

Three new species of *Discopsis* De Folin, 1870 from the Plio-Pleistocene of Sicily (Gastropoda Tornidae)

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ABSTRACT

Three new species, placed in the genus *Discopsis* de Folin, 1870 (Gastropoda Tornidae) are here described as new from the Plio-Pleistocene of Sicily on the basis of morphological characters. The first two, *D. destefanii* n. sp. and *D. vivianorum* n. sp., derived from sandy clayey silt outcropping along the shore on the left side of the mouth of Nocella river (Castellammare Gulf, North-western Sicily). *Discopsis destefanii* n. sp. has been tentatively assigned to *Imperator europaeum* De Stefani, 1888 at first attempt. After deeper researches, discrepancies between the original description and its relative drawing emerged, which rendered questionable the correct interpretation of the De Stefani's species and the possible institution of a neotype to stabilize taxonomy of this controversial species. But the lack of type materials to ascertain characters typical of this species induced us to consider it as unaccepted. As a consequence, comparisons between *D. destefanii* n. sp. and *I. europaeum* become superfluous on account of the above reported reasons. The other one, *D. philippii* n. sp., has been collected from the Pleistocene marly sand/calcarene succession outcropping along the left shore of the Ossena river (Francofonte, Syracuse, Sicily).

KEY WORDS

Gastropoda; Tornidae; *Discopsis*; Pliocene; Pleistocene; Sicily; new species.

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INTRODUCTION

The genus *Discopsis* de Folin, 1870, included in the family Tornidae Sacco, 1896 (1844), is characterized by the following diagnosis: minute shell, strongly depressed and lenticular in shape, with rapidly increasing whorls, dorsal surface smooth or with axial ribs bearing a singular prominent peripheral carina, venter with axial ribs, one or more spiral cords and a wide umbilicus (Rolán & Rubio, 2002; Landau et al., 2018), although some species

lack cords on the base (i.e. *Discopsis rarus* Rolán et Rubio, 2002). Despite the possibility that *Discopsis* de Folin, 1870 may be a synonym of *Cochliolepis* Stimpson, 1858, Rubio & Rolán (2011) highlight the distinction between these latter two genera, based on shell and opercular features, reaching the conclusion that *Discopsis* should be placed in Torninae Sacco, 1896, whereas *Cochliolepis* within Vitrinellinae Bush, 1897.

In this direction Landau et al. (2018) have transferred to *Discopsis* some species from Miocene

and Plio-Pleistocene of Europe, previously and generically positioned in *Tornus*: *Tornus trigonostoma* (de Basterot, 1825), *T. europaeum* (De Stefani, 1888), *T. pseudotinostoma* (Boettger, 1907), *Tornus canui* de Morgan, 1920, *Tornus falunicus* de Morgan, 1920, *Tornus pontileviensis* de Morgan, 1920; describing at the same time, a new species: *Discopsis pseudocanui* Landau, Ceulemand et Van Dingenen, 2018. At present, 24 species of *Discopsis* (Bouchet, 2020) are known, seven of which are described as fossils.

Our researches on the basal layers of the sedimentary succession outcropping close to the mouth of the Nocella River (North-western Sicily, Italy) and on a layer outcropping along the left shore of the Ossena river (South-eastern Sicily, Italy) led us to discover some shells attributable to three different species of *Discopsis*, whose peculiar morphological characters allowed us to describe them as new.

MATERIAL AND METHODS

Fossils here studied come from two different stratigraphic levels:

1) Along the eastern shoreline of the Castellammare Gulf (North-western Sicily), sediments attributed to the Early Pliocene outcrop along the shore of the left side of the mouth of the Nocella river (Partinico, Palermo) (IGM 249-III-NO: 38° 5'4.45"N - 13° 4'20.45"E) (Fig. 1). These sediments, indicated as "Trubi" (ISPRA, 2013), are represented by a silty, clayey, sandy sedimentary succession. The overall thickness of these sediments is about 18 meter thick; the basal levels are not visible on this site, but in nearby localities they cover transgressively the Oligo-Miocene Numidian Flysh. On the top, these levels are covered by lower Pleistocene calcarenites (Mauz & Renda, 1996; ISPRA, 2013). These sediments have been previously studied by Moroni et al. (1963) and Sprovieri (1979), who attribute them to the MPL3 Biozone of the Early Pliocene, as well as by Greco & Buccheri (1988), who report their mollusc association to a Continental Shelf marine paleoenvironment, and Sciuto & Reitano (2021), who report their ostracods association. One sample was taken from the highest part of the sandy clayey silt level (Fig. 2), which is about 10 m thick and which

has been indicated by Greco and Buccheri (1988) as "Level 1".

The rich malacofauna of this deposit is still little studied; following the list provided by Greco & Buccheri (1998), only two papers have been published by Ricordi (1991; 1994). After many years, this paper is intended to be a new contribution, in order to illustrate the interesting malacofauna of this deposit. The Nocella river outcrop deserves great attention since it has a high degree of vulnerability due to coastal erosion and the degradation of the proximal areas.

2) Along the left shore of the Ossena river, between the villages of Scordia (Catania, Italy) and Francofonte (Syracuse), Eastern Sicily (IGM 273-I-NE: 37°15'29.36"N - 14°52'14.69"E) (Fig. 3), there are some whitish-yellow coarse/fine grained calcarenite outcrop. These layers correspond to the Piano Meta Facies, of the Poggio Spica Synthem, referable to Lower Pleistocene (QC of Grasso et al., 2004). The faunal content of these sands, in which we found the new species, is mainly made up of Trochidae spp., *Tricolia* spp., *Rissoa* spp., *Pusillina* spp., *Alvania* spp., which indicate infralittoral environment. The presence of *Plicatula mytilina* Philippi, 1836 and *Chama placentina* (Defrance, 1817) has a thermophilic significance (Garilli, 2011). These data coincide with what is described by Grasso et al., 2004, and attributed to the Emilian age. At the roof of the layers from which the new species comes, there is a lens of clayey sand containing *Terebratula scillae* Müller, 1776 and *Pseudamussium peshutiae* (Linnaeus, 1771) referable to the "QA" of Sicilian age in Grasso et al. (2004) (Fig. 4). The rich malacofauna of the deposits of the entire area between Militello and Scordia (Catania, Italy), was primarily studied by Philippi who compiled lists of fossil molluscs, describing new species (1836, 1844, 1846).

The studied samples, weighting about 20 kg each, were washed using diluted hydrogen peroxide for disaggregation. The residues were sieved through sieves (1/2/3 mm). Specimens here studied, were examined under a stereomicroscope and photographed uncoated under a LMU Tescan Vega Scanning Electron Microscope in Low Vacuum modality, to investigate their micromorphology.

ACRONYMS. Museo di Storia Naturale di Comiso, Italy (MSNC); Museo Civico di Storia Naturale di Firenze, Italy (MSNF)

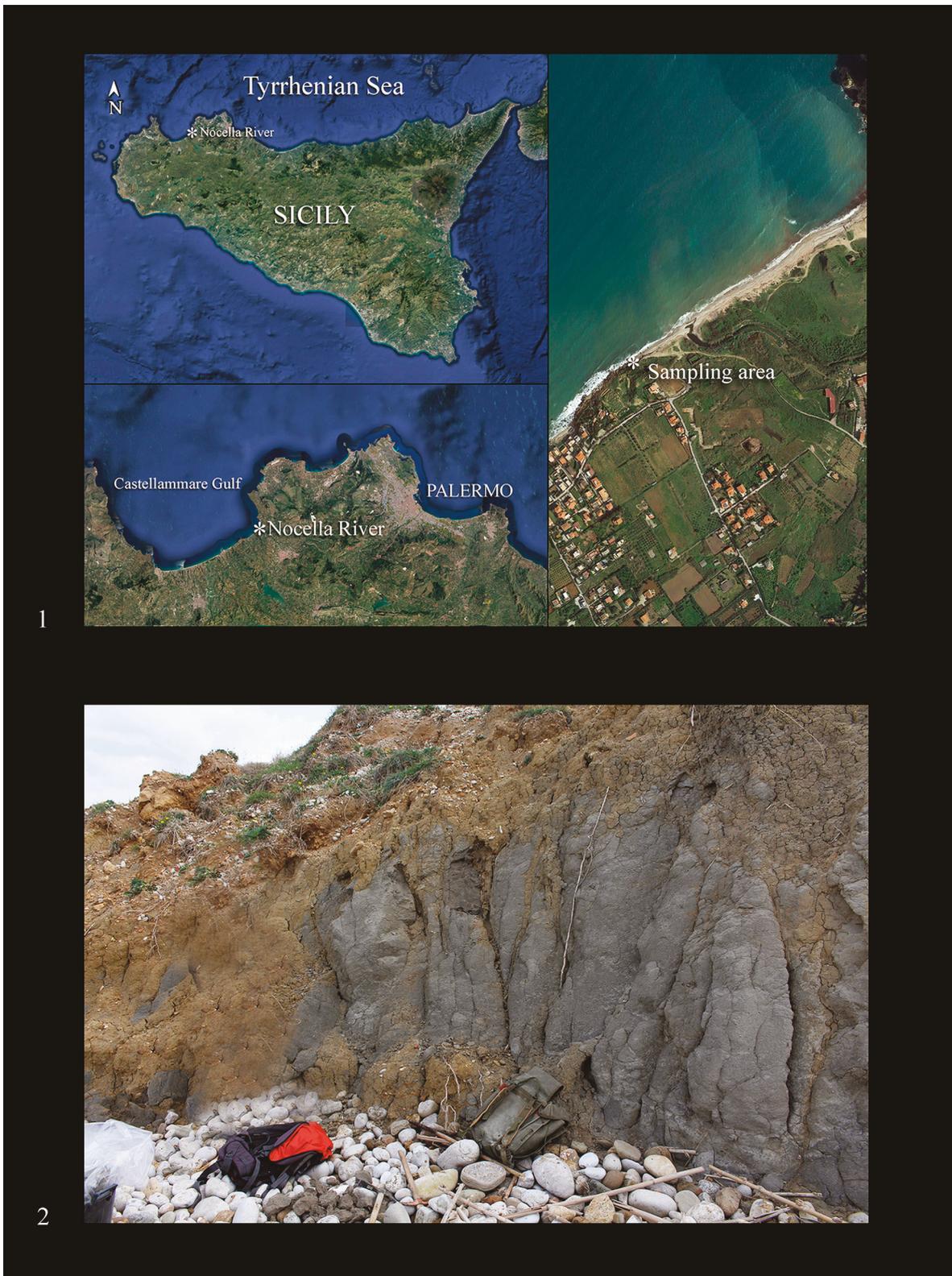


Figure 1. Location of the sampling area of the Nocella river outcrop (Sicily, Italy).
Figure 2. Section of the outcrop of the Nocella river.

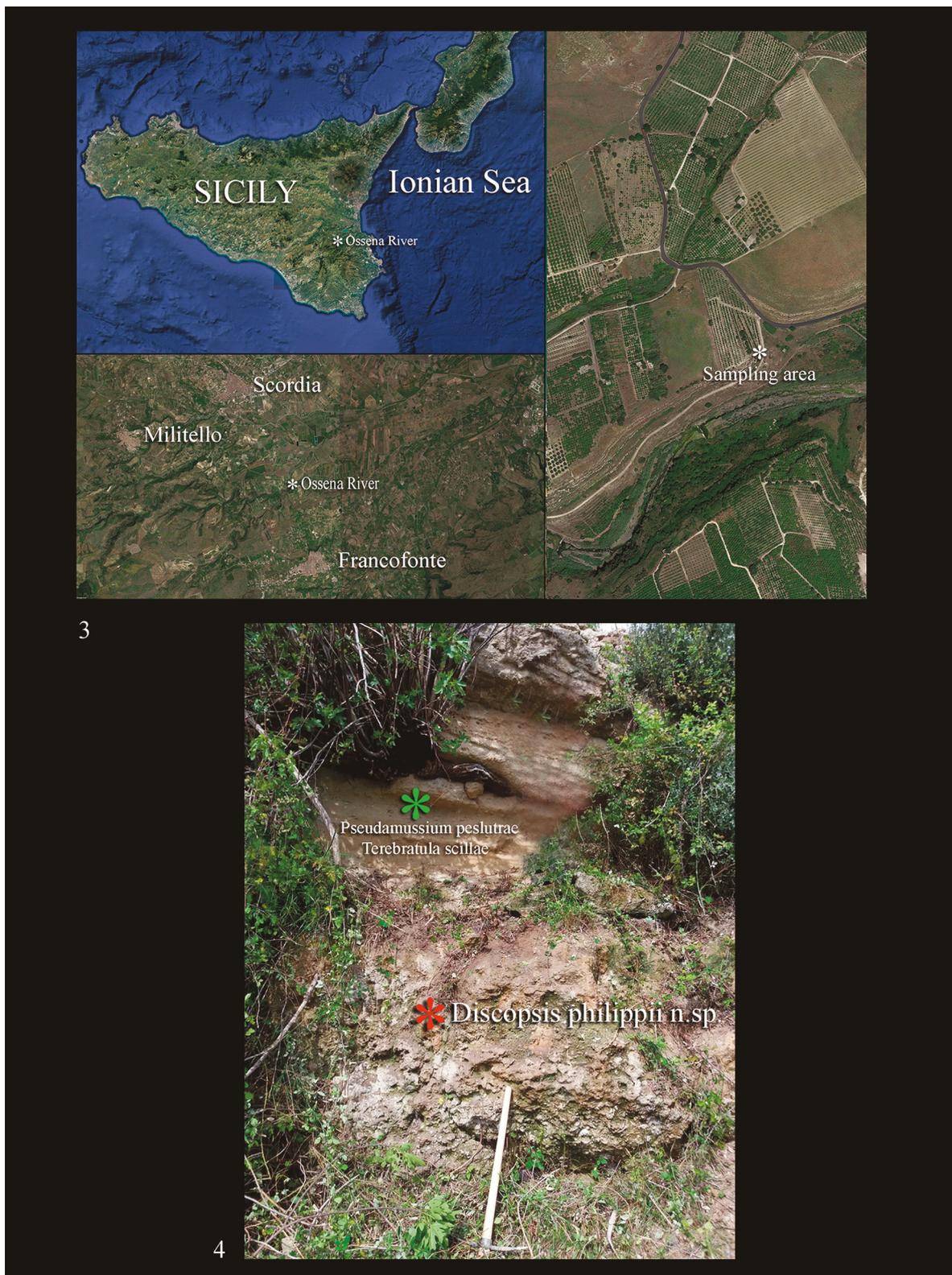


Figure 3. Location of the sampling area of the Ossena river outcrop (Sicily, Italy).
 Figure 4. Section of the outcrop of the Ossena river.

RESULTS

Systematics

Classis GASTROPODA Cuvier, 1795
 Subclassis CAENOGASTROPODA Cox, 1960
 Order LITTORINIMORPHA Golikov et Starobogatov, 1975
 Superfamily TRUNCATELLOIDEA Gray, 1840
 Family TORNIDAE Sacco, 1896 (1884)
 Genus DISCOPSIS de Folin, 1870
 TYPE SPECIES. *Discopsis omalos* (de Folin, 1870)

Discopsis destefanii n. sp.

<https://www.zoobank.org/6CE672AC-027E-4679-A904-E02DEE45BD39>

TYPE LOCALITY. Pliocene of the Nocella river mouth, top of “Level 1” (Greco & Buccheri, 1998), North-western Sicily, Italy.

TYPE MATERIAL. Holotype. ITALY • 1 shell; Sicily, Nocella river mouth; 38°5'4.45"N - 13°4'20.45"E, MSCN 4915. Paratypes. ITALY • 2 shells; same locality of the holotype; MSCN 4916.

DESCRIPTION OF THE HOLOTYPE. Shell rounded, 2.65 mm wide, with a very rounded peripheral border (Fig. 5). Protoconch of about 1.8 whorls projecting upward, with a thick, protruding and twisted nucleus, increasing rapidly, of about 470 µm indiameter, with very rounded edge. Protoconch has a punctiform microsculpture in all the surface of the whorl, aligned to form spiral lines, excluding the portion near the suture, which disappears before its end (Fig. 6). Teleoconch of about 1.8 whorls, increasing rapidly, dorsally convex, reaching a diameter of 2.7 mm. At high magnification smooth growth lines can be seen, with a lobe more protruding forward, and a covering of numerous micro-papillae that uniformly cover the dorsal part of teleoconch (Fig. 7). On the ventral side there is a well-evident spiral cord closer to the prominent peripheral border, which has a sharp keel. Umbilicus wide, through which the protoconch and the previous teleoconch whorls can be seen. The latter presents alternating peristomal thickenings, undulated, between the spiral cord and the peripheral border. Aperture ovoid, outer lip sharp and extended dorsally.

VARIABILITY. The paratypes have no substantial morphological differences compared to the ho-

lotype. Paratype A: 2.2 mm of width; paratype B: 1.8 mm of width.

ETYMOLOGY. This species is named after Carlo De Stefani (Padova, Italy), as our tribute to his important contributions on paleontology.

REMARKS. As above indicated, the most similar species to *D. destefanii* is *D. europaea*, at list as could be argued by the original description and picture. This latter is a fairly rare and rarely reported species from Zanclean-Piacenzian (Ferrero & Merlino, 1992; Ferrero et al., 1997; Baroncelli, 2001; Chirli, 2006) and from Early Pleistocene (Cerullirelli, 1916). This is probably due not only to the lack of records but really to the difficulty to correctly interpret this species. For this reason here follows the original diagnosis (De Stefani, 1888):

“Imperator europaeum: *Testa parva, valde depressa, superne convexiuscula, inferne infundibuliformis, umbilicata. Anfractus 3 ½ velociter accrescentes, ultimus maximus, nitidi, lineis incrementi et striis minimis interruptis transverse signati. Baseis ellipsoidalis, in sensum oris magis elongata, lineis incrementi signata, exterius carina acutissima praedita, costula circulari prope a carina et lineis impressis intermediis exornata. Os obliquum, ovatum, superne et inferne angulatum. Umbilicus amplum, profundum*”.

Comparing this description to the drawing presented in the same paper in Fig. 8 some discrepancies could be detected. In particular, the drawing of the shell outline appears more depressed and shows a very smaller umbilicus than that reported in the description. This is appreciable also in comparisons between the original pictures and those represented in literature as *D. europaea* (Cerullirelli, 1916; Fekih, 1975; Chirli, 2006). The protoconch appears to be smaller in appearance, but no official data were produced by De Stefani. Furthermore the lack of images taken in lateral view, in which it is possible to evaluate the height and lateral outline of the shell and the prominent peripheral carina, do not consent to really compare modern records of this species to the original diagnosis or drawing, as in the case of the specimen reported by Ferrero & Merlino (1992), or also to other related species, as the specimen reported in Brunetti & Cresti (2019) as *Teinostoma minutus* (Conti, 1864), more likely attributable to *D. destefanii* n. sp.

Finally, *Skenea divisa* Forbes et Hanley, 1853 [= *Skenea serpuloides* (Montagu, 1808)], reported by Conti (1864; 1871), was subsequently synonymized by Cerulli-Irelli (1916) with *D. europaea*. In our opinion this data could not be considered correct, due to the great morphological diversity between the two species.

For these reasons, the study of the typical material of this species was (should be) needed. Unfortunately all our attempts to find and study it in Museo Civico di Storia Naturale di Firenze (MSNF) have failed, so it is here considered lost (S. Domini in litteris). The evident discrepancies above reported and the lack of types have not allowed us to better identify this problematic species, thus remaining almost uncertain and not recognizable. For these reasons *D. europaea* still continue here to be regarded as a *nomen dubium*.

***Discopsis vivianorum* n. sp.**

<https://www.zoobank.org/24DD6CCF-E473-465F-9805-A9F07CC98286>

TYPE LOCALITY. Pliocene of the Nocella river mouth, top of Level 1 (Greco & Buccheri, 1998), North-Western Sicily, Italy.

TYPE MATERIAL. Holotype. ITALY • 1 ex; Sicily, Nocella river mouth; 38° 5'4.45"N - 13° 4'20.45"E; MSCN 4917. Paratypes. ITALY • 2 exx; same locality of the holotype; MSCN 4918.

DESCRIPTION OF THE HOLOTYPE. Shell rounded (1.7 mm width), with a rounded peripheral border (Fig. 9). Protoconch of about 1.5 whorls projecting laterally, increasing rapidly, of about 480 µm in diameter, with rounded edge; protoconch with an alveolar microsculpture along the median portion, which disappears before its end (Figs. 11, 12). Teleoconch of about one whorl, increasing rapidly, dorsally convex, reaching a diameter of 1.6 mm. Some short structures with sharp edge placed at the top of a very faint spiral cord restricted to the subsutural zone are present and oriented according to the growth lines direction. Near the suture at high magnifications, these growth lines appear more pronounced and form a deep lobe protruding forward. A well evident spiral keel is present at the peripheral border, which gives a discoid shape to the almost flat shell. Umbilicus wide, showing the protoconch and teleoconch

whorls. This latter presents alternating peristomal thickenings, undulated between the spiral cord and the peripheral border. Aperture ovoid; though the outer lip of the holotype is broken, a sharp edge extending dorsally is visible in a paratype (Fig. 10).

VARIABILITY. The paratypes have no substantial morphological differences compared to the holotype. Paratype A: 1.5 mm width; paratype B: 1.3 mm width.

ETYMOLOGY. This species is named after the Viviano brothers, Roberto and Arturo (Palermo, Italy), deep experts of natural sciences of Sicily, who also helped us in field researches.

REMARKS. *Discopsis vivianorum* n. sp. differs from *D. destefanii* n. sp. in: a clearly different protoconch, a more depressed shell, a teleoconch provided of folds with sharp edge, the absence of micropapillae of the teleoconch surface, a more prominent peripheral keel, a coarse series of growth lines and peristomal thickenings on the umbilicus.

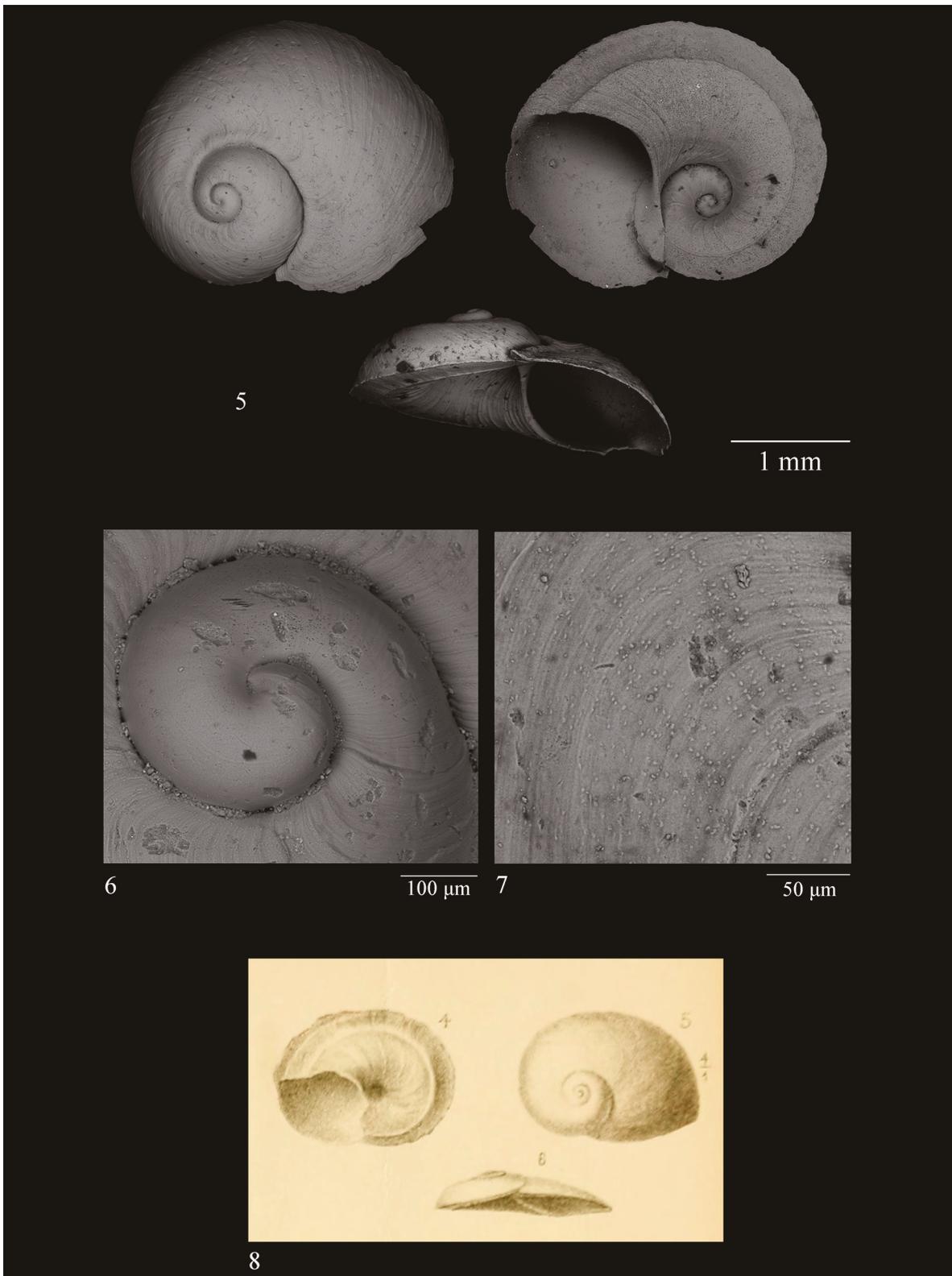
***Discopsis philippii* n. sp.**

<https://www.zoobank.org/65F3F2C2-4DD1-4565-9B0E-977A5FC81B11>

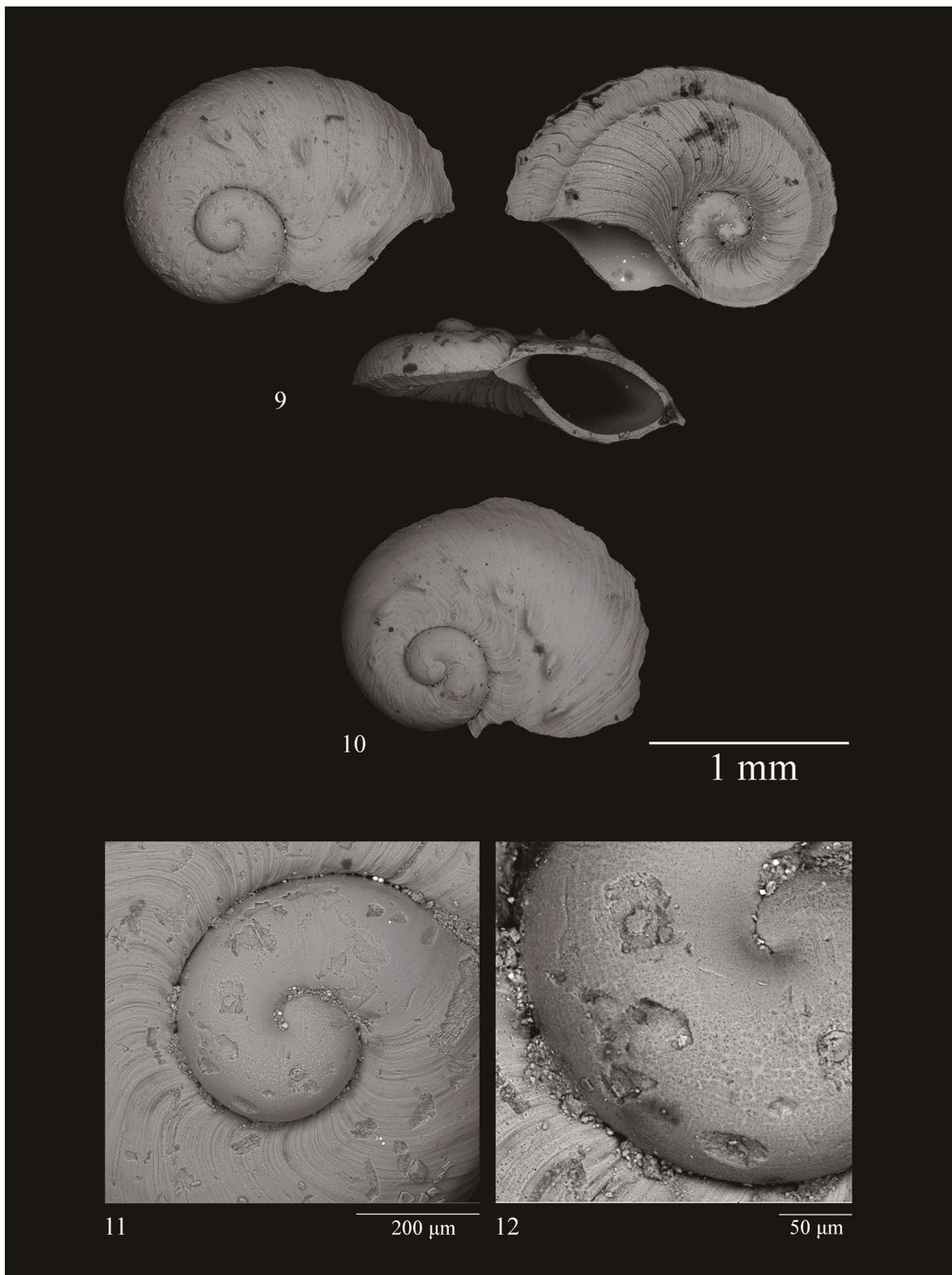
TYPE LOCALITY. Early Pleistocene of the Ossena river, Francofonte, Eastern Sicily, Italy.

TYPE MATERIAL. Holotype. ITALY • 1 ex; Sicily, Ossena river, Francofonte; 37°15'29.36"N - 14°52'14.69"E, MSNC 4914.

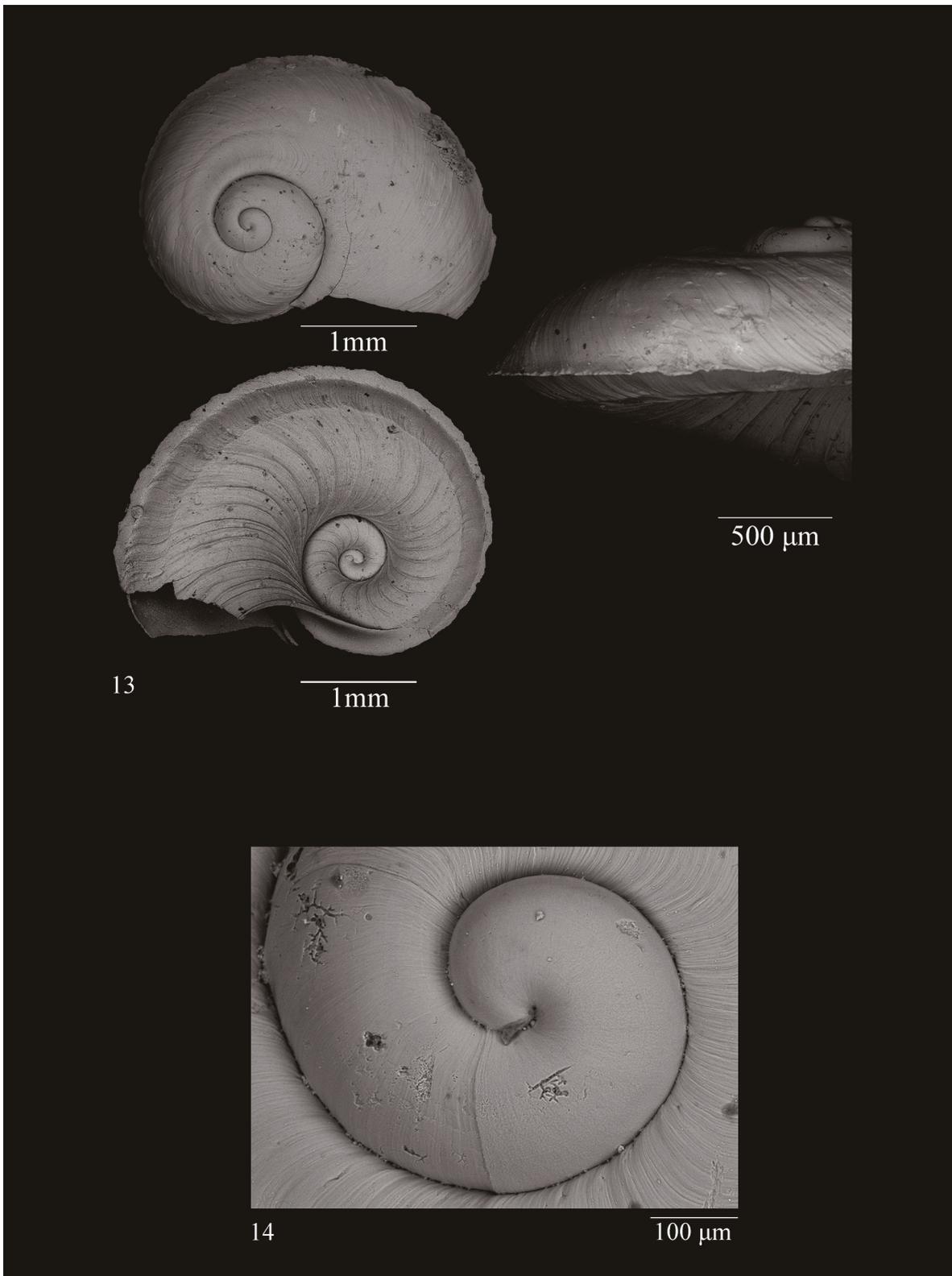
DESCRIPTION OF THE HOLOTYPE. Shell rounded (3.02 mm width), with a very rounded peripheral border, weakly folded to form a keel (Fig. 13). Protoconch, projecting upward, of about 1.5 whorls. The first 1.25 whorls have a twisted nucleus, punctiform microsculpture in all the surface of the whorl, weakly aligned to form scarce spiral lines, vanishing before the end of the same and marked by a weakly arched break. The last part of the protoconch has a surface crossed by slender spiral keels produced by the alignment of pseudopapillae and a marked rounded edge. Protoconch increasing rapidly, of about 510 µm diameter, with very rounded edge (Fig. 14). Teleoconch of about 1.5 increasing rapidly, dorsally convex whorls, reaching a diameter of 3.08 mm. At high magnifi-



Figures 5–8. *Discopsis destefanii* n. sp. Fig. 6: protoconch. Fig. 7: micromorphologies of the teleoconch. Fig. 8: *Imperator europaeum*, original drawing by De Stefani, 1888.



Figures 9–12. *Discopsis vivianorum* n. sp. Fig. 9: holotype. Fig. 10: paratype MSCN 4917.
Fig. 11: protoconch. Fig. 12: detail of the protoconch.



Figures 13, 14. *Discopsis philippi* n. sp. Fig. 13: holotype from different views.
Fig. 14: holotype, protoconch.

cation smooth growth lines can be seen with a lobe more protruding forward and few, scarce papillae in the first whorl of the teleoconch near the suture. In the basal portion a well-evident spiral cord closer to the prominent peripheral border is present, which has a sharp keel. Umbilicus wide, showing the protoconch and the previous teleoconch whorls. This latter presents alternating very marked peristomial thickenings, undulated between the spiral cord and the peripheral border, which stop at about 2/3 away from the keel forming coarse thickenings, which remains weakly furrowed and folded downwards. Aperture ovoid in shape, though broken; outer lip sharp and dorsally extended.

ETYMOLOGY. This species is named after Rudolph Amando Philippi (Berlin, Germany), almost the first Author studying fossils of the Sicilian area (“*between Militello and Scordia*”) where records of the present new species has been collected.

REMARKS. *Discopsis philippii* n. sp. differs from *D. destefanii* in: a bigger protoconch with different outline and micromorphologies, a bigger shell diameter, the absence of a carpet of papillae covering the entire surface of the dorsal portion of teleoconch, very marked peristomial thickenings on the ventral side and the morphology of the keel relative to the basal spiral cord.

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