

# Stratigraphic distribution of the terrestrial carnivores in the Vallesian and Turolian of Ukraine

by

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## Zusammenfassung

In dieser Arbeit wird eine kurze Übersicht über die terrestrischen Carnivora von 18 Fundstellen des späten Miozäns der Ukraine gegeben. Es konnte gezeigt werden, daß viele Carnivoren der *Hipparion*-Fauna nur wenig für biostratigraphische Zwecke geeignet sind, und zwar aufgrund ihrer großen zeitlichen Reichweite. Sie lebten nämlich während des ganzen oder wenigstens fast des ganzen Obermiozäns im eurasischen Raum.

## Summary

A brief review of the terrestrial carnivores from 18 Late Miocene localities in Ukraine is given. It was established that many carnivores of the *Hipparion* fauna are poorly suitable for biostratigraphic use because of their wide temporal distribution — they lived in Eurasia during all or nearly all the Late Miocene.

## 1. Introduction

The territory of Ukraine is very promising to study the *Hipparion* fauna and the stratigraphy of Neogene continental sediments of Europe. First of all, in the late Miocene it was an area through which the main faunal interchange between Asia and Europe took place. Then, there are many localities with the remains of Vallesian and Turolian terrestrial mammals, which are very rich, both by the quantity of fossils, and by the taxonomic diversity of fauna. At last, as distinct from Asia and Western Europe, most of Ukrainian localities are well bound up with marine deposits. These factors allow creating a very detailed regional biostratigraphic scheme subdividing even the continental Maeotian sediments.

However, the published data (e.g., SAVAGE & RUSSELL, 1983) show that the *Hipparion* fauna of Ukraine is not well known for most of palaeontologists.

The present review is an attempt to improve at least partially the current situation. It includes: all available data on the geographic position of 18 Ukrainian localities of *Hipparion* fauna with the remains of carnivores, the chronological sequence; the names of localities transliterated from Ukrainian and Russian (in square brackets); a specified list of Carnivora from these localities; a comparison of the regional biostratigraphic scheme of the Late Miocene of Ukraine with MN-Zonation.

The present review is based on the collections of carnivore remains from the Late Miocene localities of Ukraine.

These collections are stored in: Palaeontological Museum of the National Museum of Natural History, National Academy of Sciences of Ukraine, Kiev (NNPM); All-Russian Research Geological Institute St. Petersburg (VSEGEI); Geological Institute of the Russian Academy of Sciences Moscow (GIN); Metschnikoff University of Odesa (OU), Ukraine; O.P. and M.V. Pavlovs Museum of the Moscow Geosynoptics Institute (MGR); Palaeontological Institute of the Russian Academy of Sciences, Moscow (PIN). In addition, for determination of the carnivores from Ukraine the materials from Kazakhstan and Moldova, stored in PIN, were examined, as well as the collections of the American Museum of Natural History, New York (Frick Collection); Geological Institute of Hungary, Budapest; Institute of Palaeobiology, Georgian Academy of Sciences, Tbilisi; Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Cracow; Institute of Zoology, Academy of Sciences of Kazakhstan, Almaty; National Museum of Natural History, Washington; Palaeontological Museum of the University of Uppsala (Lagrelus Collection); Pedagogic Institute of Tiraspol, Moldova.

The items of information about the geographic position and geological age of the localities, as well as the data about the collectors of the fossils and the places of storage of the collections were compiled from publications (mainly from DUBROVO & KAPELIST, 1979; KOROTKEVICH, 1988; KOROTKEVICH et al., 1985; KRAKHMALNAYA et al., 1993; PIDOPLICHKO, 1956; SEMENOV, 1989) with my

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alterations. The list of carnivores is given by literary sources DUBROVO & KAPELIST (1979); KOROTKEVICH & SEMENOV (1975); KOROTKEVICH et al. (1985); SEMENOV (1989, 1994); WOLSAN & SEMENOV (1996) with the corrections according to my determinations and the latest classification of Carnivora (MCKENNA & BELL, 1998). The biostratigraphic scheme of the late Miocene of Ukraine, used in the present article, developed by KOROTKEVICH (1988) and TOPATCHEVSKY et al. (1998).

## 2. Localities of the late Miocene terrestrial carnivores in Ukraine

**Hrytsiv [Gritsev]** (Text-fig. 1, 1; Tab. 1, 1): Shepetiv's'kyi District of Khmel'nyts'kyi Region; cave deposits in the limestone quarry (a reef zone) on the right bank of Khomora River; 3 km W from Hrytsiv Village; latitude 49°58' N, longitude 27°10' E. The Material was collected by NNPM (1983-1993), stored in NNPM.

**Klymentovychi [Klimentovichi]** (Text-fig. 1, 2; Tab. 1, 2): Shepetiv's'kyi District of Khmel'nyts'kyi Region; marine deposits in the granite quarry; about 1 km S from Klymentovychi Village; latitude 50°13' N, longitude 27°8' E. Material was collected by NNPM (1984, 1985), stored in NNPM.

**Zhovtokam'ianka [Zheltokamenka]** (Text-fig. 1, 3; Tab. 1, 3): Apostoliv's'kyi District of Dnipropetrovs'k Regi-

on; limestone quarry near Zhovtokam'ianka Village on the bank of Zhovten'ka River. Material was collected by P. Kozachenko, I. Tiurin and I. Pidoplichko (1940), stored in PIN.

**Sevastopol'** (Text-fig. 1, 4; Tab. 1, 4): Autonomous Republic Crimea; lenses in the upper part of the Sarmatian limestones in Chesmens'ka and Mors'ka Streets in Sevastopol' City. Material was collected by P. Leskevich (1908, 1909), stored in VSEGEI.

**Beryslav [Berislav]** (Text-fig. 1, 5; Tab. 1, 5): Beryslav's'kyi District of Kherson Region; limestone deposits on the left bank of Dnieper within Beryslav City. Material was collected by NNPM (1952-1955), stored in NNPM.

**L'vove [L'vovo]** (Text-fig. 1, 6; Tab. 1, 6): Kakhov's'kyi District of Kherson Region; baring of the limestone on the right bank of Kozak River (an anabranch of Dnieper) within L'vove Village. Material was collected by NNPM (1952), stored in NNPM.

**Grossulovo** (Text-fig. 1, 7; Tab. 1, 7): Velykomykhailiv's'kyi District of Odesa Region; ravine on the right side of Kuchurhan River Valley near Velyka Mykhailivka Village (precedently Grossulovo). Material was collected by I. Sintsov (1899) and V. Laskarev (1908), stored in PIN.

**Kryvyi Rih [Krivoi Rog]** (Text-fig. 1, 8; Tab. 1, 8): Dnipropetrovs'k Region, Kryvyi Rih; the quarry of "Pivdennyi Hirnychozbahachuval'nyi Kombinat" near the city. Material was collected by L. Bilokrys and M. Chernovsky, stored in NNPM and MGRI.

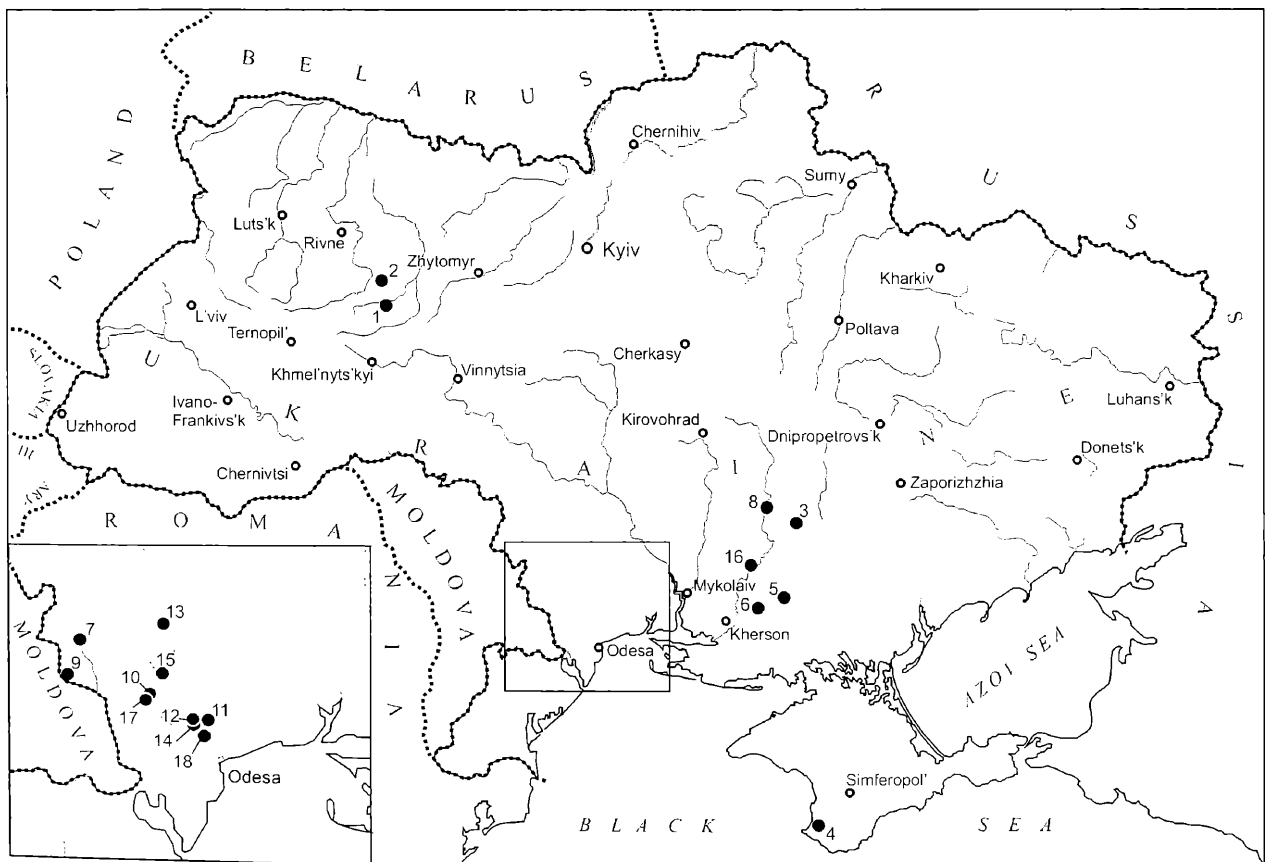


Figure 1: Ukrainian localities of the late Miocene terrestrial carnivores.

**Hrebennyky [Grebeniki]** (Text-fig. 1, 9; Tab. 1, 9): Velykomykhailivs'kyi District of Odesa Region; ravine "Frolovs'kyi Iar" near Hrebennyky Village. Material was collected by O. Alekseev (1915), V. Krokos and I. Pidoplichko (1934, 1935), stored in NNPM, OU and PIN.

**Novoukrainka 1** (Text-fig. 1, 10; Tab. 1, 10): Rozdil'nians'kyi District of Odesa Region; ravine near Novoukrainka Village. Material was collected by NNPM (1957-1959), stored in NNPM.

**Stara Kubanka [Staraiia Kubanka]** (Text-fig. 1, 11; Tab. 1, 11): Kominternivs'kyi District of Odesa Region; left bank of the estuary Kuial'nyts'kyi Liman near Stara Kubanka Village. Material was collected by NNPM (1960), stored in NNPM.

**Nova Emetivka [Novaia Emetovka] 1** (Text-fig. 1, 12; Tab. 1, 12): Biliaivs'kyi District of Odesa Region; ravine "Virchyn Iar" on the left bank of the estuary Khadzhybeis'kyi Liman within Nova Emetivka Village. Material was collected by O. Voznesens'ky (1936, 1937) and NNPM (1983), stored in NNPM.

**Novoelyzavetivka [Novoelizavetovka]** (Text-fig. 1, 13; Tab. 1, 13): Shyriaiivs'kyi District of Odesa Region; ravine near Novoelyzavetivka Village on the left side of Velykyi Kuial'nyk River Valley. Material was collected by A. Alekseev (1910-1912, 1915, 1916) and NNPM (1979, 1981), stored in NNPM and OU.

**Nova Emetivka [Novaia Emetovka] 2** (Text-fig. 1, 14; Tab. 1, 14): Biliaivs'kyi District of Odesa Region; ravine "Kostiv Iar" on the left bank of the estuary Khadzhybeis'kyi Liman on the south outskirts of Nova Emetivka Village. Material was collected by M. Burchak-Abramovich (1935), O. Voznesens'ky (1936, 1937) and NNPM (1976, 1977), stored in NNPM and PIN.

**Bilka [Belka]** (Text-fig. 1, 15; Tab. 1, 15): Ivanivs'kyi District of Odesa Region; ravine near Bilka Village on the right side of Malyi Kuial'nyk River Valley. Material was collected by NNPM (1960-1968), stored in NNPM.

**Starokondakove [Starokondakovo]** (Text-fig. 1, 16; Tab. 1, 16): Snigurivs'kyi District of Mykolaiv Region; limestone quarry on the left bank of Inhulets' River near Starokondakove Village. Material was collected by NNPM (1963), stored in NNPM.

**Novoukrainka 2** (Text-fig. 1, 17; Tab. 1, 17): Rozdil'nians'kyi District of Odesa Region; ravine on the outskirts of Novoukrainka Village near the road to Rozdil'na. Material was collected by NNPM (1985), stored in NNPM.

**Cherevychno [Cherevichnoe]** (Text-fig. 1, 18; Tab. 1, 18): Biliaivs'kyi District of Odesa Region; ravine on the left bank of the estuary Khadzhybeis'kyi Liman on the south outskirts of Cherevychno Village. Material was collected by NNPM (1965, 1967-1982), stored in NNPM.

### 3. Conclusions

The observed changes of the taxonomic structure of Carnivora reflect the stages of development of the *Hipparion* fauna of Ukraine. However, my examination of the morphological variability of the carnivores on the serial materials from collections listed above, and also the

analysis of their chronological distribution in the late Miocene of Eurasia, show that some the most common carnivores of the *Hipparion* fauna had very long periods of geological existence. For example, *Eomellivora wimani*, *Plesiogulo crassa*, *Adcrocuta eximia*, *Hyaenotherium wongii* (= *H. magnum*, *Hyaenictitherium hyaenoides orlovi*) and *Ictitherium viverrinum* (= *I. gaudryi*, *I. kurteni*, *I. ibericum*, *I. intuberculatum* and *I. sinicum*) lived in Eurasia – the first two species even immigrated to North America – during all Vallesian plus all or nearly all Turolian. The list is probably not yet complete. At the same time, in the ungulates, several changes in the taxonomic composition are observed for that time span, occurring not only at species level, but even at genus level. Carnivores depend on climatic conditions to a lesser degree than gramini-voorous mammals. Thus, it is possible to conclude that (1) many carnivore species and apparently Carnivora as a whole are poorly suitable for biostratigraphy of the upper Miocene; (2) during Vallesian and Turolian the climatic changes in Eurasia were not so significant as to result in the species alteration within the Carnivora.

### 4. Acknowledgements

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Taxon /	Locality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<b>NIMRAVIDAE</b>																			
<i>Sansanosmilus pivetaui</i>		cf.																	
<b>FELIDAE</b>																			
<i>Pseudaelurus</i> sp.		+									?								
<i>Metailurus boodon</i>										+									sp.
<i>Machairodus afanistus</i>		cf.		cf.					cf.	+	+				+				
<i>Machairodus giganteus</i>														+		+			+
<i>Paramachairodus</i> sp.		+									?								?
Felidae gen. (" <i>Felis attica</i> ")			+																
<b>VIVERRIDAE</b>																			
<i>Semigenetta</i> sp.		+																	
Viverridae gen.		+																	
<b>HYAENIDAE</b>																			
<i>Ictitherium viverrinum</i>								+		+					+		+		
<i>Ictitherium pannonicum</i>															+				cf.
<i>Ictitherium spelaeum</i>		+																	
" <i>Lycyaena</i> " <i>parva</i>															+				
<i>Protictitherium crassum</i> (= <i>Ictitherium tauricum</i> BORISSIAK, 1915)					+														
<i>Hyaenotherium wongii</i> (= <i>Hyaenotherium magnum</i> SEMENOV, 1989)										cf.	+			cf.					+
<i>Hyaenictitherium venator</i>															+	+	+	cf.	
<i>Palynhyaena bessarabica</i> (= <i>Miohyaenotherium bessarabicum</i> SEMENOV, 1989)																	+		
<i>Adcrocuta eximia</i>							+	+		+	+		+	+	+	+	+	cf.	+
<i>Dinocrocuta</i> sp. (= <i>Percrocuta</i> sp. (KOROTKEVICH et al., 1985))		+																	
<i>Allohyaena sarmatica</i> (= <i>Percrocuta</i> sp. (KOROTKEVICH et al., 1985))		+																	
Hyaenotheriini gen.								+							+				
<b>URSIDAE</b>																			
<i>Indarctos</i> sp. (? <i>Hyaenarctos</i> )		+																	
<i>Hemicyon</i> sp. (= <i>Simocyon</i> (KOROTKEVICH et al., 1985))		+																	
<b>MUSTELIDAE</b>																			
? <i>Lutravus</i> sp.																			+
<i>Promephitis maeotica</i>															+	sp.			sp.
? <i>Baranogale</i> sp.																			+
<i>Eomellivora wimani pivetaui</i>		+	+																
<i>Eomellivora wimani wimani</i> (= <i>Perunium ursogulo</i> ORLOV, 1947)										+					+				
<i>Plesiogulo crassa</i>		cf.																	+
<i>Parataxidea</i> aff. <i>polaki</i>															+				
<i>Palaeomeles</i> sp.		+																	
Mustelidae gen.		6sp.								+									
<b>PROCYONIDAE</b>																			
<i>Simocyon primigenius</i>									+		+								
Carnivora gen.						+													

Table 1: Distribution of the terrestrial carnivores in the late Miocene localities in the Ukraine.

Epoch	Regiostage	Sub-Regiostage	Land mammal age	MN-Zone	Locality	Faunal complex			
							Sub-complex		
<b>U P P E R M I O C E N E</b>	<b>M a e o t i a n</b>	Upper	<b>T u r o l i a n</b>	13	Cherevychno Novoukrainka 2	<b>Bilkyan</b>	Cherevychanian		
		Middle		12b	Bilka Starokondakove		Bilkian		
		Lower		12a	Nova Emetivka 2 Novoelyzavetivka Nova Emetivka 1		Novoelyzavetian		
	<b>S a r m a t i a n</b>	Upper		11b	Hrebenyky Novoukrainka 1 Stara Kubanka	<b>Beryslavian</b>	Hrebenykian		
				11a	Beryslav L'vove Grossulovo Kryvyi Rih		Beryslavian		
		Middle		10b	Sevastopol'	<b>Sevastopolian / Mykhajlivkian</b>			
	10a	Zhovtokam'ianka		Kalfian					
	9	Hrytsiv Klymentovychi		Hrytsivian					
					<b>V a l l e s i a n</b>				

Table 2: Stratigraphic position of the Ukrainian late Miocene localities of the terrestrial carnivores.