Collective Article A

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New Mediterranean Biodiversity Records (November 2018)

MEHMET BAKİ YOKEŞ[1], VASILIS ANDREOU[2], RIGERS BAKIU[3,4], SARA BONANOMI[5], JUDITH CAMPS[6], GEORGE CHRISTIDIS[7], FABIO CROCETTA[8], IOANNIS GIOVOS[9], ANDREA GORI[10], TEA JURETIĆ[11], SELAHATTİN ÜNSAL KARHAN[1], STELIOS KATSANEVAKIS[12], ELENI KYTINOU[12], JOACHIM LANGENECK[13], LOVRENC LIPEJ[14], MARIA MAXIMIADI[9], NIKOLAS MICHAILIDIS[15], ELENI MITSOU[9], ARTEMIS NICOLAIDOU[16], SLAVICA PETOVIĆ[17], PATRICIA PRADO[6], ANDREU SANTÍN[10], KONSTANTINOS TENEKETZIS[18], IOANNIS THASITIS[15], VALENTINA TIRELLI[19], DOMEN TRKOV[14], ERION TROPLINI[20], KONSTANTINOS TSIAMIS[21] and ANDREA VANNUCCI[22]

[1] AMBRD Doğa Bilimleri, Hanımefendi Sok. 160/6 Şişli, 34384, Istanbul, Turkey
[2] Enalia Physis Environmental Research Centre (ENALIA), Acropoleos 2, 2101 Aglanzia, Nicosia, Cyprus
[3] Department of Aquaculture and Fisheries, Faculty of Agriculture and Environment, Agricultural University of Tirana, Koder-Kamez, Albania
[4]ACEPSD, Albanian Center for Environmental Protection and Sustainable Development, Rr. Aleksander Moisiu, pallati 53/1, Kati I, Tirane, Albania
[5] Italian National Research Council (CNR), Institute of Biological Resources and Marine Biotechnologies (IRBIM), Largo Fiera della Pesca 1, 60125, Ancona, Italy
[6] IRTA Aquatic Ecosystems, Ctra. Poble Nou km 5.5, 43540 Sant Carles de la Ràpita, Catalonia, Spain
[7] Institute of Marine Biological resources and Inland waters, Hellenic Centre for Marine Research, Attiki, Greece
[8] Department of Integrative Marine Ecology, Stazione Zoologica Anton Dohrn, I-80121 Napoli, Italy
[9] iSea, Environmental Organization for the Preservation of the Aquatic Ecosystems, Thessaloniki, Greece
[10] Institut de Ciències del Mar (ICM-CSIC), Barcelona, Spain
[11] Institute of Oceanography and Fisheries, Šetalište I. Meštrovića 63, 21000 Split, Croatia
[12] Department of Marine Sciences, University of the Aegean, University Hill, 81100 Mytilene, Greece
[13] Department of Biology, University of Pisa, via Derna 1, 56126 Pisa, Italy
[14] Marine biology station, National Instutute of Biology, Fornace 41, Piran, Slovenia
[15] Department of Fisheries and Marine Research, 101 Vithleem Str., 1416 Strovolos, Nicosia, Cyprus
[16] Department of Zoology – Marine Biology.
National and Kapodistrian University of Athens, Panepistimiopolis, 15784 Athens, Greece
[17] University of Montenegro, Institute of Marine Biology, P.O. Box 69, 85330 Kotor
[18] P.O. Box 131, GR-23200 Gytheio, Laconia, Greece
[19] Istituto Nazionale di Oceanografia e di Geofisica Sperimentale – OGS, Via A. Piccard 54, 34151, Trieste, Italy
[20] ALBAMAR, Porti Detar (Ish Peshkimi), Durres, Albania
[21] European Commission, Joint Research Centre (JRC), Ispra, Italy
[22]APLYSIA soc.coop.r.l. Via Menichetti 35 57128 Livorno, Italy

Abstract

In the present article, new records are given for 18 species (6 native, 9 alien and 3 cryptogenic), belonging to 5 Phyla (i.e. Chlorophyta, Cnidaria, Annelida, Mollusca and Chordata), from 8 Mediterranean countries: **Spain:** A large population of *Polycerella emertoni* reported from the Ebro Delta, the presence of *Spinimuricea klavereni* is confirmed for the first time in the Catalan coast; **Italy:** the new record of *Cryptonome turcica* extends its distribution to the western Mediterranean Sea, the findings of *Mawia benovici* constitute the southernmost record of this species in the Adriatic Sea; **Slovenia:** second record of the alien seaslug *Cuthona perca* in the Mediterranean Sea; **Montenegro:** *Styela plicata* communities were recorded in Boka Kotorska Bay; **Albania:** the native great torpedo ray *Tetronarce nobiliana* recorded for the first time in Albanian waters; **Greece:** first record of *Lagocephalus sceleratus* in the Greek side of the Adriatic, the records of *Cassiopea andromeda* and *Pterois miles* are first records of these species from the Ionian Sea, the colonial ascidians *Aplidium coeruleum* and *Didemnum protectum* are recorded for the first time in the Eastern Mediterranean, an extremely abundant population of *Melibe viridis* is found in Messolonghi lagoon, the record of *Synchiropus sechellensis* is the range expansion of this species in Greek Seas, *Acetabularia caliculus* is recorded for the first time from Greece; **Cyprus:** first records of *Callionymus filamentosus* and *Haminoea cyanomarginata* from the island; **Turkey:** the presence of *Berthellina citrina* in the Mediterranean is confirmed.

Introduction

Although it covers a small fraction of the world ocean, Mediterranean Sea is considered to have a rich biota due to its diverse geological, physical and biological characteristics (Bianchi & Morri, 2000). However, this biota is continuously reshaped by factors, such as, anthropogenic activities, climate change and alien invasion. Fragile species and habitats may be adversely affected by these stressors, whereas some native and alien species may benefit. Biological records are important, as they supply ecological information, such as habitat integrity, distribution of species, population densities and interaction between species. Monitoring the biodiversity is needed not only for scientific interest, but also for management and policy issues.

Mediterranean Marine Science gives the opportunity to the researchers to publish a collective article concerning new records and range expansions of both native and alien species in the Mediterranean. The contributors are co-authors in this collective article, their names appearing in alphabetical order and contributing authors are cited at the beginning of each record. In this specific collective article, the new records are listed by countries, arranged from west to east. The locations of the records are approximately shown in Figure 1 and related information is given in Table 1. The records are explained in detail in relevant subchapters. In total, 18 species (6 native, 9

Fig. 1: Locations of records of new species in the Mediterranean Sea presented in "New Mediterranean Biodiversity Records (November 2018)". Numbers of locations are given in Table 1.

Table 1. List of taxa presented in New Mediterranean Records (November 2018), locality of record and country. SC=sub-chapter; LN=location number (Fig. 1).

Taxon	SS	SC	Location	Country	LN
Phylum Chlorophyta					
Acetabularia caliculus	N	6.4	Nea Kallikrateia (N Aegean)	Greece	13
Phylum Cnidaria					
Spinimuricea klavereni	N	1.2	Cap de Creus	Spain	2
Mawia benovici	C	2.2	off Ancona (Adriatic)	Italy	4*
Cassiopea andromeda	A	6.1	Itea (Ionian)	Greece	10
Phylum Annelida					
Cryptonome turcica	N	2.1	off Tuscan coast (Tyrrhenian)	Italy	3
Phylum Mollusca					
Haminoea cyanomarginata	A	7.2	Protraras (SE Cyprus)	Cyprus	15
Berthellina citrina	A	8.1	Hatay (Levantine)	Turkey	16*
Polycerella emertoni	C	1.1	Alfacs Bay (Catalonia)	Spain	1
Melibe viridis	A	6.2	Messolonghi lagoon (Ionian)	Greece	9
Cuthona perca	A	3.1	Škocjan Inlet, Koper (Adriatic)	Slovenia	5
Phylum Chordata					
Styela plicata	C	4.1.	Boka Kotorska Bay (Adriatic)	Montenegro	6*
Didemnum protectum	N	6.2	Messolonghi lagoon (Ionian)	Greece	9
Aplidium coeruleum	N	6.2	Messolonghi lagoon (Ionian)	Greece	9
Tetronarce nobiliana	N	5.1	Karaburun peninsula (Adriatic)	Albania	7
Pterois miles	A	6.1	Kythira Island (Ionian)	Greece	12
Callionymus filamentosus	A	7.1	Limassol Bay (S Cyprus)	Cyprus	14
Synchiropus sechellensis	A	6.3	Lakonikos Gulf (Ionian)	Greece	11
Lagocephalus sceleratus	A	6.1	Peristeres Island (Adriatic)	Greece	8

*All *Mawia benovici* locations in the Adriatic are represented by number 4; all *Styela plicata* locations in Montenegro by number 6; all *Berthellina citrina* locations in Turkey by number 16.

alien and 3 cryptogenic), belonging to 5 Phyla, namely, Chlorophyta (one record), Cnidaria (three records), Annelida (one record), Mollusca (five records) and Chordata (eight records) are reported from 8 Mediterranean countries. The reports include new distribution points for seventeen species. The record of *Berthellina citrina* from Hatay (Turkey) suggests the presence of an established population along the coasts of Hatay.

1. SPAIN

1.1 *Polycerella emertoni* associated to *Amathia verticillata* in the Ebro Delta, NE Spain (Western Mediterranean)

Judith Camps and Patricia Prado

More than 200 individuals of *Polycerella emertoni* A.E. Verrill, 1880 (Mollusca: Gastropoda: Polyceridae) (Fig. 2a) were found in the Alfacs Bay, Catalonia, Spain (40.593156 N, 0.652014 E) on the 13th and the 30th of August 2018 at water temperatures of 28 to 30°C and at 60 cm water depth. Some individuals were observed while mating and there were also large numbers of egg masses during the same period.

In the Eastern and Western Atlantic *P. emertoni* has been reported from different substrates including eel grass, hydroids (Chambers, 1934), and some species of the genus *Amathia* (Bryozoa, Ctenostomata) (García-Gómez & Bobo, 1986). However, in the Mediterranean it has only been found associated to the bryozoan *A. verticillata* delle Chiaje, 1822. In all occasions, individuals were found over the branching stems and groups of zooids of the bryozoan, which is possibly used both as a habitat and as a food resource. The first record of this species in the Spanish Mediterranean coast, also associated to the presence of *A. verticillata,* was in Sant Feliu de Guíxols, Catalonia (41.777254 N, 3.038620 E) on July 23th 2017 by Xavier Salvador. Previously, *P. emertoni* was also recorded on *A. verticillata* in el Portil, Huelva, in the Atlantic Spanish coast (García-Gómez & Bobo, 1986). The bryozoan *A. verticillata* was originally described from the Gulf of Naples, Italy (Jebakumar *et al.,* 2017), and is regarded as pseudo-indigenous species native from temperate and tropical waters in the Western Atlantic (Galil & Gevili, 2014). In the Alfacs Bay *A. verticillata* was found forming very large drifting mats but also as fouling on available structures such as the abundant population of the fan mussel *Pinna nobilis* Linnaeus, 1758 (Fig. 2b), the wooden or iron pylons structures of local mussel farms, and boat hulls. This suggests that the presence of *P. emertoni* is widespread throughout the Alfacs Bay. Given the close association between the gastropod and *A. verticillata*, -a prolific fouling species within man-modified environments (Jebakumar *et al.,* 2017)-, some authors have considered *P. emertoni* as an invasive species in the Mediterranean (Zenetos *et al.,* 2004). However, considering the higher number of Mediterranean reports compared to the Atlantic reports, molecular research would be needed to compare the genetic distance of individuals from both sides of the Atlantic and reach a consensus on their possible native range. Whatever its origins, given the possible predatory effect of *P. emertoni* on *A. verticillata* we consider that this association could be neutral or beneficial for the ecosystem.

***Fig. 2a**:* Close up view of the sea slug *Polycerella emertoni* feeding on *Amathia verticillata.*

Fig. 2b: Pen shell (*Pinna nobilis*) field with attached colonies of the Bryozoan *Amathia verticilata*, where *Polycerella emertoni* specimens were found.

1.2 New records of the endemic gorgonian *Spinimuricea klavereni* (Carpine & Grasshoff, 1975) (Alcyonacea: Plexauridae) in the Western Mediterranean Sea

Andreu Santín and Andrea Gori

Despite being known since the late XVIII century (as *Paramuricea placomus* (Linnaeus, 1758)), *Spinimuricea klavereni* (Carpine & Grasshoff, 1975) had been seldomly recorded until its redescription in 1975 (as *Echinomuricea klavereni* Carpine & Grasshoff, 1975), with just seven records in five different Mediterranean locations: the Gulf of Naples, the Bohsphorus, Monaco, the Aegean Sea and Algeria (Carpine & Grasshoff, 1975). Since then, this Mediterranean endemic species has mostly been recorded in certain areas of the north Aegean Sea (Vafidis *et al*., 1994) and the Sea of Marmara (Topçu & Öztürk, 2015; 2016a; 2016b), where it is considered as one of the most abundant gorgonians of the coralligenous community (Topçu & Öztürk, 2015). On the contrary, in the Western Mediterranean Basin the species has rarely been sighted during the past decades, with just a few observation records by Remotely Operated Vehicles (ROV) off the Gulf of Santa Eufemia, in the Tyrrhenian Sea, and along the Southern Mediterranean coasts of Spain and the Balearic Archipelago (Aguilar *et al*., 2015). During a ROV survey at the Cap de Creus area (42.34070° N, 3.27766° E) in July 2018, two colonies of *S. klavereni* were observed on rocky substrates at ~70 m depth, occurring within *Eunicella cavolini* (Koch, 1887) assemblages; coincidently, another colony (Fig. 3a) was caught as by-catch by local fishermen using trammel nets. The colony measured approximately 30 cm when fully extended, and had a dull white-bluish color when alive. After fixation in alcohol the specimen changed color to ocher and became less flexible. The species external shape and sclerites closely resemble that of *Spinimuricea atlantica* (Johnson, 1862), with the main distinction between species being the absence (in *S. klavereni*) or presence (in *S. atlantica*) of branched spindles in the coenenchyme (Fig. 3b; Carpine & Grasshoff, 1975). Hence, the presence of *S. klavereni* is confirmed for the first time in the Catalan coast and the Gulf of Lions, while at the same time highlighting its possible susceptibility to fishing activities.

However, while mostly unknown throughout most of the Mediterranean Basin, recent studies have recorded unexpected high abundances of *S. klavereni* in the Sea of Marmara (Topçu & Öztürk, 2015), mainly thought to be linked to the unique environmental features of its waters and the demise of other gorgonian species due to anthropogenic pressure (Topçu & Öztürk, 2015; Topçu & Öztürk, 2016).

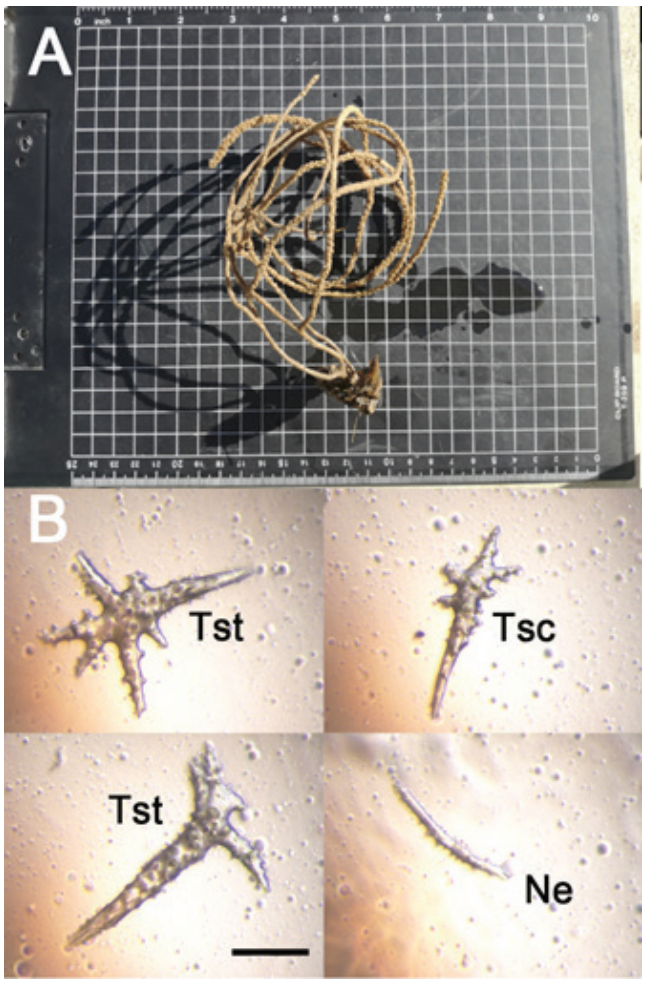

Fig. 3: A) Detail of the by-caught colony. Each white square represents 1 cm^2. B) Detail of the spicular complement, including: thornstars (Tst) and thornscales (Tsc) from the polyp's calyx and needles (Ne) from the coenenchyme. The black line at the bottom represents 200 μm; all images were taken with the same magnification.

In conclusion, the presence of *S. klavereni* outside the Sea of Marmara seems to be scarce and poorly understood, highlighting the importance of increasing our knowledge on its ecology, distribution and population dynamics before we can assess its role in the Mediterranean benthic ecosystems.

2. ITALY

2.1 A new record of *Cryptonome turcica* (Annelida: Amphinomidae) in the western Mediterranean Sea, including a genetic evaluation based on mitochondrial data

Joachim Langeneck and Andrea Vannucci

The amphinomid genus *Cryptonome* Borda, Kudenov, Bienhold & Rouse, 2012, has been established for wood-boring Amphinomidae characterised by a small caruncle not exceeding the second chaetiger. Aside from the type species, *Cryptonome conclava* Borda, Kudenov, Bienhold & Rouse, 2012, three species are known to science hitherto, namely *Cryptonome parvecaruncu-lata* (Horst, 1912), *Cryptonome turcica* (Çinar, 2008) and *Cryptonome barbada* Barroso, Kudenov, Halanych, Saeedi, Sumida & Bernardino, 2018 (Borda *et al.,* 2012; Barroso *et al.,* 2018). Among them, *C. conclava* and *C. turcica* are considered endemic of the Mediterranean Sea, but they have not been recorded since the original description.

Here we report the a new record of *C. turcica* from the western Mediterranean Sea, together with preliminary mitochondrial DNA sequence data that might be useful for molecular identification. The examined specimen of *C. turcica* (Fig. 4a) was collected on the 30th November 2016 in trawl discard collected from a haul made at 112-113 m in the Tyrrhenian Sea between Giannutri Island and the Tuscan coast (42.2589° N, 11.3014° E). The specimen has been fixed and preserved in 70% ethanol in the polychaete collection of the Natural History Museum of the University of Pisa (MSNP, accession number: P/3848). The specimen is incomplete, with a length of 33 mm, a width of approximately 3.5 mm, for 52 chaetigers. It can be assigned to the genus *Cryptonome* on the basis of the very small, sessile caruncle (Fig. 4d), the presence of very stout and solid neurochaetae (Fig. 4b) and the absence of notopodial hooks at chaetiger 1; furthermore, it can be assigned to *C. turcica* as notopodia only contain harpoon-like chaetae (Fig. 4c), finely serrated capillaries and bifurcate chaetae, completely lacking bifurcate capillaries.

Total genomic DNA was extracted from a posterior parapodium of the specimen. The mitochondrial regions coding for 16S rRNA and cytochrome c oxidase subunit I (COI) were amplified, obtaining a 485 bp-long 16S rDNA sequence (GenBank accession number: MH588299) and a 563 bp-long COI sequence (GenBank accession number: MH595465). A phylogenetic reconstruction employed using all Amphinomidae species available on GenBank identified a clade including the genera *Amphinome, Benthoscolex, Cryptonome, Eurythoe* and *Hipponoa* (Fig. 5). Within this clade, the other two available species of the genus *Cryptonome* (*C. conclava* and *C. barbada*) appear closely related to *Amphinome rostrata* (Pallas, 1766), whereas *C. turcica* appears closer to *Eurythoe complanata* (Pallas, 1766) (0.222) and *Benthoscolex seisuiae* Jimi, Kimura, Ogawa & Kajihara, 2018 (0.220) Although the low bootstrap values obtained do not allow to further infer on phylogenetic relationships among these species,

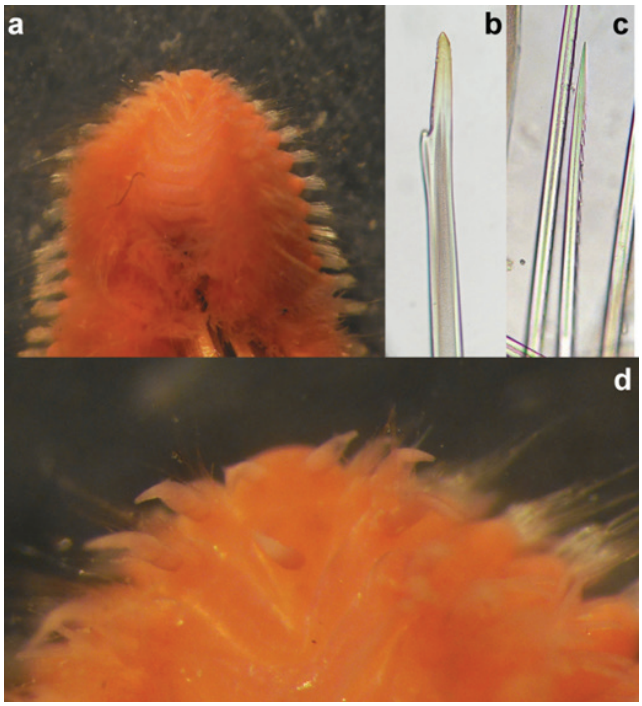

Fig. 4: *Cryptonome turcica* (Çinar, 2008) collected in the northern Tyrrhenian Sea, western Mediterranean. a) anterior part of the body; b) furcate neurochaeta; c) harpoon-like notochaeta; d) close-up of the prostomium and first chaetigers. The specimen has been stained with Shirlastain A to highlight antennae and cirri.

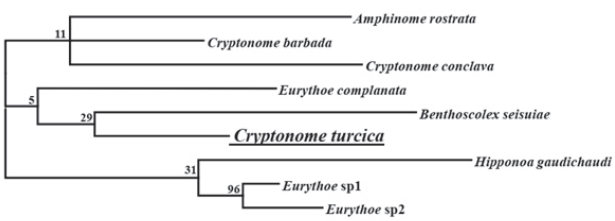

Fig. 5: Maximum likelihood phylogenetic tree inferred on concatenated 16S and COI sequences, showing the placement of *C. turcica* with respect to the other species of the genus *Cryptonome*.

the topology detected suggests that *C. turcica* is not very close to the two congeneric deep-water species. This is supported by the fact that *C. turcica* has been collected also outside of wood logs, being apparently a facultative xylophilic species, while deep-water *Cryptonome* are strictly associated to decaying wood representing a chemosynthetic environment. Despite the relatively large size, the striking morphology and the shallow and

well-studied environments in which it occurs, *C. turcica* has been described only ten years ago, and this new record outside from the type locality, extends the distribution of this species to the western Mediterranean Sea. It is likely that *C. turcica* occurs in a wide part of the Mediterranean basin, and that its limited collection in other areas is due to the preferential association with decaying wood.

2.2 Further sightings of *Mawia benovici* in the Adriatic Sea

Sara Bonanomi, Tea Juretić and Valentina Tirelli

Nowadays *Mawia benovici* (Piraino, Aglieri, Scorrano & Boero, 2014) is the only described species belonging to the genus *Mawia* Avian, Ramsak, Tirelli, D'Ambra, Malej, 2016. The discovery of this new semeostomean jellyfish was possible thanks to its sampling as bycatch in September 2013. After this finding, *Mawia* was observed and sampled in several locations of the northern Adriatic (Piraino *et al*. 2014, Avian *et al*. 2016). Its last observation dates back to August 2014 (Avian *et al.*, 2016), when few specimens were collected during the small pelagic fish (SPF) survey offshore from the Po delta. Despite the regularity of SPF surveys, which take place over the entire Adriatic basin every summer (MEDIAS project) and the interest raised by the discovery of this new species, no sighting of *Mawia* was registered in 2015. On September, 13th 2016 *Mawia benovici* reappeared in the international waters of the central Adriatic (44.33 N 13.55 E) (Fig. 6) when dozens of this jellyfish were collected as bycatch during the Croatian SPF survey (Fig. 7A, B). The video realised by Andrea Petetta (https://goo.gl/Ep2b4k) demonstrates that in December 2016 *Mawia* was in shallow waters near Ancona. On October, 5th 2017 hundreds individuals were recorded by fishermen approximately 25-30 nautical miles off Ancona (Fig. 6). Several individuals were observed floating at sea surface and collected as bycatch by a pelagic trawler during diurnal fishing operations at 55-60 m depth. A dozen of specimens (Fig. 7C, D) were housed and photographed at CNR-IRBIM, Ancona, Italy. This finding represents the southernmost record of *M. benovici* in the Adriatic Sea. This new scyphozomedusa was initially determined as *Pelagia benovici* (Piraino *et al.,* 2014) and later recognized as new genus *Mawia benovici* (Avian *et al.,* 2016). Recently Chartosia *et al*. (2018) reported the presence of *Pelagia benovici* (alternate representation of *Mawia benovici*) in the Ioanian Sea. The photos of the specimens published in this paper by Anastasiadis and Piraino show some characters of *Mawia* (in particular horseshoe shaped gonads and colourless tentacles) even if we never observed the same transparency of umbrella in the specimens from the Adriatic (which in our living samples presented always an umbrellar colour brown) and other characters closer to *Pelagia* genus (oral arms with evident nematocyst warts and solid mesogleal axis). According to Piraino *et al*. (2014) and Bayha *et al.* (2017), shipping (e.g. ballast water) is likely to have facilitated the introduction of this jellyfish in the northern Adriatic Sea. The same vector could probably favour its future spreading in the Mediterranean.

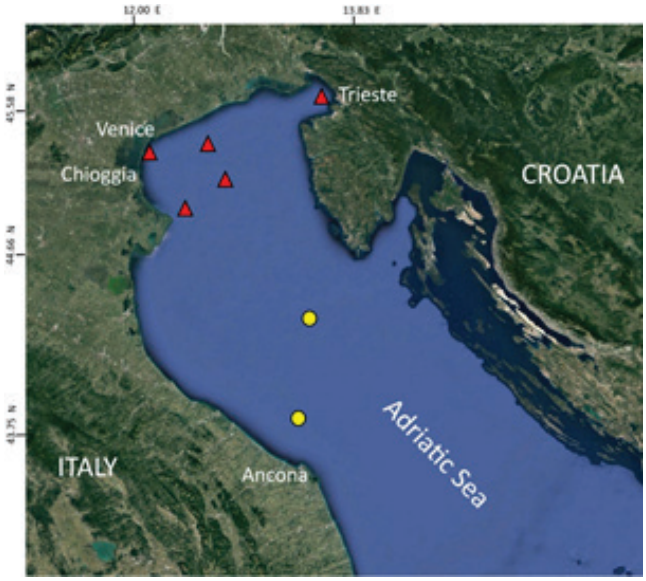

Fig. 6: Map showing the occurrence of *Mawia benovici* in the Adriatic Sea. Yellow circles indicate the new records of observations in 2016 and 2017; red triangles indicate previous occurrences documented by Piraino *et al.* (2014) and Avian *et al*. (2016).

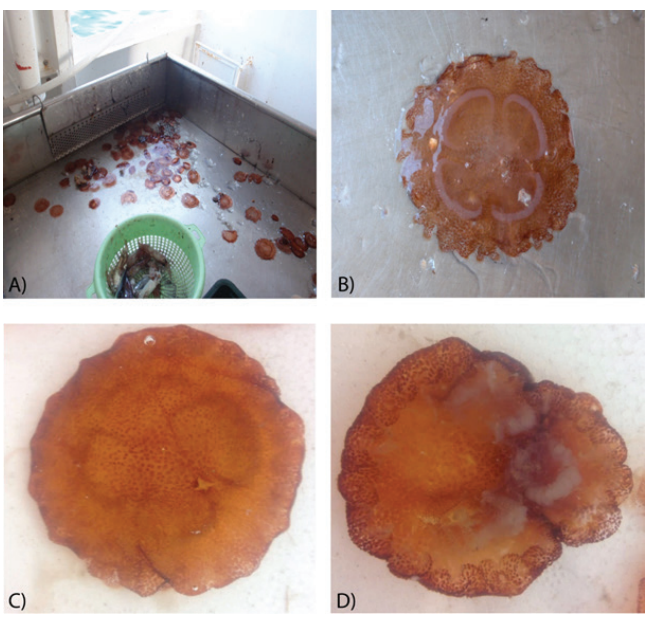

Fig. 7: (A) Specimens collected in international waters the 6 September 2016 during the SPF survey and (B) subumbrellar view of a jellyfish. (C) Aboral view and (D) subumbrellar view of specimens of *Mawia benovici* collected near Ancona (Italy), in October 2017.

3. SLOVENIA

3.1 Second record of an alien seaslug *Cuthona perca* (Er. Marcus, 1958) in the Mediterranean Sea

Lovrenc Lipej and Domen Trkov

Cuthona perca (Er. Marcus, 1958) is a nudibranch seaslug, native to the Caribbean, from Florida to Brazil, that usually inhabits lagoons, estuaries, bays, and harbours. It has also been reported as an alien species in the Venice Lagoon in the Mediterranean (Perrone 1995; Zenetos *et al.,* 2016) and in the Black Sea (Martynov *et al.,* 2007). In the Mediterranean, it is considered as a not established species (Zenetos *et al.,* 2016, 2017), whose probable vector of introduction is shipping. During the period 2013-2018, the inspection of vegetation samples of Slovenian coastal wetlands was performed with the purpose to detect alien species. In Škocjan Inlet (Koper, northern Adriatic), an artificially created lagoon on the Slovenian coast, many specimens of alien *Cuthona perca* were found. Specimens were measured alive and photographed under the stereomicroscope Olympus SZX16. Afterwards, specimens were identified with the determination keys for opisthobranchs. Specialized web sites such as www.seaslugforum.net were consulted as well. Subsequently, specimens were fixed in 70% alcohol solution and deposited in the collection of the Marine Biology Station of the National Institute of Biology.

Specimens of *C. perca* were recognized according to typical diagnostic characters such as semitransparent body and typical colour pattern. Oral tentacles are slightly shorter than rhinophores. Both of them are scarcely covered by opaque white speckles. The middle part of the head region is dorsally covered with dark-brown and orange pigments on the head between oral tentacles and rhinophores. Brown cerata are digitiform and arranged in 6 to 10 rows.

Cuthona perca (Fig. 8) was found at four localities in the coastal lagoon at three sampling dates in 2015 and 2018. The first site was close to the opening of the inlet to the sea channel through the port of Koper, where two specimens were found crawling on the sea lettuce (*Ulva* sp.). In other three different sites located in the lagoon three specimens were found in 2018 (Table 2).

Fig. 8: *Cuthona perca* specimen, collected in the coastal wetland of Škocjan Inlet (Slovenia).

Specimens were found in a brackish lagoon where substantial fluctuations of salinity are regular. This is in agreement with Martynov *et al.* (2007) who stated that *C. perca* clearly prefers waters with lowered salinity. Since the only record was reported for the Gulf of Venice (Perrone, 1995), it is probable that the species dispersed from the Venetian area to the Port of Koper and subsequently to the nearby coastal wetland of Škocjan Inlet. We can not neglect the possibility that *C. perca* was overlooked in other Slovenian and north Adriatic coastal wetlands.

Table 2. ***S***specimens of *Cuthona perca,* collected in the coastal wetland of Škocjan Inlet (Slovenia).

date	locality	N	E	n	habitat	salinity
4 Nov 2015	mouth of lagoon	45.5515139°	13.7515417°	1	*Ulva* sp.	37 ‰
6 Jul 2018	mouth of lagoon	45.5515139°	13.7515417°	1	*Ulva* sp.	37 ‰
7 Aug 2018	centre of the lagoon	45.5452194°	13.7522083°	1	*Ruppia cirrhosa*	30 ‰
7 Aug 2018	southern lagoon	45.5428250°	13.7496611°	1	*Ruppia cirrhosa*	27 ‰
7 Aug 2018	Koper railway station	45.5410972°	13.7412972°	1	*Cladophora* sp. & *Enteromorpha* sp.	30 ‰

4. MONTENEGRO

4.1 On the occurrence of *Styela plicata* (Lesueur, 1823) in Montenegro

Slavica Petović

Styela plicata is a solitary ascidian distributed worldwide. Although its origin is not yet elucidated some evidence suggest that the species is native to the NW Pacific Ocean (Barros *et al*., 2009; Pineda *et al.,* 2011), from where it has spread attached on ship's hulls. It is commonly found inhabiting marinas and harbors of warm and temperate oceans, usually at high-densities (Pineda *et al.,* 2011).

Here the finding of *S. plicata* is reported from two sites inside the Boka Kotorska Bay, Montenegro as fouling species on artificial substata.

Analysis of biofouling on aquaculture equipment-mesh from a *Pecten jacobeus* farm revealed *S. plicata* as abundant and dominant species (Fig. 9). Samples were taken from Kotor (Boka Kotorska Bay) (42°43649" N, 18°76346" E) in March 2017. Four plastic boxes with *P. jacobeus* specimens were covered by mash and immersed in the sea water from October 2016 to March 2017.

In August 2017, in the course of a biological monitoring program which studied the fouling communities in the marina of Porto Montenegro (Tivat, Boka Kotorska Bay) many specimens of *S. plicata* were recorded by SCUBA diving on the pier (42°43171" N, 18°69116" E) (Fig. 10). Numerous specimens of the species were also observed in the same area attached to hard substrata in the 2018 surveys (February, May, August).

This is first finding from Montenegrin waters, although the species was expected (Karachle *et al.,* 2017) since the species has been long established in the Adriatic Sea: Italy: (Heller, 1877); Croatia, Slovenia and Albania (Spagnolo *et al*., 2018).

Fig. 9: *Styela plicata* as fouling on the aquaculture equipment.

Fig. 10: *Styela plicata* on the pier in the marina Porto Montenegro, Tivat.

5. ALBANIA

5.1 First record of the great torpedo ray *Tetronarce nobiliana (Bonaparte, 1835)* in the Albanian waters

Rigers Bakiu and Erion Troplini

The great torpedo ray (*Tetronarce nobiliana*) (Bonaparte, 1835) has a relatively wide range in the Atlantic Ocean and the Mediterranean Sea (Notarbartolo di Sciara *et al.,* 2009). Adults are frequently pelagic or semi-pelagic reaching 800 m of depth, whereas juveniles are mainly benthic living on soft-substrate and coral reef habitats in shallower waters. When caught, electric torpedo rays are usually discarded at sea, resulting in very little data on catches of this species (Notarbartolo di Sciara *et al.,* 2009).

Data from trawl surveys suggest that (*Tetronarce nobiliana*) (Bonaparte, 1835) is relatively rare in the Mediterranean Sea (Baino *et al.,* 2001, Notarbartolo di Sciara *et al.,* 2009), with a low frequency of occurrence in bottom trawl surveys (including Albanian waters investigations). During GRUND scientific trawl surveys in the Italian waters, this species was reported in low numbers from several locations along the Italian coast, including Sicily, Calabria, Gulf of Taranto, Sardinia and Northern Tyrrhenian sea (Relini *et al.,* 2000). It is only very rarely recorded off Tuscany and Corsica (Relini *et al.,* 2000, Ferretti *et al.,* 2005). It was captured in 73 out of 6,336

Fig. 11: *Tetronarce nobiliana* specimen captured near Karaburun peninsula, in Vlorë (Albania; Ionian Sea).

hauls conducted throughout the northern Mediterranean (including the Adriatic) during MEDITS surveys from 1994-1999 at depths of 10-800 m, and appears to be more common in the western basin and inexistent in the Albanian waters (Baino *et al.,* 2001). Recent records report this species in the Ionian Sea (Capezzuto *et al.,* 2010) and the Adriatic Sea (Storelli *et al.,* 2011).

On 17th October 2018, a female individual of *T. nobiliana* (Fig. 11) was captured by a commercial bottom trawler near to Karaburun peninsula (Vlorë) in South Albania (40.232200° N, 19.096160° E) at a depth of 550 m (Fig. 11). It weighted was 5.6 kg and had a total length of 70 cm with disc width o 50 cm.

6. GREECE

6.1 New records of *Lagocephalus sceleratus* (Gmelin, 1789), *Cassiopea andromeda* (Forsskål, 1775) and *Pterois miles* (Bennett, 1828) in Greek MSFD areas.

Eleni Mitsou and Maria Maximiadi

***Lagocephalus sceleratus* (Gmelin, 1789)**

The Silver-cheeked toadfish *Lagocephalus sceleratus* (Tetraodontiformes, Tetraodontidae, Tetraodontinae) is distributed in tropical and subtropical areas of the Atlantic, Indian and Pacific Ocean, while since 2003 can be also found in the Mediterranean Sea. In Greece, it was reported for the first time in 2005 (Corsini *et al.,* 2006) and since then has been expanded considerably with several records from the Aegean and the Ionian Sea. The species is considered one of the 100 worst marine invasive species creating many problems to the local ecosystems and in commercial fishing. On 26th August 2018, a *L. sceleratus* individual (Fig. 12) was found between the Greek island of Kerkyra and the Albanian coast, in the borders of the Adriatic Sea. It was photographed by a scuba diver, next to the lighthouse Peristeres, also known as Kaparelli, (Island Peristeres 39.793056° N, 19.959417° W), at a depth of 10 m. The total length of the individual was approximately 40cm. This constitutes the first record of the species in the minor Greek side of the Adriatic Sea. The species has been already reported in several parts from the Adriatic Sea (Carbonara *et al.,* 2017 and references within).

Fig. 12: *Lagocephalus sceleratus* specimen by the lighthouse Peristeres, Greece 2018. (Photo by Petros Mimidas of Sea World Diving Center Corfu).

***Cassiopea andromeda* (Forsskål, 1775)**

The Upside-down jellyfish *Cassiopea andromeda* (Forsskål, 1775) belongs to the Cassiopeidae family, is a carnivorous species which captures its prey using nematocysts. It can also obtain nutrition through a symbiotic relationship with photosynthetic dinoflagellate algae (zooxanthellae). In its native species of the genus *Cassiopea* distributed in the western Atlantic and Indo-Pacific, including the Red Sea. The species introduced in the Mediterranean Sea through the opening of the Suez Canal back in the 1903 and is one of the six non-indigenous species of scyphozoan found in the basin. In Greece it is considered as established (Zenetos *et al.,* 2018) with all the

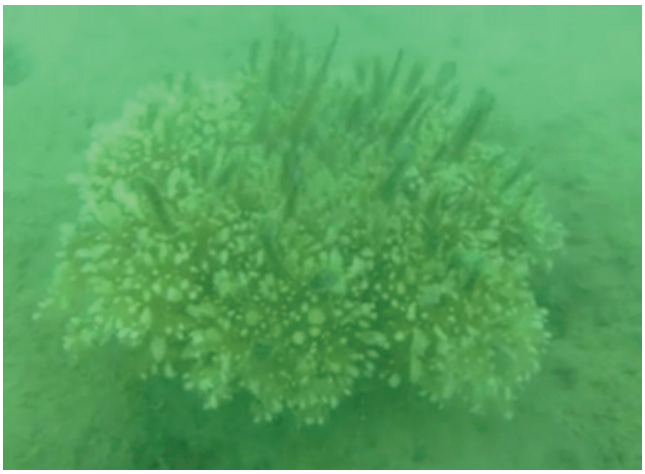

Fig. 13: *Cassiopea andromeda* specimen from Itea, Greece 2018. (Photo by Anastasios Drosopoulos).

Fig. 14: *Pterois miles* specimen captured in Kythira, Greece 2018. (Photo by Association Toulipa Goulimi).

current records reported from the Aegean Sea (Karachle *et al.,* 2017). Hereby we present the first record of the species from the Greek Ionian Sea. On 9th August 2018, an individual of *C. andromeda* (Fig. 13) observed in Itea in the Korinthiakos Gulf (38.438028° N, 22.420444° W). It was photographed by a scuba diver over a sandy bottom at the depth of 4m.

Pterois miles **(Bennett, 1828)**

The common lionfish, *Pterois miles* (Scorpaeniformes, Scorpaenidae, Pteroinae), is considered one of the worst marine invasive species in the world, causing a significant amount of detrimental effects in the local communities and the native species. Within its native range *P. miles* is distributed in the Indian Ocean from South Africa to the Red Sea and the Persian Gulf. In 1991, recorded for the first time in the Mediterranean Sea, off the Israeli coast but it was not until 2012 that the species was reported again from Lebanon (Bariche *et al.,* 2013). In 2015 it was reported for the first time in Greece (Corsini-Foka & Kondylatos, 2015) and soon expanded towards the North Aegean Sea (Giovos *et al.,* 2018). Although the species has been reported from Italy and Tunisia (Karachle *et al.,* 2017), it has never been reported from the Ionian Sea. On 23rd of August 2018, an individual of *P. miles* (Fig. 14) was captured by a professional fisher in trammel nets set at the depth of 27m in Kythira Island (36.257694° N, 22.914722° W). The total length of the individual was approximately 26cm. This is the first record of the species from the Ionian Sea.

6.2 Surveying Messolonghi lagoon (Greece): first records of the colonial ascidians *Aplidium coeruleum* and *Didemnum protectum* in the eastern Mediterranean and densest ever recorded aggregation of the alien nudibranch *Melibe viridis*

Eleni Kytinou, Artemis Nicolaidou and Stelios Katsanevakis

An inventory of the megabenthic species of Messolonghi lagoon (Ionian Sea, western Greece) was created through underwater visual surveys conducted in November 2014 (15 stations; 100-m long and 4-m wide transects). One colony of the colonial ascidian *Aplidium coeruleum* Lahille, 1890 (Fig.15A) (photo-identification confirmed by Frédéric André, pers.com.) was recorded for the first time in the Eastern Mediterranean in the outer part of the lagoon (38.299050°N, 21.300100°W) at a depth of 4.2 m, on *Posidonia oceanica* leaves. The species distributes, according to the current knowledge, at the Atlantic, the Western Mediterranean (Alboran, Catalan coast, France), Italy and Tunisia (Chebbi *et al.,* 2010). The siphons with six blue lobes are a specific diagnostic character of the species (Fig. 15A).

The colonial ascidian *Didemnum protectum* (Daumézon, 1908) (Fig. 15B) (photo-identification confirmed by Frédéric André, pers.com.) was also recorded for the first time in the eastern Mediterranean. The limited records of the species include its occurrence in the Atlantic, the Mediterranan France (Gulf of Marseilles) (Pérès, 1958) and Italy (Mastrototaro & Tursi, 2010). Three colonies of *D. protectum* were found in the inner part of the lagoon (38.334400°N, 21.356117°W), at 1.6 m depth, in a *Cymodocea nodosa* meadow. Its colonies had a maximum length of 15 cm.

Melibe viridis (Kelaart, 1858) is a large nudibranch gastropod, native in the Indian and Western Pacific Ocean, which was first recorded in the Mediterranean Sea in 1970 in Cephalonia Island, Greece, and then spread to Tunisia, Italy, Malta, Croatia, Cyprus, Montenegro, Turkey, Lebanon, and Israel (according to the European Alien Species Information Network; Katsanevakis *et al.*, 2015).

In the present study, *M. viridis* was found in an extremely high abundance in the inner part of Messolonghi lagoon. The densest published population of the species was recorded in a central station of the lagoon (38.334400°N, 21.356117°W), where the density of

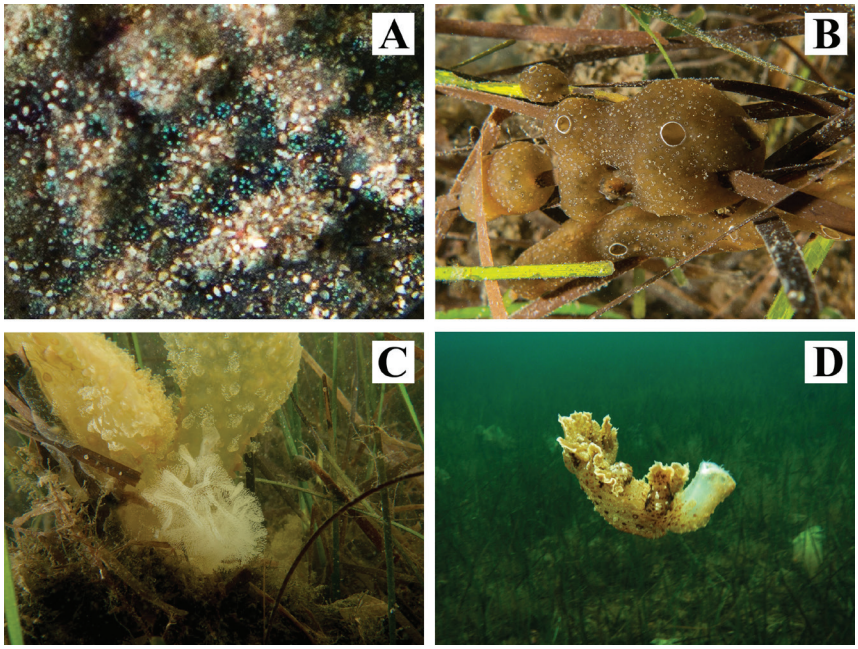

Fig. 15: A) Close up of the colonial ascidian *Aplidium coeruleum*. In each siphone, six blue lobes are distinguished, diagnostic character of the species. B) The colonial ascidian *Didemnum protectum* surrounding leaves of *Cymodocea nodosa*. C) Spawning of an individual of the alien nudibranch *M.* viridis in a *Cymodocea nodosa* meadow. D) *M. viridis* in the inner part of Messolonghi lagoon, many individuals are distingued in the background. (Photos A-C: by Christos Kotselis, D: by Eleni Kytinou).

M. viridis was 0.43 individuals/m^2, in a surveyed area of 400 m^2 (Fig. 15D). A spawning aggregation of the species was recorded with abundant egg ribbons (Fig. 15C). The second highest published population density, during a spawning aggregation of *M. viridis* is from India (native distribution) with 0.23 individuals/m^2 in a surveyed area of 100 m^2 (Parasharya & Patel, 2014). Furthermore, the largest ever recorded individuals (29 cm length), as well as the lowest temperature (13.6°C) and the lowest depth (0.9 m) of the species occurrence was documented.

6.3 Further expansion of *Synchiropus sechellensis* Regan, 1908 in the Greek Seas

Konstantinos Teneketzis and George Christidis

The dragonet *Synchiropus sechellensis* Regan, 1908 is a species widely distributed in the Indo-West Pacific and the Red Sea. The first report of the species in the Mediterranean was for an individual caught in the Gulf of Antalya (Turkey) in April 2014 (Gökoğlu *et al.,* 2014). The species was then detected in the nearby Greek waters of Kastellorizo (September 2014) and Rhodes (February 2016) (Kondylatos *et al*. 2016). Subsequent records are from Cyprus (Michailidis & Chartosia, 2016). The record from Egypt, based on >400 individuals (Akel & Rizkalla in Gerovasileiou *et al.,* 2017), confirms its introduction in the Mediterranean via the Suez Canal (Lessepsian migration).

Its establishment in Greek waters (Zenetos *et al.,* 2018) was documented for the Levantine coast of Greece. Here we report a new finding from the Greek Ionian Sea. The species was caught on 20.10.2018 from the Lakonikos Gulf (Archagelos Sela). A specimen of 93 mm, weighing 8.5 gr (Fig. 16) was caught from a sandy bottom, while fishing with a trawler between 36.63969^0 N, 22.88188^0 E and 36.6382^0 N, 22.87858^0 E, at a depth 7.7 to 21m, 70m from the coast. The present record confirms the rapid spread of the species in the Mediterranean following the route of other lessepsian immigrants.

Fig. 16: Specimen of *Synchiropus sechellensis* from Archagelos Sela, (Neapoli, Lakonia). (Photo by George Christidis).

6.4 First record of the green alga *Acetabularia caliculus* from Greece

Konstantinos Tsiamis and Ioannis Giovos

The green alga *Acetabularia caliculus* Lamouroux, commonly known as the umbrella alga, is reported for the first time from Greece. Specimens were detected at depth of 4 m in Nea Kallikrateia, Thermaikos Gulf (North Aegean Sea; 40.30488°N, 23.07694°E) in September 2018. Several individuals were found, growing in clusters (Fig. 17), on dead shells of *Callista chione,* on sandy bottom. The cup-shaped disk (upturned umbrella; Fig. 18) and the number of rays per disk (<40) distinguish the species from the similar species *Acetabularia acetabulum* (Linnaeus) Silva, which is commonly found in Greece.

First described from Western Australia, *Acetabularia caliculus* is commonly found in the tropical and subtropical coasts of the Atlantic and Indo-Pacific Ocean (Guiry & Guiry, 2018). In the Mediterranean Sea, it is only known from Spain, Egypt, Israel and Morocco (Rayss, 1955; Cormaci *et al.,* 2004 and references therein). Cormaci *et al.* (2004) considered it as an alien species of the Mediterranean Sea, while Verlaque *et al.* (2015) did not include it in the CIESM list of alien macrophytes of the Mediterranean based on its worldwide distribution. We tentatively agree with the latter authors pending molecular investigation of the species.

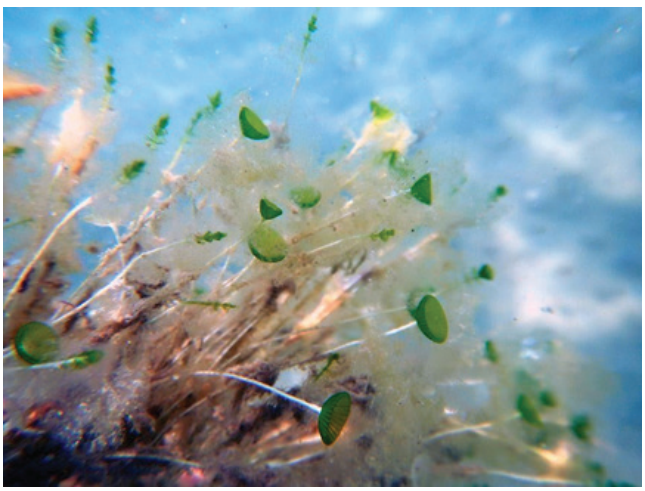

Fig. 17: *Acetabularia caliculus* in the field. (Photo by Elias Papadopoulos).

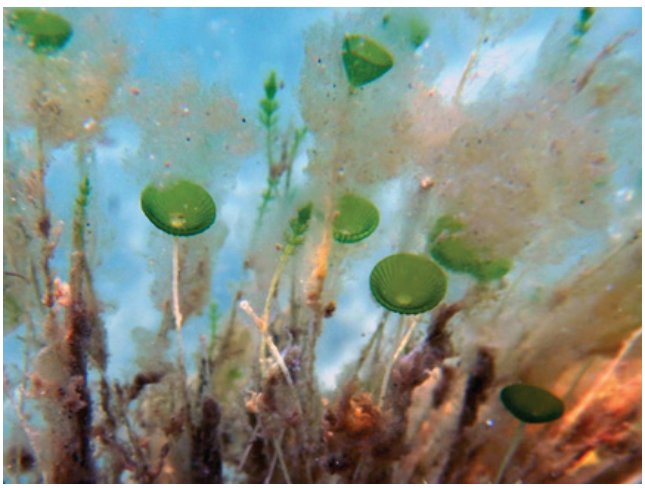

Fig. 18: Detail of the upturned umbrella of *Acetabularia caliculus.* (Photo by Elias Papadopoulos).

7. CYPRUS

7.1 First record of *Callionymus filamentosus* from Cyprus

Nikolas Michailidis and Ioannis Thasitis

The blotchfin dragonet, *Callionymus filamentosus* Valenciennes, 1837 (Class Actinopteri, Order Perciformes, Family Callionymidae) is a species of dragonet native to the Indian and the western Pacific Oceans (Froese & Pauly, 2018). It is also a Lessepsian migrant at least since 1953 and is now considered well established in Eastern Mediterranean (e.g. Gucu *et al.,* 1994; Erguden *et al.,* 2016).

A male blotchfin dragonet specimen (Fig. 19) was collected from the discards in the haul of the trawler Santa Maria fishing in Limassol Bay Cyprus (33.05 E 34.65 N), at a depth of around 50 meters, on 22 November 2016. The description of the specimen is as follows: D1, I+III; D2, 9; A, 9; P, 18; V, I+5; C, 9, weight 30.23 g, total length 193 mm, standard length 133 mm, preanal length 62 mm, predorsal length 36 mm, prepelvic length 27 mm, prepectoral length 44 mm, preorbital length 12 mm, interorbital width 2 mm. Body without scales, elongated with depressed head. First dorsal spine filamentous and separate (male characteristic), other spines short. Second dorsal fin rays longer, the last one even more. Anal fin originates beneath 2-3 dorsal ray, last ray elongated. Caudal fin with two filamentous rays (male characteristic). Pectoral fin rounded. Pelvic fin inserted before pectoral fin base, the outer rays longer than inner and connected by membrane to pectoral fin base. Head triangular from dorsal view with pointed snout. Mouth small and protrusible directed downward. Dorso-lateral eyes with very small interorbital distance. Large preopercular spine with 6 upward hook-like serrae (species characteristic: range 4 to 7). Gill opening small and located above the operculum. First dorsal black (male characteristic, only a black dot in females).

The significantly late recording of the species in Cyprus, despite the fact that it has long been established in the Levantine, is most probably due to the lack of targeted sampling or to confusion of the species with other Mediterranean dragonets.

Fig. 19: Specimen of *Callionymus filamentosus* caught off Limassol Cyprus.

7.2 The alien mollusc *Haminoea cyanomarginata* Heller & Thompson, 1983 in Cyprus

Fabio Crocetta and Vasilis Andreou

Haminoea cyanomarginata Heller & Thompson, 1983 (Mollusca: Gastropoda: Haminoeidae) is an unmistakable heterobranch gastropod originally described from the Sudanese Red Sea coast (Heller & Thompson, 1983) and recently recorded as an alien species from the Mediterranean Sea, where thriving populations were found first in Greece in 2001 and subsequently from the western to the eastern part of the basin, including the Adriatic Sea (review in Fernández-Vilert *et al.,* 2018). Despite of that, still no records occurs from the easternmost Mediterranean countries (e.g. Egypt, Israel, Lebanon, Cyprus) which often led researchers to suspect that the species did not reach the Mediterranean Sea via natural dispersal through the Suez Canal, but more likely through shipping.

In August 2016, during a recreational scuba dive at Protraras (Paralimni, Cyprus), a couple of *H. cyanomarginata* showing trailing behaviour was found on an artificial substrate at 22 m deep, on the Nemesis wreck (35°2.978'N, 34°2.196'E) (Fig. 20). Therefore, the present record adds an additional piece of knowledge to the alien invasions in Cypriot marine waters by recording for the first time this taxon in this area and by further expanding the existing knowledge on the distribution of the species in the Mediterranean.

Fig. 20: The heterobranch *Haminoea cyanomarginata* Heller & Thompson, 1983 from Cyprus.

8. TURKEY

8.1 Molecular evidence for the presence of *Berthellina citrina* (Rüppell & Leuckart, 1828) in the Eastern Mediterranean

Mehmet Baki Yokeş and Selahattin Ünsal Karhan

Berthellina citrina (Rüppell & Leuckart, 1828) (Mollusca, Pleurobranchidae) has been described from Red Sea and show a wide distribution range in the Indo-West Pacific (O'Donoghue & White, 1940; Moustafa *et al.,* 2018). However, it has been discussed that the records outside the Red Sea should be confirmed, since the distribution range of a morphologically similar species, *Berthellina delicata* (Pease, 1861) covers the range of *Berthellina citrina* (Moustafa *et al.,* 2018).

Berthellina citrina has also been reported from Southern Britain, Mediterranean coast of Israel and Italy (reviewed in Cervera *et al.,* 2004). However, it has been suggested that the Atlantic and Mediterranean records were misidentifications of the native *Berthellina edwardsii* (Vayssière, 1897) (Cervera *et al.,* 2004). Thus, *Berthellina citrina* has been excluded from the alien database lists (Zenetos *et al.,* 2004). A recent morphological and molecular study showed that the three orange-red colored species are genetically distinct and can be easily identified from their genetic barcodes (Moustafa *et al.,* 2018).

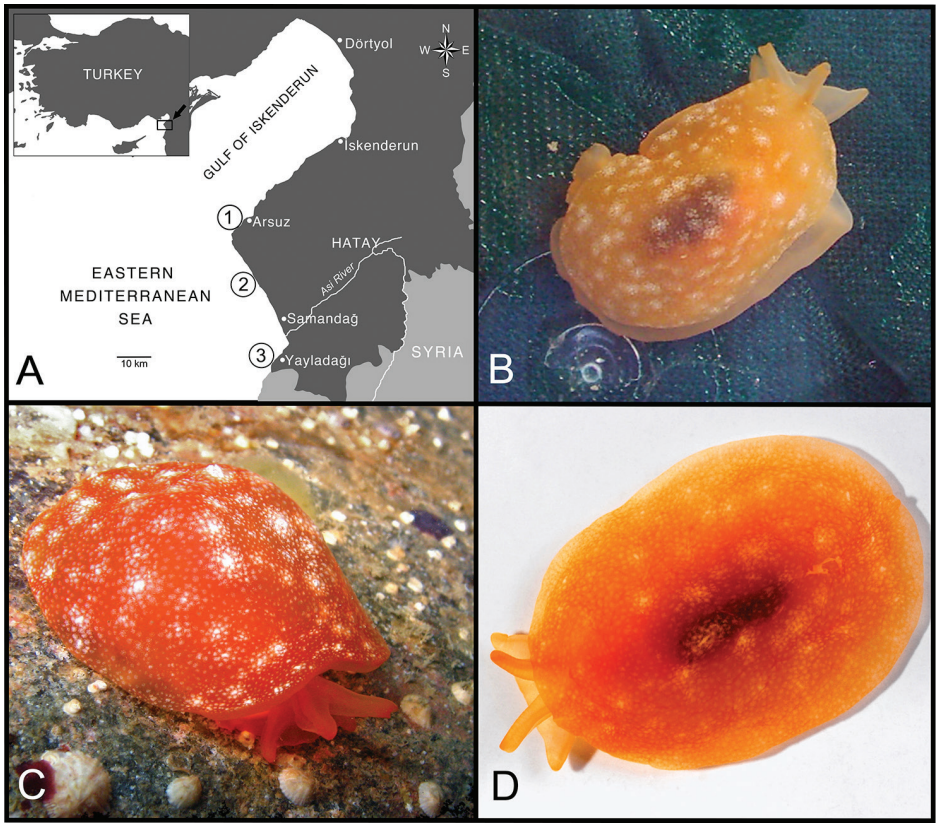

Fig. 21: A) Locations of the sampling stations. Specimens: B) Specimen #1; C) Specimen #2; D) Specimen #3.

During surveys conducted on the coasts of Hatay (Turkey) between 2005-2009, three Pleurobranchidae specimens have been collected (Table 3, Fig. 21). The specimens have been identified as *Berthellina* sp. and preserved in 96% ethanol for further investigation. DNA was extracted from mantle tissue. Mitochondrial Cytochrome c oxidase subunit I (COI) sequences were partially amplified by using universal primers (Forward: GGTCAACAAATCATAAAGATATTGG; Reverse: TAAACTTCAGGGTGACCAAAAAATCA) (Folmer *et al.,* 1994). The sequences were deposited in the NCBI GenBank (Accession no: MK157019-MK157021). The COI sequences of the three specimens were exactly identical and showed 100% match (658/658 bp) with *Berthellina citrina* (KX644916, Moustafa *et al.,* 2018), 90% match (594/658 bp) with *Berthellina delicata* (KM521689, Moustafa *et al.,* 2018) and 89% match (562/630 bp) with *Berthellina edwardsii* (KF992165, Oskars *et al.,* 2015) in the NCBI GenBank.

All our samples are yellow-orange in color. The white spots on the mantle may help to distinguish *Berthella citrina* from the uniformly colored *Berthellina edwardsii* and *Berthella auratiaca*. But, the mantle color may fade in preserved samples and more detailed anatomical investigation may be needed, that can also be confusing. However, the COI sequences of these species are so distinct, making the genetic barcoding a powerful tool for precise identification of orange-yellow colored Pleurobranchidae species in the Mediterranean.

Unfortunately, there is no molecular or visual data belonging to previous Mediterranean reports. Thus, our finding confirms the presence of *Berthellina citrina* along the Turkish coastline, but this may or may not be the first record of this species in the Eastern Mediterranean.

Table 3. Specimen information.

	Station no	Coordinates	Collection date	Depth (m)	NCBI Access. no
Specimen #1	1	36.357883°N 35.816678°E	22 July 2005	0.5	MK157019
Specimen #2	2	36.172386°N 35.877972°E	25 October 2008	9	MK157020
Specimen #3	3	35.951217°N 35.920911°E	2 May 2009	10	MK157021

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