

3D models related to the publication: Endocranium and ecology of *Eurotherium theriodis*, a European hyaenodont mammal from the Lutetian

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Abstract

The present 3D Dataset contains the 3D model analyzed in the article Dubied et al. (2021), Endocranium and ecology of *Eurotherium theriodis*, a European hyaenodont mammal from the Lutetian. *Acta Palaeontologica Polonica*. <https://doi.org/10.4202/app.00771.2020>

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INTRODUCTION

We describe the endocranium of *Eurotherium theriodis* (Fig. 1). The fossil NMB.Em12 is a complete cranium (Fig. 1A-D), found in the Swiss locality of Egerkingen (probably Egerkingen γ based on the date it has been collected; Ypresian, MP13?). The specimen belongs to the old collections of Egerkingen permanently stored at the Natural History Museum of Basel (Naturhistorisches Museum Basel, NMB). NMB.Em12 is the holotype of *Eurotherium theriodis* (Van Valen 1965).

Due to the relative large size of the specimen, two successive scans were necessary to encompass the entire specimen. We have realized three 3D reconstructions of the specimen (see Table 1): the original unprepared specimen (including the fossil, its matrix and the associated “restoration”, see Fig. 1B), the virtually prepared specimen (fossilized cranium only, Fig. 1C), and the reconstructed endocast (Fig. 1E). We have included the original specimen (Unprepared specimen) to show the artificial reconstruction, including gypsum of the basicranial part and at the level of the sagittal crest. The fossil was severely broken including some section of the braincase. Moreover, due to the poor contrast of the bone, the sediment, the gypsum, and undefined elements, the endocast has been manually segmented, giving a poorly defined resolution to the structures (Fig. 1E). The two portions scanned of the unprepared specimen and of the cranium 3D data were aligned and then flattened using Meshlab (Cigoni et al. 2008). The unprepared specimen was then aligned with the prepared cranium. The downsizing of the resulting .ply files were done using Meshlab (Cigoni et al. 2008).

Morphological characteristics on the endocranium and tur-

Model IDs	Description
M3#381	unprepared cranium model
M3#382	prepared cranium (gypsum and matrix virtually removed)
M3#383	endocast

Table 1. List of 3D models provided for the specimen NMB.Em12 (*Eurotherium theriodis*). Collection: Naturhistorisches Museum Basel (NMB), Switzerland.

bines (Fig. 1E) of this fox-sized mammal (≈ 7 kg) allow discussions on its phylogenetic attribution and ecological parameters such as its hunting strategy. The peculiar shape of its anatomy clearly distinguishes this species from the Proviverrinae such as *Proviverra* and the other hyaenodontids such as *Cynohyaenodon* (e.g. elongated tube shape olfactory bulbs), but also differs from *Hyaenodon* (e.g. ectosylvia absent in *E. theriodis*), confirming the intermediate phylogenetic position of this species. The endocranial shape recalls the conditions observed in scavenger predators (presence of very developed turbinates; Fig. 1E), in agreement with the ecomorphological characters observed on *E. theriodis*' skull and teeth (e.g. strong development of the sagittal crest, horizontal abrasion of the premolars).

METHODS

The X-ray microtomography was performed using a nanoCT[®] system nanotom[®] (phoenix x-ray, GE Sensing & Inspection Technologies GmbH, Wunstorf, Germany) hosted at the Department of Biomedical Engineering, University of Basel. The scan parameters are 180kV and 30 μ A for a resolution of 49 μ m (voxel size). We digitally segmented the cranium and endocast of NMB.Em12 using AVIZO LITE 9.0. This method permits

to have access to the inner structure of the specimen (herein the endocranium). AVIZO LITE 9.0 was also used for measuring the endocranium structures (Fig. 1).

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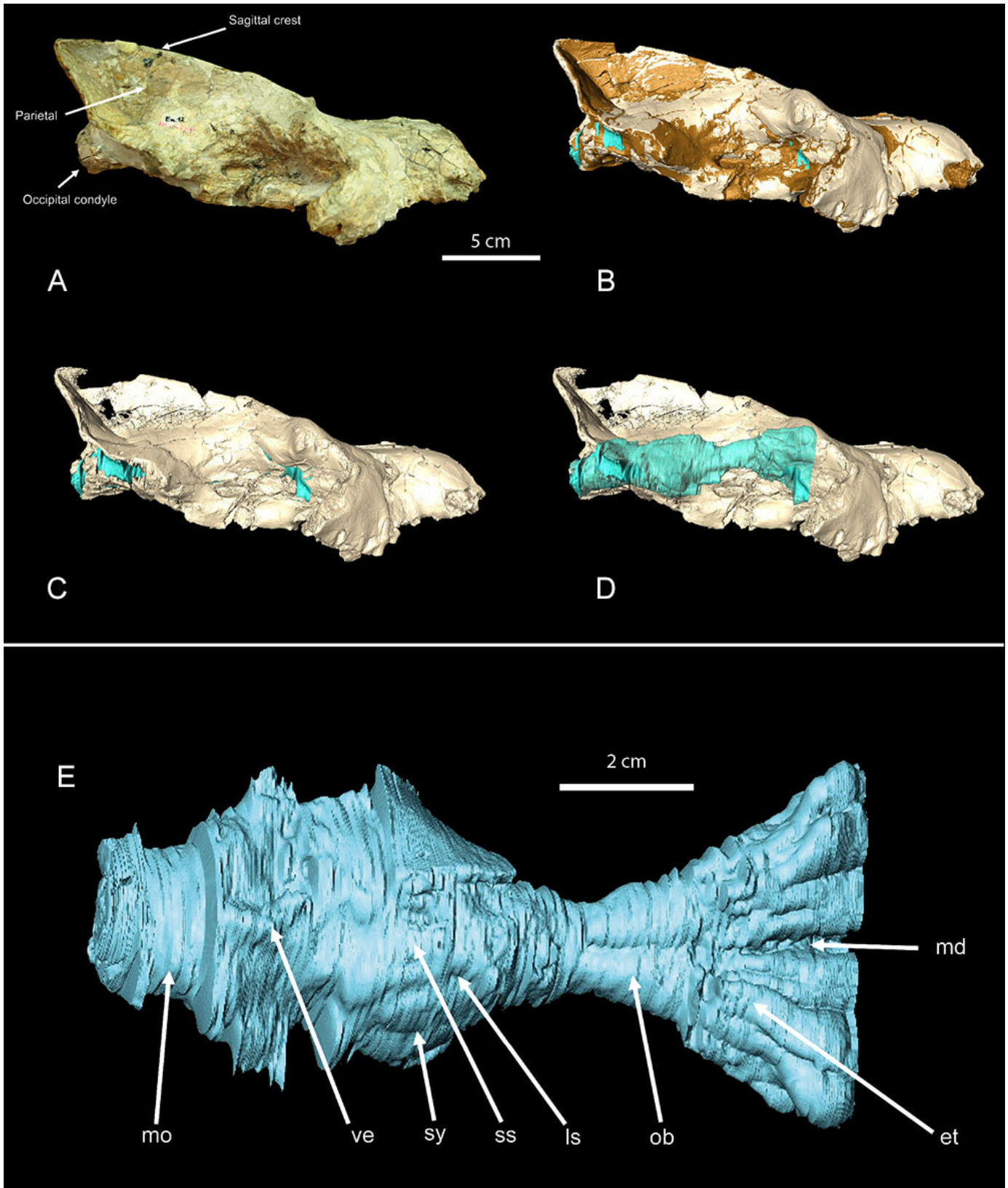


Figure 1. *Eurotherium theriodis*, NMB.Em12, cranium. A, cranium in lateral (right) view. B, digitalized unprepared specimen (with sediments and plaster, brown) and digitally prepared specimen (cranium, gold) in lateral (right) view. C, digitally prepared specimen cranium in lateral (right) view. D, digitally prepared specimen with focus on the reconstructed endocast in lateral (right) view. E, CT-scanned reconstructed endocast in dorsal view. et: ethmoturbinal; ls: lateral sulcus; md: mesethmoid; mo: medulla oblongata; ob: olfactory bulb; ss: sagittal sinus; sy: suprasylvia; ve: vermis.
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