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The Cricetodontini in the middle Miocene of the Pannonian Basin

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Abstract. The members of the tribe Cricetodontini are large sized cricetid-like rodents. They have primary importance in the biochronology of the nonmarine sediments and in the paleoclimatic/paleoecologic reconstructions. This paper presents an overview of the most important morphological characters and the biogeographical, biochronologic and palaeoecological relations of the representatives of the Cricetodontini tribe from the Badenian and Sarmatian stages of the Pannonian Basin.

Key words: Central Paratethys, continental biochronology, rodents.

Introduction

The cricetodontini (Rodentia) are common elements of the Miocene continental fossil record from Europe, Asia, and Africa. The species diversity and

the morphological plasticity are indicative of biostratigraphical and palaeoecological changes. The first representatives of the tribe are considered to be immigrants in Anatolia around the Oligocene-Miocene boundary (De Bruijn & Ünay 1996). The diversification and the expansion into Europe start later, at the time of the MN5 Zone.

In France and Spain, the study of Cricetodontini has a long tradition, since the 19th century (e. g., Lartet 1851). In sharp contrast, the study of this tribe in the Pannonian Basin begun only in the 1970's. The first Cricetodontini finds were unearthed in Comăneşti, Romania (Feru et al. 1980) and in Hasznos, Hungary (Kordos 1981, 1986).

New *Cricetodon* populations had been collected in Northern Hungary since the 2000s, at Litke (Hír 2013), Sámsonháza (Hír & Mészáros 2002), Mátraszőlős (Hír & Kókay 2004, 2011), Kozárd (Hír 2015), and Felsőtárkány-Felnémet (Hír 2007). Interesting new materials were found in Romania, at Tăşad (Hír et al. 2002) and Vărciorog (Hír et al. 2019). In Austria, Cricetodontini finds were published from the Badenian localities Mühlbach and Grund (Daxner-Höck 2003) and from the Sarmatian of Gratkorn (Prieto et al. 2010).

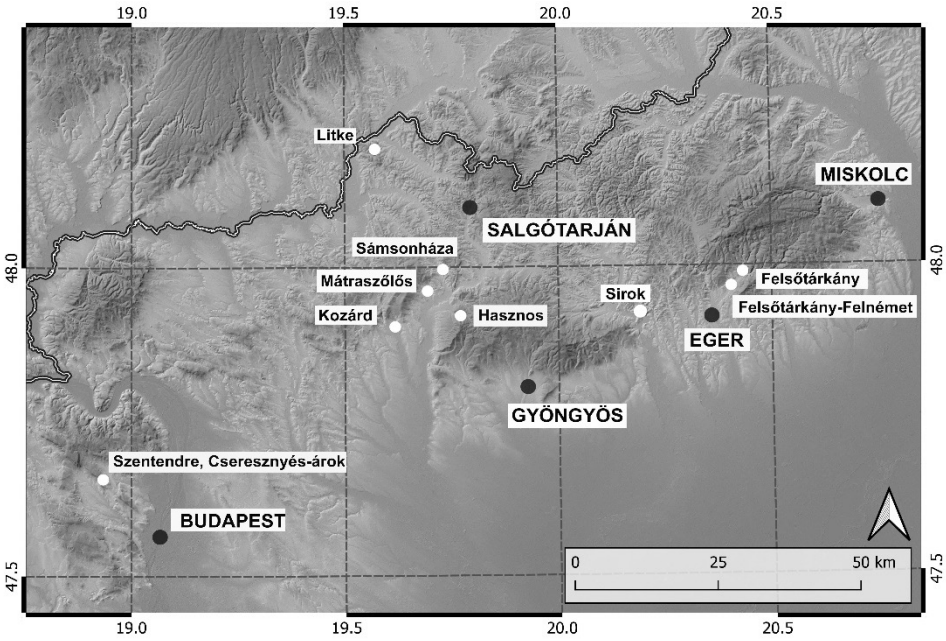

Fig. 1. Geographical position of the studied middle Miocene paleovertebrate localities in Northern Hungary.

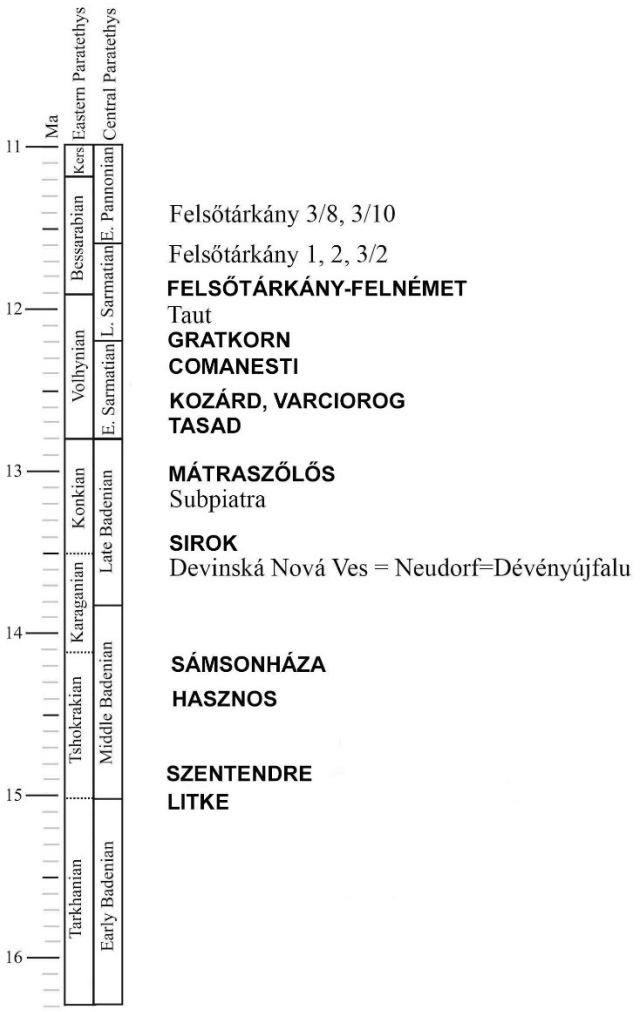

Fig. 2. Chronological position of the Middle Miocene paleovertebrate localities in the Pannonian Basin.

Methods

In the description of the occlusal surface of the molars we used the terminology of Mein & Freudenthal (1971) and Rummel (1998), with some modifications.

Abbreviations in the text:
M1-M2-M3: upper (maxillary) first, second and third molars
m1-m2-m3: lower (mandibular) first, second and third molars
L: maximal antero-posterior length of the occlusal surface (in mm)
W: maximal linguo-labial width of the occlusal surface (in mm)
No.: number of the studied molars
Min.: minimal value
Max.: maximal value
X: arithmetic average
SD: standard deviation
fr: fragment
Li: Litke
Sze: Szentendre
Ha: Hasznos
Sh 3: Sámsonháza 3
Si: Sirok
Msz: Mátraszőlős
Td: Tăşad
Var: Vârciorog
Koz: Kozárd
FF: Felsőtárkány-Felnémet

Systematic description

Family: Cricetidae Fischer, 1817
Subfamily: Cricetodontinae Simpson, 1945
Tribe: Cricetodontini Simpson, 1945
Genus: *Cricetodon* Lartet, 1851

Cricetodon meini Freudenthal, 1963, Litke, Hungary
Measurements (mm) of the *C. meini* molars from Litke 1 and Litke 2:

Li 1.	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	2	3	6	6	3	4	3	3	2	2	3	4
MIN.	2.95	1.87	2.22	1.87	1.85	1.77	2.42	1.50	2.2	1.7	2.25	1.7
MAX.	2.95	2.07	2.43	2.02	1.97	1.95	2.67	1.75	2.35	1.85	2.47	1.87
X.	2.95	1.963	2.31	1.94	1.91	1.86	2.53	1.60	2.27	1.77	2.25	1.82
SD.			0.071	0.055								

Li 2.	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	7	8	14	16	4	4	12	12	12	12	10	10
MIN.	2.6	1.8	2.12	1.8	1.85	1.7	2.17	1.45	2.2	1.77	2.25	1.7
MAX.	3.25	2.15	2.47	2.15	2.02	1.97	2.7	1.85	2.65	2.05	2.72	2
X.	2.95	1.96	2.30	1.95	1.93	1.81	2.49	1.63	2.44	1.93	2.43	1.83
SD.	0.207	0.115	0,086	0.1			0.104	0.069	0.093	0.087	0.098	0.084

The most important morphological characters:

M1. The anterocone is divided. The two units are separated by a shallow notch on the mesial surface. An arched anterior ectoloph is frequent (51%) on the posterior side of the labial anterocone. Lingual quersporn II is developed in 50% of the teeth. Protolophule I is absent. A short posterior ectoloph of the paracone is frequent. The mesoloph, entomesoloph, posteroloph, and posterosinus are absent. Four roots are developed.

m1. Anteroconid is centrally positioned. In lateral view the anteroconid is lower developed than the protoconid. The labial anterolophid is strong, it closes the protosinusid. Anterosinusid is open. Metalophulid I is rare, metalophulid II is more frequent (50%). Detailed description is given by Hír (2013).

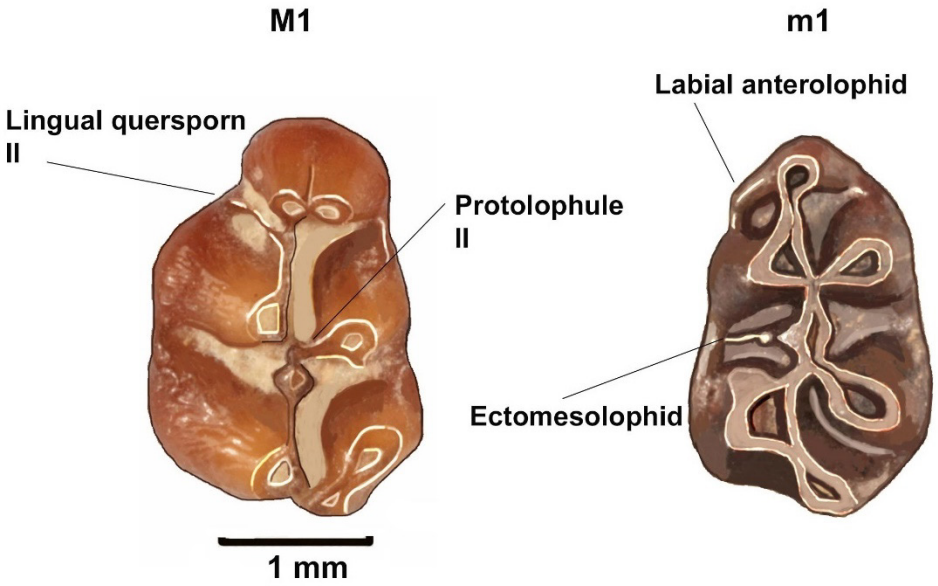

Fig. 3. Occlusal surfaces of *C. meini* M1 and m1 from Litke.

Remarks:

C. meini is the first *Cricetodon* that quickly migrated from Greece up to the Northern slopes of the Pyrenees. This species was reported from the Greek localities Komotini, Antonios, and Thymiana (Koufos 2006), the Serbian localities Paragovo, Bele Vode, Popovac, and Lazarevac (Marković & Milivojević 2010), the Austrian faunas Mühlbach and Grund (Daxner-Höck 2003), and from a series of localities in the Northern Alpine Foreland Basin and in France (Fortelius 2011). Interestingly, it does not reach the Iberian Peninsula. Litke is the first occurrence of the species in the Carpathian Basin. *C. meini* has an important biochronological value in the Northern Alpine Foreland Basin because the occurrences of the species are found directly below the „Brock horizon". The Brock horizon is the result of the Ries asteroid impact, and this is a characteristic marker horizon in that region. This event is dated as 14.9 Ma (Abdul Aziz et al. 2008).

Fig. 4. Geographical position of *C. meini* localities.

Cricetodon aureus Mein & Freudenthal, 1971, Szentendre, Hungary

Measurements (mm) of *C. aureus* molars from Szentendre, Cseresznyés-árok:

Sze	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	68	73	88	88	95	95	66	67	75	76	76	77
MIN.	2.97	1.87	2.25	1.72	1.82	1.69	2.47	1.55	2.35	1.75	2.32	1.75
MAX.	3.6	2.32	2.77	2.17	2.4	2.1	2.9	1.92	2.82	2.12	2.92	2.15
X.	3.23	2.06	2.52	1.99	2.11	1.88	2.68	1.74	2.58	1.95	2.63	1.91
SD.	0.099	0.070	0.091	0.065	0.09	0.059	0.091	0.060	0.083	0.070	0.083	0.064

The most important morphological characters:

M1. The anterocone is mainly divided. The two units are separated by a shallow notch on the mesial surface. An anterocone sporn of the labial anterocone is rare and short. Protolophule II is regular, protolophule I is absent. A lingual quersporn II is frequent (65%). The paracone posterior spur is short. The mesoloph is short or absent. The entomesoloph is mainly absent or short. There is a shallow impression on the anterior surface of the paracone and the metacone.

m1. The anteroconid is unicuspid. The labial anterolophid and the closed protosinusid are well developed. The lingual anterolophid is remnant or absent. The anterosinusid is open. The metalophulid II is regular, the metalophulid I is rare. The mesolophid is mainly absent, but there are some middle-developed specimens. The ectomesolophid is rare. The sinusid is closed by a cingulum. Detailed description is given by Hír & Venczel (2018).

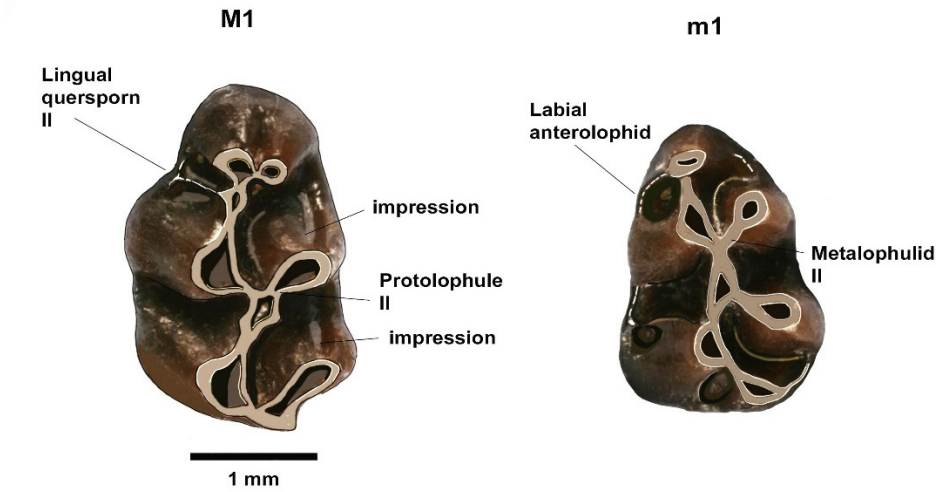

Fig. 5. Occlusal surfaces of *C. aureus* M1 and m1 from Szentendre.

Remarks:

Like *C. meini*, the biochronological value of *C. aureus* is proven in the Northern Alpine Foreland Basin. The occurrences of the species are found between the „Brock horizon" and the main bentonite horizon (Heissig 1997). The

age of the bentonite horizon is classified by Abdul-Aziz et al. (2008, 2010) as 14.55±0.19 Ma, but the new results of Rocholl et al. (2017) it is 14,925 ± 0.01 Ma. Szentendre is the Easternmost occurrence of the species. Up to the present *C. aureus* has not been reported from the Balkan and from Anatolia.

Fig. 6. Geographical position of *C. aureus* localities.

Cricetodon hungaricus (Kordos, 1986), Hasznos, Hungary

Measurements (mm) of *C. hungaricus* molars from Hasznos:

Ha	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	28	30	31	30	19	19	19	18	22	22	16	16
MIN.	3.17	2.25	2.32	1.85	2.0	1.87	2.42	1.67	2.37	1.8	2.5	1.75
MAX.	3.77	27	2.95	2.4	2.45	1.30	2.95	2.0	2.87	2.12	2.92	2.07
X.	3.62	2.22	2.65	2.1	2.26	2.02	2.42	1.8	2.72	1.99	2.74	1.91
SD.	0.11	0.054	0.098	0.119	0.099	0.01	0.124	0.062	0.071	0.075	0.107	0.093

The most important morphological characters:

M1. The anterocone is divided. The anterior ectoloph, the lingual quersporn II, the funnel structure, the posterior ectoloph, and the short and narrow entomesoloph are frequent.

m1. The labial anterolophid and the closed protosinusid are well developed. The metalophulids I+II are equally developed in 50% of the m1's. There is only metalophulid II in the other 50% of the m1's. a short or middle developed ectomesolophid is frequent. A short mesolophid is characteristic. Generally, the cusps are better developed than the ridges. The original description is given by Kordos (1986). Detailed description and emended diagnosis are given by Hír (2017).

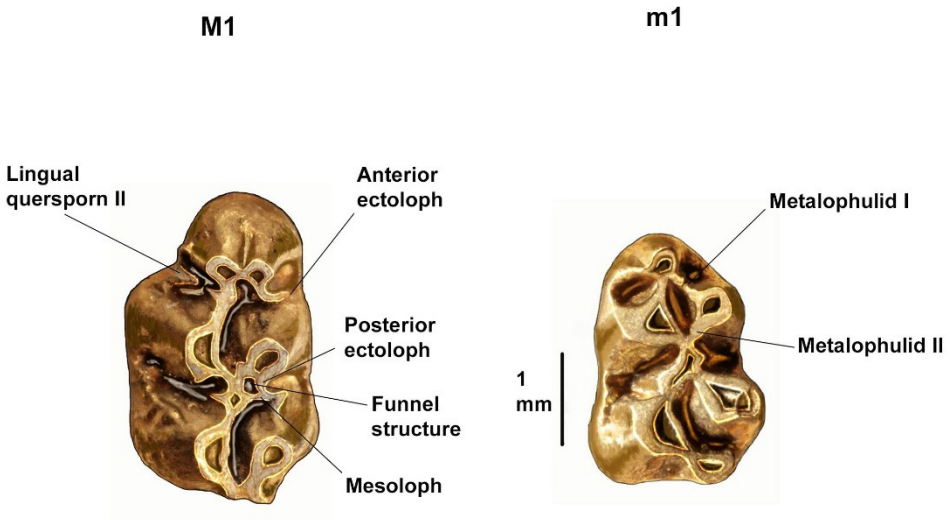

Fig. 7. Occlusal surfaces of *C. hungaricus* M1 and m1 from Hasznos.

Remarks:

The large sized Cricetodontini from Hasznos was first assigned to the species *Deperetomys hagni* (Fahlbusch, 1964) described as *Deperetomys hagni hungaricus* n. ssp. by Kordos (1986). Later De Bruijn et al. (1993) reclassified this taxon as *Cricetodon hungaricus*. These authors recognised that

C. hungaricus strongly resembles *C. candirensis* in size as well as in dental morphology. De Bruijn et al. (1993, 2013) questioned if *C. hungaricus* could be the junior synonym of *C. candirensis*. This assumption was rejected by Prieto et al. (2010) and López-Guerrero et al. (2015). After a detailed comparison, Hír (2017) verified that direct relation or even synonymy is not probable between the two species.

C. hungaricus is reported from Serbia, Brajkovac (Marković & Milivojević 2010) and from Anatolia, Zambal (De Bruijn et al. 2013), but it is not found in the Northern Alpine Foreland Basin and Western Europe.

Fig. 8. Geographical position of *C. hungaricus* localities.

Cricetodon cf. *hungaricus* (Kordos, 1986), Sámsonháza 3, Hungary

Measurements (mm) of *C.* cf. *hungaricus* molars from Sámsonháza 3:

Sh3	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	5	5	1	1	4	4	3	3	6	6	5	5
Min.	3.38	2.12	2.55	1.95	2.17	1.92	2.87	1.75	2.75	1.05	2.55	1.82
Max.	3.77	2.27			2.32	2	3.05	1.9	2.87	2.15	2.87	2.12
X	3.61	2.19			2.26	1.97	2.93	1.84	2.79	1.85	2.71	1.96
SD	0.131	0.058							0.08	0.284	0.074	0.094

The most important morphological characters:

M1. The anterocone is divided. Anterior ectoloph, lingual quersporn II are developed in one specimen. Protolophule I is absent, protolophule II is regular. Paracone posterior spur is regular. The mesoloph is short. Funnell structure is not developed.

m1. The labial anteroloph is well developed, it closes the protosinusid. Lingual anterolophid is found in two specimens. Metalophulid I is absent, metalophulid II is regular. The mesolophid is absent. A short ectomesolophid is characteristic. Detailed description is given by Hír & Mészáros (2002).

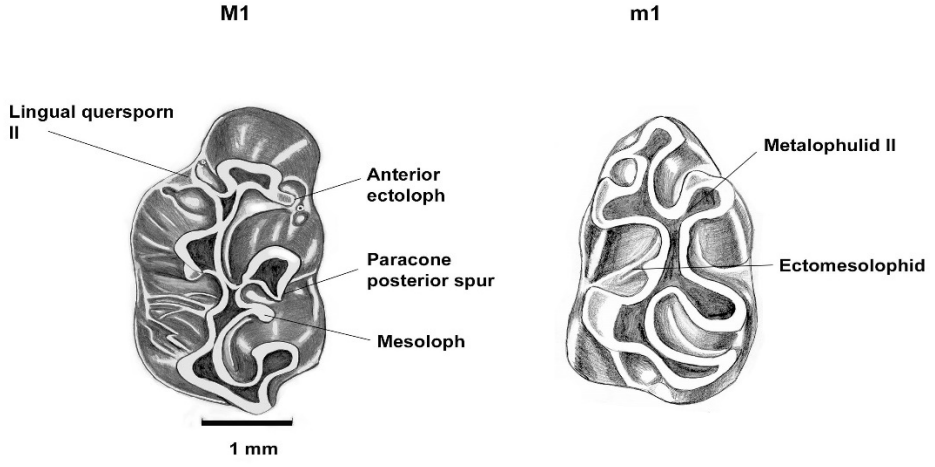

Fig. 9. Occlusal surfaces of *C.* cf. *hungaricus* M1 and m1 from Sámsonháza 3.

Remarks:

The *Cricetodon* population of Sámsonháza is regarded as a local descendant of *C. hungaricus*. The localities Sámsoháza and Hasznos are close to each other in space (10 km) and in time (both are classified as middle Badenian).

Cricetodon sansaniensis LARTET, 1851, Sirok, Hungary

Measurements (mm) of *C. sansaniensis* molars from Sirok:

Si	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	-	-	-	-	-	-	1	1	1	1	1	1
	-	-	-	-	-	-	3.0	2.0	2.8	2.05	2.85	1.87

The most important morphological characters:

m1. The anteroconid is unicuspid. The labial anterolophid is well developed between the anteroconid and the base of the protoconid. It closes the protosinusid. Metalophulid I is present, metalophulid II is absent. The mesolophid and ectomesolophid are not developed. The lingual mesosinusid is open, the labial mesosinusid is closed by a low developed ectostylid. The posterosinusid is closed.

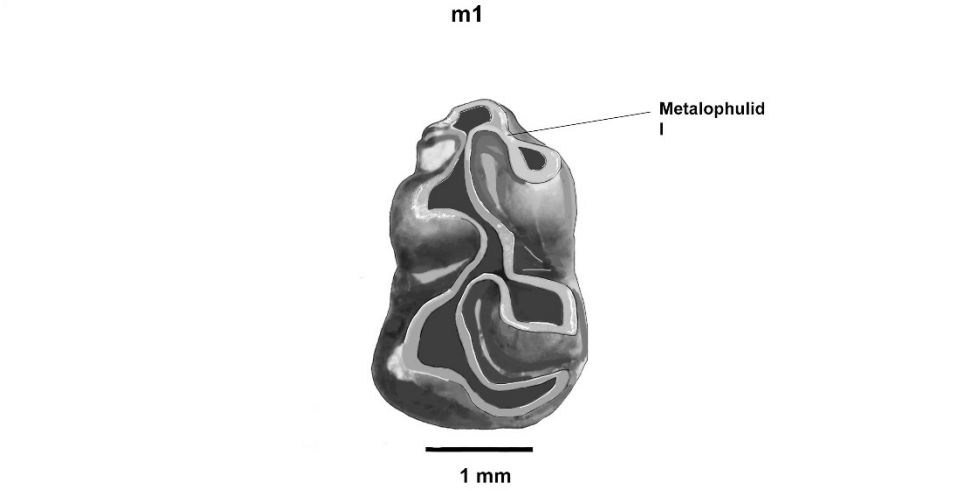

Fig. 10. Occlusal surface of *C. sansaniensis* m1 from Sirok.

Remarks:

The absence of metalophulid II occurs in the lectotype of *C. sansaniensis* (Maridet & Sen 2012: fig. 33). In the Pannonian Basin, the only occurrence of *C. sansaniensis* is in the fissure filling of Neudorf Spalte (= Devinska Nová Ves = Dévényújfalu), close to Bratislava (= Pozsony up to 1919). The species is listed by Sabol et al. (2004), but morphological description or figure are not given. The Late Badenian Studienka Formation is transgressively bedded onto the Mesozoic limestone and the fissure fillings. The numeric age of this latter complex was classified by the $^{86}Sr/^{87}Sr$ method as 13.58 Ma (Hyzny et al. 2012). In the Swiss molasse, *C*. cf. *sansaniensis* was described from the faunas of Öschgraben and Zeglingen (Rummel & Kälin 2003, Kälin & Kempf 2009). These faunas are situated above the 14.2 Ma old Leimbach bentonite. In Spain, in the Calatayud-Daroca Basin, *C. sansaniensis* was published from the faunas of the „F local Zone". The numeric age of this unit is 13.68 -13.76 Ma after López-Guerrero et al. (2015).

Cricetodon sp. I, Mátraszőlős 1, Hungary

Measurements (mm) of *Cricetodon* sp. I. molars from Mátraszőlős I:

Msz 1	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	-	-	2	2	1	1	-	-	1	1	1	1
Min.	-	-	2.98	2.28	2.28	2.0	-	-	3.0	2.03	2.88	2.0
Max.	-	-	3.05	2.3	-	-	-	-	-	-	-	-

Cricetodon sp. I, Mátraszőlős 2, Hungary:

Measurements (mm) of *Cricetodon* sp. I. molars from Mátraszőlős I:

Msz 2	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	1	1	1	1	1	1	-	-	-	-	-	-
Min.	3.70	1.29	2.85	2.12	2.25	1.90	-	-	-	-	-	-
Max.	-	-	-	-	-	-	-	-	-	-	-	-

The most important morphological characters:

M1. Anterocone is undivided (but it can be the result of the worn out, sub-senile status). There is a long ectoloph on the labial side of the anterocone reaching the anterior basis of the metacone. Lingual quersporn II is remnant.

The funnel structure is well developed. The entomesoloph is absent. Remarks. The material is scarce and is suitable only for modest conclusions. The long anterior ectoloph and the funnel structure are similar to the morphology of *C. hungaricus*, but the remnant lingual quersporn II and the absence of the entomesoloph refer to a difference in species level. Detailed description is given by Hír & Kókay (2004).

Cricetodon sp. II, Mátraszőlős 3, Hungary

Measurements (mm) of *Cricetodon* sp. II. molars from Mátraszőlős 3:

Msz 3	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	-	-	-	-	1	1	-	-	1	1	-	-
Min.	-	-	-	-	2.0	1.72	-	-	2.87	1.90	-	-
Max.	-	-	-	-	-	-	-	-	-	-	-	-

The most important morphological characters:

m2. The lingual anterolophid arm is incipient, the labial arm is weak, and it reaches the basis of the protoconid at a low level. The anterolabial sinusid is very narrow. The mesolophid is medium developed, oblique and reaches the posterior basis of the metaconid. Detailed description is given by Hír & Kókay (2011).

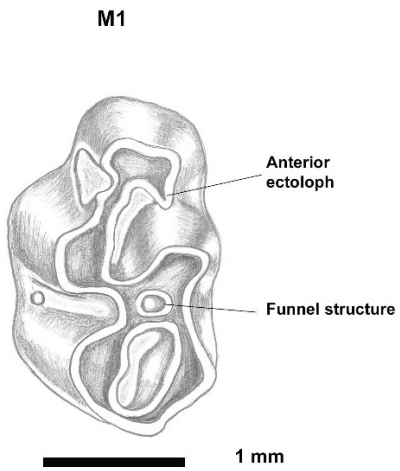

Fig. 11. Occlusal surface of *Cricetodon* sp. M1 from Mátraszőlős 2.

Remarks:

Based on the limited material, the phylogenetical relations of the finds cannot be decided. López-Guerrero et al. (2015: Fig. 6) positioned this material between the Cricetodontini populations with basal morphology and the populations with mosaic morphology.

Cricetodon sp., Tăşad, Romania

Measurements (mm) of *Cricetodon* sp. molars from Tăşad:

Td	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	2	2	2	2	1	1	fr.	fr.	-	-	1	1
Min.	3.27	2.12	2.65	2.10	2.0	1.8	-	-	-	-	2.62	1.72
Max.	3.57	2.12	2.67	1.97	-	-	-	-	-	-	-	-

The most important morphological characters:

M1. The anterocone is well divided. The two units are almost completely separated, only an enamel ridge connects them on the posterior side. The anterolophule doesn't reach the lingual unit of the anterocone. The labial unit of the anterocone has a long ectoloph, which reaches the anterior surface of the paracone. The labial quersporn II and mesoloph are absent.

m1. The only molar is fragmentary. The anteroconid is unicuspid. Protosinusid and anterosinusid are strongly reduced. Anterior metalophulid is well developed. Mesolophid is middle developed and reaches the posterior basis of the metaconid.

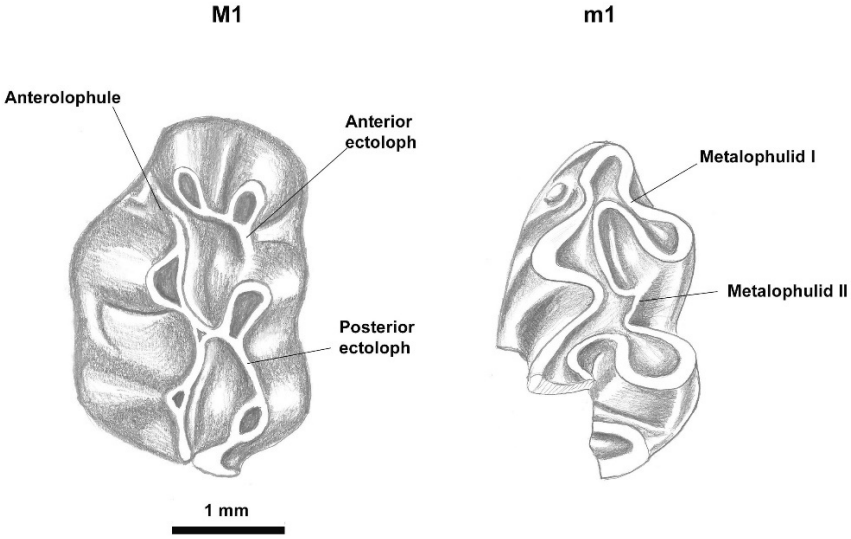

Fig. 12. Occlusal surfaces of *Cricetodon* sp. M1 and m1 fr. from Tăşad.

Remarks:

The material is limited. Only we can conclude that the material has no affinity to *Byzantinia* or *Hispanomys* genera.

„Cricetodon" *venczeli* Hír, Codrea, Prieto, 2019, Vârciorog, Romania

Measurements (mm) of „*C." venczeli* n. sp. molars from Vârciorog:

Var	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	22	23	20	20	9	9	22	22	20	20	9	9
MIN.	3.12	1.87	2.32	1.87	1.97	1.7	2.52	1.65	2.4	1.85	2.25	1.62
MAX.	3.4	2.15	2.75	2.07	2.20	1.9	2.87	1.97	2.7	2.1	2.52	2
X.	3.28	2.03	2.5	1.99	2.06	1.76	2.71	1.78	2.51	1.94	2.44	1.85
SD.	0.070	0.071	0.101	0.055	0.069	0.057	0.083	0.078	0.78	0.078	0.85	0.097

The most important morphological characters:

A middle sized „Cricetodon" species, with modest hypsodonty and flat occlusal surface.

M1. The anterocone is divided. The anterior ectoloph, complete ectoloph, lingual anteroloph, protolophule I and protocone sporn are frequent. The mesoloph is rarely developed and usually short.

m1. The metalophulid II occurs in 61% of the m1s. The co-occurrence of both metalophulids reaches 35%. There is no m1 showing the metalophulid I only. The mesolophid is short or absent.

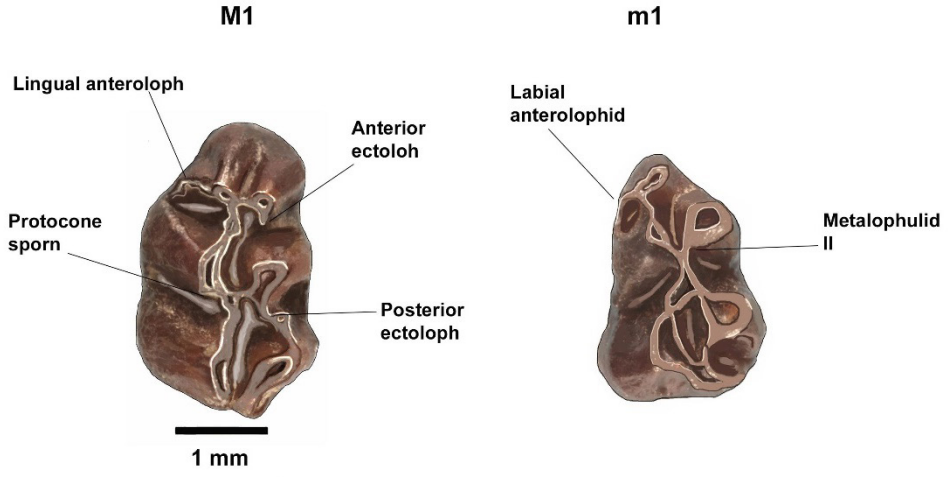

Fig. 13. Occlusal surfaces of „*C.*" *venczeli* M1 and m1 from Vârciorog.

„*Cricetodon*" cf. *klariankae* Hír, 2007, Kozárd, Hungary

Measurements of „*C.*" *cf. klariankae* molars from Kozárd:

Koz	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	22	22	23	23	12	12	18	18	18	18	6	6
MIN.	3.17	2.05	2.4	1.87	1.95	1.7	2.67	1.67	2.57	1.85	2.37	1.75
MAX.	3.75	2.27	2.95	2.03	2.10	2.0	3.0	1.87	2.87	2.10	2.67	2.05
X.	3.45	2.15	2.7	2.2	2.03	1.87	2.82	1.78	2.69	1.98	2.52	1.90
SD.	0.145	0.056	0.118	0.084	0.049	0.082	0.089	0.061	0.072	0.067	0.088	0.091

The most important morphological characters:

M1. The anterocone is divided. The labial unit of the anterocone bears a curved ectoloph. This ectoloph is frequently connected with the anterior spur of the paracone. The lingual conelet has a lingual anteroloph arm. The labial anteroloph is remnant. Complete lingual quersporn II is rare, the protosinus is mainly closed by a protostyle. The protocone sporn is frequent. The mesoloph is absent.

m1. The anteroconid is unicuspid and relatively small. Metalophulid I and II are equally developed. The mesolophid is absent.

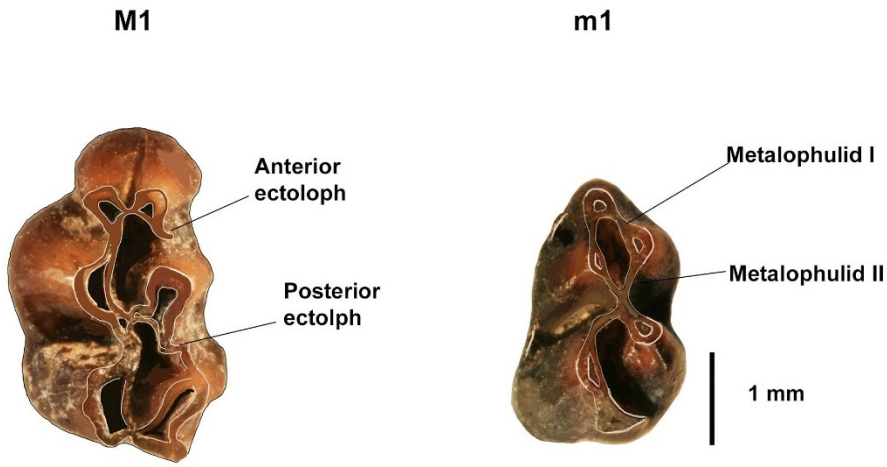

Fig. 14. Occlusal surfaces of „*C.*" cf. *klariankae* M1 and m1 from Kozárd.

„Cricetodon" klariankae HÍR, 2007, Felsőtárkány-Felnémet 2/3, Hungary

Measurements (mm) of „*C. klariankae*" molars from Felsőtárkány-Felnémet:

FF 2/3	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	9	10	11	11	11	11	13	13	16	16	9	9
MIN.	3.3	2.15	2,65	1,85	1,76	1,62	2.65	1.67	2.45	1.75	2.32	1.75
MAX.	3.55	2.27	3,05	2,17	2,05	1,9	2.8	1.95	2.87	2.12	2.5	2
X.	3.39	2.22	2,80	2,03	1.91	1.76	2.74	1.79	2.69	1.93	2,41	1,85
SD.	0.088	0.037	0,07	0,069	0.056	0.064	0.029	0.041	0.069	0.071	0.053	0.053

The most important morphological characters:

M1. The anterocone is divided. The labial unit has a curved ectoloph. It can reach the anterior spur of the paracone. Protolophule II is short. Lingual quersporn II is incomplete. The protocone sporn is regular. The mesoloph is mainly absent. The paracone posterior ectoloph is connected to the anterior ectoloph of the metacone.

m1. The anteroconid is unicuspid and rounded. In the juvenile molars the anteroconid is less developed than the protoconid and the metaconid. The anterolophid arms, the protosinusids and the anterosinusids are reduced. Metalophulid I and II are equally developed. The mesolophid is rare and it is usually short. This configuration corresponds more or less to „Cricetodontini type 4" of De Bruijn & Ünay (1996).

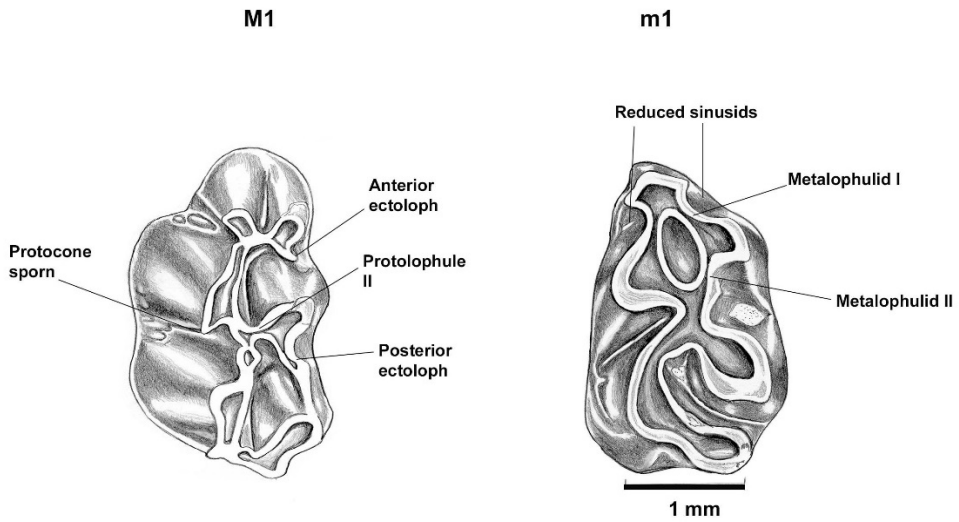

Fig. 15. Occlusal surfaces of „*C.*" *klariankae* M1 and m1 from Felsőtárkány-Felnémet 2/3.

Remarks:

Hír et al. (2019) proposed that the „*Cricetodon*" populations of Vârciorog, Kozárd and Felsőtárkány-Felnémet 2/3 form an evolutionary lineage. The evolutionary trends in *„C." venczeli – „C." klariankae* line are:

- the increasing dimensions of the molars,
- the increasing hypsodonty,
- increasing of the relative length of the M2 and m2 (but in less degree than is *Byzantinia* species),
- the disappearance of the anterior protolophule in M1,
- the strengthening of anterior ectoloph of the paracone in M1,
- the disappearance of the short mesoloph in M1,
- the disappearance of the lingual arm of anteroloph in M1,
- the involution of labial anterolophid and protosinusid in m1,
- the strengthening of metalophulid I in m1.

During the late phase of the Middle Miocene, substantial changes occurred in the morphology of the Cricetodontini tribe throughout in Europe. In SW Europe, the transition from *Cricetodon* to *Hispanomys* took place (López-Guerrero et al. 2008, López-Antoñanzas & Mein 2009). In SE Europe and in Anatolia, this is the time period of the *Cricetodon-Byzantinia* transition (De Bruijn & Ünay 1996). According to López-Guerrero et al. (2015), in the Cricetodontini populations of Western and Central Europe the change from the „basal morphology" to the „mosaic morphology" occurred. This means the strengthening of the ectolophs in the upper molars and the reduction of the mesolophids in the lower molars. The reduction of the metalophulid II can be seen in the m1s of the Western European species. This latter element is regular in the Cricetodontini populations of the Pannonian Basin.

cf. *Byzantinia* sp. or div. sp., Comăneşti 1, Romania

Measurements (mm) of cf. *Byzantinia* sp. molars from Comăneşti:

Com	M1		M2		M3		m1		m2		m3	
	L	W	L	W	L	W	L	W	L	W	L	W
No.	-	-	1	1	1	1	2	2	-	-	2	2
MIN.	-	-	2.92	2.0	2.12	1.77	1.65	1.7	-	-	2.67	1.75
MAX.							2.7	1.75			2.67	1.77

The most important morphological characters:

M2. The anterior width (across the protocone-paracone) is wider than the posterior width (across the hypocone-metacone). The lingual anteroloph is incipient and the labial anteroloph is a well-developed cusp. The protocone is disconnected from the endoloph. The protolophule is directed forwards and it is ending free, in the anterosinus. The mesoloph is not developed. M3. Anterior with is wider than the posterior width. The anterocone is widely confluent width the protocone. The lingual anteroloph arm is incipient, the labial anteroloph arm is well developed and its terminal part forms a small cusp. The mesoloph is not developed. m1. The anterolophids, anterosinusid, and protosinusid are incipient. The anterior metalophulid is well developed, the posterior metalophulid is weak and found only one of the two molars. The mesolophid is absent.

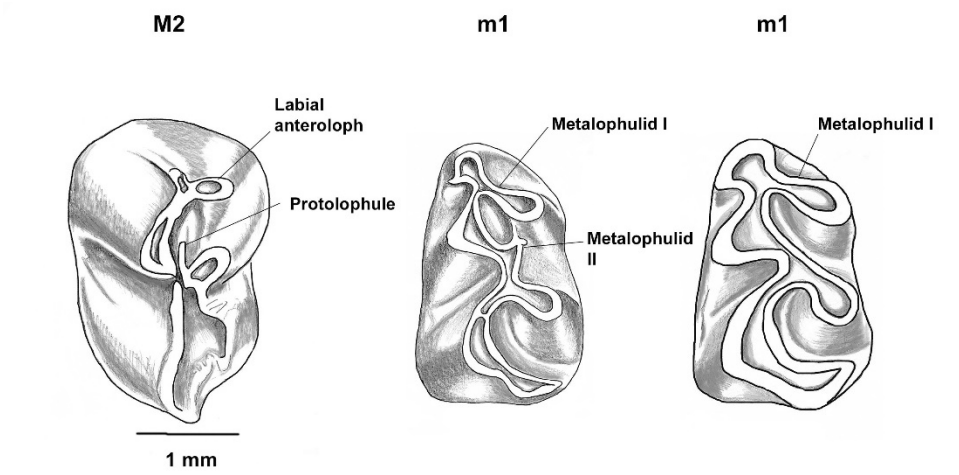

Fig. 16. Occlusal surfaces of. *Byzantinia* cf. *Byzantinia* sp. M2 and m1 from Comăneşti.

Remarks:

In their original publication, Feru et al. (1980) described two Cricetodontini taxa from the material: *Hispanomys* cf. *lavocati* and *Hispanomys* cf. *bijugatus*. Hír et al. (2011) revised the teeth and considered that the differences observed between the two m1 are linked to intraspecific variability. They considered this

sample as monospecific, in the absence of a confident generic assignment. However, the molars from Comăneşti share similarities with *Byzantinia*.

Conclusions

New important Cricetodontini populations have been unearthed in Hungary and in Romania during the last three decades.

The *C. meini* populations of Litke 1 and 2 have a relation with the first great dispersion of the Cricetodontini tribe in Europe. The species bears a substantial biochronological importance because it is possible to correlate it to 15.2 -15.0 Ma. The composition of the Litke faunas refers to a relatively arid environment (Venczel & Hír 2015).

C. aureus is a characteristic element of the early MN6 faunas of France, Germany, and Switzerland. It is related with a younger biochronological horizon: 14.55 -14.9 Ma. The species rich fauna of Szentendre points to a humid climate.

C. hungaricus or *C.* cf. *hungaricus* of Hasznos and Sámsonháza has a clear Anatolian affinity. It is known from the Balkans, but it has no occurrence in Western Europe and in the Northen Alpine Foreland Basin. The localities have no independent chronological control and the exact numerical age is not given. The faunas represent humid, but not very moist environment (Prieto et al. 2015). The faunas of Litke, Szentendre, Hasznos, Sámsonháza are relatable to the environmental conditions of the „Middle Miocene Climatic Optimum" (Böhme 2003).

C. sansaniensis is known from a series of European localities from Spain up to Devinska Nová Ves, Slovakia. Its chronological range is approximately 13.58 -13.76 Ma. This age is relatable to the Late Badenian in the Central Paratethys.

The faunas of Mátraszőlős, Tăşad, Kozárd, and Vârciorog are simultaneous with the „Middle Miocene Climatic Transition", although the latest diplocynodontid occurrences are found in Tăşad and Vârciorog.

The evolutionary line of *„C." venczeli – „C." klariankae* is endemic for the Pannonian Basin. The morphological changes are partly similar to the tendencies

observed in the Cricetodontini populations of the Mediterranean, but there are some special characters.

In the Pannonian Basin and in the Northern Alpine Foreland Basin (Switzerland and Southern Germany), Cricetodontini went extinct at the border of the Middle and Late Miocene (in the Central Paratethys it is relatable to the Sarmatian-Pannonian transition). In the Mediterranean they survived. In the Eastern Mediterranean and in Anatolia they occurred up to the Late Miocene. In Southern France the genus *Ruscinomys* survived up to the Pliocene. We assume that the early extinction of the Cricetodontini in Central Europe can be related to the increasing humidity of the climate at the terminal period of the Middle Miocene. It was the „washhouse climate" after the sense of Böhme et al. (2008).

López-Guerrero et al. (2014a, 2014b) introduced a three-phase model for the description of the morphological evolution of European Cricetodontini.

I. Basal morphology is characterised by the brachyodont molars, straight buccal contour in occlusal view, poorly developed or absent ectolophs in the upper molars, the presence of solely metalophulid II in the m1, and frequent presence of mesolophs and mesolophids. Among the Cricetodontini species of the Pannonian Region, *C. meini*, *C. aureus, C. hungaricus* are undoubtedly referable to this group.
II. Mosaic morphological pattern. The main characters are the semi-hypsodont molars, the frequently present, but rarely complete ectolophs, the straight contour of the occlusal surface in upper molars, the short or absent mesolophids, and the absence of metalophulid II. in the lower molars. In the Pannonian Basin, *C. sansaniensis*, „*C.*" *venczeli* and „*C.*" *klariankae* belong to this group.
III. In the third phase these hypsodont Cricetodontini species were frequent in the Late Miocene and Pliocene of the Mediterranean. The complete ectolophs, the absence of mesolophs and trilobate outline of the labial margin on the occlusal surface of M1 are characteristic in the upper molars. This phase has no representative in the Carpathian Region.

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References

Abdul Aziz, H., Böhme, M., Rocholl, A., Zwing, A., Prieto, J., Wijbrans, J., Heissig, K., Bahchtadse, V. 2008 – Integrated stratigraphy and 40Ar/39Ar chronology of the Early to Middle Miocene Upper Freshwater Molase in eastern Bavaria (Germany). *International Journal of Earth Sciences (Geologische Rundschau)* **97**(1): 115-134, 115-134. DOI 10.1007/s00531-006-0166-7.

Abdul Aziz, H., Böhme, M., Rocholl, A., Zwing, A., Prieto, J., Wijbrans, J., Heissig, K., Bahchtadse, V. 2010 – Integrated stratigraphy and 40Ar/39Ar chronology of the Early to Middle Miocene Upper Freshwater Molase in western Bavaria (Germany). *International Journal of Earth Sciences (Geologische Rundschau)* **99**: 1859-1886. DOI: 10.1007/s00531-009-0475-8

Böhme, M. 2003 – Miocene climatic optimum: evidence from lower vertebrates of Central Europe. *Palaeogeography, Palaeoclimatology, Palaeoecology* **195**: 389-401. DOI: 10.1016/S0031-0182(03)00367-5.

Böhme, M., Ilg, A., Winklhofer, M. 2008 – Late Miocene „washouse" climate in Europe. *Earth and Planetary Science Letters* **275**: 393-401. DOI: 10.1130/G22460.1

Daxner-Höck, G. 2003 – *Cricetodon meini* and other rodents from Mühlbach and Grund, Lower Austria (Middle Miocene, late MN5). *Annalen des Naturhistorischen Museums in Wien* **A 104**: 267–291.

De Bruijn, H., Fahlbusch, V., Saraç, G., Ünay, E. 1993 – Early Miocene rodent faunas from the eastern mediterranean area. Part III. The genera *Deperetomys* and *Cricetodon,* with a discussion of the evolutionary history of the Cricetodontini. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen,* Ser. B. **96**: 151-216.

De Bruijn, H. & Ünay, E. 1996 – On the evolutionary history of the Cricetodontini from Europe and Asia Minor and its bearing on the reconstruction of migrations and the continental biotope during the Neogene. In: Bernor R., Fahlbusch V., Mittmann W. (eds.): The Evolution of Western Eurasian Neogene Mamal Faunas. Columbia University Press. New York, p. 227-234.

De Bruijn, H., Van den Hoek Ostende, L., Kristkoiz-Boon, E., Rummel, M., Theocharopoulos, C., Ünay, E. 2003 – Rodents, Lagomorphs and Insectivores from the middle Miocene hominoid locality of Çandir (Turkey). *Courier Forschungs-Institut Senckenberg* **240**: 51-87.

Fahlbusch, V. 1964 – Die Cricetiden (Mammalia) der Oberen Süsswasser-Molasse Bayerns. *Bayerische Akademie der Wissenschaften, matematisch-naturwissenschaftliche Klasse, Abhandlungen*, *Neue Folge* **118**: 1 -136.

Feru, M., Rădulesco, C., Samson P. 1980 – La faune de Micromammiféres du Miocéne de Comănesti (dép. d' Arad). *Travaux de l'Institut de Spéologie „Emil Racoviţză*" **19:** 171 -190.

Fortelius, M. 2011 – Neogene of the Old World Database of fossil mammals (NOW). University of Helsinki, http://www.helsinki.fi/science/now.

Heissig, K. 1997 – Mammal faunas intermediate between the reference faunas of MN4 and MN6 from the Upper Freshwater Molasse of Bavaria. *Actes du Congrès BiochroM'97, Mém. Trav. E.P.H.E. Inst. Montpellier,* **21**: 537-546.

Hír, J., Kókay, J., Venczel, M. 2002 – Middle Miocene molluscs and microvertebrata from Tăşad (Bihor County, Romania). *Acta Palaeontologica Romaniae* **3:** 161-172.

Hír, J. 2007 – *Cricetodon klariankae* n. sp. (Cricetodontini, Rodentia) from Felsőtárkány Felnémet (Northern Hungary). *Fragmenta Palaeontologica Hungarica* **24-25,** 15-24.

Hír, J. 2013 – Early and Middle Miocene (MN5-MN6) transitional rodent fauna from Litke (North Hungary, Nógrád County). *Fragmenta Palaeontologica Hungarica* **30**: 101-137.

Hír, J. 2015 – Előzetes beszámoló a Kozárdi Formáció típusszelvényéből gyűjtött gerinces maradványokról [A preliminary report on the vertebrate finds collected from the type section of the Kozárd Formation]. In Hungarian with English Abstract. *A Dornyay*

Béla Múzeum Évkönyve [Yearbook of the Dornyay Béla Museum at Salgótarján] **38**: 328-347.

Hír, J. 2017 – A detailed description of *Cricetodon hungaricus* (Kordos, 1986) (Rodentia, Mammalia) from Hasznos (N. Hungary, Nógrád County). *Fossil Imprint* **73** (1-2): 155-171.

Hír, J., Codrea, V., Prieto, J. 2019 – Two new early Sarmatian s.str. (latest Middle Miocene) rodent faunas from the Carpathian Basin. *Palaeobiodiversity and Palaeoenvironments* **99** (3): 527-543. DOI:10.007/s12549-019-00399-y PBPE-D-19-00003R1.

Hír, J. & Kókay, J. 2004 – Middle Miocene molluscs and rodents from Mátraszőlős (Mátra Mountains, Hungary). *Fragmenta Paleontologica Hungarica* **22:** 83 -97.

Hír, J. & Kókay J. 2011 – Late Badenian (MN 7/8) molluscs and rodents from Mátraszőlős 3 (Northern Hungary). *Fragmenta Palaeontologica Hungarica* **29**: 69-78.

Hír, J., Kókay J., Venczel M. 2002 – Middle Miocene molluscs and microvertebrata from Tăşad (Bihor County, Romania). *Acta Palaeontologica Romaniae* **3**: 161-172.

Hír, J. & Mészáros L. 2002 – Middle Miocene insectivores and rodents (Mammalia) from Sámsonháza (Northern Hungary). *Fragmenta Palaeontologica Hungarica* **20**: 9-23.

Hír, J., Prieto, J., Ştiucă, E. 2011 – A new interpretation of the Miocene rodent faunas from Comăneşti 1 and Tauţ. *Geobios* **44:** 215-223.

Hír, J. & Venczel M. 2018 – A preliminary report on the first results of the re-excavation of the middle Miocene palaeovertebrate locality Szentendre, Cseresznyés-árok. *Nymphaea, Folia Naturae Bihariae* **45**: 35-80.

Kälin, D. & Kempf, O. 2009 – High-resolution stratigraphy from the continental record of the Middle Miocene Northern Alpine Foreland Basin of Switzerland. *Neues Jahrbuch für Geologie und Paläontologie* **254** (1-2): 177-235.

Kordos, L. 1981 – A hasznosi felső miocén gerinces lelőhely kora emlős-zonáció alapján [The age of the upper Miocene vertebrate locality of Hasznos in terms of mammal zonation]. *A Magyar Állami Földtani Intézet Jelentése az 1979 évről [Annual report of the Hungarian Geological Institute on 1979]:* 459-463.

Kordos, L. 1986 – A hasznosi és a szentendrei felső-miocén hörcsögök (Cricetidae, Mammalia) rendszertani és rétegtani vizsgálata [Upper Miocene hamsters (Cricetidae, Mammalia) of Hasznos and Szentendre (Cricetidae, Mammalia): a taxonomic and stratigraphic study]. *A Magyar Állami Földtani Intézet Jelentése az*

1984. évről [Annual Report of the Hungarian Geological Institute on 1984]: 523 - 553.

Koufos, G. 2016 – The Neogene mammal localities of Greece: faunas, chronology and biostratigraphy. *Hellenic Journalof Geosciences* **41**: 183-214.

Lartet, E**.** 1851 – Notice sur la colline de Sansan, suivie d'une récapitulation des diverses espéces d'animaux vertébérés fossiles trouvés soit á Sansan, soit dans d'autres gisements du terrain tertiaire miocéne dans le Bassin Sous-Pyrénéen. J. A. Portes, Auch, 41 pp.

López-Antoňanzas, R. & Mein, P. 2009 – First detailed description of *Hispanomys bijugatus* Mein & Freudenthal 1971 (Rodentia, Cricetodontinae) from the Upper Aragonian of La Grive-Saint Alban, France: Biostratigraphical implications. *Geobios* **42**: 783-796.

López-Guerrero, P., Álvarez-Sierra, M., López-Antoňanzas, R., Oliver-Pérez, A., Peláez-Campomanes, P. 2008 – Cricetodontini (Cricetidae, Rodentia) del Aragoniense superior (Mioceno medio) de Nombrevilla 2 (Zaragoza, Espaňa). *Palaeontologica Nova* **2008** (8): 259-329.

López-Guerrero, P., Álvarez-Sierra, M., García-Paredes, I., Peláez-Campomanes, P. 2014a – New Cricetodontini from the middle Miocene of Europe: an example of mosaic evolution. *Bulletin of Geosciences* **89** (3): 573-592.

López-Guerrero, P., Álvarez-Sierra, M., García-Paredes, I., Peláez-Campomanes, P. 2014b – Cricetodontini from the Calatayud-Daroca Basin. A taxonomical description and update of their stratigraphical distributions. *Comptes Rendus Palevol* **13**: 647-664.

López-Guerrero, P., Garcia-Paredes, I., Prieto, J., López-Antoňanzas, R., Alvarez-Sierra, M. 2015 – Palaeodiversity of Cricetodontini during the late Aragonian (middle Miocene) from the European basins. *Palaeobiodiversity and Palaeoenvironments* **95:** 415-430.

Maridet, O. & Sen, S. 2012 – Les Cricetidae (Rodentia) de Sansan. In: Peigné, S., Sen, S. (eds.): Mammiféres de Sansan. *Muséum national d'Histoire naturelle* **203**: 26-95.

Marković, Z. & Milivojević, M. 2010 – The Neogene small mammals from Serbia –collection methods and results. *Bulletin of the Natural History Museum in Beograd* **3**: 105–114.

Mein, P. & Freudenthal, M. 1971 – Les Cricetidae (Mammalia, Rodentia) du Néogène Moyen de Vieux-Collonges. Partie 1: Le genre Cricetodon Lartet, 1851. *Scripta Geologica* **5:** 1-51.

Prieto, J., Böhme, M., Gross, M. 2010 – The cricetid rodents from Gratkorn (Austria, Styria): a benchmark locality for the continental Sarmatian sensu stricto (late Middle Miocene) in the Central Paratethys. *Geologica Carpathica* **61** (5): 419-436.

Prieto, J., Van den Hoek Ostende, L., Hír, J., Kordos, L. 2015 – The Middle Miocene insectivores from Hasznos (Hungary, Nógrád County). *Palaeobiodiversity and Palaeoenvironments* **95** (3): 431-451.

Rocholl, A., Schaltegger, U., Gilg, A., Wijbrans, J., Böhme, M. 2017 – The age of volcanic tuffs from the Upper Freshwater Molasse (North Alpine Foreland Basin) and their possible use for tephrostratigraphic correlations across Europe for the Middle Miocene. *International Journal of Earth Sciences (Geologische Rundschau*), DOI 10. 1007/s00531-017-1499-0.

Rummel, M. 1997 – *Mixocricetodon dehmi*, n. gen., n. sp., ein neuer Cricetidae (Rodentia, Mammalia) aus dem Mittelmiozän von Süddeutschland. *Mitteilungen der Bayerische Staatssammlung für Paläontologie und historische Geologie* **37**: 75-93.

Rummel, M. & Kälin, D. 2003 – Die Gattung Cricetodon (Mammalia, Rodentia) aus dem Mittelmiozän dem Schweizer Molasse. *Zitteliana* **A43**: 123-141.

Sabol, M., Joniak, P., Holec, P. 2004 – Succession(-s) of mammalian assemblages during the Neogene - a case study from the Slovak part of the Western Carpathians. *Scripta Facultatis Scientarium Naturalis Universitatis Masaryk Brunensis* **31-32**: 65-84.

Venczel, M. & Hír, J. 2015 – Lissamphibians and squamate reptiles from the early middle Miocene of Litke, Northern Hungary. *Geobios* **48**: 491-504.

NYMPHAEA Folia naturae Bihariae	L	67-88	Oradea, 2023

List of sirenian fossils housed in the "Bethlen Gábor" College in Aiud, Romania

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Abstract. A museum collection represents an assemblage of cultural and natural goods which can be accessible for both the wider public as well as researchers. The sources which represent the origins of the objects that make up a collection can originate from donations, acquisitions or discoveries resulting from systematic studies in the field. The discovery of a new collection which resides in a museum's depository represents a momentous occasion. The Fuchs Herman Collection, while of a smaller size, contains several sirenian fossil remains discovered in areas inside and around Cluj-Napoca by the

respective paleontologist, a former teacher at the “Babeș-Bolyai” University. The collection itself is of great importance, because it is a part of the “Bethlen Gábor” College school museum’s patrimony, from Aiud. To this extent, the collection can help in ensuring the use of new, alternative teaching methods, the consolidation of knowledge and offers the possibility for the development of the students’ desire to learn. The sirenians from this collection are documented by fragmentary ribs and vertebrae, therefore an assignation from systematic viewpoint below the order level is not possible. The target of this paper is the inventory of the sirenian fossils from the Fuchs Herman Collection, thereby contributing to the development of the scholar museum.

Key words: Paleogene, paleontological collection, “Bethlen Gábor” College Aiud, Sirenia, museum, Romania.

Introduction

The museum collection means, according to the law of museums and public collections from Romania, ‘the assemblage of cultural and natural goods, constituted systematically and coherently by physical entities and legal entities under public or private law’ (Law nr. 311). The sources from which these objects originate can be donations, acquisitions or discoveries resulting from field research. Their evidence is performed with the help of the Registry for the analytical evidence of cultural goods (Methodological Norms, 2000). Researchers’ consultation of these registries is a difficult procedure, almost impossible in the case of museums which house dozens upon thousands of objects. While in the European countries there is a permanent preoccupation to facilitate access for the public, as well as researchers in the digital culture, in Romania however such a national systematic program for digitalizing of the museum patronage does not exist yet (Collection management).

In the XVII century Comenius (Jan Amos Komenský, 1592-1670) has shown in his work ‘*Orbis Sensualium Pictus*’ the didactic importance of a space for collecting in schools, named ‘museum’, so that students can obtain knowledge, not just from books (Nagrineac, 2019). Later John Dewey (1854-1952) underlined

the importance of the existence of a museum in each school, in which along with a library, a laboratory and the workshops the students will be prepared for their futures (Koltai 2012, Veress & Codrea 2021).

Figure 1. The “Bethlen Gábor” College in Aiud, Romania.
Source: https://reformatus.ro/iskolak/nagyenyedi-kollegium

Recognizing such aspects, the discovery of a new collection in the museums’ storages is a particular event. Herein, we present the Fuchs Collection, which belongs to the Bethlen Gábor College’s scholar museum from Aiud (Romania), which we have discovered by chance, thanks to an article from a newspaper and which we were able to inventory (Kerekes 2022).

The Aiud Museum of Natural Sciences

It is the oldest museum of natural sciences opened for the public in Romania. It subordinates to the Aiud town hall, and it is located in the same building with the “Bethlen Gábor” College (Fig. 1) since 1622. The oldest evidence for a fossil and mineral collection can be found in the manuscript of ‘*Catalogus Raritatum et Benefactorum’*, courtesy of professor Benkő Ferenc and Nagy László

(Veress & Codrea, 2021). Also, from this source we find the year in which the museum was officially founded, namely 1796, by the name of 'Raritarum et Rerum Naturalium Museum' (Codrea & Morărescu 2008). Throughout its long history, the museum's collections, aside from the scientific contributions, have offered support not only to the didactic activities of the College's students, but also to the activities of the geology students of the "Babeș-Bolyai" University, who have paid many scientific visits there (Veress & Codrea 2021).

Figure 2. The Small Museum at the „Bethlen Gábor" College in Aiud, Romania. Photo by Veress László.

Among the most important contributors to the establishment and development of the museum’s collection, we mention (aside from Benkő Ferenc and Nagy László) Herepei Károly and Zeyk Miklós, who have assured the development of the museum through their efforts, including donations of personal collections (Codrea & Mărgineanu 2007). After the passing over of the museum to the suborder of the Aiud town hall, a few of the “Bethlen Gábor” College’s professors have initiated the establishment of the so-called ‘Small Museum’ (Fig. 2). These professors are: Józsa Miklós, a professor of Hungarian literature and speech, Kónya Mária and Krizbai Jenő, professors of history, and Dvorácsek Ágoston, a professor of biology. With the support of the then-director of the college, Simon János, they were able to organize a small museum in the college’s boarding house building (Fig. 2), as an exhibition of a few objects of unique value which are in the possession of the College: documents and photographs, instruments and old devices, as well as a small collection of minerals and fossils. In the year 2006 the College received a rich donation, which is the collection of the late paleontologist and university lecturer, Fuchs Hermann (1915-1996) (Bakó 2006, Kerekes 2022). This is made up of fossils discovered in the areas around Cluj-Napoca (Leghia, Jebuc, Mera, Cheile Baciului, Someș-dig). First, professor Dvorácsek, professor Wanek Ferenc and the student Karsai Noémi have conducted an inventory of this collection and have also placed some of these fossils in the small museum, as well as write about them briefly in an article for the school’s magazine.

Fuchs Hermann (18th of February 1915 – 8th of April 1996)

He was born in Brașov into a numerous and highly religious family. He was orphaned by a father at a young age, which is why he grew up in rough material conditions. He studied at Brașov and at Odorheiul Secuiesc, obtaining his high school diploma at Brașov (Wanek 2001). His passion for Earth sciences began through his grandfather’s collection of minerals, who oversaw the mine from Baia

de Arieș, and was prompted by his gymnasium professor, Abrecht József (Ajtai 1993).

He began his university studies at Cluj, at the “Ferdinand I” University (presently “Babeș-Bolyai” University), in 1932. He obtained his graduation diplomas in 1936 at the College of Nature Sciences’ geology section, in 1940 at the College of Pedagogics’ primarily natural history and secondarily physics-chemistry. In 1941 he graduated from the Unitarian Pedagogic Seminar and in 1942 he received an *absolutorium* in geography at the “Ferenc József” University in Cluj (presently “Babeș-Bolyai” University). Here he began his didactic and research carrier at the geology-paleontology department in 1941, as an assistant of professor Balogh Ernő, remaining almost uninterrupted until his retirement in 1976 (Ajtai 1993, Wanek 2001, 2022). His main preoccupation was the development of the didactic collections for better student teaching.

He published several articles in the magazine of that time, signing towards the end of his life as ‘Brassói Fuchs Herman’. His main field of research was vertebrate paleontology, mainly Paleogene sirenians from Transylvania, but he did work in the field of micropaleontology starting from 1955, being the first Transylvanian researcher who adapted biometrics and statistics into the study of foraminifera populations in certain strata (Ajtai 1996).

After his death, his family decided to donate his personal collection, as well as a part of his professional library, to the “Bethlen Gábor” College in Aiud, because he campaigned his entire life for the popularization of paleontology and geology through numerous articles in the press, lectures, and clubs for students (Bakó 2006).

From a geological viewpoint, the fossils were collected by Fuchs himself from classical Upper Eocene and Lower Oligocene outcrops located in the basin of Transylvania, in Cluj-Napoca or in localities from the Cluj District. The deposits the sirenian fossils originated from belong to the Cluj Limestone Formation (Priabonian; Hofmann 1879) and Mera Formation (Rupelian, Merian; Koch 1880, emended by Mészáros et al. 1989). The first one is marine, while the second