A new homolid crab, *Cherpihomola italica* gen. nov., sp. nov. (Decapoda, Brachyura), from the Rupelian of the Ligure-Piemontese Basin (Alessandria, northern Italy)

Nov homolidni rak *Cherpihomola italica* gen. nov., sp. nov. (Decapoda, Brachyura) iz spodnjeoligocenskih (rupelijskih) plasti Ligursko-piemontskega bazena (Alessandria, severna Italija)

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Abstract

A new genus and species of homolid from lower Oligocene (Rupelian) strata in the Ligure-Piemontese Basin (northern Italy) is introduced. *Cherpihomola italica* gen. nov., sp. nov. represents the first record of homolids from Oligocene deposits across Europe and extends the palaeogeographical distribution of extinct homolids.

Izvleček

V prispevku predstavljamo nov rod in novo vrsto homolidnih rakov iz spodnjeoligocenskih (rupelijskih) plasti v Ligursko-piemontskem bazenu (severna Italija). *Cherpihomola italica* gen. nov., sp. nov. je prva najdba homolidnih deseteronožcev iz oligocenskih nahajališč v Evropi, kar nam omogoča boljše poznавanje paleogeografske razširjenosti te skupine fosilne rakov.

Introduction

Studies of decapod crustaceans of the Ligure Piemontese Basin started with Sismonda (1846, 1861), who recorded brachyurans of Miocene age from the Turin hills. Later, Michelotti (1861) and Crema (1895) added material from Miocene and Pliocene deposits in the same area, while Ristori (1889) described new species from the Rupelian of Sassello, Santa Giustina, Fornaci and Dego. Recently, Allasinaz (1987), Marangon & De Angeli (1997, 2007), De Angeli & Marangon (2001, 2003a, b), Larghi (2003), Busulini et al. (2014), Pasini & Garassino (2017a, b) and Pasini et al. (2019) described a number of new species from this area.

The carcinological fauna includes the following species: *Hoploparia* sp., *Callianassa canavarii* Ristori, 1889, *Callianassa* sp., *Pagurus* sp., *Zygopa galantensis* (De Angeli & Marangon, 2001), *Alcespina ovadaensis* Pasini & Garassino, 2017 [= *Ranina* (*Ranina*) speciosa, sensu Allasinaz, 1987], *Lophoranina* sp. (= *Lophoranina* ?aldrovandi, sensu Sismonda, 1861), *Calappa demarcoi* Pasini & Garassino, 2017, *Stenodromia mainii* (Allasinaz, 1987) (as *Calappila*), *Calappilia verrucosa* A. Milne-Edwards in Bouillé, 1873, *Calappilia vicentina* Fabiani, 1910, *Mursiopsis postulosus* Ristori, 1889, *Cherpiocarcinus rostratus* Marangon & De Angeli, 1997, *Retropluma* sp., *Portunus ristorii* Karasawa, Schweitzer
& Feldmann, 2008 (= *P. convexus* Ristori, 1888), *Coeloma vigil* A. Milne-Edwards, 1865, *Palaeocarpilus aquitanicus* A. Milne-Edwards, 1862 (= *P. macrocheilus*, sensu Allasinaz, 1987), *Eriphia* sp. and *Grapsus* sp. To this list, we here add *Cherpihomola italica* n. gen., sp. nov.

**Geological and stratigraphical setting**

Lithologically, Rupelian strata in the Ligure Piemontese Basin are characterised by an alternation of greyish marls with nodular elements and silt-rich marls, occasionally sandy, resting on the “Formazione di Pianfolco”, which is of Rupelian age. Macrofossils are preserved mainly within pebbles or nodules that were eroded from the highest levels exposed of this sedimentary complex, which is referred to as “Formazione di Molare”. These levels overlie terrestrial units of the “Brecce di Costa Cravara and Pianfolco”, studied by Charrier et al. (1964) and dated as early Rupelian (see also Gelati & Gnaccolini, 1978; Gnaccolini, 1978). The crab-bearing levels were attributed to the transition between the “Formazione di Molare” and the overlying “Marne di Rigoroso” by Allasinaz (1987) and to the biozone of the benthic foraminifer *Operculina complanata* (Bianco, 1985; Balossino & Bianco, 1986). Other studies on Oligocene deposits in this area were carried out by Franceschetti (1967), Gelati & Gnaccolini (1980) and Fantoni et al. (1983).

The palaeoenvironment of the Case Cherpione area documents three Rupelian phases, from a fully terrestrial setting with forests and rivers that transported abundant plant remains (early Rupelian), to a marine, warm-water lagoon with moderate currents and coasts nearby (middle Rupelian) and finally, during the late Rupelian, different platform conditions, a bathymetric change and a different benthos/plankton ratio which led to the disappearance of the macrofauna (Gelati & Gnaccolini, 1980; Fantoni et al., 1983).

The material studied here originates from the top levels of the “Molare Formation” (middle Rupelian) at Case Cherpione (Alessandria, northern Italy); it is preserved in nodules of diagenetic origin (Fig. 1).

**Material and methods**

Two specimens from the middle Rupelian of Case Cherpione (Ovada, Alessandria) are housed in the palaeontological collections of the Museo Civico “G. Zannato”, Montecchio Maggiore, Vicenza (abbreviation: MCZ). They are three-dimensionally preserved; preparation was easy because of the unconsolidated matrix. Dimensions are in millimetres. For higher-level classification, we follow the recent arrangement proposed by Guinot et al. (2013).
Systematic palaeontology

Order Decapoda Latreille, 1802
Infraorder Brachyura Latreille, 1802
Subsection Homoliformia Karasawa, Schweitzer & Feldmann, 2011
Superfamily Homoloidea H. Milne Edwards, 1837
Family Homolidae H. Milne Edwards, 1837

Discussion: The superfamily includes the families Homolidae, Poupiniidae Guinot, 1991 and Latreillidae Stimpson, 1858 (Guinot & Richer de Forges, 1995). The typical features of Recent homolids have been outlined in detail by Guinot & Richer de Forges (1995) and Davie et al. (2015), while extinct forms have been discussed by Collins (1997), Schweitzer et al. (2010), Nyborg & Garassino (2017) and Garassino et al. (2015, 2019).

According to several authors (notably Schweitzer et al., 2010; De Angeli & Alberti, 2012; Garassino et al., 2015; Nyborg & Garassino, 2017 and Garassino et al., 2019), eighteen fossil genera (four also with Recent representatives) should be assigned to the Homolidae, as follows: Cretalamoha Nyborg & Garassino, 2017, Dagnaudus Guinot & Richer de Forges, 1995 (both fossil and Recent), Doerflesia Feldmann & Schweitzer, 2009, Homola Leach, 1815 (both fossil and Recent), Homoliformis Collins, Schulz & Jakobsen, 2005, Homolopsis Bell, 1863, Hoplitocarcinus Beurlen, 1928, Latheciocarcinus Bishop, 1888, Lignihomola Collins, 1997, Lindahomola Garassino, Weaver, Portell & Vega, 2019, Londinimola Collins & Saward, 2006, Nogarhomola De Angeli & Alberti, 2012, Palehomolum Rathbun, 1926, Paromola Wood-Mason, in Wood-Mason & Alcock, 1891 (both fossil and Recent), Paromolopsis Wood-Mason, in Wood-Mason & Alcock, 1891 (both fossil and Recent), Peedeehomola Garassino, Clemens & Vega, 2015, Prohomola Karasawa, 1992 and Zygastrocarcinus Bishop, 1983.

Genus Cherpihomola gen. nov.

Type species: Cherpihomola italica sp. nov.

Etymology: The generic name refers to Case Cherpiione, the locality which yielded the type specimens.

Diagnosis: Carapace longitudinally square in outline, as long as wide; well-developed linea homolica, sinuous in outline, acute rostrum, one pseudorostral spine, one infra-orbital spine, one hepatic spine, one anterolateral spine, two posterolateral spines, regions nearly smooth and slightly raised.

Cherpihomola italica sp. nov.

Material and measurements: Two carapaces; the holotype is MCZ 5759 (carapace length 17.5 mm; carapace width 16.4 mm); the paratype is MCZ 5760 (carapace length 20.6 mm).

Description: Carapace longitudinally square, as long as wide, well-developed linea homolica, sinuous; moderately vaulted transversely, less so longitudinally, lateral sides slanted, nearly sub-vertical; regions smooth well marked by grooves; triangular rostrum not sulcate axially; one pseudorostral spine, as long as the rostrum; a short infraorbital spine; anterolateral margin with one prominent subhepatic spine directed outwards; a second short spine is present ventrally, not visible in dorsal view; one prominent anterolateral spine directed outwards present between cervical and branchiocardiac grooves; a second short spine is present ventrally, not visible in dorsal view; one prominent anterolateral spine directed outwards present between cervical and branchiocardiac grooves; posterolateral margin with two short spines; posterior margin wide, concave and rimmed; deep cervical groove, convex laterally to epibranchial lobe, strongly inclined between inferior margin of mesogastric region; branchiocardiac groove almost straight proximally, downturned posteriorly to gastric lobe, curved and continuous on branchial region; epigastric lobe defined by pair of tubercles positioned just posterior to pseudorostral spines;
Cherpihomola italica n. gen., sp. nov.; 1a-e: MCZ 5759, holotype; a - dorsal view of carapace; b - lateral view of carapace; c - nodules of diagenetic origin associated with cheliped; d - right propodus; e - ambulatory legs; 2 - MCZ 5760, paratype, dorsal view of carapace.
A new homolid crab, *Cherpihomola italica* gen. nov., sp. nov. (Decapoda, Brachyura), from the Rupelian of the Ligure-

1. *Latheticocarcinus italicus* De Angeli & Ceccon, 2013, holotype; 2. *Homola vanzoi* Beschin, De Angeli & Zorzin, 2009, holotype, part (a) and counterpart (b); 3. *Homola barbata* (Fabricius, 1793); 4. *Nogarhomola aurorae* De Angeli & Alberti, 2012, holotype (a) and paratype (b).

PLATE 2

mesogastric lobe marked by smooth grooves laterally and well-defined cervical groove posteriorly; protogastric lobe with two tubercles; narrow mesogastric lobe; triangular cardiac lobe, with three tubercles; long, narrow and smooth intestinal lobe, slightly depressed; metabranchial lobe with two small tubercles aligned along *linea homolica*; smooth dorsal surface. Chelae with elongate palm with upper and lower margins almost parallel; outer surface of palm densely covered by punctuation, fixed finger about two-thirds of palm, long and straight. Long ambulatory legs, with denticulated upper margin.
Discussion: The carapace of this new homolid is characterised by a well-marked *linea homolica*, acute rostrum, one pseudostral spine, one infra-orbital spine, one sub-hepatic spine, one anterolateral spine and two posterolateral spines, a deep cervical groove, nearly smooth and slightly raised dorsal regions and a narrow cardiac region, with three tubercles. Although Chenpihomola gen. nov. shares features of the rostrum and pseudostral spines with *Paromola*, the latter has convex lateral margins with numerous spines and tuberculated dorsal regions, delimited by shallow grooves. *Paromola* is known from six modern and two extinct species, namely *Paromola vetula* Crawford, 2008 from the Paleogene of Rio Negro Province (Argentina) and *Paromola roseburgensis* Nyborg & Garassino, 2017 from the Roseburg Formation (lower Oligocene) of Oregon (USA).

The new genus has affinities with *Latreilopsis* in showing near-parallel lateral margins, a similar arrangement of the frontal and lateral spines, a near-smooth dorsal surface and a narrow cardiac region with three tubercles. However, *Latreilopsis* has longer pseudostral spines and one or more accessory spines in the rostrum, an epibranchial margin without a spine, while the posterolateral margin has a single robust spine.

Of other Cenozoic genera, *Prohomola* has densely tuberculated dorsal regions and deep cervical and branchiocardiac grooves (see Karasawa, 1992; Blow & Manning, 1996). *Dagnaudus* has a triangular, acute rostrum, long pseudostral spines with two accessory spines, lateral margins with spines and tuberculated regions bounded by shallow grooves (see Jenkins, 1977). *Nogarhomola* has convex lateral margins with spines, a bifid rostrum and dorsal regions with tubercles (De Angeli & Alberti, 2012), while *Paihomola* has an oval carapace (larger posteriorly), a long, pointed rostrum that is strongly downturned, pseudostral spines that are slightly longer than the rostrum and with two small basal spinules, as well as a large, inflated subhepatic region, with one large triangular spine and well-developed cervical and branchiocardiac grooves (Nyborg & Garassino, 2017).

Fossil homolids from Italy

To date, only three genera are known from the fossil record. *Homola Leach*, 1815 with *H. vanzoi* Beschin, De Angeli & Zorzin, 2009 pl. 2, figs. 2a-b from the lower Eocene (Ypresian) of San Giovanni Ilarione (Verona) and *H. barbata* (Fabricius, 1793) pl. 2, fig. 3, inhabiting the modern Atlantic Ocean (Portugal) and the Mediterranean Sea and occurring as a fossil in the upper Pleistocene (Tyrrenian) of Trumbacà (Reggio Calabria). *Latheticocarcinus italicus* De Angeli & Ceccon, 2013 pl. 2, fig. 1 is known from the lower Eocene (Ypresian) of Monte Magrè (Schio, Vicenza), while *Nogarhomola aurorae* De Angeli & Alberti, 2012 pl. 2, figs. 4a-b has been described from the middle Eocene (Lutetian) of Nogarole Vicentino (Vicenza) (Beschin et al., 2009; Garassino et al., 2010; De Angeli & Alberti, 2012; De Angeli & Ceccon, 2013). The new genus and species erected herein represents the first record of homolid crabs from Oligocene strata in Europe, thus enlarging their palaeogeographical distribution.

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