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New record of *Eryma* (Crustacea, Decapoda) from the Middle Jurassic (Bathonian) of NE Armenia

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Abstract. Decapod lobsters of the family Erymidae are important components of Middle–Upper Jurassic marine ecosystems, yet their fossil record in the Lesser Caucasus remains sparse. This study documents a fossil chela of an erymid lobster from middle Bathonian strata in Tavush Province (northeastern Armenia). It consists of a large propodus with two elongated fingers, preserved in a carbonate concretion from a prominent nodular horizon within marlstones, which also yielded poorly preserved ammonites and abundant deep-infaunal bivalves. Based on its large size, morphology, and microornamentation, the chela is referred to as *Eryma ventrosum* (Meyer, 1835). *E. ventrosum* is a well-known decapod species, widely documented from Middle–Upper Jurassic localities in France, but discovered for the first time in Armenia. Our record therefore extends the paleobiogeographic distribution of the European *Eryma* fauna further to the east within the tropical Neo-Tethys seaway.

Keywords: Erymid lobster, Middle Jurassic (Bathonian), Lesser Caucasus, paleobiogeography.

Introduction

Decapods constitute one of the most diverse and morphologically complex groups of crustaceans, comprising over 14 000 known species adapted to both aquatic and terrestrial environments. They have diverse morphologies as a consequence of variable adaptive behavioral characteristics (e.g., Martin and Davis, 2001; De Grave et al., 2009; Martin et al., 2009). Fossil evidence indicates that decapods appeared as early as the Devonian (e.g., Gueriau et al., 2015), but their main diversification and expansion occurred during the Jurassic–Cretaceous Periods, when they became very common in shallow-marine environments (Devillez et al., 2016, 2017; Devillez and Charbonnier, 2019, 2021).

Although decapods are found in numerous fossil sites worldwide (Africa, North America, Australia and even Antarctica), they are most commonly described from European (Neo-Tethys) epicontinental basins. The fossil record of decapods has historically been complicated by multiple names applied to different skeletal elements, often for the same taxa. This issue has been addressed systematically only in the last two decades (e.g., Devillez and Charbonnier, 2019, 2021; Devillez et al., 2019). The same taxonomic inconsistency also affected the decapod family Erymidae, whose type genus is *Eryma*. This group represents one of two major peaks of decapod diversity during the Mesozoic, with the earliest confirmed occurrences in the Sinemurian, abundant records in Toarcian–Callovian localities, and continued distribution in the Upper Jurassic–Lower Cretaceous. However, most key fossil sites and occurrences of *Eryma* are mainly associated with the Western Tethyan successions, whereas records from the Eastern Tethys remain rare and insufficiently described.

The current study reports a new occurrence of the genus *Eryma* from the Middle Jurassic (middle Bathonian) sediments in Tavush Province, NE Armenia (Fig. 1A). Paleogeographically, the study site is situated between the dispersed Jurassic decapod faunas of the Balkan Peninsula and those of the Middle East. Although based on a single specimen, this find provides new data on the Tethyan distribution of Erymidae and contributes to filling the gap in the decapod fossil record of the Eastern Tethys.

Geological setting and stratigraphic framework

Tavush Province (NE Armenia) is part of the Lesser Caucasus and belongs to the Sokhmeto-Karabakh Zone of the Alpine-Himalayan Orogenic Belt. It is particularly intriguing region as its Jurassic sequences were deposited at an East Tethyan branch of the Neo-Tethys, which was an active arc-back-arc basin at the time (e.g., Adamia et al., 2011; Sosson et al., 2017; Hässing et al., 2020). The Jurassic succession in this region comprises several thick volcano-sedimentary units. More particularly, the Lower Jurassic is represented mainly by sedimentary strata, whereas the Middle Jurassic includes volcanic and volcaniclastic rocks (e.g., basaltic and andesite lavas, andesite-dacite pyroclastics, tuffs, and tuffites) with subordinate terrigenous-carbonate sediments. These are overlain by extensive carbonate deposits spanning the Callovian–Valanginian interval (see Galoyan et al., 2018, and references therein; see also Fig. 1B). The latter authors documented pillow lava flows at numerous sites in northern and northeastern Armenia, indicating that volcanism during the Middle–Late Jurassic occurred in a submarine environment. Middle–Late Jurassic felsic to intermediate intrusive bodies occur either as plutonic (plagiogranite, tonalite, diorite) or subvolcanic (Galoyan et al., 2018 and references herein). In the northeastern part of the region, these rocks are overlain by Upper Cretaceous volcano-sedimentary sequences, whereas to the southwest, they are overlain by Paleocene–Eocene sedimentary and volcanic formations or by Pliocene–Pleistocene sediments (ibid.). The Jurassic rocks of Tavush Province and adjacent areas form a broad belt extending from NW to SE, complicated by numerous faults and folds (Fig. 1B), where sections of the entire sequence are exposed and can be examined.

Several superimposed stratigraphic intervals were followed in detail for the purposes of this study. They are located approximately 20 km WNW of Ijevan along the upper reaches of the Tslajur stream, a tributary of the Aghstev River (Fig. 1B). Three main sedimentary units were recognized, including: 1) Lower unit, containing thick, massive flow deposits, and diverse volcanoclastic granular sandstones with alternating siliciclastic debris flow deposits; 2) Middle unit, corresponding to shallow- to moderately deep-marine sediments (7.5 m thick); and 3) Upper unit, comprising presumably continental coarse-siliciclastic strata with scattered plant detritus and undetermined, but still significant thickness. Among these, we focused on the Middle unit due to its notable fossil content. The latter unit is successively composed of bioclastic limestones, lithic arenites, marlstones with two distinct nodular levels, and interbedded crinoidal-bioclastic limestones, as well as poorly sorted carbonate debris flow cover deposits. It is delimited by clearly defined surfaces from the underlying and overlying sedimentary rocks. Lobster chela was found within a layer of 2 m thick marlstones, containing randomly dispersed calcite concretions (Fig. 1C). Concretions are often fossiliferous, including rare fragmentary ammonites, but mostly deep infaunal bivalves, e.g., *Pleuromya*, *Pholadomya*, *Pinna*, *Ctenostreon*, *Sowerbyana*, and astartids (Crispin Little, *pers. comm.*). Small-scale hummocky cross-stratification, parallel lamination, and weak-to-moderate bioturbation are all associated with the concretion horizon.

Description and discussion

Terminology and taxonomic views here rely on the works of Devillez and Charbonnier (2019, 2021), along with Charbonier et al. (2025). The described erymid is housed in the collections of the Geological Museum at the Institute of Geological Sciences of the National Academy of Sciences of Armenia, under the prefix IGS/Ts/-L1.

The material under study consists of a large-sized and elongated P1 chela with a subrectangular and dorsoventrally compressed propodus bearing two long, slightly curved and forward-tapering fingers (see Fig. 1D, E). The articulation with the carpus is slightly convex and semi-elliptical, and of the carpus itself, only a small portion of its anterior end is preserved. Both the ventral side and the dorsal side are almost flat, slightly convex and concave, respectively. The inner and the outer margins are narrow and slightly tapered. A moderately large elliptical bulge is visible at the base of the dactylus. A narrow longitudinal furrow is running along the fixed finger. Both fingers bear small conical teeth, of which only a small portion appears to be preserved. The occlusal margins are absent. The entire chela is covered with fine and dense tubercles, which are surrounded by small crescent-shaped depressions. Its

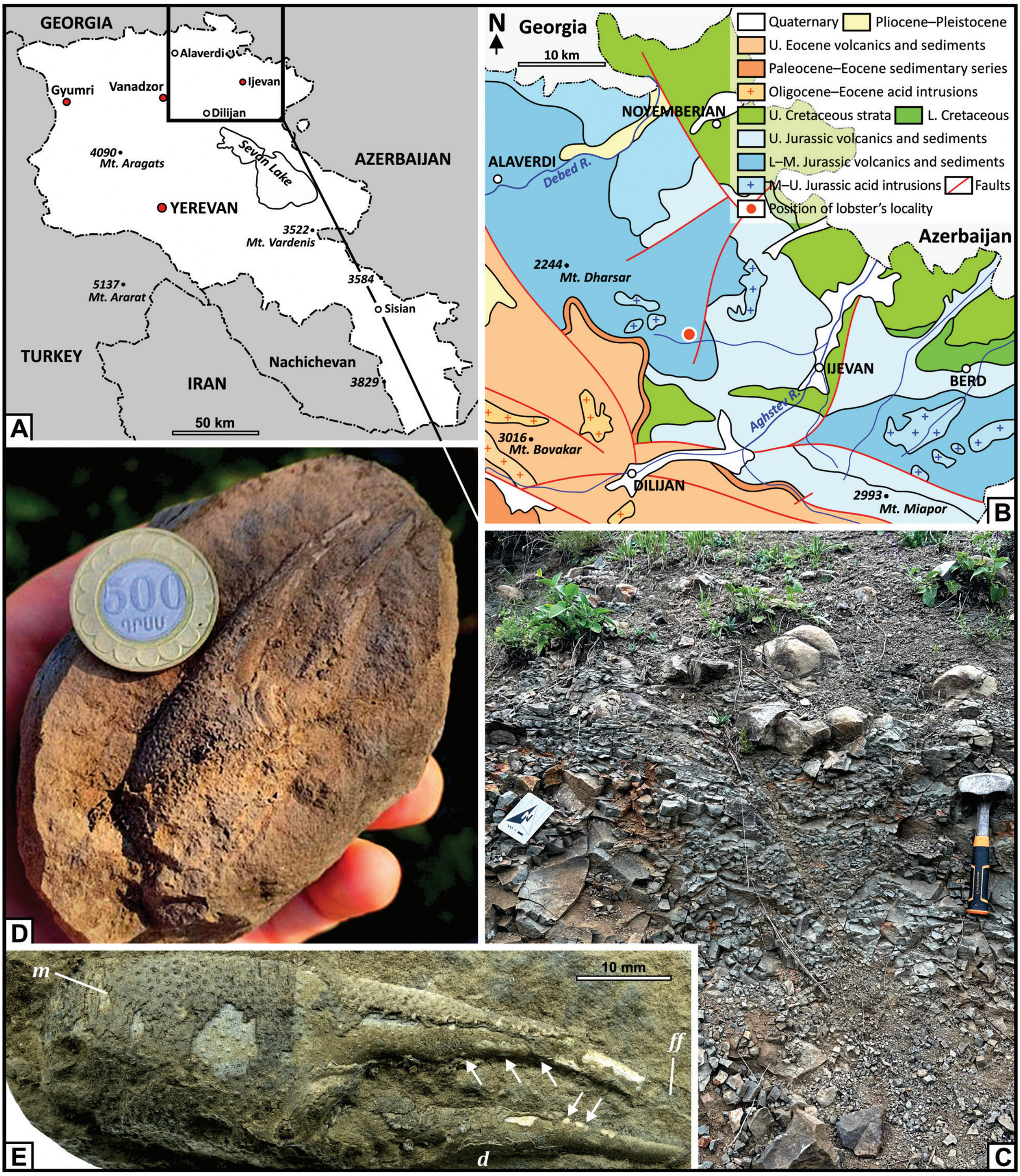

Fig. 1. A) Map of the studied area where the erymid lobster was discovered; **B**) Geological map of the Alaverdi–Berd region (NE Armenia), showing the Ijevan area and the Tslajur location (adapted from Galoyan et al., 2018); **C**) Field image of the fossil-bearing nodular level (ruler, 8 cm long, indicates the precise position of the fossil); **D**, **E**) Photographs of the chela of *Eryma ventrosum* (Meyer, 1835) (small italic letters denote the main elements of the chela: ***d*** – dactylus, ***ff*** – fixed finger, ***m*** – manus; manus + fixed finger = propodus; the white arrows indicate the observable conical teeth on the inner margins of the fingers).

dimensions are as follows: 1) length of the manus = 28 mm; 2) width of the manus = 21 mm; 3) length of the dactylus and the fixed finger >43 mm.

The morphological features described above, most notably the large and elongated P1 chela with a subrectangular, dorsoventrally compressed propodus, narrow inner and outer margins, and two long, slightly curved, forward-tapering fingers bearing a narrow dactylar bulge and fine tuberculation, allow us to assign the specimen from the Tslajur locality to the genus *Eryma* Meyer, 1840. Furthermore, the Armenian material is morphologically most similar to the first cheliped of *Eryma ventrosum* (Meyer, 1835) documented in Villers-sur-Mer (N France), originating from the Callovian strata, as shown by Charbonnier et al. (2025, Fig. 9F). It displays the same elongated chela and typically long, thin fingers, both adorned with fine tuberculation. However, the teeth that are usually located along the inner edges of the fingers are preserved only sporadically. In addition, it remains uncertain if the groove on the fixed finger holds diagnostic value or was introduced subsequently during the fossilization of the chela. When comparing our specimen with the information in the recent comprehensive review of *E. ventrosum* by Charbonnier et al. (2025, Table 3), it aligns most closely in stratigraphic position to fossils found in northeastern, central, and southeastern France. However, the latter fauna consists of carapaces and a pelon, which prevents us from making a direct comparison.

Ruban (2006) revised the Jurassic stratigraphic scale used for the Caucasus region, demonstrating that only one confirmed local ammonite zone exists for the lower parts of the Bathonian, while the rest of this stage remains undivided on zonal level. Despite being poorly preserved and fragmentary, the ammonites from the middle stratigraphic unit of Tslajur site represent identifiable examples of ?*Lycetticeras* spp. and *Wagnericeras* spp., indicating a Middle Bathonian age. Furthermore, as these ammonites cannot be directly correlated with the Caucasian zonal scheme, they are considered to indicate an approximate range corresponding to the combined extent of the Submediterranean *Morrisi* and *Bremeri* zones (*sensu* Mangold and Rioult, 1997).

Concluding remarks

The erymid lobster described herein represents a fossil group that has been poorly documented in the Jurassic of Eastern Neo-Tethys. The discovery of *Eryma ventrosum* (Meyer) in Armenia represents the first documented occurrence of this genus and of Jurassic lobsters in general, in the Lesser Caucasus, extending the known paleogeographic range of European Jurassic erymid lobsters further east. As evidenced by the abundant erymid faunas elsewhere, the decapod crustaceans seem to have played significant role in the Jurassic benthic assemblages throughout Europe and further to the east. Paleoecologically, the occurrence of *E. ventrosum* together with ammonites and bivalves at Tslajur locality indicates a diversified fauna that may reflect quite complex benthic biotope, which requires further investigation. We interpret the restriction of fossils to concretions to be a consequence of selective post-depositional preservation. The whole fossil assemblage was accumulated in randomly situated depressions on a soft sea-floor, where bivalves and chela became nucleation sites for concretion growth. A deeper marine (relatively offshore) setting is also suggested by the lithology of the surrounding strata. Based on our field studies at this site, it appears that the fossil-bearing level containing the erymid lobster corresponds to a short, probably condensed, but normal marine depositional setting that followed a particularly active volcanic and tectonic episode followed by an uplift and probably continental depositional phase.

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