

Reconstruction of the facial morphology of *Deinotherium gigantissimum* Stefanescu, 1892 based on the material from Ezerovo, South Bulgaria

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In another paper (MARKOV et al., 2001) we discussed the facial morphology of deinotheres, basing our reconstruction on the Eppelsheim skull of *Deinotherium giganteum* Kaup, 1829 (Fig. 1). There, we argued against a long elephantine proboscis and discussed the position of the lower lip. As far as the purpose of the paper was to challenge some broadly established and, as we believe, wrong ideas about the appearance of these bizarre mammals, we did not discuss differences at the genus or species level, focusing on features that we assume typical for the whole family.

Our analysis of the still unpublished¹ deinotheres skeleton from Ezerovo, near Plovdiv, South Bulgaria, showed that there are significant cranial differences between the Ezerovo skull and the skull of *D. giganteum* (Spassov & Markov in prep.). Some of the more important ones are:

The Ezerovo skull (Fig. 2) is higher and shorter, roughly inscribing within a square and not a rectangle as the skull of *D. giganteum*. The orbit is situated above M1 and not P4 (for this character in *D. giganteum* see HARRIS 1978). There is also a difference in the shape of processus angularis of the mandible, which is much more developed in the Ezerovo specimen (for the real shape of the mandible of *D. giganteum*, which is a plaster reconstruction in the Eppelsheim skull, see for example BERGOUNIOUX & CROUZEL, 1962 a, b). The larger processus angularis in another find from Southeastern Europe was noted by TARABUKIN (1974) and included in his revised diagnosis of *D. gigantissimum*.

All our reasons to accept *D. gigantissimum* Stefanescu, 1892 as a *bona fide* species (and not a junior synonym of *D. giganteum*) and to refer the Ezerovo specimen to this species are going to be published elsewhere (Spassov & Markov

¹Some preliminary data are given by NIKOLOV (1967). A photo of the mounted skeleton (Faculty of Geology and Geography, Sofia University) can be found in TOBIEN (1986); there are some metric data in TOBIEN (1988). On the age of Ezerovo - Middle to Late Turolian - see SPASSOV (in press). The name "*D. thraciensis*" is occasionally used (e.g. NIKOLOV, 1985) referring to the Ezerovo specimen, but this is not a valid name because it does not correspond to the rules of the International Code of Zoological Nomenclature.

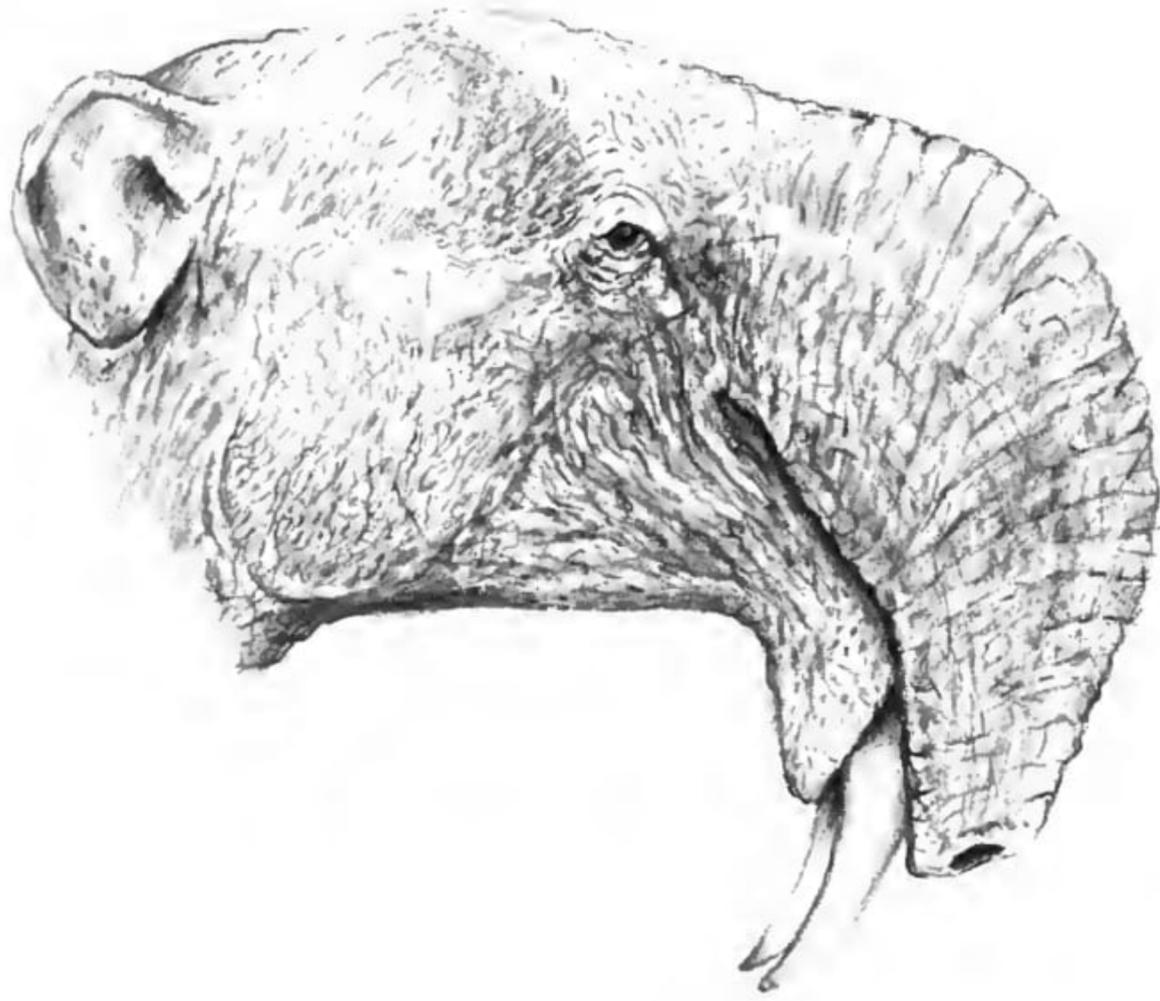


Fig. 1. Reconstruction of the head of *Deinotherium giganteum* Kaup, 1829, based on the Eppelsheim skull. (after MARKOV et al., 2001)

in prep.). Here, we present a reconstruction of the head of *D. gigantissimum* based on the Ezerovo specimen (Fig. 3) pointing out the differences with *D. giganteum* and trying to explain them from an ecological point of view.

The similarity between the relatively high and short skull of the Ezerovo specimen (which we believe is characteristic for the species *D. gigantissimum*) and *D. bozasi* from the Pleistocene of Africa has been noted by other students too (K. Huttunen, pers. comm.). We believe that this similarity between the late



Fig. 2. Skull of the skeleton from Ezerovo, South Bulgaria (coll. of the Paleontological Museum, Faculty of Geology and Geography, Sofia University) in norma lateralis



Fig. 3. Reconstruction of the head of *Deinotherium gigantissimum* Stefanescu, 1892, based on the Ezerovo skull. Drawing: Velizar Simeonovski

Miocene species from Southeastern Europe and the Pleistocene African form is an example of parallel evolution. In both cases, this was a response to the aridification of the climate in the corresponding regions. A shorter and more elevated skull provides better mastication, and the shape of the mandible also indicates a stronger masticatory apparatus. It seems possible that the forms with a shorter and higher skull possessed a better developed trunk in comparison to *D. giganteum*.

In conclusion, we suppose that the aridification that took place about the second half of the Late Miocene, led in Eastern Europe to the emergence of a new deinothere species - *Deinotherium gigantissimum*, which was better adapted to more arid conditions than the earlier West European *D. giganteum*. In some of its cranial features the East European species "presaged" the Pleistocene *D. bozasi*. In both cases this was an attempt to deal with aridification, and in both cases this was apparently the limit of the adaptation abilities of this group.

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References

- BERGOUNIOUX F.-M., F. CROUZEL. 1962a. Les Déinothéridés d'Europe. - *Annales Paléont.*, 48: 1-56.
- BERGOUNIOUX F.-M., F. CROUZEL. 1962b. Les Déinothéridés d'Espagne. - *Bull. Soc. Géol. France*, 7 (4): 394-404.
- HARRIS J. M. 1978. Deinotherioidea and Barytherioidea. - In: Maglio V.J., H.B.S. Cooke (eds), *Evolution of African Mammals*. Cambridge, Harvard University Press, 315-332.
- MARKOV G. N., N. SPASSOV, V. SIMEONOVSKI. 2001. A reconstruction of the facial morphology and feeding behaviour of the deinotheres. - In: Cavaretta G., P. Gioia, M. Mussi, M. R. Palombo (eds), *The World of Elephants. Proceedings of the 1st International Congress*. Consiglio Nazionale delle Ricerche - Roma, 652-655.
- NIKOLOV I. 1967. Une importante trouvaille scientifique: deux squelettes de *Deinotherium* et de *Mastodon*. - *Commission nationale de la Rep. Popul. de Bulgarie pour l'UNESCO*, UNESCO, 5: 16-17.
- NIKOLOV I. 1985. Catalogue of the Localities of Tertiary Mammals in Bulgaria. - *Paleontology, Stratigraphy and Lithology*, 21: 43-62.
- SPASSOV N. In press. The Turolian Megafauna of West Bulgaria and the character of the Late Miocene "Pikermian biome". - *Bollettino della Societa Paleontologica Italiana*.
- TARABUKIN B. A. 1974. New data on the systematics, phylogeny and ecology of Suborder Deinotherioidea Osborn (1921). - In: *Mammals of the late Cenozoic from south-western USSR*. Kishinev, Shtiintsa, 77-90. (In Russian).
- TOBIEN H. 1986. Die paläontologische Geschichte der Proboscider (Mammalia) im Mainzer Becken (BRD). - *Mainzer Naturw. Archiv*, 24: 155-261.
- TOBIEN H. 1988. Contributions à l'étude du gisement miocène supérieur de Montredon (Hérault). - In: *Les grands mammifères. 7 - les proboscidiens Deinotheriidae*. Palaeovertebrata, Montpellier, Mémoire extraordinaire, 135-175.

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Реконструкция на главата на *Deinotherium gigantissimum* Stefanescu, 1892 въз основа на материала от Езерово, Южна България

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(Резюме)

Външният вид на главата на *Deinotherium gigantissimum*, съдейки по черепа от Езерово, се отличава от този на *D. giganteum* (Eppelsheim) поради значителните черепни разлики между двата вида. Тези разлики са функционални и говорят за адаптация към по-сух климат при *D. gigantissimum*.