

***DEINOTHERIUM GIGANTEUM* FROM ADRANI,  
CENTRAL SERBIA**

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This paper reports an accidental find of *Deinotherium giganteum* left M3 crown in Adrani near Kraljevo, central Serbia. The specimen was found in fluvial deposits of the Zapadna Morava River. This is the second find of *Deinotherium giganteum* in the vicinity of Kraljevo. Together with other remains of proboscides (*Tetralophodon longirostris*), it confirms the presence of Tertiary large mammals fauna in Kraljevo region, probably in the context of an open forest or woodland environment.

**Key words:** *Deinotherium giganteum*, molar, Kraljevo, Central Serbia

## INTRODUCTION

The fossil proboscidean tooth is an accidental find from the fluvial deposits of the Zapadna Morava River in Adrani, about 4 km from the town of Kraljevo (the Raška District, central Serbia), during commercial sand excavations in 2008 (Fig. 1). B. Janković, a worker, noticed the “strange

tooth” in the excavated sand pit and took the fossil home. He gave it to his neighbour, a high school student of stomatology (Medical High School in Kraljevo), and she took the fossil to her teacher. During the same year, the

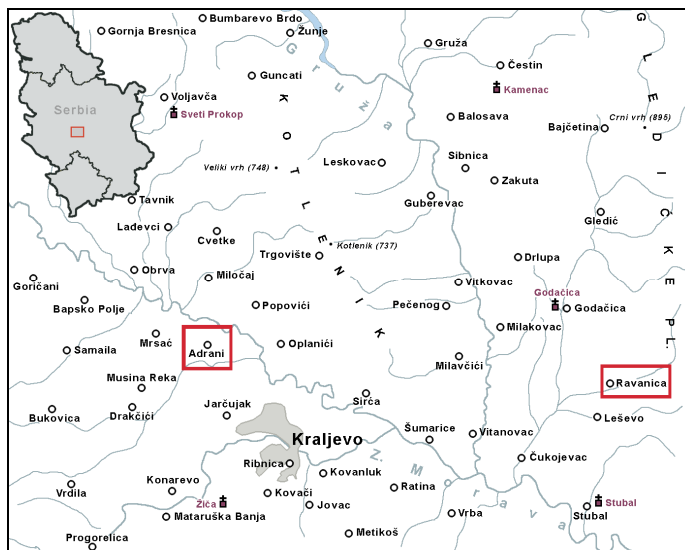


Fig. 1. - Locations of *Deinotherium giganteum* fossil teeth finds near Kraljevo: M3 from the Zapadna Morava River bed (red square), and p4-m3 from Ravanica on the Gledić mountains (blue square).

teacher donated the fossil to the National Museum in Kraljevo, where it constitutes a part of the natural history collection, which also contains other fossil remains of proboscideans from the region. In our study, we followed dental nomenclature of Tassy (1996).

## METHODS

The tooth was measured using a movable ruler and measures are given in *mm* units.

## SYSTEMATIC PALEONTOLOGY

- Order *Proboscidea* Illiger, 1811  
 Family *Deinotheriidae* Bonaparte, 1845  
 Genus *Deinotherium* Kaup, 1829  
 Species *Deinotherium giganteum* Kaup, 1829

A perfectly preserved left M3 crown (Fig. 2), with thick enamel, two lophids and strong crenulated cingula that give it a sub-triangular shape. A wide anterior cingulum does not proceed to the lingual/buccal side of the crown. The talon is crenulated and small. There is only slight and oblique dental attrition, with dentine significantly exposed only on the lingual part of the anterior loph. The lophids are curved in such a way that their buccal and lingual sides are turned up slightly backward. Tooth measurements are presented in Tab. 1.

Table 1. - Dental measurements in *mm*. L - antero-posterior maximal length; W1 - maximal width of the first lophid; W2 - maximal width of the second lophid; H - height of the crown.

L	W1	W2	H
86	93	81	47



Fig. 2. - *Deinotherium giganteum* from fluvial deposits of the Zapadna Morava River in Adrani, near Kraljevo (central Serbia). Labial views of left M3 presented in the text.

## COMPARISONS AND CONCLUSIONS

The family *Deinotheriidae* is an extinct proboscidean group that most likely evolved directly from a primitive *Moeritherium*-like ancestor (Kemp 2005). Its representatives originated in Africa in the Late Oligocene and dispersed across Europe and southwest Asia during the Early Miocene (ca.

18 m.y.a.), where they survived until the Pliocene. Huttunen (2002) accepts two genera as valid at present: *Prodeinotherium* and, the larger and younger, *Deinotherium*. Although over thirty *Deinotheriidae* species have been described, according to Huttunen (2002) only six are considered valid today: *P. hobleyi*, *P. bavaricum* (from Europe), *P. pentapotamiae*, *D. bozasi*, *D. indicum* and *D. giganteum* (from Europe). Many authors have argued against separate specific status for *D. gigantissimum* (Stefanescu, 1894), and consider it to be a large-sized variety of *Deinotherium giganteum*. Nonetheless, *D. gigantissimum* could be in fact a valid species and its specific mandibular shape morphology points in that direction (Markov 2008).

Representatives of three deinotherid species that originated from Miocene and Pliocene are recorded in Serbia: *P. bavaricum*, *D. giganteum* and *D. gigantissimum* (Pavlović 1998). A usual diagnostic feature for the determination of *Deinotherium* species is the size of teeth (Göhlich & Huttunen 2009). Maximal antero-posterior length of the tooth is greater than maximum values for *P. bavaricum*, but smaller than *D. gigantissimum*, and falls within the variation range (78-94 mm) of Western European *D. giganteum* specimens (Belokrys 1960). Based on the teeth size, *Deinotherium giganteum* represents the most appropriate taxonomical designation. This is not the first find of this species from the municipality of Kraljevo - left p4-m3 were found in Ravanica near Kraljevo, Gledić mountains (see Fig. 1).<sup>1</sup> There are also finds of teeth from Resnik near Kragujevac for example, numerous finds from Vračević near Lazarevac, finds from Svilajnac, and many others. They confirm the presence of this species' representatives (Laskarev 1948, Petronijević 1956, Pavlović 1994). Since there are no finds of the same tooth in the vicinity of Kraljevo, direct comparisons were not possible. The only other M3 (right) find from Serbia comes from the site of Medjuhana.<sup>2</sup> Representatives of *D. giganteum* have been recorded in the literature from Middle Miocene to Pliocene (Göhlich & Huttunen 2009, Pavlović 1998). Since we do not have biostratigraphic data for the region, we can only date the fossil to this broad time period. Given that the trend towards larger teeth size during Miocene culminated in the Late Miocene/Pliocene (Huttunen 2002), perhaps the Middle Miocene date is the more appropriate for the fossil, since it is at the middle of the size range.

Remains of other Tertiary proboscideans are also known from the Kraljevo region. From the *Gomphotheriidae* family, *Tetralophodon longirostris* (Kaup, 1832) is reported from Godačica, near Ravanica on the

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<sup>1</sup> Original of the fossil is kept in the Natural History Museum in Belgrade.

<sup>2</sup> Pavlović (1969) assigned Medjuhana fauna to lower Sarmatian stage of the Middle Miocene.

Gledić Mountains (abovementioned site) and *T. longirostris/arvernensis* (Croizet and Jobert) from Miločaj, which could be dated to the Lower Pliocene (Pavlović 1998). According to Göhlich and Huttunen (2009) there is enough evidence for a sympatric coexistence of *D. giganteum* and *T. longirostris* in the early Late Miocene of Europe, but representatives of these species probably occupied different ecological niches within a woodland. Based on the study of dental microwear, Calandra *et al.* (2008) suggested that *D. giganteum* and two *Gomphotherium* species did not compete for food resources.<sup>3</sup> *D. giganteum* probably browsed on dicotyledonous foliages, and ingested less abrasive food than *Gomphotherium* species. *Deinotherium* is generally correlated with an open forest or a woodland environment (Athanasidou 2004), which probably existed during Miocene time in the area that Kraljevo represents now. It would be interesting to compare dental microwear patterns of proboscidea molar finds near Kraljevo as a part of a future study.

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<sup>3</sup> They studied cheek teeth of *D. giganteum*, *G. subtapiroideum* and *G. steinheimense* from the middle/late Miocene of the Molasse Basin in southern Germany.

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## ***DEINOTHERIUM GIGANTEUM* ИЗ АДРАНА, ЦЕНТРАЛНА СРБИЈА**

БИЉАНА ЧКОЊЕВИЋ, ПРЕДРАГ РАДОВИЋ

### РЕЗИМЕ

У раду је описан фосилизовани зуб представника врсте *Deinotherium giganteum* који се чува у Народном музеју у Краљеву. Пронађен је приликом експлоатације песка из речних наноса Западне Мораве код села Адрани у околини Краљева (централна Србија).