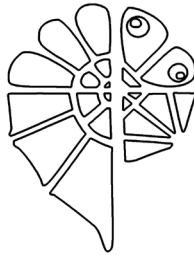


Bulletin

of

the Natural History Museum in Belgrade



Natural History Museum Belgrade, 2008
Volume 1

ISSN 1820-9521

Geology

**RODENTS OF MIDDLE MIOCENE LOCALITIES
OF LAZAREVAC VILLAGE AND BELE VODE
(CENTRAL SERBIA)**

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The dental remains of rodents from two localities - Lazarevac village and Bele Vode in Central Serbia - are used to determine the age of the sediments and to reconstruct the paleoecology of the habitat. The species recorded at Lazarevac village are *Spermophilinus bredai*, *Miopetaurista dehmi*, *Cricetodon meini*, *Megacricetodon minor*, *Democricetodon mutilus* and *Miodyromys aegercii*; species from Bele Vode are *Cricetodon meini*, *Democricetodon mutilus* and *Miodyromys aegercii*. The rodents' assemblages can be placed in MN6.

Key words: Rodentia, MN6, Central Serbia

INTRODUCTION

Early in the year 2001, the Natural History Museum in Belgrade was notified of the discovery of fossil bones of a large mammal within the area of Lazarevac village, situated northeast of Trstenik. The team of geologists from the Museum immediately visited the site where the owner of the plot had discovered the remains while he was excavating sand needed for the cultivation of fruit tree saplings. After a preliminary

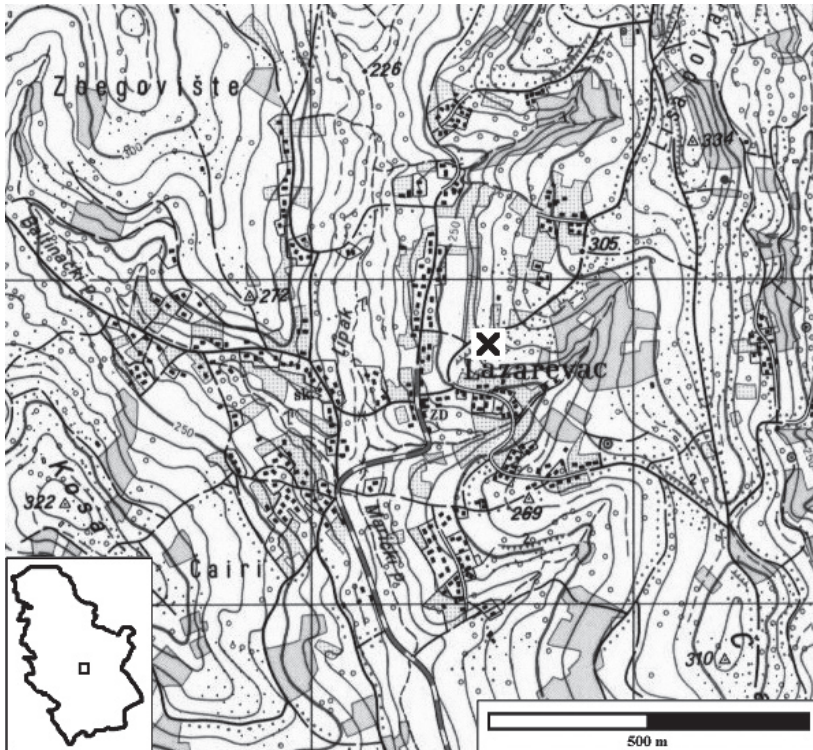
check it was obvious that the bones are from a proboscidean mammal. The complete identification was performed after the animal was excavated by Marković *et al.* (2004a) and it showed that this specimen belonged to *Deinotherium giganteum*. Although much damaged during the mechanical excavation of sand by the land owner, the remains of the skull and postcranial skeleton were conserved *in situ*. During later visits to the site, large samples of surrounding sediment were collected and sieved in the Museum in order to recover any faunal elements that could be used to determine the bio-stratigraphic position of this site more precisely. Over 200 fossil elements of various species were extracted from the sieved sediment. They belong to fish (scales, teeth and vertebra), amphibians (long bones and vertebra), reptiles (skin plates and vertebra), birds (claws, parts of skull, hollow long bones) and small and large mammals (toe bones, long bones and teeth).

POSITION AND GEOLOGY OF THE SITE

Lazarevac

This site is situated in the strata belonging to the Jasika-Drenovac part of the Kosovian-Congerian series, lying over the Crnišava-Čair sandstone series (Eremija & Pavlović 1977) (Map 1). The excavation pit is in the outcrop of sandstones and sands. The layers show a slope of 20 degrees eastward, and further east they are covered by grey clays (which are part of the brackish sandstone series) (Fig. 1b, 1d). In certain parts the sand layers are represented as whitish and light yellow sandy limestone. This limestone contains no mollusk remains but does contain numerous very well-preserved ostracodes. Petković (1926) concluded, on the basis of the presence of *Mastodon (Zigolophodon) tapiroides* and *Mastodon longirostris* from Karanovčić and Parcani (two villages in the immediate vicinity of Lazarevac at the northern rim of the Kruševac basin), that sands in this area are coastal equivalents of the Lower Sarmatian clay from the inner area of Kruševac. The sands are whitish in color and contain quartz and undamaged pieces of crystalline schist. They are laid over the clays or alternate with them. Fauna of mollusks (Dolić 1981): *Congeria* cf. *socialis* Kochansky, *C.* cf. *pilari* Kochansky, *Melanopsis* div. sp., *Neridonta* sp., *Prososthenia*

sp., *Hydrobia-Nematurella?* sp., *Kosovia* sp. nov., *operculum* indet., fish teeth and ostracodes were all extracted from the sediments laid above the conglomerates, sandy and coaly clay and sands, in the immediate vicinity (Mala Kruševica village) during the preparation of the basic geological map (OGK) (Fig. 1a).



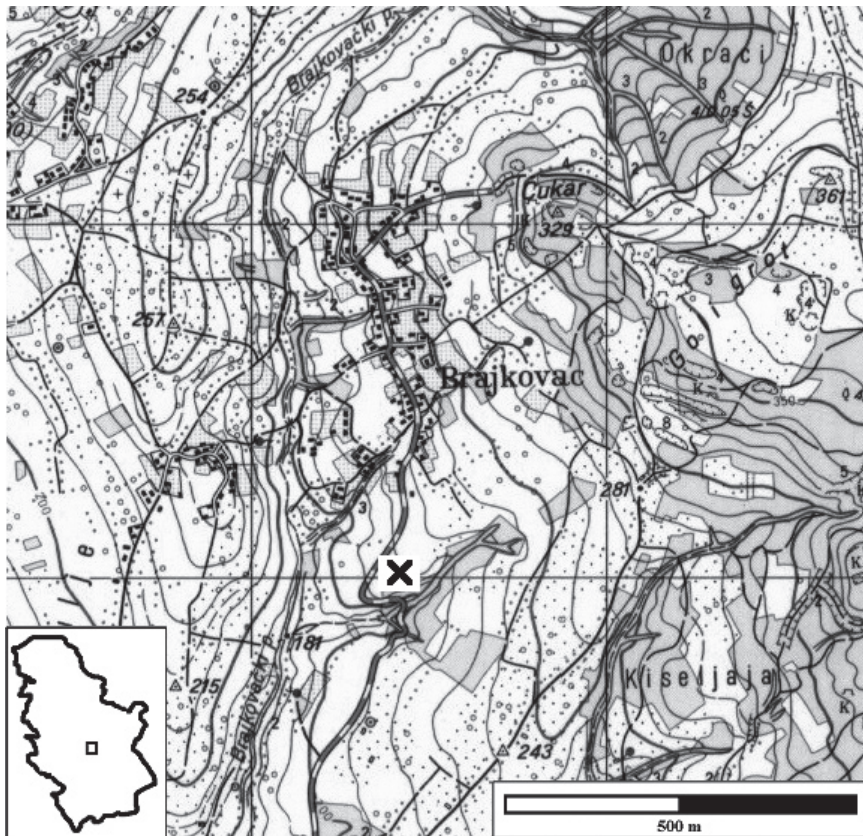
Map 1. - Geographic position of the site within Lazarevac village (GPS coordinates: 43° 40' 26" / 21° 09' 35") (detail from OTK, 531-3-2, 1: 25 000).

Bele Vode

In contrast to Lazarevac, the profile of the sand pit, the site for fossil micromammals at Bele Vode (Map 1; a few km south-east from Lazarevac), shows a poor differentiation of layers (Fig. 1c). Sands from Bele Vode have slightly larger grains than in Lazarevac and at first sight seem completely sterile in vertebrate fossil remains. However, quite a good number of remains were collected from a rather small sample of sediment (induced by the discovery of a fragment of a long mammalian bone), indicating that further excavations at this site are justified.

MATERIAL AND METHODS

The material used for analysis in the paleontological part of this paper includes 20 isolated rodent teeth from the two localities, Lazarevac village and Bele Vode. They were collected from the sieved sediment (200 kg from Lazarevac and 40 kg from Bele Vode) by using a set of vibro-sifters of various meshes.



Map 2. - Geographic position of the site in the vicinity of Bele Vode (GPS coordinates: 43° 38' 28" / 21° 11' 50") (detail from OTK, 531-3-2, 1: 25 000).

Residue was separated by hand or, in the case of the finer-grained sediment, by using a binocular microscope. After the separation, the dental material was cleaned in the ultrasonic tub in order to remove all impurities. The teeth were photographed using a digital camera Olympus Z4001 mounted with an adaptor to a Carl Zeiss binocular microscope

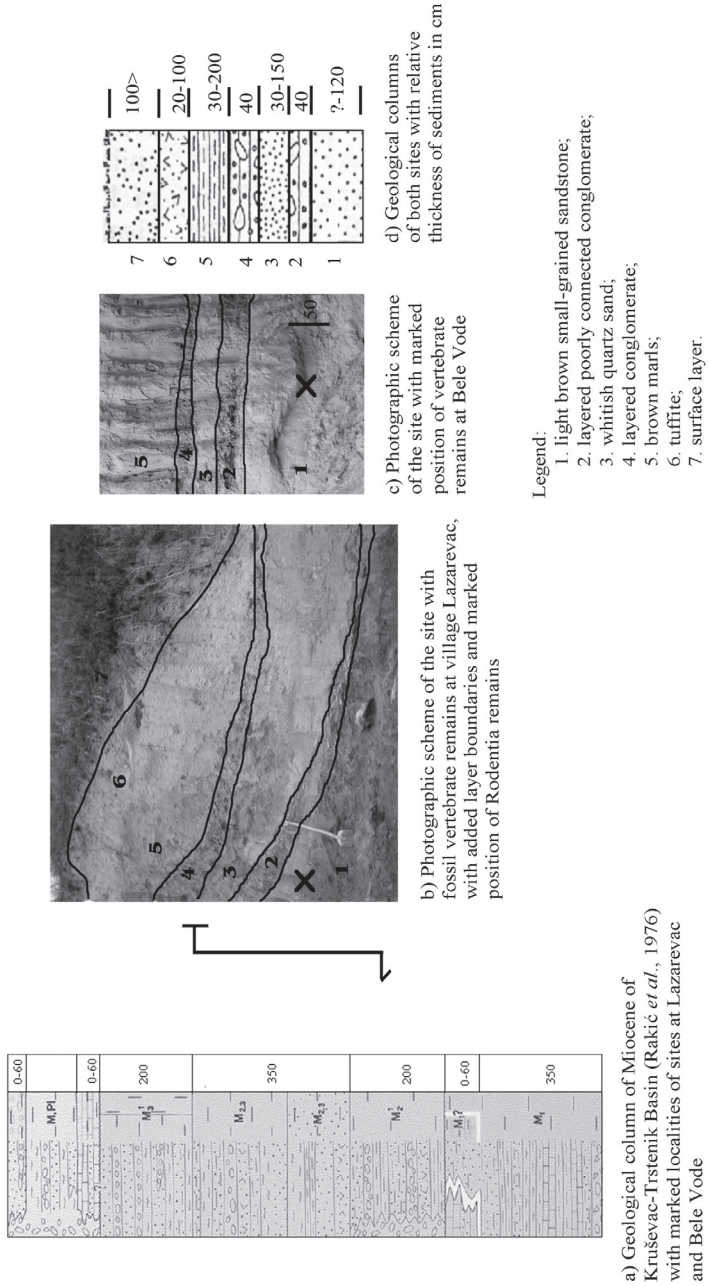


Fig. 3: Geological presentation of the sites at Lazarevac village and Bele Vode

Fig. 1. - Geological presentation of the sites at Lazarevac village and Bele Vode.

with a specially constructed movable holder. Photographs were processed by using the computer program Corel PHOTO-PAINT 10. Measurements were made by using the movable ruler on the binoculars and a special manual ruler at the IVAU (Institute of Earth Sciences Utrecht University). The results were checked through the computer program Image Tools 3.0. A scale is included in each picture and table. The teeth were compared with the material in a comparative collection of dental remains of Tertiary small mammals at the Paleontology/Stratigraphy unit of the IVAU.

In tables and figures all the teeth are presented from the left. The reversed objects are stated by an underlined letter or number in the picture or table. Each tooth has its own inventory number in the Collection of Tertiary small mammals (TVSM) which is preceded by a collector's number separated with slash (/). The teeth were described according to common nomenclature. The measurements are in 0.01 mm units.

PALEONTOLOGICAL PART

Family **Sciuridae** Fischer de Waldheim 1817

Subfamily **Xerinae** Osborn 1910

Spermophilinus De Bruijn & Mein 1968

Spermophilinus bredai (von Meyer 1848)

(Fig. 2a)

1967 *Sciurus* sp. (cfr. *bredai*) – Petronijević: 46-47, Tab. V, sl. 1a, c.

1968 *Spermophilinus bredai* – De Bruijn & Mein: 84-89

1972 *Sciurus bredai* – Engesser: 161-163, Abb. 56, Fig. 1, 2

1975 *Spermophilinus bredai* – Daxner-Höck: 66-68, Taf. 9, Fig. 1-10

1988 *Spermophilinus bredai* – Cuenca Bescós: 84-87, Lám. 2, Fig. E.

2003 *Spermophilinus bredai* – De Bruijn *et al.*: 53, Pl.1, Fig. 10-15

Lazarevac: Material: 1M3 (length: 18.3 – width: 17.7)

M3 – The anteroloph is joined with the paracone and protocone. The anterocone is somewhat weakly developed. The anterosinus is closed. The protoloph connects the protocone with the paracone. The paracone and hypocone are joined by a broad, low cingulum. The labial side of the sinus is wide and open. The posteroloph is short on the labial side and has cusps on its lingual side. The sinus has cusps and lophes in the posterolabial and labial part of the tooth.

Subfamily **Pteromyinae** Brandt 1855
Miopetaurista Kretzoi 1962
Miopetaurista dehmi De Bruijn *et al.* 1980
 (Fig. 2b)

1980 *Miopetaurista dehmi* - De Bruijn *et al.*: 251-253, Pl. 3, Fig. 1-7

1986 *Miopetaurista* cf. *dehmi* - Ziegler & Fahlbusch, 1986: 27-28, Abb. 16; Taf. 5, Fig. 1-12

1998 *Miopetaurista* aff. *dehmi* – Daxner-Höck: 372-373, Taf. 1, Fig. 1-7; Abb. 4; Tab. 4

1998 *Miopetaurista dehmi* - De Bruijn: 104-105, Pl. 3, Fig. 1-5

Lazarevac: Material: 1m1 (length: 26.4 – width: 29.3)

m1 – The anterolophid runs down the front edge of the tooth from the metacone to the anterior base of the protocone, closing the anterosinusid. The anteroconid is weakly developed. The metalophulid is narrow. The mesoconid is joined to the metaconid but not to the entoconid; the mesosinusid is open. The sinusid includes the mesoconid, which is connected to the protoconid and the hypoconid through lophids. The posterolophid encloses the whole posterior edge of the tooth. The mesosinusid is very rugose. The endolophid is missing.

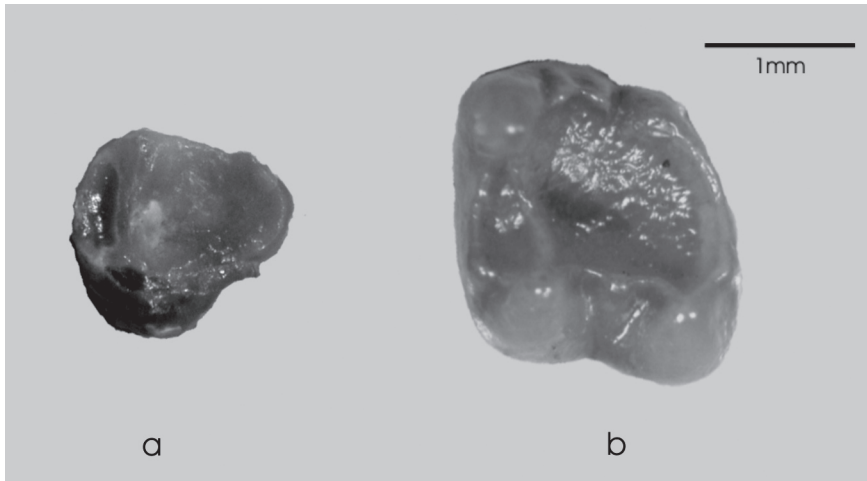


Fig. 2. - a) *Spermophilinus bredai* (von Meyer) from the village of Lazarevac: M3 (TVSM 1865/501); b) *Myopetaurista dehmi* De Bruijn *et al.* from the village of Lazarevac: m1 (TVSM 1865/514).

Family **Cricetidae** Rochebrune 1883***Megacricetodon*** (Fahlbusch 1964)***Megacricetodon minor*** (Lartet 1851)

(Fig. 3a-b)

1994 *Megacricetodon minor* – Bolliger: 113, Abb. 2 b, l; Abb. 3; Tab. 32001 *Megacricetodon minor* – Kálin & Engesser: 32-37, Abb. 30-31; Tab. 14-382003 *Megacricetodon minor* – Lengkeek: 2-23, Tab. 1-4; Diag. 1-3

Lazarevac: Material: 1M1 (length: 14.9 – width: 9.4), 1M3 (length: 8.0 – width: 7.4).

M1 – This tooth has a massive prelobe. The cusps are defined by a lowered area on the prelobe. The lingual cusp is smaller; from this cusp runs the anterolophule with a hardly noticeable widening at sinus level, towards the protocone. The lingual anteroloph is low and connected to the small protostyle. The labial anteroloph is short, ending in the labial edge of the anterosinus. The protolophule I is missing. The protolophule II joins the entoloph near the posterior arm of the protocone. A long mesoloph connects the small triangular mesocone with the triangular mesostyle. The metalophule I is absent. The lingual edge of the sinus has a low ridge between the protocone and the hypocone. The posteroloph is spur-shaped and does not close the narrow posterosinus. The metalophule II is connected with the posterior arm of the hypocone.

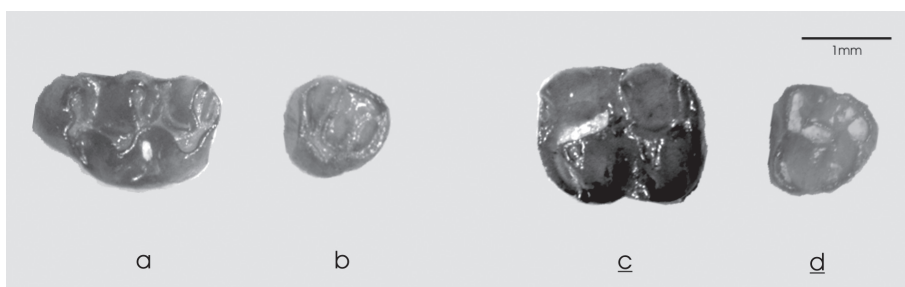


Fig. 3. - a) *Megacricetodon minor* (Lartet) from the village Lazarevac: M1 (TVSM 1865/516); b) M3 (TVSM 1865/506); c) *Democricetodon mutilus* (Fahlbusch) from the village Lazarevac: m2 (TVSM 1865/512); d) M3 (TVSM 1865/520).

M3 – The anterocone is dominated by the labial anteroloph. It starts at the wide anterocone which is placed lingually and reaches

toward the slightly raised paracone which is the only one clearly cusp-shaped. The other cusps are at loph level and are not pronounced. The lingual anteroloph is almost lacking, so the labial anterosinus is the only closed one. The front arm of the protocone is particularly well-developed and joins the protocone with the paracone. The mesoloph starts at the endoloph and reaches into the wide mesosinus. There it splits into two arms with the posterior arm connected to the posteroloph, closing the posterosinus. Along the labial edge, from the paracone to the posteroloph, there is a cingulum closing that side of the tooth. The sinus is only slightly marked.

Democricetodon (Fahlbusch 1964)

Democricetodon mutilus (Fahlbusch 1964)

(Fig. 3c-d, 6b)

1964 *Democricetodon*(*Democricetodon*) *affinis mutilus* – Fahlbusch: 36-44, Abb.2b, 20-21, 23-27; Taf.2, Fig. 23-26; Taf.3, Fig. 1-23

1982 *Democricetodon mutilus* – Wu: 47-49, Abb.3, Abb.4, Fig. 1-11; Abb.5, Fig. 1-10

1993 *Democricetodon mutilus* – Schötz: 159-162, Abb.1,2,4; Taf.3, Fig. 1-28

1995 *Democricetodon mutilus* – Heissig: 92, Abb.2, Fig. g; Abb.3, Fig. g; Abb.4, Fig. c; Abb.5, Fig. d

2003 *Democricetodon mutilus* – Daxner-Höck, 271-272; Tab.4, Pl.2, a-i
Lazarevac: Material: 1m2 (length: 22.7 – width: 17.5), 1M3 (length: 16.1 – width: 15.7)

Bele Vode: Material: 1M2 (length: 15.3 – width: 13.6)

m2 – Both anterolophids are developed. The lingual one reaches the anterolingual base of the metaconid and closes a small anterosinusid. The labial one forms a long curve toward the labial base of the protoconid. The anteroconid is small and connected to a short metalophulid and a narrow anterolophulid which is poorly defined. The mesolophid is narrow and straight and joins the base of the metaconid on its labial curve in the mesosinusid. The posteromesosinusid is open. The hypolophulid is short and reaches all the way to the ectolophid connecting with the anterior arm of hypoconid. The sinusid is wide open with a small ectostylid. A small hypoconid arm is directed towards the middle of the arch-like posterosinusid. The posterolophid is spur-like and has a small

labial part that forms a slight indentation between the lophid and the hypoconid. The posterosinusid is closed.

M2 – The lingual anteroloph is long. It slowly decreases in size in front of the lingual part of the anterosinus towards the lingual base of the protocone. The labial part of the anteroloph also decreases in size but it still closes the anterosinus at the labial part of the tooth. The anterolophule is narrow, straight and connected to the anterior arm of protocone and paracone. The posterior arms of these cusps are joined with the endoloph, closing a small ellipse-shaped mesosinus at the base of the labial edge of protocone. The endoloph is long, reaching the anterior arm of hypocone and metaloph. The mesoloph is thin and long, reaching all the way to the small mesocone at the labial edge of the mesosinus at the posterior base of the paracone. The mesocone divides the mesosinus into a posterior and an anterior part. The posterior part is completely open. The lingual sinus is closed with a cingulum wall. This sinus is particularly wide. The posterosinus is open as the posteroloph does not reach the metacone.

M3 – The anterocone is formed out of two well-developed anterolophs which close the anterosinuses and of a short anterolophule that starts from the middle part of the anterocone in the direction of the protocone. From the point of their coalescence a narrow front arm of the protocone reaches toward the paracone, closing the anterosinus. The endoloph is joined with the protolophule by a broad cingulum. The sinus is wide and open with a minuscule endostyle. The mesoloph is posteriorly directed towards the very small metacone. The mesosinus and posterosinus are closed by ecto- and protoloph. Among the cusps the protocone is the dominant one.

Subfamily **Cricetodontinae** Stehlin et Schaub 1951

Tribe Cricetodontini Simpson 1945

Cricetodon Lartet 1851

Cricetodon meini Freudenthal 1963

(Tab.1; Fig. 4a-e, 6a)

1925 *Cricetodon sansaniense* – Schaub: 8-13, Taf. I, Fig. 1; Taf. III, Fig. 1.

1963 *Cricetodon meini* – Freudenthal: 121-124, Fig. 29, Fig. 31; Taf. I, Fig. 19

1967 *Cricetodon sansaniensis* – Petronijević: 51-52, Tabla IV, sl. 2-5.

1971 *Cricetodon meini* – Mein & Freudenthal: 7-25, Pl. 1, Fig. 1-12; Pl. 2, fig. 1-11; Pl. 3, fig. 1-13

1972 *Cricetodon meini* – Engesser: 282-295, Abb. 115, Fig. 12

1993 *Cricetodon meini* – De Bruijn *et al.*: 205-206, Pl. 17, Fig. 1-6, 1a-6a

2003 *Cricetodon meini* – Daxner-Höck: 274-279, Tab. 6-7, Pl. 3, a-h
Lazarevac: Material: 1m1, 1m2, 1M1, 2M2, 2M3;

Bele Vode: Material: 1M3 (length: 19.2 – width: 18.1)

Table 1. - Dimensions of teeth of *Cricetodon meini* Freudenthal from the village of Lazarevac.

Tooth	Range	Medium value of length	No. of measured teeth	Medium value of width	Range
m1	-	22.90	1	14.30	-
m2	-	18.70	1	14.80	-
M1	-	25.50	1	16.80	-
M2	19.7 – 21.2	20.45	2	17.45	17.1 – 17.8
M3	17.7 – 18.1	17.80	2	16.70	16.5 – 16.9

m1 – The anteroconid has only one cusp, circular in shape. On the labial side a short anterolophulid reaches into the lingual anterosinusid. The lingual anterosinusid is open, wide and deep. The labial anterosinusid is also open, wide and deep. The anterolophulid is straight and short, directly connected to the protoconid. The protoconid is also connected to the posterior arm of the metaconid. The ectolophid is wide, lacking the mesolophid. It becomes broader just before it joins the hypolophid, which is short. Mesosinusids are open, wide, lacking conids. There is a posterolophid leading from the hypoconid to the lingual base of the entoconid, but it does not close the posterosinusid. The posterolophid is not spur-shaped.

m2 – The labial anterolophid closes the protosinusid with a wide abraded protoconid. The lingual anterolophid is lacking. The metaconid is connected to the protoconid with a wide metalophid. The mesolophid is present only as a cusp on the ectolophid. The hypoconid is wide. From its anterior arm the hypolophid is directed towards the entoconid. The posterolophid is spur-shaped and does not close the posterosinusid. The sinusid was closed by abrasion. The mesosinusid is open.

M1 – The anterocone is represented by two joined heart-shaped cusps separated by a slight frontal depression. The anterolophs are short, insignificant and drop immediately into the sinus. The protosinus is long and open. The anterolophule is long with short lingual and labial ridges. The anterosinus is closed by a triangular parastyle connected to the base of the paracone. The paracone is also triangular with a short posterior arm. The endoloph starts labio-posteriorly, and joins the protoloph and continues to the hypocone. There is a short mesoloph and a hint of entomesoloph that drops into the anterior slope of the metacone. The sinuses are open. The ectoloph is short and directed toward the mesoloph. The hypocone is trapezoid in shape and connected to the metacone. The posteroloph is short and connected to the posterior side of metacone. The tooth is still imbedded in a maxilla fragment.

M2 – The lingual anteroloph is directed parallel with the edge of the tooth but it does not close the anterosinus. The labial one sinks very quickly into the anterolabial base of the protocone, closing the small protosinus. The anterolophule is short and wide. All the sinuses are open. A small ectoloph starts from the paracone. The endoloph is long and wide. The mesoloph is only slightly hinted at. The posteroloph is very short.

M3 – The lingual anteroloph is well-developed. It is arch-shaped, descending toward the anterolabial base of the paracone, forming an oval-shaped protosinus. The lingual anteroloph is more robust. It reaches the lingual base of the front side of the paracone. The protocone is connected to the anteroloph at the central part with a short anterolophule. The anterosinus is long and arch-shaped. The protocone is large and its posterior arm is directed toward the sinus, which has a cingulum with an endostyle on its labial part. The paracone is higher than the other cusps. The strongly developed protolophule is joined with the posterior part of the protocone, with a transversal direction and posterior curve. At the place of contact a mesocone is present, from which a mesoloph connects with the lingual edge of the tooth. The metacone is not developed but included within the posteroloph, which starts at the triangular hypocone. The lingual base of the hypocone includes a cusp-like cingulum. The ectoloph reaches the mesoloph, closing a square-shaped anteromesosinus. The posteromesosinus is oval and elongated. The tooth has three roots.

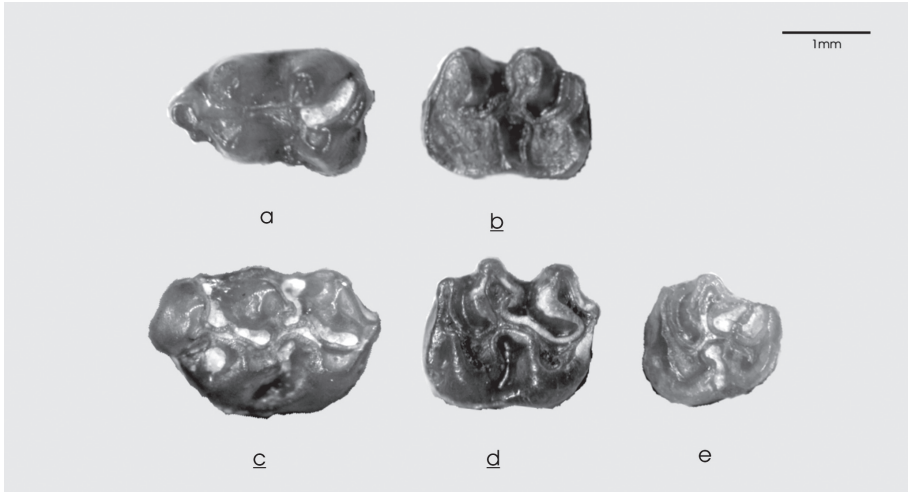


Fig. 4. - *Cricetodon meini* Freudenthal from the village of Lazarevac: a) m1 (TVSM 1865/518); b) m2 (TVSM 1865/506); c) M1 (TVSM 1867/515); d) M2 (TVSM 1865/502); e) M3 (TVSM 1865/517).

Family **Gliridae** Thomas 1897

Subfamily **Myomiminae** Daams 1981

Miodyromys Kretzoi 1943

Miodyromys aegercii Baudelot 1972

(Fig. 5a-b, 6c)

1950 *Dryomys hamadryas* – Stehlin & Schaub: 300-302, Fig. 517

1972 GLIRIDE VIII – Engasser: 227-230; Abb. 84; Falt. 2, Fig. VIII

1981 *Miodyromys* aff. *aegercii* – Engasser *et al.*: 935-936; Fig. 24-25.

1990 *Miodyromys* aff. *aegercii* – Wu: 75-81, Abb. 4-6; Taf. 3, Fig. 1-17

Lazarevac: Material: 1m1 (length: 12.4 – width: 11.6), 1M1 (length: 10.4 – width: 12.6)

Bele Vode: Material: 1M3 (length: 8.5 – width: 11.0)

m1 – A square-shaped tooth. The anterolophid is concave toward the posterior side. It closes the anterosinusid together with the curved metalophid. The centrolophid reaches the last third of the mesosinusid but does not touch the other lophids. At the front part of the mesosinusid, between the metalophid and centrolophid, there is a small ellipsoid-shaped extralophid. The mesolophid is as strongly developed as the posterolophid. The conids are prominent. The posterosinusid that includes the long posteroextralophid is open at the labial side.

M1 – This is a rectangular tooth situated on a maxilla. The anteroloph is joined with the centroloph in the area of the paracone. The centroloph is short and disappears before the middle of the tooth. The protoloph is joined with the posterior first extraloph near the protocone. The metaloph is parallel with the extraloph. The posterior centroloph is longer than the anterior one, but neither of them has contact with any of the lophs in the mesosinus. The posterior extraloph starts below the metacone, freely, from the posterior part of the mesosinus. The posterosinus is closed by the long metaloph and the posteroloph.

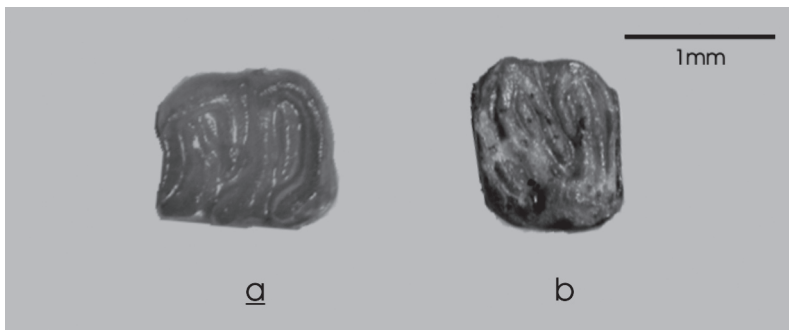


Fig. 5. - *Miodymys aegercii* Baudelot from the village of Lazarevac: a) m1 (TVSM 1865/510); b) M1 (TVSM 1865/513).

M3 – The anteroloph goes down the whole anterior side of the tooth, which is much longer than the posterior one. It is connected to the hypocone with its wider lingual part, while its labial side is touching the paracone. The protoloph is straight and directly connects the protocone and the paracone. The anterior centroloph descends into the mesosinus almost to the endoloph. The posterior centroloph is short and thin. The metaloph joins the hypocone and the metacone directly. The posteroloph does not touch the metacone. The tooth has six lophs.

Comment: Records of teeth belonging to *Spermophilinus bredai* are very common in the Tertiary sediments of Europe. The oldest specimens are from the Early Miocene (MN4) of Central Europe (De Bruijn *et al.* 1992), while the youngest ones (MN13) are from Anatolia (De Bruijn, 1995). This long time range of *Spermophilinus bredai* is also known from sites in Serbia - Sibnica 1 (MN4), Sibnica, (MN6), Vračevići (MN7+8) and Tavnik (MN9). *Spermophilinus bredai* remains from Lazarevac have dimensions similar to those from MN5 and MN6 from Central Europe (Ziegler & Fahlbusch, 1986).

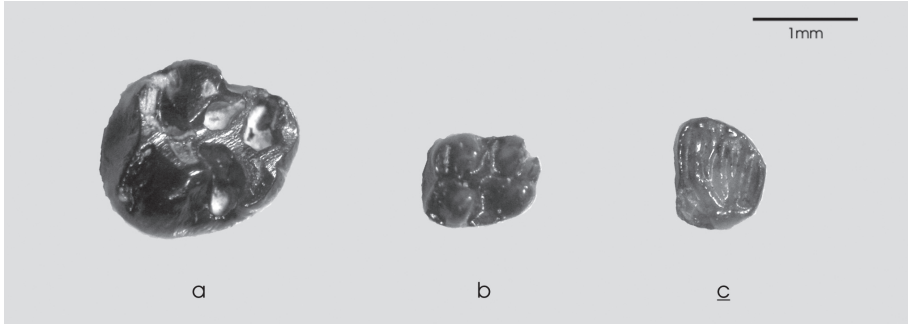


Fig. 6. - a) *Cricetodon meini* Freudenthal from Bele Vode: M3 (TVSM 1897/523); b) *Democricetodon mutilus* Fahlbusch from Bele Vode: M2 (TVSM 1897/522); c) *Miodyromys aegercii* Baudelot from Bele Vode: M3 (TVSM 1897/524).

The teeth of *Myopetaurista dehmi* from Lazarevac have the characteristic absence of endolophids and hypoconulids, and closed anterosinusid, as well as the well-developed conids of the genus. The pronounced rugose character of the sinusids is less than in *M. (Cryptopterus) gaillardi* (Engesser 1972) and *M. (Sciuropterus) lappi* (Mein 1970). Dimensions of the teeth in *Miopetaurista dehmi* are about 30% smaller than in *Miopretaurista lappi*. The latter has also a less pronounced rugose character (De Bruijn *et al.* 1980).

The dimensions of the teeth of *Megacricetodon minor* are much like the dimensions of molars of the same species from Nebelbergweg (Kälin & Engesser 2001). The specimens from the reference material (Bolliger 1994; Kälin & Engesser 2001; Lengkeek 2004) also lack the anteromesolophids and the anteromesolophs, which is the basic characteristic of *Megacricetodon minor*.

The short wide anteroconid in m1, the compressed short labial arm of anterolophid, and the narrow anterocone placed in a pronounced labial position are all primitive characteristics of cricetine rodents, separating the *Democricetodon mutilus* from the other representatives of *Democricetodon* known from sites in Serbia.

Cricetodon meini is a widely-distributed species in the Miocene sediments of Central and Southern Europe. The specimens from Lazarevac and Bele Vode match those from the reference specimens (Schaub 1925; Freudenthal 1963; Mein & Freudenthal 1971; Engesser

1972; De Bruijn *et al.* 1993; Daxner-Höck 2003) both in dimensions and in molar morphology.

The larger size of *Miodyromys aegercii* from Lazarevac and Bele Vode sets it apart from the other Middle Miocene species *Miodyromys hamadryas*, which also has fewer additional lophs.

DISCUSSION

Ecological characteristics of rodent fauna of the sites at Bele Vode and Lazarevac village must be included in grassland (savannah) subtropical biotope, considering that they are present in localities such as Sibnica (Petronijević 1967), Mala Miliva and Prebreza (Pavlović 1992; Jovanović *et al.* 2002), Brajkovac (Marković & Pavić 2004) and Lazarevac (Marković *et al.* 2004a). This picture is consistent with the fauna of large mammals of savannah areas and drier fringes of subtropical forests (hyenas, pigs, antelopes, gazelles, giraffes) and reptiles from these sites.

The results of analysis of Miocene faunas of Southeastern Europe according to diet (Fortelius *et al.* 1996) show a sudden increase in the number of forms grazing or browsing low herbaceous vegetation at the turning point from Badenian to Sarmatian. The highest peak was reached in the Sarmatian (MN 7/8).

Spermophilinus bredai, *Miopetaurista dehmi*, *Cricetodon meini*, *Megacricetodon minor*, *Democricetodon mutilus* and *Miodyromys aegercii*, from Bele Vode and Lazarevac village, are characteristic of mammal faunas of zone MN5 and MN6 in Europe and Anatolia. These sites are Sansan in France (Baudelot 1972), Sandelzhauzen in Germany (Fahlbusch 2003), and Paşalar (Sümengen *et al.* 1990; Ünay *et al.* 2003; De Bruijn *et al.* 2003) and Çandır in Anatolia (Peláez-Campomanes & Daams 2002). At the site in Lazarevac village (Marković *et al.* 2004a) there are also specimens of large mammals belonging to zone MN6 (previously called “štajerska” - “Styrian” (Petronijević 1967; Pavlović 1970; 1992) or “angustidens fauna” (Mitrović-Petrović *et al.* 1994)). The stratigraphic position of this zone is Middle Miocene (Middle to Upper Badenian).

CONCLUSION

During the field and laboratory studies preceding the paleontological processing of the fossil mammal remains from the Miocene sediments of Bele Vode and Lazarevac village, 20 dental remains of rodents were recovered. Six species were identified: *Spermophilinus bredai*, *Miopetaurista dehmi*, *Cricetodon meini*, *Megacricetodon minor*, *Democricetodon mutilus* and *Miodyromys aegercii*. All these species are common in rodent associations of Central Europe belonging to biostratigraphic zones MN5 and MN6. But, according to the accompanying large mammal and reptile fauna, representatives of subtropical, savannah areas from this and surrounding sites, it belongs to MN6.

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ГЛОДАРИ СРЕДЊЕГ МИОЦЕНА ЛОКАЛИТЕТА СЕЛО ЛАЗАРЕВАЦ И БЕЛЕ ВОДЕ (ЦЕНТРАЛНА СРБИЈА)

ЗОРАН МАРКОВИЋ

Р Е З И М Е

Одонтолошки остаци глодара, сакупљени на два локалитета у селу Лазаревац и Беле Воде (централна Србија) употребљени су за детерминацију старости седимената и палеоеколошку реконструкцију станишта. У селу Лазаревац, одређени су представници врста *Spermophilinus bredai*, *Miopetaurista dehmi*, *Cricetodon meini*, *Megacricetodon minor*, *Democricetodon mutilus* и *Miodyromys aegercii*; у Белим Водама, заступљени су представници врста *Cricetodon meini*, *Democricetodon mutilus* и *Miodyromys aegercii*. Обе глодарске асоцијације могу бити сврстане у зону MN6.