

A new remarkable species of the *Alvania scabra* (Philippi, 1844) group from the Ionian Sea: *A. scuderii* n. sp. (Gastropoda Rissoidae)

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ABSTRACT

A new species of *Alvania* Risso, 1826 (Gastropoda Rissoidae) is described, based on 80 living specimens and shells found in Eastern Sicily, Ionian Sea, between Messina and Catania. This new species belongs to the *A. scabra* (Philippi, 1844) group. The description, pictures, and drawing of the soft parts are presented in this paper. There are also comparisons with other Mediterranean and Atlantic similar species briefly reported towards the end.

KEY WORDS

Gastropoda; Rissoidae; *Alvania*; new species; Sicilian coast; Recent; Taxonomy.

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INTRODUCTION

The Ionian Sea has been the subject of countless studies since the earliest attempts of science to describe its great variety of organisms. Even in recent times, numerous papers have reported studies which vouch for the great biodiversity of this part of Sicily in particular. In fact, a lot of new species have been described (e.g. see the last contributions in chronological order: Bogi & Campani, 2006; 2007; Reitano & Buzzurro, 2006; Cecalupo & Robba, 2010; Scuderi, 2014), and many are still considered endemic.

Rissoidae is one of the most diverse family of marine molluscs in the world and many authors have added new taxa and information on the taxonomy of this family of gastropods.

Further in this paper there is the description of another new, cryptic species of the genus *Alvania* Risso, 1826 (Gastropoda Rissoidae), related to a peculiar sciaphilous environment of the Eastern Sicilian coasts. This new species belong to the so-

called *A. scabra* (Philippi, 1844) group, which in the past has been treated as taxonomically problematic. Aradas & Benoit (1872–76), in fact, dedicated more than a single page of their book to “*Rissoa*” *scabra* of Philippi (1844), concluding that at least two species are involved under this name (Aradas & Benoit, 1872–76, p. 202: “...*la Riss. scabra* di Philippi e *la scabra Auctorum* sono due specie distintissime”). So, according to Aradas & Benoit (1874: p. 202) the *A. scabra* sensu Auctorum is different from *A. scabra* of Philippi and they named it “*Rissoa schwartzii*”. Therefore, *A. schwartzii* (Aradas & Benoit, 1874) is the replacement name of *A. scabra* sensu Auctorum and synonym of *A. lanciae* Calcara, 1845, while *A. mutabilis* Weinkauff, 1868 is synonym of *A. scabra* of Philippi (Priolo, 1953: p. 72). *A. schwartzii* (Aradas & Benoit, 1874) is not at all present in any checklist consulted (see for instance WoRMS, 2017). The examination of the external soft parts of the specimens of this group of *Alvania* led to more accurate studies, which were concluded, on one hand, with results reported by Villari

& Scuderi (2017) on some taxa morphologically closely related to *A. scabra*, and, on the other hand, to what here is described as a new species.

MATERIAL AND METHODS

Numerous living specimens and shells were found on algae of hard substrates, mainly in schiaphilous side of stones during July and August 2016. Collecting methods consist on brushing stones during ARA and apnea immersions, as reported in Villari & Scuderi (2017). Living specimens were stored in aquarium to observe the soft parts. Drawing of these latter were made by pencil and colored pastels.

ACRONYMS. Museo Zoologico dell'Università di Bologna, Bologna, Italy (MZB); Alberto Villari malacological collection, Messina, Italy (AVC); Museo della Fauna del Dipartimento di Veterinaria dell'Università di Messina, Messina, Italy (MFV-ME); Danilo Scuderi malacological collection, Catania, Italy (DSC); Pasquale Micali, Fano, Italy (PMC).

RESULTS

Systematics

Phylum MOLLUSCA Cuvier, 1797
 Classis GASTROPODA Cuvier, 1795
 Subclassis CAENOGASTROPODA Cox, 1960
 Ordo LITTORINIMORPHA Golikov et Starobogotov, 1975
 Superfamilia RISSOOIDEA Gray, 1847
 Familia TROCHIDAE Rafinesque, 1815
 Genus *Alvania* Risso, 1826

Alvania scuderii n. sp.

EXAMINED MATERIAL. Holotype, Messina, Ganzirri, Sicily, Italy, rocky bottom, 2/4 meters, MZB (collection number: MZB47004) (Fig. 1). Paratype 1, same data of the holotype, in MFV-ME collection (collection number: 935/05-12-2017) (Fig. 2). Paratype 2 (Figs. 3, 4), same data of the holotype, in DSC. Other paratypes, same data of the holotype, 9 living specimens and 14 shells, all in AVC, DSC and PMC collections.

DESCRIPTION OF HOLOTYPE. Shell (Fig. 1) ovate-conic, slender, fragile, not perforated, 1.3 mm high and 0.65 mm broad. Teleoconch consist of 3.3 whorls, with marked sutures. Sculpture is constituted by equally spaced spiral chords and axial ribs, which at the intersection form minute, rounded rows of tubercles. In the first tele-whorl, only two spiral chords could be detected, bearing few (6, 7) not marked tubercles each. At the suture of the second whorl, a third faint adapical spiral chord appear and remains as the minor of all till the end of the last whorl, while a fourth starts between the two older whorls only at the end of the second tele-whorl. In the last whorl, four spiral chords are present: the two in central position are stronger, bearing 11, 12 little and well-rounded tubercles. The upper one is less marked and bears smaller tubercles, while the lower one is almost faint, with only low and rough tubercles. A faint spiral micro-sculpture is present over all the surface of the whorls and in particular over the spiral chords, that are more dense. From the upper insertion of the external lip to the base, four more smooth spirals are present, the last two being almost vanishing. The axial ribs are only slightly thicker than the spirals, barely opisthocline, 6–8 in number on the early tele-whorls, 10 on the body whorl, becoming almost absent just at the fourth spiral. The last whorl forms rather 66% of the total shell height. Aperture ovate, drop shaped, with sharp, simply and not denticled peristome. Color almost entirely amber, included the protoconch. Axial ribs are almost of the same color of the rest of the shell, while spirals are dark brown, making the shell a lyrate appearance.

Protoconch (Figs. 5–9) slender, cylindrical, paucispiral, constituted by 2 regularly convex whorls. Nucleus inflated, slightly inrolled. Sculpture of very thin spiral threads, alternated with granulated areas at the beginning. Granules in the remainder of the protoconch are arranged in only one row comprised between two very subtle threads each (Fig. 6); few granules could be coalescent. The living animal (Figs. 17–19) is almost entirely white, with gray to pale blackish strips on the opercular area. Yellow strips and stains are present scattered on the snout, in the head before the eyes, along the cephalic tentacles, the foot, making a “smile” figure inside the operculum. Four metapodial tentacle are visible. Operculum (Fig. 1) thin, paucispiral, with eccentric nucleus.

VARIABILITY. The collected specimens seem almost all of the same dimensions and color, and only few of them slightly paler. The sculpture of the shell could be more or less marked. Some completely dark shells of *A. scabra* were collected in particular environment - e.g. inside rocky caves - but they differ in protoconch outline, sculpture and dimensions, uniform color - not darker - of the spirals on the shell surface and the soft parts color pattern.

ETYMOLOGY. The specific name is after my friend Danilo Scuderi (Catania, Italy), Italian Marine Biologist.

BIOLOGY AND DISTRIBUTION. Along the rocky and very shallow waters, between algae on stones. The species is known only from type locality.

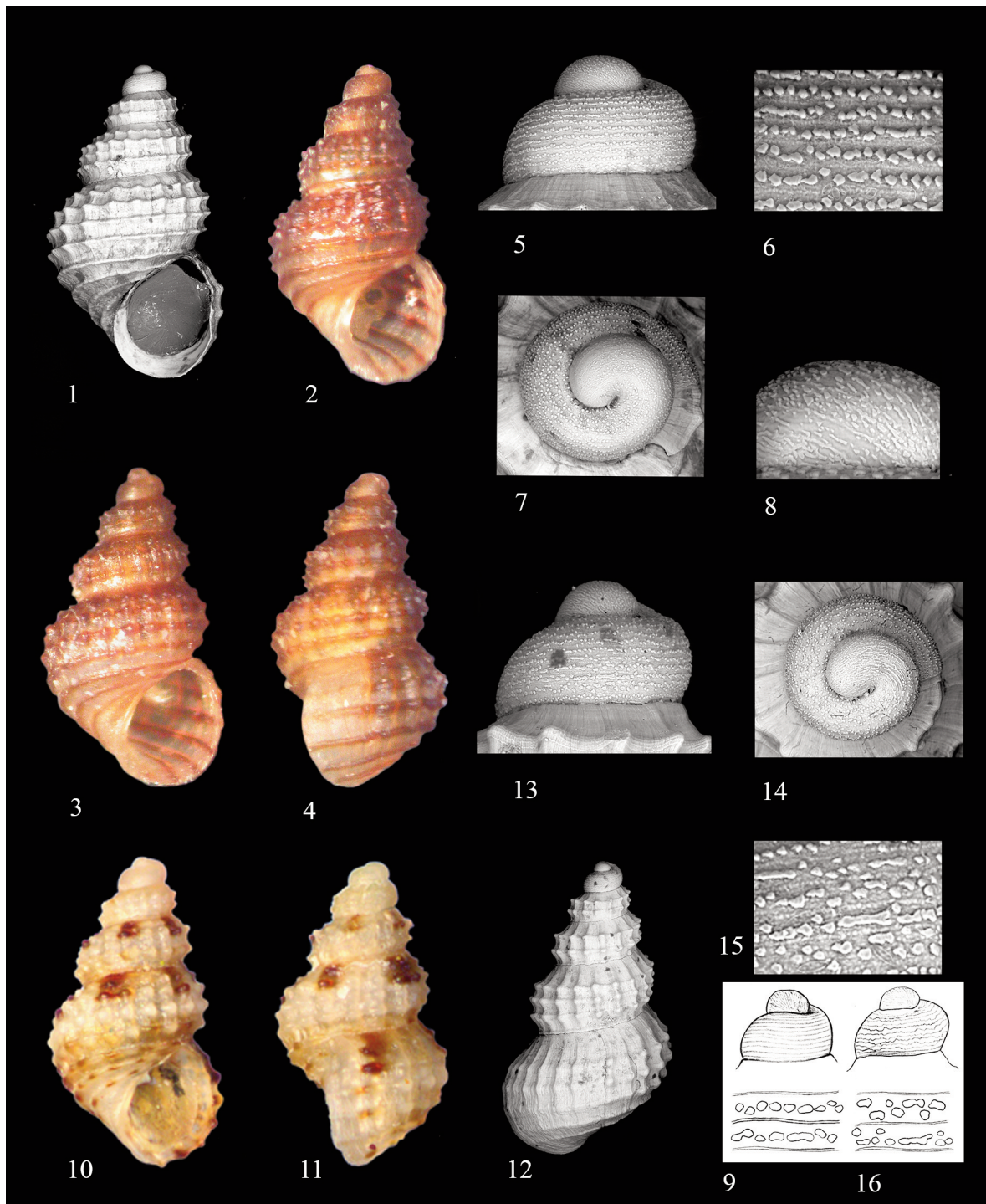
COMPARATIVE NOTES. Among Mediterranean species, *A. scuderii* n. sp. is morphologically similar to *A. scabra* (Figs. 10–12), but differs in both protoconch and teleoconch shell characters and different chromatic patterns of the soft parts. The uniform amber shell cut through by darker spirals is the most visible morphological character which distinguishes the new species from not only the most common bright form of *A. scabra* but even from the darker form, which occurs in some sciaphilous environments. In addition, *A. scabra* has a different protoconch, for shape, nucleus dimensions and sculpture, which in the new species appears regularly spirally sculptured (Figs. 5, 7, 9). Each spiral cord is constituted by granules, sometimes coalescent, arranged in only one row between two spiral treads (Fig. 6) instead of two (Fig. 15), as in *A. scabra*, which appears irregularly sculptured (Figs. 13–16). Moreover the chromatic pattern of the soft parts are different, being almost whitish in the new species (Figs. 17–19) and white and black in *A. scabra* (Fig. 20).

Other Mediterranean species of the *A. scabra* group are discussed in Villari & Scuderi (2017). Of these species *A. sororcula* Granata-Grillo, 1877 has soft parts (Fig. 21) with different chromatic pattern, intermediate between those of *A. scabra* and *A. scuderii* n. sp., a higher and heavier shell, with different proportion of whorls, broader base and protoconch. The color of the shell and the sculpture make it immediately separable from the new species, particularly for the wider subsutural zone, lacking the adapical spiral chord. For the same reason, the new species is distinguishable from *A. sculptilis* (Monterosato, 1877), even if this latter is really a good species (see for instance Villari & Scuderi (2017).

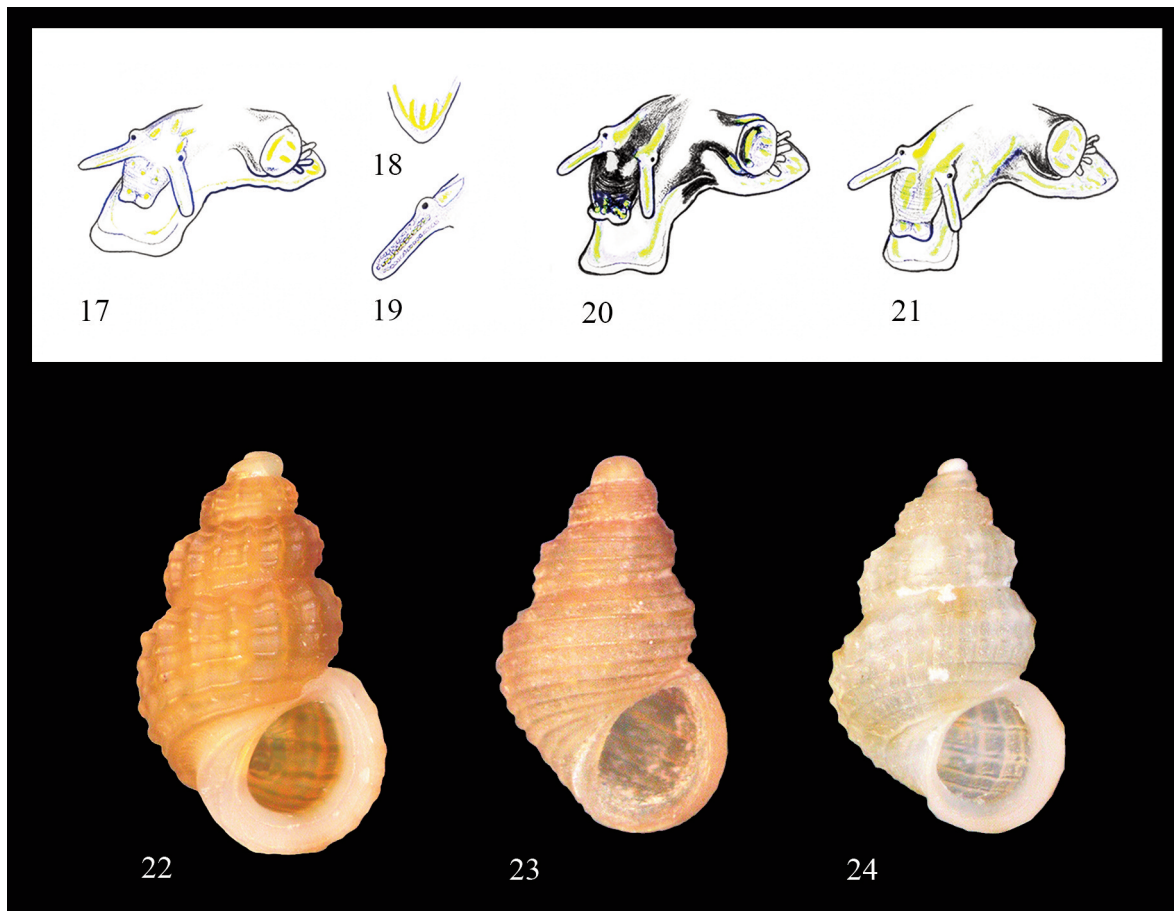
However, the new species share with *A. lucinae* Oberling, 1970 and *A. oranica* (Pallary, 1900), if these latter are really two different species, the presence of the fourth spiral chord in the whorls preceding the last, but these two species are separable on account of the same differences above reported for *A. scabra*.

We have to add a few more words concerning similar Atlantic species, just to complete the comparisons overview. Among Eastern Atlantic species, morphological resemblances could be detected in some species, which have, regardless, a different protoconch sculpture. *Alvania mediolittoralis* Gofas, 1989 has a similar color, but differs for the less slender shape and bigger dimensions, a different protoconch and the lacking of darker spirals. *Alvania angioyi* van Aartsen, 1982 has a similar protoconch shape, but different sculpture, and the shell ornamentation and color are not the same. For the same reasons, *A. tarsodes* (Watson, 1886), easily recognizable for the pointed apex with dark nucleus, is considered different. The minute shell with different shell colour and sculpture differentiates the new species from *A. grancanariensis* Segers, 1999, which is more similar to the species of *A. lanciae* (Calcara, 1845) group. The resemblance with *A. macandrewi* (Manzoni, 1868) (Fig. 22) and *A. watsoni* (Schwartz in Watson, 1873), whose shell has often an entirely dark shell, is only superficial, because the former has a heavier shape and coarse sculpture, with a dark and coarse protoconch (Fig. 20), while the latter bears only spirals over almost the entire teleoconch (Fig. 23). Among Western Atlantic species, *A. auberiana* (d'Orbigny, 1842) and *A. faberi* De Jong et Coomans, 1988 could be considered similar to the *A. scabra* group, even if they show the presence of a wide and smooth subsutural zone. Protoconchs are differently sculptured. The former has a bigger and almost entirely whitish shell, a smaller mouth and whorls with a general outline very characteristic, with the two last whorls proportionally bigger than the previous (Fig. 24). The latter has more similar dimensions and better proportionate whorls, but it is stouter and has only two tele-whorls of different color.

Seguenza L. (1903), among fossil rissoids, cited *A. scabra* without adding any other reference to its morphs or varieties, and reported and figured two species which could be morphologically related to



Figures 1–9. *Alvania scuderii* n.sp., all from Messina (Italy). Fig. 1: SEM photograph of the holotype, 2.1 mm. Fig. 2: paratype 1, same data, 2.1 mm. Figs. 3, 4: paratype 2, same data, 2.0 mm. Figs. 5–8: SEM photograph of the protoconch of the holotype; Fig. 6: detail of sculpture. Fig. 7: protoconch seen from upward. Fig. 8: detail of sculpture of the nucleus. Fig. 9: drawing of the protoconch and details of micro-sculpture. Figures 10–16. *Alvania scabra* from Messina (Italy). Figs. 10, 11: shell, 2.0 mm. Fig. 12: SEM photograph of a shell, same data, 2.2 mm. Figs. 13–16: SEM photograph of the protoconch. Figs. 13, 14: protoconch seen from aside and from upward. Fig. 15: detail of sculpture. Fig. 16: drawing of the protoconch and details of micro-sculpture.



Figures 17–19. *Alvania scuderii* n.sp. from Messina (Italy). Fig. 17: drawing of external soft parts. Fig. 18: detail of the posterior end of the foot. Fig. 19: detail of a cephalic tentacle. Fig. 20: *A. scabra*, drawing of external soft parts. Fig. 21. *A. sororcula*, Messina, drawing of external soft parts. Fig. 22. *A. macandrewi*, Ponta São Lourenço, Madeira, shell, 2.6 mm. Fig. 23. *A. watsoni*, Ponta São Lourenço, Madeira, shell, 1.7 mm. Fig. 24. *A. auberiana*, Porto S. Antonio, Jamaica, shell, 1.9 mm.

the new species, but which are clearly different. The first is *Acinulus dubius* Seguenza G., 1873, which therefore is more related to *Alvania cimicoides* (Forbes, 1844), while the second is *Actonia granulosculpta* Seguenza, 1903, described as new species, which share the general shape with the new species, but which is easily distinguishable for the first two smooth tele-whorls.

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