

Jujubinus errinae n. sp. (Gastropoda Trochidae) from the Strait of Messina, Mediterranean Sea

Carlo Smriglio¹, Paolo Mariottini^{1*} & Salvatore Giacobbe²

¹Dipartimento di Scienze, Università “Roma Tre”, Viale Marconi, 446, 00146 Roma, Italy; e-mail: csmriglio@alice.it; paolo.mariottini@uniroma3.it

²Dipartimento di Scienze Biologiche e Ambientali, Università di Messina, Viale Stagno D'Alcontres, 98166 Messina, Italy; e-mail: sggiacobbe@unime.it

Corresponding author, email: paolo.mariottini@uniroma3.it

ABSTRACT

A new species of the gastropod family Trochidae, *Jujubinus errinae* n. sp., from the Mediterranean Sea is described based on shell characters. The new taxon was compared with the most closely related species showing marked sculpture and from relatively deep water habitat, *J. catenatus* Ardovini, 2006, *J. montagui* (Wood, 1828) and *J. tumidulus* (Aradas, 1846). The species, which is known from the type locality only, the Strait of Messina, might be strictly associated to the endemic hydrocoral *Errina aspera* (Linnaeus, 1767) beds (Hydrozoa Stylasteridae).

KEY WORDS

Trochidae; Recent; *Jujubinus errinae*; new species; Mediterranean Sea.

Received 30.10.2015; accepted 16.01.2016; printed 30.03.2016

Proceedings of the Ninth Malacological Pontine Meeting, October 3rd-4th, 2015 - San Felice Circeo, Italy

INTRODUCTION

The Strait of Messina has been considered a separate Mediterranean biogeographic microsector inhabited by rich benthic communities and some peculiar assemblages that are unknown in other Mediterranean regions (Bianchi, 2004). From this specific area, a survey of the species of the genus *Jujubinus* Monterosato, 1884 (Gastropoda Trochidae) has been carried out on samples from hard and soft circalittoral bottoms, which revealed the presence of trochidae shells not recognizable as a known species. The specimens, once compared with *Jujubinus catenatus* Ardovini, 2006, *J. montagui* (Wood, 1828) and *J. tumidulus* (Aradas, 1846), the most closely related species showing marked sculpture and from relatively deep water habitat, were attributed to a new species of this genus, *J. errinae*

n. sp., which is here described.

ACRONYMS. The materials used for this study are deposited in the following private and Museum collections: Carlo Smriglio and Paolo Mariottini, Rome, Italy (CS-PM); DiSBA Benthic Ecology laboratory Messina, Italy (DiSBA); Giuseppe Notaristefano, Messina, Italy (GN); Museo Civico di Zoologia, Rome, Italy (MCZR); Museo di Zoologia Bologna, Bologna, Italy (MZB); Renato Marconcini, Reggio Calabria, Italy (RM); Walter Renda collection, Reggio Calabria, Italy (WR); Bruno Amati, Roma, Italy (BA); Ermanno Quaggiotto, Logare, Vicenza, Italy (EQ). Other acronyms used in the text: Height (H); Interdepartmental Laboratory of Electron Microscopy, Rome, Italy (LIME); Monterosato (MTS); Scanning Electron Microscopy (SEM); specimens (sps); station (st); Width (W).

MATERIAL AND METHODS

Hard and soft bottom samples containing the new species were collected in the Strait of Messina, central Mediterranean, in several cruises sponsored by the University of Messina. In particular, dredging was carried out during the "POP 95" cruise (13 to 31 July 2015), at 100 m depth (DG04: 38°14'45" N, 15°37'36" E), and arising from 115 m to 90 m, along a steep rocky floor (DG001: 38°14'45" N, 15°37'28" E).

During the same cruise, van Veen grab samples were collected in Rada Paradiso [Station (St) 02: 38°13'27"N, 15°36'02"E], 201 m depth. A further grab sample, collected by the R/V *Cooper* in the framework of the POR-CAL 2008 project, was carried out in October 2008, on the slope of the Gioia Basin (St 1B: 38°18'69.41N, 15°45'57.10E), 371 m depth. Bioclastic sediment samples were also collected during SCUBA diving on the bottoms of the Strait of Messina, at a depth of 40–50 m (38°15'36"N, 15°43'08"E). Sediment samples were sieved through a 1 mm mesh and the residue was sorted using a stereomicroscope. Among the sorted material, shells of an undescribed species of *Jujubinus*, represented by 21 sps, together juveniles and fragments not included in the type series, were separated and described herein as *J. errinae* n. sp.

Additional material examined from CS-PM collection: 3 sps of *J. catenatus* from the Sicily Channel, estimated depth 90 m; about 100 sps of *J. montagui* from Anzio, Central Tyrrhenian Sea, 50 m; 9 sps from Sfax, Tunisia, 100 m; over 200 sps of *J. tumidulus* from Lampedusa Island, Sicily Channel, dredged by fishing boats, estimated depth 70–80 m; 11 sps from Linosa Island (Punta Calcarello), Sicily Channel, 36 m. Current systematics is based on WoRMS (Gofas & Bouchet, 2015).

Scanning Electron Microscopy (SEM) photographs were taken at the Interdepartmental Laboratory of Electron Microscopy (LIME, Università "Roma Tre", Rome, Italy), using a Philips XL30.

SYSTEMATICS

Classis GASTROPODA Cuvier, 1795
 Familia TROCHIDAE Rafinesque, 1815

Genus *Jujubinus* Monterosato, 1884

Type species (by subsequent designation of Crosse, 1885) *Trochus matoni* Payraudeau, 1826

Jujubinus errinae n. sp.

(Figs. 1–18, 37)

DIAGNOSIS. Small and slightly turriculate shell; sculpture of incised spiral lines; strong prosocline lamellae between spiral cords.

EXAMINED MATERIAL. The holotype (MZB60155) and paratypes A–H (DiSBA) from the type locality: Strait of Messina, (38°14'45"N 15°37'36"E), Sicily, Mediterranean Sea, dredging DG04, 100 m depth; paratypes I (DiSBA) from 38°14'45" N, 15°37'28" E, dredging DG001, St 5, 90–115 m; paratype L (DiSBA) from 38°13'27" N, 15°36'02" E, dredging PIC02, Rada Paradiso, St 2, 90–115 m; paratype M (WR) from 38°14'45" N, 15°37'28" E, dredging DG001, St 5, 90–115 m; paratype N–R (CS-PM) from 38°15'36" N, 15°43'08" E, 40–50 m depth; paratypes S–U (GN); paratype V (RM) from 38°15'36" N, 15°43'08" E, 40–50 m depth; paratype X (BA) from 38°15'36" N, 15°43'08" E, 44 m depth; paratype Y (EQ), from 38°15'36" N, 15°43'08" E, 40–50 m depth.

DESCRIPTION OF HOLOTYPE. Shell of relatively small size for the genus, height (H) 4.9 mm, width (W) 4.0 mm, conical, slightly shiny. Protoconch about 1.5 whorls, smooth, with a diameter of 280 µm. Teleoconch of 4.5 slightly convex whorls. Sculpture of 6 closely set abapical spiral cords of about the same strength, strongly carved by strong tubercles, including the 2 peripheral ones forming the basal cord, and 6 regularly spaced, basal spiral cords narrow and well engraved, with very evident lamellae in the interspaces. First two whorls of the teleoconch showing the basal cord strongly rippled, remaining teleoconch whorls with a flat basal cord. Suture incised. Teleoconch surface covered by barely visible prosocline growth striae, irregularly set. Base convex, umbilicus closed and covered with a white callus. Aperture quadrangular, with the columellar callus thickened in the middle portion and internally whitish nacreous. Colour of protoconch whitish, teleoconch reddish-creamy, with red spiral cords interrupted by short white spots. The same chromatic pattern is shown by the basal cords. Animal unknown.

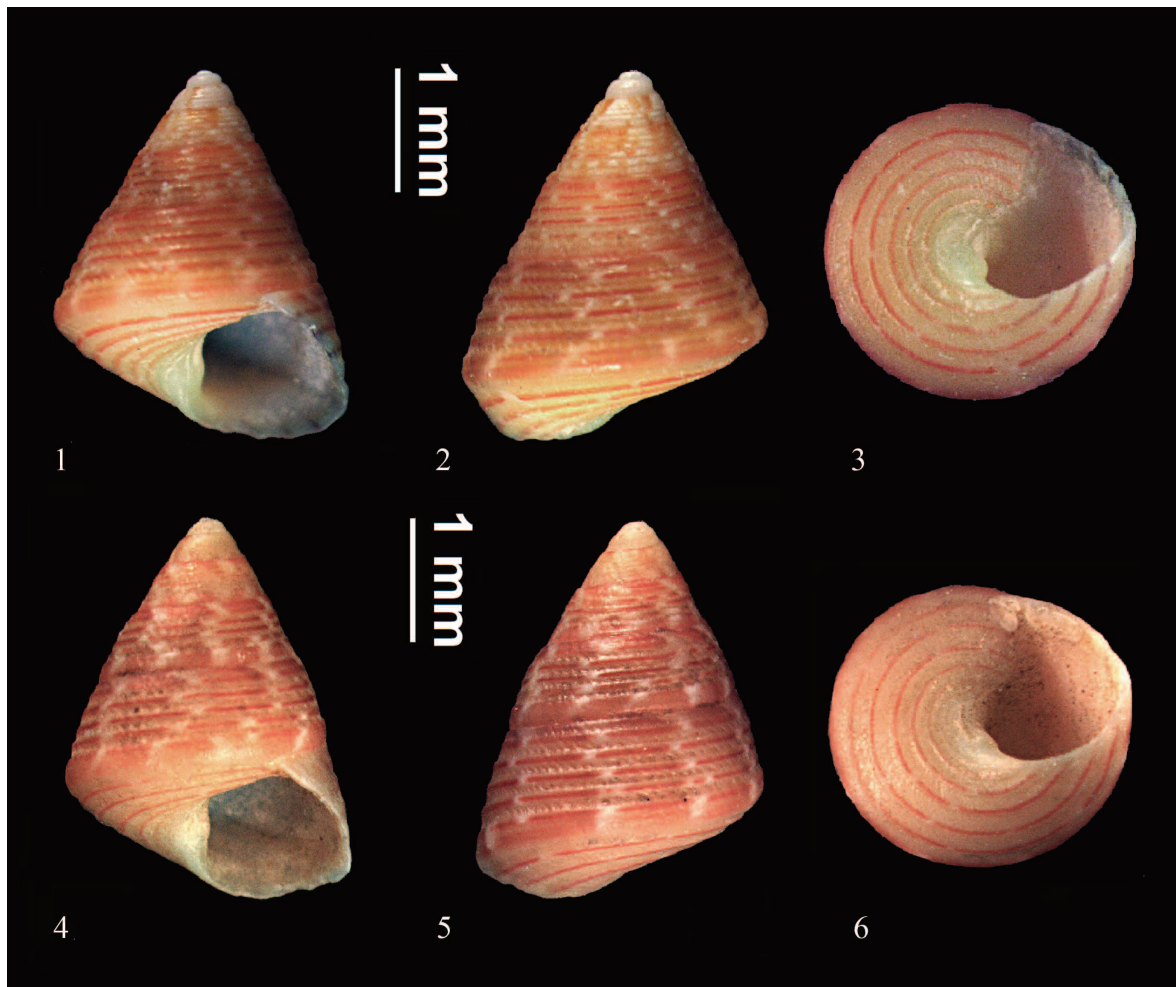
VARIABILITY. Shell H ranging from 4.5 to 6.0 mm and W from 3.8 to 4.7 mm. Protoconch diameter from 260 to 290 μm . Teleoconch varying from 4 to 4.5 whorls. Spiral and basal cords both ranging from 5 to 6, according to the H of the shell (6 in adult specimens). Umbilicus is closed also in juveniles shells. Colours of protoconch, teleoconch and base very constant in all specimens observed.

ETYMOLOGY. The species is named after *Errina aspera* (Linnaeus, 1767) the Hydrozoan Stylasteridae whose beds characterize the type locality in Strait of Messina, Sicily.

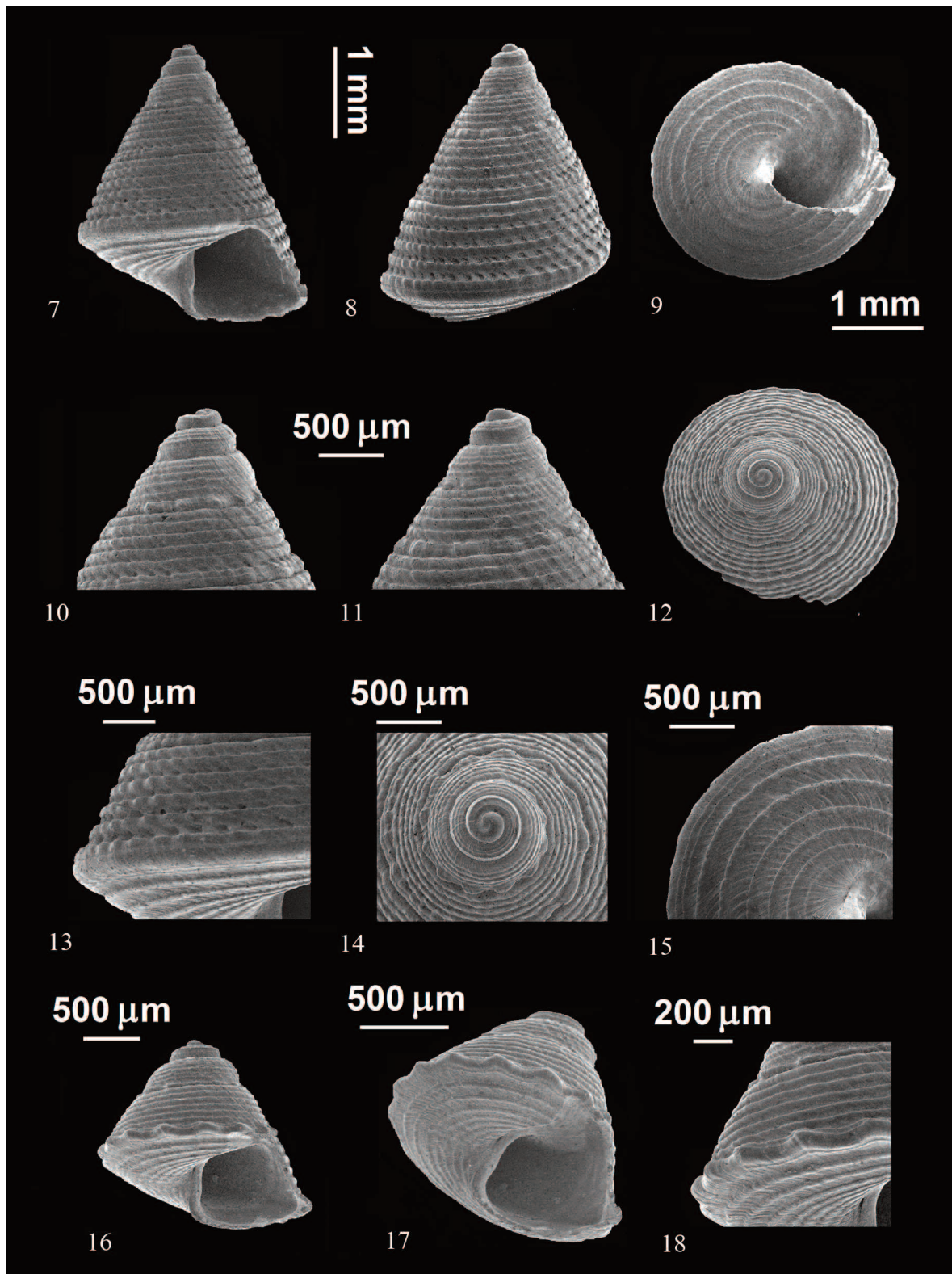
DISTRIBUTION. Currently only known from the type locality.

DISCUSSION

After the institution of the genus *Jujubinus* by Monterosato (1884), in recent years an increasing number of studies have greatly contributed to a better knowledge of this group of small trochids, with the description of new species and the rediscovery of some not yet well understood ones (Bogi & Campani, 2005; Spanu, 2011; Mariottini et al., 2013; Smriglio et al., 2014; Smriglio et al., 2015). With this note we described *J. errinae* n. sp. (Figs. 1–18, 37), so increasing the number of the typical *Jujubinus* species [i.e. shell with prosocline lamellae between the spiral threads of variable strength, often beaded (Monterosato, 1884)] to be quoted for the Italian coast. The new taxon has been compared



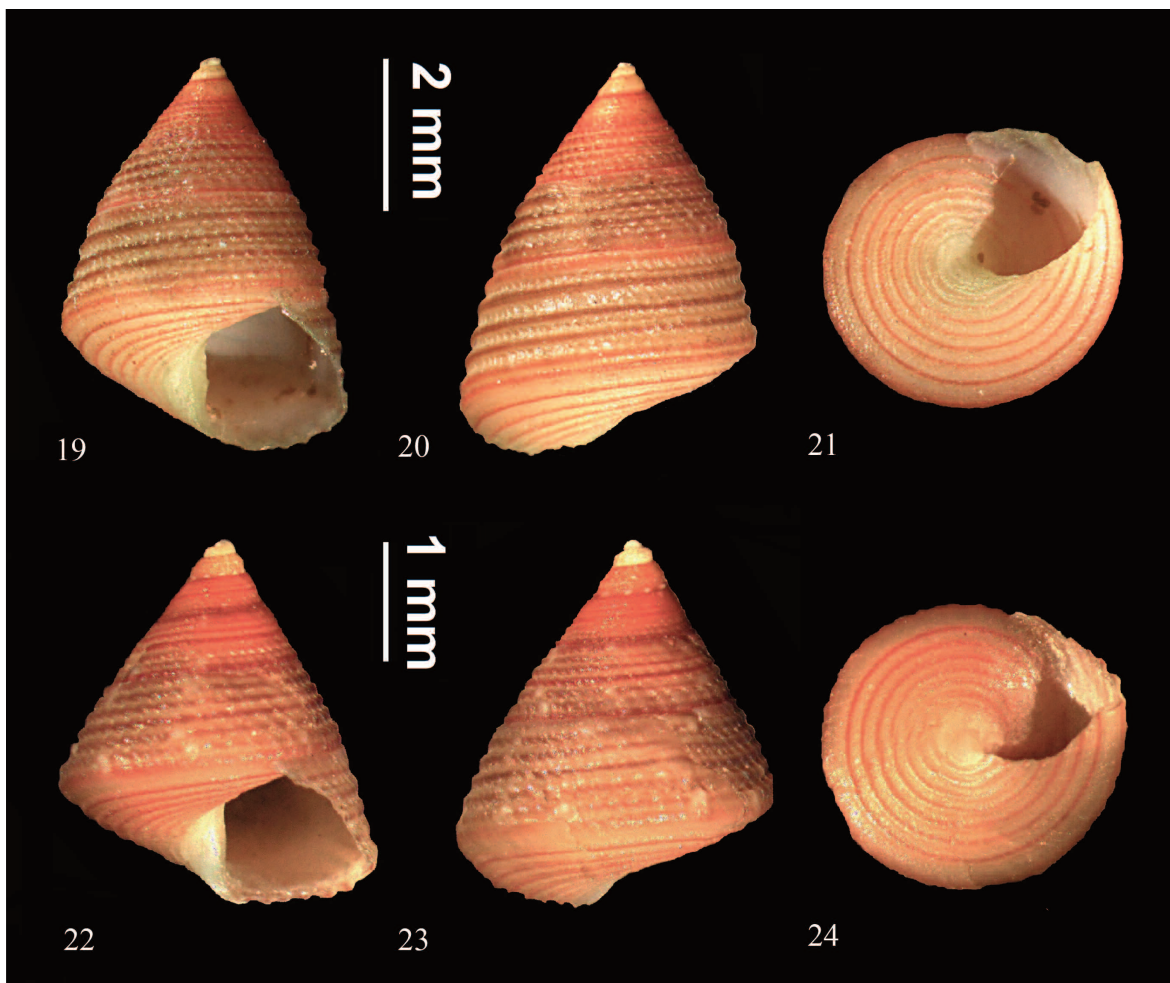
Figures 1–3. *Jujubinus errinae* n. sp., holotype (MZB60155), 4.9 mm (H) x 4.0 mm (W), from type locality (Strait of Messina), 100 m depth. Figures 4–5. *Jujubinus errinae* n. sp., paratype A (SG), 6.0 mm (H) x 4.7 mm (W) from type locality (Strait of Messina), 100 m depth.



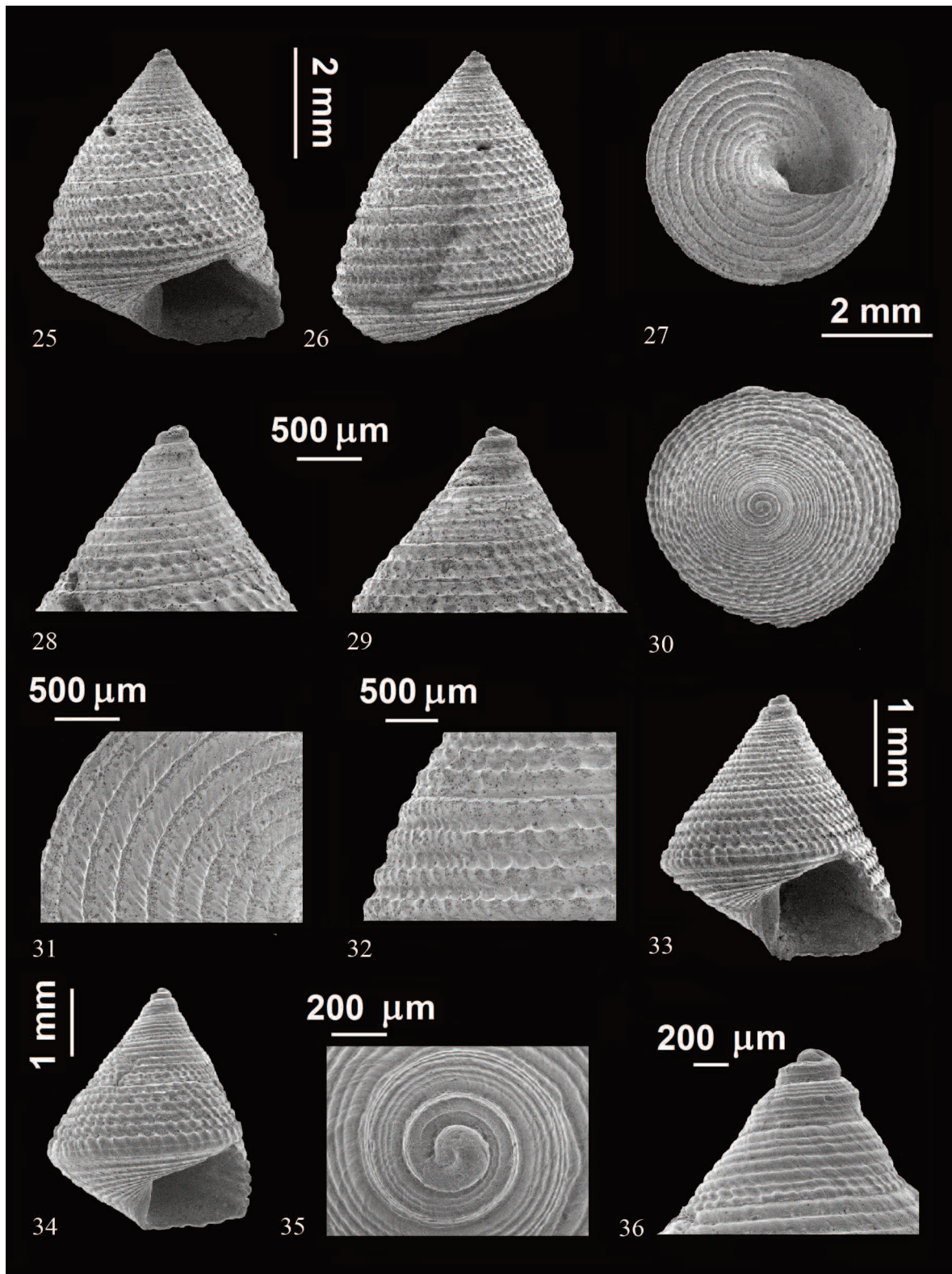
Figures 7–15. *Jujubinus errinae* n. sp., holotype, SEM analyses, details of the shell. Figures 16–18. *Jujubinus errinae* n. sp., Strait of Messina, paratype R, 1.8 m (H) x 1.9 mm (W), CS-PM collection. Subadult specimen with basal cord sculptured by very pronounced tubercles.

with three species showing a similar sculpture and occurring in the near Sicily Channel, *J. catenatus*, *J. montagui* and *J. tumidulus* (Curini & Palazzi, 1982). In particular, *J. errinae* n. sp. differs from *J. catenatus* (Figs. 19–36), the most closely related species which has an evident “pear-shaped” shell outline and shows a stronger sculptured ornamentation of the spiral cord interspaces, as well as a different background colour, being uniformly reddish-greenish in *J. catenatus*, while the spiral cords of *J. errinae* n. sp. are white-spotted producing a typical shell pattern of irregular and interrupted axial stripes. The new species differs from *J. montagui* for its lower ratio H/W, the sculpture more tuberculate and densely ornamented with growth striae, producing a more jagged appearance of the shell surface, and the different shell chro-

matic pattern. The shell colour of *J. montagui* is generally whitish or greyish with irregular brown axial stripes and basal cords with equally spaced and alternate brown-white dashes (Scaperrotta et al., 2010). *Jujubinus errinae* n. sp. differs from *J. tumidulus* being greater in size, having a much stronger sculpture, higher ratio H/W and a different shell colour, which in the latter species is generally uniformly creamy-whitish with brown spotted spiral cords (Scaperrotta et al., 2009). Noteworthy, the new taxon shows in the initial teleoconch whorls the basal cord strongly rippled, which becomes flat in the following whorls. This morphological feature, very evident in juvenile shells (Figs. 16–18), regularly disappears during the shell development (Figs. 7–15). More generally, *J. errinae* n. sp. differs from most of the Atlantic and Mediter-



Figures 19–21. *Jujubinus catenatus* Ardovini, 2006. Sicily Channel. Figures 22–24. *Jujubinus catenatus*. Sicily Channel.



Figures 25–32. *Jujubinus catenatus* Ardevini, 2006. Specimen of figure 19. Sicily Channel, SEM analyses, details of the shell. Figure 33. *Jujubinus catenatus*. Strait of Messina, CS-PM collection. Subadult specimen. Figures 34–36. *Jujubinus catenatus*. Specimen of figure 22. Sicily Channel, SEM analyses, details of the shell.

ranean *Jujubinus* species by its strongly tuberculate and jagged teleoconch sculpture, with evident lamellae in the interspaces and for its diagnostic coloration (see Description), never observed in any Recent *Jujubinus* distributed in Atlantic Ocean and Mediterranean Sea.

The new species is known currently so far only from the type locality, in the Strait of Messina, suggesting to be another new endemism for this area (Fig. 37). The Strait of Messina is a complex and diversified environment having in the tidal-induced upwelling its main physical constraint. The upwelling, causing nutrient enrichment and temperature lowering of surface water both supports exceptionally dense populations of suspension feeders (Mistri & Ceccherelli, 1995; De Domenico et al., 2009) and allows the settlement of Pliocene Atlantic remnants (Fredj & Giaccone, 1995). In this area, hard substrate corresponding to the Colantoni et al. (1981) “rough bottoms with pinnacles”, are characterized by dense and extensive colonies of the Hydrozoan Stylasteridae *Errina aspera*, known only for Gibraltar and the Messina Straits, which hosts an abundant and peculiar benthic fauna of Atlantic origin (Giacobbe & Spanò, 2001; Giacobbe et al., 2007). Such well-known associated fauna was found in the sampled *E. aspera* beds (DG001 and DG04; 90–115 m depth), together with less frequent “accessory” species, as the bivalve *Spondylus gussoni* O.G. Costa, 1829, and the here described *J. errinae* n. sp. Such associated fauna was also found deeper (St 02; 201 m depth), on partially consolidated coarse sediment, colonized by *E. aspera* together with the giant barnacle



Figure 37. Distribution of *Jujubinus errinae* n. sp.

Pachylasma giganteum (Philippi, 1836). Differently, the bathyal bottom sediment collected on the Gioia Basin slope (St 1B; 371 m), characterized by terrigenous gravelly sands, showed a mixture of autochthonous (bathyal) and allochthonous (subtidal) bioclastic remains, which included *J. errinae* n. sp. specimens. Interestingly, in the same geographical area is present *Jujubinus curinii* Bogi et Campani, 2005, another endemism belonging to the so-called “smooth” *Jujubinus* complex (Smriglio et al., 2014 and references therein). Such co-occurrence of congeneric endemisms is not surprising, since the two species are living in different habitats whose peculiarities have been put in evidence in literature. *Jujubinus errinae* n.sp., as accessory species in the *E. aspera* assemblages, might represent a further Atlantic relict fauna having in the Strait of Messina its areal distribution.

ACKNOWLEDGEMENTS

Sincere thanks are due to Andrea Di Giulio and Patrizio Tratzi (Dipartimento di Scienze, Università “Roma Tre”, Rome, Italy), for the SEM photographs carried out at the LIME. We would like to express our gratitude to Massimo Appolloni (Museo Civico di Zoologia, Rome, Italy) for the examination of the *Jujubinus* material kept in the Monterosato collection. A special thanks to Walter Renda (Reggio Calabria, Italy) for his great and disinterested help in this research.

REFERENCES

- Barbero Bianchi C.N., 2004. Proposta di suddivisione dei mari italiani in settori biogeografici. *Notiziario SIBM*, 46: 57–59.
- Bogi C. & Campani E., 2005. *Jujubinus curinii* n. sp. una nuova specie di Trochidae per le coste della Sicilia. *Bollettino Malacologico*, 41: 99–101.
- Colantoni P., Fabbri A. & Gallignani P., 1981. Seismic stratigraphic interpretation of high resolution profiles; some applied examples. *Bollettino di Geofisica Teorica e Applicata*, 23: 89–106.
- Curini M. & Palazzi S., 1982. Note ai Trochidae, V, *Jujubinus tumidulus* (Aradas, 1846) (Mollusca, Gastropoda). *Naturalista Siciliano*, 6: 67–80.
- De Domenico F., Giacobbe S. & Rinelli P., 2009. The genus *Antedon* (Crinoidea, Echinodermata) in the Strait of Messina and the nearby Tyrrhenian Sea

- (Central Mediterranean). Italian Journal of Zoology, 76: 70–75.
- Fredj G. & Giaccone G., 1995. Particularités des peuplements benthiques du détroit de Messine. In: Guglielmo L., Manganaro A. & De Domenico, E. (Eds.). The Strait of Messina ecosystem, pp. 119–128.
- Giacobbe S. & Spanò N., 2001. *Pilumnus inermis* (Decapoda, Brachyura) in the Straits of Messina (Mediterranean Sea): distribution and some aspects of its ecology. Crustaceana, 74: 659–672.
- Giacobbe S., Laria G. & Spanò N., 2007. Hard bottom assemblages in the strait of Messina: distribution of *Errina aspera* L. (Hydrozoa: Stylasteridae). Rapports Commission International Mer Méditerranée, 38: 485.
- Gofas S. & Bouchet P., 2015. *Jujubinus*. Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=138591> on 2015-09-12.
- Mariottini P., Di Giulio A., Apolloni M. & Smriglio C., 2013. Phenotypic diversity, taxonomic remarks and updated distribution of the Mediterranean *Jujubinus baudoni* (Monterosato, 1891) (Gastropoda Trochidae). Biodiversity Journal, 4: 343–354.
- Mistri M. & Ceccherelli V.U., 1995. Produzione secondaria di organismi coloniali di substrato duro: i gorgonacei. S.I.T.E. atti, 16: 463–465.
- Monterosato T.A. di Maria di, 1884. Conchiglie littorali mediterranee. Naturalista Siciliano, Palermo, 3: 102–111.
- Scapperotta M., Bartolini S. & Bogi C., 2009. Accrescimenti. Stadi di accrescimento dei Molluschi marini del Mediterraneo. I. L'Informatore Piceno, Ancona, 167 pp.
- Scapperotta M., Bartolini S. & Bogi C., 2010. Accrescimenti. Stadi di accrescimento dei Molluschi marini del Mediterraneo. II. L'Informatore Piceno, Ancona, 176 pp.
- Smriglio C., Di Giulio A. & Mariottini P., 2014. Description of two new *Jujubinus* species (Gastropoda: Trochidae) from the Sicily Channel with notes on the *Jujubinus curinii* species complex. Zootaxa, 3815: 583–590.
- Smriglio C., Mariottini P. & Oliverio M., 2015. A new species of the *Jujubinus curinii* species complex: *J. alboranensis* n. sp. (Gastropoda: Trochidae) from the Alboran Sea. Iberus, 33: 151–157.
- Spanu M.T., 2011. Prima segnalazione di *Jujubinus baudoni* (Monterosato, 1891 ex H. Martin ms) (Gastropoda: Trochidae) per la Sardegna e le acque italiane. Bollettino Malacologico, 47: 135–137.