



## Increase in knowledge of the marine gastropod fauna of Lebanon since the 19<sup>th</sup> century

<sup>1</sup>Department of Integrative Marine Ecology, Stazione Zoologica Anton Dohrn, Villa Comunale, I-80121 Napoli, Italy.

<sup>2</sup>Department of Natural Sciences, Faculty of Sciences, Lebanese University, Hadath, Lebanon.

<sup>3</sup>Le Corbusier 644, 280 Boulevard Michelet, 13008 Marseille, France.

<sup>4</sup>Department of Biology & Biotechnologies “Charles Darwin”, “Sapienza” University of Rome, Viale dell’Università 32, I-00185 Roma, Italy.

\* Corresponding author email: <fabio.crocetta@szn.it>.

**Fabio Crocetta** <sup>1\*</sup>

**Ghazi Bitar** <sup>2</sup>

**Helmut Zibrowius** <sup>3</sup>

**Marco Oliverio** <sup>4</sup>

---

**ABSTRACT.**—We hereby review and update the current state of knowledge on the Lebanese gastropod biota based on published literature and the study of new samples. Review of 1543 published records yielded 237 gastropod taxa. New samples from the Lebanese coast yielded 2414 living specimens and 4003 empty shells, belonging to 188 taxa. Forty-six of the taxa are new records for the Lebanese fauna, bringing the gastropods known from Lebanon to 283 species. Literature records also included 71 nominal gastropod taxa based on type material from Lebanon, including 3 genera, 8 species, and 60 subspecific units. Of these, only 13 are retained as available. Of the 283 gastropod taxa known from Lebanon, 41 are aliens and 7 are cryptogenic. The majority of nonnative taxa were recorded only during the last decades, particularly from 1980 to 2019. Results from the present study question the common assumption that this region has extremely low native diversity. The flora and fauna of the Lebanese coast remain relatively unexplored and our data support the perception that several formerly abundant species have recently collapsed. Despite these advances, the lack of scientific data on biodiversity and community structure of Lebanese habitats and geographic zones is likely to hamper conservation actions and legal protection of critical species. We therefore recommend additional field and laboratory research to increase knowledge of both taxonomic composition and species’ distributions in Lebanon and elsewhere in the easternmost Mediterranean Sea.

---

**Section Editor:** Aaron O’Dea

Date Submitted: 26 January, 2019.

Date Accepted: 5 June, 2019.

Available Online: 6 June, 2019.

The Mediterranean Sea has a long history of scientific exploration and is commonly considered a biodiversity hotspot, hosting approximately 17,000 marine species (Coll et al. 2010). Mollusca make up one of the most species-rich phyla in the area due to their ecological disparity, promoting colonization of virtually all marine environments, assisted by the long tradition of extensive field studies and taxonomy, which led to a good knowledge of the diversity of this group in the region (Coll et al. 2010, Sabelli and Taviani 2014). The Mediterranean basin is divided into different

biogeographic areas, each having specific oceanographic features (Bianchi 2007). Among these areas, the easternmost part of the basin, the Levant Sea (comprising essentially Turkish, Syrian, Lebanese, Israeli, Egyptian, and Cypriot territorial waters) is mostly oligotrophic due to the semiarid climate of the surrounding land masses with limited precipitation and low river runoff, except for the Nile River delta area. It also has a relatively narrow continental shelf and is distant from the nutrient-rich inflow of Atlantic water (Bariche 2010). This is reflected in the progressive eastward decline of various well-known Mediterranean species, such as the endemic sea grass *Posidonia oceanica* (see Online Appendix 1 for species authorities), or the complete absence of others, such as cnidarians genera *Corallium*, *Eunicella*, and *Paramuricea*; this has contributed to the general perception of a west–east Mediterranean biodiversity gradient, with a richer western part of the basin and an impoverished Levant basin (Morri et al. 2009, Crocetta et al. 2013a). The easternmost Mediterranean is also the region that seems to be most subject to biological invasions. This phenomenon was usually explained by addressing the vicinity to the Suez Canal (for species invading the Mediterranean Sea from the Red Sea) coupled with the presence of a sort of ecological vacuum, driven by subtropical climates and the thermal limits of Atlantic species (Bouillon et al. 2004, Voultsiadou 2009), resulting in ecological niches being available for potential newcomers (Oliverio and Taviani 2003).

The 220-km coast of Lebanon is well defined in the previous statements, hosting a large number of alien species, several of which are well established and outcompete native taxa (e.g., Zibrowius and Bitar 2003, Harmelin-Vivien et al. 2005, Crocetta et al. 2013a, Bitar et al. 2017). On the other hand, Lebanese biodiversity, whatever its actual magnitude, is also exposed to the effects of four commercial ports, at least 15 fishing harbors, many pipelines for petroleum imports, various industries, three power plants, and fuel tank farms. It is further affected by illegal or unregulated fishing practices (e.g., use of explosives and ichthyocides) and the unrelenting rise of pollution from sources including illegal sewage discharge and rivers carrying pollutants from agricultural, industrial, and urban activities (Bariche 2010, Badreddine et al. 2018).

Despite the relevance to Mediterranean marine biology, the easternmost Mediterranean marine ecosystem and its fauna and flora have been insufficiently and discontinuously investigated, in terms of both spatial and temporal distribution of its components (Azov 1991, Fredj et al. 1992, Arvanitidis et al. 2002). Thus, with the main aim to increase the overall knowledge of mollusk biodiversity in the easternmost Mediterranean Sea, we initiated a program of revision of the marine Mollusca of Lebanon (Crocetta et al. 2013a,b, 2014). Based on an exhaustive literature search and study of many previously-unpublished samples, we tested whether the low diversity commonly assumed for this area is real or an artefact caused by scarce field research and scientific exploration and general taxonomic impediments. In the present study, we critically review the knowledge of the Lebanese Gastropoda. In addition, as a contribution to the general knowledge of the Mediterranean molluscan biota, we have also screened the nomenclature of all nominal taxa originally described from the area. Finally, we focus on the region's alien fauna. The final corpus of this revision (Crocetta et al. 2013a, b, 2014) is expected to prepare and be the background for further studies, assessments, and conservation programs, and prove useful for long-term comparisons.

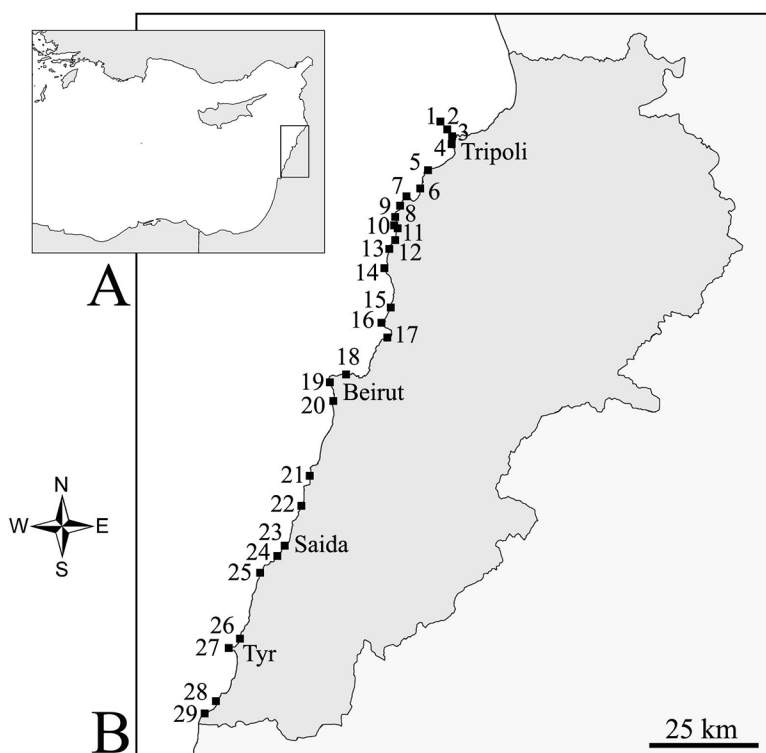


Figure 1. Study area. A. The eastern Mediterranean Sea, with location of Lebanon (rectangle). B. Map of the sampling sites, numbers corresponding to localities reported in Table 1.

## METHODS

**STUDY AREA, BENTHIC FEATURES, AND SAMPLING.**—Lebanon lies at the central/northeastern tip of the Mediterranean Sea between Syria and Israel within the Levant basin (Fig. 1). Its approximate 220 km of coastline has a narrow continental shelf (3–7 km wide) dominated by pebble beaches and rocky coasts, with sandy beaches occupying only 20% of the coast (Badreddine et al. 2018). Several localities, spanning the entire Lebanese coastline, have been sampled by snorkeling and scuba diving at daylight hours by two of the authors (GB and HZ) between 1999 and 2002 within the French-Lebanese joint program “Coopération pour l’Évaluation et le Développement de la Recherche” (CEDRE), aimed to study the coastal environment and the marine biodiversity of the Lebanese coastline (*see* Zibrowius and Bitar 2003). As the final target of the program was mostly qualitative, a high diversity of habitats from the intertidal down to approximately 40 m depth was examined (*see* Online Appendix 1 for details). When directly observed, gastropod samples were collected by hand, and other sampling techniques were used including destructive (scrapings: mesh size 1 mm) and nondestructive (visual census, underwater photographs) approaches. In addition, bioclastic sediments were collected whenever possible in each habitat explored (mesh size 1 mm), with particular attention to caves and harbors. The CEDRE material was later increased by additional samples, photos,

and personal observations (samples from 1988 onwards) donated by colleagues and ourselves, which also allowed us to include two specimens from approximately 100 m depth. Gastropoda were overall found at 29 sites, listed in Table 1 (*see also* Fig. 1).

**BIBLIOGRAPHIC DATA.**—An extensive literature survey has been conducted following the same criteria reported by Crocetta et al. (2013a, b, 2014). Indexed papers were reviewed first, followed by nonindexed papers, articles in non-peer reviewed journals, books, congress abstracts, and the “gray literature.” The listing of literature records was as exhaustive as possible, regardless of each record referring to an independent finding. Collected data were reanalyzed and taxonomically adjusted to allow for comparisons. In many cases, earlier literature records were found to be reported by subsequent authors with or without explicit reference to the previous papers. As the majority of the material previously recorded from Lebanon has neither been deposited in a museum nor is available for comparison, we trusted records based only on literature unless we found unequivocal evidence that they were wrong (*see* Online Appendices 2–5). Furthermore, the availability of all historical gastropod names based on Lebanese type material was checked as a contribution to Mediterranean taxonomy.

**LABORATORY WORK AND UPDATED TAXONOMY AND NOMENCLATURE.**—Live-collected gastropod samples were first fixed in 2% buffered formaldehyde and subsequently transferred to 100% EtOH. Empty shells were dried. Specimens collected for the present study were curated in the Department of Biology and Biotechnologies “Charles Darwin” (“Sapienza” University of Rome - Italy: BBCD), Museo Nacional de Ciencias Naturales in Madrid, Spain (MNCN), and the Muséum national d’Histoire naturelle (Paris - France: MNHN) (Online Appendix 1). Very eroded shells were discarded to exclude as much as possible contamination from taphocoenotic assemblages. Whenever possible, samples were identified to species level, following taxonomy and nomenclature in the World Register of Marine Species (WoRMS Editorial Board 2019).

**SPECIAL EMPHASIS ON ALIEN SPECIES.**—Special emphasis was given to alien species, with the following data provided for each taxon: published and unpublished records from the coastal and offshore territorial waters of Lebanon, date of first record, most plausible pathway(s) of introduction in Lebanon, and establishment success. Pathway nomenclature follows the Convention on Biological Diversity (2014). Two categories were encountered: (1) one related to a transport vector, the transport-stowaway (T-S), which typically refers to the movement of living organisms attached to transporting vessels; and (2) one related to the unaided spread (US), which refers to the secondary natural dispersal of alien species from neighboring areas. The establishment success of each species was determined on the basis of published and unpublished data. We considered each species as either casual (C) species recorded only once, the record of which is based on one or very few specimens (here synonymous with nonestablished and/or extinct), or established (E) species recorded in the wild with free living, likely self-maintaining, and/or reproducing populations, as inferred from record dates, total number of records, and number of specimens per record.

Table 1. Sampling localities shown in Figure 1, with coordinates, maximum depths (MD, in meters), and main habitats sampled (see also Online Appendix 1).

No.	Sites	Coordinates		MD	Habitats sampled
		Latitude	Longitude		
1	Ramkine Island	34°29'34"N	35°46'36"E	15	rocky bottom, under stones, photophilous algae, overhang with concretions and corals, shaded wall, tunnel and roof, cave, coarse sand bottom
2	Palms Island	34°28'16"N	35°51'34"E	4	rocky bottom, under stones, photophilous algae
3	Tripoli	34°27'28"N	35°49'34"E	5	rocky bottom, under stones, photophilous algae, harbour
4	Bouhssas	34°25'10"N	35°49'12"E	2	pebbles, muddy bottom, sandy bottom
5	Anfeh	34°21'43"N	35°43'36"E	24	rocky bottom, under stones, photophilous algae, shaded wall, cave, boulders, sandy bottom
6	El Heri	34°18'37"N	35°41'51"E	9	rocky bottom, under stones, photophilous algae, overhang, cave, <i>Cymodocea</i> meadow, muddy bottom, sandy bottom
7	Ras El Chakaa	34°18'47"N	35°40'59"E	14	rocky bottom, under stones, photophilous algae, shaded wall, cave, vertical wall with concretions, coarse sand bottom, sandy bottom
8	Chak El Hatab	34°17'36"N	35°40'17"E	18	rocky bottom, under stones, photophilous algae, overhang, cave
9	Selaata	34°17'03"N	35°39'31"E	35	vermetid platform, rocky bottom, under stones, photophilous algae, overhang with concretions, tunnel and roof, cave, cliff
10	Hannouch	34°18'26"N	35°40'35"E	24	rocky bottom, under stones, photophilous algae, overhang with concretions, sandy bottom
11	Batroun	34°15'13"N	35°39'19"E	12	vermetid platform, rocky bottom, under stones, photophilous algae, overhang with calcareous algae, vertical wall with concretions, cave, sandy bottom
12	Kfar Abida	34°14'02"N	35°39'15"E	12	rocky bottom, under stones, photophilous algae, overhang with concretions, tunnel and roof, cave
13	El Barbara	34°11'32"N	35°37'19"E	29	rocky bottom, under stones, photophilous algae, overhang, harbour, sandy bottom
14	Jbail	34°07'18"N	35°38'28"E	16	rocky bottom, under stones, overhang with concretions, cave, shoal, harbour
15	El Bouar	34°02'53"N	35°37'55"E	4	rocky bottom, under stones, photophilous algae, overhang with concretions, boulders
16	Tabarja	34°01'55"N	35°37'26"E	25	rocky bottom, under stones, photophilous algae, coarse sand bottom, sandy bottom
17	Aquamarina	34°00'51"N	35°37'57"E	25	rocky bottom, sciaphilous algae, boulders, artificial slope
18	Beirut	33°54'55"N	35°31'57"E	34	rocky bottom, under stones, photophilous algae, overhang with corals, harbour, boulders, pillars, muddy bottom
19	Raoucheh	33°53'18"N	35°28'01"E	10	rocky bottom, under stones, photophilous algae, cave, boulders, sandy bottom
20	Khaldeh	33°46'44"N	35°28'10"E	18	rocky bottom, under stones, photophilous algae, muddy bottom
21	Saadiyat	33°41'49"N	35°25'54"E	8	rocky bottom, under stones, photophilous algae, overhang with calcareous algae and bryozoans, cave, sandy bottom
22	Rmaileh	33°36'27"N	35°23'30"E	25	sandy bottom
23	Saida	33°34'00"N	35°22'10"E	31	rocky bottom, under stones, photophilous algae, sandy bottom
24	El Zahrani	33°29'46"N	35°20'01"E	24	rocky bottom, under stones, photophilous algae, sandy bottom, detritic sandy bottom
25	Khaizaran	33°26'47"N	35°16'31"E	0	vermetid platform
26	El Kassmieh	33°20'22"N	35°14'19"E	44	rocky bottom, coralligenous, freshwater springs, detritic sandy bottom
27	Tyr	33°15'56"N	35°11'24"E	37	rocky bottom, under stones, photophilous algae, overhang with concretions, shoal, coarse sand between rocks
28	El Bayada	33°09'96"N	35°10'85"E	10	rocky bottom, under stones, photophilous algae, sandy bottom
29	Nakoura	33°06'57"N	35°07'11"E	5	rocky bottom, under stones, photophilous algae, boulders, jetty

## RESULTS

**BIBLIOGRAPHIC DATA.**—Our bibliographic analysis revealed 1543 literature records from Lebanon, contained in 77 literature sources from 1844 (Philippi 1844) to 2019 (Badreddine et al. 2019). However, 60 sources mentioned fewer than 10 taxa; 37 contained records of single taxa only, and often reiterated records published by previous authors; only 33 sources actively contributed with new records for Lebanon (Online Appendix 1). The majority of these records (1070, approximately 69.5%) appeared in 6 major molluscan checklists of Lebanon, which again were mostly, if not exclusively, based on literature data (Pallary 1919, 1938, Gruvel and Moazzo 1929, Moazzo 1931, Bitar 1996, Bitar and Kouli-Bitar 1998). Emblematic examples of literature records are those of *Alvania dictyophora* and *Alvania hispidula*, both allegedly found only once a century ago, and then repeatedly listed in subsequent reviews from Lebanon with no additional findings (Online Appendix 1).

The literature records cover 237 valid gastropod taxa, consisting of 199 natives, 35 aliens, and 3 cryptogenics (Online Appendix 1, Tables 2–3); such a number also includes 25 misidentified species, whose taxonomic identifications were corrected here (Online Appendix 2, Table 4). Two taxa were ranked as *Incertae sedis*, namely *Vermetus imbricatus* and *Mitrella aradusana*, whose actual identities remain unknown (Online Appendix 3). Finally, besides the misidentifications, the presence in Lebanon of 17 more taxa was rejected and the respective records excluded from our considerations because they were based on incorrect and/or invalid locality data (11 taxa), misreadings (5 taxa), or represented species from other phyla (1 taxon). These include both alien and cryptogenic species, such as *Haliotis rugosa pustulata*, *Aspella anceps*, *Ergalatax contracta*, *Biuve fulvipunctata*, and *Retusa desgenettii*, and native taxa known only from very restricted ranges in the Mediterranean Sea, such as *Gibbula spratti*, *Jujubinus unidentatus*, and *Turritella decipiens* (Online Appendix 4, Table 5).

The 1543 literature records from Lebanon also accounted for 71 nominal gastropod taxa based on type material from Lebanon, including 3 genera, 8 species, and 60 subspecific units. *Nomina nuda* (International Commission on Zoological Nomenclature - ICZN 2012: Art. 12, 13, glossary) are represented by 38 cases, 19 have infrasubspecific rank (ICZN 2012: Art. 10.2, 45.5, 45.6, glossary), and only 13 proved to be available (ICZN 2012: Art. 10, glossary). Among the available taxa, *Patella lusitanica* (var.) *orientalis* is presumably the name to be assigned to the eastern Mediterranean clade of the *Patella rustica* complex, *Vermetus anguliferus* and *Buccinum gaillardoti* are the names to be used for the eastern Mediterranean clades of the *Dendropoma petraeum* and *Aplus dorbignyi* complexes, and *Nassa cuvieri* var. *lousi* is now known as *Tritia lousi*, a valid species. All other names are junior synonyms of valid taxa, except *Vermetus imbricatus* Pallary, 1938, which is a junior primary homonym of *Vermetus imbricatus* Sandberger, 1859 and *Vermetus imbricatus* Dunker, 1860, and thus permanently invalid (ICZN 2012: Art. 57.2) (Online Appendix 5).

**NEWLY SAMPLED MATERIAL.**—Sampling along the Lebanese coast yielded 6417 gastropod specimens, of which 2414 were living and 4003 were empty shells. As some specific samples had already been listed in nine recent articles (Online Appendix 1),

Table 2. Native marine gastropods from Lebanon, with literature records (L) and material examined (M). New records marked with an asterisk. See full details and species authorities in Online Appendix 1.

Family/Taxon	L	M	Family/Taxon	L	M
Patellidae			Cerithiidae ( <i>continued</i> )		
<i>Patella caerulea</i>	×	×	<i>Bittium reticulatum</i>	×	×
<i>Patella rustica</i> complex	×	×	<i>Cerithidium submammillatum</i>	×	×
<i>Patella ulyssiponensis</i>	×	×	<i>Cerithium alucastrum</i>	×	
Lottiidae			<i>Cerithium lividulum</i>	×	×
<i>Tectura virginea</i>	×	×	<i>Cerithium renovatum</i> complex	×	×
Fissurellidae			<i>Cerithium vulgatum</i> complex	×	
<i>Diodora gibberula</i>	×	×	Planaxidae		
<i>Diodora graeca</i>	×		<i>Fossarus ambiguus</i>	×	×
<i>Diodora italica</i>	×		Potamididae		
<i>Emarginula huzardii</i> *		×	<i>Pirenella conica</i>	×	×
<i>Emarginula octaviana</i>	×		Siliquariidae		
<i>Emarginula sicula</i>	×		<i>Tenagodus obtusus</i>	×	×
<i>Fissurella nubecula</i>	×	×	Turritellidae		
Haliotidae			<i>Turritella turbona</i>	×	×
<i>Haliotis tuberculata lamellosa</i>	×	×	Triphoridae		
Trochidae			<i>Marshallora adversa</i> *		×
<i>Clanculus corallinus</i>	×	×	<i>Metaxia metaxa</i>	×	×
<i>Clanculus cruciatus</i>	×	×	<i>Monophorus erythrosoma</i> *	×	×
<i>Clanculus jussieui</i>	×	×	<i>Monophorus perversus</i>	×	×
<i>Gibbula ardens</i>	×	×	Cerithiopsidae		
<i>Gibbula drepanensis</i>	×		<i>Cerithiopsis barleei</i> *		×
<i>Gibbula fanulum</i>	×		<i>Cerithiopsis nana</i> *		×
<i>Gibbula guttadauri</i>	×	×	<i>Cerithiopsis tubercularis</i> complex	×	
<i>Gibbula leucophaea</i>	×		<i>Dizoniopsis concatenata</i> *		×
<i>Gibbula magus</i>	×	×	<i>Dizoniopsis coppolae</i> *		×
<i>Gibbula philberti</i>	×		Epitoniidae		
<i>Gibbula rackeri</i>	×		<i>Epitonium clathrus</i>	×	×
<i>Gibbula turbinoides</i>	×	×	<i>Epitonium turtonis</i>	×	
<i>Jujubinus exasperatus</i> complex	×	×	<i>Gyroscala lamellosa</i>	×	
<i>Jujubinus striatus</i> complex	×	×	<i>Janthina janthina</i>	×	
<i>Phorcus articulatus</i>	×		<i>Janthina globosa</i>	×	
<i>Phorcus mutabilis</i>	×		Eulimidae		
<i>Phorcus richardi</i>	×		<i>Eulima glabra</i>	×	
<i>Phorcus turbinatus</i>	×	×	<i>Melanella boscii</i>	×	
<i>Steromphala adansonii</i> complex	×	×	<i>Melanella polita</i>	×	
<i>Steromphala divaricata</i>	×		<i>Parvioris ibizenca</i> *		×
<i>Steromphala nebulosa</i>	×	×	Littorinidae		
<i>Steromphala rarilineata</i> complex	×	×	<i>Echinolittorina punctata</i>	×	×
<i>Steromphala varia</i>	×	×	<i>Melarhaphe neritoides</i>	×	×
Calliostomatidae			Rissoiidae		
<i>Calliostoma laugierii laugierii</i> *		×	<i>Alvania amatii</i> *		×
<i>Calliostoma zizyphinum</i>	×	×	<i>Alvania colossophilus</i> *		×
Turbinidae			<i>Alvania datchaensis</i>	×	×
<i>Bolma rugosa</i>	×	×	<i>Alvania dictyophora</i>	×	
Phasianellidae			<i>Alvania geryonia</i>	×	×
<i>Tricolia pullus pullus</i>	×	×	<i>Alvania hispidula</i>	×	
<i>Tricolia speciosa</i>	×	×	<i>Alvania lineata</i>	×	
Neritidae			<i>Alvania mamillata</i>	×	×
<i>Smaragdia viridis</i>	×		<i>Alvania perversa</i> *		×
Cerithiidae			<i>Alvania sp.</i> *		×
<i>Bittium latreillii</i>	×	×	<i>Crisilla cf. semistriata</i> *		×

Table 2. *Continued.*

Family/Taxon	L	M	Family/Taxon	L	M
Rissoiidae ( <i>continued</i> )			Ranellidae		
<i>Pusillina marginata</i>	×	×	<i>Charonia lampas lampas</i>	×	
<i>Pusillina munda</i> *		×	<i>Charonia variegata</i>	×	×
<i>Pusillina philippi</i> *		×	<i>Monoplex corrugatus</i>	×	
<i>Pusillina radiata</i>	×	×	Muricidae		
<i>Rissoa lia</i>	×	×	<i>Bolinus brandaris</i>	×	
<i>Rissoa monodonta</i>	×		<i>Coralliophila meendorffii</i>	×	×
<i>Rissoa scurra</i> *		×	<i>Hexaplex trunculus complex</i>	×	×
<i>Rissoa similis</i>	×	×	<i>Muricopsis cristata</i>	×	×
<i>Rissoa variabilis</i>	×		<i>Ocenebra edwardsii complex</i>	×	×
Rissoinidae			<i>Ocenebra hybrida</i>	×	
<i>Rissoina bruguieri</i>	×	×	<i>Ocenebrina aegeensis</i>	×	×
Barleeiidae			<i>Stramonita haemastoma</i>	×	×
<i>Barleeia unifasciata</i>	×		<i>Typhinellus labiatus</i>	×	×
Caecidae			Marginellidae		
<i>Caecum auriculatum</i>	×		<i>Volvarina mitrella</i>	×	×
<i>Caecum trachea</i> *		×	Cystiscidae		
Tornidae			<i>Gibberula miliaria</i>	×	
<i>Tornus mienisi</i> *		×	<i>Gibberula philippii</i>	×	×
<i>Tornus subcarinatus</i>	×	×	Mitridae		
Truncatellidae			<i>Episcomitra cornicula</i>	×	×
<i>Truncatella subcylindrica</i>	×		<i>Isara cornea</i>	×	
Vermetidae			Costellariidae		
<i>Dendropoma anguliferum</i>	×	×	<i>Pusia ebenus</i>	×	×
<i>Petalconchus glomeratus</i>	×		<i>Pusia granum</i>	×	
<i>Thylacodes arenarius</i>	×	×	<i>Pusia tricolor</i>	×	
<i>Thylaeodus rugulosus</i> *		×	<i>Vexillum hypatiae</i>	×	×
<i>Vermetus triquetrus</i>	×		Pisaniidae		
Aporrhaidae			<i>Aplous gaillardoti</i>	×	×
<i>Aporrhais pespelecani</i>	×		<i>Aplous scacchianus</i>	×	×
Velutinidae			<i>Enginella leucozona</i>	×	×
<i>Lamellaria perspicua</i> *		×	<i>Pisania striata</i>	×	×
Triviidae			Buccinidae		
<i>Niveria problematica</i>	×	×	<i>Chauvetia brunnea</i>	×	
Cypraeidae			<i>Euthria cornea</i>	×	×
<i>Luria lurida lurida</i>	×	×	Colubrariidae		
<i>Naria spurca spurca</i>	×	×	<i>Cumia reticulata</i>	×	×
<i>Zonaria pyrum pyrum</i>	×		Nassariidae		
Naticidae			<i>Tritia circumcincta</i>	×	×
<i>Euspira intricata</i>	×	×	<i>Tritia corniculum complex</i>	×	
<i>Euspira nitida</i>	×	×	<i>Tritia cuvierii complex</i>	×	×
<i>Naticarius hebraeus</i>	×		<i>Tritia gibbosula</i>	×	
<i>Naticarius stercusmuscarum</i>	×	×	<i>Tritia grana</i>	×	
<i>Neverita josephinia</i>	×	×	<i>Tritia incrassata complex</i>	×	×
<i>Notocochlis dillwynii</i>	×		<i>Tritia lousi</i>	×	
<i>Tectonatica sagraiana</i>	×		<i>Tritia mutabilis</i>	×	×
Tonnidae			<i>Tritia neritea</i>	×	×
<i>Tonna galea</i>	×	×	<i>Tritia nitida</i>	×	
Cassidae			<i>Tritia pygmaea</i> *		×
<i>Galeodea rugosa</i>	×		<i>Tritia turulosa</i>	×	×
<i>Semicassis granulata</i>	×	×	<i>Tritia unifasciata</i>	×	×



Table 2. *Continued.*

Family/Taxon	L	M	Family/Taxon	L	M
<b>Columbellidae</b>			<b>Ringiculidae</b>		
<i>Columbella rustica</i>	×	×	<i>Ringicula auriculata</i>	×	
<i>Mitrella coccinea</i> *		×	<i>Ringicula conformis</i>	×	×
<i>Mitrella minor</i> *		×	<b>Bullidae</b>		
<i>Mitrella scripta</i>	×		<i>Bulla striata</i>	×	×
<b>Fascioliariidae</b>			<b>Haminoeidae</b>		
<i>Aptyxis syracusana</i>	×		<i>Haminoea hydatis</i>	×	
<i>Fusinus</i> sp.*		×	<b>Cylichnidae</b>		
<i>Tarantinaea lignaria</i>	×	×	<i>Cylichna cylindracea</i>	×	
<b>Conidae</b>			<b>Retusidae</b>		
<i>Conus ventricosus</i>	×	×	<i>Retusa mammillata</i>	×	
<b>Horaiclavidae</b>			<i>Retusa truncatula</i>	×	
<i>Haedropleura secalina</i>	×	×	<b>Rhizoriidae</b>		
<i>Haedropleura septangularis</i>	×		<i>Volvulella acuminata</i>	×	
<b>Mitromorphidae</b>			<b>Cavoliniidae</b>		
<i>Mitromorpha columbellaria</i>	×	×	<i>Clio pyramidata</i> complex	×	
<b>Mangeliidae</b>			<b>Plakobranchidae</b>		
<i>Bela zonata</i>	×		<i>Elysia timida</i>	×	
<i>Mangelia callosa</i> *		×	<b>Umbraculidae</b>		
<i>Mangelia costulata</i>	×	×	<i>Umbraculum umbraculum</i>	×	×
<i>Mangelia angelinae</i> *		×	<b>Aplysiidae</b>		
<i>Mangelia paciniana</i>	×		<i>Aplysia depilans</i>	×	×
<i>Mangelia stosiciana</i>	×	×	<i>Aplysia fasciata</i>	×	×
<i>Mangelia taeniata</i>	×		<b>Pleurobranchidae</b>		
<i>Mangelia unifasciata</i>	×		<i>Berthella aurantiaca</i>	×	×
<i>Mangelia vaiuelini</i>	×	×	<i>Berthella ocellata</i>	×	×
<i>Mangelia</i> sp.*		×	<b>Chromodorididae</b>		
<i>Sorgenfreispira brachystoma</i> *		×	<i>Felimare picta picta</i>	×	×
<b>Raphitomidae</b>			<i>Felimida binza</i>	×	×
<i>Clathromangelia granum</i>	×		<i>Felimida luteorosea</i>	×	×
<i>Clathromangelia loiselieri</i> *		×	<i>Felimida purpurea</i>	×	×
<i>Cirillia linearis</i>	×		<b>Phyllidiidae</b>		
<i>Raphitoma cordieri</i>	×		<i>Phyllidia flava</i>	×	×
<i>Raphitoma farolita</i> *		×	<b>Dendrodorididae</b>		
<i>Raphitoma laviae</i>	×	×	<i>Dendrodoris grandiflora</i>	×	×
<i>Raphitoma philberti</i>	×		<i>Dendrodoris limbata</i>	×	×
<b>Pyramidellidae</b>			<b>Aeolidiidae</b>		
<i>Eulimella acicula</i> *		×	<i>Aeolidiella alderi</i>	×	×
<i>Euparthenia bulinea</i>	×		<i>Spurilla neapolitana</i>	×	
<i>Megastomia conoidea</i>	×	×	<b>Facelinidae</b>		
<i>Odostomella bicincta</i> *		×	<i>Cratena peregrina</i>	×	
<i>Ondina vitrea</i> *		×	<i>Dondice banyulensis</i>	×	×
<i>Ondina</i> sp.*		×	<b>Flabellinidae</b>		
<i>Parthenina monozona</i>	×	×	<i>Flabellina affinis</i>	×	
<i>Pyrgiscus rufus</i>	×		<b>Siphonariidae</b>		
<i>Pyrgostylus striatulus</i>	×	×	<i>Williamia gussoni</i>	×	×
<i>Turbonilla lactea</i>	×		<b>Ellobiidae</b>		
<i>Turbonilla pusilla</i> *		×	<i>Auriculinella bidentata</i>	×	
<b>Amathinidae</b>			<i>Myosotella myosotis</i>	×	
<i>Clathrella clathrata</i>	×		<i>Ovatella firminii</i>	×	
<b>Acteonidae</b>			<b>Trimusculidae</b>		
<i>Acteon tornatilis</i>	×		<i>Trimusculus mammillaris</i>	×	×

Table 3. Alien and cryptogenic marine gastropods from Lebanon, with literature records (L) and material examined (M), first record dates (FRD), plausible pathway(s) of introduction in Lebanon (P), and establishment success (ES). New entries are marked with a plus<sup>+</sup>. See full details and species authorities in Online Appendix 1. Species for which the first Mediterranean records also included Lebanon are marked with an asterisk, whereas those recorded for the first time in the Mediterranean from Lebanon only are marked with two asterisks.

Family	Taxon	L	M	Status	FRD	P	ES
Nacellidae	<i>Cellana rota</i>	×		alien	2012–2013	US	C
Fissurellidae	<i>Diodora ruppellii</i>	×	×	alien	2002	US	E
Trochidae	<i>Pseudominolia nedyma</i>	×	×	alien	1985–1987	US	C
Trochidae	<i>Trochus erithreus</i>	×	×	alien	1985–1987	US	E
Cerithiidae	<i>Cerithidium perparvulum</i> <sup>+</sup>		×	alien	1992	US	E
Cerithiidae	<i>Cerithium scabridum</i>	×	×	alien	1929–1930	US	E
Cerithiidae	<i>Rhinoclavis kochi</i>	×	×	alien	1985–1987	US	E
Dialidae	<i>Diala semistriata</i>	×		alien	1985–1987	US	C
Scaliolidae	<i>Finella pupoides</i>	×		alien	1985–1987	US	C
Cerithiopsidae	<i>Cerithiopsis pulvis</i>	×	×	alien	1985–1987	US	E
Cerithiopsidae	<i>Cerithiopsis tenthrenois</i> <sup>+</sup>		×	alien	1999	US	C
Eulimidae	<i>Sticteulima clandestina</i> <sup>+</sup>		×	cryptogenic	1999		
Eulimidae	<i>Sticteulima</i> sp. <sup>+</sup>			cryptogenic	1999		
Rissoinidae	<i>Rissoina bertholleti</i> <sup>+</sup>		×	alien	1999	US	E
Strombidae	<i>Conomurex persicus</i>	×	×	alien	1985–1987	US	E
Cypraeidae	<i>Purpuradusta gracilis notata</i>	×	×	alien	1991	US	E
Muricidae	<i>Ergalatax junionae</i>	×	×	alien	1999	US	E
Muricidae	<i>Indothais sacellum</i> **	×	×	alien	2000	T-S, US	E
Muricidae	<i>Murex forskoehlii forskoehlii</i>	×	×	alien	1929–1930	US	E
Pisaniidae	<i>Pollia rubens</i> ** <sup>+</sup>		×	alien	2000	T-S, US	C
Columbellidae	<i>Zafra savignyi</i>	×		alien	1985–1987	US	C
Columbellidae	<i>Zafra selasphora</i> <sup>+</sup>		×	alien	1999	US	E
Fascioliariidae	<i>Fusinus verrucosus</i>	×	×	alien	2000	US	E
Pyramidellidae	<i>Brachystomia</i> sp. <sup>+</sup>		×	cryptogenic	2000		
Pyramidellidae	<i>Cingulina isseli</i>	×	×	alien	1985–1987	US	E
Pyramidellidae	<i>Megastomia</i> sp. <sup>+</sup>		×	cryptogenic	1999		
Pyramidellidae	<i>Oscilla jocosa</i> <sup>+</sup>		×	alien	1999	US	C
Pyramidellidae	<i>Pyrgulina fischeri</i>	×		alien	before 1996	US	C
Pyramidellidae	<i>Pyrgulina maiae</i>	×	×	alien	1985–1987	US	E
Pyramidellidae	<i>Syrnola fasciata</i>	×		alien	1985–1987	US	C
Amathinidae	<i>Amathina tricarinata</i> *	×	×	alien	2000	T-S, US	C
Mnestiidae	<i>Mnestia girardi</i>	×		alien	1985–1987	US	C
Tornatinidae	<i>Acteocina mucronata</i> *	×	×	alien	1986	US	C
Retusidae	<i>Pyrrunculus fourierii</i> **	×	×	alien	1985–1987	US	C
Plakobrachidae	<i>Elysia grandifolia</i> complex	×	×	alien	2002	US	E
Aplysiidae	<i>Aplysia dactylomela</i>	×	×	cryptogenic	2009		
Aplysiidae	<i>Bursatella leachii</i>	×	×	cryptogenic	1999		
Aplysiidae	<i>Syphonota geographica</i>	×	×	alien	2003	US	C
Pleurobranchidae	<i>Berthellina citrina</i>	×		alien	2016	US	C
Pleurobranchidae	<i>Pleurobranchus forskalii</i>	×	×	alien	2003	US	C
Discodorididae	<i>Tayuva lilacina</i> complex	×	×	cryptogenic	2000		
Chromodorididae	<i>Goniobranthus annulatus</i> **	×	×	alien	2000	T-S, US	E
Chromodorididae	<i>Hypselodoris infucata</i>	×	×	alien	1999	US	E
Polyceridae	<i>Plocamopherus ocellatus</i>	×	×	alien	2000	US	E
Tethyidae	<i>Melibe viridis</i>	×		alien	2015	US	C
Facelinidae	<i>Caloria indica</i>	×		alien	2016	US	C
Flabellinidae	<i>Coryphellina rubrolineata</i>	×	×	alien	2003	US	E
Siphonariidae	<i>Siphonaria crenata</i>	×		alien	1967	US	C

Table 4. Species recorded from Lebanon but excluded as based on misidentifications. Records subsequently assigned to the misidentified taxa. See full details and species authorities in Online Appendices 1 and 2. Fossil taxa are marked with a dagger †.

Literature record	Excluded species	Corrected identification
<b>Patellidae</b>		
<i>Patella depressa</i>	<i>Patella depressa</i>	<i>Patella ulyssiponensis</i>
<b>Trochidae</b>		
<i>Gibbula tumida</i>	<i>Gibbula tumida</i>	<i>Gibbula racketsi</i>
<i>Monodonta marmorata</i>	?	<i>Phorcus turbinatus</i>
<b>Turritellidae</b>		
<i>Turritella triplicata</i>	<i>Turritella triplicata</i> †	<i>Turritella turbona</i>
<i>Turritella communis</i>	<i>Turritella communis</i>	<i>Turritella turbona</i>
<b>Eulimidae</b>		
<i>Eulima polita</i>	<i>Melanella polita</i>	<i>Melanella boscii</i>
<i>Eulima polita</i> var. <i>brevis</i>	<i>Melanella polita</i>	<i>Melanella boscii</i>
<b>Rissoidae</b>		
<i>Rissoa subcrenulata</i>	<i>Alvania subcrenulata</i>	<i>Alvania amatii</i>
<i>Alvania subcrenulata</i>	<i>Alvania subcrenulata</i>	<i>Alvania amatii</i>
<i>Rissoa aspera</i> var. <i>minor</i>	<i>Alvania aspera</i>	<i>Alvania datchaensis</i>
<i>Alvania aspera</i>	<i>Alvania aspera</i>	<i>Alvania datchaensis</i>
<i>Rissoa cimex</i> var. <i>minor</i>	<i>Alvania cimex</i>	<i>Alvania mamillata</i>
<i>Rissoa cimex</i>	<i>Alvania cimex</i>	<i>Alvania mamillata</i>
<i>Alvania cimex</i>	<i>Alvania cimex</i>	<i>Alvania mamillata</i>
<i>Rissoa montagui</i> var. <i>minor</i>	<i>Alvania discors</i>	<i>Alvania</i> sp.
<i>Rissoa montagui</i> var. <i>fulva</i>	<i>Alvania discors</i>	<i>Alvania</i> sp.
<i>Rissoa montagui</i> var. <i>flavescens-fasciata</i>	<i>Alvania discors</i>	<i>Alvania</i> sp.
<i>Rissoa montagui</i>	<i>Alvania discors</i>	<i>Alvania</i> sp.
<i>Alvania discors</i>	<i>Alvania discors</i>	<i>Alvania</i> sp.
<b>Vermetidae</b>		
<i>Vermetus cristatus</i>	<i>Dendropoma cristatum</i>	<i>Dendropoma anguliferum</i>
<i>Dendropoma petraeum</i>	<i>Dendropoma cristatum</i>	<i>Dendropoma anguliferum</i>
<b>Strombidae</b>		
<i>Strombus decorus</i>	<i>Conomurex decorus</i>	<i>Conomurex persicus</i>
<b>Triviidae</b>		
<i>Trivia pulex</i> var. <i>minor</i>	<i>Trivia mediterranea</i>	<i>Niveria problematica</i>
<i>Trivia pulex</i>	<i>Trivia mediterranea</i>	<i>Niveria problematica</i>
<b>Muricidae</b>		
<i>Ergalatax obscura</i>	<i>Ergalatax martensi</i>	<i>Ergalatax junionae</i>
<i>Murex tribulus</i>	<i>Murex tribulus</i>	<i>Murex forskoehlii forskoehlii</i>
<i>Ocinebrina corallina</i>	<i>Ocinebrina corallina</i>	<i>Ocinebrina aegeensis</i>
<i>Ocinebrina aciculata</i>	<i>Ocinebrina aciculata</i>	<i>Ocinebrina aegeensis</i>
<b>Pisaniidae</b>		
<i>Buccinum orbigny</i>	<i>Aplus dorbignyi</i>	<i>Aplus gaillardoti</i>
<i>Pisania orbigny</i>	<i>Aplus dorbignyi</i>	<i>Aplus gaillardoti</i>
<i>Pisania d'Orbigny</i>	<i>Aplus dorbignyi</i>	<i>Aplus gaillardoti</i>
<i>Pisania d'orbigny</i> sous-var. <i>angusta</i>	<i>Aplus dorbignyi</i>	<i>Aplus gaillardoti</i>
<i>Cantharus d'orbigny</i>	<i>Aplus dorbignyi</i>	<i>Aplus gaillardoti</i>
<i>Pollia dorbignyi</i>	<i>Aplus dorbignyi</i>	<i>Aplus gaillardoti</i>
<b>Nassariidae</b>		
<i>Nassa reticulata</i>	<i>Tritia reticulata</i>	<i>Tritia nitida</i>
<i>Nassarius reticulatus</i>	<i>Tritia reticulata</i>	<i>Tritia nitida</i>
<i>Hinia angulate</i>	<i>Tritia angulata</i> †	<i>Tritia pygmaea</i>
<b>Mitromorphidae</b>		
<i>Mitrolumna olivoidea</i>	<i>Mitromorpha olivoidea</i>	<i>Mitromorpha columbellaria</i>
<i>Mitromorpha olivoidea</i>	<i>Mitromorpha olivoidea</i>	<i>Mitromorpha columbellaria</i>
<b>Mangeliidae</b>		
<i>Mangelia attenuata</i>	<i>Mangelia attenuata</i>	<i>Mangelia costulata</i>
<b>Raphitomidae</b>		
<i>Cordieria reticulata</i>	<i>Raphitoma echinata</i>	<i>Raphitoma cordieri</i>
<i>Raphitoma echinata</i>	<i>Raphitoma echinata</i>	<i>Raphitoma cordieri</i>
<i>Philbertia bicolor</i>	<i>Raphitoma bicolor</i>	<i>Raphitoma laviae</i>
<i>Raphitoma purpurea</i>	<i>Raphitoma purpurea</i>	<i>Raphitoma laviae</i>

Table 5. Species recorded from Lebanon but excluded and not subsequently reported in our list. Rationale for rejection: I - incorrect and/or invalid locality data; M - misreading; O - records based on species from other phyla. See full details and species authorities in Online Appendix 4.

Literature record	Accepted taxon	Status	Rejection
<b>Haliotidae</b>			
<i>Haliotis pustulata</i>	<i>Haliotis rugosa pustulata</i>	alien	I
<i>Haliotis pustulata cruenta</i>	<i>Haliotis rugosa pustulata</i>	alien	I
<b>Trochidae</b>			
<i>Gibbula spratti</i>	<i>Gibbula spratti</i>	native	I
<i>Calliostoma unidentatum</i>	<i>Jujubinus unidentatus</i>	native	I
<i>Jujubinus unidentatus</i>	<i>Jujubinus unidentatus</i>	native	I
<i>Gibbula lator</i> var. <i>albida</i>	<i>Steromphala umbilicaris</i>	native	I
<b>Turritellidae</b>			
<i>Turritella decipiens</i>	<i>Turritella decipiens</i>	native	I
<i>Vermetus lumbricalis</i>	<i>Vermicularia lumbricalis</i>	?	I
<b>Caecidae</b>			
<i>Caecum orientale</i>	<i>Caecum clarkii sensu auctores</i>	native	M
<i>Caecum clarkii</i>	<i>Caecum clarkii sensu auctores</i>	native	M
<b>Vermetidae</b>			
<i>Vermetus semisurrectus</i> (originally <i>Vermetus intestinum</i> )	<i>Thylaeodus semisurrectus</i>	native	O
<b>Cassidae</b>			
<i>Cassis saburon</i>	<i>Semicassis saburon</i>	native	M
<i>Phalium saburon</i>	<i>Semicassis saburon</i>	native	M
<b>Muricidae</b>			
<i>Aspella anceps</i>	<i>Aspella anceps</i>	cryptogenic	I
<i>Ergalatax contracta</i>	<i>Ergalatax contracta</i>	alien	I
<b>Pisaniidae</b>			
<i>Pisania scabra</i>	<i>Aplus scaber</i>	native	I
<i>Pollia scabra</i>	<i>Aplus scaber</i>	native	I
<b>Buccinidae</b>			
<i>Donavania granulata</i>	<i>Chauvetia ventrosa</i>	native	I
<b>Cancellariidae</b>			
<i>Cancellaria cancellata</i>	<i>Bivetiella cancellata</i>	native	M
<b>Raphitomidae</b>			
<i>Philbertia syriaca</i>	<i>Raphitoma syriaca</i>	native	M
<b>Aglajidae</b>			
<i>Chelidonura fulvipunctata</i>	<i>Biuve fulvipunctata</i>	alien	I
<b>Retusidae</b>			
<i>Retusa desgenettii</i>	<i>Retusa desgenettii</i>	alien	M

only 2064 specimens and 3921 shells constitute previously unpublished material. The most abundant taxon, in terms of total number of live-collected specimens, was the alien *Cerithium scabridum*, with 958 individuals. Other species abundantly represented in our samples were taxa known to aggregate in colonies, such as the natives *Dendropoma anguliferum* and *Pirenella conica* and the aliens *Elysia grandifolia* (complex) and *Ergalatax junionae*, all accounting for more than 100 specimens each. When analyzing empty shells, the native *Bittium latreillii* and the alien *Cerithium scabridum* accounted for 950 and 911 individuals, respectively. Additional species accounting for more than 100 shells were the native *Alvania mamillata* and the alien *Conomurex persicus*. The most commonly collected species (including both specimens

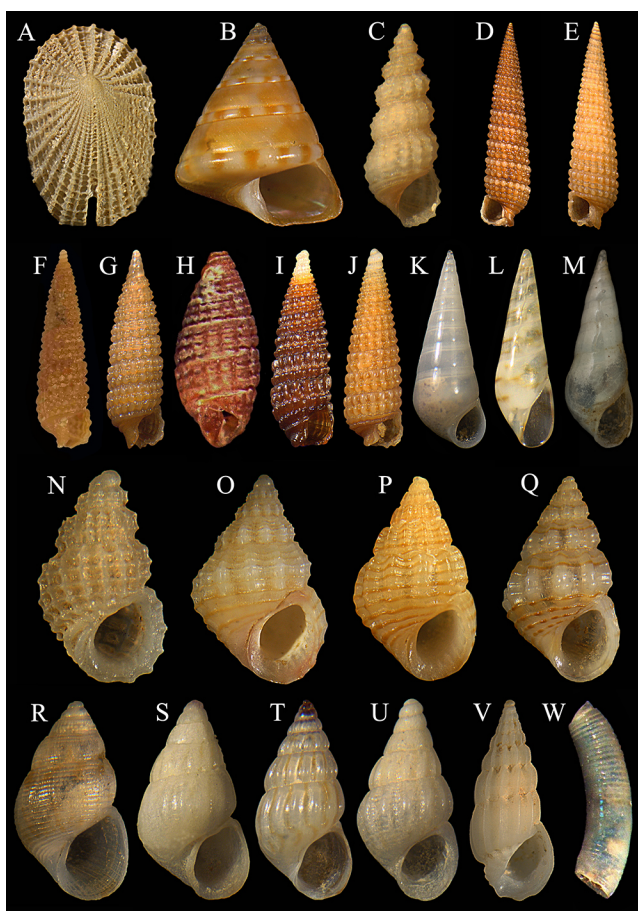


Figure 2. Marine gastropods newly recorded from Lebanon (authorities in Online Appendix 1). Specimens/shells not to scale, sizes reported as total height. A. *Emarginula huzardii* - 7.8 mm. B. *Calliostoma laugierii laugierii* - 6.65 mm. C. *Cerithidium perparvulum* - 2.65 mm. D. *Marshallora adversa* - 7.15 mm. E. *Monophorus erythrosoma* - 5.9 mm. F. *Cerithiopsis barleei* - 5.6 mm. G. *Cerithiopsis nana* - 3.05 mm. H. *Cerithiopsis tenthrenois* - 2.1 mm. I. *Dizoniopsis concatenata* - 4.1 mm. J. *Dizoniopsis coppolae* - 3.85 mm. K. *Parvioris ibizenca* - 3.9 mm. L. *Sticteulima clandestina* - 2.6 mm. M. *Sticteulima* sp. - 3.5 mm. N. *Alvania amatii* - 2.2 mm. O. *Alvania colossophilus* - 3.9 mm. P. *Alvania perversa* - 3.55 mm. Q. *Alvania* sp. - 4.15 mm. R. *Crisilla* cf. *semistriata* - 2.45 mm. S. *Pusillina munda* - 3 mm. T. *Pusillina philippi* - 2.55 mm. U. *Rissoa scurra* - 2.4 mm. V. *Rissoina bertholleti* - 5.9 mm. W. *Caecum trachea* - 2.1 mm.

and shells) were the native *Columbella rustica* and the alien *C. scabridum*, found in 17 and 16 sampling sites, respectively (Online Appendix 1).

The newly sampled material comprised 188 taxa, consisting of 151 natives, 30 aliens, and 7 cryptogenics. Only 181 taxa were identified to species level (but some belong to species complexes), whereas 7 (4 putative natives and 3 putative cryptogenics) remained at genus level (Online Appendix 1, Tables 2–3). These may represent undescribed taxa, presumably eastern Mediterranean endemics, but the lack of fresh/living and/or conspicuous material prevented us from describing them formally here. Furthermore, 46 taxa (39 of which were identified to species level) were never inventoried as part of the Lebanese fauna (Online Appendix 1, Tables

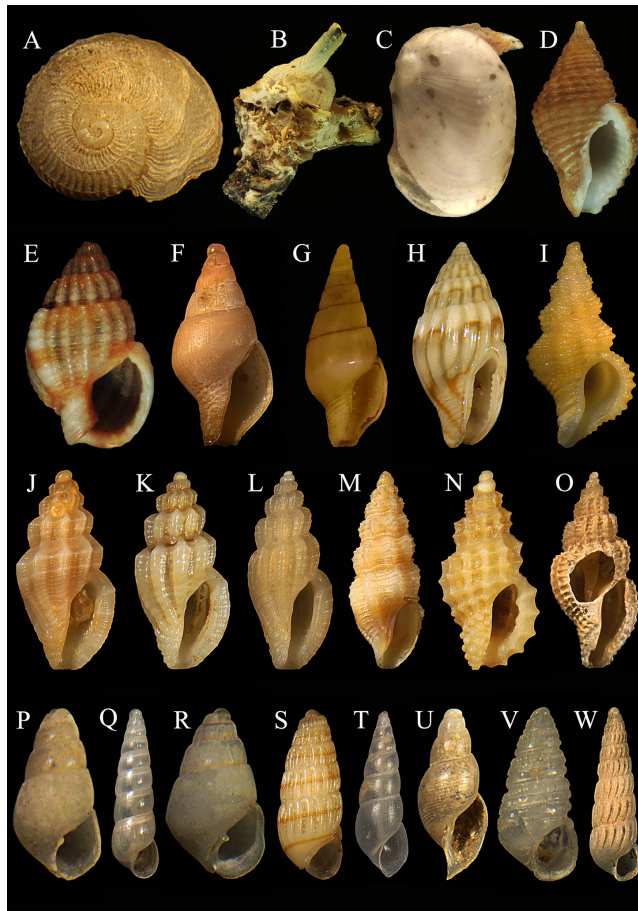


Figure 3. Marine gastropods newly recorded from Lebanon (authorities in Online Appendix 1). Specimens/shells not to scale, sizes reported as total height. A. *Tornus mienisi* - 2.3 mm. B. *Thylaeodus rugulosus* - 11 mm. C. *Lamellaria perspicua* - 5.35 mm. D. *Pollia rubens* - 19.9 mm. E. *Tritia pygmaea* - 6.9 mm. F. *Mitrella coccinea* - 5.8 mm. G. *Mitrella minor* - 7.1 mm. H. *Zafra selasphora* - 3.85 mm. I. *Fusinus* sp. - 8.5 mm. J. *Mangelia callosa* - 4.35 mm. K. *Mangelia angelinae* - 3.85 mm. L. *Mangelia* sp. - 5.65 mm. M. *Sorgenfreispira brachystoma* - 6 mm. N. *Clathromangelia loiselieri* - 4 mm. O. *Raphitoma farolita* - 6.95 mm. P. *Brachystomia* sp. - 1.7 mm. Q. *Eulimella acicula* - 2.8 mm. R. *Megastomia* sp. - 1.8 mm. S. *Odostomella bicincta* - 2.65 mm. T. *Ondina vitrea* - 5.4 mm. U. *Ondina* sp. - 2.25. V. *Oscilla jocosa* - 2.15 mm. W. *Turbonilla pusilla* - 3.6 mm.

2–3, Figs. 2–3), among which the majority were native species (36, 32 of which were identified to species level). Among them, *Alvania amatii*, *Alvania* sp., and *Tritia pygmaea* had presumably already been found, but were misidentified (Online Appendices 1–2). Among the new records, *Mitrella coccinea* was never recorded from the entire easternmost Mediterranean Sea, while *Mangelia angelinae* was already known from the northern coast of Cyprus only. However, absence of records from other countries may be due to the fact that it was only recently reinstated as a valid species (Amati et al. 2017). Besides few easy-to-identify taxa (e.g., *Emarginula huzardii*, *Calliostoma laugierii laugierii*, *Tritia pygmaea*), the majority of the new records belong to the families Rissoidae (7 taxa), Pyramidellidae (5 taxa), and

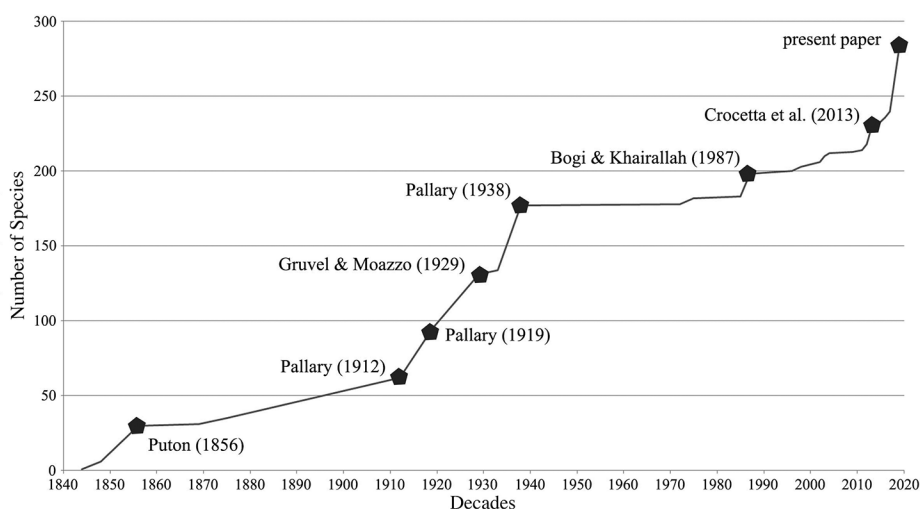


Figure 4. Cumulative increase with time of the number of marine gastropods known from Lebanon, with main contributing articles highlighted. References in Online Appendices 1–5.

Cerithiopsidae and Mangeliidae (4 taxa each), whose correct identification often requires specialist knowledge. Only six alien species were found in our samples and previously unrecorded from Lebanon, followed by four cryptogenics. Among the aliens, *Polliia rubens* had not yet been recorded as newcomer from the Indo-Pacific region (Online Appendix 1).

**THE LEBANESE GASTROPOD BIOTA.**—When analyzing the pattern of species recorded from Lebanon from 1844 to 2019 (based on publishing dates), a strong chronological inhomogeneity was noted, with contributions that significantly concentrate in three main periods only: (1) 1840–1880, with explorations mostly held by Puton, de Folin, and Périer; (2) 1910–1940, mostly by Gruvel, Moazzo, and Pallary; and (3) 1980–present, with a strong impulse by the CEDRE project (1999–2003) (full references in Online Appendices). On the contrary, comparatively few or no taxonomic studies at all were carried out locally in 1880–1910 and 1950–1980 (Fig. 4). Those three periods (1–3) yielded 35, 142, and 101 taxa, respectively (full references in Online Appendix 1), all together accounting for approximately 98% of the total number of gastropod taxa known from Lebanon. The checklist of 283 gastropod taxa recorded in Lebanon, updated in 2019 and including bibliographic records and original data from field sampling, is given in Table 2 (235 native species, of which 231 identified to species level: approximately 83%) and Table 3 (41 alien, approximately 14.5%; and 7 cryptogenic, of which 3 identified to species level, approximately 2.5%). The majority of the 231 native species have an Atlantic-Mediterranean native distribution (165, approximately 71.5%). They are followed by Mediterranean endemics (58, 25%), of which approximately 20 have ranges restricted to the eastern Mediterranean Sea (e.g., taxa of the rissoid genus *Alvania*, namely *Alvania amatii*, *Alvania colossophilus*, *Alvania datchaensis*, *Alvania dictyophora*, *Alvania perversa*). The remaining eight taxa comprise four species (approximately 1.7%) with a distribution ranging from the Atlantic Ocean to the Indo-Pacific

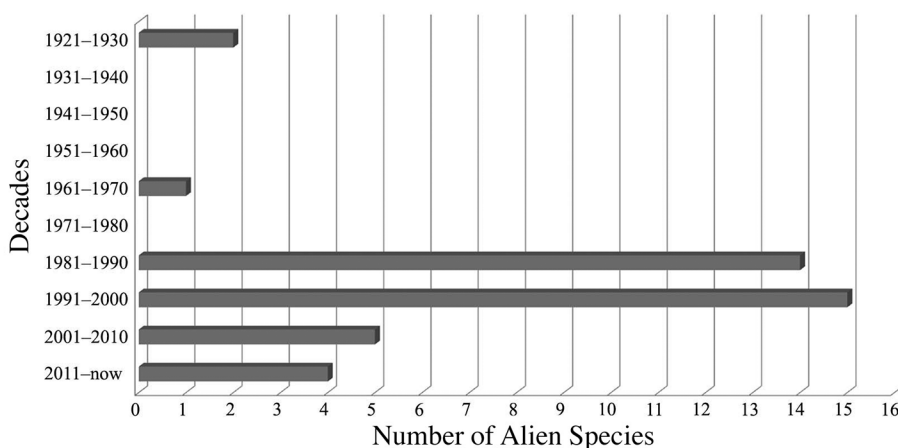


Figure 5. Rate of sighting/ collection of marine alien gastropods from Lebanon as number of species per 10-yr periods.

region (*Gyroscalea lamellosa*, *Tonna galea*, *Charonia lampas*, and *Umbraculum umbraculum*), three pelagic species (approximately 1.3%) with a cosmopolitan distribution (*Janthina janthina*, *Janthina globosa*, and specimens belonging to the *Clio pyramidata* complex), and a single species (approximately 0.5%) occurring in the Mediterranean Sea and the Indo-Pacific region (*Pirenella conica*). Finally, seven gastropod taxa reported from Lebanon are protected under the Bern and Barcelona conventions, namely the *Dendropoma petraeum* complex (here *Dendropoma anguliferum*), *Luria lurida*, *Naria spurca*, *Zonaria pyrum*, *Tonna galea*, *Charonia lampas*, and *Charonia variegata*. Nearly all 41 alien species are widespread in the Indo-Pacific realm, often including the Red Sea. The sole exception is the circumtropical sea slug *Syphonota geographica*, which occurs also in the Atlantic Ocean. This situation is also largely reflected in the analysis of the most probable pathways of arrival in Lebanon, suggesting that unaided spread accounts for approximately 95% of the Lebanese introductions, followed by approximately 5% of transport-stowaway. The majority of these alien species were already known from other Mediterranean countries, especially from Israel. The exceptions are *Indothais sacellum*, *Polia rubens*, *Pyrunculus fourierii*, and *Goniobranchus annulatus*, four species first formally found in Lebanon as Mediterranean invaders, and *Amathina tricarinata* and *Acteocina mucronata*, sampled roughly at the same time along the coast of several countries, including Lebanon. Of the 41 alien gastropod taxa inventoried here, 21 species were considered as established in Lebanon, while 20 were considered as casual. The rate (per 10-yr intervals) at which alien marine gastropods were found in Lebanon (based on precise recording dates) is shown in Figure 5. Except for three taxa, they were collected during the last of the three above defined periods (1980–present).

Our critical reappraisal of literature records revealed that 167 taxa were reported before 1950 and 234 after 1950. Only two alien species, *Cerithium scabridum* and *Murex forskoehlili forskoehlili*, were first recorded by early authors, whereas all other alien and cryptogenic species reported so far from Lebanon were first recorded by modern authors. A high number of taxa (118) are present in the literature of both periods; among the species recorded before 1950, 49 were not found in subsequent



reports, and among those reported after 1950, 116 had not been recorded earlier. Among the species absent from the recent samples, some fall into one of the following categories: species generally rare or more commonly found in waters deeper than the maximum depth of 50 m sampled in “modern” times (e.g., *Cerithium alucastrum*, *Galeodea rugosa*, *Monoplex corrugatus*); pelagic taxa, presumably washed ashore and collected amid beached material, a sampling methodology that was not used here (e.g., *Janthina janthina*, *Janthina globosa*, *Clio pyramidata* complex); records of minute species that may have been based on misidentifications (e.g., *Eulima glabra*, *Alvania hispidula*, *Mangelia paciniana*, *Raphitoma cordieri*, *Pyrgiscus rufus*). However, some widespread, conspicuous, and/or unmistakable taxa are strangely not represented in recent literature and in our samples, e.g., the two common macrogastropods *Bolinus brandaris* and *Aptyxis syracusana*, and the two microgastropods *Smaragdia viridis* and the Mediterranean endemic *Rissoa variabilis*.

## DISCUSSION

The most recent checklist of marine Mollusca in Lebanon in 1998 reported a total of 298 species, 196 of which were gastropods (Bitar and Kouli-Bitar 1998), just 1 yr before the start of the CEDRE program. Although our critical revision of the past literature, including the 1998 checklist, resulted in the deletions of several species reported for Lebanon, the present study raises the known number of gastropods to 283 taxa. This brings into question the extremely low diversity that is commonly assumed for the central/northeastern tip of the Mediterranean Sea (see Morri et al. 2009, Crocetta et al. 2013a). Notwithstanding recent efforts, the figures reported here almost certainly underestimate true gastropod richness of this region. In fact, the total number of gastropods documented from Lebanon is not only a very small fraction (18%) of the approximately 1550 taxa listed in the most recent reviews of the Mediterranean molluscan biota (Coll et al. 2010, Sabelli and Taviani 2014), but is also quite distant from the few reliable figures available from other eastern Mediterranean countries, i.e., 483 gastropod species in Cyprus (Öztürk et al. 2004), 783 in Greece (Delamotte and Vardala-Theodorou 2007), 476 in Israel (Barash and Danin 1992), and a very recent checklist of 706 taxa in Turkey (Öztürk et al. 2014). If for Greece and Turkey the considerably higher figures can be ascribed to the larger geographic extension of those countries, each encompassing more biogeographical units, the gastropod diversity reported from Cyprus and Israel is about 1.7 times higher than that of Lebanon. With limited exceptions (such as the CEDRE program), poor sampling effort is probably the reason for this gap. Considering that the core of molluscan diversity is largely composed of poorly-known and inconspicuous species, limited fieldwork, along with the taxonomic impediments, are the most likely reasons why so many new records are presented in this study.

The 283 gastropod taxa listed here comprise 235 native, 41 alien, and 7 cryptogenic species. Analysis of the alien species revealed that most species, except two, were late arrivals (1980–present) to Lebanese waters and revealed that all recorded aliens are of Indo-Pacific origin, the majority of them having presumably arrived through unaided spread from the nearby Israeli coast—also considering the proximity to the Suez Canal and the absence of shellfish farming. These findings agree with the majority of previous studies carried out in the Mediterranean Sea, showing a major increase of alien invasion over the last few decades along with a clear east–west

pattern, with the easternmost Mediterranean Sea hosting the vast majority of species arriving via the Suez Canal and the westernmost areas typically receiving species introduced via other pathways (aquaculture, shipping, etc.) (e.g., Galil et al. 2018). Such a high proportion of alien and cryptogenic species (approximately 17%) supports the notion that the Mediterranean Sea is one of the most invaded marine ecosystems of the world, hosting nearly 1000 alien taxa, of which approximately 200 are mollusks (Zenetos et al. 2017, Galil et al. 2018). This has prompted some authors to propose a separate and man-made biogeographic province for the Levant Sea (e.g., Por 1981, Goren et al. 2010).

The invasion of alien species, coupled with the recent increase of Mediterranean water temperatures, has already caused substantial reshufflings of local communities, mostly through species replacement. Although this phenomenon has already been well documented in commercial taxonomic groups such as fishes (e.g., Goren and Galil 2005, Edelist et al. 2013, Arndt et al. 2018), reports on nonharvested marine organisms remained rare until very recently. Concerning mollusks, most authors discussed the decline or disappearance of habitat-forming native bivalve species in favor of their alien counterparts (Mienis 2003, Crocetta et al. 2013a, Safrieli 2013, Rilov 2016). Few observations focused on gastropods, only reporting partial outcompetition of the natives *Cerithium lividulum*, *Cerithium vulgatum*, and *Patella caerulea* by the aliens *Cerithium scabridum*, *Rhinoclavis kochi*, and *Cellana rota*, respectively (Mienis 2002, 2003, Safrieli 2013), and a marked decline of the native and endangered *Dendropoma anguliferum* (Galil 2013, Rilov 2016, Badreddine et al. 2019). Recently, Rilov (2016) highlighted dramatic changes in the entire biota along the Israeli coast during the 2009–2015 period, including population collapses of several formerly abundant species. These include 38 mollusk species, notably the large-sized muricid *Stramonita haemastoma*. Comparing results from different studies and periods is always a challenging task, and differences in sampling methods and localities between early and modern authors may have also played a role in the differences observed in Lebanon and in other Mediterranean countries. However, if on the one hand we have found in Lebanon some of the species missing in Rilov's (2016) samples, although in low numbers and at least approximately 20 yrs ago, the absence of specimens of the *C. vulgatum* complex both in Israel and Lebanon is remarkable. The same holds for two other previously common gastropods, *Diodora graeca* and *Diodora italica*, and for several topshells (Trochidae). We may also add to the species listed by Rilov (2016) *Bolinus brandaris* and *Aptyxis syracusana*, not found in Lebanon after 1950 and possibly out-competed by the two similar alien taxa, *Murex forskoehlīi forskoehlīi* and *Fusinus verrucosus*, now widespread in Lebanon. Finally, Rilov (2016) essentially investigated large-sized organisms, whereas the present study also surveyed microgastropods. Among them, *Smaragdia viridis* and *Rissoa variabilis* are common and are both grazers associated with marine algae and/or seagrasses in the infralittoral zone (Steneck and Watling 1982, Rueda et al. 2009). Despite their relatively small size, the peculiar morphology and color pattern make them unmistakable, thus excluding that records of these taxa before 1950 were based on misidentifications. Nevertheless, they were not found again by other investigators, nor by us despite the large amount of suitable material analyzed here. Their local decline, if not complete disappearance, confirms the general issues highlighted by Rilov (2016) and may suggest an alarming loss, such as that experienced by native infralittoral algae and plants (e.g., Sala et al. 2011, Vergés et al. 2014).

Limited data on the biodiversity and community structure of particular habitats and geographic zones hamper conservation actions and legal protection of critical species and habitats. Adequate knowledge of species diversity, including information on local distributions and population dynamics, is a prerequisite for establishing priorities and effective conservation strategies, and for understanding and monitoring the effects of alien invasions and climate changes. Additional field and laboratory research is therefore still necessary to increase our knowledge on both taxonomic composition and species distributions in Lebanon and elsewhere in the easternmost Mediterranean Sea. Efforts should focus on very small fauna, poorly sampled (e.g., coralligenous, soft substrates) and deep-water habitats, and on both long and short temporal processes occurring locally. This suggests that, despite the modern advances of marine biology-related disciplines, the descriptive stage is still far from complete, even in “popular” groups such as mollusks and in widely studied biogeographic areas such as the Mediterranean basin.

#### ACKNOWLEDGMENTS

B Amati (Italy), G Bonomolo (Italy), MJ deMaintenon (Hawaii), R Giannuzzi-Savelli (Italy), S Gofas (Spain), R Houart (Belgium), I Nofroni (Italy), J Prkić (Croatia), F Pusateri (Italy), E Quaggiotto (Italy), L Romani (Italy), P Russo (Italy), G Spada (Italy), L Tringali (Italy), A Warén (Sweden), and A Zenetos (Greece) discussed problematic specimens or excluded records. H Dekker (The Netherlands), G Rosenberg (Pennsylvania), and K Fraussen (France) discussed *Polia rubens*. P La Valle (Italy) offered the specimen of *Nassarius turulosus*. R Araujo (Spain) provided photos of *Lamellaria perspicua*. P Fiorentino (Italy) offered bibliographic help. A O’Dea (U.S.A.), PG Albano (Austria), M Zuschin (Austria), and two additional anonymous reviewers improved the quality of this paper with their comments. We are grateful to all of them. Research was partially supported by the “Programme CEDRE – cooperation franco libanaise (1999–2002) (R 2000 Eb F 42/L43)” (GB and HZ) and the “Drosos Foundation” (GB and FC).

#### LITERATURE CITED

- Amati B, Appolloni M, Oliverio M. 2017. *Cythara thapsiae* Oberling, 1970 senior synonym of *Mangiliella fieldeni* van Aartsen & Fehr-de Wal, 1978 (Gastropoda, Conoidea, Mangeliidae). *Iberus*. 35(2):107–114.
- Arndt E, Givan O, Edelist D, Sonin O, Belmaker J. 2018. Shifts in Eastern Mediterranean fish communities: abundance changes, trait overlap, and possible competition between native and non-native species. *Fishes*. 3:19. <https://doi.org/10.3390/fishes3020019>
- Arvanitidis C, Bellan G, Drakopoulos P, Valavanis V, Dounas C, Koukouras A, Eleftheriou A. 2002. Seascape biodiversity patterns along the Mediterranean and the Black Sea: lessons from the biogeography of benthic polychaetes. *Mar Ecol Prog Ser*. 244:139–152. <https://doi.org/10.3354/meps244139>
- Azov Y. 1991. Eastern Mediterranean—a marine desert? *Mar Pollut Bull*. 23:225–232. [https://doi.org/10.1016/0025-326X\(91\)90679-M](https://doi.org/10.1016/0025-326X(91)90679-M)
- Badreddine A, Abboud-Abi Saab M, Gianni F, Ballesteros E, Mangialajo L. 2018. First assessment of the ecological status in the Levant Basin: application of the CARLIT index along the Lebanese coastline. *Ecol Indic*. 85:37–47. <https://doi.org/10.1016/j.ecolind.2017.10.006>
- Badreddine A, Milazzo M, Abboud-Abi Saab M, Bitar G, Mangialajo L. 2019. Threatened biogenic formations of the Mediterranean: current status and assessment of the vermetid reefs along the Lebanese coastline (Levant basin). *Ocean Coast Manage*. 169:137–146. <https://doi.org/10.1016/j.ocecoaman.2018.12.019>

- Barash A, Danin Z. 1992. Fauna Palaestina. Mollusca I. Annotated list of Mediterranean molluscs of Israel and Sinai. Jerusalem: The Israel Academy of Sciences and Humanities.
- Bariche M. 2010. Marine reserve network for the Lebanese waters. Beirut: Greenpeace Mediterranean.
- Bianchi CN. 2007. Biodiversity issues for the forthcoming tropical Mediterranean Sea. *Hydrobiologia*. 580:7–21. <https://doi.org/10.1007/s10750-006-0469-5>
- Bitar G. 1996. Le macrozoobenthos. *In*: Minist Agr Liban, editor. Etude de la biodiversité biologique du Liban. Publ. Faune et flore marines et côtières, PNUE, Projet GF/6105-92-72. p. 41–48, 113–126.
- Bitar G, Kouli-Bitar S. 1998. Inventaire des mollusques marins benthiques du Liban et remarques biogéographiques sur quelques espèces nouvellement signalées. *Mesogée*. 56:37–44.
- Bitar G, Ramos-Esplá AA, Ocaña O, Sghaier YR, Forcada A, Valle C, El Shaer H, Verlaque M. 2017. The introduced marine macroflora of Lebanon and its distribution on the Levantine coast. *Med Mar Sci*. 18(1):138–155. <https://doi.org/10.12681/mms.1993>
- Bouillon J, Medel MD, Pagès F, Gili J-M, Boero F, Gravili C. 2004. Fauna of the Mediterranean Hydrozoa. *Sci Mar*. 68 suppl. 2:5–438. <https://doi.org/10.3989/scimar.2004.68s25>
- Coll M, Piroddi C, Steenbeek J, Kaschner K, Lasram FBR, Aguzzi J, Ballesteros E, Bianchi CN, Corbera J, Dailianis T, et al. 2010. The biodiversity of the Mediterranean Sea: estimates, patterns, and threats. *PLoS One*. 5(8):e11842. <https://doi.org/10.1371/journal.pone.0011842>
- Convention on Biological Diversity. 2014. Pathways of Introduction of Invasive Species, Their Prioritization, and Management. Available from: [www.cbd.int/doc/meetings/sbstta/sbstta-18/official/sbstta-18-09-add1-en.pdf](http://www.cbd.int/doc/meetings/sbstta/sbstta-18/official/sbstta-18-09-add1-en.pdf)
- Crocetta F, Bitar G, Zibrowius H, Oliverio M. 2013a. Biogeographical homogeneity in the eastern Mediterranean Sea. II. Temporal variation in Lebanese bivalve biota. *Aquat Biol*. 19:75–84. <https://doi.org/10.3354/ab00521>
- Crocetta F, Bitar G, Zibrowius H, Capua D, Dell'Angelo B, Oliverio M. 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.
- Crocetta F, Zibrowius H, Bitar G, Templado J, Oliverio M. 2013b. Biogeographical homogeneity in the eastern Mediterranean Sea - I: The opisthobranchs (Mollusca: Gastropoda) from Lebanon. *Med Mar Sci*. 14(2):403–408. <https://doi.org/10.12681/mms.404>
- Delamotte M, Vardala-Theodorou E. 2007. Shells from the Greek seas. Kifisia: Goulandris Museum of Natural History.
- Edelist D, Rilov G, Golani D, Carlton JT, Spanier E. 2013. Restructuring the sea: profound shifts in the world's most invaded marine ecosystem. *Div Dist*. 19(1):69–77. <https://doi.org/10.1111/ddi.12002>
- Fredj G, Bellan-Santini D, Meinardi M. 1992. Etat des coinnassances sur la faune marine méditerranéenne. *Bull Inst Oceanogr*. 9:133–145.
- Galil BS. 2013. Going going gone: the loss of a reef building gastropod (Mollusca: Caenogastropoda: Vermetidae) in the southeast Mediterranean Sea. *Zool Middle East*. 59(2):179–182. <https://doi.org/10.1080/09397140.2013.810885>
- Galil BS, Marchini A, Occhipinti-Ambrogi A. 2018. East is east and West is west? Management of marine bioinvasions in the Mediterranean Sea. *Estuar Coast Shelf Sci*. 201:7–16. <https://doi.org/10.1016/j.ecss.2015.12.021>
- Goren M, Galil BS. 2005. A review of changes in the fish assemblages of Levantine inland and marine ecosystems following the introduction of non-native fishes. *J Appl Ichthyology*. 21(4):364–370. <https://doi.org/10.1111/j.1439-0426.2005.00674.x>
- Goren M, Yokes MB, Galil BS, Diamant A, Stern N. 2010. The Indo-Mediterranean; the emerging of a manmade biogeographical province. *Rapp Comm int Mer Médit*. 39:535.
- Gruvel A, Moazzo G. 1929. Première liste de mollusques récoltés par MM. A. Gruvel et G. Moazzo sur les côtes de Syrie. *Bull Mus Natl Hist Nat*. 1:419–429.

- Harmelin-Vivien ML, Ghazi B, Harmelin J-G, Monestiez P. 2005. The littoral fish community of the Lebanese rocky coast (eastern Mediterranean Sea) with emphasis on Red Sea immigrants. *Biol Invasions*. 7(4):625–637. <https://doi.org/10.1007/s10530-004-5852-4>
- International Commission on Zoological Nomenclature. 2012. International code of zoological nomenclature, Fourth edn. London: International Trust for Zoological Nomenclature. Available from: <http://www.iczn.org/>
- Mienis HK. 2002. Is the Lessepsian migrant *Cellana rota* replacing native limpets along the Mediterranean coast of Israel? *Conch Newsletter*. 163:275–276.
- Mienis HK. 2003. Native marine molluscs replaced by Lessepsian migrants. *Tentacle*. 11:15–16.
- Moazzo GP. 1931. Contributo alla fauna malacologica marina delle coste libano siriane. *In*: Gruvel A, editor. *Les Etats de Syrie. Richesses marines et fluviales, exportation actuelle*. Paris: Avenir. Société d'Édition Géographiques, Maritimes et Coloniales. p. 437–453.
- Morri C, Puce S, Bianchi CN, Bitar G, Zibrowius H, Bavestrello G. 2009. Hydroids (Cnidaria: Hydrozoa) from the Levant Sea (mainly Lebanon), with emphasis on alien species. *J Mar Biol Assoc UK*. 89(1):49–62. <https://doi.org/10.1017/S0025315408002749>
- Oliverio M, Taviani M. 2003. The Eastern Mediterranean Sea: tropical invasions and niche opportunities in a “Godot Basin”. *Biogeographia*. 24:313–318. <https://doi.org/10.21426/B6110004>
- Öztürk B, Buzzurro G, Benli HA. 2004. Marine molluscs from Cyprus: new data and checklist. *Boll Malacol*. 39(5–8):49–78.
- Öztürk B, Dogan A, Bitlis-Bakir B, Salman A. 2014. Marine molluscs of the Turkish coasts: an updated checklist. *Turk J Zool*. 38:832–879. <https://doi.org/10.3906/zoo-1405-78>
- Pallary P. 1919. Énumération des mollusques marins des côtes de la Syrie. *Bull Soc Hist Nat Afr N*. 10:166–172.
- Pallary P. 1938. Les mollusques marins de la Syrie. *J Conchyliol*. 82:5–57.
- Philippi RA. 1844. *Fauna molluscorum viventium et in tellure tertiaria fossilium Regni utriusque Siciliae*. Halle: Halis Saxonum, Sumptibus Eduardi Anton.
- Por FD. 1981. The Lessepsian biogeographic province of the Eastern Mediterranean. *In*: Rampal J, editor. *Journées d'études sur la systématique évolutive et la biogéographie en Méditerranée*. Monaco: Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée. p. 81–83.
- Rilov G. 2016. Multi-species collapses at the warm edge of a warming sea. *Sci Rep*. 6:36897. <https://doi.org/10.1038/srep36897>
- Rueda JL, Salas C, Urrea J, Marina P. 2009. Herbivory on *Zostera marina* by the gastropod *Smaragdia viridis*. *Aquat Bot*. 90:253–260. <https://doi.org/10.1016/j.aquabot.2008.10.003>
- Sabelli B, Taviani M. 2014. The making of the Mediterranean molluscan biodiversity. *In*: Goffredo S, Dubinsky Z, editors. *The Mediterranean Sea: its history and present challenges*. Dordrecht: Springer. p. 285–306.
- Safriel UN. 2013. The “Lessepsian invasion” – a case study revisited. *Isr J Ecol Evol*. 59(4):214–238. <https://doi.org/10.1080/15659801.2013.930994>
- Sala E, Kizilkaya Z, Yildirim D, Ballesteros E. 2011. Alien marine fishes deplete algal biomass in the eastern Mediterranean. *PLoS One*. 6(2):e17356. <https://doi.org/10.1371/journal.pone.0017356>
- Steneck RS, Watling L. 1982. Feeding capabilities and limitation of herbivorous molluscs: a functional group approach. *Mar Biol*. 68(3):299–319. <https://doi.org/10.1007/BF00409596>
- Vergés A, Tomas F, Cebrian E, Ballesteros E, Kizilkaya Z, Dendrinis P, Karamanlidis AA, Spiegel D, Sala E. 2014. Tropical rabbitfish and the deforestation of a warming temperate sea. *J Ecol*. 102(6):1518–1527. <https://doi.org/10.1111/1365-2745.12324>
- Voultsiadou E. 2009. Reevaluating sponge diversity and distribution in the Mediterranean Sea. *Hydrobiologia*. 628:1–12. <https://doi.org/10.1007/s10750-009-9725-9>
- WoRMS Editorial Board. 2019. World Register of Marine Species. Available from: <http://www.marinespecies.org>

- Zenetos A, Çinar ME, Crocetta F, Golani D, Rosso A, Servello G, Shenkar N, Turon X, Verlaque M. 2017. Uncertainties and validation of alien species catalogues: the Mediterranean as an example. *Estuar Coast Shelf Sci.* 191:171–187. <https://doi.org/10.1016/j.ecss.2017.03.031>
- Zibrowius H, Bitar G. 2003. Invertébrés marins exotiques sur la côte du Liban. *Leban Sci J.* 4:67–74.



Appendix 1. Marine gastropods from Lebanon (Eastern Mediterranean Sea) according to literature (for some species multiple records may be based on the same sample) and original material: confirmed species and updated check list (misidentifications listed here under the correct taxon, in the “Literature records” section, and followed by “*sensu*”). Families are listed in systematic order, whereas genera and species are listed in alphabetical order. Updated systematics, species taxonomy, and nomenclature follow the World Register of Marine Species (WoRMS) with a few exceptions (taxa listed as a still unsolved complex, or groups where current knowledge does not allow correct identification by morphology alone; new synonymies). Species newly reported from Lebanon are marked with an asterisk [\*], those newly reported from the Mediterranean Sea are marked with a cross [+]. For literature records, the use (or not) of parentheses for taxon authorships has been reported as originally employed in each literature record. The original style (caps vs small, italics vs roman) has been corrected if wrong, whilst the original spelling has been maintained and, when wrong (by typesetting, incorrect spelling, declension errors, or when using unjustified emendations or invalid authorities), it is followed by “[sic!]” and its explanation. Numbers in parentheses before localities in the “Material examined” section refer to Table 1 and Figure 1. Abbreviations: **A** - alien species (Convention on Biological Diversity definition: CBD, 2014); **C** - cryptogenic species (a species that cannot be included with confidence among either native or introduced ones: see Carlton, 1996); sh - empty shell(s); lv - live specimen(s); AZ - Argyro Zenetos, private collection (Greece); BBCD - Department of Biology and Biotechnologies “Charles Darwin”, “Sapienza” University of Rome (Italy); HUI - Hebrew University of Jerusalem (Israel); LACM - Natural History Museum of Los Angeles County (California); MNCN - Museo Nacional de Ciencias Naturales, Madrid (Spain); MNHN - Muséum National d’Histoire Naturelle, Paris (France).

## Family PATELLIDAE Rafinesque, 1815

### *Patella caerulea* Linnaeus, 1758

#### Literature records:

*Patella caerulea* [sic! for *caerulea* (see Linnaeus, 1758: 782)] Lamk. [sic!] Lin. - Puton, 1856: 223; *Patella caerulea* Linné - Pallary, 1912b: 173; *Patella tarentina* Lamarck - Pallary, 1912b: 173; Pallary, 1919: 172; Bitar, 1996: 117; *Patella caerulea* Linné - Pallary, 1919: 172; Pallary, 1938: 46; *Patella caerulea* Linné var. *stellata* B.D.D. - Pallary, 1919: 172; *Patella caerulea* [sic!] Linné - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 449; *Patella coerulea* [sic!] L. - Gruvel, 1931: 124; *Patella caerulea* Linné var. *stellata* B.D.D. 1882 - Pallary, 1938: 46; *Patella* (*Patellastra*) *subplana* Potiez et Michaud 1838 = *tarentina* Lamarck 1819 (non von Salis) - Pallary, 1938: 47; *Patella caerulea* [sic!] (B.D.D.) [sic!] - Fadlallah, 1975: 68; *Patella coerulea* [sic!] Linnaeus - Shiber & Shatila, 1978: 125; Shiber, 1980: 147; *Patella caerulea* L. - Bitar, 1996: 117; *Patella caerulea* Linné, 1758 - Bitar & Kouli-Bitar, 1998: 38; *Patella caerulea* - Ramos-Esplá et al., 2015: 82-83;

Ramos-Esplá et al., 2017: 106; *Patella caerulea* Linnaeus, 1758 - Ramos-Esplá et al., 2015: 158, 168, 182, 191, 211; Ramos-Esplá et al., 2017: 94.

**Material examined:**

(3) Tripoli: 19/09/2002 - harbour, upper intertidal: 3 lv (BBCD); (9) Selaata: 23/10/1999 - cave, tunnel roof, 7–8 m: 3 lv (BBCD); 23/10/1999 - on a *Dendropoma anguliferum* (Monterosato, 1878) platform: 3 lv (BBCD); (11) Batroun: 15/07/2003 - edge of a *Dendropoma anguliferum* (Monterosato, 1878) platform: 3 lv (BBCD); (14) Jbail: 17/10/1999 - entrance of the port, intertidal–1 m: 5 lv (BBCD); (15) El Bouar: 15/10/1992: 1 lv (BBCD); (18) Beirut: 15/09/2002 - harbour jetty, lower side: 1 lv (BBCD); 09/07/2003 - harbour, outer side of the main jetty, 5–9 m: 4 lv (BBCD); (23) Saida: 14/09/1993 - Saida Island: 2 sh (BBCD).

**Remarks:**

Published records ascribed to *Patella tarentina* Lamarck, 1819 (not *Patella tarentina* von Salis, 1793) belong to *Patella caerulea* Linnaeus, 1758. The taxonomy of Eastern Atlantic/Mediterranean Patellidae has been widely discussed in the literature (Muñoz & Acuña, 1994; Cabral, 2003; Mauro et al. 2003; Petraccioli et al., 2010), often resulting in the statement that taxonomic attribution of *Patella* specimens based on morphological characters is not completely reliable. Therefore, given the impossibility to barcode our specimens due to their previous formaldehyde fixation, our identifications may be erroneous.

*Patella rustica* Linnaeus, 1758 complex

**Literature records:**

*Patella lusitanica* Gmelin - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; Bitar, 1996: 117; *Patella lusitanica* Gm. - Gruvel, 1931: 124; *Patella lusitanica orientalis* Piry - Pallary, 1933: 152; *Patella (Patellastra) lusitanica* Gmelin var. *orientalis* Piry - Pallary, 1938: 47; *Patella lusitanica orientalis* - Pallary, 1938: plate I (figs. 23–24); *Patella rustica* Linné, 1758 - Bitar & Kouli-Bitar, 1998: 38; *Patella rustica* - Ramos-Esplá et al., 2015: 81 (figure 78); Ramos-Esplá et al., 2017: 106; *Patella rustica* Linnaeus, 1758 - Ramos-Esplá et al., 2015: 158, 168, 182, 191; Ramos-Esplá et al., 2017: 94; *Patella rustica* (Linnaeus, 1758) - Badreddine et al., 2019: 140.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - 1–5 m: 1 sh (BBCD).

**Remarks:**

Molecular data showed that specimens previously ascribed to *Patella rustica* Linnaeus, 1758 comprise a complex of cryptic species (see Sá-Pinto et al., 2010), thus we keep literature records and new unpublished material examined as “*Patella rustica* Linnaeus, 1758 complex”.

See above under *Patella caerulea* Linnaeus, 1758 for remarks on the taxonomic attribution based on morphological characters of Eastern Atlantic/Mediterranean Patellidae.

*Patella ulyssiponensis* Gmelin, 1791



**Literature records:**

*Patella aspera* Philippi [sic! for Röding (see Röding, 1798: 10)] - Pallary, 1912b: 173; Pallary, 1919: 172; Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 449; Bitar, 1996: 117; *Patella depressa* Pennant - *sensu* Gruvel & Moazzo, 1929: 425; *sensu* Moazzo, 1931: 449; *sensu* Bitar, 1996: 117; *Patella (Patellastra) aspera* Philippi [sic!] - Pallary, 1938: 47; *Patella (Patellastra) aspera* Philippi [sic!] var. *tarentina* von Salis 1793 - Pallary, 1938: 47; *Patella aspera* (Sal. [sic!]) - Fadlallah, 1975: 68; *Patella ulyssiponensis* Gmelin, 1791 - Bitar & Kouli-Bitar, 1998: 38, 42; Ramos-Esplá et al., 2015: 158, 168, 182, 191; Ramos-Esplá et al., 2017: 94; *Patella ulyssiponensis* - Ramos-Esplá et al., 2015: 82; Ramos-Esplá et al., 2017: 54 (Figure 6.4), 106; *Patella ulyssiponensis* (Gmelin, 1791) - Badreddine et al., 2019: 140.

**Material examined:**

(18) Beirut: 15/09/2002 - harbour jetty, lower side: 5 lv (BBCD); 16/07/2003 - airport, pillar jetty, surface: 3 lv (BBCD).

**Remarks:**

Published records ascribed to *Patella aspera* Philippi [sic! for Röding] and *Patella aspera* von Salis [sic! for Röding] belong to *Patella ulyssiponensis* Gmelin, 1791. Gruvel & Moazzo (1929: 425) and Moazzo (1931: 449) reported *Patella depressa* Pennant, 1777 as “common” along the entire Syrian shores. Accordingly, Bitar (1996: 117) listed it from Lebanon. However, this taxon has a prevalently Eastern Atlantic distribution, and only occurs in the Mediterranean Sea in the neighbourhoods of the Gibraltar Strait up to the Malaga area (Templado, 2012a). *Patella caerulea* Linnaeus, 1758, *P. ulyssiponensis* and the *Patella rustica* Linnaeus, 1758 complex are common and widespread in the Mediterranean Sea. Both Gruvel & Moazzo (1929: 425) and Moazzo (1931: 449) declared as common *P. caerulea* and *P. rustica*, whilst listed *P. ulyssiponensis* (as *Patella aspera* Philippi [sic!]) as recorded by Pallary only. Therefore, it seems evident that their Lebanese records of *P. depressa* represented in fact a misidentification and belonged to *Patella ulyssiponensis* Gmelin, 1791.

See above under *Patella caerulea* Linnaeus, 1758 for remarks on the taxonomic attribution based on morphological characters of Eastern Atlantic/Mediterranean Patellidae.

## Family LOTTIDAE Gray, 1840

### *Tectura virginea* (Müller, 1776)

**Literature records:**

*Acmaea virginea* Müller - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 449; Pallary, 1938: 46; Bitar, 1996: 116; *Acmaea virginea* (O.F. Müller, 1776) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 3 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

## Family NACELLIDAE Thiele, 1891

### A - *Cellana rota* (Gmelin, 1791)

#### Literature records:

*Cellana rota* - Ramos-Esplá et al., 2015: 37, 38 (figure); *Cellana rota* (Gmelin, 1791) - Ramos-Esplá et al., 2015: 157; cf. *Cellana rota* (Gmelin, 1791) - Ramos-Esplá et al., 2015: 191.

#### First record date:

First found in 2012–2013 (Ramos-Esplá et al., 2015).

## Family FISSURELLIDAE Fleming, 1822

### *Diodora gibberula* (Lamarck, 1822)

#### Literature records:

*Fissurella gibberula* Lamarck var. *minor* P. - Pallary, 1919: 172; *Fissurella gibberula* Lamarck var. *minor* P. - Pallary, 1938: 46; *Diodora gibberula* (Lamk.) - Fadlallah, 1975: 68; *Diodora gibberula* Lamarck - Bitar, 1996: 117; *Diodora gibberula* (Lamarck, 1822) - Bitar & Kouli-Bitar, 1998: 38, 42.

#### Material examined:

(6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 5 m: 1 sh (BBCD); 03/06/2000 - muddy sediment just below small cliff, 3 m: 3 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (BBCD).

### *Diodora graeca* (Linnaeus, 1758)

#### Literature records:

*Fissurella graeca* Linné - Pallary, 1919: 172; Pallary, 1938: 46; *Diodora graeca* (L.) - Spada, 1971: 90; *Fissurella graeca* L. - Bitar, 1996: 116; *Diodora graeca* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

*Diodora italica* (Defrance, 1820)

**Literature records:**

*Fissurella neglecta* Deshayes - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 449; Bitar, 1996: 116; *Fissurella mediterranea* (Gray) Sowerby - Pallary, 1938: 46; *Fissurella mediterranea* Sowerby - Bitar, 1996: 116; *Diodora italica* (Defrance, 1820) - Bitar & Kouli-Bitar, 1998: 38.

**A - *Diodora ruppellii* (Sowerby I, 1835)**

**Literature records:**

*Diodora ruppellii* [sic! for *ruppellii* (see Sowerby, 1835: 128)] (G. B. Sowerby I, 1835) - Ramos-Esplá et al., 2015: 157, 191.

**Material examined:**

(3) Tripoli: 19/09/2002 - harbour, 2–5 m: 1 lv (BBCD); 08/07/2003 - harbour, on quay wall, 2–5 m: 1 lv (BBCD); (18) Beirut: 07/07/2003 - St. George, 10 m: 1 sh (BBCD); 09/07/2003 - harbour, inner side, max 14 m: 1 sh (BBCD).

**First record date:**

First found in 2002 (see Material examined).

**\* *Emarginula huzardii* Payraudeau, 1826**

**Material examined:**

(5) Anfeh: 26/10/1999 - sand, 20 m: 1 sh (BBCD) (Fig. 2A); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 2 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD).

**Remarks:**

A slit limpet very similar to our samples, *Emarginula divae* van Aartsen & Carrozza, 1995, has been described from the nearby Israel, and would mostly differ in its less ovate and depressed shell and its less centrally located top (van Aartsen & Carrozza, 1995). However, our shells clearly belong to *Emarginula huzardii* Payraudeau, 1826 (Fig. 2A). Moreover, the validity of *E. divae* has been recently questioned (Portalatina, 2008).

*Emarginula octaviana* Coen, 1939

**Literature records:**

*Emarginula elongata* da Costa - Pallary, 1938: 46; *Emmarginula* [sic! for *Emarginula* (see Lamarck, 1801: 69)] *elongata* da Costa [sic! for Costa (see O. G. Costa, 1829: 10)] - Bitar, 1996: 117; *Emarginula octaviana* Coen, 1939 - Bitar & Kouli-Bitar, 1998: 38, 42.

## *Emarginula sicula* Gray, 1825

### Literature records:

*Emarginula cancellata* Philippi - Pallary, 1919: 172; *Emarginula cancellata* Philippi = *sicula* Gray - Pallary, 1938: 46; *Emmarginula* [sic! for *Emarginula* (see Lamarck, 1801: 69)] *cancellata* Philippi - Bitar, 1996: 117; *Emarginula sicula* Gray J. E., 1825 - Bitar & Kouli-Bitar, 1998: 38.

## *Fissurella nubecula* (Linnaeus, 1758)

### Literature records:

*Fissurela* [sic! for *Fissurella* (see Bruguière, 1789–1792: XIV - genre 29)] *nubecula* Linné - Pallary, 1919: 172; Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 449; Pallary, 1938: 46; *Fissurela* [sic!] *nubecula* Linné var. *minor* Piry 1912 - Pallary, 1938: 46; *Fissurella nubecula* L. - Bitar, 1996: 116; *Fissurella nubecula* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38, 42.

### Material examined:

(9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (18) Beirut: 16/09/2002 - harbour, quay 60, surface, with crust of *Spirobranchus kraussii* (Baird, 1865): 1 lv (BBCD); (23) Saida: 14/04/1993 - low depth: 1 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 3 sh (BBCD).

## Family HALIOTIDAE Rafinesque, 1815

### *Haliotis tuberculata lamellosa* Lamarck, 1822

### Literature records:

*Haliotis tuberculata* Lin. var. *lamellosa* - Puton, 1856: 223; *Haliotis lamelta* [sic! for *lamellosa* (see Lamarck, 1822a: 217)] Lamarck - Pallary, 1912b: 173; *Haliotis lamellosa* Lamarck - Pallary, 1919: 171; Pallary, 1938: 46; Bitar, 1996: 116; *Haliotis lamellosa* Lamarck var. *reticulata* Reeve - Pallary, 1919: 171; *Haliotis lamellosa* Lk. - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 449; *Haliotis lamellosa* Lmk. - Gruvel, 1931: 124; *Haliotis tuberculata lamellosa* Lamarck, 1822 - Bitar & Kouli-Bitar, 1998: 38; *Haliotis tuberculata* Linnaeus, 1758 - Ramos-Esplá et al., 2017: 94; *Haliotis tuberculata* - Ramos-Esplá et al., 2017: 111.

### Material examined:

(1) Ramkine Island: 14/07/2003 - under stones, 3–4 m: 1 lv (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (10) Hannouch: 18/09/2002 - under stones, 1–5 m: 2 lv (BBCD).

## Family TROCHIDAE Rafinesque, 1815

### *Clanculus corallinus* (Gmelin, 1791)

#### Literature records:

*Clanculus corallinus* Gmelin - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Bitar, 1996: 118; *Clanculus corallinus* Gmelin var. *minor* Monts. 1884 - Pallary, 1938: 42; *Clanculus corallinus* (Gmelin, 1791) - Bitar & Kouli-Bitar, 1998: 38.

#### Material examined:

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 2 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 8 sh (BBCD).

### *Clanculus cruciatus* (Linnaeus, 1758)

#### Literature records:

*Clanculus cruciatus* Linné var. *minor* Locard [sic! for Locard & Caziot (see Locard & Caziot, 1900-1901: 170)] - Pallary, 1912b: 173; Pallary, 1919: 171; *Clanculus cruciatus* L. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Bitar, 1996: 118; *Clanculopsis cruciata* Linné var. *minor* Loc. et Caz. 1900 [sic!] - Pallary, 1938: 42; *Clanculopsis cruciata* Linné var. *undata* Plry - Pallary, 1938: 42; *Clanculus cruciatus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38, 42.

#### Material examined:

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 5 sh (BBCD); 01/06/2000 - sand, 13–14 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 7 sh (BBCD).

### *Clanculus jussieui* (Payraudeau, 1826)

#### Literature records:

*Clanculus jussieui* Payraudeau var. *minor-laevigata* Monts. - Pallary, 1919: 171; *Clanculopsis* (*Clanculella*) *jussieui* Payraudeau var. *minor-laevigata* Monts. 1884 - Pallary, 1938: 42; *Clanculopsis* (*Clanculella*) *jussieui* Payraudeau var. *zebrina* Requier 1848 - Pallary, 1938: 42; *Clanculus jussieui* Payraudeau - Bitar, 1996: 118; *Clanculus jussieui* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 38.

#### Material examined:

(6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD).

## *Gibbula ardens* (Von Salis, 1793)

### **Literature records:**

*Gibbula ardens* von Salis var. *modesta* Pply - Pallary, 1938: 43; *Gibbula barbara* di Monterosato var. *minor-elevata* Pply - Pallary, 1938: 43; *Gibbula barbara minor-elevata* - Pallary, 1938: plate II (fig. 6); *Gibbula ardens* Salis - Bitar, 1996: 118; *Gibbula barbara* Monterosato - Bitar, 1996: 118; *Gibbula ardens* (Von Salis, 1793) - Bitar & Kouli-Bitar, 1998: 38.

### **Material examined:**

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 1 sh (BBCD); 01/06/2000 - 3–5 m: 1 lv (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 5 m: 1 lv (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 4 sh (BBCD); 23/10/1999 - cave, tunnel roof, 7–8 m: 3 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 3 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD).

## *Gibbula drepanensis* (Brugnone, 1873)

### **Literature records:**

*Gibbula dvepanesis* [sic! for *drepanensis* (see Brugnone, 1873: 13)] (Brugnone) - Fadlallah, 1975: 68; *Gibbula dvepanesis* [sic!] Brugnone - Bitar, 1996: 118; *Gibbula drepanensis* (Brugnone, 1873) - Bitar & Kouli-Bitar, 1998: 38.

## *Gibbula fanulum* (Gmelin, 1791)

### **Literature records:**

*Forskälia fanulum* Gmelin - Pallary, 1938: 43; *Forskälia fanulum* Gmelin var. *minor* Loc. et Caz. 1901 - Pallary, 1938: 43; *Forskalia* [sic! for *Forskälia* (see Adams & Adams, 1854: 432)] *fanulum* Gmelin - Bitar, 1996: 118; *Gibbula fanulum* (Gmelin, 1791) - Bitar & Kouli-Bitar, 1998: 38.

## *Gibbula guttadauri* (Philippi, 1836)

### **Literature records:**

*Gibbula guttadauroi* [sic! for *guttadauri* (see Philippi, 1844: 154)] Philippi - Pallary, 1938: 44; *Gibbula guttadauri* (Philippi, 1836) - Bitar & Kouli-Bitar, 1998: 38.

### **Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, base of cliff, 13 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 5 sh (BBCD).

## *Gibbula leucophaea* (Philippi, 1836)

### Literature records:

*Gibbula leucophaea* Philippi - Pallary, 1919: 171; Bitar, 1996: 118; *Gibbula leucophaea* Philippi var. *nigra* P. - Pallary, 1919: 171; *Gibbula (Phorculus) leucophaea* Philippi - Pallary, 1938: 44; *Gibbula (Phorculus) leucophaea* Philippi var. *nigra* P. - Pallary, 1938: 44; *Gibbula leucophaea* (Philippi, 1836) - Bitar & Kouli-Bitar, 1998: 38.

## *Gibbula magus* (Linnaeus, 1758)

### Literature records:

*Gibbula magus* Linné var. *minor* [sic! for *minor fusco maculata* (see Requier, 1848: 67)] Requier 1848 - Pallary, 1938: 43; *Gibbula magus* L. - Bitar, 1996: 118; *Gibbula magus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

### Material examined:

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

## *Gibbula philberti* (Récluz, 1843)

### Literature records:

*Gibbula (Phorculus) philberti* [sic! for *philberti* (see Récluz, 1843: 11)] Récluz - Pallary, 1938: 44; Bitar, 1996: 118; *Gibbula (Phorculus) philberti* [sic!] Récluz var. *sidoniensis* P. - Pallary, 1938: 44; *Gibbula philberti* (Récluz, 1843) - Bitar & Kouli-Bitar, 1998: 38, 42.

## *Gibbula racketsi* (Payraudeau, 1826)

### Literature records:

*Gibbula racketsi* Payr. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Bitar, 1996: 118; *Gibbula (Phorculus) racketsi* Payraudeau - Pallary, 1938: 44; *Gibbula pygmaea* Risso - Fadlallah, 1975: 68; Bitar, 1996: 118; *Gibbula tumida* Montg. - *sensu* Fadlallah, 1975: 68; *Gibbula tumida* Montagu - *sensu* Bitar, 1996: 118; *Gibbula tumida* (Montagu, 1803) - *sensu* Bitar & Kouli-Bitar, 1998: 38; *Gibbula racketsi* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 38.

### Remarks:

Lebanese reports of *Gibbula tumida* (Montagu, 1803) by Bitar (1996) and Bitar & Kouli-Bitar (1998) are explicitly declared as based on Gruvel, Moazzo, Pallary and Fadlallah (see Bitar & Kouli-Bitar, 1998), whilst this species has been listed in Lebanon by Fadlallah (1975) only. However, records of *G. tumida* from the Eastern and Central Mediterranean Sea are misidentifications of *Gibbula racketsi* (Payraudeau, 1826), being *G. tumida* a species with a mostly Atlantic distribution.

## *Gibbula turbinoides* (Deshayes, 1835)

### Literature records:

*Gibbula turbinoides* [sic! for *turbinoides* (see Deshayes, 1835: 143)] Desh. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; *Gibbula (Glossulus) turbinoides* Deshayes - Pallary, 1938: 44; *Gibbula turbinoides* Deshayes - Bitar, 1996: 118; *Gibbula turbinoides* (Deshayes, 1835) - Bitar & Kouli-Bitar, 1998: 38.

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 2 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 2 sh (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, concretions, 9 m: 1 sh (BBCD); (12) Kfar Abida: 30/05/2000 - 5–12 m: 3 lv (BBCD); (13) El Barbara: 08/06/2000 - overhang, 26–28 m: 1 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (BBCD).

## *Jujubinus exasperatus* (Pennant, 1777) complex

### Literature records:

*Jujubinus exasperatus* Pennant var. *tricolor* Monts. [sic! for Risso (see Risso, 1826: 127)] - Pallary, 1919: 171; *Calliostoma (Jujubinus) exasperatum* Pennant - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; *Jujubinus exasperatus* Pennant = *matoni* [sic! for *matonii* (see Payraudeau, 1826: 126)] Payraudeau var. *tricolor* Risso 1826 - Pallary, 1938: 45; *Jujubinus crenulatus* Brocchi - [sensu?] Pallary, 1938: 46; [sensu?] Bitar, 1996: 118; *Jujubinus exasperatus* Pennant - Bitar, 1996: 118; *Jujubinus exasperatus* (Pennant, 1777) - Bitar & Kouli-Bitar, 1998: 38, 42.

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 4 sh (BBCD); 01/06/2000 - sand, 13–14 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 3 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 1 sh (BBCD); sand in *Cymodocea* meadow, 5 m: 2 lv (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 11 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 3 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 4 sh (BBCD).

### Remarks:

The identity of *Trochus crenulatus* Brocchi 1814, described as a fossil from Ischia, is still unknown (see Gofas, 2014). We hereby tentatively refer the record under this name by Pallary (1938) to *Jujubinus exasperatus* (Pennant, 1777). Uribe et al. (2017) recently suggested that specimens previously ascribed to *J. exasperatus* may comprise a complex of cryptic species, and thus we keep literature records and new unpublished material examined as “*Jujubinus exasperatus* (Pennant, 1777) complex”.



## *Jujubinus striatus* (Linnaeus, 1758) complex

### Literature records:

*Jujubinus striatus* Linné - Pallary, 1938: 45; *Jujubinus striatus* L. - Bitar, 1996: 118; *Jujubinus striatus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 4 sh (BBCD).

### Remarks:

Uribe et al. (2017) recently suggested that specimens previously ascribed to *Jujubinus striatus* (Linnaeus, 1758) may comprise a complex of cryptic species, and thus we keep literature records and new unpublished material examined as “*Jujubinus striatus* (Linnaeus, 1758) complex”.

## *Phorcus articulatus* (Lamarck, 1822)

### Literature records:

*Trochocochlea turbiformis* von Salis - Pallary, 1912b: 173; *Trochocochlea turbiformis* von Salis - Pallary, 1919: 171; *Trochocochlea articulata* Lk. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; *Trochocochlea turbiformis* von Salis var. *undata* Piry - Pallary, 1938: 43; *Trochocochlea turbiformis undata* - Pallary, 1938: plate II (fig. 1); *Trochocochlea articulata* Lamarck - Bitar, 1996: 118; *Trochocochlea turbiformis* Salis - Bitar, 1996: 118; *Monodonta articulata* (Lamarck, 1822) - Gofas & Jabaud, 1997: 58; *Osilinus articulatus* (Lamarck, 1822) - Bitar & Kouli-Bitar, 1998: 38; *Phorcus articulatus* (Lamarck, 1822) - Ramos-Esplá et al., 2015: 158, 182; *Phorcus articulatus* - Affenzeller et al., 2017: 801.

## *Phorcus mutabilis* (Philippi, 1851)

### Literature records:

*Monodonta mutabilis* Philippi - Nuwayhid et al., 1985: 9.

### Remarks:

Lebanese occurrence, as *Trochocochlea mutabilis* Philippi in Bitar (1996) and as *Phorcus mutabilis* (Philippi, 1846) in Bitar & Kouli-Bitar (1998), was based on Gruvel & Moazzo (see Bitar & Kouli-Bitar, 1998). Actually, Gruvel & Moazzo (1929) only reported it from Lattaquié (Syria).

## *Phorcus richardi* (Payraudeau, 1826)

### Literature records:

*Gibbula richardi* Payraudeau var. *minima* P. - Pallary, 1912b: 173; Pallary, 1919: 171; *Phorcus richardi* Payr. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; *Gibbula* (*Phorcus*) *richardi* Payraudeau var. *minima* Piry 1912 - Pallary, 1938: 45; *Gibbula richardi minima* - Pallary, 1938: plate II (figs. 13–14); *Gibbula richardi* (Payraudeau) - Spada, 1971: 90; *Gibbula richardi*

Payraudeau - Bitar, 1996: 118; *Gibbula richardi* (Payraudeau, 1826) - Gofas & Jabaud, 1997: 58; *Phorcus richardi* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 38, 42.

### *Phorcus turbinatus* (Born, 1778)

#### **Literature records:**

*Monodonta marmorata* - sensu Mougeot, 1848: 718; *Trochus fragaroides* [sic! for *fragarioides* (see Lamarck 1822b: 36)], Lamk. - Puton, 1856: 223; *Trochocochlea turbinata* Born - Pallary, 1912b: 173; Pallary, 1919: 171; Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 445; Pallary, 1938: 42; Bitar, 1996: 118; *Trochocochlea turbinata* Born var. *interrupta* P. - Pallary, 1919: 171; *Trochocochlea turbinata interrupta* P. - Pallary, 1933: 152; *Trochocochlea turbinata* Born var. *interrupta* P. - Pallary, 1938: 43; *Monodonta turbinata* (Born) - Shiber & Shatila, 1978: 125; Shiber, 1980: 147; *Monodonta turbinata* - Dalongeville, 1977: 28–30; Bitar & Kouli-Bitar, 1995a: 19; Bitar & Kouli-Bitar, 1995b: 19; *Osilinus turbinatus* (von Born, 1778) - Bitar & Kouli-Bitar, 1998: 38, 42; *Phorcus turbinatus* - Ramos-Esplá et al., 2015: 82; Affenzeller et al., 2017: 801; Ramos-Esplá et al., 2017: 106; *Phorcus turbinatus* (Born, 1778) - Ramos-Esplá et al., 2015: 158, 168, 182, 191, 202; Ramos-Esplá et al., 2017: 94; Badreddine et al., 2019: 140; *Porcus* [sic! for *Phorcus* (see Risso, 1826: 133)] *turbinatus* - Ramos-Esplá et al., 2017: 54.

#### **Material examined:**

(1) Ramkine Island: 22/10/1999 - low depth: 1 sh (BBCD); (9) Selaata: 23/10/1999 - on a *Dendropoma anguliferum* (Monterosato, 1878) platform: 2 lv (BBCD).

#### **Remarks:**

The Lebanese record of *Monodonta marmorata* by Mougeot (1848) was subsequently corrected by Puton (1856) as belonging to *Trochus fragarioides* Lamarck, 1822, which is in turn a junior synonym of *Phorcus turbinatus* (Born, 1778).

### **A - *Pseudominolia nedyma* (Melvill, 1897)**

#### **Literature records:**

*Minolia nedyma* Melvill, 1897 - Bogi & Khairallah, 1987: 55; *Pseudominolia nedyma* - Bitar, 2012: 8; *Pseudominolia nedyma* (Melvill, 1897) - Perna, 2013: 42; Bitar, 2014: 44.

#### **Material examined:**

(9) Selaata: 23/10/1999 - amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 1 m: 1 sh (BBCD).

#### **First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

### *Steromphala adansonii* (Payraudeau, 1826) complex

**Literature records:**

*Gibbula adansoni* [sic! for *adansonii* (see Payraudeau, 1826: 127)] Payr. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Bitar, 1996: 118; *Gibbula (Glossulus) aegytiaca* [sic! for *aegyptiaca* (see Pallary, 1912a: 143)] Pallary 1912 var. *minor* Piry - Pallary, 1938: 44; *Gibbula aegyptiaca* Pallary - Bitar, 1996: 118; *Gibbula adansonii* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(16) Tabarja: 15/11/1991: 1 lv (BBCD).

**Remarks:**

Molecular data showed that specimens previously ascribed to *Steromphala adansonii* (Payraudeau, 1826) may comprise a complex of cryptic species (see Barco et al., 2013a), and thus we keep literature records and new unpublished material examined as “*Steromphala adansonii* (Payraudeau, 1826) complex”.

*Steromphala divaricata* (Linnaeus, 1758)**Literature records:**

*Gibbulastra divaricata* Linné - Pallary, 1912b: 173; *Gibbulastra divaricata* Linné var. *minima* - Pallary, 1919: 171; *Gibbula divaricata* L. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; *Steromphalus divaricatus* Linné var. *minima* Piry 1919 - Pallary, 1938: 45; *Gibbula divaricata* (L.) - Bitar, 1996: 118; *Gibbula divaricata* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

*Steromphala nebulosa* (Philippi, 1848)**Literature records:**

*Gibbula nebulosa* Phil. - Pallary, 1933: 152; *Gibbula (Tumulus) nebulosa* Philippi - Pallary, 1938: 44; *Gibbula (Tumulus) nebulosa* Philippi var. *parva* Piry - Pallary, 1938: 44; *Gibbula umbilicaris* f. *nebulosa* - Spada, 1971: 90; *Gibbula umbilicaris* L. - *sensu* Bitar, 1996: 118; *Gibbula nebulosa* Philippi - Bitar, 1996: 118; *Gibbula umbilicaris* (Linné, 1758) - *sensu* Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(1) Ramkine Island: 01/06/2000 - 0.5 m: 1 sh (BBCD); (15) El Bouar: 26/11/1991: 1 lv.

**Remarks:**

*Steromphala nebulosa* (Philippi, 1848) is here considered as distinct from *Steromphala umbilicaris* (Linnaeus, 1758) following Barco et al. (2013a) and Affenzeller et al. (2017). Late Lebanese records of *S. umbilicaris* by Bitar (1996) and Bitar & Kouli-Bitar (1998) were based on Pallary (1933, 1938) and did actually refer to *G. nebulosa* (see also discussions on *G. umbilicaris* in “Excluded species”).

## *Steromphala rarilineata* (Michaud, 1829) complex

### Literature records:

*Gibbulastra rarilineata* Michaud - Pallary, 1912b: 173; *Gibbulastra rarilineata* Michaud var. *pulchella* P. - Pallary, 1919: 171; *Gibbula rarilineata* Michaud - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Bitar, 1996: 118; *Steromphalus rarilineatus* Michaud var. *pulchella* P. - Pallary, 1938: 45; *Gibbulastra rarilineata pulchella* - Pallary, 1938: plate II (fig. 9); *Gibbula rarilineata* (Michaud) - Spada, 1971: 90; *Steromphalus rarilineatus* Michaud - Bitar, 1996: 118; *Gibbula rarilineata* (Michaud, 1829) - Bitar & Kouli-Bitar, 1998: 38, 42.

### Material examined:

(12) Kfar Abida: 30/05/2000 - 5–12 m: 1 sh (BBCD).

### Remarks:

Molecular data showed that specimens previously ascribed to *Steromphala rarilineata* (Michaud, 1829) may comprise a complex of cryptic species (see Barco et al., 2013a), and thus we keep literature records and new unpublished material examined as “*Steromphala rarilineata* (Michaud, 1829) complex”.

## *Steromphala varia* (Linnaeus, 1758)

### Literature records:

*Gibbula varia* Linné - Pallary, 1912b: 173; *Gibbula varia* Linné var. *minor* - Pallary, 1919: 171; *Gibbula varia* Linné var. *marmorata* Requier - Pallary, 1919: 171; *Gibbula varia* L. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Bitar, 1996: 118; *Gibbula (Phorculus) varia* Linné - Pallary, 1938: 44; *Gibbula (Phorculus) varia* Linné var. *minor* P. - Pallary, 1938: 44; *Gibbula (Phorculus) varia* Linné var. *marmorata* Requier 1848 - Pallary, 1938: 44; *Gibbula varia* (L.) - Spada, 1971: 86; *Gibbula varia* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38, 42; *Steromphala varia* - Affenzeller et al., 2017: 801.

### Material examined:

(6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh (BBCD); 03/06/2000 - muddy sediment just below small cliff, 3 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD).

## A - *Trochus erithreus* Brocchi, 1821

### Literature records:

*Trochus erythraeus* [sic! for *erithreus* (see Brocchi, 1821: 223)] Brocchi, 1821 - Bogi & Khairallah, 1987: 55, 60 (fig. 8); *Trochus erythraeus* [sic!] Brocchi, 1821 - Bitar & Kouli-Bitar, 1998: 42; Zibrowius & Bitar, 2003: 70; *Trochus erythraeus* [sic!] - Bitar & Kouli-Bitar, 2001: 72; Bitar, 2012: 8; *Trochus erithraeus* [sic!] (Brocchi, 1821) - Bitar, 2014: 45; *Infundibulops erythraeus* [sic!] (Brocchi, 1821) - Ramos-Esplá et al., 2015: 158, 168, 182, 202, 211; *Trochus erithreus* Brocchi, 1821 - Ramos-Esplá et al., 2017: 94; *Trochus erithreus* - Ramos-Esplá et al., 2017: 116.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - 15 m: 1 lv (BBCD); (3) Tripoli: 19/09/2002 - harbour, on quay wall, in very turbid waters, 2–3 m: 10 lv (BBCD); 20/09/2002 - harbour entrance, breakwater jetty, outer side, 5 m: 1 lv (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - 1–5 m: 1 lv (BBCD); (10) Hannouch: 18/09/2002 - 1–5 m: 1 sh (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, concretions, 9 m: 1 lv (BBCD); (18) Beirut: 15/09/2002 - harbour jetty, inner side: 1 lv (BBCD); 16/09/2002 - harbour, quay 60, 3–8 m: 8 lv (BBCD); 25/09/2002 - airport, pillar jetty, 3–10 m: 1 lv (BBCD); (27) Tyr: 25/10/1999 - shoal, 12 m: 1 lv (BBCD); (29) Nakoura: 22/09/2002 - 5 m: 1 lv (BBCD).

**First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

## Family CALLIOSTOMATIDAE Thiele, 1924 (1847)

\* *Calliostoma laugierii laugierii* (Payraudeau, 1826)

**Material examined:**

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 3 sh; 31/05/2000 - cave, 5–7 m: 1 lv; 01/06/2000 - sand, 13–14 m: 7 sh (Fig. 2B); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 5 m: 1 lv; (9) Selaata: 18/10/1999 - cave sediment, 9 m: 7 sh; 23/10/1999 - cave, tunnel roof, 7–8 m: 3 sh; (11) Batroun: 16/10/1999 - old town, “Phenician wall”, concretions, 9 m: 2 sh; (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh.

*Calliostoma zizyphinum* (Linnaeus, 1758)

**Literature records:**

*Calliostoma alexandrinum* Pallary 1912 - Pallary, 1938: 45; *Calliostoma alexandrinum* Pallary - Bitar, 1996: 118; *Calliostoma zizyphinum* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh.

## Family TURBINIDAE Rafinesque, 1815

## *Bolma rugosa* (Linnaeus, 1767)

### Literature records:

*Astralium rugosum* var. *minor* P. - Pallary, 1912b: 173; *Astralium rugosum* Linné var. *minor* P. - Pallary, 1919: 171; *Astralium (Bolma) rugosum* Linné - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; *Astralium rugosum* Linné var. *minor* P. - Pallary, 1938: 42; *Astralium rugosum* L. - Bitar, 1996: 118; *Bolma rugosa* (Linné, 1767) - Bitar & Kouli-Bitar, 1998: 38, 42.

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 3 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

## Family PHASIANELLIDAE Swainson, 1840

### *Tricolia pullus pullus* (Linnaeus, 1758)

### Literature records:

*Phasianella (Eudora) pullus* Linné - Pallary, 1919: 171; *Phasianella pullus* L. - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; Bitar, 1996: 118; *Phasianella (Tricoliella) pullus* Linné - Pallary, 1938: 42; *Phasianella (Tricoliella) pullus* Linné var. *bipunctata* P. - Pallary, 1938: 42; *Phasianella (Tricoliella) pullus* Linné var. *mediocris* Monts. - Pallary, 1938: 42; *Tricolia pulla* [sic!] (L.) - Fadlallah, 1975: 68; *Tricolia pullus pullus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 4 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 lv, 20 sh (BBCD); muddy sediment just below small cliff, 3 m: 4 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 14 sh; (14) Jbail: 17/10/1999 - Tablieh, small cave, 16 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 5 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD); (28) El Bayada: 16/09/2000 - 8–10 m: 1 lv (BBCD).

### *Tricolia speciosa* (Megerle von Mühlfeld, 1824)

### Literature records:

*Phasianella speciosa* Mühlfeld - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; Bitar, 1996: 118; *Phasianella (Tricolia) speciosa* von Mühlfeld - Pallary, 1938: 41; *Phasianella (Tricolia)*

*speciosa* von Mühlfeld var. *minor* Monts. 1884 - Pallary, 1938: 42; *Tricolia speciosa* (von Mühlfeld, 1824) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(1) Ramkine Island: 01/06/2000 - sand, 13–14 m: 1 sh; (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh.

## Family NERITIDAE Rafinesque, 1815

*Smaragdia viridis* (Linnaeus, 1758)

**Literature records:**

*Smaragdia viridis* L. - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; Bitar, 1996: 118, 119; *Smaragdia viridis* Linné - Pallary, 1938: 41; *Smaragdia viridis* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

## Family CERITHIIDAE Fleming, 1822

*Bittium latreillii* (Payraudeau, 1826)

**Literature records:**

*Bittium latreillei* [sic! for *latreillii* (see Payraudeau, 1826: 143)] Payraudeau - Pallary, 1919: 170; *Bittium* (*Monobittium* [sic! for *Manobittium* (see Monterosato, 1917: 20)]) *latreillei* [sic!] Payraudeau - Pallary, 1938: 35; *Bittium latreillei* [sic!] Payr. - Bitar, 1996: 119; *Bittium latreillii* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 111 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 98 sh (BBCD); 01/06/2000 - sand, 13–14 m: 41 sh (BBCD); coarse sand, 13–14 m: 128 sh (BBCD); (2) Palms Island: 17/05/2001 - 4 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 46 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 115 sh (BBCD); 1–5 m: 2 sh (BBCD); sortie Est, amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, surface: 1 sh (BBCD); muddy sediment just below small cliff, 3 m: 12 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 35 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 20 sh (BBCD); 23/10/1999 - cave, 7–8 m: 4 sh (BBCD); 24/09/2002 - cliff, among calcareous algae, 35 m: 2 sh (BBCD); (11) Batroun: 25/09/1993 - 12 m: 11 sh (BBCD); (12) Kfar Abida: 30/05/2000 - tunnel, small cave, 7–8 m: 2 sh

(BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 90 sh (BBCD); (15) El Bouar 15/10/1992: 1 sh (BBCD); (16) Tabarja: 15/11/1991: 5 lv (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 85 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 8 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 28 sh (BBCD); freshwater, 42 m: 1 sh (BBCD); (27) Tyr: 08/11/1992: 2 lv, 3 sh (BBCD); 25/10/1999 - Sour, 15 m: 3 sh (BBCD); Sour, shoal, coarse sand between rocks, 12 m: 101 sh (BBCD).

### *Bittium reticulatum* (da Costa, 1778)

#### **Literature records:**

*Bittium afrum* (Dan. et San.) [sic! for Danilo & Sandri in Danilo (see Danilo, 1856: 115)] - Brusina in de Folin & Périer, 1875-1879: 30; *Bittium scabrum* (Olivi) - Brusina in de Folin & Périer, 1875-1879: 30; *Bittium jadertinum* Brusina - Pallary, 1919: 170; Bitar, 1996: 119; *Bittium reticulatum* Da Costa - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; Bitar, 1996: 119; *Bittium* (*Manobittium*) *jadertinum* Brusina - Pallary, 1938: 35; *Bittium reticulatum* (da Costa, 1778) - Bitar & Kouli-Bitar, 1998: 38, 42.

#### **Material examined:**

(1) Ramkine Island: 01/06/2000 - coarse sand, 13–14 m: 3 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 5 m: 1 sh (BBCD); muddy sediment just below small cliff, 3 m: 3 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 3 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 4 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 4 sh (BBCD).

### \* **A** - *Cerithidium perparvulum* (Watson, 1886)

#### **Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3-4.5 m: 2 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 6 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD) (Fig. 2C); (27) Tyr: 08/11/1992: 1 lv (BBCD).

#### **Remarks:**

Recently, Janssen et al. (2011) suggested the presence of a single alien species in the Mediterranean, to be named *Clathrofenella cerithina* (Philippi, 1849). Unfortunately, they did not discuss the previous works by Hasegawa (1998) and van Aartsen (2006), where the taxonomy of the Mediterranean alien species of *Cerithidium* Monterosato, 1884 was clarified with two sister species recognised: *C. diplax* (R.B. Watson, 1886) and *C. perparvulum* (Watson, 1886). Therefore we prefer to keep the two *Cerithidium* taxa as separated, pending molecular analyses to elucidate the taxonomic status of the putative sister species.

#### **First record date:**

First found in 1992 (see Material examined).



*Cerithidium submammillatum* (de Rayneval, Vanden Hecke & Ponzi, 1854)

**Literature records:**

*Crithidium* [sic! for *Cerithidium* (see Monterosato, 1884a: 123)] *submammillatum* Rayn. et Ponzi [sic! for de Rayneval, Vanden Hecke & Ponzi (see de Rayneval, Vanden Hecke & Ponzi, 1854: 1)] - Pallary, 1938: 35; *Crithidium* [sic!] *submammillatum* Rayn. et Ponzi [sic!] - Bitar, 1996: 119; *Bittium submammillatum* [sic!] (de Rayneval & Ponzi, 1854 [sic!]) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 11 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 2 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 5 sh (BBCD).

*Cerithium alucastrum* (Brocchi, 1814)

**Literature records:**

*Cerithium (Gladiocerithium) alucastrum* Brocchi var. *minor* Pply - Pallary, 1938: 32; *Cerithium alucastrum* Brocchi - Bitar, 1996: 119; *Cerithium alucastrum* (Brocchi, 1814) - Bitar & Kouli-Bitar, 1998: 38.

*Cerithium lividulum* Risso, 1826

**Literature records:**

*Cerithium mediterraneum* Desh. - Mougéot, 1848: 718; Puton, 1856: 224; Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; *Cerithium (Pithocerithium) limatum* Monterosato - Monterosato, 1900: 401; Pallary, 1919: 170; *Cerithium mediterraneum* Deshayes var. *achipetagicum* Monterosato [sic! for *archipelagicum* Gaglini (see Gaglini, 1912)] - Pallary, 1912b: 172; *Cerithium mediterraneum* Deshayes var. *syriaca* P. - Pallary, 1919: 170; *Cerithium (Vulgocerithium) vulgatum* Bruguière var. *spina gracilis* Pply 1912 - Pallary, 1938: 32; *Cerithium (Lithocerithium) lividulum* Risso - Pallary, 1938: 33; *Cerithium (Lithocerithium) lividulum* Risso var. *erecta* Pply - Pallary, 1938: 33; *Cerithium (Pithocerithium) limatum* di Monterosato - Pallary, 1938: 34; *Cerithium (Lithocerithium) syriacum* Pallary 1919 - Pallary, 1938: 34; *Cerithium (Lithocerithium) syriacum* Pallary 1919 var. *strigosa* Pply - Pallary, 1938: 34; *Cerithium (Lithocerithium) syriacum* Pallary 1919 var. *minor* Pply - Pallary, 1938: 34; *Cerithium (Lithocerithium) syriacum* Pallary 1919 var. *aurea* - Pallary, 1938: 34; *Cerithium (Lithocerithium) syriacum* Pallary 1919 var. *albina* - Pallary, 1938: 34; *Cerithium syriacum strigosa* - Pallary, 1938: plate I (fig. 13); *Cerithium vulgatum spina gracilis* - Pallary, 1938: plate I (fig. 14); *Cerithium limatum* - Pallary, 1938: plate I (figs. 19–21); *Cerithium syriacum* - Pallary, 1938: plate I (fig. 22); *Cerithium limatum* Monterosato - Bitar, 1996: 119; Bitar & Kouli-Bitar, 1998: 38; *Cerithium lividulum* Risso - Bitar, 1996: 119; *Cerithium mediterraneum* (Desh.) - Bitar, 1996: 119; *Cerithium syriacum* Pallary - Bitar, 1996: 119; Bitar & Kouli-Bitar, 1998: 38; *Cerithium lividulum* Risso, 1826 - Bitar & Kouli-Bitar, 1998: 38; *Cerithium*

*syriacum* Pallary, 1938 - Gofas et al., 2004: 101 (figs.7G, 7H); Garilli & Galletti, 2006: 112 (fig. 1j), 116.

**Material examined:**

(11) Batroun: 15/10/1999 - next to lab, snorkeling, 1 m: 3 sh (BBCD); (12) Kfar Abida: 30/05/2000 - 5–12 m: 2 sh (BBCD).

**Remarks:**

There is no general agreement on the synonymy of *Cerithium lividulum* Risso, 1826, some authors requiring more taxonomical analyses on previously described morphotypes and other considering all of them as belonging to a single, highly variable, species widespread in the Mediterranean Sea. We hereby followed the latest taxonomic views by Cecalupo (2006), Garilli & Galletti (2006), and Appolloni et al. (2018), who considered *Cerithium limatum* Monterosato, 1900, *Cerithium syriacum* Pallary, 1938, and *Cerithium vulgatum* var. *spinosa-gracilis* (= *spinagracilis*) as junior synonyms of *C. lividulum*, and thus we listed records of these taxa in the synonymy of *C. lividulum*. In addition, under the criteria adopted by Appolloni et al. (2018: 10), *C. limatum* was originally described (Monterosato 1900: 401) based on samples from Larnaka (Cyprus), Saïda (Lebanon), and Jaffa (Israel). Since no lectotype has been ever designated, the type locality encompasses all three sites (ICZN, 1999: Art. 76.1, 73.2.3). Therefore, *C. limatum* is here included among “Gastropod nominal taxa historically described on type material from Lebanon and/or used for Lebanese material” (Appendix 5). Finally, it is worth mention that the morphology-based taxonomy of Mediterranean *Cerithium* species has been recently tested by DNA-barcoding (Evangelisti et al., 2016). Main results indicated that some individuals morphologically falling within the variation of *C. lividulum* were in fact genetically *Cerithium renovatum* Monterosato, 1884, and that under the latter name is actually hidden a complex of cryptic species (Evangelisti et al., 2016). Given the impossibility to barcode our specimens due to their previous formaldehyde fixation, our identifications may therefore be erroneous.

### *Cerithium renovatum* Monterosato, 1884 complex

**Literature records:**

*Cerithium phaeniciacum* - Pallary, 1933: 152; *Cerithium (Hirtocerithium) renovatum* di Monterosato - Pallary, 1938: 32; *Cerithium (Hirtocerithium) phaeniciacum* - Pallary, 1938: 33 (plate I, figs. 7-8); *Cerithium renovatum* Monterosato - Bitar, 1996: 119; *Cerithium phaeniciacum* Pallary - Bitar, 1996: 119; Bitar & Kouli-Bitar, 1998: 38; *Cerithium rupestre* Risso - *sensu* Spada, 1971: 90; *Cerithium rupestre* Risso, 1826 - *sensu* Bitar & Kouli-Bitar, 1998 (*partim*): 42.

**Material examined:**

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 4 sh (BBCD); (9) Selaata: 18/10/1999 - small cave, 7 m: 1 sh (BBCD).

**Remarks:**

Mediterranean records of *Cerithium rupestre* Risso, 1826 by Spada (1971) and Bitar & Kouli-Bitar (1998) [*partim*: unpublished material only] are to be referred to *Cerithium renovatum* Monterosato, 1884, as the type material of *C. rupestre* turned out to belong to a species of the

*Cerithium vulgatum* Bruguière, 1792 complex (Gofas et al. 2004, Garilli & Galletti 2006). See also above under *Cerithium lividulum* Risso, 1826 for remarks on the taxonomic attribution of Mediterranean small Cerithiidae based on morphology, and the presence of a complex of species within *Cerithium renovatum* Monterosato, 1884.

### *Cerithium lividulum* Risso, 1826 or *Cerithium renovatum* Monterosato, 1884

#### **Literature records:**

*Cerithium rupestre* Risso - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; Bitar, 1996: 119; *Cerithium (Lithocerithium) lividulum* Risso var. *minor* B.D.D. 1882 [sic! for 1884 (see Bucquoy, Dautzenberg & Dollfus, 1882-1886: 203)] - Pallary, 1938: 33; *Cerithium rupestre* Risso, 1826 - *sensu* Bitar & Kouli-Bitar, 1998 (*partim*): 38.

#### **Remarks:**

Early Mediterranean records of *Cerithium rupestre* Risso, 1826 may refer to either *Cerithium lividulum* Risso, 1826 or *Cerithium renovatum* Monterosato, 1884 (or both), as the type material of *C. rupestre* turned out to belong to a species of the *Cerithium vulgatum* Bruguière, 1792 complex, and these species were often mixed in the literature (Gofas et al. 2004, Garilli & Galletti 2006). This holds true also for the Lebanese presence reported by Bitar & Kouli-Bitar (1998) [*partim*: bibliographic records only] as it was based on Gruvel & Moazzo (1929). Moreover, following Gofas et al. (2004), who suggested that *C. rupestre sensu* Bucquoy, Dautzenberg & Dollfus (1882-1886) is a misidentification of *C. lividulum*, the record by Pallary (1938) of *Cerithium rupestre* var. *minor* B.D.D. 1884 should belong to *Cerithium lividulum*. However, this seems to be in disagreement with Pallary's (1938) listing of *Cerithium lividulum* var. *minor* B.D.D. 1882 [sic!], a taxon that does not exist formally, but that he kept separated from the other record. Therefore, we cannot taxonomically adjust these records with confidence and prefer not to assign them to either taxa. See also above under *Cerithium lividulum* Risso, 1826 for remarks on the taxonomic attribution of Mediterranean small Cerithiidae based on morphology.

### **A - *Cerithium scabridum* Philippi, 1848**

#### **Literature records:**

*Cerithium (Bakka) scabridum* Philippi - Pallary, 1938: 34; *Cerithium (Bakka) scabridum* Philippi var. *hispida* Piry - Pallary, 1938: 34; *Cerithium scabridum hispida* - Pallary, 1938: plate I (figs. 16–18); *Cerithium scabridum* (Risso [sic! for Philippi (see Philippi, 1848: 23)]) - Fadlallah, 1975: 68; *Cerithium scabridum* Philippi, 1849 [sic!] - Bogi & Khairallah, 1987: 56; *Cerithium scabridum* Philippi, 1848 - Houbriek, 1992: 177; Bitar & Kouli-Bitar, 1998: 38, 42; Ramos-Esplá et al., 2017: 94; *Cerithium scabridum* Philippi - Bitar, 1996: 119; *Cerithium scabridum* - Bitar & Kouli-Bitar, 2001: 72, 73; Bitar et al., 2007: 437; Bitar, 2010: 452; Bitar, 2012: 8; Ramos-Esplá et al., 2015: 91; Ramos-Esplá et al., 2017: 56, 59, 101, 106, 111, 116; *Cerithium scabridum* (Philippi, 1848) - Bitar, 2014: 44; *Cerithium scabridum* [sic! for *scabridum* (see Philippi, 1848: 23)] Philippi, 1848 - Ramos-Esplá et al., 2015: 157, 167, 181, 191, 195, 201, 211; *Cerithium* [sic! for *Cerithium* (see Bruguière, 1789–1792: xv)] *scabridum* - Ramos-Esplá et al., 2017: 58.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - concretions, 13–14 m: 1 sh (BBCD); sediment (mainly foraminiferous), 13–14 m: 120 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 3 lv, 93 sh (BBCD); 01/06/2000 - 3 m: 59 lv (BBCD); cave, 5–7 m: 1 sh (BBCD); 6 m: 1 sh (BBCD); sand, 13–14 m: 197 sh (BBCD); 15 m: 1 sh (BBCD); (2) Palms Island: 17/05/2001 - 4 m: 4 lv, 13 sh (BBCD); (3) Tripoli: 08/07/2003 - harbour, on quay wall, 2–5 m: 1 sh (BBCD); (5) Anfeh: 26/10/1999 - 3 m: 270 lv, 1 sh (BBCD); sand, 20 m: 10 sh (BBCD); 24 m: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sortie Est, amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, surface: 5 lv, 11 sh (BBCD); 2–3 m: 36 lv, 10 sh (BBCD); muddy sediment just below small cliff, 3 m: 14 sh (BBCD); sand in *Cymodocea* meadow, 4 m: 426 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD); (8) Chak El Hatab: 05/07/2003 - 6–10 m: 2 sh (BBCD); (9) Selaata: 18/10/1999 - small caves and overhangs, 3–8 m: 3 lv (BBCD); on rocks, 5 m: 203 lv, 4 sh (BBCD); cave, 7 m: 2 lv, 2 sh (BBCD); cave sediment, 9 m: 27 sh (BBCD); 23/10/1999 - on a *Dendropoma anguliferum* (Monterosato, 1878) platform: 3 sh; amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 1 m: 2 sh (BBCD); 5 m: 3 sh (BBCD); 5–10 m: 5 lv (BBCD); cave sediment, 7–8 m: 1 sh (BBCD); 20 m: 5 sh (BBCD); 06/07/2003 - under stones, 6–7 m: 2 sh (BBCD); cave, 20 m: 1 sh (BBCD); (11) Batroun: 15/10/1999 - next to lab, snorkeling, 1 m: 3 sh (BBCD); 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 6 sh (BBCD); (12) Kfar Abida: 30/05/2000 - tunnel, small cave, 7–8 m: 1 sh (BBCD); (13) El Barbara: 08/06/2000 - overhang, 28 m: 2 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, concretions, 15 m: 1 sh (BBCD); Tablieh, small cave, concretions, 16 m: 1 lv, 1 sh (BBCD); Tablieh, cave sediment, 16 m: 8 sh (BBCD); (18) Beirut: 02/06/2000 - harbour: 1 lv, 2 sh (BBCD); muddy sediment, 10 m: 9 sh (BBCD); 15/09/2002 - harbour jetty, inner side, surface: 1 lv, 3 sh (BBCD); 07/07/2003 - St. George, 10 m: 283 lv, 13 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Hawieh El Jouani, 11 m: 16 sh (BBCD); Harf El Hawieh El Jouani, 14 m: 14 sh (BBCD); Harf El Shbak, overhang, 24 m: 1 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 71 sh (BBCD); 15 m: 1 sh (BBCD); (29) Nakoura: 22/09/2002 - on boulders below beach, 5 m: 82 lv, 2 sh (BBCD).

**First record date:**

First found in 1929–1930 (Pallary, 1938).

*Cerithium vulgatum* Bruguière, 1792 complex**Literature records:**

*Cerithium vulgatum* - Mougéot, 1848: 718; Ramos-Esplá et al., 2017: 111; *Cerithium vulgatum* Brug. - Puton, 1856: 224; *Cerithium vulgatum* Brug. var. *minor* - Puton, 1856: 224; *Cerithium vulgatum* Bruguière - Pallary, 1912b: 172; Pallary, 1919: 169; Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; Bitar, 1996: 119; *Cerithium vulgatum* Bruguière var. *minor* Puton - Pallary, 1912b: 172; Pallary, 1919: 169; *Cerithium (Vulgocerithium) vulgatum* Bruguière - Pallary, 1938: 32; *Cerithium (Vulgocerithium) vulgatum* Bruguière var. *tuberculata* Philippi 1844 - Pallary, 1938: 32; *Cerithium (Vulgocerithium) vulgatum* Bruguière var. *intermedia* Requier 1848 - Pallary, 1938: 32; *Cerithium (Vulgocerithium) vulgatum* Bruguière var. *minor* Puton 1855 [sic! for 1856

(see Puton, 1856: 224)] - Pallary, 1938: 32; *Cerithium vulgatum* Bruguière, 1792 - Bitar & Kouli-Bitar, 1998: 38; Ramos-Esplá et al., 2015: 157, 202, 211; Ramos-Esplá et al., 2017: 94.

**Remarks:**

Boisselier-Dubayle & Gofas (1999) showed that specimens previously ascribed to *Cerithium vulgatum* Bruguière, 1792 comprise a complex of at least two cryptic species. The sister species of the most known Mediterranean *Cerithium* species was identified as *Cerithium repandum* Monterosato, 1880 by Cecalupo et al. (2008), and the validity of the taxon was confirmed by molecular taxonomy carried out by Evangelisti et al. (2016). In addition, large individuals morphologically assigned to *C. vulgatum* turned out to belong to *C. repandum*, therefore suggesting that taxonomic attribution of specimens belonging to the *Cerithium vulgatum* Bruguière, 1792 complex based on morphology is not completely reliable (Evangelisti et al. 2016). Given the impossibility to barcode our specimens due to their previous formaldehyde fixation, we keep literature records and new unpublished material examined as “*Cerithium vulgatum* Bruguière, 1792 complex”.

**A - *Rhinoclavis kochi* (Philippi, 1848)**

**Literature records:**

*Cerithium (Rhinoclavis) kochi* (Philippi, 1848) - Bogi & Khairallah, 1987: 58; *Rhinoclavis kochi* - Bitar et al., 2007: 437; Bitar, 2012: 8; *Rhinoclavis kochi* (Philippi, 1848) - Bitar, 2014: 45; Ramos-Esplá et al., 2015: 158, 168, 173, 182, 202; Ramos-Esplá et al., 2017: 94; *Rhinoclavis (Proclava) kochi* - La Porta et al., 2014: 167; *Rhinoclavis couchii* [sic! for *kochi* (see Philippi, 1848: 21)] - Ramos-Esplá et al., 2015: 104; *Rhinoclavis kochi* - Ramos-Esplá et al., 2015: 106; Ramos-Esplá et al., 2017: 62, 101, 111, 116.

**Material examined:**

(9) Selaata: 23/10/1999 - amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 1 m: 2 sh (BBCD); 20 m: 3 sh (BBCD); (19) Raoucheh: 17/09/2002 - fine sand, 10 m: 5 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 30–31 m: 3 sh (BBCD); (28) El Bayada: 12/07/2003 - 5 m: 1 sh (BBCD).

**First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

**Family DIALIDAE Kay, 1979**

**A - *Diala semistriata* (Philippi, 1849)**

**Literature records:**

*Diala varia* = *semistriata* (Philippi, 1849) - Bogi & Khairallah, 1987: 58; *Diala varia* A. Adams, 1861 - Giannuzzi-Savelli et al., 2002: 50–51 (fig. 99); *Diala varia* - Bitar, 2012: 8; *Diala semistriata* (Philippi, 1849) - Bitar, 2014: 44.

**First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

## **Family SCALIOLIDAE Jousseaume, 1912**

### **A - *Finella pupoides* Adams, 1860**

**Literature records:**

*Eufenella pupoides* (A. Adams, 1860) - Bogi & Khairallah, 1987: 55, 60 (fig. 7); *Finella pupoides* - Bitar, 2012: 8; *Finella pupoides* (Adams, 1860) - Bitar, 2014: 44.

**First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

## **Family PLANAXIDAE Gray, 1850**

### *Fossarus ambiguus* (Linnaeus, 1758)

**Literature records:**

*Fossarus fossar* Adanson - Pallary, 1919: 170; Pallary, 1938: 38; Bitar, 1996: 121; *Fossarus gossar* [sic! for *fossar* (see Adanson, 1757: 173)] Adanson - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; *Fossarus ambiguus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(9) Selaata: 23/10/1999 - cave, tunnel roof, 7–8 m: 1 sh (BBCD).

## **Family POTAMIDIDAE H. Adams & A. Adams, 1854**

### *Pirenella conica* (Blainville, 1829)

**Literature records:**

*Pirenella conica* de Blainville - Pallary, 1938: 35; *Pirenella conica* de Blainville var. *mairei* Piry - Pallary, 1938: 36; *Pirenella conica* (Blainville, 1826 [sic! for 1829 (see Blainville, 1828-1830: 158)]) - Bogi & Khairallah, 1987: 58; *Pirenella conica* Blainville - Bitar, 1996: 117; *Pirenella conica* (de Blainville, 1829) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(11) Batroun: 20/10/1999 - old town, "Phenician wall", sea level: 224 lv (BBCD).

## Family SILIQUARIIDAE Anton, 1838

### *Tenagodus obtusus* (Schumacher, 1817)

**Literature records:**

*Tenagodes obtusa* [sic! for *obtusus* (see Schumacher, 1817: 262)] Schumacher var. *minor* Piry 1900 - Pallary, 1938: 37; *Tenagodes obtusa* [sic!] Schumacher - Bitar, 1996: 117; *Tenagodus obtusus* (Schumacher, 1817) - Bitar & Kouli-Bitar, 1998: 38, 42.

**Material examined:**

(20) Khaldeh: 19/06/2013 - Airport1, offshore, muddy bottom, 100 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 2 sh (BBCD).

## Family TURRITELLIDAE Lovén, 1847

### *Turritella turbona* Monterosato, 1877

**Literature records:**

*Turritella (Haustator) triplicata* Brocchi - *sensu* Pallary, 1938: 37; *Turritella triplicata* Brocchi - *sensu* Bitar, 1996: 119; *Turritella communis* Risso, 1826 - *sensu* Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 2 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 8 sh (BBCD).

**Remarks:**

*Turritella triplicata* Brocchi, 1814 is actually a fossil taxon, although this binomen has been used by past authors to identify the living species *Turritella turbona* Monterosato, 1877 (e.g. Di Geronimo, 1974; Caprotti, 1975). Bitar & Kouli-Bitar (1998) incorrectly listed previous Pallary records of this taxon as *Turritella communis* Risso, 1826.

## Family TRIPHORIDAE Gray, 1847

\* *Marshallora adversa* (Montagu, 1803)

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 4 sh (BBCD) (Fig. 2D).

*Metaxia metaxa* (delle Chiaje, 1828)

### Literature records:

*Cerithiopsis metaxae* [sic! for *metaxa* (see delle Chiaje, 1829: 222)] delle Chiaje - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; Bitar, 1996: 119; *Cerithiopsis (Metaxia) metaxai* [sic!] Delle Chiaje - Pallary, 1938: 35; *Metaxia metaxae* [sic!] (delle Chiaje, 1828) - Bitar & Kouli-Bitar, 1998: 38.

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 1 sh (BBCD); (9) Selaata: 23/10/1999 - cave, tunnel roof, 7–8 m: 1 sh (BBCD); (16) Tabarja: 11/07/2003 - 12–18 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 6 sh (BBCD).

\* *Monophorus erythrosoma* (Bouchet & Guillemot, 1978)

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 2 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 6 sh (BBCD) (Fig. 2E).

*Monophorus perversus* (Linnaeus, 1758)

### Literature records:



*Triforis perversus* Linné - Pallary, 1912b: 172; Pallary, 1919: 170; *Trigoris* [sic! for *Triforis* (see Deshayes, 1824-1837: 429)] *perversa* [sic! for *perversus*] L. - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; *Triforis (Biforina) perversa* [sic!] Linné - Pallary, 1938: 32; *Triphora perversa* L. - Bitar, 1996: 119; *Monophorus perversus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 38.

**Material examined:**

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 3 sh (BBCD).

## Family CERITHIOPSIDAE H. Adams & A. Adams, 1853

\* *Cerithiopsis barleei* Jeffreys, 1867

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD) (Fig. 2F).

\* *Cerithiopsis nana* Jeffreys, 1867

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 4 sh (BBCD) (Fig. 2G).

**A** - *Cerithiopsis pulvis* (Issel, 1869)

**Literature records:**

*Cerithiopsis pulvis* (Issel, 1869) - Bogi & Khairallah, 1987: 56; *Cerithiopsis pulvis* - Bitar, 2012: 8; *Nanopsis pulvis* (Issel, 1869) - Bitar, 2014: 44.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 5 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Hawieh El Jouani, 14 m: 3 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 2 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 14 sh (BBCD).

**First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

\* **A** - *Cerithiopsis tenthrenois* (Melvill, 1896)

**Material examined:**

(9) Selaata: 23/10/1999 - cave, tunnel roof, 7–8 m: 1 sh (BBCD) (Fig. 2H).

**First record date:**

First found in 1999 (see Material examined).

*Cerithiopsis tubercularis* (Montagu, 1803) complex

**Literature records:**

*Cerithiopsis tubercularis* Montagu - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; Pallary, 1938: 35; Bitar, 1996: 119; *Crithiopsis* [sic! for *Cerithiopsis* (see Forbes & Hanley, 1851: 364)] *clarki* [sic! for *clarkii* (see Forbes & Hanley, 1851: 368)] Hanley [sic! for Forbes & Hanley (see Forbes & Hanley, 1851: 368)] - Pallary, 1938: 35; *Cerithiopsis clarki* [sic!] Hanley [sic!] - Bitar, 1996: 119; *Cerithiopsis tubercularis* (Montagu, 1803) - Bitar & Kouli-Bitar, 1998: 38.

**Remarks:**

The identity of *Cerithiopsis clarkii*, conditionally introduced by Forbes & Hanley (1851), has been long debated, and the taxon has been eventually accepted as representing a terathological specimen of *Cerithiopsis tubercularis* (Montagu, 1803) (see discussions in Bouchet et al., 2010). More recently, molecular data suggested that specimens previously ascribed to *Cerithiopsis tubercularis* (Montagu, 1803) comprise a complex of cryptic species (Modica et al., 2013), and thus we keep literature records and new unpublished material examined as “*Cerithiopsis tubercularis* (Montagu, 1803) complex”.

\* *Dizoniopsis concatenata* (Conti, 1864)

**Material examined:**

(9) Selaata: 06/07/2003 - cliff, 35 m: 1 sh (BBCD) (Fig. 2I); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 4 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

\* *Dizoniopsis coppolae* (Aradas, 1870)

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 10 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 4 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 4 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 9 sh (BBCD) (Fig. 2J).

## Family EPITONIIDAE Berry, 1910 (1812)

### *Epitonium clathrus* (Linnaeus, 1758)

#### Literature records:

*Scalaria communis* Lamarck - Pallary, 1912b: 173; Bitar, 1996: 119; *Scalaria communis* var. *minor* P. - Pallary, 1919: 171; *Scalaria (Clathrus) communis* Lk. - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; *Scalaria (Clathrus) communis* Lamarck var. *minor* Ply 1900 - Pallary, 1938: 40; *Epitonium commune* (Lamarck, 1822) - Bitar & Kouli-Bitar, 1998: 39.

#### Material examined:

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD).

### *Epitonium turtonis* (Turton, 1819)

#### Literature records:

*Scalaria tenuicosta* Michaud - Pallary, 1912b: 173; Bitar, 1996: 119; *Scalaria tenuicosta* Michaud var. *minor-variegata* Mts. - Pallary, 1919: 171; *Scalaria (Fuscocala) tenuicosta* Mich. - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 444; *Scalaria (Fuscocala) tenuicosta* Michaud var. *minor-variegata* Monts. 1878 - Pallary, 1938: 40; *Scalaria (Fuscocala) tenuicosta* Michaud var. *strigata* Ply - Pallary, 1938: 41; *Epitonium turtonis* (Turton, 1819) - Bitar & Kouli-Bitar, 1998: 39.

### *Gyroscala lamellosa* (Lamarck, 1822)

#### Literature records:

*Scalaria commutata* Monterosato - Pallary, 1919: 171; *Scalaria (Opalia) commutata* di Monterosato - Pallary, 1938: 40; *Scalaria commucata* [sic! for *commutata* (see Monterosato, 1877a: 420)] Monterosato - Bitar, 1996: 119; *Gyroscala lamellosa* (Lamarck, 1822) - Bitar & Kouli-Bitar, 1998: 39, 42.

### *Janthina janthina* (Linnaeus, 1758)

#### Literature records:

*Janthina prolongata* - sensu Mougéot, 1848: 718; *Janthina communis* Lamk. - Puton, 1856: 223; *Janthina bicolor* Menke - Pallary, 1912b: 173; Pallary, 1919: 171; Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 448; *Janthina (Iodes) bicolor* Menke - Pallary, 1938: 40; *Janthina (Iodes) bicolor* Menke var. *minor* Monts. 1878 - Pallary, 1938: 40.

#### Remarks:

The Lebanese record of *Janthina prolongata* Blainville, 1822 by Mougeot (1848) was subsequently corrected by Puton (1856) as belonging to *Janthina communis* Lamarck, 1822, which is in turn a junior synonym of *Janthina janthina* (Linnaeus, 1758).

### *Janthina globosa* Swainson, 1822

#### **Literature records:**

*Janthina nitens* Menke - Pallary, 1919: 171; *Janthina (Iodes) nitens* Menke - Pallary, 1938: 40.

## **Family EULIMIDAE Philippi, 1853**

### *Eulima glabra* (da Costa, 1778)

#### **Literature records:**

*Subularia subulata* Donovan - Pallary, 1938: 41; Bitar, 1996: 119; *Eulima glabra* (da Costa, 1778) - Bitar & Kouli-Bitar, 1998: 39.

### *Melanella boscii* (Payraudeau, 1826)

#### **Literature records:**

*Eulima polita* Linné - *sensu* Pallary, 1919: 171; *Eulima polita* L. - *sensu* Gruvel & Moazzo, 1929: 422; *sensu* Moazzo, 1931: 445; *Eulima polita* L. var. *brevis* - *sensu* Gruvel & Moazzo, 1929: 422; *sensu* Moazzo, 1931: 445; *Eulima boscii* Payraudeau = *polita* auct. - Pallary, 1938: 41; *Eulima polita* auct. - Bitar, 1996: 119.

#### **Remarks:**

According to Pallary (1938: 41), his previous (Pallary, 1919) Lebanese records of *Turbo politus* Linnaeus, 1758, subsequently reported also by Gruvel & Moazzo (1929) and Moazzo (1931), are to be referred to *Melanella boscii* (Payraudeau, 1826).

### *Melanella polita* (Linnaeus, 1758)

#### **Literature records:**

*Eulima intermedia* Cantraine - Pallary, 1919: 171; Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; Pallary, 1938: 41; Bitar, 1996: 119; *Melanella polita* (Linnaeus, 1758) - Bitar & Kouli-Bitar, 1998: 39.

\* *Parvioris ibizenca* (Nordsieck, 1968)

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD) (Fig. 2K); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

\* **C** - *Sticteulima clandestina* Mifsud & Ovalis 2019

**Material examined:**

(14) Jbail: 17/10/1999 - Tablieh, small cave, 16 m: 1 sh (BBCD) (Fig. 2L).

**Remarks:**

This species has been recently described from the Mediterranean Sea (Mifsud & Ovalis, 2019). It may be an overlooked native taxon or a new Lessepsian immigrant, and therefore we prefer to list it as cryptogenic.

\* **C** - *Sticteulima* sp.

**Material examined:**

(9) Selaata: 18/10/1999 - small caves and overhangs, 3–8 m: 1 sh (BBCD) (Fig. 2M).

**Remarks:**

Shell elongated, with 10 slightly convex whorls, smooth and glossy, seemingly white (although the shell is not extremely fresh). Aperture piriform, outer lip convex when seen from the side. The single specimen is distinguished from the native *Sticteulima jeffreysiana* (Brusina, 1869) by having a sharper apex and a rounded anterior edge of the aperture; it is very similar to the alien taxon recorded as *Sticteulima* cf. *lentiginosa* (A. Adams, 1861) from southern Turkey (Tringali, 1994) and Cyprus (Buzzurro & Greppi, 1997), but it lacks the pattern of diffuse small reddish-orange dots and the whorls are more neatly convex. It also differs from *Sticteulima* sp. recently recorded from Turkey (Ovalis & Mifsud, 2015) in the more neatly convex whorls and the lack of two coloured spiral bands. However, the latter is also extremely similar to juveniles of the native *Eulima bilineata* Alder, 1848, and therefore even its attribution to the genus *Sticteulima* Laseron, 1955 requires further investigations.

**First record date:**

First found in 1999 (see Material examined).

**Family LITTORINIDAE Children, 1834**

## *Echinolittorina punctata* (Gmelin, 1791)

### Literature records:

*Littorina syriaca* Phill. [sic! for Philippi] - Puton, 1856: 223; *Littorina punctata* Gmelin = *syriaca* Philippi - Pallary, 1912b: 173; Pallary, 1919: 170; Pallary, 1938: 37; *Littorina punctata* Gmelin - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 445; Bitar, 1996: 119; *Melaraphe* [sic! for *Melarhappe* (see Menke, 1828: 23)] *punctata* - Dalongeville, 1977: 28–30; *Littorina punctata* Gmelin - Nuwayhid et al., 1985: 9; *Littorina punctata* - Bitar & Kouli-Bitar, 1995a: 19; Bitar & Kouli-Bitar, 1995b: 19; *Nodilittorina punctata* (Gmelin, 1791) - Bitar & Kouli-Bitar, 1998: 39, 42; *Echinolittorina punctata* - Ramos-Esplá et al., 2015: 80–82 (figures 77–78); Ramos-Esplá et al., 2017: 53 (figures 6.2–6.3), 106; *Echinolittorina punctata* (Gmelin, 1791) - Ramos-Esplá et al., 2015: 157, 167, 181, 191, 202, 211; Ramos-Esplá et al., 2017: 94; Badreddine et al., 2019: 140.

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (11) Batroun: 20/10/1999 - old town, “Phenician wall”, sea level: 1 lv (BBCD).

## *Melarhappe neritoides* (Linnaeus, 1758)

### Literature records:

*Littorina caerulea* [sic! for *caerulea* (see Lamarck, 1822b: 49)] Lamk. - Puton, 1856: 223; *Littorina neritoides* Linné - Pallary, 1912b: 173; Pallary, 1919: 170; *Littorina neritoides* [sic! for *neritoides* (see Linnaeus, 1758: 761)] L. - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 445; *Littorina* (*Melaraphe* [sic! for *Melarhappe* (see Menke, 1828: 23)]) *neritoides* Linné - Pallary, 1938: 37; *Littorina neritoides* Linnaeus - Shiber, 1980: 147; *Littorina neritoides* Linné - Nuwayhid et al., 1985: 9; *Littorina neritoides* L. - Bitar, 1996: 119; *Melaraphe* [sic!] *neritoides* - Bitar & Kouli-Bitar, 1995a: 19; Bitar & Kouli-Bitar, 1995b: 19; *Melaraphe* [sic!] *neritoides* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 42; *Melarhappe neritoides* - Ramos-Esplá et al., 2015: 80 (figure 77); Ramos-Esplá et al., 2017: 53 (figure 6.2), 106; *Melarhappe neritoides* (Linnaeus, 1758) - Ramos-Esplá et al., 2015: 158, 168, 182, 191, 202, 211; Ramos-Esplá et al., 2017: 94; Badreddine et al., 2019: 140.

### Material examined:

(11) Batroun: 20/10/1999 - old town, “Phenician wall”, sea level: 1 lv (BBCD).

### Remarks:

*Turbo caerulea sensu* Lamarck, 1822 (not *Littorina caerulea* Woods, 1879), recorded from Lebanon by Puton (1856), is a junior synonym of *Melarhappe neritoides* (Linnaeus, 1758) (see Reid & Williams, 2004), as also confirmed by the reported (Puton, 1856) synonymy with *Littorina basterotii* Payraudeau and *Paludina glabrata* Pfeiffer, both junior synonyms of *Melarhappe neritoides* (Linnaeus, 1758).

## Family RISSOIDAE Gray, 1847

\* *Alvania amatii* Oliverio, 1986

### Literature records:

*Rissoa (Alvania) subcrenulata* Schwartz [sic! for Bucquoy, Dautzenberg & Dollfus (see Bucquoy, Dautzenberg & Dollfus, 1882-1886: 293)] - *sensu* Pallary, 1938: 38; *Rissoa subcrenulata* Schwartz [sic!] - *sensu* Bitar, 1996: 117; *Alvania subcrenulata* (B., D. & D., 1884) - *sensu* Bitar & Kouli-Bitar, 1998: 39.

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 7 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 3 sh (BBCD) (Fig. 2N); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 12 sh (BBCD); 23/10/1999 - cave, tunnel roof, 7–8 m: 1 sh (BBCD).

### Remarks:

The complex of *Alvania subcrenulata* (Bucquoy, Dautzenberg & Dollfus, 1884) is represented in the easternmost Mediterranean by *Alvania amatii* Oliverio, 1986, which can be diagnosed by its protoconch with 4-5 spiral cords (*vs* one apical keel with tubercles in *A. subcrenulata*), its slightly smaller size and its more cylindrical outline (Amati, 2014). Therefore, literature records of *A. subcrenulata* from Lebanon must be referred to *A. amatii*.

\* *Alvania colossophilus* Oberling, 1970

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 15 sh (BBCD) (Fig. 2O); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 9 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 22 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 39 sh (BBCD).

*Alvania datchaensis* Amati & Oliverio, 1987

### Literature records:

*Rissoa (Alvania) aspera* Philippi - *sensu* Pallary, 1919: 170; *sensu* Pallary, 1938: 38; *sensu* Gruvel & Moazzo, 1929: 425; *sensu* Moazzo, 1931: 448; *Rissoa aspera* Phil. - *sensu* Pallary, 1933: 152; *Rissoa (Alvania) aspera* Philippi var. *minor* Piry - *sensu* Pallary, 1938: 38; *Rissoa aspera* Philippi - *sensu* Bitar, 1996: 117; *Alvania aspera* (Philippi, 1844) - *sensu* Bitar & Kouli-Bitar, 1998: 39.

### Material examined:

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 1 sh (BBCD); 01/06/2000 - sand, 13–14 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 2 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 4 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 8 sh (BBCD).

**Remarks:**

*Alvania aspera* (Philippi, 1844) and *Alvania fractospira* Oberling, 1970 do not occur in the easternmost Mediterranean (M. Oliverio & B. Amati, unpublished pers. obs.). Therefore, literature records of *A. aspera* from Lebanon must actually be referred to *A. datchaensis*, which is diagnosed by its bright teleoconch surface, devoid of a microsculpture; the spirals and axials slightly broader and less elevated (particularly on the first whorls); the much weaker outer lip varix even in fully mature specimens; the spiral cordlets equidistant; the protoconch with a typical pattern of zig-zag spiral threads (Amati, 2012).

*Alvania dictyophora* (Philippi, 1844)

**Literature records:**

*Rissoa (Alvinia) dictyophora* Philippi - Pallary, 1919: 170; Pallary, 1938: 39; *Rissoa dictyophora* Philippi - Bitar, 1996: 117; *Alvania dictyophora* (Philippi, 1844) - Bitar & Kouli-Bitar, 1998: 39.

**Remarks:**

We are not aware of reliable/confirmed records of *Alvania dictyophora* from the Levant basin. *A. oliverioi* Buzzurro, 2003, known so far only from Cyprus, could be confounded, but differs from *A. dictyophora* in its smaller size and the more delicate sculpture (Buzzurro, 2003). Some coloured specimens of *A. amatii* may recall the species of the *A. dictyophora* complex, but differ in the stronger sculpture of the teleoconch, with fewer spiral cords on the last whorl, and the weaker sculpture on the protoconch (cf. Palazzi & Villari, 2001: figs 22–31).

\* *Alvania perversa* F. Nordsieck, 1972

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 4 sh (BBCD); 01/06/2000 - sand, 13–14 m: 10 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 3 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 4 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 5 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 24 sh (BBCD) (Fig. 2P).

**Remarks:**



This taxon has been identified until recently as *Alvania dorbignyi* (Audouin, 1826). However, as shown by Amati et al. (2019), the holotype of *Rissoa dorbignyi* Audouin, 1826 (see also Bouchet & Danrigal, 1982) is not conspecific with the Mediterranean specimens usually ascribed to this nominal taxon, for which the name *Alvania perversa* F. Nordsieck, 1972 (originally introduced as *Alvania dorbignyi perversa* from Haifa: Nordsieck, 1972a; 1972b) is available.

### *Alvania geryonia* (Nardo, 1847)

#### **Literature records:**

*Rissoa (Acinus) geryonia* (Chiereghini) Brusina [sic! for Nardo (see Nardo, 1847: 75-76)] - Pallary, 1938: 38; *Rissoa (Acinus) geryonia* (Chiereghini) Brusina [sic!] var. *alba* Piry - Pallary, 1938: 38; *Rissoa geryonia* (Chiereghini) Brusina [sic!] - Bitar, 1996: 117; *Alvania geryonia* (Nardo, 1847) - Bitar & Kouli-Bitar, 1998: 39.

#### **Material examined:**

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 3 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 1 sh (BBCD).

### *Alvania hispidula* (Monterosato, 1884)

#### **Literature records:**

*Rissoa (Acinus) clathrata* Philippi - Pallary, 1919: 170; Pallary, 1938: 38; *Rissoa clathrata* Philippi - Bitar, 1996: 117; *Alvania hispidula* (Monterosato, 1884) - Bitar & Kouli-Bitar, 1998: 39.

### *Alvania lineata* Risso, 1826

#### **Literature records:**

*Rissoa (Alvania) lineata* Risso - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; Pallary, 1938: 38; *Rissoa lineata* Risso - Bitar, 1996: 117; *Alvania lineata* Risso, 1826 - Bitar & Kouli-Bitar, 1998: 39.

### *Alvania mamillata* Risso, 1826

#### **Literature records:**

*Rissoa (Acinus) cimex* var. *minor* Loc. et Caz. - *sensu* Pallary, 1919: 170; *Rissoa (Acinus) cimex* Linné - *sensu* Gruvel & Moazzo, 1929: 424; *sensu* Moazzo, 1931: 448; *Rissoa (Acinus) cimex* L. var. *depauperata* Monterosato - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; *Rissoa (Acinus) cimex* Linné var. *minor* Loc. et Caz. 1900 [sic! for 1901 (see Locard & Caziot, 1900-1901: 47)] - *sensu* Pallary, 1938: 38; *Rissoa (Acinus) cimex* Linné var. *depauperata* Monts. 1884 [sic! for 1877 (see Monterosato, 1877b: 34)] - Pallary, 1938: 38; *Alvania cimex* (Phil. [sic! for Linnaeus (see

Linnaeus, 1758: 761)]; *Rissoa cimex* L. - *sensu* Bitar, 1996: 117; *Alvania cimex* Philippi [sic!] - *sensu* Bitar, 1996: 121.

#### **Material examined:**

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 15 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 50 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 9 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand, 3 m: 19 sh (BBCD); sand in *Cymodocea* meadow, 4 m: 19 sh (BBCD); (7) Ras El Chakaa: 19/10/1999 - cave, 3–5 m: 1 sh (BBCD); 04/06/2000 - cave sediment, 3–4.5 m: 36 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 24 sh (BBCD); 23/10/1999 - 5–10 m: 1 sh (BBCD); cave, tunnel roof, 7–8 m: 41 sh (BBCD); 06/07/2003 - cliff, 35 m: 1 sh (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, concretions, 9 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 41 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 3 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 51 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 40 sh (BBCD).

#### **Remarks:**

*Alvania cimex* (Linnaeus, 1758) has been often considered the sister species of *Alvania mamillata* Risso, 1826, from which it mostly differs in its multispiral protoconch, indicating a planktotrophic development (Verduin, 1986), and its usually larger shell sizes. Gofas & Oliver (2012) and Oliver et al. (2015) recently considered *A. cimex* and *A. mamillata* as synonyms, whilst the study by Criscione et al. (2017) highlighted the necessity of further studies within this putative complex of species. However, we still prefer to keep them here as separated, as already done in other recent papers (Bitlis & Öztürk, 2017), waiting for further molecular analysis aiming to elucidate their taxonomic status. While we have found *A. mamillata* rather common in the entire eastern Mediterranean (including Lebanon), we are not aware of any confirmed record of *A. cimex* (or at least of specimens to be morphologically ascribed to this taxon) from the easternmost Levant basin (see van Aartsen & Kinzelbach, 1990; Amati et al., 2017b for similar discussions). We thus strongly suspect that the literature records under this name from Lebanon should actually be referred to *A. mamillata*, as also suggested by records belonging to variety *minor* (now in synonymy of *A. cimex*) and variety *depauperata* (now in synonymy of *A. mamillata*).

\* *Alvania* sp.

#### **Literature records:**

*Rissoa (Alvania) montagui* Payraudeau var. *minor* Requier - *sensu* Pallary, 1919: 170; Pallary, 1938: 38; *Rissoa (Alvania) montagui* Payraudeau var. *fulva* Requier - *sensu* Pallary, 1938: 38; *Rissoa (Alvania) montagui* Payraudeau var. *flavescens-fasciata* Requier - *sensu* Pallary, 1938: 38; *Rissoa montagui* Payraudeau - *sensu* Bitar, 1996: 117; *Alvania discors* (Allan, 1818) - *sensu* Bitar & Kouli-Bitar, 1998: 39.

#### **Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4–5 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD) (Fig. 2Q); (23) Saida: 05/06/2000 - off Nahr El

Ouali, sand, 31 m: 1 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 1 sh (BBCD).

**Remarks:**

The specimens here examined recall *Alvania discors* (Allan, 1818) in outline and color, whereas their sculpture (strength and number of spirals and axials) is more similar to *Alvania perversa* F. Nordsieck, 1972 (see above for discussions on this species). We refrain here from describing a new taxon until more and fresher material is available to check its actual separation from *A. perversa*. Due to the absence in our samples of *A. discors*, we suspect that previous Lebanese records of *Alvania montagui* (Payraudeau, 1826), subsequently moved to *A. discors* by Bitar & Kouli-Bitar (1998), actually refer to this taxon.

\* *Crisilla cf. semistriata* (Montagu, 1808)

**Material examined:**

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 2 sh (BBCD) (Fig. 2R).

**Remarks:**

The two specimens have the protoconch not perfectly readable and although it seems blunter than in typical *Crisilla semistriata* (Montagu, 1808) it looks still multispiral; the teleoconch fits *C. semistriata*.

*Pusillina marginata* (Michaud, 1830)

**Literature records:**

*Pusillina margiminia* (Nordsieck, 1972) - Bogi & Khairallah, 1987: 58, 60 (fig. 3).

**Material examined:**

(1) Ramkine Island: 31/05/2000 - 13 m: 1 sh; (9) Selaata: 18/10/1999 - cave sediment, 9 m: 9 sh; (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 6 sh; (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 9 sh.

\* *Pusillina munda* (Monterosato, 1884)

**Material examined:**

(1) Ramkine Island: 31/05/2000 - 13 m: 3 sh (Fig. 2S); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh.

\* *Pusillina philippi* (Aradas & Maggiore, 1844)

**Material examined:**

(1) Ramkine Island: 31/05/2000 - 13 m: 3 sh; (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh; (9) Selaata: 18/10/1999 - cave sediment, 9 m: 7 sh (Fig. 2T); (12) Kfar Abida: 06/08/1995 - 10–12 m: 1 sh; (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 2 sh.

### *Pusillina radiata* (Philippi, 1836)

#### **Literature records:**

*Rissoa simplex* n. sp. - Philippi, 1844: 129; *Rissoa* (*Turbela* [sic! for *Turboella* (see Gray, 1847a: 271)]) *simplex* Philippi - Pallary, 1912b: 173; *Rissoa* (*Turbella* [sic!]) *simplex* Philippi - Pallary, 1919: 170; Pallary, 1938: 38; *Rissoa* (*Turbela* [sic!]) *simplex* Phil. - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; *Rissoa simplex* Philippi - Bitar, 1996: 117; *Pusillina radiata* (Philippi, 1836) - Bitar & Kouli-Bitar, 1998: 39.

#### **Material examined:**

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh.

### *Rissoa lia* (Monterosato, 1884)

#### **Literature records:**

*Rissoa* (*Apicularia*) *lia* Benoit [sic! for Monterosato (see Monterosato, 1884b: 139)] - Pallary, 1919: 170.

#### **Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh.

### *Rissoa monodonta* Philippi, 1836

#### **Literature records:**

*Rissoa* (*Schwarzia* [sic! for *Schwartzia* Bucquoy, Dautzenberg & Dollfus, 1884 (see Bucquoy, Dautzenberg & Dollfus, 1882-1886: 278)] *monodonta* Bivona [sic! for Philippi (see Philippi, 1836: 151)] var. *minor* Piry 1900 - Pallary, 1938: 38; *Rissoa monodonta* Bivona [sic!] - Bitar, 1996: 117; *Rissoa hyalina* Fréminville [sic! for Desmarest (see Desmarest, 1814: 8)] - Bitar & Kouli-Bitar, 1998: 39.

#### **Remarks:**

Early Lebanese records of *Rissoa monodonta* Bivona actually refer to *Rissoa monodonta* Philippi, 1836. Despite *R. monodonta* being often ascribed to Bivona, this binomen was originally introduced by Philippi (1836), based on Bivona material (see Verduin, 1983 for discussions). Later on, Bitar & Kouli-Bitar (1998) listed previous Lebanese records as *Rissoa hyalina* Fréminville [sic!]. *Rissoa hyalina* Desmarest, 1814 has been often considered in the past as a senior synonym of *R. monodonta*, but it is currently regarded as a *nomen dubium* (Verduin, 1983).

\* *Rissoa scurra* (Monterosato, 1917)

**Material examined:**

(9) Selaata: 18/10/1999 - cave sediment, 9 m: 4 sh (Fig. 2U); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh.

*Rissoa similis* Scacchi, 1836

**Literature records:**

*Rissoa (Apicularia) similis* Scacchi - Pallary, 1938: 38; *Rissoa similis* Scacchi - Bitar, 1996: 117; *Rissoa similis* Scacchi, 1836 - Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - 13 m: 2 sh; (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 5 m: 3 sh; (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 3 sh; (9) Selaata: 13/10/1999 - tunnel sediment, 7–8 m: 2 sh; 18/10/1999 - cave sediment, 9 m: 4 sh; 23/10/1999, 7–8 m: 1 sh.

*Rissoa variabilis* (Von Mühlfeldt, 1824)

**Literature records:**

*Rissoa (Persephona) variabilis* Mlfed. - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; *Rissoa variabilis* Mühlfeldt - Bitar, 1996: 117; *Rissoa variabilis* (Von Mühlfeldt, 1824) - Bitar & Kouli-Bitar, 1998: 39.

## **Family RISSOINIDAE Stimpson, 1865**

\* **A** - *Rissoina bertholleti* Issel, 1869

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 3 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 4 sh (BBCD) (Fig. 2V); (6) El Heri (marina Beaulieu): 03/06/2000 - sand, 1–5 m: 3 sh (BBCD); sand in *Cymodocea* meadow, 4 m: 1 lv, 1 sh (BBCD); (8) Chak El Hatab: 05/06/2003 - 6–10 m: 1 sh (BBCD); (9) Selaata: 06/07/2003 - under stones, 6–7 m: 1 lv (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, concretions, 9 m: 3 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 39 sh (BBCD); 15 m: 1 sh (BBCD).

**First record date:**

First found in 1999 (see Material examined).

*Rissoina bruguieri* (Payraudeau, 1826)**Literature records:**

*Rissoina bruguieri* [sic! for *bruguieri* (see Payraudeau, 1826: 113)] Payraudeau - Pallary, 1919: 170; Pallary, 1938: 39; Bitar, 1996: 117; *Rissoina bruguieri* [sic!] Payr. - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; *Rissoina bruguieri* [sic!] Payraudeau var. *minor* Requien 1848 - Pallary, 1938: 39; *Rissoina bruguieri* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 9 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 15 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 15 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 22 sh (BBCD).

**Family BARLEEIIDAE Gray, 1857***Barleeia unifasciata* (Montagu, 1803)**Literature records:**

*Barleeia rubra* Adams - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; *Barleeia rubra* Montagu [sic! for Adams (see Adams, 1797: 66)] - Pallary, 1938: 39; Bitar, 1996: 117; *Barleeia unifasciata* (Montagu, 1803) - Bitar & Kouli-Bitar, 1998: 39.

**Family CAECIDAE Gray, 1850***Caecum auriculatum* de Folin, 1868**Literature records:**

*Caecum syriacum* (de Fol.) - de Folin in de Folin & Périer, 1869: 114-115, pl. XI (figs. 7-8); *Caecum syriacum* (n. sp.) (de Fol.) - de Folin in de Folin & Périer, 1875: 350; *Caecum syriacum* de Folin - Pallary, 1912b: 173; Pallary, 1919: 170; Panetta, 1980: 285-286, 293 (fig. 5: holotype); *Caecum syriacum* de Folin - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 448; Pallary, 1938: 37;

*Caecum syriacum* de Folin, 1869 - Van Aartsen, 1977: 15; Pizzini et al., 1995: 79, 83 (figs. 7-9: holotype and labels); *Caecum syriacum* Folin - Bitar, 1996: 117; *Caecum auriculatum* de Folin, 1868 - Bitar & Kouli-Bitar, 1998: 39.

\* *Caecum trachea* (Montagu, 1803)

**Material examined:**

(14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (BBCD) (Fig. 2W).

**Family TORNIDAE Sacco, 1896 (1884)**

\* *Tornus mienisi* van Aartsen, Carrozza & Menkhorst, 1998

**Material examined:**

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD) (Fig. 3A).

*Tornus subcarinatus* (Montagu, 1803)

**Literature records:**

*Adeorbis subcarinatus* (Mont.) - Brusina in de Folin & Périer, 1875-1879: 30; *Adeorbis subcarinatus* Montagu - Pallary, 1919: 171; Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; Pallary, 1938: 40; Bitar, 1996: 117; *Tornus subcarinatus* (Montagu, 1803) - Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD).

**Family TRUNCATELLIDAE Gray, 1840**

*Truncatella subcylindrica* (Linnaeus, 1767)

**Literature records:**

*Truncatella truncatula* Drap. - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; Bitar, 1996: 117; *Truncatella subcylindrica* Linné = *truncatula* Draparnaud var. *laevigata* Risso - Pallary, 1938: 39; *Truncatella subcylindrica* (Linné, 1767) - Bitar & Kouli-Bitar, 1998: 39.

## Family VERMETIDAE Rafinesque, 1815

### *Dendropoma anguliferum* (Monterosato, 1878)

#### Material examined:

(9) Selaata: 23/10/1999 - surface: >100 lv specimens observed (GB & HZ); (11) Batroun: 15/07/2003 - surface: >100 lv specimens observed (GB & HZ); (25) Khaizaran: 03/04/2010 - surface: >100 lv specimens observed (GB & HZ).

#### Literature records:

*V. anguliferus*, Monts. = *V. glomeratus*, var. *angulifera*, Monts. - Monterosato, 1878: 89; *Vermetus cristatus* Biondi - *sensu* Pallary, 1919: 170; *sensu* Bitar, 1996: 117; *Vermetus (Spiroglyphus) cristatus* Biondi - *sensu* Pallary, 1938: 37; *Vermetus (Siphonium) anguliferum* [sic! for *anguliferus* (see Monterosato, 1878: 89)] di Monterosato - Pallary, 1938: 37; *Vermetus anguliferus* di Monts - Pallary, 1938: plate II (fig. 3); *Dendropoma petraeum* (Monterosato) - *sensu* Févret & Sanlaville, 1965: 117; *sensu* Févret & Sanlaville, 1966: 357; *Dendropoma petraeus* [sic! for *petraeum*] Monterosato [sic! for Monterosato] - *sensu* Dalongeville, 1977: 26; *Dendropoma petraeum* - *sensu* Bitar & Kouli-Bitar, 1995a: 19; *sensu* Morhange et al., 2006: 103; *sensu* Bitar et al., 2007: 437; *sensu* Ramos-Esplá et al., 2015: 60, 80, 82, 84, 122, 125, 127–128; *Vermetus anguliferus* Monterosato - Bitar, 1996: 117; *Dendropoma (Novastoa) petraeum* Monterosato - *sensu* Sanlaville et al., 1997: 390; *Dendropoma anguliferum* (Monterosato, 1884 [sic! for 1878]) - Bitar & Kouli-Bitar, 1998: 39; *Dendropoma petraeum* (Monterosato, 1884) - *sensu* Bitar & Kouli-Bitar, 1998: 42; *sensu* Ramos-Esplá et al., 2015: 65 (figure 56), 157, 167, 181, 211; *sensu* Ramos-Esplá et al., 2017: 29 (figure 5.12), 54, 72, 76, 94, 106; *Dendropoma anguliferum* (Monterosato, 1878) - Badreddine et al., 2019: 137.

#### Remarks:

Calvo et al. (2009) showed that specimens previously ascribed to *Dendropoma petraeum* (Monterosato, 1884) comprise a complex of cryptic species. Subsequently, Templado et al. (2016) accepted that *Dendropoma petraeum* (Monterosato, 1884) is a junior synonym of *Dendropoma cristatum* (Biondi, 1859), as previously proposed by Scuderi (1995), and suggested that *Dendropoma anguliferum* (Monterosato, 1878) was originally described from Tripoli (Lebanon). Monterosato (1884a) did not specify if “Tripoli” referred to either the Lybian or the Lebanese locality. We have screened Monterosato literature (see Giannuzzi-Savelli, 1982; 1983; 1984; 1989), and noticed that he widely used “Tripoli” for the Lybian one, whilst no certainties occur about its explicit usage for the Lebanese one, which was almost always included generally in the “Syria” geographic area, without specifying localities. Appolloni et al. (2018) also discussed this issue,



and kept the type locality of this taxon in Lybia. However, Monterosato obtained this species from Capt. Henri Gaudion, and there is thus good evidence that he collected this material during his service with the French line “Messageries Maritimes” which served at that time several localities, including Lebanon — in the “ligne du Levant” calling at Mersin, Alexandrette (now Iskenderun), Lattaquieh, Tripoli, Jaffa (now Haifa), Alexandria, and back to Marseille (Vayssière, 1903; S. Gofas and P. Bouchet, pers. comm.). Therefore, we include *D. anguliferum* among “Gastropod nominal taxa historically described on type material from Lebanon and/or used for Lebanese material” (Appendix 5). Finally, assuming the Lebanese Tripoli as the type locality of *D. anguliferum*, as done by Templado et al. (2016), maintains nomenclatural stability, whereas a different one would yield several nomenclatural problems.

### *Petalococonchus glomeratus* (Linnaeus, 1758)

#### **Literature records:**

*Vermetus* (*Petalococoncha* [sic! for *Petalococonchus* (see Lea, 1843: 162)]) *subcancellatus* Bivona - Pallary, 1938: 36; *Vermetus* (*Petalococoncha*) *subcancellatus* Bivona var. *intortiformis* Monts. 1892 - Pallary, 1938: 36; *Vermetus surbcancellatus* [sic! for *subcancellatus* (see Bivona-Bernardi, 1832: 7)] - Bitar, 1996: 117; *Petalococonchus glomeratus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 42; *Petalococonchus glomeratus* - Bitar et al., 2007: 437.

### *Thylacodes arenarius* (Linnaeus, 1758)

#### **Literature records:**

*Vermetus gigas* Bivona - Pallary, 1919: 170; Pallary, 1938: 36; Bitar, 1996: 117; *Vermetus polyphragma* Sasso [sic! for Sassi - typesetting error even in the original paper (see Sassi, 1827)] - Pallary, 1919: 170; Pallary, 1938: 36; Bitar, 1996: 117; *Vermetus* (*Serpulorbis*) *gigas* Bivona - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; *Vermetus gigas* Bivona var. *minor* Requien - Pallary, 1938: 36; *Vermetus horridus* di Monterosato - Pallary, 1938: 36; *Vermetus horridus* di Monterosato var. *minor* Ply - Pallary, 1938: 36; *Vermetus polyphragma* Sasso [sic!] var. *verrucosa* Monts. 1892 - Pallary, 1938: 36; *Vermetus polyphragma* Sasso [sic!] var. *verrucosa* Monts. 1892 subvar. *minor* - Pallary, 1938: 36; *Vermetus horridus minor* - Pallary, 1938: plate II (fig. 4); *Vermetus horridus* Monterosato - Bitar, 1996: 117; *Serpulorbis arenarius* (Linné, 1767 [sic! for 1758 (see Linnaeus, 1758: 787)]) - Bitar & Kouli-Bitar, 1998: 39, 42; *Serpulorbis arenarius* (Linnaeus, 1767 [sic!]) - Ramos-Esplá et al., 2015: 158, 168, 182, 202, 212; *Thylacodes arenarius* (Linnaeus, 1767 [sic!]) - Ramos-Esplá et al., 2017: 95; *Serpuloides* [sic! for *Serpulorbis* (see Sassi, 1827: 478)] *arenarius* - Ramos-Esplá et al., 2017: 101, 116.

#### **Material examined:**

(1) Ramkine Island: 14/10/2000 - cave: 1 lv (BBCD); (13) El Barbara: 08/06/2000 - overhang, 28 m: 1 sh (BBCD).

\* *Thylaeodus rugulosus* (Monterosato, 1878)

**Material examined:**

(1) Ramkine Island: 22/10/1999 - concretions, 13–14 m: 8 sh (BBCD) (Fig. 3B); 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (7) Ras El Chakaa: 19/10/1999 - cave, 3–5 m: 2 sh (BBCD); (8) Chak El Hatab: 21/09/2002 - cave, 12 m: 1 sh (BBCD); 05/07/2003 - cave, 12–14 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 2 sh (BBCD); 23/10/1999 - overhang, 6–7 m: 1 sh (BBCD); 14/09/2002 - cave, 21 m: 3 sh (BBCD); 06/07/2003 - cliff, 35 m: 4 sh (BBCD); (12) Kfar Abida: 30/04/2000 - cave, 7–8 m: 4 sh (BBCD); 30/05/2000 - tunnel, small cave, 7–8 m: 2 sh (BBCD); (13) El Barbara: 08/06/2000 - overhang, 26 m: 2 sh (BBCD); (18) Beirut: 21/10/1999 - Harf El Kalb, overhang with corals, 34 m: 1 sh (BBCD); 15/09/2002 - harbour jetty, breakwater, max 15 m: 8 sh (BBCD); max 20 m: 4 sh (BBCD); 25/09/2002 - airport, pillar jetty, 3–10 m: 11 lv, 4 sh (BBCD); (19) Raoucheh: 16/07/2003 - cave, 2–3 m: 2 sh (BBCD); (23) Saida: 05/06/2000 - Harf El Rijmeh, rocky bottom, 12 m: 2 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Hawieh El Jouani, 14 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - with *Madracis* sp., 42–43 m: 4 lv (BBCD); detritic sand, 44 m: 8 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, on rocks, 12 m: 1 sh (BBCD).

*Vermetus triquetrus* Bivona-Bernardi, 1832

**Literature records:**

*Vermetus (Bivonia) gregarius* Monts. - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 448; *Vermetus (Bivonia) triqueter* [sic! for *triquetrus* (see Bivona-Bernardi, 1832: 6)] Bivona - Gruvel & Moazzo, 1929: 425; Moazzo, 1931: 449; Pallary, 1938: 37; Dalongeville, 1977: 26; *Vermetus (Bivonia) gregarius* di Monterosato - Pallary, 1938: 37; *Vermetus triqueter* [sic!] (Bivona) - Févret & Sanlaville, 1965: 117; Févret & Sanlaville, 1966: 357; *Vermetus gregarius* Monterosato - Bitar, 1996: 117; *Vermetus triqueter* [sic!] Bivona - Bitar, 1996: 117; *Vermetus triqueter* [sic!] - Bitar & Kouli-Bitar, 1995a: 19; Bitar & Kouli-Bitar, 1995b: 19; *Vermetus triquetrus* Bivona Ant., 1832 - Bitar & Kouli-Bitar, 1998: 39, 42; *Vermetus triquetrus* - Ramos-Esplá et al., 2015: 83–84; Ramos-Esplá et al., 2017: 59, 106; *Vermetus triquetrus* Bivona-Bernardi, 1832 - Ramos-Esplá et al., 2015: 158, 212; Ramos-Esplá et al., 2017: 95; *Vermetus triquetrus* (Bivona-Bernardi, 1832) - Badreddine et al., 2019: 137.

**Family STROMBIDAE Rafinesque, 1815**

**A - *Conomurex persicus* (Swainson, 1821)**

**Literature records:**

*Strombus decorus raybaudi* K. Nicolay & E.R. Manoja, 1983 - Bogi & Khairallah, 1987: 56; *Strombus decorus* - *sensu* Bitar, 1996: 41; *sensu* Bitar, 2010: 452; *sensu* Bitar & Kouli-Bitar, 2001:

73; *Strombus decorus* (Röding, 1798) - *sensu* Bitar & Kouli-Bitar, 1998: 42; *Strombus persicus* Swainson, 1821 - Zibrowius & Bitar, 2003: 70; *Strombus persicus* - Bitar et al., 2007: 437; *Conomurex persicus* - Bitar, 2012: 8; *Conomurex persicus* (Swainson, 1821) - Bitar, 2014: 44; Ramos-Esplá et al., 2015: 157, 167, 173, 181, 188, 191, 195, 202, 211; Ramos-Esplá et al., 2017: 94; *Conomurex persicus* - La Porta et al., 2014: 167; Ramos-Esplá et al., 2015: 91, 93-94, 99, 104, 107, 109–110; Ramos-Esplá et al., 2017: 56, 101, 106, 111, 116.

#### **Material examined:**

(1) Ramkine Island: 31/05/2000 - 7 m: 1 sh (BBCD); coarse sand, 13 m: 54 sh (BBCD); cave entrance: 1 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 1 lv (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sortie Est, amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, surface: 1 sh (BBCD); sand in *Cymodocea* meadow, 5 m: 2 sh (BBCD); (7) Ras El Chakaa: 01/06/2000 - coarse sand, 13 m: 9 sh (BBCD); 21/09/2002 - coarse sand, 20 m: 3 lv (BBCD); (9) Selaata: 23/10/1999 - cave sediment, 7–8 m: 1 sh (BBCD); 23/10/1999 - 20 m: 3 sh (BBCD); (11) Batroun: 15/10/1999 - next to lab, snorkeling, 1–3 m: 23 lv (BBCD); (12) Kfar Abida: 30/04/2000 - 7–8 m: 1 sh (BBCD); 5–12 m: 1 sh (BBCD); (13) El Barbara: 08/06/2000 - overhang, 26 m: 1 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, concretions, 15 m: 7 lv, 1 sh (BBCD); Tablieh, small cave, concretions, 16 m: 1 sh (BBCD); Tablieh, 17 m: 1 sh (BBCD); (16) Tabarja: 11/07/2003 - 15 m: 3 sh (BBCD); (18) Beirut: 15/09/2002 - harbour jetty, inner side: 1 sh (BBCD); 25/09/2002 - airport, 6–18 m: 10 sh (BBCD); (19) Raoucheh: 17/09/2002 - 3 m: 1 sh (BBCD); boulders and rock, 7–10 m: 18 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD).

#### **First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

## **Family APORRHAIIDAE Gray, 1850**

### *Aporrhais pespelecani* (Linnaeus, 1758)

#### **Literature records:**

*Chenopus pes-pelecani* [sic! for *pes pelecani* (see Linnaeus, 1758: 742)] L. - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; *Chenopus pes pelecani* Linné - Pallary, 1938: 31; *Chenopus pes pelecani* Linné var. *minor* Fontannes 1882 [sic! for Bucquoy, Dautzenberg & Dollfus, 1884 (see Bucquoy, Dautzenberg & Dollfus, 1882-1886: 220, plate 23 - fig. 11 and Remarks below)] - Pallary, 1938: 32; *Chenopus pespelecani* [sic!] L. - Bitar, 1996: 119; *Aporrhais pespelecani* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39.

#### **Remarks:**

Fontannes (1879-1882) reported small sized Pliocene specimens from south-eastern France. Bucquoy, Dautzenberg & Dollfus (1882-1886) introduced a varietal name (var. *minor*) for this

entity. While in the text (Bucquoy, Dautzenberg & Dollfus, 1882-1886: 220) they assigned it to Fontannes, no formal description was ever provided by either Fontannes or B.D.D., and the variety was only listed as figured in plate 25 (sic! for 23) figure 11. On the contrary, in the plates (Bucquoy, Dautzenberg & Dollfus, 1882-1886: pl. 23, fig. 11), they assigned it to themselves. Therefore, we hereby assign it to Bucquoy, Dautzenberg & Dollfus, in agreement with recent literature (e.g.: Brunetti & Forli, 2013).

## Family VELUTINIDAE Gray, 1840

\* *Lamellaria perspicua* (Linnaeus, 1758)

### Material examined:

(1) Ramkine Island: 01/06/2000 - under stones, 3–5 m: 1 lv (MNCN); (6) El Heri (marina Beaulieu) 03/06/2000 - under stones, 3 m: 2 lv (MNCN); (9) Selaata: 06/07/2003 - under stones, 6 m: 1 lv (MNCN 15.05/47209) (Fig. 3C).

## Family TRIVIIDAE Troschel, 1863

*Niveria problematica* (Schilder, 1931)

### Literature records:

*Trivia pulex* Solander [sic! for Gray (see Gray, 1827: 368)] - *sensu* Pallary, 1912b: 172; *sensu* Bitar, 1996: 119; *Trivia pulex* Solander [sic!] var. *minor* Monts. - *sensu* Pallary, 1919: 169; *Trivia pulex* Gray - *sensu* Gruvel & Moazzo, 1929: 422; *sensu* Moazzo, 1931: 444; *Trivia pulex* Solander [sic!] var. *minor* Monts. 1878 - *sensu* Pallary, 1938: 31; *Trivia pulex* (Solander in Gray J.E. [sic!], 1828 [sic!]) - *sensu* Bitar & Kouli-Bitar, 1998: 39.

### Material examined:

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

### Remarks:

Fehse & Grego (2004; 2008) recently synonymized *Trivia levantina* Smriglio, Mariottini & Buzzurro, 1998 with *Niveria problematica* (Schilder, 1931) (see also Cate, 1979; Pelorce, 2009). Previous literature records from Lebanon were ascribed by Bitar (1996) and Bitar & Kouli-Bitar (1998) to *Trivia pulex* (Gray, 1827) [= *Trivia pullicina* Locard, 1892 = *Trivia mediterranea* (Risso, 1826): Van Aartsen, 1987; Gofas, 2010]. Smriglio et al. (1998) concomitantly analyzed the material

on which the Lebanese records by Pallary (1912b, 1919, 1938) were based, and suggested that these records were based on misidentifications of *T. levantina*, as *T. mediterranea* does not occur in the easternmost Mediterranean Sea. The same very likely holds for the records by Gruvel & Moazzo (1929) and Moazzo (1931), and therefore we have listed them here.

## Family CYPRAEIDAE Rafinesque, 1815

### *Naria spurca spurca* (Linnaeus, 1758)

#### Literature records:

*Cypraea spurca* Lin. - Puton, 1856: 226; *Cypraea spurca* Linné - Pallary, 1912b: 172; *Cypraea spurca* Linné - Pallary, 1919: 169; *Cypraea spurca* L. - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 444; *Cypraea (Ocellaria) spurca* Linné - Pallary, 1938: 31; *Cypraea (Ocellaria) spurca* Linné var. *luridoidea* Ptry 1900 - Pallary, 1938: 31; *Cypraea (Ocellaria) spurca* Linné var. *pantherina* Ptry 1910 [sic! for 1919 (see Pallary, 1919: 169) and Remarks below] - Pallary, 1938: 31; *Cypraea (Ocellaria) spurca* Linné var. *major* Ptry 1900 - Pallary, 1938: 31; *Cypraea (Ocellaria) spurca* Linné var. *minor* Ptry 1900 - Pallary, 1938: 31; *Cypraea (Ocellaria) spurca* Linné var. *pallida* Requien 1848 - Pallary, 1938: 31; *Cypraea spurca minima pallida* - Pallary, 1938: plate I (fig. 12); *Cypraea spurca* L. - Bitar, 1996: 119; *Erosaria spurca* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 42; *Erosaria spurca* - Ramos-Esplá et al., 2015: 60, 122, 125, 127, 128; *Erosaria spurca* (Linnaeus, 1758) - Ramos-Esplá et al., 2015: 65 (figure 57), 158, 182, 191, 202, 211.

#### Material examined:

(8) Chak El Hatab: 05/07/2003 - 2–3 m: 2 sh (BBCD); 13/07/2003 - cave, 3–4 m: 1 sh (BBCD); (9) Selaata: 24/09/2002 - concretions, 12 m: 1 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, small cave, concretions, 16 m: 1 sh (BBCD); (18) Beirut: 21/10/1999 - Harf El Kalb, overhang with corals, 34 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - Harf El Rijmeh, rocky bottom, 12 m: 1 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Hawieh El Jouani, 14 m: 1 sh (BBCD); (28) El Bayada: 12/07/2003 - 5 m: 1 sh (BBCD).

#### Remarks:

Pallary (1938) reported “*Cypraea (Ocellaria) spurca* Linné var. *pantherina* Ptry 1910” as being described in 1910. Only two articles by Pallary have been published in 1910 (Bank & Menkhorst, 2009), and none of these included this varietal taxon. It was, in fact, described later (Pallary, 1919). Despite no clear locality was stated in 1919, it has been reported in 1938 only from Jounieh (Lebanon), and therefore we include it in Appendix 5 among gastropod nominal taxa historically described on type material from Lebanon and/or used for Lebanese material.

### *Luria lurida lurida* (Linnaeus, 1758)

**Literature records:**

*Cypraea lurida* Linné - Pallary, 1912b: 172; *Cypraea lurida* Linné var. *minima* Dunker - Pallary, 1912b: 172; *Cypraea lurida* Linné - Pallary, 1919: 169; *Cypraea lurida* Linné var. *minima* Dunker - Pallary, 1919: 169; *Cypraea (Luria) lurida* L. - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 444; *Cypraera* [sic! for *Cypraea* (see Linnaeus, 1758: 718)] (*Luria*) *lurida* Linné - Pallary, 1938: 31; *Cypraera* [sic!] (*Luria*) *lurida* Linné var. *minima* Dunker, 1853 - Pallary, 1938: 31; *Cypraea lurida* L. - Bitar, 1996: 119; *Luria lurida* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39; *Luria lurida* - Ramos-Esplá et al., 2015: 60, 122, 125; *Luria lurida* (Linnaeus, 1758) - Ramos-Esplá et al., 2015: 66 (figure 58), 158, 182.

**Material examined:**

(7) Ras El Chakaa: 13/07/2003 - 9 m: 1 sh (BBCD).

**A - *Purpuradusta gracilis notata* (Gill, 1858)****Literature records:**

*Cypraea fragilis* [sic! for *gracilis* (see Gaskoin, 1848: 93)] - Bitar, 1996: 41; *Purpuradusta gracilis* (Gaskoin, 1849) - Bitar & Kouli-Bitar, 1998: 42; Ramos-Esplá et al., 2017: 94; *Purpuradusta gracilis* - Bitar & Kouli-Bitar, 2001: 72; Ramos-Esplá et al., 2017: 111; *Purpuradusta* [sic! for *Purpuradusta* (see Schilder, 1939: 188)] *gracilis notata* [sic! for *notata* (see Gill, 1858: 255)] - Bitar, 2012: 8; *Purpuradusta gracilis notata* (Gill, 1858) - Bitar, 2014: 45; *Purpuradusta gracilis notata* (Gaskoin, 1849 [sic! for Gill, 1858 (see Gill, 1858: 255)]) - Ramos-Esplá et al., 2015: 158, 182, 202, 211.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - concretions, 13–14 m: 1 lv (BBCD); 01/06/2000 - 3–5 m: 1 lv (BBCD); (9) Selaata: 18/10/1999 - small cave, 8 m: 1 lv (BBCD); 23/10/1999 - amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, surface: 1 lv (BBCD); 24/09/2002 - concretions, 10 m: 1 sh (BBCD); (10) Hannouch: 18/09/2002 - 1–5 m: 3 lv (BBCD); (11) Batroun: 15/10/1999 - 3 m: 1 lv (BBCD); 16/10/1999 - old town, “Phenician wall”, concretions, 9 m: 1 lv (BBCD); 23/09/2002 - under stones, 1–4 m: 1 lv (BBCD); 26/09/2002 - calcareous algae, 6 m: 1 lv (BBCD); (18) Beirut: 25/09/2002 - airport, pillar jetty, 6–10 m: 1 lv (BBCD); (29) Nakoura: 22/09/2002 - 5 m: 2 lv (BBCD).

**First record date:**

First found on the 29th December 1991 at Sarafand (Plage Brakeh) (Bitar, 1996; G. Bitar, unpublished data).

***Zonaria pyrum pyrum* (Gmelin, 1791)****Literature records:**

*Cypraea pyrum* Gmel. - Puton, 1856: 226; *Cypraea pyrum* Gmelin var. *undata* P. - Pallary, 1912b: 172; *Cypraea pyrum* Gmelin var. *undata* P. - Pallary, 1919: 169; *Cypraea (Luponia) pyrum* [sic! for *pyrum* (see Gmelin, 1791: 3411)] Gmelin - Gruvel & Moazzo, 1929: 422; Moazzo, 1931:

444; *Cypraea (Zonaria) pyrum* Gmelin - Pallary, 1938: 31; *Cypraea (Zonaria) pyrum* Gmelin var. *minor* Ptry 1900 - Pallary, 1938: 31; *Cypraea (Zonaria) pyrum* Gmelin var. *undata* Ptry 1904 - Pallary, 1938: 31; *Cypraea pimum* [sic!] - Bitar, 1996: 119; *Zonaria pyrum* (Gmelin, 1791) - Bitar & Kouli-Bitar, 1998: 39; Nolf, 2015: 32–35.

## Family NATICIDAE Guilding, 1834

### *Euspira intricata* (Donovan, 1804)

#### Literature records:

*Natica intricata* Donovan - Pallary, 1912b: 173; Pallary, 1919: 170; Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; *Natica (Payraudeautia) intricata* Donovan - Pallary, 1938: 39; *Natica intricata* (Hidalgo [sic! for Donovan (see Donovan, 1804: 167)]) - Bitar, 1996: 119; *Payraudeautia intricata* (Donovan, 1804) - Bitar & Kouli-Bitar, 1998: 39.

#### Material examined:

(1) Ramkine Island: 01/06/2000 - sand, 13–14 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 2 sh (BBCD).

### *Euspira nitida* (Donovan, 1804)

#### Literature records:

*Euspira pulchella* (Risso, 1826) - Bitar & Kouli-Bitar, 1998: 42.

#### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 2 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 2 sh (BBCD).

### *Naticarius hebraeus* (Martyn, 1786)

#### Literature records:

*Natica hebraea* Martyn - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; Bitar, 1996: 119; *Natica (Nacca) hebraea* Martyn - Pallary, 1938: 39; *Natica (Nacca) hebraea* Martyn var. *zonata* Ptry 1903 - Pallary, 1938: 39; *Natica hebraea* (Martyn, 1784 [sic! for 1786 (see Martyn, 1784-1787: plate 109)]) - Bitar & Kouli-Bitar, 1998: 39.

### *Naticarius stercusmuscarum* (Gmelin, 1791)

**Literature records:**

*Natica millepunctata* Lamk. - Puton, 1856: 223; *Natica millepunctata* Lamarck - Pallary, 1912b: 173; Pallary, 1919: 170; Bitar, 1996: 119; *Natica millepunctata* Lk. - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; *Natica (Nacca) millepunctata* Lamarck - Pallary, 1938: 39; *Natica (Nacca) millepunctata* Lamarck var. *punctatissima* Ptry 1903 - Pallary, 1938: 39.

**Material examined:**

(9) Selaata: 23/10/1999 - 20 m: 1 sh (BBCD).

*Neverita josephinia* Risso, 1826**Literature records:**

*Natica olla* Mar. de Ser. - Puton, 1856: 223; *Natica josephinia* Risso - Pallary, 1912b: 173; Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; Bitar, 1996: 119; *Natica (Neverita) josephinia* Risso var. *philippii* Reeve [sic! for *philippiana* (see Reeve, 1855: plate XI, species 45)] - Pallary, 1919: 171; *Natica josephinia* Risso, var. *caelata* B.D.D. [sic! for *caelata* (see Bucquoy, Dautzenberg & Dollfus, 1882-1886: 152)] - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; *Natica (Neverita) josephinia* [sic! for *josephinia* (see Risso, 1826: 149)] Risso var. *philippiana* (Recluz) Reeve 1855 - Pallary, 1938: 40; *Natica (Neverita) josephinia* [sic!] Risso var. *caelata* B.D.D. 1882 [sic! for 1883] - Pallary, 1938: 40; *Neverita josephinia* Risso, 1826 - Bitar & Kouli-Bitar, 1998: 39, 42; Ramos-Esplá et al., 2017: 94; *Neverita josephina* [sic! for *josephinia*] - Ramos-Esplá et al., 2017: 62; *Neverita josephinia* - Ramos-Esplá et al., 2017: 101, 111.

**Material examined:**

(5) Anfeh: 26/10/1999 - sand, 24 m: 1 lv (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (19) Raoucheh: 17/09/2002 - fine sand, 10 m: 1 sh (BBCD).

*Notocochlis dillwynii* (Payraudeau, 1826)**Literature records:**

*Natica dillwyni* [sic! for *dillwynii* (see Payraudeau, 1826: 120)] Payraudeau - Pallary, 1912b: 173; Pallary, 1919: 170; Pallary, 1938: 39; *Natica dillwyni* [sic!] Payr. - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; Bitar, 1996: 119; *Naticarius dillwyni* [sic!] (Payr.) - Fadlallah, 1975: 68; *Natica dillwynii* Payraudeau, 1826 - Bitar & Kouli-Bitar, 1998: 39; *Natica dillwyni* [sic!] Payraudeau, 1826 - Bitar & Kouli-Bitar, 1998: 42.

*Tectonatica sagraiana* (d'Orbigny, 1842)**Literature records:**

*Natica (Nacca) flammulata* Requier var. *minor* - Pallary, 1938: 39; *Natica flammulata* Requier - Bitar, 1996: 119; *Tectonatica filosa* (Philippi, 1845) - Bitar & Kouli-Bitar, 1998: 39.



## Family TONNIDAE Suter, 1913 (1825)

### *Tonna galea* (Linnaeus, 1758)

#### Literature records:

*Dolium galea* Lin. - Puton, 1856: 224; *Dolium galea* Linné - Pallary, 1912b: 172; *Dolium galea* Linné var. *minor* P. - Pallary, 1919: 168; *Dolium galea* L. - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; Bitar, 1996: 119; *Dolium galea* Linné var. *minor* P. - Pallary, 1938: 31; *Tonna galea* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 42; *Tonna galea* - Bitar, 2010: 452; Ramos-Esplá et al., 2015: 60, 122, 127; Ramos-Esplá et al., 2017: 111; *Tonna galea* (Linnaeus, 1758) - Ramos-Esplá et al., 2015: 67 (figure 59), 158, 202; Ramos-Esplá et al., 2017: 94; *Tonna galea* Linnaeus, 1758 - Ramos-Esplá et al., 2017: 30 (figure 5.13), 72.

#### Material examined:

(1) Ramkine Island: 22/10/1999 - on sand, 10 m: 1 lv (photo G. Bitar); (10) Hannouch: 18/09/2002 - 7 m: 1 sh (BBCD); (17) Aquamarina (N Bay of Jounieh): 11/07/2003 - 14–23 m: 1 sh (BBCD); (29) Nakoura: 22/09/2002 - 5 m: 1 sh (BBCD).

## Family CASSIDAE Latreille, 1825

### *Galeodea rugosa* (Linnaeus, 1771)

#### Literature records:

*Cassidaria tyrrhena* Chemn. [sic! for Gmelin (see Gmelin, 1791: 3478)] - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; *Cassidaria tyrrhena* Chemnitz [sic!] - Pallary, 1938: 30; Bitar, 1996: 120; *Galeodea rugosa* (Linné, 1771) - Bitar & Kouli-Bitar, 1998: 39.

### *Semicassis granulata* (Born, 1778)

#### Literature records:

*Cassis undulata* Linné [sic! for Gmelin (see Gmelin, 1791: 3475)] - Pallary, 1912b: 172; Pallary, 1919: 169; *Cassis undulata* L. [sic!] - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 444; *Cassis undulata* Lk. [sic!] - Moazzo, 1931: 444; *Cassis* (*Semicassis*) *undulata* Linné [sic!] var. *syriaca* - Pallary, 1938: 30; *Cassis undulata syriaca* - Pallary, 1938: plate I (fig. 15); *Cassis undulata* Lamarck [sic!] - Bitar, 1996: 120; Bitar & Kouli-Bitar, 1998: 39; *Semicassis granulata* -

Ramos-Esplá et al., 2015: 106; *Semicassis granulata undulata* (Gmelin, 1791) - Ramos-Esplá et al., 2015: 158; *Semicassis granulata* (Gmelin, 1791 [sic! for Born, 1778 (see Born, 1778: 239)]) - Ramos-Esplá et al., 2015: 168.

**Material examined:**

(8) Chak El Hatab: 05/07/2003 - 12–18 m: 1 sh (BBCD); (17) Aquamarina (N Bay of Jounieh): 11/07/2003 - 14–23 m: 1 sh (BBCD).

## Family RANELLIDAE Gray, 1854

### *Charonia lampas lampas* (Linnaeus, 1758)

**Literature records:**

*Eutritonium nodiferum* Lk. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; *Tritonium nodifer* [sic! for *nodiferum* (see Lamarck, 1822b: 179)] Lamarck - Pallary, 1938: 30; *Tritonium nodiferum* - Bitar, 1996: 42; *Eutritonium nodiferum* Lamarck - Bitar, 1996: 121; *Charonia lampas* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 43; *Charonia lampas* - Bitar, 2010: 452.

### *Charonia variegata* (Lamarck, 1816)

**Literature records:**

*Eutritonium seguenzai* [sic! for *seguenzae* (see Aradas & Benoît, 1871: 90)] Aradas et Benoit - Pallary, 1933: 152; *Tritonium seguenzai* [sic!] Aradas et Benoit = *variegatum* (auct.) non Lamarck [sic! for *variegatum* Lamarck (see Lamarck, 1816: plate 421)] - Pallary, 1938: 29; *Tritonium seguenzai* [sic!] Aradas et Benoit = *variegatum* (auct.) non Lamarck [sic!] var. *minor* Ply - Pallary, 1938: 29; *Charonia variegata seguenzae* A. e B. - Spada, 1971: 90; *Tritonium seguenzal* [sic!] Aradas et Benoit - Bitar, 1996: 121; *Charonia tritonis variegata* Lamarck, 1816 - Bitar & Kouli-Bitar, 1998: 39; *Charonia tritonis variegata* - Bitar, 2010: 452.

**Material examined:**

(1) Ramkine Island: 14/07/2003 - under stones, 3–4 m: 1 lv (BBCD); (7) Ras El Chakaa: 13/07/2003 - under stones, 12 m: 2 lv (BBCD).

### *Monoplex corrugatus* (Lamarck, 1816)

**Literature records:**

*Eutritonium corrugatum* Lk. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; *Lampusia corrugata* Lamarck - Pallary, 1938: 30; *Eutritonium corrugatum* Lamarck - Bitar, 1996: 121; *Cymathium corrugatum* (Lamarck, 1816) - Bitar & Kouli-Bitar, 1998: 39.

## Family MURICIDAE Rafinesque, 1815

### *Bolinus brandaris* (Linnaeus, 1758)

#### Literature records:

*Murex brandaris* Lin. - Puton, 1856: 224; *Murex brandaris* Linné - Pallary, 1912b: 172; Pallary, 1919: 169; Pallary, 1938: 25; *Murex brandaris* L. - Gruvel & Moazzo, 1929: 419; Moazzo, 1931: 441; Bitar, 1996: 121; *Murex brandaris* Linné var. *coronata* Risso 1826 - Pallary, 1938: 25; *Murex brandaris* Linné var. *compacta* Ptry 1912 - Pallary, 1938: 26; *Murex brandaris* Linné var. *albina* Ptry - Pallary, 1938: 26; *Murex brandaris coronata* Risso - Pallary, 1938: plate II (fig. 10); *Bolinus brandaris* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39.

### *Coralliophila meyendorffii* (Calcara, 1845)

#### Literature records:

*Pseudomurex meyendorffi* [sic! for *meyendorffii* (see Calcara, 1845: 38)] Calcara - Pallary, 1938: 28; *Pseudomurex meyendorffi* [sic!] (Calcara) - Bitar, 1996: 121; *Coralliophila meyendorffii* (Calcara, 1845) - Bitar & Kouli-Bitar, 1998: 39.

#### Material examined:

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD).

### A - *Ergalatax junionae* Houart, 2008

#### Literature records:

*Ergalatax obscura* Houart, 1996 - *sensu* Zibrowius & Bitar, 2003: 70; *Ergalatax obscura* - *sensu* Bitar et al., 2007: 437; *Ergalatax junionae*, new species - Houart, 2008: 104 (figs. 36-37), 105; *Ergalatax junionae* - Bitar, 2012: 8; *Ergalatax junionae* (Houart, 2008) - Bitar, 2014: 44; *Cerithium scabridum* - *sensu* Ramos-Esplá et al., 2015: 86 (figure 90); *Conomurex persicus* - *sensu* Ramos-Esplá et al., 2015: 88 (figure 98); *Ergalatax junionae* - Ramos-Esplá et al., 2015: 89, 91; Ramos-Esplá et al., 2017: 56, 58, 59, 101, 106, 111, 116; *Ergalatax junionae* Houart, 2008 - Ramos-Esplá et al., 2015: 158, 168, 181, 188, 191, 202, 211; Ramos-Esplá et al., 2017: 94.

#### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 lv (BBCD); (3) Tripoli: 20/09/2002 - harbour entrance, breakwater jetty: 1 lv (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - 1–5 m: 1 lv (BBCD); (8) Chak El Hatab: 05/07/2003 - overhang, 9 m: 1 lv (BBCD); cave, 14 m: 1 sh (BBCD); (9) Selaata: 14/09/2002 - 8 m: 2 lv (BBCD); 24/09/2002 - cliff, among calcareous algae, 35 m: 1 sh (BBCD); 06/07/2003 - under stones, 6–7 m: 27 lv (BBCD), 34 lv (MNHN); (10)

Hannouch: 18/09/2002 - under stones, 1–5 m: 1 lv (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 1 lv (BBCD); 23/09/2002 - under stones, 1–4 m: 7 lv (MNHN); under stones, 2–3 m: 1 sh (MNHN); (12) Kfar Abida: 30/05/2000 - 5–12 m: 1 lv (BBCD); (16) Tabarja: 10/07/2003 - 10–25 m: 2 sh (MNHN); 11/07/2003 - 8–18 m: 5 lv, 3 sh (BBCD); 10–25 m: 1 sh (BBCD); sand, 15 m: 1 lv (BBCD); (17) Aquamarina (N Bay of Jounieh): 10/07/2003 - 10–25 m: 5 lv (MNHN); (18) Beirut: 16/09/2002 - harbour, quay 60, 5–7 m: 1 lv (BBCD); 07/07/2003 - harbor entrance, outer side, breakwater, 10 m: 15 lv, 2 sh (BBCD); St. George, 10 m: 23 lv (BBCD).

**Remarks:**

Early Mediterranean record of *Ergalatax obscura* Houart, 1996 [now junior synonym of *Ergalatax martensi* (Schepman, 1892)] are to be referred to *Ergalatax junionae* Houart, 2008 (Houart, 2008).

**First record date:**

First found in 1999 (see Material examined).

*Hexaplex trunculus* (Linnaeus, 1758) complex

**Literature records:**

*Murex trunculus* Lin. - Puton, 1856: 224; *Murex trunculus* Linné - Pallary, 1912b: 172; Pallary, 1919: 169; *Murex (Chicoreus) trunculus* L. - Gruvel & Moazzo, 1929: 419; Moazzo, 1931: 441; *Murex trunculus* L. - Gruvel, 1931: 124; *Murex trunculus pagodula* Piry - Pallary, 1933: 152; *Murex (Phyllonotus) trunculus* Linné - Pallary, 1938: 26; *Murex (Phyllonotus) trunculus* Linné var. *bonnannii* [sic! for *bonanni* (see Monterosato, 1917: 21)] Monts. 1917 - Pallary, 1938: 26; *Murex (Phyllonotus) trunculus* Linné var. *pagodula* Piry 1903 - Pallary, 1938: 26; *Trunculariopsis trunculus* (L.) - Spada, 1971: 90; *Murex trunculus* L. - Bitar, 1996: 121; *Hexaplex trunculus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 43; *Hexaplex trunculus* (Linnaeus, 1758) - Ramos-Esplá et al., 2015: 158, 168, 182, 191, 202, 211.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - 1–5 m: 1 sh (MNHN); (7) Ras El Chakaa: 19/10/1999 - cave, 3–5 m: 2 sh (BBCD); 31/05/2000 - shaded wall, 5 m: 1 sh (MNHN); 04/06/2000 - cave: 1 lv (MNHN); cave sediment, 3–4.5 m: 1 sh (BBCD); (9) Selaata: 23/10/1999 - 5–10 m: 1 lv, 1 sh (MNHN); 06/07/2003 - under stones, 6–7 m: 1 lv (MNHN); (11) Batroun: 15/10/1999 - next to the lab, 1–3 m: 1 sh; 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 1 sh (MNHN); 26/09/2002 - 2–5 m: 1 lv (BBCD); (12) Kfar Abida: 30/05/2000 - 1 m: 1 sh (MNHN); (19) Raoucheh: 17/09/2002 - boulders and rock, 7–9 m: 1 sh (BBCD).

**Remarks:**

Molecular data showed that specimens previously ascribed to *Hexaplex trunculus* (Linnaeus, 1758) may comprise a complex of cryptic species (see Marzouk et al., 2017), and thus we keep literature records and new unpublished material examined as “*Hexaplex trunculus* (Linnaeus, 1758) complex”.

## A - *Indothais sacellum* (Gmelin, 1791)

### Literature records:

*Thais sacellum* (Gmelin, 1791) - Zibrowius & Bitar, 2003: 70; Zenetos et al., 2004: 119; *Thais scacellum* [sic! for *sacellum* (see Gmelin, 1791: 3530)] - Bitar, 2012: 8; *Indothais sacellum* (Gmelin, 1791) - Bitar, 2014: 45; *Thaisella scacellum* [sic!] (Gmelin, 1791) - Ramos-Esplá et al., 2015: 158, 182.

### Material examined:

(7) Ras El Chakaa: 04/06/2000 - 4–14 m: 1 sh (MNHN); (17) Aquamarina (N Bay of Jounieh): 10/07/2003 - 10–25 m: 10 lv (MNHN); 11/07/2003 - 10–25 m: 1 sh (BBCD); 14–23 m: 1 sh (BBCD); (18) Beirut: 02/06/2000 - harbour, 1–2 m: 2 lv (MNHN); 3–8 m: 3 lv (MNHN); 15/09/2002 - harbour jetty, inner side, on blocks, 3–12 m: 38 lv (BBCD), 4 lv (AZ); 16/09/2002 - harbour jetty, outer side, 10 m: 10 lv (MNHN); 07/07/2003 - harbour entrance, 14 m: 1 lv (HUIJ 50065); St. George, 10 m: 10 lv (MNHN); (20) Khaldeh: Villamar, 07/06/2000 - 3 m: 1 lv (MNHN).

### First record date:

First found in 2000 (Zibrowius & Bitar, 2003).

## A - *Murex forskoehlii forskoehlii* Röding, 1798

### Literature records:

*Murex (Acupurpurea* [sic! for *Acupurpura* (see Jousseume, 1980: 335)]) *tribulus* Linné - *sensu* Pallary, 1938: 27; *Murex tribulus* L., 1758 - *sensu* Bogi & Khairallah, 1987: 58; *Murex forskoehlii* Röding, 1798 - Ponder & Vokes, 1988: 33; Bitar & Kouli-Bitar, 1998: 39; Zibrowius & Bitar, 2003: 70; *Murex tribulus* L. - *sensu* Bitar, 1996: 121; *Murex forskoehlii* - Bitar, 2012: 8; Ramos-Esplá et al., 2015: 106; *Murex forskoehlii* (Röding, 1798) - Bitar, 2014: 44; *Murex forskoehlii* Röding, 1798 - Ramos-Esplá et al., 2015: 158, 168, 182.

### Material examined:

(17) Aquamarina (N Bay of Jounieh): 11/07/2003 - 14–23 m: 3 sh (MNHN); (18) Beirut: 25/09/2002 - airport, pillar jetty, 10–12 m: 1 lv (MNHN); airport, breakwater, muddy sand, 17 m: 3 lv (MNHN); (19) Raoucheh: 17/09/2002 - boulders and rock, 7–9 m: 1 sh (BBCD); fine sand, 10 m: 2 lv (MNHN); (22) Rmaileh: 1995 - from fishermen, 25 m: 1 lv (MNHN).

### Remarks:

This Lessepsian immigrant suffered very recently from a troublesome nomenclatural and taxonomical issue. Kovalis & Korkos (2009) tentatively described Mediterranean specimens as “*Murex forskoehlii mediterranea*”. However, failure in respecting ICZN rules (ICZN, 2012: art. 16.4) made “*Murex forskoehlii mediterranea* Kovalis & Korkos, 2009” unavailable (Mienis, 2010). Kovalis (2010) first figured a holotype for “*Murex forskoehlii mediterranea*”, therefore making *Murex forskoehlii mediterranea* Kovalis, 2010 available [and not *Murex forskoehlii mediterranea* Kovalis & Korkos, 2009, as reported by Houart (2014)]. However, few months before, Heiman &

Mienis (2010) described *Murex forskoehlii spinifer* Heiman & Mienis, 2010 from East Sinai, differentiating it from the nominal subspecies living in the northern Red Sea, the Gulf of Suez, the Suez Canal and the eastern Mediterranean Sea. Therefore, if a subspecies differentiation is accepted, the Mediterranean specimens belong to the nominal subspecies *Murex forskoehlii forskoehlii* Röding, 1798.

In his recent review, Houart (2015) did not include Lebanon among the recent distribution of this taxon. However, we can confirm its local presence based on bibliographic records and material examined. Previous Mediterranean record of *Murex tribulus* Linnaeus, 1758, subsequently moved to *Murex ternispina* Lamarck, 1822, are all to be referred to *Murex forskoehlii forskoehlii* Röding, 1798 (see also Yaron, 1978; Ponder & Vokes, 1988).

#### **First record date:**

First found in 1929–1930 (Pallary, 1938).

### *Muricopsis cristata* (Brocchi, 1814)

#### **Literature records:**

*Murex cristatus* Brocchi - Puton, 1856: 224; *Ocenebrina blainvillei* [sic! for *blainvillii* (see Payraudeau, 1826: 149)] Payraudeau - Pallary, 1912b: 172; Pallary, 1919: 169; *Ocenebra* [sic! for *Ocenebra* (see Gray, 1847b: 133)] *cristata* Brocchi - Gruvel & Moazzo, 1929: 419; Moazzo, 1931: 441; *Ocenebra* [sic!] *inermis* Philippi - Gruvel & Moazzo, 1929: 419; Moazzo, 1931: 441; *Ocenebrina* (*Muricidea*) *blainvillei* [sic!] Payraudeau - Pallary, 1938: 27; *Ocenebrina* (*Muricidea*) *inermis* Philippi - Pallary, 1938: 28; *Ocenebrina* (*Muricidea*) *inermis* Philippi var. *atra* L. et C. 1901 - Pallary, 1938: 28; *Ocenebrina* (*Muricidea*) *inermis* Philippi var. *rosea* Requier 1848 [sic! for *Murex cristatus* var. *rosea* (see Requier, 1848: 77)] - Pallary, 1938: 28; *Muricopsis blainvillei* [sic!] (Payr.) - Spada, 1971: 90; *Ocenebrina blainvillei* [sic!] Payr. - Bitar, 1996: 121; *Ocenebrina cristata* Brocchi - Bitar, 1996: 121; *Ocenebrina inermis* Philippi - Bitar, 1996: 121; *Muricopsis cristata* (Brocchi, 1814) - Bitar & Kouli-Bitar, 1998: 39, 43.

#### **Material examined:**

(1) Ramkine Island: 22/10/1999 - tunnel, 1–2 m: 4 lv, 1 sh (MNHN); sediment (mainly foraminiferous), 13–14 m: 2 sh (BBCD); overhang, 14 m: 2 lv (MNHN); 31/05/2000 - shaded wall, 5 m: 4 lv (MNHN); cave, 5–7 m: 3 sh (MNHN); 01/06/2000 - 3–5 m: 10 lv, 1 sh (MNHN); 14/07/2003 - cave, 7 m: 1 lv (MNHN); coarse sand, 13 m: 3 sh (BBCD), 5 sh (MNHN); (5) Anfeh: 26/10/1999 - sand, 20 m: 2 sh (MNHN); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 5 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 2 sh (MNHN); cave, 5–6 m: 2 sh (MNHN); (8) Chak El Hatab: 05/07/2003 - overhang, 9 m: 1 lv (MNHN); (9) Selaata: 18/10/1999 - small caves, 3–8 m: 5 sh (MNHN); cave sediment, 9 m: 1 sh (BBCD); 23/10/1999 - under stones, 12 m: 2 lv, 1 sh (MNHN); 06/07/2003 - under stones, 6–7 m: 1 sh (MNHN); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 2 sh (BBCD), 1 sh (MNHN); (12) Kfar Abida: 02/07/1995, 1 m: 1 sh (MNHN); 30/05/2000 - tunnel, small cave, 7–8 m: 5 sh (MNHN); (17) Aquamarina (N Bay of Jounieh): 10/07/2003 - 10–25 m: 1 sh (MNHN); (19) Raoucheh: 17/09/2002 - cave, 1–3 m: 1 lv (MNHN); fine sand, 10 m: 1 sh (MNHN); (20) Khaldeh: Villamar, 07/06/2000 - 1–2 m: 1 lv (MNHN); (23) Saida: 05/06/2000 - off

Nahr El Ouali, sand, 31 m: 1 lv (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 2 sh (BBCD); (27) Tyr: 25/10/1999 - shoal, 12 m: 1 lv (MNHN).

### *Ocenebra edwardsii* (Payraudeau, 1826) complex

#### **Literature records:**

*Ocenebrina edwardsii* [sic! for *edwardsii* (see Payraudeau, 1826: 155)] Payr. - Gruvel & Moazzo, 1929: 419; Moazzo, 1931: 441; Bitar, 1996: 121; *Ocenebrina* (*Dentocenebra*) *edwardsii* Payraudeau - Pallary, 1938: 28; *Ocenebrina* (*Dentocenebra*) *edwardsii* Payraudeau var. *apiculata* Pallary 1902 - Pallary, 1938: 28; *Ocenebrina* (*Dentocenebra*) *edwardsii* Payraudeau var. *cyclopus* Benoit 1870 [sic! for Monterosato 1884 (see Monterosato, 1884a: 112)] - Pallary, 1938: 28; *Ocenebrina cyclopus* Benoit [sic!] - Bitar, 1996: 121; *Ocenebrina edwardsii* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 39.

#### **Material examined:**

(1) Ramkine Island: 01/06/2000 - sand, 13–14 m: 2 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sortie Est, amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, surface: 2 lv (MNHN); (8) Chak El Hatab: 05/07/2003 - cave sediment, 1.5 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - small caves and overhangs, 3–8 m: 1 sh (BBCD); cave sediment, 9 m: 2 sh (BBCD); (11) Batroun: 15/10/1999 - next to lab, snorkeling, 1 m: 2 lv (BBCD); 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 1 sh (MNHN); (12) Kfar Abida: 30/05/2000 - tunnel, small cave, 7–8 m: 1 sh (MNHN); 5–12 m: 1 lv (BBCD).

#### **Remarks:**

Molecular data showed that specimens previously ascribed to *Ocenebra edwardsii* (Payraudeau, 1826) actually comprise a complex of cryptic species (see Barco et al., 2013b), and thus we keep literature records and new unpublished material examined as “*Ocenebra edwardsii* (Payraudeau, 1826) complex”.

### *Ocenebra hybrida* (Aradas & Benoît, 1876)

#### **Literature records:**

*Ocenebrina hybrida* Aradas et Benoît - Pallary, 1919: 169; Bitar, 1996: 121; *Pseudomurex* (?) *hybridus* Aradas et Benoît - Pallary, 1938: 28; *Murex hybridus* - Pallary, 1938: plate II (fig. 11); *Benoitia*, new genus - Pallary, 1938: 29; *Ocenebrina hybrida* Ar. e Ben. - Fadlallah, 1975: 68; *Pseudomurex hibridus* [sic! for *hybridus* (see Aradas & Benoît, 1872-1876: 272)] Aradas et Benoît - Bitar, 1996: 121; *Ocenebrina hybrida* (Aradas & Benoît, 1876) - Bitar & Kouli-Bitar, 1998: 39.

### *Ocenebrina aegeensis* Aissaoui, Barco & Oliverio, 2018

#### **Literature records:**

*Ocinebrina corallina* Scacchi - *sensu* Gruvel & Moazzo, 1929: 419; *sensu* Moazzo, 1931: 441; *sensu* Pallary, 1938: 28; *sensu* Bitar, 1996: 121; *Ocinebrina aciculata* Lamarck - *sensu* Pallary, 1938: 28; *sensu* Bitar, 1996: 121; *Ocinebrina aciculata* (Lamarck, 1822) - *sensu* Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 3 sh (BBCD).

**Remarks:**

Molecular data showed that specimens previously ascribed to *Ocinebrina aciculata* (Lamarck, 1822) comprise a complex of cryptic species (see Barco et al., 2018). Although not tested genetically, Barco et al. (2018) suggested that specimens from the eastern Mediterranean should belong to *Ocinebrina aegeensis* Aissaoui, Barco & Oliverio, 2018, and therefore (pending a necessary genetic study of Levantine material) for the sake of nomenclatural stability we report Lebanese specimens under this name.

*Stramonita haemastoma* (Linnaeus, 1767)

**Literature records:**

*Purpura haemastoma* [sic! for *haemastoma* (see Linnaeus, 1767: 1202)] Lin. - Puton, 1856: 224; *Purpura haemastoma* Linné - Pallary, 1912b: 172; Pallary, 1919: 169; *Purpura haemastoma* Linné - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; *Purpura* (*Stramonita*) *haemastoma* Linné - Pallary, 1938: 29; *Thais haemastoma* (L.) - Spada, 1971: 90; Fadlallah, 1975: 68; *Purpura haemastoma* L. - Bitar, 1996: 121; *Stramonita haemastoma* (Linné, 1766 [sic!]) - Bitar & Kouli-Bitar, 1998: 39, 43; *Stramonita haemastoma* - Bitar, 2010: 452; *Stramonita haemostoma* [sic!] (Linnaeus, 1767) - Ramos-Esplá et al., 2015: 158, 212.

**Material examined:**

(16) Tabarja: 10/07/2003 - 12–15 m: 1 sh (MNHN); 11/07/2003 - 8–18 m: 1 lv, 1 sh (BBCD); (17) Aquamarina (N Bay of Jounieh): 10/07/2003 - 10–25 m: 1 sh (MNHN).

*Typhinellus labiatus* (de Cristofori & Jan, 1832)

**Literature records:**

*Tythis* [sic! for *Typhis* (see de Montfort, 1810: 615)] *sowerbyi* - Gruvel & Moazzo, 1929: 419; *Tythis* [sic!] *sowerbyi* Brod. - Moazzo, 1931: 441; Bitar, 1996: 121; *Typhis* (*Typhinella* [sic! for *Typhinellus* (see Jousseume, 1880: 335)]) *sowerbyi* Broderip - Pallary, 1938: 25; *Typhis sowerbyi* Broderip - Bitar, 1996: 121; *Typhinellus sowerbyi* (Broderip, 1833) - Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (MNHN).



## Family MARGINELLIDAE Fleming, 1828

### *Volvarina mitrella* (Risso, 1826)

#### Literature records:

*Marginella secalina* Phil. - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; *Volvarina mitrella* Risso 1826 = *secalina* Philippi 1844 - Pallary, 1938: 18; *Volvarina mitrella* Risso 1826 = *secalina* Philippi 1844 var. *minor* - Pallary, 1938: 18; *Marginella secalina* Philippi - Bitar, 1996: 119; *Volvarina mitrella* Philippi [sic! for Risso (see Risso, 1826: 250)] - Bitar, 1996: 121; *Volvarina mitrella* (Risso, 1826) - Bitar & Kouli-Bitar, 1998: 39.

#### Material examined:

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 3 sh (BBCD).

## Family CYSTISCIDAE Stimpson, 1865

### *Gibberula miliaria* (Linnaeus, 1758)

#### Literature records:

*Gibberula miliaria* Linné - Pallary, 1919: 167; Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Pallary, 1938: 18; *Gibberula miliaria* L. - Bitar, 1996: 118; *Gibberula miliaria* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39.

### *Gibberula philippii* (Monterosato, 1878)

#### Literature records:

*Gibberula philippi* [sic! for *philippii* (see Monterosato, 1878: 109)] di Monterosato - Pallary, 1938: 18; *Gibberula philippii* Monterosato - Bitar, 1996: 118; *Gibberula philippii* (Monterosato, 1878) - Bitar & Kouli-Bitar, 1998: 39.

#### Material examined:

(1) Ramkine Island: 01/06/2000 - coarse sand, 13–14 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 4 sh (BBCD).

## Family MITRIDAE Swainson, 1829

### *Episcomitra cornicula* (Linnaeus, 1758)

#### Literature records:

*Mitra cornicula* Lin. var. *olivacca* - Puton, 1856: 225; *Mitra cornicula* Lamarck [sic! for Linnaeus (see Linnaeus, 1758: 731)] - Pallary, 1912b: 171; *Mitra (Fuscomitra) cornicula* Linné - Pallary, 1919: 168; *Mitra (Fuscomitra) cornicula* Linné var. *minor* P. - Pallary, 1919: 168; *Mitra (Volutomitra) lutescens* Lk. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 443; *Mitra (Fuscomitra) cornicula* L. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 443; *Mitra (Fuscomitra) cornicula* Linné = *lutescens* Lamarck - Pallary, 1938: 18; *Mitra (Fuscomitra) cornicula* Linné = *lutescens* Lamarck var. *glandina* (Monts.) Ply 1903 - Pallary, 1938: 18; *Mitra (Fuscomitra) cornicula* Linné = *lutescens* Lamarck var. *minor* Ply - Pallary, 1938: 18; *Mitra (Fuscomitra) cornicula* Linné = *lutescens* Lamarck var. *albina* - Pallary, 1938: 18; *Mitra cornicula* (L.) - Spada, 1971: 90; *Mitra cornicula* L. - Bitar, 1996: 120; *Mitra lutescens* Lamarck - Bitar, 1996: 120; *Mitra corniculum* [sic! for *cornicula* (see Linnaeus, 1758: 731)] (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 43.

#### Material examined:

(1) Ramkine Island: 31/05/2000 - cave, 5–7 m: 1 lv (BBCD); coarse sand, 13 m: 16 sh (BBCD); 01/06/2000 - North, 0.5 m: 1 lv (BBCD); coarse sand, 13–14 m: 6 sh (BBCD); (2) Palms Island: 17/05/2001 - 4 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - 24 m: 1 lv (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 5 sh (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 1 lv, 5 sh (BBCD).

### *Isara cornea* (Lamarck, 1811)

#### Literature records:

*Mitra cornea* Lamk - Fadlallah, 1975: 68; *Mitra cornea* (Lamarck) - Bitar, 1996: 120; *Mitra cornea* Lamarck, 1811 - Bitar & Kouli-Bitar, 1998: 39.

## Family COSTELLARIIDAE MacDonald, 1860

### *Pusia ebenus* (Lamarck, 1811)

#### Literature records:

*Uromitra (Ebenomitra) ebenus* Lamarck var. *cordieri* [sic! for *cordierii* (see Maravigna, 1840: 325)] Maravigna - Pallary, 1919: 168; *Mitra (Uromitra) ebenus* Lk. - Gruvel & Moazzo,

1929: 420; Moazzo, 1931: 443; *Uromitra (Ebenomitra) ebenus* Lamarck var. *cordieri* [sic!] Maravigna 1840 - Pallary, 1938: 18; *Mitra ebenus* Lamarck - Spada, 1971: 90; Bitar, 1996: 120; *Vexillum ebenus* (Lamarck, 1811) - Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 4 sh.

*Pusia granum* (Forbes, 1844)

**Literature records:**

*Mitra (Uromitra) littoralis* Reeve [sic! for Forbes (see Forbes, 1844: 140)] - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 443; *Uromitra (Pusiola) littoralis* Reeve [sic!] var. *major* - Pallary, 1938: 19; *Mitra littoralis* Reeve [sic!] - Bitar, 1996: 120.

*Pusia tricolor* (Gmelin, 1791)

**Literature records:**

*Mitra (Uromitra) tricolor* Gmelin - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 443; *Uromitra (Pusiola) tricolor* Gmelin - Pallary, 1938: 19; *Mitra tricolor* Gmelin - Bitar, 1996: 120; *Vexillum tricolor* (Gmelin, 1791) - Bitar & Kouli-Bitar, 1998: 39.

*Vexillum hypatiae* (Pallary, 1912)

**Literature records:**

*Uromitra (Pusiola) hypatiae* Pallary - Pallary, 1919: 168; Pallary, 1938: 19; *Mitra hypatiae* Pallary - Bitar, 1996: 120; *Vexillum hypatiae* (Pallary, 1913 [sic! for 1912 (see Pallary, 1912a: 88)]) - Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13–14 m: 1 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 10 sh (BBCD); 01/06/2000 - coarse sand, 13–14 m: 5 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 7 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 15 m: 1 sh (BBCD).

**Family PISANIIDAE Gray, 1857**

## *Aplus gaillardoti* (Puton, 1856)

### Literature records:

*Buccinum orbigny* [sic! for *d'orbigny* = *dorbigny* (see Payraudeau, 1826: 159)] Payr. - *sensu* Puton, 1856: 224; *Buccinum gaillardoti* - Puton 1856: 224; *Pisania orbigny* [sic!] Payraudeau - *sensu* Pallary, 1912b: 172; *sensu* Pallary, 1919: 168; *Pisania orbigny* [sic!] Payraudeau var. *gaillardoti* Puton - Pallary, 1912b: 172; Pallary, 1919: 168; *Pisania d'Orbigny* Payr. - *sensu* Gruvel & Moazzo, 1929: 420; *sensu* Moazzo, 1931: 442; *Pisania (Aplus) d'orbigny* Payraudeau var. *gaillardoti* Puton 1855 [sic!] - Pallary, 1938: 20; *Pisania (Aplus) d'orbigny* Payraudeau sous-var. *angusta* Piry - *sensu* Pallary, 1938: 20; *Cantharus d'orbigny* [sic!] (Payraudeau) - *sensu* Spada, 1971: 90; *Pisania d'orbigny* Payr. - *sensu* Bitar, 1996: 120; *Polia dorbigny* (Payraudeau, 1826) - *sensu* Bitar & Kouli-Bitar, 1998: 39.

### Material examined:

(1) Ramkine Island: 22/10/1999 - 15 m: 1 lv (BBCD); 31/05/2000 - cave: 1 lv (BBCD); cave entrance: 1 sh (BBCD); coarse sand, 13 m: 2 sh (BBCD); 14/07/2003 - under stones, 3–4 m: 2 lv (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sortie Est, amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, surface: 2 lv (BBCD); muddy sediment just below small cliff, 3 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 2 sh (BBCD); 06/07/2003 - under stones, 6–7 m: 3 sh (BBCD); (10) Hannouch: 18/09/2002 - under stones, 1–5 m: 1 lv (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 4 lv (BBCD); 26/09/2002 - under stones, 2–3 m: 1 lv (BBCD); (16) Tabarja: 10/07/2003 - 10–25 m: 1 sh (BBCD); (18) Beirut: 02/06/2000 - harbour, muddy sediment, 10 m: 1 sh (BBCD); 17/09/2002 - 1–3 m: 1 sh (BBCD); 17/09/2002 - on sand, 10 m: 2 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD); (27) Tyr: 25/10/1999 - 15 m: 1 sh (BBCD).

### Remarks:

Molecular data showed that specimens previously ascribed to *Aplus dorbigny* (Payraudeau, 1826) actually comprise a complex of cryptic species (see Aissaoui et al. 2016). Aissaoui et al. (2016) suggested that specimens from the eastern Mediterranean should belong to *Aplus gaillardoti* (Puton, 1856), and therefore (pending a necessary genetic study of Levantine material) for the sake of nomenclatural stability we report Lebanese specimens under this name.

## *Aplus scacchianus* (Philippi, 1844)

### Literature records:

*Pisania picta* Scacchi - Pallary, 1912b: 172; Pallary, 1919: 168; Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; Bitar, 1996: 120; *Pisania picta* Scacchi var. *minor* P. - Pallary, 1919: 168; *Pisania (Aplus) picta* Scacchi - Pallary, 1938: 21; *Pisania (Aplus) picta* Scacchi var. *minor* Piry 1912 - Pallary, 1938: 21; *Cantharus pictus* (Scacchi) - Spada, 1971: 90; Fadlallah, 1975: 68; *Cantharus pictus* Scacchi - Bitar, 1996: 121; *Polia scacchiana* (Philippi, 1844) - Bitar & Kouli-Bitar, 1998: 39.

### Material examined:

(1) Ramkine Island: 22/10/1999 - concretions, 13–14 m: 1 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 7 sh (BBCD); 01/06/2000 - sand, 13–14 m: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 1 sh (BBCD); sand in *Cymodocea* meadow, 5 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 12 sh (BBCD); (8) Chak El Hatab: 05/07/2003 - cave sediment, 1.5 m: 3 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 3 sh (BBCD); 23/10/1999 - cave sediment, 7–8 m: 2 sh (BBCD); (12) Kfar Abida: 30/05/2000 - small cave, 7–8 m: 3 sh (BBCD); 5–12 m: 1 lv (BBCD); (19) Raoucheh: 17/09/2002 - cave, 1–3 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

### *Enginella leucozona* (Philippi, 1844)

#### **Literature records:**

*Pisania bicolor* Cantraine - Pallary, 1912b: 172; Pallary, 1919: 168; Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; Bitar, 1996: 120; *Pisania (Enginella) bicolor* Cantraine - Pallary, 1938: 21; *Pisania (Enginella) bicolor* Cantraine var. *luctuosa* Piry - Pallary, 1938: 21; *Engina bicolor* (Cantraine) - Spada, 1971: 90; *Engina leucozona* (Philippi, 1843 [sic! for 1844]) - Bitar & Kouli-Bitar, 1998: 39.

#### **Material examined:**

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 4 sh (BBCD); overhang, 13–14 m: 2 lv, 1 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 5 sh (BBCD); 01/06/2000 - sand, 13–14 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 3 sh (BBCD); (8) Chak El Hatab: 05/07/2003 - cave, 1.5 m: 1 sh (BBCD); (9) Selaata: 23/10/1999 - 5–10 m: 1 sh (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, concretions, 9 m: 1 lv (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 8 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, concretions, 37 m: 1 lv (BBCD).

### *Pisania striata* (Gmelin, 1791)

#### **Literature records:**

*Buccinum maculosum* Lamk. - Puton, 1856: 224; *Pisania maculosa* Lamarck - Pallary, 1912b: 171; Pallary, 1919: 168; *Pisania maculosa* Lk. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; *Pisania maculosa* (Bruguière) Lamarck [sic! for Lamarck (see Lamarck, 1822b: 269)] - Pallary, 1938: 20; *Pisania maculosa* (Bruguière) Lamarck [sic!] var. *major* Monts. 1879 [sic! for 1878 (see Monterosato, 1878: 102)] - Pallary, 1938: 20; *Pisania maculosa* (Bruguière) Lamarck [sic!] var. *marmorata* Requien 1848 - Pallary, 1938: 20; *Pisania maculosa* (Lamarck) - Spada, 1971: 90; *Pisania maculosa* (Brugiere [sic!]) Lamarck [sic!] - Bitar, 1996: 120; *Pisania striata* (Gmelin, 1791) - Bitar & Kouli-Bitar, 1998: 39, 43.

#### **Material examined:**

(11) Batroun: 16/10/1999 - old town, "Phenician wall", concretions, 9 m: 1 sh (BBCD); (12) Kfar Abida: 30/05/2000 - 5–12 m: 3 sh (BBCD); (19) Raoucheh: 17/09/2002 - on sand, 10 m: 2 sh (BBCD); 16/07/2003 - cave, max. 5 m: 1 sh (BBCD).

<sup>+</sup> **A** - *Pollia rubens* (Küster, 1858)

**Material examined:**

(18) Beirut: 02/06/2000 - harbour, muddy bottom, 10 m: 1 sh (BBCD) (Fig. 3D).

**Remarks:**

Our specimen perfectly corresponds to *Pollia rubens* (Küster, 1858) from the Red Sea. Shell fusiform, 19.9 mm long; protoconch paucispiral of 1.2 bulbous whorls; teleoconch of 5 flat whorls, suture slightly canaliculated but not incised; axial sculpture of slightly prosocline, not elevated ribs, and regular growth marks; spiral sculpture of 12 spiral cords (4 above the aperture) overriding the axials; colour tawny-reddish with a lighter band at the periphery. This taxon shows some similarities with *Pollia fumosa* (Dillwyn, 1817) and *Pollia rubiginosa* (Reeve, 1846), that presumably do not live in the Red Sea (H. Dekker, pers. comm.). Additionally, they can be differentiated from *P. rubens* by their more neatly marked whitish spiral band at the periphery (and darker colour on the axial ribs in *P. fumosa*), the larger size, the slightly deeper suture and the more convex whorls. Finally, *Pollia subcostata* (Krauss, 1848), another close species, seems to be restricted from Mozambique to Natal, and is usually larger than *P. rubens*, light yellowish in colour and with weaker spiral ribs (Singer & Mienis, 1995). Although we first report this taxon from the Mediterranean Sea based on an empty shell only, the traces of periostracum leave no doubts it was alive shortly before collection.

**First record date:**

First found in 2000 (see Material examined).

## **Family BUCCINIDAE Rafinesque, 1815**

*Chauvetia brunnea* (Donovan, 1804)

**Literature records:**

*Donovania minima* Montagu - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 444; Pallary, 1938: 29; *Donavania* [sic! for *Donovania* Bucquoy, Dautzenberg & Dollfus, 1883 (see Bucquoy, Dautzenberg & Dollfus, 1882-1886: 112)] *minima* Montagu - Bitar, 1996: 119; *Chauvetia brunnea* (Donovan, 1804) - Bitar & Kouli-Bitar, 1998: 39.

*Euthria cornea* (Linnaeus, 1758)

**Literature records:**

*Euthria cornea* Linné - Pallary, 1912b: 172; Pallary, 1919: 168; *Eutria* [sic! for *Euthria* (see Gray, 1850: 67)] *cornea* L. - Gruvel & Moazzo, 1929: 419; Moazzo, 1931: 441; Bitar, 1996: 121; *Buccinulum corneum* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39; *Euthria cornea* (Linnaeus, 1758) - Ramos-Esplá et al., 2015: 158, 191, 202.

**Material examined:**

(1) Ramkine Island: 01/06/2000 - sand, 13–14 m: 1 sh (BBCD); 14/07/2003 - cave, 7 m: 1 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, small cave, concretions, 16 m: 1 sh (BBCD).

## Family COLUBRARIIDAE Dall, 1904

### *Cumia reticulata* (Blainville, 1829)

**Literature records:**

*Epidromus reticulatus* Blainville - Pallary, 1912b: 172; Bitar, 1996: 121; *Epidromus reticulatus* de Blainville var. *minor* P. - Pallary, 1919: 169; *Epidromus reticulatus* Blainv. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; *Epidromus reticulatus* de Blainville var. *minor* P. - Pallary, 1912 - Pallary, 1938: 30; *Colubraria reticulata* (de Blainville, 1829) - Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13–14 m: 1 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 3 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 3 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 2 sh (BBCD); 23/10/1999 - cave sediment, 7–8 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 2 sh (BBCD).

## Family NASSARIIDAE Iredale, 1916 (1835)

### *Tritia circumcincta* (Adams, 1852)

**Literature records:**

*Nassa gibbosula* Lin. var. *syriaca* - Puton, 1856: 225; *Arcularia circumcincta* A. Adams var. *syriaca* Puton - Pallary, 1912b: 172; *Arcularia circumcincta* A. Adams - Pallary, 1919: 168; Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; Pallary, 1938: 23; Bitar, 1996: 120; *Arcularia circumcincta* A. Adams var. *minor* P. - Pallary, 1919: 168; *Arcularia circumcincta* A. Adams var.

*minor* Piry 1912 - Pallary, 1938: 23; *Arcularia circumcincta* (A. Adams) - Spada, 1971: 90; *Nassarius circumcinctus* (A. Adams, 1851 [sic! for 1852 (see Adams, 1852: 102)]) - Bogi & Khairallah, 1987: 58; *Nassarius circumcinctus* (Adams) - Khairallah & Mattar, 1987 - 304; *Nassarius circumcinctus* (A. Adams, 1852) - Bitar & Kouli-Bitar, 1998: 39, 43; Ramos-Esplá et al., 2015: 158, 168; Ramos-Esplá et al., 2017: 94; *Nassarius circumcinctus* - Ramos-Esplá et al., 2017: 62, 116.

**Material examined:**

(19) Raoucheh: 17/09/2002 - fine sand, 10 m: 2 lv, 30 sh (BBCD); 16/07/2003 - cave, maximum 5 m: 5 sh (BBCD).

*Tritia corniculum* (Olivi, 1792) complex

**Literature records:**

*Amycla corniculum* Olivi - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; Pallary, 1938: 23; Bitar, 1996: 120; *Amycla corniculum* Olivi var. *minor* Piry 1900 - Pallary, 1938: 23; *Amycla corniculum* Olivi var. *raricosta* Risso 1826 - Pallary, 1938: 23; *Nassarius corniculum* (Olivi, 1792) - Bitar & Kouli-Bitar, 1998: 39.

**Remarks:**

A combined morphological-molecular approach suggested that specimens previously ascribed to *Tritia corniculum* (Olivi, 1792) may comprise a complex of cryptic species (see Iannotta et al., 2008; Aissaoui et al., 2017), and thus we keep literature records and new unpublished material examined as “*Tritia corniculum* (Olivi, 1792) complex”.

*Tritia cuvierii* (Payraudeau, 1826) complex

**Literature records:**

*Nassa ferussaci* Payraudeau - Pallary, 1912b: 172; *Nassa (Telasco) cuvierii* [sic! for *cuvierii* (see Payraudeau, 1826: 163)] Payraudeau - Pallary, 1919: 168; *Nassa (Telasco) ferussaci* Payraudeau - Pallary, 1919: 168; Pallary, 1938: 22; *Nassa costulata* Renieri [sic! for Brocchi (see Brocchi, 1814: 343)] - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; *Nassa (Telasco) cuvierii* [sic!] Payraudeau - Pallary, 1938: 22; *Hinia costulata* (Renier) [sic!] - Spada, 1971: 90; *Nassa costulata* Renier [sic!] - Bitar, 1996: 120; *Nassa ferussaci* Payr. - Bitar, 1996: 120; *Nassarius cuvierii* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 39.

**Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - 4 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 4 sh (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, concretions, 9 m: 5 sh (BBCD); (27) Tyr: 08/11/1992: 1 sh (BBCD).

**Remarks:**



Molecular data showed that specimens previously ascribed to *Tritia cuvierii* (Payraudeau, 1826) comprise a complex of cryptic species (see Aissaoui et al., 2017), and thus we keep literature records and new unpublished material examined as “*Tritia cuvierii* (Payraudeau, 1826) complex”.

### *Tritia gibbosula* (Linnaeus, 1758)

#### **Literature records:**

*Nassa gibbosula* Lin. - Puton, 1856: 225; *Arcularia gibbosula* Linné - Pallary, 1912b: 172; Pallary, 1919: 168; Pallary, 1938: 23; *Arcularia gibbosula* Linné var. *minor* P. - Pallary, 1912b: 172; Pallary, 1919: 168; *Arcularia gibbosula* Linné var. *minor rufa* P. - Pallary, 1919: 168; *Arcularia gibbosula* L. - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; Bitar, 1996: 120; *Arcularia gibbosula* Linné var. *minor* P. - Pallary, 1912 - Pallary, 1938: 23; *Arcularia gibbosula* Linné var. *obscura* P. - Pallary, 1912 - Pallary, 1938: 23; *Arcularia gibbosula* (L.) - Spada, 1971: 90; *Nassarius gibbosulus* (L., 1758) - Bogi & Khairallah, 1987: 58; *Nassarius gibbosulus* (L.) - Khairallah & Mattar, 1987 - 304; *Arcularia gibbosula* L. - Bitar, 1996: 120; *Nassarius gibbosulus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39; *Nassarius gibbosulus* - Ramos-Esplá et al., 2017: 62, 116; *Tritia gibbosula* (Linnaeus, 1758) - Ramos-Esplá et al., 2017: 94.

### *Tritia grana* (Lamarck, 1822)

#### **Literature records:**

*Naytiopsis granum* (Lamarck, 1822) - Bogi & Khairallah, 1987: 58; *Nassarius granum* (Lamarck [sic!]) - Khairallah & Mattar, 1987 - 304.

### *Tritia incrassata* (Strøm, 1768) complex

#### **Literature records:**

*Nassa incrassata* Mull. [sic! for Strøm (see Strøm, 1768: 369)] - Puton, 1856: 225; *Nassa incrassata* Strøm - Pallary, 1912b: 172; *Nassa (Hima) incrassata* Strøm var. *minor* P. - Pallary, 1919: 168; *Nassa incrassata* Müller [sic!] - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; Bitar, 1996: 120; *Nassa (Hima) incrassata* Strøm var. *minor* B.D.D. 1882 - Pallary, 1938: 22; *Nassarius incrassatus* (Strøm [sic!], 1768) - Bitar & Kouli-Bitar, 1998: 39.

#### **Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 2 sh (BBCD); (7) Ras El Chakaa: 19/10/1999 - encrusted wall, 5–7 m: 1 sh (BBCD); 04/06/2000 - cave sediment, 3–4.5 m: 9 sh (BBCD); (18) Beirut: 07/07/2003 - harbour entrance, 10 m: 1 sh (BBCD).

#### **Remarks:**

Molecular data showed that specimens previously ascribed to *Tritia incrassata* (Strøm, 1768) may comprise a complex of cryptic species (see Borges et al., 2016), and thus we keep literature records and new unpublished material examined as “*Tritia incrassata* (Strøm, 1768) complex”.

### *Tritia lousi* (Pallary, 1912)

#### **Literature records:**

*Nassa cuvieri* [sic! for *cuvierii* (see Payraudeau, 1826: 163)] Payraudeau var. *lousi* P. - Pallary, 1912b: 172; *Nassa (Telasco) cuvieri* [sic!] Payraudeau var. *lousi* P. - Pallary, 1919: 168; *Nassa cuvieri* [sic!] Payr. var. *lousi* Pallary - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; Bitar, 1996: 120; *Nassa lousi* Ptry - Pallary, 1933: 152; *Nassa lousi* - Pallary, 1933: 152; *Nassa (Telasco) lousi* Pallary 1912 - Pallary, 1938: 23; *Nassa (Telasco) lousi* Pallary 1912 var. *major* Ptry - Pallary, 1938: 23; *Nassa lousi* Pallary - Bitar, 1996: 120; *Nassarius lousi* (Pallary, 1912) - Bitar & Kouli-Bitar, 1998: 39.

### *Tritia mutabilis* (Linnaeus, 1758)

#### **Literature records:**

*Nassa mutabilis* Lin. var. *minor* - Puton, 1856: 225; *Nassa mutabilis* Linné - Pallary, 1912b: 172; Pallary, 1919: 168; Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; Pallary, 1938: 21; *Nassa mutabilis* Linné var. *minor* Monts. 1878 - Pallary, 1938: 21; *Nassa mutabilis* Linné var. *minuscula* Ptry 1900 - Pallary, 1938: 21; *Sphaeronassa mutabilis* (L.) - Spada, 1971: 90; *Nassa mutabilis* L. - Bitar, 1996: 120; *Nassarius mutabilis* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39; *Nassarius mutabilis* - La Porta et al., 2014: 167; *Nassarius mutabilis* - Ramos-Esplá et al., 2015: 104, 106; *Nassarius mutabilis* (Linnaeus, 1758) - Ramos-Esplá et al., 2015: 158, 182; *Tritia mutabilis* - Ramos-Esplá et al., 2017: 62, 116; *Tritia mutabilis* (Linnaeus, 1758) - Ramos-Esplá et al., 2017: 94.

#### **Material examined:**

(9) Selaata: 23/10/1999 - 20 m: 1 sh (BBCD); 24/09/2002 - cave, 22 m: 2 sh (BBCD); (18) Beirut: 25/09/2002 - airport, breakwater: 1 sh (BBCD); (19) Raoucheh: 17/09/2002 - sand, 10 m: 3 sh (BBCD).

### *Tritia neritea* (Linnaeus, 1758)

#### **Literature records:**

*Nassa neritea* Lin. - Puton, 1856: 225; *Nassa neritea* Lin. var. *rufa* - Puton, 1856: 225; *Cyclonassa neritea* Linné - Pallary, 1912b: 172; Pallary, 1919: 168; Pallary, 1938: 24; *Cyclonassa neritea* Linné var. *rufa* Requier - Pallary, 1919: 168; *Cyclonassa neritea* Linné var. *compacta* P. - Pallary, 1919: 168; *Cyclonassa neritea* L. - Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; Bitar, 1996: 120; *Cyclonassa neritea* Linné var. *rufa* Requier 1848 = *atra* Monts. 1878 - Pallary, 1938: 24; *Cyclonassa neritea* Linné var. *lutescens* Requier 1848 - Pallary, 1938: 24; *Cyclonassa neritea* Linné var. *globulosa* Ptry 1919 - Pallary, 1938: 24; *Cyclonassa neritea* Linné var. *italica* Issel 1869 - Pallary, 1938: 24; *Cyclope neritea* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39.

#### **Material examined:**

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 2 sh (BBCD).

*Tritia nitida* (Jeffreys, 1867)

**Literature records:**

*Nassa reticulata* L. - *sensu* Gruvel & Moazzo, 1929: 421; *sensu* Moazzo, 1931: 443; *sensu* Bitar, 1996: 120; *Nassa (Hinia) reticulata* Linné - *sensu* Pallary, 1938: 21; *Nassa (Hinia) reticulata* Linné var. *mamillata* Risso 1826 = *nitida* Jeffreys 1867 - Pallary, 1938: 21; *Nassa nitida* Jeffreys - Bitar, 1996: 120; *Nassarius reticulatus* (Linné, 1758) - *sensu* Bitar & Kouli-Bitar, 1998: 39; *Nassarius reticulatus* - *sensu* Ramos-Esplá et al., 2015: 104; *Nassarius reticulatus* (Linnaeus, 1758) - *sensu* Ramos-Esplá et al., 2015: 158, 202.

**Remarks:**

Lebanese records of *Hinia reticulata* are to be referred to *Tritia nitida* (Jeffreys, 1867), being *Buccinum reticulatum* Linnaeus, 1758 a different species widely distributed in the Atlantic Ocean and the westernmost Mediterranean Sea only (Rolán & Luque 1994).

\* *Tritia pygmaea* (Lamarck, 1822)

**Literature records:**

*Hinia angulata* Payraudeau - *sensu* Fadlallah, 1975: 68; *Hinia angulata* Payraudeau - *sensu* Bitar, 1996: 117.

**Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 1 sh (BBCD) (Fig. 3E); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD).

**Remarks:**

Early Mediterranean records of *Hinia angulata* Payraudeau *sensu auctores* presumably referred to *Tritia pygmaea* (Lamarck, 1822) (see also Parenzan, 1970; Posi et al., 2012).

*Tritia turulosa* (Risso, 1826)

**Literature records:**

*Nassarius turulosus* - La Porta et al., 2014: 167.

**Material examined:**

(18) Beirut: 29/04/2013 - Antelias2, offshore, muddy bottom, 100 m: 1 lv (BBCD).

**Remarks:**

The specimen examined here was in the same lot listed by La Porta et al. (2014), from a locality where this species was reported as “dominant”.

## *Tritia unifasciata* (Kiener, 1834)

### Literature records:

*Nassarius unifasciatus* (Kiener, 1834) - Bitar & Kouli-Bitar, 1998: 43.

### Material examined:

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13–14 m: 2 lv (BBCD); (4) Bouhssas: 26/11/1991: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 4 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 2 sh (BBCD); 23/10/1999 - cave, 6 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 lv (BBCD).

## Family COLUMBELLIDAE Swainson, 1840

### *Columbella rustica* (Linnaeus, 1758)

### Literature records:

*Columbella rustica* - Mougéot, 1848: 718; *Columbella rustica* Lin. - Puton, 1856: 225; *Columbella russica* [sic! for *rustica* (see Linnaeus, 1758: 731)] Linné - Pallary, 1912b: 172; *Columbella rustica* L. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; Bitar, 1996: 121; *Columbella rustica* Linné - Pallary, 1938: 24; *Columbella cuneata* di Monterosato var. *minor* Ply 1906 - Pallary, 1938: 24–25; *Columbella rustica* (L.) - Spada, 1971: 90; Fadlallah, 1975: 68; *Columbella rustica* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 43; *Columbella rustica* (Linnaeus, 1758) - Ramos-Esplá et al., 2015: 157, 167, 181, 211.

### Material examined:

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13–14 m: 3 sh (BBCD); concretions, 13–14 m: 1 sh (BBCD); 15 m: 2 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 3 sh (BBCD); cave: 1 lv (BBCD); 01/06/2000 - 0.5 m: 1 lv (BBCD); 6 m: 1 lv, 1 sh (BBCD); sand, 13–14 m: 7 sh (BBCD); 17/05/2001 - 4 m: 1 lv (BBCD); (3) Tripoli: 20/09/2002 - harbour entrance, breakwater jetty, inner side, 1 m: 2 lv (BBCD); harbour, breakwater jetty, outer side, 5 m: 1 lv (BBCD); Anfeh: 26/10/1999 - sand, 20 m: 1 sh (BBCD); (4) Bouhssas: 26/11/1991: 1 lv (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - 1–5 m: 2 lv (BBCD); sand in *Cymodocea* meadow, 4 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 8 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 9 sh (BBCD); (11) Batroun: 25/09/1993 - 12 m: 1 lv, 1 sh (BBCD); 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 3 lv, 2 sh (BBCD); (12) Kfar Abida: 30/05/2000 - 5–12 m: 1 lv (BBCD); (14) Jbail: 17/10/1999 - Tablieh, concretions, 15 m: 1 lv, 1 sh (BBCD); Tablieh, cave sediment, 16 m: 3 sh (BBCD); (15) El Bouar: 15/10/1992: 1 lv (BBCD); (16) Tabarja: 15/11/2001: 1 lv (BBCD); (19) Raoucheh: 17/09/2002 - boulders and rock, 7–9 m: 1 lv, 1 sh (BBCD); (20) Khaldeh: Villamar, 07/06/2000 - surface: 1 lv (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD); (24) El Zahrani: 06/06/2000 -

Harf El Hawieh El Jouani, 14 m: 1 lv (BBCD); Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - 42 m: 1 sh (BBCD); 25/10/1999 - detritic sand, 44 m: 5 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 12 sh (BBCD); 15 m: 1 sh (BBCD).

\* *Mitrella coccinea* (Philippi, 1836)

**Material examined:**

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD) (Fig. 3F).

\* *Mitrella minor* (Scacchi, 1836)

**Material examined:**

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD) (Fig. 3G).

*Mitrella scripta* (Linnaeus, 1758)

**Literature records:**

*Mitrella scripta* Linné - Pallary, 1912b: 172; Pallary, 1919: 169; Pallary, 1938: 25; *Mitrella scripta* L. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; Bitar, 1996: 120; *Mitrella scripta* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39, 43.

**A** - *Zafra savignyi* (Moazzo, 1939)

**Literature records:**

*Anachis (Zafra) savignyi* (Moazzo, 1939) - Bogi & Khairallah, 1987: 58; *Zafra savignyi* - Bitar, 2012: 8; *Zafra savignyi* (Moazzo, 1939) - Bitar, 2014: 45.

**First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

\* **A** - *Zafra selasphora* (Melvill & Standen, 1901)

**Material examined:**

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 1 sh (BBCD); overhang, 13–14 m: 1 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 4 sh (BBCD); 01/06/2000 - sand, 13–14 m: 1 sh (BBCD); (3) Tripoli: 20/09/2002 - harbour entrance, breakwater jetty, inner side, 2–5 m: 3 lv (BBCD); 08/07/2003 - harbour, on quay wall, 2–5 m: 2 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 4 sh (BBCD); 23/10/1999 - cave, 6 m: 1 sh (BBCD); 14/09/2002 - cave sediment, 22 m: 2 sh (BBCD); 24/09/2002 - cave sediment, 22 m: 1 sh (BBCD); 06/07/2003 -

cave, 20 m: 1 sh (BBCD); cliff, 35 m: 8 sh (BBCD); (12) Kfar Abida: 30/05/2000 - tunnel, small cave, 7–8 m: 2 sh (BBCD); (16) Tabarja: 11/07/2003 - 15 m: 3 sh (BBCD); (17) Aquamarina (N Bay of Jounieh): 10/07/2003 - 10–25 m: 1 lv (BBCD); (18) Beirut: 02/06/2000 - harbour, 1–2 m: 1 lv (BBCD); 02/06/2000 - harbour, 1–8 m: 3 lv (BBCD); 25/09/2002 - airport, pillar jetty, 3–10 m: 43 lv (BBCD) (Fig. 3H); 16/07/2003 - airport, under pillar jetty, 3–11 m: 11 lv (BBCD); 09/07/2003 - harbour, outer side of the main jetty, 5–9 m: 2 lv (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 15 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 17 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Hawieh El Jouani, 14 m: 1 lv (BBCD); Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 12 sh (BBCD).

#### **Remarks:**

*Zafra selasphora* (Melvill & Standen, 1901) has been repeatedly reported for the eastern Mediterranean (see Tringali & Villa, 1995 for a review). Recently, Öztürk et al. (2015) reported *Zafra obesula* (Hervier, 1899) from Turkey, basing on samples that would differ from *Z. selasphora* “being globular and having less evident wavy axial lines”. We noticed that our materials (141 shells or specimens) encompass a wide variation in shell outline and chromatism, and were unable to separate two discrete entities. Such a variation is also known in this group in the Indo-Pacific populations, and even Öztürk et al. (2015) figured specimens [especially their figure 4A (see also Öztürk et al., 2017), but also figures 4B–C) that seem to match more *Z. selasphora* (see for instance deMaintenon 1990: fig. 40) than *Z. obesula* (see for instance deMaintenon 1990: fig. 37), which is definitely stouter than most Mediterranean shells. Thus, we prefer to keep all our material under *Zafra selasphora* (Melvill & Standen, 1901) until this group of rather variable columbellids is revised.

#### **First record date:**

First found in 1999 (see Material examined).

## **Family FASCIOLARIIDAE Gray, 1853**

### *Aptyxis syracusana* (Linnaeus, 1758)

#### **Literature records:**

*Aptyxis syracusanus* Linné - Pallary, 1912b: 171; Pallary, 1919: 168; Pallary, 1938: 19; *Fusus syracusanus* L. - Gruvel & Moazzo, 1929: 419; Moazzo, 1931: 441; Bitar, 1996: 121; *Fusinus syracusanus* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39.

### **A - *Fusinus verrucosus* (Gmelin, 1791)**

#### **Literature records:**

*Fusinus marmoratus* (Philippi, 1846) - Zibrowius & Bitar, 2003: 70; *Fusinus verrucosus* - Cossignani & Ardovini, 2011: 312; Bitar, 2012: 8; *Fusinus verrucosus* (Gmelin, 1791) - Bitar, 2014: 44; Ramos-Esplá et al., 2015: 158, 168, 182.

**Material examined:**

(1) Ramkine Island: 01/06/2000 - 14–15 m: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000: 1 sh (BBCD); (16) Tabarja: 10/07/2003 - 10–25 m: 1 sh (BBCD); 11/07/2003 - 8–18 m: 3 lv, 4 sh (BBCD); (17) Aquamarina (N Bay of Jounieh): 10/07/2003 - artificial slope, 15–25 m: 1 lv, 5 sh (BBCD); 11/07/2003 - 14–23 m: 3 sh (BBCD); (18) Beirut: 02/06/2000 - harbour, 1–8 m: 2 lv (BBCD); 16/09/2002 - harbour jetty, outer side, 20 m: 2 sh (BBCD); 25/09/2002 - airport, pillar jetty, 6–18 m: 16 lv, 3 sh (BBCD); airport, breakwater, 12 m: 2 lv (BBCD); 07/07/2003 - St. George, 10–20 m: 3 lv, 2 sh (BBCD); 16/07/2003 - airport, pillar jetty, 11 m: 4 lv (BBCD); (19) Raoucheh: 17/09/2002 - fine sand, 10 m: 1 sh (BBCD); 16/07/2003 - cave, 2–3 m: 1 sh (BBCD).

**Remarks:**

Early Lebanese records of *Fusinus verrucosus* (Gmelin, 1791) by Bitar (1996: 121) and Bitar & Kouli-Bitar (1998: 39) (as *Fusus marmoratus* and *Fusinus marmoratus*, respectively) were explicitly based on Gruvel, Moazzo, and Pallary (see Bitar & Kouli-Bitar, 1998). More recently, Bitar (2014) listed its first record from Lebanon as based on Gruvel & Moazzo (1929). However, Gruvel & Moazzo (1929), Moazzo (1931) and Pallary (1938) only reported specimens from Acre and Haifa (Israel), and therefore early records from Lebanon are considered a bibliographic misreading.

**First record date:**

First found in 2000 (see Material examined).

\* *Fusinus* sp.

**Material examined:**

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD) (Fig. 3I).

**Remarks:**

The only specimen hereby analysed presumably belongs to an undescribed species, and only slightly resembles in its spiral sculpture *Fusinus parvulus* (Monterosato, 1884), from which it differs in its angled whorls (see Buzzurro & Russo, 2007).

*Tarantinaea lignaria* (Linnaeus, 1758)

**Literature records:**

*Fasciolaria tarentina* Lamk. - Puton, 1856: 224; Dalongeville, 1977: 26; *Fusus lignarius* Lin. - Puton, 1856: 224; *Fasciolaria lignaria* Linné - Pallary, 1912b: 171; Pallary, 1919: 168; *Fasciolaria lignaria* L. - Gruvel & Moazzo, 1929: 420; Moazzo, 1931: 442; Bitar, 1996: 121; *Fasciolaria (Tarentinaea) lignaria* Linné var. *orientalis* - Pallary, 1938: 20; *Fasciolaria lignaria*

(L.) - Spada, 1971: 90; *Fasciolaria lignaria* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 39; *Fasciolaria lignaria* Linné, 1758 - Bitar & Kouli-Bitar, 1998: 43.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - tunnel, 1–2 m: 1 lv (BBCD); (5) Anfeh: 26/10/1999 - 24 m: 1 lv (BBCD); (7) Ras El Chakaa: 19/10/1999 - encrusted wall, 5–7 m: 1 lv (BBCD); (9) Selaata: 18/10/1999 - cave, 7 m: 1 sh (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 1 lv (BBCD); (19) Raoucheh: 16/07/2003 - cave, 2–3 m: 1 sh (BBCD).

## Family CONIDAE Fleming, 1822

### *Conus ventricosus* Gmelin, 1791

**Literature records:**

*Conus ventricosus* Gmel. - Puton, 1856: 226; *Conus mediterraneus* Bruguière [sic! for Hwass in Bruguière (see Bruguière, 1789–1792: 701)] - Pallary, 1912b: 171; Pallary, 1919: 167; Gruvel & Moazzo, 1929: 421; Moazzo, 1931: 443; Spada, 1971: 90; Bitar, 1996: 120; *Conus mediterraneus* Bruguière [sic!] var. *rubescens* B.D.D. - Pallary, 1919: 167; *Conus (Chelyconus) mediterraneus* (Hwass) Bruguière - Pallary, 1938: 15; *Conus (Chelyconus) mediterraneus* (Hwass) Bruguière var. *alticonica* Piry 1904 - Pallary, 1938: 15; *Conus (Chelyconus) mediterraneus* (Hwass) Bruguière var. *oblonga* B.D.D. 1882 - Pallary, 1938: 15; *Conus (Chelyconus) mediterraneus* (Hwass) Bruguière var. *alpus* di Gregorio [sic! for De Gregorio (see De Gregorio, 1885)] 1885 - Pallary, 1938: 16; *Conus (Chelyconus) mediterraneus* (Hwass) Bruguière var. *major* B.D.D. 1882 - Pallary, 1938: 16; *Conus (Chelyconus) mediterraneus* (Hwass) Bruguière var. *rubescens* B.D.D. 1882 - Pallary, 1938: 16; *Conus mediterraneus* Brug. [sic!] - Fadlallah, 1975: 68; *Conus mediterraneus* Hwass in Bruguière, 1792 - Bitar & Kouli-Bitar, 1998: 40, 43; *Conus ventricosus* Gmelin, 1791 - Ramos-Esplá et al., 2015: 157, 167, 181, 211.

**Material examined:**

(1) Ramkine Island: 22/10/1999 - tunnel, 1–5 m: 1 sh (BBCD); 31/05/2000 - coarse sand, 13 m: 9 sh (BBCD); 01/06/2000 - sand, 13–14 m: 14 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 6 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 1 sh (BBCD); sand in *Cymodocea* meadow, 4 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 4 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); (11) Batroun: 16/10/1999 - old town, “Phenician wall”, encrusted vertical wall, 9 m: 1 lv (BBCD); (14) Jbail: 17/10/1999 - Tablieh, small cave, concretions, 16 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 9 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD); (27) Tyr: 25/10/1999 - Sour, shoal, coarse sand between rocks, 12 m: 34 sh (BBCD); Sour, 15 m: 1 sh (BBCD).



## Family HORAICLAVIDAE Bouchet, Kantor, Sysoev & Puillandre, 2011

### *Haedropleura secalina* (Philippi, 1844)

#### Literature records:

*Haedropleura secalina* Philippi - Pallary, 1938: 16; Bitar, 1996: 120.

#### Material examined:

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

### *Haedropleura septangularis* (Montagu, 1803)

#### Literature records:

*Haedropleura septangularis* Montagu - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; Pallary, 1938: 16; Bitar, 1996: 117, 120; *Haedropleura septangularis* (Montagu, 1803) - Bitar & Kouli-Bitar, 1998: 39.

## Family MITROMORPHIDAE Casey, 1904

### *Mitromorpha columbellaria* (Scacchi, 1836)

#### Literature records:

*Mitrolumna olivoidea* [sic! for olivoidea (see Cantraine, 1835: 391)] Cantraine - *sensu* Gruvel & Moazzo, 1929: 420; *sensu* Moazzo, 1931: 443; *Mitrolumna algeriana* (Monts.) Pallary - Pallary, 1938: 19; Bitar, 1996: 120; Bitar & Kouli-Bitar, 1998: 39; *Mitrolumna olivoidea* Cantraine - *sensu* Bitar, 1996: 120; *Mitromorpha olivoidea* (Cantraine, 1835) - *sensu* Bitar & Kouli-Bitar, 1998: 39; *Mitromorpha* (*Mitrolumna*) *columbellaria* (Scacchi, 1836) - Amati et al., 2015: 155.

#### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); 01/06/2000 - coarse sand, 13–14 m: 6 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 2 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 2 sh (BBCD).

#### Remarks:

*Mitrolumna olivoidea* (Cantraine, 1835) has a distribution limited to the western-central Mediterranean Sea (Amati et al., 2015), and therefore early Lebanese records of this species should be ascribed to *M. columbellaria*.

## Family MANGELIIDAE P. Fischer, 1883

*Bela zonata* (Locard, 1891)

### Literature records:

*Ginnania laevigata* Deshayes [sic! for Philippi (see Philippi, 1836: 199)] - Pallary, 1938: 16; Bitar, 1996: 120; Bitar & Kouli-Bitar, 1998: 40.

\* *Mangelia callosa* (Nordsieck, 1977)

### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD) (Fig. 3J).

*Mangelia costulata* Risso, 1826

### Literature records:

*Smithiella* [sic! for *Smithiella* (see Monterosato, 1890: 186)] *striolata* [*sensu*] Scacchi - Pallary, 1938: 18; *Smithiella* [sic!] *striolato* [sic! for *striolata* (see Risso, 1826: 221)] [*sensu*] Scacchi - Bitar, 1996: 120; *Mangelia attenuata* (Montagu, 1803) - *sensu* Bitar & Kouli-Bitar, 1998: 39.

### Material examined:

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD).

### Remarks:

*Mangelia striolata* (Risso, 1826) *sensu* Scacchi (1836) is a misidentification for *Mangelia costulata* Risso, 1826 (see Cretella et al., 2005). Bitar & Kouli-Bitar (1998) did not notice “*sensu* Scacchi” and listed early Lebanese records of *M. striolata* (Risso, 1826) as belonging to *Mangelia attenuata* (Montagu, 1803). This was based on some old taxonomic views, when *M. striolata* Risso, 1826 was frequently (and incorrectly) considered as a junior synonym of *Mangelia attenuata* (Montagu, 1803) (see Cretella et al., 2005). However, *M. striolata* (Risso, 1826) is the type species of *Mangelia* Risso, 1826 and is a distinct species (Spada & Della Bella, 2010). Currently, specialists of European mangeliids place *M. costulata* in the genus *Smithiella* Monterosato, 1890 and *M.*

*attenuata* in the genus *Villiersiella* Monterosato, 1890 (Spada & Della Bella, 2010; Scarponi & Della Bella 2010).

\* *Mangelia angelinae* (Cecalupo & Quadri, 1996)

**Material examined:**

(1) Ramkine Island: 01/06/2000 - coarse sand, 13–14 m: 2 sh (BBCD) (Fig. 3K).

**Remarks:**

*Mangelia angelinae* (Cecalupo & Quadri, 1996) is here considered different from *Mangelia thapsiae* (Oberling, 1970) following Amati et al. (2017a).

*Mangelia paciniana* (Calcara, 1839)

**Literature records:**

*Mangilia pacinii* [sic! for *paciniana* (see Calcara, 1839: 7)] Calcara - Pallary, 1919: 167; Pallary, 1938: 17; Bitar, 1996: 120; *Mangilia paccinii* [sic!] Calcara - Gruvel & Moazzo, 1929: 424; *Mangilia paccini* [sic!] Calcara - Moazzo, 1931: 447; *Mangelia paciniana* (Calcara, 1839) - Bitar & Kouli-Bitar, 1998: 39.

*Mangelia stossiciana* Brusina, 1869

**Literature records:**

*Mangilia stossiciana* [sic! for *stossiciana* (see Brusina, 1869: 235)] Brusina - Pallary, 1938: 17; Bitar, 1996: 120; *Mangelia stossiciana* [sic!] Brusina, 1869 - Bitar & Kouli-Bitar, 1998: 40.

**Material examined:**

(5) Anfeh: 26/10/1999 - sand, 20 m: 3 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 2 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 3 sh (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

*Mangelia taeniata* (Deshayes, 1835)

**Literature records:**

*Mangilia taeniata* Deshayes - Pallary, 1938: 18; Bitar, 1996: 120; *Mangelia taeniata* (Deshayes, 1835) - Bitar & Kouli-Bitar, 1998: 40.

*Mangelia unifasciata* (Deshayes, 1835)

**Literature records:**

*Mangilia rugulosa* Philippi - Pallary, 1938: 18; *Mangilia derelicta* Reeve var. *minor* Loc. et Caziot, 1900 - Pallary, 1938: 18; *Mangilia unifasciata* Deshayes - Pallary, 1938: 18; Bitar, 1996: 120; *Mangilia rugulsa* [sic! for *rugulosa* (see Philippi, 1844: 169)] Philippi - Bitar, 1996: 120; *Mangilia derelicta* Reeve - Bitar, 1996: 120; *Mangilia unifasciata* Deshayes, 1835 - Bitar & Kouli-Bitar, 1998: 40.

*Mangelia vauquelini* (Payraudeau, 1826)

**Literature records:**

*Mangilia vauquelini* Payraudeau - Pallary, 1919: 167; Pallary, 1938: 17; *Mangilia vauquelini* Payr. - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; Bitar, 1996: 120; *Mangilia vauquelini* Payraudeau var. *brevis* Requien 1848 - Pallary, 1938: 17; *Mangelia vauquelini* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 40.

**Material examined:**

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD).

\* *Mangelia* sp.

**Material examined:**

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD) (Fig. 3L).

**Remarks:**

The single shell examined by us shows some similarities in the outline with *Mangelia scabrida* Monterosato, 1890, but differs in the paucispiral protoconch [v. multispiral in *M. scabrida*: see van Aartsen & Fehr-De Wal (1978)] and the finer and less coloured spiral cords.

\* *Sorgenfreispira brachystoma* (Philippi, 1844)

**Material examined:**

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 2 sh (BBCD) (Fig. 3M).

## Family RAPHITOMIDAE Bellardi, 1875

*Clathromangelia granum* (Philippi, 1844)

**Literature records:**

*Clathromangilia* [sic! for *Clathromangelia* (see Monterosato, 1884a: 131)] *cancellata* Calcara - Pallary, 1938: 17; Bitar, 1996: 120; *Clathromangilia* [sic!] *cancellata* Calcara var. *elongata* - Pallary, 1938: 17; *Clathromangilia* [sic!] *cancellata* Calcara var. *fusca* Piry - Pallary, 1938: 17; *Clathromangelia granum* (Philippi, 1844) - Bitar & Kouli-Bitar, 1998: 39.

\* *Clathromangelia loiselierii* Oberling, 1970

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 8 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 2 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD) (Fig. 3N).

*Cyrillia linearis* (Montagu, 1803)

**Literature records:**

*Cirillia linearis* Montagu - Pallary, 1938: 17; Bitar, 1996: 120; *Raphitoma linearis* (Montagu, 1803) - Bitar & Kouli-Bitar, 1998: 40.

**Remarks:**

The systematics of Mediterranean raphitomids have been recently revised (Fassio et al., 2019) and *Murex linearis* Montagu, 1803 has been classified in the genus *Cyrillia* Kobelt, 1905.

*Raphitoma cordieri* (Payraudeau, 1826)

**Literature records:**

*Cordieria cordieri* Payr. - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; *Cordieria cordieri* Payraudeau - Pallary, 1938: 16; Bitar, 1996: 117, 120; *Cordieria reticulata* Brocchi - *sensu* Bitar, 1996: 117; *Raphitoma echinata* (Brocchi, 1814) - *sensu* Bitar & Kouli-Bitar, 1998: 40.

**Remarks:**

Early Lebanese records of *Raphitoma cordieri* (Payraudeau, 1826) were first listed as *Cordieria reticulata* Brocchi by Bitar (1996) and then as *Raphitoma echinata* (Brocchi, 1814) by Bitar & Kouli-Bitar (1998). *Murex reticulatus* Brocchi, 1814 is currently considered as a junior synonym of *R. echinata* (Brocchi, 1814), a species different from *Raphitoma cordieri* (Payraudeau, 1826).

\* *Raphitoma farolita* Nordsieck, 1977

**Material examined:**

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD) (Fig. 3O).

**Remarks:**

*Raphitoma farolita* Nordsieck, 1977 is the sister species of *Raphitoma bicolor* (Risso, 1826), differing in its paucispiral protoconch (*vs* multispiral in *bicolor*: Pusateri et al., 2013; Giannuzzi-Savelli et al. 2018).

*Raphitoma laviae* (Philippi, 1844)**Literature records:**

*Philbertie* [sic! for *Philbertia* (see Monterosato, 1884a: 132)] *philberti* Payraudeau var. *la viae* Philippi - Pallary, 1919: 167; *Philbertia bicolor* Risso = *philberti* Michaud var. *laviae* Philippi 1844 - Pallary, 1938: 16; *Philbertia bicolor* Risso - *sensu* Bitar, 1996: 120; *Raphitoma purpurea* (Montagu, 1803) - *sensu* Bitar & Kouli-Bitar, 1998: 40.

**Material examined:**

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

**Remarks:**

Early Lebanese records of *Raphitoma laviae* (Philippi, 1844) were erroneously listed as *Philbertia bicolor* Risso by Bitar (1996) and *Raphitoma purpurea* (Montagu, 1803) by Bitar & Kouli-Bitar (1998). However, both species are similar but clearly distinct from *R. laviae*.

*Raphitoma philberti* (Michaud, 1829)**Literature records:**

*Philbertie* [sic! for *Philbertia* (see Monterosato, 1884a: 132)] *philberti* Payraudeau [sic! for Michaud (see Michaud, 1829: 261)] - Pallary, 1919: 167; *Philbertia bicolor* Risso = *philberti* Michaud - Pallary, 1938: 16.

**Family PYRAMIDELLIDAE Gray, 1840**

\* C - *Brachystomia* sp.

**Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh (BBCD) (Fig. 3P).

**Remarks:**

Shell small, 3.5 slightly convex teleconch whorls, smooth, whitish; aperture piriform, internally smooth; protoconch of type C. The single specimen collected is somehow similar to *Brachystomia eulimoides* (Hanley 1844), differing in its more turruculated spire, and a more

pronounced angulation at the periphery. The single, worn specimen does not allow a certain identification; it may be an undescribed species, with uncertain native/alien status, but more material is necessary.

**First record date:**

First found in 2000 (see Material examined).

**A - *Cingulina isseli* (Tryon, 1886)**

**Literature records:**

*Cingulina isseli* (Tryon, 1886) - Bogi & Khairallah, 1987: 55; Bitar, 2014: 44; *Cingulina isseli* - Bitar, 2012: 8.

**Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - sand in Cymodocea meadow, 4 m: 1 sh (BBCD); (7) Ras El Chakaa: 19/10/1999 - cave, 3–5 m: 1 sh (BBCD); (9) Selaata: 18/10/1999 - small caves, sediment, 5–6 m: 1 sh (BBCD); 23/10/1999 - cave, tunnel roof, 7–8 m: 1 sh (BBCD); (18) Beirut: 02/06/2000 - harbour, 1–8 m: 1 sh (BBCD).

**First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

**\* *Eulimella acicula* (Philippi, 1836)**

**Material examined:**

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD) (Fig. 3Q); (24) El Zahrani: 06/06/2000 - Harf El Shbak, detritic sand, 24 m: 1 sh (BBCD).

***Euparthenia bulinea* (Lowe, 1841)**

**Literature records:**

*Acteopyramis* [sic! for *Actaeopyramis* (see Fischer, 1885: 787)] *bullinea* [sic! for *bulinea* (see Lowe, 1841: 40)] Lowe - Pallary, 1938: 41; Bitar, 1996: 119; *Euparthenia bulinea* (Lowe, 1841) - Bitar & Kouli-Bitar, 1998: 40.

***Megastomia conoidea* (Brocchi, 1814)**

**Literature records:**

*Odostomia conoidea* Brocchi - Pallary, 1938: 41; Bitar, 1996: 119; *Odostomia conoidea* (Brocchi, 1814) - Bitar & Kouli-Bitar, 1998: 40.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh (BBCD); (9) Selaata: 14/09/2002 - cave sediment, 22 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 3 sh (BBCD).

\* *C - Megastomia* sp.

**Material examined:**

(14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (BBCD) (Fig. 3R).

**Remarks:**

Shell stout, smooth, whitish, 4 rather flat teleconch whorls, with incised and canaliculated suture; aperture piriform, internally lyrate; protoconch of type A. The single specimen collected (with a fractured and repaired last whorl) is different from any known species: it is similar to *Megastomia conoidea* (Brocchi, 1814), but can be easily diagnosed by its stouter spire, the somehow stepped outline and the more neatly angulate periphery. It may be an undescribed species, with uncertain native/alien status, but more material is necessary.

**First record date:**

First found in 1999 (see Material examined).

\* *Odostomella bicincta* (Tiberi, 1868)

**Material examined:**

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 4 sh (BBCD) (Fig. 3S).

\* *Ondina vitrea* (Brusina, 1866)

**Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh (BBCD) (Fig. 3T); (9) Selaata: 14/09/2002 - cave sediment, 22 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

\* *Ondina* sp.

**Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 1 sh (BBCD) (Fig. 3U); (9) Selaata: 14/09/2002 - cave sediment, 22 m: 1 sh (BBCD).

**Remarks:**



Shell small, semitransparent, 3.5 convex teleconch whorls, striated; aperture piriform elongate; protoconch of type C. The two slightly worn collected specimens are similar to *Ondina warreni* (Thompson, 1845), from which can be diagnosed by their more marked sculpture and to *Ondina michaelae* Cachia & Mifsud, 2015, recently described from Malta, which is less slender and more finely striated (Cachia & Mifsud, 2015). They may represent either an undescribed species or an eastern cline of *O. warreni*, and additional material is necessary to solve the matter.

\* **A** - *Oscilla jocosa* Melvill, 1904

**Material examined:**

(7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 1 sh (BBCD) (Fig. 3V); (9) Selaata: 18/10/1999 - small caves, sediment, 5–6 m: 1 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (BBCD); (18) Beirut: 02/06/2000 - harbour, 1–8 m: 1 lv (BBCD).

**First record date:**

First found in 1999 (see Material examined).

*Parthenina monozona* (Brusina, 1869)

**Literature records:**

*Chrysallida monozona* (Brug.) [sic! for Brusina (see Brusina, 1869: 240)] - Fadlallah, 1975: 68; *Chrysallida monozona* Brug. [sic!] - Bitar, 1996: 121; *Chrysallida monozona* (Brusina, 1869) - Bitar & Kouli-Bitar, 1998: 40.

**Material examined:**

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD).

*Pyrgiscus rufus* (Philippi, 1836)

**Literature records:**

*Turbonilla (Striaturbonilla) densecostata* Philippi - Pallary, 1938: 41; *Turbonilla rufa densecostata* Philippi - Bitar, 1996: 119; *Turbonilla rufa* (Philippi, 1836) - Bitar & Kouli-Bitar, 1998: 40.

*Pyrgostylus striatulus* (Linnaeus, 1758)

**Literature records:**

*Turbonilla striolata* [sic! for *striatula* (see Linnaeus, 1758: 765)] - Brusina in de Folin & Périer, 1875-1879: 30; *Turbonilla (Pyrgostylus) striatulus* Linné - Pallary, 1938: 41; *Turbonilla striatulus* L. - Bitar, 1996: 119; *Turbonilla striatula* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 40.

**Material examined:**

(23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD).

### A - *Pyrgulina fischeri* Hornung & Mermod, 1925

#### Literature records:

*Chrysallida fischeri* - Cossignani & Ardochini, 2011: 346; *Pyrgulina fischeri* Hornung & Mermod, 1924 - Giannuzzi-Savelli et al., 2014: 74, 75 (fig. 215).

#### Remarks:

*Pyrgulina fischeri* Hornung & Mermod, 1925 is only known from Lebanon on the basis of a single shell, preserved in the private collection of Pasquale Micali (Italy) and figured both by Cossignani & Ardochini (2011) and Giannuzzi-Savelli et al. (2014).

#### First record date:

The single known shell was collected before 1996 (P. Micali, pers. comm.).

### A - *Pyrgulina maiae* Hornung & Mermod, 1924

#### Literature records:

*Chrysallida maiae* (Hornung & Mermod, 1924) - Bogi & Khairallah, 1987: 57, 60 (fig. 6); Bitar, 2014: 44; *Chrysallida maiae* - Bitar, 2012: 8.

#### Material examined:

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 18 sh (BBCD); 01/06/2000 - coarse sand, 13–14 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 1 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - sand in *Cymodocea* meadow, 4 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 5 sh (BBCD); (9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD); 23/10/1999 - cave, tunnel roof, 7–8 m: 1 sh (BBCD); (18) Beirut: 15/09/2002 - harbour entrance, breakwater, maximum depth 20 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 3 sh (BBCD).

#### First record date:

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

### A - *Syrnola fasciata* Jickeli, 1882

#### Literature records:

*Syrnola fasciata* Jickeli, 1882 - Bogi & Khairallah, 1987: 57, 59 (fig. 1); *Syrnola fasciata* - Bitar, 2012: 8; *Syrnola fasciata* Jickeli, 1882 - Bitar, 2014: 45.

#### First record date:

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

## *Turbonilla lactea* (Linnaeus, 1758)

### Literature records:

*Turbonilla lactea* Linné - Pallary, 1912b: 173; Pallary, 1919: 171; *Turbonilla lactea* L. - Gruvel & Moazzo, 1929: 422; Moazzo, 1931: 445; Bitar, 1996: 119; *Turbonilla lactea* Linné - Pallary, 1938: 41; *Turbonilla lactea* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 40.

### \* *Turbonilla pusilla* (Philippi, 1844)

### Material examined:

(26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 1 sh (BBCD) (Fig. 3W).

## Family AMATHINIDAE Ponder, 1987

### A - *Amathina tricarinata* (Linnaeus, 1767)

### Literature records:

*Amathina tricarinata* (Linnaeus, 1767) - Scapolatempo et al., 2003: 614-617 (figs. 1, 2); *Amathina tricarinata* - Bitar, 2012: 8; *Amathina tricarinata* (Linnaeus, 1767) - Bitar, 2014: 44.

### Material examined:

(9) Selaata: 06/07/2003 - cave, living on *Chama pacifica* Broderip, 1835, 20 m: 1 lv (BBCD); (18) Beirut: 02/06/2000 - harbour, living on *C. pacifica*, 3–8 m: 1 lv (BBCD).

### Remarks:

Scapolatempo et al. (2003) incorrectly reported *Amathina tricarinata* (Linnaeus, 1767) as living in association with oysters. Giannuzzi-Savelli et al. (2014) listed it as living with Pinnoidea and Pterioidea only. However, Kiat Tan & Low (2014) recently reviewed its confirmed host species, which include Chamidae. Congruently, both Lebanese specimens were found on *Chama pacifica* Broderip, 1835 (H. Zibrowius and G. Bitar, pers. obs.), as also already highlighted by Mienis (2006).

### First record date:

First found in 2000 (Scapolatempo et al., 2003).

### *Clathrella clathrata* (Philippi, 1844)

### Literature records:

*Fossarus costatus* Brocchi - Pallary, 1938: 38; Bitar, 1996: 121; *Clathrella clathrata* (Philippi, 1844) - Bitar & Kouli-Bitar, 1998: 40.

## **Family ACTEONIDAE d'Orbigny, 1843**

*Acteon tornatilis* (Linnaeus, 1758)

### **Literature records:**

*Actaeon tornatilis* L. - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; Bitar, 1996: 118; *Actaeon tornatilis* Linné var. *minor* Monts. 1878 - Pallary, 1938: 15; *Acteon tornatilis* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 40; *Acteon tornatilis* (Linnaeus, 1758) - Crocetta et al., 2013: 405.

## **Family RINGICULIDAE Philippi, 1853**

*Ringicula auriculata* (Ménard de la Groye, 1811)

### **Literature records:**

*Ringicula auriculata* Ménard de la Groye - Pallary, 1938: 15; Bitar, 1996: 118; *Ringicula auriculata* (Ménard de la Groye, 1811) - Bitar & Kouli-Bitar, 1998: 40; Crocetta et al., 2013: 405.

### **Remarks:**

*Ringicula auriculata* (Ménard de la Groye, 1811) and *Ringicula conformis* Monterosato, 1877 were discussed by Oliverio & Tringali (2001), who considered them distinct based on general morphology, spiral sculpture and protoconch features (suggesting non-planktotrophic vs planktotrophic development, respectively). More recently, Templado (2012b) considered these characters weak, declaring the presence of intermediate forms. We hereby keep them separated, waiting for molecular analysis aiming to elucidate the taxonomic status of these possible sister species.

*Ringicula conformis* Monterosato, 1877

### **Literature records:**

*Ringicula auriculata* Ménard de la Groye var. *conformis* de Monts., 1877 - Pallary, 1938: 15; *Ringicula conformis* Monterosato, 1877 - Crocetta et al., 2013: 405.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - coarse sand, 13 m: 2 sh (BBCD); 01/06/2000 - sand, 13–14 m: 1 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 43 sh (BBCD); (9) Selaata: 23/10/1999 - cave/tunnel sediment, 7–8 m: 1 sh (BBCD); 24/09/2002 - cave sediment, 22 m: 2 sh (BBCD); (14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 2 sh (BBCD); (16) Tabarja: 11/07/2003 - coarse sand, 15 m: 1 sh (BBCD); (23) Saïda: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 10 sh (BBCD).

**Remarks:**

See above under *Ringicula auriculata* (Ménard de la Groye, 1811).

## Family BULLIDAE Gray, 1827

### *Bulla striata* Bruguière, 1792

**Literature records:**

*Bulla striata* Brug. - Puton, 1856: 223; *Bulla striata* Bruguière - Pallary, 1912b: 171; Pallary, 1919: 167; Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Pallary, 1938: 15; Bitar, 1996: 118; *Bulla striata* Bruguière var. *minor* - Pallary, 1938: 15; *Bullaria striata* (Bruguière) - Spada, 1971: 90; *Bullaria striata* Brug. - Fadlallah, 1975: 68; *Retusa mariateresae* (Parenzan) - Fadlallah, 1975: 69; *Retusa mariateresae* Parenzan - Bitar, 1996: 118; *Retusa mariateresae* Parenzan, 1970 - Bitar & Kouli-Bitar, 1998: 40; *Bulla striata* Bruguière 1792 - Bitar & Kouli-Bitar, 1998: 40, 43; Malaquias & Reid, 2008: 464; Crocetta et al., 2013: 405; Ramos-Esplá et al., 2015: 157, 201; Ramos-Esplá et al., 2017: 95; *Bulla striata* - Ramos-Esplá et al., 2017: 111.

**Material examined:**

(1) Ramkine Island: 01/06/2000 - sand, 13–14 m: 1 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 3 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - from sand in *Cymodocea* meadow, 4 m: 1 lv (BBCD); (24) El Zahrani: 06/06/2000 - Harf El Hawieh El Jouani, 14 m: 1 sh (BBCD).

## Family HAMINOEIDAE Pilsbry, 1895

### *Haminoea hydatis* (Linnaeus, 1758)

**Literature records:**

*Haminea hydatus* [sic! for *hydatis* (see Linnaeus, 1758: 726)] (L.) - Brusina in de Folin & Périer, 1875-1879: 30; *Haminea hydatis* Linné - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446;

Pallary, 1938: 15; *Haminea hydatis* L. - Bitar, 1996: 118; *Haminoea hydatis* (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 40; *Haminoea hydatis* (Linnaeus, 1758) - Crocetta et al., 2013: 405.

**Remarks:**

In the review of the Lebanese “opisthobranchs” (Crocetta et al. 2013) the record of Brusina in de Folin & Périer (1975) was skipped. Despite the wide usage of this binomen in several papers on the Atlanto-Mediterranean fauna, deep uncertainties exist on the actual identity of this species, the type material of which consists of only a shell in poor conditions (Crocetta *et al.*, 2015).

## **Family MNESTIIDAE Oskars, Bouchet & Malaquias, 2015**

### **A - *Mnestia girardi* (Audouin, 1826)**

**Literature records:**

*Cylichnina girardi* (Audouin, 1827 [sic! for 1826 (see Audouin, 1826: 178)]) - Bogi & Khairallah, 1987: 57, 60 (fig. 4); *Cylichnina girardi* - Bitar, 2012: 8; *Cylichnina girardi* (Audouin, 1826) - Crocetta et al., 2013: 405; Bitar, 2014: 44.

**First record date:**

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

## **Family TORNATINIDAE P. Fischer, 1883**

### **A - *Acteocina mucronata* (Philippi, 1849)**

**Literature records:**

*Acteocina mucronata* (Philippi, 1849) - Bogi & Giannini, 1990: 48–51 (fig. 4); *Acteocina mucronata* - Bitar, 2012: 8; *Acteocina mucronata* (Philippi, 1849) - Crocetta et al., 2013: 405; Bitar, 2014: 44.

**Material examined:**

(9) Selaata: 18/10/1999 - cave sediment, 9 m: 1 sh (BBCD).

**Remarks:**

Bitar (2014) listed the species as first published from Lebanon in Bogi & Khairallah (1987). However, no records of this species are given there, and the statement is considered a misreading.

**First record date:**

First found in 1986 (Bogi & Giannini, 1990).

## Family CYLICHNIDAE H. Adams & A. Adams, 1854

*Cylichna cylindracea* (Pennant, 1777)

### Literature records:

*Cylichna cylindracea* Pennant - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; Pallary, 1938: 15; Bitar, 1996: 117; *Cylichna cylindracea* (Pennant, 1777) - Bitar & Kouli-Bitar, 1998: 40; Crocetta et al., 2013: 405.

## Family RETUSIDAE Thiele, 1925

**A** - *Pyrrunculus fourierii* (Audouin, 1826)

### Literature records:

*Retusa fourieri* [sic! for *fourierii* (see Audouin, 1826: 178)] (Audouin, 1826) - Bogi & Khairallah, 1987: 56, 60 (fig. 5); *Pyrrunculus fourierii* (Audouin, 1827 [sic! for 1826 (see Audouin, 1826: 178)]) - Bogi & Galil, 2002: 13 (fig. 5); *Pyrrunculus fourierii* - Bitar, 2012: 8; *Pyrrunculus fourierii* (Audouin, 1826) - Crocetta et al., 2013: 405; Bitar, 2014: 45.

### Material examined:

(14) Jbail: 17/10/1999 - Tablieh, cave sediment, 16 m: 1 sh (BBCD).

### First record date:

First found in 1985–1987 (Bogi & Khairallah, 1987; C. Bogi, pers. comm.).

*Retusa mamillata* (Philippi, 1836)

### Literature records:

*Retusa mamillata* [sic! for *mamillata* (see Philippi, 1836: 122)] Philippi - Gruvel & Moazzo, 1929: 423; Moazzo, 1931: 446; Bitar, 1996: 118; *Tornatina mamillata* [sic!] Philippi - Pallary, 1938: 15; Bitar, 1996: 117; *Retusa mamillata* (Philippi, 1836) - Bitar & Kouli-Bitar, 1998: 40; Crocetta et al., 2013: 405.

*Retusa truncatula* (Bruguière, 1792)

**Literature records:**

*Tornatina truncatula* Bruguière - Pallary, 1938: 15; Bitar, 1996: 117; *Tornatina truncatula* Bruguière var. *minor* - Pallary, 1938: 15; *Retusa truncatula* Bruguière - Bitar, 1996: 118; *Retusa truncatula* (Bruguière, 1792) - Bitar & Kouli-Bitar, 1998: 40; Crocetta et al., 2013: 405.

**Family RHIZORIDAE Dell, 1952**

*Volvulella acuminata* (Bruguière, 1792)

**Literature records:**

*Volvula acuminata* Bruguière - Pallary, 1938: 15; Bitar, 1996: 117; *Volvulella acuminata* (Bruguière, 1792) - Bitar & Kouli-Bitar, 1998: 40; Crocetta et al., 2013: 405.

**Family CAVOLINIIDAE Gray, 1850 (1815)**

*Clio pyramidata* Linnaeus, 1767 complex

**Literature records:**

*Cleodora pyramidata* Rang - Pallary, 1938: 14.

**Remarks:**

The taxonomy of the *Clio pyramidata* Linnaeus, 1767 complex of species is still highly debated. The type specimens should have been collected at or near Jamaica in the Caribbean, where specimens are different from Mediterranean ones (see Janssen, 2012). We thus keep literature records as “*Clio pyramidata* Linnaeus, 1767 complex”.

**Family PLAKOBRANCHIDAE Gray, 1840**

**A -** *Elysia grandifolia* Kelaart, 1858 complex



**Literature records:**

*Elysia grandifolia* Kelaart, 1858 - Yokeş & Rudman, 2004: 3; *Elysia grandifolia* - Bitar, 2012: 8; Ramos-Esplá et al., 2017: 101, 106, 116; *Elysia grandifolia* Kelaart, 1857 [sic! for 1858 (see Kelaart, 1858: 119)] - Crocetta et al., 2013: 405; Ramos-Esplá et al., 2015: 157, 167, 202; *Elysia grandifolia* (Kelaart, 1857 [sic! for 1858]) - Bitar, 2014: 44; *Elysia grandiflora* [sic! for *grandifolia* (see Kelaart, 1858: 119)] - Ramos-Esplá et al., 2017: 55; *Elysia grandifolia* Kelaart, 1858 - Ramos-Esplá et al., 2017: 95.

**Material examined:**

(3) Tripoli: 19/09/2002 - harbour, 2 m: 1 lv (MNCN - 15.05/46604); 20/09/2002 - harbour entrance, breakwater jetty, outer side, 5 m: 1 lv (MNCN - 15.05/46606); (5) Anfeh: 22/08/2012 - among *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 2 m: 1 lv (photo G. Bitar); (11) Batroun: 23/09/2002 - 2–3 m: 1 lv (MNCN - 15.05/47202); 26/09/2010 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 0–3 m: 3 lv (photo G. Bitar); (12) Kfar Abida: 26/08/2012 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders and *Bryopsis*, 0–3 m: ~50 lv (photo G. Bitar); 29/08/2012 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders and *Bryopsis* (in bloom), 0–3 m: very abundant, >150 lv (photo G. Bitar); 01/09/2012 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders and *Bryopsis* (in bloom), 0–3 m: very abundant, >150 lv (photo G. Bitar); 22/09/2012 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders and *Bryopsis* (in strong regression), 0–3 m: ~50 lv (photo G. Bitar); 29/09/2012 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders and very rare *Bryopsis*, 0–3 m: 7 lv (photo G. Bitar); 07/10/12 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders and absence of *Bryopsis*, 0–3 m: 1 dead (photo G. Bitar); (18) Beirut: 15/09/2002 - harbour jetty, inner side, 5 m: 2 lv (MNCN - 15.05/46609); 25/09/2002 - airport, on boulders, 17 m: 1 lv (MNCN - 15.05/46608); (19) Raoucheh: 17/09/2002, boulders and rock, 7–9 m: 12 lv (MNCN - 15.05/46607); (29) Nakoura: 22/09/2002 - jetty, 3 m: 3 lv (MNCN - 15.05/46605).

**Remarks:**

Bitar (2014) listed the species as first published from Lebanon by Valdés & Templado (2002). However, no records of this species are given there, and the statement is considered a misreading. Krug et al. (2016) suggested that the taxonomy of the Indo-Pacific taxa belonging to the *E. marginata*/*E. grandifolia* complex requires further work, and thus we keep literature records as “*Elysia grandifolia* Kelaart, 1858 complex”.

**First record date:**

First found in 2002 (Crocetta et al., 2013).

*Elysia timida* (Risso, 1818)**Literature records:**

*Elysia timida* - Ramos-Esplá et al., 2015: 37, 38 (figure); *Elysia timida* (Risso, 1818) - Ramos-Esplá et al., 2015: 157, 202.

## Family UMBRACULIDAE Dall, 1889 (1827)

### *Umbraculum umbraculum* (Lightfoot, 1786)

#### Literature records:

*Umbrella mediterranea* Lamarck - Pallary, 1919: 167; Pallary, 1938: 15; *Umbrella mediterranea* Lamarck - Bitar, 1996: 116; *Umbraculum umbraculum* (Röding, 1798) [sic! for Lightfoot 1786 (see Lightfoot, 1786: 178)] - Bitar & Kouli-Bitar, 1998: 40; *Umbraculum umbraculum* (Lightfoot, 1786) - Crocetta et al., 2013: 405.

#### Material examined:

(5) Anfeh: 25/04/2010 - among *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 2 m: 1 lv (photo G. Bitar); among sponges, 2 m: 1 lv (photo G. Bitar); (19) Raoucheh: 17/09/2002 - boulders and rock, on a grey sponge, 7–9 m: 1 lv (MNCN - 15.05/46603); 19/02/2006 - cave, among sponges and ascidians, 2 m: 1 lv (photo G. Bitar).

## Family APLYSIIDAE Lamarck, 1809

### C - *Aplysia dactylomela* Rang, 1828

#### Literature records:

*Aplysia dactylomela* - Bitar, 2012: 8; *Aplysia dactylomela* Rang, 1828 - Crocetta et al., 2013: 405; Ramos-Esplá et al., 2015: 157, 211; *Aplysia dactylomela* (Rang, 1828) - Bitar, 2014: 44.

#### Material examined:

(1) Ramkine Island: 25/07/2011 - on rocks: 1 lv (photo G. Bitar); (21) Saadiyat: 12/07/2009, in a small sciafilous cave with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, *Peyssonnelia* and *Crambe crambe* (Schmidt, 1862): 1 lv (photo G. Bitar); (25) Khaizaran: 03/04/2010 - amidst *Dendropoma anguliferum* (Monterosato, 1878), surface: 1 lv (photo G. Bitar); (27) Tyr: 11/09/2010 - rocky bottom with *Jania*, 1 m: 5 lv (photo G. Bitar).

#### Remarks:

The actual status of *Aplysia dactylomela* Rang, 1828 in the Mediterranean is still debated since it remains unclear if its spreading has been human-mediated or a natural event (Valdes et al., 2013), and therefore we prefer to list it as cryptogenic.

#### First record date:

First found in 2009 (Crocetta et al., 2013).

## *Aplysia depilans* Gmelin, 1791

### **Literature records:**

*Aplysia depilans* Linné [sic! for Gmelin (see Gmelin, 1791: 3103)] - Pallary, 1938: 15; *Aplysia depilans* L. [sic!] - Bitar, 1996: 116; *Aplysia depilans* Gmelin, 1791 - Bitar & Kouli-Bitar, 1998: 40; Crocetta et al., 2013: 405.

### **Material examined:**

(18) Beirut: 04/05/2008 - AUB (American University of Beirut), amidst mainly photophilous algae (*Acanthophora*, *Colpomenia*, *Ellisolandia*, *Hypnea*, *Jania*, *Padina* and *Ulva*), 1m: 2 lv (photo G. Bitar).

## *Aplysia fasciata* Poiret, 1789

### **Literature records:**

*Aplysia fasciata* Poiret, 1789 - Crocetta et al., 2013: 405.

### **Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - 1 m: 1 lv (MNCN - 15.05/47198); (11) Batroun: 25/07/2011 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders - 1 m: 1 lv (photo G. Bitar); (18) Beirut: 04/05/2008 - AUB (American University of Beirut), amidst mainly photophilous algae (genus *Acanthophora*, *Colpomenia*, *Ellisolandia*, *Hypnea*, *Jania*, *Padina* and *Ulva*), 1 m: 17 lv (photo G. Bitar); 03/06/2010 - IC (International College), amidst *Ellisolandia*, *Jania* and *Ulva*, 1 m: 1 lv (photo G. Bitar); (19) Raoucheh: 13/06/2008 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 3 m: 1 lv (photo G. Bitar); (20) Khaldeh: Villamar, 07/06/2000 - 1 m: 1 lv (MNCN - 15.05/47197); (21) Saadiyat: 04/07/2010 - on boulders covered by *Ganonema*, 2 m: 1 lv (photo G. Bitar); (27) Tyr: 06/07/2011 - rocky bottom amidst *Ellisolandia* and *Jania*, 2 m: 1 lv (photo G. Bitar).

## **C - *Bursatella leachii* Blainville, 1817**

### **Literature records:**

*Bursatella leachi* [sic! for *leachii* (see Blainville, 1817: 138)] de Blainville, 1817 - Zenetos et al., 2004: 181; *Bursatella leachi* [sic!] - Bitar, 2012: 8; *Bursatella leachii* Blainville, 1817 - Crocetta et al., 2013: 405; *Bursatella leachii* (Blainville, 1817) - Bitar, 2014: 44.

### **Material examined:**

(9) Selaata: 18/10/1999 - 12 m: 2 lv (photo J.G. Harmelin); 10/10/2000 - 10 m: 2 lv (MNCN - 15.05/40235); (18) Beirut: 02/06/2000 - harbour, 10 m: 1 lv (MNCN - 15.05/47122).

### **Remarks:**

The actual status of *Bursatella leachii* Blainville, 1817 in the Mediterranean is still debated since it remains unclear if its spreading has been human-mediated or a natural event (Bazzicalupo et al., 2018), and therefore we prefer to list it as cryptogenic.

**First record date:**

First found in 1999 (Crocetta et al., 2013).

**A - *Syphonota geographica* (Adams & Reeve, 1850)**

**Literature records:**

*Syphonota geographica* (Adams & Reeve, 1850) - Galil (2009: supplementary material); Crocetta et al., 2013: 405; *Syphonota geographica* (Adams & Reeve, 1850) - Crocetta & Galil, 2012: 45; *Syphonota geographica* - Bitar, 2012: 8; *Syphonota geographica* (Adams & Reeve, 1850) - Bitar, 2014: 45.

**Material examined:**

(9) Selaata: 06/07/2003: under boulders, 10 m: 1 lv (MNCN).

**Remarks:**

Crocetta et al. (2013) previously reported this species as first formally recorded from Lebanon by Crocetta & Galil (2012), overlooking the presence of a previous record in a review of alien species from the Mediterranean Sea (Galil, 2009: supplementary material), where the species is first reported from Lebanon as based on a personal communication by José Templado (Galil, pers. comm.). The record reported in Galil (2009) is based on the same material mentioned by Crocetta & Galil (2012) and fully explained by Crocetta et al. (2013).

**First record date:**

First found in 2003 (Galil, 2009).

**Family PLEUROBRANCHIDAE Gray, 1827**

*Berthella aurantiaca* (Risso, 1818)

**Literature records:**

*Berthella aurantiaca* (Risso, 1818) - Crocetta et al., 2013: 405.

**Material examined:**

(1) Ramkine Island: 14/07/2003 - under stones, 3–4 m: 2 lv (MNCN - 15.05/47205); (12) Kfar Abida: 30/05/2000 - tunnel, small cave, 7–8 m: 1 lv (MNCN - 15.05/47203).

*Berthella ocellata* (delle Chiaje, 1830)

**Literature records:**

*Berthella ocellata* (delle Chiaje, 1830) - Crocetta et al., 2013: 405.

**Material examined:**

(11) Batroun: 23/09/2002 - under stones, 2–3 m: 1 lv (MNCN - 15.05/47204).

**A - *Berthellina citrina* (Rüppell & Leuckart, 1828)**

**Literature records:**

*Berthellina citrina* (Rüppell & Leuckart, 1828) - Ramos-Esplá et al., 2017: 95; *Berthellina* cf. *edwardsii* - *sensu* Ramos-Esplá et al., 2017: 116.

**First record date:**

First found in 2016 (Ramos-Esplá et al., 2017).

**A - *Pleurobranchus forskalii* Rüppell & Leuckart, 1828**

**Literature records:**

*Pleurobranchus forskalii* - Bitar, 2012: 8; *Pleurobranchus forskalii* (Rüppell & Leuckart, 1831 [sic! for 1828 (see Rüppell & Leuckart, 1828-1831: 18)]) - Crocetta et al., 2013: 405; Bitar, 2014: 44.

**Material examined:**

(8) Chak El Hatab: 05/07/2003 - 3 m, cave: 1 lv (MNCN).

**First record date:**

First found in 2003 (Crocetta et al., 2013).

**Family DISCODORIDIDAE Bergh, 1891**

**C - *Tayuva lilacina* (Gould, 1852) complex**

**Literature records:**

*Discodoris lilacina* (Gould, 1852) - Valdés & Templado, 2002: 26 (fig 2: D, E), 28 (fig. 4), 29; Zibrowius & Bitar, 2003: 70; *Tayuva lilacina* (Gould, 1852) - Dayrat, 2010: 119–127; Crocetta et al., 2013: 405; *Discodoris lilacina* - Bitar, 2012: 8.

**Material examined:**

(6) El Heri (marina Beaulieu): 03/06/2000 - 2–3 m: 1 lv (LACM - 152717).

**Remarks:**

Dayrat (2010, 2011) used the name *Tayuva lilacina* (Gould, 1852) referring to a circumtropical complex of cryptic species (including the taxa *T. lilacina* Gould, 1852, from the Indo-Pacific; *T. crucis* Bergh, 1880, from the Caribbean Sea; *T. maculosa* Bergh, 1884, from the Mediterranean and eastern Atlantic; and *T. ketos* Marcus and Marcus, 1967, from the Panamic Eastern Pacific) until a phylogeographic study of this group based on genetic data clarifies their taxonomic status. Lebanese specimens may therefore either belong to the Mediterranean *T. maculosa*, or correspond to the true *T. lilacina* from the Indo-Pacific through Lessepsian migration. We hereby considered our records as representing a cryptogenic species, belonging to the *T. lilacina* complex, and excluded it from the list of Lebanese alien species pending genetic studies to elucidate this issue.

**First record date:**

First found in 2000 (Valdés & Templado, 2002).

## Family CHROMODORIDIDAE Bergh, 1891

### *Felimare picta picta* (Schultz in Philippi, 1836)

**Literature records:**

*Felimare picta* (Schultz in Philippi, 1836) - Crocetta et al., 2013: 405.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - 3–5 m: 2 lv (MNCN - 15.05/47107 - 15.05/47119); 19/10/2008, low depth: 1 lv (photo G. Bitar); (5) Anfeh: 27/09/09 - among *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, low depth: 1 lv (photo G. Bitar); 26/10/1999 - 15 m: 2 lv (MNCN - 15.05/40236); (18) Beirut: 25/09/2002 - airport, on boulders, 17 m: 1 lv (MNCN - 15.05/47211); (23) Saida: 05/06/2000 - Harf El Rijmeh, rocky bottom, 10 m: 1 lv (MNCN - 15.05/47112); (24) El Zahrani: 06/06/2000 - Harf El Hawieh El Jouani: 1 lv (MNCN); (26) El Kassmieh: 25/10/1999 - 42 m: 1 lv (photo G. Bitar).

### *Felimida binza* (Marcus & Marcus, 1963)

**Literature records:**

*Felimida britoi* (Ortea & Perez, 1983) - Crocetta et al., 2013: 405.

**Material examined:**

(18) Beirut: 16/09/2002 - harbour, quay 60, 5 m: 1 lv (MNCN - 15.05/47201).

*Felimida luteorosea* (Rapp, 1827)

**Literature records:**

*Felimida luteorosea* (Rapp, 1827) - Crocetta et al., 2013: 405.

**Material examined:**

(1) Ramkine Island: 14/07/2003: 1 lv (MNCN).

*Felimida purpurea* (Risso, 1831)

**Literature records:**

*Felimida purpurea* (Risso in Guérin, 1831) - Crocetta et al., 2013: 405.

**Material examined:**

(9) Selaata: 02/05/2001: 1 lv (MNCN).

**A - *Goniobranchus annulatus* (Eliot, 1904)**

**Literature records:**

*Chromodoris annulata* - Bitar, 2012: 8; *Goniobranchus annulatus* (Eliot, 1904) - Crocetta et al., 2013: 405; Bitar, 2014: 44; Ramos-Esplá et al., 2015: 158, 182, 202, 211; Ramos-Esplá et al., 2017: 95; *Goniobranchus annulatus* - Ramos-Esplá et al., 2015: 97; Ramos-Esplá et al., 2017: 111, 116.

**Material examined:**

(1) Ramkine Island: 28/08/2010 - sciaphilous rocky bottom with *Ellisolandia* and *Peyssonnelia*, 1 m: 1 lv (photo G. Bitar); (6) El Heri (marina Beaulieu): 03/06/2000 - 2–3 m: 2 lv (MNCN); (7) Ras El Chakaa: 04/06/2000 - cave, 6 m: 1 lv (MNCN); (11) Batroun: 09/07/2011 - rocky bottom with *Ellisolandia* and *Bryopsis*, 3 m: 2 lv (photo G. Bitar); 25/07/2011 - rocky bottom amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders and *Galaxaura rugosa* (J. Ellis & Solander) J.V. Lamouroux, 2 m: 1 lv (photo G. Bitar); (19) Raoucheh: 30/09/2010 - cave entrance amidst *Ellisolandia* et *Pterocladia*, 3 m: 1 lv (photo G. Bitar); (21) Saadiyat: 02/07/2009 - rocky bottom with *Ellisolandia*, *Peyssonnelia*, *Margaretta cereoides* (Ellis & Solander, 1786) and *Crambe crambe* (Schmidt, 1862), 2 m: 2 lv (photo G. Bitar); 13/09/2011 - rocky bottom amidst calcareous algae and bryozoans, 1 m: 1 lv (photo G. Bitar); 26/07/2012 - rocky bottom with *Laurencia* and *Macrorhynchia philippina* Kirchenpauer, 1872, 3 m: 1 lv (photo G. Bitar); (27) Tyr: 23/05/2011 - amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 2 m: 1 lv (photo G. Bitar); (28) El Bayada: 14/10/2009 - rocky bottom with *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, *Crambe crambe* and *Chondrosia*, 2 m: 2 lv (photo G. Bitar); 26/07/2011 - rocky bottom amidst *Ellisolandia elongata* (Ellis & Solander) Hind & Saunders, 2 m: 1 lv (photo G. Bitar).

**First record date:**

First found in 2000 (Crocetta et al., 2013).

## A - *Hypselodoris infucata* (Rüppell & Leuckart, 1831)

### Literature records:

*Hypselodoris infucata* (Rüppell & Leuckart, 1830 [sic! for 1831 (see Rüppell & Leuckart, 1831: 34)]) - Valdés & Templado, 2002: 25, 26 (fig. 2C), 27 (fig. 3); Zibrowius & Bitar, 2003: 70; *Hypselodoris infucata* - Bitar et al., 2007: 437; Bitar, 2012: 8; *Hypselodoris infucata* (Rüppell & Leuckart, 1831) - Crocetta et al., 2013: 405; Bitar, 2014: 44; Ramos-Esplá et al., 2015: 158, 168, 191, 202.

### Material examined:

(1) Ramkine Island: 31/05/2000: 4 lv (LACM - 152755); 14/07/2003 - 3–4 m: 1 lv (MNCN); (5) Anfeh: 16/09/2012 - amidst algae, low depth: 1 lv (photo G. Bitar); (6) El Heri (marina Beaulieu): 03/06/2000 - 2–3 m: 3 lv (LACM - 152758); (9) Selaata: 02/05/2001: 1 lv (LACM - 152757); (11) Batroun: 23/09/2002 - amidst algae, low depth: 1 lv (photo G. Bitar); (14) Jbail: 17/10/1999 - harbour entrance, 2–3 m: 1 lv (MNCN - 15.05/40234); (16) Tabarja: 09/07/2009 - amidst algae, 1 m: 1 lv (photo G. Bitar); (18) Beirut: 02/06/2000 - harbour, 3–8 m: 63 lv (LACM - 152756 and MNCN - 15.05/45958); 16/09/2002 - harbour, breakwater, 5 m: 1 lv (MNCN - 15.05/46601); 09/07/2003 - harbour, outer side of the main jetty, western part, 12 m: 1 lv (MNCN - 15.05/47200); (19) Raoucheh: 17/09/2002 - boulders and rock, 7 m: 1 lv (MNCN - 15.05/46602); 13/06/2008 - amidst algae, low depth: 1 lv (photo G. Bitar); (29) Nakoura: 07/11/2010 - 1 m: 1 lv (photo G. Bitar).

### First record date:

First found in 1999 (Valdés & Templado, 2002).

## Family PHYLLIDIIDAE Rafinesque, 1814

### *Phyllidia flava* Aradas, 1847

### Literature records:

*Phyllidia flava* Aradas, 1847 - Crocetta et al., 2013: 405.

### Material examined:

(23) Saida: 05/06/2000 - off Nahr El Ouali: 1 lv (LACM-152718).



## Family DENDRODORIDIDAE O'Donoghue, 1924 (1864)

### *Dendrodoris grandiflora* (Rapp, 1827)

#### Literature records:

*Dendrodoris grandiflora* (Rapp, 1827) - Crocetta et al., 2013: 405.

#### Material examined:

(7) Ras El Chakaa: 21/09/2002 - under stone, 12 m: 1 lv (MNCN - 15.05/47206).

### *Dendrodoris limbata* (Cuvier, 1804)

#### Literature records:

*Dendrodoris limbata* (Cuvier, 1804) - Crocetta et al., 2013: 405.

#### Material examined:

(11) Batroun: 23/09/2002 - under stones, 2–3 m: 4 lv (MNCN - 15.05/47207); 26/09/2002 - under stones, 2 m: 2 lv (MNCN - 15.05/47208).

## Family POLYCERIDAE Alder & Hancock, 1845

### A - *Plocamopherus ocellatus* Rüppell & Leuckart, 1828

#### Literature records:

*Plocamopherus ocellatus* (Rüppell & Leuckart, 1830 [sic! for 1828 (see Rüppell & Leuckart, 1828-1831: 17)]) - Valdés & Templado, 2002: 24, 25 (fig. 1), 26 (fig 2: A, B); Zibrowius & Bitar, 2003: 70; *Plocamopherus ocellatus* - Bitar, 2012: 8; *Plocamopherus ocellatus* (Rüppell & Leuckart, 1831 [sic!]) - Crocetta et al., 2013: 405; Bitar, 2014: 44; *Plocamopherus ocellatus* Rüppell & Leuckart, 1828 - Ramos-Esplá et al., 2015: 158.

#### Material examined:

(8) Chak El Hatab: 04/06/2000 - 5 m: 1 lv (LACM 152716); (18) Beirut: 07/07/2003 - harbour, outer side of the main jetty, 15 m: 1 lv (MNCN); (19) Raoucheh: 17/09/2002 - boulders and rocks, 7 m: 2 lv (MNCN 15.05/46581).

#### First record date:

First found in 2000 (Valdés & Templado, 2002).

## Family TETHYDIDAE Rafinesque, 1815

A - *Melibe viridis* (Kelaart, 1858)

### Literature records:

*Melibe viridis* (Kelaart, 1858) - Crocetta & Barique in Tsiamis et al., 2015: 481.

### First record date:

First found in 2015 (Crocetta & Barique in Tsiamis et al., 2015).

## Family AEOLIDIIDAE Gray, 1827

*Aeolidiella alderi* (Cocks, 1852)

### Literature records:

*Aeolidiella alderi* (Cocks, 1852) - Crocetta et al., 2013: 405.

### Material examined:

(1) Ramkine Island: 01/06/2000 - 1 m: 1 lv (MNCN - 15.05/47210).

*Spurilla neapolitana* (delle Chiaje, 1841)

### Literature records:

*Spurilla* cf. *neapolitana* - Ramos-Esplá et al., 2017: 37 (figure 5.25), 116; *Spurilla* cf. *neapolitana* (Delle Chiaje, 1841) - Ramos-Esplá et al., 2017: 95.

## Family FACELINIDAE Bergh, 1889

A - *Caloria indica* (Bergh, 1896)

### Literature records:

*Caloria indica* (Bergh, 1896) - Ramos-Esplá et al., 2017: 95; *Caloria indica* - Ramos-Esplá et al., 2017: 116.

**First record date:**

First found in 2016 (Ramos-Esplá et al., 2017).

*Cratena peregrina* (Gmelin, 1791)**Literature records:**

*Catrena* [sic! for *Cratena* (see Bergh, 1864: 213)] *peregrina* (Gmelin, 1791) - Ramos-Esplá et al., 2015: 157, 181.

*Dondice banyulensis* Portmann & Sandmeier, 1960**Literature records:**

*Dondice banyulensis* Portmann & Sandmeier, 1960 - Crocetta & Bitar in Stamouli et al., 2017: 553.

**Material examined:**

(16) Tabarja: 11/07/2003 - 18 m: 1 lv (photo G. Bitar).

**Family FLABELLINIDAE Bergh, 1889****A - *Coryphellina rubrolineata* O'Donoghue, 1929****Literature records:**

*Flabellina rubrolineata* - Bitar, 2012: 8; *Flabellina rubrolineata* (O'Donoghue, 1929) - Crocetta et al., 2013: 405; Bitar, 2014: 44; Ramos-Esplá et al., 2015: 158, 211.

**Material examined:**

(7) Ras El Chakaa: 13/07/2003 - on *Eudendrium*, 5 m: 1 lv (MNCN - 15.05/47199).

**First record date:**

First found in 2003 (Crocetta et al., 2013).

*Flabellina affinis* (Gmelin, 1791)**Literature records:**

*Flabellina affinis* (Gmelin, 1791) - Ramos-Esplá et al., 2015: 158, 168, 182.

## Family SIPHONARIIDAE Gray, 1827

### A - *Siphonaria crenata* Blainville, 1827

#### Literature records:

*Siphonaria (Mestosiphon) laciniosa* (Linnaeus, 1758) - Morrison, 1972: 60.

#### Remarks:

The taxonomy of the alien species of *Siphonaria* in the Mediterranean is confused, and only recently Zenetos et al. (2004) considered old records of *S. belcheri* Hanley, 1858, *S. laciniosa* (Linnaeus, 1758) and *S. siphon* Sowerby, 1824 from the Suez Canal and the eastern Mediterranean as misidentifications of *Siphonaria crenata* Blainville, 1827. At the same time, the authors considered *S. kurracheensis* Reeve, 1856 and *S. savignyi* Krauss, 1848 as synonyms of *S. crenata*. Albayrak & Çağlar (2006) questioned these statements, and re-affirmed the presence of *S. belcheri* in Turkey. Since to analyze the correct taxonomy of Mediterranean alien *Siphonaria* is out of our purposes, pending molecular data, we hereby accepted Zenetos et al. (2004) suggestion regarding the presence of only *S. crenata* as an alien in the Mediterranean Sea.

#### First record date:

First found in 1967 (Morrison, 1972).

### *Williamia gussoni* (Costa, 1829)

#### Literature records:

*Williamia gussonii* [sic! for *gussoni* (see Costa, 1829: 10)] (Costa O. G., 1829) - Bitar & Kouli-Bitar, 1998: 43.

#### Material examined:

(1) Ramkine Island: 22/10/1999 - sediment (mainly foraminiferous), 13 m: 2 sh (BBCD); (5) Anfeh: 26/10/1999 - sand, 20 m: 2 sh (BBCD); (6) El Heri (marina Beaulieu): 03/06/2000 - muddy sediment just below small cliff, 3 m: 2 sh (BBCD); (7) Ras El Chakaa: 04/06/2000 - cave sediment, 3–4.5 m: 3 sh (BBCD); (14) Jbail: Tablieh, cave sediment, 16 m: 1 sh (BBCD); (18) Beirut: 21/10/1999 - Harf El Kalb, concretions on rocky bottom, 30 m: 1 sh (BBCD); (23) Saida: 05/06/2000 - off Nahr El Ouali, sand, 31 m: 2 sh (BBCD); (26) El Kassmieh: 25/10/1999 - detritic sand, 44 m: 3 sh (BBCD).

## Family ELLOBIIDAE L. Pfeiffer, 1854 (1822)

*Auriculinella bidentata* (Montagu, 1808)

**Literature records:**

*Pythia michelii* [sic! for *micheli* (see Mitre, 1841: 66)] Mitre - Pallary, 1938: 14; *Pythia micheli* Mitre - Bitar, 1996: 116; *Auriculinella erosa* (Jeffreys, 1830) - Bitar & Kouli-Bitar, 1998: 40.

*Myosotella myosotis* (Draparnaud, 1801)

**Literature records:**

*Alexia myosotis* Draparnaud - Pallary, 1919: 167; *Alexia myosotis* Drap. - Bitar, 1996: 118; *Ovatella myosotis* (Draparnaud, 1801) - Bitar & Kouli-Bitar, 1998: 40.

*Ovatella firminii* (Payraudeau, 1826)

**Literature records:**

*Ovatella firmini* [sic! for *firminii* (see Payraudeau, 1826: 105)] Payraudeau - Pallary, 1912b: 171; Pallary, 1938: 14; Bitar, 1996: 118; *Ovatella firminii* Payraudeau - Pallary, 1919: 167; *Ovatella firmini* [sic!] Payr. - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; *Ovatella firminii* (Payraudeau, 1826) - Bitar & Kouli-Bitar, 1998: 40.

**Family TRIMUSCULIDAE J. Q. Burch, 1945 (1840)**

*Trimusculus mamillaris* (Linnaeus, 1758)

**Literature records:**

*Gadinia garnoti* Payraudeau var. *minor* P. - Pallary, 1912b: 171; Pallary, 1919: 167; *Gadinia mamillaris* Linné - Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 447; *Gadinia mamillaris* Linné = *garnoti* Payraudeau var. *minor* Ply 1900 - Pallary, 1938: 14; *Gadinia mamillaris* Linné = *garnoti* Payraudeau var. *capuloidea* B.D.D. 1882 [sic! for 1886 (see Bucquoy, Dautzemberg & Dollfus, 1882-1886: 485)] - Pallary, 1938: 14; *Gadinia mamillaris* L. - Bitar, 1996: 117; *Trimusculus mamillaris* [sic! for *mammillaris* (see Linnaeus, 1758: 782)] (Linné, 1758) - Bitar & Kouli-Bitar, 1998: 40.

**Material examined:**

(1) Ramkine Island: 31/05/2000 - crevice of cave roof, 3–4 m: 14 lv (MNHN).

Appendix 2. Marine gastropods from Lebanon (Eastern Mediterranean Sea): species recorded from the area but excluded as based on misidentifications, arranged in systematic order (see Appendix 1 for species-specific remarks and taxonomic and nomenclatural details).

Literature record	Excluded species	Corrected identification
<i>Patella depressa</i> Pennant	<i>Patella depressa</i> Pennant, 1777	<i>Patella ulyssiponensis</i> Gmelin, 1791
<i>Gibbula tumida</i> Montg. <i>Gibbula tumida</i> Montagu <i>Gibbula tumida</i> (Montagu, 1803)	<i>Gibbula tumida</i> (Montagu, 1803)	<i>Gibbula racketti</i> (Payraudeau, 1826)
<i>Monodonta marmorata</i>	?	<i>Phorcus turbinatus</i> (Born, 1778)
<i>Turritella (Haustator) triplicata</i> Brocchi <i>Turritella triplicata</i> Brocchi	<i>Turritella triplicata</i> (Brocchi, 1814)†	<i>Turritella turbona</i> Monterosato, 1877
<i>Turritella communis</i> Risso, 1826	<i>Turritella communis</i> Risso, 1826	<i>Turritella turbona</i> Monterosato, 1877
<i>Eulima polita</i> Linné <i>Eulima polita</i> L. <i>Eulima polita</i> L. var. <i>brevis</i>	<i>Melanella polita</i> (Linnaeus, 1758)	<i>Melanella boscii</i> (Payraudeau, 1826)
<i>Rissoa (Alvania) subcrenulata</i> Schwartz <i>Rissoa subcrenulata</i> Schwartz <i>Alvania subcrenulata</i> (B., D. & D., 1884)	<i>Alvania subcrenulata</i> (Bucquoy, Dautzenberg & Dollfus, 1884)	<i>Alvania amatii</i> Oliverio, 1986
<i>Rissoa (Alvania) aspera</i> Philippi <i>Rissoa aspera</i> Phil. <i>Rissoa (Alvania) aspera</i> Philippi var. <i>minor</i> Piry <i>Rissoa aspera</i> Philippi <i>Alvania aspera</i> (Philippi, 1844)	<i>Alvania aspera</i> (Philippi, 1844)	<i>Alvania datchaensis</i> Amati & Oliverio, 1987
<i>Rissoa (Acinus) cimex</i> var. <i>minor</i> Loc. et Caz. <i>Rissoa (Acinus) cimex</i> Linné <i>Rissoa (Acinus) cimex</i> Linné var. <i>minor</i> Loc. et Caz. 1900 <i>Rissoa cimex</i> L. <i>Alvania cimex</i> Philippi	<i>Alvania cimex</i> (Linnaeus, 1758)	<i>Alvania mamillata</i> Risso, 1826
<i>Rissoa (Alvania) montagui</i> Payraudeau var. <i>minor</i> Requien <i>Rissoa (Alvania) montagui</i> Payraudeau var. <i>fulva</i> Requien <i>Rissoa (Alvania) montagui</i> Payraudeau var. <i>flavescens-fasciata</i> Requien <i>Rissoa montagui</i> Payraudeau <i>Alvania discors</i> (Allan, 1818)	<i>Alvania discors</i> (T. Allan, 1818)	<i>Alvania</i> sp.
<i>Vermetus cristatus</i> Biondi <i>Vermetus (Spirogyphus) cristatus</i> Biondi <i>Dendropoma petraeum</i> (Monterosato) <i>Dendropoma petraeus</i> Monterosato <i>Dendropoma petraeum</i> <i>Dendropoma petraeum</i> (Monterosato, 1884)	<i>Dendropoma cristatum</i> (Biondi, 1859)	<i>Dendropoma anguliferum</i> (Monterosato, 1878)
<i>Strombus decorus</i> <i>Strombus decorus</i> (Röding, 1798)	<i>Conomurex decorus</i> (Röding, 1798)	<i>Conomurex persicus</i> (Swainson, 1821)
<i>Trivia pulex</i> Solander <i>Trivia pulex</i> Solander var. <i>minor</i> Monts. <i>Trivia pulex</i> Gray <i>Trivia pulex</i> Solander var. <i>minor</i> Monts. 1878 <i>Trivia pulex</i> (Solander in Gray J.E., 1828)	<i>Trivia mediterranea</i> (Risso, 1826)	<i>Niveria problematica</i> (Schilder, 1931)
<i>Ergalatax obscura</i> Houart, 1996 <i>Ergalatax obscura</i>	<i>Ergalatax martensi</i> (Schepman, 1892)	<i>Ergalatax junionae</i> Houart, 2008
<i>Murex (Acupurpurea) tribulus</i> Linné <i>Murex tribulus</i> L., 1758	<i>Murex tribulus</i> Linnaeus, 1758	<i>Murex forskoehlii forskoehlii</i> Röding, 1798
<i>Ocenebrina corallina</i> Scacchi	<i>Ocenebrina corallina</i> (Scacchi, 1836)	<i>Ocenebrina aegeensis</i> Aissaoui, Barco & Oliverio, 2018
<i>Ocenebrina aciculata</i> Lamarck <i>Ocenebrina aciculata</i> (Lamarck, 1822)	<i>Ocenebrina aciculata</i> (Lamarck, 1822)	<i>Ocenebrina aegeensis</i> Aissaoui, Barco & Oliverio, 2018

<i>Buccinum orbigny</i> Payr.		
<i>Pisania orbigny</i> Payraudeau		
<i>Pisania d'Orbigny</i> Payr.		
<i>Pisania (Aplus) d'orbigny</i> Payraudeau sous-var. <i>angusta</i> Pply	<i>Aplus dorbigny</i> (Payraudeau, 1826)	<i>Aplus gaillardoti</i> (Puton, 1856)
<i>Cantharus d'orbigny</i> (Payraudeau)		
<i>Pisania d'orbigny</i> Payr.		
<i>Pollia dorbigny</i> (Payraudeau, 1826)		
<i>Nassa reticulata</i> L.		
<i>Nassa (Hinia) reticulata</i> Linné		
<i>Nassarius reticulatus</i> (Linné, 1758)	<i>Tritia reticulata</i> (Linnaeus, 1758)	<i>Tritia nitida</i> (Jeffreys, 1867)
<i>Nassarius reticulatus</i>		
<i>Nassarius reticulatus</i> (Linnaeus, 1758)		
<i>Hinia angulata</i> Payraudeau	<i>Tritia angulata</i> (Brocchi, 1814)†	<i>Tritia pygmaea</i> (Lamarck, 1822)
<i>Mitrolumna olivoidea</i> Cantraine		
<i>Mitrolumna olivoidea</i> Cantraine	<i>Mitromorpha olivoidea</i> (Cantraine, 1835)	<i>Mitromorpha columbellaria</i> (Scacchi, 1836)
<i>Mitromorpha olivoidea</i> (Cantraine, 1835)		
<i>Mangelia attenuata</i> (Montagu, 1803)	<i>Mangelia attenuata</i> (Montagu, 1803)	<i>Mangelia costulata</i> Risso, 1826
<i>Cordieria reticulata</i> Brocchi	<i>Raphitoma echinata</i> (Brocchi, 1814)	<i>Raphitoma cordieri</i> (Payraudeau, 1826)
<i>Raphitoma echinata</i> (Brocchi, 1814)		
<i>Philbertia bicolor</i> Risso	<i>Raphitoma bicolor</i> (Risso, 1826)	<i>Raphitoma laviae</i> (Philippi, 1844)
<i>Raphitoma purpurea</i> (Montagu, 1803)	<i>Raphitoma purpurea</i> (Montagu, 1803)	<i>Raphitoma laviae</i> (Philippi, 1844)

Appendix 3. Marine gastropods from Lebanon (Eastern Mediterranean Sea): taxa *incertae sedis*, arranged in systematic order (see Appendix 1 for taxonomic and nomenclature details).

## Family VERMETIDAE Rafinesque, 1815

### *Vermetus imbricatus* Pallary, 1938

#### **Literature records:**

*Vermetus imbricatus* - Pallary, 1938: 36, plate II (fig. 2); *Vermetus imbricatus* Pallary - Bitar, 1996: 117; Bitar & Kouli-Bitar, 1998: 39.

#### **Remarks:**

The identity of *Vermetus imbricatus* Pallary, 1938, is still unknown. It was originally described on material from Tripoli (Lebanon) and Lattaquié (Syria) (see also Appendix 5).

## Family COLUMBELLIDAE Swainson, 1840

### *Mitrella aradusana* Pallary, 1938

#### **Literature records:**

*Mitrella aradusana* - Pallary, 1933: 152; Pallary, 1938: 25; *Mitrella aradusana* var. *carminea* - Pallary, 1938: 25; *Mitrella aradusana* Pallary - Bitar, 1996: 121; Bitar & Kouli-Bitar, 1998: 39.

#### **Remarks:**

*Mitrella aradusana* Pallary, 1938 was originally described from Tartus (Syria), whilst its variety *carminea* was introduced from Jaffa (Israel) and Khaizaran (Lebanon). It belongs to the *Mitrella coccinea* (Philippi, 1836) group, but its actual identity is still unknown (Chiarelli et al., 2003).



Appendix 4. Marine gastropods from Lebanon (Eastern Mediterranean Sea): species excluded as based on incorrect and/or invalid locality data, misreadings, or simply based on species of other phyla, arranged in systematic order (see Appendix 1 for taxonomic and nomenclature details). Abbreviations: **A** - alien species (Convention on Biological Diversity definition: CBD, 2014); **C** - cryptogenic species (a species that cannot be included with confidence among either native or introduced ones: see Carlton, 1996).

## Family HALIOTIDAE Rafinesque, 1815

### **A** - *Haliotis rugosa pustulata* Reeve, 1846

#### **Literature records:**

*Haliotis pustulata* Reeve, 1846 - Barash & Danin, 1973: 303; *Haliotis pustulata cruenta* - Bitar, 2012: 8.

#### **Remarks:**

Barash & Danin (1973: 303) suspected the presence of *Haliotis pustulata* Reeve, 1846 in Lebanon, but then (1992: 347) decided to not list this species from the country. Later on, in his review of alien species from the Mediterranean Sea, Galil (2009: supplementary material) listed it from Lebanon as based on Barash & Danin (1973). More recently, Bitar first accepted its presence (Bitar, 2013: 8), but then excluded it from the Lebanese fauna (Bitar, 2014). All these records were originally based on Gohar (1954: 74), who simply stated that a Red Sea *Haliotis* species was established along the Lebanese shores. He did not list any specific taxon, nor his statement was based on concrete material. Given that, and due to the absence of this species in our samples, we decided to exclude the taxon from our list pending findings of concrete material.

## Family TROCHIDAE Rafinesque, 1815

### *Gibbula spratti* (Forbes, 1844)

#### **Literature records:**

*Gibbula spratti* Forbes - Bitar, 1996: 118; *Gibbula spratti* (Forbes, 1844) - Bitar & Kouli-Bitar, 1998: 38.

#### **Remarks:**

Lebanese occurrence reported by Bitar (1996) and Bitar & Kouli-Bitar (1998) was based on Pallary (see Bitar & Kouli-Bitar, 1998). Pallary (1912b, 1919) reported it from “Côtes de la Syrie (Mac Andrew)”, thus including a large area from Egypt to Turkey. No reliable records are known from Lebanon of this Aegean endemic, living in Greece and Turkey only (Barco et al., 2013a), and we excluded this species from our list.

*Jujubinus unidentatus* (Philippi, 1844)

**Literature records:**

*Calliostoma unidentatum* Philippi - Bitar, 1996: 118; *Jujubinus unidentatus* (Philippi, 1844) - Bitar, 1996: 118; Bitar & Kouli-Bitar, 1998: 38.

**Remarks:**

Lebanese occurrence reported by Bitar (1996) and Bitar & Kouli-Bitar (1998) was based on Pallary (see Bitar & Kouli-Bitar, 1998). Pallary (1912b, 1919) reported it from “Côtes de la Syrie (Monterosato)”, thus including a large area from Egypt to Turkey. Later, he stated to have not found this species “in Syria” any more (Pallary, 1938). No reliable records are known from Lebanon, and we excluded this species from our list. Additionally, *Jujubinus unidentatus* (Philippi, 1844) is known to live in Tunisia only (Ghisotti & Melone, 1975; Cretella, 1993; Cecalupo et al., 2008).

*Steromphala umbilicaris* (Linnaeus, 1758)

**Literature records:**

*Gibbula latior* Monterosato var. *albida* Montrs. - Bitar, 1996: 118.

**Remarks:**

Bitar (1996) reported *Gibbula latior* Monterosato on the basis of Pallary (1912b, 1919, 1938). Pallary (1912b, 1919, 1938) reported it from “Côtes de la Syrie (Monterosato)”, thus including a large area from Egypt to Turkey. No reliable records are known from Lebanon, and we excluded this species from our list. Additionally, *Gibbula latior* Monterosato [now considered a large-sized depressed-shape form of *Steromphala umbilicaris* (Linnaeus, 1758)] is known to live in Tunisia only (Cecalupo et al., 2008).

**Family TURRITELLIDAE Lovén, 1847**

*Turritella decipiens* Monterosato, 1878

**Literature records:**

*Turritella decipiens* Monterosato - Bitar, 1996: 119; *Turritella decipiens* Monterosato, 1878 - Bitar & Kouli-Bitar, 1998: 38.

**Remarks:**

Lebanese occurrence reported by Bitar (1996) and Bitar & Kouli-Bitar (1998) was based on Gruvel, Moazzo and Pallary (see Bitar & Kouli-Bitar, 1998). Pallary (1912b, 1919, 1938), Gruvel & Moazzo (1929) and Moazzo (1931) reported it from “Côtes de la Syrie (Monterosato and Bucquoy, Dautzenberg & Dollfus)”, thus including a large area from Egypt to Turkey. No reliable records are known from Lebanon, and we excluded this species from our list. Additionally, *Turritella decipiens* Monterosato, 1878 is known to live in a restricted area of the Central Mediterranean (Sicily Channel, from Lampedusa Island to Tunisia) only (Spada et al., 1973; Sabelli & Spada, 1978; Cecalupo et al., 2008).

*Vermicularia lumbricalis* (Linnaeus, 1758)

**Literature records:**

*Vermetus lumbricalis* L. - Bitar, 1996: 117; Bitar & Kouli-Bitar, 1998: 39.

**Remarks:**

Lebanese occurrence reported by Bitar (1996) and Bitar & Kouli-Bitar (1998) was based on Pallary (1912b: 173; 1919: 170; 1938: 36), Gruvel & Moazzo (1929: 425) and Moazzo (1931: 448) lists, that recorded it from “Côtes de la Syrie (Monterosato)”, thus including a large area from Egypt to Turkey. The presence of this species in the Mediterranean Sea is doubtful (Monterosato, 1892; Bieler & Petit, 2011) and since no reliable records are known from Lebanon, we excluded it from our list.

## Family CAECIDAE Gray, 1850

*Caecum clarkii* Carpenter, 1859 *sensu auctores*

**Literature records:**

*Caecum orientale* de Folin - Pallary, 1912b: 173; *Caecum orientale* de Folin - Pallary, 1919: 170; Gruvel & Moazzo, 1929: 424; Moazzo, 1931: 448; Pallary, 1938: 37; *Caecum orientale* Folin - Bitar, 1996: 117; *Caecum clarkii* Carpenter, 1859 - Bitar & Kouli-Bitar, 1998: 39.

**Remarks:**

All Lebanese records from Beirut (mostly as *Caecum orientale*) are based on the original record in “Messageries” (see de Folin & Périer, 1869, 1875, 1875-1879, 1881), first listed by Pallary (1912b). Actually, the original record refers to Mersin (Turkey) only (de Folin & Périer,

1869: 107; de Folin & Périer, 1875: 349; de Folin & Périer, 1875-1879: 328) and therefore its record in Lebanon is considered a bibliographic misreading. Nofroni et al. (1997) have shown that *Caecum clarki* Carpenter, 1859 is limited to the Canary Islands, and that no name is available with certainties for its Mediterranean sister species (*C. clarki sensu auctores*), and thus the binomen is here used as such with cautions.

## Family VERMETIDAE Rafinesque, 1815

*Thylaeodus semisurrectus* (Bivona-Bernardi, 1832)

### Literature records:

*Vermetus semisurrectus* Bivona Ant., 1832 - Bitar & Kouli-Bitar, 1998: 39.

### Remarks:

The Lebanese occurrence of *Thylaeodus semisurrectus* (Bivona-Bernardi, 1832) in Bitar & Kouli-Bitar (1998) was based on Lebanese records of *Vermetus intestinum* Lamarck by Gruvel & Moazzo (1929: 425), Moazzo (1931: 448), Pallary (1938: 37) and Bitar (1996: 117). However, *Protula intestinum* (Lamarck, 1818) is a polychaete species (phylum Annelida), and therefore we excluded this species from our molluscan list.

## Family CASSIDAE Latreille, 1825

*Semicassis saburon* (Bruguière, 1792)

### Literature records:

*Cassis saburon* Adanson [sic! for Bruguière (see Bruguière, 1789–1792: 420)] - Bitar, 1996: 120; *Phalium saburon* (Bruguière, 1792) - Bitar & Kouli-Bitar, 1998: 39.

### Remarks:

Lebanese occurrence reported by Bitar (1996) and Bitar & Kouli-Bitar (1998) was based on Gruvel and Moazzo (see Bitar & Kouli-Bitar, 1998). However, Gruvel & Moazzo (1929) and Moazzo (1931) only reported it from Lattaquié (Syria) and therefore its record in Lebanon is considered a bibliographic misreading.

## Family MURICIDAE Rafinesque, 1815

### C - *Aspella anceps* (Lamarck, 1822)

#### Literature records:

*Aspella anceps* (Lamarck, 1822) - Houart, 2001: 45; Merle et al., 2011: 560.

#### Remarks:

The taxonomic status of the “Recent” Mediterranean *Aspella* specimens has long been debated (*e.g.* see Zenetos et al., 2004 for recent discussions). Landau et al. (2007) first separated fossil European species of *Aspella* from the “Recent” Mediterranean specimens, recording the true *Aspella anceps* from the Red Sea Holocene and suggesting a Lessepsian migration as source for the possibly Recent Mediterranean specimens. However, no records of this species exist from the Suez Canal despite its shell sizes (see Tillier & Bavay, 1905; Moazzo, 1939; Hoffmann et al., 2006), and therefore a Lessepsian migration for this species may be questionable: this led us to keep it here still as a cryptogenic species. Reliable Mediterranean records of *A. anceps* mostly come from the Levant Sea, from Egypt to Turkey, including Cyprus (*e.g.* Falchi, 1974; Ghisotti, 1974; Settepassi, 1977; Barash & Danin, 1973, 1992; Gaglini, 1987; Houart & Vokes, 1995; Öztürk et al., 2003), although most of them are based on empty shells only, and very few authors declared records of living specimens (*e.g.* Settepassi, 1977). Only one record has been often reported as from outside the Levant Sea. Monterosato (1880) recorded this species (as *Epidromus gladiolus*, new species) based on two specimens received from “Alessandria” (Egypt) and one single specimen found in sponges “dalle coste della Tunisia, da quelle della Siria e dell'Arcipelago Greco”. The latter unprecised locality (Tunisia, Syria or Greece) was tentatively assigned to the Tunisian shores by some subsequent authors (*e.g.* Dautzenberg, 1883; Carus, 1889-1893), according to the title of Monterosato’s paper (“Notizie intorno ad alcune conchiglie delle coste d’Africa”). Tillier & Bavay (1905) first reported it from “Tripoli” based on Monterosato’s personal communication. Subsequent authors therefore considered the Lybian Tripoli as the finding locality (*e.g.* Falchi, 1974; Ghisotti, 1974; Settepassi, 1977; Barash & Danin, 1973, 1992; Houart & Vokes, 1995), until Houart (2001) and Merle et al. (2011) listed it from Lebanon, with no further discussion. We failed to find the original “Tripoli” specimen and label, as the specimen was not found in the Monterosato collection (Appolloni et al., 2018). If on the one hand, it is noteworthy that the sampling localities reported by Monterosato (1880) did include Lebanon (as “Siria”) but apparently did not Lybia (unless reported as “Tunisia”), and that the currently known Mediterranean distribution of this species seems to include Lebanon, but not Lybia, on the other hand it is worth mentioning that Monterosato frequently used “Tripoli” referring to the Lybian Tripoli, and not to the Lebanese one, which was almost always included generally in the “Syria” geographic area. In agreement with this, Appolloni et al. (2018) reported that Monterosato repeatedly confused “Coste di Siria” pro “Coste d’Africa”, and this may have happened also here. We therefore keep this issue as unsolved, exclude this species from those recorded with certainties from Lebanon, and avoid including *E. gladiolus* among “Gastropod nominal taxa historically described on type material from Lebanon and/or used for Lebanese material” (Appendix 5).

## A - *Ergalatax contracta* (Reeve, 1846)

### Literature records:

*Ergalatax contracta* - Zenetos et al., 2004: 15.

### Remarks:

A Lebanese record of *Ergalatax contracta* (Reeve, 1846) was reported by Zenetos et al. (2004), as based on a personal communication by Roland Houart, and subsequently reported also by Mienis (2004) and Galil (2009: supplementary material). However, no records of this deep water (alien) species are known from the area, and its presence in Lebanon must be excluded (S. Gofas, R. Houart, and A. Zenetos, pers. comm.).

## Family PISANIIDAE Gray, 1857

### *Aplus scaber* (Locard, 1891)

### Literature records:

*Pisania scabra* Monterosato [sic! for Locard (see Locard, 1891: 103)] - Bitar, 1996: 120;  
*Polliia scabra* Locard, 1886 [sic! for 1891 (see Locard, 1891: 103)] - Bitar & Kouli-Bitar, 1998: 39.

### Remarks:

Lebanese occurrence reported by Bitar (1996) and Bitar & Kouli-Bitar (1998) was based on Gruvel, Moazzo and Pallary (see Bitar & Kouli-Bitar, 1998). However, Pallary (1912b, 1919, 1938), Gruvel & Moazzo (1929) and Moazzo (1931) generally reported it from "Syria", thus including a large area from Egypt to Turkey. No reliable records are known from Lebanon, and we excluded this species from our list.

## Family BUCCINIDAE Rafinesque, 1815

### *Chauvetia ventrosa* Nordsieck, 1976

### Literature records:

*Donavania* [sic! for *Donovania* Bucquoy, Dautzenberg & Dollfus, 1883 (see Bucquoy, Dautzenberg & Dollfus, 1882-1886: 112)] *granulata* [sensu] Tiberi - Bitar, 1996: 119.

### Remarks:

*Nesaea granulata* Risso 1826 *sensu* Tiberi, 1868 is probably a synonym of *Chauvetia ventrosa* Nordsieck, 1976 (Micali, 1999). Its Lebanese occurrence reported by Bitar (1996) was based on Pallary (1912b: 172; 1919: 169; 1938: 29), Gruvel & Moazzo (1929: 422) and Moazzo (1931: 444), that reported it from “Côtes de la Syrie (Monterosato)”, thus including a large area from Egypt to Turkey. No reliable records are known from Lebanon, and we excluded this species from our list.

## Family CANCELLARIIDAE Forbes & Hanley, 1851

### *Bivetiella cancellata* (Linnaeus, 1767)

#### **Literature records:**

*Cancellaria cancellata* L. - Bitar, 1996: 121; *Cancellaria cancellata* (Linné, 1767) - Bitar & Kouli-Bitar, 1998: 39.

#### **Remarks:**

Lebanese occurrence reported by Bitar (1996) and Bitar & Kouli-Bitar (1998) was based on Gruvel, Moazzo and Pallary (see Bitar & Kouli-Bitar, 1998). However, Gruvel & Moazzo (1929), Moazzo (1931) and Pallary (1938) only reported a specimen from Acre (Israel) and therefore its record in Lebanon is considered a bibliographic misreading.

## Family RAPHITOMIDAE Bellardi, 1875

### *Raphitoma syriaca* Pallary 1938

#### **Literature records:**

*Philbertia syriaca* Pallary - Bitar, 1996: 120; Bitar & Kouli-Bitar, 1998: 40.

#### **Remarks:**

Lebanese occurrence reported by Bitar (1996) and Bitar & Kouli-Bitar (1998) was based on the original description by Pallary (1938: 16-17). Actually, this species was known from Tartus and Lattaquié (both in modern Syria) only, and no records are known from Lebanon. Its record in Lebanon is considered a bibliographic misreading.

## Family AGLAJIDAE Pilsbry, 1895 (1847)

### A - *Biuve fulvipunctata* (Baba, 1938)

#### Literature records:

*Chelidonura fulvipunctata* Baba, 1938 - Tsiakkios & Zenetos, 2011: 117; Bogi & Galil, 2013: 1.

#### Remarks:

*Chelidonura fulvipunctata* Baba, 1938 was listed from Lebanon by Tsiakkios & Zenetos (2011), and subsequently reported also by Bogi & Galil (2013), based on “Lakkis & Novel-Lakkis, 2005”: the latter evidently referred to a MEDCORE Power Point presentation (once freely available on the web at <http://www.medcore.unifi.it/conference/PDFComunicazConvegno/3-LAKKIS%20SEDIMENT%20%20Firenze.pdf>) (see Crocetta et al., 2013). No specific records of molluscan species were ever published in any of that meeting’s Abstracts [see Lakkis (2005) and Lakkis & Novel-Lakkis (2005)], whilst the MEDCORE Proceedings’ paper only dealt with algae living in vermetid platforms along the Lebanese shores (Lakkis & Novel-Lakkis, 2006). However, they were followed by a tentatively comprehensive overview of the Lebanese flora and fauna (Lakkis, 2013), including also a checklist of the Mollusca. This work, however, lacks any critical approach, is mostly not based on concrete material (nor, when available, is the location of the voucher specified) and does not refer to recent bibliography. The strong incongruences and uncertainties on systematics, taxonomy, nomenclature, and identification of native and non-native species are the reasons why not only the *C. fulvipunctata* record, but the whole book was excluded from the present review (Crocetta et al., 2014).

## Family RETUSIDAE Thiele, 1925

### A - *Retusa desgenettii* (Audouin, 1826)

#### Literature records:

*Retusa desgenettii* (Audouin, 1826) - Scaperrotta et al., 2009: 75.

#### Remarks:

Scaperrotta et al. (2009) reported the alien *Retusa desgenettii* (Audouin, 1826) from Israel, Turkey, Lebanon and Cyprus. However, this was a misunderstanding/misreading for the other alien sea slug *Pyrunculus fourierii* (Audouin, 1826), since actual records of *R. desgenettii* are known from Egypt, Israel, and Turkey only (Bogi & Galil, 2002; 2006; 2007; Mienis, 2004; Crocetta & Tringali, 2015) (see also review of *P. fourierii* distribution in Crocetta et al., 2013).



Appendix 5. Gastropod nominal taxa historically described on type material from Lebanon and/or used for Lebanese material, arranged in systematic order (see Appendix 1 for taxonomic details), along with their current status. When the same taxon was reported in different papers, only the date of first introduction is reported, unless it is *nomen nudum* in a previous article and then reported again in a subsequent article. When, within the same paper [e.g. Pallary (1938)], a new taxon was introduced as a varietal name, but subsequently reported in the plates as trinomial name, the term variety is here reported in parentheses (see below), but only the combination reported in the text has been followed. Taxa described from wider areas that may include, or not, Lebanon [e.g. “coasts of Syria” in Monterosato’s papers: see Appolloni et al. (2018) for discussions] are not listed here. Abbreviations used: a - available (ICZN, 2012: Art. 10, glossary); inf - infrasubspecific rank (ICZN, 2012: Art. 10.2, 45.5, 45.6, glossary); N - notes; *nn* - *nomen nudum* (ICZN, 2012: Art. 12, 13, glossary); var. - variety.

Author/Literature	Proposed taxon	Status	N
Pallary (1933)	<i>Patella lusitanica orientalis</i>	<i>nn</i>	[1]
Pallary (1938)	<i>Patella lusitanica</i> (var.) <i>orientalis</i>	a	[1]
Pallary (1919)	<i>Fissurella gibberula</i> var. <i>minor</i>	<i>nn</i>	
Pallary (1938)	<i>Fissurella gibberula</i> var. <i>minor</i>	inf	
Pallary (1938)	<i>Clanculopsis cruciata</i> var. <i>undata</i>	<i>nn</i>	
Pallary (1938)	<i>Glossulus</i>	<i>nn</i>	
Pallary (1938)	<i>Gibbula aegytiaca</i> var. <i>minor</i>	inf	
Pallary (1938)	<i>Gibbula ardens</i> var. <i>modesta</i>	inf	
Pallary (1938)	<i>Gibbula barbara</i> (var.) <i>minor-elevata</i>	inf	
Pallary (1919)	<i>Gibbulastra divaricata</i> var. <i>minima</i>	inf	
Pallary (1919)	<i>Gibbula leucophaea</i> var. <i>nigra</i>	<i>nn</i>	
Pallary (1938)	<i>Gibbula nebulosa</i> var. <i>parva</i>	inf	
Pallary (1938)	<i>Gibbula philiberti</i> var. <i>sidoniensis</i>	<i>nn</i>	
Pallary (1919)	<i>Gibbulastra rarilineata</i> (var.) <i>pulchella</i>	inf	
Pallary (1938)	<i>Trochocochlea turbiformis</i> (var.) <i>undata</i>	inf	
Pallary (1919)	<i>Gibbula varia</i> var. <i>minor</i>	<i>nn</i>	
Pallary (1912b)	<i>Gibbula richardi</i> (var.) <i>minima</i>	inf	
Pallary (1938)	<i>Phasianella pullus</i> var. <i>bipunctata</i>	inf	
Monterosato (1900)	<i>Cerithium limatum</i>	a	[2]
Pallary (1938)	<i>Cerithium alucastrum</i> var. <i>minor</i>	<i>nn</i>	
Pallary (1919)	<i>Cerithium mediterraneum</i> var. <i>syriaca</i>	a	[3]
Pallary (1938)	<i>Cerithium lividulum</i> (var.) <i>erecta</i>	inf	
Pallary (1938)	<i>Cerithium syriacum</i>	a	[3]
Pallary (1938)	<i>Cerithium syriacum</i> (var.) <i>strigosa</i>	<i>nn</i>	
Pallary (1938)	<i>Cerithium syriacum</i> var. <i>minor</i>	<i>nn</i>	
Pallary (1938)	<i>Cerithium syriacum</i> var. <i>aurea</i>	<i>nn</i>	
Pallary (1938)	<i>Cerithium syriacum</i> var. <i>albina</i>	<i>nn</i>	
Pallary (1933)	<i>Cerithium phaeniciacum</i>	<i>nn</i>	[4]
Pallary (1938)	<i>Cerithium phaeniciacum</i>	a	[4]
Pallary (1938)	<i>Bakka</i>	<i>nn</i>	

Pallary (1938)	<i>Cerithium scabridum</i> (var.) <i>hispida</i>	inf	
Puton (1856)	<i>Cerithium vulgatum</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Pirenella conica</i> var. <i>mairei</i>	a	[5]
Pallary (1938)	<i>Scalaria tenuicosta</i> var. <i>strigata</i>	inf	
Pallary (1938)	<i>Rissoa aspera</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Rissoa geryonia</i> var. <i>alba</i>	nn	
de Folin & Périer (1869)	<i>Caecum syriacum</i>	a	[6]
Monterosato (1878)	<i>Vermetus anguliferus</i>		[7]
Pallary (1938)	<i>Vermetus horridus</i> (var.) <i>minor</i>	nn	
Pallary (1938)	<i>Vermetus polyphragma</i> var. <i>verrucosa</i> subvar. <i>minor</i>	inf	
Pallary (1938)	<i>Cypraea spurca minima pallida</i>	inf	
Pallary (1919)	<i>Cypraea spurca</i> var. <i>pantherina</i>	inf	
Pallary (1938)	<i>Natica flammulata</i> var. <i>minor</i>	nn	
Pallary (1919)	<i>Dolium galea</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Dolium galea</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Cassis undulata</i> (var.) <i>syriaca</i>	a	[8]
Pallary (1938)	<i>Tritonium seguenzai</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Murex brandaris</i> var. <i>albina</i>	nn	
Pallary (1938)	<i>Benoitia</i>	nn	
Pallary (1938)	<i>Volvarina mitrella</i> var. <i>minor</i>	nn	
Puton (1856)	<i>Mitra cornicula</i> var. <i>olivacca</i>	nn	
Pallary (1919)	<i>Mitra cornicula</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Mitra cornicula</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Mitra cornicula</i> var. <i>albina</i>	nn	
Pallary (1938)	<i>Uromitra littoralis</i> var. <i>major</i>	nn	
Pallary (1938)	<i>Pisania bicolor</i> var. <i>luctuosa</i>	inf	
Puton (1856)	<i>Buccinum gaillardoti</i>	a	[9]
Pallary (1938)	<i>Pisania d'orbigny</i> sous-var. <i>angusta</i>	inf	
Puton (1856)	<i>Nassa gibbosula</i> var. <i>syriaca</i>	a	[10]
Pallary (1919)	<i>Arcularia gibbosula</i> var. <i>minor rufa</i>	nn	
Pallary (1919)	<i>Nassa incassata</i> var. <i>minor</i>	nn	
Pallary (1912b)	<i>Nassa cuvieri</i> var. <i>lousi</i>	a	[11]
Pallary (1938)	<i>Nassa lousi</i> var. <i>major</i>	nn	
Puton (1856)	<i>Nassa mutabilis</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Fasciolaria lignaria</i> var. <i>orientalis</i>	a	[12]
Pallary (1938)	<i>Clathromangilia cancellata</i> var. <i>elongata</i>	nn	
Pallary (1938)	<i>Clathromangilia cancellata</i> var. <i>fusca</i>	nn	
Pallary (1938)	<i>Tornatina truncatula</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Bulla striata</i> var. <i>minor</i>	nn	
Pallary (1938)	<i>Mitrella aradusana</i> var. <i>carminea</i>	inf	
Pallary (1938)	<i>Vermetus imbricatus</i>	a	[13]

Notes:

- [1] *Patella lusitanica* (var.) *orientalis* Pallary, 1933 is a *nomen nudum*, whilst *Patella lusitanica* (var.) *orientalis* Pallary, 1938 is available. It is presumably the name to be assigned to the eastern Mediterranean clade of the *Patella rustica* Linnaeus, 1758 complex reported by Sá-Pinto et al. (2010).
- [2] *Cerithium limatum* Monterosato, 1900 is a junior synonym of *Cerithium lividulum* Risso, 1826 (see Appolloni et al., 2018).
- [3] *Cerithium mediterraneum* var. *syriaca* Pallary 1919 [subsequently raised to *Cerithium syriacum* by Pallary (1938)] is a junior synonym of *Cerithium lividulum* Risso, 1826 (see Gofas et al. 2004; Cecalupo, 2006; Garilli & Galletti, 2006, often reported as published in 1938 [sic!]).
- [4] *Cerithium phaeniciacum* Pallary, 1933 is a *nomen nudum*, whilst *Cerithium phaeniciacum* Pallary 1938 is available. It belongs to the *Cerithium renovatum* Monterosato, 1884 complex (see Gofas et al. 2004; Cecalupo, 2006; Garilli & Galletti, 2006 as *C. phaenicium* [sic!]).
- [5] *Pirenella conica* var. *mairei* Pallary, 1938 is a junior synonym of *Pirenella conica* (Blainville, 1829) (see Reid & Ozawa, 2016).
- [6] *Caecum syriacum* de Folin & Périer, 1869 is a junior synonym of *Caecum auriculatum* de Folin, 1868 (see Van Aartsen & Fehr-De Wal, 1975; Van Aartsen, 1977; Panetta, 1980; Pizzini et al., 1995).
- [7] *Vermetus anguliferus* Monterosato, 1878 has been considered until recently a junior synonym of *Dendropoma petraeum* (Monterosato, 1884) [= *Dendropoma cristatum* (Biondi, 1859)]. Calvo et al. (2009) first suggested that specimens previously ascribed to *D. petraeum* comprise a complex of cryptic taxa, and Templado et al. (2016) raised *Dendropoma anguliferum* (Monterosato, 1878) to the rank of valid species. See Remarks on *D. anguliferum* for further discussions.
- [8] *Cassis undulata* (var.) *syriaca* Pallary, 1938 is a junior synonym of *Semicassis granulata* (Born, 1778).
- [9] *Buccinum gaillardoti* Puton, 1856 has been considered until recently a junior synonym of *Aplus dorbignyi* (Payraudeau, 1826) (see Monterosato, 1884a; Pallary, 1912b). Aissaoui et al. (2016) first suggested that specimens previously ascribed to *Aplus dorbignyi* (Payraudeau, 1826) comprise a complex of cryptic species, of which an eastern Mediterranean clade may match *Aplus gaillardoti* (Puton, 1856). See Remarks on *A. gaillardoti* for further discussions.
- [10] *Nassa gibbosula* var. *syriaca* Puton, 1856 is a junior synonym of *Tritia circumcincta* (Adams, 1852) (see Pallary, 1912b, 1919; Mienis, 1980).
- [11] *Nassa cuvieri* var. *lousi* Pallary, 1912b is considered a valid species (*Tritia lousi*: see Mienis, 1987).
- [12] *Fasciolaria lignaria* var. *orientalis* Pallary, 1938 is a junior synonym of *Tarantinaea lignaria* (Linnaeus, 1758) (see Settepassi, 1985; Snyder, 2003).

[13] *Vermetus imbricatus* Pallary, 1938 is a junior primary homonym of *Vermetus imbricatus* Sandberger, 1859 and *V. imbricatus* Dunker, 1860 (Bieler & Petit, 2011), and therefore permanently invalid (ICZN, 2012: Art. 57.2).

## REFERENCES

- Adams A. 1852. Catalogue of the species of *Nassa*, a genus of gasteropodous mollusca, belonging to the family Buccinidae, in the collection of Hugh Cuming, Esq., with the description of some new species. Proceedings of the Zoological Society of London, 19: 94-114.
- Adams H. & Adams A. 1854. The genera of recent Mollusca; arranged according to their organization - Volume 1. London: John Van Voorst.
- Adams J. 1797. The specific characters of some minute shells discovered on the coast of Pembrokehire, with an account of a new marine animal. Transactions of the Linnean Society of London, 3(1): 64-69.
- Adanson M. 1757. Histoire naturelle du Sénégal. Coquillages. Avec la relation abrégée d'un voyage fait en ce pays pendant les années 1749, 50, 51, 52 & 53. Paris: Chez Claude-Jean-Baptiste Bauche.
- Affenzeller S., Haar N., Steiner G. 2017. Revision of the genus complex *Gibbula*: an integrative approach to delineating the Eastern Mediterranean genera *Gibbula* Risso, 1826, *Steromphala* Gray, 1847, and *Phorcus* Risso, 1826 using DNA-barcoding and geometric morphometrics (Vetigastropoda, Trochoidea). Organisms Diversity and Evolution, 17(4): 789–812.
- Aissaoui C., Puillandre N., Bouchet P., Fassio G., Modica M.V. & Oliverio M. 2016. Cryptic diversity in Mediterranean gastropods of the genus *Aplus* (Neogastropoda: Buccinidae). Scientia Marina, 80(4): 521-533.
- Aissaoui C., Galindo L.A., Puillandre N. & Bouchet P. 2017. The nassariids from the Gulf of Gabès revisited (Neogastropoda, Nassariidae). Marine Biology Research, 13(4): 370-389.
- Albayrak, S., Çağlar, S. (2006). On the presence of *Siphonaria belcheri* Hanley, 1858 [Gastropoda: Siphonariidae] and *Septifer bilocularis* (Linnaeus, 1758) [Bivalvia: Mytilidae] in the Iskenderun Bay (SE Turkey). Aquatic Invasions. 1(4): 292-294.
- Amati B. 2012. *Alvania consociella* Monterosato, 1884 junior synonym of *Alvania lanciae* (Calcara, 1845) (Prosobranchia, Rissoidae). Bollettino Malacologico, 48(2): 116-121
- Amati B. 2014. Description of *Alvania alicae* spec. nov. (Gastropoda, Rissoidae) from the Mediterranean Sea. Iberus, 32(2) 87-95.
- Amati B., Appolloni M., Oliverio M. 2017a. *Cythara thapsiae* Oberling, 1970 senior synonym of *Mangiliella fieldeni* van Aartsen & Fehr-de Wal, 1978 (Gastropoda, Conoidea, Mangeliidae). Iberus, 35(2): 107-114.
- Amati B., Appolloni M., Smriglio C. 2017b. Taxonomic notes on the *Alvania cimex*-complex in the Mediterranean Sea. *Alvania cingulata* (Philippi, 1836) junior synonym of *Alvania mamillata* Risso, 1826 (Gastropoda, Rissoidae). Iberus, 35 (2): 123-141.
- Amati B., Smriglio C. & Oliverio M. 2015. Revision of the Recent Mediterranean species of *Mitromorpha* Carpenter, 1865 (Gastropoda, Conoidea, Mitromorphidae) with the description of seven new species. Zootaxa, 3931(2): 151-195.
- Amati B., Appolloni M., Quaggiotto E., Smriglio C. & Oliverio M. 2019. Notes on some taxa of the *Alvania lineata*-complex with the descriptions of three new species from the Mediterranean Sea (Gastropoda: Rissoidae). Iberus, 37(1): 81-112.
- Appolloni M., Smriglio C., Amati B., Lugliè L., Nofroni I., Tringali L.P., Mariottini P. & Oliverio M. 2018. Catalogue of the primary types of marine molluscan taxa described by Tommaso

- Allery Di Maria, Marquis of Monterosato, deposited in the Museo Civico di Zoologia, Roma. *Zootaxa*, 4477(1): 1-138.
- Aradas A. & Benoît L. 1871. Osservazioni sopra alcune specie malacologiche pertinenti al genere *Tritonium*. *Atti dell'Accademia Gioenia di Scienze Naturali in Catania*, 3(5): 85-95.
- Aradas A. & Benoît L. 1872-1876 [1872: 1-113, plates 1-2; 1874: 113-226, plates 3-4; 1876: 227-324, plate 5]. *Conchigliologia vivente marina della Sicilia e delle isole che la circondano*. *Atti dell'Accademia Gioenia di Scienze Naturali in Catania*, 3: 1-324.
- Audouin V. 1826. Explication sommaire des planches de Mollusques de l'Egypte et de la Syrie publiées par J.C. Savigny. In: *Description de l'Egypte ou recueil des observations et des recherches qui ont été faites en Egypte pendant l'expédition de l'armée française*, publié par les ordres de sa majesté l'empereur Napoléon le grand. *Histoire Naturelle, Animaux invertébrés*, 1(4): 7-56. Paris: Imprimerie impériale.
- Badreddine A., Milazzo M., Abboud-Abi Saab M., Bitar G. & Mangialajo L. 2019. Threatened biogenic formations of the Mediterranean: Current status and assessment of the vermetid reefs along the Lebanese coastline (Levant basin). *Ocean and Coastal Management*, 169: 137-146.
- Bank R.A. & Menkhorst H.P.M.G. 2009. A revised bibliography of the malacological papers of Paul Pallary. *Zoologische Mededelingen*, 83(5): 537-546.
- Barash A. & Danin Z. 1973. The Indo-Pacific species of Mollusca in the Mediterranean and notes on a collection from the Suez Canal. *Israel Journal of Zoology*, 21: 301-374.
- Barash A. & Danin Z. 1992. *Fauna Palaestina. Mollusca I. Annotated List of Mediterranean Molluscs of Israel and Sinai*. Jerusalem: The Israel Academy of Sciences and Humanities.
- Barco A., Evans J., Schembri P.J., Taviani M. & Oliverio M. 2013a. Testing the applicability of DNA barcoding for Mediterranean species of top-shells (Gastropoda, Trochidae, *Gibbula* s.l.). *Marine Biology Research*, 9(8): 785-793.
- Barco A., Houart R., Bonomolo G., Crocetta F. & Oliverio M. 2013b. Molecular data reveal cryptic lineages within the northeastern Atlantic and Mediterranean small mussel drills of the *Ocenebrina edwardsii* complex (Mollusca: Gastropoda: Muricidae). *Zoological Journal of the Linnean Society*, 169(2): 389-407.
- Barco A., Aissaoui C., Houart R., Bonomolo G., Crocetta F. & Oliverio M. 2018. Revision of the *Ocenebrina aciculata* species complex (Mollusca: Gastropoda: Muricidae) in the northeastern Atlantic Ocean and Mediterranean Sea. *Journal of Molluscan Studies*, 84: 19–29.
- Bazzicalupo E., Crocetta F., Estores-Pacheco K., Golestani H., Bazairi H., Giacobbe S., Jaklin A., Poursanidis D., Chandran S.B.K., Cervera C.J.L. & Valdés Á. 2018. Population genetics of *Bursatella leachii* (De Blainville, 1817) and implications for the origin of the Mediterranean population. *Helgoland Marine Research*, 72: 19.
- Bergh R. 1864. Anatomiske bidrag til kundskab om Aelidierne. *Det Kongelige Videnskabernes Selskabs Skrifter, Naturvidenskabelige og Mathematiske Afdeling*, 7: 139-316.
- Bieler R. & Petit R.E. 2011. Catalogue of Recent and fossil “worm-snail” taxa of the families Vermetidae, Siliquariidae, and Turritellidae (Mollusca: Caenogastropoda). *Zootaxa*, 2948: 1-103.
- Bitar G. 1996. Le macrozoobenthos. In: *Minist. Agr. Liban. (Ed). Etude de la biodiversité biologique du Liban. Publ. Faune et flore marines et côtières, PNUE, Projet GF/6105-92-72: 41-48, 113-126.*

- Bitar G. 2010. Impact des changements climatiques et des espèces exotiques sur la biodiversité et les habitats marins au Liban. Rapports et procès-verbaux des réunions Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée, 39: 452.
- Bitar G. 2012. Les mollusques exotiques de la côte libanaise. RECUEIL DES RESUMES – 3ème Congrès Franco-Maghrebin de Zoologie et d'Ichtyologie. Marrakech 2012.
- Bitar G. 2014. Les mollusques exotiques de la côte libanaise. Bulletin de la Société zoologique de France, 139(1-4): 37-45.
- Bitar G. & Kouli-Bitar S. 1995a. Aperçu de bionomie benthique et répartition des différents faciès de la roche littorale à Hannouch (Liban-Méditerranée orientale). Rapports et procès-verbaux des réunions Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée, 34: 19.
- Bitar G. & Kouli-Bitar S. 1995b. Impact de la pollution sur la répartition des peuplements de substrat dur à Beyrouth (Liban-Méditerranée orientale). Rapports et procès-verbaux des réunions Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée, 34: 19.
- Bitar G. & Kouli-Bitar S. 1998. Inventaire des mollusques marins benthiques du Liban et remarques biogéographiques sur quelques espèces nouvellement signalés. Mesogée, 56: 37-44.
- Bitar G. & Kouli-Bitar S. 2001. Nouvelles données sur la faune et la flore benthiques de la côte libanaise. Migration Lessepsienne. Thalassia Salentina, 25: 71-74.
- Bitar G., Ocaña O. & Ramos-Esplà A. 2007. Contribution of the Red Sea alien species to structuring some benthic biocenosis in the Lebanon coast (Eastern Mediterranean). Rapports et procès-verbaux des réunions Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée, 38: 437.
- Bitlis B. & Öztürk B. 2017. The genus *Alvania* (Gastropoda: Rissoidae) along the Turkish Aegean coast with the description of a new species. Scientia Marina, 81(3): 395-411.
- Bivona-Bernardi A. 1832. Continuazione dell'articolo sui vermeti, estratto dalle Collettanee di Storia naturale del barone BIVONA. Effemeridi Scientifiche e Letterarie per la Sicilia, 2: 3-8.
- Blainville H.M.D. de. 1817. *Bursatella*. In: F. Cuvier (Ed.). Dictionnaire des Sciences Naturelles, vol. 5 (supplement): 138. Paris: Levrault, Strasbourg & Le Normant.
- Blainville H.M.D. de. 1828-1830 [1828 (volume 1): 1-80; 1829 (volume 2): 81-176; (volume 23): 177-240; 1830(volume 28): 241-320]. Malacozoaires ou Animaux Mollusques. In: Faune Française. Paris: Chez F.-G. Levrault.
- Bogi C. & Galil B.S. 2002. Finding of *Retusa desgenettii* (Audouin, 1826) (Gastropoda: Opisthobranchia) along the Israeli coast. La Conchiglia, 305: 11-13.
- Bogi C. & Galil B.S. 2006. Nuovi ritrovamenti lungo le coste Israeliane. Notiziario S.I.M., 24: 16-18.
- Bogi C. & Galil B.S. 2007. First record of *Theora (Endopleura) lubrica* Gould, 1861 (Mollusca: Bivalvia: Semelidae) from a Levantine port. Aquatic Invasions, 2: 77-79.
- Bogi C. & Galil B.S. 2013. *Cylichna villersii*, an Erythraean cephalaspideid snail (Mollusca: Gastropoda: Opisthobranchia) in the eastern Mediterranean. Marine Biodiversity Records, 6: e92.
- Bogi C. & Giannini F. 1990. Notes on a few molluscs, found in the Mediterranean Sea. La Conchiglia, 22: 48-51.

- Bogi C. & Khairallah N.H. 1987. Nota su alcuni molluschi de provenienza Indo-Pacifica raccolti nella baia di Jounieh (Libano) - Contributo I. Notiziario del CISMA, 10: 54-60.
- Boisselier-Dubayle M.C. & Gofas S. 1999. Genetic relationships between marine and marginal-marine populations of *Cerithium* species from the Mediterranean Sea. *Marine Biology*, 135(4): 671-682.
- Borges Luísa M. S., Hollatz Claudia, Lobo Jorge, Cunha Ana M., Vilela Ana P., Calado Gonçalo, Coelho Rita, Costa Ana C., Ferreira Maria S. G., Costa Maria H. & Costa Filipe O. 2016. With a little help from DNA barcoding: investigating the diversity of Gastropoda from the Portuguese coast. *Scientific Reports* 6: 20226.
- Born I. 1778. Index rerum naturalium Musei Cæsarei Vindobonensis. Pars I.ma. Testacea. Verzeichniß der natürlichen Seltenheiten des k.k. Naturalien Cabinets zu Wien. Erster Theil. Schalthiere. Vindobonæ: Kraus.
- Bouchet P. & Danrigal F. 1982. Napoleon's Egyptian campaign (1798-1801) and the Savigny collection of shells. *The Nautilus*, 96: 9-24.
- Bouchet P., Gofas S. & Warén A. 2010. Notes on Mediterranean *Dizoniopsis* (Gastropoda: Cerithiopsidae), with the description of two new species. *Iberus*, 28(2): 51-62.
- Brocchi G.B. 1814. Conchiologia fossile subappennina con osservazioni geologiche sugli Apennini e sul suolo adiacente. Tomo secondo. Milano: Dalla Stamperia Reale.
- Brocchi G.B. 1821. Continuazione e fine del catalogo delle conchiglie raccolte dal Sig. G. Forni nel seno Arabico ed illustrate dal Sig. Brocchi. *Biblioteca Italiana*, 24: 209-226.
- Brugnone J. 1873. *Miscellanea malacologica. Pars Prima.* Palermo: Michaelis Amenta.
- Bruguière, J. G. (1789-1792). *Encyclopédie méthodique ou par ordre de matières. Histoire naturelle des vers.* Volume 1. Pancoucke, Paris. Pp. 1-344 [June 1789]; 345-758 [13 Feb. 1792]
- Brunetti M.M. & Forli M. 2013. The genus *Aporrhais* Da Costa, 1778 (Gastropoda Aporrhaidae) in the Italian Plio-Pleistocene. *Biodiversity Journal*, 4(1): 183-208.
- Brusina S. 1869. Gastéropodes nouveaux de l'Adriatique. *Journal de Conchyliologie*, 17: 230-249.
- Bucquoy E., Dautzenberg P. & Dollfus G. 1882-1886 [1882: 1-84, plates 1-10; 1883: 85-196, plates 11-20; 1884: 197-342, plates 21-40; 1885: 343-418, plates 41-50; 1886: 419-570, plates 51-66]. *Les mollusques marins du Roussillon. Tome Ier. Gastropodes.* Paris, J.B. Baillièrè & fils.
- Buzzurro G. 2003. Una nuova specie di *Alvania* di Cipro. *La Conchiglia*, 308: 43-46.
- Buzzurro G. & Greppi E. 1996. The lessepsian molluscs of Tasuçu (South East Turkey). *La Conchiglia*, 279 (supplement): 3-22 (*errata corrige* in 280: 4).
- Buzzurro G. & Russo P., 2007. *Fusinus* del Mediterraneo/Mediterranean *Fusinus*. Published by the authors, Milano, 280 pp.
- Cabral J.P. 2003. Characterization and multivariate analysis of *Patella intermedia*, *Patella ulyssiponensis* and *Patella vulgata* from Póvoa de Varzim (Northwest Portugal). *Iberus*, 21(2): 1-17.
- Cachia C. & Mifsud C. 2015. Considerations about *Leucotina eva* Thiele, 1925, with description of *Ondina michaelae* n. sp. *Triton*, 31: 3-5.
- Calcara P. 1839. Esposizione di alcune nuove specie di conchiglie appartenenti al genere *Pleurotoma* del Sig. De Lamarck, fatta del Dr. Pietro Calcara, coll'aggiunta di tutte le altre fossili e viventi, che rinvenngonsi nei dintorni di Palermo. Palermo: L'Oretea.
- Calcara P. 1845. Cenno sui molluschi viventi e fossili della Sicilia da servire da supplimento ed insieme di critiche osservazioni all'opera di R.A. Philippi. Palermo: Stamperia Reale.



- Calvo M., Templado J., Oliverio M. & Machordom A. 2009. Hidden Mediterranean biodiversity: molecular evidence for a cryptic species complex within the reef building gastropod *Dendropoma petraeum* (Mollusca: Caenogastropoda). *Biological Journal of the Linnean Society*, 96(4): 898-912.
- Cantraine F.J. 1835. Diagnoses ou descriptions succinctes de quelques espèces nouvelles de mollusques. *Bulletin de l'Académie Royale des Sciences et Belles-Lettres de Bruxelles*, 2(11): 380-411.
- Caprotti E. 1975. Grandi linee evolutive e limiti di variabilità di Turrítelle del Nord Italia dal Tortoniano ad oggi. *Conchiglie*, 9(9-10): 215-239.
- Carlton J.T. 1996. Biological invasions and cryptogenic species. *Ecology*, 77: 1653-1655.
- Carus J.V. 1889-1893. *Prodromus faunae Mediterraneae sive descriptio animalium Maris Mediterranei incolarum quam comparata silva rerum quatenus innotuit adiectis locis et nominibus vulgaribus eorumque auctoribus in commodum Zoologorum*. Volume 2. Brachiostomata. Mollusca. Tunicata. Vertebrata. Stuttgart: E. Schweizerbart'sche Verlagshandlung.
- Cate C.N. 1979. A review of the Triviidae (Mollusca: Gastropoda). *San Diego Society of Natural History, Memoir* 10: 1-126.
- CBD (Convention on Biological Diversity) 2014. Pathways of introduction of invasive species, their prioritization and management. UNEP/CBD/SBSTTA/18/9/Add.1 - <https://www.cbd.int/doc/meetings/sbstta/sbstta-18/official/sbstta-18-09-add1-en.pdf>.
- Cecalupo A. 2006. Elenco della famiglia Cerithiidae Férussac, 1822 (Prosobranchia) - Nomenclatura delle specie conosciute o poco note e relative revisioni sistematiche. *Attuali*. Volume II. Quaderni della Civica Stazione Idrobiologica di Milano, 27: 1-375.
- Cecalupo A., Buzzurro G. & Mariani M. 2008. Contributo alla conoscenza della malacofauna del Golfo di Gabès (Tunisia). *Quaderni della Civica Stazione Idrobiologica di Milano*, 31: 1-267.
- Chiarelli S., Micali P. & Quadri P. 2003. Note su alcune specie mediterranee del genere *Mitrella* Risso, 1826 (Gastropoda, Muricidae). *Bollettino Malacologico*, 38(9-12): 171-183.
- Cossignani T. & Ardovini R. 2011. *Malacologia Mediterranea. Atlante delle conchiglie del Mediterraneo - 7.500 foto a colori*. Ancona: L'Informatore Piceno.
- Costa O.G. 1829. Osservazioni Zoologiche intorno ai testacei dell'Isola di Pantelleria. Napoli: Tipografia della Minerva.
- Cretella M. 1993. Rassegna delle specie viventi del genere *Jujubinus* Monterosato, 1884 (Gastropoda: Trochidae) (IV parte). *La Conchiglia*, 25: 40-46.
- Cretella M., Crovato C., Crovato P., Fasulo G. & Toscano F. 2005. L'opera malacologica di Arcangelo Scacchi (1810-1893). Parte II: rassegna critica dei taxa scacchiani. *Bollettino Malacologico*, 40: 114-131.
- Criscione F., Ponder W.F., Köhler F., Takano T. & Kano Y. 2017. A molecular phylogeny of Rissoidae (Caenogastropoda: Rissooidea) allows testing the diagnostic utility of morphological traits. *Zoological Journal of the Linnean Society*, 179(1): 23-40.
- Crocetta F., Bitar G., Zibrowius H., Capua D., Dell'Angelo B. & Oliverio M. 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.

- Crocetta F. & Galil B. 2012. The invasive spotted sea hare *Aplysia dactylomela* (Mollusca: Gastropoda: Aplysiidae) - new records and spread pattern in the Mediterranean. *Vie et Milieu*, 62(1): 43-46.
- Crocetta F., Poursanidis D., Tringali L.P. 2015. Biodiversity of sea slugs and shelled relatives (Mollusca: Gastropoda) of the Cretan Archipelago (Greece), with taxonomic remarks on selected species. *Quaternary International*, 390: 56-68.
- Crocetta F. & Tringali L.P. 2015. Mapping alien Mollusca distribution in the Mediterranean Sea: the Lessepsian immigrant *Retusa desgenettii* (Audouin, 1826) reaches Turkey. *Quaternary International*, 390: 15-20.
- Crocetta F., Zibrowius H., Bitar G., Templado J. & Oliverio M. 2013. Biogeographical homogeneity in the eastern Mediterranean Sea - I: the opisthobranchs (Mollusca: Gastropoda) from Lebanon. *Mediterranean Marine Science*, 14(2): 403-408.
- Dalongeville M. 1977. Formes littorales de corrosion dans les roches carbonatées au Liban - Etude morphologique. *Méditerranée*, 3: 21-33.
- Danilo F. 1856. Elenco nominale dei gasteropodi testacei marini raccolti nei dintorni di Zara, e determinati dal Sig. Giovanni Battista Sandri e dal Prof. Dr. Francesco Danilo. *Programma dell'I.R. ginnasio completo di prima classe in Zara*, 6: 107-150.
- Dautzenberg P. 1883. Liste de Coquilles du Golfe de Gabès. *Journal de Conchyliologie*, 31: 289-330.
- Dayrat B. 2010. A Monographic revision of basal discodorid sea slugs (Mollusca: Gastropoda: Nudibranchia: Doridina). *Proceedings of the California Academy of Sciences*, 61: 1-403.
- Dayrat B. 2011. A warning for ecologists and conservation biologists using species checklists: how the European marine fauna 'lost' all of its 16 *Discodoris* species. *Organisms Diversity & Evolution*, 11: 75-82.
- deMaintenon M. 1990. Results of the Rumphius Biohistorical Expedition to Ambon. Part 14. The Columbelloidea (Gastropoda: Neogastropoda) collected at Ambon during the Rumphius Biohistorical Expedition. *Zoologische Mededelingen* 82(34): 341-374.
- de Folin L. & Perier L. 1869. Les fonds de la mer. Étude internationale sur les particularités nouvelles des régions sous-marines - Tome Premier. Paris: Savy.
- de Folin L. & Perier L. 1875. Les fonds de la mer. Étude sur les particularités nouvelles des régions sous-marines - Tome Deuxième. Paris: Savy.
- de Folin L. & Perier L. 1875-1879. Les fonds de la mer. Étude sur les particularités nouvelles des régions sous-marines - Tome Troisième. Paris: Savy.
- de Folin L. & Perier L. 1881. Les fonds de la mer. Étude sur les particularités nouvelles des régions sous-marines - Tome IV. Paris: Savy.
- De Gregorio A. 1885. Studi su talune conchiglie Mediterranee viventi e fossili. Siena: Tipografia all'insegna dell'ancora.
- de Montfort D. 1810. *Conchyliologie systématique, et classification méthodique des coquilles; offrant leurs figures, leur arrangement générique, leurs descriptions caractéristiques, leurs noms; ainsi que leur synonymie en plusieurs langues. Ouvrage destiné à faciliter l'étude des coquilles, ainsi que leur disposition dans les cabinets d'histoire naturelle. Coquilles univalves, non cloisonnées. Tome second.* Paris: F. Schoell.
- Delle Chiaje S. 1829. *Memorie sulla storia e notomia degli animali senza vertebre del regno di Napoli. Volume IV.* Napoli: Società Tipografica.

- de Rayneval A.G., Vanden Hecke E.B.G. & Ponzi G. 1854. Catalogue des fossiles du Monte Mario (près Rome), recueillis par M. le C.te de Rayneval, M.gr Vanden Hecke et M. le professeur Ponzi. Versailles: Imp. De Montalant-Bougleux.
- Deshayes G.P. 1824-1837 [1824: 1-80, plates 1-8; 1825: 81-162, plates 9-19; 1832: 163-290, plates 20-40; 1833: 291-429, plates 41-61; 1834: 430-494, plates 62-78; 1835: 495-780, plates 79-106; 1837: 781-814]. Description des coquilles fossiles des environs de Paris. Tome II, Mollusques. Paris: Levrault.
- Deshayes G.P. 1835. Mollusques: 81-203. In: Expédition scientifique de Morée. Section des Sciences Physiques. Tome 3. Première Partie. Zoologie. Strasbourg: Imprimerie Levrault.
- Desmarest M.A.-G. 1814. Description des Coquilles univalves du genre *Rissoa* de M. de Freminville. Bulletin des Sciences, par la Société Philomathique de Paris, année 1814: 7-9.
- Di Geronimo I. 1974. La Famiglia Turritellidae nel Mediterraneo. La Conchiglia, 60: 10-12.
- Donovan E. 1804. The natural history of British shells, including figures and descriptions of all the species hitherto discovered in Great Britain, systematically arranged in the Linnean manner, with scientific and general observations on each. Vol. 5. London: Donovan E. & Rivington F. & C.
- Evangelisti F., Bonfitto A., Morassi M. & Sabelli B. 2016. How many native *Cerithium* species in the Mediterranean Sea? An integrative taxonomic approach. Journal of Molluscan Studies, 82(2): 292–304.
- Fadlallah Y.H. 1975. Systematics and ecology of benthic macroinvertebrates in the eastern Mediterranean. MSc dissertation, American University of Beirut.
- Falchi S. 1974. Molluschi di provenienza Indopacifica lungo le coste turche. Conchiglie, 10(3-4): 89.
- Fassio G., Russini V., Pusateri F., Giannuzzi-Savelli R., Høisæter T., Puillandre N., Modica M.V. & Oliverio O. 2019. An assessment of *Raphitoma* and allied genera (Gastropoda, Conoidea, Raphitomidae). Journal of Molluscan Studies, in press.
- Fehse D. & Grego J. 2004. Contributions to the knowledge of the Triviidae (Mollusca: Gastropoda). IX. Revision of the genus *Trivellona* Iredale, 1931. Berlin-Banska Bystrica: 122 pp.
- Fehse D. & Grego J. 2008. Contributions to the knowledge of the Triviidae: XIX. New species from the Indo-Pacific and eastern Atlantic (Mollusca: Gastropoda). Neptunea, 7(4): 20-29.
- Fischer P. 1885. Manuel de Conchyliologie et de Paléontologie Conchyliologique, ou histoire naturelle des mollusques vivants et fossiles. Paris: Librairie F. Savy.
- Fontannes F. 1879-1882. Les Invertébrés du Bassin du Sud-est de la France - Les Mollusques Pliocènes de la Vallée du Rhône et du Roussillon. Tome Premier. Gastéropodes. Georg: Lyon and F. Savy: Paris.
- Forbes E. 1844. Report on the Mollusca and Radiata of the Aegean Sea, and on their distribution, considered as bearing on geology. Reports of the British Association for the Advancement of Science, 1843: 130-193.
- Forbes E. & Hanley S. 1851. A history of British mollusca, and their shells. Volume 3. Including the families of gasteropoda from Neritidae to Elysiadae. London: John Van Voorst.
- Févret M. & Sanlaville P. 1965. Contribution à l'étude du littoral libanais. Méditerranée, 6(2): 113-134.
- Fevret, M., Sanlaville, P., 1966. De l'utilisation des vermetes dans la détermination des anciens niveaux marins. Méditerranée, 7(4), 357-364.

- Gaglini A. 1987. Nota su *Epidromus gladiolus* Monterosato (= *Aspella anceps* Lamarck). Notiziario CISMA, 10(1-2): 1-2.
- Gaglini A. 1992. Terze spigolature...monterosatiene. Argonauta, 37(1-6): 125-180.
- Galil B.S. 2009. Taking stock: inventory of alien species in the Mediterranean Sea. Biological Invasions, 11: 359-372.
- Garilli V. & Galletti L. 2006. Taxonomical characters for distinguishing *Cerithium lividulum* Risso, 1826, and *C. renovatum* Monterosato, 1884 (Gastropoda, Caenogastropoda, Cerithiidae). Basteria, 70: 109-122.
- Gaskoin J.S. 1848. Description of new species of the genus *Cypraea*. Proceedings of the Zoological Society of London, 16: 90-98.
- Ghisotti F. 1974. Recente penetrazione in Mediterraneo di molluschi marini di provenienza Indo-Pacifica. Quaderni della Civica Stazione Idrobiologica di Milano, 5: 7-22.
- Ghisotti F. & Melone C.G. 1975. Catalogo illustrato delle conchiglie marine del Mediterraneo. Conchiglie, 11 (suppl. 5): 147-208.
- Giannuzzi-Savelli, R. 1982. Tommaso Di Maria marchese di Monterosato. Opera Omnia - Vol. I (1869-1877). Unione Malacologica Italiana, Palermo, Italy.
- Giannuzzi-Savelli, R. 1983. Tommaso Di Maria marchese di Monterosato. Opera Omnia - Vol. II (1878-1885). Società Italian di Malacologia, Palermo, Italy.
- Giannuzzi-Savelli, R. 1984. Tommaso Di Maria marchese di Monterosato. Opera Omnia - Vol. III (1886-1909). Società Italian di Malacologia, Palermo, Italy.
- Giannuzzi-Savelli, R. 1989. Tommaso Di Maria marchese di Monterosato. Opera Omnia - Vol. IV (1910-1923). Società Italian di Malacologia, Palermo, Italy.
- Giannuzzi-Savelli R., Pusateri F., Palmeri A. & Ebreo C. 2002. Atlante delle Conchiglie Marine del Mediterraneo. Vol. 2 (Caenogastropoda parte 1: Discopoda - Heteropoda). Roma: Evolver.
- Giannuzzi-Savelli R., Pusateri F., Micali P., Nofroni I. & Bartolini S. 2014. Atlante delle conchiglie marine del Mediterraneo. Vol. V (Heterobranchia). Palermo: Danaus.
- Giannuzzi-Savelli R., Pusateri F. & Bartolini S. (2018). A revision of the Mediterranean Raphitomidae (Gastropoda: Conoidea) 5: loss of planktotrophy and pairs of species, with the description of four new species. Bollettino Malacologico. 54, supplement 11: 1-77.
- Gill T. 1858. Description of a new species of the genus *Cypraea* Linn.: *Cypraea notata*, Gill. Annals of the Lyceum of Natural History of New York, 6: 255-257.
- Gmelin J.F. 1791. Caroli a Linné, systema naturae. Tom. I. Pars VI. Lipsiae: Beer.
- Gofas S., Garilli V. & Boisselier-Dubayle M.C. 2004. Nomenclature of the smaller Mediterranean *Cerithium* species. Bollettino Malacologico, 39: 95-104.
- Gofas S. & Jabaud A. 1997. The relationships of the Mediterranean trochid gastropods '*Monodonta*' *mutabilis* (Philippi, 1846) and '*Gibbula*' *richardi* (Payraudeau, 1826). Journal of Molluscan Studies, 63(1): 57-64.
- Gofas S. & Oliver J.D. 2012. Familia RISSOIDAE. In: Gofas S., Moreno D. & Salas C. (Eds.) Moluscos marinos de Andalucía - I. Málaga: Servicio de Publicaciones e Intercambio Científico, Universidad de Málaga: 167-194.
- Gofas, S. (2010). *Trivia mediterranea* (Risso, 1826). In: MolluscaBase (2016). Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=477358> on 2016-06-25

- Gofas S. 2014. *Trochus crenulatus* Brocchi, 1814. Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=750695> on 2014-07-07.
- Gohar H.A.F. 1954. The place of the Red Sea between the Indian Ocean and the Mediterranean. *Universite Hidrobioloji Arastirma Enstitusu*, 2(2- 3): 47-82.
- Gray J.E. 1827. Monograph on the Cypraeidae, a family of testaceous Mollusca. *Zoological Journal*, 3: 363-371.
- Gray J.E. 1847a. On the classification of the British Mollusca by W. E. Leach, M.D. *Annals and Magazine of Natural History*, 1(20): 267-273.
- Gray J.E. 1847b. A list of the genera of recent Mollusca, their synonyma and types. *Proceedings of the Zoological Society of London*, 15: 129-219.
- Gray M.E. 1850. Figures of Molluscous animals. Selected from various authors. Etched for the use of students. Vol. 4. Explanation of plates and list of genera. London: Longman, Brown, Green & Longmans.
- Gruvel A. & Moazzo G. 1929. Première liste de mollusques récoltés par MM. A. Gruvel et G. Moazzo sur les côtes de Syrie. *Bulletin du Muséum National d'Histoire Naturelle*, 1: 419-429.
- Gruvel A. 1931. F. Mollusques. In: Gruvel A. (Ed). *Les Etats de Syrie. Richesses marines et fluviales. Exportation actuelle - Avenir*. Paris. Société d'Édition Géographiques, Maritimes et Coloniales: 122-127.
- Hasegawa, K. 1998. A review of recent Japanese species previously assigned to *Eufenella* and *Clathrofenella* (Mollusca: Cerithioidea). *Memoirs of National Science Museum, Tokyo*, 31: 165-186.
- Heiman E.L. & Mienis H.K. 2010. *Murex forskoehlii spinifer* a new subspecies from east Sinai. *Triton*, 21: 5-9.
- Hoffman L., van Heugten B & Dekker H. 2006. Marine Mollusca collected during a journey to the Great Bitter Lake (Suez Canal) and Nile Delta, Egypt. *Gloria Maris* 45 (1-2) 184-200.
- Houart R. & Vokes E.H. 1995. On the identity of *Aspella anceps* (Lamarck, 1822) (Gastropoda: Muricidae). *Bollettino Malacologico*, 31(1-4): 13-16.
- Houart R. 2001. A review of the recent Mediterranean and Northeastern Atlantic species of Muricidae. Roma: Evolver.
- Houart R. 2008. Rehabilitation of *Ergalatax martensi* (Schepman, 1892) (Gastropoda: Muricidae), senior synonym of *Ergalatax obscura* Houart, 1996, and description of *Ergalatax junionae*, new name for *Morula martensi* Dall, 1923. *The Nautilus*, 122(2): 99-106.
- Houart R. 2014. Living Muricidae of the World - Muricinae. ConchBooks.
- Houbriek R.S. 1992. Monograph of the Genus *Cerithium* Bruguiere in the Indo-Pacific (Cerithiidae: Prosobranchia). *Smithsonian Contribution to Zoology* - 510. Washington: Smithsonian Institution Press.
- Iannotta M.A., Toscano F. & Patti F.P. 2008. *Nassarius corniculatus* (Olivi, 1792) (Caenogastropoda: Nassariidae): a model of environmental complexity of Italian brackish and marine habitats. *Marine Ecology - An Evolutionary Perspective*, 30: 106-115.
- ICZN [International Commission on Zoological Nomenclature] (2012) International code of zoological nomenclature, Fourth edn. London: International Trust for Zoological Nomenclature. Accessed at <http://www.iczn.org/> on 2016-04-15.

- Janssen R., Zuschin M. & Baal C. Gastropods and their habitats from the northern Red Sea (Egypt: Safaga) Part 2: Caenogastropoda: Sorbeoconcha and Littorinimorpha. *Ann. Naturhist. Mus. Wien, Serie A*, 113: 373–509.
- Janssen A.W. 2012. Late Quaternary to Recent holoplanktonic Mollusca (Gastropoda) from bottom samples of the eastern Mediterranean Sea: systematics, morphology. *Bollettino Malacologico*, 48 : 1-105.
- Jousseume F.P. 1880. Division méthodique de la famille des Purpuridae. *Le Naturaliste: journal des échanges et des nouvelles*, 2: 335-336.
- Kelaart E.F. 1858. Description of new and little known species of Ceylon nudibranchiate molluscs and zoophytes. *Journal of the Ceylon Branch of the Royal Asiatic Society*, 3(1): 76-124.
- Khairallah N.H. & Mattar N. 1987. On the coexistence of two *Nassarius* species. *Bollettino Malacologico*, 23(9-10): 304-306.
- Kiat Tan S. & Low M.E.Y. 2014. Singapore Mollusca: 4. The family Amathinidae (Gastropoda: Heterobranchia: Pyramidelloidea). *Nature in Singapore*, 7: 9-13.
- Kovalis M. & Korkos D. 2009. *Murex forskoehlii mediterranea*: a new subspecies from the east coast of the Mediterranean Sea. *Gloria Maris*, 48: 146-153.
- Kovalis M. 2010. Remarks concerning the description and status of *Murex forskoehlii mediterranea* Kovalis & Korkos, 2009. *Gloria Maris*, 49: 89-92.
- Krug P.J., Vendetti J.E. & Valdés Á. (2016). Molecular and morphological systematics of *Elysia* Risso, 1818 (Heterobranchia: Sacoglossa) from the Caribbean region. *Zootaxa*. 4148(1): 1-137.
- Lakkis S. 2005. Benthic populations diversity of soft substratum along the Lebanese coast (Levantine Basin, eastern Mediterranean). p. 58. In: *The Mediterranean coastal areas from watershed to the sea: interactions and changes*. Medcore Project International Conference, Florence, 10th-14th November 2005. Firenze University Press, 109 pp.
- Lakkis S. & Novel-Lakkis V. 2005. Vermetid terraces, characteristic coastal habitat of the Lebanese coast (eastern Mediterranean). p. 59. In: *The Mediterranean coastal areas from watershed to the sea: interactions and changes*. Medcore Project International Conference, Florence, 10th-14th November 2005. Firenze University Press, 109 pp.
- Lakkis S. & Novel-Lakkis V. 2006. Peuplements des algues macrophytes des trottoirs rocheux à vermetes de la côte libanaise. p. 343-361. In: *The Mediterranean coastal areas from watershed to the sea: interactions and changes*. Scapini, F (Ed.). Proceedings of the MEDCORE international conference, Florence, 10th-14th November 2005, Firenze University Press, 379 pp.
- Lakkis S. 2013. Flore et faune marines du Liban (Méditerranée orientale). *Biologie, Biodiversité, Biogéographie*. Aracne, Roma.
- La Porta B., Nicoletti L., Mouawad R., Targusi M., La Valle P., Lattanzi L. & Lelli S. 2014. Benthic assemblages along the highly urbanised coasts of Lebanon (eastern Mediterranean Sea). 45° Congresso della Società Italiana di Biologia Marina - Venezia, 19-23 maggio 2014. Volume dei pre-print: 166-167.
- Lamarck J.-B.P.A. de M. de. 1801. *Système des animaux sans vertèbres*. Paris: Lamarck and Deterville.
- Lamarck J.-B.P.A. de M. de. 1816. *Tableau encyclopédique et méthodique des trois règnes de la nature*. Vingt-troisième partie. Mollusques et polypes divers. Paris: M<sup>me</sup> Veuve Agasse.

- Lamarck J.-B.P.A. de M. de. 1822a. Histoire naturelle des animaux sans vertèbres. Tome Sixième. 2<sup>me</sup> partie. Paris.
- Lamarck J.-B.P.A. de M. de. 1822b. Histoire naturelle des animaux sans vertèbres. Tome Septième. Paris.
- Landau B., Houart R. & Marques da Silva C. 2007. The early Pliocene gastropoda (Mollusca) of Estepona, southern Spain. Part 7: Muricidae. *Palaeontos*, 11: 1-87.
- Lea H.C. 1843. Description of some new fossil shells from the Tertiary of Virginia. *Proceedings of the American Philosophical Society held at Philadelphia for promoting useful knowledge*, 3: 162-165.
- Lightfoot J. 1786. A Catalogue of the Portland Museum, lately the property of the Dutchess Dowager of Portland, deceased: which will be sold by auction by Mr. Skinner and Co. London.
- Linnaeus C. 1758. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Holmiae: Laurentii Salvii.*
- Linnaeus C. 1767. *Systema naturae, Tom. I. Pars II. Holmiae: Laurentii Salvii.*
- Locard A. (1891). Les coquilles marines des côtes de France. *Annales de la Société Linnéenne de Lyon*. 37: 1-385
- Locard A. & Caziot E. 1900-1901 [1900 (volume 46): 193-274; 1901 (volume 47): 1-80, 159-291]. Les coquilles marines des côtes de Corse. *Annales de la Société Linnéenne de Lyon*.
- Lowe R.T. 1841. On *Parthenia*, a new genus of recent marine shells or mollusks, containing British species. *Proceedings of the Zoological Society of London*, 8(88-89): 39-42.
- Malaquias M.A.E. & Reid D.G. 2008. Systematic revision of the living species of Bullidae (Mollusca: Gastropoda: Cephalaspidea), with a molecular phylogenetic analysis. *Zoological Journal of the Linnean Society*, 153: 453-543.
- Maravigna C. 1840. Description de plusieurs coquilles nouvelles. *Revue Zoologique, par la Société Cuvierienne*, novembre 1840: 325-326.
- Martyn T. (1784-1787) [1784 (volumes 1 and 2): 1-39, plates 1-80; 1786 (volume 3): plates 81-120; 1787 (volume 4): plates 121-160]. *The Universal Conchologist, exhibiting the figure of every known shells. IV volumes.* London: Martyn.
- Marzouk Z., Aurelle D., Said K. & Chenuil A. 2017 - Cryptic lineages and high population genetic structure in the exploited marine snail *Hexaplex trunculus* (Gastropoda: Muricidae). *Biological Journal of the Linnean Society*, 122(2): 411–428.
- Mauro A., Arculeo M. & Parrinello N. 2003. Morphological and molecular tools in identifying the Mediterranean limpets *Patella caerulea*, *Patella aspera* and *Patella rustica*. *Journal of Experimental Marine Biology and Ecology*, 295: 131-143.
- Menke C.T. 1828. *Synopsis methodica molluscorum generum omnium et specierum earum, quae in museo Menkeano adservantur; cum synonymia critica et novarum specierum diagnosi.* Pymonti: Henrici Gelpke.
- Merle D., Garrigues B. & Pointier J.-P. 2011. Fossil and Recent Muricidae of the world. Part Muricinae. Hackenheim: Conchbooks.
- Micali P. 1999. Note sulle specie di *Chauvetia* dell'Atlantico nord-orientale. *Bollettino Malacologico*, 34(5-8): 53-68.
- Michaud A.L.G. 1829. Description de plusieurs espèces nouvelles de coquilles vivantes. *Bulletin d'Histoire Naturelle de la Société Linnéenne de Bordeaux*, 3: 260-276.

- Mienis H.K. 1980. On the identity of *Nassa gibbosula* var. *syriaca* Puton, 1856. Informations de la Societe Belge de Malacologie, 8(1): 27.
- Mienis HK. 1987. *Nassarius louisi* Pallary, 1912 = *N. zambakidisi* Nofroni & Savona, 1987: an overlooked species from the eastern Mediterranean. La Conchiglia, 224-225: 10-11.
- Mienis H.K. 2004. An old find *Retusa desgenettii* (Audouin, 1826) from the Bardawil Lagoon, Egypt. Triton, 10: 12.
- Mienis H.K. 2004. New data concerning the presence of Lessepsian and other Indo-Pacific migrants among the molluscs in the Mediterranean Sea with emphasis on the situation in Israel. Turkish Journal of Aquatic Life, 2(2): 117-131.
- Mienis H.K. 2006. A first record of *Amathina tricarinata* from the Mediterranean coast of Israel. Triton, 14: 3.
- Mienis H.K. 2010. Remarks concerning the description and status of *Murex forskoehlii mediterranea*. Gloria Maris, 49: 79-83.
- Mifsud C. & Ovalis P. 2019. Two new species of *Sticteulima* Laseron, 1955 (Gastropoda: Eulimidae) from Turkey, eastern Mediterranean. Bollettino Malacologico, 55: 68-71.
- Mittre M.H. 1841. Description de quelques coquilles nouvelles. Revue Zoologique, par la société Cuvierienne, mars 1841: 65-70.
- Moazzo G.P. 1931. Contributo alla fauna malacologica marina delle coste libano siriane. In: Gruvel A. (Ed.). Les Etats de Syrie. Richesses marines et fluviales, exportation actuelle. Paris: Avenir. Société d'Édition Géographiques, Maritimes et Coloniales: 437-453.
- Modica M.V., Mariottini P., Prkić J. & Oliverio M. 2013. DNA-barcoding of sympatric species of ectoparasitic gastropods of the genus *Cerithiopsis* (Mollusca: Gastropoda: Cerithiopsidae) from Croatia. Journal of the Marine Biological Association of the United Kingdom, 93(4): 1059-1065.
- Monterosato T.A. di. 1877a. Notizie sulle conchiglie della rada di Civitavecchia. Annali del Museo civico di Storia Naturale di Genova, 9: 407-428.
- Monterosato T.A. di. 1877b. Note sur quelques Coquilles provenant des côtes d'Algérie. Journal de Conchyliologie, 25(1): 24-49.
- Monterosato T.A. di. 1878. Enumerazione e sinonimia delle Conchiglie mediterranee. Giornale di Scienze Naturali ed Economiche pubblicato per cura della Società di Scienze Naturali ed Economiche di Palermo, 13: 61-115.
- Monterosato T.A. di. 1880. Notizie intorno ad alcune conchiglie delle coste d'Africa. Bollettino della Società Malacologica Italiana, 5(11-15): 213-233.
- Monterosato T.A. di. 1884a. Nomenclatura generica e specifica di alcune conchiglie mediterranee. Palermo: Virzi.
- Monterosato T.A. di. 1884b. Conchiglie littorali mediterranee. Il Naturalista Siciliano, 3(5): 137-140.
- Monterosato T.A. di. 1900. Coquilles marines de Chypre. Journal de Conchyliologie, 47(4): 392-401.
- Monterosato T.A. di. 1890. Conchiglie della profondità del mare di Palermo. Il Naturalista Siciliano, 9(8): 181-191.
- Monterosato T.A. di. 1892. Monografia dei Vermeti del Mediterraneo. Bollettino della Società Malacologica Italiana, 17(1-3): 7-48.
- Monterosato T.A. di. 1917. Molluschi viventi e quaternari raccolti lungo le coste della Tripolitania dall'Ing. Camillo Crema. Bollettino della Società Zoologica Italiana, 3(4): 1-28.



- Morhange C., Pirazzoli P.A., Marriner N., Montaggioni L.F. & Nammour T. 2006. Late Holocene relative sea-level changes in Lebanon, Eastern Mediterranean. *Marine Geology* 230: 99–114
- Morrison J.P.E. (1972) Mediterranean *Siphonaria*. West and East - Old and New. *Argamon* 3, 51-62.
- Mougeot A. 1848. Rapport adressé à MM. les membres de la Société d'Émulation sur les objets concernant l'histoire naturelle déposés au Musée vosgien pendant l'année 1847. *Annales de la Société d'Émulation du Département des Vosges*, 6(1): 664-719.
- Muñoz M.A. & Acuña J.D. 1994. On the taxonomic discrimination between *Patella aspera* Röding and *P. caerulea* Linnaeus (Gastropoda: Patellidae) using conchological traits. *Journal of Conchology*, 35: 37-43.
- Nardo GD. 1847. *Sinonimia moderna delle specie registrate nell'opera intitolata: Descrizione de' crostacei, de' testacei e de' pesci che abitano le lagune e golfo veneto, rappresentati in figure, a chiaro-scuro ed a colori dall'Abate Stefano Chiereghin Ven. Clodiense*. Venezia: Stabilimento Antonelli.
- Nofroni, I., Pizzini, M. & Oliverio, M. (1997) Contribution to the knowledge of the family Caecidae. 3. Revision of the Caecidae of the Canary Islands (Prosobranchia, Caenogastropoda, Rissooidea). *Argonauta*, 11, 3–31.
- Nolf F. 2015. A dark-margined form of *Zonaria pyrum* (Gmelin, 1791) (Mollusca: Gastropoda: Cypraeidae) from Lebanon: further evidence of a wrongly assumed subspecies. *Neptunea* 13: 32-35
- Nordsieck F. 1972a. Die europäischen Meeresschnecken (Opisthobranchia mit Pyramidellidae; Rissoacea). Vom Eismeer bis Kapverden, Mittelmeer und Schwarzes Meer. Stuttgart: Gustav Fischer Verlag.
- Nordsieck F. 1972b. Marine Gastropoden as der Shiqmona-Bucht in Israel. *Archiv für Molluskenkunde*, 102(4/6): 227-245.
- Nuwayhid M.A., Evans D.L. & Young L.G.L. 1985. Defensive behavior in littoral snails from Lebanon. *Malacological Review*, 18: 9-14.
- Oliver J.D., Calvo M., Guallart J., Sánchez-Tocino L. & Templado J. 2015. Gasterópodos marinos de las islas Chafarinas (Mediterráneo suroccidental). *Iberus*, 33: 97-150.
- Oliverio M. & Tringali L.P. 2001. The types of marine molluscan species described by Monterosato, in the Museo Civico di Zoologia, Roma. General scope of the work, and part 1: the opisthobranch gastropods. *Bollettino Malacologico*, 37: 121-142.
- Ovalis P. & Mifsud C. 2015. More alien Lessepsian species from the eastern Mediterranean. *Triton*, 31: 1-2.
- Öztürk B., Buzzurro B. & Benli H.A. Marine molluscs from Cyprus: new data and checklist. *Bollettino Malacologico*, 39(5-8): 49-78.
- Öztürk B., Recevik M. and Geyrann K. 2015. New alien Molluscs in the Mediterranean Sea. *Cah. Biol. Mar.* 56: 205-212.
- Öztürk B., Bitlis B., Doğan A. & Türkçü N. 2017. Alien marine molluscs along the Turkish coast, with a new record of *Varicopeza pauxilla* (Mollusca: Gastropoda) from the Mediterranean Sea. *Acta zool. bulg.*, Suppl. 9: 83-92.
- Palazzi S. & Villari A., 2001. Molluschi e Brachiopodi delle grotte sottomarine del Taorminese. *La Conchiglia*, Suppl. 297: 1-56.
- Pallary P. 1912a. Catalogue des mollusques du littoral méditerranéen de l'Égypte. *Mémoires de l'Institut Égyptien*, 7(3): 69-200.

- Pallary P. 1912b. Liste des mollusques marins des côtes de la Syrie. La Feuille des jeunes naturalistes: revue mensuelle d'histoire naturelle, 42: 171-174.
- Pallary P. 1919. Enumération des mollusques marins des côtes de la Syrie. Bulletin de la Société d'histoire naturelle d'Afrique du Nord, 10: 166-172.
- Pallary P. 1933. Résultats généraux d'une prospection malacologique effectuée en Syrie de 1929 à 1932. Bulletin du Muséum National d'Histoire Naturelle, 5: 148-154.
- Pallary P. 1938. Les mollusques marins de la Syrie. Journal de Conchyliologie, 82: 5-57.
- Panetta P. 1980. La Famiglia Caecidae in Mediterraneo. Bollettino Malacologico, 16(7-8): 277-300.
- Parenzan P. 1970. Carta d'identità delle conchiglie del Mediterraneo - Vol. 1 Gasteropodi. Taranto: Bios Taras Editrice.
- Payraudeau B.-C. 1826. Catalogue descriptif et méthodique des annelides et des mollusques de l'île de Corse. Paris: Béchet.
- Pelorce J. 2009. La famille Triviidae en Méditerranée ou la famille recomposée! Xenophora 123: 34-37.
- Perna E. 2013. La Collezione Perna Atlanto - Mediterranea. Gastropoda. I quaderni di Malachia, 7: 1-271.
- Petraccioli A., Guarino F.M., Maio N., Odierna N. 2010. Molecular cytogenetic study of three common Mediterranean limpets, *Patella caerulea*, *P. rustica* and *P. ulyssiponensis* (Archaeogastropoda, Mollusca). Genetica, 138: 219-225.
- Philippi R.A. 1836. Enumeratio Molluscorum Siciliae cum viventium turn in tellure Tertiaria fossilium quae in itinere suo observavit. Berolini: Sumptibus Simonis Schroppii et Sociorum.
- Philippi R.A. 1844. Fauna molluscorum viventium et in tellure tertiaria fossilium Regni utriusque Siciliae. Halle: Halis Saxonum, Sumptibus Eduardi Anton.
- Philippi R.A. 1848. Testaceorum novorum centurio (continuato). Malakozoologische Blätter, 5: 13-16, 17-27.
- Pizzini M., Nofroni I. & Oliverio M. 1995. Contribution to the knowledge of the family Caecidae. 2. *Caecum auriculatum* de Folin, 1868 (Caenogastropoda, Rissoidae). Apex, 10(2-3): 79-86.
- Ponder W.F. & Vokes E.H. 1988. A Revision of the Indo-West Pacific Fossil and Recent Species of *Murex* s.s. and *Haustellum* (Mollusca: Gastropoda: Muricidae). Records of the Australian Museum, Supplement 8: 1-160.
- Portalatina M. 2008. Analisi concometrica sul complesso di specie *Emarginula crebrisculpta* Coen, 1939 - *Emarginula divae* Aartsen & Carrozza, 1996 - *Emarginula huzardii* Payraudeau, 1826 (Gastropoda: Fissurellidae). Thalassia Salentina, 31: 79-91.
- Posi M.E., Scuderi D., Miglietta A.M. & Belmonte G. 2012. Riordino e aggiornamento tassonomico della "Collezione di malacologia ecologica" di Pietro Parenzan - Prima parte. Thalassia Salentina, 34: 43-115.
- Pusateri F., Giannuzzi-Savelli R. & Oliverio M. 2013. A revision of the Mediterranean Raphitomidae 2: On the sibling species *Raphitoma lineolata* (B.D.D., 1883) and *Raphitoma smriglioi* n. sp. Iberus, 31(1): 11-20.
- Puton M. 1856. Lettre au docteur Mougeot sur les Mollusques de Syrie, envoyés au musée des Vosges par M. le docteur Gaillardot. Annales de la Société d'Emulation du Département des Vosges, 9: 219-231.

- Ramos-Esplá A.A., Bitar G., Khalaf G., El Shaer H., Forcada A., Limam A., Ocaña O., Sghaier Y.R. & Valle C. 2015. Ecological characterization of sites of interest for conservation in Lebanon: Enfeh Peninsula, Ras Chekaa cliffs, Raoucheh, Saida, Tyre and Nakoura. Ed. RAC/SPA - MedMPAnet Project, Tunis. 216 pp.
- Récluz C.A. 1843. Catalogue descriptif de plusieurs nouvelles espèces de coquilles de France suivi d'observations sur quelques autres. *Revue zoologique*, par la Société Cuvierienne, 1843: 5-12, 104-112, 228-238, 257-261.
- Reeve L. 1855. *Conchologia Iconica: or, illustrations of the shells of molluscous animals*. Vol. IX. London: Reeve.
- Reid D.G. & Williams S.T. 2004. The subfamily Littorininae (Gastropoda: Littorinidae) in the temperate southern hemisphere: the genera *Nodilittorina*, *Austrolittorina* and *Afrolittorina*. *Records of the Australian Museum*, 56: 75-122.
- Reid D.G. & Ozawa T., 2016. The genus *Pirenella* Gray, 1847 (= *Cerithideopsilla* Thiele, 1929) (Gastropoda: Potamididae) in the Indo-West Pacific region and Mediterranean Sea. *Zootaxa* 4076 (1): 1-91.
- Requien E. 1848. *Catalogue des Coquilles de l'Île de Corse*. Avignon: Seguin.
- Risso A. 1826. *Histoire naturelle des principales productions de l'Europe Méridionale et particulièrement de celles des environs de Nice et des Alpes Maritimes*. Tome Quatrième. Paris: Levrault.
- Röding P.F. 1798. *Museum Boltenianum sive catalogus cimeliorum e tribus regnis naturæ quæ olim collegerat Joa. Fried Bolten, M. D. p. d. per XL. annos proto physicus Hamburgensis. Pars secunda continens conchylia sive testacea univalvia, bivalvia & multivalvia*. Hamburgi: Trapp.
- Rolán E. & Luque A.A. 1994. *Nassarius reticulatus* (Linneus, 1758) y *Nassarius nitidus* (Jeffreys, 1867) (Gastropoda, Nassariidae), dos especies válidas de los mares de Europa. *Iberus*, 12: 59-76.
- Rüppell E. & Leuckart F.S. 1828-1831 [1828: 1-22, plates 1-12; 1831: 23-47]. *Mollusca* [In] *Atlas zu des Reise im Nordlichen Afrika von Eduard Rüppell*. 1. Abth. Zoologie. 5. Neue wirbellose Thiere des Rothen Meers. Frankfurt: H.L. Brönnner.
- Sá-Pinto A., Baird S.J.E., Pinho C., Alexandrino P. & Branco M. 2010. A three-way contact zone between forms of *Patella rustica* (Mollusca: Patellidae) in the central Mediterranean Sea. *Biological Journal of the Linnean Society*, 100: 154-169.
- Sabelli B. & Spada G. 1978. Guida illustrata all'identificazione delle conchiglie del Mediterraneo. Mathildidae, Turritellidae, Gen. *Mathilda*, *Turritella*, *Mesalia*. *Bollettino Malacologico*, 14 (3-6) (supplement): 1-4.
- Sanlaville P., Dalongeville R., Bernier P. & Evin J. 1997. The Syrian Coast: A Model of Holocene Coastal Evolution. *Journal of Coastal Research*, 13(2): 385-396.
- Sassi [sic!] A. 1827. Saggio geologico sopra il Bacino terziario di Albenga. *Giornale Ligustico di Scienze, Lettere ed Arti*, 1: 467-484.
- Scacchi A. 1836. *Catalogus Conchyliorum regni Neapolitani*. Neapoli: Typis Filiatre-Sebetii.
- Scaperrotta M., Bartolini S., Bogi C. 2009. Accrescimenti - Stadi di accrescimenti dei molluschi marini del Mediterraneo. Volume I. L'informatore Piceno, Ancona.
- Scapolatempo M., Solustri C. & Sabelli B. 2003. *Amathina tricarinata* (Linnaeus, 1767) (Orthogastropoda, Heterobranchia, Amathinidae): una nuova specie esotica in Mediterraneo. *Biologia Marina Mediterranea*, 10(2): 614-617.

- Scarponi D. & Della Bella G. 2010. Molluschi marini del Plio-Pleistocene dell'Emilia-Romagna e della Toscana: Conoidea. Vol. 3 - Conidae II. Ancona: L'informatore Piceno.
- Schilder F.A. 1939. Die Genera der Cypraeaacea. Archiv für Molluskenkunde, 71: 165-201.
- Schumacher C.F. 1817. Essai d'un nouveau système des habitations des vers testacés. Copenhagen: Schultz.
- Scuderi D. (1995). Il genere *Dendropoma* (Gastropoda, Vermetidae) nel Mediterraneo. Bollettino Malacologico 31(1-4): 1-6.
- Settepassi F. 1977. Atlante Malacologico dei Molluschi marini viventi nel Mediterraneo. II. Gasteropodi. Roma: Museo di Zoologia.
- Settepassi F. 1985. Atlante Malacologico dei Molluschi marini viventi nel Mediterraneo. III. Gasteropodi. Roma: Museo di Zoologia.
- Shiber J.G. 1980. Trace metals with seasonal considerations in coastal algae and molluscs from Beirut, Lebanon. Hydrobiologia, 69: 147-162.
- Shiber J.G. & Shatila T.A. 1978. Lead, cadmium, copper, nickel and iron in limpets, mussels and snails from the coast of Ras Beirut, Lebanon. Marine Environmental Research, 1: 125-134.
- Singer B.S. & Mienis H.K. 1995. Shells from the Red Sea, family Buccinidae. La Conchiglia, 27(274): 22-29.
- Smriglio C., Mariottini P. & Buzzurro G. 1998. The *Trivia spongicola* complex, with the description of a new species (Caenogastropoda Triviidae). Bollettino Malacologico, 33(9-12): 161-168.
- Snyder Martin Avery 2003. Catalogue of the marine gastropod family Fasciolaridae. Academy of Natural Sciences of Philadelphia, Special Publication, 21: 1-431.
- Sowerby G. B. I. 1835. Characters of new species of Mollusca and Conchifera collected by Mr. Cuming. Proceedings of the Zoological Society of London, 1834: 6-8, 17-19, 21-22, 46-47, 68-72, 87-89, 123-128.
- Spada G. 1971. Ritrovamenti malacologici nelle acque di Beirut (Libano). Conchiglie, 7: 85-93.
- Spada G. & Della Bella G. 2010. Identification and neotype designation of *Mangelia striolata*, type species of *Mangelia* Risso, 1826 (Neogastropoda, Conoidea). Bollettino Malacologico, 46: 75-82.
- Spada G., Sabelli B. & Morandi V. 1973. Contributo alla conoscenza della malacofauna marina dell'Isola di Lampedusa. Conchiglie, 9(3-4): 29-67.
- Stamouli C., Akel E.H.Kh., Azzurro E., Bakiu R., Bas A.A., Bitar G., Boyaci Y.Ö., Cakalli M., Corsini-Foka M., Crocetta F., Dragičević B., Dulčić J., Durucan F., El Zrelli R., Erguden D., Filiz H., Giardina F., Giovos I., Gönülal O., Hemida F., Kassar A., Kondylatos G., Macali A., Mancini E., Ovalis P., Paladini De Mendoza F., Pavičić M., Rabaoui L., Rizkalla S.I., Tiralongo F., Turan C., Vrdoljak D., Yapici S. & Zenetos A. 2017. New Mediterranean Biodiversity Records (December 2017). Mediterranean Marine Science, 18(3): 534-556.
- Strøm H. (1768). Beskrivelse over Norske Insecter. Andet Stykke. In: Det Kongelige Norske Videnskabers Selskabs Skrifter. Kjobenhavn, 4: 313-371.
- Templado J. 2012a. Familia PATELLIDAE. In: Gofas S., Moreno D. & Salas C. (Eds.). Moluscos marinos de Andalucía - I. Málaga: Servicio de Publicaciones e Intercambio Científico, Universidad de Málaga: 84-88.
- Templado J. 2012b. Familia RINGICULIDAE. In: Gofas S., Moreno D. & Salas C. (Eds.) Moluscos marinos de Andalucía - II. Málaga: Servicio de Publicaciones e Intercambio Científico, Universidad de Málaga: 400-401.

- Templado J., Richter A. & Calvo M. (2016). Reef building Mediterranean vermetid gastropods: disentangling the *Dendropoma petraeum* species complex. *Mediterranean Marine Science*, 17: 13-31.
- Tillier L. & Bavay A. 1905. Les Mollusques testacés du Canal de Suez. *Bulletin de la Société Zoologique de France*, 30: 170-181.
- Tringali L. 1994. Levant Sea: a new Lessepsian host of the genus *Sticteulima* F.C. Laseron, 1955. *La Conchiglia*, 273: 57-58.
- Tringali L. & Villa R. 1995. On the identity of the Lessepsian species of the genus *Anachis* H. & A. Adams, 1853, subgenus *Zafra* A. Adams, 1860 found in the Levant Sea. *La Conchiglia*, 274: 15-19.
- Tsiakkeros L. & Zenetos A. 2011. Further additions to the alien mollusk fauna along the Cypriot coast: new opisthobranch species. *Acta Adriatica*, 52: 115-124.
- Tsiamis K., Aydoğan Ö, Bailly N., Bariche M., Carden-Noad S., Corsini-Foka M., Crocetta F., Davidov B., Dimitriadis C., Dragičević B., Drakulić M., Dulčić J., Escánez A., Fernández-Álvarez F.A., Gerakaris V., Gerovasileiou V., Hoffman R., Izquierdo-Gómez D., Izquierdo-Muñoz A., Kondylatos G., Latsoudis P., Lipej L., Madiraca F., Mavrič B., Parasporo M., Sourbès L., Taşkin E., Türker A. & Yapici S. 2015. New Mediterranean Biodiversity Records (July 2015). *Mediterranean Marine Science*, 16(2): 472-488.
- Uribe J.E., Williams S.T., Templado J., Buge B., Zardoya R., 2017. Phylogenetic relationships of Mediterranean and North-East Atlantic Cantharidinae and notes on Stomatellinae (Vetigastropoda: Trochidae). *Molecular Phylogenetics and Evolution*, 107: 64–79.
- Valdés Á. & Templado J. 2002. Indo-Pacific dorid nudibranchs collected in Lebanon (eastern Mediterranean). *Iberus*, 20: 23-30.
- Valdés Á., Alexander J., Crocetta F., Yokes M.B., Giacobbe S., Poursanidis D., Zenetos A., Cervera J.L., Caballer M., Galil B.S. & Schembri P.J. 2013. The origin and dispersal pathway of the spotted sea hare *Aplysia dactylomela* (Mollusca: Opisthobranchia) in the Mediterranean Sea. *Aquatic Invasions*, 8(4): 427-436.
- van Aartsen J.J. & Carrozza F. 1995. *Emarginula divae* nov. spec., a new species from the Mediterranean coast of Israel. *Bollettino Malacologico*, 31(5-8): 133-136.
- van Aartsen J.J. & Fehr-De Wal M.C. 1975. A critical examination of *Caecum clarkii* Carpenter, 1858. *Basteria*, 39: 81-86.
- van Aartsen J.J. & Fehr-De Wal M.C. (1978). The subfamily Mangeliinae Fischer, 1887 in the Mediterranean. *Conchiglie*, 14 (3-6): 97-110.
- van Aartsen J.J. 1977. Revision of the East Atlantic and Mediterranean Caecidae. *Basteria*, 41: 7-19.
- van Aartsen J.J. 1987. Nomenclatural notes, 5. *Trivia pullicina* Locard, 1892: the name to be used for *Trivia pulex* (Gray, 1827) because of primary homonymy. *Basteria*, 51: 151-152.
- van Aartsen J.J. 2006. Indo-Pacific migrants into the Mediterranean. 4. *Cerithidium diplax* (Watson, 1886) and *Cerithidium perparvulum* (Watson, 1886) (Gastropoda, Caenogastropoda). *Basteria*, 70: 33-39.
- van Aartsen J.J. & Kinzelbach R., 1990. Marine molluscs from the Iztuzu beach near Dalyan (Mediterranean coast of Turkey). *Zoology in the Middle East*, 4(1): 103-112.
- Vayssière A. 1903. Notice biographique sur Henri Gaudion (1828-1902). *Annales du Muséum d'Histoire naturelle de Marseille*, 8: 16-13.

- Verduin A. 1983. On the taxonomy of Recent Mediterranean species of the subgenus *Loxostoma* of the genus *Rissoa* (Mollusca, Gastropoda, Prosobranchia). *Basteria*, 47: 61-66.
- Verduin A. 1986. *Alvania cimex* (L.) s.l. (Gastropoda, Prosobranchia), an aggregate species. *Basteria*, 50: 25-32.
- WoRMS. World Register of Marine Species. [www.marinespecies.org](http://www.marinespecies.org). Last accessed: 21/11/2016.
- Yaron I. 1978. A few comments to “Additions to the knowledge of Indo-Pacific Mollusca in the Mediterranean” by Barash & Danin. *Levantina*, 12: 116-118.
- Yokeş M.B. & Rudman W.B. 2004. Lessepsian Opisthobranch from southwestern coast of Turkey; five new records for Mediterranean. *Rapport du Congrès de la Commission Internationale pour l’Exploration Scientifique de la Mer Méditerranée*, 37: 557.
- Zenetos A., Gofas S., Russo G. & Templado J. 2004. CIESM Atlas of Exotic Species in the Mediterranean. Vol. 3. Monaco: CIESM Publishers.
- Zibrowius H. & Bitar G. 2003. Invertébrés marins exotiques sur la côte du Liban. *Lebanese Science Journal*, 4: 67-74.