

Neogene carnivores of Slovakia

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Abstract. The fossil findings of the Neogene carnivores are found relatively rarely in the Western Carpathians. In spite of it, so far eight Neogene localities with approximately thirty-five taxa of carnivores are known in the territory of Slovakia. Author gives an overview of these eight mammalian localities. The localities were correlated on the base of biochronological MN zonation of the continental Neogene of the Europe and Western Asia. Also, the carnivorous associations and literature references for these localities are given.

Key words: Neogene, Biostratigraphy, Carnivores, Western Carpathians (Slovakia)

The Neogene Mammalian Localities and their Fauna of Carnivores

The findings of the Neogene fossil carnivores are found relatively rarely in Slovakia. In spite of it, so far eight Neogene localities with approximately thirty-five taxa of carnivores are known (Tab. 1). An overview of them is given in this paper.

The geologically oldest locality is **Devínska Nová Ves – Štokrav limestone pit** (MN 6, Astaracian, Lower? - Middle Badenian, Middle Miocene, Estimated age: 15.0 - 16.4 Ma.) is situated in a quarry at the left side of the railway from Bratislava to Brno (Fig. 1). The quarry is formed in the dark recrystallised Jurassic limestone with fissures running in the N – S direction. These fissures are often filled with sinter, cave sediments, sands, „terra rossa“ and „terra fusca“. A large quantity of the vertebrate bones has been discovered in two of them. The fossil remains of the carnivores have been described by Zapfe (1950). They belong to five families: Mustelidae (*Trocharion albanense* F. MAJOR, 1903; Mustelidae gen. et spec. indet.), Amphicyonidae (*Alopecodon leptorhynchus* (FILHOL, 1883)), Ursidae (*Hemicyon sansaniensis* LARTET, 1851; *Hemicyon* cf. *sansaniensis* LARTET, 1851; *Ursavus brevirohinus* (HOFMANN, 1887)), Amphicyonidae (*Amphicyon maior* BLAINVILLE, 1842; *Amphicyon* cf. *steinheimensis* FRAAS, 1885) and Felidae (*Ailurictis jourdani* KRETZOI, 1929; *Pseudaelurus* sp.).

The **Devínska Nová Ves – Sandberg** (MN 7/8, Astaracian, Late Badenian, Middle Miocene, Estimated age: 12.8 - 13.8 Ma.) is one of the best-known Miocene mammalian localities in Slovakia (Fig. 1). The locality is situated in the southern border of Devínska Nová Ves village and in the northwestern foothills of Devínska Kobyla. This significant paleontological site consist of the Badenian sands, sandy limestone, algal limestone and gravel layers. Rich terrestrial and marine fauna of the vertebrates and invertebrates has been discovered here. The marine

fauna indicates a shallow littoral facies. Faunal list of the Sandberg fossil vertebrates is in the article from Holec and Sabol (1996), where these carnivorous taxa are put out: Mustelidae (*Mionictis dubia* (BLAINVILLE); *Trocharion albanense* F. MAJOR, 1903; *Paleogale* sp.), Pinnipedia (*Potamotherium miocenicum* (PETTERS, 1868); *Pristiphoca vetusta* ZAPFE), Ursidae (*Hemicyon sansaniensis* LARTET, 1851 (*H. goeriachensis* (TOULA, 1884) after Ginsburg, 1999); *Ursavus brevirohinus* (HOFMANN, 1887)), Amphicyonidae (*Amphicyon* sp.; *Pseudarctos* aff. *bavaricus* Schlosser, 1899), Felidae (*Pseudaelurus lorteti* GAILLARD, 1899; *Pseudaelurus turnauensis* (HOERNES, 1882)).

The locality **Devínska Nová Ves – Bonanza** (MN 7/8, Astaracian, Late Badenian, Middle Miocene, Estimated age: 12.8 - 13.8 Ma.), which was discovered by Š. Meszároš in the year 1982, is situated in the same quarry as the locality Štokrav limestone pit (Fig. 1). It is in a large fissure running in the WNW – ESE direction. Besides fossil remains of the terrestrial vertebrates the sediments contain also fossil remains of the marine vertebrates. Findings of frogs indicate the presence of an fresh-water environment in near vicinity of the locality (Holec et al., 1987). Representatives of three carnivorous families have been found here only: Mustelidae (*Trocharion albanense* F. MAJOR, 1903 and *Plesictis* sp.), Phocidae (*Devinophoca claytoni* KORETSKY; *Pristiphoca vetusta* ZAPFE; Phocidae gen. et spec. indet.) and Viverridae (Viverrinae gen. et spec. indet.).

The next locality near **Devínska Nová Ves** is **Wait quarry** (MN 7/8, Astaracian, Late Badenian, Middle Miocene, Estimated age: 12.8 - 13.8 Ma.). It is abandoned quarry in the western foothill of Devínska Kobyla, approximately 700 m southward of the Sandberg (Fig. 1). The site is situated in the Jurassic carbonates with transgressive horizontal layers of the Badenian sands, especially in the upper parts of the quarry. These sands contain a large quantity of the fish and seal (*Pristiphoca vetusta* ZAPFE) fossil remains.

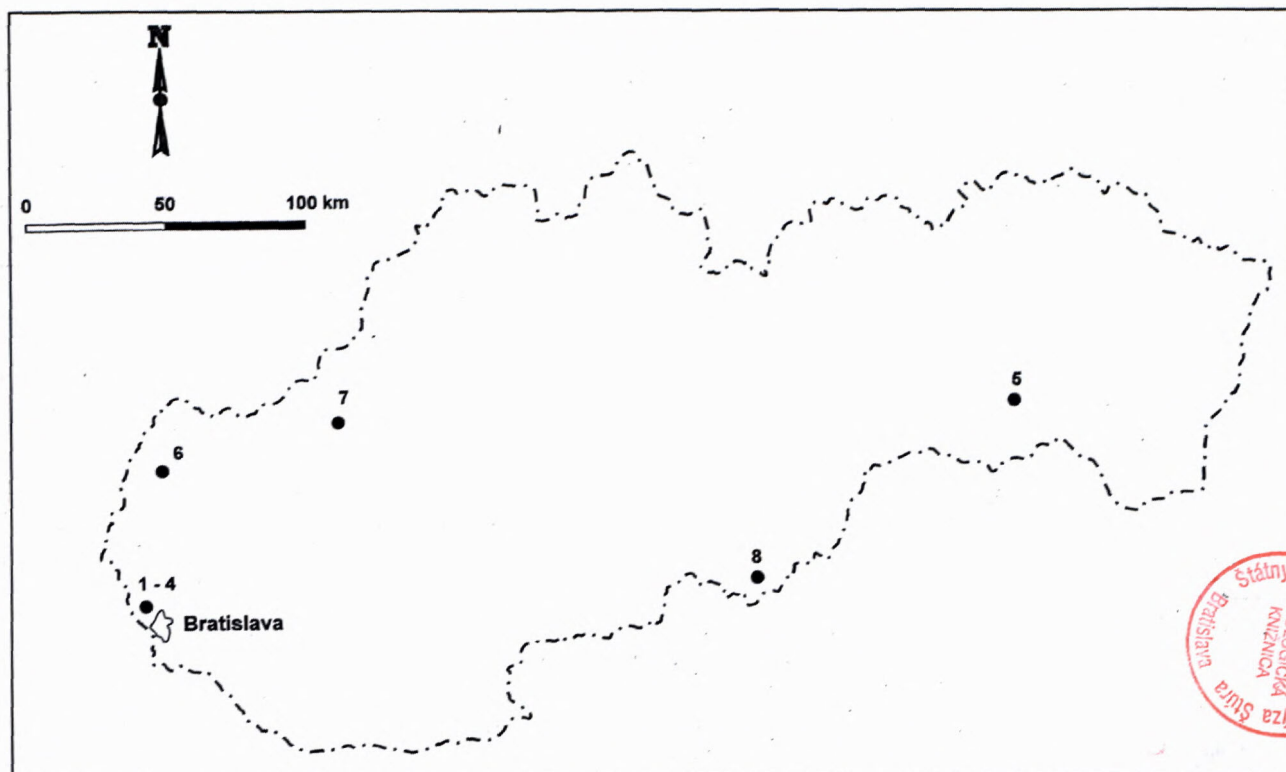


Fig. 1 Location of Neogene carnivores sites in Slovakia

1. Devínska Nová Ves – Štokerav limestone pit; 2. Devínska Nová Ves – Sandberg; 3. Devínska Nová Ves – Bonanza; 4. Devínska Nová Ves – Wait quarry; 5. Košice-Bankov; 6. Borský Svätý Jur; 7. Ivanovce near Trenčín; 8. Hajnáčka.

From the Miocene fissure filling of the magnesite quarry **Košice – Bankov** (MN 7/8, Astaracian, Sarmatian, Middle Miocene, Estimated age: 11.2 - 12.8 Ma.) in the Eastern Slovakia (Fig. 1) some cranial fragments of *Lophocyon carpathicus* FEJFAR, SCHMIDT-KITTLER et ZACHAROV, 1987 have been discovered. This genus from the family Viverridae is closely related to the Miocene *Sivanasua* Pilgrim and *Euboictis* FEJFAR et SCHMIDT-KITTLER reported from the central and southern Europe (FEJFAR et al., 1987).

The loam pit of the brick yard in **Borský Svätý Jur** (MN 11, Turolian, Upper Pannonian, Late Miocene, Estimated age: 7.5 - 9.0 Ma.) is situated 75 km N from Bratislava in the Vienna Basin (Fig. 1). Lithologically the locality is characterized by the clayey silts with some sandy beds, silty sands and fine sands, which contain fossil remains of the ostracods, molluscs, and vertebrates. A large quantity of vertebrate remains belong to mammals. Besides representatives of the insectivores, rodents, artiodactyls and perissodactyls, the fossil carnivores have been found here too. They belong to individuals of the taxa Mustelidae (*Eomellivora wimani* ZDANSKY, 1924) (Lupták, 1985a) and Hyaenidae (*Ictitherium viverrinum* ROTH et WAGNER, 1854) (LUPTÁK, 1985b).

The fossils of carnivores have been described from the sediments of fissures in the stone quarry **Ivanovce near Trenčín** (MN 15, Ruscinian, Romanian, Late Pliocene, Estimated age: 3.6 - 4.4 Ma.) together with a quantity of the micromammal fossil remains and other mammal findings (Fig. 1). These carnivore remains belong to representatives

of four families: Mustelidae (*Lutra* cf. *bravardi* POMEL, 1843 and *Proputorius* sp.), Procyonidae (*Parailurus* sp.), Viverridae (*Hesperoviverra carpathorum* (KRETZOI et FEJFAR, 1982)) and Hyaenidae (Hyaenidae gen. et spec. indet.) (FEJFAR & HEINRICH, 1985).

The locality **Hajnáčka I** (MN 16a, Lower Villafranchian, Romanian, Late Pliocene, Estimated age: 2.8 - 3.5 Ma.) is situated near Hajnáčka village in the Rimavská Sobota district in the southern Slovakia (Fig. 1) and was discovered in 1863. The fossiliferous sequence, which has been deposited in a small lake, consists mainly of the fine grained, tuffaceous and poorly indurated sediments (silty sands, tuffites and pyroclastic inclusions). The excavated fauna includes remains of the clams, fishes, reptiles, birds and mammals. The rare findings of the carnivores are represented by fossil remains of the individuals of the families Mustelidae (*Lutra* sp.), Procyonidae (*Parailurus hungaricus* KORMOS, 1934), Felidae (*Megantereon* sp.), Hyaenidae (*Pliocrocuta perrieri* (CROIZET et JOBERT, 1828)) (FEJFAR et al., 1990) and Ursidae (Ursidae gen. et spec. indet. (cf. *Ursus minimus*)).

The Neogene carnivores found in the Western Carpathians (Slovakia) cover a time span from the Middle Miocene to the Pliocene. The Middle Miocene carnivores were discovered mostly at the NE margin of the Vienna basin and are Middle to Late Badenian in age (MN 6 – MN 7/8, Astaracian). The age of the findings at the E margin of the Transcarpathian (East Slovakian) basin is the Sarmatian (MN 7/8, Astaracian). The fauna from the Borský Svätý Jur at the margin of the Vienna basin is

Tab. 1. List of the Neogene Carnivores of Slovakia

Carnivores/Localities	SLP	S	B	WQ	KB	BJ	IT	H
Mustelidae								
<i>Eomellivora wimani</i>						+		
<i>Mionictis dubia</i>		+						
<i>Trocharion albanense</i>	+	+	+					
<i>Lutra</i> cf. <i>bravardi</i>							+	
<i>Lutra</i> sp.								+
<i>Paleogale</i> sp.		+						
<i>Plesictis</i> sp.			+					
<i>Proputorius</i> sp.							+	
Mustelidae gen. et spec. indet.	+							
Pinnipedia								
<i>Potamotherium miocenicum</i>		+						
<i>Devinophoca claytoni</i>			+					
<i>Pristophoca vetusta</i>		+	+	+				
Phocidae gen. et spec. indet.			+					
Procyonidae								
<i>Parailurus hungaricus</i>								+
<i>Parailurus</i> sp.							+	
Amphicyonodontidae								
<i>Alopecodon leptorhynchus</i>	+							
Ursidae								
<i>Hemicyon sansaniensis</i>	+	+						
<i>Hemicyon</i> cf. <i>sansaniensis</i>	+							
<i>Ursavus brevirostris</i>	+	+						
Ursidae gen. et spec. indet.								+
Amphicyonidae								
<i>Amphicyon maior</i>	+							
<i>Amphicyon</i> cf. <i>steinheimensis</i>	+							
<i>Amphicyon</i> sp.		+						
<i>Pseudarctos</i> aff. <i>bavaricus</i>		+						
Viverridae								
<i>Hesperoviverra carpathorum</i>							+	
<i>Lophocyon carpathicus</i>					+			
Viverrinae gen. et spec. indet.			+					
Hyaenidae								
<i>Ictitherium viverrinum</i>						+		
<i>Pliocrocuta perrieri</i>								+
Hyaenidae gen. et spec. indet.							+	
Felidae								
<i>Ailurictis jourdani</i>	+							
<i>Pseudaelurus lorteti</i>		+						
<i>Pseudaelurus turnauensis</i>		+						
<i>Pseudaelurus</i> sp.	+							
<i>Megantereon</i> sp.								+

SLP – Štokrav limestone pit (MN 6), S – Sandberg (MN 7/8), B – Bonanza (MN 7/8), WQ – Wait quarry (MN 7/8), KB – Košice-Bankov (MN 7/8), BJ – Borský Svätý Jur (MN 11), IT – Ivanovce near Trenčín (MN 15), H – Hajnáčka (MN 16a).

from the Upper Miocene - Pannonian (MN 11, Turolian). The Pliocene (Romanian) findings are from the N margin of the Banube basin (near Trenčín; MN 15, Ruscinian) and from Hajnáčka in the Novohrad basin (MN 16a, Lower Villafranchian).

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