

Short communication

Petrochirus sp. (Anomura, Paguroidea, Diogenidae) from the early Pleistocene of the Podere dell'Infrascato, Volterra (Pisa, Tuscany, central Italy)

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Abstract - We report *Petrochirus* sp. (Diogenidae Ortmann, 1892) from the early Pleistocene of the Podere dell'Infrascato, Volterra (Pisa, Tuscany, central Italy). The record of *Petrochirus* sp. in this peculiar environment (upper bathyal zone) is significant due to the scarce knowledge about the genus distribution in the paleo-Mediterranean area.

Key words: Anomura, Paguroidea, Diogenidae, Pleistocene, Tuscany, Italy.

Riassunto - *Petrochirus* sp. (Anomura Diogenidae) del Pleistocene inferiore del Podere dell'Infrascato, Volterra (Pisa, Toscana, Italia centrale).

Viene segnalato *Petrochirus* sp. (Diogenidae Ortmann, 1892) del Pleistocene inferiore del Podere dell'Infrascato, Volterra (Pisa, Toscana, Italia centrale). Questa nuova segnalazione, relativa ad un ambiente considerato di acque profonde (zona batiale-superiore), amplia le scarse conoscenze sulla presenza e distribuzione del genere nel paleo-Mediterraneo.

Parole chiave: Anomura, Paguroidea, Diogenidae, Pleistocene, Toscana, Italia.

INTRODUCTION

The studied specimen was recently collected from the bottom of a small natural escarpment, nearly 60 meters along the side of a hill in the Podere dell'Infrascato landslide, a few kilometres W of Volterra (Pisa, Tuscany, central Italy). Garassino *et al.* (2012) reported *Bathypluma pliocecnica* Garassino, Pasini & Marini, 2012 (Brachyura, Retroplumidae) from the Podere dell'Infrascato landslide. Later Pasini *et al.* (2014) reported a rich decapod faunal assemblage, including several axiidean and brachyuran species

from the same locality, suggesting a possible palaeoecological scenario for this early Pleistocene environment, referable to an upper bathyal zone (Baldanza *et al.*, 2014). The report of *Petrochirus* sp. from this peculiar environment is important due to the very scarce record (only five species are known to date) and poor knowledge about the genus distribution in the Tethyan area (Pasini *et al.*, 2014).

MATERIALS AND METHODS

One specimen preserved in a silty/clay block. Due to the delicate nature of the silty/clay rock including and the presence of iron oxides, the specimen has been fixed with a film of thermoplastic acrylic resin for study and preservation. The specimen, assigned to *Petrochirus* Stimpson, 1858, with *P.* sp. (Diogenidae Ortmann, 1892), is housed in the palaeontological collection of the Museo di Storia Naturale di Milano (MSNM).

Abbreviations

h: height of the palm;
ld: length of the dactylus;
li: length of the index;
lp: length of the palm;
lpr: length of the propodus (including index).

SYSTEMATIC PALEONTOLOGY

Infraorder Anomura MacLeay, 1838
Superfamily Paguroidea Latreille, 1802
Family Diogenidae Ortmann, 1892
Genus *Petrochirus* Stimpson, 1858

Type species: *Pagurus granulatus* Olivier, 1811 [= *Cancer bahamensis* Herbst, 1796 (for 1791 in Herbst, 1782-1804)], by original designation.

Fossil species: See Schweitzer *et al.* (2010) and Pasini, Garassino & De Angeli in Baldanza *et al.* (2014).

Material and measurements: one left propodus; palm three-dimensionally preserved, partially compressed, and exposed in lateral view. Only part of the original exocuticle is preserved. (see Fig. 1; MSNM i28478 – h: 15 mm; ld: 12 mm; lp: 25 mm; lpr: 30 mm, li: 10 mm).

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Fig. 1 - *Petrochirus* sp., MSNM i28478, left cheliped; early Pleistocene of the Podere dell'Infrascato, Volterra (Tuscany, Italy) ($\times 2$).

Note: a small, poorly preserved portion of the carpus or merus belonging to the same specimen is also observable near the dorsal margin of the palm (not measurable).

Description: Strong subsquare left chela; palm with both convex upper and lower margins; palm slightly longer than high; convex outer side, covered with flat arranged irregular tubercles; upper margin of palm with a longitudinal rim of subrounded stout tubercles; strong subtriangular, tuberculate dactylus rounded distally, slightly turned downward distally; occlusal margin of dactylus with a rim of teeth decreasing in size distally; triangular index shorter than dactylus; straight occlusal margin of index with flat teeth, poorly preserved.

Discussion: Though poorly preserved, the studied specimen shows close affinities with the Diogenidae (Anomura, Paguroidea) specifically with the distinctive characters of *Petrochirus* Stimpson, 1858, such as the ornamentation with raised and flat tubercles on the outer surface of the palm and dactylus, and the longitudinal rim of tubercles along the upper margin of the outer surface of the palm. These characters allow us to justify its assignment to *Petrochirus*.

The Tethyan fossil record of *Petrochirus* includes: *P. mezi* (Lorenthey, 1909) from the middle Eocene of Egypt; *P. poscolensis* Beschin, De Angeli, Checchi & Mietto, 2006, from the late Eocene (Priabonian) of Veneto (N Italy); *P. priscus* (Brocchi, 1883) from the Miocene (Badenian) of Hungary; *P. savii* Beschin, De Angeli, Checchi & Zarantonello, 2012, from the middle Eocene (Lutetian) of Veneto (Brocchi, 1883; Lorenthey, 1909; Beschin *et al.*, 2006; 2012); *P. sanctilazzari* Pasini, Garassino & De Angeli 2014 in Baldanza *et al.* (2014) has been reported from the Pliocene of Piedmont, northern Italy and from the early Pleistocene of Tuscany, central Italy (Pasini, *et al.*, 2014; Pasini & Garassino, 2015a,b).

Some characters, such as the outer side of the palm with a rim of flat tubercles dorsally; similar tubercles

smaller and sparse ventrally and on the dactylus; the occlusal margin of the dactylus, with a rim of teeth decreasing in size distally, distinguish the studied specimen both from the type species (*P. granulatus*), and from the others species reported to date from the Tethyan area.

Indeed, *Petrochirus mezi* has an outer surface of the palm with large tubercles, occlusal margin of index with one strong raised tooth and four small teeth. *Petrochirus savii* has an outer surface of the palm with small tubercles arranged randomly, and an occlusal margin of the index with one strong raised tooth and two small teeth. *Petrochirus poscolensis* has inner and outer surfaces of the palm with small tubercles arranged uniformly. *Petrochirus sanctilazzari* and *P. priscus* have a coarser spiny ornamentation of the palm, an irregular row of spiny tubercles distally directed on the upper margin, and a longitudinal depression running along the upper margin of the palm, that does not appear in *P. sp.* Moreover, *P. sanctilazzari* (known by right chelipeds only) has a more pronounced subsquare palm and appears to have a shorter and curved dactylus occlusal margin, that is more rounded in transverse section.

Finally, the widely distributed extant Western Atlantic species, *P. diogenes* (Linnaeus, 1758) shares with the studied specimen a similar but stronger ornamentation on the palm, differing also in having a more distinctly curved, convex inferior margin and a more oblique dactylus-palm articulation.

Based upon these comparisons the studied specimen could belong to a different unknown species. However, the incompleteness of the palm exocuticle and its partial compression do not allow us to assign the studied specimen from a systematic point of view. Therefore, we ascribe it to *Petrochirus* in generic way. *Petrochirus sp.* is the second record (first from a bathyal environment) in the Pleistocene record of the paleo-Mediterranean basin representing with *P. sanctilazzari*, the youngest fossil representatives of the genus in the Mediterranean area.

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