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A new species of *Setia* H. Adams et A. Adams,1852 (Prosobranchia Caenogastropoda Rissoidae) from the Mediterranean Sea

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ABSTRACT A new species of *Setia* H. Adams et A. Adams, 1852 (Prosobranchia Caenogastropoda Rissoidae) is here described as new for science. Specimens were found in samples collected in two localities of the Ionic Sea. Here the description and figures of the new species follow, which is compared to the most similar congeners and to species of different genera, which share the cylindrical shape, smooth shell and rounded top-whorl. Biological notes of the environment where the new species was found are added to complete its profile.

KEY WORDS *Setia homerica*; Rissoidae; new species; Recent; Mediterranean Sea.

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INTRODUCTION

The family Rissoidae Gray, 1847 is a hyperdiverse group of gastropods with a worldwide distribution, living from the infralittoral to the bathyal region (Ponder, 1985; Criscione & Ponder, 2013 and herein). In the Mediterranean Sea and along the Atlantic coasts of Europe Rissoidae are extraordinarily represented (Ávila et al., 2012). While some recent contributions utilized molecular data to discriminate generic taxa (Criscione & Ponder, 2013), species are traditionally arranged in genera according to both anatomical and morphological criteria (Ponder, 1985). The last one is based on the general shell shape, size and sculpture, which could range from entirely smooth (*Setia* H. Adams et A. Adams, 1852, *Peringiella* Monterosato, 1878; *Botryphallus* Ponder, 1990; *Pseudosetia* Monterosato, 1884; the subgenus *Ovirissoa* Hedley, 1916 of *Onoba* H. Adams et A. Adams, 1852) to slightly sculptured (*Crisilla* Monterosato, 1917; *Porosalvania* Gofas, 2007; *Gofasia* Bouchet et Warén, 1993; *Rissoa* Desmarest, 1814; *Pusillina* Monterosato, 1884) to cancellate (*Alvania* Risso, 1826).

The species of *Setia* are characterized by minute shells, smooth teleoconch, where only faint growth lines can be detected. Shells are generally colourless with dark strips and/or spots; aperture almost rounded with simple peristome; the protoconch has a dome-shaped shape of about 1 to 1.5 whorls, smooth or with spiral threads. *Setia* seems to be a quite speciose genus, with more than 30 extant species, mainly living in the North East Atlantic Ocean and the Mediterranean Sea (in the latter 17 species are currently known, 10 of which are considered endemic) (Ávila et al., 2012 and herein; Cordeiro & Ávila, 2015; CLEMAM database: Gofas & Le Renard, 2015; WoRMS database: Rosenberg & Gofas, 2015).

In this framework, a single shell of a peculiar, small and smooth rissoid was found in the Jonian Sea (E-Sicily) and reported as "undetermined

Rissoidae" (Scuderi et al., 2006). Other material of the same species were afterwards collected in the same area of the first finding and along the Calabrian side of Strait of Messina. These further specimens allowed us to make a more detailed taxonomic study of this undescribed species, which, due to its morphological features, is assigned to the genus *Setia*.

MATERIAL AND METHODS

The material was picked up from bioclastic bottom samples collected by SCUBA diving. A shell was collected during a benthonic characterisation work in the Gulf of Catania, it was sampled utilising a 15 l Van Veen grab; samples were sifted out and saved in a 4% tamponed formalin solution; they were sorted at the stereoscope in laboratory. Living specimens of other species were collected brushing handily hard substrata and picking crawling animals under stereomicroscope. Shells were studied with a stereomicroscope. Photos were taken with a digital photocamera and Scanning Electron Microscope (SEM). Protoconch whorls are counted following Verduin (1977).

ABBREVIATIONS AND ACRONYMS. AM: Australian Museum, Sydney, Australia; APC: Attilio Pagli collection (Lari, Italy); AVC: Alberto Villari collection (Messina, Italy); CBC: Cesare Bogi collection (Livorno, Italy); DSC: Danilo Scuderi collection (Catania, Italy); NBC: Naturalis Biodiversity Center; NHMB: Naturhistorisches Museum, Bern, Switzerland; RMNH: Rijksmuseum van Natuurlijke Historie (now NCB: Naturalis Biodiversity Center, Leiden, the Netherlands); SBC: Stefano Bartolini collection (Firenze, Italy). UMA: University of Malaga, Malaga, Spain. d: diameter of the nucleus (in μm); D: diameter of the first half whorl of the protoconch (in μm); H: maximum height (in mm); Nwp: number of protoconch whorls; Nwt: number of whorls of the teleoconch; SEM: scanning electron microscope; W: maximum width (in mm);

RESULTS

Sistematics

Class GASTROPODA Cuvier, 1795
Subclass CAENOGASTROPODA Cox, 1960
Superfamily RISSOOIDEA Gray, 1847
Family RISSOIDAE Gray, 1847
Genus *Setia* H. Adams & A. Adams, 1852
Type-species: *Rissoa pulcherrima* Jeffreys, 1848, by subsequent designation (Kobelt, 1878). Recent, Europe.

Setia homerica n. sp. (Figs. 1–9, 12, 16)
Rissoide indet. - Scuderi et al., 2006, p. 647, fig. 2b

EXAMINED MATERIAL. Holotype. Scilla (Reggio Calabria, Italy), 57 m depth, Stefano Bartolini legit, 07-2009, H: 1.78 mm, in MNHN (IM-2000-31233) (Figs. 1, 2). Paratypes. Paratype 1: Scilla (Reggio Calabria, Italy), summer 2007, 48 m depth, H: 1.27 mm, in AM (C.474170) (Figs. 5, 8). Paratypes 2–11: same data of holotype, H: 1.47 to 1.95 mm, in SBC (Figs. 4, 7, 9, 16). Paratypes 12-13: Riposto, N of the harbour, (Catania, Italy, 37°44'464"N, 015°12'561"E), pebble bottom, 6/8 m depth, H: 1.68 (Fig. 3) and 0.55 mm, in DSC. Paratype 14: Riposto, N of the harbor, muddy pebble bottom, 50 m depth, 16.VII.2004, H: 1.60 mm, in DSC (Fig. 6; Scuderi et al., 2006, p. 647, fig. 2b). Paratypes 15–19: same data of paratype 1, H: 1.35 to 1.90 mm, in DSC. Paratypes 21–30: same data of holotype, H: 0.91 to 1.90 mm, in SBC.

OTHER EXAMINED MATERIAL. *Setia antipolitana* (van der Linden et W.M. Wagner, 1987). 1 shell, le Brusc (Toulon, France), 1 m depth, J.H. Hoenselaar legit 09-1988, H: 1.83 mm, in CBC; 1 shell, La Maddalena island (Olbia-Tempio, Sardinia, Italy), 1 m depth, H: 1.85 mm, in CBC; 2 shells, Vernazza (La Spezia, Italy), beached, in DSC; *Cingula antipolitana* holotype (RMNH. MOL.55933), Antibes (Alpes-Maritimens, France), H: 2.05 mm.

Setia ambigua (Brugnone, 1873). More than 100 shells, Porticello (Villa San Giovanni, Reggio Calabria, Italy), 1–2 m depth; 50 shells, Scilla (Reggio Calabria, Italy), 30 m depth, all in SBC.

Setia gittenbergeri (Verduin, 1984). More than 100 shells, Tarifa (Spain), 20 m depth, in SBC.

Setia scillae (Aradas et Benoit, 1876). More than 100 shells, Capo Peloro (Messina, Sicily, Italy), 40 m depth; more than 100 shells, Cannitello (Villa San Giovanni, Reggio Calabria, Italy), 40 m depth, all in SBC; one living specimen and 2 shells, Messina harbor (Sicily, Italy), among algae on breakwaters, -2/6 m depth, AVC and DSC.

Setia turriculata Monterosato, 1884. More than 50 shells, Vada (Rosignano Marittimo, Livorno, Italy), 1 m depth; 20 shells, Porto Palo (Siracusa, Sicily, Italy), 1 m depth; 20 shells, Filicudi Island (Messina, Sicily, Italy), 30 m depth, all in SBC.

Cingula nikolarianae Oberling, 1970. NHMB, Lectotype (NMBE.21186), Malia (Crete, Greece), H: 1.7 mm.

Description of Holotype. Shell (Figs. 1–6) small, slender, ovate-subconical, rather thin. Height 1.78 mm, width 0.95 mm. Protoconch (Figs. 7, 8, 12) completely smooth, dome-shaped, 1.1 whorls, diameter 345 μm, separated from the teleoconch by a marked scar, often the protoconch-teleoconch border is characterized by a shallow depression of the spire. Teleoconch with 2.8 convex whorls, with maximum curvature just under the middle of the whorl. Sculpture absent, except for faint prosocline axial growth lines. Suture quite deep, in fresh specimens is visible a "false suture" marking the internal contact between the whorls. Spire moderately high, whorls have conspicuous increase in size. Last whorl large, inflated but not globose, cylindrical, 71% of shell length. Base rounded, slightly curving, almost straight in some specimens. Aperture large, oval, drop-shaped, oblique with continuous and simple peristome (not thickened, smooth inside) and posterior angulation. Parietal and columellar regions rather straight or gently angulated. Outer lip well rounded. Seen from aside, the edge of the outer lip is orthocline, gently curved in the middle, and straight or shallow concave near the suture. It is clearly reflexed outwards (Fig. 9). Umbilicus reduced to a very narrow chink.

The colour of the protoconch is uniformly brownish to light violet, the nucleus being darker. Fresh shells are transparent with a background colour whitish or yellowish, while older are almost whitish opaque. Teleoconch shows a pattern of elongated, longitudinal and irregular strips of red-brownish tinge running from suture to suture and reaching the periumbilical zone (Fig. 6).

Variability. Paratypes shell: height 1.47–1.95 mm, width 0.83–1.03 mm, protoconch with 1.0–1.1 whorls, diameter 340–345 μm, teleoconch with 2.5 to 3 convex whorls, last 70–73% of shell length. The size of mature shells range from 1.43 mm to 1.97 mm; the general outline as well as the convexity of the whorls can be more or less slender. In larger shells the aperture, in frontal view, exceeds the spire outline (Fig. 1). Some shells have some stronger growth lines, others are almost smooth. The colour is quite variable, some shells are uniformly whitish or yellowish (Fig. 16), the colour pattern can be more or less sharp. Soft parts are unknown.

Etymology. After the Greek poet Homer, who in the Odyssey dealt with the two Sicilian and Calabrian localities which constitute two of the classic places of the mythical Ulysses' journey and where material of this species was found.

Biology and Distribution. No living material was collected and most of the shells were found in shell grit from coralligenous bottoms at 48–57 m depth. Further dead specimens were found in materials from an ecotone between coastal detritical and muddy bottom biocenosis, as desumed by the associated species, such as *Anadara gibbosa* (Reeve, 1844), *Thyasira biplicata* (Philippi,1836), *Mysella bidentate* (Montagu, 1803), *Plagiocardium papillosum* (Poli, 1795), *Tellina donacina* (Linnaeus,1767), *Abra nitida* (O.F. Müller, 1776), *Timoclea ovata* (Pennant, 1777). Notwithstanding these findings, the species is likely associated to the algal film on the pebbles of the lower littoral zone, commonly present in the Northern Ionian Sea. This could be inferred by the finding, along the Northern coast of Catania, of some fresh-collected specimens of the new species in materials from 6-8 m depth, associated with numerous specimens of the congener *S. turriculata* and, by analogy, by recent observations of one of us (DS) on the habit of the similar congener *S. scillae*.

This species is known only from the Messina Strait and the Eastern coast of Sicily. The Messina Strait has been considered a separate Mediterranean biogeographical microsector, inhabited by rich benthic communities and some particular assemblages that are unknown in other Mediterranean regions (Guglielmo et al. ed., 1991; Bianchi, 2004; Giacobbe et al., 2007), with characteristic malacofauna including endemic or subendemic taxa (Vazzana, 2010; Smriglio & Mariottini, 2013).

Comparative notes. *Setia homerica* n. sp. can only be compared with few congeners and similarly shaped Rissoidae taxa. The most similar species is *S. antipolitana* (Figs. 10, 13), which has a more conical, slender, straight-sided shell; whorls less

convex; the apex is smaller (d/D: 120/200 μm vs. 145/255 μm in *S. homerica*), with a very dark, often comma-shaped spot. The outer lip is thickened, prosocline and seen from aside appears straight. The color pattern is composed by two rows of spots, the adapical ones elongated, the abapical shorter. *Setia antipolitana* is distributed in the northern part of the Western Mediterranena Sea, from Bouches-du-Rhône to Liguria (van der Linden J. & Wagner, 1987; Giannuzzi-Savelli et al., 1997; Buzzurro et al., 1999). Here we report our finding of a single, beached shell from Northern Sardinia that seems to confirm its distributional area, being the record from Malta by Cachia et al. (1993) to be confirmed.

Setia ambigua (Fig. 11) is more slender with a more pointed protoconch with small apical stain; the aperture is smaller, the whorls are very convex and the color pattern is different (Verduin, 1984; Reina & Giannuzzi Savelli, 1985).

Setia scillae (Fig. 17) and *S. gittenbergeri*, sometimes regarded as synonyms, are similar to *S. homerica* n. sp. but differ by the smaller size, more convex whorls, different color pattern, smaller and less globose protoconch (without darker stains), the outer lip is very flexuous (Verduin, 1984; Gaglini, 1994; Gofas et al., 2011).

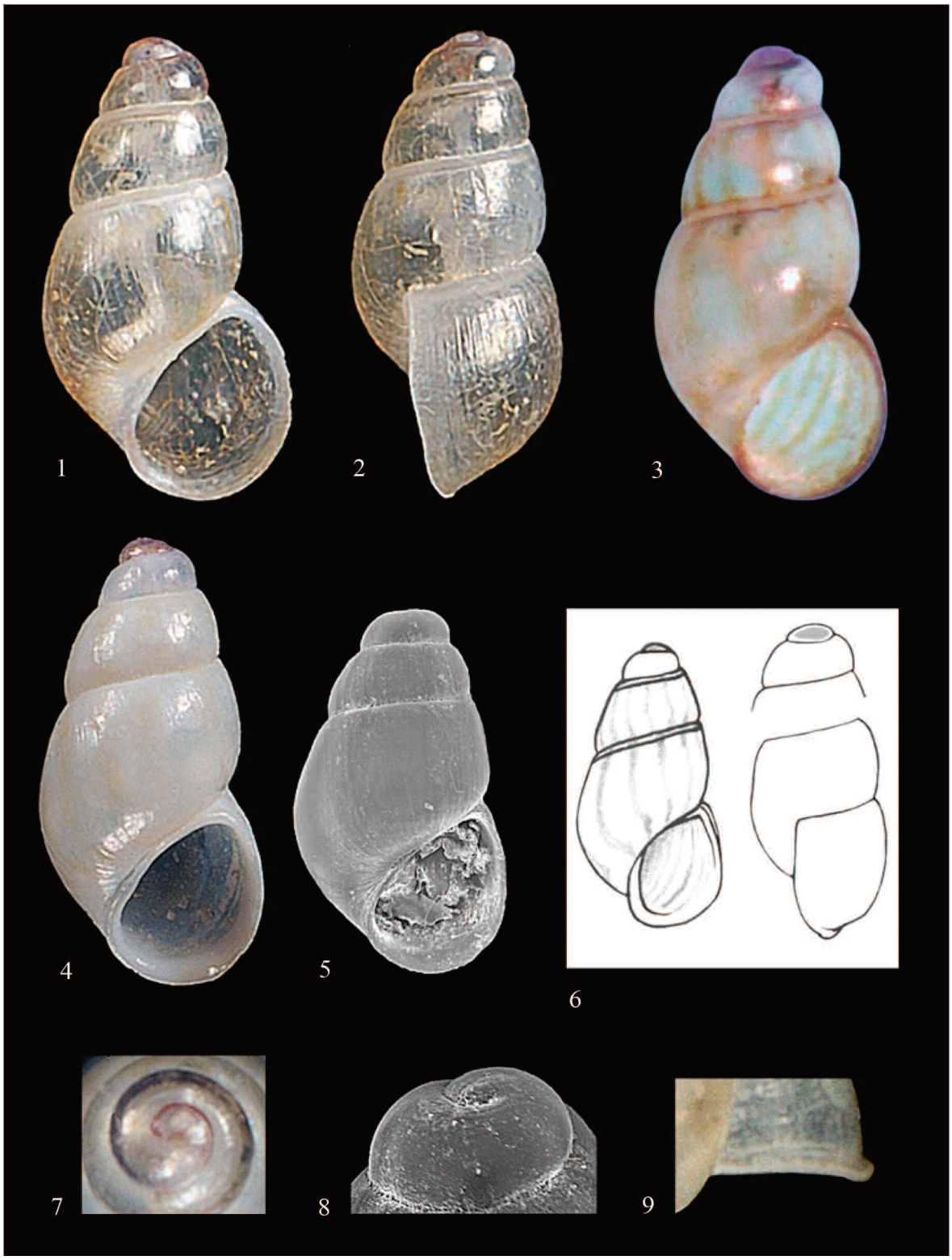
Setia fusca (Philippi, 1841) and *S. turriculata*, whose taxonomical status as separated species is also debated, share with the new species an oblique columella, but they have more turriculated shells with well-rounded whorls; the umbilicus is well developed; the colour pattern is very variable but never joins up that of *S. homerica* n. sp.; the aperture is less wide, squared; the protoconch is similar but is sculptured (van Aartsen & Verduin, 1978; Verduin, 1984; Gofas et al., 2011).

S. sciutiana (Aradas et Benoit, 1870) is currently placed among nomina dubia (CLEMAM), notwithstanding Gaglini (1994) redescribed and figured the type material demonstrating the validity of the species. However, according to the description and figure of this latter Author, this species is characterised by a shell with a different general outline, conical and not cylindrical, with more rounded whorls, a different set of stains and a protoconch less globose; mouth wide, not so inclined as *S. homerica* n. sp.; the umbilicus is almost lacking but a narrow chink is often present on a more rounded base of the shell; the colour pattern is different. Among Macaronesian and South Iberian species, *S. alboranensis* Peñas et Rolán, 2006 which seems to have a distribution restricted to Alboran, has a more conical outline, convex whorls, outer lip very flexuous and the protoconch is similar in shape and size but is sculptured by thin spiral lirae; the color is almost uniformly whitish (Peñas et al., 2006; Gofas et al., 2011).

Setia jansseni (Verduin, 1984) and *Setia lidyae* Verduin, 1988 are smaller and more ovoidal in outline, while *Setia nicoleae* Segers, Swinnen et De Prins, 2009 and *Setia subvaricosa* Gofas, 1990 are more conical. All these species have protoconchs sculptered with spiral threads, the color patterns are also different from *S. homerica* n. sp. (Verduin, 1984, 1988; Gofas, 1990; Segers et al., 2009; Rolán, 2011). Some few rissoids, different from *Setia*, could recall the new species for an almost smooth shell, the flattened whorls and the shape of mouth and are here compared. *Cingula nikolarianae* nowadays reported as a junior synonym of *Hyala vitrea* (Montagu, 1803) (WoRMS database: Rosenberg & Gofas, 2015), resemble the new species for the unsculptured surface of the shell and the oblique columella.

The examination of the lectotype (NHMB, NMBE21186) (Figs. 14, 15) revealed numerous differences: first of all its completely white colour, lacking both the apical and labial stains, a different general outline with more rounded whorl, and a larger protoconch. We have doubts concerning the correct collocation of this species in the genus *Onoba* by Moolenbeek et al. (1991). Some other species, which belong to the genera *Bothryphallus, Peringiella* and *Pseudosetia*, have smooth shells and could superficially recall the general shape of the new species, but they are all colourless and reveal important differences at a deeper examination of the shell morphology.

As concerns fossil species, *S. homerica* n. sp. at a preliminary exam has a superficial resemblance with *Rissostomia gravitellensis* Aradas, 1847 for the absence of sculpture and the internal lip slightly oblique, but the latter species is bigger and more solid, with a different protoconch. The new species could be more usefully compared with *Setia conoidea* (Seguenza L., 1903), a thin-shelled rissoid which has a more conical shape and well rounded whorls (Seguenza L., 1903).



Figures 1–9. *Setia homerica* n. sp., Scilla, Reggio Calabria, Italy. Figs. 1, 2: holotype, H 1.78 mm, (MNHN IM-2000-31233); Fig. 1: shell, frontal view; Fig. 2: shell, lateral view. Fig. 3: Paratype 12, H 1.68 mm, in DSC. Fig. 4: paratype 3, H 1.75 mm, in SBC. Figs. 5, 8: paratype 1, H 1.27 mm, in AM (C.474170). Fig. 6: schematic drawing of paratype 14, H 1.60 mm, in DSC. Figs. 7, 9: paratype 2, H 1.95 mm, in SBC; 9: outer lip in apical view.

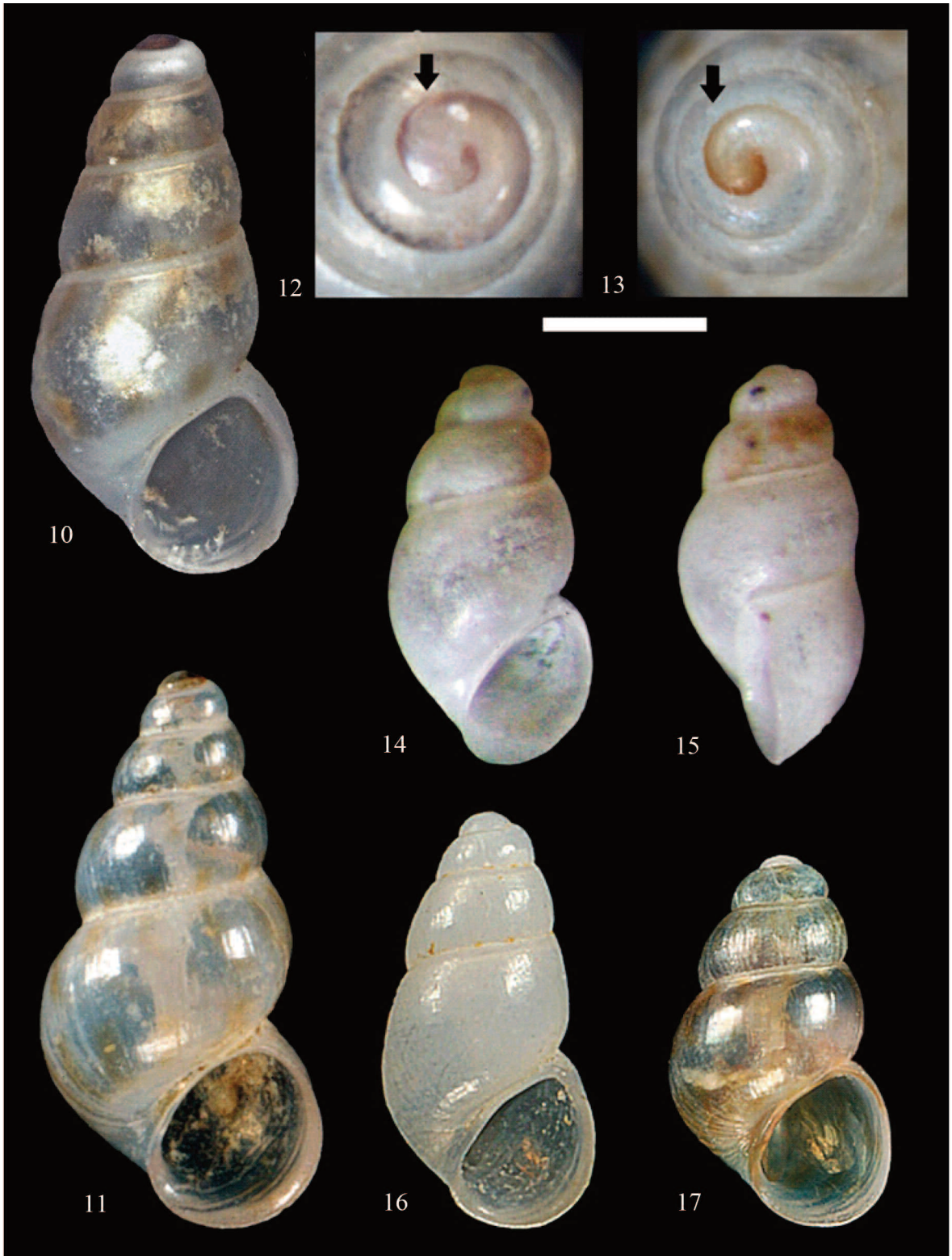


Figure 10: *Setia antipolitana* holotype, Antibes (France), H 2.05 mm. Fig. 11: *S. ambigua*, Scilla, Reggio Calabria, Italy, H 2.00 mm. 12: *S. homerica* n. sp., holotype, protoconch. Fig. 13: *S. antipolitana*,Toulon, France, H 1.83 mm, protoconch. (scale bar 200 µm, black arrow: protoconch-teleoconch border). Figs. 14, 15: *Cingula nikolarianae*, lectotype, H 1.70 mm (NMBE.21186). Fig. 16: *Setia homerica* n. sp., paratype 4, H 1.65 mm, in SBC. Fig. 17: *S. scillae*, Scilla, Reggio Calabria, Italy, H 1.30 mm.

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