

Taxonomical notes on some poorly known mollusca species from the Strait of Messina (Italy)

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ABSTRACT

The finding of some species of Mollusca interesting either for their distributional pattern, taxonomy or simply for the new iconography here presented are reported. Some species represent the first finding in Italian waters or the first record of living specimens. As a consequence, they furnished interesting data on habitat preferences and the external morphology of the living animal, which are hereafter reported. The taxonomy of some problematic taxa is here discussed, reporting new name combinations, while for others the question remains open. Discussions, comparisons and a new iconography are here reported and discussed.

KEY WORDS

Mollusca; poorly known species; Messina Strait; Mediterranean Sea.

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INTRODUCTION

Notwithstanding a lot of inedited papers on the biodiversity of the Messina's Strait were produced in the past, from the XVIII century to recent time, numerous new notices are added every year. This richness of interesting findings is due to the particular series of coincidences, from the peculiar currents to the very characteristics geo-morphology of the site, which play a fundamental role for a high hydrodynamism, already well known since Omer's time, and its influence on maintaining a wide range of environmental conditions deeply connected to the large variety of ecological niches. From the deep bottoms to the lower water biocoenosis, the Messina's Strait had ever offered to researches a complete series of data in every possible field of marine biology, from Algae to jellyfish, to ichthyology and malacology. As an example, beyond data

of his life as a researcher, the recent biography of A. Cocco includes even interesting romantic notices of the scientific activity in Europe (Ammendolia et al., 2014) and the Messina Strait in particular, as could be inferred by its definition as “the Paradise of Zoologist” done by August David Krohn (Battaglia et al., 2012).

In the XIX century numerous contributions regarded the Messina's Strait malacology, among which a complete checklist of the malacological taxa inhabiting the Strait (Granata-Grillo, 1876-1877), while a more recent and updated edition was compiled by Micali & Giovine (1983).

Numerous records of peculiar or new species at all regarded the Calabrian side of the Strait of Messina. Among all, the most recent important taxonomical studies led to the description of new taxa, i.e. *Jujubinus curinii* Bogi et Campani, 2006, *Fusinus dimassai* Buzzurro et Russo, 2007, *Gibberula*

cristinae Tisselli, Agamennone et Giunchi, 2009. Further notes on new assessments of the malacological communities of the Strait of Messina regarded some new alien species, whose geographical distribution is expanded to this area (Crocetta et al., 2009).

In recent times new additions to the malacology of the Sicilian side of the Strait of Messina were published. Among Gastropoda some taxonomical and biological notes regarded the rare species *Melanochlamys seurati* (Vayssière, 1926), subsequently reported as *M. algirae* (Adams in Sowerby II, 1850), found at Villaggio Pace -7m, 2 liv. specimens under *Condylactis aurantiaca* (Delle Chiaje, 1825), Anthozoa Actiniaria Actiniidae (Micali & Scuderi, 2006); the taxonomical position and distribution of the opisthobranch incorrectly known as *Cylichnina multiquadrata* Oberling, 1970 was re-discussed by Micali (2014), who assigned it the correct name *Notodiaphana atlantica* Ortea, Moro et Espinosa, 2013; *Skenea giemellorum* Romani, Bogi et Bartolini, 2015 was described as new species and reported for some Italian localities, among which the Strait of Messina (Romani et al., 2015).

The bivalves *Lucinoma spelaenum* Palazzi et Villari, 2001 for the first time after hits institution as a new species (Palazzi & Villari, 2001), was recorded outside Taormina's caves, along the shores of the Strait (Micali, 2004), where an exceptional finding of the Cephalopoda *Octopoteuthis sicula* Rüppell, 1844 (Villari & Ammendolia, 2009), a problematic mesopelagic species, allowed new taxonomical considerations (Jereb et al., 2012; 2016).

Since we always had been attracted by the biological richness of the Messina's harbor, whose peculiar hook shaped form contributes to maintain a well preserved environment, also due to a very vigorous hydrodynamism, we began to sample malacological materials for new observations. Data on species hereafter reported and commented are based on records of the sole Messina province (Fig. 1).

Some of these records represent just an expansion of the geographical distribution of some poorly known species, i.e. *Jujubinus curinii*, described only in recent time from Scilla (Reggio Calabria), and *Pitar mediterraneus* (Aradas et Benoit, 1872), reported as a good species by Gofas et al. (2011), separated by the more common *P. rudis* (Poli,

1795). The habitat preference, the external appearance of the soft parts and the likely shell growth rate are here reported for the rare *Mathilda gemmulata* Semper, 1865. Some species with an Atlantic or W-Mediterranean preference, like *Tricolia deschampsii* Gofas, 1993, *Setia slikorum* (Verduin, 1984), *Gregariella semigranata* (Reeve, 1858) are here reported for the first time or confirmed to be present in Italian waters. The systematic position of some other debated taxa are here confirmed as good species, i.e. *Alvania sororcula* Granata-Grillo, 1877 and *Setia sciutiana* (Aradas et Benoit, 1874), whose locus typicus is the Messina's Strait. While the validity of *Alvania peloritana* Aradas et Benoit, 1874 as a good species and the identity of a probable second species of *Pinctada* Röding, 1798 in the Mediterranean remain open questions. *Chelidonura fulvipunctata* Baba, 1938 is here reported as a recent new alien species for the Italian waters.

MATERIAL AND METHODS

Sampling was undertaken in June-September 2015 and materials were collected along the shores of Messina, in classic localities where Authors in the past had described their new taxa: a complete map of the sampling localities is reported (Fig. 1).

Samples were conducted by SCUBA diving and materials were collected handily with a hand-towed net method (Russo et al., 1985), modified simultaneously utilizing a brush on both shaphilic and well-lighted photophilic hard substrata, from the surface to -4/6m depth. Materials fallen into the net, with a 1 mm mesh size, were immediately stored in marine water and sorted for the identification under stereomicroscope after few minutes. Some specimens were drawn with gray and coloured pencils and then saved in 90° ethanol.

Additional material derived from preceding collecting samples by fish-nets shell-grit in the collections of both the Authors of the present paper.

ABBREVIATIONS AND ACRONYMS. h: height; liv.: living specimens; sh.: shell/shells; st.: station; AVC: Alberto Villari collection; PMC: Pasquale Micali collection; DSC: Danilo Scuderi collection; JC: Jeffreys Collection; RMNH: Rijksmuseum van Natuurlijke Historie (now NCB: Naturalis Biodiversity Center, Leiden, the Netherlands); USNM: United States National Museum.



Figure 1. Study area and position of the six investigated stations: 1. Harbor of Messina; 2. S. Raineri, Maddalena Lo Faro wreck; 3. S. Raineri, “Degassifica” station; 4. Marina del Nettuno; 5. Contrada Paradiso; 6. Ganzirri.

RESULTS

Conclusions on the most interesting malacological material collected here follow. Results are grouped according to the systematic order of taxa. They vary from enlargements of geographical ranges of distribution of some species recorded to re-evaluations of the taxonomical status of some problematic taxa.

Jujubinus curinii Bogi et Campani, 2006 (Figs. 29, 30)

EXAMINED MATERIAL. st. 6, fishing nets, -100/120 m depth, one single sh., DSC; Taormina, -20 m, 12 sh., PMC.

REMARKS. This species was known only for the locus typicus, the Calabrian coast of the Strait, where it was supposed to be an endemism (Bogi & Campani, 2006). According to our own data, the range of geographic distribution should be enlarged, though only inside the restricted area around the Sicilian coasts of the Strait, from Ganzirri Southern to Taormina.

Tricolia deschampsii Gofas, 1993 (Fig. 31–34)

EXAMINED MATERIAL. st. 2, 3, 5, 6, -2/4 m depth, among algae and under stones, 56 liv. and 32 sh.

REMARKS. Among the “small *Tricolia* species” living in Sicily, *T. deschampsii* has never been recorded before. The exam of the external anatomy of the living animal (Fig. 34) had confirmed the taxonomical identification made after shell morphology. The species was described for the South Mediterranean part of Spain, where it was believed to be endemic, like other congeners. In recent time *T. deschampsii* has been recorded in Aegean Sea (Manousis & Galinou-Mitsoudi, 2014), although the species figured seems better to correspond to young specimens of *T. tenuis* on the basis of the colour pattern of the shell and the protoconch outline (see sketches in figures 2, 3 for comparisons). Our findings are the first for Italian waters and allowed comparisons with *T. landinii* (Fig. 35). Differences based on shell morphology, underlined by Scuderi & Reitano (2014), and on colour and anatomy of the living animal (almost entirely green in *T. landinii* and reddish-brown in *T. deschampsii*) allowed the easy distinction of the two sympatric species. Gofas (1993) reported the very similar *T. punctura* Gofas, 1993 in the Strait of Messina, which differs in colour pattern and some details of the shell.

Tricolia landinii Bogi et Campani, 2007 (Fig. 35)

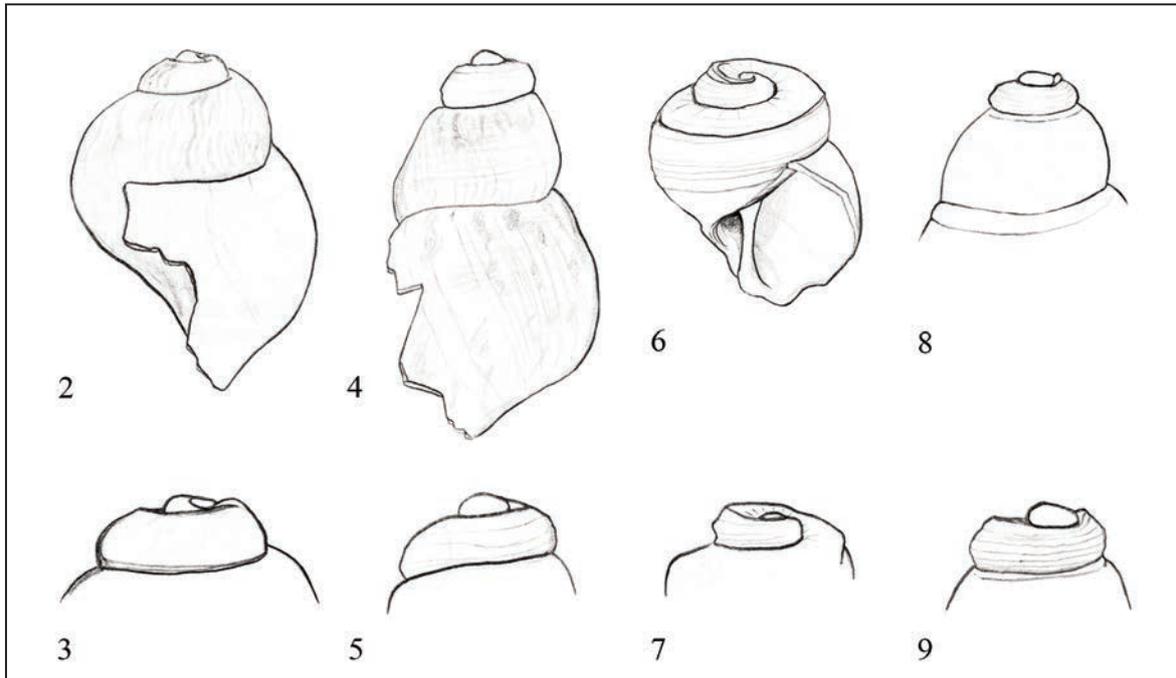
EXAMINED MATERIAL. st. 1, 2, 3, 4, 5, 6, -2/4 m depth, among algae, 49 liv. and 37 sh.

REMARKS. The original material on which the species was described resulted constituted by young specimens, making the identification of the species problematic: only the re-description of adult specimens and the description of the external anatomical parts discriminated it rather sufficiently from all other “small *Tricolia*” and from the close similar *T. tingitana* (Scuderi & Reitano, 2014). Specimens here collected furnished useful additional informations on the shell colour pattern (Figs. 35, 36), which is almost paler and reddish than those usually found around the volcanic coasts of Catania. The colour of the living animals, paler brown in *T. deschampsii* and greenish in *T. landinii*, allows a good and quick discrimination of these two similar species.

Setia sciutiana (Aradas et Benoit, 1874) (Figs. 23–27)

Cingula kuiperi Verduin, 1984

EXAMINED MATERIAL. st. 4, -2/4 m depth, among



Figures 2–9. Sketches of young shells and protoconchs of some species of *Tricolia*. Figs. 2, 3: *T. tenuis*, Linosa Island. Figs. 4, 5: *T. miniata*, Linosa Island. Figs. 6, 7: *T. pullus*, Linosa Island. Figs. 8, 9: *T. speciosa*, Portopalo di Menfi.

algae and under stones, 25 liv. and 22 sh. *Cingula kuiperi*, holotype (RMNH.MOL.55641), El Djemila, Algeria, h: 1.6 mm (Fig. 27).

REMARKS. This species is similar to *Setia ambigua* (Brugnone, 1873) but the former could be recognised by: whorls more rounded, spire shorter, less turruculated, protoconch dome-shaped, smooth, with a dark stain umbilicus reduced to a narrow chink dark spots of the body-whorl arranged in three rows, but the lower two usually merge into one. Judging from Mediterranean checklists (Clemam, 2016; WoRMS, 2017), the taxonomical position of this species is still uncertain.

In fact it is placed among incertae sedis of Rissoidae. Probably the uncertainty which characterises the taxonomical status of the species is due to Verduin (1984), who, notwithstanding the good original diagnosis, stated the impossibility to identify this taxon without the help of the type material, which he was not able to find among the collections of several Museums. In the same paper *Cingula kuiperi* Verduin, 1984 was described from Algeria. One year after the description of this taxon, it was reported from Antibes (van der Linden & Wagner, 1985), extending its geographical distribution

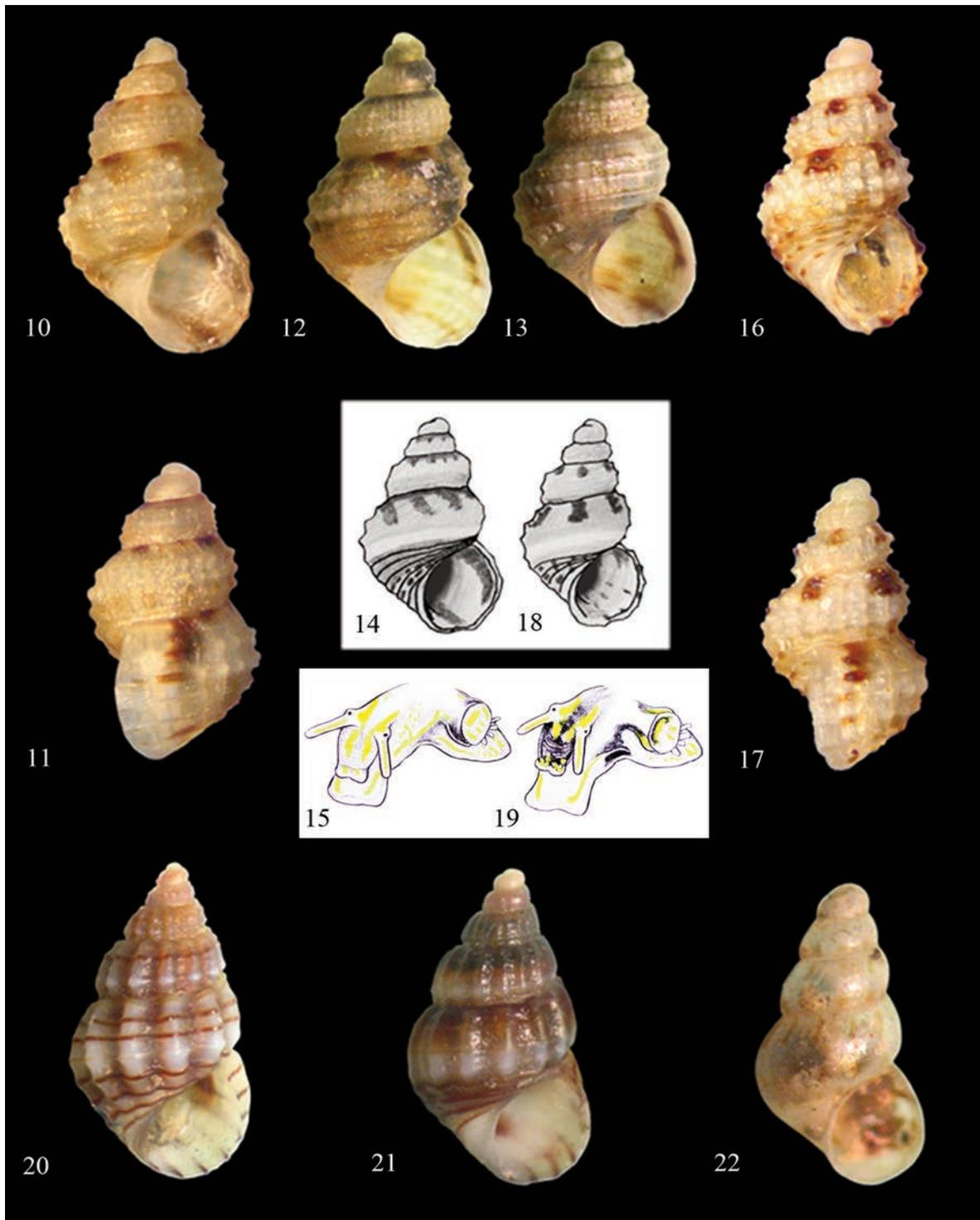
to France. Ten years later Gaglini (1994) reported the finding of the type material of “*Rissoa sciutiana* Aradas et Benoit, 1874, which she figured and reported as valid species and possible synonym of *Setia kuiperi* (Verduin, 1984). But, one more time, the name *S. sciutiana* was not recognised as valid.

We have found numerous living specimens of this species, sympatric with the abundant congeneric *S. ambigua* from which could be separated by the almost orange-brown colour of the hepatopancreas, instead of blackish as in *S. ambigua* (Figs. 25, 26 and 28). We have found a perfect correspondence with the type material figured by Gaglini (1994). Moreover, after the comparison of the material collected with the type of *S. kuiperi* (Fig. 27), we agree with Gaglini in considering this latter species as a junior synonym of *S. sciutiana*.

Setia slikorum (Verduin, 1984) (Fig. 7)

EXAMINED MATERIAL. st. 6, -3 m, on *Caulerpa taxifolia*, 1 liv. spec.

REMARKS. This is a species of atlantic affinity usually recorded in Western-Mediterranean coasts,



Figures 10–15. *Alvania sororcula*, S. Raineri, “Degassifica” station; Figs. 11–13: variability, same data, h 2.3; 2.2 and 1.8 mm respectively. Fig. 11: shell, lateral view. Fig. 14: drawing of the shell outline and colour pattern. Fig. 15: drawing of the living animal. Figures 16–19. *Alvania scabra*, shell, same data of *A. sororcula*, h 1.8 mm. Fig. 17: lateral view. Fig. 18: drawing of the shell outline and colour pattern. Fig. 19: drawing of the living animal. Fig. 20. *Alvania lineata*, Harbor of Messina, h 3.3 mm. Fig. 21. *Alvania peloritana*, same data of *A. lineata*, h 3.2 mm. Fig. 22. *Setia slikorum*, Ganzirri, h 1.8 mm.

regularly found, but not common, in S-Spain. Few scattered records along Italian coasts are reported, which justify its presence in the Italian check-list (Oliverio, 2006), but reportedly none is really officially published. Its finding in the Sicilian waters is relevant because of its peculiarity as for environmental condition of finding and because it enlarges its geographical distribution to more Eastern localities of the Mediterranean and represents the first record for «zone 4» (the Messina's Strait) of Italian checklist.

Alvania peloritana Aradas et Benoit, 1874 (Fig. 21)

EXAMINED MATERIAL. st. 1 to 6, -2/4 m depth, among algae, 36 liv. and 41 sh.

REMARKS. Numerous living specimens and shells of what we interpreted as the problematic *A. peloritana* have been found along the Messina coast sympatric with the congener *Alvania lineata* (Risso, 1826) (Fig. 20). Reported as synonym of *Alvania discors* (Allan, 1818), of which *A. peloritana* recall the general shell outline, the straight and large axial ribs and the tendency of spiral chords to become faint at the top of the whorl (Scuderi & Terlizzi, 2012), it shows sufficiently marked morphological differences to be separated (Fig. 6). But the protoconch is not smooth like in *A. discors*. *Alvania peloritana* shares with *A. lineata* the general colour of the shell, the protoconch sculpture and the colour pattern of the living animal. The taxonomical problem on the correct interpretation of this species from the original diagnosis and its validity as a good separated species should be remanded to more accurate specific studies which should take in consideration the comparison with the type material.

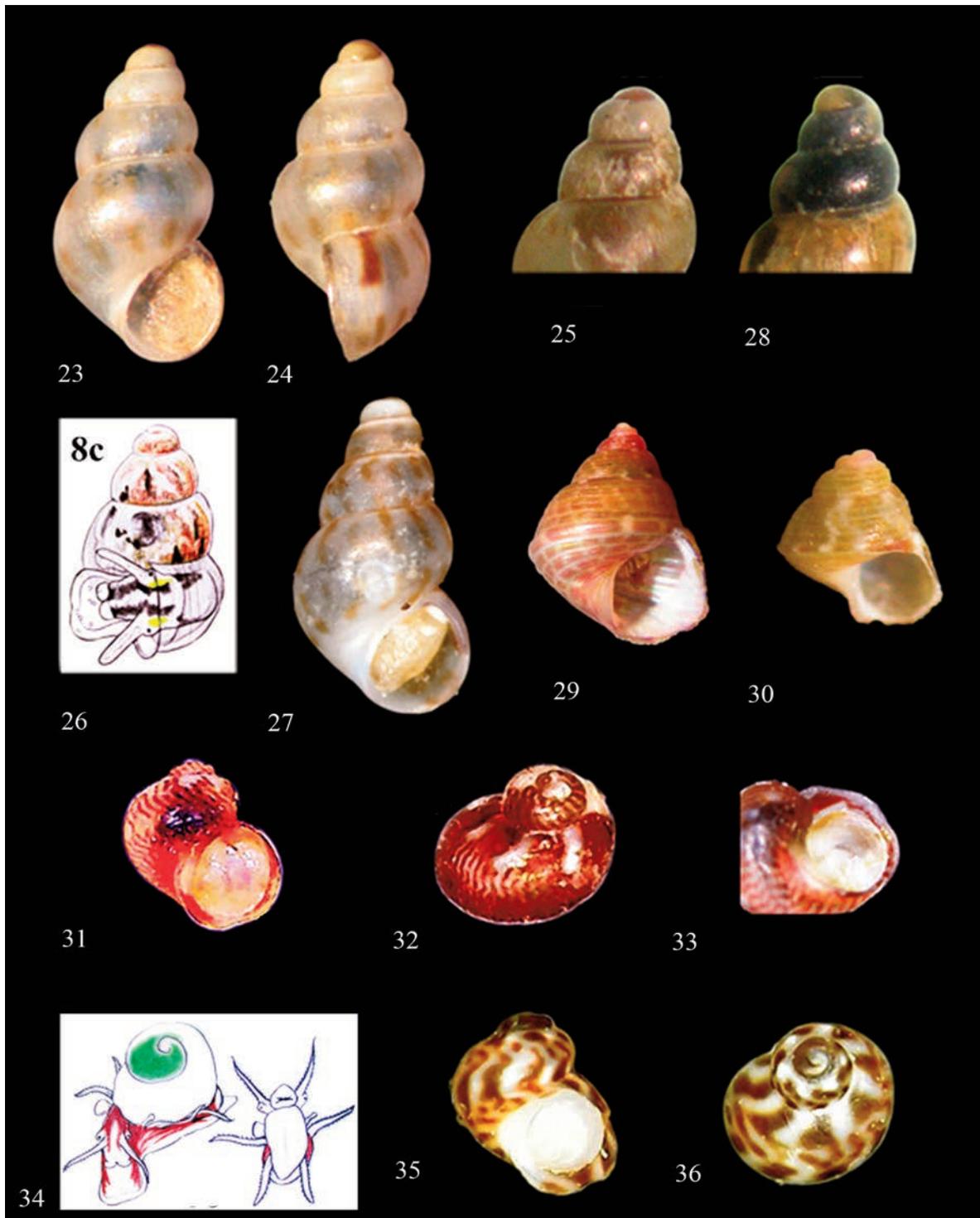
Alvania sororcula Granata-Grillo, 1877 (Figs. 10–15)

EXAMINED MATERIAL. st. 3, -2/4 m depth, among algae, 27 liv. and 11 sh.

REMARKS. The *A. scabra* (Philippi, 1844) “group” comprises several Mediterranean and Atlantic species, whose differences are questionable; the real status of single species is still debated. *Alvania sororcula* is one of them, even if we feel that among malacologists the idea of this taxon is different from the real one. Good SEM pictures of shell and protoconch of a specimen sent to Jeffreys

by Granata-Grillo (USNM) and some brief comments were published by Gofas & Warén (1982: p. 4, see remarks under *A. jeffreysi* Waller, 1864), who considered it as valid. Our findings fit rather satisfactory with this latter and we agree with him in considering *A. sororcula* as a good species, which could be distinguished from *A. scabra* (Figs. 16–19), by the following differences, summarized in the sketches of figures 14 and 18: shell higher (2.4 mm vs. 1.8 mm). Different teleoconch proportions: h 0.83 vs. 0.61, with wider base. Different teleoconch sculpture: three main spirals per whorl except for the first, which bears only two; spirals are predominant over the axial ribs, with faint or no knobs at the intersection; wide smooth subsutural zone. Protoconch bigger, but with similar sculpture. Colour pattern of the shell similar, but different in some ways, being markedly bi-coloured in every whorl, with chestnut brown lower half and a grayish upper part, with characteristic dark brown subsutural alternating and prosocline stains, instead of few bigger and not inclined almost brown stains, even if almost entirely brown shells are known of both species. A wide dark band is present at the internal side of the base, instead of some rows of little points. A wider dark stain could be seen on the external lip, below the suture, just near the outer edge of the aperture. The external soft body parts are similar, but in *A. sororcula* the colour pattern is constantly less shiny, with only grayish bands, which are almost black in *A. scabra* (Fig. 19).

COMPARATIVE NOTES. The numerous shells and living specimens collected allowed us to confirm the above mentioned taxonomical status of the species and to compare it to close similar species. Starting by saying that all these considerations are based on morphological characters only and that the taxonomy of this complicated group of *Alvania* needs a more accurate revision with molecular approach, according to our observations *A. sororcula* could be easily separated from typical *A. scabra* s.s., from *A. lucinae* Oberling, 1970 and from *A. oranica* (Pallary, 1900) by the absence of the fourth spiral chord in the whorls preceding the last, which leaves a wide abapical steep zone and shapes the whorls characteristically pagoda-shaped and not almost rounded (see for instance figures 14 and 18). In the Mediterranean only *A. sculptilis* (Monterosato, 1877) resembles *A. sororcula*. Speaking about *A. sculptilis*, Tringali (2001) described



Figures 23-26. *Setia sciuttiana*, Marina del Nettuno, h 1.55 mm; Fig. 24: shell, lateral view; Fig. 25: detail of the protoconch shape and colour of hepatopancreas; Fig. 26: drawing of the living animal. Fig. 27. "*Cingula*" *kuiperi*, holotype (RMNH.MOL.55641), 1.6 mm. Fig. 28. *Setia ambigua*, Marina del Nettuno, h 1.75 mm, detail of the protoconch and colour of hepatopancreas. Figs. 29, 30. *Jujubinus curinii*, Ganzirri, h 3.8 mm; Fig. 30: Taormina, h 1.4 mm (PMC). Figs. 31-34. *Tricolia deschampsi*, S. Raineri, Maddalena Lo Faro wreck, h 1.2 mm; Fig. 32: upper view; Fig. 33: detail of the outer lip and operculum. Fig. 34: drawing of the living animal. Figs. 35, 36. *Tricolia landinii*, S. Raineri, Maddalena Lo Faro wreck, h 1.3 mm; Fig. 36: upper view.

and figured very well the shell and protoconch, distinguishing it from *A. scabra*. Of this latter he showed good figures too of the shell and protoconch (a specimen from a submarine cave from Capo Palinuro, Italy), which however does not perfectly match with our own idea and figures of *A. scabra*. Tringali (2001) concludes its note to *A. sculptilis* hypothesizing that the Western Mediterranean form, corresponding to *A. sculptilis*, is separable by the Central Mediterranean one, which corresponds to *A. scabra* s.s. if it will be proved the lack of intermediate forms. He never mentions nor compares *A. sculptilis* to *A. sororcula*. Concerning *A. oranica*, therefore, Tringali (2001) seems convinced that this latter species, which should bear a spiral chord more on the penultimate whorl in some specimens, should be the same of *A. sculptilis* too, being the presence of the fourth spiral chord a rather variable character on account of his experience. According to us *A. sculptilis* could be the same as *A. sororcula*, even if some little differences could be detected (see Gofas et al., 2011: 183). *Alvania oranica* should be a different species, which could represent at least a Western Mediterranean cline of *A. scabra*, being intermediates maybe constituted by a third still undescribed species.

If the identity between *A. sororcula* and *A. sculptilis* will be demonstrated, the former should be considered junior synonym, the description of the taxon being published on August 1877 (see Bertolaso & Palazzi, 1997), while that of *A. sculptilis* was published on January of the same year (Clemam, 2016). But this latter is a secondary homonym of *A. sculptilis* (May, 1920), an Australian species for which seem more useful to be employed (see Criscione & Ponder, 2011 and comments on WoRMS, 2017).

BIOLOGY AND DISTRIBUTION. Shallow water, among algae. The deeper findings of some collectors are probably due to dead specimens falling down from shallow waters by the strong sea currents or to misidentifications of the species.

Mathilda gemmulata Semper, 1865 (Figs. 37–40)

EXAMINED MATERIAL. st. 1, -2/4 m depth, among algae and under stones, 14 liv. and 2 sh.

REMARKS. This rather infrequent species was taxonomically treated by Oliverio & Nofroni

(1986), who listed and critically commented a series of synonyms. We agree with actual point of view of modern checklists (see WoRMS, 2017) in considering *M. barbadensis* Dall, 1889 as a distinct species, being more conical in general outline, with a different proportion between the height of the last whorl and that of the spire, more pointed, having a proportionally smaller protoconch, and with a more marked central chord, which excels over the others. Specimens of *M. gemmulata* Semper, 1865 collected in the present paper have been recorded in shallow waters, on the shaphilic side of the harbor's piers, which lie on sandy bottom, where some sea anemones of different species were present and upon which it probably feeds. As additional data on this species, here we present two photographs of the living animal (Figs. 39, 40) since, at our knowledge, no pictures of this species are present in literature

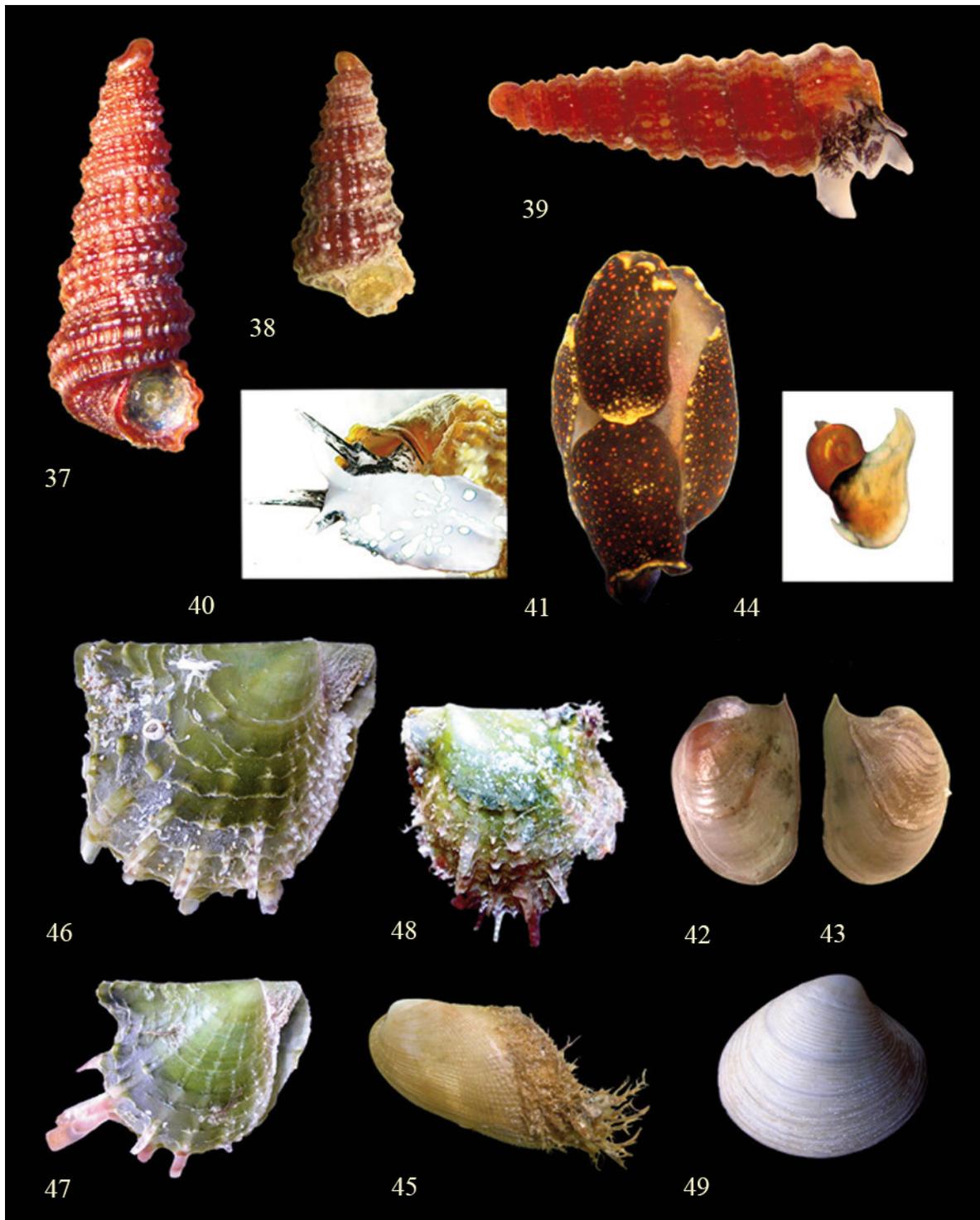
Chelidonura fulvipunctata Baba, 1938 (Figs. 41–43)

EXAMINED MATERIAL. st. 3, under small rocks, -2m depth, one single specimen.

REMARKS. A single specimen of an undetermined Aglajidae was collected alive. The general shape of the living specimen suggested that it belongs to the genus *Chelidonura* A. Adams, 1850. But none of the known Mediterranean species seemed to correspond to the characteristics of the specimen found, for the higher dimensions, the brown colour, mottled of small orange stains, except for the head, which bears a marked whitish "W" on the anterior part of the shield. Further studies allowed us to name it as *C. fulvipunctata*, an alien species which entered into the Mediterranean only in recent times and was recorded for the first time in Turkey and reported as *Chelidonura mediterranea* (Swennen, 1961) new species.

The internal very small and fragile shell is wider and bigger in dimension compared to that of the other Mediterranean species, which are thinner and very reduced. In particular it is different in colour pattern, dimensions and internal shell from *C. italica* Sordi, 1980, which name is to be used instead of *C. africana* Pruvot-Fol, 1953 as stated in Perrone & Sammut (1997), with whom we agree and which we found sympatrically in the same site (Fig. 44).

Mediterranean records of this species are scanty and regard mainly Eastern regions: see Tsiakkios



Figures 37-40. *Mathilda gemmulata*, Harbor of Messina, h 5.0 mm; Fig. 38: younger specimen, h 3.5 mm; Figs. 39, 40: living animal, h 5.3 mm. Figures 41-43. *Chelidonura fulvipunctata*, S. Raineri, "Degassifica" station, living animal, h 26 mm; Figs. 42, 43, upper and lower view of the internal shell, h 6 mm. Fig. 44. *Chelidonura italica*, S. Raineri, "Degassifica" station, lower view of the internal shell, h 0.46 mm. Fig. 45. *Gregariella semigranata*, Harbor of Messina, h 2.1x3.4 mm. Figures 46-48. *Pinctada* sp. aff. *radiata*; Figs. 46, 47: Playa di Catania, h 28 and 21 mm; Fig. 48: Contrada Paradiso, h 40 mm. Figure 49. *Pitar mediterraneus*, Ganzirri, h 13.5x15 mm.

& Zenetos (2011), who collected it at Cyprus, for a more complete list of collecting localities. In recent time it was found at Malta (Perrone & Sammut, 1997).

Gregariella semigranata (Reeve, 1858) (Fig. 45)

EXAMINED MATERIAL. st. 1, on algae of break waves, -1/2m depth, one single specimen.

REMARKS. This species too is usually recorded in Western-Mediterranean coasts. Its scattered records into the Mediterranean could be linked to anthropic activities, since findings are accompanied with other Atlantic species in localities often interested by a very busy naval traffic (personal observations).

Pinctada* sp. aff. *radiata (Figs. 46–48)

EXAMINED MATERIAL. st. 5, *Posidonia* mattes, -7 m, 15 sh.

REMARKS. *Pinctada radiata* is one of the earliest introduced Indo-Pacific species in the Mediterranean sea through the Red sea, being the first record reported by Monterosato as *Meleagrina savignyi* Monterosato, 1884 from Egypt (Monterosato, 1878). Subsequently this species was regularly found along all the Mediterranean sea and the Italian coasts (Parenzan, 1961; Bombace, 1967; Paccagnella, 1967; Spada, 1969). Nowadays the distribution of the species in this basin is rather wide but inconsistent as for number of specimens collected in single localities. Only in some North-African sites it seems abundant. In Lampedusa Island (Pelagic Islands) it is well established in shallow rocky shores till today. Young specimens of this species were found attached on the carapace of the sea turtles (Oliverio et al., 1992), though its distribution in the Mediterranean is not proved to be linked to the movements of these marine reptiles.

In recent times a new massive invasion of this species seems to proceed along the Ionian coasts of Sicily. Two years ago several thousands of living specimens (Figs. 46–47) were beached at Playa of Catania after a storm, where, judging by the literature data, the species was never found before since Aradas & Benoit (1872–74) till today (personal

data), with the exception of a single record for the external wall of the harbor of Catania (Di Gerónimo, 1971: based on material of Priolo collection). Specimens found in Catania are identical to those found inside the lake of Ganzirri and just out of there, along the Messina's shores (Fig. 48). All this materials is constituted by specimens, which morphologically seem to differ from specimens of typical *P. radiata* from Southern Mediterranean localities.

In particular specimens here reported differ for: valves more convex; less flattened profile seen from the umbo; shell colour tending from yellowish-green to deep green; only 5, 6 main ribs on the right valve, with a series of 4–6 more minute ribs on the posterior margin of the same valve; spiny process less numerous and more robust, even on the left valve (Fig. 48).

One additional character could be detected observing some small differences of the hinge tooth of both the valves, less robust and better defined in *P. radiata* s.s. But these last observations need more accurate studies to be confirmed. On the other hand, a more accurate anatomical exam has revealed the presence of a speare-shaped anal funnel typical of the *P. imbricata* Röding, 1798 group (Gervis & Sims, 1992), to which some geographically different clines seem to merge. In fact *P. imbricata radiata* (Leach, 1814) is the name nowadays used for this alien species, though it is not clear whether a single cline from a specific geographic area could be considered a separated species or not (Temkin, 2010). Molecular data support the validity of some groups only (Temkin, 2010), even if large reshuffling of clines (or species?) happens in single geographic regions, due to actual very intensive ship traffic, which renders more complicated every further investigations.

Pitar mediterraneus (Aradas & Benoit, 1872) (Fig. 49)

EXAMINED MATERIAL. st. 4, on sandy bottom, -7 m depth, 2 liv.

REMARKS. Considered a simply chromatic variation of *Pitar rudis* (Poli, 1795), only in very recent time it was considered a different species (Gofas et al., 2011), not only on the basis of the entirely white colour of the shell and the general more globose outline, but even of the shell sculpture, different

arrangement of the hinge's teeth and habitat characteristics.

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