Granulina zanclea spec. nov. (Gastropoda, Marginellidae) from the Southern Tyrrhenian Sea

Granulina zanclea spec. nov. (Gastropoda, Marginellidae) del Mar Tirreno meridional

Cesare BOGI*, Franck BOYER**, Walter RENDA*** and Salvatore GIACOBBE****

Recibido el 30-X-2015. Aceptado el 31-III-2016

ABSTRACT

A tiny cylindrical shelled species of *Granulina* is described as new from the bathyal of Southern Tyrrhenian Sea, on the basis of shell morphology. *G. zanclea* sp. nov. is compared with similar species known from the Mediterranean and northeastern Atlantic. The high level of specific diversity of the *Granulina* in Mediterranean is underlined.

RIASSUNTO

Una piccola conchiglia di forma cilindrica appartenente al genere *Granulina*, raccolta in sedimenti batiali del Sud Tirreno, viene descritta come nuova specie sulla base della morfologia conchigliare.

G. zanclea n. sp. è qui confrontata con specie simili conosciute per il Mediterraneo e nord-est Atlantico. Viene inoltre evidenziato l'alto livello di diversità specifica del genere *Granulina* in Mediterraneo.

INTRODUCTION

The genus *Granulina* Jousseaume, 1888 includes small marine gastropods with ovate, colorless and smooth shells. The family placement of *Granulina* remains under discussion. Respectively on the ground of animal type and of original shell characters, La Perna (1999) and Boyer and Rolán (2004) challenged the placement of the Granulinae within Cystiscidae, as proposed by Coovert and Coovert (1995), and preferred to keep *Granulina* and the Granulinae within the family Marginellidae, in a conservative way.

The species from Mediterranean and nearest Atlantic were revised by Gofas (1992), who recorded only four species from the inner Mediterranean and two species restricted to the waters of the Strait of Gibraltar. Subsequently, several new species of *Granulina* have been added to the Mediterranean fauna by Smriglio and Mariottini (1996, 1999, 2003, 2013), Smriglio, Mariottini & Rufini (1998) and Landau, La Perna and Marquet (2006). Currently, no less than 12 recent species of *Granulina* are recognized from Mediterranean waters,

*= Via Gino Romiti 37, 57124 Livorno Italy, e-mail : bogicesare@tiscali.it
**= 4 impasse Pasquier, 30190 Garrigues Sainte Eulalie, France. e-mail : franck.boyer7@orange.fr
***= Via Bologna, 18/A, 87032 Amantea (CS), Italy, e-mail : w.renda1@tin.it
****=Dipartimento di Scienze Biologiche e Ambientali, Università di Messina, Viale Stagno D'Alcontres, 98166 Messina, Italy. e-mail: sgiacobbe@unime.it

most of them ranging in the Western Mediterranean and some being restricted to the Alboran Sea. As a further confirmation of this high specific diversity at the local scale, a tiny, apparently new form of *Granulina* was recently discovered in deep water sediment samples collected along the Gioia Tauro Basin, a poorly explored area of Southern Tyrrhenian Sea. The species shows a peculiar cylindrical shape and is well-distinguishable from all the other Mediterranean species of *Granulina*, as well as from other tiny cylindrical forms known from Eastern Atlantic (Boyer & Rolán, 1999, 2004).

SYSTEMATICS

Family Marginellidae Fleming, 1828
Subfamily Granulininae Coovert and Coovert, 1995
Genus *Granulina* Jousseaume, 1888

Granulina zanclea spec. nov.

Type material: Holotype: H=1.84 mm, W= 0.9 mm, is deposited in the collection of the Museum at Bologna University with the catalog number MZB60200. One fragment H=1.93 mm in the collection of W. Renda (Amantea, Italy); one fragment H=1.94 mm in the collection of S. Giacobbe (Messina, Italy). All the specimens are from deep water sediment samples collected along the Gioia Tauro Basin, Southern Tyrrhenian Sea.
Etymology: from Zancle, ancient name of the Messina town, whose colonizers founded the city of Gioia Tauro, both facing on the Gioia Tauro basin sampled area.

Description (Holotype, Figs. 1 B-F): Shell minute, slender cylindrical outline, whitish. Spire absorbed, anterior and posterior ends rounded, opening a little narrow along its posterior $^{2}/_{3}$ and widening along its anterior $^{1}/_{3}$, lip vertical and thin, with low but sharply designed outer margin, with flat surface, angular break of the slope, and steep step over the body whorl, with no internal teeth. Four protuberant columellar plaits on the anterior 1/3 of the left border, the first one being the largest. The surface is smooth except a well-delimited columellar callus with a distinctive microshagreen network in its lower part. Numerous and strongly marked growth axial ribs all along the body whorl.

Radula and soft parts unknown.

Distribution: Presently known only for the Gioia Tauro Basin, South-east Tyrrhenian Sea.

Habitat: The single specimen and the fragments were collected in a sediment sample carried out from the Gioia bathyal plane, close to the continental slope (38°19.24' N – 15°44.99'E, 335 m depth). The sediment was composed of allochthonous gravelly sands covered by a fine layer of silt, with bioclastic remain and continental plant debris.

Remarks: The Mediterranean species of *Granulina* so far known are markedly different in shell characters from *G. zanclea* spec. nov., especially taking into account its unusual cylindrical outline.

Several species of *Granulina* with a cylindrical shape have been recently reported by Boyer and Rolán (2004) from the North East Atlantic, with the description of the new species *G. cylindrata*.

Granulina zanclea is well-distinct from *G. cylindrata* on the basis of several morphologic features:

- The more elevated columellar plaits.
- The well-delimited columellar callus.
- The thinner lip, with a low but sharply defined outer edge, flat and forming an angle with the outer surface of the body whorl.

The surface is completely smooth, contrary to *G. cylindrata* in which the

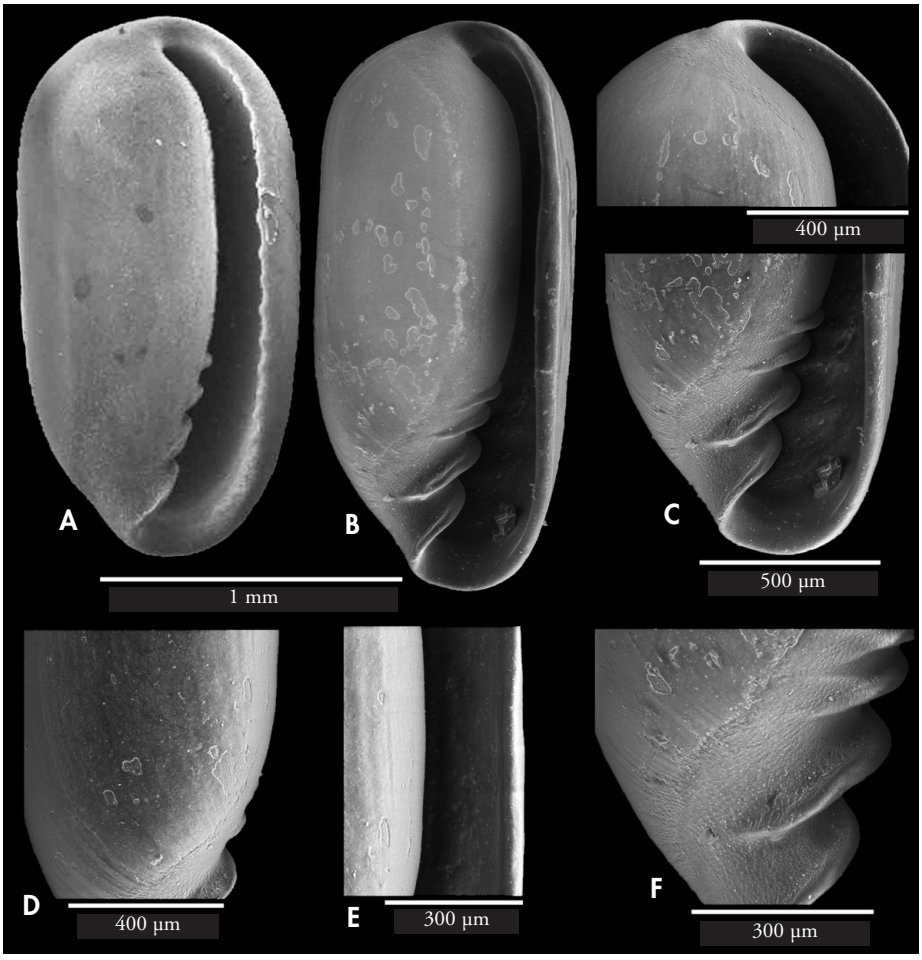

Figure 1. A. *Granulina cylindrata*, holotype, height 1.58 mm, Les Madeleines, Dakar, Senegal. B-F. *Granulina zanclea* spec. nov., holotype, height 1.84 mm, Gioia, Tauro basin, southern Tyrrhenan Sea, 335 m. B: frontal view; C, D, F: details of the columellar plaits and of the rounded posterior end; E: detail of the median portion of the outer lip; note the absence of internal teeth.
Figura 1. A. Granulina cylindrata*, holotipo, altura 1,58 mm, Les Madeleines, Dakar, Senegal. B-F.* Granulina zanclea *spec. nov., holotipo, altura 1,84 mm, cuenca de Gioia, Tauro, sur del Mar Tirreno, 335 m. B: vista frontal; C, D, F: detalles de los pliegues columelares y del extremo posterior redondeado; E: detalle de la parte media del labio exterior; nótese la ausencia de dientes internos.*

microsculpture of the body whorl consists of very fine low granulations covering the whole surface (BOYER & ROLÁN, 2004). In the same article, two other forms are described: *Granulina* sp.1, from the Cape Verde Islands, and *Granulina* sp. 2 from Lanzarote, Canary Islands. *Granulina* sp.1 differs from *G. zanclea* principally in the smaller size, the presence of only three, less prominent columellar plaits and by the more elevated posterior part of the labrum. *Granulina* sp. 2 differs principally by its slender outline, its attenuated anterior part, its oblique and not prominent columellar plaits.

Table I. List of molluscs collected in Gioia bathyal plain, 335 m depth.
Tabla I. Lista de moluscos colectados en la llanura batial de Gioia, en 335 m de profundidad.

Gastropoda
Emarginula pustula Thiele in Küster, 1913
Anatoma umbilicata (Jeffreys, 1883)
Lepetella laterocompressa (de Rayneval & Ponzi, 1854)
Akritogyra conspicua (Monterosato, 1880)
Dikoleps depressa (Monterosato, 1880)
Dikoleps nitens (Philippi, 1844)
Turritella communis Risso, 1826
Epitonium clathrus (Linnaeus, 1758)
Epitonium tiberii (de Boury, 1890)
Epitonium tryoni (de Boury, 1913)
Aclis attenuans Jeffreys, 1883
Eulima bilineata Alder, 1848
Melanella lubrica (Monterosato, 1890)
Entoconcha mirabilis J. Müller, 1852
Curveulima devians (Monterosato, 1884)
Alvania cimicoides (Forbes, 1844)
Alvania testae (Aradas & Maggiore, 1844)
Benthonella tenella (Jeffreys, 1869)
Crisilla beniamina (Monterosato, 1884)
Onoba dimassai Amati & Nofroni, 1991
Ceratia proxima (Forbes & Hanley, 1850)
Hyala vitrea (Montagu, 1803)
Hadriania craticulata Bucquoy & Dautzenberg, 1882
Pagodula echinata (Kiener, 1840)
Trophonopsis muricata (Montagu, 1803)
Granulina occulta (Monterosato, 1869)
Nassarius lima (Dillwyn, 1817)
Nassarius pygmaeus (Lamarck, 1822))
Mitrella minor (Scacchi, 1836)
Fusinus pulchellus (Philippi, 1840)
Fusinus rostratus (Olivi, 1792)
Comarmondia gracilis (Montagu, 1803)
Gymnobela abyssorum (Locard, 1897)
Pleurotomella eurybrocha (Dautzenberg & Fischer, 1896)
Pleurotomella gibbera Bouchet & Warén, 1980
Raphitoma pseudohystrix (Sykes, 1906)
Taranis moerchii (Malm, 1861)
Sorgenfreispira brachystoma (Philippi, 1844)
Bela menkhorsti van Aartsen, 1988
Mangelia costata (Pennant, 1777)
Mangelia nuperrima (Tiberi, 1855)
Kurtziella serga (Dall, 1881)
Parthenina flexuosa (Monterosato, 1874)
Parthenina palazzii (Micali, 1984)
Tiberia minuscula (Monterosato, 1880)
Turbonilla gradata Bucquoy, Dautzenberg & Dollfus, 1883
Turbonilla pumila Seguenza G., 1876
Eulimella acicula (Philippi, 1836)
Eulimella scillae (Scacchi, 1835)
Eulimella ventricosa (Forbes, 1844)
Syrnola minuta H. Adams, 1869
Crenilabium exile (Jeffreys, 1870)
Diaphana lactea (Jeffreys, 1877)
Philine quadrata (S. Wood, 1839)
Hermania scabra (O. F. Müller, 1784)
Cylichna cylindracea (Pennant, 1777)
Roxania monterosatoi Dautzenberg & H. Fischer, 1896

Bivalvia
Nucula sulcata Bronn, 1831
Yoldiella philippiana (Nyst, 1845)
Crenella arenaria Monterosato, 1875 ex H. Martin, ms.
Modiolula phaseolina (Philippi, 1844)
Limatula gwyni (Sykes, 1903)
Myrtea spinifera (Montagu, 1803)
Thyasira biplicata (Philippi, 1836)
Thyasira subovata (Jeffreys, 1881)
Diplodonta rotundata (Montagu, 1803)
Acanthocardia paucicostata (G. B. Sowerby II, 1834)
Abra nitida (O. F. Müller, 1776)
Kelliella miliaris (Philippi, 1844)
Timoclea ovata (Pennant, 1777)
Corbula gibba (Olivi, 1792)
Cuspidaria cuspidata (Olivi, 1792)
Cuspidaria rostrata (Spengler, 1793)
Tropidomya abbreviata (Forbes, 1843)

Scaphopoda
Antalis agilis (M. Sars in G.O. Sars, 1872)
Cadulus jeffreysi (Monterosato, 1875)

G. fernandesi Boyer and Rolàn, 1999, described for the Cape Verde Islands, presents some similarities with G. *zanclea* but differs principally for its smaller size, its squat shape and less pronounced columellar plaits. Our specimen, overall well preserved, was found together a mixture of fresh, eroded and fragmented shell remains (Table I), as described by Selli *et al*.

(1978) for the same sampled area. According to this author, reworked specimens were in part lower or middle Pleistocene fossils, in part displaced from littoral environments and from the "coralligenous formations" of the sill. With this respect, the apparent freshness of the here described specimen suggested a recent origin, whereas fragments might be due to predation by durophagous fishes or crabs. Moreover, the species was not described as fossil from the well-known nearby Pleistocene outcrops, and does not appear in the most recent revisions (LA PERNA, 1999, 2000).

As a final comment, the occurrence of *G. zanclea* n. sp. morphologically similar to other cylindrical shaped species from north-east Atlantic, might find an explanation with the biogeographic affinities linking the Strait of Messina area with the subtropical Atlantic (BIANCHI *ET AL.*, 2012). Such affinities notoriously underlie disjoint or discontinuous areas, such as those known for habitat-forming laminariales (DREW, 1974), hydrocorals (ARNAUD AND ZIBROWIUS, 1979), and associated species (ARNAUD AND ZIBROWIUS, 1979; FREDJ AND GIACCONE, 1987; GIACOBBE AND SPANÒ, 2001; 2006). Additional evidences, however, are necessary to validate its inclusion to the recent fauna of the Mediterranean Sea.

ACKNOWLEDGEMENTS

Thanks to Giuseppe Sabatino for the SEM photographs of then. sp., and to E. Rolán for comments and for photographs of *G. cylindrata*.

BIBLIOGRAPHY

ARNAUD P.M. & ZIBROWIUS H. 1979. L'association *Pedicularia sicula–Errina aspera* en Méditerrranée (Gastropoda Prosobranchia et Hydrocorallia Stylasterina). *Rapport de la Commission Internationale de la Mer Méditerranée*, 25/26 (4): 123–124.

BIANCHI C.N., MORRI C., CHIANTORE M., MONTEFALCONE M., PARRAVICINI V. & ROVERE A. 2012. Mediterranean Sea biodiversity between the legacy from the past and a future of change. In Stambler N. (Ed.): *Life in the Mediterranean Sea: A Look at Habitat Changes*. Nova Science Publishers, Inc., New York: 1-55.

BOYER F. & ROLÁN E. 1999. *Granulina fernandesi* (Gastropoda: Volutacea), a new species from Cape Verde Islands, and some considerations on the genus *Granulina*. *Iberus*, 17 (2): 1-10.

BOYER F. & ROLÁN E. 2004. About a series of cylindrical shelled *Granulina* (Marginellidae) from north east Atlantic waters and the taxonomic organization of the Granulininae. *Iberus*, 22 (1): 155-165.

COOVERT G.A. & COOVERT H.K. 1995. Revision of the supraspecific classification of marginelliform Gastropods. *The Nautilus*, 109 (23): 43-110.

DREW E.A. 1974. An ecological study of *Laminaria ochroleuca* Pyl. growing below 50 meters in the Straits of Messina. *Journal of Experimental Marine Biology and Ecology*, 15: 11-24.

FREDJ G. & GIACCONE G. 1987. Bionomie des fonds à Laminariales du détroit de Messine. *Documents et Travaux IGAL*, 11: 237-238.

GIACOBBE S. & SPANÒ N. 2001. *Pilumnus inermis* (Decapoda, Brachyura) in the Straits of Messina and the southern Tyrrhenian Sea (Mediterranean Sea): distribution and some aspects of its ecology. *Crustaceana*, 74 (7): 659-672.

GIACOBBE S. & SPANÒ N. 2006. A new record of *Euchirograpsus liguricus* (Decapoda, Brachyura) in Mediterranean Sea. *Crustaceana*, 79 (5): 555-562.

GOFAS S. 1992. Le genre *Granulina* (Marginellidae) en Méditerranée et dans l'Atlantique oriental. *Bollettino Malacologico*, 28 (1-4): 1-26.

LANDAU B., LA PERNA R. & MARQUET R. 2006. The early Pliocene Gastropoda (Mollusca) of Estepona, Southern Spain. Part 10: Marginellidae, Cystiscidae. *Palaeontos*, 9: 22-60.

LA PERNA R. 1999. Pleistocene and Recent Mediterranean species of *Granulina* (Gastropoda: Marginellidae), with the description of four new species. *Bollettino Malacologico*, 34 (1-4): 33-42.

LA PERNA R. 2000. *Granulina elliptica* n.sp. and comments on the Mediterranean Pliocene species of *Granulina* (Gastropoda, Marginellidae). *Bollettino Malacologico*, 35 (1-4): 53-55.

Selli R., Colantoni P., Fabbri A., Rossi S., Borsetti A.M. & Gallignani P. 1978. Marine Geological investigation on the Messina Straits and its approaches. *Giornale di Geologia,* (2)42 (2): 1-70.

Smriglio C. & Mariottini P. 1996. Mollusche del Mar Tirreno Centrale.Contributo XII. Description of a new species of Cystiscidae Stimpson, 1865 from the Mediterranean: *Granulinagofasi* n. sp. *La Conchiglia*, 281:54-56.

Smriglio C., Mariottini P. & Rufini S. 1998. Description of *Granulina melitensis* n. sp. (Neogastropoda, Cystiscidae) from the Mediterranean Sea. *La Conchiglia*, 287: 53-56.

Smriglio C. & Mariottini P. 1999.Descrizione di *Granulina gubbiolii* n. sp. Per il Mar Mediterraneo. *La Conchiglia* 31 (292) : 35 – 40.

Smriglio C. & Mariottini P. 2003. *Granulina pusaterii*. In Giannuzzi-Savelli R., Pusateri F., Palmeri A. & Ebreo C. (Eds.): *Atlante delle conchiglie marine del Mediterraneo,* vol. 4 (Neogastropoda: Muricoidea). Evolver, Roma: 286-288.

Smriglio C. & Mariottini P. 2013. Description of *Granulina lapernai* spec. nov. (Gastropoda, Marginellidae) from the Mediterranean Sea. *Basteria*, 77 (1-3): 23-28.