

Paleoenvironmental controls on decapod crustacean diversification

Fernando A. Ferratges¹

¹Instituto Geológico y Minero de España (IGME-CSIC), Residencia CSIC, Campus Aula Dei, Av. Montañana 1005, E-50059 Zaragoza, Spain

* fa.ferratges@igme.es

Palabras clave: *Benthonic; bioherms; Brachyura; decapod revolution; Mesozoic.*

The study of the diversity and distribution of decapod crustaceans during the Mesozoic is essential to understanding their origin, evolution, and morphological and ecological diversification. The fossil record indicates that this era marked the appearance of major clades and significant diversity peaks, involving crabs, hermit crabs, and lobsters. Among these events, the so-called *Mesozoic Decapod Revolution* represents an evolutionary turning point, with the emergence of nearly 80% of extant higher-level lineages. This evolutionary pulse was closely linked to large-scale paleoenvironmental changes, including the expansion and contraction of reef ecosystems—from the Upper Jurassic buildups of Central Europe to the Early Cretaceous of Olazagutía (Navarra, Spain)—and to the early stages of the Late Cretaceous.

Material recently recovered from deposits ranging from the Middle Jurassic (Bathonian) to the early Late Cretaceous (Cenomanian) in Aragón, Spain, offers valuable new insights into the morphology and paleoecology of decapods at key moments in their evolutionary history. These fossils reveal significant anatomical traits, while the outcrops from which they originate provide important evidence of the environments where these groups diversified.

These discoveries refine the paleobiogeographic distribution of Mesozoic decapods and offer crucial evidence for understanding their origin, morphological variability, and environmental affinities. By addressing knowledge gaps regarding their early diversification, this study contributes to reconstructing the evolutionary trajectory of modern decapods and to discerning the spatiotemporal patterns underlying their evolution. Ultimately, the results highlight the importance of Iberian fossil sites as key reference points for correlating evolutionary and paleoenvironmental patterns at a global scale during one of the most dynamic intervals in the history of decapod crustaceans.

Financiación/Agradecimientos: *The present work has been supported by the project Programa Juan de la Cierva (ref. JDC2022-049170-I), financed by MCIU/AEI/10.13039/501100011033.*