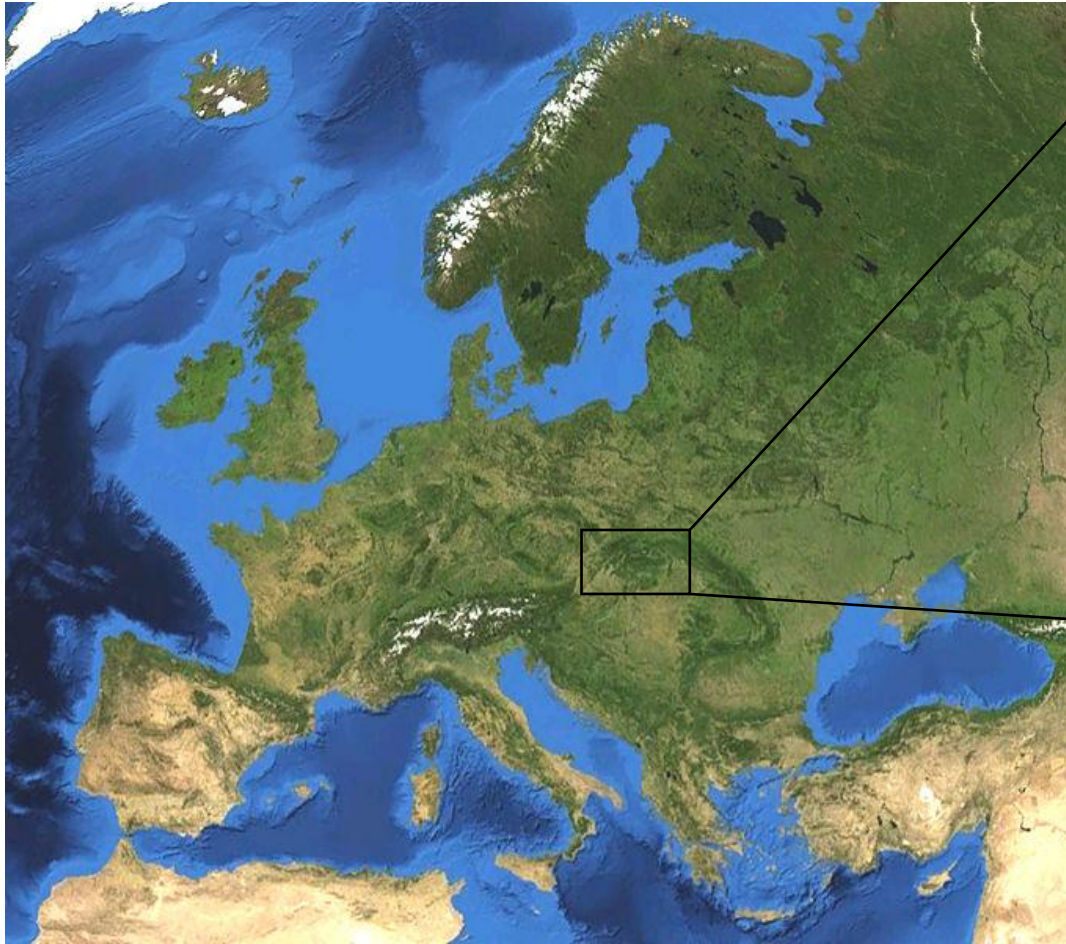


PLIOCENE MAMMALS FROM THE SLOVAK TERRITORY OF THE WESTERN CARPATHIANS



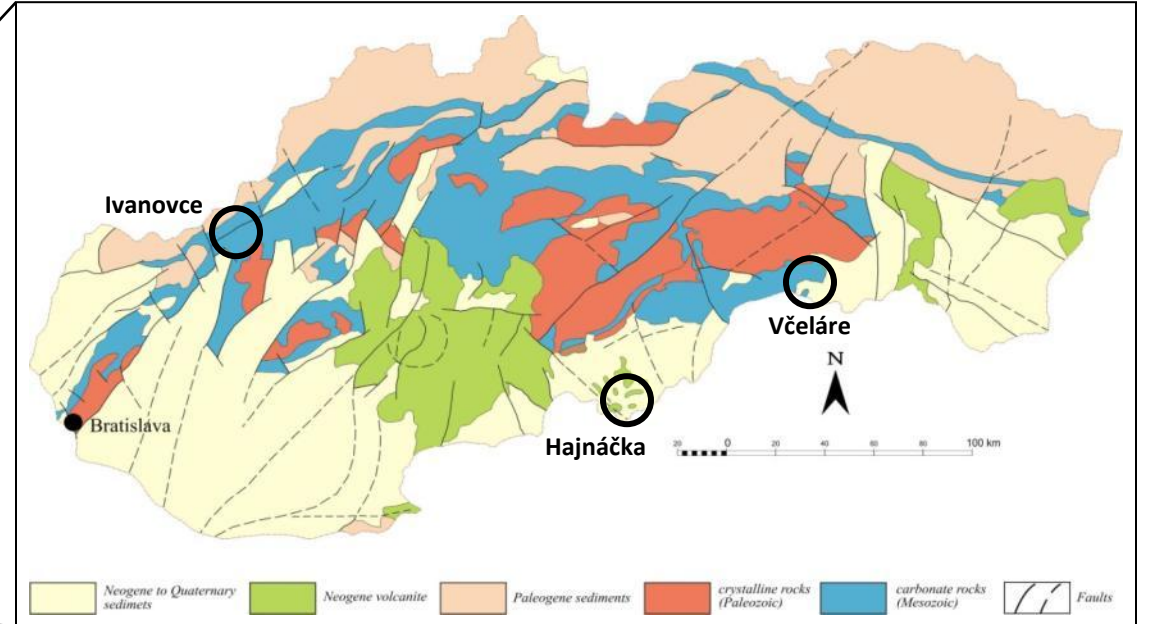
Ridpath J. C., 1840-1900: Cyclopaedia universal history. Balch Brothers & Company, Boston (1895).

(https://commons.wikimedia.org/wiki/File:Landscape_of_the_Pliocene_epoch_-_showing_environment_at_the_time_of_men's_appearance_-_drawn_by_Riou.jpg)

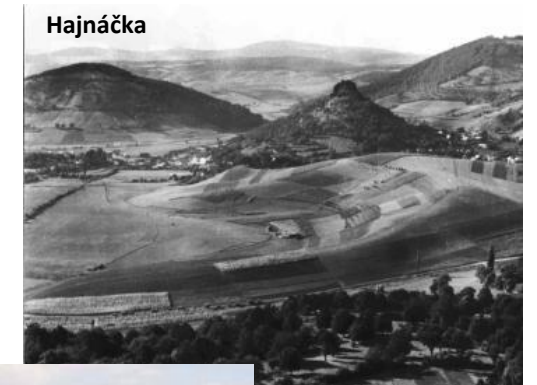


<https://commons.wikimedia.org/wiki/File:Europe.jpg> (2025)

The Pliocene fossil record is known from 14 sites so far, but only 3 of them have yielded remains of more diverse faunal assemblages.



Ivanovce
photo: Fejfar (1965)



Hajnáčka
photo: Fejfar (1959)



Včeláre

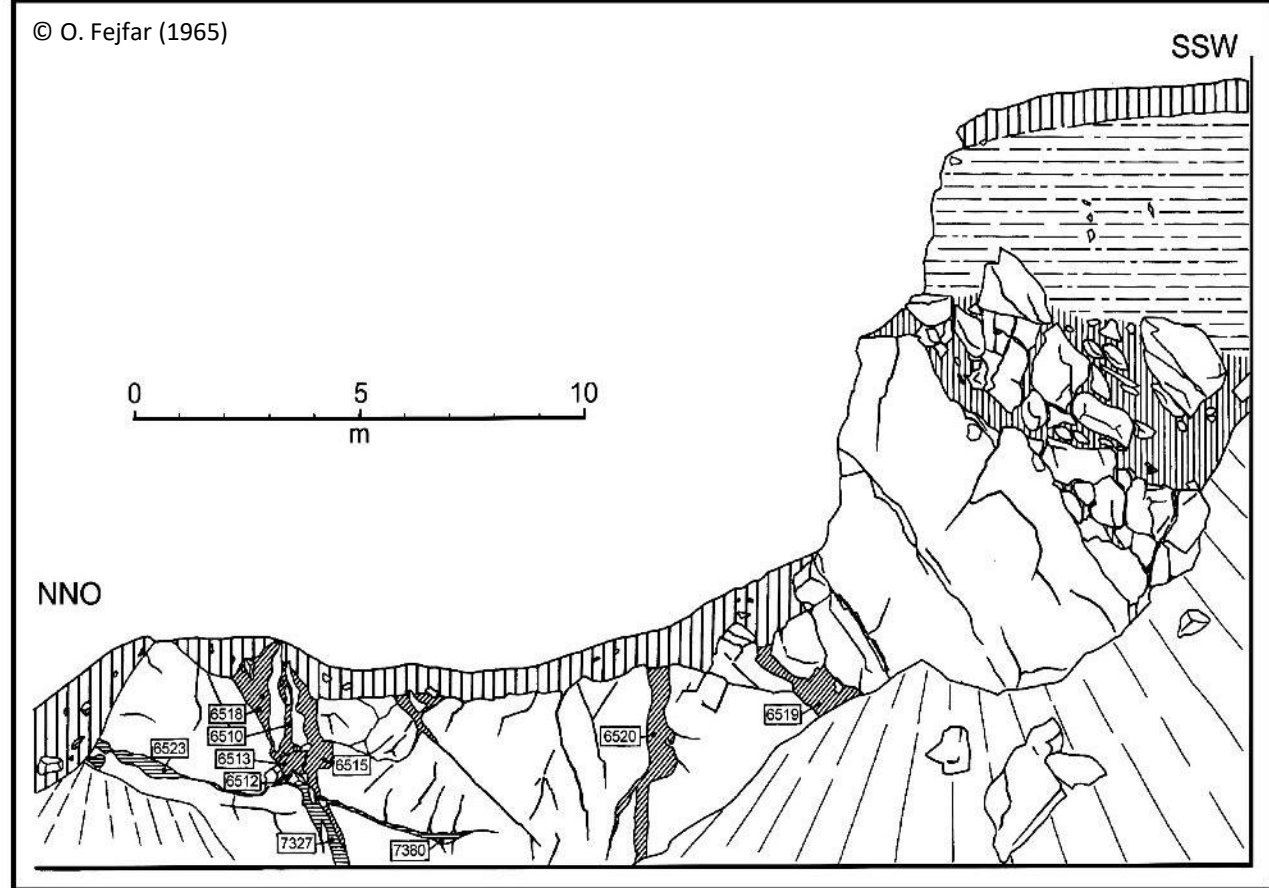
<https://www.slideserve.com/major/ko-ick-kraj> (2025)

IVANOVCE

photo: O. Fejfar (1965)



© O. Fejfar (1965)



The **Ivanovce** site is situated in western Slovakia, approximately 12 km south-west of Trenčín town ($48^{\circ}49'30''$ N, $17^{\circ}54'14''$ E) and its early Pliocene fossil assemblage comes from the reddish clays of tectonically disturbed vertical and horizontal karst fissures in Triassic limestone, numbered originally by **O. Fejfar** as 6510, 6512, 6513, 6520, 6521, 6523, 6524, 6530, and 6571. In 1961, Fejfar distinguished **Ivanovce I (A)** – sedimentary fillings of karst cavities with bean-ores and **Ivanovce II (B)** – sedimentary fillings of karst cavities or pockets without bean-ores.

IVANOVCE

AMPHIBIA

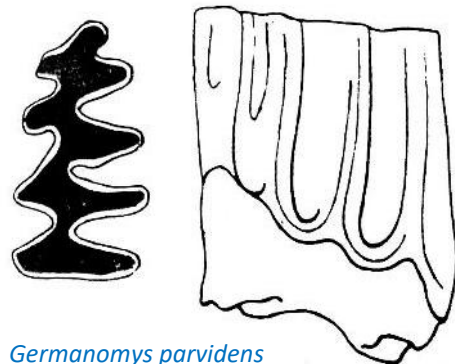
Bombina cf. *bombina*
Bombina cf. *variegata*
Latonia kolebabi
Eopelobates cf. *bayeri*
Pelobates cf. *fuscus*
Pliobatrachus langhae
Pliobatrachus sp. II indet.
Hyla cf. *arborea*
Bufo bufo
Rana cf. *temporaria*
Rana cf. *arvalis*,
Rana cf. *dalmatina-latastei*
Rana esculenta – Formenkreis
Salamandra salamandra
Triturus cristatus
Triturus vulgaris
Triturus cf. *marmoratus*
Triturus cf. *alpestris*
Chioglossa seu *Mertensiella* nov. sp.
Chelotriton-Tylotriton – Formenkreis

REPTILIA

Ohisaurus sp.
Pseudopus pannonicus
Pseudopus apodus
Anguis fragilis
Emys orbicularis
Emydidae gen. et spec. indet.
?Chelydridae gen. et spec. indet.

AVES

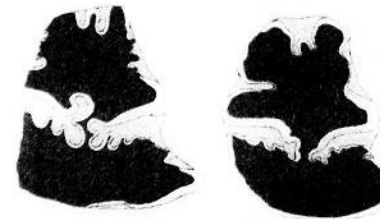
Passeriformes gen. et spec. indet.
Turdus sp.
Hirundo rustica
Palaeocryptonyx donnezani



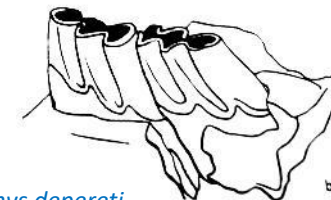
Germanomys parvidens
m1 sin. (Fejfar 1961)

LAGOMORPHA

Pliopentalagus dietrichi
Hypolagus petenyii
Ochotonoides csarnotanus



Pliopentalagus dietrichi
P3s and lower molars (Fejfar 1961)



Trilophomys depereti
mandible with m1-m2 (Fejfar 1961)

RODENTIA

Pliopetaurista pliocaenica
Pliopetaurista dehneli
Selevinia nov. sp.
Glis minor
Muscardinus pliocaenicus
Estramomys sp.
Eomyops sp.
Kowalskia intermedia
Allocricetus cf. *bursae*
Cricetus sp.
Trilophomys depereti
Mimomys (*Cseria*) *gracilis*
Mimomys davakosi
Dolomys (*Hintonia*) *occitanus*
Germanomys parvidens
Germanomys weileri
Baranomys loczyi
Apodemus sp.
Rhagapodemus frequens
Castor fiber ssp.
Dipoides cf. *problematicus*
Prospalax priscus
Hystrix cf. *depereti*

IVANOVCE

CARNIVORA

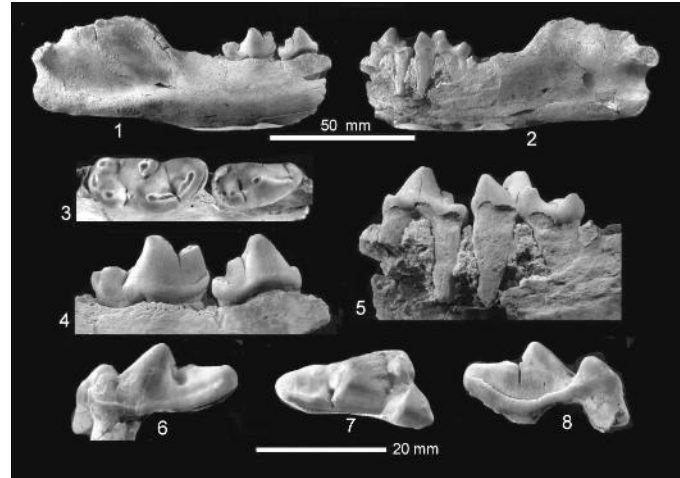
Hesperoviverra carpathorum

Viverridae gen. et spec. indet.

Agriotherium sp.

Parailurus cf. *anglicus*

Martellictis ardea



Hesperoviverra carpathorum: mandible dext. with p4-m1 (in detail) and P4 sin. (author: O. Fejfar)

EULIPOTYPHILA

Erinaceus sp.

Talpa minor

Talpa fossilis

Desmana nehringi

Archaeodesmana sp.

Desmanella sp.

Galemys sp.

Asoriculus gibberodon

Blarinoides mariae

Beremendia fissidens

Deinsdorfia fallax

Paenelimnoecus pannonicus

Paenelimnoecus sp.

Petenyia hungarica

Crocidura sp.

Neomyini gen. et spec. indet.

Sorex minutus

Sorex sp. 1

Sorex sp. 2

Sulimskia kretzoi

Zelceina soriculoides

Allosorex stenodus

Paranourosorex gigas

CHIROPTERA

Rhinolophus cf. *variabilis*

Rhinolophus lissiensis

Rhinolophus aff. *kowalskii*

Myotis kormosi

Myotis cf. *mystacinus*

Myotis cf. *podlesicensis*

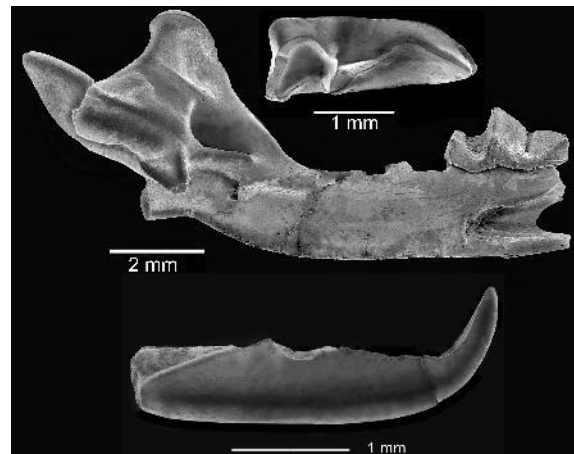
Myotis cf. *exilis*

Myotis cf. *delicatus*

PRIMATES

Semnopithecus sp.

(= *Mesopithecus monspessulanus*)



Allosorex stenodus: m1 sin., mandible sin. with m1, and lower incisor (author: O. Fejfar)

PERISSODACTYLA

Tapirus arvernensis

Rhinocerotidae indet.

ARTIODACTYLA

Sus minor

Alephis sp.

cf. *Tuscomeryx* sp. nov.

Procapreolus sp.

Cervidae gen. et spec. indet. I

Cervidae gen. et spec. indet. II

PROBOSCIDEA

Anancus arvernensis

„Mammut“ *borsoni*

IVANOVCE

the assemblage is probably older than 3.55 Ma BP

Early Pliocene, Zanclean (Mediterranean chronostratigraphy) – Early Romanian (Paratethys chronostratigraphy)
Ruscinian, Mimomys-Ruscinomys Stage, Mimomys occitanus Substage, **MN 15b**



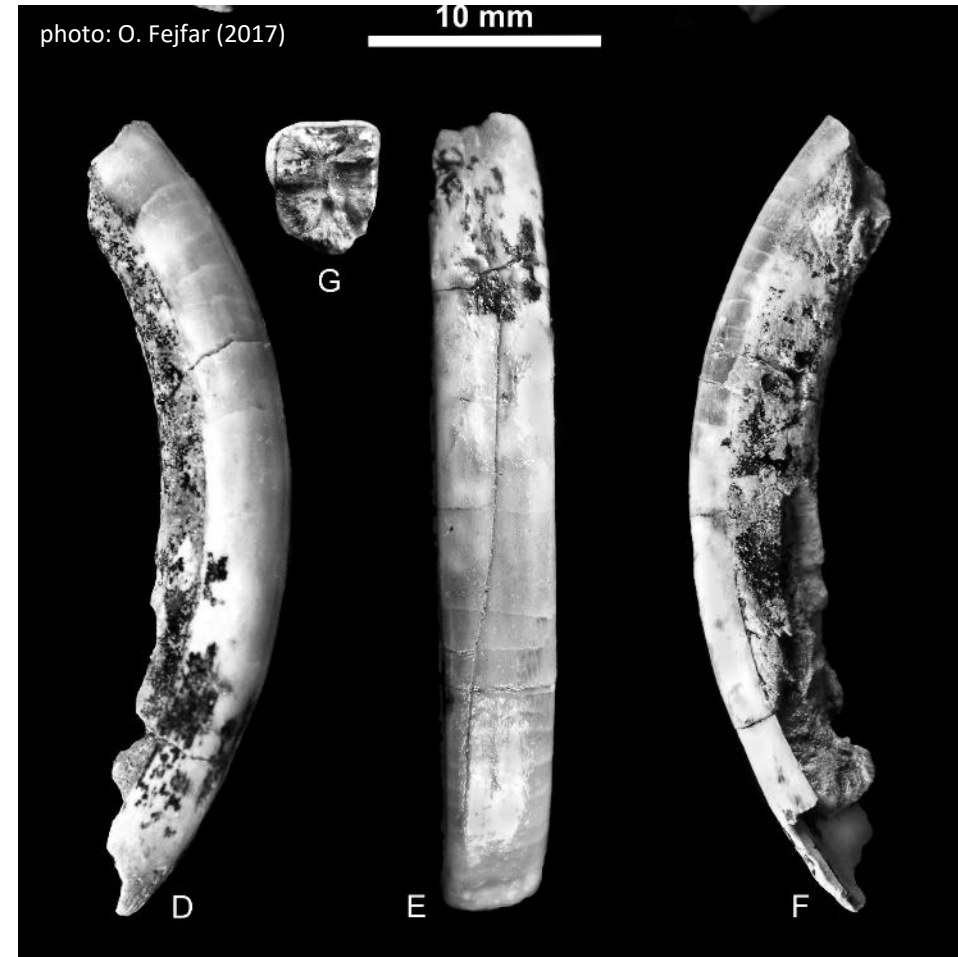
humid forest environment along the river valley (paleo-Váh) with limestone karst and with the occurrence of drier grasslands at higher elevations

the Pliocene equivalent of the foothills of present-day Southeast Asia

IVANOVCE



Ivanovce – “Kapsa 2”
situated the opposite to the main quarry wall
early Biharian assemblage with *Mimomys savini*



Hystrix sp. (*H. refossa* seu *H. vinogradovi*)
Isolated upper left incisor

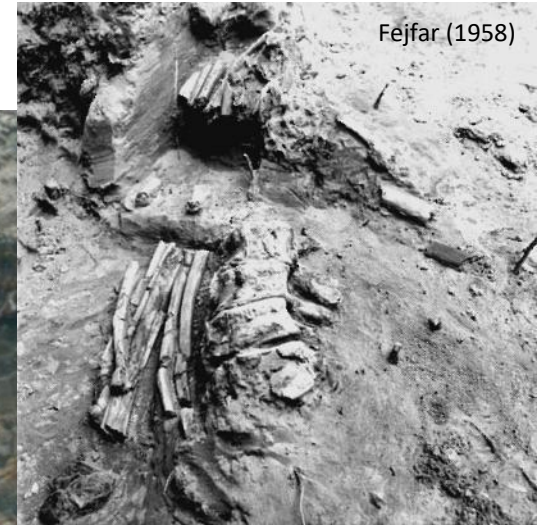
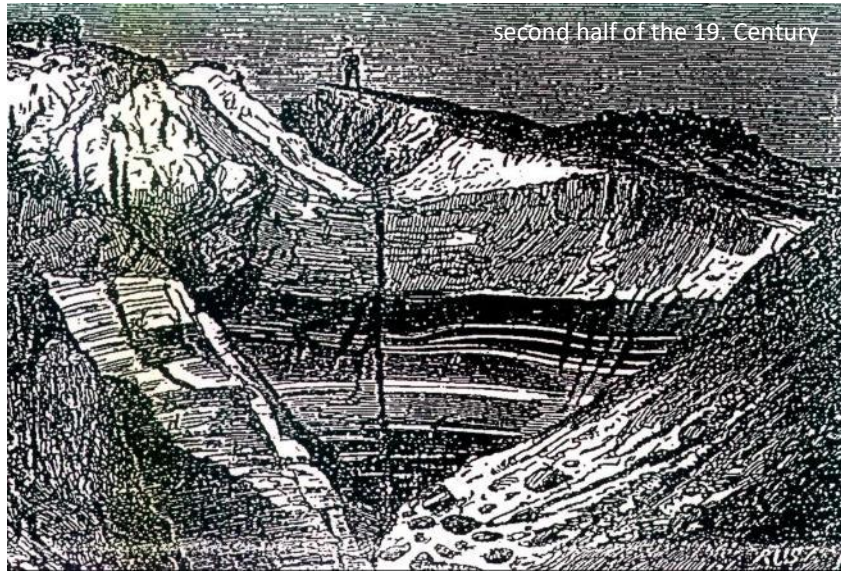
HAJNÁČKA

photo: Fejfar (1959)



The **Hajnáčka** locality (Hajnáčka I and Hajnáčka II) is situated approximately 1.5 km south-east of Hajnáčka village in the Novohrad Basin near Rimavská Sobota town, Southern Slovakia ($48^{\circ}12'35''$ N, $19^{\circ}58'00''$ E). The **Hajnáčka I** fossiliferous sequence consists of fine grained, tuffaceous and poorly indurated sediments (silty sands, tuffites and pyroclastic inclusions) deposited in a small volcanic lake and partly redeposited by solifluction. The **Hajnáčka II** site is formed by solid volcanic rock (tuffites and pyroclastics).

HAJNÁČKA



Fossil mammalian remains from Hajnáčka were first reported in 1863 by Kubinyi, later by Szabó and Schafarzik. The first research of the site was realized by Kormos in 1917, then by Fejfar in the late 1950s, and the last one was carried out in 1996 – 2000.

HAJNÁČKA

EVERTEBRATA

Anodonta sp.

CHONDRICHTHYES

Carcharias cuspidatus

?*Carcharias* sp.

Odontaspis acutissimus

Carcharhinus priscus

Elasmobranchii indet.;

AMPHIBIA

Pliobatrachus sp.

Bufo bufo

Rana cf. *temporaria*

Rana cf. *arvalis*

Rana cf. ex gr. *dalmatina-latastei*

Anura indet.

REPTILIA

Chelydra aff. *decheni*

Emys orbicularis

Testudinata indet.

Ophisaurus sp.

AVES

Bucephala clangula

LAGOMORPHA

Hypolagus petenyii

RODENTIA

Pliopetaurista pliocaenica

Sciurus sp.

Seleviniidae nov. spec.

Prospalax priscus

Castor fiber

Trogontherium minus

Mimomys (*Mimomys*) *hassiacus*

Mimomys (*Cseria*) *stehlini*

Germanomys sp.

Ungaromys sp.

Baranomys loczyi

Arvicolinae gen. et spec. indet.

Apodemus sp.

CARNIVORA

Lutra cf. *bravardi*

Megantereon sp.

Parailurus hungaricus

Pliocrocuta perrieri

Mustela sp.

Ursidae gen. et spec. indet.

EULIPOTYPHLA

Talpa cf. *minor*

Talpa fossilis

Desmana nehringi

Blarinoides mariae

Beremendia fissidens

Deinsdorfia hibbardi

Petenya hungarica

Soricidae gen. et spec. indet.

PRIMATES

Semnopithecus sp.

(= *Mesopithecus* sp.)

PERISSODACTYLA

Tapirus arvernensis

Stephanorhinus jeanvireti

ARTIODACTYLA

Sus minor

Euprox pidoplitschkoi

(= *Muntiacus* cf. *polonicus*)

Croizetoceros ramosus

Metacervoceros pardinensis

cf. *Arvernoceros ardei*

Cervidae gen. et spec. indet. I

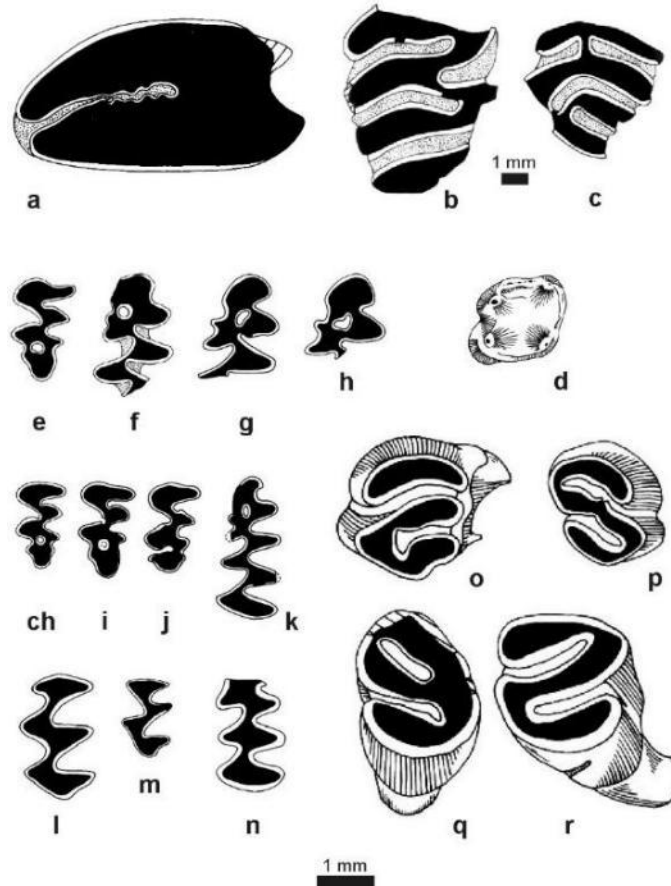
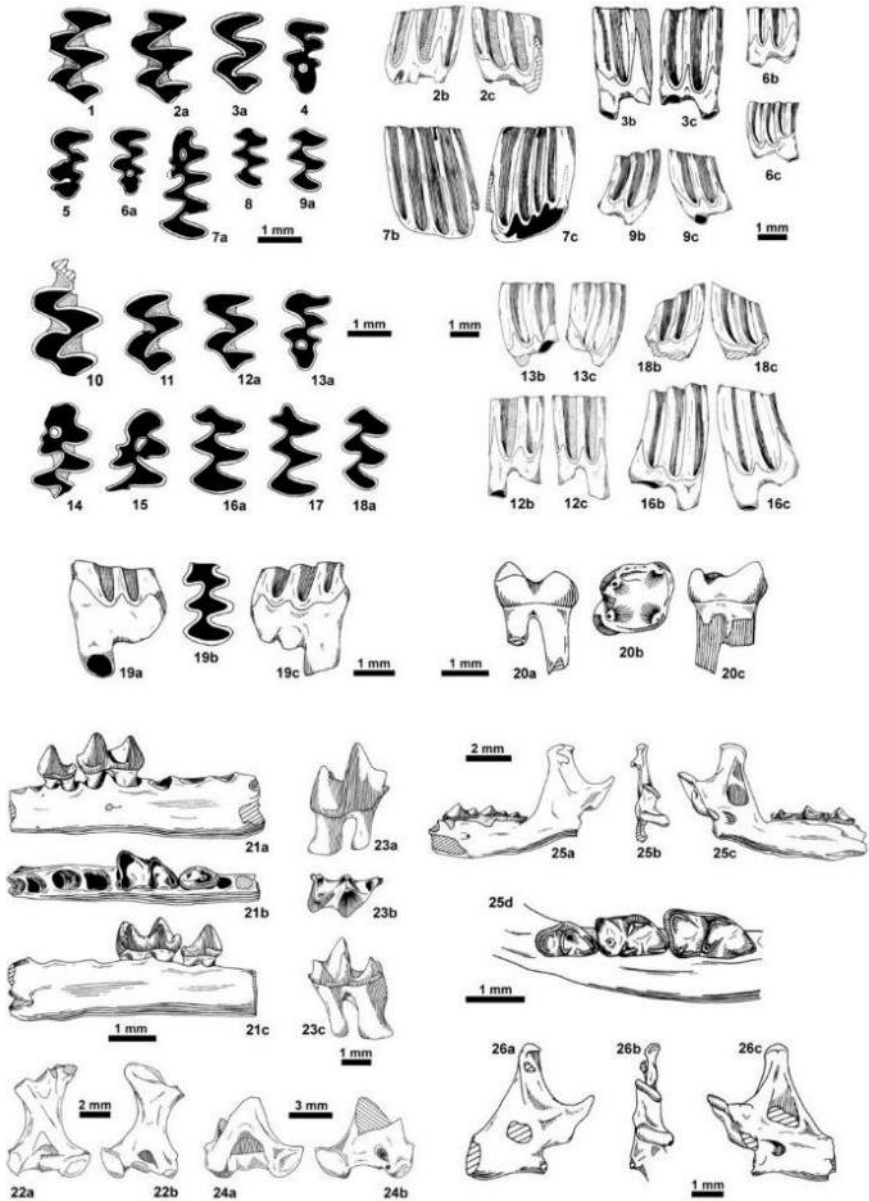
Cervidae gen. et spec. indet. I

PROBOSCIDEA

Anancus arvernensis

„Mammut“ *borsoni*

HAJNÁČKA



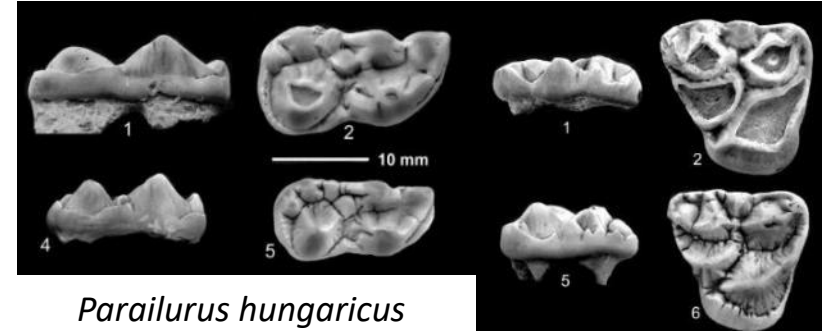
Mimomys stehlini – *Mimomys hassiacus*

Germanomys – *Ungaromys*

Sciurus – *Castor* – *Prospalax* – *Apodemus*

Talpa – *Deinsdorfia* – *Beremendia* – *Blarinoides*

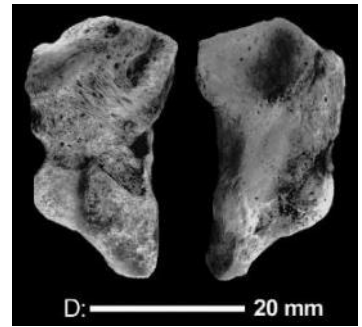
Hypolagus



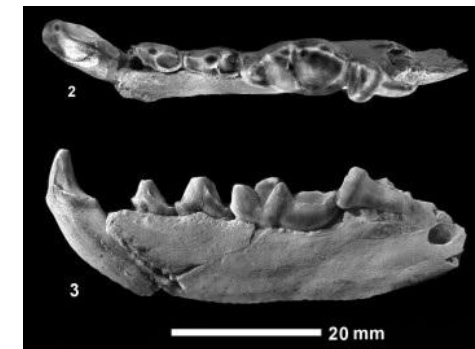
Parailurus hungaricus



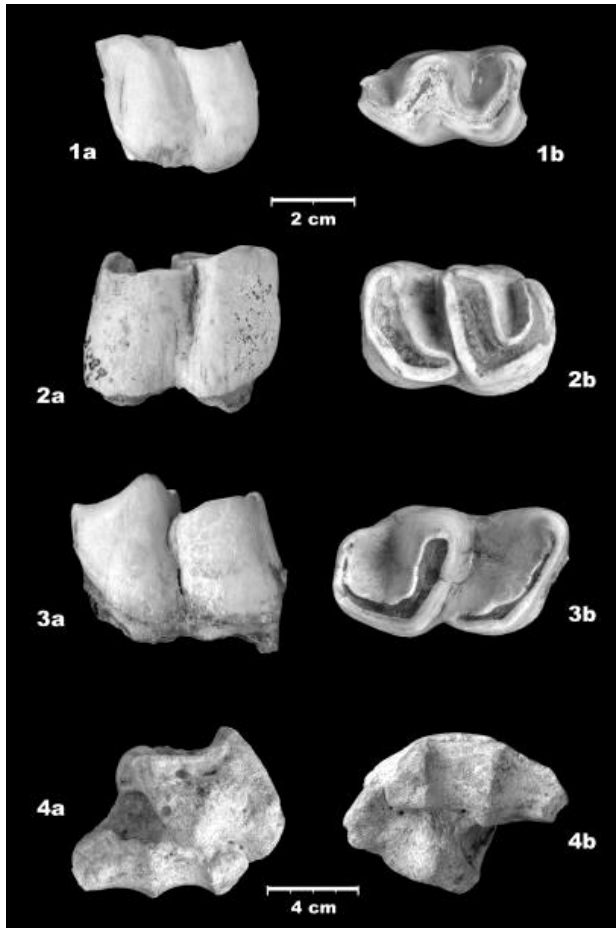
Pliocrocota perrieri



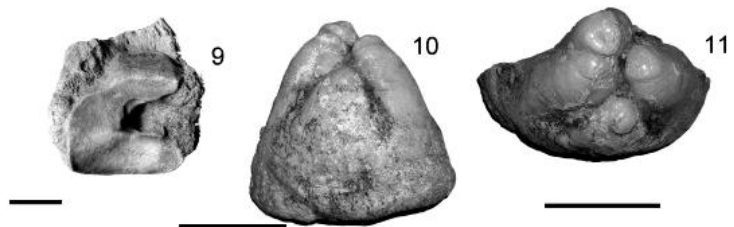
Megantereon sp.



Lutra cf. *bravardi*

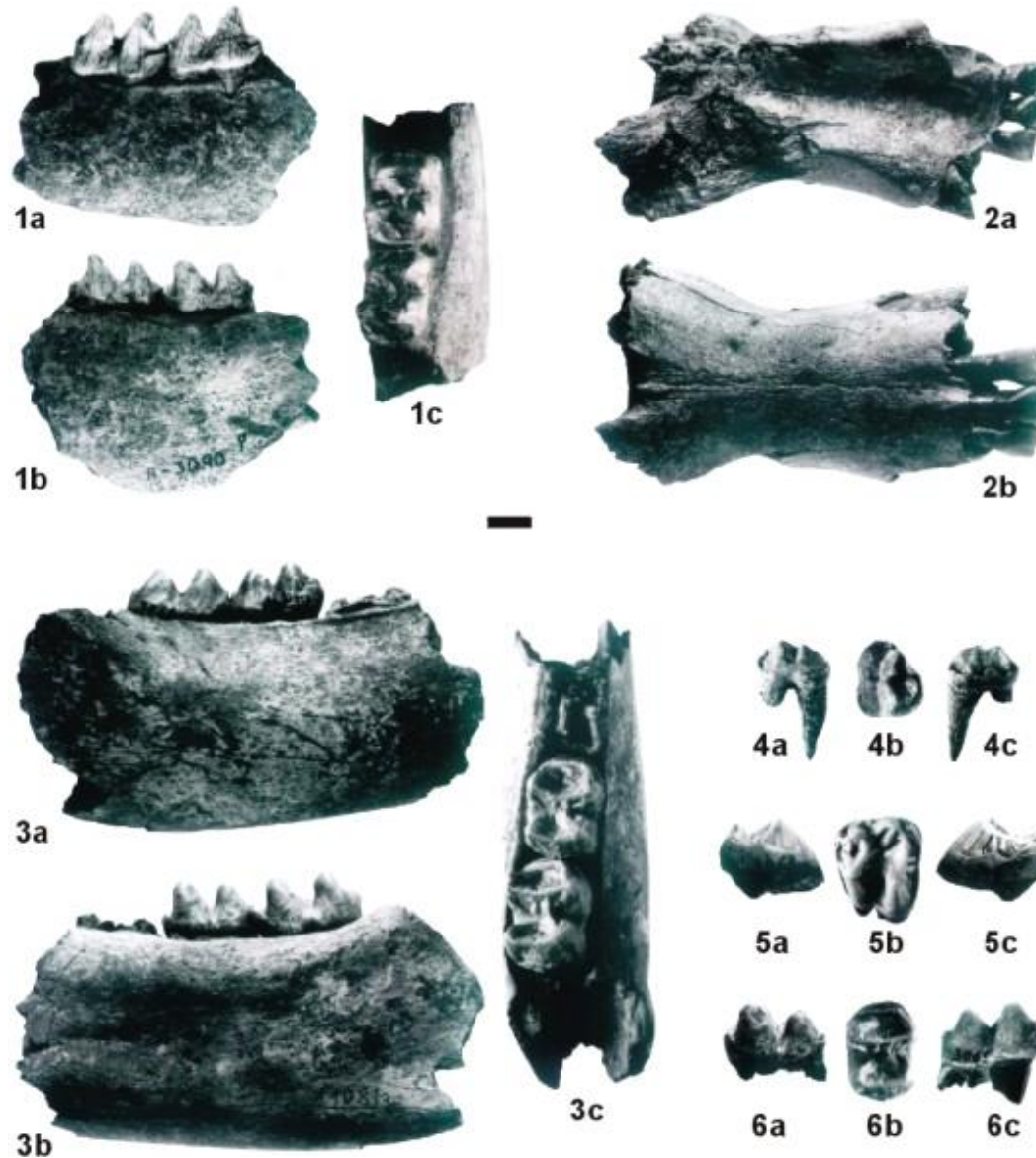


Stephanorhinus jeanvireti



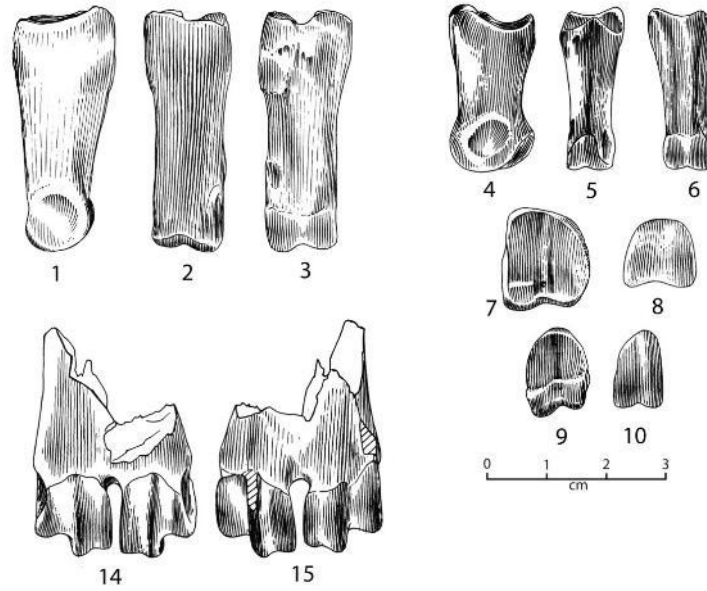
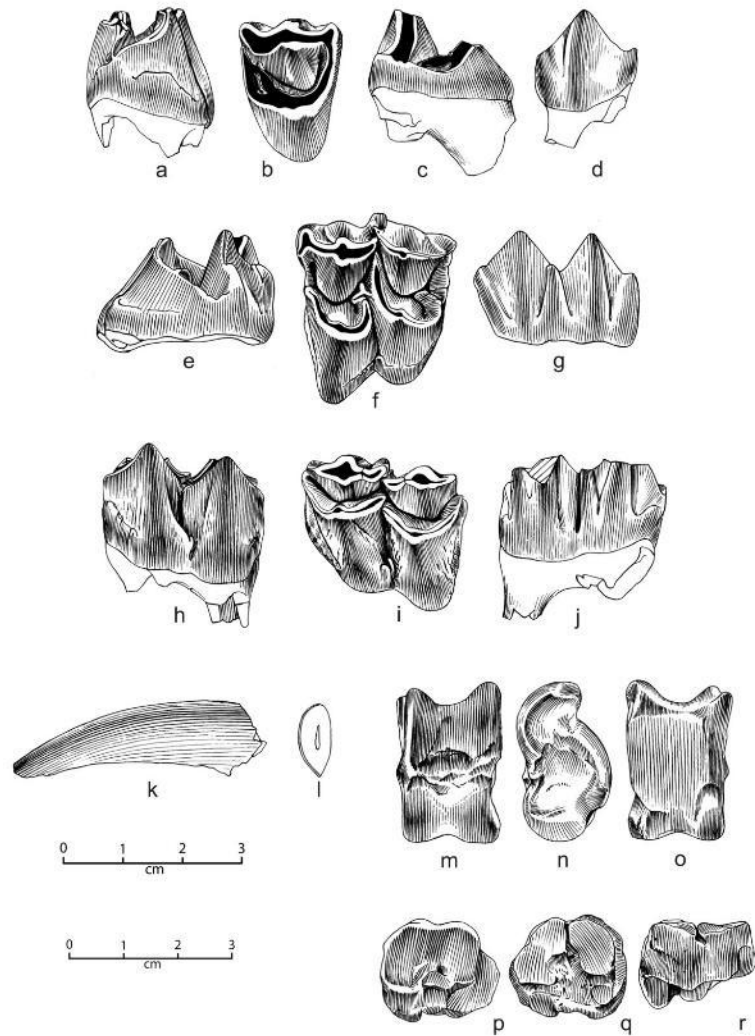
Anancus arvernensis – Mammuth borsoni

HAJNÁČKA

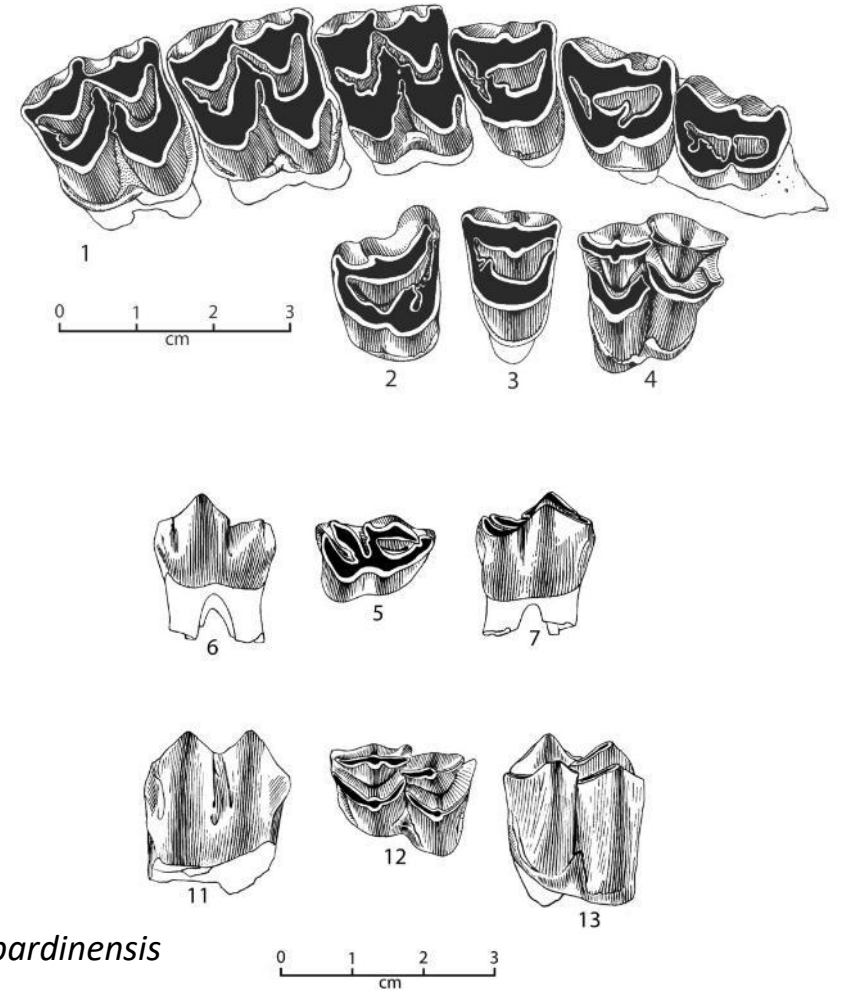


Tapirus arvernensis

HAJNÁČKA



Croizetoceros ramosus



Metacervoceros pardinensis

Euprox pidoplitschkoii

HAJNÁČKA

the assemblage is younger than 3.55 Ma BP (3.30 – 2.80 Ma BP)

Late Pliocene, Piacenzian (Mediterranean chronostratigraphy) – Romanian (Paratethys chronostratigraphy)
Villányian, Borsodia-Dolomys Stage, Mimomys hassiacus Substage, **MN 16a**



more humid mesophytic forest environments around water sources (presence of volcanic activity)
occurrence of drier grasslands and montane vegetation

Pliocene equivalents of habitats of present-day Southeast Asia

VČELÁRE



The site is a big quarry situated on the Slovak-Hungarian border, 1 km from Včeláre village near Turňa town in Košice district, southern Slovakia (48° 33' N, 20° 49' E). Some fissure fillings of various age were discovered here (**Včeláre 1-7, 10**). Except for site of **Včeláre 2**, all others are of the Early Pleistocene age, moving from the Late Villányian (MN 17) to the Middle Biharian (Q2).

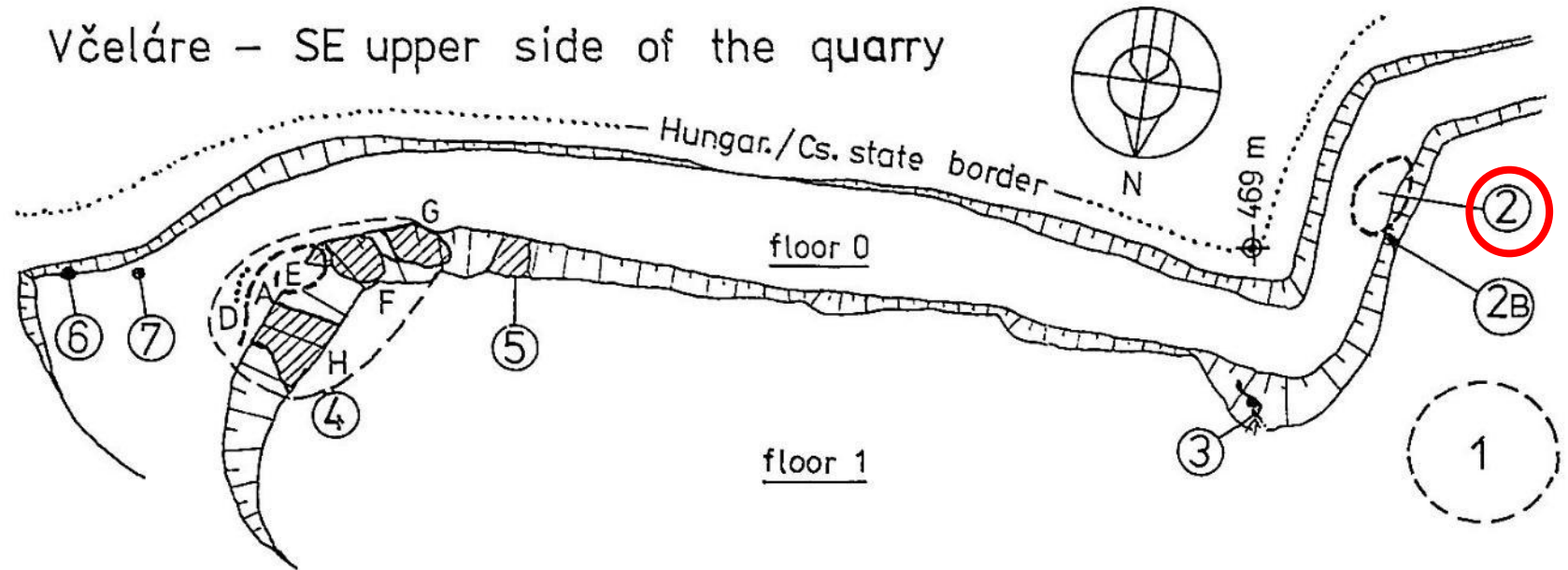
Horáček (1985)

Včeláre 2

A large fossil karst cavern filled by lithified yellowish ochrous to reddish clayed sediments with numerous vertebrate remains. The site was destroyed by mining in 1977.

Late Pliocene

(MN 16b or MN 16/17)



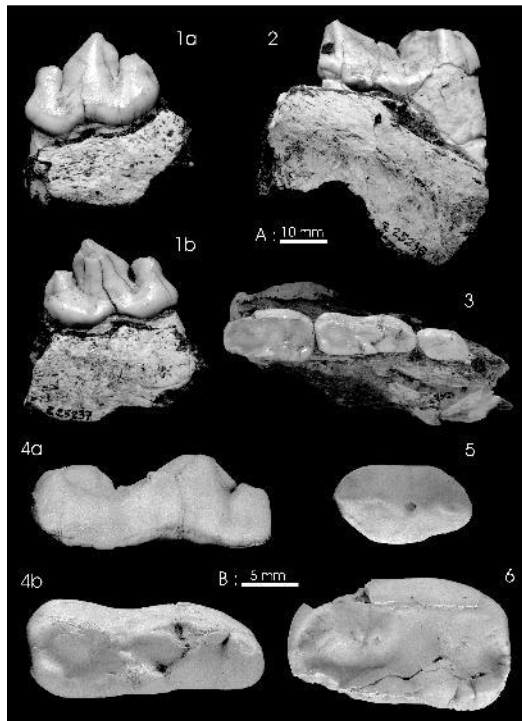
Position of individual fossil sites (indicated by corresponding numbers) in the quarry Včeláre (schematized)

VČELÁRE 2

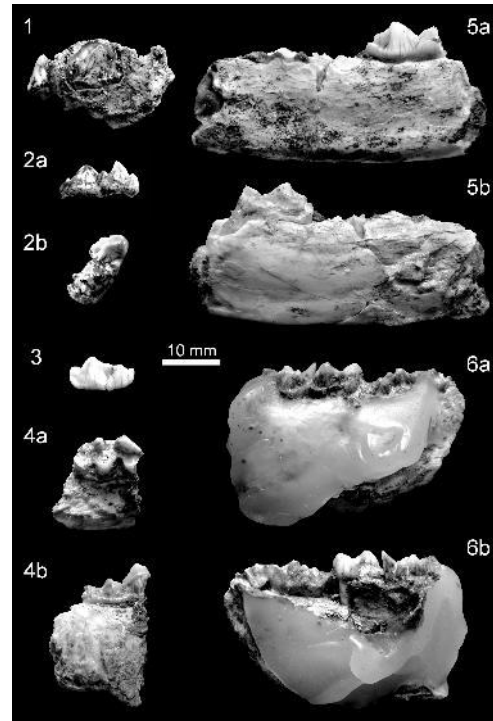
FAUNA (preliminary results)

Homotherium crenatidens
Parailurus sp. (nov. sp.)
Ursus minimus

Pseudopus pannonicus
Macaca salvanus florentina
Pliopetaurista sp.
Tapirus sp.
Anancus arvernensis
„*Mammut*“ *borsoni*



Homotherium crenatidens (1-2) and
Ursus minimus (3-6) (Sabol et al. 2008)



Parailurus sp. (Sabol et al. 2008)



photo: Holec (1976)

Včeláre 2B

Debris cone of a yellowish ochrous clayed loam under a narrow vertical fissure near the site of Včeláre 2. The site was destroyed by mining in 1978.

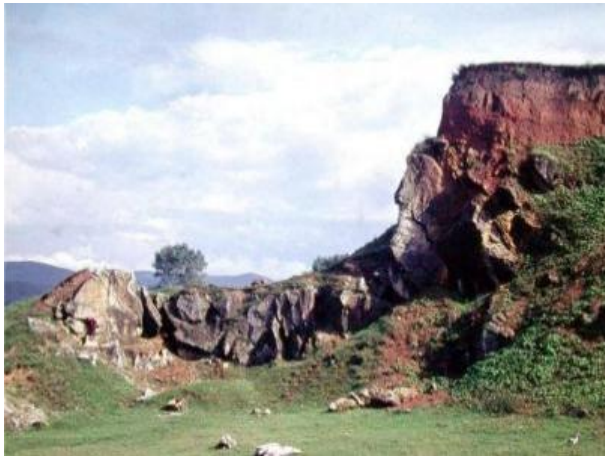
Late Pliocene

(MN 16b or MN 16/17)

Anura gan. et spec. indet.
Ophisaurus sp.
Blarinoides mariae
Zelceina cf. *soriculoides*
Apodemus cf. *dominans*

“PLIOCENE SITE SUCCESSION“

Ivanovce



MN 15b



Hajnáčka



MN 16a



Včeláre 2



MN 16b (MN 16/17)

FROM EARLY TO LATE PLIOCENE

(from the period after the Early Pliocene Climatic Optimum (EPCO) to the onset of the Early Pleistocene cooling)

Oldřich Fejfar at the Hajnáčka site (1959)



THANK YOU FOR YOUR ATTENTION