Mediterranean Marine Science

Vol 16, No 3 (2015)

New Mediterranean Biodiversity Records (October 2015)

F. CROCETTA, D. AGIUS, P. BALISTRERI, M. BARICHE, Y.K. BAYHAN, M. ÇAKIR, S. CIRIACO, M. CORSINI-FOKA, A. DEIDUN, R. EL ZRELLI, D. ERGÜDEN, J. EVANS, M. GHELIA, M. GIAVASI, P. KLEITOU, G. KONDYLATOS, L. LIPEJ, C. MIFSUD, Y. ÖZVAROL, A. PAGANO, P. PORTELLI, D. POURSANIDIS, L. RABAOUI, P.J. SCHEMBRI, E. TAŞKIN, F. TIRALONGO, A. ZENETOS

doi: 10.12681/mms.1477

Collective Article A

Mediterranean Marine Science
Indexed in WoS (Web of Science, ISI Thomson) and SCOPUS
The journal is available on line at http://www.medit-mar-sc.net
DOI: http://dx.doi.org/10.12681/mms.1477

New Mediterranean Biodiversity Records (October 2015)

F. CROCETTA[1], D. AGIUS[2], P. BALISTRERI[3], M. BARICHE[4], Y.K. BAYHAN[5], M. ÇAKIR[6], S. CIRIACO[7], M. CORSINI-FOKA[8], A. DEIDUN[9], R. EL ZRELLI[10], D. ERGÜDEN[11], J. EVANS[12], M. GHELIA[13], M. GIAVASI[14], P. KLEITOU[15], G. KONDYLATOS[8], L. LIPEJ[16], C. MIFSUD[17], Y. ÖZVAROL[18], A. PAGANO[19], P. PORTELLI[17], D. POURSANIDIS[20], L. RABAOUI[21], P.J. SCHEMBRI[12], E. TAŞKIN[6], F. TIRALONGO[22], A. ZENETOS[1]

[1] Institute of Marine Biological Resources and Inland Waters, Hellenic Centre for Marine Research, GR-19013, Anavyssos, Greece
[2] Faculty of Science, University of Malta, Msida MSD 2080 Malta
[3] Vicolo Giotto 6, I-91023, Favignana, Italy
[4] Department of Biology, American University of Beirut, PO Box 11-0236, Beirut 1107 2020, Lebanon
[5] Department of Fisheries, Vocational School of Kahta, University of Adıyaman, TR-02400 Kahta, Adıyaman, Turkey
[6] Department of Biology, Faculty of Arts and Sciences, Celal Bayar University, Muradiye-Manisa 45140, Turkey
[7] WWF Miramare, Strada Costiera 334, I-34014, Trieste, Italy
[8] Hydrobiological Station of Rhodes, Hellenic Centre for Marine Research, Cos Street, GR-85100, Rhodes, Greece
[9] Department of Geosciences, Room 315, Chemistry Building 3rd Floor, University of Malta campus, Msida, MSD 2080, Malta
[10] Géosciences Environnement Toulouse (GET), Université de Toulouse, UMR 5563 CNRS/UPS/IRD/CNES, 14 avenue Edouard Belin, 31400 Toulouse, France
[11] Department of Marine Science, Faculty of Marine Sciences and Technology, University of Iskenderun Technical, TR-31220, Iskenderun, Hatay, Turkey
[12] Department of Biology, University of Malta, Msida MSD2080 Malta
[13] Centro Immersioni Pantelleria, Contrada Madonna delle Grazie, I-91017, Pantelleria, Italy
[14] Glarentzas Str, GR-27068, Kyllini Ileias, Greece
[15] Marine & Environmental Research (MER) Lab, 202 Amathountos Av, Marina Gardens, Block B, Off. 13-14, Limassol, Cyprus
[16] Marine Biology Station, National Institute of Biology, Fornače 61, 6630 Piran, Slovenia
[17] Malta Natural History Musuem, Triq Inguanez, Mdina, MDN 1010, Malta
[18] Fisheries Department, Faculty of Fisheries, Akdeniz University, TR-07059 Antalya, Turkey
[19] G.R.O. Sub - F.I.P.S.A.S., Viale Africa 186, I-95129, Catania, Italy
[20] Institute of Applied and Computational Mathematics, Foundation for Research and Technology, Nikolaou Plastira 100, Vassilika Vouton, P.O. Box 1385, GR-71110, Heraklion, Crete, Greece
[21] Research Unit of Integrative Biology and Evolutionary and Functional Ecology of Aquatic Systems, Faculty of Science of Tunis, University of Tunis El Manar, University Campus, 2092 Tunis, Tunisia
[22] Ente Fauna Marina Mediterranea, Via M. Rapisardi, trav.VIII-2, I-96012 Avola, Siracusa, Italy

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 has adopted a country-based classification and the countries are listed according to their geographic position, from west to east. New biodiversity data are reported for 7 different countries, although one species reported from Malta is new for the entire Mediterranean basin, and is presumably also present in Israel and Lebanon (see below, under Malta). **Italy:** the rare native fish *Gobius kolombatovici* is first reported from the Ionian Sea, whilst the alien jellyfish *Rhopilema nomadica* and the alien fish *Oplegnathus fasciatus* are first reported from the entire country. The presence of *O. fasciatus* from Trieste is concomitantly the first for the entire Adriatic Sea. Finally, the alien bivalve *Arcuatula senhousia* is reported for the first time from Campania (Tyrrhenian Sea). **Tunisia:** a bloom of the alien crab *Portunus segnis* is first reported from the Gulf of Gabes, where it was considered as casual. **Malta:** the alien flatworm *Maritigrella fuscopunctata* is recorded in the Mediterranean Sea for the first time, on the basis of 25 specimens. At the same time, web searches include possible unpublished records from Israel and Lebanon. The alien crab *P. segnis*, already mentioned above, is first formally reported from Malta based on specimens collected in 1972. Concomitantly, the presence of *Callinectes sapidus* in Maltese waters is excluded since based on misidentifications. **Greece:** the Atlantic northern brown shrimp *Penaeus atzecus*, previously known from the Ionian Sea from sporadic records only, is now well established in Greek and international Ionian waters. The alien sea urchin *Diadema setosum* is reported for the second time from Greece, and its first record from the country is backdated to 2010 in Rhodes Island. The alien lionfish *Pterois miles* is first reported from Greece and concomitantly from the entire Aegean Sea. **Turkey:** the alien rhodophyte *Antithamnion hubbsii* is first reported from Turkey and the entire eastern Mediterranean. New distribution data are also provided for the native fishes *Alectis alexandrina* and *Heptranchias perlo*. In particular, the former record consists of a juvenile

measuring 21.38 mm total length, whilst the latter by a mature male. **Cyprus:** the rare native cephalopod *Macrotritopus defilippi*, and the alien crab *Atergatis roseus*, sea slug *Plocamopherus ocellatus* and fish *Cheilodipterus novemstriatus* are first recorded from the entire country. **Lebanon:** the alien crabs *Actaea savignii* and *Matuta victor*, as well as the alien fish *Synanceia verrucosa*, are first recorded from the entire country. In addition, the first Mediterranean record of *A. savignii* is backdated to 2006, whilst the high number of *M. victor* specimens observed in Lebanon suggest its establishment in the Basin. The Atlantic fishes *Paranthias furcifer* and *Seriola fasciata*, and the circumtropical *Rachycentron canadum*, are also first reported from the country. The *P. furcifer* record backdates its presence in the Mediterranean to 2007, whilst *S. fasciata* records backdate its presence in the eastern Mediterranean to 2005. Finally, two of these latter species have been recently ascribed to alien species, but all three species may fit the cryptogenic category, if not a new one, better.

Introduction

Collecting detailed biodiversity data and mapping spatial patterns of marine species across large spatial scales is challenging, and usually requires extensive and expensive sampling. Often, such information remains in the grey literature or no relevant records are available and thus is largely unavailable to the scientific community. However, biodiversity data constitute a useful basis for further studies, assessments and conservation programmes, and are a valid tool for long-term comparisons, especially when data are reviewed under the prism of modern taxonomic studies.

This work presents new records per country according to their geographic position in the Mediterranean, from west to east. The location of new records is illustrated on a map (Fig. 1). Altogether, new records are provided for 22 taxa, belonging to Rhodophyta, Cnidaria, Arthropoda, Mollusca, Platyhelminthes, Chordata and Echinodermata. These add two species that are new to Italy, one to Malta, one to Greece, one to Turkey, four to Cyprus and six to Lebanon. Concomitantly, among the others, one species is new to the entire Mediterranean Sea and one is new to the entire eastern Mediterranean. The records reported here cover alien species (15 species) mostly, followed by native species (four species) and cryptogenic/possible alien species (three species) (Table 1).

The alien species reported here consist mainly of Lessepsian taxa, whose continuous spreading in the Mediterranean has allowed the recent colonization of new countries. However, lack of records from certain areas may also be due to the absence of targeted field research. In this respect, the contribution of citizen scientists and the appearance of marine targeted social networks have contributed to filling distributional data gaps.

With regards to cryptogenic/possible alien species, one of the subchapters also discusses a previous inclusion in alien species of two taxa ascribed to this category, and suggests their inclusion in the cryptogenics category, if not a new one, until further studies, including molecular data, can confirm or disprove faunistic speculations.

The definition of alien species used here is in accordance with the proposal of the International Union for Conservation of Nature (IUCN). Updated systematics, lower taxonomy and nomenclature follow the World Register of Marine Species (WoRMS).

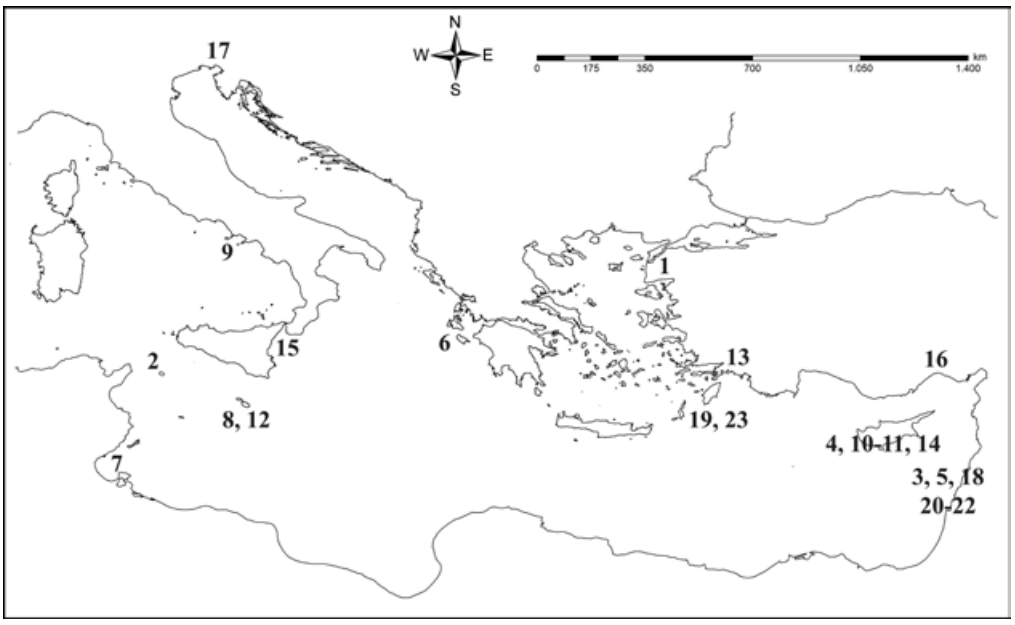

Fig. 1: The Mediterranean Sea and the sampling sites of the records included in "New Mediterranean Biodiversity Records (October 2015)". Numbers corresponding to localities reported in Table 1.

Table 1. Species included in "New Mediterranean Biodiversity Records (October 2015)" (systematical order per phyla, species authorities as in single subchapters), with SS - species status (A, alien; C, cryptogenic; PA, possible aliens), subchapter, location/area and country of records. N - numbers as in Figure 1.

Taxon	SS	Subchapter	Location/Area	Country	N
Phylum RHODOPHYTA Wettstein, 1901					
Antithamnion hubbsii	A	5.1	Çanakkale	Turkey	1
Phylum CNIDARIA Verrill, 1865					
Rhopilema nomadica	A	1.1	Nikà	Italy	2
Phylum ARTHROPODA von Siebold, 1848					
Actaea savignii	A	7.1	Beirut (fish market) Batroun	Lebanon	3
Atergatis roseus	A	6.1	Beirut Xylofagou Ayia Napa	Cyprus	4
Matuta victor	A	7.1	Batroun Tyr	Lebanon	5
Penaeus atzecus	A	4.1	Saida Greek Ionian Sea	Greece	6
Portunus segnis	A	2.1	Zaratt Gabes Skhira Hchichina	Tunisia	7
		3.2	Mahress Marsaxlokk Bay	Malta	8
Phylum MOLLUSCA Linnaeus, 1758					
Arcuatula senhousia	A	1.2	Bacoli	Italy	9
Macrotritopus defilippi	N	6.1	Ayia Napa	Cyprus	10
Plocamopherus ocellatus	A	6.1	Protaras Ayia Napa	Cyprus	11
Phylum PLATYHELMINTHES Gegenbaur, 1859					
Maritigrella fuscopunctata	A	3.1	Exiles St. Julian's Manoel Island	Malta	12
Phylum CHORDATA Haeckel, 1874					
Alectis alexandrina	N	5.2	Ekincik	Turkey	13
Cheilodipterus novemstriatus	A	6.1	Protaras	Cyprus	14
Gobius kolombatovici	N	1.4	Acireale	Italy	15
Heptranchias perlo	N	5.3	Mersin Bay	Turkey	16
Oplegnathus fasciatus	A	1.3	Trieste	Italy	17
Paranthias furcifer	C - PA	7.1	Jounieh Bay	Lebanon	18
Pterois miles	A	4.3	Kallithea Plimmiri Bay Rodos town	Greece	19
Rachycentron canadum	C - PA	7.1	Al Qalamoun Southern Lebanon	Lebanon	20
Seriola fasciata	C - PA	7.1	Selaata Batroun	Lebanon	21
Synanceia verrucosa	A	7.1	Tyr	Lebanon	22
Phylum ECHINODERMATA Bruguière, 1791 [ex Klein, 1734]					
Diadema setosum	A	4.2	Rodos town	Greece	23

1. ITALY

1.1 First record of *Rhopilema nomadica* from Italy

P. Balistreri & M. Ghelia

In 1976, several specimens of an undescribed blue jellyfish species were observed for the fist time along the Mediterranean coasts of Israel (see Galil *et al.*, 1990). This taxon was later described as a new species, *Rhopilema nomadica* Galil, Spannier & Ferguson, 1990 (Scyphozoa: Rhizostomeae: Rhizostomatidae), characterized by an umbrella that can reach a diameter of 80 cm and a weight of 40 kg (Lotan *et al.*, 1992), and easily distinguished from other local Scyphomedusae by the absence of marginal tentacles and the presence of numerous mouths and eight pairs of large scapulets on the mouth arms (no central mouth opening), which bear long filaments (Galil *et al.*, 1990).

In subsequent years, *R. nomadica* has been observed in the majority of eastern Mediterranean countries up to Greece, as well as in Malta and Tunisia in the central Mediterranean Sea (see Daly Yahia *et al.*, 2013). On 19th September 2015, a large specimen of *R. nomadica* (with an umbrella of ~40 cm in diameter) was observed floating close to a rocky bottom at Punta Polacca (Nikà, Pantelleria Island, Trapani, Italy) (36.74416° N - 11.98222° E), at 7 m depth (sea water temperature 26°C) (Fig. 2). This record constitutes the first sighting of *R. nomadica* in Italy, and may represent the beginning of a possible spreading to the northern areas of the central Mediterranean Sea. As already observed along the Levant coasts, this taxon is able to change the native faunal assemblage abruptly, cause massive economic losses for tourism, fisheries and coastal activities, as well as inflict dangerous stings characterized by erythematous eruptions, itching and burning sensations, whose subsequent symptoms are fever, fatigue and muscular pain (review in Katsanevakis *et al.*, 2014b: supplementary material). Therefore, public service announcements may be necessary to avoid possible damage to commercial activities or injuries to unwary citizens.

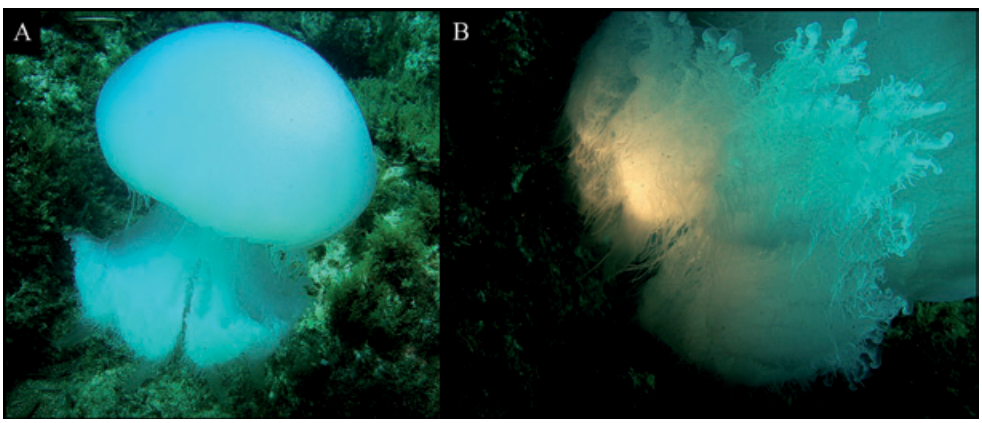

Fig. 2: The nomad jellyfish *Rhopilema nomadica* from Pantelleria Island (A) and a magnification of the terminal part of the mouth arms (B).

1.2 *Arcuatula senhousia* reaches Campania (central Tyrrhenian Sea)

F. Crocetta

Arcuatula senhousia (Benson in Cantor, 1842) (Bivalvia: Mytiloida: Mytilidae) is a small mytilid species with a thin oval and elongated shell and subterminal umbones, olive-green/brown in colour, with a sculpture of thin green lines radiating posteriorly and brownish-purple interstices. Native from the Western Pacific, it soon colonized NW America, Australia and Europe (see Zenetos *et al*., 2004). Since 1992, it was recorded live from Italy (northern Adriatic Sea: review in Crocetta, 2012), although Brancato & Reitano (2009) reported the record of a single valve from Syracuse in 1988. The Asian bag-mussel is now locally established and widespread along the northern and central Adriatic shores, the Gulf of Taranto, Tuscany (Livorno Harbour), Sardinia (Olbia, Cagliari and Oristano area), Latium (Sabaudia Lake), Calabria (Gizzeria Harbour) and Sicily (Lago Faro and Syracuse Harbour) (see Crocetta *et al*., 2010; Crocetta, 2012; Macali *et al*., 2013). Its presence in Campania was yet undetected, despite the presence of several mussel aquaculture farms, which constitute the taxon's favourite secondary spreading vector.

During a fishing expedition on 12th July 2015, I obtained a rope with 2 kg of local mussels (*Mytilus galloprovincialis* Lamarck, 1819) from mussel aquaculture farms off Miseno (Bacoli, Naples) (40.778300° N - 14.090436° E), which are popularly believed to be more attractive as bait to sparids than the stabulated ones. As the mussels had just been removed from the sea in my presence, the associated biota had not yet been discarded and, therefore, I had the opportunity to analyze their mol-

luscan fauna. Among a dozen of native species, 21 living specimens of *A. senhousia* were also found, varying from 7 to 13 mm in total lenght. All of them were attached to the byssal threads of the mussels (Fig. 3). Thus, this finding constitutes the first record of the Asian bag-mussel from Campania, and fills an expected gap in its known distribution. The absence of large-sized specimens, as well as continuous monitoring of the associated biota of local mussels carried out by the author of the note, point to a very recent introduction, and its finding in a mussel farm would suggest its local introduction through aquaculture, as for most Italian records.

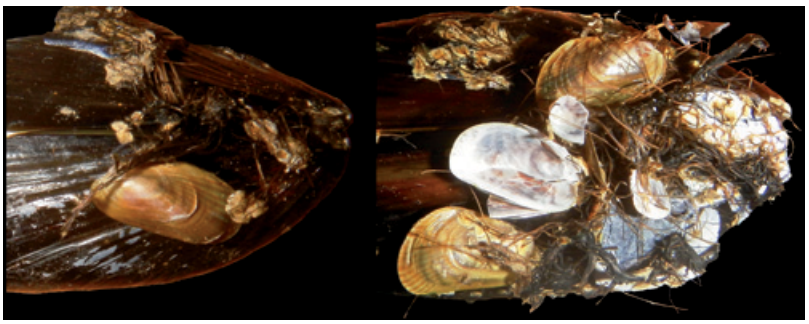

Fig. 3: The Asian bag-mussel *Arcuatula senhousia* from Bacoli: living specimens amidst the byssal threads of native mussels.

1.3 First record of *Oplegnathus fasciatus* from Italy and the Adriatic Sea

S. Ciriaco & L. Lipej

The barred knifejaw *Oplegnathus fasciatus* (Temminck & Schlegel, 1844) (Actinopteri: Perciformes: Oplegnathidae) is native to Asian waters (Japan, Korea and China), where it inhabits rocky coastal areas and is an economically important species, especially for aquaculture. Juveniles often seek shelter next to floating objects. Indeed, Hirosaki (1960) reported that *O. fasciatus* is included among the most dominant fish species associated with drifting seaweeds, and is also known to drift with oceanic debris.

This species was first recorded in the Mediterranean Sea by Schembri *et al.* (2010), on the basis of two individuals photographed in Grand Harbour, Valletta (Malta). The authors also provided a number of possible occurrence scenarios, all related to shipping agents. The barred knifejaw was also recorded as an alien species in the western part of the USA (Oregon State University, 2015). In fact, five specimens were discovered in a lost Japanese boat that was washed up on Long Beach in Washington and believed to be a debris of the Japanese March 2011 tsunami. It appears that these specimens were able to survive a two-year long journey at the mercy of currents, from Japan to the north-eastern Pacific coast. In February 2015, another barred knifejaw specimen was caught in the nearby area (Oregon State University, 2015).

On 17th September 2015, a barred knifejaw specimen was caught in the waters close to the SIOT (Italian Society for the Transalpine pipeline) in Trieste (Italy, north Adriatic Sea) (45.61135° N - 13.78649° E) by a local fisherman (Fig. 4). He photographed the specimen and sent a photograph to the authors. Unfortunately, the specimen was not preserved because the fisherman subsequently discarded the fish in the same area. The subadult specimen measured approximately 140 mm in total length and 60 mm in height. It was identified according to the typical light and dark vertical bands colour pattern. The teeth on both jaws are fused and resemble a parrot-like beak.

Some other alien species originating from the same area had already been reported for the Adriatic Sea. *Pampus argenteus* (Euphrasen, 1788) was caught in the waters off Rijeka (Croatia) in 1896 (Dulčić *et al*., 2004). This species probably arrived in the northern Adriatic sea by following a slow boat or together with pelagic jellyfishes, floating wrecks or drifting algae. More recently (2007), *Terapon theraps* Cuvier, 1829 was caught in the waters off Piran (Slovenia) (Lipej *et al.,* 2008).

Fig. 4: The barred knifejaw *Oplegnathus fasciatus* from Trieste.

1.4 On the presence of *Gobius kolombatovici* in the Ionian Sea

F. Tiralongo & A. Pagano

The orange-spotted goby *Gobius kolombatovici* Kovačić & Miller, 2000 (Actinopteri: Perciformes: Gobiidae) was very recently described from the northern Adriatic Sea (Island of Krk, Croatia) (Kovačić & Miller, 2000). It usually inhabits soft sediments, where it is observed at the base of the few rocks present or in nearby, in a bathymetric range between 15 and 90 meters. It can only be confused with *Thorogobius macrolepis* (Kolombatovic, 1891), which displays a similar colour-pattern. However, some chromatic characteristics that are useful to distinguish the adults of the two species are: (1) the background colour of the body is usually grayish-white in *G. kolombatovici* and pinkish-white in *T. macrolepis*; (2) a dark spot in the upper posterior part of the first dorsal fin is only present in *G. kolombatovici*; (3) *G. kolombatovici* has irregular and elongated spots, orange-yellow or dark orange in colour, arranged in rows along the midline (typically 9 in number), whilst in *T. macrolepis* the spots along the midline (typically 5 in number) are more messy and have an oval-rounded shape. They are also usually yellow or brownish in colour; (4) in the area behind the eye, on the nape, *G. kolombatovici* has a Y-shaped spot, whilst in *T. macrolepis* this area is irregularly yellow-spotted; (5) the yellow spots on the head, similarly as in the midline, are more irregular and elongated in *G. kolombatovici*, whilst in *T. macrolepis* they are more regular and have a rounded shape; (6) *G. kolombatovici* is usually bigger (11 cm vs 7 cm for *T. macrolepis*).

The orange-spotted goby does not appear to be very common, in general, and its distribution seems to be very scattered and restricted to a few locations in Croatia, Spain, Monaco, France, Italy and Turkey (see Relini & Lanteri, 2010; Bilecenoğlu in Bilecenoğlu *et al*., 2013). On 4th June 2015, *G. kolombatovici* was first reported from Acireale (Sicily, Ionian Sea) (37.63910° N - 15.18400° E) at 62 m depth. Four specimens were observed on the soft bottom, on a surface of about 10 m^2 in an area characterized by rocky canyons with a maximum width of ~10 m and a height between ~1-4 m from the bottom. A specimen of ~10 cm in total length was photographed (Fig. 5). The benthic invertebrate community observed in the area was composed mostly of the sponge *Sarcotragus foetidus* Schmidt, 1862, the cnidarians *Paramuricea clavata* (Risso, 1826), *Leptogorgia sarmentosa* (Esper, 1789) and *Corallium rubrum* (Linnaeus, 1758) and the echinodermata *Centrostephanus longispinus* (Philippi, 1845) and *Peltaster placenta* (Müller & Troschel, 1842).

So far, this sighting constitutes the southern-most for the species. However, as already observed for other gobiid species such as *T. macrolepis* (see Guidetti *et al.*, 2006), it is presumably more widespread and common than previously thought. The main causes of underestimation include the absence of adequate and targeted research and possibile misidentification and confusion with other similar species by non-specialists.

Fig. 5: Dorsal (A) and lateral (B) view of the orange-spotted goby *Gobius kolombatovici* from Acireale.

2. TUNISIA

2.1 *Portunus segnis* 'bloom' in the Gulf of Gabes: observations in September-October 2015

L. Rabaoui & R. El Zrelli

The blue swimming crab *Portunus segnis* (Forsskål in Niebuhr, 1775) (Malacostraca: Decapoda: Portunidae), is one of the earliest Lessepsian invaders of the Mediterranean Sea, recorded since decades in various areas of the Mediterranean (Galil, 2011). Its presence in the Gulf of Gabes (south-eastern Tunisian coasts), however, is very recent, and after its first record in October 2014, it only occurred in the area accidentally and with very low abundances (Rabaoui *et al.*, 2015).

From August 2015, the abundance of *P. segnis* showed a very significant increase, leading to a 'bloom' in the coastal areas of the Gulf of Gabes, and in particular in the central area between Zarrat and Ghannouche. Based on a series of systematic visits to the Gulf of Gabes ports and on questionnaires administered to fishermen, its occurrence in September-October 2015 was observed in almost the entire gulf area. Captures of the blue swimming crab were landed by fishermen at the following ports:

Mahress, Hchichina, Skhira, Gabes and Zaratt (Table 2) and, according to local fishermen, this is the first *P. segnis* 'bloom' in the Gulf of Gabes. In October 2015, a daily average of 2- 3 *P. segnis* boxes was estimated per fisherman using gillnets or beach seines (see Fig. 6 taken on 4th October 2015). Its occurrence was reported from sandy or sandy/muddy areas with seagrass meadows or algae mainly, at 20-24 m depth, sometimes at a distance of around 30 miles from the coastline (Table 2). The October 2015 catches consisted of many gravid females, suggesting that the reproduction period of this species in the Gulf of Gabes occurs in autumn. Additionally, some specimens had a carapace width exceeding 18 cm (Fig. 6E), thus suggesting that the species has found favourable conditions to grow and reproduce in the area. The recent abundances of *P. segnis* in the Gulf of Gabes confirm its successful invasion and establishment (Rabaoui *et al.*, 2015). Despite the invasive behaviour of the blue swimming crab, there is a still a knowledge-gap as regards the effect of this alien on the receiving ecosystems, and its interspecific relationships in particular. It is considered an active predator and carnivorous species, which competes for food with other native species (Katsanevakis *et al.*, 2014b), and its high abundances in the Gulf of Gabes may have an impact on the structure and composition of local communities. On the other hand, while *P. segnis* is edible in other areas of the globe (Carpenter *et al.*, 1997) and could be economically beneficial for Tunisian fisheries, the species is not consumed - like other edible crabs species - by Tunisians. Besides, local fishermen complain about *P. segnis* because this locally 'valueless' crab species currently represents most of their catches, and according to them it damages their nets (Fig. 6C-D) and even some of their catches (fish). During Autumn, fishermen in the Gulf of Gabes use trammel nets and beach seines mainly to catch the common Mediterranean cuttlefish *Sepia officinalis* (Linnaeus, 1758). Due to the huge quantities of blue swimming crabs and the continuous damage to nets, some fisherman give up fishing during this period due to high economic losses. In the Arabian Gulf (Indian Ocean), like in certain Asian countries, *P. segnis* is caught by traps mainly and has a good commercial value. If the Tunisian authorities establish *P. segnis* fisheries in the Gulf of Gabes and succeed in valorizing this commercially-important species (at least for exportation), this may support local fishermen and the fisheries sector of Tunisia as a whole. Further studies are therefore needed regarding the biology and ecology of the blue swimming crab in the Mediterranean Sea and multidisciplinary factors behind its 'bloom' in the Gulf of Gabes.

Table 2. List of main ports in the Gulf of Gabes, with coordinates, where *Portunus segnis* catches were landed by fishermen between August and October 2015. Depth-range (DR) in meters, substratum type (ST) and substratum cover (SC) were also gathered from local fishermen. SC abbreviations: CN - *Cymodocea nodosa* (Ucria) Ascherson, 1870; PO - *Posidonia oceanica* (Linnaeus) Delile, 1813; C - *Caulerpa* sp.

PORT	COORDINATES	PERIOD	DR	ST	SC
Zaratt	33.701158° N - 10.362767° E	Aug/Sept 2015	9-12	sandy	CN, PO
Gabes	33.895547° N - 10.117147° E	Aug/Sept 2015	22-24	sandy and sandy-muddy	CN, PO, C
Skhira	34.286947° N - 10.096578° E	Aug/Oct 2015	14-16	sandy	CN, PO
Hchichina	34.347758° N - 10.211261° E	Sept/Oct 2015	3-4	sandy-muddy	CN, PO
Mahress	34.515075° N - 10.498717° E	Sept/Oct 2015	8-10	sandy	CN, PO

Fig. 6: The blue swimming crab *Portunus segnis* from the Gulf of Gabes (A-E).

3. MALTA

3.1 Yet another Lessepsian arrival: first record of the euryleptid flatworm *Maritigrella fuscopunctata* from the Mediterranean Sea

P. Portelli, D. Agius, C. Mifsud & A. Deidun

So far, the Polyclada of the Mediterranean have been poorly studied, and most of the papers date back centuries. As an example, one of the few reviews of the group was produced by Lang (1884) for the Gulf of Naples. The euryleptid flatworm species *Maritigrella fuscopunctata* (Prudhoe, 1978) (Rhabditophora: Polycladida: Euryleptidae) was first described by Prudhoe (1978), who placed it in the genus *Pseudoceros* Lang, 1884, on the basis of two specimens from Western Australia. The species was subsequently first moved to the genus *Eurylepta* Ehrenberg, 1831 by Gosliner *et al.* (1996) and then settled to *Maritigrella* Newman & Cannon, 2000. The majority of the species belonging to this genus, mostly present on the Great Barrier Reef (Australia), have distinctive transverse black markings on a cream-white background (Newman & Cannon, 2000).

M. fuscopunctata has not been previously recorded from the Mediterranean Sea. However, while snorkelling at <2 m depth, numerous individuals were observed during July and September 2015 at three different coastal localities in Malta (Fig. 7; Table 3). The three sampling locations represent different wave exposure regimes, with Manoel Island being a sheltered harbour location, whilst the other two are characterised by higher degrees of wave exposure. All the Maltese *M. fuscopunctata* specimens were mostly found in association with algal-dominated - e.g. *Ellisolandia elongata* (J.Ellis & Solander) K.R. Hind & G.W. Saunders - rocky seabed typologies, or within fouling assemblages along existing seawalls. Some individuals were collected alive and transferred to a marine aquarium for subsequent behavioural observations, whilst a small number of individuals were preserved in 90% ethanol and deposited at the National Museum of Natural History in Mdina (Malta) (catalogue number NMNH/Mar.011-2015 X3). Taxonomic identity of the specimens was definitely confirmed by Dr. Terrence Gosliner (Department of Invertebrate Zoology - Californian Academy of Sciences).

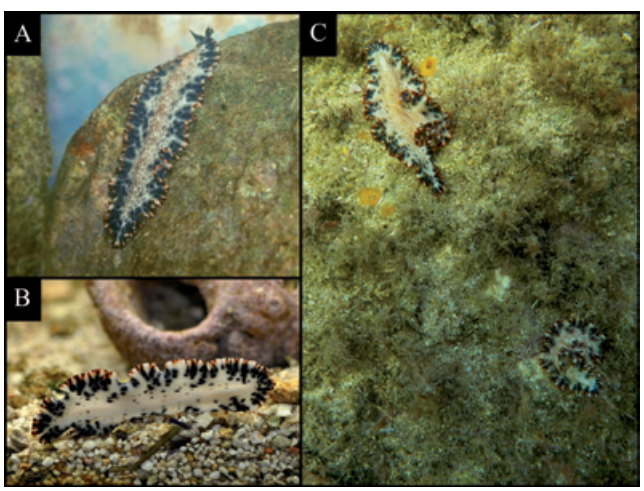

Fig. 7: The euryleptid flatworm *Maritigrella fuscopunctata* from Malta in an aquarium (A-B) and in the field (C).

To date, *M. fuscopunctata* was mainly known from Western Australia, Malé Atoll (Maldives), Indonesia and Micronesia (see Newman & Cannon, 2000). Two possible scenarios may be hypothesized for the Mediterranean occurrence of this Indo-Pacific species: it may have entered the Mediterranean through the Suez Canal, as have other Lessepsian species. This view seems to be substantiated by possible unpublished records from Lebanon (http://flickrhivemind.net/Tags/polyclad/Recent) and Israel (http://www.rafiamar.com/#!nudis-flatwarm/zoom/c1eih/image9oc) and, therefore, it may have arrived in Malta through alien spreading from nearby localities. Given the flatworm's life cycle traits, however, it may also have arrived both in the Mediterranean Sea and in Malta via shipping. In this respect, all three Maltese sampling localities lie along the eastern coast of Malta, at less than 10 km from Grand Harbour, Valletta, a major trans-shipment centre overlooking the Malta-Sicily Channel, which constitutes a major shipping lane within the Mediterranean.

The present record from the Maltese Islands makes this flatworm the umpteenth addition to the list of sixty-six alien species already confirmed for the waters around the islands (Evans *et al.*, 2015), and the first non-indigenous platyhelminth recorded from the area. As live individuals were observed on four occasions at different coastal localities, always in small aggregations and never as single individuals, we suggest that the species is well-established in Maltese coastal waters.

Table 3. Collection details of *Maritigrella fuscopunctata* individuals from Malta. N - number of specimens.

SITE	COORDINATES	DATE	N
Exiles	35.917269° N - 14.497669° E	21.07.2015	5
		11.09.2015	12
St. Julian's	35.917700° N - 14.493139° E	05.09.2015	4
Manoel Island	35.904456° N - 14.497031° E	07.09.2015	4

3.2 Re-assessing the occurrence of alien blue crabs: first formal record of *Portunus segnis* from Malta

J. Evans & P.J. Schembri

Several alien portunid crab species have been recorded from the Mediterranean, but only two - *Callinectes sapidus* Rathbun, 1896 and *Portunus segnis* (Forsskål in Niebuhr, 1775) (Malacostraca: Decapoda: Portunidae) - have records spanning the western, central and eastern Mediterranean region (see Zenetos *et al*., 2010). Adults of these two species are easily distinguishable from other Mediterranean portunids due to their large size (adult carapace width >15 cm) and presence of an enlarged ninth antero-lateral tooth projecting laterally from the carapace. In the Mediterranean, *P. segnis* was first recorded off Egypt in 1898; it subsequently reached the central Mediterranean by 1966 and the Tyrrhenian Sea by 2006 (see Crocetta, 2006).

Mediterranean records of *P. segnis* prior to 2010 refer to it as *Portunus pelagicus* (Linnaeus, 1758), but Lai *et al*. (2010) have shown that *P. pelagicus sensu lato* is a species complex, and the western Indian Ocean, Red Sea and Mediterranean populations belong to *P. segnis*, which can be distinguished from *P. pelagicus sensu stricto* based on morphological and genetic characters. Morphological characters also enable distinguishing between *P. segnis* and *C. sapidus*: the former possesses a prominent inner spine on the cheliped carpus and a triangular abdomen in males; the latter lacks a carpal spine and has an "inverted T" shaped abdomen in males (Galil *et al*., 2002). In spite of this, several authors have confused the two species in the past. For instance, the first Mediterranean specimens of *C. sapidus*, recorded from Venice in 1949, were originally identified as *Neptunus* (= *Portunus*) *pelagicus* (see Galil *et al*., 2002), while the "*C. sapidus*" specimens recorded from Sicily by different authors in 1966, 1967, 1970 and 1972 turned out to be *P. segnis* (see Crocetta, 2006).

Some months ago, one of us (PJS) observed large living swimming crabs in an aquarium at a fish restaurant in Marsaxlokk (Malta), that were originally thought to be *C. sapidus*, but which on closer inspection appeard more likely to be *P. segnis*. We could not ascertain the origin of these specimens, but this restaurant specialises in seafood caught locally, thus increaing the possibility that the specimens originated from Maltese waters. *Callinectes sapidus* has been recorded from Malta on the basis of two specimens originally captured in Marsaxlokk Bay (35.825° N - 14.550° E) in 1972 and exhibited at the National Museum of Natural History at Mdina (NMNH/DEC0113) (see Schembri & Lanfranco, 1984). Given that several past records of *P. segnis* were originally misidentified as *C. sapidus*, we decided to double check the original record of the latter species, particularly since the original identification was made on the mounted specimens in the museum without handling them.

One specimen was made available to us for detailed examination (Fig. 8), the other is on permanent display and only its dorsal side could be observed. Examination of the specimens showed them to present some abnormal characters. For example, one has four spines on the anterior margins of its cheliped mera, while the other has four spines on one merus and three on the other, whereas both *P. segnis* and *C. sapidus* usually have only three spines (Lai *et al*., 2010; Galil *et al*., 2002). Nevertheless, both specimens have a clear inner spine on their cheliped carpi, while the specimen that could be seen in ventral view also possesses a triangular abdomen, indicating that they should be ascribed to *P. segnis* (Fig. 8). Therefore, the portunid crabs recorded from Marsaxlokk Bay in 1972 as *C. sapidus* represent the first sighting of *P. segnis* from Malta, whereas previous reports of *C. sapidus* were based on a misidentification and this species has not actually been found in Maltese waters.

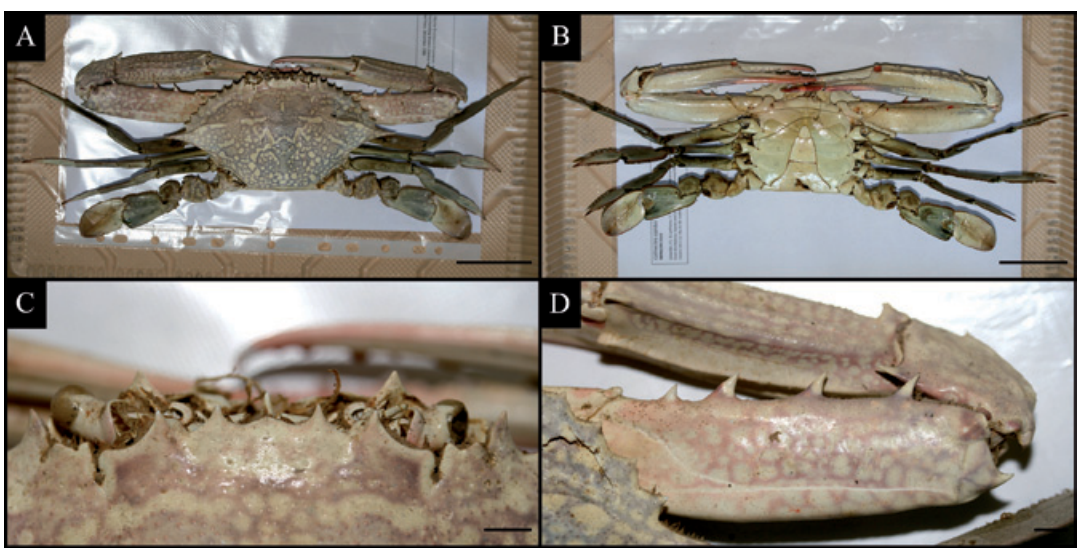

Fig. 8: One of the two specimens of the blue swimming crab *Portunus segnis* collected from Marsaxlokk Bay in 1972. A. Dorsal view. B. Ventral view. C. Carapace frontal margin. D. Merus of right cheliped. Scale bars: A-B: 5 cm. C-D: 0.5 cm.

4. GREECE

4.1 *Penaeus aztecus* establishing in the Greek Ionian Sea

A. Zenetos A. & M. Giavasi

Penaeus atzecus Ives, 1891 (Malacostraca: Decapoda: Penaeidae) is an Atlantic, commercially important, shrimp, which has recently invaded the Mediterranean. It was first reported in Antalya (Turkey) (Deval *et al*., 2010), from where it rapidly spread eastwards (Gokoğlu & Özvarol in Bilecenoglu *et al.*, 2013) and westwards to the Aegean Sea (Minos *et al*., 2015). The presence of *P. aztecus* has also been recently reported from sporadic findings in the Adriatic Sea (e.g. Montenegro: Marković *et al.*, 2014) and the Ionian Sea (e.g. off Corfu Island: Kapiris & Apostolidis in Kapiris *et al.*, 2014).

Here we report the establishment of *P. aztecus* in eastern Ionian territorial and international waters. According to local fishermen, the first individual, unknown at that time to them, was caught in the area in October 2014, at ~50 m depth. Since then, 1-2 specimens on average are caught at each haul, during a 5 h trawling operation. We were only recently informed about their findings and, since the end of September 2015, we are monitoring shrimp spreading in the area. The largest specimen caught so far is ~26 cm in total length (Fig. 9), and was captured on 23th September 2015 in a haul of the PETROS/MARIA trawler in international waters off Kyllini (38° N - 38.5000° N - 21° E - 21.5000° E) at 70-90 m depth. Among the overall sampled specimens, three individuals were sent to HCMR for definitive identification and were preserved in 95% alcohol. Their external morphology is in accordance with Deval *et al.* (2010).

Nowadays, the species is commercially exploited, although catches are still limited. However, its steady presence in the territorial and international waters of the aforementioned area clearly confirms its establishment in the eastern Ionian Sea.

Fig. 9: The Atlantic northern brown shrimp *Penaeus atzecus* from the Greek Ionian Sea.

4.2 *Diadema setosum* moving west to the Hellenic Seas

G. Kondylatos & M. Corsini-Foka

Diadema setosum (Leske, 1778) (Echinoidea: Diadematoida: Diadematidae) is a venomous sea urchin with distinctively long spines, five white spots situated dorsally on the mid-lines of the interambulacral, an orange anal ring and blue/green dots of iridophores on the genital plates. It occurs throughout the Northwestern Pacific (Japan to Australia and Fiji), the Indo-Pacific, the East African coast and the Red Sea. After its first occurrence in the Mediterranean Sea in 2006 around Kaş Peninsula (Turkey), it has been subsequently reported from Lebanon in 2009, Turkey in 2010 and 2014 and Greece (Kastellorizo Island) in 2014 (Latsoudis in Tsiamis *et al*., 2015).

On 29th July 2015, a single *D. setosum* specimen was collected under a rock at ~6 m depth, during scuba diving west of the windmills of the town of Rodos, outside Mandraki harbor (Rhodes Island) (36.449089° N - 28.227934° E). It was directly transported to the Hydrobiological Station of Rodos (HSR) and placed in one of the closed recirculation aquarium tanks, although most of the spines were already broken (Fig. 10). The diagnostic features and substrate agree with the find-

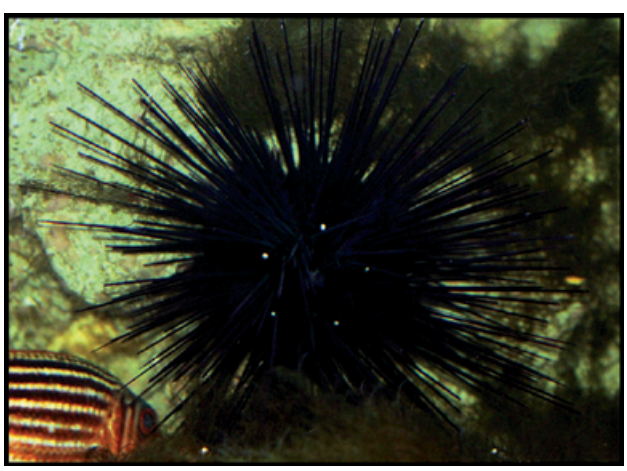

Fig. 10: The needle-spined urchin *Diadema setosum* from Rodos town.

ings of Coppard & Campbell (2006) and Yapici *et al.* in Katsanevakis *et al.* (2014a), respectively. The spines were black as in Latsoudis in Tsiamis *et al*. (2015) (no gray spines were observed) and the depth corresponds to another publication (e.g. Yokeş & Galil, 2006).

According to interviews and testimonies of local divers, the discovery of this species from Rhodes Island should have occurred at least 4-5 years earlier, since they are well aware of the local presence of the needle-spined urchin since 2010. This information therefore backdates its arrival in Greece to 2010, and fills the 10-year gap between the first report of *D. setosum* from the neighbouring Kaş peninsula, which lies approximately 67 nm of Rhodes Island.

Larval transportation via the Suez Canal, shipping and aquarium trade are considered the main possible pathways of introduction of the species in Mediterranean waters (see Yokeş & Galil, 2006; Yapici *et al.* in Katsanevakis *et al.*, 2014a). Its finding in the proximity of the port area may imply ship transport, possibly with recreational boats.

4.3 First occurrence of the invasive lionfish *Pterois miles* in Greece and the Aegean Sea

M. Corsini-Foka & G. Kondylatos

Pterois miles (Bennett, 1828) (Actinopteri: Scorpaeniformes: Scorpaenidae) is a species native to the Indian Ocean, from the Red Sea to Sumatra, and invasive to the Atlantic Ocean. Its occurrence has also been ascertained along the eastern Levantine Sea coasts, first in Israel in 1991 (Golani & Sonin, 1992), later in Lebanon in 2012 (Bariche *et al*., 2013), along the northeastern Mediterranean coasts of Turkey in 2014 (Turan *et al*., 2014) and in Cyprus in 2013 and 2015 (see Oray *et al*., 2015).

A single lionfish specimen was photographed by divers on 15th July 2015 in Kallithea (Rhodes Island) (36.3855° N - 28.2458° E), at 7 m depth under a large rock covered by vegetation on a sandy bottom (Fig. 11). On 2nd August 2015, a lionfish was also observed by divers in the shipwreck of Plimmiri Bay (35.9194° N - 27.8566° E), about one kilometer off the southeastern coasts of the island, while another specimen was sighted by a swimmer on 23rd September 2015 at 2 m depth in Psaropoula, Rodos town (approximate coordinates 36.4539° N - 28.2181° E). At the moment, the available photographic material is not sufficient for distinguishing *P. miles* from its congeneric *Pterois volitans* (Linnaeus, 1758), as the two species are morphologically similar (Bariche *et al*., 2013). Nevertheless, it is reasonable and highly probable that the specimen of the lionfish reported here belongs to *P. miles*, since the marine environment of the island is suitable for the introduction and establishment of alien biota of Indo-Pacific origin, generally, after their spread along the Levantine Mediterranean coasts (Corsini-Foka *et al*., in press). Therefore, our findings constitute the first not only in Greece, but also the entire Aegean Sea.

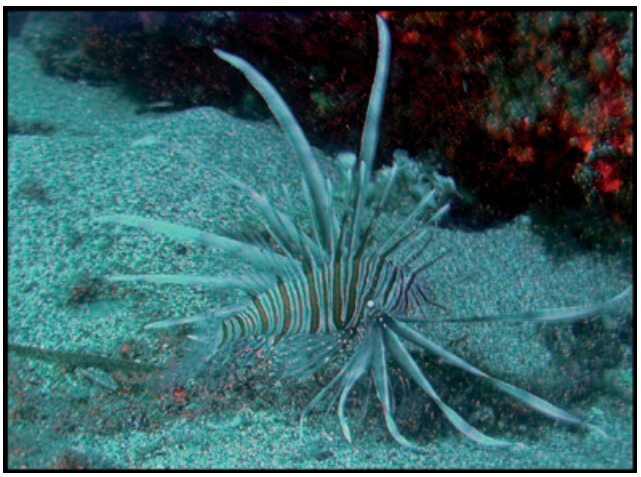

Fig. 11: The invasive lionfish *Pterois miles* from Kallithea. Photo by Antonis Kantaros.

P. miles is considered to be one of the most successful invasive aquatic species globally; the frequency of records in the last three years at various eastern Mediterranean locations may suggest that this alien fish has recently found environmental conditions that are favourable for its invasive character, after twenty years since its first finding in the basin (Golani & Sonin, 1992). Being dangerous for humans also, due to highly venomous fin spines (Bariche *et al*., 2013), we suggest that the wider community is informed and authorities alerted as early as possible as regards the presence of this fish in the region. Finally, these records confirm the importance of citizen scientists in providing information on biological invasions and monitoring alien dispersion (Zenetos *et al*., 2013, 2015b).

5. TURKEY

5.1 First record of *Antithamnion hubbsii* from Turkey and the eastern Mediterranean

M. Çakir & E. Taşkin

The alien rhodophyte *Antithamnion hubbsii* E.Y. Dawson (Florideophyceae: Ceramiales: Ceramiaceae) was originally described from Isla Guadeloupe, Baja California (Pacific Mexico), and currently occurs in California, Australia, New Zealand, China, the Western Atlantic, Azores, Norway, Spain, France, the Adriatic Sea and South Africa (Guiry & Guiry, 2015). Given its troublesome taxonomic history, it has often been reported as *Antithamnion nipponicum* Yamada & Inagaki (e.g. Cho *et al.,* 2005; Secilla *et al.,* 2007), until Athanasiadis (2009) showed that *A. nipponicum* is a jun-

ior synonym of *Antithamnion pectinatum* (Montagne) J. Brauner, a species so far restricted to the Indo-Pacific, and that *A. hubbsii* is the correct name to be used for the species introduced to the Mediterranean and the northern Atlantic. Within the Mediterranean Sea, this alien rhodophyte was so far only know from France and Italy (Guiry & Guiry, 2015).

Samples of an unidentified *Antithamnion* species were collected on May 2015 by snorkeling at 1 m depth in Çanakkale (Dardanelles, Turkey) (40.09000º N - 26.24000º E), where specimens grew epilithically. The material was preserved in 4% formaldehyde in sea water for later examination at the Department of Biology, Celal Bayar University (Turkey). Using a light microscope (Nikon SE) with photographic equipment (Nikon P5100), we found morphological characters (see below) in agreement with the description of *A. hubbsii* Dawson as known from the protologue (Dawson, 1962) and the re-examination of the type material (Athanasiadis, 1996). Thalli are 1-15 mm long and pink-reddish in colour. They are composed of a prostrate, and erect axes of unlimited growth, bearing two opposite whorl-branches of determinate growth from each axial cell. Whorl-branches are more or less distichously arranged along the axes. Each whorl-branch reaches up to 360 µm long (Fig. 12A), and is provided with a basal cell (c. 20 µm in diameter) followed by 7-15 cells. In the proximal part, whorl-branches bear distichous opposite, simple branchlets, whereas in the distal part, up to two simple branchlets may develop abaxially (Fig. 12B). Apical axial cells are blunt and 7 µm in diameter. Elliptical gland cells occur abundantly (~12-15 µm in diameter). These gland cells develop adaxially on branchlets, and are in contact with 2 cells (Fig. 12C). Development of new axes near thallus apices occurs from basal cells of whorl-branches (Fig. 12A). Specimens have been deposited at the herbaria of Celal Bayar University (Turkey) and University of Gothenburg (Sweden).

This report constitutes the first record of an alien *Antithamnion* species from Turkey, a genus so far known from the area only by native Mediterranean species. As the Dardanelles is a 60 km long strait with heavy traffic, linking the North Aegean to the Sea of Marmara and the Black Sea, *A. hubbsii* may have reached Turkey through ballast water.

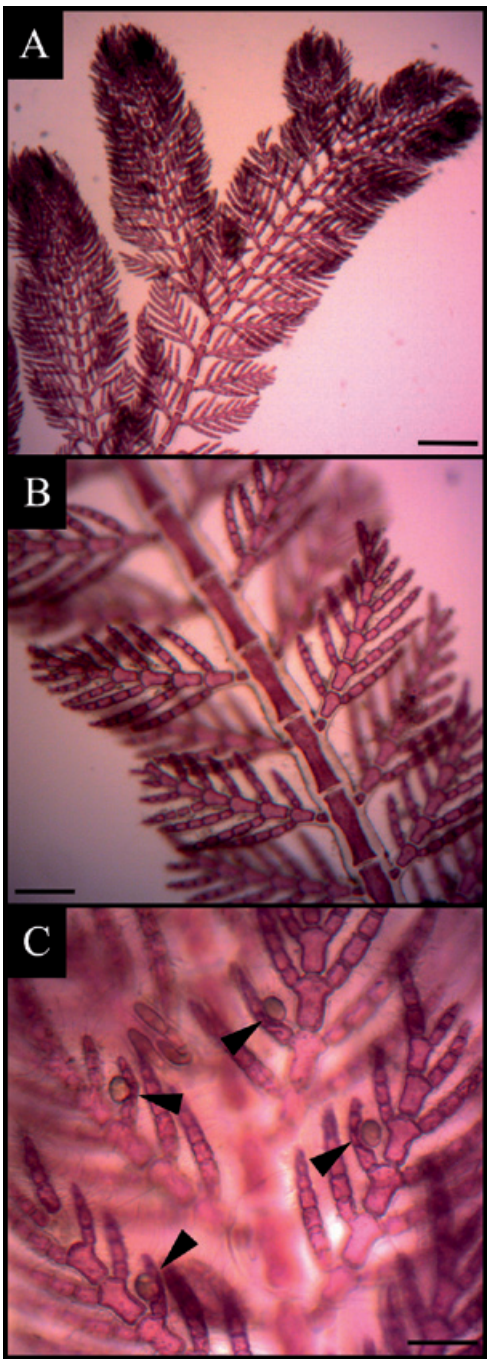

Fig. 12: *Antithamnion hubbsii* from Çanakkale. A. Portion of apical thallus with lateral new axes. B. branching of thallus. C. gland cells (arrowheads). Scale bars: A: 250 µm. B: 100 µm. C: 50 µm.

5.2 On the record of a juvenile *Alectis alexandrina* from Turkey

Y. Özvarol

The African threadfish *Alectis alexandrina* (Geoffroy Saint-Hilaire, 1817) (Actinopteri: Perciformes: Carangidae) is one of three species of the diamond trevally genus *Alectis* Rafinesque, 1815, and is widely distributed throughout the tropical eastern Atlantic Ocean, inhabiting the waters of West Africa from Morocco to Angola (Bauchot, 2003). Originally described from Mediterranean Egypt, it was also found in other nearby countries (e.g. Torcu *et al.*, 2001; Dulčić, 2005; Meriç *et al.*, 2007), including Turkey (see Bilecenoğlu *et al.*, 2014), although it is generally considered a rare occurrence in the Basin.

We hereby report the finding of a single juvenile specimen of *A. alexandrina* by a fisherman of R/V

Akdeniz Su, at anchor in Ekincik Port (Muğla, Turkey) (36.828036° N - 28.549408° E), on 22nd August 2015. Specimen description: body deep and strongly compressed, with a scaleless appearance; first dorsal and anal fin rays extremely long and filamentous. Colour silver-yellowish without any dark bar, large mouth and nose with black marks (Fig. 13). Morphometric and meristic counts are as follows: dorsal fin spines VIII, dorsal fin soft rays 20, pectoral fin rays 13, anal fin spines III, caudal fin rays 28, anal fin soft rays 18, standard length 14.95 mm, fork length 18.96 mm, total length 21.38 mm, body depth 14.33 mm, predorsal length 5.6 mm, preanal length 10.2 mm, caudal fin length 5.08 mm, head length 5 mm, pectoral fin length 4.29 mm, pelvic fin length 70 mm, eye diameter 2 mm. The specimen (1.02 gr) was preserved in 4% formalin and deposited at the fish Museum of the Fisheries Faculty of Akdeniz University, Antalya (collection number: 156).

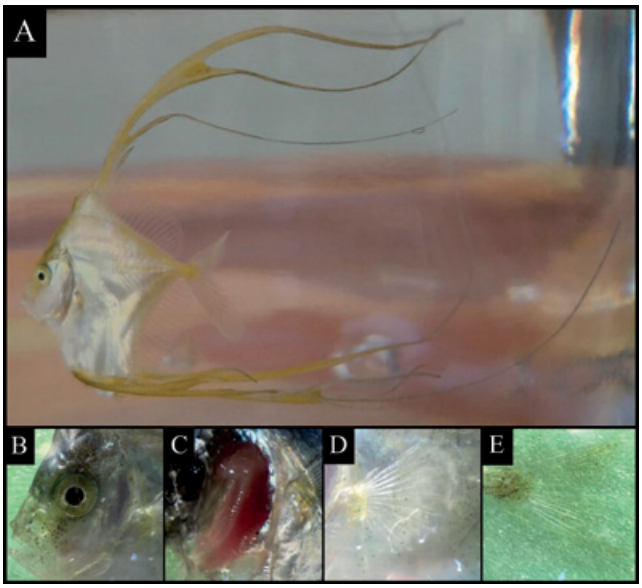

Fig. 13: Juvenile specimen of the African threadfish *Alectis alexandrina* from Ekincik and detailed photos of the head (B), gills (C), pectoral fin (D) and caudal fin (E).

5.3 On the occurrence of *Heptranchias perlo* in the northeastern Mediterranean

D. Ergüden & Y.K. Bayhan

The sharpnose sevengill shark *Heptranchias perlo* (Bonnaterre, 1788) (Elasmobranchii: Hexanchiformes: Hexanchidae) lives in deep waters over the continental shelves and upper slopes, usually between 25 m and 700 m depth, although it has been recorded up to 1.000 m (Paul & Fowler, 2003). It is a voracious predator, feeding on crustaceans, squids and cuttlefishes, small sharks and bony fishes. Average size ranges between 90 cm and 110 cm, maximum length ~140 cm (Compagno, 1984). Males reach sexual maturity at ~85 cm, females at ~90 cm (Paul & Fowler, 2003). It has a circumglobal distribution, occurring in the Western and Eastern Atlantic Ocean, the Mediterranean, the Indian Ocean and the Western and Eastern Pacific Ocean (Compagno, 1984; Paul & Fowler, 2003). So far, *H. perlo* is known from the Mediterranean waters of Turkey through few records. The first reports of this species from Turkey originate from the second half of the 20th Century, although in recent years it has been reported from western and eastern Mediterranean Turkey (Gűven *et al.*, 2012; Başusta, in press).

On 27th June 2014, a male specimen (TL - total length = 105 cm; clasper length: 8.1 cm; W - weight = 3.6 kg) of *H. perlo* was captured by a commercial bottom trawl from Mersin Bay (Turkey) (36.164172° N - 34.221320° E), at 601 m depth (Fig. 14). The following morphometric measurements were obtained: HL - Head length 21.3%, pre-dorsal length 48.1%, pre-pelvic length 40.5%, pre-anal length 53.8%, pre-caudal length 69.6%, of TL; pre-nasal length 13.1%, pre-orbital length 24.6%, eye length 15.5%, of HL. All measurements, diagnostic characteristics and the colour pattern agree with the descriptions of Compagno (1984). The specimen was deposited in the Museum of the Faculty of Fisheries, Iskenderun Technical University, Hatay (collection number: MSM-PIS/2014-9).

The occurrence of this species in the northeastern Mediterranean Sea not only extends the distribution of its known range, but also represents the first collection of a mature male specimen of this species from Turkey. *H. perlo* is considered as near threatened (NT) in Europe by Paul & Fowler (2003) and vulnerable (VU) in the Mediterranean Sea by the IUCN (Abdul Malak *et al.*, 2011), presumably due to population declines where deepwater trawling has been carried out for several decades. Increased deepwater fishing effort is likely to affect sharpnose sevengill shark populations even more in the future. Consequently, a conservation strategy for *H. perlo* and other threatened sharks in the Mediterranean Sea is necessary.

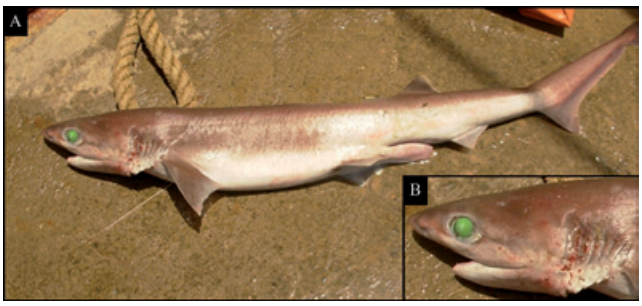

Fig. 14: The sharpnose sevengill shark *Heptranchias perlo* from Mersin Bay (A) and a magnification of the head and gills (B).

6. CYPRUS

6.1 Web contribution to native and alien species distribution: four new records from Cyprus

P. Kleitou, F. Crocetta & D. Poursanidis

The help of citizen scientists (divers, fishermen, shell collectors and fervent sea lovers) constitutes an invaluable parallel source of information when it comes to reporting records of both rare native taxa and newly introduced species, and monitoring the spread of the latter to marine ecosystems. Although for some species direct examination of specimens may be necessary, in other cases even single photographs may be adequate to identify a specimen and unpublished distribution data. Photographs obtained from social networks are even more useful as a supplement to field research, especially because of the high number of citizen scientists involved in web posting. We hereby first report the presence of the brachyuran *Atergatis roseus*, the sea slug *Plocamopherus ocellatus*, the cephalopod *Macrotritopus defilippi* and the fish *Cheilodipterus novemstriatus* from Cyprus, based on web postings in social networks only.

Atergatis roseus (Rüppell, 1830)

The egg crab *Atergatis roseus* (Rüppell, 1830) (Malacostraca: Decapoda: Xanthidae) is an alien species native to Hong Kong, India, Sri Lanka to Pakistan, the Red Sea and South Africa, which entered the Mediterranean Sea via the Suez Canal and gradually dispersed northwards and spread westwards. It was so far recorded from Egypt, Israel, Lebanon, Turkey, Syria and Greece (see Corsini-Foka & Pancucci-Papadopoulou, 2010; Moussa & Zenetos in Zenetos *et al.*, 2015a) and is well established all along the Levant coastline.

This note first reports the presence of *A. roseus* in Cyprus. In particular, two specimens were observed and photographed during scuba diving along the southeast coast of the island. On 7th September 2015, a single specimen was found in a cave at 8 m depth in Xylofagou (Larnaca, British military area) (34.95175° N - 33.84334° E), while crawling amidst red algae (Fig. 15A). In addition, another specimen was found a few days later (30th September 2015) over a rocky substrate at 50 cm depth at the diving site of Cyclops in Konnos Bay (Ayia Napa, Famagusta) (34.99970° N - 34.06734° E).

Plocamopherus ocellatus Rüppell & Leuckart, 1828

Plocamopherus ocellatus Rüppell & Leuckart, 1828 (Gastropoda: Nudibranchia: Polyceridae) is a large and conspicuous sea slug species, native from the Red Sea, that feeds on branching bryozoans. Despite its highly distinctive diagnostic characters, around 30 specimens have been recorded in the scientific literature (Rothman & Galil, 2015), including some from the Mediterranean Sea, where it entered as a Lessepsian migrant. In fact, this taxon was early recorded in the Suez Canal and then found in 1977 along the Levantine shores, where it is now presumably established in Israel, Lebanon and Turkey (Crocetta *et al.*, 2013; Rothman & Galil, 2015).

We first report the presence of *P. ocellatus* in Cyprus. In May 2015, a single specimen was found while scuba diving at 25 m depth on the Nemesis shipwreck (Protaras, Famagusta) (35.04718° N - 34.04650° E) (Fig. 15B), a recent artificial reef created by the Cyprus government in 2013. Furthermore, on 26th August 2015, two more specimens were sighted at a nearby location (Kyrenia shipwreck) (Ayia Napa, Famagusta) (34.97564° N - 33.97246° E) at 19 m depth. Both shipwrecks were sunk as part of a recent program funded by the Cyprus government and the Cyprus Dive Centre Association (CDCA) in 2013. Our findings indicate that shipwrecks in the form of artificial reefs provide a suitable habitat and ecological niche for the distribution of *P. ocellatus*.

Macrotritopus defilippi (Vérany, 1851)

The Lilliput longarm octopus *Macrotritopus defilippi* (Vérany, 1851) (Cephalopoda: Octopoda: Octopodidae) is a local native species, whose distribution seems to be confined to the Mediterranean Sea and the northeastern Atlantic Ocean (Jereb *et al.*, 2014). Described from the western Mediterranean Sea, it occupies both sandy and muddy substrates of the continental shelf up to 200 m depth (Jereb *et al.*, 2014), and its distribution in the Levant basin seems to be patchy given that, so far, it has only been recorded from Greece, Turkey and Israel (see Lefkaditou, 2007; Mienis *et al.*, 2013; Öztürk *et al.*, 2014).

This note first reports the presence of *M. defilippi* in Cyprus. On 8th April 2015, a single specimen was observed while scuba diving at 14 m depth at Cyclops in Konnos Bay (Ayia Napa, Famagusta) (34.98537° N - 34.07704° E), on a sandy area (Fig. 15C). Despite the fact that we were not able to analyze the specimen, photos leave no doubts about its identification, and match those already analyzed by one of the authors (FC) from other Mediterranean countries.

Cheilodipterus novemstriatus (Rüppell, 1838)

The Indian Ocean twospot cardinalfish *Cheilodipterus novemstriatus* (Rüppell, 1838) (Actinopteri: Perciformes: Apogonidae) is widely distributed in the western Indian Ocean, including the Red Sea. In 2010, it became the fourth Apogonid species recorded in the Mediterranean Sea within a five-year period, and the fifth overall recorded from the Basin (Goren *et al.*, 2010). After its initial record from Tel Aviv, *C. novemstriatus* settled on several eastern Mediterranean shores, from Israel to Lebanon and Turkey (see Irmak & Engin, 2015).

We first report the occurrence of *C. novemstriatus* in Cyprus. On 3rd October 2015, two individuals were spotted in a cave in Green Bay (Protaras, Famagusta)

(35.00261° N - 34.07359° E), at 18 m depth during scuba diving over a hard substrate. The specimens were photographed and identified according to the descriptions given by Goren *et al.* (2010) (Fig. 15D).

Macrotritopus defilippi is considered to be a rare species, and is known from rare sightings even in oversampled areas. Lack of knowledge about its ecological niche may be at the basis of the few records from its entire distribution range. On the contrary, the three new records of alien species from Cyprus reported above confirm the establishment and expansion of *Atergatis roseus*, *Plocamopherus ocellatus* and *Cheilodipterus novemstriatus* in the Levantine area. Lack of records from Cyprus may be due to the absence of targeted field studies. Alien spreading and potential competition with native species should be monitored in order to forestall any possible latent events. Whilst so far no potential adverse scenario has been hypothesized for the spreading of the brachyuran and the sea slug, *C. novemstriatus* may share the same habitat with the native cardinal fish *Apogon imberbis* (Linnaeus, 1758), which may raise concerns as regards potential direct competition between the two species in the Mediterranean Sea (Goren *et al.*, 2010).

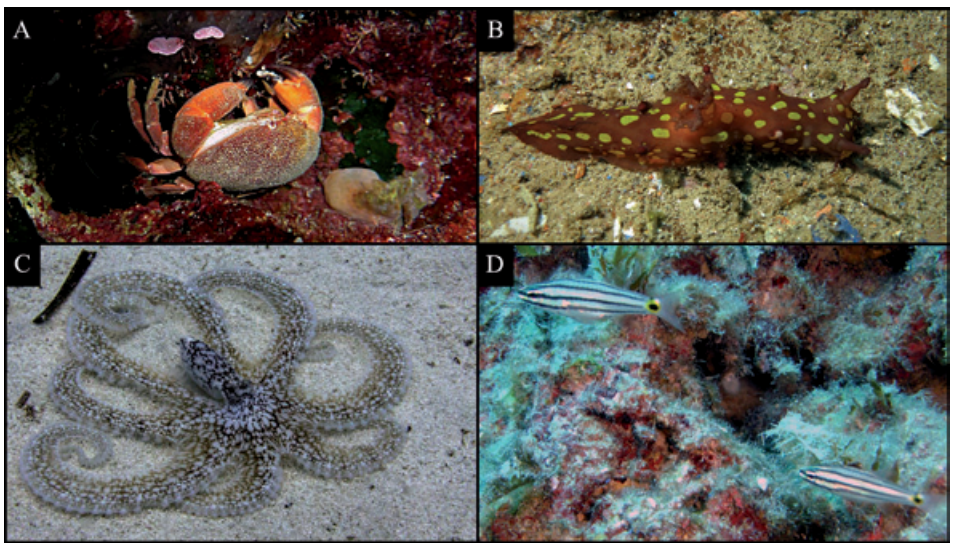

Fig. 15*:* A-D. New records from Cyprus. A. The egg crab *Atergatis roseus* from Xylofagou. Photo by Vangelis Gavallas. B. The sea slug *Plocamopherus ocellatus* from Protaras. Photo by Philipp Spillmann. C. The Lilliput longarm octopus *Macrotritopus defilippi* from Ayia Napa. Photo by Shelley Patient. D. The Indian Ocean twospot cardinalfish *Cheilodipterus novemstriatus* from Protaras. Photo by Royce Hatch.

7. LEBANON

7.1 Six new records from Lebanon, with general implications for Mediterranean alien fauna

F. Crocetta & M. Bariche

Lebanon, which is located at about 400 km north of the Suez Canal, lies along the natural pathway of Lessepsian migration. As for other areas in the Mediterranean, the coast of Lebanon is also subject to colonization by Atlantic species, a phenomenon which seems to be increasing due to multiple natural and anthropogenic changes. Our knowledge of Levantine fauna is very poor compared to other western and central Mediterranean countries, which leads to the relative common encounter of unrecorded species. We hereby record six new species from the coastal waters of Lebanon, namely the Indo-Pacific crustaceans *Actaea savignii* and *Matuta victor* and the teleost *Synanceia verrucosa*, as well as the Atlantic teleosts *Paranthias furcifer* and *Seriola fasciata* and the circumtropical *Rachycentron canadum*. Further notes on Mediterranean first record dates, establishment status and inclusion among Mediterranean alien lists are discussed for each species.

Actaea savignii (H. Milne Edwards, 1834)

The xanthid crab *Actaea savignii* (H. Milne Edwards, 1834) (Malacostraca: Decapoda: Xanthidae) is a small decapod widely reported from the Indo-West Pacific, although records outside the Red Sea have often been considered erroneous (review in Ünsal Karhan *et al*., 2013). The species was reported from the Suez Canal in 1924 but was spotted in the Mediterranean in 2010 in the vicinity of Haifa and in 2011 off Mersin (Ünsal Karhan *et al.*, 2013). On 21st May 2006, a single specimen of this species (Fig. 16A) was found in a fish auction market south of Beirut (33.838667° N - 35.482010° E). Another specimen was collected by a trammel net on 20th April 2006 in Batroun (34.235099° N - 35.640386° E), and a third individual was collected by the author (31 m depth, rocky bottom, scuba diving) on 11th November

2006 north of Beirut (33.944948° N - 35.570891° E). The specimens were then sent on loan to the Senckenberg Natural History Museum and are still currently stored there (care of Michael Türkay†). Our records therefore backdate the first Mediterranean record of this taxon to 2006 and confirm the presence of this species all along the Levantine coast.

Matuta victor (Fabricius, 1781)

The moon crab *Matuta victor* (Fabricius, 1781) (Malacostraca: Decapoda: Matutidae) is widely distributed in the Indo-Pacific, including the Red Sea (Galil & Mendelson, 2013). Two specimens were collected in the vicinity of Haifa in 2012 and constitute the unique record from the Mediterranean Sea (Galil & Mendelson, 2013). In September 2013, a single specimen was captured by a trammel net from Batroun (34.229884° N - 35.641305° E) and was deposited in the marine collection of the American University of Beirut (AUBM CR1490) (Fig. 16B). Furthermore, we observed two fishing nets loaded with several dozen individuals, respectively landed from off Tyr (approx. 33.277905° N - 35.186949° E) on 18th May 2014 and from off Saida (33.564723° N - 35.368936°E) on 1st November 2014. No voucher specimens were collected but only photography and a video from Saida, available on the following webpage: https://www.youtube.com/watch?v=CWeZayQ_Aow. In addition to the first record, our specimen and additional observations suggest a permanent establishment of the species in the Mediterranean Sea.

Synanceia verrucosa Bloch & Schneider, 1801

The reef stonefish *Synanceia verrucosa* Bloch & Schneider, 1801 (Actinopteri: Scorpaeniformes: Synanceiidae) is one of the two species within genus *Synanceia* Bloch & Schneider, 1801 that occur in the Red Sea. It is widely distributed through the Indo-Pacific, where it is considered one of the most venomous fish in the ocean, with fatalities reported in the literature (see Edelist *et al.*, 2011). It differs mostly from *Synanceia nana* Eschmeyer & Rama-Rao, 1973 by the lack of dark margins on the pectoral, pelvic and caudal fins, as well as by different sizes (*S. nana*: up to 135 mm *vs S. verrucosa*: up to 400 mm) (see Edelist *et al.*, 2011). This taxon is known from the Mediterranean Sea by the record of a single specimen from south of Tel-Aviv and another one in Iskenderun Bay (Edelist *et al.*, 2011; Bilecenoğlu, 2012). We hereby report a third Mediterranean specimen captured alive on 29 January 2012 off Tyr (33.290657° N - 35.184459° E) (Fig. 16C). A video showing the specimen alive is available on the following webpage: https://www.youtube.com/watch?v=g84cN15ZqH4.

Paranthias furcifer (Valenciennes, 1828)

The Atlantic creole fish *Paranthias furcifer* (Valenciennes, 1828) (Actinopteri: Perciformes: Serranidae) is a marine tropical to subtropical fish widely distributed in the eastern and the western Atlantic Ocean (see Dulčić & Dragičević, 2012). This species is so far known from the Mediterranean Sea by a single specimen from Croatia, captured on 17 June 2011. We hereby report the presence of this species from off Jounieh Bay (approx. 34.035597° N - 35.566367° E), where it was captured in 2007 by an amateur angler jigging an artificial lure at 160 m. The specimen was not preserved, but the photograph, showing the trophy (Fig. 16D), leaves no doubts as to its identity. Our record therefore backdates the first Mediterranean occurrence of this taxon to 2007.

Rachycentron canadum (Linnaeus, 1766)

The cobia *Rachycentron canadum* (Linnaeus, 1766) (Actinopteri: Perciformes: Rachycentridae) is the only species within family Rachycentridae Gill, 1896, and is a circumtropical species found in warm-temperate to tropical waters of the western and eastern Atlantic Ocean, throughout the Caribbean, and in the Indo-Pacific (see Akyol & Vahdet, 2013). It is usually a pelagic solitary fish and its distribution has recently been updated by two reports from the Mediterranean: a single specimen was caught in Haifa Bay in 1978 (Golani & Ben-Tuvia, 1986) and another specimen was found in Turkey, off Marmaris in 2013 (Akyol & Vahdet, 2013). We hereby report two additional specimens from Lebanon based on images: one from off Al Qalamoun (approx. 34.405020° N - 35.675891° E), captured on 22nd July 2012 (Fig. 16E) and another from southern Lebanon (unknown site) captured on December 2014. These third and fourth records do not suggest population establishment and the presence of the species should still be considered casual in the Mediterranean, pending further records.

Seriola fasciata (Bloch, 1793)

The lesser amberjack *Seriola fasciata* (Bloch, 1793) (Actinopteri: Perciformes: Carangidae) is an Atlantic species widely distributed from Madeira and the Canary Islands on the eastern coast, and from Massachusetts to the Gulf of Mexico on the western coast (Sonin *et al.*, 2009). It has been recorded from several parts of the Mediterranean, including the eastern shores (see Jawad *et al.*, 2015). The first Levantine records dates back to 2008, when two specimens were found in Haifa Bay (Sonin *et al.*, 2009). We hereby report three records from Lebanon: one specimen was found in trammel nets in Selaata (34.297052° N - 35.667286° E) in November 2005 (American University of Beirut - AUBM OS3690), four other specimens were found in pairs in gill nets landed in Batroun (approx. 34.243553° N - 35.653034° E) in September 2010 (AUBM OS3862) and October 2012 (AUBM OS3902) (Fig. 16F). Our records backdate the presence of this taxon in the eastern Mediterranean Sea to 2005.

As regards the three latter species, Dulčić & Dragičević (2012) considered *Paranthias furcifer* as an alien species and the Lessepsian status of *Rachycentron cana-*

dum has been widely discussed by several authors, who considered the Suez Canal as the most probable pathway of introduction due to the absence of records from the western Mediterranean (Golani & Ben-Tuvia 1986; Akyol & Vahdet, 2013). Zenetos *et al.* (2010; 2012), based on Golani & Ben-Tuvia (1986), also considered this species as an alien in the Mediterranean, and included it among "casual aliens". As for *Seriola fasciata*, there seems to be general agreement among Mediterranean scientists to consider that spreading is by natural means (see Zenetos *et al.*, 2012). However, as for other species from various phyla, some recently recorded taxa do not entirely match the alien or native status, and may fall under cryptogenics (see Carlton, 1996: a species that cannot be included with confidence among native nor among introduced ones). So far, this term has been used mainly for defining circumtropical species or species with a disjunct distribution, and whose native range is still unknown or its presence may be the result of past introductions not recorded in the literature (Carlton, 2009). This term may also be applied to small, cryptic species, that may have gone unnoticed for hundreds of years. In the three previous cases, we are dealing with recently recorded taxa, excluding the possibility that their historical presence in the Mediterranean may have gone unnoticed, and whose vector of arrival in the Mediterranean is still unknown and may be due to natural spreading or human activities. Until further studies, including molecular data, can confirm or disprove faunistic speculations, we prefer to separate them from "cryptogenics" and keep them in our list of "possible aliens", pending the possibility to include or exclude them from alien lists in the future. For harmonization purposes, species commonly labelled "vagrant" should also be included in the "possible aliens" category, at least until further studies including molecular data confirm or disprove faunistic speculations.

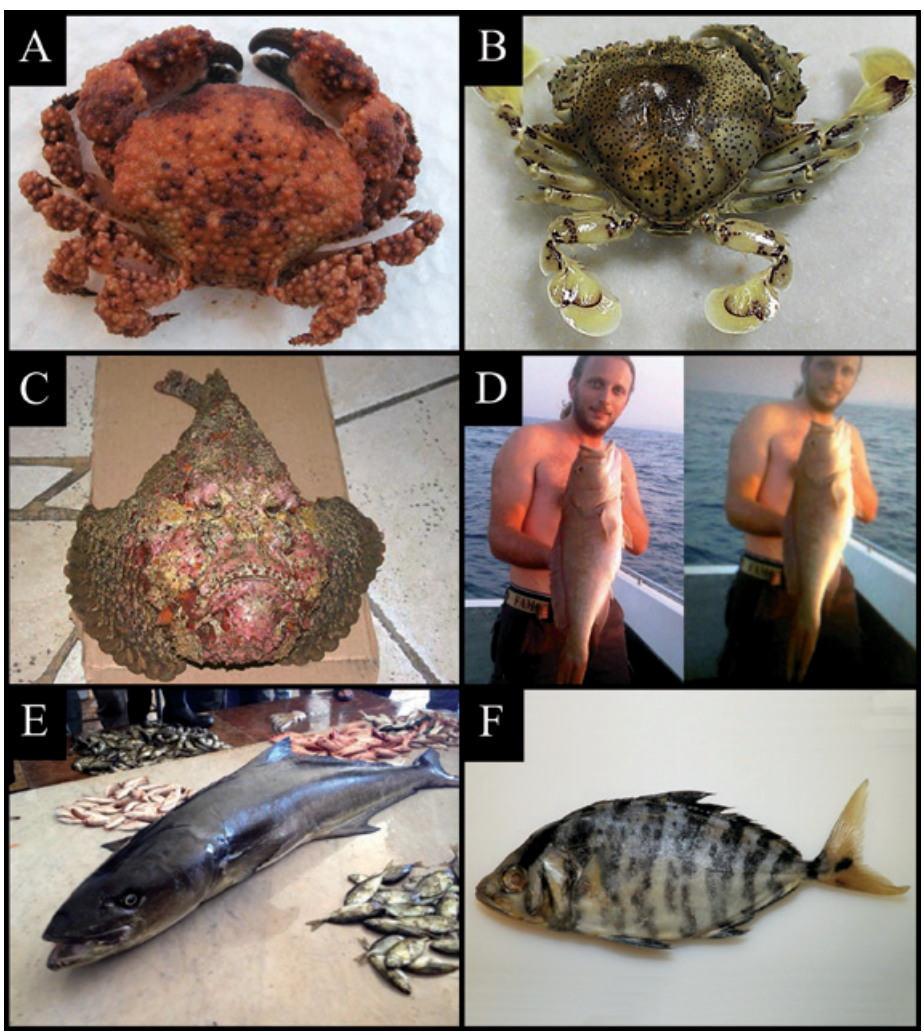

Fig. 16: A-F. New records from Lebanon. A. The xanthid crab *Actaea savignii* from a fish auction market south of Beirut. B. The moon crab *Matuta victor* from Batroun. C. The reef stonefish *Synanceia verrucosa* from off Tyr. D. The Atlantic creole fish *Paranthias furcifer* from off Jounieh Bay. E. The cobia *Rachycentron canadum* from off Al Qalamoun. F. The lesser amberjack *Seriola fasciata* from Batroun.

Acknowledgements

Paolo Balistreri and Maria Ghelia thank Dr. Anna Maria Mannino (University of Palermo). Paul Portelli, Daryl Agius, Constantine Mifsud and Alan Deidun are indebted to Dr. Terrence Gosliner for his taxonomic advice in confirming the identity of *Maritigrella fuscopunctata*. Julian Evans and Patrick J. Schembri acknowledge John J. Borg (National Museum of Natural History, Mdina, Malta) for allowing them to examine the *Portunus segnis* specimens collected in 1972. Argyro Zenetos and Maria Giavasi thank Kostas Kapiris (HCMR) for confirmation of the *Penaeus atzecus* identification, and Petros Giavasis from F/V PETROS/MARIA (N.K.09 Kyllini) for providing the specimens. Maria Corsini-Foka and Gerasimos Kondylatos are grateful to the team of the "Yellow Submarine" Glass Bottom Boat (Mandraki, Rodos) for providing the *Diadema setosum* specimen, to Josif Makris for immediately alerting the ELNAIS, Hellenic Centre for Marine Research, about the presence of *Pterois miles* in Rhodes, to Jill Simmons and Antonis Kantaros ("Waterhoppers" Diving School of Rodos) and Adrien E. Flouros for reporting further *P. miles* sightings. Murat Çakır and Ergun Taşkın were supported by TÜBİTAK, Ankara, Turkey (114Y238) and are grateful to Dr. Athanasios Athanasiadis (University of Gothenburg, Sweden) for critically reviewing the manuscript. Yaşar Özvarol is grateful to Dr. Rainer Froese, Prof. Daniel Golani, Harald Rosental, Ronald Fricke, Bill Smith-Vaniz and Rachel Atanacio for their invaluable help in identifying the juvenile specimen of *Alectis alexandrina*. Periklis Kleitou, Fabio Crocetta and Dimitrios Poursanidis are grateful to Vangelis Gavallas (Greece), Royce Hatch (United Kingdom), Shelley Patient (United Kingdom, Scuba Tech Diving Centre Cyprus), Philipp Spillmann (Switzerland) and Werner Wolf (Austria), who kindly shared data from Cyprus and gave permission to use their photos, and to Maria Corsini-Foka (Greece), Evgenia Lefkaditou (Greece) and Alp Salman (Turkey), who kindly helped while handling *Atergatis roseus* and *Macrotritopus defilippi*. Fabio Crocetta & Michel Bariche acknowledge Messrs Toufic Assal, Marwan Hariri, Abdel Kader Finge, Marwan Khoury, Jean-Paul Massoud, Ahmad Jammal, who provided photographs, videos or specimens of the records from Lebanon, and the website www.yasour.org. Lofti Rabaoui and Radhouan El Zrelli are grateful to fishermen of Gabes Gulf for providing information on the recent bloom of *Portunus segnis*. Fabio Crocetta also acknowledges the East and South European Network for Invasive Alien Species - a tool to support the management of alien species in Bulgaria (ESENIAS-TOOLS), EEA funded project (Contract No. Д-33-51/30.06.2015), that supported the study of alien species from central and eastern European countries.

References

Abdul Malak, D., Livingstone, S.R., Pollard, D., Polidoro, B.A., Cuttelod, A. *et al.,* 2011. *Overview of the conservation status of the marine fishes of the Mediterranean Sea.* IUCN, Gland, Switzerland and Malaga, Spain, 61 pp.

Akyol, O., Vahdet, Ü., 2013. Second record of the cobia, *Rachycentron canadum* (Actinopterygii: Perciformes: Rachycentridae), from the Mediterranean Sea. *Acta Ichthyologica et Piscatoria*, 43 (4), 315-317.

Athanasiadis, A., 1996. Morphology and classification of the Ceramioideae (Rhodophyta) based on phylogenetic principles. *Opera Botanica* - 128, Council for Nordic Publications in Botany, Copenhagen, 216 pp.

Athanasiadis, A., 2009. Typification of *Antithamnion nipponicum* Yamada et Inagaki (Antithamnieae, Ceramioideae, Ceramiaceae, Ceramiales, Rhodophyta). *Botanica marina*, 52 (3), 256-261.

Bariche, M., Torres, M., Azzurro, E., 2013. The presence of the invasive Lionfish *Pterois miles* in the Mediterranean Sea. *Mediterranean Marine Science*, 14 (2), 292-294.

Başusta, N., in press. New records of neonate and juvenile sharks (*Heptranchias perlo*, *Squatina aculeata*, *Etmopterus spinax*) from the North-eastern Mediterranean Sea. *Marine Biodiversity*, doi: 10.1007/s12526-015-0391-z.

Bauchot, M.L., 2003. Carangidae. p. 464-483. In: *Faune des poissons d'eaux douce et saumâtres de l'Afrique de l'Ouest, Tome 2. Coll. Faune et Flore tropicales 40.* Lévêque, C., Paugy, D., Teugels, G.G. (Eds.). Musée Royal de l'Afrique Centrale, Tervuren, Belgique, Museum National d'Histoire Naturalle, Paris, France and Institut de Recherche pour le Développement, Paris, France.

Bilecenoğlu, M., 2012. First sighting of the Red Sea originated stonefish (*Synanceia verrucosa*) from Turkey. *Journal of the Black Sea/Mediterranean Environment*, 18 (1), 76-82.

Bilecenoğlu, M., Alfaya, J.E.F., Azzurro, E., Baldacconi, R., Boyaci, Y.Ö. *et al.,* 2013. New Mediterranean Biodiversity Records (December 2013). *Mediterranean Marine Science*, 14 (2), 463-480.

Bilecenoğlu, M., Kaya, M., Cihangir, B., Çiçek, E., 2014. An updated checklist of the marine fishes of Turkey. *Turkish Journal of Zoology*, 38 (6), 901-929.

Brancato, A., Reitano, A., 2009. Segnalazione di *Fulvia fragilis* (Forskål, 1775) e *Musculista senhousia* (Benson in Cantor, 1842) nelle acque del Porto Grande di Siracusa (Sicilia sud-orientale) (Mollusca, Bivalvia). *Il Naturalista Siciliano*, 33 (1-2), 207-212.

Carlton, J.T., 1996. Biological invasions and cryptogenic species. *Ecology*, 77 (6), 1653-1655.

Carlton, J.T., 2009. Deep invasion ecology and the assembly of communities in historical time. p. 13-56. In: *Biological invasions in marine ecosystems.* Rilov, G., Crooks, J.A. (Eds). Springer, Berlin.

Carpenter, K.E., Krupp, F., Jones, D.A., Zajonz, U., 1997. *The living marine resources of Kuwait, Eastern Saudi Arabia, Bahrain, Qatar, and the United Arab Emirates. FAO species identification guide for fishery purposes*. FAO, Rome, 293 pp.

Cho, T.O., Won, B.Y., Fredericq, S., 2005. *Antithamnion nipponicum* (Ceramiaceae, Rhodophyta), incorrectly known as *A. pectinatum* in western Europe, is a recent introduction along the North Carolina and Pacific coasts of North America. *European Journal of Phycology*, 40 (4), 323-335.

Compagno, L.J.V., 1984. *FAO Species Catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of*

shark species known to date. Part 1 - Hexanchiformes to Lamniformes. FAO Fisheries Synopsis, Rome, 249 pp.

Coppard, S., Campbell, A., 2006. Taxonomic significance of test morphology in the echinoid genera *Diadema* Gray, 1825 and *Echinothrix* Peters, 1853 (Echinodermata). *Zoosystema*, 28 (1), 93-112.

Corsini-Foka, M., Pancucci-Papadopoulou, M.-A., 2010. The alien brachyuran *Atergatis roseus* (Decapoda: Xanthidae) in Rhodes Island (Greece). *Marine Biodiversity Records*, 3: e76.

Corsini-Foka, M., Zenetos, A., Crocetta, F., Çinar, M.E., Koçak, F. *et al.*, in press. Inventory of alien and cryptogenic species of the Dodecanese (Aegean Sea, Greece): collaboration through COST Action training school. *Management of Biological Invasions*.

Crocetta, F., 2006. First record of *Portunus pelagicus* (Linnaeus, 1758) (Decapoda, Brachyura, Portunidae) in the Northern Tyrrhenian Sea. *Crustaceana*, 79 (9), 1145-1148.

Crocetta, F., 2012. Marine alien Mollusca in Italy: a critical review and state of the knowledge. *Journal of the Marine Biological Association of the United Kingdom*, 92 (6), 1357-1365.

Crocetta, F., Vazzana, A., Renda, W., 2010. The infralittoral mobile bottom molluscs of Gizzeria harbour (Catanzaro, Italy). *Marine Biodiversity Records*, 3, e15.

Crocetta, F., Zibrowius, H., Bitar, G., Templado, J., Oliverio, M., 2013. Biogeographical homogeneity in the eastern Mediterranean Sea – I: the opisthobranchs (Mollusca: Gastropoda) from Lebanon. *Mediterranean Marine Science*, 14 (2), 1-9 (+ supplementary data).

Daly Yahia, M.N., Daly Yahia-Kefi, O., Maïte Gueroun, S.K., Aissi, M., Deduin, A. *et al.*, 2013. The invasive tropical scyphozoan *Rhopilema nomadica* Galil, 1990 reaches the Tunisian coast of the Mediterranean Sea. *BioInvasions Records*, 2 (4), 319-323.

Dawson, E.Y., 1962. Marine red algae of Pacific Mexico. Part 7. Ceramiales: Ceramiaceae, Delesseriaceae. *Reports on the collections obtained by Allan Hancock Pacific expeditions off the coasts of southern California, Mexico, central America, south America, and the Galapagos Islands*, 26, 1-207.

Deval, M.C., Kaya, Y., Guven, O., Gokoğlu, M., Froglia, C., 2010. An unexpected finding of the western Atlantic shrimp *Farfantepenaeus aztecus* (Ives, 1891) (Decapoda, Penaeidae) in Antalya Bay, eastern Mediterranean Sea. *Crustaceana,* 83 (12), 1532-1537.

Dulčić, J., 2005. On the record of the African threadfish *Alectis alexandrinus* (Pisces: Carangidae) from the Adriatic Sea. *Journal of the Marine Biological Association of the United Kingdom*, 85 (4), 1013-1014.

Dulčić, J., Dragičević, B., 2012. *Paranthias furcifer* (Perciformes: Serranidae), a new alien fish in the Mediterranean Sea. *Journal of Fish Biology*, 82 (1), 332-337.

Dulčić, J., Jardas, I., Pallaoro, A, Lipej, L., 2004. On the validity of the record of silver pomfret *Pampus argenteus* (Stromateidae) from the Adriatic Sea. *Cybium,* 28 (1), 69-71.

Edelist, D., Spanier, E., Golani, D., 2011. Evidence for the occurrence of the Indo-Pacifis stonefish *Synanceia verrucosa* (Actinopterygii: Scorpaeniformes: Synanceiidae), in the Mediterranean Sea. *Acta Ichthyologica et Piscatoria*, 41 (2), 129-131.

Evans, J., Barbara, J., Schembri, P.J., 2015. Updated review of marine alien species and other 'newcomers' recorded from the Maltese Islands (Central Mediterranean). *Mediterranean Marine Science*, 16 (1), 225-244.

Galil, B.S., 2011. The alien Crustaceans in the Mediterranean Sea: An historical review. p. 377-401. In: *In the Wrong Place - Alien Marine Crustaceans: Distribution, Biology and Impacts*. Galil, B.S., Clark, P.F., Carlton, J.T. (Eds). Springer, Berlin.

Galil, B.S., Froglia, C., Noël, P.Y., 2002. CIESM Atlas of exotic species in the Mediterranean. Vol. 2. Crustaceans: decapods and stomatopods. Briand, F. (Eds.). CIESM Publishers, Monaco, 192 pp.

Galil, B.S., Mendelson, M., 2013. A record of the moon crab *Matuta victor* (Fabricius, 1781) (Crustacea; Decapoda; Matutidae) from the Mediterranean coast of Israel. *BioInvasions Records*, 2 (1), 69-71.

Galil, B.S., Spanier, E., Ferguson, W.W., 1990. The Scyphomedusae of the Mediterranean coast of Israel, including two Lessepsian migrants new to the Mediterranean. *Zoologische Mededelingen*, 64 (7), 95-105.

Golani, D., Ben-Tuvia, A., 1986. New records of fishes from the Mediterranean coast of Israel including Red Sea immigrants. *Cybium*, 10 (3), 285-291.

Golani, D., Sonin, O., 1992. New records of the Red Sea fishes, *Pterois miles* (Scorpaenidae) and *Pteragogus pelycus* (Labridae) from the eastern Mediterranean Sea. *Japanese Journal of Ichthyology*, 39 (2), 167-169.

Goren, M., Lipsky, G., Brokovich, E., Abelson, A., 2010. A 'flood'of alien cardinal fishes in the eastern Mediterranean - first record of the Indo-Pacific *Cheilodipterus novemstriatus* (Rüppell, 1838) in the Mediterranean Sea. *Aquatic Invasions*, 5, S49-S51.

Gosliner, T.M., Behrens, D.W., Williams G.C., 1996. Coral Reef Animals of the Indo-Pacific. Sea Challengers, Monterey, 314 pp.

Guidetti, P., Bussotti, S., Kovačić, M., 2006. First record of the large-scaled goby, *Thorogobius macrolepis* (Pisces, Gobiidae), in Italian Seas. *Thalassia Salentina*, 29, 41-45.

Guiry, M.D., Guiry, G.M., 2015. AlgaeBase. World-wide electronic publication, National University of Ireland, Galway. Last accessed on 18th October 2015 at: http://www.algaebase.org/search/species/detail/?species_id=rc8456f092562ad73&-session=abv4:53D4F35018e1b1C164uWDCB90C6.

Gűven, O., Kebapçıoğlu, T., Deval, M.C., 2012. Length-weight relationships of sharks in Antalya Bay, eastern Mediterranean. *Journal of Applied Ichthyology*, 28 (2), 278-279.

Hirosaki, Y., 1960. Some ecological observations on fishes in Sagami Bay appearing together with the drifting sea weeds. *Journal of the Faculty of Science Hokkaido University - Series VI - Zoology*, 14 (3), 435-442.

Irmak, E., Engin, S., 2015. A newly established population of the Indian Ocean Twospot Cardinalfish, *Cheilodipterus novemstriatus* (Rüppell, 1838), in the Northern Levantine Sea (Osteichthyes: Apogonidae). *Zoology in the Middle East*, 61 (2), 1-3.

Jawad, L., Mtawej, A., Ibrahim, A., Hassan, M., 2015. First record of the lesser amberjack *Seriola fasciata* (Teleostei: Carangidae) in Syrian coasts. *Cahiers de Biologie Marine*, 56 (1), 81-84.

Jereb, P., Roper, C.F.E., Norman, M.D., Finn, J.K., 2014. *Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 3.*

Octopods and Vampire Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 3. FAO, Rome, 370 pp.

Kapiris, K., Apostolidis, C., Baldacconi, R., Başusta, N., Bilecenoğlu, M. *et al.*, 2014. New Mediterranean Biodiversity Records (April 2014). *Mediterranean Marine Science*, 15 (1), 198-212.

Katsanevakis, S., Acar, Ü., Ammar, I., Balci, B.A., Bekas, P. *et al*., 2014a. New Mediterranean Biodiversity Records (October 2014). *Mediterranean Marine Science*, 15 (3), 675-695.

Katsanevakis, S., Wallentinus, I., Zenetos, A., Leppäkoski, E., Çinar, M.E. *et al.*, 2014b. Impacts of invasive alien marine species on ecosystem services and biodiversity: a pan-European review. *Aquatic Invasions*, 9 (4), 391-423.

Kovačić, M., Miller, P.J., 2000. A new species of *Gobius* (Teleostei: Gobiidae) from the northern Adriatic Sea. *Cybium*, 24 (3), 231-239.

Lai, J.C.Y., Ng, P.K.L., Davie, P.J.F., 2010. A revision of the *Portunus pelagicus* (Linnaeus, 1758) species complex (Crustacea: Brachyura: Portunidae) with the recognition of four species. *The Raffles Bulletin of Zoology*, 58 (2), 199-237.

Lang, A., 1884. *Die Polycladen (Seeplanarien) des Golfes von Neapel und der angrenzenden Meeresabschnitte. Eine Monographie. Fauna und Flora des Golfes von Neapel und der angrenzenden Meeresabschnitte, herausgegeben von der Zoologische Station in Neapel*. W. Engelmann, Leipzig, 688 pp.

Lefkaditou, E., 2007. Review of Cephalopod Fauna in Hellenic Waters. p. 62-69. In: Papaconstantinou, C., Zenetos, A., Vassilopoulou, V., Tserpes, C. (Eds.). *State of Hellenic Fisheries*. Hellenic Centre for Marine Research, Athens.

Lipej, L., Mavrič, B., Žiža, V., Dulčić, J., 2008. The largescaled terapon *Terapon theraps*: a new Indo-Pacific fish in the Mediterranean Sea. *Journal of Fish Biology*, 73 (7), 1819-1822.

Lotan, A., Ben-Hillel, R., Loya, Y., 1992. Life cycle of *Rhopilema nomadica*: a new immigrant scyphomedusan in the Mediterranean. *Marine Biology*, 112 (2), 237-242.

Macali, A., Conde, A., Smriglio, C., Mariottini, P., Crocetta, F., 2013. The evolution of the Molluscan biota of the Sabaudia Lake: a matter of human history. *Scientia Marina*, 77 (4), 649-662.

Marković, O., Gökoğlu, M., Petović, S., Mandić, M., 2014. First record of the Northern brown shrimp, *Farfantepenaeus aztecus* (Ives, 1891) (Crustacea: Decapoda: Penaeidae) in the South Adriatic Sea, Montenegro. *Mediterranean Marine Science*, 15 (1), 165-167.

Meriç, N., Eryilmaz, L., Özuluğ, M., 2007. A catalogue of the fishes held in the Istanbul University, Science Faculty, Hydrobiology Museum. *Zootaxa*, 1472, 29-54.

Mienis, H.K., Galil, B.S., Lubinevsky, H., 2013. *Heteroteuthis dispar* (Cephalopoda, Sepiolidae): another bobtail squid from the Levant Sea, Eastern Mediterranean. *Triton*, 28, 1-3.

Minos, G., Kokokiris, L., Imsiridou, A., Karachle, P.K., Kapiris, K., 2015. Notes on the distribution and biology of northern brown shrimp *Farfantepenaeus aztecus* (Ives, 1891) in the Eastern Mediterranean. *Turkish Journal of Zoology*, 39 (3), 467-473.

Newman, L.J., Cannon, L.R.G., 2000. A new genus of eurylepti d flatworm (Platyhelminthes, Polycladida) from the Indo-Pacific. *Journal of Natural History*, 34 (2), 191-205.

Oray, I.K., Sınay, E., Saadet Karakulak, F., Yıldız, T., 2015. An expected marine alien fish caught at the coast of Northern Cyprus: *Pterois miles* (Bennett, 1828). *Journal of Applied Ichthyology*, 31 (4), 733-735.

Oregon State University, 2015. Fish native to Japan found in Port Orford waters. Last accessed on 18th October 2015 at: http://oregonstate.edu/ua/ncs/archives/2015/feb/fish-native-japan-found-port-orford-waters.

Öztürk, B., Doğan, A., Bitlis-Bakir, B., Salman, A., 2014. Marine molluscs of the Turkish coasts: an updated checklist. *Turkish Journal of Zoology*, 38 (6), 832-879.

Paul, L., Fowler, S., 2003. *Heptranchias perlo*. The IUCN Red List of Threatened Species. Version 2015-3. Last accessed on 18th October 2015 at: http://www.iucnredlist.org/details/41823/0.

Prudhoe, S., 1978. Some polyclad turbellarians new to the fauna of the Australian coasts. *Records of the Australian Museum*, 31 (14), 586-604.

Rabaoui, L., Arculeo, M., Mansour, L., Tlig-Zouari, S., 2015. Occurrence of the lessepsian species *Portunus segnis* (Crustacea: Decapoda) in the Gulf of Gabes (Tunisia): first record and new information on its biology and ecology. *Cahiers de Biologie Marine*, 56 (2), 169-175.

Relini, G., Lanteri, L., 2010. Osteichthyes. *Biologia Marina Mediterranea*, 17 (1), 649-674.

Rothman, B.-S.S., Galil, B.S., 2015. Not so rare: *Plocamopherus ocellatus* (Nudibranchia, Polyceridae) in the Eastern Mediterranean. *Marine Biodiversity Records*, 8, e144.

Schembri, P.J., Bodilis, P., Evans, J., Francour, P., 2010. Occurrence of Barred Knifejaw, *Oplegnathus fasciatus* (Actinopterygii: Perciformes: Oplegnathidae), in Malta (Central Mediterranean) with a discussion on possible modes of entry. *Acta Ichthyologica et Piscatoria*, 40 (2), 101-104.

Schembri, P.J., Lanfranco, E., 1984. Marine Brachyura (Crustacea: Decapoda: Brachyura) from the Maltese Islands and surrounding waters (Central Mediterranean). *Centro* [Malta], 1 (1), 21-39.

Secilla, A.I., Diez, A., Santolaria, A., Gorostiaga, J.M., 2007. *Antithamnion nipponicum* (Ceramiales, Rhodophyta) nueva cita para la peninsula Iberica. *ALGAS, Boletín de la Sociedad Española de Ficología*, 38, 22-23.

Sonin, O., Salameh, P., Golani, D., 2009. First record of the lesser amberjack, *Seriola fasciata* (Actinopterygii: Perciformes: Carangidae), in the Levant. *Acta Ichthyologica et Piscatoria*, 39 (1), 71-73.

Torcu, H., Aka, Z., Işbilir, A., 2001. An Investigation on Fishes of the Turkish Rebuplic [sic!] of Northern Cyprus. *Turkish Journal of Veterinary and Animal Science*, 25 (3), 155-159.

Tsiamis, K., Aydogan, Ö., Bailly, N., Balistreri, P., Bariche, M. *et al*., 2015. New Mediterranean Biodiversity Records (July 2015). *Meditterranean Marine Science*, 16 (2), 472-488.

Turan, C., Ergüden, D., Gürlek, M., Yağlıoğlu, D., Uyan, A. *et al.*, 2014. First record of the Indo-Pacific lionfish *Pterois miles* (Bennett, 1828) (Osteichthyes: Scorpaenidae) for the Turkish marine waters. *Journal of Black Sea/Mediterranean Environment*, 20 (2), 158-163.

Yokeş, B., Galil, B.S., 2006. The first record of the needlespined urchin *Diadema setosum* (Leske, 1778) (Echinodermata: Echinoidea: Diadematidae) from the Mediterranean Sea. *Aquatic Invasions*, 1 (3), 188-190.

Ünsal Karhan, S., Yokeş, M.B., Clark, P.F., Galil, B.S., 2013. First Mediterranean record of *Actaea savignii* (H. Milne Edwards, 1834) (Crustacea: Decapoda: Brachyura: Xanthidae), an ad-

ditional Erythraean alien crab. *BioInvasions Records*, 2 (2), 145-148.

WoRMS Editorial Board, 2015. World Register of Marine Species. Last accessed on 18th October 2015 at: http://www.marinespecies.org at VLIZ.

Zenetos, A., Gofas, S., Russo, G., Templado, J., 2004. CIESM Atlas of exotic species in the Mediterranean. Vol. 3. Molluscs. Briand, F. (Eds.). CIESM Publishers, Monaco, 376 pp.

Zenetos, A., Gofas, S., Verlaque, M., Çinar, M.E., García Raso, J.E. *et al.*, 2010. Alien species in the Mediterranean Sea by 2010. A contribution to the application of European Union's Marine Strategy Framework Directive (MSFD). Part I. Spatial distribution. *Mediterranean Marine Science*, 11 (2), 381-493.

Zenetos, A., Gofas, S., Morri, C., Rosso, A., Violanti, D. *et al.*, 2012. Alien species in the Mediterranean Sea by 2012. A contribution to the application of European Union's Marine Strategy Framework Directive (MSFD). Part 2. Introduction trends and pathways. *Mediterranean Marine Science*, 13 (2), 328-352.

Zenetos, A., Koutsogiannopoulos, D., Ovalis, P., Poursanidis, D., 2013. The role played by citizen scientists in monitoring marine alien species in Greece. *Cahiers de Biologie Marine*, 54 (3), 419-426.

Zenetos, A., Akel, E.H.KH., Apostolidis, C., Bilecenoğlu, M., Bitar, G. *et al.*, 2015a. New Mediterranean Biodiversity Records (April 2015). *Mediterranean Marine Science*, 16 (1), 266-284.

Zenetos, A., Arianoutsou, M., Bazos, I., Balopoulou, S., Corsini-Foka, M. *et al.*, 2015b. ELNAIS: A collaborative network on Aquatic Alien Species in Hellas (Greece). *Management of Biological Invasions*, 6 (2), 185-196.