

**M.Vremir****Reevaluation of the unusual bovid skull from Lunnaya Cave,
Karabi karst plateau, Crimea (SE Ukraine)**

Времір М. Переоценка необычного черепа бовида из пещеры Лунная, карстовое плато Караби, Крым (ЮВ Украина) // Спелеология и карстология, - № 4. – Симферополь. – 2010. С. 47-51.

Резюме: Частичный череп бовида из карстовых отложений пещеры Лунной (плато Караби, Крым) был подвергнут повторному исследованию. Субфосильная находка неизвестного возраста, был найдена местными спелеологами из Симферополя, и была определена как позднеплейстоценовый евразийский овцебык: *Ovibos moschatus* (Zimmermann, 1780). Совсем недавно стала возможна повторная экспертиза образца, и его детальный анализ указывает на принадлежность черепа водяному буйволу (*Bubalus bubalis* (Kerr, 1792)), с некоторыми морфологическими нарушениями, вызванными гидроцефалией – врожденным уродством, спорадически отмечающимся у ныне живущих бовид. Несмотря на то, описываемый череп, как сообщалось, был извлечен из-под толстой натечной коры, возраст образца не древнее, чем VII-X ст. н.э. (или даже еще моложе), когда одомашненная форма появляется в юго-восточной Европе, в том числе на Крымском полуострове. Вероятно из-за его болезни, животное было убито острым подобным топору инструментом и сброшено в пещеру. Исходя из этого, позднеплейстоценовые находки мускусного быка все еще отсутствуют в Крымской териофауне, а его наиболее южная граница распространения ограничена Черниговско-Житомирско-Киевским регионом в Северной Украине.

Ключевые слова: палеонтология позвоночных, палеопатология, *Bubalus bubalis*, голоцен, Крым, Украина

Времір М. Переоцінка незвичайного черепу бовида з печери Місячної, карстове плато Карабі, Крим (ПС Україна) // Спелеологія і карстологія, - № 4. – Симферополь. – 2010. С. 47-51.

Резюме: Частковий череп бовида з карстових відкладів печери Місячної (плато Карабі, Крим) був підданий повторному дослідженню. Субфосильна знахідка невідомого віку, була знайдена місцевими спелеологами із Симферополя, і була визначена як пізньоплейстоценовий евразійський віцебик: *Ovibos moschatus* (Zimmermann, 1780). Зовсім нещодавно стала можливою повторна експертиза зразка, і його детальний аналіз указує на приналежність черепа водяному буйволу (*Bubalus bubalis* (Kerr, 1792)), з деякими морфологічними порушеннями, спричиненими гідроцефалією – вродженою вадою, що спорадично спостерігається й у тих бовід, що живуть нині. Незважаючи на те, що описуваний череп, як повідомлялося, був вилучений з-під товстої натічної кори, вік зразка не давніший, ніж VII-X ст. н.е. (або навіть ще молодше), коли одомашнена форма з'являється в південно-східній Європі, зокрема на Кримському півострові. Ймовірно через її хворобу, тварина було вбита гострим подібним до сокири інструментом і скинута в пещеру. Виходячи з цього, пізньоплейстоценові знахідки мускусного бика все ще відсутні в кримській териофауні, а його найбільш південна межа поширення обмежена чернігівсько-житомирсько-київським регіоном у Північній Україні.

Ключові слова: палеонтологія хребетних, палеопатологія, *Bubalus bubalis*, голоцен, Крим, Україна

Vremir M. Reevaluation of the unusual bovid skull from Lunnaya Cave, Karabi karst plateau, Crimea (SE Ukraine) // Speleology and Karstology, - Vol. 4. – Simferopol. – 2010. – P. 47-51.

Abstract: A partial bovid skull, from the karst deposits of Lunnaya Cave (Karabi karst plateau, Crimea) is re-examined. The subfossil find of unknown age, was retrieved by local cavers from Simferopol, and was allocated to the late Pleistocene Eurasian musk-ox: *Ovibos moschatus* (Zimmermann, 1780). Most recently, a reexamination of the specimen was possible, and a detailed analysis indicates an appurtenance to the water-buffalo (*Bubalus bubalis* (Kerr, 1792)), with some morphological disorders caused by Hydrocephalus, an inherited malformation sporadically recorded in extant bovinds. However the skull was reported from below a thick flowstone crust, the age of the specimen is not older than 7th to 10th century A.D. (or even younger), when the domesticated form appear in SE Europe including the Crimean peninsula. Probably due to its disease, the animal was killed by a sharp axe-like tool and dropped into the cave. In this respect, late Pleistocene musk-ox finds are still missing from the Crimean theriofauna, their Southern range in the area, being limited to Zhytomyr-Kiev-Chernigov regions in Northern Ukraine.

Key words: vertebrate palaeontology, paleopathology, *Bubalus bubalis*, Holocene, Crimea, Ukraine.

INTRODUCTION

Up to recently, some comprehensive paleotheriological studies discussed the possible presence or absence of the musk-ox (*Ovibos moschatus*) in the Late Pleistocene vertebrate fauna of the Crimea Peninsula in Southern Ukraine (Gromova, 1965; Vereschagin & Baryshnikov, 1980; Belan, 1985). No "evidence" of its presence was recorded till 1999, when we had the opportunity to shortly see a fragmented skull of presumably late Pleistocene age, which shows great resemblance to the fossil musk-ox known from Northern Eurasia and North America.

The skull fragment (a partially destroyed neurocranium), comes from a karstic cave (Lunnaya Cave) from the Karabi plateau in the Yayla Mountains (1300 m a.s.l.), and was collected by local cavers from Simferopol. The material was subsequently deposited at the Geographical Department of Vernadsky Tavrichesky University in Symferopol (recently moved to the Speleological Institute of Ukraine, Simferopol). However we had no opportunity to make any closer investigation on this, the find was listed in two studies dealing with the Late Pleistocene and Holocene theriofauna of the Yayla Mountains (Ridush, B. & Vremir, M., 2003, 2004). More recently two other studies were published by N. Lysenko (2006) in the same topic, and the specimen was recognised as belonging to the fossil *Ovibos moschatus*.

The systematic appurtenance of the Late Pleistocene Eurasian musk-ox, is still disputed (Tikhonov, 1998; Crégut-Bonnoure, 2005). The morphological differences (observed mainly on skull and metapodias) between the extant *Ovibos moschatus* and the fossil *Ovibos pallantis* Henr.-Smith, 1827 respectively, shows clear distinction. In the present state, most of the researchers agree to consider *O. pallantis*, as the possible ancestor of the extant *O. moschatus* (see. Tikhonov, 1998 and Crégut-Bonnoure, 2005), being the only Late Pleistocene Eurasian representative of the Ovibovini. Some other researchers considered the two forms to be conspecific, respectively coexisting Late Pleistocene subspecies, namely *O. moschatus moschatus* in N. America and *O. moschatus pallantis* in Eurasia (Belan, 1985). In this respect, the specific name *Ovibos moschatus* is still widely used in Europe for the Late Pleistocene musk-ox. It seems that the North American autochthonous helmeted musk-ox species *Bootherium bombifrons* (Harlan, 1825; see McDonald & Clayton, 1989), which coexisted with *O. moschatus*, in the same territory (including Western Alaska and Beringia) never influenced the North-Eastern Siberian populations. This group was characterized however by a very pronounced sexual dimorphism (as seen for instance, on present day Greenland populations), which ultimately could make difficult the distinction between certain fossil "morpho-types" as well.

From this point of view, more complete fossil specimens and a large number of samples are required to clarify the systematical problems in question. Complex genetic studies (mtDNA), may be useful as well, however recent investigations arise some difficulties in characterization of modern and ancient musk-ox mtDNA (Kolokotronis, et al., 2007).

Musk-ox finds in the Eastern Europe are not numerous, and only North from the 50th parallel (Gromova, 1935;

Tikhonov, 1998), being found mainly in Late Palaeolithic archaeological sites (Gromova, 1965). Scattered finds were recorded in the Late Pleistocene of Dobrogea in South-East Romania as well (Samson & Radulescu, 1959), from the same latitude as Southern Crimea. In Western Europe, the most musk-ox finds belongs mainly to the Weichselian, but older records are also numerous (Crégut-Bonnoure, 2005). According to Belan (1985), in the present Ukraine, scattered *Ovibos* remains (including skulls) were found only in Late Pleistocene sites at Zbranka village (Ovruch district, Zhytomyr oblast), Kiev and Dobranichevka (Kiev oblast), at Bugorok (Pushkari village of Chernigiv oblast), and particularly Mezin (Chernigov oblast). Most of the Russian and Ukrainian researchers, consider that the musk-ox probably didn't penetrate to the Crimea peninsula et al.

In this respect, from paleotheriological point of view, the Karabi "ovibos" discovery was considered quite intriguing (especially being the only such find in Crimea), and recently (October 2007) we had the opportunity to reexamine the specimen. As a consequence, both the previous identifications proven to be wrong, the actual animal in question being a water-buffalo (*Bubalus bubalis*), which however suffered by an inherited malformation (*Hydrocephalia*). The pronounced pathological deformation of the fronto-parietal region of the skull, lead to the early erroneous identifications. The present paper is intended to make the required corrections.



Fig. 1. Frontal view of a recent water-buffalo (*Bubalus bubalis*) skull.

Рис. 1. Фронтальний вигляд черепа сучасного водяного буйвола (*Bubalus bubalis*)

MATERIAL AND DESCRIPTION

Material: partial water-buffalo (*Bubalus bubalis*) skull, hosted in the collection of Ukrainian Institute of Speleology and Karstology (UISK), Simferopol (field. # L-1).

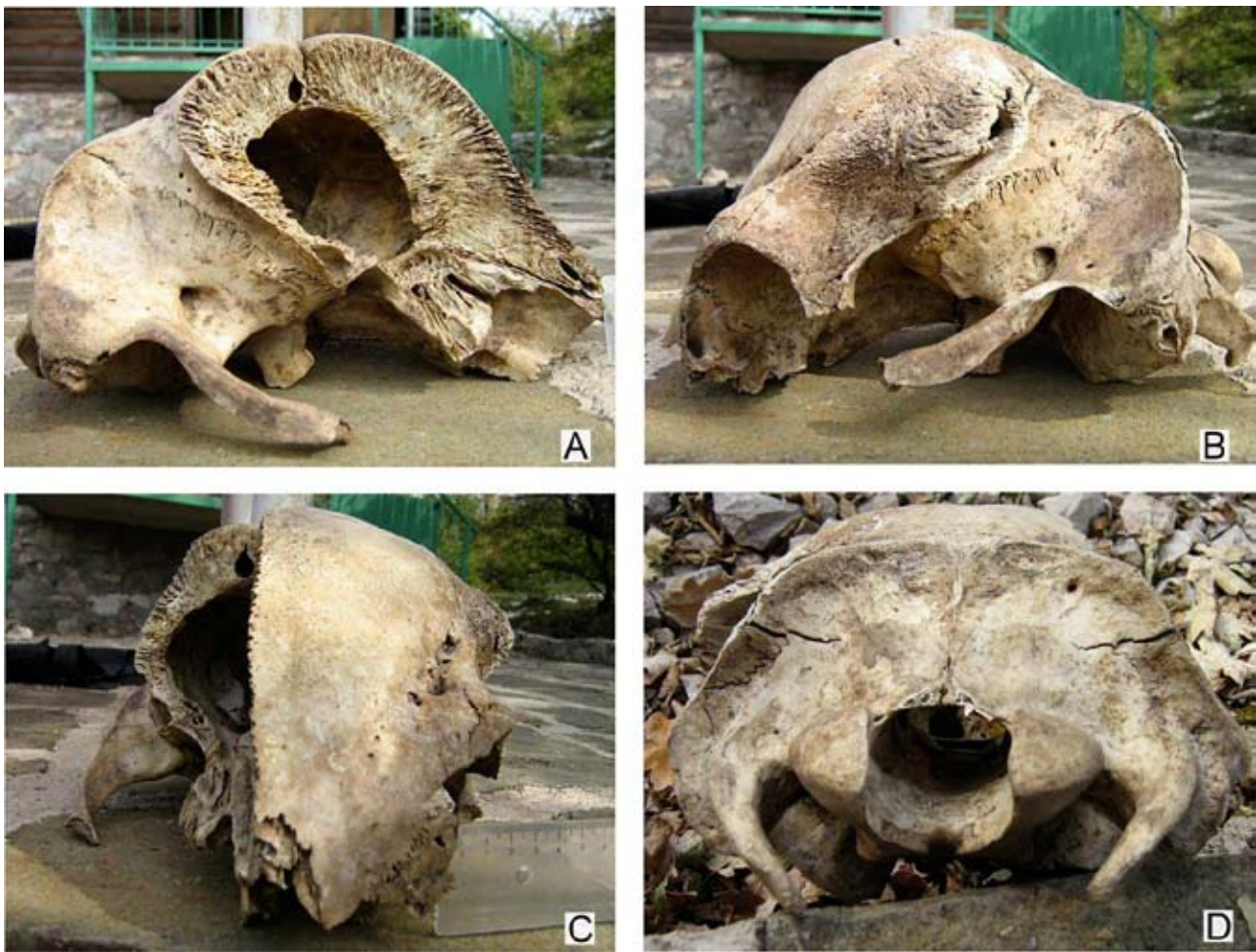


Fig. 2. A – lateral dexter, B – lateral sinister, C – frontal, D – dorsal views of the bovid skull from the Lunnaya Cave (photo by B. Ri-dush)

Рис. 2. А – правий бічний, В – лівий бічний, С – фронтальний, D – дорсальний вигляд черепа бовіда з печери Лунная (фото Б. Рідуша)

Field data: specimen retrieved in early '90 from Lunnaya cave (Karabi karst plateau), from under a "thick flowstone crust", during cave exploration performed by local cavers from Simferopol.

Comparison: the specimen was compared with recent and fossil musk-ox (*Ovibos moschatus*) skulls as well as recent Transylvanian water-buffalo (*Bubalus bubalis*) skulls, hosted in Romanian collections, including Zoological Museum of Babes-Bolyai University (UBBMZ, Cluj, Romania), and the Paleontological Department of Hungarian National Museum (MNM, Budapest, Hungary).

Measurements: according to (Driesch, 1976); plastic measuring tape and sliding metal calliper.

Photos: Canon A 430 digital camera.

Description: the Karabi specimen is represented by a partial neurocranium. It consists of the incomplete left lachrymal, left frontal from the fronto-nasal suture and anterior margin of the orbit, backward to the fronto-parietal suture; both corneal process and base of corneal process; both temporals; both parietals; the complete occipital (condyl occipital, processus jugularis, tubercula musculare); the basioccipital and basisphenoidal. It is worth to mention that all fractures (except horn-cores)

are fresh, suggesting a more complete specimen in its original context.

The incomplete *lacrimal* is narrow and long; *processus lacrimales* caudally is rather elevated with rounded edge. The *frontal* is extremely wide and more convex (also in transversal section), however the roof of the skull connection to the lateral side is quite abrupt. The frontal suture is indented and strait, widely opened caudally (28 mm in length). The bone shows a great thickness with a vacuolar-hollow structure. The *intercornual exostosis* surface is missing. The constriction between the orbits and horn-cores not pronounced. Three pairs of *foramen supraorbitale* were present, the middle one being the largest (11 mm in diameter). The supraorbital margin is elevated and strait, but not beyond the lateral limit of the temporal. The caudal orbital rim is moderately prominent. Only the base of the two horn-cores are preserved, being well elongated in *rostrum-caudal* direction, laterally compressed and obliquely oriented backward. *Cole cornuale* same elevation than *processus cornuale* on base. The *parietal* is narrow and slightly convex; *fronto-parietal* suture dorsally opened (43 mm in length), being semicircular and parallel to *occipito-parietal* suture. *Fossa temporalis* is large and deep; *intertemporal* restriction well pronounced.

The *nuchal crest* and *mastoid crest* extremely elevated; *mastoid process* narrow and long; *zygomatic process of temporal*, narrow and sinusoidal; *jugular process* narrow-long an curved distally (45°); *bulla tympanic* medium size and elongated (4 chambers); acoustic opening small and oval (12x8 mm). The *occipital* is more or less flat, *occipital condyls* of medium size; wide *foramen magnum* slightly shifted ventrally; external *occipital crest* not elevated; dorsal margin of *foramen magnum* strait; *occipito-basal* narrow and long. The *basioccipital* and *basisphenoidal* shows a horizontal plain, ventral surface of *basishenoid* rises into a sharp and elevated ridge along median line. Degree of flexion between *basioccipital* and *basishenoid* not evident, however degree of flexion is related to sexual dimorphism and age (more pronounced in adults and/or males).

Dimensions:

Table 1

The morpho-dimensional parameters of the Karabi water-buffalo (*Bubalus bubalis*) partial skull (UIS # L-1)

Таблиця 1

Морфометричні параметри часткового черепа водного буйвола (*Bubalus bubalis*) з Карабі (UIS # L-1)

Neurocranium length n. l. (basion-nasion)	234.5 mm
n. l. frontonasal-occipital condyl	263 mm
Median frontal length (akromion-nasion)	204 mm
Entorbital – occipital condyl	235 mm
Maximal frontal breath (across orbits in mirror)	222 mm
Minimal frontal breath (mirror)	188 mm
Frontal maximal thickness on midline	49 mm
Frontal minimal thickness on midline	37 mm
Minimal breath between orbits (mirror)	122 mm
Minimal breath between the basis of horn-cores	220 mm
Oro-aboral diameter of horn-cores	59 mm
Dorso-aboral diameter of horn-cores	38.5 mm
Minimal temporal breath	109 mm
Maximal nasal breath	50 mm*
Minimal height of temporal groove	41 mm
Parietal length on midline	60.5 mm
Parietal thickness on midline	29 mm
Foramen magnum, greatest breath	39 mm
Height of basion-opisthion	33.2 mm
Breath of occipital condyles	91 mm
Breath of basis of paraoccipital processes	149 mm
Mastoid breath (otion-otion)	210 mm
Ectorbital-Entorbital	62 mm
Occipital height	113.5 mm

DISCUSSION AND CONCLUSION

The “Karabi musk-ox” skull belongs to a recent water-buffalo (*Bubalus bubalis*), which however was suffering by Hydrocephalia, sporadically recorded in extant bovines. Hydrocephalia is caused by the production of too much cerebrospinal fluid (CSF) in the ventricles, being considered an inherited disease. Only sporadic cases of internal and external Hydrocephalia is recorded in bovines. Is marked by the enlargement of the skull, the ventrally shifting in position of foramen magnum, also possible asymmetry. Usually a gross distension of cranium (best seen on sutures), with normal facial bones occurs, causing intracranial pressure and progressive enlargement of the skull. All listed characteristics are present on the Karabi skull as well, clearly indicating a pathological state. An elongated deep damage caused probably by a sharp axe-like toll is present on the frontal bone. Due to its disease and related abnormal behaviour, probably the animal was killed by its owner, and subsequently dropped into the cave.

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