ABSTRACT

Neogastropoda represent one of the most abundant and diverse groups of predominantly marine gastropods, characterised by a wide range of hunting strategies, with some taxa also adopting a scavenging mode of life. The origin and early evolutionary history of neogastropods during the Mesozoic have remained poorly understood, largely due to the fragmented nature of the fossil record and the dispersion of relevant data across numerous regional taxonomic studies. This research presents a comprehensive synthesis of worldwide occurrences of Cretaceous neogastropods and their Mesozoic ancestors, integrating taxonomic revision of selected taxa, detailed morphological analysis, and palaeoecological interpretation. It also provides a revised framework for relationships among higher Caenogastropoda during the early Mesozoic.

A revision of the extinct families Maturifusidae, Pseudotritoniidae, and Purpurinidae, traditionally regarded as potential stem or sister groups of neogastropods, demonstrates that each of them represents a separate group, primarily distinguishable by protoconch morphology. The stratigraphical range of purpurinid *Purpurina* has been extended back to the Late Triassic, indicating an earlier diversification of the group than previously assumed. Furthermore, purpurinids are inferred to have diverged into two evolutionary lineages by the Jurassic, one potentially leading towards neogastropods and the other towards tonnoids.

The taxonomic composition of Colombellinidae, a group of uncertain taxonomic position within the higher caenogastropods, is revised and restricted to the genera *Colombellina* and *Zittelia*. Detailed analysis of *Zittelia* shell morphology reveals a gradual transition from the Oxfordian to the Tithonian–Valanginian leading towards Cypraeoidea, and expressed by enlargement of the last whorl, elongation of the aperture, and expansion of the columellar lip. It supports the interpretation of *Zittelia* as a stem or sister group of cypraeoids. The presence of an infracolumellar groove in some recent cypraeoids, interpreted as homologous to the anterior sinuosity diagnostic of *Zittelia*, further reinforces this phylogenetic connection and suggests that the divergence of cypraeoids from colombellinids occurred no later than the Middle–Late Jurassic.

Palaeoecological data indicate that colombellinids were restricted to neritic carbonate facies in the north-western part of the Tethys Ocean. Their low abundance and high endemism may reflect a carnivorous mode of life. The co-occurrence of *Zittelia* and the earliest cypraeoids in the Upper Jurassic–lowermost Cretaceous of Sicily suggests that Late Jurassic reefs and associated peri-reefal facies served as centres of diversification for colombellinids and as probable sites of emergence of early cypraeoids.

The discovery of the early neogastropod *Fimbrivasum bulgaricum* sp. nov. (Vasidae) demonstrates that neogastropods started to diversify much earlier than previously assumed, i.e.

already in the early Early Cretaceous, challenging the hypothesis of mid-Cretaceous emergence and immediate radiation, revealing a prolonged cryptic phase characterised by low individuals density and low taxonomic diversity. This finding also documented the earliest occurrences of certain functional traits in Neogastropoda, such as varices and a labral tooth.

Throughout the Cretaceous, neogastropods underwent significant radiation, resulting in the establishment of all major clades (superfamilies) by the end of the period and reaching a diversity of 20 families and 159 genera with a global distribution. The large number of described species may suggests that evolution of Neogastropoda proceeded primarily at the species level, with a gradual accumulation of higher taxa. Although many genera became extinct at the K/Pg boundary, a portion of Cretaceous taxa survived, indicating that they had already attained a degree of ecological resilience and evolutionary flexibility that enabled them to recover and radiate again in the early Cenozoic. Patterns of generic diversity closely correlate with major climatic events, although neogastropod evolutionary success is best explained as the outcome of interacting climatic, biological, and ecological factors.