

Decapod fauna from the lower Aptian in the Valencian sector of the Maestrat Basin (NE Iberia)

urn:lsid:zoobank.org:pub:BAF46873-69D5-41E3-9064-79FFE88646B4

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ABSTRACT

The Forcall Formation in the Morella and Orpesa sub-basins of the Valencian sector of the Maestrat Basin has yielded a diverse assemblage of decapod crustaceans. A total of thirteen taxa are documented, representing the superfamilies Nephropoidea, Paguroidea, Galatheaidea, Axiidea, and Brachyura. Among these, one new genus, three new species, and one new taxonomic combination are proposed: *Viapagurus covavidrensis* n. sp., *Eomunidopsis rigolleti* n. sp., *Morellosia maestratensis* n. gen., n. sp., and *Distefania pimientai* n. comb. Comparisons with decapod faunas from other sub-basins of the Maestrat Basin reveal a notable degree of faunal homogeneity across the region. Furthermore, the palaeobiogeographic implications of these assemblages provide new insights into the distribution and diversity of Aptian decapod crustaceans. The findings highlight a significant faunal similarity with coeval basins such as the Garraf and Basque-Cantabrian basins and underscore the potential role of the Maestrat Basin as a biogeographic corridor linking decapod faunas of the Tethyan and Boreal realms. Overall, this study contributes to a more comprehensive understanding of the decapod assemblages of the Forcall Fm. and their relationships with contemporaneous faunas in the western Maestrat Basin and beyond.

KEYWORDS

Early Cretaceous. Maestrat Basin. Crustaceans. Decapoda. Brachyura. Systematics.

INTRODUCTION

The Aptian marine strata of the central Maestrat Basin (Castelló, NE Iberia), particularly in the Morella sub-basin (Fig. 1) are well-known for their exceptional fossil

richness. These strata have provided an extraordinary diversity of fossil invertebrates as echinoids, brachiopods, bivalves, gastropods and ammonites, among others, which have been extensively studied since the 19th century, notably Coquand (1865), Ländlerer (1872), Mallada

(1887) and Vilanova y Piera (1859) among others. Numerous species have been described, as documented in the comprehensive compilations by Forner (2011) and Forner i Valls and Gual i Ortí (2013), with several new species described (Forner i Valls and Castany i Àlvaro, 2010, and references therein).

Despite the extensive literature on invertebrate faunas in this area, fossil decapods have received comparatively little attention given their relative scarcity, as a minor component in the invertebrate community of the Morella sub-basin outcrops, and also due to the low fossilization potential of the crustaceans caused by the rapid decay of their remains, compared to other hard-shelled invertebrate faunas (*e.g.* Bishop, 1986). Only few works have reported their presence in the Morella sub-basin, including those by Van Straelen (1927), Vía (1951), Garassino *et al.* (2009), and Ossó *et al.* (2015).

Among the fossiliferous units in the region, the lower Aptian Forcall Formation (Fm.) (Canérot *et al.*, 1982) stands out for its extensive distribution across the Maestrat Basin, cropping out in most of its sub-basins (*e.g.* Moreno-Bedmar *et al.*, 2010). In the Morella sub-basin, fossil decapods occur in classic fossil-bearing localities where the Forcall Fm. crops out, such as Mola d'en Camaràs, Mola de la Garumba, and Cap de Vinyet, as well as in the surrounding areas of Morella and Forcall. Additionally, decapod remains have been reported from more distant sites further North, such as the Cova del Vidre (Ossó *et al.*, 2018) or eastward in Alcalà de Xivert and Torreblanca (Vía Boada, 1975).

This study presents an initial assessment of the decapod fauna recovered from outcrops of the Forcall Fm. in the Morella and also from the Orpesa sub-basins, within the Valencian sector of the Maestrat Basin (Fig. 1B).

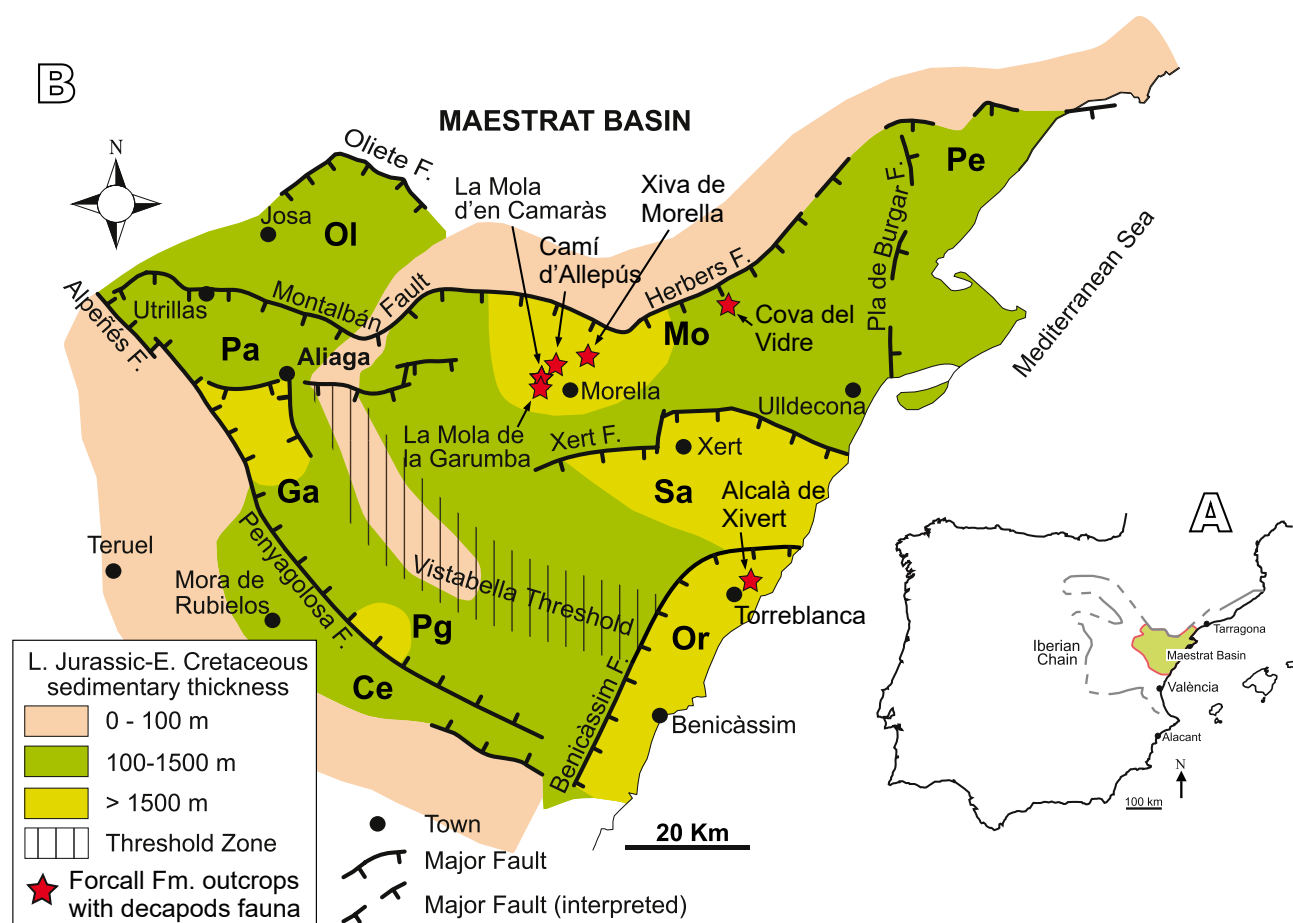


FIGURE 1. A) Location of the Maestrat Basin within the Iberian Peninsula and the Iberian Chain. B) Structural map of the Maestrat Basin during the Late Jurassic–Early Cretaceous, illustrating its compartmentalization into nine sub-basins: Orpesa (Or), La Salzedella (Sa), El Perelló (Pe), Morella (Mo), Penyalgosa (Pg), Cedramán (Ce), Galve (Ga), Las Parras (Pa), and Oliete (Ol). The map also displays the sedimentary thickness accumulated during this period and the red stars indicate the localities where the Aptian decapod remains reported herein were found. Modified from Salas *et al.* in Martín-Chivelet *et al.* (2019).

This compilation includes thirteen taxa, among which we propose a new genus, three new species, and a new combination. The present research adds knowledge to the lower Aptian Forcall Fm., decapod assemblages in the central and eastern Maestrat Basin, complementing previous studies focused on decapods of the same formation at the western sector of the basin (*e.g.* Ferratges *et al.*, 2021; García-Penas *et al.*, 2023). Moreover, this work provides a general overview of the composition and diversity of decapod fauna in the Maestrat Basin during Aptian times.

GEOLOGICAL SETTING

The fossil decapods documented in this study were collected in the Morella and Orpesa sub-basins, which represent central and a southeastern depocenters of the Maestrat Basin, respectively (eastern Iberian Chain; Fig. 1). The Mesozoic Maestrat Basin developed during two major rifting cycles: the Kimmeridgian–Berriasian and the Barremian–early Albian, the latter associated to the opening of the Bay of Biscay (García-Senz and Salas, 2011; Salas *et al.*, 2001, 2010). As a result of this rifting process, nine sub-basins were formed: El Perelló, Orpesa, Morella, La Salzedella, Penyagolosa, Oliete, Galve, Las Parras, and Cedramán, (Salas and Guimerà, 1996; Salas *et al.* in Martín-Chivelet *et al.*, 2019) (Fig. 1B). The fossil decapods specimens reported herein were recovered from the Forcall Fm. strata, mostly from the Morella sub-basin, but also from the Orpesa sub-basin.

The Margas del Forcall Fm. (Canérot *et al.*, 1982) consists of a succession of marls, marly limestones, limestones, and silty to sandy limestones, reaching a maximum thickness of 200 meters in the Morella sub-basin. This unit, characterized by their extensive distribution and limited facies variations, represents deposition in a deep, open marine environment associated with a sea-level rise during the lower Aptian (*e.g.* Moreno-Bedmar *et al.*, 2010). The Forcall Fm. was divided by Canérot *et al.* (1982) into three members, that from bottom to top includes the marls and marl-limestones of the Cap de Vinyet Member, the meter-thick bioclastic limestones of the Barra de Morella, and the grey clay-rich marls interbedded with some limestone levels of the Morella la Vella Marls (*e.g.* Moreno-Bedmar *et al.*, 2010, fig. 2). The three members are highly fossiliferous and contain a diverse assemblage of invertebrates, including orbitolinid foraminifera, nautiloids, brachiopods, vermetid gastropods, solitary corals, serpulids, echinoids, and the ostreid *Plicatula placunea*, which is characteristic of this formation (*e.g.* Canérot, 1974; Fallot and Bataller, 1927; Marín and Sornay, 1971; García *et al.*, 2014). Ammonoids are particularly abundant,

generally limonitized, in the uppermost Morella la Vella member, where their assemblages have been used to establish the biostratigraphic framework for the lower Aptian biozones (*e.g.* Bover-Arnal *et al.*, 2016; García *et al.*, 2014, fig. 3; Moreno-Bedmar *et al.*, 2010, fig. 2). Upward, the Forcall Marls transition into the Villarroya de los Pinares Limestone Fm., which is characterized by grayish bioclastic limestones with rudists and corals, oolitic bars, and marls with orbitolinids deposited in an inner to outer infralittoral environment with reef development (Cánerot *et al.*, 1982). This formation, which can reach a thickness of up to 300 meters, forms a distinctive topographic escarpment above the underlying Forcall marls.

Despite the high fossil content of the Forcall Fm., decapod crustaceans are relatively rare compared to other invertebrate groups, occurring throughout the different stratigraphic levels in association with specific paleoenvironmental conditions. Notably, regular echinoids, which are characteristic of reefal facies, have also been reported from these deposits (Fig. 2, Bover-Arnal *et al.*, 2016, fig. 7C; 2022; fig. 15, Forner i Valls and Saura Vilar, 2020).

MATERIAL AND METHODS

The material described in this work has been recovered from old collections and it was originally collected on the surface from different fossiliferous localities of Morella, Xiva de Morella, Forcall, and Alcalà de Xivert towns. Some specimens were prepared using a WEN Pneumatic Engraving pen and needles, under magnification lens. Photographs were taken under cold light with a Canon PowerShot G11 camera; specimens were dry. Some of the fossil specimens described in this article were digitized using photogrammetric techniques at the TerraLab3D laboratory of the UB-GEOMODELS Research Institute, within the framework of the GEODIGIT project (TED2021-130602B-I00). The resulting digital models are provided as supplementary material and are available for download from the CORA Repositori de Dades de Recerca (Ferrer *et al.*, 2025). These models allow the corresponding morphological descriptions to be explored in a three-dimensional environment, enhancing visualization and interpretation. The physical repositories of specimens are the Museu de la Universitat de València d'Història Natural (Valencia, Spain), under acronym MGVU for the geological collections; the Museu de Geologia del Seminari de Barcelona (Barcelona, Catalonia), under acronym MGSB; and the Museo de Ciencias Naturales de la Universidad de Zaragoza (Zaragoza, Spain) under acronym MPZ.

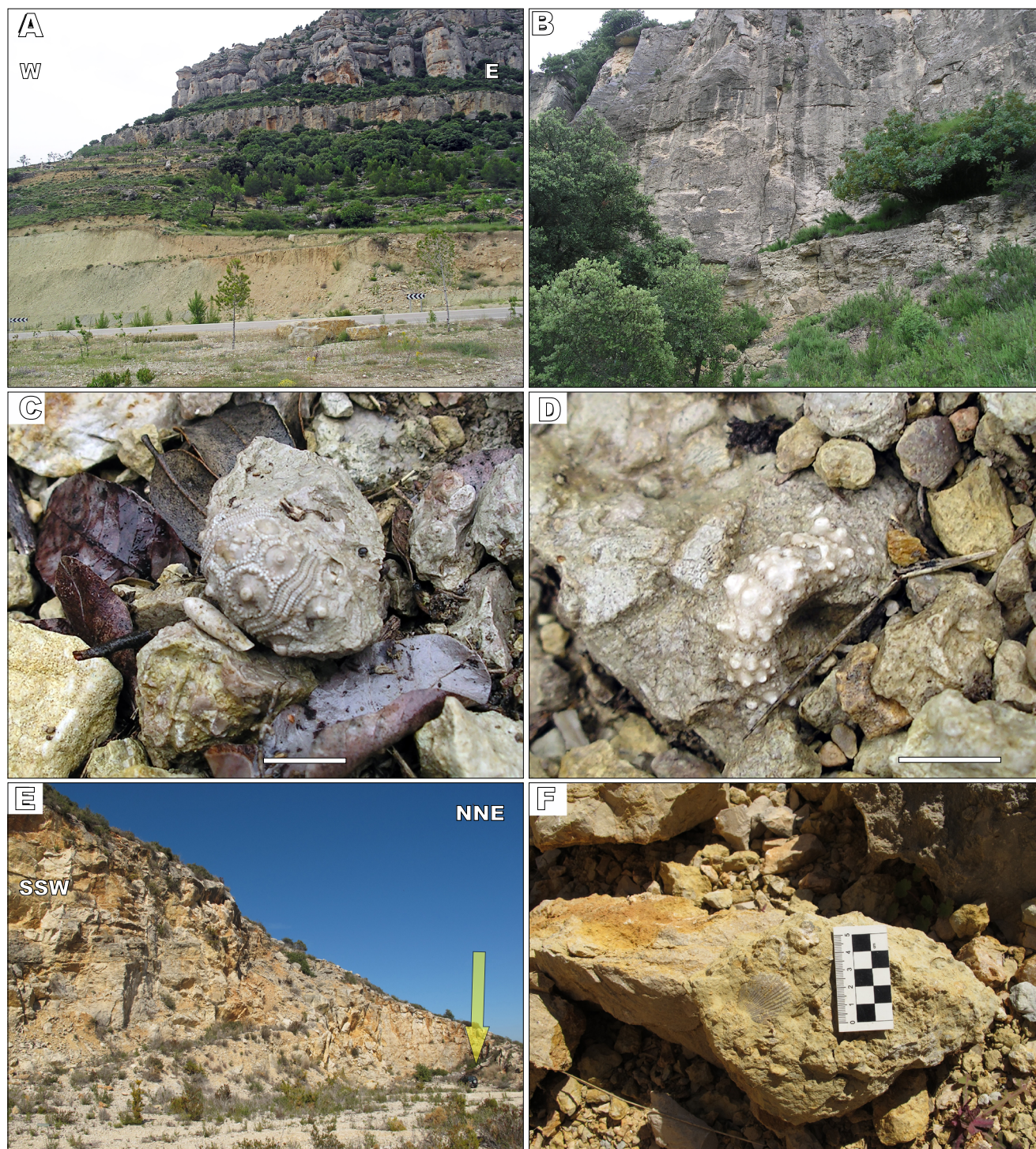


FIGURE 2. Outcrops. A) Landscape of the La Mola d'en Camaràs in Morella (Castelló, Valencian Country), showing the Marls of Morella member of the Forcall Fm. (below), the Villarroya de los Pinares Formation limestones (middle) and the Benassal Formation limestones above. B) Close-up of the top of the Forcall Fm. (below) overlaid by the limestones of the Villarroya de los Pinares Fm. C) Typical fauna of the top of the Forcall Fm., corals, rudists, regular echinoids. D) Top of the Forcall Fm., orbitolinids, regular echinoid. E) General view of the Magdaleno quarry, Alcalà de Xivert (Castelló, Valencian Country) with the Villarroya de los Pinares Formation limestones overlying the Forcall Formation outcropping below (yellow arrow) (car as scale). F), close-up of the typical lithology and fauna of the Forcall Fm. Scale bar for C) and D) equal to 10mm. Photos by À. Ossó.

SYSTEMATIC PALAEOLOGY

Class: Malacostraca LATREILLE, 1802
Order: Decapoda LATREILLE, 1802
Infraorder: Astacidea LATREILLE, 1802
Superfamily: Nephropoidea DANA, 1852
Family: Nephropidae DANA, 1852

GENUS *Hoplopatria* M'COY, 1849

TYPE SPECIES: *Astacus longimanus* G.B. SOWERBY, 1826, subsequent designation by Rathbun (1926: 129)

Species included (only Early Cretaceous species from Europe, after Tshudy and Sorhannus, 2003): *Hoplopatria aspera* HARBORT, 1905, *H. dentata* (ROEMER, 1841), *H. edwardsii* (ROBINEAU-DESVOIDY, 1849), *H. longimana* (SOWERBY, 1826), *H. minima* DE TRIBOLET, 1876; *H. pelseneeri* (VAN STRAELEN, 1936) and *H. triboleti* BORISSIAK, 1904

Hoplopatria sp.

Figure 3A. The 3D digital model is also available as accompanying supplementary material in Ferrer et al. (2025) (file Fig3A_MGUV-40215).

Locality. Mola d'en Camaràs, Morella, Comarca dels Ports (Castelló province, Valencian Country, Spain).

Stratigraphical horizon. Morella la Vella Marls Member (*deshayesi* Zone), Forcall Fm., lower Aptian (Early Cretaceous) of Morella sub-basin (Maestrat Basin).

Studied material and measurements (in mm). Only right P1 propodus preserved, embedded in soft limestone showing its inner surface. MGUV-40215, length= 29.5; height= 11.5.

Description. *Thoracic appendages.* P1 palm subtrapezoidal elongate, higher distally; inner palm surface smooth, covered with small granules, slightly keeled longitudinally; ventral margin not well preserved, and dorsal margin carinate and smooth; articulation bulge present at upper proximal corner. Pollex long, bearing at least two prominent teeth.

Discussion. The studied specimen is assigned to *Hoplopatria* based on the typical chelae pattern (e.g. Charbonnier and Garassino, 2022; figs. 12, 16, 20). The Early Cretaceous species of *Hoplopatria* from Europe are numerous and most of them have never been revised since their original description. The incompleteness of the studied propodus hampers a proper specific identification, but likely can be related with the specimens recently

reported by Ossó et al. (2024, pp. 12–14, fig. 8M-P) as *Hoplopatria* aff. *longimana* (see comparisons therein). This report of *Hoplopatria* in the Early Cretaceous of the Morella sub-basin, links the genus, and probably the species, with the previous records in the Maestrat Basin such as the Orpesa sub-basin (Valencian Country) and Galve sub-basin (Aragon), and the Garraf Basin (Catalonia) (see García-Penas et al., 2023; Ossó et al., 2023, 2024, and discussions therein).

Infraorder: Glypheidea ZITTEL, 1885
Superfamily: Glypheoidea ZITTEL, 1885
Family: Mecochiridae VAN STRAELEN, 1925

GENUS *Atherfieldastacus* SIMPSON in Robin, Charbonnier, Merle, Simpson, Petit and Fernandez, 2016

TYPE SPECIES: *Meyeria magna* M'COY, 1849 by original designation

Species included: *Atherfieldastacus magnus* (M'COY, 1849), *A. rapax* (HARBORT, 1905) and *A. schwartzi* (KITCHIN, 1908)

Atherfieldastacus magnus (M'COY, 1849)

Figure 3B, C. The 3D digital model of Figure 3B specimen is also available as supplementary material in Ferrer et al. (2025) (file Fig3B_MGUV-40216).

Synonymies list: see Sasaki, 2023, pp. 4772–4774; references therein to *A. mexicanus* (RATHBUN, 1935) must be included as junior synonym of *A. magnus*.

2024 *Atherfieldastacus magnus* (M'COY, 1849); Ossó, Charbonnier, Hyžný, van Bakel and Devillez in Ossó et al., pp. 14, 15, fig. 9A–F

Locality. Camí del Mas d'Allepús and Mola d'en Camaràs, Comarca dels Ports (Castelló province, Valencian Country, Spain).

Stratigraphical horizon. Morella la Vella Marls Member (*deshayesi* and *forbesi* Zones), Forcall Fm., lower Aptian (Early Cretaceous) of Morella sub-basin (Maestrat Basin).

Studied material and measurements (in mm). One complete specimen preserving carapace and pleon preserved in nodule MGUV-40216, complete body length= 50; carapace length= 37; carapace height= 19. Remains of pleon MGUV-40217, length= 13; height= 8.

Description. Carapace subcylindrical, compressed laterally, length about twice height. Rostrum not preserved.

Branchial region with three branchial ridges; ventral branchial ridge extending hepatic ridge, well-marked; cervical groove oblique, delimiting cephalic region; cephalic region with three parallel spiny carinae: orbital, gastric and antennal carinae not completely preserved; gastro-orbital groove short, originating as slight inflexion of cervical groove at level of gastro-orbital carina; post-cervical and branchiocardiac groove, parallel directed towards posterior margin; cardiac groove not visible. Surface of branchial region granulated. Regions evenly covered by small spiny tubercles, more densely in lower branchial areas; upper branchial area smooth. Pleon short. Very short pleonal somite s1, triangular in lateral view; s2–s5 with beveled cross-section; s6 smallest; s2–s5 with three rows of granules; lower margins rounded and posterior margins straight; pleura with serrated edges. Telson showing uropodal endopod and exopod. Only remains of P3 or P4 present.

Remarks. The presence of *Atherfieldastacus magnus* in the Aptian of the Morella sub-basin is not surprising, since it has been repeatedly reported in western sub-basins (e.g. [Vía, 1951](#); [Vía Boada, 1975](#); [Vilanova y Piera, 1863](#); [Ferratges et al., 2021](#)) and eastern sub-basins of the Maestrat Basin (e.g. [Van Straelen, 1927](#); [Vía Boada, 1975](#); [Ossó et al., 2024](#)), being abundant in some of those reported localities. In the Morella sub-basin, this mecochirid occurs in relative abundance, preserved in nodules in some marly outcrops of the Forcall Fm. (Fig. 3B), although it also can be found, as isolated remains (Fig. 3C) along that formation in all the Morella sub-basin. Remarks on taphonomy or palaeobiogeography of *Atherfieldastacus magnus*, has been discussed by [Ferratges et al. \(2021\)](#), [García-Penas et al. \(2023\)](#) and [Ossó et al. \(2024\)](#).

Infraorder: Axiidea [DE SAINT LAURENT, 1979](#)

Family: Axiidae [HUXLEY, 1879](#)

GENUS *Protaxius* [BEURLIN, 1930](#)

TYPE SPECIES: *Callianassa isochela* [WOODWARD, 1876](#), by original designation

Species included: *Protaxius betajurensis* ([QUENSTEDT, 1885](#)) [as *Pagurus betajurensis*]; *P. isochelus* ([WOODWARD, 1876](#)); *P. suevicus* [BEURLIN, 1930](#), and *P. paucisaetosus* [ANDRADA, LAZO, BRESSAN AND AGUIRRE-URRETA, 2022](#)

Remarks. The incomplete preservation of this axiid remains, consisting in just palms of P1, completely inexpressive at first glance, do not help to make a reliable systematic approach. However, the subrectangular outline, with margins almost parallel, and the fact that they are clearly isochelous, suggest that they could be assigned to *Protaxius*, an Upper Jurassic genus, which is diagnosed as

an isochelous genus and with palms of P1 subrectangular with a short pollex bearing a medial tooth, diagnostic characters preserved to a greater or lesser extent in our specimens (cf. [Andrada et al., 2022](#), pp. 3, 5; [Schweitzer et al., 2023](#), p. 6). However, until new findings of more complete material, the species of these specimens cannot be determined. The axiids reported by [Vía \(1951, pp. 165, 167, text-fig. VII, fig. 7\)](#) and [Ossó et al. \(2023, p. 7, fig. 5C\)](#) from the Aptian of the Garraf Basin, shows morphological similarities with the Morella sub-basin specimens reported herein, as well as the specimens reported and depicted by [García-Penas et al. \(2023, p. 5, fig. 4B, C\)](#) from the Galve sub-basin. [Andrada et al. \(2022\)](#) carried out a comprehensive review of this genus, and described the first Cretaceous species of the genus, *Protaxius paucisaetosus*, from the lower Hauterivian of Argentina. The Maestrat specimens of *Protaxius* are the youngest report of the genus and spreads its presence to southern Europe. The abundance of remains gathered together in the outcrops, would confirm a gregarious behavior of the genus as suggested by [Andrada et al. \(2020 and references therein\)](#).

Protaxius sp.

Figure 3D–O. The 3D digital models of the specimens in **Figure 3J–K** and **3L–M** are also provided as supplementary material in [Ferrer et al. \(2025\)](#) (files Fig3J-K_MGUV-40223 and Fig3L-M_MGUV-40221 respectively).

Studied material and measurements. Left P1 palm MGUV-40218, length= 11; height= 6.5. Right P1 palm MGUV-40219, length= 12.5; height= 8. Right P1 palm, MGUV-40224, length= 11; height= 8. Left P1 palm, MGUV-40220, length= 13; height= 8. Left P1 palm MUGV-40221 L-M, length= 16, height= 10; thickness= 5. Right P1 palm MGUV-40222, length= 10, height= 6.5; thickness= 3. Right P1 palm MGUV-40223, length= 16.5; height= 8.5; thickness= 5.

Locality. Xiva de Morella, Comarca dels Ports (Castelló province, Valencian Country, Spain).

Stratigraphical horizon. Barra de Morella Member (*forbesi* Zone), Forcall Fm., lower Aptian (Early Cretaceous) of Morella sub-basin (Maestrat Basin).

Description. Palms of P1 propodi, isochelous, subrectangular, almost twice as long as height, slightly higher proximally, laterally compressed. Upper margin straight, sharp edged; lower margin straight to weakly convex, keeled. Outer and inner surface slightly convex, smooth. Row of setal pits along both margins. Pollex short, bearing a median subtriangular tooth on occlusal margin. Carpo-propodial articulation slightly exceeding 90° from carpus.

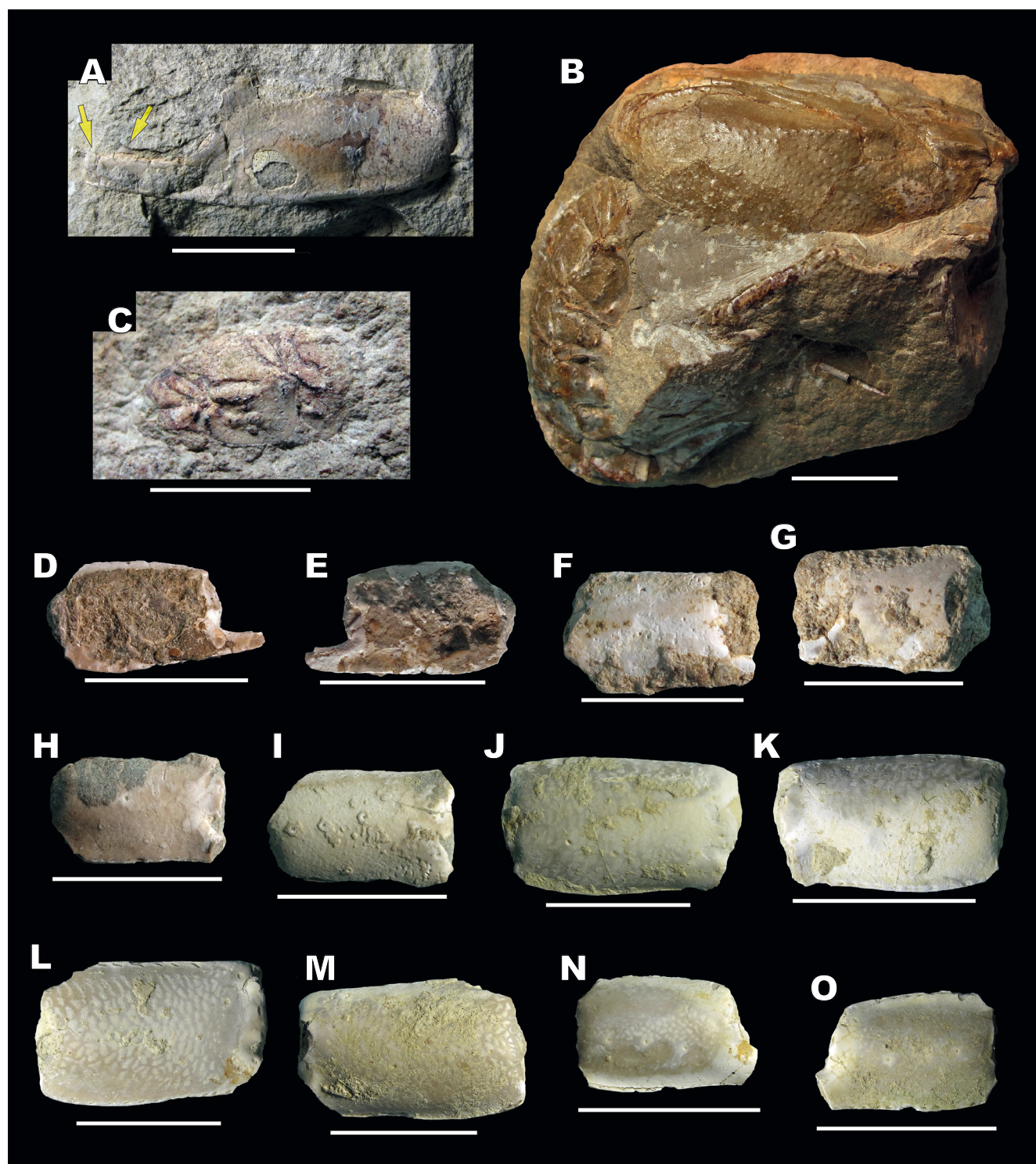


FIGURE 3. Decapods from the lower Aptian Forcall Formation. A) *Hoploparia* sp. MGUV-40215, from the Mola d'en Camaràs (Morella, Castelló, Valencian Country), yellow arrows indicate teeth. B, C) *Atherfieldastacus magnus* (m'coy, 1849); B) MGUV-40216, from Camí del Mas d'Allepús (Morella, Castelló, Valencian Country); C) MGUV-40217, from the Mola d'en Camaràs (Morella, Castelló, Valencian Country). D-O) *Protaxius* sp. from Xiva de Morella (Castelló, Valencian Country); D) MGUV-40220, P1 inner side, E) outer side; F) MGUVXX2F-G, P1 outer side, G) inner side; H) MGUV-40218, P1 inner side, I) outer side; J) MGUV-40223, P1 outer side, K) inner side; L) MUG-40221, P1 outer side, M) inner side; N) MGUV-40222, P1 outer side, O) inner side. Scale bar is equal to 10mm. Photos by À. Ossó.

Infraorder: Anomura [MACLEAY, 1838](#)
Superfamily: Galatheoidea [SAMOUELLE, 1819](#)
Family: Galatheidae [SAMOUELLE, 1819](#)

GENUS *Eomunidopsis* [VÍA BOADA, 1981](#)

TYPE SPECIES: *Galathea orobensis* [RUIZ DE GAONA, 1943](#), by original designation

Species included (sensu [Klompmaaker et al., 2022](#)).
Eomunidopsis aldoirarensis [KLOMPMAKER, FELDMANN, ROBINS AND SCHWEITZER, 2012a](#); *E.?* *cobbani* [BISHOP, 1985](#); *E. kinokunika* [KARASAWA, OHARA AND KATO, 2008](#); *E.?* *kojimai* [KARASAWA AND HAYAKAWA, 2000](#), *E. limonitica* ([STENZEL, 1945](#)) [as *Galathea? limonitica*], *E. meerssensensis* [COLLINS, FRAAYE AND JAGT, 1995](#), *E. navarrensensis* ([VAN STRAELEN, 1940](#)) [as *Galathea navarrensensis*], *E. orobensis* ([RUIZ DE GAONA, 1943](#)) [as *Galathea orobensis*], and *E. texcalaensis* [KLOMPMAKER, ROBINS, JAKOBSEN AND SHELDON, 2022](#)

Eomunidopsis rigolleti n. sp.

Figure 4A, B. The 3D digital model of this specimen is also available as supplementary material in [Ferrer et al. \(2025\)](#) (file Fig4A-B_MGUV-40225).

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Studied material and measurements (in mm). One partial specimen, preserving half of left carapace and almost complete rostrum, MGUV-40225, length= 7; width= 3.1 (half of carapace).

Type locality. Mola de la Garumba, El Forcall, Comarca dels Ports (Castelló province, Valencian Country, Spain).

Etymology. Dedicated to Laurent Rigollet, devote echinoid collector who found and donate the holotype.

Stratigraphical horizon. Morella la Vella Marls member (*furcata* Zone), Forcall Fm., lower Aptian (Early Cretaceous) of Morella sub-basin (Maestrat Basin).

Diagnosis. Carapace longer than wide, crossed by transverse smooth ridges, gently vaulted transversely; lateral margins spiny; upper margin of epigastric region crossed by oblique striae. Rostrum triangular elongate, with median keel, lateral sides with short transverse striae not reaching the lateral margin of the rostrum.

Description. Portion of left half of carapace, and half of rostrum with remains of anterior part of carapace. Carapace longer than wide, crossed by smooth ridges. Rostrum triangular elongate, sulcate by median longitudinal keel,

lateral sides of the rostrum with short transverse striae not reaching the lateral margin of the rostrum. Orbits not preserved. Anterolateral margins of carapace appear to be short, converging forwards, spiny. Posterolateral margin straight, gently rounded at posterolateral corner, spiny. Posterior margin not preserved. Epigastric region crossed by smooth transverse striae, except the upper one which is crossed by oblique parallel striae. Mesogastric and protogastric regions not completely preserved, delimited posteriorly by cervical groove. Urogastric region narrow, transversely elongated, delimited laterally by very shallow branchiocardiac groove and anteriorly by cervical groove. Cardiac region appearing inverted subtriangular. Intestinal region not completely preserved. Hepatic region small. Epibranchial region subtriangular, delimited by the anterior and posterior branches of the cervical groove. Meso- and metabranchial groove slightly inflated, crossed by transverse smooth ridges which end laterally in a short spine. Cervical groove well marked, widely U-shaped. Ventral remains and appendages not preserved.

Remarks. In despite of the fragmentary condition of the studied specimen, that would preclude a conclusive systematic assignment, it preserves enough diagnostic characters, such as the triangular rostrum with median keel, cervical groove U-shaped with secondary branch, and dorsal carapace crossed by transverse ridges, that allow to place it within *Eomunidopsis*. Also, although the number of ridges cannot be counted due to the partial condition of the specimen, those particular diagnostics preserved characters permit to differentiate it from all the current *Eomunidopsis* known species.

Eomunidopsis rigolleti n. sp., is morphologically close to the three known Iberian species, *E. aldoirarensis*, *E. navarrensensis* and *E. orobensis*, from the upper Albian of Navarra (Spain), but all of them can be distinguished from the new species by the lack of the oblique striae at the upper edge of the epigastric ridge that *E. rigolleti* n. sp. has, as well as a different ornamentation of the lateral sides of rostrum (e.g. [Klompmaaker et al., 2012a, figs. 3A–F, 4A–G, and 5B–F](#)). Same differences separate *Eomunidopsis rigolleti* n. sp. from *E.?* *cobbani*, from the Campanian of Colorado (USA), although the dorsal ornamentation of smooth ridges appears to be very similar (cf. [Klompmaaker et al., 2022, fig. 5.1–5.3](#)). The diagnosis of *Eomunidopsis kinokunika* from the Barremian of Wakayama (Japan) indicated the lateral margin without spines, which precludes relationship with the new species, also, the transverse ridges appear to be narrower than in *E. rigolleti* n. sp. (see [Karasawa et al., 2008, pp. 105, 106, figs. 2.4, 2.5](#)). The absence of a rostrum in the holotypes of *Eomunidopsis?* *kojimai*, from the Santonian of Hokkaido (Japan) and *E. meerssensensis* hampers a proper comparison, but the different ridge ornamentation, and

temporal gap separating both species, would preclude conspecificity with *E. rigolleti* n. sp. (see Karasawa and Hayakawa, 2000, p. 144, fig. 4.2; Collins et al., 1995, pp. 176, 177, fig. 4I, resp.). *Eomunidopsis limonitica*, from the Albian of Texas (USA), clearly differs from the new species by having the dorsal ridges with transverse striae, instead of the smooth ridges of *E. rigolleti* n. sp. (see Stenzel, 1945, pp. 431, 432, pl. 43, fig. 4). The strongly transversely vaulted carapace of *Eomunidopsis texcalaensis*, from the Barremian of Puebla (Mexico), the narrower transverse ridges and the absence of the oblique striae in the epigastric ridges, discards conspecific relationship with *E. rigolleti* n. sp. (see Klompmaker et al., 2022, fig. 6.1–6.4; Vega et al., 2019, fig. 3.1–3.4). Therefore, in view of the aforementioned differences, the erection of a new species for the studied specimen is appropriate.

Superfamily: Paguroidea LATREILLE, 1802

Family: Paguridae LATREILLE, 1802

GENUS *Viapagurus* FERRATGES AND ZAMORA IN GARCÍA-PENAS et al., 2023

TYPE SPECIES: *Pagurus avellanedai* VÍA, 1951 by original designation

Species included: *Viapagurus avellanedai* (VÍA, 1951); *Viapagurus covavidrensis* n. sp. herein

***Viapagurus avellanedai* (VÍA, 1951)**

Figure 4P–S. The 3D digital model of the specimen in Figure 4Q–S is also available as supplementary material in Ferrer et al. (2025) (file Fig4Q-S_MGUV-40231).

1943 fragmento de pata; Bataller, p. 547.

*1951 *Pagurus Avellanedae* Vía, p. 171, text-fig. 11; pl. 1, fig. 11–11a.

1982 *Pagurus avellanedae* Vía, 1951; Whetstone and Collins, p. 1219.

1988 *Pagurus avellanedai* Vía, 1951; Vía, pp. 344, 350, fig. 344.

1989 *Pagurus avellanedai* Vía, 1951; Solé and Vía, p. 26.

2015 *Pagurus avellanedae* Vía, 1951; Fraaije et al., p. 356.

2017 *Pagurus avellanedai* Vía, 1951; Ferratges, p. 38, pl. 6, fig. D.

2018 *Pagurus avellanedai* Vía, 1951; Ossó et al., p. 97, figs. 4–6.

2023 *Pagurus avellanedai* Vía, 1951; Sasaki, pp. 6966, 6967.

2023 *Viapagurus avellanedai* (Vía, 1951); Ferratges and Zamora in García-Penas et al., pp. 7–9, figs. C, E, F–H.

Studied material and measurements (in mm). Two left propodi palms. MGUV-40230, length= 13; height= 8.5; thickness= 6. MUGV -40231, length= 11.5; height= 9; thickness= 6.5.

Locality. Xiva de Morella, Comarca dels Ports (Castelló province, Valencian Country, Spain).

Stratigraphical horizon. Barra de Morella Member (*forbesi* Zone), Forcall Fm., lower Aptian (Early Cretaceous) of Morella sub-basin (Maestrat Basin).

Description of the present material. Palm of left propodus subquadrate, robust, slightly wider than high; maximum length at proximal end; transverse section ovoid; outer and inner sides convex, strongly convex at the mid of inner side; outer and inner surface densely covered by coarse tubercles of different sizes, coarser distally; articulating rims smooth. Upper margin convex, with one irregular rows of spines directed upwards, and one outer row of small emerging spines directed forwards. Lower margin straight, with row of coarse tubercles. Pollex incomplete, rounded subtriangular in section; dactylus not preserved.

Remarks. The morphology of the reported left propodi, match well with the diagnosis for the left propodus of *Viapagurus avellanedai* established by Ossó et al. (2018, p. 97). However, the spines of the upper and lower margins are not as developed, and the lower margin appears to be more rounded and less spinose than the left chelae described by Ossó et al. (2018, fig. 6A–K) surely due to the much smaller size, perhaps juvenile state, of the studied specimen. *Viapagurus avellanedai* was firstly described by Vía (1951), as *Pagurus avellanedae*, based on scarce material from la Cova del Vidre (Roquetes, Catalonia) at the North area of the Morella sub-basin. Subsequent work carried out by Ossó et al. (2018) based on new collected material from the type locality, allowed to redescribe this taxon and in particular its left chela, and Ferratges and Zamora in García-Penas et al. (2023) established the genus *Viapagurus* for that species. *Viapagurus avellanedai* is widely present in different localities of the various sub-basins of the Maestrat Basin, ranging from the lower Aptian Xert and Forcall fms. to the upper Aptian Benassal Fm. (see Solé and Vía, 1989, p. 25; García-Penas et al., 2023,

figs. 6C, E, F–H, 8, t. 2). At this point, we must clarify that the claimed specific name correction (incorrectly spelled as *avellaneda*) made by Ferratges and Zamora in García-Penas et al. (2023, p. 8), was already corrected in accordance with the rules in the International Code of Zoological Nomenclature (article 32.3) to *avellanedai*, by Ossó et al. (2018, p. 97; cf. Sasaki, 2023, p. 6967).

***Viapagurus covavidrensis* n. sp.**

Figure 4C–O. The 3D digital models of the specimens in Figures 4C–F; H–I are also provided as supplementary material in Ferrer et al. (2025) (files Fig4C-F_MGSB-88667 and Fig4H-I_MGUV-40226 respectively).

Zoobank ID code: urn:lsid:zoobank.org:act:9554AEB4-17D3-4146-85A8-5A637EF629F7

Studied material and measurements (in mm). Five right propodi. Holotype MGSB-88667, propodus length (including pollex)= 39; height= 23.5; thickness= 16. Paratype MGUV-40226, propodus length= 13; height= 7.5; thickness= 5.5. Paratype MGUV-40227, propodus length= 13; height= 11; thickness= 6.5. MGUV-40228-, palm length= 14; height= 13.5; thickness= 9.5. MGUV-40229, palm length= 14; height= 12; thickness= 8.

Type locality. La Cova del Vidre (municipality of Roquetes), Comarca del Baix Ebre (Catalonia) in the El Port Massif.

Etymology. From the Cova del Vidre (Roquetes, Baix Ebre, Catalonia) Locality where the holotype was found.

Stratigraphical horizon. Barra de Morella Member (*forbesi* Zone) and Morella la Vella Marls Member (*deshayesi* Zone), Forcall Fm., lower Aptian (Early Cretaceous), of Morella sub-basin (Maestrat Basin).

Diagnosis. Palm of right propodus subquadrate, slightly longer than high; gently curved inwards; transverse section ovoid; outer and inner sides strongly convex. Outer surface finely covered by small granules that become coarser distally, near the dactylo-propodial articulation; inner surface smooth medially, and granulated distally. Upper margin convex, armed with a row of small tubercles flanked on both sides by irregular rows of granules. Lower margin gently concave in the smaller individuals, straight in the larger ones, slightly blunt edged. Carpo-propodial and dactylo-propodial articulations parallel, almost straight. Pollex inverted triangular in section, strong, equaling about half of palm length; occlusal inner margin longitudinally sunken, with acute outer margin raised medially, forming a lateral cutting edge. Dactylus subtriangular in section, granulated, strong, curved downwards, laterally depressed

forming a ridge in upper margin. cutting edge with proximal tooth; lateral edges of the dactylo-propodial cavity with granular rim.

Description. As for the species diagnosis.

Remarks. As it can see above, *Viapagurus avellanedai* is by far, the commonest paguroid of the Aptian outcrops of the Maestrat Basin (Vía, 1951; García-Penas et al., 2023; Ossó et al., 2018). However, a second form of paguroid, with similar morphology but with different ornamentation, has been recovered from localities of the Morella sub-basin where *V. avellanedai* also inhabited, such as La Cova del Vidre (Roquetes, Catalonia) and Xiva de Morella (Valencian Country). Closer examination of those specimens, reveals morphological similarities but also differences. The robust and subquadrate right palm, with parallel proximal and distal margins, and the identical morphology of the pollex, indicates a clear congeneric relationship between both forms. Nevertheless, *Viapagurus avellanedai*, clearly differs from *V. covavidrensis* n. sp. by its coarser and tightly tuberculated cuticle surfaces of the right palm (vs. surfaces of the right palm finely granulated only distally), and by its much spinier upper margin than the new species (García-Penas et al., 2023, fig. 6C, E, F; Ossó et al., 2018, figs. 4A, 5A–J). The striking fact of two morphologically similar forms cohabiting in the same localities, perhaps could suggest some kind of sexual dimorphism, which we cannot demonstrate with the material we have in hand. An intraspecific variation would be ruled out, in view of the fact that the differential characters remain constant in individuals of both forms from two different localities, with the only difference being size, surely due to different factors such as the age of the individuals, or more or less favorable paleoenvironments in the different localities where the species occurs. Comparisons of *Viapagurus* to other Cretaceous paguroid genera were carried out in García-Penas et al. (2023, pp. 8, 9) Therefore, we propose a new species, *Viapagurus covavidrensis*, to accommodate those specimens.

Infraorder: Brachyura LATREILLE, 1802

Subsection: Dynomeniformia DE HAAN, 1833

Superfamily: Dromioidea DE HAAN, 1833

Family: Dromiidae DE HAAN, 1833

Subfamily: Goniidromitinae BEURLEN, 1932

GENUS *Distefania* CHECCHIA-RISPOLI, 1917

TYPE SPECIES: *Distefania himeraensis* CHECCHIA-RISPOLI, 1917, by original designation

Species included: *Distefania autissiodorensis* (VAN STRAELEN, 1936) [as *Cyclothyrus autissiodorensis*]; *D. buerai* OSSÓ, VAN BAKEL, ARTAL AND DOMÍNGUEZ, 2024;

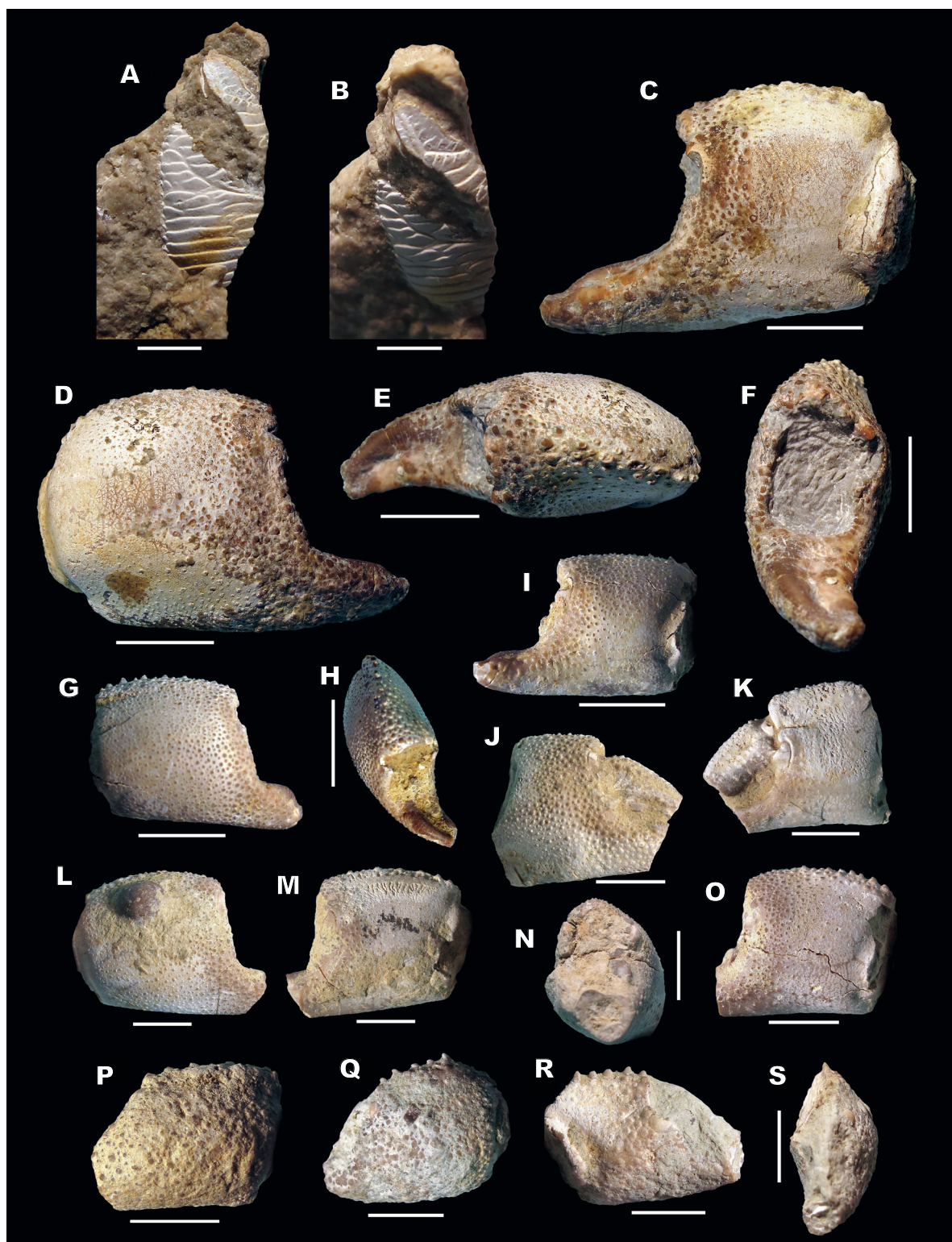


FIGURE 4. Anomuran decapods from the lower Aptian Forcall Formation. A), B) *Eomunidopsis rigolleti* n. sp. MGUIV-40225, from the Mola de la Garumba (Forcall, Castelló, Valencian Country), A) dorsal view, B) close-up of the rostrum. C)-O) *Viapagurus covavidrensis* n. sp. MGSB-88667, holotype from la Cova del Vidre (Roquetes, Catalonia), C) inner side of right propodus, D) outer side, E) view of upper margin, F) frontal view; G)-O) paratypes from Xiva de Morella (Castelló, Valencian Country); G) MGUIV-40226, right propodus outer side, H) frontal view, I) inner side; J) MGUIV-40227, right propodus outer side, K) inner side; L) MGUIV-40229, right propodus outer side, M) inner side; N) MGUIV-40228, frontal view of right propodus, O) inner side. P)-S) *Viapagurus avellanedai* (via, 1951) from Xiva de Morella; P) MUGV-40230, left propodus outer side; Q) MGUIV-40231, left propodus outer side, R) inner side, S) frontal view. Scale bar for A) and B) equal to 2mm; for C) to F) equal to 10mm; for G) to S) equal to 5mm. Photos by À. Ossó.

D. calva SCHWEITZER AND FELDMANN, 2010; *D. cryptica* (JAGT, VAN BAKEL & FRAAIJE, 2007) [as *Palaeodromites crypticus*], *D. dacia* SCHWEITZER AND FELDMANN, 2010; *D. himeraensis* CHECCHIA-RISPOLI, 1917; *D. incerta* (BELL, 1863) [as *Cyphonotus incertus*]; *D. lauginigeri* FELDMANN, SCHWEITZER, BALTZLY, BENNETT, JONES, MATHIAS, WEAVER AND YOST, 2013; *D. oxythyreiformis* (GEMMELLARO, 1869) [as *Prosopon oxythyreiforme*]; *D. renefraaijei* KLOMPMAKER, FELDMANN AND SCHWEITZER, 2012b; *D. renevieri* (DE TRIBOLET, 1876) [as *Prosopon renevieri*]; *D. sinuosulcata* (WRIGHT AND COLLINS, 1972) [as *Palaeodromites sinuosulcatus*]; *D. tangishirazensis* JAGT, VAN BAKEL, FRAAIJE AND NEUMANN, 2014a; *D. transiens* (WRIGHT AND COLLINS, 1972) [as *Palaeodromites transiens*] and *D. vanrijsselti* JAGT, FRAAIJE AND VAN BAKEL, 2014b

Distefania pimientai (FERRATGES AND ZAMORA in García-Penas et al., 2023) n. comb.

Figure 5A–P. The 3D digital models of the specimens in Figure 5E–F G–H, L are also provided as supplementary material in Ferrer et al. (2025) (files Fig5E-F_MGUV-40238, Fig5G-H_MGUV-40239 and Fig5L_MGUV-40234 respectively).

1927 *Dromiopsis* sp.; Van Straelen, pp. 83, 84, t. 2, fig. 3.

1988 *Dromiopsis*; Vía, p. 344, fig. 339N, t. 344.

2023 *Palaeodromites pimientai*; Ferratges and Zamora in García-Penas et al., p. 10, fig. 7D, E.

Locality. Mola de la Garumba, El Forcall, Comarca dels Ports, and Magdaleno quarry, Alcalà de Xivert, Comarca del Baix Maestrat (Castelló province, Valencian Country, Spain).

Stratigraphical horizon. Morella la Vella Marls Member (*furcata* Zone), Forcall Fm., lower Aptian (Early Cretaceous) of Morella sub-basin, and Orpesa sub-basin (Maestrat Basin).

Studied material and measurements (in mm). Dorsal carapace, slightly deformed, preserving partial cuticle MGUV-40232, length= 8; width= 8.5. Half dorsal carapace preserving cuticle MGUV-40238, length= 20; width= 18. Complete carapace preserving cuticle, MGUV-40239, length= 18; width= 22. Carapace lacking anterior left third, embedded in limestone matrix, preserving cuticle MGUV40240, length= 16.5; width= 22. Complete dorsal carapace, slightly deformed, preserving cuticle MGUV-40233. Left cheliped with propodus and carpus MGUV-40234, propodus length= 14.5; height= 8.5; thickness= 6.5. Left cheliped with propodus and carpus embedded in soft limestone matrix MGUV-40235, propodus length= 12.5;

height= 6.5; thickness= 4.5. Right propodus MGUV-40236, length= 14.5; height= 10; thickness= 6.5. Right propodus MGUV-40237, length= 10.5; height= 7.

Diagnosis (emended). Carapace small, transversely ovate, wider than long, average length/width ratio about 0.72, slightly vaulted longitudinally and transversely; maximum width placed at the posterior third of carapace. Carapace regions weakly defined, surface finely granulated, slightly coarser near the lateral margins. Front broad, strongly down-turned, medially sulcate, fairly concave from dorsal view. Fronto-orbital margin about 65 percent of total carapace width. Orbits broad, placed obliquely. Anterolateral margins long, slightly convex bearing four sub-rectangular lobes (outer orbital corner excluded). Posterolateral margins convex, with a row of six to eight small spines decreasing in size posteriorly. Posterior margin short, concave from posterior view, rimmed. Cervical groove barely marked, branchial grooves only marked medially, branchiocardiac grooves deep, short. Chelipeds robust, palm subrectangular elongated, surface of outer side strongly granulated; dactyli strong, pollex very short, dactylus strongly curved.

Description of the present material: Carapace transversely ovate to sub-hexagonal, wider than long, length/width ratio about 0.72; slightly vaulted longitudinally and transversely. Maximum width placed at posterior third of carapace, about 60 percent of the carapace length. Fronto-orbital margin about 65 percent of total carapace width. Carapace regions weakly defined by faint swellings and rather shallow grooves. Surface of carapace finely granulated, with coarser granules near the lateral margins. Front broad; rostrum bluntly triangular, strongly downturned at 90°, medially sulcate, fairly concave from dorsal view, with thickened margin. Orbits ovoid, obliquely directed, aligned with anterolateral margins; outer orbital corner short, subtriangular, strong; supraorbital margin with thick and slightly raised rim, edge finely granulated. Anterolateral margin sharp edged, slightly convex, armed with four (excluding outer orbital corner) flattened, subrectangular, subequal lobes. Posterolateral margin convex, rounded in cross section, anterior half of margins ornate with about six to eight small spines decreasing in size progressively backwards. Posterior margin short, concave in dorsal view and, in posterior view, with narrow, granular rim. Epigastric region defined by two marked rounded swellings. Protogastric lobes faintly marked. Mesogastric region barely defined, except the anterior portion, narrow and elongate, slightly inflated, surpassing end of protogastric lobes. Metagastric region indistinct from mesogastric posterior portion. Urogastric region reniform, widely V-shaped, bounding posterior part of meso- metagastric process along cervical groove, separating both regions anteriorly; posteriorly separated from cardiac

region by weak short groove, and laterally from branchial regions by short oblique postcervical grooves. Cardiac region elongated, inverted subpentagonal, bounded by short and deep branchiocardiac grooves. Intestinal region barely visible. Branchial regions swollen, practically indistinguishable from each other. Cervical groove barely marked except in the medial part of carapace; postcervical groove short, oblique; branchial groove barely defined to not visible in various individuals; branchiocardiac grooves short, subparallel. Chelipeds robust. Right propodus strong; palm subrectangular, slightly longer than high, outer and inner sides convex, surface strongly granulated, lower margin straight, upper margin straight with rows of spiny tubercles; carpo-propodial and dactylo-propodial articulations parallel, bulge of carpo-propodial articulation strongly marked; pollex short, bearing one or two teeth; dactylus strongly curved. Left propodus strong; palm subrectangular, longer than high, outer and inner sides convex, surface coarsely granulated, lower margin straight, upper margin straight with rows of more acute granules; carpo-propodial and dactylo-propodial articulations parallel, bulge of carpo-propodial articulation strongly marked; pollex short, bearing one or two teeth; dactylus strongly curved. Carpus strong, rounded margins, surface coarsely granulated. Ventral remains and ambulatory appendages not preserved.

Remarks. *Distefania pimientai* n. comb. was originally described as *Palaeodromites pimientai*, based on a single partially preserved dorsal carapace from the Aptian strata of the Benassal Fm. of Galve sub-basin of Miravete de la Sierra (Teruel province, Aragon, Spain).

Direct comparison in hands of the holotype of *Palaeodromites pimientai* (Fig. 5A, B) with the Valencian specimens reported herein (Fig. 5C–K), reveals clearly its conspecificity. However, its generic placement within *Palaeodromites* A. Milne-Edwards, 1865 is questionable. Indeed, the description of those more complete specimens, indicates that they belong to *Distefania* rather than *Palaeodromites* (e.g. Checchia-Rispoli, 1917, p. 174, figs. 1–4, t. 1, figs. 1–3; Milne-Edwards, 1865, p. 346, pl. 5, fig. 2a–c; Klompmaker et al., 2012b, p. 782; Schweitzer et al., 2012, pp. 6–8, figs. 3.3a, b, 4.3a, b). The differences between *Palaeodromites* and *Distefania* have been widely highlighted in previous works; *Palaeodromites* features a more elongated carapace than *Distefania*, longer posterolateral margins, and absence of the series of posterolateral lobes (e.g. Schweitzer and Feldmann, 2010, pp. 369, 370, fig. 2; Ossó et al., 2024, p. 8). It is true that the incomplete preserved lateral margins of the holotype (Fig. 5A, B), could blur the real shape and outline of the carapace and it may appear longer, and at the same time recall at first glance the *Palaeodromites* outline (e.g. Schweitzer et al., 2016, fig. 4.1, 2). In any case, the assignment

of this species to *Distefania* is appropriate. Therefore, *Distefania pimientai* n. comb. must be compared with all its congeneric Cretaceous species currently assigned to the genus as follows.

Distefania autissiodorensis from the Hauterivian of Auxerre (France) differs in having coarser granulation and the dorsal grooves, in particular the branchial groove clearly defined instead of the barely visible grooves of *D. pimientai* n. comb. (see Van Straelen, 1936, pp. 29, 30, pl. 4, fig. 3). *Distefania buerai* from the upper Cenomanian of Guadalajara (Spain) differs from *D. pimientai* n. comb. by its extremely vaulted dorsal carapace (see Ossó et al., 2024). *Distefania incerta* from the Aptian to Cenomanian of Spain, France, Great Britain and Germany, clearly differs from *D. pimientai* n. comb. by its coarser dorsal granulation, and more distinctly marked grooves (e.g. Klompmaker et al., 2012b, fig. 2A, B; Ossó et al., 2023, fig. 6A–D). *Distefania cryptica*, from the Cenomanian of Tournai (Belgium), *D. lauginigeri*, from the Campanian of Delaware (USA), and *D. tangishirazensis*, from the Albian of Hamiran (Iran), clearly differ from *D. pimientai* n. comb. by their dorsal surface strongly tuberculate whereas it is finely granulated in the revised species (cf. Feldmann et al., 2013, figs. 6.1, 2; Jagt et al., 2007, fig. 2A–C; Jagt et al., 2014a, pl. 1, figs. 1, 2). *D. himeraensis* (the type species) from the Cenomanian of Sicily (Italy) is separated from *D. pimientai* n. comb. by its coarser granulation of carapace, and regions defined by deeper, more distinct grooves (see Checchia-Rispoli, 1917, fig. 1, pl. 1, figs. 1, 3). *Distefania renefraaijei* from the Albian of Great Britain and Spain, presents a close dorsal pattern by having a slightly vaulted dorsal carapace, but differs from *D. pimientai* n. comb. by its coarser granulated and more strongly marked cervical groove, at least in the decorticated specimens (cf. Klompmaker et al., 2012b, fig. 4A–H). *Distefania renevieri*, from the Barremian of Sainte-Croix-Auberson (Switzerland), despite its fragmentary condition can be differentiated from *D. pimientai* n. comb. by its coarser dorsal granulation and the well-marked cervical and branchial grooves (see de Tribolet, 1876, pl. 1, fig. 6). *Distefania sinuososulcata* from the lower Albian of Bedfordshire (Great Britain) appears to be closely similar to *D. pimientai* n. comb. in having a similar outline and a not very vaulted dorsal carapace, but differs from the currently studied specimens in having fine but somewhat coarser, and less dense dorsal granulation in the specimens with preserved cuticle, and principally a more well-marked cervical groove (see Wright and Collins, 1972, text-fig. 9a, b, pl. 8, figs. 3a–c, 4a–c; Klompmaker et al., 2012b, fig. 3A, B). After examination of high-resolution pictures, of the type series of *Distefania transiens* from the upper Albian of Cambridge (Great Britain), kindly provided by A. Klompmaker, it appears to be the most similar species to *D. pimientai* n. comb., by having a similar finely

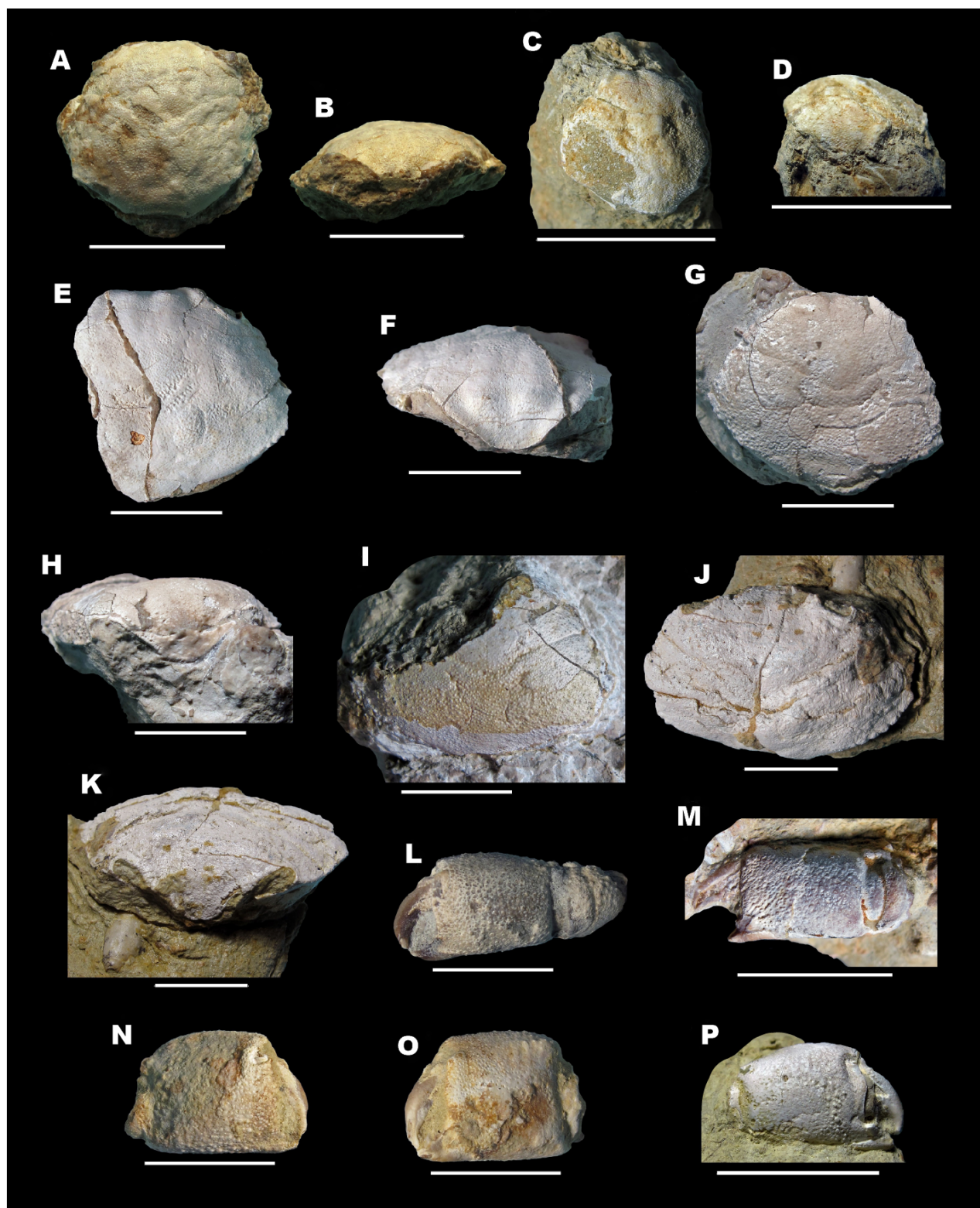


FIGURE 5. *Distefania pimientai* (FERRATGES AND ZAMORA in [García-Penas et al., 2023](#)) n. comb. A), B) Holotype MPZ2022/641, from the upper Aptian Benassal Fm. of Miravete de la Sierra (Teruel, Aragon), A) dorsal view of carapace, B) frontal view. C), D), J)-P) from de lower Aptian Forcall Fm. of the Magdaleno quarry of Alcalá de Xivert (Castelló, Valencian Country). E)-I) from the lower Aptian Forcall Fm. of the Mola de la Garumba, Forcall (Castelló, Valencian Country). C) MGUIV-40232, dorsal view carapace, D) frontal view; E) MGUIV-40238, dorsal view of carapace, F) frontal view; G) MGUIV-40239, dorsal view of carapace, H) frontal view; I) MGUIV-40240, dorsal view of carapace; J) MGUIV-40233, dorsal view of carapace, K) frontal view, notice the *Goniopygus* echinoid radiole (left); L) MGUIV-40234, left cheliped outer side; M) MGUIV-40235, left cheliped outer side; N) MGUIV-40236, right propodus inner side, O) outer side; P) MGUIV-40237, right propodus inner side. Scale bar equal to 10mm. Photos by À. Ossó.

granulated cuticle, and a similar anterior outline, but differs by its less vaulted dorsal carapace, more marked cervical groove, possibly longer carapace (about 0.82); also, the rostrum appears to be distinctly pointed (see Wright and Collins, 1972, text-fig. 9d, e, pl. 8, fig. 5a, b). *Distefania vanrijsselti*, from the Maastrichtian of Maastricht (The Netherlands) has a dorsal ornamentation of close-set granules and cauliflower-shaped tubercles, which differs from the finely granulated cuticle of *D. pimientai* n. comb. (see Jagt et al., 2014b, pl. 6, fig. 3).

In general, species of *Distefania* have a great morphological similarity, so it is not easy to distinguish them from one another. A detailed revision of some of them, taking into account whether the cuticle is preserved or not, in particular those of Great Britain could lead to synonymy (e.g. Klompmaker, 2015; Ossó et al., 2024, p. 10). An anterior half of carapace described as *Dromiopsis* sp. by Van Straelen (1927, pp. 83, 84, pl. 2, fig. 3) likely belongs to *D. pimientai* n. comb.; unfortunately, a more detailed comparison cannot be done since the specimen seems to be lost or at least not found (curators of MNCN-CSIC and GEODESPAL-UCM, Madrid, pers. comm. December, 2024). Although none of the recovered chelipeds and propodi described herein have been found attached to carapaces, they have been found invariably associated with them, thus, their attribution to the goniodromitines described herein seems to be reliable (see also Jagt et al., 2010, pp. 176–178).

Superfamily: Homolodromioidea ALCOCK, 1900

Family: Prosopidae VON MEYER, 1860

GENUS *Rathbunopon* STENZEL, 1945

TYPE SPECIES: *Rathbunopon polyakron* STENZEL, 1945, by original designation

Species included: *Rathbunopon obesum* (VAN STRAELEN, 1944); *R. oblitum* (CARTER, 1898); *R. polyakron* STENZEL, 1945; *R. schrattenkalkensis* KLOMPMAKER, ARTAL AND GULISANO, 2011; *R. tarraconensis* OSSÓ, VAN BAKEL, FERRATGES-KWEKEL AND MORENO-BEDMAR, 2018; *R. tuberculatum* (VAN STRAELEN, 1936); *R. viai* GONZÁLEZ-LEÓN, OSSÓ, MORENO-BEDMAR AND VEGA, 2016; and *R. woodsi* WITHERS, 1951

Rathbunopon tarraconensis OSSÓ, VAN BAKEL, FERRATGES-KWEKEL AND MORENO-BEDMAR, 2018

Figure 6A, B

2018 *Rathbunopon tarraconensis*; Ossó, van Bakel, Ferratges-Kwekel and Moreno-Bedmar, pp. 97–102, figs. 7, 8.

2023 *Rathbunopon tarraconensis* Ossó et al., 2018; García-Penas et al., p. 14, t. 1.

2024 *Rathbunopon tarraconensis* Ossó et al., 2018; Ossó et al., p. 28.

Locality. Magdaleno quarry, Alcalá de Xivert, Comarca del Baix Maestrat (Castelló province, Valencian Country, Spain).

Stratigraphical horizon. Morella la Vella Marls Member (*furcata* Zone), Forcall Fm., lower Aptian (Early Cretaceous) of Orpesa sub-basin (Maestrat Basin).

Studied material and measurements (in mm). One dorsal carapace, slightly deformed, preserving partial cuticle, MGVV -40241, length= 10; width= 9.5.

Description of the present material. Small-sized carapace, with cuticle partially preserved, as long as wide, pyriform in outline; maximum width in posterior third of carapace at level of metabranchial region. Dorsal surface strongly sculptured, regions well defined by strong tubercles or inflations and delimited by deep grooves; surface smooth, eroded, except for posterior third where some remains of coarse granules are distinguishable. Anterolateral margins convergent, medially divided by cervical groove; strong and salient epibranchial tooth directed laterally; broken outer orbital tooth directed forwards. Posterolateral margins strongly convex, anterior notch formed by the branchial groove. Posterior margin convex, not well preserved. Front with lateral folds that form the inner orbital teeth. Rostrum partially preserved, strongly downturned, axially depressed. Orbits large and deep, complete; supraorbital margin with two strong rounded and upwardly directed projections; remains of outer orbital tooth strong, directed forwards, closing laterally the orbit; infraorbital margin with a strong subtriangular tooth, dorsally visible. Epigastric region with two strong tubercles at both sides of the axial depression. Mesogastric region subtriangular elongate anteriorly, longer than wide, inflated. Protogastric lobes with a strong posterior tubercle near the median mesogastric tubercle, and a less marked anterior tubercle near the anterior end of mesogastric region. Metagastric region not distinguishable from mesogastric region. Urogastric region defined by two short, narrow, parallel transverse lobes separated by a short transverse groove; the anterior one, below the cervical groove, is confluent laterally with the epibranchial lobes; the posterior one is separated laterally by the branchiocardiac groove and posteriorly from the cardiac lobe by a short groove. Cardiac region inverted triangular elongate, inflated and well bounded laterally by deep branchiocardiac grooves. Epibranchial region defined by a transverse lobe with two tubercles, separated

from the epibranchial tooth by a depression and separated from the mesobranchial lobe by the postcervical groove. Mesobranchial region, formed by a well-defined, swollen and transverse lobe faintly depressed distally, obliquely directed towards the epibranchial tooth, separated from that by a notch, and separated from the metabranchial region by deep and well-marked branchial groove. Metabranchial region subtrapezoidal, large, strongly inflated, laterally prominent, with scattered coarse granules. Hepatic region small, defined by an inflation, contiguous to the rearmost protogastric tubercle and ending below the outer orbital tooth. Intestinal region transversely faintly preserved. Cervical, postcervical, branchial and branchiocardiac grooves well marked, deep, smooth. Ventral carapace and appendages not preserved.

Remarks. The Alcalà de Xivert specimen, can be assigned to *Rathbunopon tarraconensis* with confidence. Its pyriform and inflated carapace, the characteristic two supraorbital teeth or projections and the sculpted carapace, with regions strongly delimited by deep grooves, match exactly with the type series, discovered further North in the Morella sub-basin from the same formation (see Ossó et al., 2018, pp. 97–102, figs. 7, 8). In this sense, it should be noted that the lobe called metagastric, in the original diagnosis and description, is actually the anterior lobe of the urogastric region, located below the cervical groove and the gastric pits, and contiguous to the epibranchial lobes. Thus, the lobe called urogastric in the original diagnosis, is actually the posterior lobe of the urogastric region, the “distinct double bar-like urogastric lobe” of Wright & Collins (1972: 16, 21). This modification would also affect the genus diagnosis of Stenzel (1945: 450–452, fig. 16). The presence of *R. tarraconensis* in localities of the Orpesa sub-basin, the southernmost sub-basin of the Maestrat Basin, where the Forcall Fm. also crops out, as well as in the Aptian of the Murcia province (Southeast of Spain) where it has also been recognized (À.O. pers. obs.), shows that decapod taxa are not restricted to specific sub-basins or basins, but being widely spread when the paleoenvironmental conditions are similar.

Subsection: Homoliformia KARASAWA, SCHWEITZER AND FELDMANN, 2011

Superfamily: Homoloidea DE HAAN, 1839

Family: Mithracitidae ŠTEVČIĆ, 2005

GENUS *Mithracites* GOULD, 1859

TYPE SPECIES: *Mithracites vectensis* GOULD, 1859

Species included: *Mithracites vectensis* GOULD, 1859; *M. takedai* VAN BAKEL, GUINOT, JAGT AND FRAAIJE, 2012

Mithracites vectensis GOULD, 1859

Figure 6C–F The 3D digital model of the specimen in **Figure 6D–E** is also provided as supplementary material in Ferrer et al. (2025) (file Fig6D-E_MGUV-40243).

Synonymies. See Sasaki (2023, pp. 8639, 8640).

Locality. Xiva de Morella, Comarca dels Ports (Castelló province, Valencian Country, Spain).

Stratigraphical horizon. Barra de Morella Member (*forbesi* Zone), Forcall Fm., lower Aptian (Early Cretaceous) of Morella sub-basin (Maestrat Basin).

Studied material and measurements (in mm). Three partially preserved dorsal carapaces, preserving cuticle. MGUV-40243, length= 11; width= 11.5. MGUV-40244, length= 13; width= 18.5. MGUV-40242, length= 14; width= 15.

Description of the present material. Dorsal carapaces incomplete, appear to be slightly longer than wide, ovate, maximum width at the posterior third; dorsal surface strongly granulated, slightly convex in both directions. Regions well defined by grooves and swellings, with prominent granular tubercles. Fronto-orbital margin broad; rostrum subtriangular, downturned, tip broken. Orbital area broad, deep; outer orbital teeth broken but appear robust, subtriangular. Anterolateral margins short; posterolateral margin long and convex; posterior margin broad, rounded, delimited by a finely granulated rim. Epigastric region with two conical, prominent and granular tubercles. Mesogastric region subtriangular, anteriorly elongated, inflated, bearing a small tubercle anteriorly and a large and prominent tubercle posteriorly. Protogastric region with two swollen lobules, each with a central prominent granular tubercle, and another more posterior one, smaller, near the posterior margin of the lobule. Metagastric region transversely elongate, swollen, with two contiguous and prominent granular tubercles. Urogastric region transversely narrow, depressed, with coarse granules. Cardiac region subtrapezoidal elongate, wider anteriorly, bearing two prominent and granulate tubercles, the anterior one, the larger. Intestinal region slightly swollen, with a central small tubercle. Epibranchial region with swellings and tubercles, bounded anteriorly by cervical groove, and posteriorly by branchial groove; meso- and metabranchial regions swollen, bearing granulate and prominent conical tubercles. Hepatic region fairly developed, bearing a central tubercle. Cervical groove well marked notching lateral margins. Branchial groove well defined, parallel to cervical groove. Branchiocardiac grooves deep, short, bounding urogastric region.

Remarks. Reported for the first time in Iberia by Ossó et al. (2015) from the upper Barremian of the Morella sub-basin, *Mithracites vectensis* has been subsequently reported in

Aptian strata of the Josa Fm. in the western Maestrat Basin, Oliete sub-basin, as well as in the northern Iberia, in the Basque-Cantabrian Basin (e.g. Ferratges et al., 2021; González-León et al., 2016). The presence of *Mithracites vectensis* in the Aptian soft sediments of the Morella sub-basin, demonstrates one more time the existing faunal affinities of similar paleoenvironments along the Iberian basins, such as the Maestrat Basin, and the Basque-Cantabrian Basin, and the Isle of Wight (South of Great Britain) where it was described for the first time (e.g. González-León et al., 2016; van Bakel et al., 2022).

Subsection: *Incertae sedis*

Superfamily: Etyoidea GUINOT AND TAVARES, 2001

Family: Etyidae GUINOT AND TAVARES, 2001

Genera included: *Etyus* Leach in MANTELL, 1822; *Etyxanthosia* FRAAIJE, VAN BAKEL, JAGT AND ARTAL, 2008; *Guinotosia* BESCHIN, BUSULINI, DE ANGELI AND TESSIER, 2007; *Karyosia* SCHWEITZER, FELDMANN, RADER AND FRANȚESCU, 2016; *Morellosia* n. gen.; *Rolerithosia* COLLINS, VILLIER AND BRETON, 2013; *Secretanella* GUINOT AND TAVARES, 2001; *Sharnia* COLLINS AND SAWARD, 2006; *Steorrosia* SCHWEITZER, FELDMANN, FRANȚESCU AND KLOMPMAKER, 2012; *Xanthosia* BELL, 1863

GENUS *Morellosia* n. gen.

Zoobank ID code: urn:lsid:zoobank.org:act:3E52A121-2AC5-4B72-9052-51133139D569-

Etymology. From Morella, where the specimens were found, and *osia*, derived from *Xanthosia*, as a common termination within the family.

TYPE SPECIES: *Morellosia maestratensis* n. sp. by original designation

Species included: *Morellosia maestratensis* n. sp.

Diagnosis. Small sized carapace, subhexagonal in outline, slightly wider than long, maximum width at the level of the epibranchial region. Fronto-orbital margin about 0.80 times maximum carapace width. Front straight, bilobed. Orbits directed forwards; supraorbital margin with strong subquadrate medial tooth bounded by deep notches. Dorsal carapace regions fairly defined, mainly smooth. Anterolateral margins arched, bearing five subtriangular teeth, including the extraorbital tooth. Posterolateral margins straight, converging backwards. Posterior margin short, slightly concave. Protogastric regions large, subcircular, swollen, with thin anterior extension. Hepatic region bearing two central tubercles and two lateral spinous teeth. Cervical groove sinuous, well-marked, continuous from side to side.

Morellosia maestratensis n. gen., n. sp.

Figure 6G–I. The 3D digital model of the specimen in Figure 6G–H is also provided as supplementary material in Ferrer et al. (2025) (file Fig6G-H_MGUV-40245).

Zoobank ID code: urn:lsid:zoobank.org:act:84EEC6C4-149C-4BD4-B665-557A35EECBBE

Type locality. Mola d'en Camaràs, Morella, Comarca dels Ports (Castelló province, Valencian Country, Spain).

Stratigraphical horizon. Morella la Vella Marls Member (*furcata* Zone), Forcall Fm., lower Aptian (Early Cretaceous) of Orpesa sub-basin (Maestrat Basin).

Etymology. From the Maestrat, historical territory created in the Middle Ages and under the rule of Military Orders. Gender feminine.

Studied material and measurements (in mm). One nearly complete carapace embedded in limestone, holotype MGUV-40245, length= 10; width= 12. One fragment, a left fourth anterior portion of the carapace, embedded in limestone matrix, paratype MGUV-40246, length= 6.5; width= 6.

Diagnosis. As for the genus.

Description. Carapace subhexagonal in outline, somewhat wider than long (1.2 times), maximum width at the level of the epibranchial region, weakly convex in both directions. Front straight, bilobed. Orbits directed forwards, bounded by two notable teeth, two fissures and a strong subquadrate medial tooth in the supraorbital margin. Dorsal surface of carapace with well-defined regions, swollen and bounded by shallow grooves. Anterolateral margins arched, shorter than posterolateral, bearing five subtriangular teeth: two hepatic and two epibranchial teeth, and the extraorbital tooth. Posterolateral margins straight, converging backwards. Posterior margin narrow, slightly concave, bounded by a thin posterior rim and an arched anterior groove. Protogastric regions large, subcircular, swollen, with thin anterior extension. Mesogastric region small, rhombus shaped, with thin anterior extension. Hepatic region swollen, bounded by grooves, bearing two central tubercles and two lateral teeth. Cervical groove sinuous, well-marked, continuous from side to side. Epibranchial region elongated, transversely situated, with two small tubercles and two lateral teeth. Mesobranchial and metabranchial regions undifferentiated, slightly swollen. Cardiac region subpentagonal in shape, swollen. Intestinal region small, anteriorly bounded by a gentle arched groove. Dorsal surface of carapace mainly smooth, lateral areas finely granulated. Ventral remains and appendages not preserved.

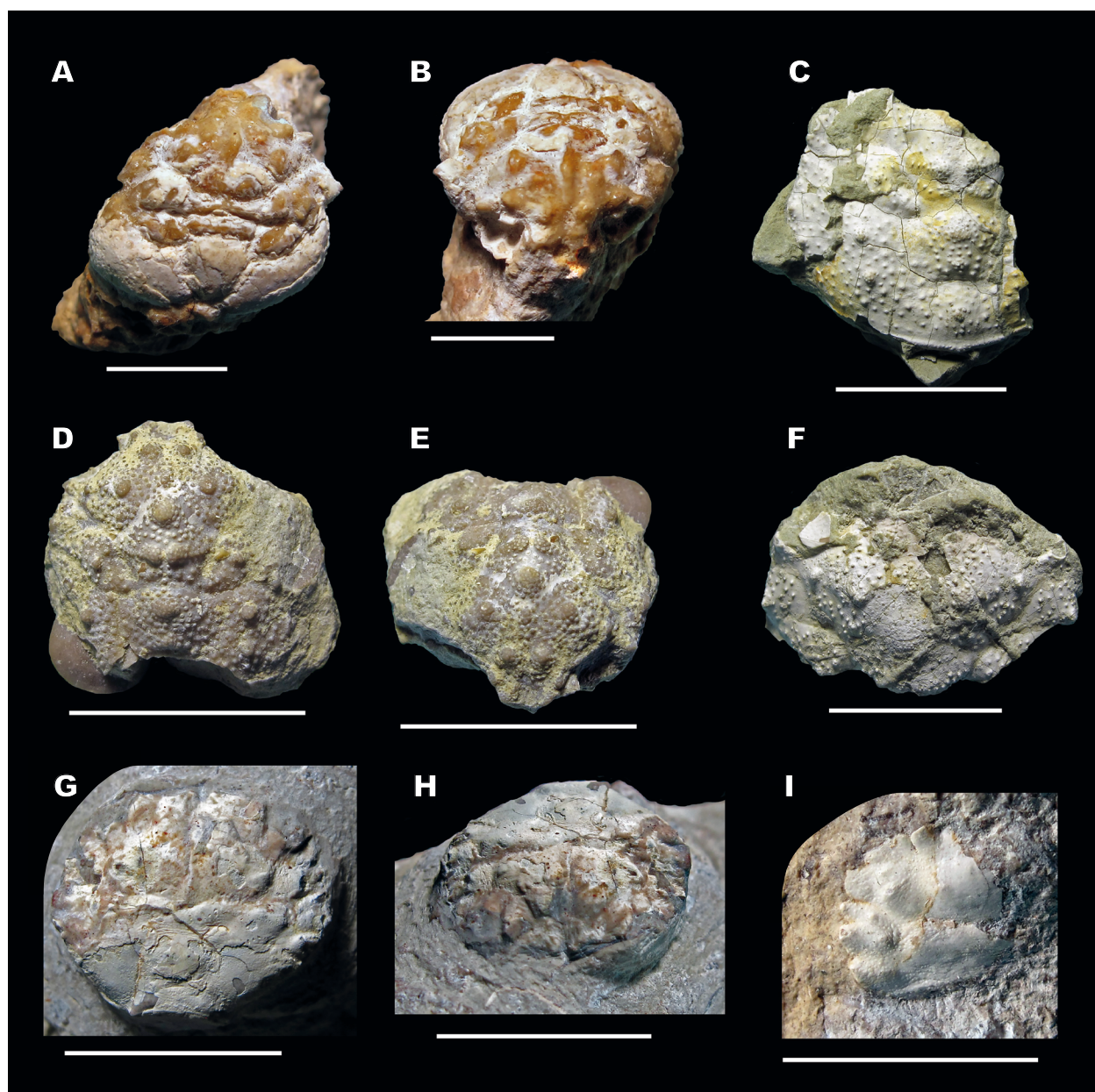


FIGURE 6 Decapod brachyurans from the lower Aptian Forcall Fm. A), B) *Rathbunopon tarraconensis* ossó, VAN BAKEL, FERRATGES-KWEKEL AND MORENO-BEDMAR, 2018 MGUV -40241, from the Magdaleno Quarry, Alcalà de Xivert (Castelló, Valencian Country); A) dorsal view, B) frontal view. C)-F) *Mithracites vectensis* GOULD, 1859 from Xiva de Morella (Castelló, Valencian Country); C) MGUV-40242, dorsal view; D) MGUV-40243, dorsal view, E) frontal view; F) MGUV-40244, dorsal view. G)-I) *Morellosia maestratensis* n. gen., n. sp. from the Mola d'en Camaràs, Morella (Castelló, Valencian Country); G) holotype MGUV-40245, dorsal view, H) frontal view, I) paratype MGUV-40246, dorsal view. Scale bar for A) and B) is equal to 5mm; for C) to I) is equal to 10mm. Photos by Á. Ossó.

Remarks. Despite the dorsal carapace of the holotype is deformed, hiding thus its true outline and proportions, most of its dorsal morphology can be observed. The dorsal morphology of *Morellosia maestratensis* n. gen., n. sp., characterized by a subhexagonal outline, slightly wider than long, dentate anterolateral margins, straight posterolateral margins, and short posterior margin, match with those of some genera included within Etyidae (e.g. Guinot and Tavares, 2001, pp. 510, 511; Schweitzer et al., 2017, pp.

1, 2), and in particular with those of *Xanthosia*, which appears to be closely similar. *Xanthosia* is characterized by a subhexagonal outline, similar swollen dorsal regions, shallow post cervical and branchial grooves and straight posterolateral margins of the carapace (e.g. Schweitzer et al., 2012, p. 131, figs. 4.1, 4.3; 2017, p. 6, figs. 2, 5a, 5b), all the mentioned features are shared with *Morellosia maestratensis* n. gen., n. sp.; however, major differences are present, such as a generally much wider carapace

in *Xanthosia* spp., lower fronto-orbital ratio (about 0.55), different supra-orbital margin, deeper cervical, post-cervical and branchial grooves, and less prominent anterolateral teeth (cf. Schweitzer et al., 2012, pp.131–135, fig. 4.1–4.4; 2017, p. 6, fig. 2.5a, b). *Etyus* clearly differs from *Morellosia maestratensis* n. gen., n. sp., by its much wider carapace, absence of subtriangular anterolateral teeth

and a dorsal carapace surface usually densely covered by large granules and/or tubercles (cf. Guinot and Tavares, 2001, pp. 513–516, figs. 1A, B, 2–5; Ossó and Moreno-Bedmar, 2020; Schweitzer et al., 2017, p. 2, fig. 1a, b). *Etyxanthosia*, *Guinotosia* and *Rolerithosia*, clearly differ from *Morellosia maestratensis* n. gen., n. sp., by their much wider carapaces, lower fronto-orbital ratio, much

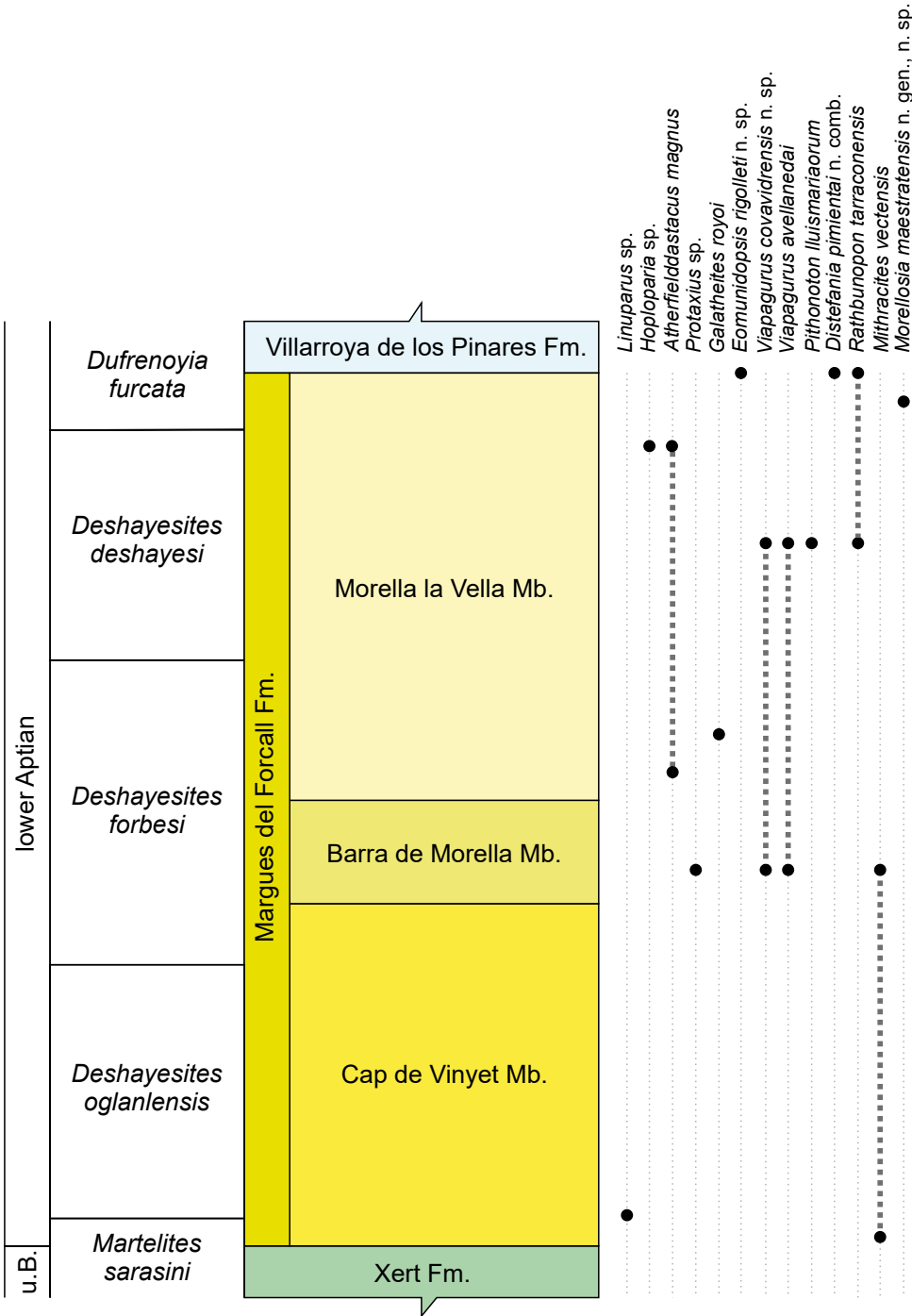


FIGURE 7. Summary of the decapod crustacean fossil record from the Margues del Forcall Fm. (lower Cretaceous) in the Morella and Orpesa sub-basins (Maestrat Basin) described in this work. The left column corresponds to the ammonite biozones described by Moreno-Bedmar et al. (2010) for the area (U.B. = Upper Barremian).

more well defined regions delimited by deeper grooves, and the maximum width of carapace placed more posteriorly than *M. maestratensis* n. gen., n. sp., (e.g. Beschin et al., 2007, pp. 31, 32, pl. 3, fig. 1a, b; Collins et al., 2013, pp. 48, 49, figs. 1–3; Fraaije et al., 2008, pp. 199–201, pl. 2, fig. 4). *Karyosia* and *Secretanella* present a similar dorsal surface of carapace, almost smooth and weakly defined dorsal grooves as in *Morellosia maestratensis* n. gen., n. sp., but differ from it by having a much wider carapace, lower ratio of fronto-orbital margin and by the absence of the prominent subtriangular anterolateral teeth that *M. maestratensis* n. gen., n. sp. possesses (see Secrétan, 1964, pp. 173–178, text-figs. 101–104, pl. 19, figs. 5, 6, pl. 20, figs. 7, 8 [as *Xanthosia arcuata*]; Charbonnier et al., 2012, fig. 18N, O; Schweitzer et al., 2016, pp. 10, 11, fig. 7). Lastly, *Sharnia* and *Steorrosia* also differ from *Morellosia maestratensis* n. gen., n. sp., by its wider carapace, shorter fronto-orbital margin, dorsal surface completely covered by coarse granules and tubercles, deeper dorsal grooves, and regarding the latter, the extremely lateral extensions of carapace (see Collins and Saward, 2006, pp. 70–72, pl. 1, fig. 5; Schweitzer et al., 2012, pp. 138, 139, figs. 6, 7). In conclusion, *Morellosia maestratensis* n. gen., n. sp., can be placed within Etyidae, albeit none of its genera can accommodate the Valencian specimens, therefore the erection of a new genus for the new species is appropriate.

Etyids are already known in the marine Aptian of Iberia, for instance *Etyxanthosia fossa* (Wright and Collins, 1972), has been reported from Aptian outcrops of the Garraf Basin, in the northeastern of Iberia (see Ossó et al., 2023, pp. 20, 21, fig. 8K), as well as *Etyus tresgalloi* Ossó in Ossó and Moreno-Bedmar, 2020, from the Aptian

outcrops of the Basque-Cantabrian Basin, of northern Iberia (Ossó and Moreno-Bedmar, 2020, pp. 179–181, fig. 4). The present report adds more data on the faunistic similarities of the Iberian basins and the southern part of Great Britain during the Aptian (see Wright and Collins, 1972, t. 2; González-León et al., 2016; van Bakel et al., 2022).

DISCUSSION

The present compilation of fossil decapods is based on specimens from previously unstudied localities within the Morella sub-basin, where the Forcall Fm. is well exposed, as well as from historical collections. Although not exhaustive, the present work provides new insights into the composition of the decapod fauna from the Forcall Fm. within the Maestrat Basin. The studied specimens proceed from different stratigraphic levels within the formation reflecting the different paleoenvironments that characterized the basin during Early Aptian. Decapods remains occur in relatively low abundance compared to other invertebrate groups throughout all stratigraphic levels of the formation, with their assemblages largely controlled by specific environmental conditions. Notably, dromioids and galatheoids, are typically found in the uppermost beds of the Morella la Vella Marls Member, associated with small coral patch-reefs scattered at the transition to the overlying Villarroya de los Pinares Fm. In contrasts, homoloids and paguroids predominantly occur in the bioclastic limestones of the Barra de Morella Member, the middle member of the formation, while axiids appear sporadically found within the marls of the middle and the upper members.

TABLE 1. Decapod list from the lower Aptian Forcall Formation of the Valencian sector of the Maestrat Basin.

Infraorder	Superfamily/Family	Genus	Species	Sub-basin	References
Achelata Scholtz and Richter, 1995	Palinuroidea Latreille, 1802	<i>Linuparus</i>	sp.	Morella	Garassino et al., 2009
Astacidea Latreille, 1802	Nephropoidea Dana, 1852	<i>Hoploparia</i>	sp.*	Morella	Herein
Glypheidea Zittel, 1885	Glypheoidea Zittel, 1885	<i>Atherfieldastacus</i>	<i>magnus</i> (M'Coy, 1849)*	Morella-Orpesa	Van Straelen, 1927; Vía Boada, 1975; herein
Axiidea de Saint Laurent, 1979	Axiidae Huxley, 1879	<i>Protaxius</i>	sp.*	Morella	Herein
Anomura Macleay, 1838	Galatheoidea Samouelle, 1819	<i>Galatheites</i>	<i>royoi</i> Van Straelen, 1927	Morella	Van Straelen, 1927
		<i>Eomunidopsis</i>	<i>rigolleti</i> n. sp.	Morella	Herein
	Paguroida Latreille, 1802	<i>Viapagurus</i>	<i>covavidrensis</i> n. sp.	Morella	Herein
		<i>Viapagurus</i>	<i>avellanedai</i> (Vía, 1951)*	Morella	Vía, 1951; herein
Brachyura Latreille, 1802	Dromioidea De Haan, 1833	<i>Distefania</i>	<i>pimentai</i> (Ferratges and Zamora in García-Penas et al., 2023) n. comb. *	Morella-Orpesa	Herein
		<i>Pithonoton</i>	<i>lluismariaorum</i> Ossó et al., 2018*	Morella	Ossó et al., 2018
	Homolodromioidea Alcock, 1900	<i>Rathbunopon</i>	<i>tarraconensis</i> Ossó et al., 2018*	Morella-Orpesa	Ossó et al., 2018; herein
	Homoloidea De Haan, 1839	<i>Mithracites</i>	<i>vectensis</i> Gould, 1859*	Morella	Herein
	Etyoidea Guinot and Tavares, 2001	<i>Morellosia</i> n. gen.	<i>maestratensis</i> n. sp.	Morella	Herein

Comparisons with Aptian decapod assemblages from both the western and eastern sectors of the Maestrat Basin (cf. [García-Penas et al., 2023, t. 1](#); [Ossó et al., 2024](#), respectively) indicate notable degree of faunal homogeneity across the sub-basins. Of the thirteen taxa reported from the Morella sub-basin ([Table 1](#)), eight have also been documented in other sub-basins of the Maestrat Basin.

Examples include the nephropoid lobster *Hoploparia* sp., the glypheoid lobster *Atherfieldastacus magnus*, the axiid *Protaxius*, the hermit crab *Viapagurus avellanedai*, and the brachyurans *Distefania pimientai*, *Pithonoton lluismariaorum*, *Mithracites vectensis*, and *Rathbunopon tarraconensis* (see [Table 1](#); [García-Penas et al., 2023, t. 1](#); [Ossó et al., 2023, 2024](#), and references therein).

Regarding taxa that currently lack documented counterparts in other basins, some may indeed be endemic to the central Morella sub-basin, or they have yet to be documented from elsewhere. For instance, *Linuparus* sp. previously reported by [Garassino et al. \(2009\)](#), is also known, in the coeval lower Aptian sandy-clayey deposits of the Isle of Wight (see [Reed, 1911](#) [as *Thenops carteri*]; [Simpson, 1985](#)). Similarly, *Eomunidopsis rigolleti* n. sp. described herein, may had congeneric or even conspecific equivalent in the coeval Garraf Basin (see [Ossó et al., 2023](#)). The newly proposed etyid *Morellosia maestratensis* n. gen., n. sp., belongs to a family also recorded in the Garraf Basin to the East and in the Basque-Cantabrian Basin and the Isle of Wight farther Northwest ([Ossó and Moreno-Bedmar, 2020](#); [Wright and Collins, 1972](#); [Ossó et al., 2023](#)). Additionally, the necrocarcinid *Necrocarcinus mariae* OSSÓ, VAN BAKEL AND ARTAL, in [Ossó et al., 2023](#), known from the Garraf Basin and the Orpesa sub-basin, has also been observed farther West, in the marly limestones of the Forcall Fm. in the Galve sub-basin (À.O., pers. obs.). It is also worth noting that taxa such as the longodromitid *Garrafosopon angustus* ([WRIGHT AND COLLINS, 1972](#)), originally described from the Isle of Wight as *Glaessneria angusta*, also occur in the Garraf Basin (northeastern Iberia). Likewise, the viaiid *Vectis* WITHERS, 1946, and the dromioid *Mesodromilites* WOODWARD, 1900, are genera found in both areas (cf. [Wright and Collins, 1972](#); [Ossó et al., 2023](#)).

The transgressive event that occurred during the early Aptian likely facilitated a marine connection between the Tethys and Boreal realms, possibly via the Pyrenean or Lusitanian basins. However, connections through the northern Iberian basins -including the Maestrat, Cameros and Basque-Cantabrian basins- should not be excluded ([Suarez-Gonzalez et al., 2013, figs. 12, 15B](#)). Such connections may have played a key role in the larval dispersal of decapods, enabling faunal exchange between both realms and supporting the establishment of diverse

decapod communities. These assemblages were controlled by a range of paleoenvironmental conditions, spanning from shallow to distal marine platform settings, from open to restricted marine environments, and from muddy substrates to coral/sponges reefal facies ([García-Penas et al., 2023, t. 1](#); [Ossó et al., 2023; 2024](#)). A broader discussion on the paleobiogeographic distribution of Iberian Aptian decapods and their assemblages is provided in [Ossó et al. \(2023, p. 24; 2024, p. 28\)](#).

CONCLUDING REMARKS

This preliminary approach to the decapods diversity in the Forcall Fm. from the Morella and Orpesa sub-basins (Maestrat Basin, NE Iberia) reveals notable similarities with decapod fauna previously documented in other sub-basins of the Aragonese sector of the Maestrat Basin. These faunal affinities suggest a relative homogeneous composition of decapod assemblages across the Maestrat Basin during the Aptian, with differences primarily driven by variations in the paleoenvironmental conditions that shaped local ecosystems. Further sampling efforts, both through fieldwork and the systematic review of material housed in public and private collections, would help to expand the scope of the current compilation. Such efforts will provide a more comprehensive understanding of the taxonomic composition paleoecological context, and spatial distribution of lower Aptian decapod assemblages within the central Maestrat Basin.

ACKNOWLEDGMENTS

We are grateful to the late Lluís Prieto and Maria Sánchez, Manuel Vicente Taus, Laurent Rigollet, Isidre Gurrea, and Manuel Cervantes, who have collaborated by providing relevant information and important material for the present work, and to Quim Pastó for their assistance in the field. We thank Tèlm Bover Arnal (UB, Catalonia), Josep Anton Moreno Bedmar (UNAM, México), and Matus Hyžný (Comenius University, Slovakia), for providing useful comments on geology and systematics. Adiël Klompmaier (Alabama Museum of Natural History, USA) kindly shared photographs of specimens for comparisons. We also thank Ester Díaz and José Ignacio Canudo (Museo de Ciencias Naturales, University of Zaragoza, Spain) for the facilities in accessing the collections for consultation. Special thanks to Anna Garcia Forner from the Museu de la Universitat de València d'Història Natural (València, Spain), for the facilities in the donation process. We thank the reviewers, Dr. Yusuke Ando (Mizunami Museum, Mizunami, Japan) and Dr. Jonathan Wallaard (Oertijd Museum, Bostel, the Netherlands) for their pertinent and constructive remarks. M. De Matteis and E. Carola are gratefully acknowledged

for the digitalization of several specimens included in the supplementary material, carried out within the framework of the GEODIGIT project (TED2021-130602B-I00), funded by MICIU/AEI/10.13039/501100011033 and the European Union NextGenerationEU/PRTR. As part of this project, some of the decapod fossils included in this study have been digitized in 3D using advanced methodologies developed within GEODIGIT. Additionally, OF's research has been supported by the Grup de Recerca de Geodinàmica i Anàlisi de Conques (2021SRG076), funded by the Secretaria d'Universitats i Recerca of the Departament d'Economia i Coneixement of the Generalitat de Catalunya.

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Manuscript received February 2025;
 revision accepted May 2025;
 published Online July 2025.