

New Mediterranean Biodiversity Records (April 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 fish species include: the slender sunfish *Ranzania laevis* and the scalloped ribbonfish *Zu cristatus* in Calabria; the Azores rockling *Gaidropsarus granti* in Calabria and Sicily; the agujon needlefish *Tylosurus acus imperialis* in the Northern Aegean; and the amphibious behaviour of *Gouania willdenowi* in Southern Turkey. As regards molluscs, the interesting findings include *Ischnochiton usticensis* in Calabria and *Thordisa filix* in the bay of Piran (Slovenia). The stomatopod *Parasquilla ferussaci* was collected from Lesvos island (Greece); the isopod *Anilocra frontalis* was observed parasitizing the alien *Pteragogus trispilus* in the Rhodes area. The asteroid *Tethyaster subinermis* and the butterfly ray *Gymnura altavela* were reported from several localities in the Greek Ionian and Aegean Seas.

The new records of alien species include: the antenna codlet *Bregmaceros atlanticus* in Saronikos Gulf; three new fish records and two decapods from Egypt; the establishment of the two spot cardinal fish *Cheilodipterus novemstriatus* and the first record of the marble shrimp *Saron marmoratus* in semi-dark caves along the Lebanese coastline; the finding of *Lagocephalus sceleratus*, *Sargocentron rubrum*, *Fistularia commersonii* and *Stephanolepis diaspros* around Lipsi island (Aegean Sea, Greece); the decapod *Penaeus hathor* in Aegean waters; the decapod *Penaeus aztecus* and the nudibranch *Melibe viridis* in the Dodecanese islands; the finding of *Pinctada imbricata radiata* in the Mar Grande of Taranto (Ionian Sea, Italy) and the Maliakos Gulf (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 thus is largely unavailable to the scientific community. 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 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 ap-

pearing in alphabetical order. This article is divided into two main sections, the first for native species, and the second for alien and cryptogenic species. The contributing authors are also cited at the beginning of the subsection corresponding to their record.

1. Native species

1.1. On the occurrence of *Ranzania laevis* and *Zu cristatus* in Calabria (Southern Tyrrhenian Sea)

By E. Sperone and G. Giglio

The slender sunfish *Ranzania laevis* (Pennant, 1776) and the scalloped ribbonfish *Zu cristatus* (Bonelli, 1820) are two rare and elusive species for the Mediterranean (Psomadakis *et al.*, 2006; Elbaraasi & Elsalini, 2010). This note reports on the occurrence of these two fish in the Calabria region, the southernmost tip of the Italian Peninsula. On 11 April 2014, a specimen of *Ranzania laevis* (Fig. 1A) was found on the beach of Gizzeria (38.9833°N, 16.2°E). It measured 56 cm and weighed about 2.08 kg; both the dorsal and anal fins had 18 rays, while the pectoral fin had 14 rays. A specimen of *Zu cristatus* (Fig. 1B) was caught on 31 July 2014 by rod fishing about 1 km offshore Vibo marina (38.6667°N, 16.05°E): it measured 98 cm and weighed about 2.0 kg, and had 135 dorsal rays.

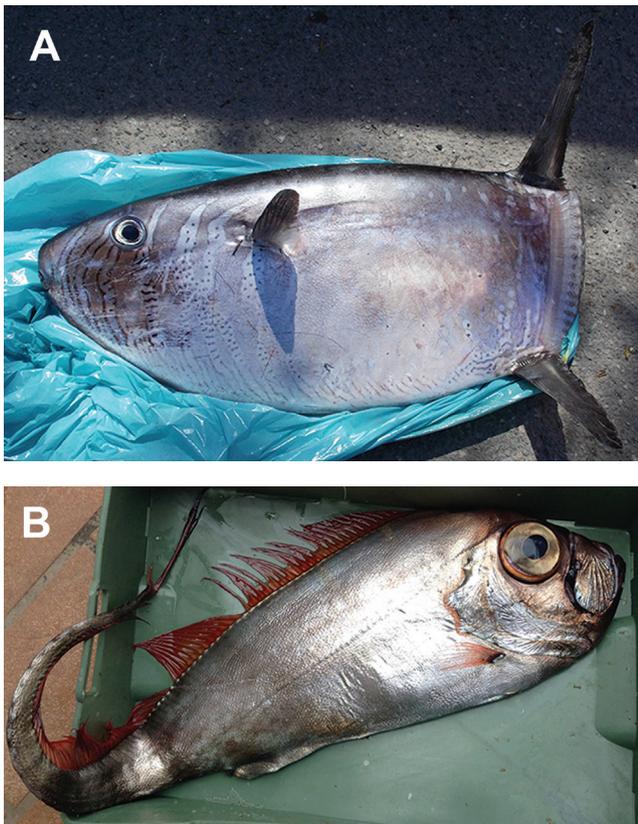


Fig. 1: A. Specimen of *Ranzania laevis* from Gizzeria; B. Specimen of *Zu cristatus* from Vibo marina.

Ranzania laevis is very rare in the Mediterranean: few records are known from Libya and the Adriatic Sea. In Southern Italy, this species has been observed, probably, only once in the Strait of Messina in 1965 (Tortonese, 1975). Thus, our record represents the first recent confirmation of the presence of the species in the Southern Tyrrhenian Sea.

Zu cristatus occurs throughout the Mediterranean basin with the exception of the northern parts of the Adriatic and Aegean Seas (Fischer *et al.*, 1987). In Italian waters, the species is principally known from the Ligurian Sea and from Latium (Psomadakis *et al.*, 2006). Thus, in this case also, our record confirms the presence of the species in the Southern Tyrrhenian Sea.

These records confirm the importance of the geographical position of the Calabria region in monitoring Mediterranean species (Sperone *et al.*, 2012). They also increase the number of species known for the area and, at the same time, extend the known distribution of *Ranzania laevis* and *Zu cristatus*.

1.2. First record of *Gaidropsarus granti* (Regan, 1903), (Gadiformes: Lotidae), in the Ionian Sea

By F. Tiralongo and F. Russo

Three species of the genus *Gaidropsarus*, namely *G. mediterraneus*, *G. vulgaris* and *G. biscayensis* are common in the Mediterranean Sea and widely distributed in the Italian seas (Relini & Lanteri, 2010), while only few records for the Basin as a whole concern *Gaidropsarus granti*. Two specimens of *G. granti* were collected in 1989-1990 from the Ligurian Sea at 550-700 m depth; one specimen in 1995 from the Aegean Sea at about 360-400 m depth whereas the recent records are from the Sardinian Channel at about 120-136 m and the Tyrrhenian Sea, Sardinia, at about 250 m depth (Orsi Relini & Relini, 2013 and References therein). *G. granti* has also been recorded in the South Adriatic Sea (Golani *et al.*, 2014), where its presence was recently ascertained at 450-500 m (Angeletti *et al.*, 2014). Taking into account all published information, the species inhabits a wide bathymetric range, from 20 to more than 400 m deep. In our study, we report, for the first time, on the presence of the species in the Ionian Sea (South Calabria, San Gregorio), adding a further documented record on the occurrence of this uncommon fish for the Mediterranean Sea (38.05967°N, 15.6359°E). On 26 November 2014, a specimen of 20 cm in total length was caught at a depth of about 300 m with a fish trap. The specimen was kept in an aquarium, where it seems to have adapted quite well (Fig. 2). Furthermore, according to interviews with fishermen of Southeast Sicily (Siracusa and Portopalo di Capo Passero), the species seems to appear occasionally in local catches. In fact, fishermen have recognized large specimens of this “strange” species that differ substantially in colour

from other *Gaidropsarus* species. Moreover, juveniles of the species are more difficult to identify than adults. The latter, in fact, displays a specific colour pattern, which alone is sufficient to identify the species (Fig. 2). In our opinion, *G. granti* may actually be widespread along the east coast of Sicily (Fig. 3) (and probably in other Mediterranean areas), although not abundant, and its presence may have been unreported. The species, which was previously listed among the alien fishes of Atlantic origin, is now considered an Atlanto-Mediterranean species on the basis of parasitological results (Pais *et al.*, 2008). In agreement with Orsi Relini & Relini (2013), we believe that the Mediterranean findings are due to range expansion of the Atlantic populations.



Fig. 2: The specimen of *Gaidropsarus granti* caught in Sicily, Ionian Sea. The marked irregular dorsal longitudinal white stripe is characteristic of the species. Another longitudinal white stripe is present along the dorsal fin.

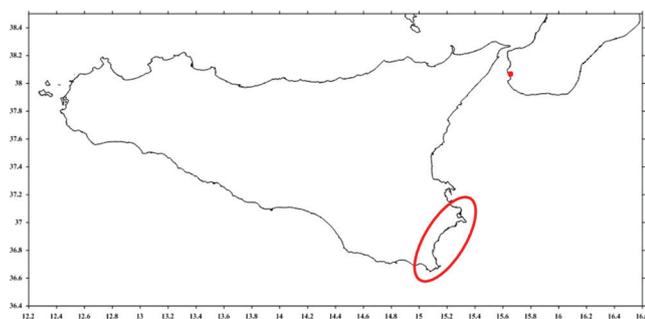


Fig. 3: Record of *Gaidropsarus granti* (red bullet) and areas of its possible presence (circumscribed in red).

1.3. On the presence of the agujon needlefish *Tylosurus acus imperialis* (Rafinesque, 1810) in the North Aegean Sea (Eastern Mediterranean)

By G. Minos and A. Imsiridou

Three species of the genus *Tylosurus* have been reported in the Mediterranean Sea, besides the common needlefishes of the genus *Belone*, namely *Tylosurus acus imperialis* (Rafinesque, 1810) and the two very rare lessepsian immigrants, *Tylosurus choram* (Rüppell, 1837) and *Tylosurus crocodilus* (Péron & Lesueur, 1821) (Collette & Parin, 1986; Froese & Pauly, 2014). Species belonging to the genus *Tylosurus* are similar to those of the genus *Belone* but the dorsal fin of the genus *Tylosurus* is longer, no gill rakers are present and a thin black lateral keel is present on the caudal peduncle (Collette & Parin, 1986; Froese & Pauly, 2014).

The agujon needlefish *T. acus imperialis* is a ma-

rine epipelagic subspecies of *T. acus* restricted to the Mediterranean Sea (Froese & Pauly, 2014). It has been reported in Turkey and Croatia (Türker Çakır & Zengin, 2013 and references therein; Pećarević *et al.*, 2013), in Tunisia (Châari *et al.*, 2013), Italy, Greece, Lebanon and Israel (Collette & Parin, 1986; Froese & Pauly, 2014).

In this work, the presence of *T. acus imperialis* is reported for the first time in Thermaikos Gulf, North Aegean Sea. These captures represent the northernmost record of this species in the Aegean Sea.

Samplings were performed throughout the year, from June 2013 to July 2014 and *T. acus imperialis* was captured only in summer 2013 and summer 2014. 112 specimens of the agujon needlefish (Fig. 4) were collected from commercial fisheries in Thermaikos Gulf, North Aegean Sea. The main fishing areas of agujon needlefish individuals were restricted to the inner part of Thermaikos Gulf, close to the small towns of Angelochori (40.4728°N, 22.8211°E), Nea Michaniona (40.4714°N, 22.8430°E) and Epanomi (40.3944°N, 22.9000°E), which are situated opposite of the Axios river estuaries. The specimens were captured from a depth of ca 1-3 m using gillnets, night spear fishing from a boat and arrowhead fixed fish trap.

The question is, has this species established a population in the North Aegean Sea or is it a seasonal visitor during summer? All the reports from the Mediterranean Sea indicate a seasonal pattern. In Turkey (North Aegean Sea), it is an occasional visitor with a seasonal appearance during summer (Türker Çakır & Zengin, 2013 and references therein). *T. acus imperialis* also appears in the South Adriatic Sea during summer, from the end of May till July (Pećarević *et al.*, 2013). Even in the Southern Mediterranean (Tunisia), this species appears during summer (Châari *et al.*, 2013). Similarly to the above, a coastal approach during summer is observed in the study area.

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 agujon needlefish in the Aegean Sea in recent years. According to local fishermen, it is a new fish species that has been present in the Thermaikos Gulf during the last five years. Perhaps this species spends most of the year in deeper waters while mature individuals approach the coastline for reproduction only, since the conditions (high water temperature, low depth, bottom vegetation cover, food availability, lack of predators) in the specific area are favourable for gonadal maturation, reproduction and growth of juveniles.



Fig. 4: Specimen of *Tylosurus acus imperialis* collected in North Aegean Sea.

1.4. Range expansion of the rare species *Gymnura altavela* (Linnaeus, 1758) (Fishes, Gymnuridae)

By S. Kavadas and A. Siapatis

Gymnura altavela is a wide-ranging butterfly ray distributed in tropical and warm temperate continental brackish waters in a depth range of 5 - 150 m (McEachran & Capapé, 1984; McEachran & Dunn, 1998). The species is included in the IUCN Red List of Threatened Species as a vulnerable species (A2bd+4bd). In terms of habitat selection, the species prefers sandy and muddy substrata, and feeds on fishes, crustaceans, molluscs and plankton (Vooren *et al.*, 2007). *Gymnura altavela* is an ovoviviparous matrotrophic species, gestation lasts about 6 months with 4 to 7 embryos produced per female (McEachran & Capapé, 1984; Alkusaury *et al.*, 2014). The maximum reported size is 220 cm in disc width (DW) (Musick *et al.*, in Vooren *et al.*, 2007). This species was part of the catch of demersal fisheries throughout the Mediterranean, but a drastic decline of captures has been reported in the region (Vooren *et al.*, 2007).

With respect to the occurrence of *G. altavela* in Greek waters, the limited number of references (Papaconstantinou, 2014 and references therein), confirms its rare appearance. Additional findings of the species have been reported sporadically in the course of fishing activities carried out by the Hellenic Centre for Marine Research and archived in IMAS-Fish (Kavadas *et al.*, 2013)(Table 1).

The species was recorded in the Maliakos Gulf during a bottom trawl survey carried out in November 2014 with R/V PHILIA. Fifteen specimens were caught in 5 hauls (out of a total of 8) at a depth range of 23 - 41 m. Fourteen specimens were caught in the inner part

of Maliakos Gulf at sites located 1.6 - 3.7 nm from the estuaries of Sperchios river, while one specimen was caught in the outer part of the Maliakos Gulf, 9 nm from the river mouth. The largest specimen was caught in the inner part of Maliakos Gulf at 23 m depth, measured 1502 mm in disk width (DW) and 28050 g in weight (Fig. 5), while the smallest was 505 mm in DW and 920 g in weight. In the same area and the inner part of the Maliakos Gulf, in particular, two specimens were recorded by observers onboard a professional fishing vessel operating with trammel nets in October 2014 at a depth range of 20-22 m (640 mm DW, 1700 g weight; 884 mm DW, 5000 g weight) (Table 1). According to Capapé *et al.* (1992) the species matures at a DW of 680-1020 mm; thus, we could suggest that the sampled individuals in the Maliakos Gulf were mature, since the majority of them exceed this range.



Fig. 5: *Gymnura altavela* caught in Maliakos Gulf (November 2014).

Table 1. *Gymnura altavela* records from Greek waters in the period 2001-14 (Source: Imas-Fish database).

Fishing gear	Fishing area	Sampling date	Depth (m)	Latitude	Longitude	N of specimens
Trawl	Maliakos Gulf	25/11/2014	40.8	38.8332°N	22.7705°E	1
		26/11/2014	25.0	38.8688°N	22.6495°E	8
		26/11/2014	22.7	38.8782°N	22.6448°E	2
		26/11/2014	24.0	38.8745°N	22.6118°E	1
		26/11/2014	23.2	38.8578°N	22.6587°E	3
Trammel nets		08/10/2014	22.0	38.8691°N	22.6810°E	1
		10/10/2014	22.0	38.8710°N	22.6625°E	1
Trawl	SE of Chios island	13/06/2001	54.0	38.2680°N	26.1365°E	1
	Thracian Sea	11/03/2004	123.0	40.5917°N	25.2172°E	1
	Kerkyraikos Gulf	09/11/2013	61.5	39.6308°N	19.9717°E	1
		10/11/2013	64.0	39.6427°N	19.9888°E	1
		13/05/2014	63.0	39.3960°N	20.1740°E	1
NW Cretan Sea	16/12/2004	72.0	35.6167°N	24.2128°E	1	

1.5. First observation of the amphibious behaviour of *Gouania willdenowi* (Gobiesocidae) in the Eastern Mediterranean Sea

By M. Bilecenoglu

Gouania willdenowi is a stenoeicous clingfish species endemic to the Mediterranean Sea, whose habitat is restricted to interstices of infralittoral pebbles. The biology of the species is almost unknown with the exception of a few works documenting its habitat utilization along the western shores of Mediterranean (Pérès, 1967; Patzner, 1999; Hofrichter & Patzner, 2000). The fish lead a very hidden life from the waterline mark to a depth of 2 m, and escape from moving pebbles to lower parts of the boulders during stormy weathers (Pérès, 1967); it has never been observed outside the layer of pebble banks (Patzner, 1999). An exceptional study by Hofrichter & Patzner (2000) also indicated the presence of the blunt-snouted clingfish in the lower tidal zone, but the authors were hesitant to define this behaviour as amphibious, because the deeper layers of the pebbles, where it lives, still contain some water.

During a macrozoobenthic sampling survey carried out in a protected cove (36.2519°N, 30.1175°E; Eastern Mediterranean Sea, Turkey; Fig. 6a), 26 pale coloured individuals of *G. willdenowi* with total lengths ranging from 21 to 30 mm were observed in the middle and high tidal zones (Fig. 6b-c). All the fish were encountered within the moist lower pebble layer, constituted of pebbles having with a maximum diameter of 2 cm. The blunt-nose clingfish individuals were relatively quiet and inactive while out of water and do not appear to be distressed, even after exposure to air for over 2 hours (Fig. 6d). The available *in situ* observations are in agreement with the relevant descriptions of passive amphibious emergence behaviour (Martin, 2014), in which the underlying reasons are probably associated with a vast number of biotic and abiotic factors, yet to be elucidated. Such an unusual terrestrial



Fig. 6: Pictures showing observation locality (a) and habitat (b) of the intertidal population of *Gouania willdenowi* (c,d).

endurance of *G. willdenowi* has not been reported previously from the eastern coasts of the Mediterranean Sea coasts and thus represents a novel finding worth of further meticulous study.

1.6. Not so rare: new sites of occurrence of *Ischnochiton usticensis* Dell'Angelo & Castriota, 1999

By F. Crocetta and W. Renda

To date, 37 polyplacophoran are known with certainty from the Mediterranean Sea (Crocetta *et al.*, 2014). Among them, *Ischnochiton usticensis* Dell'Angelo & Castriota, 1999 (Mollusca: Polyplacophora: Ischnochitonidae) is considered to be one of the rarest species of the Mediterranean molluscan fauna, only recently described from Ustica (Sicily) (Dell'Angelo & Castriota, 1999) and so far known from its type locality (Dell'Angelo & Castriota, 1999; Castriota *et al.*, 2005) and north-western Sardinia only (Paolini, 2011). Both records share a similar depth (35-50 m) and biotope (coastal detritic bottoms). During field surveys in the Messina Strait area (Italy), three further specimens were found: *i*) Villa San Giovanni (Reggio Calabria) (38.2314°N, 15.6358°E), 20/01/2011, one beached specimen (3 mm), *legit* Walter Renda (WR collection) (Fig. 7); *ii*) Villa San Giovanni (Reggio Calabria), 01/03/2011, one beached specimen (2.5 mm), *legit* Walter Renda (WR collection); *iii*) Secca di Pellaro (Reggio Calabria) (38.0183°N, 15.6328°E), 01/07/2012, 26 m depth under calcareous algae (2 mm), *legit* Renato Marconcini (RM collection). The present records not only report, for the fourth time (two times from Ustica), on living specimens of *I. usticensis* from the Mediterranean Sea, suggesting that its putative rarity is only due to absence of field research and taxonomic impediments, but also considerably expand its known Italian distribution to the Messina Strait area. Furthermore, the presence of a living specimen at 26 m depth may suggest that its bathymetric distribution is not limited to the circalittoral zone, but comprises at least the infralittoral zone.



Fig. 7: *Ischnochiton usticensis* Dell'Angelo & Castriota, 1999 from Villa San Giovanni (Reggio Calabria, Italy).

1.7. First record of the discodorid nudibranch *Thordisa filix* Pruvot-Fol, 1951, in the Adriatic Sea

By L. Lipej and B. Mavrič,

A specimen of the nudibranch *Thordisa filix* (Fig. 8) was found in material collected with a benthic dredge on 25 September 2014 in the Bay of Piran at 21 m depth (45.5334°N; 13.2167°E). The habitat where the specimen was collected was a muddy bottom with substantial detritus consisting mainly of bivalve shells. The specimen was transferred to an aquarium tank; however, it died a few days later. The specimen was determined according to characteristic diagnostic features defined in the identification keys of Pruvot-Fol (1954) and Schmekel & Portman (1982). Special web sites such as Sea Slug Forum (www.seaslugforum.net) and OPK-Opisthobranquis (Ballesteros *et al.*, 2012-2015) were consulted, as well. The specimen was photographed and measured alive and subsequently fixed in a 70% alcohol solution.

The specimen measured 25 mm in total length. The mantle is uniform yellow and covered with tubercles of different sizes. Three dark spots are located in a row on the dorsum. The typical 4-gill leaves are bipinnate. The rhinophores are light coloured at the base, with brown lamellae at the top. The tips are whitish. These characteristics fit well with the description found in identification keys and on specialized web sites.

Thordisa filix is known from different areas of the Western Mediterranean such as Banyuls (France), the Catalan and eastern coasts of Spain, the Gulf of Naples and San Isidoro (Italy) and Yassiada-Istanbul (Turkey) (see Ballesteros *et al.*, 2012-2015). It has also been found outside the Mediterranean, off Portugal (see Cervera *et al.*, 2004). The closest site to our discovery location is off San Isidoro in the Ionian Sea, not far from the entrance to the Adriatic Sea.

This species has not been recorded previously in the Slovenian waters, or the entire Adriatic Sea in general, the primary reason being that *T. filix* inhabits deeper areas on the muddy bottom, which are less attractive to underwater photographers and divers. This could also be the principle explanation for the limited knowledge regarding the distribution of this species in the Mediterranean Sea and its general biology and ecology.



Fig. 8: A specimen of *Thordisa filix* caught off Punta Piran in the Gulf of Trieste (Photo: Borut Mavrič).

1.8. First record of *Parasquilla ferussaci* (Roux, 1830) (Stomatopoda, Pseudosquillidae) in the Northern Aegean Sea

By K. Kapiris and C. Apostolidis

Parasquilla ferussaci (Roux, 1830) is one of the two species of the stomatopod family Parasquillidae occurring in the Mediterranean Sea. The known distribution of this rather rare species comprises the Eastern Central Atlantic from the northern shores of the Gulf of Guinea to the Gulf of Cadiz, the western coasts of the Iberian Peninsula along the northern coasts of Portugal, including the Madeira islands and Balearic Islands (Abelló *et al.*, 1994) and the Mediterranean Sea (e.g. Innocenti, 2006). Its usual habitat appears to be the muddy bottoms of the upper continental slope at depths comprised between around 175-185 and 700 m, but it may also occur on the continental shelf (Dounas & Steudel, 1994). The occurrence of this species in the Eastern Mediterranean has been noted by Dounas & Steudel (1994) off Kriti, and was caught by a commercial trawler at a depth of 50 m on soft bottom; by Corsini-Foka & Pancucci-Papadopoulou (2012) along the north-western and eastern coasts of Rhodes Island at a depth of 150 m, and was caught by a crayfish trap placed on a biogenic detritus bottom mixed with mud, and by Özcan *et al.* (2008) in the Turkish Aegean Sea on sandy-silt bottom.

Knowledge concerning the biology of *P. ferussaci* is very limited. Mori *et al.* (1998) pointed out that the size at maturity of this stomatopod is 20 mm CL and may be considered as an active predator since epibenthic mobile crustaceans constitute most of its prey.

Due to the low sampling intensity of megabenthos, this stomatopod has very rarely been reported in the Aegean Sea. A female individual caught from a sandy and coralligenous bottom at 130 m by a commercial trawler, with 40 mm stretched mesh size, in the eastern part of Lesbos Island (14 n.m. east of Sigris, N. Aegean Sea) (39.3492°N, 23.5872°E) in December 2014 was transferred to the Institute of Marine Biological Resources and Inland Waters of the Hellenic Centre for Marine Research where it was identified, measured using an electronic calliper, weighed and photographed (Fig. 9). The species was caught during an experimental survey within the framework of the National Fisheries Data Collection Programme (EPSAD). The carapace length was 22.11 mm, carapace width was 16.51 mm, total length was 99.78 mm and total weight was 11.32 gr. These measurements were almost similar to those found in other study areas.



Fig. 9: *Parasquilla ferussaci* caught in the N. Aegean Sea.

1.9. *Anilocra frontalis* (Crustacea, Isopoda, Cymothoidae) on the Lessepsian fish *Pteragogus trispilus* in Rhodes Island, Greece

By M. Corsini-Foka and G. Kondylatos

The infestation of the alien fish of Indo-Pacific/Red Sea origin *Pteragogus trispilus* (ex *Pteragogus pelycus* Randall, 1981) by the native parasitic isopod *Anilocra frontalis* H. Milne Edwards, 1840 is documented for the first time in Mediterranean waters.

A. frontalis usually parasitizes a wide variety of Mediterranean fish (sparids, labrids, gadids, gobiids and others). Its occurrence has been recently ascertained on fishes from the waters of Turkey and Cyprus (Innal *et al.*, 2007; Kirkim *et al.*, 2009). In the marine area of Rhodes Island, the same isopod has been regularly noticed in the past, mainly on sparids and small labrids (*Symphodus* sp. and the sideburn wrasse) (unpublished data), while samples of the cymathoid parasite *Nerocila bivittata* (Risso, 1816) from native fishes have also been collected.

A total of 23 specimens of *P. trispilus* (Total length 68.3±16.5mm, min-max 35-95 mm; Standard length 56.1±13.1mm, min-max 28-79 mm; Weight 4.6±3.0 g, min-max 0.5-10 g) were caught in a single experimental boat-seine haul performed on 22 January 2015, at 5-30 m of depth, on the northwest coast of the island (36.4272°N, 28.1919°E). Five specimens of *P. trispilus* (22% of the total) were infested by *A. frontalis*. The parasites were attached on the head, beyond the eyes, of living sideburn wrasse specimens (Fig. 10). The specimens were identified following Naylor (1972) and Innal *et al.* (2007). In the samples of *A. frontalis*, the anterior end of the head was rounded and the endopodits of uropods distinctly surpassed the distal part of the pleotelson (Fig. 11), two characters distinguishing this species from the congeneric parasitic *Anilocra physodes* (Linnaeus, 1758). The length of parasites, measured with a digital Vernier caliper, ranged from 13.3 mm to 19.5 mm, approximately 17-20% of the total length of hosts.

In the specific haul, no other evident ectoparasites were noted on the body or buccal cavity and gill chamber of the remaining 424 specimens of native and alien fishes counted.

Cymothoids parasitizing Lessepsian fishes are, for example, the native *A. physodes* (on *Siganus luridus* and *Sphyræna chrysotaenia*) and *N. bivittata* (on *S. luridus* and *S. rivulatus*) (Innal *et al.*, 2007; Shakman *et al.*, 2009), while the alien *Cymothoa indica* Schioedte & Meinert, 1884 was found on *S. chrysotaenia* (Trilles & Bariche, 2006).

Most probably, this parasite was not previously detected, because the labrid *P. trispilus* has no commercial value and is generally discarded.



Fig. 10: The cymothoid *Anilocra frontalis* (Length 14.3 mm) on the head of its host, *Pteragogus trispilus* (Total length 81.9 mm) in life.



Fig. 11: Dorsal view of a dried specimen of *Anilocra frontalis* (Length 17.8 mm), collected from *Pteragogus trispilus* in Rhodes Island waters (A) (Black bar: 10 mm). Details: B, anterior end of the head, molting; C, uropods.

1.10. New records of *Tethyaster subinermis* (Philippi, 1837) (Echinodermata, Asteroidea) from Greek Waters

By M.A. Pancucci-Papadopoulou and E. Lefkaditou

Tethyaster subinermis is an Atlanto-Mediterranean species, inhabiting muddy bottoms, from 40 to 1400 m depth. It is distributed in the Eastern Atlantic, from the Bay of Biscay to the Gulf of Guinea and the Mediterranean Sea. In the Eastern Mediterranean, it has been reported from the Levantine Sea, the Eastern Aegean Sea (Koukouras *et al.*, 2007; Öztoprak *et al.*, 2014; the Northern Evvoikos Gulf (Koukouras *et al.*, 2007)) and once from the Hellenic Ionian coasts (Peloponnisos: Kaspiris & Tortonese, 1982).

New records of the seastar *Tethyaster subinermis* (Philippi, 1837) (Echinodermata, Asteroidea) (Fig. 12) from the South-Western Aegean Sea (north < 38°, east > 24°) and the eastern Ionian Sea, are reported here. The specimens presented in Table 2 were caught during the bottom trawl survey carried out in July-August 2014 within the framework of the National Program for Fisheries Data Collection. The experimental bottom trawl GOC 73 was used and 59 hauls (Argosaronikos region: 23 hauls, Ionian Sea: 36 hauls), distributed according to the MEDITS protocol at depths 10-800 m, were performed.

These new findings confirm the presence of *T. subinermis* in the Eastern Ionian Sea, as well throughout the Aegean. Furthermore, the finding of the species in haul catches west of Kythnos Island, indicates that the species has a wider depth range in the Mediterranean Sea, which nevertheless still appears narrower than that in the Atlantic

Table 2. Data on new records of *Tethyaster subinermis* during the MEDITS trawl survey 2014 in the region of Argosaronikos and the Ionian Sea.

Area	Date	Latitude	Longitude	Depth range (m)	Number of individuals	Total weight (g)
West of Macronisos Isl.	28-7-14	37.8000°N	24.1167°E	91-100	1	-
West of Kythnos Isl.	29-7-14	37.3833°N	24.2167°E	500-522	1	30
Near Amvrakikos Gulf	17-8-14	38.9167°N	20.6500°E	72-91	1	85
Off Amvrakikos Gulf	17-8-14	38.9167°N	20.5667°E	130-152	2	20
Off Kyllini	24-8-14	37.9833°N	21.0500°E	103-107	1	155
Off NW Peloponissos	24-8-14	37.7167°N	21.1667°E	242-297	1	150

Ocean (Mecho *et al.*, 2014). Bottom trawl surveys, although not considered the best tool for the study of benthic fauna, permit to collect numerous echinoderms and other species of megafauna, especially those living at depths that are difficult to reach with the usual benthos sampling methods.



Fig. 12: *Tethyaster subinermis* from the Aegean Sea (Photo: Evgenia Lefkaditou).

2. Alien species

2.1 First record of the antenna codlet *Bregmaceros atlanticus* Goode & Bean, 1886 in Greek waters

By A. Dogrammatzi and P.K. Karachle

The family Bregmacerotidae comprises of 14 species, with only one representative in the Mediterranean, namely, the circumtropical antenna codlet *Bregmaceros atlanticus* Goode & Bean, 1886. The species was reported for the first time, in the Mediterranean, by D'Ancona & Cavinato (1965; in Goren & Galil, 2006) in the Straits of Sicily, a record that was considered doubtful (Goren & Galil, 2006). Subsequently, several records of the species have been reported in the Eastern Mediterranean [coasts of Antalya (2004), Israel (2006), Kusadasi Bay (2007), Bay of Iskenderun (2011), and Hekim Island, Izmir Bay (2013) (data from Aydin & Akyol, 2013)].

On July 31st 2014, a female individual (total length (TL)=53 mm; total weight (W)=0.762 g) identified as *B. atlanticus* was caught during a Mediterranean Trawl Survey (MEDITS 2014) (trawl cod end=44mm square) in the area of Saronikos Gulf (37.5081°N, 23.2956°E, depth 90-91 m). Additionally, on August 2nd 2014, another seven individuals (Fig. 13) (three females TL range= 60-64 mm; and four males: TL range = 54-64 mm) were caught in the same general area (37.5011°N, 23.2020°E, depth 97-98 m).

The mode of reported presence of *B. atlanticus* in the Mediterranean Sea, combined with its absence from the Red Sea, has raised an issue as regards its origin. According to Goren & Galil (2006), there are three possible explanations for its presence in the Mediterranean: (a) it belongs to a small native overlooked Mediterranean population, (b) it entered the Mediterranean through the Suez Canal, and (c) it was transported through ballast waters. Yet, Agiadi *et al.* (2012), while examining the Tsampika marly diatomites in Rhodes island, found remains of *Bregmatocerus* species, which they consider to belong both to *B. albyi*, a post-Messinian fish, and *B. atlanticus*. For the latter species, they propose the Strait of Gibraltar as a possible mode of introduction. Hence, the origin of the Mediterranean *B. atlanticus* in the basin still remains unclear and further investigation is needed in order to clarify whether it was previously overlooked, introduced, or, as other fishes recently reported in the Mediterranean, just a “repatriated” species (Por, 2009).

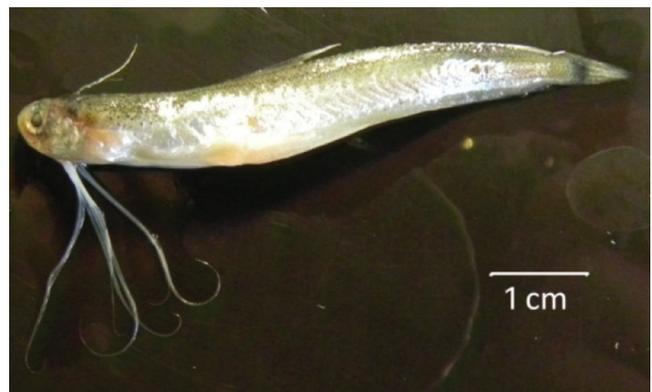


Fig. 13: One of the *Bregmaceros atlanticus* specimens caught in the Saronikos Gulf.

2.2. New records of Indo- Pacific and Atlantic species in Egyptian Mediterranean waters

By S.I. Rizkalla and E.H.Kh. Akel

Alien species of Indo-Pacific and Atlantic origin were sorted from the trash catches obtained by trawlers operating along the Mediterranean coastal area of Egypt (El-Arish, Damietta, Balteem and Rashid) during summer 2013 and 2014. Three new alien species were found in the fisheries of Egyptian Mediterranean waters; namely, *Ostorhinchus fasciatus*, *Apogon smithi* and the Atlantic species *Bregmaceros* sp. In addition, *Plotosus lineatus*, a newly reported species in Egypt (Temraz & Ben Souissi, 2013), appears to be established in Egyptian Mediterranean waters. The identification of the species agrees with those of Golani *et al.* (2014) and fishbase (Froese & Pauly, 2014). Four specimens of *Ostorhinchus fasciatus* (White, 1790) were collected in September 2014 at Balteem (50 m depth). Their length ranged between 4.0 and 9.0 cm, with an average of 7.8 cm; average weight being 6.8 g (Fig. 14A). One specimen of *Apogon smithi* (Kothaus, 1970) was collected in August 2013 at Damietta (30 m depth) measuring 11 cm in length and weighing 11 g (Fig. 14B). One specimen of *Bregmaceros* sp. (Maul, 1952) (Fig. 14C) was collected in September



Fig. 14A: *Ostorhinchus fasciatus* caught at Balteem (Mediterranean Egypt).



Fig. 14B: *Apogon smithi* caught at Damietta (Mediterranean Egypt).



Fig. 14C: *Bregmaceros* sp. Caught at Rashid (Mediterranean Egypt).



Fig. 14D: *Plotosus lineatus* caught along Mediterranean Egypt in September 2014.

2014 at Rashid (29 meter depth). Total length: 7.6 cm. Standard length: 6.9 cm. Total weight: 3 g. The striped eel cat fish *Plotosus lineatus* (Thunberg, 1787) (Fig. 14D) was caught from two areas along the Egyptian Mediterranean coastline in September 2014. a) El-Arish: 51 m depth (1 specimen length 9.0 cm and weight 4.5 g); b) El-Arish: 67 meter depth (27 specimens with length range 8.0 - 10.0 cm, all ripe females); c) Balteem: 21 m depth (3 specimens, length range 8.0 - 10 cm, average length 8.7cm, average weight 3.0 g). This work adds three more records to those reported by Halim & Rizkalla, (2011) and Temraz & Souissi (2013).

2.3. On the establishment of the twospot cardinalfish *Cheilodipterus novemstriatus* (Rüppell, 1838) and the first record of the Indo-Pacific marble shrimp *Saron marmoratus* (Olivier, 1811) in semi-dark caves along the Lebanese coasts (Eastern Mediterranean)

By G. Bitar

The non-indigenous apogonid *Cheilodipterus novemstriatus* (Rüppell, 1838) was first discovered in the Mediterranean in Tel Aviv's coastal waters on 2 June, 2010 where two specimens were collected by scuba divers

from a shipwreck situated at 30 m depth (Goren *et al.*, 2010). Today, this species has become common in Haifa and Rosh Hanikra (Rothman *et al.*, 2013a). In Lebanon, one specimen of *C. novemstriatus* was photographed offshore Halat village and a small school at Tabarja northernmost of Halat (Bariche & Azzurro, 2012). This work reports on the finding of *C. novemstriatus* on six occasions (between September 13th and November 10th, 2014) in the port of the village of Anfeh, situated about 50km north of Tabarja (34.3611° N, 35.7286°E). This fish was observed in small schools in the most protected zone of the port of Anfeh. They were observed near a cliff covered by *Corallina elongata* and on boulders between the surface and 4 m depth where the bottom is sandy (Fig. 15A). Their number increased considerably below a chalet, which extends over the sea surface (Fig. 15B). In this sciaphilous area, consisting of two small semi-dark caves, we found several hundred of specimens whose sizes varied between 3 and 10cm (total length was estimated taking into consideration the optical magnification occurring under water) (Fig. 15C). Small specimens, whose mobility is very low, were observed at the end of the caves, while adults and young fish were found at the entrances as well as in the vicinity of these caves (Fig. 15D). This suggests that the species is nocturnal like most apogonids (Golani & Bogorodsky, 2010). The habitat inside the caves is formed of blocks that are covered with calcareous algae including Porifera (*Crambe crambe*, *Phorbos topsenti*, *Chondrosia reniformis*, and a yellow erect sponge to be determined), Cnidaria (*Oculina patagonica*) towards the entrance of the caves, Polychaeta (*Hermodice carunculata*), Mollusca (*Chama pacifica*, *Spondylus spinosus* and an Ostreidae), Holothuroidea (*Synaptula reciprocans*), Ascidiacea (*Herdmania momus* and *Cystodytes dellechiaei*) and Decapoda (*Charybdis hellerii* and *Saron marmoratus*). The latter is an introduced species that was found in Lebanon for the first time at the exit of the port of Anfeh on boulders at 3 m depth on 7 September 2014 (Fig. 16.) A second individual was sighted on 8 November 2014 in the cave. These findings constitute the second report on *S. marmoratus* in the Mediterranean, where one specimen was encountered at Naharya on 20 July 2013) (Rothman *et al.*, 2013b). At the entrances and in the vicinity of the sea caves, rock blocks are covered with algae *Corallina elongata*, *Galaxaura rugosa* and *Lobophora variegata*. The following fishes were found: *Atherinomorus lacunosus*, *Apogonichthyoides nigripinnis* (3 individuals), *Boops boops*, *Diplodus sargus*, a Muligidae, *Siganus rivulatus*, *Siagnus luridus*, *Thalassoma pavo*, *Coris julis*, *Sparisoma cretense*, *Epinephelus marginatus*, *Fistularia commersonii*, *Gobius buchichii*, *Parablennius sanguinolentus* and *Troquigener flavimaculosus*.

The fishes found inside the caves were: *Atherinomorus lacunosus*, *Apogon imberbis* (only one individual), *Boops boops*, *Pempheris vanicolensis*, a Muligidae, *Siganus rivulatus*, *Thalassoma pavo*, *Tripterygion melanurum*,



Fig. 15: *Cheilodipterus novemstriatus* on scree outside their refuge (A); refuge of *C. novemstriatus* in the two semi-dark caves below a chalet in the port of Anfeh (B); *C. novemstriatus* inside their refuge (C); *C. novemstriatus* at the cave entrance (D).

Fistularia commersonii and *Scorpaena maderensis*.

Our observations show that these two small semi-dark caves are used by *Cheilodipterus novemstriatus* as a refuge, breeding and recruitment area and, therefore, the species seems to be well-established in Lebanon. As in its native habitat, and in accordance with Gon and Randall (2003), it is found mainly in protected and shallow areas, although Brokovich *et al.* (2008) found this species down to 50 m in Eilat. Its monitoring along the Lebanese coasts is important in order to investigate its expansion and potential competition with the other two Apogonidae present, namely, *Apogon imberbis* and *Apogonichthyoides nigripinnis* (lessepsian species) as well as other well-established alien fish, particularly *Pempheris vanicolensis* and *Fistularia commersonii*.



Fig. 16: *Saron marmoratus*: (A) inside the semi-dark cave and (B) at the exit of the port of Anfeh.

2.4. New records of the Lessepsian invaders *Lagocephalus sceleratus* (Gmelin, 1789) (Tetraodontidae) and *Sargocentron rubrum* (Forsskål, 1775) (Holocentridae) around Lipsi Island (E Aegean, Greece)

By N. Ríos and V. Buchet

The silver-cheeked toadfish, *L. sceleratus*, is a Lessepsian migrant fish that has entered the Mediterranean via the Suez Canal from the Red Sea. It was recorded for the first time in Turkey in 2003 (Akyol *et al.*, 2005) and

in Greece in 2005 around Rhodes and Kriti (Streftaris & Zenetos, 2006). Due to the tetrodotoxin present in this species, it is potentially fatal to humans if consumed. Therefore, it is considered one of the most dangerous invaders of the Mediterranean (Streftaris & Zenetos, 2006).

From April 2014 to November 2014, the small-scale fishery landings were recorded on Lipsi Island (37.3033°N, 26.7514°E). Daily surveys with local fishermen allowed determination of catch composition and size of the individuals recorded.

L. sceleratus was reported on three occasions and on one occasion was morphologically identified (Fig. 17), measured and dissected after it was caught by artisanal fishermen using a trammel net in May 2014. The toadfish was identified as a 70 cm long female with gonads full of eggs, thus confirming that the spawning period is in early summer with a peak in June (Kalogirou, 2013). The other two specimens, identified by fishermen, were recorded in October and November 2014 and were landed by a trammel net and through squid-jigging.

The squirrelfish, *S. rubrum* has a native distribution in the Indo-West Pacific, Red Sea. The first record was from the Israeli coast (1947), Rhodes (1948) and later Turkey and Libya (1970) (Ben-Tuvia, 1966; Papaconstantinou, 1990).

From April to November 2014, 7 individuals of *S. rubrum* were found in the landings of the Lipsi Island small-scale fishery (Fig. 18). They were caught by trammel net between 10 and 20 meters depth in the waters around the island (Table 3). The individuals were identified and measured within the framework of the landing surveys.



Fig. 17: Specimen of *Lagocephalus sceleratus* landed at Lipsi harbour (Greece).



Fig. 18: Specimen of *Sargocentron rubrum* landed at Lipsi harbour (Greece).

Table 3. Date, location, measurement and depths of 7 recorded individuals of *S. rubrum*.

Date	Latitude	Longitude	Depth	Individual length
27/05/2014	37.29°N	26.73°E	20 m	18.3 cm
19/06/2014	37.32°N	26.71°E	20 m	18 cm
05/08/2014	37.30°N	26.80°E	10-20 m	14.5 cm 19.6 cm
14/08/2014	37.30°N	26.81°E	10 m	18 cm 16.7 cm
24/08/2014	37.27°N	26.76°E	20 m	15 cm

2.5. New records of *Fistularia commersonii* and *Stephanolepis diaspros* around Lipsi Island, Dodecanese, Greece

By M. Servonnat and M. Drakulić

The blue-spotted cornetfish, *Fistularia commersonii* (Ruppell, 1838), was first recorded in the Mediterranean Sea in 2000 after its passage through the Suez Canal from the Indo Pacific (Golani *et al.*, 2014). It was detected for the first time in the south-eastern Aegean Sea, Greece, in 2002. The population is now established after colonization in just 7 years with a rate of spread at around 1,000-1,500km per year making it the fastest and most widespread lessepsian migrant (Azzurro *et al.*, 2013). It is considered an aggressive top predator that preys on the Centracanthidae, Sparidae and Mullidae families, which are economically important to fisheries (Kalogirou *et al.*, 2007) and competes with native piscivorous species (Katsanevakis *et al.*, 2014). The reticulated leatherjacket *Stephanolepis diaspros* (Fraser-Brunner, 1940) originates from the western Indian Ocean. It also occurs in the Red Sea, and has entered the Mediterranean Sea via the Suez Canal (Golani *et al.*, 2014). The first record of this species was in Palestine in 1927 and it is now very common throughout the eastern basin. The population is considered as established in the Greek Seas yet not reported from Lipsi Island (Zenetos *et al.*, 2015).

Data collection was performed at 13 sites around Lipsi Island (37.303299°N, 26.751428°W), through a combination of underwater visual census and surface visual census methods. During the surveys in July and August 2014 around Lipsi Island, *F. commersonii* was recorded at three different sites with a total of 4 adult individuals, measuring 40 to 60 cm, found in 1 to 3 meters depth in seagrass meadows (Table 4). *Stephanolepis diaspros* (Fig. 19) occurred at 4 of the 13 sites (Table 4). A total of 17 adult individuals, measuring 10 to 30 cm in length, were recorded in sandy and seagrass habitats at depths of 1 to 6 meters. They have been recorded in close proximity of *Mullus surmuletus*, *Bothidae* spp. and *Siganus luridus*.



Fig. 19: *Stephanolepis diaspros* in Lipsi Island, Greece.

Table 4. Records of *Fistularia commersonii* and *Stephanolepis diaspros* around Lipsi Island, Greece (number of specimens in brackets).

Site	Coordinates	Number of records
Kamos	37.1753°N, 26.4531°E	<i>F. commersonii</i> (1) <i>S. diaspros</i> (6)
Gatis	37.1737°N, 26.4504°E	<i>F. commersonii</i> (2)
Moschato	37.1919°N, 26.4325°E	<i>F. commersonii</i> (1)
Ledou	37.1749°N, 26.4542°E	<i>S. diaspros</i> (2)
Gatis	37.1738°N, 26.4505°E	<i>S. diaspros</i> (4)
Vroulia	37.1906°N, 26.4327°E	<i>S. diaspros</i> (5)

2.6. On the range extension of the alien decapod *Penaeus hathor* (Decapoda, Penaeidae) in the Aegean waters

By K. Kapiris and N. Chalari

Penaeus hathor (Burkenroad, 1959) lives in shallow marine and estuarine waters (down to 40 meters) on sandy-mud bottoms (Pérez Farfante & Kensley, 1997). The species is easily distinguished from other Mediterranean penaeids by the vertical brown stripes on the margins of the abdominal pleura.

P. hathor, widely distributed in the Indian Ocean, is one of the most commercially important penaeids in the Red Sea, the Persian Gulf, and the Gulf of Oman and along the east coast of Africa (Pérez Farfante & Kensley, 1997). It was recorded for the first time in

the Mediterranean Sea from the coasts of Israel (Galil, 1999). Shortly afterwards it was collected from the north-eastern Levantine coasts, at Iskenderun Bay, Turkey, and subsequently from the north-western Levantine coasts at Kas, Antalya and Fethiye, Turkey (Özcan *et al.*, 2007 and references therein) and the Kastellorizo area, Greece (Siokou *et al.*, 2013). The first occurrence of *P. hathor* in the Aegean Sea was along the south-eastern coasts of the basin, at Gökova Bay, Turkey (Yokes *et al.*, 2007).

A female individual was caught from a sandy bottom by a trammel net of 28 mm stretched mesh size in the Flisvos area (Saronikos Gulf, Western Aegean Sea) (37.9169°N, 23.6848°E) in November 2014. The specimen was measured using an electronic calliper and photographed (Fig. 20). The carapace length was 33.14 cm and total weight was 15 g. These measurements were almost similar to those of specimens found in other Mediterranean areas.

This study shows a remarkable rapid westward expansion of the range of this economically valued species, from the eastern to the western coasts of the Aegean basin, thus confirming the observation along the Turkish Mediterranean coasts (Gokoglu & Kaya, 2008).



Fig. 20: *Penaeus hathor* caught in the Saronikos Gulf (Aegean Sea).

2.7. First record of *Penaeus aztecus* Ives, 1891 (Crustacea, Decapoda) and *Melibe viridis* (Kelaart, 1858) (Gastropoda, Nudibranchia) in the South-Eastern Aegean Sea (Greece)

By G. Kondylatos and M. Corsini-Foka

Penaeus aztecus (Ives, 1891), an estuarine and oceanic littoral shrimp in its West Atlantic natural range, occurs from the coastline to 160 m depth (Tavares, 2002) and shows a fast growing distribution within the eastern and central part of the Mediterranean Sea, where it was probably introduced via shipping (ballast waters) (Deval *et al.*, 2010). Soon after its first record from Antalya Bay, Turkey, the northern brown shrimp was reported from the Gulf of Iskenderun and Finike, west from the South Adriatic Sea (Montenegro) and the Ionian Sea (Greece) and north from the North-Western (Thermaikos Gulf) and Central Western (Argolikos Gulf) Aegean Sea (Minos *et al.*, 2015 and references therein).

Ten specimens of *P. aztecus* of similar size, were observed at Chalki Island, Greece (36.2414°N, 27.6147°E), on the night of 1 November 2014, at 1-2 m depth, over a muddy sand substrate. A single male individual was collected (Fig. 21) and kept alive in an aquarium (temperature 23-24°C, salinity 38, frozen seafood) for several days prior to preservation in ethanol (Catalogue number HSR116). The description and coloration of the specimen agree with Tavares (2002).

The occurrence of *P. aztecus* in the South-Eastern Aegean Sea apparently fills a missing link in the distribution map of the species from the Thermaikos and Argolikos Gulfs in the Western Aegean Sea to Antalya Bay, North Levantine Sea.

Melibe viridis (Kelaart, 1858) has a wide distribution in the tropical Indo-West Pacific excluding the Red Sea. It was probably introduced into the Mediterranean via the Suez Canal by shipping and seems to have spread within the Mediterranean partly by range expansion and partly by internal transport via shipping (Stasolla *et al.*, 2014). The species has already established populations in Montenegro, Croatia, Italy (Ionian and Tyrrhenian Seas) (Stasolla *et al.*, 2014) Libya, Malta, Cyprus, the Mediterranean and the south-eastern Aegean coasts of Turkey (up to Marmaris), Israel and Greece (Western-Central Aegean Sea, Western Kriti and Ionian Sea) (ELNAIS: Zenetos *et al.*, 2015).

Specimens of *M. viridis* (approximate length between 10 and 15 cm) were observed and photographed (Fig. 22) in the coastal waters of Faliraki, Rhodes Island, Greece (36.34°N, 28.206667°E), on 14 September 2014, over sandy substrate with sparse patches of *Caulerpa prolifera*. Depth ranged between 2-3 m, similarly to that along the Sicilian shores, shallower than most of the Mediterranean reports (Tsiakkios & Zenetos, 2011). The present record fills the distribution gap of the species in Hellenic Aegean waters from the western up to the south-eastern part of the basin.



Fig. 21: The male *Penaeus aztecus* from Chalki Island, kept in aquarium.



Fig. 22: A *Melibe viridis* specimen from Faliraki, Rhodes Island.

2.8. Looking for aliens: two unrecorded alien species well-established along the coast of Alexandria (Egypt)

By R. Moussa and A. Zenetos

This work establishes the presence of two alien species, indicating that regular monitoring programs are essential for information on biodiversity changes. Within the framework of the ‘Pattern of diversity and climate change in Mediterranean Transitional Zone’ monitoring project, two species of crustaceans hitherto unreported from the Egyptian Mediterranean area, were found, namely, *Atergatis roseus* (Rüppell, 1830) and *Ixa monodi* (Holthuis & Gottlieb, 1956). *Atergatis roseus* appears to be widely distributed along the coast of Alexandria, especially in rocks inhabited by mussels. Although encountered in samples gathered along the coast of Alexandria

and known to divers and fishermen, its presence has not been documented to-date. The specimens reported here (Fig. 23), were collected from Al-Agami, West Alexandria (31.0959°N, 29.7604°E), on 18.12.2012 at 5 m depth from rocky substrata. In contrast, the distribution of *Ixa monodi* (Fig. 24) is limited and it is not well known to fishermen and divers. It was collected from Abu Qir, East Alexandria (31.3556°N, 30.0525°E) on 12.01.2013 from sandy substratum at 22 m depth.

Both species are of Indo-Pacific origin and are well established in the Levantine Basin (Galil *et al.*, 2015). Their northernmost expansion is Rhodes Island for *Atergatis roseus* (Corsini-Foka & Pancucci-Papadopoulou, 2010), and Gökova for *Ixa monodi* (Ceyhan & Akyol, 2008).

Following the works of Fox (1926) and Holthuis (1956), reports alien species of crustaceans in Mediterranean Egypt, have been sporadic (e.g. Azzurro *et al.*, 2011). The distribution and abundance of both species attest that they have most likely been introduced many years ago, and their absence from IAS lists is due to lack of monitoring studies in the wider area. In Egypt, divers who break the rocks searching for mussels might collect hidden *A. roseus* crabs. Representatives of the genus *Atergatis* contain paralytic shellfish poisons (PSPs) such as saxitoxin (STX), neo saxitoxin (neoSTX), etc. (Noguchi *et al.*, 1983). There is no antidote to their toxins. A regional alarming system is needed for potentially toxic *Atergatis roseus* to mitigate its negative impacts on human health and study its toxin in new drug development.



Fig. 23: *Atergatis roseus* collected from El-Agamy, west Alexandria, Egypt. A. Dorsal View, B. Ventral view of female specimen size: Length = 34.81 mm, width = 52.75 mm, weight = 30.46 gm., C. Ventral view of male specimen size: Length = 32.52 mm, width = 50.22 mm, weight = 24.62 gm.

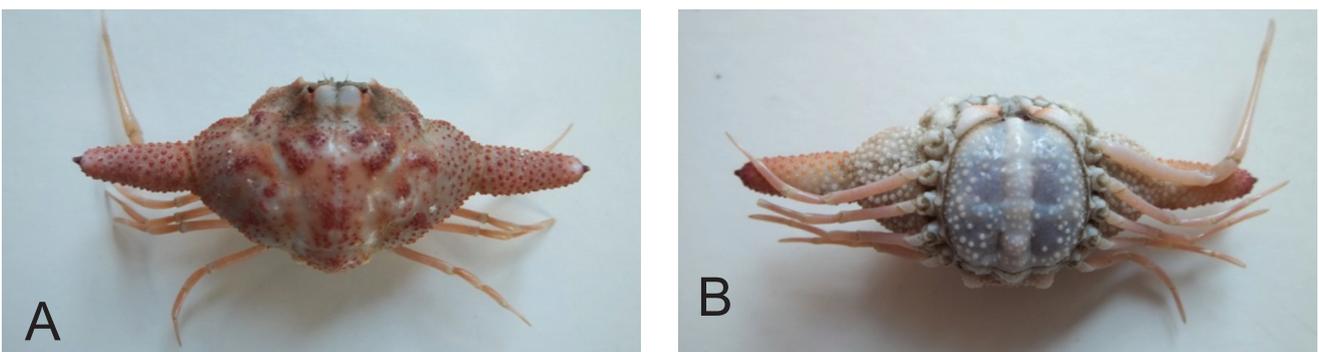


Fig. 24: *Ixa monodi* collected from Abu Qir, East Alexandria, Egypt. A. Dorsal View, B. Ventral view. Size: Length = 21.41 mm, Width = 57.64 mm, Weight = 7.41 gm.

2.9. Occurrence of *Pinctada imbricata radiata* (Leach, 1814) (Bivalvia: Pteriidae) in the Mar Grande of Taranto (Ionian Sea, Italy)

By E. Prato and G. Fanelli

This contribution reports on the presence of the rayed pearl *Pinctada imbricata radiata* (Leach, 1814) in the coastal area of Mar Grande, Taranto (Ionian Sea, Central Mediterranean).

Pinctada imbricata radiata, is a marine species native to the Arabian Gulf region of the North-Western Indian Ocean and the Red Sea. It is considered the oldest Lessepsian bivalve reported in the Mediterranean Sea, having been described and recorded from Egypt in 1884 by Monterosato (Zenetos *et al.*, 2004). Subsequently, this invasive species spread throughout the Mediterranean Sea, colonizing new habitats mainly in the eastern part of the basin. Anthropogenic activity may have contributed to introductions of this Indo-Pacific species allowing colonisation of new habitats. During the last century, this species was imported for aquaculture purposes to many areas in Greece, contributing to its spread in the Mediterranean area (Zenetos *et al.*, 2004). Currently, it is common in the eastern Mediterranean and along coasts of Tunisia, while sporadic occurrences in the Western Mediterranean Basin have been registered (Deidun *et al.*, 2014).

In Italian waters, a very small number of specimens have been found in the Tyrrhenian, Ionian and Adriatic Seas. *P. radiata* is considered as widespread in many islands along the Sicilian coastline (Lodola *et al.*, 2013; Zenetos *et al.*, 2004). An accidental occurrence of a specimen has been recorded in the Bay of Trieste, where live individuals have been found on an oil platform coming from the Sicily Channel (Vio & De Min, 1996). In

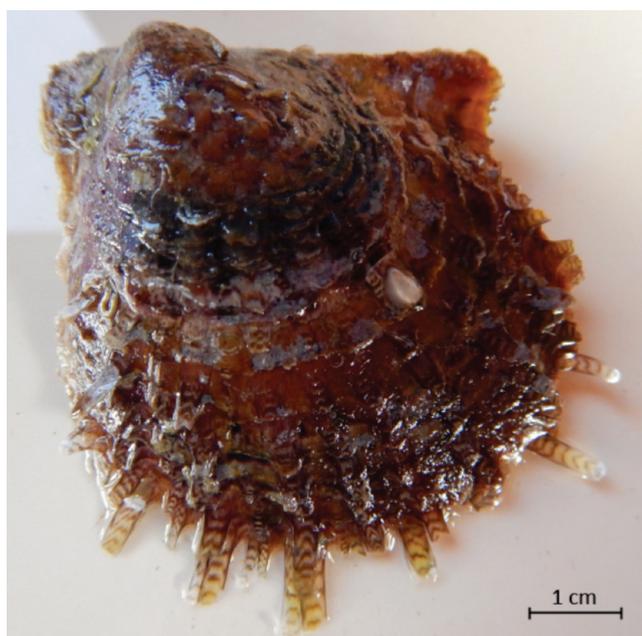


Fig. 25: *Pinctada imbricata radiata* in Mar Grande, Taranto (Ionian Sea, Italy).

the South Adriatic Sea, one specimen has been reported from Torre Guaceto, by Scuderi & Terlizzi, in 2012, one from Cagliari (Tyrrhenian sea) and another one from Mar Grande, Taranto (Stasolla *et al.*, 2014).

Very recently, four specimens of *P. imbricata radiata* were collected in Mar Grande, Taranto (40.4436° N; 17.2264° E), during SCUBA diving activities carried out within the framework of the REPAIR project, supported by FEP Apulia Region 2007-2013. All specimens were recorded on experimental cages for shellfish culture in suspension at about 12 m depth. At the laboratory, the specimens were photographed, measured and deposited in the collection of the CNR-IAMC, Taranto (Fig. 25). The first specimen was collected in January 2013, with a total length (TL) of about 65 mm; another one in October 2014 with TL= 62mm and two individuals (23 and 51 mm TL) were captured in November 2014.

The present finding of *P.i. radiata* following the record of Stasolla *et al.* (2014), suggests a slow spread of this invasive species northwards of the Ionian Sea. In this coastal area, the intense mussel commercialisation and also their farming clearly points to aquaculture as the likely vector of introduction, as is the case for other alien species previously recorded in Mar Grande, Taranto. High vigilance is necessary to prevent the spread of this invasive pearl oyster through mussel-culture and, thus, further investigation and good collaboration with local fisherman is required.

2.10. First reporting of invasion by the pearl oyster *Pinctada imbricata radiata* (Leach, 1814) in Maliakos Gulf, Aegean Sea

By J.A. Theodorou and I. Tzovenis

The subtropical pearl oyster *Pinctada imbricata radiata* (Leach 1814), of Indo-Pacific origin, has a long record of appearance as a non-indigenous species (NIS) in the Mediterranean. In the Aegean Sea, the first occurrence was reported in 1963 in Saronikos Gulf where it was introduced for aquaculture purposes. Since then, there have been reports of its occurrence in the SE Aegean (Karpathos, Rhodes), in the NE Aegean (Lesvos, Turkey's coast) and Central Aegean round the island of Evvoia (1992-1994). Recently, reports on its occurrence in Lakonikos Bay (South Peloponnese, 2002), Kyklades (Serifos, South Aegean, 2006) and Kriti (Zenetos *et al.*, 2013) indicate that *P. imbricata radiata* has migratory potential, compliant with the Lessepsian migration pattern (Gofas & Zenetos, 2003). This work documents, for the first time, the distribution of the pearl oyster in Maliakos Gulf, a semi enclosed environmentally protected (Natura 2000 Network) embayment in the Central part of Eastern Greece (Aegean Sea). Animals were collected during the low tide period and the major morphological characteristics of the bivalve were identified according to Lodola

et al. (2013). Initially, in 2005, an empty shell was found (55.05 mm height, 45.58 mm length mm, 17.15 mm width and 6.44 g weight) at Agios Ioannis beach, Northern Maliakos (38.8889°N, 22.6598°E). According to hydrological data, this part of the bay is the first to receive the inflow from the Aegean thus probably explaining the invasion by spat drifting in with the current. During the summer of 2007, spat of the animal has been collected as attached biofouling on pergolari was observed at a long-line Mediterranean mussel farm (38.8423°N, 22.6474°E) along the southern part of the Gulf in the Molos area (Theodorou *et al.*, 2011). The spat was covering the entire surface of the culture system at a depth defined by the length of the pergolari (3-3.5 m) hanging about 1-1.5 m below the sea surface from the mother rope. Later in December (2007), live animals could be found along the coast line of Molos. *Pinctada imbricata radiata* inhabits the beach by sticking on gravel and shore stones (Fig. 26), competing for space with the declining native flat-oyster *Ostrea edulis* L. It has also been found attached to the small “oyster reefs” that are created by the conjunction of more than 3 empty dead native oyster shell aggregations (38.8391°N, 22.6697° E). Mean biometric values and standard deviation of animals (n=3) collected during the low tide period were 50.09±5.49 mm for height, 48.13±2.56 mm for length, 16.12±1.70 mm for width and 10.03±2.99 g for wet weight.

The introduction of a NIS in an environmentally protected area where it competes with the native species and interferes with bivalve aquaculture practises raises concerns regarding the ecological balance and the proper management of the ecosystem and, therefore, equires further investigation. At any rate, the species is more or less established in the bay now, and the authorities have to reconsider its NIS status for future fisheries and aquaculture guidelines.



Fig. 26: Pearl oysters (*P. imbricata radiata*) from the Southern Maliakos Gulf attached on hard substrata such as the stone (left) and a small native “oyster reef” (right).

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References

- Abelló, P., Pretus, J.L., Corbera, J., 1994. Occurrence and distribution of some stomatopod crustaceans in the Western Mediterranean. *Miscellània Zoològica*, 17, 107-113.
- Agiadi, K., Koskeridou, E., Moissette, P., Lopez-Otalvaro, G.E., Quillévéré, F. *et al.*, 2012. A middle Pleistocene eastern Mediterranean fish refuge: the Tsampika Bay (Rhodes, Greece). *Geophysical Research Abstracts*, 14, EGU2012-8280, 1 p.
- Akyol, O., Ünal, V., Ceyhan, T., Bilecenoglu, M., 2005. First confirmed record of *Lagocephalus scleratus* (Gmelin, 1789) in the Mediterranean Sea. *Journal of Fish Biology*, 66,4, 1183-1186.

- Alkusaury, H., Ali, M., Saad, A., Reynaud, C., & Capape, C., 2014. Maturity, reproductive cycle, and fecundity of spiny butterfly ray, *Gymnura altavela* (Elasmobranchii: Rajiformes: Gymnuridae), from the coast of Syria (eastern Mediterranean). *Acta Ichthyologica et Piscatoria*, 44 (3), 229-240.
- Angeletti, L., Taviani, M., Canese, S., Foglini, F., Mastrototaro, F. et al., 2014. New deep-water cnidarian sites in the southern Adriatic Sea. *Mediterranean Marine Science*, 15 (2), 263-273.
- Aydin, I., Akyol, O., 2013. New record of the antenna codlet, *Bregmaceros atlanticus* Goode and Bean, 1886 (Gadiformes: Bregmacerotidae), from the northern Aegean Sea (Izmir Bay, Turkey). *Journal of Applied Ichthyology*, 29, 245-246.
- Azzurro, E., Milazzo, M., Maynou, F., Abelló, P., Temraz, T., 2011. First record of *Percnon gibbesi* (H. Milne Edwards, 1853) (Crustacea: Decapoda: Percnidae) from Egyptian waters. *Aquatic Invasions*, 5 (1), S123-S125.
- Azzurro, E., Soto, S., Garofalo, G., Maynou, F., 2013. *Fistularia commersonii* in the Mediterranean Sea: invasion history and distribution modeling based on presence-only records. *Biological Invasions*, 15 (5), 977-990.
- Ballesteros, E., E. Madrenas, M. Pontes et al., 2012-2015. "Thordisa filix" in OPK-Opisthobranquis, Published: 29/08/2012, Accessed at 25/1/2015 at <http://opisthobranquis.info/en/guia/nudibranchia/euctenidiacea/doridacea/thordisa-filix/>
- Bariche, M., Azzurro, E., 2012. New records and establishment of the Indian Ocean twospot cardinal fish *Cheilodipterus novemstriatus* (Rüppell, 1838) in the Mediterranean Sea. *BioInvasions Records*, 1 (4), 299-301.
- Ben-Tuvia, A., 1966. Red Sea Fishes recently found in the Mediterranean. *Copeia*, 2, 249-255.
- Brokovich, E., Einbinder, S., Shashar, N., Kiflawi, M., Kark, S., 2008. Descending to the twilight-zone: changes in coral reef fish assemblages along a depth gradient down to 65 m. *Marine Ecology Progress Series*, 371, 253-262.
- Capapé, C., Zaouali, J., Tomasini, J.A., Bouchereau, J.L. 1992. Reproductive biology of the spiny butterfly ray, *Gymnura altavela* (Linnaeus, 1758) (Pisces: Gymnuridae) from off the Tunisian coasts. *Scientia Marina* 56, 347-355.
- Castriota, L., Agamennone, F., Sunseri, G., 2005. The mollusc community associated with maerl beds of Ustica Island (Tyrrhenian Sea). *Cahiers de Biologie Marine*, 46, 289-297.
- Cervera, J.L., Calado, G., Gavaia, C., Malaquias, M.A. E., Templado, J. et al., 2004. An annotated and updated checklist of the opisthobranchs (Mollusca: Gastropoda) from Spain and Portugal (including islands and archipelagos). *Boletín Instituto Español de Oceanografía*, 20 (1-4), 5-115.
- Ceyhan, T., Akyol, O., 2008. A new record of the Red Sea pebble crab, *Ixa monodi* Holthuis and Gottlieb, 1956 (Crustacea: Decapoda) from the Aegean Coast of Turkey. *Aquatic Invasions*, 3, 239-241.
- Chaari, M., Derbel, H., Neifar, L., 2013. *Lecithostaphylus tylosuri* sp. nov. (Digenea, Zoogonidae) from the digestive tract of the needlefish *Tylosurus acus imperialis* (Teleostei, Belonidae). *Acta Parasitologica*, 58 (1), 50-56.
- Collette, B.B., Parin N.V., 1986. Belonidae. Vol. II. p. 604-609. In: *Fishes of the Northeastern Atlantic and the Mediterranean*. Whitehead, P.J.P., Bauchot, M.L., Hureau, J.C., Nielsen, J., Tortonese, E., (Eds.). UNESCO, Paris.
- 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., Pancucci-Papadopoulou, M.A., 2012. Inventory of Crustacea Decapoda and Stomatopoda from Rhodes island (Eastern Mediterranean Sea), with emphasis on rare and newly recorded species. *Journal of Biological Research-Thessaloniki*, 18, 359-371.
- Crocetta, F., Bitar, G., Zibrowius, H., Capua, D., Dell'Angelo, B. et al., 2014. Biogeographical homogeneity in the eastern Mediterranean Sea - III: new records and a state of the art of Polyplacophora, Scaphopoda and Cephalopoda (Mollusca) from Lebanon. *Spixiana*, 37 (2), 183-206.
- Deidun, A., Gianni, F., Cilia, D.P., Lodola, A., Savino, D., 2014. Morphometric analyses of a *Pinctada radiata* (Leach, 1814) (Bivalvia: Pteriidae) population in the Maltese Islands. *Journal of Black Sea/Mediterranean Environment*, 20 (1), 1-12.
- Dell'Angelo, B., Castriota, L., 1999. Descrizione di una nuova specie di polioplacoforo mediterraneo. *La Conchiglia*, 291, 23-26.
- Deval, M.C., Kaya Y., Güven, O., Gökoğlu, M., Froglija C., 2010. An unexpected find of the Western Atlantic shrimp, *Farfantepenaeus aztecus* (Ives, 1891) (Decapoda, Penaeidae) in Antalya Bay, Eastern Mediterranean Sea. *Crustaceana*, 83, 1531-1537.
- Dounas, C., Steudel, C., 1994. Stomatopod Crustacea from the island of Crete. *Crustaceana*, 66, 252-254.
- Elbaraasi, H., Elsalini, O., 2010. Occurrence of the Slender Sunfish *Ranzania laevis* Pennant, 1776, (Molidae) in the Eastern Part of the Libyan Coast (Southern Mediterranean). *Turkish Journal of Fisheries and Aquatic Sciences*, 10, 549-550.
- Fischer, W., Bauchot, M.-L., Schneider, M.S., 1987. *Fishes FAO d'Identification des Espèces pour les Besoins de la Pêche. Méditerranée et mer Noire. Vol. II (Vertébrés)*. FAO, Rome, 1529 pp.
- Fox, H.M., 1926. General part. Zoological results of the Cambridge expedition to the Suez Canal, 1924. 1. *Transactions of the Zoological Society of London*, 22, 1-64.
- Froese, R., Pauly, D., 2014. *FishBase*. www.fishbase.org (Accessed 12 December 2014)
- Galil B.S., 1999. *Melicertus hathor* (Burkenroad, 1959): a Red Sea penaeid prawn new to the Mediterranean. *Crustaceana*, 72 (9), 1226-1228.
- Galil, B., Froglija, C., Noel, P., 2015. *CIESM Atlas of exotic crustaceans in the Mediterranean Sea*. <http://www.ciesm.org/atlas/appendix2.html>
- Gofas, S., Zenetos, A., 2003. Exotic molluscs in the Mediterranean basin: Current status and perspectives. *Oceanography and Marine Biology: An annual Review*, 41, 237-277.
- Gokoglu, M., Kaya, Y., 2008. First record of *Melicertus Hathor* (Penaeidae) from the Gulf of Antalya (Mediterranean Sea). *Marine Biodiversity Records*, 1, e17.
- Golani, D., Orsi-Relini, L., Massuti, E., Quingard, J.P., Dulcic, J. et al., 2014. *CIESM Atlas of Exotic Fishes in the Mediterranean Sea*. <http://www.ciesm.org/atlas/appendix1.html>
- Golani, D., Bogorodsky, S.V., 2010. The Fishes of the Red Sea - Reappraisal and Updated Checklist. *Zootaxa*, 2463, 1-135.
- Gon, O., Randall, J.E., 2003. A review of the cardinalfishes (Perciformes: Apogonidae) of the Red Sea. *Smithiana*, 1, 1-48.
- Goren, M., Galil, B.S., 2006. Additional records of *Bregmaceros atlanticus* in the eastern Mediterranean-an invasion through the Suez Canal or in ballast water? *JMBA2 -Biodiversity Records*, 1, e42.

- 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 (Suppl. 1), S49-S51.
- Halim, Y., Rizkalla, S.I., 2011. Aliens in Egyptian Mediterranean waters. A checklist of Erythrean fish with new records. *Mediterranean Marine Science*, 12 (2), 479-490.
- Harmelin-Vivien, M.L., Bitar, G., Harmelin, J. G., Monestiez, P., 2005. The littoral fish community of the Lebanon rocky coast (eastern Mediterranean Sea) with emphasis on Red Sea immigrant. *Biological Invasions*, 7, 625-637.
- Hofrichter, R., Patzner, R.A., 2000. Habitat and microhabitat of Mediterranean clingfishes (Teleostei: Gobiesociformes: Gobiesocidae). *PSZN Marine Ecology*, 21, 41-53.
- Holthuis, L.B., 1956. Notes on a collection of Crustacea Decapoda from the Great Bitter Lake, Egypt, with a list of species of Decapoda known from the Suez Canal. *Zoologische Mededelingen, Leiden*, 34 (22), 301-330.
- Innal D., Kirkim F., Erk'akan F., 2007. The parasitic isopods, *Anilocra frontalis* and *Anilocra physodes* (Crustacea; Isopoda) on some marine fish in Antalya Gulf, Turkey. *Bulletin of the European Association of Fish Pathologists*, 27 (6), 239-241.
- Innocenti, G., 2006. Collections of the Natural History Museum, Zoological Section "La Specola" of the University of Florence. XXIV. Crustacea, Class Malacostraca, Order Stomatopoda. *Atti della Società Toscana di Scienze Naturali, Memorie Serie B*, 113, 13-18.
- Kalogirou, S., 2013. Ecological characteristics of the invasive pufferfish *Lagocephalus sceleratus* (Gmelin, 1789) in the eastern Mediterranean Sea—a case study from Rhodes. *Mediterranean Marine Science*, 14 (2), 251-260.
- Kalogirou, S., Corsini, M., Kondilatos, G., & Wennhage, H., 2007. Diet of the invasive piscivorous fish *Fistularia commersonii* in a recently colonized area of the eastern Mediterranean. *Biological Invasions*, 9 (8), 887-896.
- Kaspiris, P., Tortonese, E., 1982. Echinoderms from the western seas of Greece. *Thalassographica*, 2, 27-32.
- Katsanevakis, S., Wallentinus, I., Zenetos, A., Leppäkoski, E., Çinar, M.E. et al., 2014. Impacts of invasive alien marine species on ecosystem services and biodiversity: a pan-European review. *Aquatic Invasions*, 9 (4), 391-423.
- Kavadas, S., Damalas, D., Georgakarakos, S., Maravelias, C., Tserpes, G., et al., 2013. IMAS-Fish: Integrated Management System to support the sustainability of Greek Fisheries resources. A multidisciplinary web-based database management system: implementation, capabilities, utilization and future prospects for fisheries stakeholders. *Mediterranean Marine Science*, 14 (1), 109-118.
- Kirkim F., Özcan, T., Katağan, T., 2009. Four species of parasitic isopods (Isopoda, Cymothoidae) new to the fauna of Cyprus. *Crustaceana*, 82 (8), 1079-1085.
- Koukouras, A., Sinis, A., Bobori, D., Kazantzidis, S., Kitsos, M.S., 2007. The echinoderm (Deuterostomia) fauna of the Aegean Sea, and comparison with those of the neighbouring seas. *Journal of Biological Research*, 7, 67-92.
- Lodola, A., Nicolini, L., Savini, D., Deidun, A., Occhipinti-Ambrogi, A., 2013. Range expansion and biometric features of *Pinctada imbricata radiata* (Bivalvia: Pteriidae) around Linosa Island, Central Mediterranean Sea (Italy). *Italian Journal of Zoology*, 80 (2), 303-312.
- Martin, K.L., 2014. Theme and variations: amphibious air-breathing intertidal fishes. *Journal of Fish Biology*, 84, 577-602.
- McEachran, J.D., Capapé, C., 1984. Gymnuridae. p. 203-204. In P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen and E. Tortonese (eds.) *Fishes of the north-eastern Atlantic and the Mediterranean*. Vol. 1. Richard Clay Ltd, U.K., 510 pp.
- McEachran, J. D., Dunn, K. A., 1998. Phylogenetic analysis of skates, a morphologically conservative clade of elasmobranchs (Chondrichthyes: Rajidae). *Copeia*, 271-290.
- Mecho, A., Billett, D. S., Ramirez-Llodra, E., Aguzzi, J., Tyler, P. A., 2014. First records, rediscovery and compilation of deep-sea echinoderms in the middle and lower continental slope of the Mediterranean Sea. *Scientia Marina*, 78 (2), 281-302.
- Minos, G., Kokokiris, L., Imsiridou, A., Karachle, P.K., Kaporis, K., 2015. Notes on the distribution and biology of the northern brown shrimp *Farfantepenaeus aztecus* (Ives, 1891) in the Eastern Mediterranean. *Turkish Journal of Zoology*, 39, doi:10.3906/zoo-1403-19
- Mori, M., Comes, A., De Ranieri, S., 1998. Relative growth and diet of *Parasquilla ferussaci* (Roux) (Crustacea, Stomatopoda). *Bollettino dei Musei e degli Istituti Biologici dell'Università di Genova*, 62-63, 47-56.
- Naylor, E., 1972. British Marine Isopods (Keys and notes for the identification of the species). The Linnean Society of London. Academic Press, London and New York. *Synopsis of the British Fauna new series*, 3, 1-86.
- Noguchi, T., Uzu, A., Koyama, K., Maruyama, J., Nagashima, Y. et al., 1983. Occurrence of tetrodotoxin as the major toxin in a xanthid crab *Atergatis floridus*. *Bulletin of the Japanese Society of Scientific Fisheries*, 49 (12), 1887-1892.
- Orsi Relini, L., Relini G., 2013. *Gaidropsarus granti* from a Ligurian seamont: a Mediterranean native species? *Marine Ecology*, 35 (Suppl.1), 35-40.
- Ozaydin, O., Katagan, T., Unsal, S., 1995. The Echinoderms of the Turkish seas. *Israel Journal of Zoology*, 41, 57-68
- Özcan, T., Bakir, K., Kocatas, A., 2007. On the range extension two exotic decapods crustaceans along the Levant Sea coast of Turkey. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Mediterranee*, 38, 564.
- Özcan, T., Katağan, T., Irmak, E., 2008. First record of the *Parasquilla ferussaci* (Roux, 1830) (Stomatopoda, Parasquillidae) from the Turkish coasts. *Crustaceana*, 81 (10), 1254-1257.
- Öztoprak, B., Doğan, A., Dağlı, E., 2014. Checklist of Echinodermata from the coasts of Turkey. *Turkish Journal of Zoology*, 38 (6), 892-900.
- Pais, A., Merella, P., Follasa, M.C., Garippa G., Golani, D., 2008. New data on *Gaidropsarus granti* (Regan, 1903) (Gadiformes: Lotidae) from the Mediterranean Sea, with emphasis on its parasites. *Scientia Marina*, 72 (3), 461-468.
- Paolini, P., 2011. Segnalazione di *Ischnochiton usticensis* Dell'Angelo & Castriota, 1999 per la Sardegna Nord-Occidentale. *Notiziario S.I.M.*, 29 (1), 22.
- Papaconstatinou, C., 1990. The spreading of Lessepsian fish migrants into the Aegean Sea (Greece). *Scientia Marina*, 54 (4), 313-316.
- Papaconstatinou, C., 2014. *Fauna Graeciae. An updated checklist of the fishes in the Hellenic Seas*, Monographs on Marine Sciences, 7, Athens 2014, HCMR, 340 pp.
- Patzner, R., 1999. Habitat utilization and depth distribution of small cryptobenthic fishes (Blenniidae, Gobiesocidae, Gobiidae, Tripterygiidae) in Ibiza (western Mediterranean Sea). *Environmental Biology of Fishes*, 55, 207-214.

- Pećarević, M., Mikuš, J., Bratoš Cetinić, A., Dulčić, J., Čalić, M., 2013. Introduced marine species in Croatian waters (Eastern Adriatic Sea). *Mediterranean Marine Science*, 14 (1), 224-237.
- Pérès, J.M., 1967. The Mediterranean benthos. *Oceanography and Marine Biology: An Annual Review*, 5, 449-533.
- Pérez Farfante, I., Kensley, B., 1997. *Penaeoid and Sergestoid Shrimps and Prawns of the World: Keys and Diagnoses for the Families and Genera. Mémoires du Muséum nationale d'Histoire naturelle*, Tome 175, Paris, France, 233 pp.
- Por, F.D., 2009. Tethys returns to the Mediterranean: Success and limits of tropical re-colonization. p. 5-19. In: *Environment, Biodiversity and Conservation in the Middle East*. Krupp, F., Musselman, J.L., Kotb, M.M.A., Weidig, I. (Eds). *Proceedings of the First Middle Eastern Biodiversity Congress, Aqaba, Jordan, 20-23 October 2008*. *BioRisk*, 3.
- Pruvot-Fol, A., 1954. *Mollusques opisthobranches*. Paris, Lechevalier, 457pp.
- Psomadakis, P.N., Scacco, U., Vacchi, M., 2006. Recent findings of some uncommon fishes from the central Tyrrhenian Sea. *Cybius*, 30 (4), 297-304.
- Relini, G., Lanteri, L., 2010. Osteichthyes. *Biologia Marina Mediterranea*, 17 (Suppl.1), 649-674.
- Rothman, B-S.S., Goren, M., Galil, B.S. 2013a. *Cheilodipterus novemstriatus* (Rüppell, 1838) along the Levantine coast of the Mediterranean Sea: a forthcoming invasion? *BioInvasions Records*, 2, 1, 85-88.
- Rothman, B-S.S., Shlagman, A., Galil, B. S., 2013b. *Saron marmoratus*, an Indo-Pacific marble shrimp (Hippolytidae: Decapoda: Crustacea) in the Mediterranean Sea. *Marine Biodiversity Records*, 6, e129.
- Schmekel, L., Portmann, A., 1982. *Opisthobranchia des Mittelmeeres. Nudibranchia und Saccoglossa*. Berlin, Springer Verlag. 410 pp.
- Scuderi, D., Terlizzi, A., 2012. *Manuale di Malacologia dell'Alto Jonio*. Edizioni Grifo, Lecce, 188 pp.
- Shakman, E., Kinzelbach R., Trilles, J.P., Bariche, M., 2009. First occurrence of native cymothoids parasites on introduced rabbitfishes in the Mediterranean Sea. *Acta Parasitologica*, 54 (4), 380-384.
- Siokou, I., Ates, A.S., Ayas, D., Ben Souissi, J., Chatterjee, T. et al., 2013. New Mediterranean Marine biodiversity records. [Kapiris, K., Apostolidis, C.: First record of the alien decapod shrimp *Melicertus hathor* (Decapoda, Penaeidae) in Greek waters]. *Mediterranean Marine Science*, 14 (1), 238-249.
- Sperone, E., Parise, G., Leone, A., Milazzo, C., Santoro, G., et al. 2012. Spatiotemporal patterns of distribution of large predatory sharks in Calabria (Central Mediterranean, Southern Italy). *Acta Adriatica*, 53 (1), 13-24.
- Stasolla, G., Riolo, F., Macali, A., Pierri, C., Crocetta, F., 2014. Further spreading in the Italian seas of already established non-indigenous mollusk species. *Marine Biodiversity Records*, 7, e120.
- Streftaris N., Zenetos, A., 2006. Alien Marine Species in the Mediterranean - the 100 'Worst Invasives' and their Impact. *Mediterranean Marine Science*, 7 (1), 87-11.
- Tavares, M., 2002. Shrimps. p. 251-291. In: *The living marine resources of the Western Central Atlantic. Volume 1: Introduction, molluscs, crustaceans, hagfishes, sharks, batoid fishes, and chimaeras*. Carpenter, K.E. (Ed). FAO Species Identification Guide for Fishery Purposes and American Society of Ichthyologists and Herpetologists Special Publication No. 5. FAO, Rome.
- Temraz, T., Ben Souissi, J.B., 2013. First record of striped eel catfish *Plotosus lineatus* (Thunberg, 1787) from Egyptian waters of the Mediterranean. *Rapport de la Commission International pour l' Exploration Scientifique de la Mer Méditerranée*, 40, 604.
- Theodorou, J.A., Viaene, J., Sorgeloos, P., Tzovenis, I., 2011. Production and marketing trends of the cultured Mediterranean mussel *Mytilus galloprovincialis* L. 1819, in Greece. *Journal of the Shellfish Research*, 30 (3), 859-874.
- Tortonese, E., 1975. *Osteichthyes (Pesci Ossei). Parte Seconda. Fauna d'Italia, Vol. XI*. Calderini, Bologna, 636 pp.
- Trilles, J.P., Bariche, M., 2006. First record of the Indo-Pacific *Cymothoa indica* (Crustacea, Isopoda, Cymothoidae), a Lessepsian species in the Mediterranean Sea. *Acta Parasitologica*, 51 (3), 223-230.
- Tsiakkuros, L., Zenetos A., 2011. Further additions to the alien mollusc fauna along the Cypriot coast: new Opisthobranchia species. *Acta Adriatica*, 52 (1), 115-124.
- Türker Çakır, D., Zengin, K., 2013. Occurrence of *Tylosurus acus imperialis* (Rafinesque, 1810) (Osteichthyes: Belonidae) in Edremit Bay (Northern Aegean Sea). *Journal of Applied Ichthyology*, 29, 671-672.
- Yokes, B., Ünsal Karhan, S., Okus, E., Yükses, A., Aslan-Yılmaz, A. et al., 2007. Alien Crustacean Decapods from the Aegean Coast of Turkey. *Aquatic Invasions*, 2 (3), 162-168.
- Vio, E., De Min, R., 1996. Contributo alla conoscenza dei molluschi marini del Golfo di Trieste. *Atti Museo Civico di Storia Naturale di Trieste*, 47, 173-233.
- Vooren, C.M., Piercy, A.N., Snelson Jr., F.F., Grubbs, R.D., Notarbartolo di Sciara, G. et al., 2007. *Gymnura altavela*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org> (Assessed on 06 January 2015).
- Zenetos, A., Arianoutsou, M., Bazos, I., Balopoulou, S., Corsini-Foka, M. et al., 2015. ELNAIS: A collaborative network on Aquatic Alien Species in Hellas (Greece). *Management of Biological Invasions*, 6 (in press).
- Zenetos, A., Gofas, S., Russo, G., Templado, J., 2004. *CIESM Atlas of exotic species in the Mediterranean*. Vol. 3. Molluscs. CIESM Publishers, Monaco, 376 pp.
- 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.