

New findings of Gastropods in the Hellenic seas with emphasis on their origin and distribution status

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Through the continuous and intensive investigation of the marine molluscan fauna of Greece and the collection of live and dead specimens during the last two years, 23 gastropod species were identified up to the species level (four philinids up to the genus level), all belonging to 14 families. Their biodiversity was compared with the current checklists of marine gastropod molluscs for the Hellenic seas based on previous surveys. In this collection of mainly minute species, 15 are new for the Greek fauna, one of which is alien (*Murchisonella columna*) and one, *Melanochlamys wildpretii*, is first record for the Mediterranean Sea. The main identification characteristics and ecological information such as habitat, distribution and origin are given and discussed.

Key words: Molluscs, microgastropods, Prosobranchia, Opisthobranchia, alien species, Greece.

INTRODUCTION

Progress in benthos research, human activities and environmental conditions change significantly the marine recorded biodiversity while detailed and persisting surveys usually increase the number of species, mainly of those of small sizes (Streftaris & Zenetos, 2007; Manousis *et al.*, 2010; Tzomos *et al.*, 2012).

The existing published records on the marine gastropod species in Hellenic waters are rather few, sometimes parts of faunistic research and are mainly referred to the southern marine basins of Greece and to relatively large species (e.g. Tenekidis, 1989; Koutsoubas *et al.*, 1997; Antoniadou *et al.*, 2004; Koulouri *et al.*, 2006; Delamotte & Vardala-Theodorou, 2008). Consequently, smaller species (i.e. < 5 mm) remain underestimated or lack from the local fauna. Moreover, publications on opisthobranch fauna are more

limited and/or scattered (Mollo *et al.* 2008; Poursanidis *et al.*, 2008) when compared to other gastropod taxa.

As far as human activities are concerned, ballast water is considered a main vector for the introduction of exotic species (Galil, 2000; Galil & Zenetos, 2002; Zenetos *et al.*, 2005; Abdulla & Linden, 2008; Galil *et al.*, 2008) because large quantities (3-5 billion tonnes per year throughout the world) of ballast water (GEF-UNDP-IMO GloBallast Partnerships & IOI, 2009) with a huge variety of species are discharged into new environments. The Hellenic seas are a navigation crossroad of the Mediterranean Sea. Thermaikos and Thessaloniki Gulfs are successive marine basins on the navigation line to the second largest port of Greece with more than 3000 ship arrivals per year (data from the Thessaloniki Port Authority S.A.) and therefore a stage of continuous alien species occurrence (Manousis *et al.*, 2010).

The aim of this work was to investigate under-stu-

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died Hellenic areas for the existence of new and the expansion of other known gastropod species with emphasis on small size species.

MATERIALS AND METHODS

The sampling of specimens was conducted by i) sieving surface soft bottom of shallow waters through a 5 mm, a 2 mm and a 0.5 mm mesh sieve, ii) diving to a depth of 10 m along the infralittoral zone and iii) searching the supralittoral zone of several coasts of Greece (Fig. 1) from October 2008 to June 2011. In certain cases, the search was intensive by visiting the areas not less than fifty times (Table 1). After cleaning with fresh water, large shells were washed with acetone, dried and covered with a thin coat of paraffin oil. For the collection of minute species, material from the 0.5 mm mesh sieve was examined under a stereoscope with a magnification of up to $\times 80$ and the shells were treated as the larger specimens. The size of the shells was determined according to the measurement of shell length.

Specimens without shells were first narcotized with tobacco soaked in seawater, then frozen over-

night and subsequently preserved in 95% ethanol (Sturm *et al.*, 2006). For each species collected the following data were recorded: location, depth, type of habitat and size (length). Moreover, information on the origin and current distribution status was collected from the literature while the proposed distribution status is based on the existing and the presented data. For the use of the status terminology the terms proposed by Occhipinti-Ambrogi & Galil (2004), Colautti & MacIsaac (2004), Zenetos *et al.* (2005) and Pyšek *et al.* (2009) were taken into account. The species recognition was based on systematic guides, atlases and papers listed in the References section (i.e. Tenekidis, 1989; Heyward *et al.*, 1996; Cachia *et al.*, 2001, 2004; Campani, 2004; Repetto *et al.*, 2005; Lipej *et al.*, 2008; Cossignani & Ardochini, 2011); information from specific web sites was also taken into account (i.e. Sea Slug Forum, www.seaslugforum.net, Sea Slugs of Hawaii, seaslugsofhawaii.com). For the species nomenclature, besides the ERMS (www.marbef.org), the CLEMAM (www.somali.asso.fr) on-line database and its taxonomic order was followed. In addition, the Ellenic Network on Aquatic Invasive Species (ELNAIS, <https://services.ath.hcmr.gr/>) was used for assessing the alien species status in the Hellenic Seas.

The specimens are deposited in the premises of the Alexander Technological Educational Institute of Thessaloniki and those of Dr. T. Manousis. Scientists are welcomed to have access to the biological material at will.

RESULTS AND DISCUSSION

Approximately 200 specimens of the species under investigation were collected. Twenty seven species were identified in total, belonging to 14 families. They are listed in phylogenetic order within families in Table 1 and presented in Figures 2 to 7.

FISSURELLIDAE

Diodora demartiniorum Buzzurro & Russo, 2004 (Fig. 2A). One shell (20.3 mm) was found at a depth of 40.0 m in Nea Sarti, Chalkidiki. The species is referred for the first time from N Aegean while it is rather common in Saronikos and mainly in Evoikos Gulfs (Shellauction.net, <http://www.shellauction.net/login.php>; Conchology Inc., www.conchology.be).



FIG. 1. Map of sampling sites: 1. Micro Emvolo; 2. Palioura, Epanomi; 3. Cape, Epanomi; 4. Potamos, Epanomi; 5. Nea Sarti, Chalkidiki; 6. Nafplio; 7. Porto Cheli (Argolikos Gulf); 8. Melidoni, Kythira; 9. Gouves, Heraklion; 10. Atzikari, Lasithi; 11. Lindos, Rhodes; 12. Ahlia, Lasithi; 13. Kaloi Limenes, Heraklion; 14. Rodakino-Aghia Marina, Rethymno; 15. Paliochora, Chania; 16. Gavdos island.

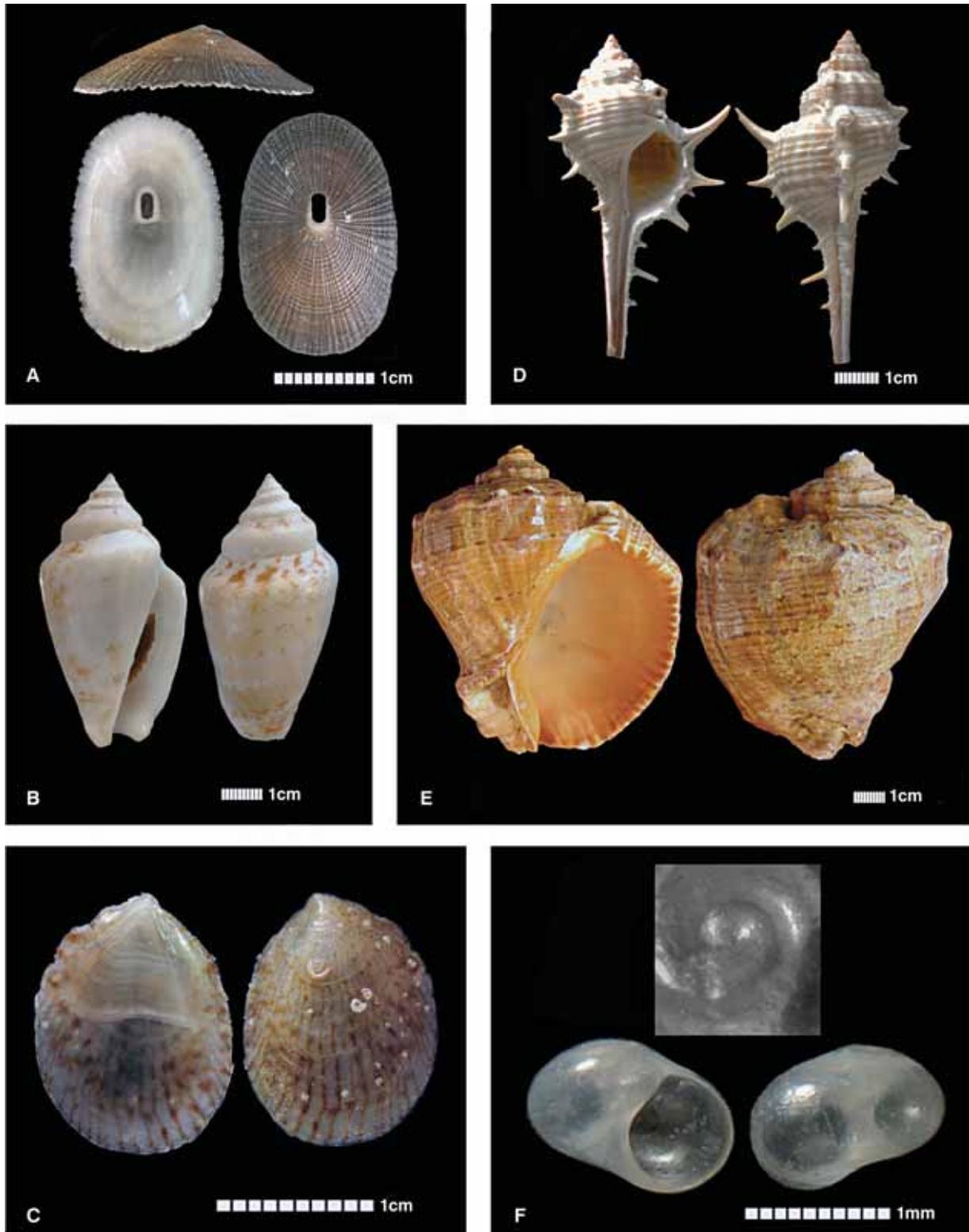


FIG. 2. A. *Diodora demartiniorum*, B. *Conomurex persicus*, C. *Crepidula gibbosa*, D. *Murex forskoehlii*, E. *Rapana venosa*, F. *Tomura depressa*.

TABLE 1. List of Gastropod species. M1: new documented record for the Mediterranean Sea; R1: new record species for the Hellenic Seas; A1: new alien species for the Hellenic Seas; R2: record of geographical expansion in the Hellenic seas; A2: alien with geographical expansion in the Hellenic seas; (*): casual search (visits < 5 times); (**): intensive search (visits > 50 times)

Family	Species	Record type	Location	Zone/ Depth	Habitat	Condition	Size (mm)
FISSURELLIDAE	<i>Diodora demariniorum</i>	R2	Sarti, Chalkidiki	40.0 m	mixed	1 shell (*)	20.3
	<i>Conomurex persicus</i> (Swainson, 1821)	A2	Nafplion	2-4 m	sand	51 live (*)	24.0-45.0
STROMBIDAE			Nafplion	1-2 m	sand	>50 shells (*)	16.0-53.0
			Porto Cheli	1-2 m	sand	11 shells (*)	19.0-56.0
			Melidoni, Kythira	beached		8 shells (*)	39.0-52.0
			Lindos, Rhodes	3-5 m	sand	4 live (*)	30.0-65.3
			Lindos, Rhodes	beached		9 shells (*)	35.0-66.0
			Rodakino,				
			Rethymno	beached		6 shells (*)	40.0-55.0
			Paliochora, Chania	beached		4 shells (*)	27.0-48.0
			Kaloi Limenes, Heraklion	2-3.5 m	sand	5 live (*)	42.0-46.0
			Atzikari, N Lasithi	2-3.5 m	sand	4 shells (*)	42.0-56.0
CALYPTRAEIDAE			Ahlia, Lasithi	beached		5 live (*)	29.0-50.0
			Ahlia, Lasithi	beached		13 shells (*)	21.0-44.0
			N Gavdos, S Crete	2-4 m	sand	6 live (*)	37.0-49.0
			N Gavdos, S Crete	1-2 m	sand	3 shells (*)	19.0-49.0
MURICIDAE	<i>Crepidula gibbosa</i>	R2	Palioura, Epanomi	5.0 m	mixed	6 live (**)	5.0-16.8
	<i>Murex forskoehlitii</i> Röding, 1798	A2	Anisara, Heraklion	beached		1 shell (*)	65.2
CORNIROSTRIDAE	<i>Rapana venosa</i> (Valenciennes, 1846)	A2	Perea, Thessaloniki	5.0 m	mixed	2 shells (*)	50.0 & 130.0
	<i>Tomura depressa</i> (Granata-Grillo, 1877)	R1	Palioura, Epanomi	5.0 m	mixed	2 live (**)	1.1 & 1.3
MURCHISONELLIDAE			Palioura, Epanomi	5.0 m	mixed	10 shells (**)	1.0-1.4
			Cape, Epanomi	0.2 m	<i>Zostera</i>	1 live (**)	1.2
			Cape, Epanomi	0.2 m	<i>Zostera</i>	9 shells (**)	1.2-2.3
			Cape, Epanomi	0.2 m	<i>Zostera</i>	1 live (**)	2.0
		Cape, Epanomi	0.2 m	<i>Zostera</i>	2 shells (**)	1.8 & 1.9	
		Cape, Epanomi	0.2 m	<i>Zostera</i>	1 live (**)	1.7	
		Cape, Epanomi	0.2 m	<i>Zostera</i>	7 shells (**)	1.6-1.8	
		Cape, Epanomi	0.1-0.4 m	<i>Zostera</i>	3 live (**)	2.0-2.5	
		Cape, Epanomi	0.1-0.4 m	<i>Zostera</i>	8 shells (**)	1.2-1.9	

TABLE 1. continued

Family	Species	Record type	Location	Zone/ Depth	Habitat	Condition	Size (mm)
PHILINIDAE	<i>Philine denticulata</i> (Adams J., 1800)	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	6 shells (**)	1.0-1.6
	<i>Philine intricata</i> Monterosato, 1875	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	5 shells (**)	1.0-1.9
	<i>Philine iris</i> Tringali, 2001	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	2 shells (**)	1.7 & 1.9
	<i>Philine punctata</i> (Adams J., 1800)	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	2 shells (**)	1.0 & 1.2
	<i>Philine</i> sp. 1	R1	Cape, Epanomi	0.5 m	<i>Zostera</i>	2 shells (**)	1.1 & 1.5
	<i>Philine</i> sp. 2	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	4 live (**)	2.0-6.0
	<i>Philine</i> sp.3	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	8 shells (**)	1.5-3.0
	<i>Philine</i> sp. 4	R1	Cape, Epanomi	0.5 m	<i>Zostera</i>	1 shell (**)	4.1
AGLAJIDAE	<i>Melanochlamys wildpretii</i> Ortea, Bacallado & Moro, 2003	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	2 shells (**)	2.5 & 3.0
	<i>Calliopaea bellula</i> d'Orbigny, 1837	M1	Cape, Epanomi	0.2 m	<i>Zostera</i>	2 shells (**)	1.9 & 1.8
STILIGERIDAE	<i>Berthella plumula</i> (Montagu, 1803)	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	3 live (**)	2.3
	<i>Bursatella leachii</i> Blainville, 1817	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	4 shells (**)	1.1-3.4
APLYSIIDAE	<i>Petalifera gravieri</i> (Vayssière, 1906)	A2	Micro Emvolo	0.2 m	rocky	1 live (*)	95.0
	<i>Hypselodoris villafranca</i> (Risso, 1818)	R1	Potamos, Epanomi	2.0 m	shipwreck	5 live (**)	50.0-85.0
CHROMODORIDIDAE	<i>Berghia verrucicornis</i> (Costa A., 1867)	R2	Cape, Epanomi	0.3 m	<i>Zostera</i>	6 shells (**)	1.2-2.0
	<i>Facelina annulicornis</i> (Chamisso & Eysenhardt, 1821)	R1	Cape, Epanomi	0.2 m	<i>Zostera</i>	3 live (**)	16.3-22.0
FACELINIDAE	<i>Cratena peregrina</i> (Gmelin, 1791)	R2	Cape, Epanomi	0.3 m	<i>Zostera</i>	4 live (**)	12.6-12.9
		R1	Cape, Epanomi	0.3 m	<i>Zostera</i>	4 live (**)	25.0-31.0
		R2	Cape, Epanomi	0.3 m	<i>Zostera</i>	4 live (**)	12.2-13.2

STROMBIDAE

Conomurex persicus (Swainson, 1821) (Fig. 2B). Numerous alive and empty shells (16.0-66.0 mm) of this alien species were collected from Nafplion, Porto Cheli, Crete (Heraklion, Lasithi, Rethymno, Gavdos, Chania), Kythira and Rhodes Islands at a depth of 1-4 m. The species seems to have expanded in many south Hellenic coasts quickly after a successful establishment in comparison with the distribution of the species in ELNAIS (ELNAIS, <https://services.ath.hcmr.gr>). It should be noticed that the dense population of *C. persicus* in Nafplion may indicate a) a good adaptation to the S Hellenic coasts as their population is consisted of a wide size range, b) lack of predators (possibly due to the aggressive behaviour of the animal) and c) unknown to locals and therefore an unexploitable species.

CALYPTRAEIDAE

Crepidula gibbosa DeFrance, 1818 (Fig. 2C). Six live specimens (5.0-16.8 mm) were collected from 5.0 m depth. This species is referred for the first time from N Aegean Sea while it is common in Saronikos Gulf and in the western and central Mediterranean. The species name is referred as a synonym of *C. moulinsii* Michaud, 1829 by Cossignani & Ardochini (2011).

MURICIDAE

Murex forskoehlii Röding, 1798 (Fig. 2D). One shell (65.2 mm) was collected in N Crete. The first occurrence of this alien species from Saronikos Gulf was characterized as questionable by Zenetos *et al.* (2003) and ELNAIS (ELNAIS, <https://services.ath.hcmr.gr/>). The present record should be considered as occasional.

Rapana venosa (Valenciennes, 1846) (Fig. 2E). Two shells (50.0 & 130.0 mm) at 5.0 m depth in Thessaloniki Gulf were found. Live *Rapana venosa* unique record was referred by Koutsoubas & Voultziadou-Koukoura (1991) from Thermaikos Gulf. The current record of the two shells indicates a rather unsuccessful or a temporary establishment of this species in the area. This could be attributed to a) the higher salinity of Thermaikos Gulf (> 37-38‰, Hyder *et al.*, 2002), in comparison with that of the Black Sea where the salinity is < 20‰ (UNEP/GRID-Arendal, 2001, http://maps.grida.no/go/graphic/salinity_of_the_black_sea), b) the dense populations of the crab *Callinectes sapidus* - a voracious predator species of small *Rapana* individ-

uals (Harding, 2003) - in the area, and c) the initial densities of *R. venosa* (scattered, too low for reproductive effectiveness). Consequently, its status in the area still remains uncertain while for N. Adriatic Sea with a salinity of < 36-37‰ (Tedesco *et al.*, 2007) it is considered established (Occhipinti-Ambrogi *et al.*, 2011).

CORNIROSTRIDAE

Tomura depressa (Granata-Grillo, 1877) (Fig. 2F). Two live specimens (1.1 & 1.3 mm) and 10 shells (1.0-1.4 mm) were found at 5.0 m depth in mixed substrate of E Thermaikos Gulf for the first time in Greece. This small species is almost oval, translucent, with wide circular aperture (equal to the shell's length). In large shells, the umbilicus is closed. The species is uncommon in W Mediterranean (Repetto *et al.*, 2005) and rather rare in Central Mediterranean according to Cossignani & Ardochini (2011); however, the number of the specimens found, both alive and shells, in Thermaikos Gulf indicates that it is rather common in this area.

MURCHISONELLIDAE

Ebala gradata (Monterosato, 1878) (Fig. 3A). One live individual (1.2 mm) and nine shells (1.2-2.3 mm) were collected from the Cape, Epanomi in shallow *Zostera* meadows (0.2 m depth). The species has a semi-transparent shell with flat and shouldered whorls, a triangular aperture and lacks the spiral striae characteristic of *E. striatula*. The species is referred by Repetto *et al.* (2005) as rare in the S Mediterranean under the name *E. trigonostoma* (de Folin, 1869). Although the species is referred for the first time from Greece, it is rather common in E Thermaikos Gulf according to the number of collected specimens.

Ebala striatula (Jeffreys, 1856) (Fig. 3B). One live specimen (2.0 mm) and two shells (1.8 & 1.9 mm) found in the same biotope of *E. gradata*. The species, which is considered as rare in W Mediterranean (Repetto *et al.*, 2005; Cossignani & Ardochini, 2011), is referred for the first time from Greece and seems to be uncommon in the studied area.

Murchisonella columna (Hedley, 1907) (Fig. 3C). Two live specimens (1.7 mm) and seven shells (1.6-1.8 mm) of this species were collected in the biotope, where the two pre-mentioned *Ebala* species were found. The cylindrical and semi-transparent shell has a subsutural smooth zone and a heterostrophic smooth protoconch. The species is originated from the Indo-

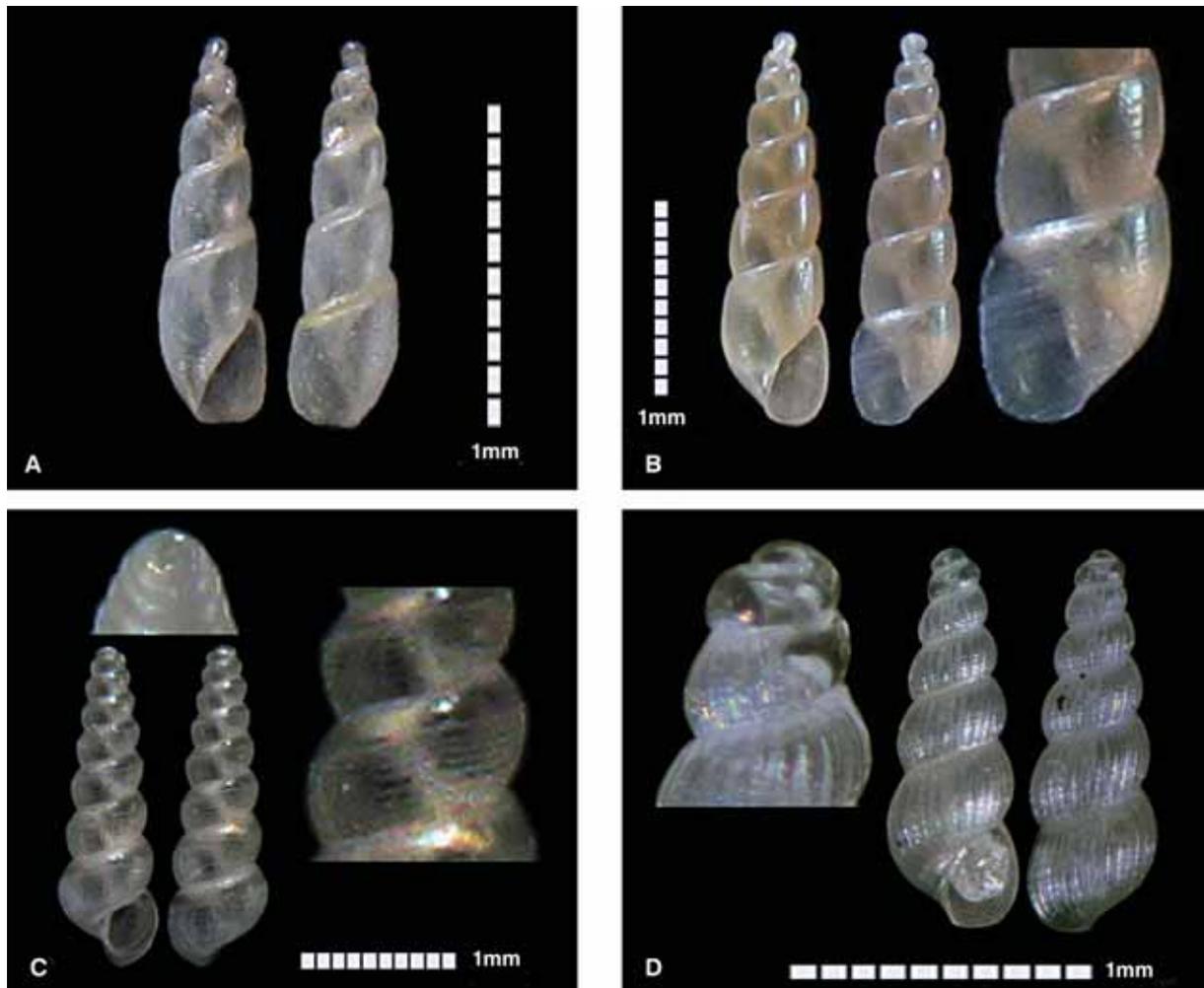


FIG. 3. A. *Ebala gradata*, B. *Ebala striatula*, C. *Murchisonella columna*, D. *Graphis barashi*.

Pacific and was referred from E Mediterranean Sea previously (Zenetos *et al.*, 2003). The current records are the first from Greece, indicating the expansion of this alien species.

Graphis barashi van Aartsen, 2002 (Fig. 3D). Three live specimens (2.0-2.5 mm) were collected from shallow waters 0.1-0.4 m with *Zostera* meadows in NE Thermaikos. This reference is the first from Greece. The identification of the species was based on the form of the protoconch, the higher number of the axial ribs and its more cylindrical form of the shell (Scudellari, 2004) as well as on the wider elliptical shape of the aperture in comparison with *G. albida*. *Graphis barashi* is referred by Repetto *et al.* (2005) as rare species in E Mediterranean but all the specimens of this study were found in a limited area of NE Thermaikos Gulf and for this reason its status was characterized as “not common”.

PHILINIDAE

All *Philine* species were collected from the Cape, Epanomi in shallow *Zostera* meadows (0.2-0.5 m depth) after intensive and very careful examination of the sediment (see Table 1). They are presented in Figures 4 and 5 with their shells' sculptural ornamentation shown under higher magnification.

Philine denticulata (Adams J, 1800) (Fig. 4A). Six shells (1.0-1.6 mm) were identified as *P. denticulata* according to the descriptions and drawing of Cachia *et al.* (2001) and Campani (2004) focused mainly on the gently curved outer lip with a pointed tip, the shouldered body whorl with two fine ridges and the absence of shell sculpture. The species is considered as rare inhabitant of the W Mediterranean (Cachia *et al.*, 2001) and is referred for the first time from the Hellenic seas where it is rather uncommon. The draw-

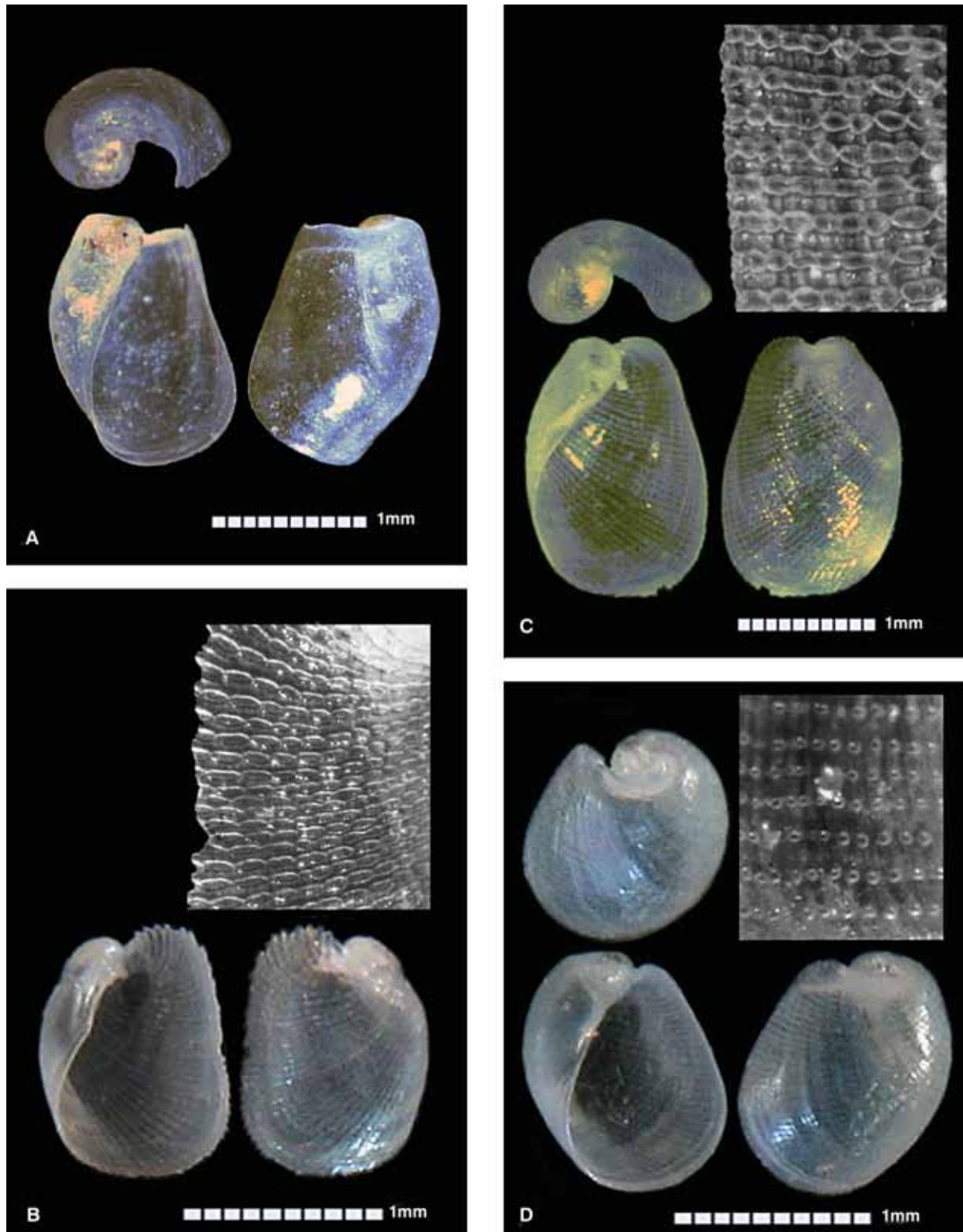


FIG. 4. A. *Philine denticulata*, B. *Philine intricata*, C. *Philine iris*, D. *Philine punctata*.

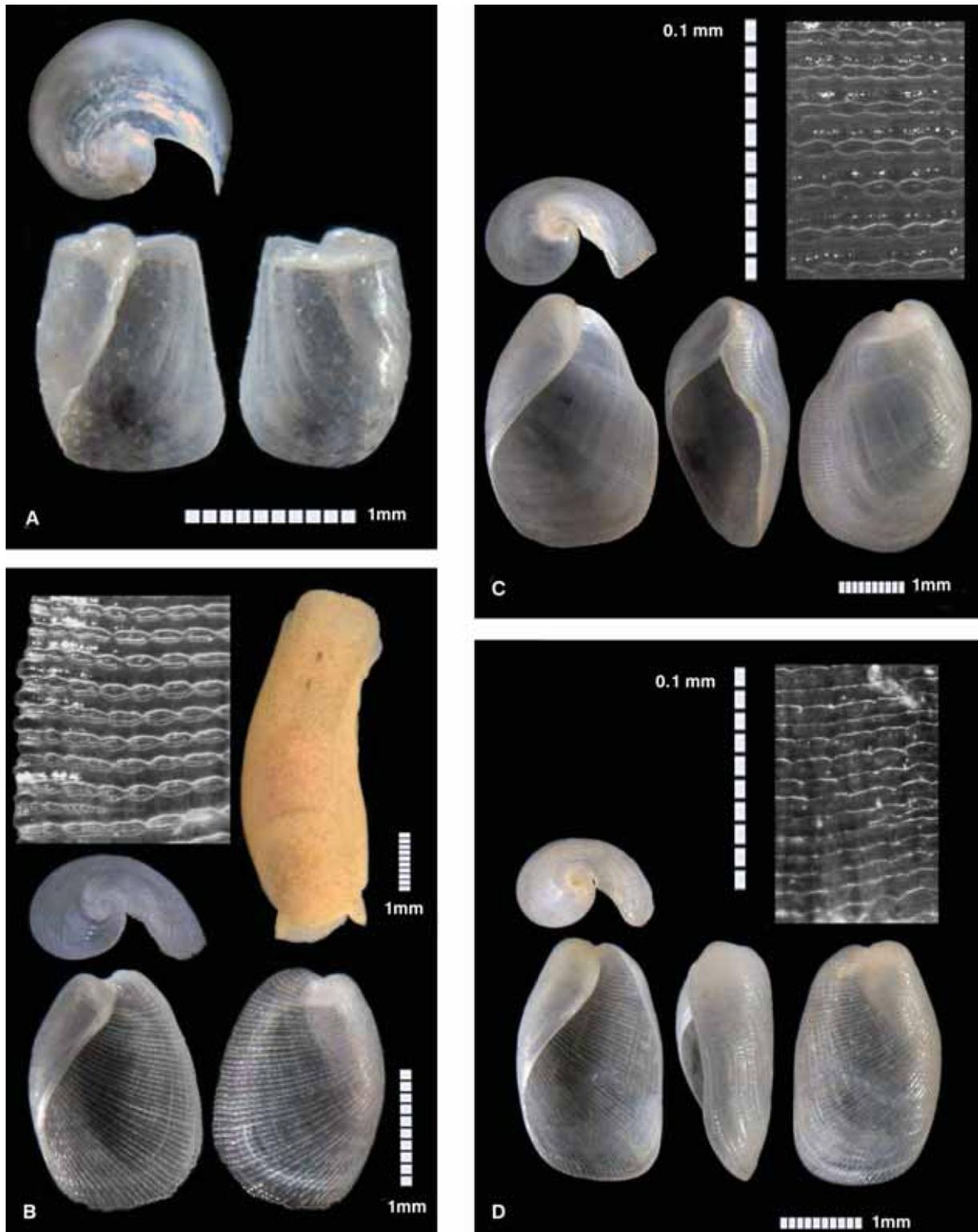


FIG. 5. A. *Philine* sp. 1, B. *Philine* sp. 2, C. *Philine* sp. 3, D. *Philine* sp. 4.

ing of *P. denticulata* in Reppeto et al. (2005) is rather a misidentification.

Philine intricata Monterosato, 1875 (Fig. 4B). Five shells (1.0-1.9 mm). The shells were identified according to the description, drawing and figures of Cachia et al. (2001), Campani (2004) and Cossignani & Ardochini (2011), with a focus at the top part of the inner lip which bears a ridge and a folder. The species is referred from the Mediterranean Sea (Cachia et al., 2001) as uncommon (Reppeto et al., 2005) while the current records are the first from the Hellenic Seas.

Philine iris Tringali, 2001 (Fig. 4C). Two shells (1.7 & 1.9 mm) of this philinid were collected for the first time from Greece. The shell is transparent, bears dense chains with more rounded rings than the very similar shell of *P. catena* (Campani, 2004). Between the chains, there are alternating white “ribbons” consisted of scattered lines in a narrow barcode fashion. This characteristic, but without comments, is clearly shown by www.naturamediterraneo.com and described by Cachia et al. (2004) while the shape of the shell in published descriptions and figures appears more spherical than our specimens (Campani, 2004; Cossignani & Ardochini, 2011).

Philine punctata (Adams J, 1800) (Fig. 4D). Two shells (1.0 & 1.2 mm) were collected for the first time from Greece. The shell of the species bears characteristic sculpture consisted of unconnected rings in lines (Campani, 2004). The species is referred as uncommon in the W Mediterranean (Repetto et al., 2005) as well as in E Thermaikos Gulf.

Philine sp. 1 (Fig. 5A). Two shells (1.1 & 1.5 mm) were collected. The shell is quite similar to *P. denticulata* with a trapezoid outlook instead of sub-oval and bears several spiral lines around the apex by the suture.

Philine sp. 2 (Fig. 5B). Four live individuals (2.0-6.0 mm in animal length) and eight shells (1.5-3.0 mm) were collected. These animals were found for the first time in Greece while Mifsud reports an identical live specimen from Malta under the name *P. quadrata* (www.medslugs.de). The shells of this report differ from those of *P. quadrata* shown in published figures (Campani, 2004; Cossignani & Ardochini, 2011) and more specifically in their overall shape, the size and shape of the aperture and the intensity of the sculpture.

Philine sp. 3 (Fig. 5C). One shell, 4.1 mm in length, with a sculpture decoration (~ 15 chains mm⁻¹ at a shell size of 3 mm), very similar to that of *P. catena* (though more dense), giving a whitish translucent appearance. Apart from that, it is pear-shaped, instead

of oval, due to a constriction of the spire at approximately two thirds of its length. This constriction culminates in an extension of the outer lip of the aperture best seen when the shell is observed from the side.

Philine sp. 4 (Fig. 5D). Two shells (2.5 & 3.0 mm) with a sculpture decoration very similar to *P. catena*. Nevertheless *Philine* sp. 4 differs from *P. catena* in that the position of the top of its outer lip is situated at the same level with the apex (Cachia et al., 2001; Cossignani & Ardochini, 2011). Moreover the sculpture of *Philine* sp. 4 is denser than *Philine* sp. 3 (~ 20 chains mm⁻¹ at a shell size of 3 mm) and less elongated than *P. scabra* from which it also differs in the ring's shape of the chains (round in *P. scabra*) (Campani, 2004).

All the above four unidentified *Philine* species are first records for Greece.

AGLAJIDAE

Melanochlamys wildpretii Ortea, Bacallado & Moro, 2003 (Fig. 6A). Two shells (1.9 & 1.8 mm) were collected from the Cape, Epanomi in shallow *Zostera* meadows (0.2 m depth). This species is recently described from the Canary Islands (Ortea et al., 2003). The species shell can unmistakably identified by the two spicules on its apex. Reppeto et al. (2005) present a drawing of a similar shell with one spicule on the apex under the name “*Philine denticulata*”. The drawing in the webpage Conchiglie del Mediterraneo (Conchiglie del Mediterraneo, www.conchigliedelmediterraneo.it), under the same name (*P. denticulata*) is characterized as “poorly documented” and could portrait *M. wildpretii*. Consequently, the present record of this species is the first documented from the Mediterranean Sea.

STILIGERIDAE

Calliopaea bellula d'Orbigny, 1837 (Fig. 6B). Three specimens (approximately 2.3 mm each) were collected for the first time from Greece in the Cape, Epanomi in shallow *Zostera* meadows. The species is referred from the Mediterranean and the Black Sea (Sea Slug Forum, www.seaslugforum.net). The animals were translucent grey-green to chestnut-brown with whitish dots, while the sides of the head and the tips of the cerata lacked pigmentation. The cerata are short, inflated, arranged in about 6 rows on each side of the body, leaving the anterior part of the body clear.

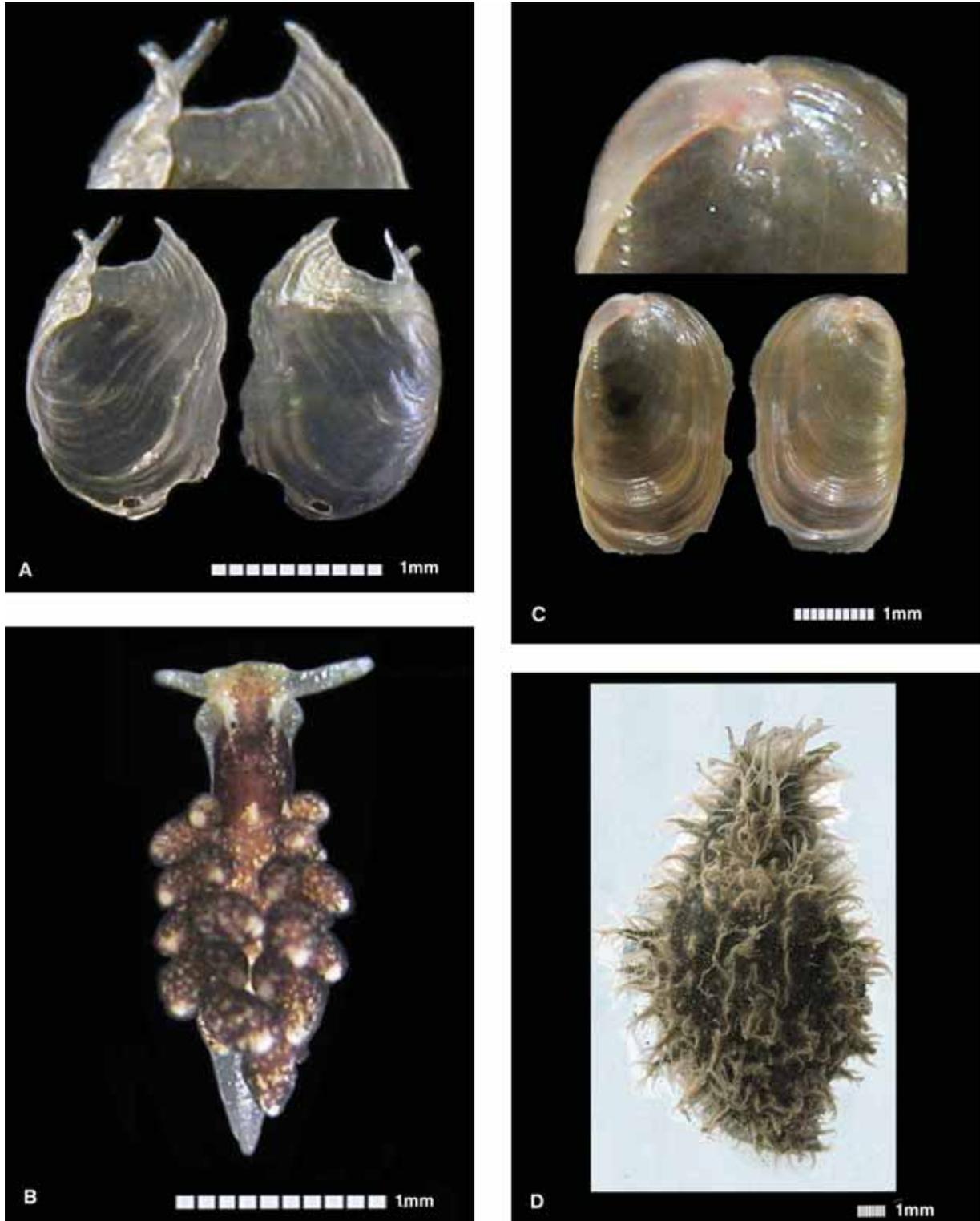


FIG. 6. A. *Melanochlamys wildpretii*, B. *Calliopaea bellula*, C. *Berthella plumula*, D. *Bursatella leachii*.

PLEUROBRANCHIDAE

Berthella plumula (Montagu, 1803) (Fig. 6C). Four shells (1.1-3.4 mm) were taken from a *Zostera* bed of NE Thermaikos at a depth of 0.2 m, for the first time from Greece, while it is rather common in the Mediterranean Sea. The narrow oval shells are of a patchy golden and rose color. The outer lip a) ends over the end of the spire, a difference from *B. aurantiaca*, *B. stellata* and *B. ocellata*, b) is situated close to the midline (but not in *B. aurantiaca* and *B. stellata*) and c) the external fine sculpture is smoother and the apex less prominent than in *B. aurantiaca* and *B. ocellata*. The three mentioned differences are drawn out from Campani (1998), Cachia et al. (2001), Repetto et al. (2005) and Cossignani & Ardovini (2011).

APLYSIIDAE

Bursatella leachii Blainville, 1817 (Fig. 6D). One live individual (95.0 mm in the animal length) was collected from rocky bottom, 0.2 m depth, in Micro Emvolo of E Thermaikos Gulf, while several animals of various sizes have been observed in Potamos, Epanomi (E Thessaloniki Gulf) on a shipwreck and on mixed bottom. After certain areas in Greece, mainly in Aegean Sea (ELNAIS, <https://services.ath.hcmr.gr>) and the current records, *B. leachii* is a well established and expanding alien species in Thessaloniki and Thermaikos Gulfs.

Petalifera gravieri (Vayssière, 1906) (Fig. 7A). Six shells (1.2-2.0 mm) were collected from NE Thermaikos at a depth of 0.2 m, for the first time from Greece and East Mediterranean Sea, while it is referred as rare in the West and Central Mediterranean Sea (Repetto et al., 2005). The shell is vitreous, of golden rose color, with a relatively big spire for its size (~ 1/4 of its length). This proportion is reduced in larger shells (Conchiglie del Mediterraneo, www.conchigliedelmediterraneo.it).

CHROMODORIDIDAE

Hypselodoris villafranca (Risso, 1818) (Fig. 7B). Three specimens (16.3-22.0 mm) were collected in the Cape, Epanomi in shallow *Zostera* meadows. The species has been referred from the Mediterranean Sea (Sea Slug Forum, www.seaslugforum.net) and from Greece in a general checklist (Greek Biodiversity, <http://greek-biodiversity.web.auth.gr/>) as well as from a certain location of Chalkidiki (N Aegean Sea) (Marine Biodiversity and Ecosystem Functioning – MarBEF,

<http://www.marbef.org/data/erms.php>). The animals were grey blue in color with several dorsal parallel white and yellow-orange lines forming an irregular pattern. The species is distinguished by a) the grayish coloration of the gills and rhinophores, b) the presence of a white line on the rhinophores and c) a dorsal yellow (Sea Slug Forum, www.seaslugforum.net) line around the brachial sheath and the rhinophores.

AEOLIDIIDAE

Berghia verrucicornis (Costa A, 1867) (Fig. 7C). Four animals (12.6-12.9 mm) were taken live from the same biotope as the following species (*Cratena peregrina* and *Facelina annulicornis*). This species is referred for the first time from Greece while it has been recorded from the W Mediterranean Sea (www.seaslugforum.net, Heyward et al., 1996) and also from NE Adriatic (Lipej et al., 2008). The body is whitish, with a light orange area dorsally and two orange blotches in front of the tuberculate rhinophores which are orange except of their tips and bases. The light brown cerata are tipped with a bright orange ring.

FACELINIDAE

The following two species were collected from the Cape, Epanomi in shallow *Zostera* meadows (0.3 m depth).

Facelina annulicornis (Chamisso & Eysenhardt, 1821) (Fig. 7D). Four animals (25.0-31.0 mm) were found. The species is referred for the first time from Greece and the E Mediterranean Sea and it is known from the W Mediterranean and the E European Atlantic coast. The body has an orange-pink tinge, usually more intense on the head. White spots are sprinkled all over the body and cerata. The rhinophores characteristically bear numerous obliquely sloping lamellae (18 or more, according to Rudman, 2000).

Cratena peregrina (Gmelin, 1791) (Fig. 7E). Four individuals (12.2-13.2 mm) were collected. This species was referred from all over the Mediterranean (including the Aegean Sea) and Black Seas (Sea Slug Forum, www.seaslugforum.net; Türkmen & Demirsoy, 2009), while in Greece, it has already been recorded from S Chalkidiki (N Aegean Sea) and the Ionian Sea (Opisthobranchs of the Mediterranean Sea and elsewhere, www.medslugs.de). It is characterized by two large orange bands on the head one between each rhinophore and oral tentacle (Rudman, 2009).

Among the 27 identified species, 15 are referred for the first time for the Hellenic fauna raising its gas-

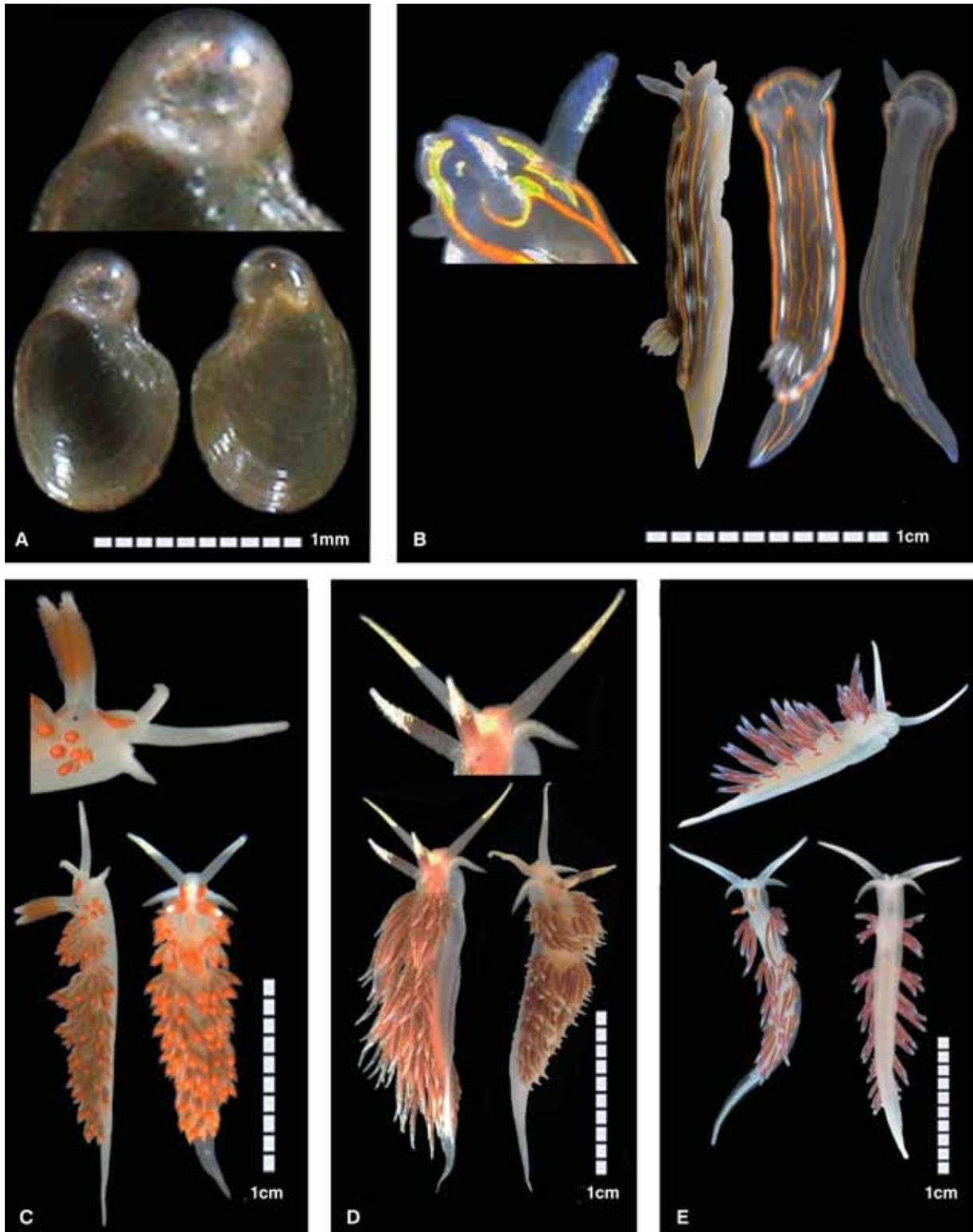


FIG. 7. A. *Petalifera gravieri*, B. *Hypselodoris villafranca*, C. *Berghia verrucicornis*, D. *Facelina annulicornis*, E. *Cratena peregrina*.

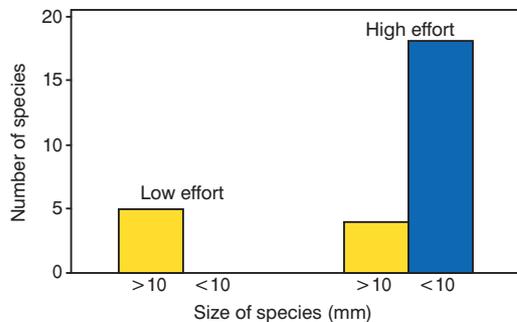


FIG. 8. Effectiveness in terms of number of collected species in relation to the research effort and species size.

tropod biodiversity from 622 (Coll *et al.*, 2010) to 637 species. The majority of these new species are of small size (< 10 mm) and their finding is attributed to the intensive, frequent and thorough sampling effort (Fig. 8).

Out of the new findings one is alien (*Murchisonella columna*) and one, *Melanochlamys wildpretii*, is the first record for the Mediterranean Sea. *Melanochlamys wildpretii* is a very small species, with a fragile shell, recently described from the Canary Islands, and therefore it is difficult to decide whether it is a native Mediterranean species or it is originated from the Atlantic Ocean, before more distribution evidences are gathered.

Apart from the above findings, two more shells were collected from Gouves beach (N Crete) belonging to the two Indo-Pacific species of *Tectus fenestratus* (Gmelin, 1791) (Turbinidae) (Fig. 9A) and *Angaria delphinus* (Linnaeus, 1758) (Angariidae) (Fig. 9B). Although after careful examination no sign of

human treatment (e.g. for decoration) was detected, the occurrence of these shells should be characterized as questionable until more specimens (live and/or shells) are found.

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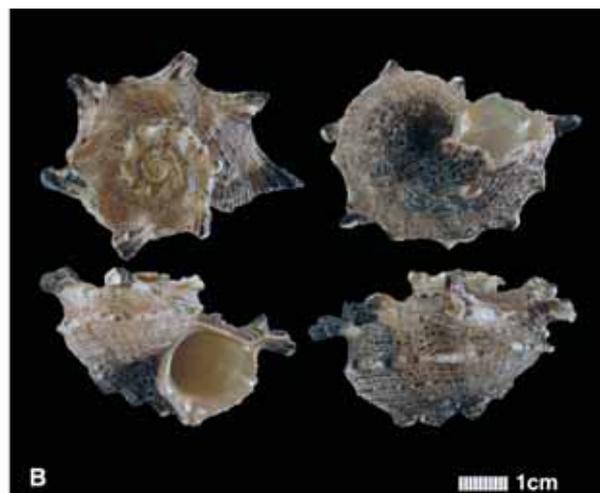
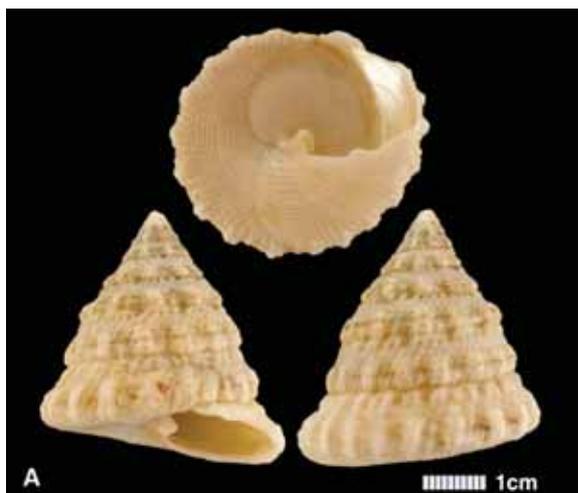


FIG. 9. A. *Tectus fenestratus*, B. *Angaria delphinus*.

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