

Phylogeny, histology and inferred body size evolution in a new rhabdodontid dinosaur from the Late Cretaceous of Hungary

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Following 12 years of extensive excavations and screen-washing, the Iharkút locality, the only site in Hungary that has yielded Mesozoic vertebrates, has become one of the most important Late Cretaceous vertebrate sites in Europe. Remains of at least 30 species have been identified and document a Santonian continental–freshwater faunal assemblage that is generally similar to, but in some aspects distinct from, other European Late Cretaceous assemblages. The dinosaur assemblage is composed of basal tetanuran, abelisaurid and paravian theropods, nodosaurid ankylosaurs, coronosaurian ceratopsians, and a new species belonging to the endemic European ornithomimid clade Rhabdodontidae, which is represented by both cranial and postcranial remains. A global phylogenetic analysis of ornithomimid dinosaurs including all known rhabdodontid genera supports the rhabdodontid affinities of the Hungarian form. In addition to the Hungarian taxon, Rhabdodontidae comprises *Rhabdodon* spp. from the Early Campanian–Maastrichtian of France and Spain, a poorly known rhabdodontid from the Lower Campanian of Austria, and *Zalmoxes* spp. from the Maastrichtian of Romania. Based on characters of the dentary, an element that is known in all rhabdodontid species, the Hungarian species is most similar to the Austrian rhabdodontid. This close affinity is further supported by their close temporal as well as spatial proximity. The Hungarian rhabdodontid also shows similarities to *Zalmoxes*, a genus that is approximately 15 million years younger in age, but the morphologies of the quadrate, dentary and some limb bones clearly indicate important differences between the two forms. Histological study of limb bones has allowed estimation of adult body size for all genera of Rhabdodontidae. Samples from the Hungarian and Austrian species indicate a similar adult body length of 1.6–1.8 m that is in accordance with the morphological similarities between these two rhabdodontids. In contrast, the French specimens of *Rhabdodon* had a much larger, 5–6 m adult body length, indicating a substantial difference in body size between the western and eastern European taxa. However, phylogenetic mapping of body size onto the results of the phylogenetic analysis calls into question the hypothesis that insular dwarfism accounts for the small body size of the eastern rhabdodontids. These results imply a deep divergence (prior to the Santonian) between a western rhabdodontid lineage represented by at least two species of *Rhabdodon* in Spain and France and an eastern lineage consisting of the *Zalmoxes* and the Austrian and Hungarian rhabdodontids.