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## **Abstracts and field trip guide**



Edited by:

**George Pleş, Carmen Chira, Emanoil Săsăran, Raluca Bindiu-Haitonic,  
Ioan I. Bucur, Vlad A. Codrea, Cristian V. Mircescu, Lóránd Silye & Ioan Tanţău**

## Wading into Cretaceous deltas – palaeontology, sedimentology and taphonomy of a unique uppermost Cretaceous vertebrate fossil site from Vălioara, NW Hațeg Basin (Romania)

Csiki-Sava, Z.<sup>1,2</sup>, Magyar, J.<sup>2,3</sup>, Budai, S.<sup>4</sup>, Páll-Gergely, B.<sup>5</sup>, Konecsni, G.<sup>2</sup>, Koczó, L.<sup>2</sup>, Tabără, D.<sup>6</sup> & Botfalvai, G.<sup>2,7</sup>

<sup>1</sup> University of Bucharest, Department of Geology, Mineralogy and Palaeontology, Bd. N. Bălcescu no. 1, 010041 Bucharest, Romania, e-mail: zoltan.csiki@g.unibuc.ro

<sup>2</sup> Eötvös Loránd University, Institute of Geography and Earth Sciences, Department of Palaeontology, Pázmány Péter sétány 1/c, 1117 Budapest, Hungary, e-mails: magyarjani90@gmail.com, koni.gergo@gmail.com, koczo7967@gmail.com

<sup>3</sup> Hungarian National Museum Public Collection Centre, Budapest - Hungarian Natural History Museum, Department of Geology and Paleontology, Ludovika tér 2, 1083 Budapest, Hungary

<sup>4</sup> Università degli Studi di Pavia, Dipartimento di Scienze della Terra e dell'Ambiente, Via Ferrata 1, 27100 Pavia, Italy, e-mail: soma.budai@unipv.it

<sup>5</sup> Plant Protection Institute, HUN-REN Centre for Agricultural Research, Brunszvik u. 2, 2462 Martonvásár, Hungary, e-mail: pallgergely2@gmail.com

<sup>6</sup> 'Al. I. Cuza' University of Iași, Department of Geology, Bd. Carol I no. 20A, 700505 Iași, Romania, e-mail: dan.tabara@yahoo.com

<sup>7</sup> HUN-REN-MTM-ELTE Research Group for Paleontology, Ludovika tér 2-6, 1083 Budapest, Hungary, e-mail: botfalvai.gabor@gmail.com

**Keywords:** earliest Maastrichtian; Vertebrates; Gastropods; Palynology; Taphonomic history.

**Introduction.** The uppermost Cretaceous continental beds of Hațeg Basin are known due to their vertebrate fauna (fishes, anuran and albanerpetontid amphibians, *Kalloukibotia* and *Dorotodon* turtles, diverse lizards, snakes, varied crocodyliforms, pterosaurs, different clades of herbivorous and carnivorous non-avian dinosaurs, birds, and multituberculates; Csiki-Sava et al., 2015). Several members of the fauna show features (dwarfing, anatomical peculiarities, endemic nature and/or relictual character) most often interpreted as adaptations to their restrictive, insular habitat on the so-called Hațeg Island of the Late Cretaceous European Archipelago (e.g. Nopcsa, 1923; Csiki-Sava et al., 2015). However, despite the importance of this fauna, thorough systematic excavations aimed at unearthing and documenting the detailed stratigraphic-sedimentologic context and faunal composition of the different local assemblages are rather rare and far apart; such data are especially sparse to non-existent or the historical collections amassed before the end of the 20<sup>th</sup> century. The deposits of the Densuș-Ciula Formation, grouping such uppermost Cretaceous deposits from the northwestern part of Hațeg Basin (Csiki-Sava et al., 2016) are especially poorly known in these regards, despite their highly fossiliferous nature (Kadić, 1916; Botfalvai et al., 2021).

**Methodology.** In recent years, attempts to relocate the historical dinosaur quarries of Kadić (1916) near Vălioara, NW Hațeg Basin (e.g., Botfalvai et al., 2021), led to the identification, mapping and excavation of several new fossil accumulations in the deposits of the middle Densuș-Ciula Formation cropping out in this area. These include the site identified as K2, as it coincides with/falls near the historical Quarry II of Kadić. Given the richly fossiliferous nature of the site, we have conducted systematic excavations here, supplemented by detailed lithological logging, sedimentological analyses as well palynological investigations, aimed at constraining the age, relative position, taphonomic history and depositional origin of the K2 accumulation, in the framework of our wider research efforts in this area (Albert et al., 2025).

**Results.** Hundreds of vertebrate remains have been recovered from site K2, a large part of which is identifiable to taxonomic level/skeletal identity. In addition, many invertebrate fossils (continental gastropods and bivalves), plants (charred tree trunks and debris, seeds) and trace fossils (amber, insect coprolites) had been also collected. The sedimentological analysis of the site

and its immediate surroundings showed that the fossiliferous deposits at K2 consist of an alternation between fine lake bottom deposits and somewhat coarser deltaic beds prograding occasionally into the lake, within a wider wetland setting, as also supported by the palynomorph and gastropod assemblages. The main fossil-bearing horizon, a dm-thick super-concentrated bonebed, is hosted by one of the deltaic interbeds. The faunal and taphonomic analyses identify the K2 assemblage as a high-diversity multitaxic, multidominant mixed (macrofossil and microfossil assemblage), composed of fishes, amphibians, squamates, different turtles and crocodyliforms, pterosaurs, herbivorous and carnivorous dinosaurs, and multituberculates. The taphonomic analysis of the assemblage shows that most of the taxa identified are relatively rare and represented by isolated fossils, whereas well-preserved, associated (even articulated) remains of a small number of taxa (*Kallokibotium*, rhabdodontids, titanosaurs) dominate, and these belong (especially in the case of the dinosaurs) to a small number of incomplete skeletons. This preservational dichotomy, combined with the dominance of terrestrial taxa over aquatic-semi-aquatic ones, indicates that several different taphonomic pathways contributed to the genesis of the K2 assemblage, sampling in different manners several distinct palaeocommunities present in the wider neighbourhood of the site. The palynostratigraphic data from site K2, together with regionally available age constraints, point to an earliest Maastrichtian age of the local fauna, predating all relatively diverse faunal assemblages that were previously known from Hațeg Basin (see Csiki-Sava et al., 2016).

**Conclusions.** Site K2 documents an as yet unsampled new sedimentary setting (a small lacustrine delta) in the uppermost Cretaceous of the Transylvanian area, one that preserved the associated remains of several important local taxa, within an otherwise multitaxic accumulation. Due to its age, sedimentary setting, complex taphonomic history, and presence of definitively associated incomplete skeletons, it has a great potential to offer new insights regarding topics such as the taxonomic identity and affinities of key Hațeg taxa, the assembly and evolution of the Hațeg Island faunas, as well as the habitats and faunal composition of local palaeoecosystems.

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