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Additional records of decapod crustaceans from the lower Pleistocene beds of Poggi Gialli (Tuscany, central Italy)

Nove najdbe rakov deseteronožcev iz spodnjepleistocenskih plasti v kamnolomu Poggi Gialli (Toskana, Italija)

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Ključne besede: Decapoda, Astacidea, Anomura, Brachyura, kenozoik, Sredozemlje

Abstract

Additional species of decapod crustaceans are recorded from the lower Pleistocene beds exposed at the Poggi Gialli quarries (Sinalunga, Tuscany, central Italy). They include *Galathea tuscia* sp. nov., *Ilia* sp., *Liocarcinus* cf. *L. maculatus* (Risso, 1827), and *Aliaplax tyrsenorum* gen. nov., sp. nov. Novel morphological details for *Distolambrus rasnus* De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017, based on a single newly collected specimen, are added, as is the rare record of an indeterminate nephropid. These additions augment our knowledge of the composition of carcinological faunas in this peculiar environment from the early Pleistocene of central Italy. An updated list of decapod crustacean species from Poggi Gialli is also provided herein.

Izvleček

V prispevku predstavljamo nove najdbe in nove vrste rakov deseteronožcev iz spodnjepleistocenskih plasti v kamnolomu Poggi Gialli (Sinalunga, Toskana, osrednja Italija). Najdbe vključujejo vrste *Galathea tuscia* sp. nov., *Ilia* sp., *Liocarcinus* cf. *L. maculatus* (Risso, 1827) in *Aliaplax tyrsenorum* gen. nov., sp. nov. Dodatno opisujemo tudi nove morfološke podrobnosti vrste *Distolambrus rasnus* De Angeli, Garassino & Pasini na Baldanzi, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017, ki temeljijo na novo odkritem primerku. Opisujemo tudi redko najdbo nedoločenega nefropidnega raka. Opisan material dopolnjuje naše znanje o sestavi združb deseteronožcev v tem nenavadnem okolju zgodnjepleistocenske starosti. Prispevku je dodan tudi posodobljen seznam vseh fosilnih deseteronožcev iz kamnoloma Poggi Gialli.

Introduction

Both fully marine and transitional sedimentary rocks that crop out in a relatively restricted quarried area at Poggi Gialli (Sinalunga, Siena, Tuscany) have yielded diverse macrofossil assemblage from the early Pleistocene, including molluscs, echinoids, bryozoans, corals, decapod crustaceans, isopods, and plant remains (for a full list, see Baldanza et al., 2017). The rich and peculiar decapod crustacean assemblage, which is incomparable to other communities previously recorded from the Pleistocene of Tuscany and from the Mediterranean basin, has recently been discussed in detail by Baldanza et al. (2017) who also provided a sedimentological, stratigraphic and palaeoenvironmental interpretations of the Poggi Gialli quarries.

Subject of the present note is a description of a number of recently collected specimens of decapod crustaceans that are referred to species, unknown from this locality until now.

Material and methods

In the Poggi Gialli area there are two disused quarries that are traversed by the Siena-Bettole highway and formally named as Poggi Gialli North (PGN) and Poggi Gialli South (PGS) respectively (see Baldanza et al., 2017, p. 43, fig. 4).

The studied specimens are mostly preserved three-dimensional, partially mineralised, inner moulds embedded in small chunks of loose yellow-grey, sandy clay. They were collected from the PGS quarry section and are housed in the palaeontological collections of the Museo di Storia Naturale dell'Accademia dei Fisiocritici (Siena) (MUSNAF).

The Anomura includes *Galathea tuscia* sp. nov. (Galatheidae Samouelle, 1819) (1 specimen); the Brachyura includes *Ilia* sp. (3 specimens) (Leucosiidae Samoulle, 1819); *Distolambrus rasnus* (Parthenopidae MacLeay, 1838) (1 specimen); *Liocarcinus* sp. cf. *L. maculatus* (Risso, 1827) (Portunidae Rafinesque, 1815) (1 specimen); and *Aliaplax tyrsenorum* gen. nov., sp. nov. (Goneplacidae MacLeay, 1838) (2 specimens). Finally, one specimen was assigned to a nephropid (Astacidea Latreille, 1802), genera and species indeterminate.

Abbreviations – lcxp: carapace length (including rostrum); lpa: palm length (excluding index); P1-P5: pereiopods 1 to 5; pll: pleon length; plw: pleon width; s1-s6: pleonal somites 1 to 6; St: thoracic sternites; wcxp: carapace width; wpa: palm width.

Systematic palaeontology

The classification used in this paper follows Ng et al. (2008) and Schweitzer et al. (2010), while for the description of leucosiids and parthenopids we follow, in part, the terminology proposed by Ihle (1918) and Tan & Ng (2007), respectively.

Order Decapoda Latreille, 1802
Infraorder Astacidea Latreille, 1802
Superfamily Nephropoidea Dana, 1852
Family Nephropidae Dana, 1852

Nephropidae genus and species indeterminate

(Plate 1 A)

Material: A single, three-dimensionally preserved P1 palm, with an incomplete index and dactylus (MUSNAF/GEO/7175 – lpa: *c.* 17 mm; wpa: 6 mm).

Description: Elongate slender and subrectangular P1 chela; subparallel upper and lower margins, with rounded tubercles; palm surface slightly convex, partially crushed, covered by sparse, irregular tubercles of different sizes; elongate straight index, with upper margin bearing a rim of strong pointed tubercles directed upwards; occlusal margin of index not observable; sparse tubercles, similar to those at the upper margin, extending over entire index length; dactylus stouter than index; index with line of stronger elongate tubercles directed upwards along the occlusal margin; distal extremity of index and dactylus not preserved.

Discussion: The shape and some characters of this P1 chela allow it to be compared with chelae of a number of extant and fossil representatives of the Nephropidae. We consider the coarse ornamentation of the palm and dactylus, consisting of more or less pointed to rounded coarse tubercles of different sizes to be partial internal casts of possibly pointed spines protruding on the original exocuticle, as in extant representatives of Nephropidae. According to Garassino & De Angeli (2004, p. 35), among Nephropoidea "only the representatives of the family Nephropidae exhibit a slender and very elongate propodus of the chelae". For example, the elongate and slender spiny chelae with rows of pointed spines is a feature of the extant and fossil *Nephrops norvegicus* (Linnaeus, 1758). This species differs, however, from the studied specimen in the general ornament of the palm, lacking the strong spiny rims along both fingers. Unfortunately, the poor preservation and incompleteness of the studied specimen make impossible a more detailed systematic assignment.

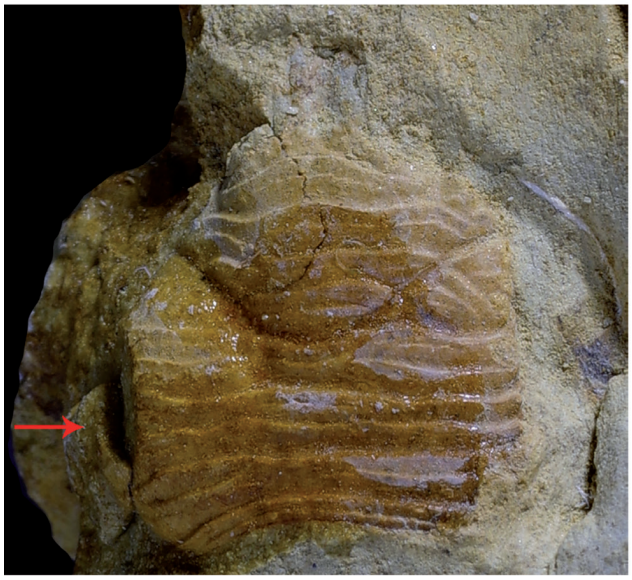
Baldanza et al. (2017, p. 49, fig. 9A) recorded another indeterminate nephropid from the PGN quarry. This specimen differs, however, from the studied one in having a wider flattened palm covered by sparse, irregular pointed tubercles directed upwards; an elongate straight index gently decreasing towards the tip; an occlusal margin of the index with unequal molariform, rounded teeth proximally, followed by subtriangular equal-sized teeth; a median longitudinal rim with pointed tubercles, rimmed by two lateral longitudinal grooves; an elongate straight dactylus with a molariform tooth in the median part; and two longitudinal grooves that extend along the middle longitudinal part of the flat dactylus.

In the Mediterranean area, nephropids from the late Cenozoic (Plio-Pleistocene) are quite

PLATE 1



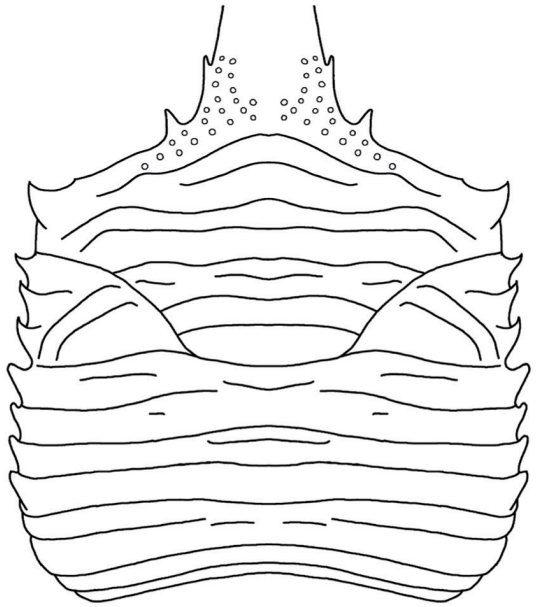
A



B



C



D

A – Nephropidae genus and species indeteterminate, MUSNAF/GEO/7175 (× 6).

B, C – *Galathea tuscia* sp. nov., Holotype, MUSNAF/GEO/7176a, b with a rounded inflated bulge on the left branchial chamber margin as a result of isopod (bopyrid) infestation (red arrow) (× 8).

D – *Galathea tuscia* sp. nov., carapace, line drawing.

rare and mostly poorly preserved. Indeed only two genera have previously been recorded from Italy, namely *Nephropsis* sp. from the Pleistocene of the Enza River (Emilia-Romagna; Garassino & De Angeli, 2004) and *Nephrops* cf. *N. norvegicus* (Linnaeus, 1758) from the early Pleistocene of Poggio i Sodi (Tuscany; Baldanza et al., 2013).

Infraorder Anomura MacLeay, 1838
Superfamily Galatheoidea Samouelle, 1819
Family Galatheidae Samouelle, 1819
Genus *Galathea* Fabricius, 1793

Type species: *Cancer strigosus* Linnaeus, 1761, by original designation.

Fossil species: *Galathea affinis* Ristori, 1886; *G. berica* De Angeli & Garassino, 2002; *G. caporiondoi* De Angeli & Ceccon, 2017; *G. hexacristata* Beschin, Busulini & Tessier *in* Beschin, Busulini, Fornaciari, Papazzoni & Tessier, 2018; *G. keijii* Karasawa, 1993; *G. lovarica* Beschin, De Angeli, Checchi & Zarantonello, 2016; *G. lupiae* Robineau-Desvoidy, 1849; *G. mainensis* Ceccon & De Angeli, 2012; *G. sahariana* Garassino, De Angeli & Pasini, 2008; *G. spitzbergica* Gripp, 1927; *G. strigifera* Fischer-Benzon, 1866; *G. tuscia* sp. nov. (this study); *G. valmaranensis* De Angeli & Garassino, 2002; *G. weinfurteri* Bachmayer, 1950.

Galathea tuscia sp. nov.
(Plate 1 B-D)

Diagnosis: Subsquare carapace (excluding rostrum), slightly convex in transverse section; rostrum wide, triangular, with slight median depression, large dorsal tubercles and two lateral spines; cervical groove laterally bifurcated; carapace with nine main uninterrupted sinuous transverse ridges, intercalated with five interrupted transverse ridges; anterior branchial region with two main diagonal uninterrupted ridges.

Etymology: from the Latin *tuscus*, *tusci* = Tuscia or Etruria, the southern part of Tuscany inhabited by Tusci or Etruschi people between 900 to 27 BC.

Holotype: MUSNAF/GEO/7176a, b (part-counterpart).

Measurements: MUSNAF/GEO/7176 – lcxp: 9.5 mm; wcxp: 7 mm.

Description: Carapace subsquare in dorsal view, as long as wide, transversely convex and enlarged chiefly in posterior third; wide triangular rostrum, enlarged towards base, well developed anteriorly, with at least one median spine along lateral margins; first rostral spine (supraorbital spine) shorter than the other one; dorsal surface of rostrum with a weak median depression and covered with many large uniformly arranged tubercles; wide orbits; extraorbital spine apparently shorter than the supraorbital one; one strong anterolateral spine directed forwards; anterior branchial margins slightly convex, with three spines, equal in size and directed forwards; posterior branchial margins convergent posteriorly, with four spines, equal in size and directed forwards; posterior margin wide, slightly concave and marked by one thin marginal ridge; deep cervical groove laterally bifurcated; epigastric region with one main uninterrupted sinuous transverse ridge and one weak laterally interrupted ridge; proto-, meso-, and metagastric regions not well separated, with five main uninterrupted sinuous transverse ridges, intercalated with two medially interrupted transverse ridges; subtriangular anterior branchial regions, with two main short uninterrupted strongly diagonal ridges; posterior branchial regions with three main uninterrupted sinuous transverse ridges, intercalated with one weak medially interrupted transverse ridge and one laterally interrupted transverse ridge.

Discussion: According to Robins et al. (2013, p. 174) and MacPherson & Robainas-Barcia (2015, p. 13), the broad, subtriangular rostrum, with lateral teeth and the poorly defined cardiac region allow to assign the studied specimen to the Galatheidae.

Fossil representatives of the Galatheoidea are very rare in Tuscany, being limited to only two genera, *Galathea* Fabricius, 1793 and *Munida* Leach, 1820. Baldanza et al. (2013, p. 343) noted that of *Galathea* there was only a single record, *Galathea* sp. from the early Pleistocene of Poggi i Sodi (Siena, Tuscany); this differs from the *G. tuscia* sp. nov. in having the dorsal carapace regions with only uninterrupted ridges. Later, Garassino & Pasini (2015, p. 40) described *Munida grossetana* Garassino & Pasini, 2015 from the Pliocene of Monterotondo Marittimo (Grosseto, Tuscany), its needle-like rostrum ruling out any congeneric assignment of the new species.

The sole species that is close, stratigraphically speaking, is *Galathea affinis* Ristori, 1886 from the late Pliocene of Bianchi (Sicily) and from the Miocene of Capo San Marco (Sardinia) (Lőrenthey, 1909). A detailed comparison, however, with the new species is impossible because the holotype and additional sample are lost. Additionally, the poor description and the poor quality of the line drawing provided by Ristori (1886, p.

126, 127, pl. 2, fig. 18) preclude to note diagnostic characters of *G. affinis*. Based on these observations, we herein consider *G. affinis* to be a *nomen dubium*.

We justify the erection of the new species, *G. tuscia*, based on these characters: dorsal carapace regions without hepatic, epigastric, parahepatic, anterior branchial, and postcervical spines; such are always present in extant species of the Mediterranean Sea (Zariquey Alvarez, 1968; Falciai & Minervini, 1992) and occassionally in some Eocene and Oligocene species (Beschin et al. 2016, 2018; Ceccon & De Angeli, 2012; De Angeli & Ceccon, 2017; De Angeli & Garassino, 2002) and two uninterrupted strongly diagonal ridges on the anterior branchial regions – this is a peculiar character not seen in any other fossil species of *Galathea* from the Italian fossil record.

Note: The studied specimen shows a typical rounded inflated bulge on the left branchial chamber margin, most probably denoting isopod (bopyrid) infestation. Isopod parasitism in decapod crustaceans, including squat lobsters, has been recorded by several authors for Mesozoic and Cenozoic taxa (for full references see Klompmaker & Boxshall, 2015).

The only examples of isopod parasitism in fossil material from Italy are those recorded by Ceccon & De Angeli (2013) for the Eocene of Vicenza, which we can here supplement with a record from the early Pleistocene.

Infraorder Brachyura Latreille, 1802
Section Eubrachyura de Saint Laurent, 1980
Subsection Heterotremata Guinot, 1977
Superfamily Leucosioidea Samouelle, 1819
Family Leucosiidae Samouelle, 1819
Subfamily Ebaliinae Stimpson, 1871
Genus *Ilia* Leach, 1817

Type species: *Cancer nucleus* Linnaeus, 1758, by monotypy.

Included fossil species: see Schweitzer et al. (2010).

Ilia sp.
(Plate 2 A–B)

Material: Two pleons in ventral view (MUSNAF/GEO/7177 – pll: 10 mm; plw: 10 mm; MUSNAF/GEO/7178 – pll: 8 mm; plw: 8 mm); and a single, incomplete P1 [MUSNAF/GEO/7179 – lpa: 15 mm (including index); wpa: 3 mm].

Description: Pleon – Sternum ovoid, with granulate surface; thoracic sternites exposed, subpetaloid in shape, decreasing in size and length posteriorly; St 1-4 fused; triangular elongate sternum pleonal cavity deeply excavated, narrowing to the anterior part of sternum.

P1 – elongate globular palm, preserved as an inner mould, ovoid in transverse section; straight upper and inferior margins, narrowing distally; thin very elongate pointed index directed downwards, curved distally with small conical alternating occlusal teeth.

Discussion: Based on the proxy characters, these rounded granulate pleons and typically elongate chela are compared with those of some representatives of the family Leucosiidae and, tentatively, with *Ilia* Leach, 1817.

The studied pleon has affinities in shape and ornamentation with that of the fossil representatives of *Ilia nucleus* (Linnaeus, 1758), as recorded and illustrated by Garassino et al. (2012, p. 28, fig. 14C) from the early Pliocene of La Serra quarry (San Miniato, Tuscany), whereas the globular elongate palm and index are comparable in shape with those of the extant representatives of the same species (Garassino et al., 2012, p. 28, fig. 14H). The studied specimens seem to have, however, a larger, coarse granules on the pleon, whereas the palm, preserved as an inner mould, does not allow any comparison of the external ornamentation of the chela. We prefer to leave the studied specimens in open nomenclature, awaiting the discovery of more complete material.

Superfamily Portunoidea Rafinesque, 1815
Family Portunidae Rafinesque, 1815
Subfamily Polibinae Ortmann, 1893
Genus *Liocarcinus* Stimpson, 1871

Type species: *Portunus holsatus* Fabricius, 1798, by original designation.

Fossil species: see Schweitzer et al. (2010).

Liocarcinus cf. ***L. maculatus*** (Risso, 1827)
(Plate 2 C)

Material and measurements: A single, near-complete carapace in dorsal view (MUSNAF/GEO/7180 – lcxp: 8 mm; wcxp: 7 mm).

Description: Small-sized, subhexagonal carapace weakly convex transversely; front with three spines projecting beyond the orbits, median slightly longer and sharper than lateral ones; anterolateral margins, with four triangular spines, directed anterolaterally (excluding extraorbital spine), fourth spine smaller than the others; convergent posterolateral margins concave and longer than

PLATE 2



A



B



C



D

A, B – *Ilia* sp., MUSNAF/GEO/7179, P1 in lateral view (× 8) and MUSNAF/GEO/7177, thoracic sternum and pleon (× 8.5).

C – *Liocarcinus* cf. *L. maculatus* (Risso, 1827), MUSNAF/GEO/7180, carapace in dorsal view (× 13.5). D – *Distolambrus rasnus* De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017, MUSNAF/GEO/7181a, carapace in dorsal view (× 15).

the anterolateral ones; rounded and well-raised protogastric regions; subtriangular mesogastric region strongly tuberculate; undifferentiated branchial regions; cardiac region with three bulges; tuberculate dorsal surface.

Discussion: The morphological characters of the anterolateral margins with spines, as well as the configuration of the front match those of the *Liocarcinus* "*pusillus*" group (i.e. "small sized *Liocarcinus* having front projecting beyond the orbits") as recognised by Froglia & Manning (1982, p. 257), and especially into those of the extant *Liocarcinus maculatus* (Risso, 1827) in particular, as based on the diagnosis provided by Froglia & Manning (1982, p. 262). However, we prefer prudence in our comparison of the studied specimen with *L. maculatus* due to the lack of carpus and antennal flagellum; those provide essential specific diagnostic characters (Froglia & Manning, 1982, p. 264). Although the studied specimen is only likened to the extant taxon, it would constitute the first mention of *L. maculatus* from the fossil record. The extant species inhabits the Mediterranean Sea at sublittoral (5–73 meters) depths (Froglia & Manning, 1982, p. 262).

Note: Baldanza et al. (2017, p. 69, fig. 15D), recorded *Liocarcinus depurator* (Linnaeus, 1758), from the PGS quarry based on a single, small and incomplete carapace, lacking the frontal margin. A revision of this specimen might also document *L. maculatus* rather than *L. depurator*.

Superfamily Parthenopoidea MacLeay, 1838
Family Parthenopidae MacLeay, 1838
Subfamily Parthenopinae MacLeay, 1838
Genus *Distolambrus* Tan & Ng, 2007

Type species: *Heterocrypta maltzani* Miers, 1881, by original designation.

Fossil species: *Distolambrus rasnus* De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani Garassino, Pasini & Pizzolato, 2017.

Distolambrus rasnus De Angeli, Garassino & Pasini, 2017 *in* Baldanza, Bizzarri, De Angeli, Famiani Garassino, Pasini & Pizzolato, 2017
(Plate 2 D)

2017 *Distolambrus rasnus* De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani Garassino, Pasini & Pizzolato; p. 57, Fig. 14A, B.

Material and measurements: A single complete carapace in dorsal view (MUSNAF/GEO/7181a, b – lcxp: 5 mm; wcxp: 6 mm).

Description: Very small-sized carapace for the genus, trapezoidal transversaly; dorsal surface with raised granulate ridges on gastric, epibranchial, and cardiac regions; protruding triangular rostrum; serrate straight anterolateral margins, tapering frontally; serrate posterolateral margins gently convex medially ending in a point at level of the posterior margin; V-shaped granulate gastric ridge; diagonal branchial granulate ridge not continuous with the gastric ridge; strong raised, round tubercle on the median cardiac region, bearing some small sparse tubercles dorsally; intestinal region flat expanded posteriorly; convex epibranchial margin; posterior margin convex medially.

Discussion: This specimen shows the main diagnostic characters of *Distolambrus rasnus* described from PGS quarry by De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani Garassino, Pasini & Pizzolato (2017, p. 57, fig. 14A, B), as follows: subpentagonal and smooth carapace; triangular and pointed rostrum domed depressed medially, with serrate margins; serrate antero- and posterolateral margins; raised, granulate ridges on gastric, epibranchial and cardiac regions; V-shaped ridge on the gastric region; oblique branchial ridge not continuous with the gastric one; strong median cardiac tubercle; and intestinal region flat. Here we wish to remark that the antero- and posterolateral margins in the studied specimen are not distinctly separated by a small hepatobranchial notch as the one seen in the type specimen, which is possibly due to its smaller size or this could reflect intraspecific variation.

This is only the second specimen of this uncommon fossil species, reported from the Poggi Gialli quarries only.

Superfamily Goneplacoidea MacLeay, 1838
Family Goneplacidae MacLeay, 1838
Subfamily Goneplacinae MacLeay, 1838

Genus *Aliaplax* gen. nov.

Diagnosis: Carapace trapezoidal, strongly elongate transversely, twice wider than long, broadest at exorbital angle; orbital angle outwardly projected in a pointed spine; distinctly T-shaped narrow front directed downwards; very elongate orbit grooves occupying the entire frontal margin, deeper proximally; supraorbital margin smooth slightly sinuous; suborbital margin smooth, notably sinuous, projected frontally,

exceeding supraorbital margin; diagonal posterolateral margins slightly convex gently tapering posteriorly to the wide posterior margin, wider than the half of the total frontal margin; dorsal carapace convex fronto-posteriorly and smooth, with one weak horizontal uninterrupted ridge on the posterior third, without clear indications of regions; protogastric region with a drop-shaped bulge, extending from the frontal base to the mesogastric region; intestinal region with one transverse arched groove, concave dorsally behind the metabranchial regions slightly constricted forming two lateral rounded depressions.

Etymology: From the name of the mythical marine nereid Alia, described by Homer as the nymph with "large eyes", and the suffix *–plax*. Gender: feminine.

Type species: *Aliaplax tyrsenorum* sp. nov., by monotypy.

Fossil species: *Aliaplax tyrsenorum* sp. nov. (this study).

Discussion: According to Castro (2007, p. 616) the studied specimens have been assigned to the Goneplacidae in having transversely rectangular carapace, narrow front, wide and long orbits, and dorsal surface with horizontal ridges, without clear indication of regions.

According to De Angeli et al. (2019), goneplacids are represented in the fossil record of Italy by five genera: *Albaidaplax* Garassino, Pasini & Castro, 2013 from the early Pliocene-early Pleistocene of Tuscany and Umbria; *Astiplax* Garassino & Pasini, 2013 from the late Pliocene of San Pietro (Asti, Piedmont), *Goneplax* Leach, 1814 from the Miocene to early Pleistocene of Piedmont, Emilia-Romagna, Tuscany, Lazio, and Sicily; *Magyacarcinus* Schweitzer & Karasawa, 2004 from the middle Eocene-late Eocene of Veneto; and *Ommatocarcinus* White, 1851 from the early Pleistocene of Tuscany.

The subrectangular carapace, slightly wider than long, the front as wide as the orbits, and the short posterior margin rule out assignment of the studied specimens to *Albaidaplax*, while the strongly tuberculate carapace, the very narrow front, and the presence of gastric pits and branchiocardiac groove exclude *Astiplax*. The studied specimens cannot be placed in *Goneplax* because the carapace has a strong outer orbital tooth, the notch between the front, and one anterolateral tooth, while the subsquare carapace, the wide straight front, the deep branchiocardiac groove, and the swollen subhepatic regions set them apart from *Magyacarcinus*. *Ommatocarcinus*, recently recorded from Poggi Gialli by De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani Garassino, Pasini & Pizzolato (2017, p. 62), shares some characters with the studied specimens, as follows: carapace transversely rectangular, much wider than long; orbits wide, greatly expanded laterally; supraorbital margin sinuous; dorsal surface of carapace smooth, with one weak horizontal ridge, without clear indication of regions; the outer orbital angle with one tooth; and anterolateral tooth absent. The studied specimens, however, differ from *Ommatocarcinus* in having shorter, T-shaped front; very elongate orbit grooves occupying the entire frontal margin; smooth suborbital margin notably projected frontally, exceeding supraorbital margin; median drop-shaped bulge on gastric region; intestinal transverse groove concave dorsally behind the metabranchial regions that are slightly constricted forming two lateral rounded depressions; and wide posterior margin.

Castro (pers. comm, 2019) identified strictly morphological affinities, such as the shape of the frontal region, outer orbital angle with conspicuous acute tooth, and the long straight posterior margin when comparing the studied specimens with two extant Indo-Pacific genera of the Goneplacinae, *Singhaplax* Serène & Soh, 1976 and *Microgoneplax* Castro, 2007. However, the studied specimens differ from these extant genera in having protogastric regions with a drop-shaped bulge, intestinal region with one transverse arched groove, and one weak horizontal uninterrupted ridge on the posterior third of the dorsal carapace surface.

Based upon these observations, we believe the description of a new genus is warrented to accommodate these specimens.

Aliaplax tyrsenorum sp. nov.
(Plate 3 A–D)

Etymology: The trivial name originates from the Tyrseni, the ancient Greek name for the inhabitants of the Etruscan regions.

Holotype: MUSNAF/GEO/7183.

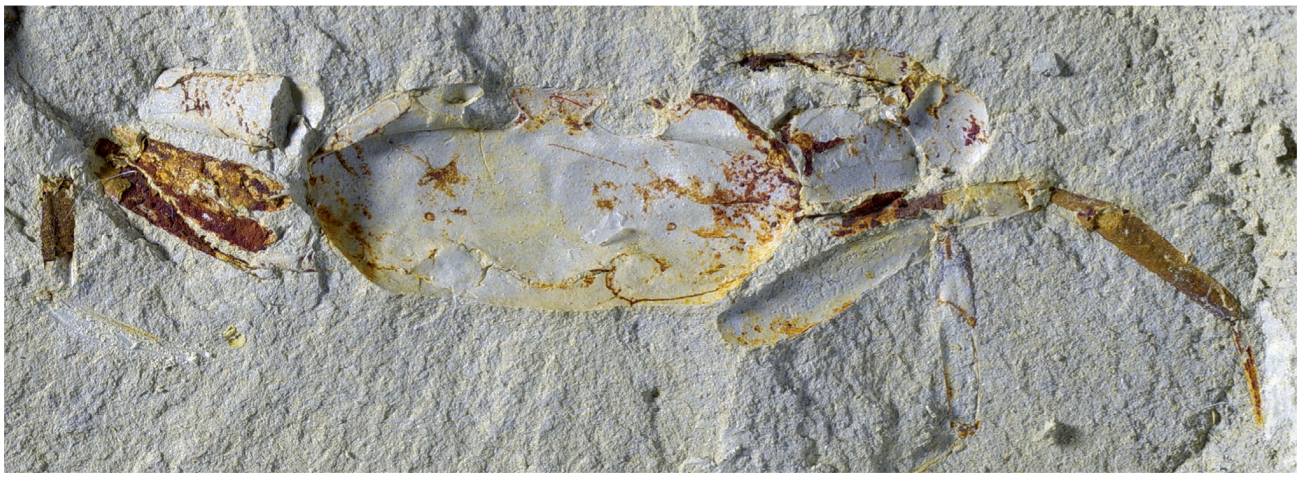
Paratype: MUSNAF/GEO/7182 a, b.

Material and measurements: One complete specimen in dorsal view (part-counterpart) (MUSNAF/GEO/7182a, b – lcxp: 6 mm; wcxp: 13 mm, excluding lateral spine), and another in counterpart only (MUSNAF/GEO/7183 – lcxp: 4.5 mm; wcxp: 10 mm, excluding lateral spine).

PLATE 3



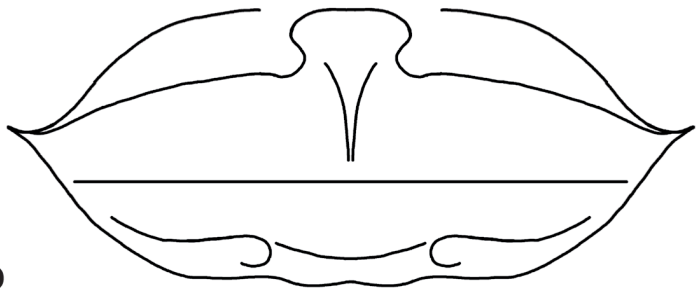
A



B



C



D

Aliaplax tyrsenorum gen. nov., sp. nov.
A – Holotype, MUSNAF/GEO/7183 (× 5).
B, C – Paratype, MUSNAF/GEO/7182a, b (× 6.5).
D – Carapace, line drawing.

Description: Carapace trapezoidal, strongly elongate transversely, twice wider than long, broadest at exorbital angle; orbital angle outwardly projected in a pointed spine; distinctly T-shaped narrow front directed downwards; very elongate orbit grooves occupying the entire frontal margin, deeper proximally; supraorbital margin smooth slightly sinuous; suborbital margin smooth, notably sinuous, projected frontally, exceeding supraorbital margin; diagonal anterolateral margins slightly convex gently tapering posteriorly to the wide posterior margin, wider than the half of the total frontal margin; dorsal carapace convex fronto-posteriorly and smooth, with one transverse uninterrupted ridge on the posterior third; protogastric region with a drop-shaped bulge, extending from the frontal base to the mesogastric region; intestinal region with one transverse arched groove, concave dorsally behind the metabranchial regions that appears slightly constricted forming two lateral rounded depressions. P1 elongate, heterochelous with stout rectangular right palm and shorter left palm; dactylus gently curved; P4-P5 elongate, with pointed dactyli.

Conclusions

The present study updates the rich and peculiar Poggi Gialli decapod crustacean assemblage by adding a few new, recently collected and not previously recorded taxa. Among these is a new squat lobster *Galathea tuscia* sp. nov.; in addition, the presence of *Aliaplax tyrsenorum* gen. nov., sp. nov., is remarkable. The presence of a few goneplacids that have closer affinities to some Indo-Pacific genera than to those from the Mediterranean calls for a discussion of their presence, diffusion, and extinction in the paleo-Mediterranean Sea. Moreover, the presence of swimming macrurans is herein corroborated by a new record of an indeterminate nephropid.

The new data corroborate the previous characterisation of the paleoenvironment suggested by Baldanza et al. (2017, p. 67), with "a sub-tidal marine shallow to moderate deep environment with some terrestrial fresh water influence (possibly from a few to less than 100 m deep), in temperate waters at low levels of water energy…".

Updated list of decapod crustacean species from the early Pleistocene of Poggi Gialli (Siena, central Italy) is herein provided. Taxa with an asterisk (*) appear to be confined to Poggi Gialli (after De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017; this study).

Superfamily Thalassinoidea Latreille, 1831
Family Laomediidae Borradaile, 1903
Genus ***Jaxea*** Nardo, 1847
Jaxea nocturna Nardo, 1847

Superfamily Galatheoidea Samouelle, 1819
Family Galatheidae Samouelle, 1819
Genus ***Galathea*** Fabricius, 1793
Galathea tuscia sp. nov.*
Superfamily Paguroidea Latreille, 1802
Family Paguridae Latreille, 1802
Genus ***Anapagurus*** Henderson, 1886
Anapagurus cf. *A. breviaculeatus* Fenizia, 1937

Superfamily Raninoidea De Haan, 1839
Family Lyreididae Guinot, 1993
Subfamily Lyridinae Guinot, 1993
Genus ***Lyreidus*** De Haan, 1841
Lyreidus paronae (Crema, 1895)

Superfamily Dorippoidea MacLeay, 1838
Family Ethusidae Guinot,1977
Genus ***Ethusa*** Roux, 1830
Ethusa cf. *E. mascarone* Herbst, 1785

Superfamily Leucosioidea Samoulle, 1819
Family Leucosiidae Samoulle, 1819
Subfamilu Ebaliinae Stimpson, 1871
Genus ***Leucosiraja*** De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017
Leucosiraja manta De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017*
Genus ***Merocryptus*** A. Milne-Edwards, 1873
Merocryptus viperinus De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017*

Superfamily Majoidea Samouelle, 1819
Family Majidae Samouelle, 1819
Subfamily Majinae Samouelle, 1819
Genus ***Eurynome*** Leach, 1814
Eurynome italica De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017*

Superfamily Parthenopoidea MacLeay, 1838
Family Parthenopidae MacLeay, 1838
Subfamily Parthenopinae MacLeay, 1838
Genus ***Distolambrus*** Tan & Ng, 2007
Distolambrus rasnus De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017*

Superfamily Retroplumoidea Gill, 1894
Family Retroplumidae Gill, 1894
Genus ***Retropluma*** Gill, 1894
Retropluma craverii (Crema, 1895)

Superfamily Cancroidea Latreille, 1802
Family Cancridae Latreille, 1802
Subfamily Lobocarcininae Beurlen, 1930
Genus ***Lobocarcinus*** Reuss, 1857
Lobocarcinus sismondai (von Meyer, 1843)

Superfamily Xanthoidea MacLeay, 1838
Family Xanthidae MacLeay, 1838
Subfamily Euxanthinae Alcock, 1898
Genus ***Monodaeus*** Guinot, 1967
Monodaeus bortolottii Delle Cave, 1988

?Superfamily Xanthoidea MacLeay, 1838
Genus *Ancipitecancer* Pasini, Luque & Garassino, 2020
Ancipitecancer collinsi Pasini, Luque & Garassino, 2020*

Superfamily Portunoidea Rafinesque, 1815
Family Portunidae Rafinesque, 1815
Subfamily Polybinae Ortmann, 1893
Genus ***Liocarcinus*** Stimpson, 1871
Liocarcinus depurator (Linnaeus, 1758)
Liocarcinus cf. *L. maculatus* (Risso, 1827)

Superfamily Goneplacoidea MacLeay, 1838
Family Goneplacidae MacLeay, 1838
Subfamily Goneplacinae MacLeay, 1838
Genus ***Aliaplax*** gen. nov.
Aliaplax tyrsenorum gen. nov., sp. nov.*
Genus ***Goneplax*** Leach, 1814
Goneplax rhomboides (Linnaeus, 1758)
Genus ***Ommatocarcinus*** White, 1851
Ommatocarcinus occidentalis De Angeli, Garassino & Pasini *in* Baldanza, Bizzarri, De Angeli, Famiani, Garassino, Pasini & Pizzolato, 2017*

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