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New Mediterranean Biodiversity Records (July 2015)

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Abstract

The Collective Article 'New Mediterranean Biodiversity Records' of the Mediterranean Marine Science journal offers the means to publish biodiversity records in the Mediterranean Sea. The current article is divided in two parts, for records of native and alien species respectively. The new records of native species include: the neon flying squid *Ommastrephes bartramii* in the waters surrounding the island of Capri, Thyrrenian Sea; the bigeye thresher shark *Alopias superciliosus* in the Adriatic Sea; a juvenile basking shark *Cetorhinus maximus* caught off Piran (northern Adriatic); the deep-sea Messina rockfish *Scorpaenodes arenai* in the National Marine Park of Zakynthos (East Ionian Sea, Greece); and the oceanic puffer *Lagocephalus lagocephalus* in the Adriatic Sea.

The new records of alien species include: the red algae *Antithamnionella elegans* and *Palisada maris-rubri*, found for the first time in Israel and Greece respectively; the green alga *Codium parvulum* reported from Turkey (Aegean Sea); the first record of the alien sea urchin *Diadema setosum* in Greece; the nudibranch *Goniobranchus annulatus* reported from the South-Eastern Aegean Sea (Greece); the opisthobranch *Melibe viridis* found in Lebanon; the new records of the blue spotted cornetfish *Fistularia commersonii* along the Alicante coast (Eastern Spain); the alien fish *Siganus luridus* and *Siganus rivulatus* in Lipsi Island, Dodecanese (Greece); the first record of *Stephanolepis diaspros* from the Egadi Islands Marine Protected Area (western Sicily); a northward expansion of the alien pufferfish *Torquigener flavimaculosus* along the southeastern Aegean coasts of Turkey; and data on the occurrence of the Lessepsian immigrants *Alepes djedaba*, *Lagocephalus sceleratus* and *Fistularia commersonii* in the waters surrounding the island of Zakynthos (SE Ionian Sea, Greece).

Introduction

Collecting detailed biodiversity data and mapping spatial patterns of marine biodiversity across large spatial scales is challenging, and usually requires extensive and expensive sampling. Often, such information remains in the grey literature and is thus largely unavailable to the scientific community (Katsanevakis *et al.,* 2014). This is particularly challenging when it comes to marine alien species, which constitute one of the main pressures driving biodiversity loss in the marine environment. Therefore, continuous efforts for monitoring and reporting their occurrence and expansion is now more vital than ever, especially in Europe under the concept of the recent EU Regulation 1143/2014.

The *Mediterranean Marine Science,* journal recognizing the importance of archiving records of species found in the Mediterranean Sea, offers the means to publish biodiversity records, either native or alien, through its Collective Article 'New Mediterranean Biodiversity Records'. Submissions to the Collective Article are peer-reviewed by at least one reviewer and the editor, and the contributors of records are co-authors, their names appearing in alphabetical order. This article is divided into two main sections, the first for native species and the second for alien species. The contributing authors are also cited at the beginning of the sub-section corresponding to their record.

1. Native species

1.1. On the presence of *Ommastrephes bartramii* (Cephalopoda: Ommastrephidae) in the waters of the island of Capri, Thyrrenian Sea

By F.A. Fernández-Álvarez and A. Escánez

The neon flying squid *Ommastrephes bartramii* (Lesueur, 1821) is a large ommastrephid squid, reaching a maximum size of 1020 mm in dorsal mantle length (DML) (Guerra *et al*., 2010), although the majority of the specimens measure up to 450 mm in males and up to 600 mm in females (Jereb & Roper, 2010). This species is widely distributed in subtropical and temperate zones of the Atlantic, Indian and Pacific Oceans with a depth range from 1500 m to near the surface, in the bathymetric layers above 200 m (Jereb & Roper, 2010). Although this species supports an important fishery in the North Pacific Ocean (Jereb & Roper, 2010), it is rather rarely caught in the Mediterranean Sea. Most of the reports listed in the review of the Mediterranean records by Lefkaditou *et al*. (2011) concern single large individuals apart from those coming from experimental jigging targeting this species and professional jigging of pelagic Ommastrephids in the Aeolian Islands at the southernmost part of the Tyrrhenian Sea. Similarly, the more recent records from the Ionian Sea concerned five large females (Kapiris *et al*., 2014).

We hereby report 3 subadult individuals of neon flying squid (Fig. 1), 242, 200 and 165 mm in DML, found stranded on the shore near Punta Carena, island of Capri (40.5358°N, 14.1978°E) on the morning of October 17th 2014. The squid had presumably died a few hours before given the state of their flesh. All individuals showed clear skin damages and other injuries, including amputations of arms and tentacles and the absence of the head in the smaller individual.

Fig. 1: Ventral view of the *Ommastrephes bartramii* individuals collected from Capri Island. Scale bar: 100 mm.

This is the first record known to date of *Ommastrephes bartramii* on the shores of the island of Capri. The presence of subadult individuals in late summer and autumn in the Thyrrenian Sea is in agreement with Lefkaditou *et al*. (2011). These three individuals were likely attacked and killed by fish or discarded from trawlers, since it is considered a low-quality species in this region (Battaglia *et al*., 2010). The scarcity of *O. bartramii* records in the central Mediterranean contrasts with the frequency of occurrence in the stomach contents of apex predators such as odontocetes, tunas and swordfish from the same area (e.g. Romeo *et al*., 2012). This suggests that the presence of *O. bartramii* in the area is not rare and that the low number of squid recorded may be due to the scarcity of fishing fleets targeting ommastrephid squids in the Mediterranean Sea. Other authors have suggested an increasing presence of this species in the Mediterranean, which could be due to climate change (Lefkaditou *et al*., 2011) and the misidentification of this species as *Todarodes sagittatus* (Lamarck, 1798), which exhibits external similarities (Kapiris *et al*., 2014). However, as shown by the analysis of teuthophagus predators (Romeo *et al*., 2012) as well as by the analysis of artisanal jigging fishery catches in the Aeolian islands (Battaglia *et al.*, 2010), *O. bartramii* is less abundant than the european flying squid, *T. sagittatus*, in the Mediterranean Sea.

1.2. The first record of the bigeye thresher shark, *Alopias superciliosus* (Elasmobranchii: Lamniformes: Alopiidae) in the Adriatic Sea

By F. Madiraca and B. Davidov

On the 20th of May 2012, a bigeye thresher shark, *Alopias superciliosus* (Lowe, 1841) was caught by a local fisherman, in the proximity of the island of Mamula (42.3953°N, 18.5583°E) in Montenegro (eastern coast of the Adriatic) (Fig. 2). Even though the exact location is unknown, it was noted that the capture occurred 15 Nm from the mentioned island. According to the report that provided information about the capture, published in the Vijesti online newspaper, the specimen measured 485 cm (total length) and weighed 285 kg (Kosić, 2012). In order to identify the species, the authors examined photographic evidence of the capture.

The three main observed identification features in the analysis were: (1) relative distance between the leading point of the first dorsal fin and the trailing end of the pectoral fins (Tricas *et al.*, 1997), (2) presence of relatively big eyes facing upwards, (3) existence of prominent lateral grooves that start between and just behind the mentioned big eyes (Compagno, 2001) (Fig. 3).

Alopias superciliosus is circumglobal in tropical and temperate seas (Compagno, 2001) and is considered to be a highly migratory species. It is caught as bycatch of the semi-industrial fisheries in the western and central Mediterranean. In recent years a records from the eastern basin have also increased (off Israel in the Levantine basin, in the Aegean Sea off Turkey and southern Greece, and off southern Crete) (Amorim *et al.*, 2009 and references therein). Unfortunately, it is poorly documented in the Mediterranean and is considered scarce or rare. The lack of records and further information on the population of the species in the given area precludes an assessment beyond Data Deficient at this time (Amorim *et al.*, 2009 and references therein). Up to date, it has never been recorded in the Adriatic, which also complies with the most recent review of shark species that have previously been recorded in the basin (Gajić, 2015). The only species of the genus *Alopias* known to be native in the area up till now was the common thresher shark, *A. vulpinus* (Bonnaterre, 1788) (Gajić, 2015). It is also possible that *A. superciliosus* does occur in the Adriatic but is confused with *A. vulpinus*.

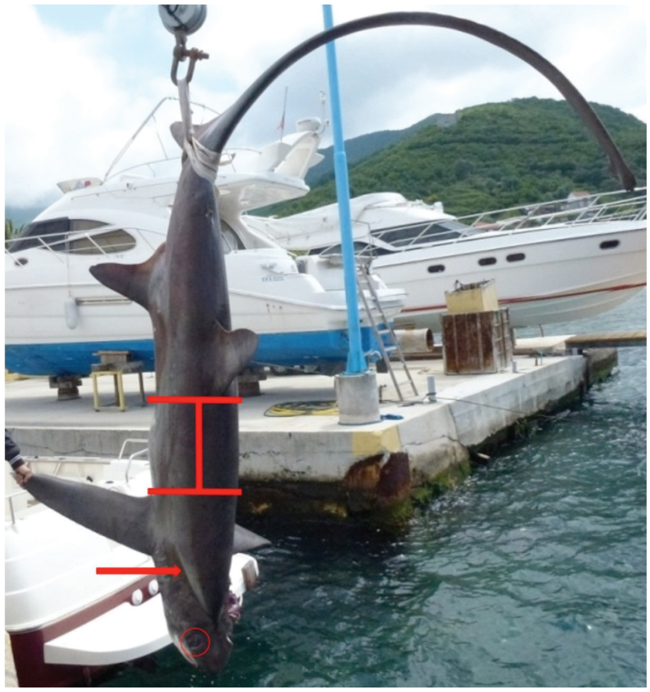


Fig. 3: Edited photographic evidence of the landed shark with highlighted morphological features used for identification of the bigeye thresher shark, *Alopias supercilliosus*: position of the first dorsal fin in relation to the trailing end of the pectoral fins (red lines), presence of the prominent lateral groove (red arrow) and relatively big eye (red circle); photo: Kosić, 2012; edited.

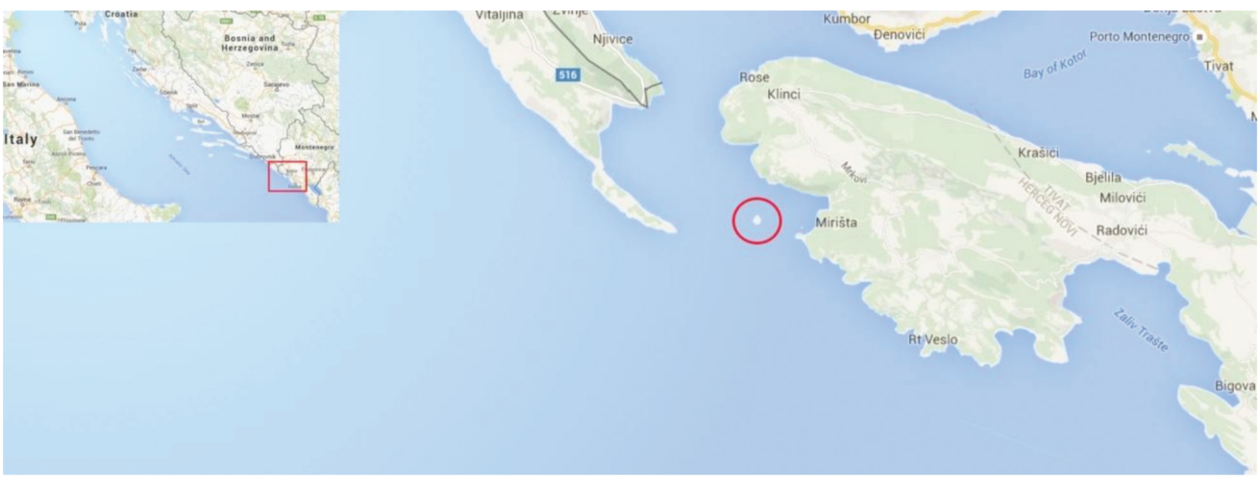


Fig. 2: The island of Mamula (42.3953°N, 18.5583°E), Montenegro (red circle); image created with Google Maps platform (position in the Adriatic: see top left corner).

There are a lot more questions regarding the species status, not only in the Adriatic Sea, but also in the entire Mediterranean. Hopefully, this first record in the Adriatic will serve as valuable information in future research endeavours.

1.3. Juvenile basking shark *Cetorhinus maximus* caught in the waters off Piran (northern Adriatic)

By L. Lipej and B. Mavrič

On Christmas morning 2014, a young male basking shark *Cetorhinus maximus* (Günnerus, 1768) was caught by fishermen in the waters off Piran (45°31.016'N, 13°34.081'E). It measured 217 cm in total length (TL) (Fig. 4) and weighed 40 kg. The shark was accurately measured to the nearest mm and weighed at the Marine Biology Station (Table 1). The animal was later delivered to the Slovenian National History Museum in Ljubljana.

One of the important features, which is useful for the recognition of young specimens, is a long hook-like snout; somehow resembling a pig like nose. The snout shape changes with increasing age. Izawa & Shibata (1993) assumed that the function of the elongated snout is related to oophagy (unfertilized eggs) or to assist feeding due to the increase of water flow through the mouth and thus higher feeding efficiency.

Findings of small-sized basking sharks were rather rare in the past. It is still not really clear what is the smallest size of a free swimming specimen. The size at birth is estimated between 1.5 and 1.7 m; however without any certainty, since no specimens were accurately measured. Only few data exists on small size specimens and even many of such data are without basic biometrical information. Recently, many small sized immature basking sharks were sighted in Manx waters, with the smallest among them measuring approximately 1.6 m (Hall *et al.*, 2013). In the Adriatic Sea, basking basking shark records were very rare; however, after the year 1990 the number of records increased drastically. Up to date; more than 100 records of basking shark are known from the Adriatic Sea (unpublished data). Among them approximately 15% are specimens which measured less than 400 cm TL and about 6% are specimens less than 300 cm TL.

Fig. 4: Juvenile basking shark, caught on 25th December 2014 in Piran (Slovenia).

Table 1. Measurements (in mm) of a specimen, caught at 25th December 2014 in Piran (Northern Adriatic).

		Abb.		%TOT
1	Total length	**TOT**	2170	100
2	Fork length	**FOR**	1784	82.21
3	Precaudal length	**PRC**	1618	74.56
4	Pre-second dorsal length	**PD2**	1379	63.55
5	Pre-first dorsal length	**PD1**	806	37.14
6	Head length	**HDL**	606	27.93
7	Prebranchial length	**PGL**	450	20.74
8	Preorbital length	**POB**	162,9	7,51
9	Prepectoral length	**PP1**	529	24.38
10	Prepelvic length	**PP2**	1127	51.94
11	Pelvic-caudal space	**PCA**	341	15.71
12	Preanal length	**PAL**	1421	65.48
13	Preoral length	**POR**	182.2	8.40
14	Eye length	**EYL**	23.7	1.09
15	Eye height	**EYH**	24.3	1.12
16	Pectorial anterior margin	**P1A**	382,3	17.62
17	Pectorial posterior margin	**P1P**	275,4	12.69
18	Pectoral base	**P1B**	76,8	3.54
19	Pectoral length	**P1L**	185,7	8.56
20	Pectorial height	**P1H**	371,7	17.13
21	First dorsal anterior margin	**D1A**	286,5	13.20
22	First dorsal posterior margin	**D1P**	179,5	8.27
23	First dorsal base	**D1B**	189,5	8.73
24	First dorsal length	**D1L**	253	11.66
25	First dorsal height	**D1H**	178	8.20
26	Second dorsal anterior margin	**D2A**	75,5	3.48
27	Second dorsal posterior margin	**D2P**	45,1	2.08
28	Second dorsal base	**D2B**	71,2	3.28
29	Second dorsal length	**D2L**	93,8	4.32
30	Second dorsal height	**D2H**	42	1.94
31	Pelvic anterior margin	**P2A**	160	7.37
32	Pelvic posterior margin	**P2P**	121,5	5.60
33	Pelvic base	**P2B**	141,7	6.53
34	Pelvic length	**P2L**	174,2	8.03
35	Pelvic height	**P2H**	124,6	5.74
36	Anal anterior margin	**ANA**	78,9	3.64
37	Anal posterior margin	**ANP**	38,3	1.76
38	Anal base	**ANB**	61	2.81
39	Anal length	**ANL**	82,6	3.81
40	Anal height	**ANH**	33,6	1.55
41	Dorsal caudal margin	**CDM**	603,3	27.80
42	Preventral caudal margin	**CPV**	287,4	13.24
43	Lower postventral caudal margin	**CPL**	173	7.97
44	Caudal fork length	**CFL**	218,5	10.07
45	Upper postventral caudal margin	**CPU**	347,7	16.02
46	Caudal fork width	**CFW**	172,5	7.95
47	Terminal caudal margin	**CTR**	84,3	3.88
48	Terminal caudal lobe	**CTL**	109,2	5.03
49	Clasper length	**CL**	50,1	2.31

The studied specimen is already the third small sized basking shark caught in waters off Piran in fishing nets. The first juvenile basking shark was recorded in May 2000 when a 299 cm long specimen weighing approximately 120 kg was entangled a fishing net (Lipej *et al.,* 2000).

Two months later, another specimen measuring 249 cm in TL and weighing 70 kg was entangled in a net (Lipej *et al*., 2000). Both specimens had a typical elongated snout. This was even more evident in the specimen of December 2014, which was also curved down.

1.4. New record of the deep-sea Messina rockfish *Scorpaenodes arenai* in a sublittoral cave of the National Marine Park of Zakynthos (East Ionian Sea, Greece)

By V. Gerovasileiou and N. Bailly

The Messina rockfish *Scorpaenodes arenai* Torchio, 1962 has been rarely reported after its first description. Only 36 specimens have been hitherto recorded in the literature: (a) 17 stranded individuals from the Strait of Messina; (b) 13 individuals recorded with ROV (70.9-135 m deep) in the straits of Messina, and of Sicily, and in the Tyrrhenian Sea (Battaglia *et al.*, 2015 and references therein); (c) 6 individuals collected in a subtidal tunnel and rocky bottoms (14-30 m deep) in Azores (Azevedo & Heemstra, 1995; Micael *et al*., 2006).

This study reports on the observation of *Scorpaenodes arenai* along the south-western coasts of the island of Zakynthos, inside the National Marine Park of Zakynthos (Ionian Sea, Greece), approximately 450 km away from Messina Strait where most records were made previously. Two specimens were observed on 14 June 2015 (8:23 am) during a SCUBA dive in a submerged cave (37.647˚N, 20.846˚E) located at a depth range of 26-31 m. The fish was lying on the walls and ceiling of the dark cave sector (10-15 m from the entrance), often in an upside-down position and displayed elusive behaviour (swimming rapidly away as divers were approaching) in contrast to the typical behaviour of shallow-water *Scorpaena* spp. Thus, only a single individual was photographed (Fig. 5). The fish length was visually estimated to approximately 10 cm.

A combination of diagnostic morphological characters was used to safely identify *Scorpaenodes arenai*: (a) overall red-orange colour; (b) vertical reddish-brown bars with that on the caudal peduncle not being Y-forked like in *Helicolenus dactylopterus*; (c) eye with dark iris and brownish radial bands; (d) suborbital ridge with spines; (e) black blotch in the middle of the dorsal fin (Azevedo & Heemstra, 1995; Battaglia *et al*., 2015).

This is the first time *Scorpaenodes arenai* is observed during a SCUBA dive in the Mediterranean. The shallowest record of the species was also reported during diving in a subtidal tunnel (14 m deep) in Azores where it was regularly observed as "resident species", exhibiting nocturnal feeding habits (Micael *et al*., 2006). Marine caves often provide refuge for deep-sea species and thus have been characterized as "bathyal islands" within the littoral zone (Harmelin & Vacelet, 1997).

The present finding of *Scorpaenodes arenai* in the dark zone of a sublittoral cave constitutes a new addition to Mediterranean marine cave fauna (Gerovasileiou *et al*., 2015). The species was spotted in a typical dark cave community dominated by serpulid polychaetes and sponges (e.g. *Agelas oroides*, *Dendroxea lenis*, and *Haliclona mucosa*). Large swarms of the shrimp *Plesionika narval* were found throughout the cave while its fish assemblage also included *Anthias anthias*, *Apogon imberbis*, *Phycis phycis* and *Serranus cabrilla*.

Fig. 5: *Scorpaenodes arenai* in a dark cave of the National Marine Park of Zakytnhos (Photo by V. Gerovasileiou).

The current record is the first of *Scorpaenodes arenai* in Greek waters, expanding eastwards of its hitherto known distribution. The south-western coasts of Zakynthos are characterized by vertical cliffs often falling sharply to a depth of >30 m and are exposed to wind-driven upwelling currents from the open Ionian Sea. Furthermore, the limestone coasts of the area are perforated by numerous caves and crevices which could be used as refuge or "stepping stones" by deep-sea species drifting from adjacent deeper waters.

1.5. New additional records of the oceanic puffer *Lagocephalus lagocephalus* (Osteichthyes, Tetraodontidae) in the Adriatic Sea

By J. Dulčić and B. Dragičević

The oceanic puffer *Lagocephalus lagocephalus* (Linnaues, 1758) is distributed circumglobally from the tropical to temperate seas. It is primarily an oceanic, pelagic species but may enter estuaries. It feeds on crustaceans and squid (Smith & Heemstra, 1986). It is represented in the Mediterranean (Tortonese, 1986) and Adriatic waters (Lipej & Dulčić, 2010). However, the species is rarely sighted in the Adriatic Sea and biological information is quite scarce (Dulčić & Pallaoro, 2006). The first record in the Adriatic Sea was observed on 16-17 September 2004, a specimen of 181.2 mm total length, 7 nautical miles from the coast (off Molunat Bay, southern Adriatic) at approximately 70 m depth (Dulčić & Pallaoro, 2006).

Fig. 6: The *s*pecimen of *Lagocephalus lagocephalus* caught near Kornati archipelago (on 16 June 2015).

Two new additional records of oceanic puffer were found near Kornati archipelago (6 nautical miles to the south, around 43°47'N, 15°20'E, on 16 June 2015) and near the island of Rab (around 44°46'N, 14°46'E, on 17 June 2015). This record near the island of Rab represents the northernmost record of this species in the Adriatic Sea.

The first specimen from Kornati archipelago (Total length TL=50 cm, Weight W= 2120 g) (Fig. 6) was captured from a depth of *ca* 1-3 m with a hand-line, while the second (TL=48 cm, W=2000 g) (Fig. 7) from a depth of 80 m with a trawl net. The specimens were stored in the Ichthyological collection of the Institute of Oceanography and Fisheries in Split (catalogue number LagIOR 297).

These findings are interesting primarily because they were recorded over 11 years after the first finding of the species in the Adriatic Sea. Several questions could arise based on the new additional records of the oceanic puffer in the Adriatic Sea. Has this species established a population in the Adriatic Sea or is it a seasonal visitor (three records for the Adriatic Sea were during summer)? Although there is no evidence of a permanent population in the study area, the captures described here might be an indication of a northernmost expansion of the distribution of the oceanic puffer in the Adriatic Sea in recent years. This species has probably extended its distribution from populations in the Ionian Sea. Such expanding behaviour was already observed for the Central Mediterranean between 2007 and 2012 along the Calabrian coast (Nicolaidou *et al*., 2012). Zava *et al*. (2005) mention that the number of oceanic puffer specimens has been increasing since 1999 for Sicilian waters (western Ionian Sea). New additional records in the Adriatic could also be related to the effect of BiOS (Civitarese *et al*., 2010) and oceanographical changes in the Adriatic Sea (Dulčić *et al*., 2004).

Fig. 7: The specimen of *Lagocephalus lagocephalus* caught near island Rab – northernmost record in the Adriatic Sea (on 17 June 2015).

There is no doubt that fish biodiversity in the Adriatic Sea is changing but to what extent non-indigenous species will affect its ecological balance remains to be seen and continuous monitoring is essential.

2. Alien species

2.1. Occurrence of *Antithamnionella elegans* (Ceramiales, Rhodophyta) on the Mediterranean shore of Israel

By R. Hoffman

During an annual algal survey conducted in 2014, the filamentous red seaweed *Antithamnionella elegans* (Berthold) J.H. Price & D.M. John was found for the first time in the Levant Mediterranean Sea of Israel. This alien species, which probably originated from the Indo-Pacific Ocean, is distributed all along the shoreline from Ashkelon (31.6808°N, 34.5539°E) in southern Israel to Rosh HaNikra (33.0867°N, 35.1055°E) in the north. All specimens collected were found growing as epiphytes, exclusively attached on the thalli of the red calcified seaweed *Ellisolandia elongata* (J.Ellis & Solander) K.R. Hind & G.W. Saunders, collected from the lower intertidal and shallow subtidal zone.

Specimens collected were filamentous, uncorticated, prostrate, up to 6 mm long, irregularly ramified and producing upright axes which grow to a height of up to ~1.5 mm; axial cells of the prostrate axes measuring 90-120 x 26-40 µm; those of the erect axes 40-100 x 15-21 µm; erect

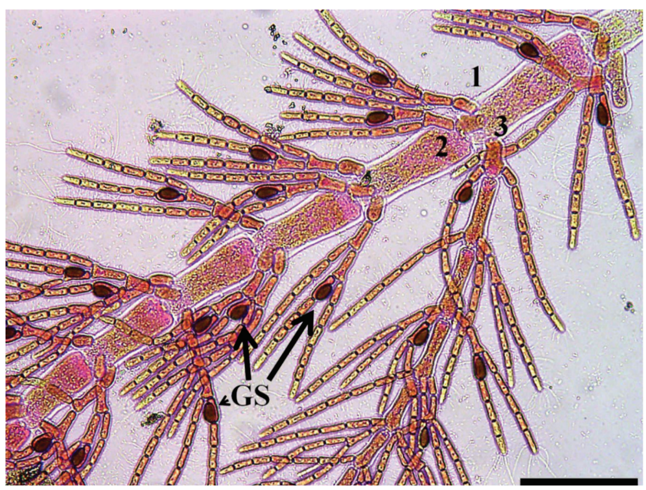


Fig. 8: Antithamnionella elegans: General view of branch and whorl-branchlets in whorls of three. Note that each gland cell (GS) lays laterally on a single cell (scale bar = 100µm).

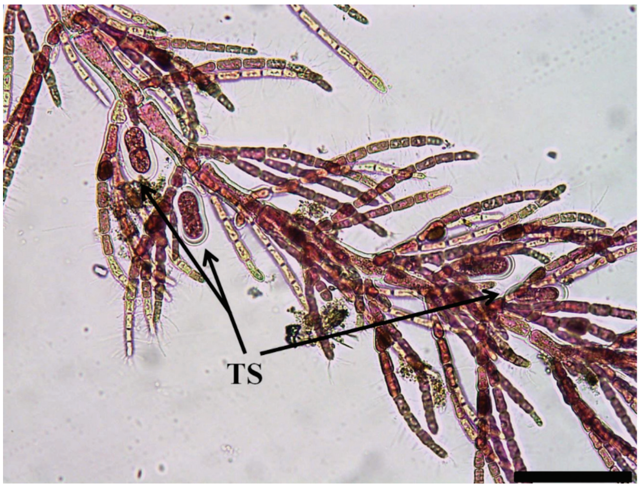


Fig. 9: Tetrasporophyte specimen of *Antithamnionella elegans*. Note the tetraspores (TS) attached to the first order cell of the whorl-branchlets (scale bar = 100µm).

and prostrate axes mainly bear three whorl branchlets per axial cell, distichously arranged; gland cell measuring 15-18 x 8.5-10.5 µm, with each one resting laterally on a single cell (Fig. 8). Rhizoids, produced on the ventral surfaces of most cells of the main axes, anchor these prostrate axes to *E. elongata* calcified thalli. Tetrasporangia oblong, 38-53 x 17-25 µm, tetrahedrally, sessile, formed singly, initially on the first whorl cell, usually one per whorl (Fig. 9); spermatangial and carposporangial plants were not observed.

Morphological and cellular characteristics of the examined specimens were in good agreement with those of *Antithamnionella elegans* var. *elegans*, published by Cormaci & Furnari (1988) and *Antithanmion elegans* Berthold published by Athanasiadis (1996). These taxa are now regarded as *Antithamnionella elegans* (Guiry & Guiry, 2015).

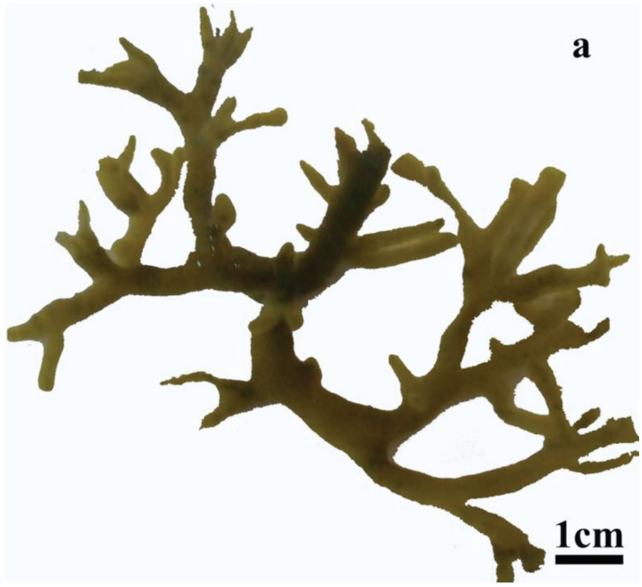
Antithamnionella elegans has been previously reported from the Levant Mediterranean Sea of Syria as well as from several sites in the western and eastern basins of the Mediterranean Sea (Zenetos *et al*., 2010; Tsiamis *et al*., 2011).

Although the Levant Mediterranean shore of Israel was intensively surveyed during the past ten years, this is the first observation of the genus *Antithamnionella* from this coast. Moreover, the present survey shows that this species is very common all along the shoreline. These facts may indicate that this alien species needs special environmental conditions in order to grow and prosper in the Levant Mediterranean.

2.2. New record of the alien green alga *Codium parvulum* for Turkey and the Aegean Sea

By Ö. Aydogan and E. Taşkın

Thirteen taxa in the genus *Codium* Stackhouse (Codiaceae, Bryopsidales) have been reported to occur in the Mediterranean Sea (Cormaci *et al.,* 2014). Ten *Codium*



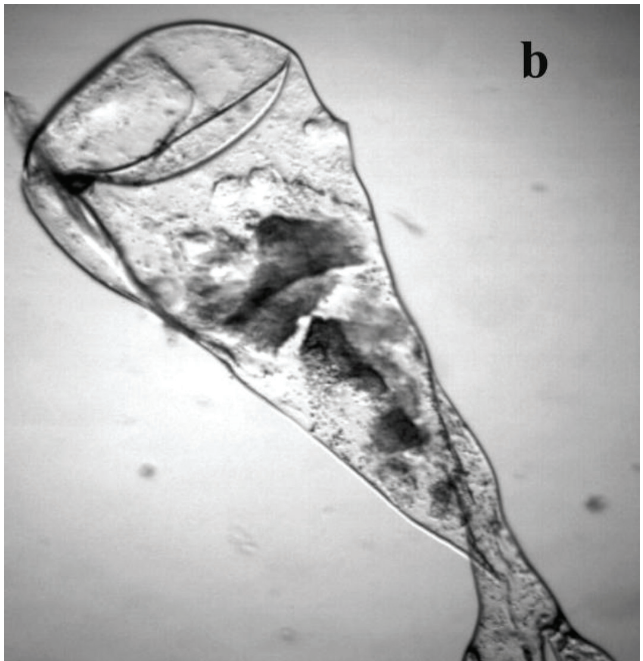


Fig. 10: Codium parvulum. a. Habit. b. Utricle in the basal part.

species have been recorded to occur in Turkey (Taşkın *et al.,* 2008; Thessalou-Legaki *et al*., 2012). Two alien species, *Codium parvulum* (Bory *ex* Audouin) P.C. Silva and *Codium arabicum* Kützing, were reported for the first time in the Mediterranean Sea from Israel (Israel *et al.*, 2010; Hoffman *et al.,* 2011). In this paper, the alien green alga *Codium parvulum* is recorded for the first time from Turkey and the Aegean Sea.

Samples were collected at Ayvalık in June 2012 (Aegean coast of Turkey) by scuba diving, and preserved in 2-4% formaldehyde in seawater. Specimens were studied using a light microscope (Nikon SE), and photographs were taken using a Nikon P5100 camera. Vouchers were deposited in the Department of Biology of the Celal Bayar University, Turkey.

Codium parvulum is a procumbent (repent) species**.** Thallus light green, to 13 cm long, dichotomously branched (Fig. 10a); lower segments irregularly branched and some parts of cylindrical branches are slightly flattened, 2-4.5 mm broad; hair distance from apical portion 140-450 µm; mature utricules clavate, pyriform and subcylindrical, 110-290 µm broad and 550-800 µm long (Fig. 10b); gametangia cylindrical, fusiform and ovate, 40-65 µm broad and 250-440 µm long, borne at the apex of utricle; medullary filaments 20-50 µm broad, chloroplasts discoid or fusiform with one pyrenoid. This species was collected from Ayvalık (39º18'47″N, 26º41'02″E), on the Aegean coast of Turkey, at 10-15 m depth, in June 2012, from sandy and partially stony substratum. The identification was made on the basis of the description in Israel *et al.* (2010).

2.3. First report of the red alga *Palisada maris-rubri* (Ceramiales, Florideophyceae) from the Eastern Mediterranean Sea

By K. Tsiamis and V. Gerakaris

The red alga *Palisada maris-rubri* (K.W. Nam & Saito) K.W. Nam is reported for the first time from Greece. Several epilithic plants were found in a rock pool, at 0.2 m depth, in the semi-enclosed bay of Ladiko, Rhodes, S. Aegean Sea, in January 2006 and April 2014. This finding represents the first record of this species from the Eastern Mediterranean Sea.

Plants are erect, robust, up to 15 cm high, greenish, hard cartilaginous in texture, attached to the substratum by a discoid holdfast 2 cm in diameter (Fig. 11A); main axes percurrent, 2-3 mm broad, irregularly and sparsely ramified; branches irregularly to alternately ramified, but also subverticillate and unilateral to upper parts (Fig. 11B); ultimate branches cylindrical, 3-4 mm long and 0.5-1 mm wide, with truncate apices; in surface view epidermal cells without secondary pit connections, polygonal to rounded, 20 µm in diameter; in cross section, epidermal cells rectangular, 50 x 20 µm, with a palisade-like arrangement (Fig. 11C); medullary cells rounded, larger, up to 140 µm in diameter, with thick walls, without lenticular thickenings and intercellular spaces; two pericentral cells per axial cell; no reproductive structures observed.

Originally described from the Red Sea (Nam & Saito, 1995), *Palisada maris-rubri* was reported from the Mediterranean coasts of Spain and the Eastern coast of Sicily (Lachea Island near Catania) (Serio *et al*., 2010), and it might represent a rather recent introduction for the Mediterranean Sea.

Despite the absence of reproductive structures, our specimens are almost identical with those described by

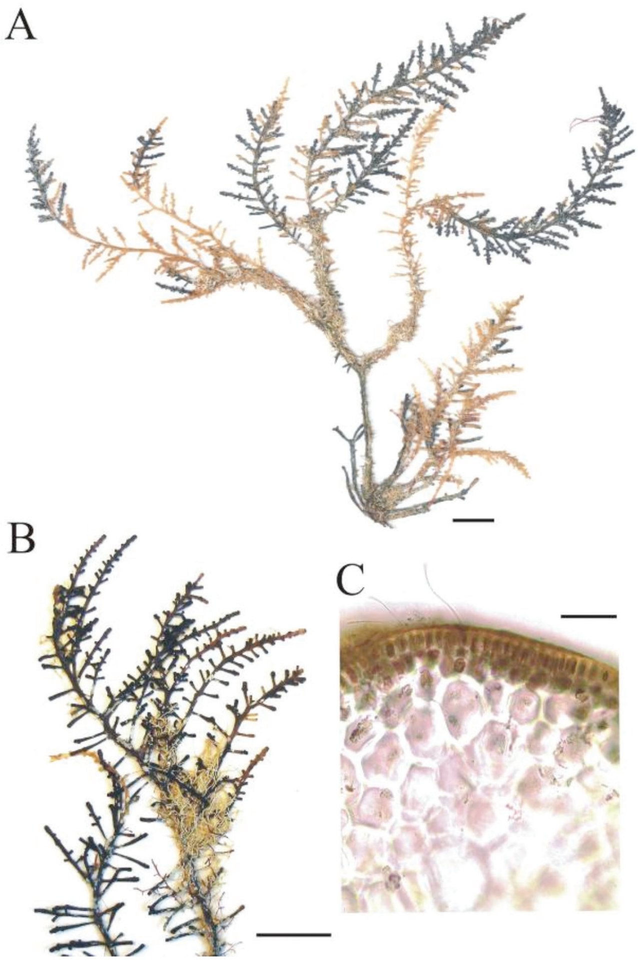


Fig. 11: *Palisada maris-rubri*. A. General herbarium habit. B. Detail of upper thallus part. C. Cross-section of thallus, depicting large medullary colorless cells surrounded by smaller pigmented cortical cells forming a palisade-like arrangement. Scale bars: Figure A, B = 1 cm; Figure C = 100µm.

Serio *et al*. (2010). *P. maris-rubri* probably has a wider distribution in the Mediterranean Sea, most likely having been previously confused with *Palisada perforata* (Bory de Saint-Vincent) K.W. Nam.

2.4. First record of the alien sea urchin *Diadema setosum* (Echinodermata: Echinoidea: Diadematidae) in Hellenic waters

By P. Latsoudis

The first record of *Didema setosum* (Leske, 1778) in the Mediterranean Sea was reported in 2006 off Kaş Peninsula, south-western coast of Turkey (Yokes & Galil, 2006), but no other specimen was sighted in the same area between 2007-2009 (Yokes & Galil, 2006). This area is about 3 km north of Kastellorizo Island. Its occurrence was verified later eastward, along the Lebanese coastline in 2009 and in Antakya, south-eastern coast of Turkey in 2010, and westward, up to Gökova Bay, Aegean Sea, Turkey (Yapici *et al*., 2014 and references therein).

During a free diving underwater photographic survey on 5-6 December 2014 in a coastal area of the Greek island of Kastelorizo, four specimens of an exotic echinoid were observed and photographed. The studied marine area is just parallel to the shore, narrow and about 200 meters long. It is located close to the port of the island (36.152916°N, 29.591658°E) and is characterized by a rocky substrate. The specimens observed during the day were semi-shielded on rocky bottom and open crevices at a depth of only 3-5 meters. One specimen was observed and photographed again in the same area during a similar survey on 2-3 May 2015.

After close examination of the photographic material and based on external morphological aspects, the specimens were recognized as the needle-spined urchins *Diadema setosum* (Fig. 12).

The conspicuous characteristic of the species is the unusual long spines, absent from the swallow water echinoids of Greece. The specimens also had at least four white spot markings on the inter-ambulacrals just above the ambitus (Fig. 13). According to Coppard & Campbell (2006), the white spot markings are evident during the day and night on *Diadema setosum* instead of the similar markings on the test of the closely related *D. savignyi* (Michelin, 1845) which are typically visible only during the night. All specimens observed had only dark (almost black) spines but no gray ones, instead of the both dark and gray spines of the specimens mentioned by Yapici *et al*. (2014) in Turkish waters.

Fig. 12**:** Specimen of *Diadema setosum* in an open crevice.

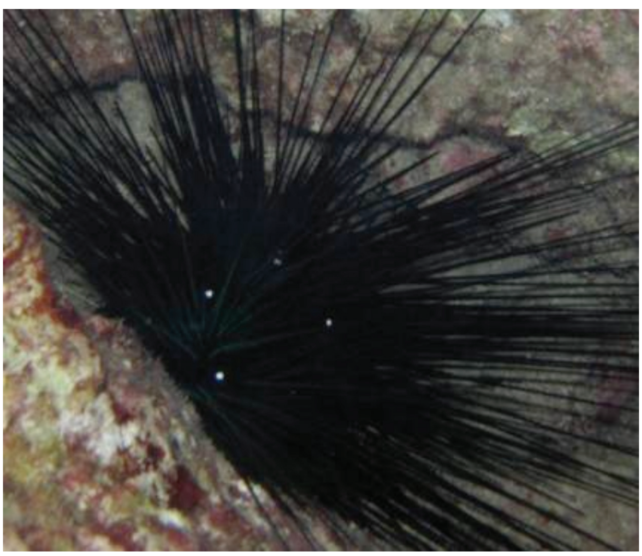


Fig. 13: At least 4 white spot markings are obvious on the test of this specimen.

Yokes & Galil (2006) mention that possible vectors for the indroduction of this species into the Mediterranean Sea include larval transport through the Suez Canal, shipping, and aquarium trade. They also underline the urchin's venomous spines that may cause painful injuries to swimmers.

Although the occurrence of *Diadema setosum* in Kastellorizo, Greece, could be expected after its appearance in the nearby Turkish coastal area of Kaş Peninsula (Yokes & Galil, 2006), its presence around the island is documented here after about a decade. This is probably due to the scarce scientific investigation of the area and this underlines the urgent need for a more thorough effort to monitor the rapid expansion of alien species. The latter is of significant importance for taking management measures for the eradication of unwanted invasive species in due time.

The finding of *Diadema setosum* adds a new alien echinoderm to Hellenic waters, after the previously inventoried species *Ophiactis savignyi* (Müller & Troschel, 1842) and *Synaptula reciprocans* (Forsskål, 1775) (Zenetos *et al*., 2011 and references therein).

2.5. *Goniobranchus annulatus* invading the South-Eastern Aegean Sea (Greece)

By G. Kondylatos and M. Corsini-Foka

Goniobranchus annulatus (Eliot, 1904), a nudibranch of distinctive colour pattern, inhabits the Indian Ocean, the East African coast and the Red Sea. After its first occurrence in the Mediterranean, in a rock pool on the island of Salamina, Saronikos Gulf, Greece in 2004 (Daskos & Zenetos, 2007), the species has been found along the Mediterranean coasts of Turkey, at Beldibi, Antalya (2008), at Çevlik Harbor (2009) and in Iskenderun Gulf (2008-2009); in Cyprus, at Dhekelia, Larnaca, (2009); in various locations off Israel (2009-2011) (Pasternak *et al*., 2011 and references within); in Lebanon (Crocetta *et al.*, 2013); and in Greece, island of Kastelorizo, in 2010 (Zenetos *et al*., 2011).

On the 10^{th} of May 2015, more than 10 specimens of the nudibranch were observed along a distance of 30-40 m, over the rocky substrate covered by green, red and brown algae, within a depth range of 2-12 m, during snorkeling and free diving. 7 live samples, 3-5 cm in length, were collected by hand and transported to the facilities of the Hydrobiological Station of Rhodes, where they suc-

Fig. 14: *Goniobranchus annulatus* in aquarium.

cessfully adapted, feeding on the algae and *Aiptasia* spp. attached to the hard substrates of the aquarium tanks, for a period of more than 30 days (Fig. 14).

Close to the area of collection (36.063645°N, 27.997037°E) there is a jetty (36.068128°N, 28.004172°E), used for the docking of fishing vessels and cargo ships, which supply Rhodes and the neighbouring islands with construction materials and provisions from around Greece. This is probably the vector of introduction of the species into the waters of Rhodes thus supporting the hypothesis of its introduction in Saronikos Gulf (Daskos & Zenetos, 2007). However, range expansion from the already established population in the Levantine Sea is also an option.

The depth and substrate (hard with algae) of the collections agree with that of Greek (Daskos & Zenetos, 2007), Cyprian (Tsiakkiros & Zenetos, 2011), Turkish (e.g. Özcan *et al*., 2010), Lebanese (Crocetta *et al*., 2013), and Israeli specimens (Pasternak *et al*., 2011). Coloration agrees with all specimens from the Mediterranean (e.g. Gökoglu & Özgur, 2008), except for that of Daskos & Zenetos (2007).

This third record in Hellenic waters, fills the distribution gap of the species from the western central to the south-eastern part of the Aegean Sea.

2.6. Filling the gaps: on the presence of *Melibe viridis* in Lebanon

By F. Crocetta and M. Bariche

Melibe viridis (Kelaart, 1858) (Mollusca: Gastropoda: Tethydidae) is a conspicuous shallow water Indo-Pacific opisthobranch, that has invaded the Mediterranean Sea since the 1970s. It is currently known from the central and the eastern Mediterranean Sea, including the Adriatic (Croatia, Montenegro, Italy, Tunisia, Malta, Greece, Turkey, Cyprus and Israel) (bibliographic and web references in Tsiakkiros & Zenetos, 2011). Records from the easternmost part of the Mediterranean Sea are scarce, and consist of a few records from Cyprus (Tsiakkiros & Zenetos, 2011) and a single record from Israel (Mienis, 2010). The absence of early Red Sea records, as well as its first records from Greece (see Tsiakkiros & Zenetos, 2011), suggested that its presence in the Mediterranean Sea was most presumably due to shipping transport rather than to a passage from the Indo-Pacific through the Suez Canal (Lessepsian immigration). However, the mode of introduction of this species remains questionable.

On 28 May 2015, a single specimen of *Melibe viridis* was collected from the fishing port of Batroun (34.257276°N, 35.657224°E) in Lebanon. The specimen was captured with a landing net, while wandering betwen the boats at about 1 m depth. A video of the swimming individual can be visualized at the following webpage: http://youtu.be/uZQrcbRpRdw. So far, the species was unknown from Lebanon (see Crocetta *et al*., 2013) and our record fills a gap in its known Mediterranean invaded range. This and other published additions (see Ramos-Esplá *et al*., 2015) increase taxa the “opisthobranch” fauna for Lebanon to 39 taxa. Crocetta *et al*. (2013) pointed out a higher proportion (approx. 34%) of alien species with respect to native ones in the Lebanese seaslug fauna, outstandingly exceeding the range of 10-20% commonly estimated for the entire Levantine fauna. With these new data, alien, possible alien and cryptogenic fauna (14 species) amounts to 35.9%. Moreover, this rare record adds to the previous ones from neighboring areas and confirms the presence of the species in the Levantine Sea.

2.7. New records of blue spotted cornetfish *Fistularia commersonii* on the Alicante coast (Eastern Spain)

By A. Izquierdo-Muñoz and D. Izquierdo-Gómez

The first citation of *Fistularia commersonii* (Rüppell, 1838) in the Mediterranean Sea was from Israel (Golani, 2000) in 2000, but later records report it from Lebanon in 1975 (Bariche *et al*., 2014). The species spread rapidly across the Mediterranean reaching as far west as Granada (southern coast of Spain) in 2007 (Sanchez-Tocino *et al*., 2007).

In January 2015, one specimen of *Fistularia commersonii* was captured by a fisherman using a trammel net at Urbanova beach (38.28330ºN, 0.50695ºW), at a depth of

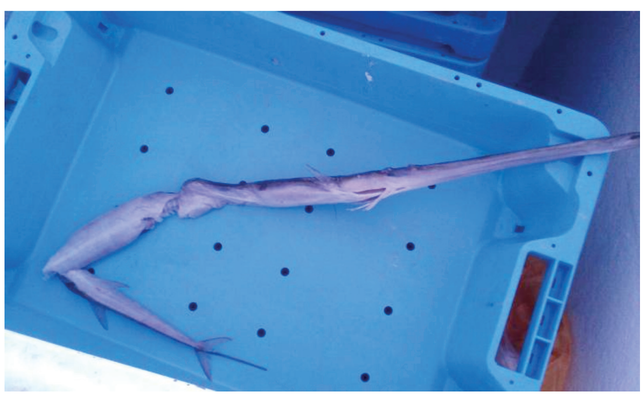


Fig. 15: Specimen of *Fistularia commersonii* captured at Urbanova beach.

8 m, depth and mean sea surface temperature was 14.5ºC (Fig. 15). Only the total length (TL) could be provided as the specimen was partially predated, showing 77 cm of TL. Interestingly, the capture of another specimen 30 km southwards (38.17395ºN, 0.58601ºW), was mentioned by the same fisherman, but this information could not be verified as the specimen was not preserved.

Anyhow, the establishment of *Fistularia commersonii* in the SW Mediterranean was suspected, since the species was also documented in areas such as the Balearic Islands (Mas *et al*., 2009), and more recently at Cabo de Palos (Martinez, 2015).

Summarizing, the sporadic detection of the species in the western Mediterranean, coupled with low abundance during the last 7-8 years, indicate that the *Fistularia commersonii* have not had the ability to become invasive in the area presumably due to environmental features. However, since the species has been detected on a yearly basis, future tropicalization of the Mediterranean Sea could render this area more suitable for *F. commersonii*, in the same way that other native species are expanding their distribution range in the North-western Mediterranean due to warming of the sea. Despite the latter, monitoring programs for *F. commersonnii* and other targeted invasive species will be needed to prevent further impacts on the ecosystem.

2.8. *Siganus luridus* and *Siganus rivulatus* in the Coastal Waters of Lipsi Island, Dodecanese, Greece

By S. Carden-Noad and M. Drakulić

Siganus luridus (Rüppell, 1829) and *Siganus rivulatus* (Forsskål, 1775) are invasive Lessepsian fish species, native to the Red Sea. The first records of their presence in the Mediterranean are from the early 1900s. These invasive species are thought to be altering the natural food web of the rocky infralittoral zone by overgrazing and outcompeting native herbivores such as *Sarpa salpa* (Linnaeus, 1758) and *Boops boops* (Linnaeus, 1758) (Stergiou, 1988; Azzurro *et al*., 2007; Giakoumi, 2014).

Table 2: List of infralittoral sites with number of *Siganus* spp. present.

Site	Coordinates	Number of *S. luridus* present	Number of *S. rivulatus* present
Giofito	37.280556°N, 26.771667°E	42	2
Lendou	37.299722°N, 26.763056°E	33	1
Platis Gialos	37.313611°N, 26.739722°E	28	0
Gatis	37.293611°N, 26.750000°E	93	2
Moschato	37.321667°N, 26.724167°E	13	18
Vroulia	37.318056°N, 26.723889°E	42	5
Katsadia	37.281944°N, 26.771944°E	34	18
Kamares	37.305278°N, 26.787778°E	19	6

In August 2014, sampling of the two Siganid species was performed on the island of Lipsi (37.303299°N, 26.751428°E), Dodecanese group of islands, in the Southeast of the Aegean Sea, Greece. Fish communities at 8 sites (Table 2) were recorded to assess *Siganus* spp. habitat preference. The habitats assessed were rocky algal beds, seagrass meadows and sand. The species richness and diversity of algae at these sites were measured. Local artisanal fishermen's daily catches were also assessed to denote *Siganus* spp. presence further offshore.

Siganus spp. were dominant in the local artisanal fishermen's catch, with *S. luridus* comprising 54.5% of the total catch in the month of August 2014, and 74.9% of the total herbivore catch. This bears socio-economic implications as *Siganus* spp. in the region have low commercial value (around 5€/kg). It was found that *S. luridus* (Fig. 16) and S. *rivulatus* (Fig. 17) favour rocky algal habitats, with *S. rivulatus* also frequenting seagrass, though not to the same extent.

At Kamares, the site with the lowest abundance of *Siganus* spp. present, it was also noted that there was a lack of the invasive alga species, *Caulerpa cylindracea* Sonder supporting the idea that this alga is one of the preferred food sources of *Siganus* spp. (Stergiou, 1988;

Fig. 16: *Siganus luridus* over rocky algal substrate in Lipsi coastal waters

Fig. 17: School of *Siganus rivulatus* in Lipsi coastal waters.

Lundberg *et al*., 1999; Azzurro *et al*., 2004). This site also had the greatest populations of herbivore species *S. salpa, Chromis chromis* (Linnaeus, 1758) and *Sparus aurata* (Linnaeus, 1758), suggesting that herbivorous fish species are able to thrive at this site, without the competing *Siganus* spp. overgrazing the benthic algae.

Earlier records in the area are from the island of Fourni, where fishermen's fish catch was recorded in August and September 2012 (Pennington *et al*., 2013). Regarding the results of this study, *Siganus* spp. have to be considered as a totally established species in the region.

2.9. First record of *Stephanolepis diaspros* (Tetraodontiformes, Monacanthidae) from the Egadi Islands Marine Protected Area (western Sicily)

By P. Balistreri and M. Parasporo

Stephanolepis diaspros (Fraser–Brunner, 1940) is a representative of the Monacanthidae family (file fishes) widely distributed in the shelf waters of the Persian Gulf and Red Sea. Reticulated leatherjacket *S. diaspros* is one of the earlier Lessepsian immigrants actually well established in the eastern part of the Mediterranean Sea (Golani *et al*., 2015). The species inhabits various substrates and is usually encountered on rocky bottoms with vegetation, sandy and muddy bottoms as well as seagrass meadows (Golani *et al*., 2015). In fact, according to Zouari-Ktari *et al.* (2008), it is an omnivorous species and could be considered an opportunistic predator.

In the central part of the basin, the distribution of the species extends to the Tunisian coasts and Malta, while in Italy it has been reported from the Gulf of Taranto, in the waters off Lampedusa Island up to the Gulf of Palermo (Deidun *et al.*, 2015; Golani *et al*., 2015). It has also been recorded in the North Adriatic Sea (Lipej *et al.*, 2014), actually representing the northernmost record of *S. diaspros diaspros*.

On 20th July 2014, a specimen of *Stephanolepis diaspros* was caught using a trammel net in the waters off Punta Mugnone (Marettimo, Italy, 37.99028°N, 12.02397°E; Fig. 18) on a rocky bottom at about 20 m depth. The identification of the specimen (Fig. 19), about 17 cm long, was based exclusively on the available photos using a dichotomous key on the basis of the following characteristics: spiniform ray on the first dorsal followed by a reduced membrane; rounded caudal with two dark transversal bands; gray/brown or greenish colour with darker patches or with clear lines that sometimes draw oblong rhombus shapes. According to El-Ganainy (2010), since females are smaller-sized (8.0-16.0 cm long) than male specimens (up to 16.0-26.0 cm long), we considered that the file fish sample must be an adult male.

This is an additional report of *S. diaspros* from Italian waters and from the Strait of Sicily. Even though *S. diaspros* has a wide distribution in the Mediterranean Sea, the

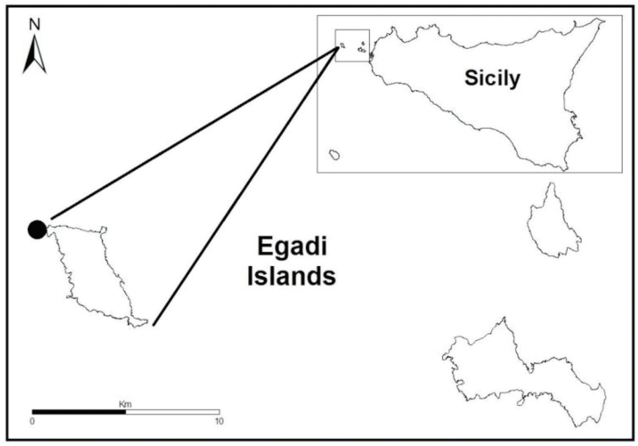


Fig. 18: Map showing the locality off Punta Mugnone (Marettimo Island, Italy) where *Stephanolepis diaspros* was recorded.

Fig. 19: Specimen of *Stephanolepis diaspros* caught off Marettimo Island (Italy) (photo by Vito Vaccaro).

scarce information about its biology and ecology do not allow us to draw definite conclusions on its settlement in the geographical region under study. Nowadays, thanks to the most recent reports, we can state that probably this file fish has been expanding towards the western part of the Mediterranean basin, as already recorded for other species such as: *Siganus luridus* (Rüppel, 1828), *Fistularia commersonii* (Rüppel, 1835), and *Lagocephalus sceleratus* (Gmelin, 1789). This expansion could suggest that new specimens of *S. diaspros* will soon be sighted in the Egadi Islands and along the western and southern coast of Sicily.

2.10. Northward expansion of the alien pufferfish *Torquigener flavimaculosus* along the southeastern Aegean coasts of Turkey

By S. Yapici and A. Tűrker

The pufferfish *Torquigener flavimaculosus* Hardy & Randall, 1983, is an Erythrean fish; it entered into the Mediterranean from the Red Sea via the Suez Canal, and was reported for the first time by Golani (1987) from Haifa, Israel. The first record of *T. flavimaculosus* in the Turkish Aegean Sea was given from Fethiye Bay (Bilecenoğlu, 2005), while its expansion was confirmed in 2008 at Iskenderun Bay

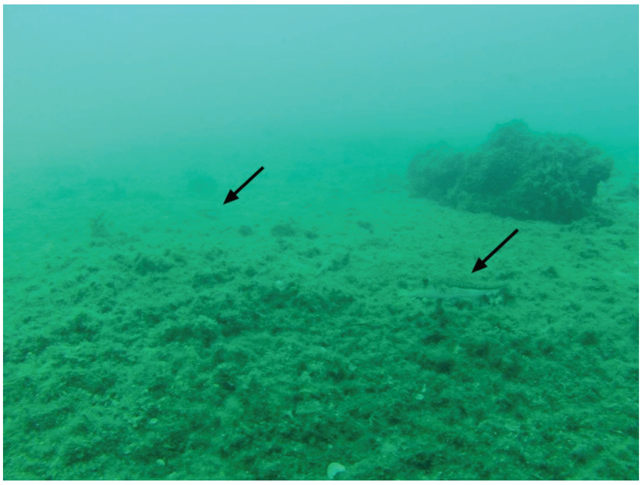


Fig. 20: Two specimens of *Torquigener flavimaculosus* from the SE Aegean Sea (Photo by Ali Türker).

(Erguden & Gurlek, 2010) and later at Adrasan (Anonymous, 2012), eastern Mediterranean coasts of Turkey.

During SCUBA dive performed at Gökova Bay, Aegean Sea, Turkey, one of the authors (A.T) observed two specimens of *Torquigener flavimaculosus* (37.0316°N, 28.1820°E), on 12 September 2013, in shallow waters (4 m), on rocks covered by algae patches and sandy bottom (Fig. 20). The identification of the species was based on the description provided by Golani *et al.* (2006) using high quality photos. Important diagnostic features of specimens were clearly visible and noticeable: body colour brown dorsally with irregular grey-whitish spots; a mid-lateral line of well-distinguished yellow-orange spots, pale yellow ventrally. Dorsal and ventral zones were separated by dark band with irregular spots. Caudal fin pigmented with dark spots, anal and pectorals fins transparent.

The observation of the alien *Torquigener flavimaculosus* reported here for the first time in the Aegean Turkish waters, shows a slight expansion northwards to the waters of Rhodes Island, southeastern Aegean Sea, Greece, where the species is well established and common (Corsini-Foka *et al.,* 2014).

The spread of non-indigenous warm-water species in the Mediterranean Sea is an ongoing and accelerating process and the observations derscribed here highlight the intensification of this phenomenon in the area of the South Aegean Sea. Therefore, the study of non-indigenous new assemblages should be more focused, and their interactions deeply investigated as well.

2.11. On the occurrence of the Lessepsian immigrants *Alepes djedaba*, *Lagocephalus sceleratus* and *Fistularia commersonii* in Zakynthos Island (SE Ionian Sea, Greece)

By C. Dimitriadis and L. Sourbès

The shrimp scad *Alepes djedaba* (Forsskål, 1775) (Carangidae), the silver-cheeked toadfish *Lagocephalus sceleratus* (Gmelin, 1789) (Tetraodontidae) and the Bluespotted cornetfish *Fistularia commersonii* (Ruppell, 1838) (Fistulariidae) (Fig. 21) are Lessepsian immigrant fish species of Indo-Pacific origin that have been successfully established mainly in the Eastern Mediterranean Sea. *A. djedaba* has been reported from several locations of the Levantine Sea, the Aegean Sea and the coast of Libya (Golani *et al.,* 2013 and references therein) while it spread westward up to Tunisian waters (Hattour & Bradai, 2013) and the Maltese Islands (Sciberras & Schembri, 2007). *L. sceleratus*, which can be lethal to humans if the fish is consumed, has been reported throughout the eastern Mediterranean Sea, the Hellenic Ionian sea, the coast of Tunisia and Lampedusa Island in Italy (Azzurro *et al.*, 2014 and references therein). *F. commersonii* is considered to be one of the most widespread Lessepsian immigrants, which has rapidly expanded throughout the Mediterranean Sea (Azzurro *et al.*, 2013). However, all the above species have not yet been reported from the southern part of the Hellenic Ionian Sea. This study reports on their presence around Zakynthos Island (SE Ionian Sea) including the Marine Protected Area (MPA) of the National Marine Park of Zakynthos (NMPZ) (Fig. 22).

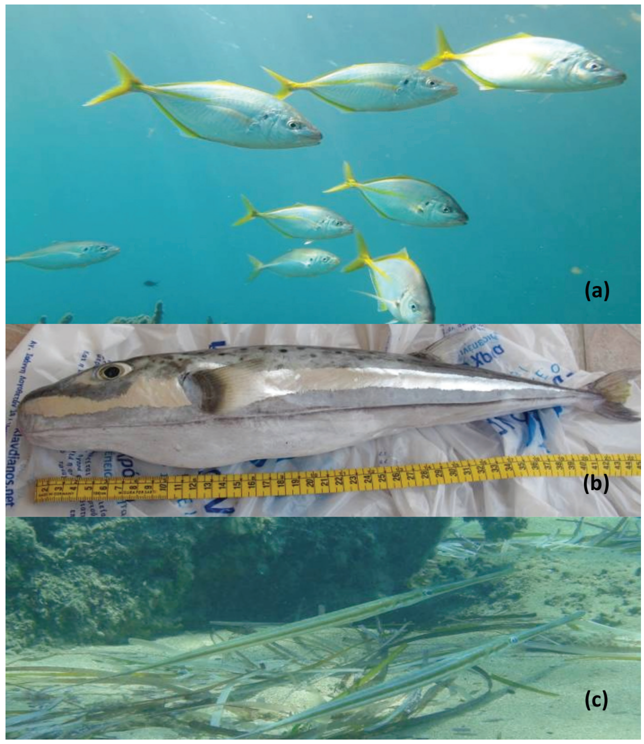


Fig. 21: (a) *Alepes djedaba* (Photo by L. Sourbès), (b) *Lagocephalus sceleratus* (Photo by C. Dimitriadis) and (c) *Fistularia commersonii* (Photo by K. Vatikiotis) in Zakynthos Island (SE Ionian Sea, Greece).

A single individual of *Alepes djedaba* was initially observed (17th of August 2014) during a snorkelling survey in front of Gerakas beach (37.706764˚N, 20.986537˚E, 2 m depth), feeding on benthic fauna across a sandy habitat. A school of 9 individuals was further detected after

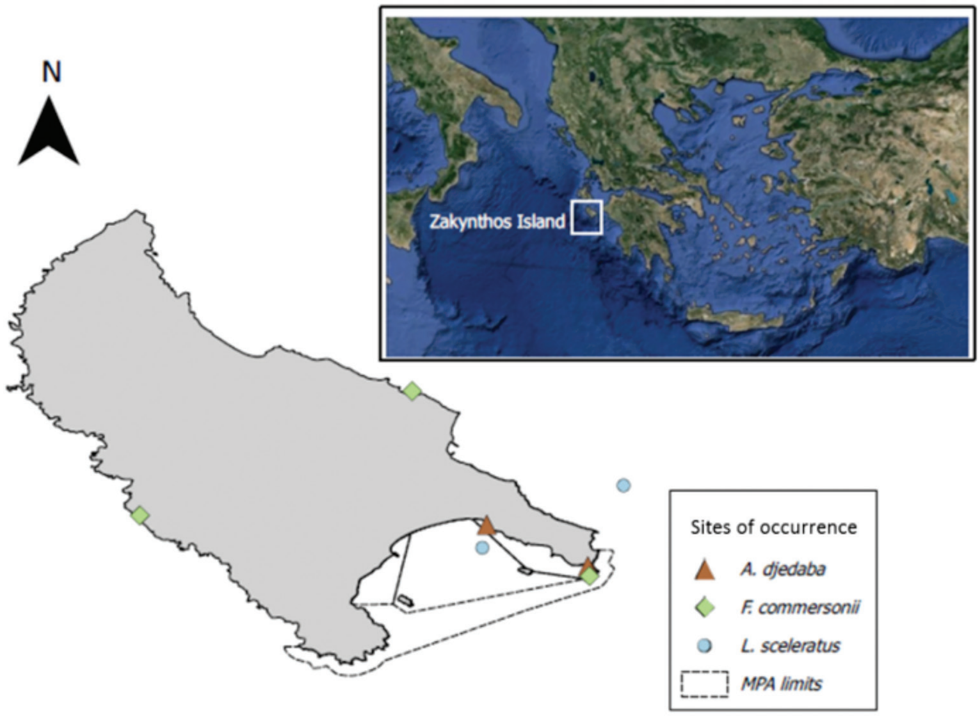


Fig. 22: Sites of occurrence of *Alepes djedaba*, *Lagocephalus sceleratus* and *Fistularia commersonii* in Zakynthos Island (SE Ionian Sea).

13 days around Vrontonero (37.733179˚N, 20.922256˚E, 4 m depth), swimming across a reef. Both sightings occurred within the MPA, whereas this species was found to school with individuals of *Trachurus mediterraneus*. With regard to *Lagocephalus sceleratus*, 30 individuals of this species were caught on the 23rd of March 2014 (around 37.718513˚N, 20.919438˚E) by artisanal fishermen using trammel nets at depths ranging from 10 to 20 m within the MPA. Two more individuals were caught by a trawler on the 3rd of June 2014, off the coast of Zakynthos coast (37.758183˚N, 21.009275˚E). Fishermen provided samples for the identification of the species. Regarding *Fistularia commersonii,* a single individual was caught at Tsilivi (SE coast of Zakynthos Island: 37.818286˚N, 20.874918˚E) on the 16th of March 2014 by local fishermen who provided a photo. Later on, the authors identified during snorkeling surveys (on the 15th of June 2014) 2 more individuals of *F. commersonii* at Limnionas (west coast of Zakynthos Island: 37.739128˚N, 20.701634˚E, 5 m depth) and another 14 individuals of this species around Gerakas beach (37.700477˚N, 20.987682˚E, 4 m depth). Our findings increase the available information on the occurrence and distribution of alien fish species in the Hellenic part of the Ionian Sea, which, in general, is rather limited.

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