Short note

A new calappid species from the Ligure Piemontese Basin (NW Italy) and reappraisal of the fossil calappid specimens in the Museo "G. Maini", Ovada

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ABSTRACT

The Oligocene species ascribed to the Calappidae H. Milne Edwards, 1837, housed in the palaeontological collections of the Museum "G. Maini" of Ovada (Alessandria, Piemonte, NW Italy) from the Ligure Piemontese Basin, are herein revised in order to verify their systematic assignment. Two additional specimens are ascribed to *Calappilia guttata* n. sp., whereas one specimen previously ascribed to *M. pustulosus* is herein assigned to *Calappilia* sp. The revision allows us to provide an emended diagnosis and new description of *Mursiopsis pustulosus* Ristori, 1889. Finally the assignment of *Stenodromia mainii* (Allasinaz, 1987) and *Calappilia vicetina* Fabiani, 1910, is briefly discussed.

Keywords: Crustacea, Decapoda, Brachyura, Calappidae, Oligocene, Italy.

RESUMEN

Las especies del Oligoceno, adscritas a los Calappidae H. Milne Edwards, 1837, depositadas en las colecciones paleontológicas del Museo "G. Maini" de Ovada (Alessandria, Piemonte, NO Italia), procedentes de la Cuenca Ligure Piemontese, son revisadas aquí, con el propósito de verificar su asignación sistemática. Dos especímenes son adscritos a Calappilia guttata n. sp., en tanto que un espécimen adscrito a M. pustulosus, es aquí asignado a Calappilia sp. Esta revisión nos permite ofrecer una diagnosis corregida y una nueva descripción de Mursiopsis pustulosus Ristori, 1889. Finalmente, la asignación de Stenodromia mainii (Allasinaz, 1987) y Calappilia vicetina Fabiani, 1910, es brevemente discutida.

Palabras clave: Crustacea, Decapoda, Brachyura, Calappidae, Oligoceno, Italia.

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1. Introduction

The aim of this paper is the review of fossil calappid specimens from the early Oligocene (Rupelian; according to Allasinaz, 1987: 515–518) of the Ligure Piemontese Basin, nearby Ovada (Piemonte, NW Italy) and housed in the Museo Paleontologico "G. Maini", Ovada. These specimens were assigned by Allasinaz (1987) to some species within the Calappidae H. Milne Edwards, 1837. Two specimens, not reported previously by Allasinaz (1987) have been ascribed to *Calappilia guttata* n. sp., whereas one specimen previously ascribed by Allasinaz (1987) to *Mursiopsis pustulosus* does not fit the morphological characters of this species and is herein assigned to *Calappilia* sp. Moreover, this review allowed us to provide an emended diagnosis and a new description of *M. pustulosus* Ristori, 1889.

Finally the systematic position of the specimens assigned by Allasinaz (1987) to *Calappilia mainii* [= *Stenodromia mainii* (Allasinaz, 1987)] and *Calappilia vicetina* Fabiani, 1910 is herein discussed respectively.

Abbreviations – lcxp: carapace length; wcxp: carapace width; MPOM: Museo Paleontologico "G. Maini", Ovada (Alessandria, Piemonte); MSNVR: Museo di Storia Naturale di Verona.

2. Systematic palaeontology

Infraorder Brachyura Latreille, 1802
Section Eubrachyura de Saint Laurent, 1980
Subsection Heterotremata Guinot, 1977
Superfamily Calappoidea H. Milne Edwards, 1837
Family Calappidae H. Milne Edwards, 1837
Genus *Calappilia* A. Milne-Edwards in Bouillé, 1873

Calappilia guttata n. sp.
Figure 1A and 1B

Diagnosis: Convex carapace longer than wide, drop-shaped outline, widest in the anterior quarter, longitudinally trilobate; rounded anterolateral margins slightly sinuous; posterolateral margins tapering posteriorly, nearly straight with a marginal tubercle on the posterior half; narrow posterior margin convex in the middle, with a small tubercle on each lateral corner; gastric and cardiac regions defined by sinuous grooves; elongate median lobe with unequal tubercles on gastric, cardiac and intestinal regions, surrounded by smaller irregular ones; protogastric regions with a central rounded tubercle surrounded by smaller ones; branchial regions inflated anteriorly with about 30 tubercles of different size arranged uniformly; metabranchial regions with sparse rounded tubercles.

Etymology: The trivial name alludes to the drop shape of the carapace (drop = *gutta* in Latin language).

Holotype: MPOM 249.

Paratype: MPOM 223B.

Type locality: Case Viazzi, Ciglione (Alessandria, NW Italy).

Geological age: early Oligocene (Rupelian).

Material and measurements: MPOM 223B – lcxp: 14 mm, wcxp: 13.5 mm; MPOM 249 – lcxp: 12 mm, wcxp: 11 mm.

Description: Small carapace; carapace slightly longer than wide, drop-shaped in outline, widest in the anterior quarter, longitudinally trilobate; deep rounded orbits poorly preserved, frontally directed; dorsal ornamentation with small irregular granulations, closer on the posterior regions, alternate by a great number of irregular tubercles ranged in longitudinal rims; rounded anterolateral margins slightly sinuous by the presence of some marginal small, rounded tubercles; posterolateral

Figure 1 A, B, *Calappilia guttata* n. sp.; A, Holotype MPOM 249; B, Paratype MPOM 223B. C, *Calappilia vicetina* Fabiani, 1910, MPOM 236. D, *Calappilia* sp., MPOM 223. E, F, *Mursiopsis pustulosus* Ristori, 1889; E, MPOM 101M; F, MPOM 361. G-L, *Stenodromia mainii* (Allasinaz, 1987); G, Holotype MPOM 158M; H, Paratype 3AD; I, Paratype 1A; J, Paratype MPOM 289; K, Paratype MPOM 189; L, Paratype 162M. Scale bars = 5 mm.

margins tapering posteriorly, nearly straight with a marginal bigger subtriangular expanded tubercle between the branchial and metabranchial regions; narrow posterior margin slightly sinuous, gently rounded, convex in the middle, with a small rounded tubercle on each lateral corner; gastric and cardiac regions well defined by elongate sinuous grooves; elongate median lobe, with large, rounded, unequal tubercles on gastric, cardiac and intestinal regions, surrounded by smaller irregular ones; protogastric regions with a central rounded tubercle circled by several (4-5) smaller ones; branchial regions inflated anteriorly bearing about 30 tubercles of different size arranged uniformly; metabranchial regions with some sparse rounded tubercles.

Discussion: The studied specimens have been ascribed to *Calappilia* A. Milne-Edwards in Bouillé, 1873, in having wider vaulted carapace, widest in the anterior part; longitudinal three-lobed dorsal surface, with rounded tubercles, arranged in longitudinal rims; and lacking wing-like projections for covering the pereiopods. Though poorly preserved frontally, some peculiar proxy characters (*sensu* Schweitzer, 2003) of the carapace of both specimens, allowed us to distinguish the studied specimens from the other species of *Calappilia* reported to date, mainly in the elongate shape of the carapace, the dense tuberculation, and number and distribution of marginal tubercles.

Among the European species belonging to *Calappilia*, recently discussed by Busulini *et al.* (2014), the studied specimens share only affinities with *Calappilia lyrata* Lőrenthey in Lőrenthey and Beurlen, 1929, from the late Eocene of Hungary (Busulini *et al.*, 2014: 201), having a longitudinally elongate shape of the carapace, curved anterolateral margins, and a great number of tubercles (25-30) distributed over the branchial regions. *Calappilia lyrata* differs, however, in the orbital margin shape, the less deep marked three-lobate dorsal carapace, the median lobe ornamentation and for the posterolateral and posterior margins (Busulini *et al.*, 2014: 200, Pl. 2, figs. 5, 6).

Calappilia vicetina Fabiani, 1910
Figure 1C

Calappilia vicetina Fabiani, 1910: 4, 21, Pl. 1, fig. 1a-c.
Calappilia vicetina – Fabiani, 1915: 285. — Glaessner, 1929: 74. — Allasinaz, 1987: 525-527, fig. 6, Pl. 1, fig. 7. — De Angeli and Beschin, 2001: 23. — De Angeli and Garassino, 2006: 42. — Schweitzer *et al.*, 2010: 84. — Messina, 2012: 45, fig. 1. — Busulini *et al.*, 2014: 205, Pl. 3, figs. 4, 5.
Material: MPOM 236.
Locality: Casa Ivaldi, Ponzone (Alessandria, NW Italy).
Geological age: early Oligocene (Rupelian).
Material and measurements: MPOM 236 – lcxp: 17 mm, wcxp: 19.2 mm.
Discussion: According to Allasinaz (1987: 525) and Busulini *et al.* (2014: 205), the studied specimen shows the main carapace proxy characters of *Calappilia vicetina* Fabiani, 1910, such as the posterolateral margin joining posterior one in large arch bearing single, triangular spine; posterior margin with large median projection in shape of dovetail with marginal spines and two smaller spines; meso-metagastric lobe with row of three large tubercles; and five tubercles on cardiac region. Allasinaz (1987: 526) reported also a second specimen (n. 10, not figured) assigned to this species, not housed in the Museo Paleontologico "G. Maini" and probably lost.

Calappilia sp.
Figure 1D

Material: MPOM 223.
Locality: Case Viazzi, Ciglione (Alessandria, NW Italy).
Geological age: early Oligocene (Rupelian).
Material and measurements: MPOM 223 – lcxp: 21 mm, wcxp: 23.3 mm.
Discussion: One carapace in dorsal view, mainly preserved as an internal mould. Though the carapace cuticle is not preserved and the rostrum

is incomplete, the subrounded shape of the carapace, with convex antero- and posterolateral margins; the carapace widest in the anterior part; the longitudinal three-lobate dorsal surface, with rounded tubercles, arranged in longitudinal rims; the absence of posterolateral expansions or teeth, allow us to compare the studied specimen to the representatives of *Calappilia* A. Milne-Edwards in Bouillé, 1873. However, the lack of a complete fronto-orbital margin and the dorsal cuticle do not allow a sure specific assignment or close comparisons with the European species belonging to *Calappilia*, as recently discussed by Busulini *et al.* (2014).

The proxy characters of the dorsal carapace mould only allowed us to recognize that the studied specimen seems to be different in the ornamentation arrangement from the species within the Calappidae, reported to date from the Oligocene of the Ligure Piemontese Basin. Therefore the studied specimen could represent a new undetected species. The studied specimen was originally assigned, but not figured by Allasinaz (1987: 528) to *Mursiopsis pustulosus*.

Genus *Mursiopsis* Ristori, 1889

Note: Ristori (1889) erected this genus, reporting only a short description. Allasinaz (1987) gave a very detailed description for this species, without providing a diagnosis. Therefore, we provide herein an emended diagnosis for the species, based on the direct observation of the specimens from the Museo Paleontologico "G. Maini".

Emended diagnosis: Subpentagonal convex carapace, three-lobate; maximum width in anterior part; convex undulate anterolateral margins indistinct from the slightly concave posterolateral margins; short straight posterior margin slightly convex at the middle; posterolateral margin with three alternate rounded tubercles; frontal and postorbital regions depressed compared to the remainder carapace; dorsal carapace tuberculate, with four irregular, alternate subrounded, tubercles arranged in longitudinal rims; deep gastro-branchial sinuous grooves, diverging frontally.

Mursiopsis pustulosus Ristori 1889
Figure 1E and 1F

Mursiopsis pustulosus Ristori, 1889: 405, Pl. 15, figs. 6–8.

Mursiopsis pustulosus – Glaessner, 1929: 261. — Glaessner, 1969: 495. — Allasinaz, 1987: 527-529, fig. 7, Pl. 1, figs. 8, 9. — De Angeli and Garassino, 2006: 43. — Schweitzer *et al.*, 2010: 84.

Holotype: Lost.

Locality: Case Galletto, Ciglione; Case Ivaldi, Ponzone (Alessandria, NW Italy).

Geological age: early Oligocene (Rupelian).

Material and measurements: MPOM 101M (Allasinaz, 1987: Pl. 1, fig. 8) – lcxp: 25.2 mm, wcxp: 27 mm; MPOM 361 (Allasinaz, 1987: Pl. 1, fig. 9) – lcxp: 19 mm, wcxp: 21.4 mm.

Description: Carapace wider than long, subpentagonal in shape; frontal margin narrow; rostrum short, with a short longitudinal median depression; frontal and postorbital regions depressed compared to the remainder carapace; subrounded frontal orbits with thin granulate orbital margin, slightly upward projected; anterolateral margins convex undulate by the presence of marginal tubercles, indistinct by the posterolateral margins; posterolateral margins slightly concave, with three marginal alternate tubercles, narrowing to the short posterior margin; posterior margin narrow, nearly straight, slightly convex at the middle; carapace surface covered by thin tubercles and by alternate subrounded unequal bigger tubercles (at least four) arranged in longitudinal rims, surrounded by irregular smaller ones; deep gastro-branchial sinuous grooves diverging frontally, outlining the protogastric regions, dividing the median lobe from the branchial longitudinal lobes, followed by

two shorter, less marked tuberculate lateral lobes on each epibranchial region; pleon and cephalic appendages not preserved.

Discussion: Ristori (1889: 405; Pl. 15, figs. 6-8), established *Mursiopsis* with *M. pustulosus* based upon one single carapace (today lost) from the Oligocene (Tongrian = Rupelian) of Sassello, Savona (Liguria, NW Italy), pointing out that the genus differed from *Calappilia* A. Milne-Edwards in Bouillé, 1873, for the different shape of the posterior part of the carapace and from *Mursia* Desmarest, 1823 for the longitudinal distinct three-lobate shape of the carapace.

Ristori (1889: 405) pointed out the main characters of *Mursiopsis*: "…rounded anterolateral margins, posterolateral margin concave, posterior margin slightly convex. All the margins are finely denticulate and tuberculate. The dorsal carapace is three-lobate longitudinally…", but did not provide a diagnosis for the species, limiting to a short description of the dorsal carapace regions and ornamentation: "… Frontal margin poorly projected. Lateral and anterior margins arched, covered by several very small thick tubercles… Posterolateral margins concave with 3 marginal tubercles; the median one smaller than others. Posterior margin nearly straight, only slightly projected posteriorly. All the dorsal carapace surface is covered by a small and fine granulation. Beside the central lobe bears a row of longitudinal tubercles of different size forming a tuberculate rib, as in the two lateral longitudinal lobes that are more and more convex in shape approaching to the carapace margins. The form and size of the tubercles is variable, usually globular to ovoid, especially those of the central lobe with the bigger ones in the central part of the carapace. The tubercles are less raised on the frontal and posterior regions. At the bottom of the ocular lobes there are two series of 3 small tubercles arranged symmetrically on both the parts of the carapace, converging in the middle to a small medial tubercle, in which end frontally the central lobe. Locality Sassello – don Perrando Collection – Museum of Genova (now lost)." [literal translation from the original description in Italian language]. Finally Ristori (1889: Pl. 15, figs. 6-8) provided also some figures of the species not useful for a detailed comparison. Later Allasinaz (1987: 527) established the specimen used by Ristori as lectotype and reported also three new specimens assigned to *M. pustulosus* from the Oligocene (late Rupelian) of Ciglione and Ponzone (Alessandria, Piemonte), belonging to the Briata-Maini collection, housed in the Museo Paleontologico "G. Maini", Ovada.

Based upon these additional specimens, an updated description of *Mursiopsis* was provided by Allasinaz (1987: 527-528, Pl. 1, figs. 8, 9), in which included a line drawing reconstruction of the carapace (Allasinaz, 1987: fig. 7): "… carapace of median to small size, subcircular to subpentagonal, rather convex, trilobate with a W/L [wide/length] ratio behind 90 and 93%. Narrow fronto orbital margin… median rostrum depressed medially, poorly expanded frontally…small concave orbits, with a very thin rise supraorbital margin…. Antero and posterolateral margins arcuate, indistinct one to other and undulated by the presence of marginal tubercles…. Posterolateral margins strongly concave forming an angle of 140° to the posterior margin that is slightly convex… Stout tubercle on the protogastric region, surrounded by smaller tubercles; mesogastric region enlarged frontally with a stout central tubercle surrounded by smaller ones; narrow urogastric region with a single tubercle, and sub-trapezoidal cardiac region with 3-4 tubercles. Quite deep longitudinal epato-branchial furrows enlarged frontally outlining the protogastric lobes….. Pleon and appendages not preserved. Localities- Ciglione: Case Galletto (specimen 101M), Case Viazzi (specimen 223) – not figured –; Ponzone: Case Ivaldi (specimen 361). Geological Age: limit behind the Molare Fm. and Rigoroso Marls. Upper Rupelian" [literal translation from the description in Italian language].

The original description by Ristori (1889) was very limited and the close description by Allasinaz (1987) in some way does not reflect accurately the real appearance of the species. The line drawing

of the carapace by Allasinaz (1987) shows some inconsistencies and does not really represent the original shape and ornamentation. These inconsistencies were probably due to the fact that the description and reconstruction provided by Allasinaz (1987) were based on a mix on all the characters present in three specimens ascribed by the author to *Mursiopsis*, one of which (MPOM 223, Figure 1D) does not fit the specific characters and therefore in this review was assigned to *Calappilia* sp. (see discussion above). For this reason only two specimens can be assigned to *M. pustulosus*.

Note: Busulini *et al.* (2014: 200) discussed *Calappilia incisa* Bittner 1886 from the middle Eocene of Veneto (NW Italy), pointing out that the paralectotypes MSNVR i1950 and MSNVR i1950a (the last one not figured by the authors) were doubtfully assigned to this species, as previously already remarked by Bittner (1886) himself, and stated that the specimens "are reminiscent of *Mursiopsis pustulosus* Ristori, 1899…" because the carapace outline " with regularly convex anterior and anterolateral margins and strongly re-entring posterolateral margins, and dorsal tuberculation…" (Busulini *et al.*, 2014: 200).

Though we did not check directly these specimens, we don't think that they can fits into *Mursiopsis* in having indeed convex anterolateral margins undulate by the presence of marginal tubercles and slightly concave posterolateral margins, with three marginal alternate tubercles, as previously reported in description of the type material (this work). Moreover, *M. pustulosus*, based on the knowledge reported to date, seems to be restricted to the early Oligocene of the Ligure Piemontese Basin only.

Remarks: Fossil *Mursiopsis* seems to be uncommon in the Italian fossil record. Indeed the only previous report for the genus was made by Lőrenthey (1909: 236) who reported one unfigured single specimen (*Mursiopsis* sp.) from the Miocene of Sardinia (central Italy) in the Lovisato's collection, without giving details on repository and catalog number. This specimen is not housed in any palaeontological collection in Sardinia, probably lost, not allowed us to verify its assignment.

Genus *Stenodromia* A. Milne-Edwards in Bouillé, 1873

Stenodromia mainii (Allasinaz, 1987)

Figure 1G to 1L

Calappilia mainii Allasinaz, 1987: 523-525, text-fig. 2, Pl. 1, figs. 2-6.

Calappilia mainii – De Angeli and Garassino, 2006: 42. — Schweitzer *et al.*, 2010: 83.

Stenodromia mainii – Busulini *et al.*, 2014: 206, 207, Pl. 3, fig. 6.

Holotype: MPOM 158M (Allasinaz, 1987: Pl. 1, figs. 2) – lcxp: 25.2 mm, wcxp: 23 mm.

Paratypes: MPOM 1a (Allasinaz, 1987: Pl. 1, fig. 6) – lcxp: 18.5 mm, wcxp: 20.2 mm; 3AD figured as 289 by Allasinaz (1987: Pl. 1, fig. 3) – lcxp: 28 mm, wcxp: 32 mm; 162M (Allasinaz, 1987: Pl. 1, fig. 5) – lcxp: 25 mm, wcxp: 23 mm; MPOM 189 (Allasinaz, 1987: 524, Pl. 1, fig. 4) – lcxp: 19 mm, wcxp: 23 mm.

Additional material: MPOM 287 not reported by Allasinaz (1987) – lcxp: 21.5 mm, wcxp: 21 mm; MPOM 289 erroneously reported but not figured by Allasinaz (1987) – lcxp: 20 mm, wcxp: 19.3 mm; B IV – lcxp: 20 mm, wcxp: 19.6 mm.

Note: The paratype 289, as originally designated by Allasinaz (1987), not corresponding to the original figure provided by Allasinaz (1987: Pl. 1, fig. 3), is herein correctly figured (Figure 1J).

Geological age: early Oligocene (Rupelian).

Type locality: Cappelletta di Santa Teresa, Ciglione (Alessandria).

Discussion: Allasinaz (1987: 523) described *Calappilia mainii* based on five complete carapaces from the early Oligocene of the Ligure Piemontese Basin nearby Ovada. Busulini *et al.* (2014: 206) discussed the systematics of this genus, pointing out that the proxy characters of the specimens previously ascribed by Allasinaz (1987) to *Calappilia*, such as gastric and cardiac regions swollen and defined by very deep and broad longitudinal grooves;

branchial regions inflated in anterior part, being narrower posteriorly; and posterolateral margins characterised by few spiny protrusions best fit those of *Stenodromia* A. Milne-Edwards in Bouillé, 1873 "in view of the carapace overall shape, the developpment of longitudinal keels and postero-lateral and posterior teeth." (Busulini *et al.*, 2014: 207). Moreover, Busulini *et al.* (2014: 207) pointed out also that: "the specimens studied by Allasinaz (1978), constituted a very heterogeneous group and more detailed analysis of the type series would be needed to ascertain the correct attributions of all the specimens to the same species". Indeed, the direct observation of the revised type series allows us to confirm a variability of the above-mentioned proxy characters in the carapace outline and size of the posterolateral spines among the specimens, mainly due to the different sizes and preservation of the single carapaces as simply moulds or preserving the original cuticle. Especially the paratype 3AD (Figure 1H) seems to have a median spine protruding the posterior margin (as preserved), not observable in the others specimens. Finally the lack of the ventral regions does not allow us to verify if these differences can be related also to a sexual dimorphism or to a marked intraspecific variability, usually common in the representatives of extant (and fossil) Calappidae.

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