

A revision of the Mediterranean Raphitomidae, 3: on the *Raphitoma pupoides* (Monterosato, 1884) complex, with the description of a new species (Mollusca Gastropoda)

Francesco Pusateri¹, Riccardo Giannuzzi-Savelli^{2*} & Stefano Bartolini³

¹Via Castellana 64, 90135 Palermo, Italy; e-mail: francesco@pusateri.it

²Via Mater Dolorosa 54, 90146 Palermo, Italy; e-mail: malakos@tin.it

³Via E. Zaccaroni 16, 50137 Firenze, Italy; e-mail: stefmaria.bartolini@libero.it

*Corresponding author

ABSTRACT

In the present work we present a complex of species of the family Raphitomidae (Mollusca Gastropoda) comprising three entities: two have multispiral protoconchs, *Raphitoma pupoides* (Monterosato, 1884), the less known *R. radula* (Monterosato, 1884) and a new species with paucispiral protoconch.

KEY WORDS

Mollusca; Conoidea; Raphitomidae; new species; Mediterranean Sea.

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INTRODUCTION

The family of Raphitomidae is a well supported clade of the Conoidea (Bouchet et al., 2011). The genus *Raphitoma* Bellardi, 1847 as currently conceived includes, based on our estimates, ca. 40 Mediterranean species, some of which are still undescribed. Propaedeutic to the general revision of the Mediterranean *Raphitoma* s.l., we have focused on several pairs of species, differing only or mostly in the size and shape of the protoconch (Pusateri et al., 2012, 2013). The specific distinction is based on the assumption that the dichotomy multispiral protoconch/planktotrophic development vs. paucispiral protoconch/lecithotrophic development (Jablonski & Lutz, 1980) can be used in caenogastropods to recognise distinct sister species (Bouchet, 1989; Oliverio, 1996a, 1996b, 1997). Anyway, it should not be abused to create polyphyletic genera by artificially separating closely

related species among different genera only based on their larval development (Bouchet, 1990).

In the present work we present the results on a complex of species comprising three entities: two have multispiral protoconchs, *R. pupoides* (Monterosato, 1884), and the less known *R. radula* (Monterosato, 1884); the other was discovered while revising the materials in the Monterosato collection, where a lot (MCZR 16905) included some specimens with paucispiral protoconch, labelled by Monterosato himself “*V. tomentosa/Monts./Palermo*”, never published, that we describe hereby as new to Science.

ABBREVIATIONS AND ACRONYMS. d = diameter; h = height; sh = empty shell(s); LMG-NS: Leeds Museums and Galleries - Natural Science; MNHN: Musée Nationale Histoire Naturelle, Paris, France; MRSNT: Museo Regionale Storia Naturale, Terrasini, Italy; NMW: National Museum of Wales, United Kingdom; SMF: Senckenberg Museum,

Frankfurt/M, Germany; SMNH: Swedish Museum of Natural History, Stockholm, Sweden; MCZR: Museo Civico di Zoologia, Roma, Italy; HUI: Hebrew University of Jerusalem, Israel; ARD: Roberto Ardovini collection (Rome, Italy); BOG: Cesare Bogi collection (Livorno, Italy); DUR: Sergio Duraccio collection (Napoli, Italy); GER: Alfio Germanà collection (Trecastagni, Catania, Italy); GOR: Sandro Gori collection (Livorno, Italy); HOA: André Hoarau collection (Fréjus, France); MAC: Gabriele Macri collection (Scorano, Lecce, Italy); MAR: Alessandro Margelli collection (Livorno, Italy); PAG: Attilio Pagli collection (Lari, Pisa, Italy); PAO: Paolo Paolini collection (Livorno, Italy); PRK: Jakov Prkić collection (Split, Croatia); PSI: Peter Sossi collection (Trieste, Italy); PUS: Francesco Pusateri collection (Palermo, Italy); SBR: Carlo Sbrana collection (Livorno, Italy); SER: Gabriele Sercia collection (Palermo, Italy); SPA: Gianni Spada collection (Vagrigneuse, France); SQU: Ennio Squizzato collection (Loreggia, Padova, Italy); TIS: Morena Tisselli collection (S. Zaccaria, Ravenna, Italy); TRI: Lionello Tringali collection (Rome, Italy); VAZ: Angelo Vazzana collection (Reggio Calabria, Italy).

RESULTS

Systematic

Citation of unpublished names is not intended for taxonomic purposes.

Familia RAPHITOMIDAE Bellardi, 1875

Genus *Raphitoma* Bellardi, 1847

Type species: *Pleurotoma hystrix* Cristofori et Jan, 1832 (nomen nudum, validated by Bellardi, 1847 as "*Pleurotoma histrix* Jan.") by subsequent designation (Monterosato, 1872: 54).

Raphitoma pupoides (Monterosato, 1884)

Figs. 1–9, 24

Pleurotoma rudis Scacchi, 1836 non G.B. Sowerby I, 1834 nec Philippi, 1836

Pleurotoma rudis Scacchi, Weinkauff, 1868: 130 (see Remarks)

Pleurotoma reticulatum var. *rudis* Sc., Petit de la Saussaye, 1869: 154

Pleurotoma (Defrancia) rudis Sc., Monterosato, 1875: 44 (see Remarks)

Pleur. rude Scacchi, Aradas & Benoit, 1876: 249 n. 662 (see Remarks)

Pleurotoma rudis Sc., Monterosato, 1878: 106 (see Remarks)

Clathurella rudis Scacchi, B.D.D., 1883: 94 pl. 14 figs. 8, 9

Cordieria pupoides Monterosato, 1884: 132 [nomen novum]

Clathurella pupoidea Monterosato, Locard, 1886: 114 [error pro *pupoides*]

Clathurella pupoidea Monterosato, Locard, 1891: 66 fig. 52 [error pro *pupoides*]

Clathurella rudis (B.D.D.), Carus, 1893: 426

Clathurella pupoidea de Monterosato, Locard & Caziot, 1900: 248

Clathurella pupoidea var. *major*, Locard & Caziot, 1900: 248 (nomen nudum)

Clathurella pupoidea var. *minor*, Locard & Caziot, 1900: 248 (nomen nudum)

Clathurella pupoidea var. *ventricosa*, Locard & Caziot, 1900: 248 (nomen nudum)

Clathurella pupoidea var. *curta*, Locard & Caziot, 1900: 248 (nomen nudum)

Clathurella pupoidea Mtrs., Kobelt, 1905: 351

Mangilia (Clathurella) pupoides Monterosato, Cipolla, 1914: 146, pl. 13, figs. 16 (fossil)-17 (recent)

Cordieria pupoides Montrs., Bellini, 1929: 32

Philbertia (Philbertia) rudis Scacchi, Priolo, 1967: 697

Raphitoma (Cyrtoidea) rudis (Scacchi), Nordsieck, 1968: 176 pl. 30, fig. 20

Raphitoma (Cyrtoidea) rudis pupoidea (Monterosato), Nordsieck, 1968: 176 pl. 30 fig. 21

Raphitoma rudis pupoidea Monts, Parenzan, 1970: 207 pl. 44, fig. 842

Raphitoma (C.) pupoidea (Monterosato), Nordsieck, 1977: 52, pl. 16, fig. 126 (error pro *pupoides*)

Raphitoma (C.) neapolitana Nordsieck, 1977: 52, pl. 16 figs. 124, 125 (nomen vanum)

Raphitoma pupoides (Mts), Terreni, 1981: 40 n. 328

Raphitoma pupoidea (Monterosato), Nordsieck, 1982: 272, pl. 101, fig. 98.11

Raphitoma neapolitana Nordsieck, 1982: 272, pl. 101, fig. 98.10

Raphitoma neapolitana form *a* Nordsieck, 1982: 272, pl. 101, fig. 98.10a

- Raphitoma* (*R.*) *pupoides* (Monterosato), Van Aartsen et al., 1984: 91
- Raphitoma pupoides* (Monterosato), Orlando & Palazzi, 1986: 44
- Raphitoma pupoides* (Monterosato), Tenekidis, 1989: n. 58.50
- Raphitoma* (*Raphitoma*) *pupoides* (Monterosato), Sabelli et al., 1990–1992: 44, 216, 411
- Raphitoma pupoides* (Monterosato), Poppe & Goto, 1991: 174
- Raphitoma* (*Cyrtoides*) *pupoides* (Monterosato), Delamotte & Vardala-Theodorou, 1994: 287
- Raphitoma pupoides* (Monterosato), Cecalupo & Quadri, 1995: 109
- Raphitoma pupoides* (Monterosato), Giribet & Peñas, 1997: 53
- Raphitoma pupoides* (Monterosato), Marquet, 1998: 276
- Raphitoma pupoides* (Monterosato), Oztürk et al., 2004: 59
- Raphitoma pupoides* (Monterosato), Repetto et al., 2005: 220 fig. 910
- Pleurotoma rudis* Scacchi, Cretella et al., 2005: 125
- Raphitoma pupoides* (Monterosato), Cretella et al., 2005: 125
- Raphitoma pupoides* (Monterosato), Cossignani & Ardovini, 2011: 31, 328
- Raphitoma pupoides* (Monterosato, 1884), Scuderi & Terlizzi, 2012 (see Remarks)

TYPE LOCALITY. Coast of Provence, France, Mediterranean Sea.

EXAMINED MATERIAL. Type material: neotype, from “Artufel/Provenza” [Provence, M. Artufel legit] (18.7 x 7.7 mm) (MCZR 16492).

OTHER EXAMINED MATERIAL. France. “Artufel/Provenza” 3 sh (MCZR 16492, with Monts label “*H. pupoides*”); Marseille, 4 sh (coll. Locard MNHN); St. Raphael, 3 sh coll. Locard (MNHN), 1 sh (coll. Hoarau); Cassis, 2 sh coll. (Locard MNHN); Le Brusc, 4 sh (coll. Locard MNHN, 4 sh); Coste di Provenza, 2 sh (coll. Chaster NMW n. 01894); Bastia, 2 sh (coll. Monterosato, MCZR lot 16861).

Italy. Gulf of Baratti, 7 sh (PAO), 1 sh (PAG); Punta Ripalti (Elba Isl.), 2 sh -25 m (GOR); Lazio 1 sh (PAG); Circeo, 1 sh (TRI); Napoli, 1 sh (coll. Coen HUI, n. 8082c sub nomine “*Philbertia* (*Cordieria*) *cordieri cancellata*”); Sorrento

(Napoli), 2 sh (DUR); Palinuro (Salerno), 1 sh (SPA); Scilla (Reggio Calabria), 4 sh (VAZ); Palermo, Sicily, 10 sh with Monterosato handwritten label “*pupoides*/Monts./Pal!!/et/v. *decolorata*, Pallary”, 1 sh with non-Monterosato label “*Cordieria/pupoides* Monts./dr. Golfo di Palermo” and 15 sh with non-Monterosato label “*Cordieria/pupoides* Monts./drag. Golfo di Palermo” (MCZR 16492, with Monts label “*H. pupoides*”); Porticello (Palermo), 2 sh sub nomine *R. reticulata* (coll. MRSNT n. 4759); Isola delle Femmine (Palermo), 1 sh (SER), 8 sh (PUS); Trapani, 1 sh (SER); Catania, 1 sh (GER); Pozzillo Inferiore (Catania), 1 sh (PAG); Canale di Sicilia, 1 sh (TRI), 1 sh (coll. MRSNT n. 7312); Sicilia, 6 sh sub nomine *R. purpurea* (coll. MRSNT n. 29824); Jesolo (Venezia), 1 sh (SQU).

“Coste d’Africa”. 1 sh, coll. Monterosato MCZR, lot 16901.

Croatia. Unprecised locality, 1 sh (DEL); Dalmatia, 1 sh (PRK).

DESCRIPTION. In squared parentheses data of the neotype. Shell of medium size for the genus, height 10–21 mm [18.7] (mean 15.05, std 3.81), width 5–8 mm [7.7] (mean 6.57, std 1.27), cirto-pupoid, slender, h/d 2.1–2.57 [2.43] (mean 2.26, std 0.19). Protoconch multispiral, only part of the last whorl known, with traces of diagonally cancellate sculpture. Teleoconch of 6–8 [7] whorls, evenly convex (more convex in juveniles). Suture fine and undulate. Axial sculpture of 12–24 [18] slightly opisthocline, non-equidistant ribs, and interspaces broader than the ribs (with interspace width varying with shell size). Axial sculpture evident, but becoming obsolescent in largest shells. In particularly large shells (gerontic), axial ribs revert to same strength as the spiral cords on the last quarter of whorl. Spiral sculpture on the last whorl of 7–10 [9] cordlets, thinner than axial ribs. Cancellation squared in juveniles, becoming rectangular in adults. Secondary cordlets appearing occasionally and thereafter becoming as strong as the others. Subsutural ramp narrow, devoid of evident sculpture. Columella simple, slightly sinuous anteriorly, gently angled posteriorly. Outer lip thickened and crenulated externally, with 11–13 [12] strong inner denticles, the most posterior smaller, delimiting the wide and short anal sinus, the most anterior more robust and delimiting the funnel-like siphonal canal. Siphonal fasciole of 6 nodulose cordlets, neatly spaced from the last spiral cordlet. Colour uniformly light chestnut brown in the back-

ground, with darker blotches, more evident in larger shells (>20 mm), and same darker colour bordering the siphonal fasciole and inside the aperture. Violet hue on the first 3–4 whorls of particularly fresh specimens. Comma-shaped white spots on the sub-sutural ramp, arrow-like white spots inside some cancellation interspaces. Soft parts unknown.

DISTRIBUTION. Western and Central Mediterranean. Adriatic. The records under this name from Greece by Koukouras (2010) and Delamotte & Vardala-Theodorou (1994: 287) were in turn based on Tenekides (1989) who reported under this name another species (probably *R. echinata*).

REMARKS. The protoconch was always either lacking, broken or corroded in almost specimens studied. Anyway parts of the apical whorls showing traces of a diagonally cancellate sculpture, indicating a multispiral protoconch.

Pleurotoma rudis Scacchi, 1836 was introduced with the following diagnosis: “*Testa fusca fascis pallidioribus, anfractibus rotundatis, cancellatis et muricatis; labro crasso interne striato, cauda vix ultra labrum producta. Alta lin. 10–11. P. echinatae similis; at labro crassiore, cauda brevior, et minus aspera; saepe fascis pallidioribus ornata. In sinu neapolitano et tarentino*” (Scacchi, 1836), Fig. 17.

Weinkauff (1868), Petit de la Saussaye (1869) and Aradas & Benoit (1876) considered it as a variety or synonym of *R. echinata* (as *Defrancia reticulata* Renier). Monterosato (1875, 1878) at first included it within *Pleurotoma purpurea* sensu Philippi non Montagu. Thereafter (Monterosato, 1884), he separated to two species and introduced the replacement name *Cordieria pupoides* noticing an alleged homonymy with “*P. rudis* Broderip”. Actually, Broderip introduced, in 1834, *Placunanomia rudis* (a bivalve), the abbreviation *P. rudis* having possibly mislead Monterosato. However, *Pleurotoma rudis* Scacchi is preoccupied by *P. rudis* G.B. Sowerby I, 1834 (currently accepted as *Crassispira rudis*) and by *P. rudis* Philippi, 1836 (currently accepted as *Clathromangelia granum* (Philippi, 1844); note that Philippi’s work preceeds Scacchi’s one according to Cretella et al., 2005: 115), and the replacement name by Monterosato still holds valid. Regrettably, the type material of *Pleurotoma rudis* Scacchi is lost (Cretella et al., 2005: 123) and we have established hereby a neotype based on Monterosato’s material. The original material of

Pleurotoma rudis Scacchi has gone lost. We designate, for the sake of stability, a shell from the Monterosato collection, upon which he based his concept of *Cordieria pupoides*, as the neotype of *Pleurotoma rudis* Scacchi.

Some Authors (Bucquoy et al., 1883: 93) included, in the synonymy of *R. rudis*, *Pleurotoma reticulata* var. *brevis* Requi  n, 1848. However, this is a nomen nudum and thus, not available. Nordsieck (1977) used this name (*brevis*) and provided the first valid introduction, but referring to a distinct species.

Nordsieck (1968: 176) split *R. rudis* Scacchi into four subspecies: *R. rudis rudis*, *R. rudis pupoidea* [sic!], *R. rudis cylindrica* and *R. rudis intermedia*. Descriptions of *R. rudis rudis* and *R. rudis pupoidea* [sic! error pro *pupoides*] are quite similar and might be referred to the same species (*R. pupoides*). Concerning the two other “subspecies”, *R. cylindrica* (erroneously ascribed to Monterosato, actually introduced by Locard & Caziot, 1899) is a distinct unrelated species; “*R. rudis intermedia* n. ssp.” had a scanty description and was not figured. Subsequently, Nordsieck raised it to species level and provided a description and figure of *R. intermedia* (Nordsieck, 1977: 56, pl. 18 fig. 140). This is *R. laviae*, as confirmed by the study of a syntype (SMF, sine numero, with autograph Nordsieck’s label). To increase confusion, Nordsieck (1977: 52) also introduced *R. (Cyrtoides) neapolitana* as a replacement name pro *Pleurotoma rudis* Scacchi, 1836 non Broderip, evidently neglecting Monterosato’s introduction: *R. neapolitana* is thus not available. Material on which Nordsieck based his concept of *R. neapolitana* (SMF 340337, 3403379 and 340338) included small size specimens of *R. laviae* and *R. bicolor*.

Raphitoma cfr. *pupoides* as figured by Cavallo & Repetto (1992: 147 fig. 401) and *R. cfr. pupoides* as figured by Cachia et al. (2001: 69 pl. 10 fig. 9) are not referable to the present species. *Raphitoma pupoides* as figured by Scuderi & Terlizzi (2012: pl. XVIII n. 6) is rather to be referred to *R. cordieri* sensu Auctores.

Raphitoma pupoides can be easily distinguished from *R. echinata* sensu Auctores by its cyrtconoid not stepped outline and the shorter siphonal canal. Specimens of *R. pupoides* with strong sculpture on the last whorls may be confused with *R. radula*, which is however diagnosed by its more acute spire, the lighter colour without blotches or spots.



Figures 1–8. Shells of *Raphitoma pupoides* (Monterosato, 1884). Fig. 1: Lectotype: Provenza, (MCZR lotto 16492), h: 18.7 mm with label of the lot; Fig. 2: sine locus (MNHN-IM-2000-3240), h: 16.5 mm; Fig. 3: Palinuro, close-up of the sculpture; Fig. 4: Anzio, h: 20 mm; Fig. 5: Anzio, h: 17 mm; Fig. 6: Jesolo (Venezia), h: 20 mm; Fig. 7: Saint-Raphael, Est La Chretienne (France), h: 15.7; Fig. 8: Isola delle Femmine (Palermo), juveniles, h: 9.1 mm.

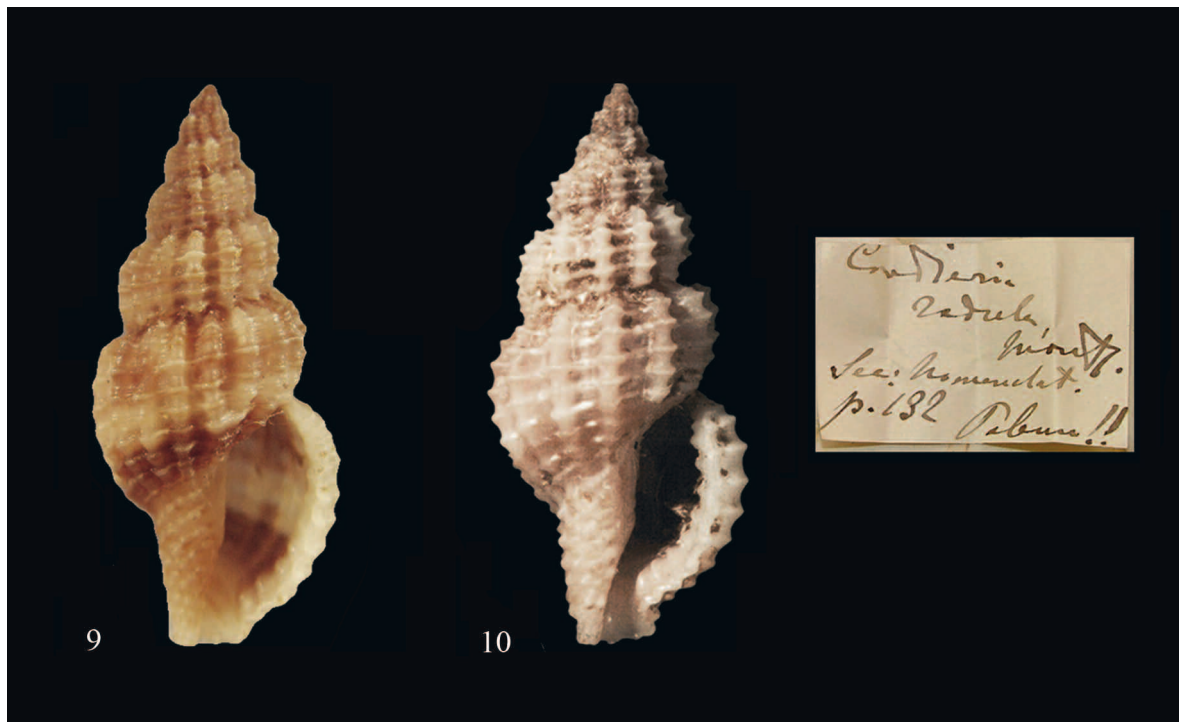


Figure 9. *Raphitoma pupoides* (Monterosato, 1884), Adriatic, h: 12 mm.

Figure 10. *Raphitoma radula* (Monterosato, 1884), Palermo, coll. Melville-Tomlin, NMW, h: 11.5 mm, with label.

Raphitoma alida Pusateri et Giannuzzi-Savelli
n. sp. - Figs. 11–15, 25

EXAMINED MATERIAL. Holotype and 3 paratypes from Palermo (coll. Monterosato, MCZR 16905), with handwritten Monterosato label: "*V. tomentosa*/Monts./Palermo"; 2 paratypes, Gulf of Palermo (PUS).

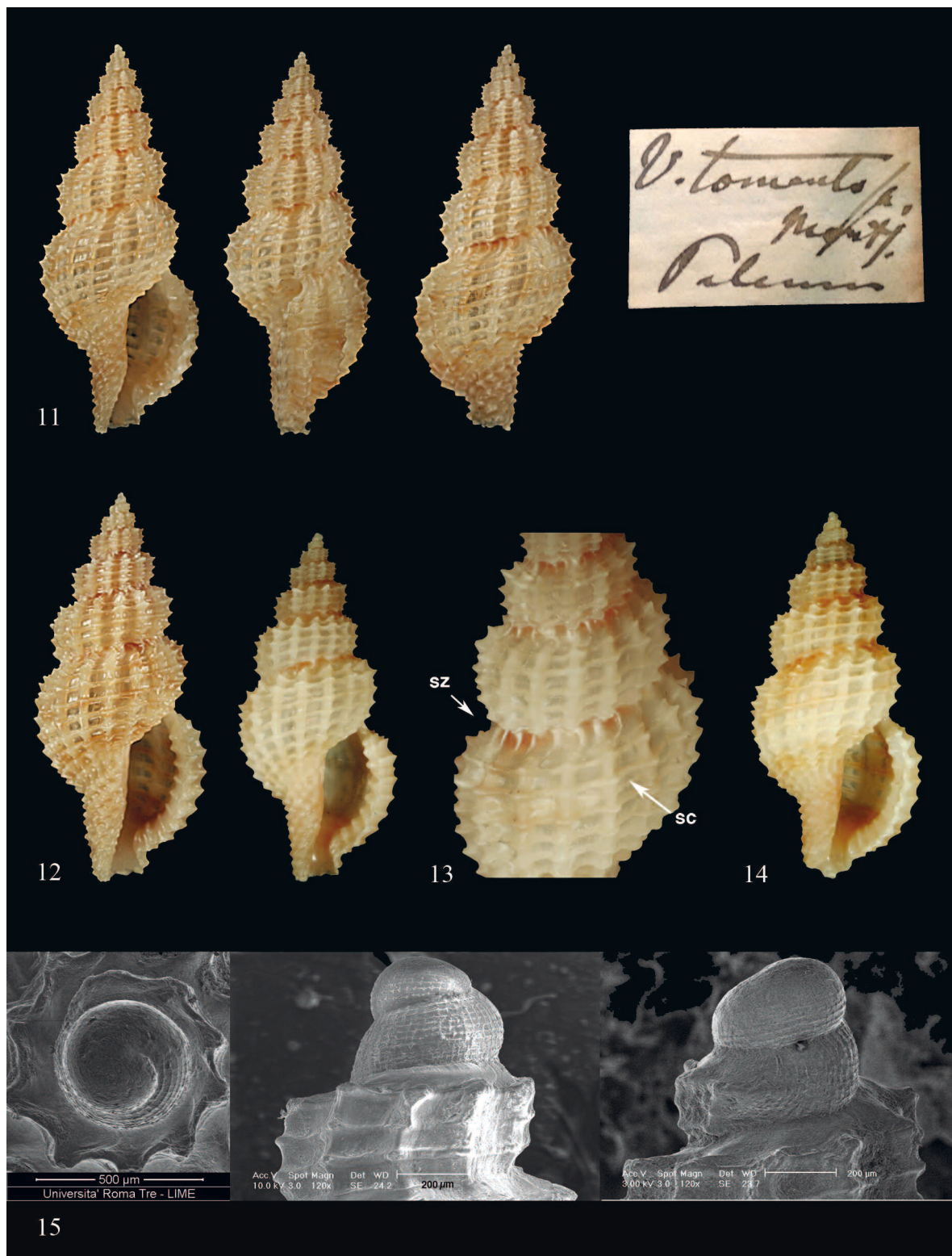
OTHER EXAMINED MATERIAL. Italy. Gulf of Baratti, 1 sh (MAR), 1 sh (BOG); Livorno, 1 sh (BOG); Scilla (Reggio Calabria), 3 sh (VAZ); Palermo, 1 sh sub nomine ms. "*perfecta*" (coll. Monterosato, 16905); sine loco probably Palermo, 1 sh, (coll. Monterosato, MCZR 16905); Gulf of Palermo, 2 sh (PUS).

"Coste d'Africa". 1 sh (coll. Monterosato, MCZR 16905).

DESCRIPTION OF HOLOTYPE. Shell of medium size for the genus, height 17.1 mm, width 7 mm, fusi-form-pupoid, slender, h/d 2.44 mm. Protoconch paucispiral, only protoconch I of 1.5 convex whorls, height 540 µm, width 480 µm; sculpture orthogonally cancellate. Teleoconch of 7 convex whorls. Suture not incised, evident. Axial sculpture

of 16 slightly opisthocline (sometimes orthocline), elevated and strong ribs, and interspaces twice as broad as the ribs. Spiral sculpture on the last whorl of 6 cordlets, thinner than axial ribs and interspaces twice as broad as the cordlets. Cancellation rectangular, with spinulose tubercles at the intersections. Secondary cordlets appearing occasionally and thereafter becoming as strong as the others. Subsutural ramp wide, devoid of evident sculpture. Columella simple, slightly sinuous anteriorly, gently angled posteriorly. Outer lip thickened and crenulated externally, with 9 strong inner denticles, the most posterior smaller, delimiting the wide and deep anal sinus, the most anterior more robust and delimiting the funnel-like siphonal canal. Siphonal fasciole of 7 nodulose cordlets, neatly spaced from the last spiral cordlet. Colour straw yellow, becoming gradually orange-brownish in the subsutural area, and with an orange-brown band visible inside the aperture. Comma-shaped white spots on the subsutural ramp, arrow-like white spots inside some cancellation interspaces. Soft parts are unknown.

VARIABILITY. Paratypes shells: height 12–17 mm (mean 14.4, std 1.66), width 5.5–7 mm (mean 6.36,



Figures 11–14. Shells of *Raphitoma alida* n. sp. Fig. 11: Holotype, Palermo (coll. Monterosato MCZ, lot 16905), h: 17.1 mm; Fig. 12: Paratype A, Palermo (coll. Monterosato MCZR, lot 16905), h: 14.8 mm; Fig. 13: Paratype E, Gulf of Palermo, (PUS n. 405), h: 12.1 mm (sz = subsutural zone; sc = secondary cordlet); Fig. 14: Gulf of Palermo, h: 12.8 mm. Figure 15. *Raphitoma alida* n.sp., protoconch of the holotype.

std 0.57), h/d 2.12–2.36 mm (mean 2.26, std 0.10); axial sculpture of 14–16 ribs; outer lip with 9–10 denticles. Soft parts are unknown.

ETYMOLOGY. From the two granddaughters of the authors (Alice Giannuzzi Savelli and Ida Pusateri), ali[ce]+ida, used as a noun in apposition.

DISTRIBUTION. This new species is known only for the examined material, from Tyrrhenian and Central Mediterranean. Type locality is Palermo.

REMARKS. *Raphitoma alida* n. sp. differ from *R. pupoides* mainly in its paucispiral protoconch (v. multispiral in *R. pupoides*). Shells without protoconch of the new species could be confused with shells of *R. pupoides* with a non-obsolete sculpture on the last whorl; *R. alida* n. sp. can be distinguished by its different background colour (chestnut v. yellowish), 7 nodulose cordlet on the fasciole v. 6 less nodulose in *R. pupoides*, and the less pupoid and more fusiform outline.

Some recent Authors (Nordsieck, 1968, 1977; Piani, 1980) erroneously ascribed to Monterosato a validly published "*Raphitoma tomentosa*". Although the epithet "*tomentosa*" was evidently especially liked by Monterosato, he has never published such binomen. The epithet "*tomentosa*" was, for mysterious reasons, to be particularly dear and pleasing to Monterosato so that in schedis, gave this name to various entities: - *Philbertia tomentosa*, lot 16682 = some mixed specimens of *R. philberti* var. - *D. tomentosa*, lotto 16901 = 4 specimens of *R. horrida*. - *P. tomentosa* lotto 16696 = 5 specimens of *R. lineolata*. - *Philbertia tomentosa*, Monterosato's label in coll Coen lot 1912 = 2 specimens of *R. pruinosa*.

Nordsieck (1968: 177) reported *Raphitoma philberti tomentosa* with a useless scanty description ("*kleiner, gedrungen mit konvexen Umgängen. Schlanker stiel. Hell reh-weiss*"; small, stout, with convex whorls. Slender tail. Light fawn and white) and without any figure. Nordsieck (1977: 58 n. A149) again reported *Raphitoma (Philbertia) tomentosa* ascribing it to Monterosato, 1884, with an apparently good description and a figure (Nordsieck, 1977: pls. 19 n. 149). However, the four lots labelled under this name in the coll. Nordsieck included the following materials:

SMF 341803/1, labelled "*Philbertia tomentosa* Mtrs. Egina", one worn shell, 5.4 mm long, with two holes, protoconch missing, probably *R. laviae*;

SMF 341804/1, labelled "*Philbertia tomentosa* Mtrs. Karpathos", one very worn shell, 3.2 mm long, protoconch missing, probably *R. bicolor* juv.; SMF 341805/1, labelled "*Philbertia tomentosa* Mtrs, Cataldo (Brindisi)", one very worn shell, 5.9 mm long, protoconch missing, indeterminable. Nordsieck (1977: 58) reported "Palermo, Cataldo": although there is a beach called San Cataldo near Terrasini (Palermo), it is more likely that the true locality was San Cataldo, not far from Brindisi; SMF 341802/5, labelled as "*Philbertia tomentosa* Mtrs., Ibiza", 5 shells, 2.5–6.5 mm long, four too worn to be identified, one referable to *R. bicolor* juv., with a portion of multispiral protoconch.

None of these shells matched the description, the size (7 x 3.2 mm) or the figure provided by Nordsieck, including the described paucispiral protoconch, whilst all but one shells (with traces of multispiral protoconch) lacked the apex. It is worthy of notice that Nordsieck's "descriptions" were not necessarily based (only) on actual specimens but frequently included also a compilation from literature. Same holds for his drawings, often compound artwork of actual specimens and figures from the literature. This explains why so rarely specimens can be found which match his figures (our unpublished observations and R. Janssen, SMF, personal communication). Nordsieck included this entity in the subgenus *Philbertia*, which in his scheme comprised species (*R. philberti*, *R. laviae*, *R. lineolata*, *R. atropurpurea*, *R. densa*, etc.) that have nothing to do with the *R. pupoides*-complex. Parenzan (1970: 212 n. 862) cited *R. philberti* var. *tomentosa* Monterosato evidently mutuating it after Nordsieck (1968). This name is anyway unavailable, having been introduced as a varietal name after 1960 (ICZN, 1999: art. 15.2).

Raphitoma radula (Monterosato, 1884) [*Cordieria*]
Figs. 10, 16–23, 26

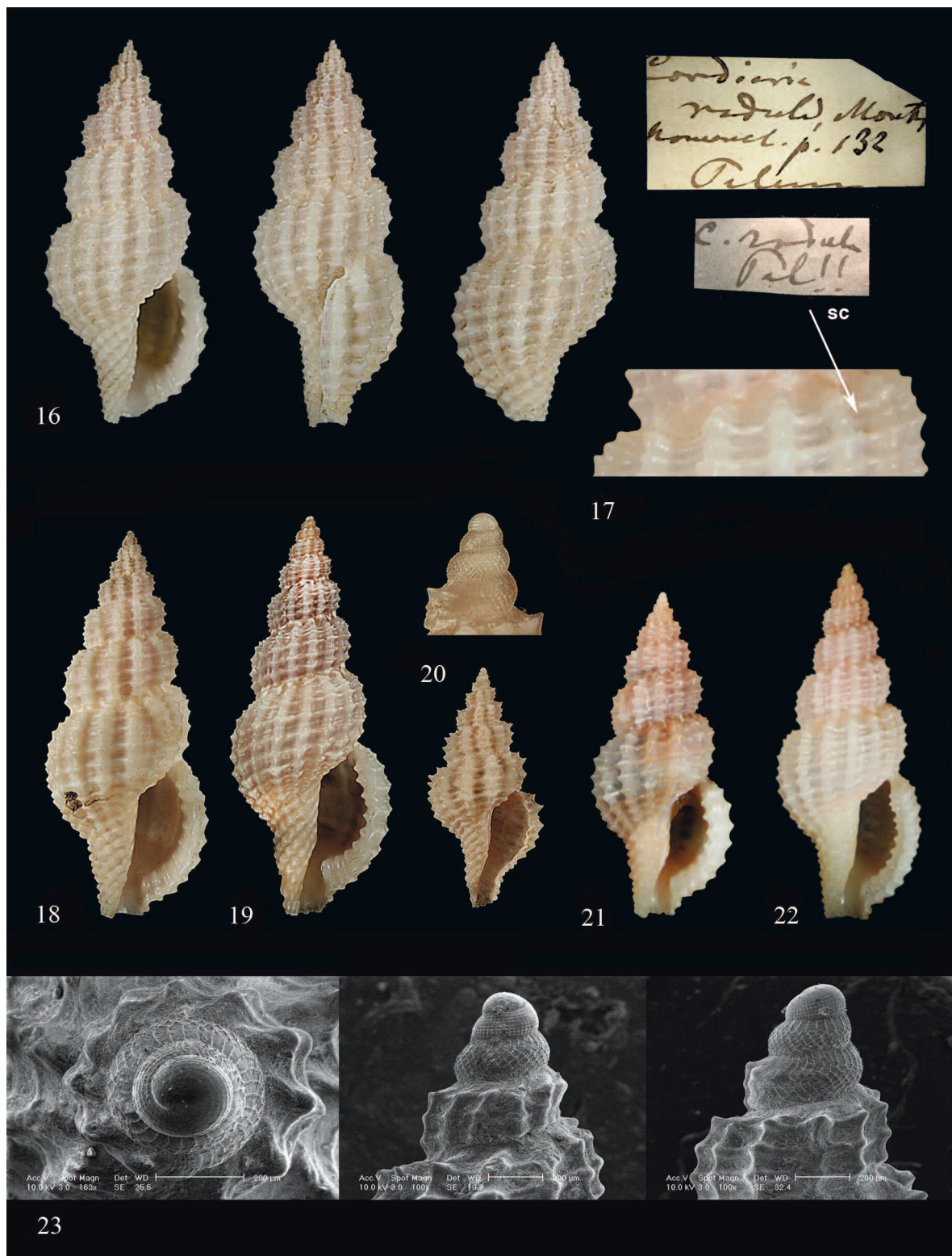
Cordieria radula Monterosato, 1884: 132

Clathurella radula de Monterosato, Locard, 1886: 117

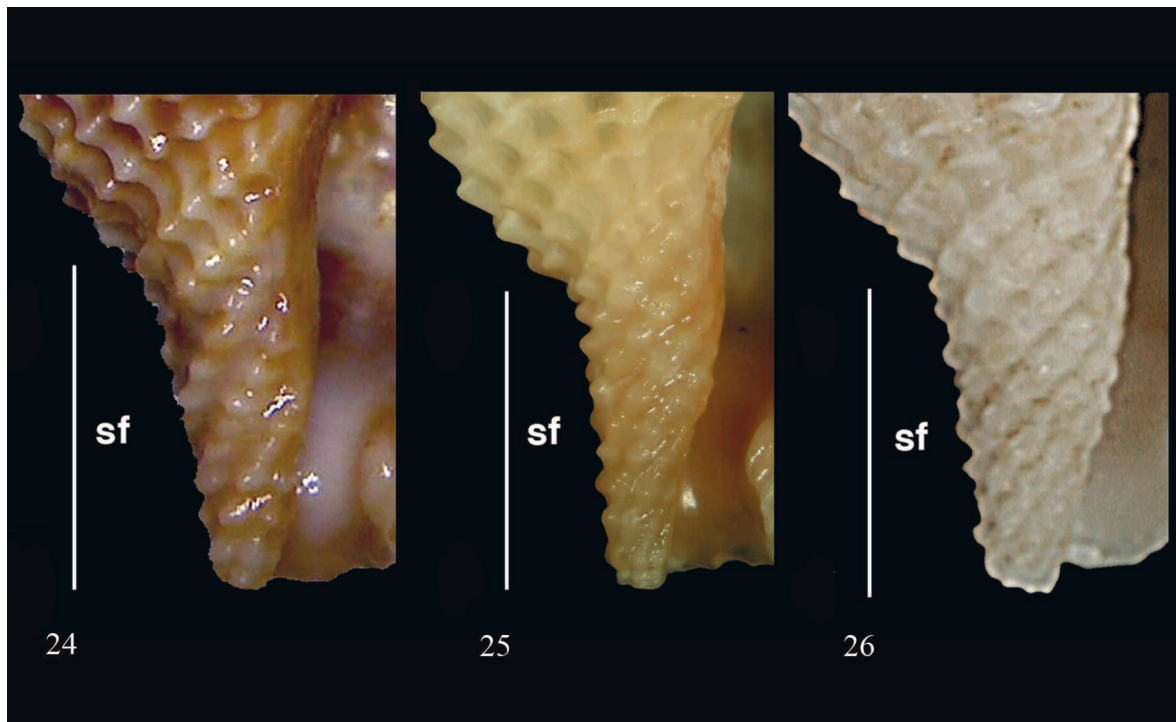
Clathurella radula de Monterosato, Locard, 1891: 67

Clathurella radula de Monterosato, Locard & Caziot, 1899: 250

Clathurella radula var. *elongata*, Locard & Caziot, 1899: 250 (nomen nudum)



Figures 16–22. Shells of *Raphitoma radula* (Monterosato, 1884). Fig. 16: Lectotype, Palermo, (MCZR), h: 14.8 mm; Fig. 17: particular (sc = secondary cordlet); Fig. 18: Palermo (coll. Monterosato MCZR), Paralectotype A, h: 17 mm; Fig. 19: Isola d'Elba, h: 18 mm; Fig. 20: Palermo (coll. Monterosato MCZR), Paralectotype F, h: 6 mm; Fig. 21: Antignano (Livorno), h: 9.9 mm; Fig. 22: Gulf of Palermo, h: 12.7 mm. Figure 23. *Raphitoma radula*, protoconch of paralectotype F.



Figures 24–26. Siphonal fasciole of *Raphitoma pupoides* (Fig. 24), *R. alida* (Fig. 25), and *R. radula* (Fig. 26).

Clathurella radula var. *fuscescens*, Locard & Caziot, 1899: 250 (nomen nudum)

Clathurella radula var. *lutescens*, Locard & Caziot, 1899: 250 (nomen nudum)

Clathurella radula var. *minor*, Locard & Caziot, 1899: 250 (nomen nudum)

Clathurella radula var. *ventricosa*, Locard & Caziot, 1899: 250 (nomen nudum)

Cordieria radula Monterosato, Pallary, 1900: 256

Raphitoma reticulata radula Nordsieck, 1968: 175, pl. 29 fig. 94.16

Raphitoma echinata cordieri form d (*radula*) Monterosato, Nordsieck, 1977: 51

Cordieria radula (Monterosato), Sabelli et al., 1990: 217

TYPE LOCALITY. Palermo.

EXAMINED MATERIAL. Lectotype (here designated, 14.8 x 6.4 mm) Monterosato coll (MCZR 16476), with handwritten label by Monterosato “*Cordieria/radula*, Monts/Nomencl. p. 132/Palermo”; and 11 paralectotypes Monterosato coll (MCZR 16476) with handwritten label by Monterosato “*C. radula*/ Pal!!”. Spain. Alboran, -80 m, 1 sh, (SBR); Cadiz, 1 sh (MNHN).

France. St. Henry (Marseille), 4 sh (coll. Locard MNHN); Marseille, 5 sh (coll. Locard MNHN); Toulon, 1 sh (coll. Locard MNHN); St. Raphael, 1 sh (coll. Locard MNHN); Sète, 2 sh (coll. Locard MNHN).

Italy. Secca delle Vedove, -120/130 m, 2 sh (PAO); Castiglioncello (Livorno), 1 sh (MAR); Capraia Isl., 1 sh (BOG); Napoli, 2 sh (coll. Monterosato, MCZR, sine numero, sub nomine ms. var. *aspera*); Puolo (Napoli), 1 sh (DUR); Ischia Isl., 1 sh (TRI); Gulf of Palermo, 10 sh (PUS); Gulf of Palermo, 3 sh (coll. Monterosato, MCZR lot 16492, 3), 2 sh (coll. Monterosato, MCZR lot 17342); Porto di Palermo, 2 sh (coll. Monterosato, MCZR lot 16476); Palermo, 3 sh (coll. Melville-Tomlin, NMW); Mondello (Palermo), 1 sh (coll. Monterosato sine numero, sub nomine “*purpurea albina*”); Sciacca, 1 sh (coll. Monterosato, MCZR lot 16492); Catania, (coll. Monterosato ex Aradas, MCZR, lot 16476, 2 sh).

Algeria. Sine loco, 2 sh (coll. Monterosato, MCZR lot 16492); Orano, 1 sh (coll. Pallary MNHN).

Croatia. Between Pula and Lighthouse of Porer, 1 sh, legit W. Koers (SMNH lot 70484).

DESCRIPTION. In squared parentheses data of the lectotype. Shell of medium size for the genus, height 9–19 mm [14.8] (mean 13.81, std 2.90), width 4–8 mm [6.4] (mean 5.90, std 1.10), fusiform-pupoid, slender, h/d 2.2–2.5 [2.31] (mean 2.32, std 0.09). Protoconch multispiral of 2.7 convex whorls, height 580 μ m, width 440 μ m; protoconch I of 1.1 whorls, width 210 μ m, with irregularly placed small tubercles and orthogonally cancellate sculpture; protoconch II of 1.6 whorls, with a diagonally cancellate sculpture. Teleoconch of 7–8 [7] convex whorls. Suture not impressed. Axial sculpture of 12–17 [16] slightly opisthocline, elevate, strong ribs, and interspaces as broad as the ribs (or slightly broader). Growth lines visible between the ribs on the last whorl. Spiral sculpture on the last whorl of 5–6 [5] cordlets above the aperture, thinner than axial ribs, with interspaces three times as broad as the cordlets, and a secondary cordlet bordering the subsutural ramp. Cancellation squared. Secondary cordlets appearing occasionally and thereafter becoming as strong as the others. Subsutural ramp narrow, devoid of evident sculpture. Columella simple, slightly sinuous anteriorly, gently angled posteriorly. Outer lip thickened and crenulated externally, with 8–9 [9] (rarely up to 11) strong inner denticles, the most posterior smaller, delimiting the wide and deep anal sinus, the most anterior more robust and delimiting the funnel-like siphonal canal. Siphonal fasciole of 7–8 [7] nodulose cordlets, neatly spaced from the last spiral cordlet. Colour from uniformly whitish to very light chestnut brown, with darker subsutural ramp and darker band on the lower part of the last whorl. Violet hue on the background in particularly fresh specimens. Comma-shaped white spots on the subsutural ramp, arrow-like white spots inside some cancellation interspaces. Soft parts are unknown.

DISTRIBUTION. Provence, Western Mediterranean and Tyrrhenian. A single record from neighbouring Atlantic (Cadiz).

REMARKS. *Raphitoma radula* could be confused with shells of *R. pupoides* with non-obsolescent sculpture, but it is easily diagnosed by its homogeneous light coloration with violet hue. It could be mixed with very light or albinistic shells of *R. echinata* (of similar size) from which it differs in the less elevate spirals, the shorter and more rounded aperture and the violet hue in fresh specimens.

Monterosato (1884: 132) introduced *Cordieria radula* for the erroneously identified *P. purpureum* sensu Philippi (non Mtg.), referring to the examen (ex typo) of a specimen provided by Philippi himself to Sylvanus Hanley. According to Clare Brown (Leeds Museum Discovery Centre) “Hanley’s collection came to us [LMG-NS] in the 1950s after being broken up and many parts sold on. Sadly, it seems as if the Philippi *P. purpurea* didn’t make it to Leeds”. However, there is little doubt that the type material of *Cordieria radula* Monterosato consists of the type series at MCZR.

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