only species of the deep-sea family Bythitidae occurring on its continental shelf (Ragkousis *et al*., 2021). This inconspicuous fish has been reported inhabiting the dark sectors of marine caves within the bathymetric range of 2-30 metres (Gerovasileiou *et al*., 2015; Ragkousis *et al*., 2021). Until today it has been recorded in at least 31 marine caves across the Mediterranean Sea, from Cyprus, Greece and Croatia to Italy, Malta, France, Monaco and Spain, while records from the Azores Archipelago and Portuguese coasts remain unverified (Gerovasileiou *et al*., 2015; 2017; Ragkousis *et al*., 2021; Borg *et al*., 2022).

In March 2022, an individual of *G. ater* was photographed during a night SCUBA dive in the fully submerged “La Tercera” cave (36.73833° N, 3.77917° W), in the framework of a monitoring program on the cave fauna of Maro-Cerro Gordo Natural Park (Granada, Spain). The individual was sighted at the depth of 5 m, swimming along the halocline (transition zone between saltwater and freshwater) of the innermost semidark part of the cave (Fig. 16). Although the studied cave is relatively small (2 m wide, 1.5 m high and approximately 8 m long), it provides an inner semidark environment due to its narrow parts.

The recorded individual was approximately 10 cm in length and its caudal fin was joined and indistinct from dorsal and anal fins along its short and dark-coloured body (Fig. 16). The posterior edge of its triangular opercle was angled while its upper jaw ended behind its mainly laterally directed eyes (Gerovasileiou *et al*., 2015; Borg *et al*., 2022).

Although *G. ater* has been reported from marine caves of Spain, to the best of our knowledge all records are from the Balearic Islands (Gerovasileiou *et al*., 2015 and therein references; Ragkousis *et al*., 2021). Therefore, this is the first record of the species from the continental coasts of Spain and the Alboran Sea, also being the westernmost record in the Mediterranean Sea. Although *G. ater* is considered as an uncommon species (Bussotti *et al*., 2015; Gerovasileiou *et al*., 2015), recent studies in marine caves (Ragkousis *et al*., 2021), along with the current report indicate that its rare sightings are probably attributed to its cryptic behaviour and preference for the innermost darker sectors of marine caves.

Fig. 16: *Grammonus ater* photographed below the halocline at the innermost semidark part of “La Tercera” cave in the Alboran Sea. Photo credit: Markos Digenis.

8.5 A rare record of the critically endangered sandy ray, *Leucoraja circularis* (Chondrichthyes: Rajidae), from the eastern Ionian Sea

Konstantinos CHARALAMPOUS and Archontia CHATZISPYROU

The sandy ray *Leucoraja circularis* (Couch, 1838) is a demersal species inhabiting the edge of the continental shelf from the North Sea down to north-west African coasts and the Mediterranean Sea (Mnasri *et al*., 2009), where it is considered quite rare. The life history traits of the species are poorly known; however, it is considered a relatively large-bodied species reaching a maximum total length (TL) of 120 cm, with common size of 70-80 cm (Stehmann, 1990). The sandy ray inhabits offshore shelf waters and upper slopes from 50 to 800 m depth, being more abundant in the deeper waters (around 500-800 m; Weigmann, 2016). Due to its large size at first maturity, low fecundity and high longevity *L. circularis* is more vulnerable to fishing pressure than other skates (Mnasri *et al*., 2009), yet with a low commercial value in the demersal fisheries. The International Union for the Conservation of Nature (IUCN) has listed the species as Critically Endangered (CR) in the Mediterranean Sea, as its population has shown a significant decrease over the last 60 years in the area (McCully *et al.*, 2016).

One active mature male sandy ray (Fig. 17) was caught in 2023 during the Mediterranean International Bottom Trawl Surveys (MEDITS) in GSA 20 (39.0147˚ N, 20.2458˚E), at 296 m depth. The specimen was reported dead when handled on board. Its size, weight, sex and maturation stage were documented, following the MED-

Fig. 17: The active mature male sandy ray, *Leucoraja circularis*, examined and measured at the Ichthyology Laboratory of the Institute of Marine Biological Resources and Inland Waters (IMBRIW, Athens, Greece).

ITS protocol (MEDITS Handbook, 2017). Additional morphometric measurements were recorded in the Ichthyology Laboratory of the Institute of Marine Biological Resources and Inland Waters (IMBRIW), at the Hellenic Centre for Marine Research (HCMR; Table 6). The tail end from the second dorsal fin of the skate was absent, thus the total length was not recorded.

The current finding is the first specimen of *L. circularis* captured in the MEDITS surveys in GSA 20 (IMAS-FISH database), where the species is scarce and generally misidentified as *Leucoraja fullonica*; yet a few specimens have been observed in the Aegean Sea at least in the frame of the IMBRIW surveys, from 1997 to 2022 (Table 7).

Overall, *L. circularis* inhabits temperate waters (Weigmann, 2016). However, the Mediterranean environment is becoming warmer which can affect the migration of the species from the north-eastern Atlantic through the Strait of Gibraltar (Mnasri *et al.*, 2009), thus making the species rarely reported to the southern part of Europe. Updating the literature on this rare species is of great importance for future status assessments and conservation issues.

Table 6. Basic morphometric measurements of the sandy ray, *Leucoraja circularis*, caught in GSA 20, during the 2023 MEDITS surveys.

Morphological measurements	mm
Total length (TL)	>660
Disc length (DL)	373
Disc width (DW)	441
Interorbital distance	29.22
Interspiracural distance	43.12
Eye length	29.94
Spiracle length	19.23
Preorbital length	70.61
Prespiracle length	102.5
Snout tip to pelvic fin	444
Snout tip to 1st dorsal fin	624
Dorsal fin base length 1	38.52
Prenasal length	58.07
Preoral length	74.45
Internarial length	49.36
Mouth width	50.76
Distance between 1st gill slits	90.92
Distance between 5th gill slits	59.84
Snout to 1st gill slit distance	129.95
Nasal curtain length	28.05
Nasal curtain width	57.64
Pelvic fin anterior lobe length	60.29
Pelvic fin posterior lobe length	112.96
Snout to cloaca distance	331
Width of tail at pelvic tips	34.99
Pectoral anterior length	310
Pectoral posterior length	230
Clasper external length	81.56
Clasper internal length	135.98

Table 7. All records of the sandy ray, *Leucoraja circularis*, reported in the HCMR data base (IMAS-Fish), indicating its rare encountering in the eastern Ionian Sea.

Program	Year	Catch weight (g)	Catch N	Depth (m)
AEGEAN SEA				
Discards	1997	5200	2	200
Discards	1997	2900	1	210
Discards	1998	1000	1	210
MEDITS	2005	1495	1	411
MEDITS	2005	1330	1	230
MEDITS	2014	1540	1	470
MEDITS	2016	2417	1	540
DCF	2019	1700	1	264
MEDITS	2022	2200	1	-
MEDITS	2022	1950	1	-
IONIAN SEA				
Interreg	1999	2000	1	463
DCF	2014	500	1	136
DCF	2016	3000	1	486
MEDITS	2023	1743	1	296

8.6 Oddities from the past: First record of the Crested Oarfish *Lophotus lacepede* Giorna, 1809 in Sardinia (Western Mediterranean, Italy)

Daniele GRECH and Silvio FERRUZZI

Fishes of the order Lampriformes comprise some of the most colourful and morphologically diverse teleosts (Albano *et al*., 2022 and references therein). In the Mediterranean, the crested oarfish *Lophotus lacepede* Giorna, 1809 generally reaches 180 cm, but usually 100 cm in length. A specimen of *L. lacepede* was reported in the 90s (July 2, 1994) during the preparatory training of a spearfishing world cup, and recently (in 2023) brought to our knowledge in the framework of a citizen science initiative devoted to the biodiversity inventory of Sardinian Seas.

The specimen was caught by the champion spear fisher Alberto Pizzoccheri in the middle water of a seafloor with rocky substrate mixed with *Posidonia* at 16 m depth, about 2 km off Capo Sperone (S. Antioco, Sardinia; approximate coordinates: 38.958° N, 8.376° E). The animal seemed quite calm and resting (A. Pizzoccheri pers. comm.), but after the shot it immediately released a dark ink in the surrounding area. The specimen had a maximum length of about 130 cm and weight of 5.6 kg with elongated and compressed morphology of the body (Fig. 18), as in all species of the genera *Eumecichthys* and *Lophotus* which comprise the Lophotidae family. This family is represented in the Mediterranean Sea only by the here reported species. The genus *Lophotus* is characterised by a large crest (or horn) that extends the jaw of the species, while within the genus *Eumecichthys* (not observed in the basin) it protrudes far forward of the jaw. *Lophotus lacepede* has a nearly world-wide distribution. As for many mesopelagic species (Olivar *et al*., 2023), they rise to the surface for feeding during the night and this species is generally found at depths ranging from few to 300 m. The Lampriformes order includes many species with similar behaviour and which are involved in pelagic food web interactions (Albano *et al*., 2022). Due to paucity of records, its current population trend is unknown and is classified by IUCN as Least Concern (LC; Knudsen, 2015). Records are very rare (33 records since 19th century: from Croatia, Spain, Greece, Türkiye, Syria and Italy with eight observations including the present record). In addition, few records are available in GBIF and WoRMS databases and in iNaturalist platform. Being a very rare species, we added the existing literature data on length-weight relationship (Albano *et al*., 2022 and references therein) and estimated the relationship between Weight (W) and Total Length (TL): W=0.0593*TL^2.3559 (R^2=0.608; N=14). More observations will be useful to increase the number of measured specimens, that mostly concerned by-catch, mainly from occasional capture of longline or trawl fisheries. It is worth mentioning that, despite the historical record dating back almost 30 years, it still represents the first record for Sardinia, in the era of digital media and increases awareness on biodiversity issues. This testifies the extreme rarity of *Lophotus lacepede* in this area and contributes to our understanding of regional biodiversity, which is likely still overlooked (Grech *et al*., 2020) and only partially addressed thanks to participatory approaches (Grech *et al*., 2023).

Fig. 18: The specimen of *Lophotus lacepede* in Sardinia (Italy) A: caught by the spearfisher Alberto Pizzoccheri and B: a photo with Silvio Ferruzzi with the same specimen during an international championship preparatory training. Photos are of courtesy of Alberto Pizzoccheri and Silvio Ferruzzi archive respectively.

8.7 First record of the white trevally *Pseudocaranx dentex* (Block & Schneider, 1801) at Tremiti Islands (South Adriatic Sea, Italy)

Andrea TURSI and Francesco MASTROTOTARO

The white trevally *Pseudocaranx dentex* (Bloch & Schneider, 1801) is a carangid fish living within photophilic rocky areas and feeding on fishes, crustaceans, and molluscs. This species is widely distributed in the Atlantic Ocean (Smith-Vaniz & Jelks, 2006), as well as the subtropical and temperate waters of the Indo-Pacific Ocean (Kim & Song, 2014). In the last few years, it has also been spotted with increasing frequency in the Mediterranean Sea (Tiralongo *et al*., 2018). Concerning the Italian coasts, *P. dentex* has been reported from the Sicilian, Calabrian, and Apulian coastal zones (Tiralongo *et al*., 2020a). Here, we report the first evidence of the white trevally at Tremiti Islands Marine Protected Area (MPA), about 35 nautical miles away from the coast of Termoli, the closest area where this species has been found so far. Three adult specimens of *P. dentex* were observed swimming together close to the photophilic hard bottoms off Caprara Island (locality of Punta Secca, Tremiti Islands MPA; 42.139237 N°, 15.527625 E°), at 8–10 m depth. The visual identification of the specimens was made based on video analysis, following the descriptions reported in the literature (Fischer *et al.*, 1987; Kim & Song, 2014). The body was elongated, with dorsal and ventral profiles regularly and gently curved from the caudal fin to the snout (Fig. 19 A, B). The body was light grey coloured, with yellow stripes running along its upper margin and on both sides. The pectoral, dorsal, anal, and caudal fins had yellowish reflections, while pelvic fins were almost transparent (Fig. 19 A, B). A round black spot was present on the upper part of the operculum (Fig. 19 C). The fish's total length was estimated to be around 70 cm from the tip of the snout to the most extreme part of the caudal fin. The eye diameter was smaller than the snout length. The three specimens showed two well-separated dorsal fins of similar height (Fig. 19 C), with the second dorsal fin bearing 24 soft rays (Fig. 19 D). Anal fins showed 23 soft rays (Fig. 19 D), while pelvic fins, which were positioned in correspondence to the first dorsal fin, bore 6 soft rays (Fig. 19 E). The pectoral fins were falcate and longer than the head (Fig. 19 E). The lateral line had a curved part longer than the straight one (Fig. 19 F).

The increasingly numerous records of the white trevally along the coasts of the Mediterranean Sea suggest the need for further studies and monitoring programs aiming at better understanding the actual distribution of *P. dentex* in the Mediterranean basin, as well as its effects on native coastal communities and their trophic networks.

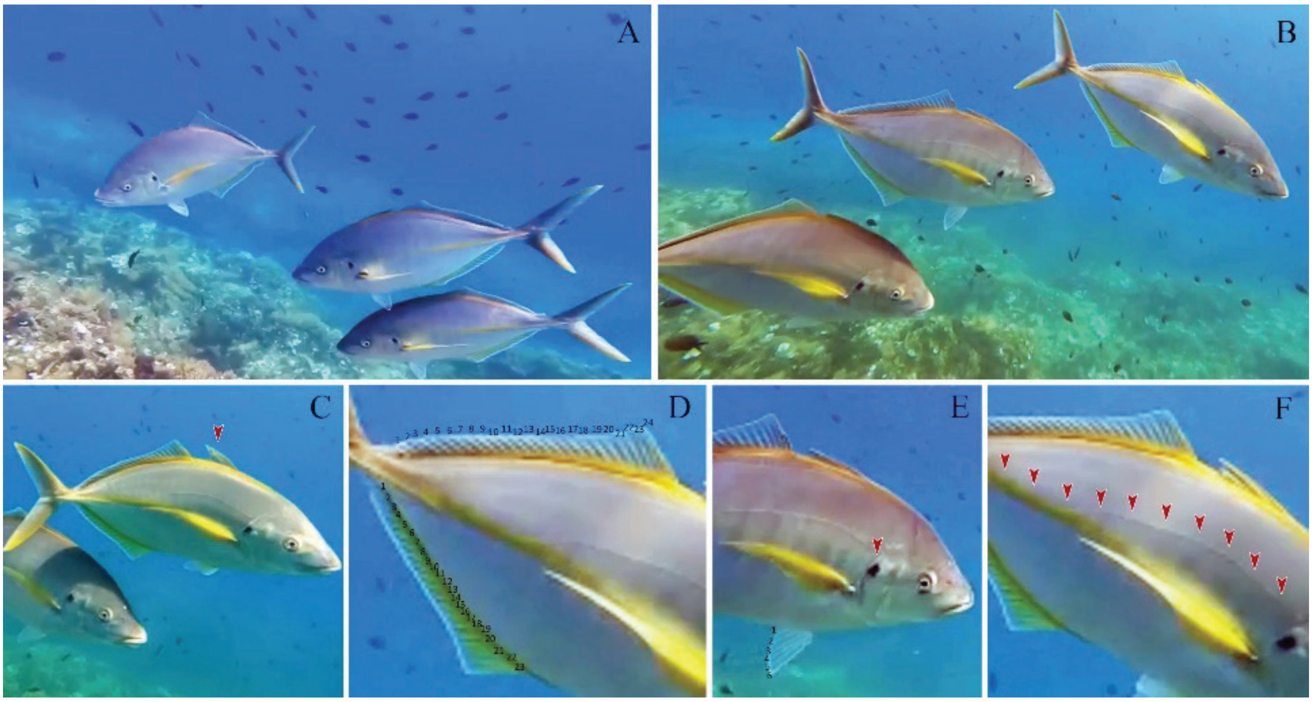

Fig. 19: A, B: Images of the three specimens of *Pseudocaranx dentex* taken at Tremiti Islands Marine Protected Area; C: details of the first dorsal fin, showing a height similar to the second dorsal fin, and the round black spot at the upper part of the operculum (red arrows); D: details of the second dorsal and the anal fins with numeration of their 24 and 23 soft rays, respectively; E: detail of the pelvic fins, with numeration of the 6 soft rays; F: lateral line showing a curved part longer than the straight one (red arrows). Photo credit: Giovanni Scicchitano.

8.8 First record of Phaeton dragonet *Synchiropus phaeton* (Günther, 1861) in the Syrian marine waters, Eastern Mediterranean

Ranim Mohamad OTHMAN and Mohamad Younis GALIYA

Dragonets are benthic fishes of the family Callionymidae, represented by 193 valid named species which belong to 11 genera (Farias *et al*., 2016). In the Mediterranean Sea this family is represented with seven species, six in Eastern Mediterranean, of which one is a Lessepsian migrant (Golani *et al*., 2006). Only one species of this family, the blotchfin dragonet *Callionymus filamentosus* (Valenciennes, 1837) has been reported so far from Syria (Ali, 2018).

The dragonet genus *Synchiropus* includes benthic fishes which occur mainly on sandy or muddy bottoms at depths of 80-650 m (Whitehead *et al*., 1984-1986). Phaeton dragonet, *Synchiropus phaeton* (Günther, 1861) inhabits Atlanto-Mediterranean regions, mainly in the northern part of the Mediterranean, but has also been found in the Atlantic from Portugal to Gabon (Whitehead *et al*., 1984-1986; Golani *et al*., 2006). This species was reported from several countries in the Mediterranean basin, but this study is the first record of this species from Syrian waters (Eastern Mediterranean Sea).

A single female specimen (Fig. 20) was collected by trawl net at a depth of 100 m from the muddy bottom of Ras Albasit (35.8524°N, 35.8378°E) in June 2023. Subsequently, the specimen was measured and weighted. Species identification was based on Whitehead *et al*. (1984-1986), Golani *et al.* (2006) and Fricke (2016). The specimen was preserved in 7% formaldehyde and deposited at the Laboratory of Hydrobiology, Faculty of Sciences, Tishreen University, Lattakia, Syria.

Morphometric (in centimetres) and meristic characteristics of the sample are presented in Table 8. The examined specimen weighted 3.01 g and had elongated body, without scales, with flat head, becoming cylindrical beyond the pectoral fins. It had two dorsal fins, the first one with four spines without filaments and with a black blotch on the third membrane. The second dorsal fin had irregular dark spots. Snout was short and rounded. Eyes were very close to each other on the dorsal surface of head with very small interorbital space. The sample was female because the caudal fin was distally convex, without two medcaudal filaments, and the preopercular spine was strong and had two tips (Fig. 20 D). Our morphological measurements and meristics were in agreement with all the above-mentioned studies.

Table 8. Morphometric measurements and meristics of *Synchiropus phaeton* captured in the Syrian waters (June 2023).

Morphometric measurements (in cm)			
Total length	7.7	Height pectoral fin	1.3
Standard length	6.1	Height pelvic fin	1.6
Head length	1.8	Height caudal fin	0.4
Body depth	0.8	1st dorsal spine length	0.7
Orbit diameter	0.9	2nd dorsal spine length	0.6
Snout length	0.4	3rd dorsal spine length	0.6
Interorbital length	0.1	4th dorsal spine length	0.5
Predorsal(1) length	2.4	Length of first ray of second dorsal fin	1.0
Predorsal(2) length	3.3	Length of last ray of second dorsal fin	0.7
Prepelvic fin length	2	Dorsal fin (1) base length	0.3
Prepectoral fin length	2.6	Dorsal fin (2) base length	1.6
Preanal length	3.4	Pectoral fin base length	0.5
Caudal peduncle length	1.2	Pelvic fin base length	0.4
Caudal peduncle depth	0.3	Anal fin base length	1.3
Length from tip of snout to end of preopercular spine			2
Preopercular spine length			0.4
Meristic counts			
First dorsal-fin spines			IV
Second dorsal-fin rays			9
Pectoral-fin rays			16
Pelvic-fin rays			I+5
Anal-fin rays			8

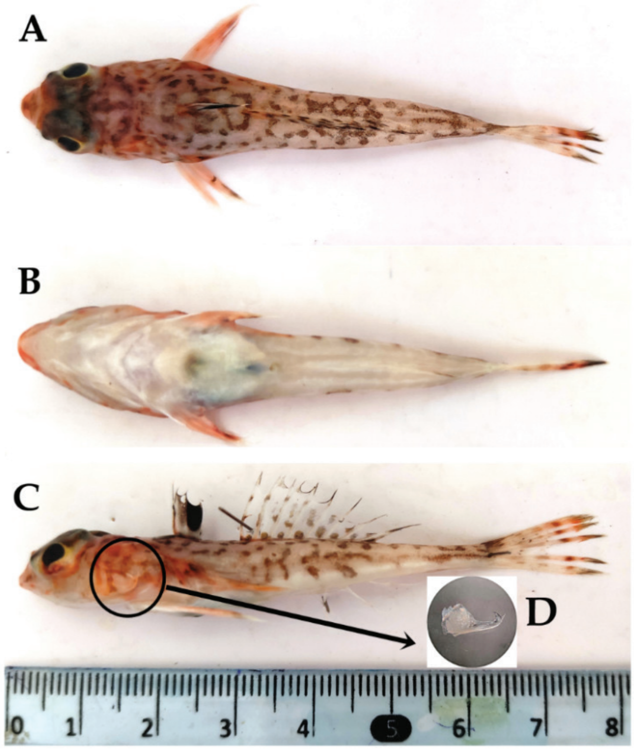

Fig 20: General view of *Synchiropus phaeton*, caught in Syrian marine waters (June 2023) with total length of 7.7 cm and weight of 3.01 g. A: Dorsal face, B: Ventral face, C: Lateral face, D: preopercular spine.

8.9 First record of *Zebrus pallaoroi* (Actinopterygii: Gobiidae) in Italian waters

Joachim LANGENECK and Matteo PUTIGNANO

Even though the Mediterranean Sea is one of the best-known marine areas worldwide, the knowledge about diversity and distribution of species occurring in the basin is far from being complete. This is particularly true for invertebrate taxa, which often display an unexpected morphological and molecular diversity, associated with the complex geological history of the basin. However, the diversity of some vertebrate groups has also been recently re-evaluated integrating molecular data and fine morphological characterisation. This is the case with the Mediterranean cryptobenthic fish species, mostly Gobiidae, that turned out not to be just more widespread and more abundant than expected, but also having hidden diversity revealed by genetic methods and diagnosable from morphological characters (Kovačić *et al.*, 2021). The zebra goby, *Zebrus zebrus* (Risso, 1827), is a common cryptobenthic species occurring in the Mediterranean Sea, with a few records in the adjacent Atlantic Ocean (Kovačić *et al.*, 2021), and was long considered as the only species within the monotypic genus *Zebrus* de Buen, 1930. However, molecular and morphological differences led to the description of a second species, *Zebrus pallaoroi* Kovačić, Sanda, Čekovská, Soukupová & Vukić, 2021 (Kovačić *et al.*, 2021). *Zebrus pallaoroi* has been reported in shallow environments of the eastern Adriatic Sea, north-eastern Ionian Sea and Aegean Sea, and shares the same ecological traits of *Z. zebrus*, with which it can occur in sympatry (Kovačić *et al.*, 2021; 2022). The present note reports for the first time the occurrence of *Z. pallaoroi* in Italian waters, along the Salento Peninsula, significantly expanding the range of this species westwards in the Ionian Sea.

On the 22nd of February 2023 a single individual of *Z. pallaoroi* (Fig. 21 B, D) was sampled in Acquatina Lake (40.44052° N, 18.24421° E), a brackish-water pond on the eastern coast of Salento. The specimen was swimming at approximately 0.5 m depth on a sparse *Cymodocea nodosa* (Ucria) Ascherson, 1870 meadow, in the most external part of the pond. On the 28th of September 2023 another individual of *Z. pallaoroi* (Fig. 21 A, C, E) was sampled in Porto Cesareo inlet (40.25725° N, 17.89342° E), a partially enclosed, relatively shallow water basin on the western coast of Salento. The specimen was found inside a hollow stone sampled at approximately 0.5 m depth on a boulder field. Both specimens were deposited in the collection of the Marine Biology Museum "Pietro Parenzan" of the University of Salento (accession numbers: PCZL-F-2023-001 and PCZL-F-2023-003). The specimens were tentatively identified as *Z. pallaoroi* among the Mediterranean gobies (Kovačić *et al.*, 2021, 2022) by having (1) suborbital papillae of the lateral-line system without longitudinal row *a*; (2) all three head canals present; (3) predorsal area naked; (3) seven transverse suborbital rows; (4) two suborbital transverse rows below row *b*; (5) interorbital papillae absent; (6) snout longer than eye, its length being 1.02 and 1.06 of eye diameter (1.1–1.2 in Kovačić *et al.*, 2021); (7) posterior nostril short tube, height being 0.70 and 0.79 of anterior nostril height

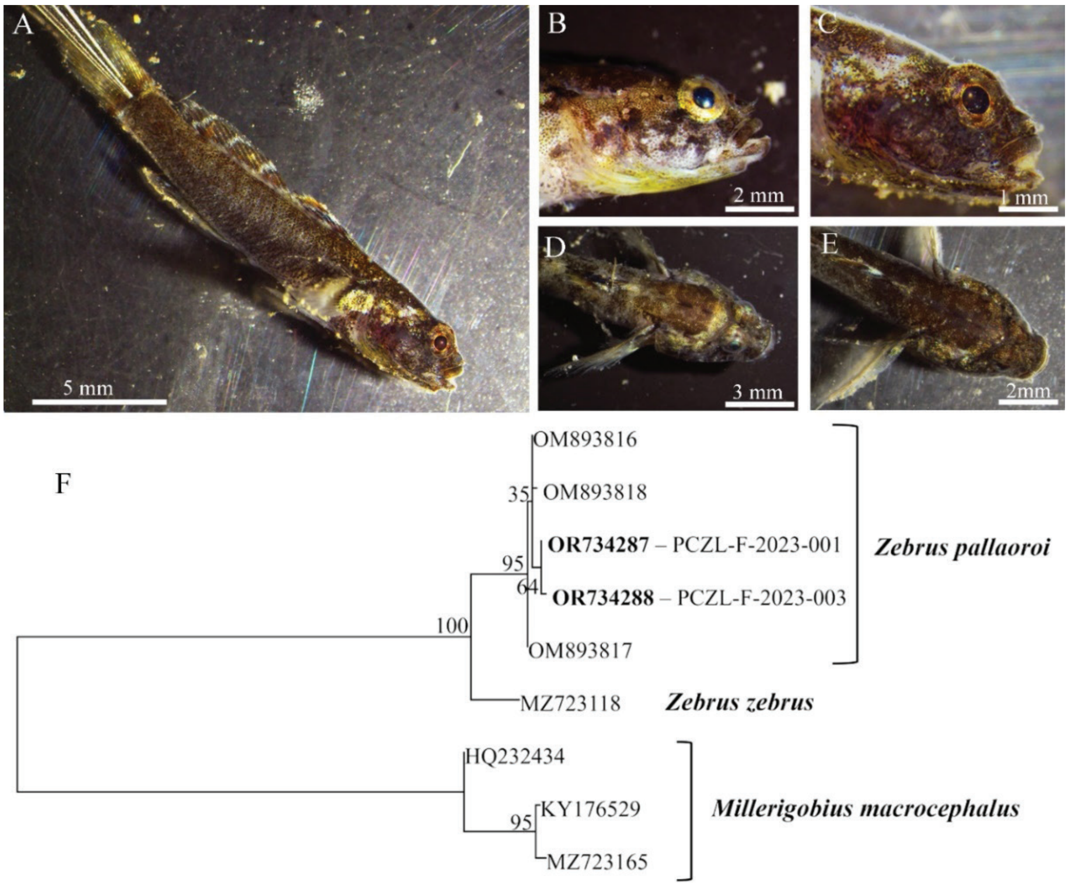

Fig. 21: A: *Zebrus pallaoroi* from Porto Cesareo inlet (PCZL-F-2023-003). B: *Zebrus pallaoroi* from Acquatina Pond (PCZL-F-2023-001), head, lateral view. C: *Zebrus pallaoroi* from Porto Cesareo inlet (PCZL-F-2023-003), head, lateral view. D: *Zebrus pallaoroi* from Acquatina Pond (PCZL-F-2023-001), anterior part, dorsal view. E: *Zebrus pallaoroi* from Porto Cesareo inlet (PCZL-F-2023-003), anterior part, dorsal view F: Maximum likelihood phylogenetic tree based on COI sequences; sequences of specimens from Salento in bold.

(0.7-0.9 in Kovačić *et al.,* 2021; 2022); (8) eyes relatively large, eye diameter 3.88 and 3.98 in head length (4.2-4.7 in Kovačić *et al.*, 2021; 2022); (9) left and right ventrolateral head ridges transversally connected on anterior part by short transversal ridge. Additional morphometric and meristic characters are presented in Table 9. Some differences could be retrieved between these specimens and previous descriptions (Kovačić *et al.*, 2021; 2022), in particular as regards the ratio between the eye diameter and the snout and the ratio between the eye diameter and opercular head length. The ratio between eye diameter and snout length is intermediate between typical values for *Z. pallaoroi* and *Z. zebrus*, so the range of *Z. pallaoroi* for this character should be extended to 1.0-1.2. The ratio between eye diameter and opercular head length falls within the known variation of *Z. zebrus*. Since the ranges are overlapping (3.9-4.7 in *Z. pallaoroi vs*. 3.1-4.1. in *Z. zebrus,* Kovačić *et al.*, 2021; 2022), the ratio between eye diameter and opercular head length cannot be used for identification of individuals having values within the overlap, showing this diagnostic character has limited application. To check the morphological identification, total genomic DNA was extracted from a fin clip, following the salting-out protocol detailed in Furfaro *et al.* (2022), and the Folmer fragment of the mitochondrial gene coding for the subunit I of the cytochrome c oxidase (COI) was amplified using the universal primers designed by Folmer *et al*. (1994). The two sequences obtained (accession numbers: OR734287 and OR734288) gave a >99.5% identity with sequences deposited as *Z. pallaoroi* on GenBank; by contrast, the identity with *Z. zebrus* was below 96.5%, confirming the distinctness of the two species, as also shown by the phylogenetic tree (Fig. 21 F). Molecular data confirm the identification of these individuals as *Z. pallaoroi*; the morphological differences towards previous descriptions might depend on the small size of the individuals, which are characterised by proportionally larger eyes. While the possibility of a hybrid population between *Z. zebrus* and *Z. pallaoroi* cannot be in principle ruled out based on the available data, the occurrence in sympatry of the two species (Kovačić *et al.*, 2021) makes it rather unlikely.

The present data considerably expand the distribution of *Z. pallaoroi* westwards, for the first time recording the species for the Italian ichthyofauna. The record of this species for Acquatina pond is particularly interesting from both the ecological and the historical point of view. In fact, this is the first record of *Z. pallaoroi* for a brackish-water environment and a soft bottom, while this species was hitherto considered strictly associated with hard bottom habitats (Kovačić *et al.*, 2022). Moreover, historical data about fish species occurring in Acquatina pond do not mention *Z. zebrus* but cite *Millerigobius macrocephalus* (Kolombatović, 1891) as a species occurring in the basin, approximately in the same area where the individual of *Z. pallaoroi* was sampled (Lumare *et al.*, 2009). Considering the occurrence of the superficially similar *Z. pallaoroi* in Acquatina pond, further research should be carried on confirming if *M. macrocephalus* is actually present or has been misidentified there. More generally, as already suggested by Kovačić *et al.* (2021), previous records of *Z. zebrus* for the western Mediterranean should be re-examined to check the occurrence of this species, whose distribution might encompass the whole basin.

Table 9. Biometric and meristic measurements of the *Zebrus pallaoroi* specimens collected along the Salento coastline.

Biometric parameters	**PCZL-F-2023-001 (Acquatina)**	**PCZL-F-2023-003 (Porto Cesareo)**
Total length (TL)	25 mm	18.5 mm
Standard length (SL)	19.5 mm	15.0 mm
Opercular head length	6.1 mm	4.3 mm
Orbital diameter	1.6 mm	1.3 mm
First dorsal fin length	2.7 mm	2.3 mm
Second dorsal fin length	6.4 mm	5.6 mm
Anal fin length	5.9 mm	3.4 mm
Ventral fin length	4.7 mm	2.5 mm
Pectoral fin length	5.3 mm	3.4 mm
Greatest depth	3.2 mm	2.7 mm
Pectoral breadth	2.5 mm	1.9 mm
Meristic counts		
First dorsal fin rays	VI	VI
Second dorsal fin rays	I/10	I/10
Pectoral fin rays	15	15
Ventral fin rays	I/5 + I/5	1/5+1/5
Anal fin rays	I/9	I/9
Caudal fin branched rays	15	15
Caudal fin articulated rays	17	17
Scales on lateral line	33	32

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