Short Communication

New report of the box crab *Calappa granulata* (Linnaeus, 1758) from the Pliocene of Borgomanero (NW Italy), with remarks on its fossil distribution

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Abstract - We report a small carapace and palm from the Pliocene of Borgomanero (Novara, Piedmont, NW Italy), herein assigned to the extant and fossil box crab *Calappa granulata* (Linnaeus, 1758) (Calappidae De Haan, 1833). This is the northernmost report for the species, enlarging its palaeogeographic distribution, although *Calappa granulata* has been already reported from the Plio-Pleistocene Mediterranean outcrops among several Italian localities. An updated map of the fossil localities of *C. granulata* is also provided.

Key words: Brachyura, Calappidae, Crustacea, Italy, palaeogeographic distribution, Pliocene.

MATERIALS AND METHODS

The studied specimen is a small partially crushed dorsal carapace with an incomplete right chela preserved ventrally. Due to the delicate nature of the thin cuticle and incoherence of the sandy matrix, the specimen was fixed with a film of polyvinyl acetate solution for study and preservation. The specimen is housed in the palaeontological collections of the Museo di Storia Naturale di Milano (MSNM).

SYSTEMATIC PALAEOONTOLOGY

*Type species:* *Cancer granulatus* Linnaeus, 1758, by subsequent designation by Latreille (1810).

*Included fossil species:* see Schweitzer et al. (2010: 82, 83) and Pasini & Garassino (2017: 74).

*Geological range:* lowermost Pliocene-Recent.
Calappa granulata (Linnaeus, 1758)
Figs. 1 A-C, 2

[synonym list restricted to the fossil record]

Cancer granulatus Linnaeus, 1758: 627.

Cancer granulatus – Linnaeus, 1767: 533.

Calappa granulata – Gemmellaro 1914: 80, pl. 1, figs. 9, 10. – Garassino & De Angeli 2004: 38, fig. 4 (1-3). – Garassino et al. 2004: 264, fig. 7 a-c. – De Angeli & Garassino 2006: 40. – De Angeli et al. 2009: 176, 177, 195, 196, fig. 8a. b. – Schweitzer et al. 2010: 82. – Garassino et al. 2012: 51. – Pasini & Garassino 2013: 320, 321. – Garassino & Pasini 2013: 330, 331, fig. 1. – Baldanza et al. 2013: 344, fig. 9. – Garassino et al. 2014: 125, 126, fig. 2D, E.

Material. One carapace with nearly complete right propodus and incomplete dactylus of right cheliped (MSNM i 29338 - carapace length: c. 25 mm).

Description. Carapace – Small convex carapace, wider than long; frontal and orbital margins not preserved; right anterolateral margin crushed, pressed transversely;...
left convex posterolateral margin with six flat, triangular teeth protruding laterally, slightly increasing in size posteriorly, the fifth larger; teeth appear to be separated by narrow indentations; posterior margin nearly straight, slightly inflated medially, lacking median teeth; carapace regions well marked by two longitudinal parallel grooves dividing dorsal surface into three main parts bearing blunt tubercles, decreasing in size posteriorly, aligned longitudinally; dorsal surface covered by small tubercles uniformly arranged, larger in the metathoracic and intestinal regions.

Cheliped – Subtriangular, flattened, and wide palm higher anteriorly, with some blunt rounded tubercles proximally; upper margin with a rim of triangular spines; outer palm surface and upper and lower margins with small granulations; dactylus broken proximally and translated, strongly curved and pointed distally, fringed with granulations along the upper margin, and a typical, strong, molariform proximal prominence protruding outward on the basis of the outer margin; short, triangular index broken transversally, with tip directed upward and occlusal margin with triangular short teeth.

Discussion. The studied specimen similar in shape, ornamentation, and number of posterolateral spines with the small carapace and dactylus reported from the Pliocene of Tuscany (De Angeli et al., 2009: 177, fig. 8 A, B) and the carapace and complete chela from the Pleistocene of Calabria (Garassino et al., 2014: 124, fig. 2 D, E) fits well within the morphological characters and intraspecific variability of the extant and fossil C. granulata (Linnaeus, 1758) to which is herein assigned, probably pertaining to a juvenile or immature individual due to the small-sized carapace for the species.

Zariguey-Álvarez (1968) pointed out the main characters of this species, such as the convex carapace wider than long; rounded anterolateral margins with small poorly developed teeth wider at the base, followed on the posterior third by larger teeth pointed medially; straight posterior margin poorly produced, lacking teeth on the median portion; esophageal and cardiological regions fused, forming a prominent longitudinal ridge delimited laterally by two marked longitudinal grooves; at each side of these two grooves, generally four longitudinal groves not reaching the posterior margin and delimiting other ridges; all the ridges bear longitudinally nodules of decreasing size, with the larger sizes in the esophageal region. Later, Müller (1984: 67) pointed out the presence of “six big (marginal) lobes [teeth]...” in C. granulata is recognised as an useful character to distinguish this species from the highly similar C. praetata Lörenthey in Lörenthey & Beurlen, 1929, from the Mediterranean Miocene bearing four main posterolateral teeth only.

PREVIOUS FOSSIL RECORDS OF C. GRANULATA

Fossil reports assigned to C. granulata were mainly based on the identification of characters of loose chelae or dactyli and only three almost complete carapaces were reported to date from the fossil record of Italy.

Gemellaro (1914) was the first to report Calappa granulata (Linnaeus, 1758) from the Pliocene of Altavilla and the Pleistocene of Monte Pellegrino (Palermo, Sicily) based on two loose dactyli having similar morphological characters with those of the living species. Garassino & De Angeli (2004: 38) reported three fragmentary chelae from the early Pliocene and lower-middle Pleistocene of Arda River (Castell’Arquato, Emilia Romagna). Garassino et al. (2004: 264) reported several fragmental chelae from the Pliocene of Candeló, Cossato, and Masserano (Biella, Piedmont). De Angeli et al. (2009: 176) reported one complete carapace and one dactylus from the early Pliocene of Prescianó and Stroncoli (Siena, Tuscany) respectively. Pasini & Garassino (2013: 320) reported one dactylus from the earlymost Pliocene of Monticello di Quattro Castella (Reggio Emilia, Emilia Romagna). Garassino & Pasini (2013: 350) reported one chela from the late Pliocene of San Pietro (Asti, Piedmont). Baldanza et al. (2013: 344) reported one loose chela from the early Pleistocene of Poggi i Sodi (Siena, Tuscany). Finally, Garassino et al. (2014: 124) reported one carapace and one chela from the late Pleistocene of Trumbacà (Reggio Calabria) (Fig. 2).
Currently our knowledge of the fossil record of *C. granulata* is restricted to the Mediterranean basin. Indeed, this species seems to be restricted to the marine coasts of Italy with their oldest fossil record from the earliest Pliocene. *Calappa granulata* is derived from a quite similar *C. praelata* which is probably spread in the Mediterranean area during the middle and late Miocene (Pasini et al., 2012: 138).

Nowadays the extant *C. granulata* is largely widespread in the Mediterranean Sea from 10-15 to 400 or more meters deep, and in the adjacent Atlantic Ocean including Madera, Canary, and Cape Verde Islands and it represents an infaunal active predator, burrowing in bottoms of sandy or muddy detritus (Zariquiey-Álvarez, 1968).

CONCLUSIONS

This report enlarges the poorly knowledge of the decapod community from the Borgomanero outcrop, representing the fourth crab assigned to *C. granulata*, extending the paleogeographic distribution for the species to the northernmost paleo-Mediterranean basin. Moreover, the fossil record of the species would seem to support the hypothesis of an original restricted central Mediterranean area of distribution during the Plio-Pleistocene of Italy from the northernmost paleo-Adriatic gulf to the southern Tyrrenian outcrops, suggesting, in our personal opinion, a possible later and wider diffusion in the Mediterranean area and adjacent Atlantic Ocean. Of course, this hypothesis needs closer future palaeontological investigations in the Mediterranean outcrops and new confident records to be supported. Finally, an updated map showing the fossil records of *C. granulata*, is herein provided (Fig. 2).

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