

Quantifying evolution – paleolake mollusks from the Dinaride Lake System (Middle Miocene, Sinj Basin, SE Croatia)

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The present investigation deals with the mollusk evolutionary patterns and environmental change in a lower Middle Miocene succession in the Sinj Basin (Dalmatia, SE Croatia) reflecting the depositional history of a long-lived freshwater lake. Despite its mature investigation stage, an analysis of a quantified mollusk record, providing insight into species contributions, taxonomic relationships and the nature of the morphologic changes, is completely missing up to now.

The taxonomic diversification of freshwater gastropods and its connection with morphologic disparity events are documented for a ca. 100-m-thick section representing the topmost infill of the Sinj Basin. Based on the available age model, these alterations occur extremely fast on a millennial scale, re-proving the significance of long-lived lakes for evolutionary research. Furthermore, the simultaneity of morphologic shifts in systematically independent taxa suggests them to be tightly linked to environmental changes. Most probably, climatic fluctuations leading to variations in lake-level and habitat types are the driving factors for these radiation events.

The study provides statistical treatment of quantified samples accompanied by a taxonomic revision of the taxa. Additionally, based on the mollusk distribution a paleoenvironmental interpretation is given, supported by sedimentological data and previous palynological analysis. Actually, it supports previous results of the section's division into two limestone-coal cycles, grading from shallow intermediate-energy settings with high freshwater input via fossil-poor transgressive limestones to shallow low-energy conditions, resulting finally in a total lake drought at the section top.

The discussion will focus on the evolutionary lines of four species, two of *Melanopsis* and two of *Prososthenia*. All four species appear almost continuously and can be divided into several morphotypes based on different sculpture features; in some cases also size plays a role. It will be demonstrated that the morphs occur sequentially, each more or less limited to a special interval. Moreover, the changes in morphology appear at the same time in different taxa.

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