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ABSTRACT VOLUME

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Ecological radiation of *Cyprideis* in the Late Miocene Lake Pannon.

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Abstract

Cyprideis is a cosmopolite, euryhaline genus adapted mainly to brackish environment. It is known since the Miocene (? Oligocene) and passed two major phases of adaptive radiations in the Miocene Amazonian Basin and Lake Pannon (Van Harten, 1990; Whatley et al., 1998). The typical extant species – *Cyprideis torosa* (Jones) – distributed in Europe, Asia, North America and Central Africa lives in coastal brackish water. It has a very effective osmoregulatory system allowing a life in freshwater and hypersaline environment where salinity can reach up to 200 g·l⁻¹ (Aladin & Potts, 1996).

Methods. Morphometric outline analyses were realized on adult Middle and Late Miocene female valves of *Cyprideis* from the northern Lake Pannon (Vienna Basin, Danube Basin, and Styrian Basin). All valves were photographed in external lateral view using a microscope and a digital camera. Optical images were processed with the Tps-dig software and for the reconstruction of valve outlines the B-splines approach adapted to ostracods was used (Brauneis et al., 2006). Multi-variate analyses of the morphological disparity of the valves were done using the non-metric multidimensional scaling algorithm (N-MDS), ANOSIM for the 1-way layout, as well as hierarchical clustering using group-average linking.

Results. *Cyprideis* colonized the Central Paratethys area since the Sarmatian time (regional Middle Miocene stage) after partial isolation of the basin and a drop of salinity from normal marine conditions (~ 35.0 ‰) to brachyhaline (16.5-30.0 ‰). *Cyprideis* displayed a wide morphological and ecological variability and were associated with brackish and marine taxa of sublittoral, outer estuarine conditions and a caliche-like saline coastal ponds or lake sediments influenced by fresh waters. A rise of the brackish/freshwater Lake Pannon at the beginning of the Pannonian time (regional Late Miocene stage) formed the conditions for an adaptive radiation of brackish organisms (Geary, 1990). The Middle Miocene *Cyprideis* entered the lake and started to diversify. Early Pannonian *C. pannonica* and *C. tuberculata* associated with brackish *Hungarocypris*, *Amplocypris*, *Hemicytheria*, *Loxoconcha* and freshwater taxa being paleoecologically more unified than those from the Middle Miocene and Middle Pannonian. In the Middle Pannonian, the paleobiological evolution of the genus is closely related to the tectonic activity of the Central Paratethys area. An acceleration of the subsidence and rise of the sea-level was the reason for development of various paleobiotopes. The Middle Pannonian *Cyprideis* are more diversified and five taxa can be recognised. Three small - *C. heterostigma*, *C. alberti*, and *C. regularis* - dominated the ostracod associations adapted to brackish eutrophicated estuarine and littoral conditions with freshwater influence. Two large taxa display high similarity. *C. obesa* can be found in well oxygenated shelf-mud environment influenced by approaching deltas and rich occurrence on brackish ostracods. The large *C. macrostigma* of sublittoral, open lake muddy environment is rarely dominant in the ostracod associations. This environment was predominantly settled by diverse and numerous Cytheroidea and Paratethyan Candoninae.

This radiation of *Cyprideis* finished at the end of Middle Pannonian when the immense deltaic bodies filled the lake progressively and the evolution of *Cyprideis* continued in the southern Lake Pannon and the adjacent Dacian Basin.