

Two new species of Early Pleistocene marine ostracods from Southeast Sicily

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Abstract: Two fossil species of Ostracoda belonging to the genera *Urocythereis* RUGGIERI, 1950, and *Semicytherura* WAGNER, 1957, discovered in the Lower Pleistocene shallow marine sandy-silty sediments outcropping at "Cartiera Molino" (F. 276, IV NO, Vittoria, Southeast Sicily) are described and figured.

Key Words: Shallow marine ostracods; new species; Early Pleistocene; Sicily.

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Résumé : *Deux nouvelles espèces d'ostracodes marins du Pléistocène inférieur du Sud-Est de la Sicile.*- Deux nouvelles espèces d'ostracodes fossiles appartenant aux genres *Urocythereis* RUGGIERI, 1950, et *Semicytherura* WAGNER, 1957, découvertes dans des sédiments marins peu profonds, sableux et sablonneux, du Pléistocène inférieur affleurant à "Cartiera Molino" (F. 276, IV NO, Vittoria, Sud-Est de la Sicile), sont décrites et figurées.

Mots-clefs : Ostracodes marins de faible bathymétrie ; nouvelles espèces ; Pléistocène inférieur ; Sicile.

Riassunto: *Due nuove specie di ostracodi marini del Pleistocene inferiore della Sicilia sud-orientale.*- Due specie di ostracodi fossili appartenenti ai generi *Urocythereis* RUGGIERI, 1950, e *Semicytherura* WAGNER, 1957, rinvenute in sedimenti sabbioso siltosi di acque basse del Pleistocene Inferiore affioranti in località "Cartiera Molino" (F. 276, IV NO, Vittoria, Sicilia sud-orientale) vengono qui descritte e approximate.

Parole chiave: Ostracodi marini; specie nuove; infralittorale; Pleistocene Inferiore; Sicilia.

Introduction

Lower Pleistocene marine sediments, locally evolving upwards to lacustrine deposits, widely crop out along the south-western edge of the Hyblean Plateau in the Comiso-Vittoria area (Fig. 1). These sediments consist predominantly of yellow calcareous sands, sands and silts and /or calcarenites with the bivalve *Arctica islandica* (LINNAEUS, 1767) and the foraminifer *Hyalina balthica* (SCHRÖTER, 1783). They evolve laterally and upward to marine whitish silts and sands that locally evolve, in turn, to lacustrine white calcareous silts and travertine. This succession is truncated by an erosive surface with which Lower-Middle Pleistocene sandy sediments are associated. The regressive succession is known through geological studies by CONTI *et al.* (1979) and molluscan analyses by COSTA (1989). A further palaeoecological study of these sediments was conducted, which integrated the data obtained from the analysis of ostracods, forams, bryozoans and serpulids (SCIUTO *et al.*, in prep.) that have been found along a 6 m thick section, well exposed at "Cartiera Molino" (F. 276, IV NO, Vittoria, RG) along the north side of the Ippari River (Fig. 2).

Some ostracods found in the lower layers (Fig. 2, unit A of the section, samples 1-3) do not seem to belong to any known species. The aim of this paper is therefore to describe these

two new species, respectively belonging to the genus *Urocythereis* RUGGIERI, 1950, and to *Semicytherura* WAGNER, 1957.

Materials and methods

The newly described species were recovered from the lower marine silty sandy layers (samples 1-3 in unit A) of the Cartiera Molino section referred to the Early Pleistocene. These layers contain abundant ostracods such as *Aurila*, *Loxoconcha*, *Bairdia*, *Urocythereis*, *Costa*, *Cytheretta*, *Cytherelloidea* and *Graptocythere*. These species are typical of algae and/or algal debris, may testify to a very shallow and sheltered marine environment, which can be ascribed to SVMC (Upper muddy-sand assemblages in sheltered areas) Biocoenosis *sensu* PÉRÈS & PICARD (1964) and PÉRÈS (1982) [SCIUTO *et al.*, in prep.].

Samples were washed and sieved, and ostracods were picked from the 63-500 µm size fraction. Selected ostracods were studied and photographed under a LMU Tescan Vega II SEM.

The material is housed in the Museo di Paleontologia of the Department of Bio- Geo- Environmental Science of the University of Catania. The repository number of the two holotypes and all the paratypes are given in the systematic descriptions.

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◀ **Figure 1:** Geographical location of Cartiera Molino.

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Figure 2: A view of the sedimentary succession at Cartiera Molino. A) Marine sandy-silty sediments, samples 1-3. B) Brackish water sediments and white lacustrine calcareous silts and travertine.

Systematics

Class Ostracoda LATREILLE, 1806

Order Podocopida SARS, 1866

Family Hemicytheridae PURI, 1953

**Sub-family Urocythereidinae
HARTMANN & PURI, 1974**

Genus *Urocythereis* RUGGIERI, 1950

Type species: *Cytherina favosa* ROEMER, 1838.

***Urocythereis emanuelae* n.sp.**

(Pl. 1, figs. A-L)

Derivatio nominis: The species is named after Dr. Emanuela DI MARTINO, palaeontologist, for her scientific contribution to Neogene invertebrates.

Material: Nine left valves and five right valves.

Holotype: The left female valve figured in Pl. 1, fig. A, from sample 1 (L = 740 µm, H = 400 µm) (PMC. O10 H. 10.03.2014)

Paratypes: The left valve (male) figured in Pl. 1, fig. C (L = 930 µm, H = 525 µm), and the two right valves figured in Pl. 1, fig. B (L = 940 µm, H = 520 µm) and D (L = 935 µm, H = 530 µm) (PMC. O41-43P. 10.03.2014) from sample 1. Four right valves and seven left valves not figured from samples 2 and 3.

Type locality: "Cartiera Molino" (F. 276, IV NO; 36°56'58"N; 2°07'00"E) along the north side of the Ippari River near Vittoria (RG) (Fig. 1) in the Lower Pleistocene, shallow-water marine, whitish silty-sandy sediments (Fig. 2).

Stratigraphic range: Lower levels (samples 1-3) of the stratigraphic section of Cartiera Molino attributable to the Early Pleistocene.

Diagnosis: *Urocythereis emanuelae* n.sp. is characterized by subrectangular ovate valves with the exterior surface entirely ornamented by strongly crenate ridges, sometimes intersecting and/or bifurcating.

Description:

Carapace medium sized ovate subrectangular in lateral external view (Pl. 1, figs. A-D). Anterior margin regularly arched and well marked by several denticles, smooth and arched dorsal margin that passes into the posterior margin with an obtuse angle. Posterior margin obtuse and denticulate, initially straight, then arcuate. Ventral margin slightly convex.

Outer surface ornamentation consists of thin, jagged ridges with flattened tops. The first three anterior ridges are curved and parallel to each other and with the anterior

margin; the other ridges are almost straight. The ridges, sometimes discontinuous, intersecting and branching give rise to a labyrinthine morphology with wide and flat sulci.

Normal pore-canals sieve type (Pl. 1, fig. G), evenly scattered on the valves.

Eye tubercles barely visible outside, while, inside, the eye sockets are much engraved and clearly visible (Pl. 1, figs. B, E). Post ocular sinus evident.

Hinge heterodont (Pl. 1, figs. E-F, L): in the right valve, a straight crenulate - groove parallel to the dorsal margin connecting two simple teeth; the anterior smaller one with a lateral socket at the anterior extremities, the biggest at the posterior. Left valve complementary.

Post ocular buttress clearly evident.

Inside, internal marginal zone very strong, wider anteriorly; adhesive strip very large, marginal pore-canals numerous, simple, straight and observable all along the marginal zone. Selvage very marked around the anterior and ventral-posterior outline (Pl. 1, figs. B, H-I), *septa* clearly visible. Oral convexity well marked.

It is possible to identify two sets of muscle scars such as in the features of the genus, the first group of frontal scars is easily identifiable (Pl. 1, fig. B), the second group is less clearly defined.

Sexual dimorphism marked; the males showing larger size than the females, and the postero-ventral area ornamented.

Remarks - The genus *Urocythereis* RUGGIERI, 1950, is known from the Tertiary to the Recent. The living species are usually referred to shallow water (Infralittoral stage). Only four species are reported in the Recent Mediterranean Sea (HORNE *et al.*, 2001). Moreover, its geographical distribution seems to be quite limited, living records being reported in the North European Seas, East Atlantic (ATHERSUCH, 1977; HORNE *et al.*, 2001), and the China Sea.

Similarities and differences - For identifying the diagnostic characters of the new species, reference was made to the study of ATHERSUCH (1977) who has performed a detailed taxonomy of all the known Recent species and some fossil species of the genus *Urocythereis*.

The new species described herein has been assigned to the genus *Urocythereis* using internal and external morphological features such as the general shape of the carapace, the type of hinge, and the marginal zone. *U. emanuelae* n.sp. is easily distinguishable from the other species of the genus because of the external ornamentation. *Urocythereis* species mostly show a reticulate ornamentation with rather

thick muri and fossae, like *U. favosa* (ROEMER, 1838), *U. margaritifera* (MÜLLER, 1894), *U. sororcula* (SEGUENZA, 1880), *U. crenulosa* (TERQUEM, 1878), and *U. minoos* ULICZNY, 1969, or a labyrinthine ornamentation with very thick and densified ridges that leave little space for the flat areas like *U. exedata* ULICZNY, 1969, and *U. labyrinthica* ULICZNY, 1969. The new species shows a general shape similar to *U. labyrinthica* ULICZNY, 1969, figured in MOSTAFAWI & MATZKE-KARASZ (2006) in Pl. 7, fig. 1, but the external ornamentation distinguishes it clearly.

U. emanuelae n.sp. while still showing ornamentation quite similar to *U. phantastica* ATHERSUCH & RUGGIERI, 1975, is easily distinguishable from this species because the distribution of muri is much less dense.

Family Cytheruridae MÜLLER, 1894

Sub-family Cytherurinae MÜLLER, 1894

Genus *Semicytherura* WAGNER, 1957

Type species: *Cythere nigrescens* BAIRD, 1838.

Semicytherura elsae n.sp.

(Pl. 2, figs. A-I)

Derivatio nominis: The species is named after Prof. Elsa GLIOZZI (University of Roma Tre), palaeontologist, for her scientific contribution to the study of ostracods.

Material: six left valves and three right valves.

Holotype: The right valve (female) figured in Pl. 2, fig. A (L = 500 µm, H = 300 µm), (PMC. O11 H. 10.03.2014) found in sample 1.

Paratypes: Three left valves figured in Pl. 2, fig. B (L = 530 µm, H = 280 µm), C (L = 535 µm, H = 275 µm), E (L = 520 µm, H = 220 µm) and the right valve figured in Pl. 2, fig. D (L = 520 µm, H = 270 µm), (PMC. O44-47 P. 10.03.2014) found in sample 1. Four right valves and five left valves from samples 2 and 3 are not figured.

Type locality: "Cartiera Molino" (F. 276, IV NO; 36°56'58"N; 2°07'00"E) along the north side of the Ippari River near Vittoria (RG) (Fig. 1) in the Lower Pleistocene, shallow marine, whitish silts.

Stratigraphic range: Lower levels (samples 1-3) of the stratigraphic section of Cartiera Molino attributable to the Early Pleistocene.

Diagnosis: *Semicytherura elsae* n.sp. is characterized by subrectangular shape with the exterior valve surface ornamented by large ribs that diverge and become progressively finer giving rise to a dendritic structure which delimits areas intensely reticulated in anterior, posterior and ventral areas; whereas large pits in sets of two, three or four characterize the

central area of the valves. Ala very strong and prominent. Caudal process short and obtuse in postero-dorsal area.

Description:

Carapace medium sized subrectangular in lateral external view (Pl. 2, figs. A-B).

Dorsal and ventral margin subparallel. Anterior margin regularly arched. Dorsal margin, thickened by a rugged rib, is straight in the right valve, flexuous in the left and passing into the caudal process in the posterior area through a slight curvature in subdorsal position. Caudal process small, obtuse and well marked. Posterior margin slightly arched forming a very marked obtuse angle with the ventral margin. Central area swollen from which originates a very strong, alar process downward and posteriorly.

In dorsal view (Pl. 2, fig. E) carapace clearly of subtrapezoid shape, because of the strong alar process which are obtuse and prominent. Anterior end acute, posterior large, denticulate with short caudal process.

Outer surface ornamentation of the central part of the valve and the inner part of the ala consists of large pits distributed in sets of two, three or four elements. Whereas around the central area the valves are ornamented by large ribs that diverge and become progressively finer giving rise to a dendritic structure which delimits areas intensely reticulated in anterior, posterior and ventral areas and in the outer part of the ala.

The longest rib starts posteriorly in subdorsal position and brand the dorsal margin to the height of the eye tubercle, it is divided into two branches which, in turn, bifurcate repeatedly. The main branch outermost gets progressively thinner until it reaches the midpoint of the anterior margin, the innermost falls downward and bifurcates in its turn. The second most important rib starts approximately just below the middle of the anterior margin, is repeatedly subdivided while the main branch moves towards the central area of the valve, after which it turns downwards and constitutes the outer margin of the ala. Another big rib is the rear edge of the ala. The median sulcus is barely hinted in the female, more evident in the male.

Eye tubercles slightly prominent.

Normal pore canals simple.

At inside lateral view, anterior and posterior marginal zone very large. Marginal pore canals anteriorly numerous and straight, some false.

Hinge merodont type (Pl. 2, figs. C-G).

Muscle scars as for the genus (Pl. 2, figs. C, H).

Sexual dimorphism marked: the male carapace is more swollen in mid-posterior area and the posterior end is straight.

Remarks. - *Semicytherura* WAGNER, 1957, is a genus that is extremely rich in species; it is known from Paleocene to Recent and has a worldwide distribution (ATHERSUCH *et al.*, 1989). Thirty-seven *Semicytherura* species are reported in the Recent Mediterranean Sea by HORNE *et al.* (2001), while thirty-four species are reported in the Recent Adriatic Sea by BONADUCE *et al.* (1975).

All species of the genus are referred to the Infralittoral and to the upper Circalittoral Zone (GUERNET & LETHIERS, 1989; MONTENEGRO *et al.*, 1998; and SMITH & HORNE, 2002, *inter alia*).

Similarities and differences - *Semicytherura elsae* n.sp. shows all the characteristic features of the genus. It can be fairly easily recognized on the basis of ornamentation.

Semicytherura elsae n.sp. shows some affinities with some species of the genus such as *Semicytherura mediterranea* (MÜLLER, 1894) and *S. alifera* RUGGIERI, 1959, originally described as *Cytherura alata* (MÜLLER, 1894).

The specimens of *S. mediterranea* found in the Adriatic Sea and figured in BONADUCE *et al.* (1975: Pl. 41, figs. 6-8) show a very similar outline. Nevertheless, some differences are very marked and justify the erection of a new species. For example, *Semicytherura elsae* n.sp. compared to *S. mediterranea* (MÜLLER, 1894) shows: dorsal and ventral margin slightly converging forward, (in *S. mediterranea* dorsal and ventral margin converging backwards), fewer large pits and more concentrated in the central part of the valve, dorsal rib stronger, the dendritic structure of the ribs more evident, the rib that marks the external profile of the ala more flexuous, the caudal process and the eye tubercles less prominent, and the alar process obtuse.

S. alifera RUGGIERI, 1959, also found in the Adriatic Sea and figured in BONADUCE *et al.* (1975: p. 70, Pl. 44, figs. 3-9) although showing some similarities to *Semicytherura elsae* n.sp., shows a very different alar process in dorsal view (Pl. 2, fig. E). Another species rather similar to that described herein is *Semicytherura abdita* BONADUCE *et al.*, 1975; the two species, however, are distinguished by different ornamentation, different shape of the carapace in the central area (more swollen in *S. elsae* n.sp.) and the different position of the caudal process.

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Bibliographic references

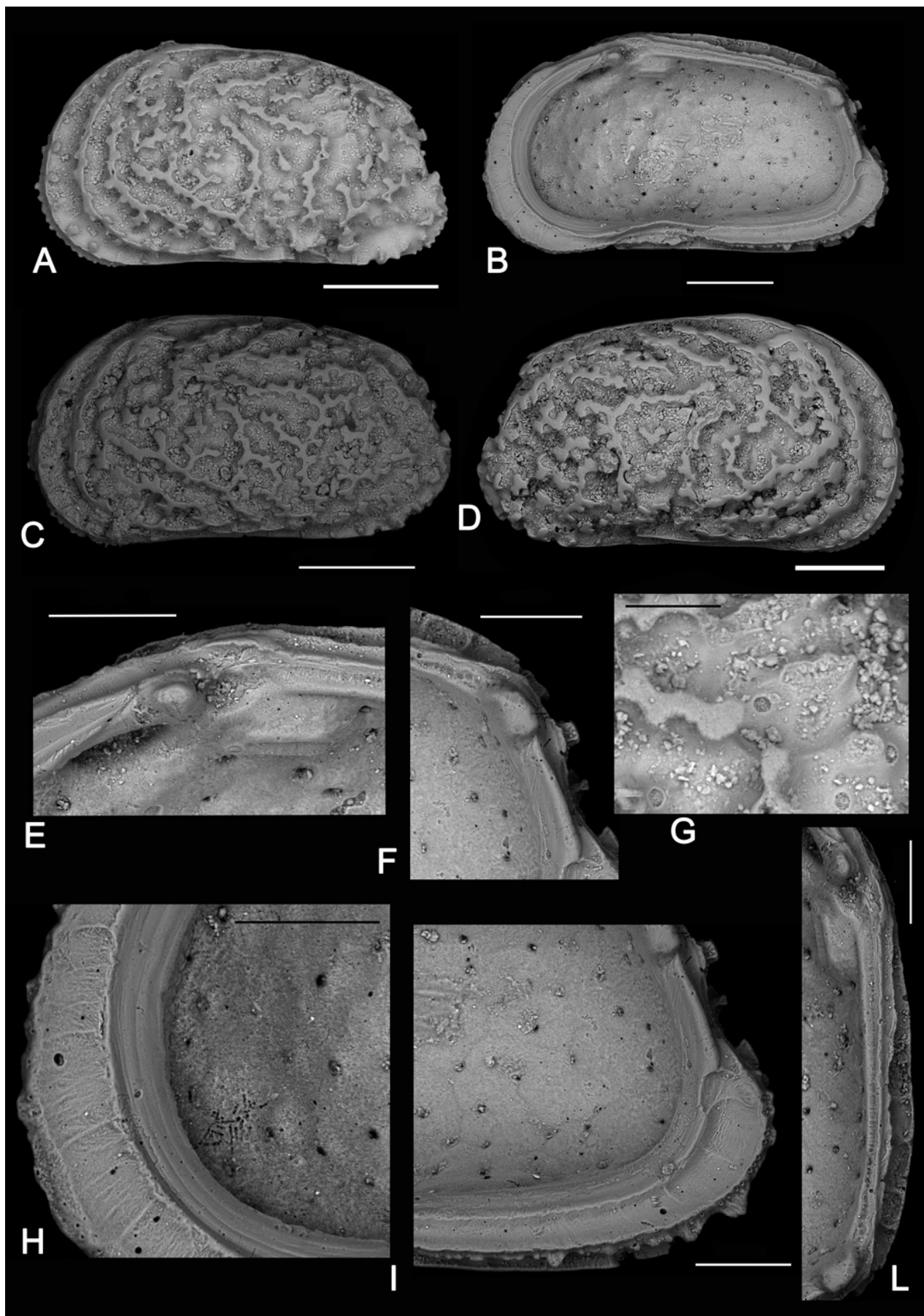
- ATHERSUCH J. (1977).- The Genus *Urocythereis* (Crustacea: Ostracoda) in Europe, with particular reference to Recent Mediterranean species.- *Bulletin of the British Museum (Natural History), Zoology*, London, vol. 32, n° 7, p. 247-283.
- ATHERSUCH J., HORNE D.J. & WHITTAKER J.E. (1989).- Marine and brackish water ostracods (Superfamilies Cypridacea and Cytheracea : Keys and Notes for the Identification of the Species).- The Linnean Society of London, vol. 43, 343 p.
- ATHERSUCH J. & RUGGIERI G. (1977).- On *Urocythereis phantastica* ATHERSUCH & RUGGIERI sp. nov.- Stereo-atlas of Ostracods Shells, London, vol. 2, n° 4, p. 223-230.
- BONADUCE G., CIAMPO G. & MASOLI M. (1977).- Distribution of Ostracoda in the Adriatic Sea.- *Pubblicazioni della Stazione Zoologica di Napoli*, Napoli, vol. 40 (Suppl.), 304 p.
- CONTI M. A., DI GERONIMO I., ESU D. & GRASSO M. (1979).- Il Pleistocene in facies limnica di Vittoria (Sicilia meridionale).- *Geologica Romana*, vol. 18, p. 93-104.
- COSTA B. (1989).- La malacofauna pleistocenica della Cartiera Mulino (Vittoria, Ragusa). In: DI GERONIMO I. (ed.), Atti del terzo simposio di Ecologia e Paleoecologia delle comunità bentoniche.- Tipografia dell'Università, Catania, p. 477-500.
- GUERNET C. & LETHIERS F. (1989).- Ostracodes et recherche des milieux anciens: possibilités et limites.- *Bulletin de la Société géologique de France*, Paris, vol. 8, n° 5, p. 577-588.
- HORNE D.J., BRUCE A. & WHITTAKER J.E. (2001).- Ostracoda. In: COSTELLO M.J., EMBLOW C. & WHITE R.J. (eds.), European register of marine species: a check-list of the marine species in Europe and a bibliography of guides to their identification.- Publications Scientifiques du M.N.H.N., Paris, p. 244-251.
- MONTENEGRO M.E., PUGLIESE N. & BONADUCE G. (1998).- Shelf ostracods distribution in the Italian seas. In: CRASQUIN-SOLEAU S., BRACCINI E. & LETHIERS F. (eds.), What about Ostracoda!- *Bulletin du Centre de Recherches elf Exploration-Production*, Pau, vol. 20, p. 91-101.
- MOSTAFAWI N. & MATZKE-KARASZ R. (2006). - Pliocene Ostracoda of Cephalonia, Greece. The

- unrevised species of ULICZNY (1969).- *Revista Española de Micropaleontología*, Madrid, vol. 38, n° 1, p. 11-48.
- MÜLLER G.W. (1894).- Die ostracoden des Golfes von Neapel und der angrenzenden Meeresabschnitte.- *Fauna und Flora des Golfes von Neapel*, Berlin, vol. 21, 404 p. Online at <https://archive.org/details/dieostracodendes21ml>
- PÉRÈS J.M. (1982).- Structure and dynamics of assemblages in the benthic. In: KINNE O. (ed.), *Marine ecology*.- Wiley & Sons, Chichester, vol. 5, n° 1, p. 119-185.
- PÉRÈS J.M. & PICARD J. (1964).- Nouveau manuel de biologie benthique de la Mer Méditerranée.- *Recueil des Travaux de la Station marine d'Endoume*, Marseille, vol. 31, n° 47, 137 p.
- PURI U. (1953).- The Ostracode genus *Trachyleberis* and its ally *Actinocythereis*.- *The American Midland Naturalist*, Notre Dame, vol. 49, p. 163-172.
- RUGGIERI G. (1950).- Gli Ostracodi delle sabbie grigie quaternarie (Milazziano) di Imola (I).- *Giornale di Geologia*, Bologna, (ser. 2), vol. 21, p. 1-58.
- RUGGIERI G. (1959).- Enumerazione degli ostracodi marini del Neogene, Quaternario e Recenti italiani descritti o elencati nell'ultimo decennio.- *Atti della Società Italiana di Scienze Naturali*, Milano, vol. 98, p. 183-208.
- SCHRÖTER J.S. (1783).- Einleitung in die Conchylienkenntniß nach LINNÉ. Erster Band.- J.G. Gebauer, Halle, xxxii + 860 p. Online at <http://gdz.sub.uni-goettingen.de/dms/load/img/?PPN=PPN581946847&IDDOC=433535>
- SEGUENZA G. (1880).- Le formazioni terziarie nella provincia di Reggio Calabria.- *Regia Accademia dei Lincei*, Roma, vol. 3, 416 p.
- SMITH A.J. & HORNE D.J. (2002).- Ecology of marine, marginal marine and non marine Ostracodes. In: HOLMES J.A. & CHIVAS A.R. (eds.), *The Ostracoda: application in Quaternary research*.- *Geophysical Monograph*, American Geophysical Union, Washington, vol. 131, p. 37-64.
- ULICZNY F. (1969, unpublished).- Hemicytheridae und Trachyleberididae (Ostracoda) aus dem Pliozän der Insel Kephallina (Westgriechland).- Dissertation Universität München, 152 p.
- WAGNER C.W. (1957).- Sur les ostracodes du Quaternaire récent des Pays-Bas et leur utilisation dans l'étude géologique des dépôts holocènes.- Mouton & co.'s-Gravenhage, 259 p.

Plates

► Plate 1: *Urocythereis emanuelae* n.sp.

- A - Left valve (female), Holotype PMC. O10 H. 10.03.2014, external lateral view (scale bar 200 µm).
- B - Right valve, Paratype PMC. O 41P. 10.03.2014, internal lateral view (scale bar 200 µm).
- C - Left valve (male), Paratype PMC. O 42P. 10.03.2014, external lateral view (scale bar 250 µm).
- D - Right valve (female), Paratype PMC. O43 P. 10.03.2014, detail of ornamentation and sieve pore canals (scale bar 50 µm).
- E - Right valve, Paratype PMC. O 41P. 10.03.2014, internal lateral view. Detail of anterior part of the hinge (scale bar 100 µm).
- F - Right valve, Paratype PMC. O 41P. 10.03.2014, internal lateral view. Detail of posterior part of the hinge (scale bar 100 µm).
- G - Left valve (female), Holotype PMC. O10 H. 10.03.2014, detail of ornamentation and sieve pore canals (scale bar 50 µm).
- H - Right valve, Paratype PMC. O 41P. 10.03.2014, internal lateral view. Detail of anterior inner lamella (scale bar 100 µm).
- I - Right valve, Paratype PMC. O 41P. 10.03.2014, internal lateral view. Detail of posterior inner lamella (scale bar 100 µm).
- L - Right valve, Paratype PMC. O 41P. 10.03.2014, internal lateral view. Hinge (scale bar 100 µm).



► **Plate 2:** *Semicytherura elsae* n.sp.

- A - Right valve (female), Holotype PMC. O11 H. 10.03.2014, external lateral view (scale bar 200 μ m).
- B - Left valve (male), Paratype PMC. O44 P. 10.03.2014, external lateral view (scale bar 200 μ m).
- C - Left valve, Paratype PMC. O45 P. 10.03.2014, internal lateral view (scale bar 100 μ m).
- D - Right valve, Paratype PMC. O46 P. 10.03.2014, internal lateral view (scale bar 100 μ m).
- E - Left valve (male), Paratype PMC. O47 P. 10.03.2014, dorsal view (scale bar 100 μ m).
- F - Left valve (male), Paratype PMC. O45 P. 10.03.2014, internal lateral view. Detail of posterior part of the hinge and caudal process (scale bar 50 μ m).
- G - Left valve, Paratype PMC. O45 P. 10.03.2014, internal lateral view. Detail of anterior part of the hinge (scale bar 50 μ m).
- H - Left valve, Paratype PMC. O45 P. 10.03.2014, internal lateral view, detail of muscle scars (scale bar 50 μ m).
- I - Left valve (male), Paratype PMC. O47 P. 10.03.2014, external lateral view. Detail of ornamentation and normal pore canals (scale bar 20 μ m).

