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The updated record of cave bear and other members of the genus *Ursus* on the territory of Czech Republic

Registro actualizado de Oso de las Cavernas y otras especies del género *Ursus* en la República Checa

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ABSTRACT

During the 2nd half of 20th century, a succession of new Pleistocene localities was discovered and some classical paleontological sites were revised. From many of those places also bear remains were recorded. Nine localities provided large material of bear remains in good stratified layers. Bear record from Moravian localities were studied in details by Prof. R. MUSIL from Brno. This paper presents a review of updated knowledge on this localities - especially about their stratigrafical position (based on micromammalian evidence) and basic information on bear remains studied.

Key words: Pleistocene, *Ursus*, cave bear, brown bear, Czech Republick, Bohemian karst, Moravian Karst

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INTRODUCTION

Palaeontological investigation of fossil cenozoic mammals has a tradition in the territory of the Czech Republic. Already from the begining of this investigations remains of bears were among the most frequent finds. The first phase research started in area of Moravian karst in the 1st half of the 19th century (e. g. WANKEL made in 1850 first skeleton of cave bear in the Austria-Ungarn from bones founded in Vupustek cave). From the 2nd half of 19th century lot of data about bear finds from Moravia (WANKEL. 1867; MASKA, 1884, 1886; KNIES, 1891, 1893 etc.) and from Bohemia (KREJCI, 1865; LAUBE, 1874; WOLDRICH, 1890, 1893, etc.) has been recorded. At the end of 19th and during the 1st half of 20th century first lists of vertebrates fossils finds (incl. bears) were given from the area of Bohemia (WOLDRICH, 1897; KAFKA, 1901; BAYER, 1905) and Moravia (KNIES, 1929; STEHLIK, 1929; SKUTIL & STEHLIK, 1932). The old authors determined their finds mostly as *U. spelaeus* or *Ursus arctos/priscus*. Some of these finds are but lost, the most of remaining is not revised and without stratigraphical level or correct localization. Till in 2nd half of 20st century began modern palaeontological research. New and revised old localities are discovered, with emphasis to stratigraphical signification. The most important researchers of this period are FEJFAR in Bohemia (FEJFAR, 1956, 1961, 1993, etc.) and MUSIL (MUSIL, 1959, 1962, 1965, 1968, etc.) in Moravia. The papers of the last author brougt detailed studies of cave and brown bear.

The most important informations are given by new discovered sites with both large and small mammals together, which allows morphometric studies of bears combined with their exact stratification. The most importent are as follows:

1) **Holstejn** (Moravian karst)

Stratigraphy: zona B of Early Biharian 1 (FEJFAR & HORACEK, 1990)

Stratigraphicaly significant taxa from this locality: *Microtus* (*Allophaimys*) *pliocae - nicus* KORMOS, *Mimomys pusilus* (MÉHELY), *Pliomys episcopalis* MÉHELY, *P. lenki* (HELLER), *Hypolagus beremendensis* (PETENYI) (according MUSIL, 1966).

The others species of carnivores from this locality: *Panthera* cf. *gobaszoegensis* (KRETZOI), *Putorius* cf. *stromeri* KORMOS, *Meles meles* (LINNAEUS) (according MUSIL, 1966).

Locality was discovered in 1965 during limestone-mining. It was a chimney cave infilled with terra rossa deposits. Fauna was published by MUSIL (1966).

The locality provided about 30 items of bears, all identified as *Ursus* sp. by MUSIL who compared them to the bears of Biharian age (*U. deningeri*, *U. mediterra - neus*, *U. e.* ? *d. gombaszoegensis*) but did not coidentified the Holstejn bears with anyone of them. The form was very near to *U. e.* ? *d. gombaszoegensis* but exhibited some more primitive features.

The following items were published: fragment of mandible with M_2 and M_3, free C, fragment of mandible with C, and a lot of fragments of long bones, hand and food bones and ribs.

2) **Stranska Skala** (Brno)

Stratigraphy: Late Biharian 2 (FEJFAR & HORACEK, 1990)

Stratigraphicaly significant taxa from this locality: *Allocricetus bursae* SCHAUB, *Pliomys episcopalis* MEHELY, Mimomys savini HINTON, *Pitymys hintoni* KRETZOI, *Pitymys gregaloides* HINTON (according LOZEK & FEJFAR, 1957 and MUSIL & VALOCH, 1968)

The others species of carnivores from this locality: *Canis mosbachensis* SOERGEL, ?*Cuon* sp., *Vulpes angustidens* THENIUS, *Vulpes praeglacialis*, ?*Vulpes* sp., *Xenocyon lycaonoides* KREETZOI, *Crocuta crocuta* ssp., *Hyaena brevirostris* AYMARD, *Gula schlosseri* KORMOS, *Homotherium moravicum* (WOLDRICH), *Lynx* sp., *Meles atavus* KORMOS, *Panthera gombaszoegensis* KRETZOI, *Panthera pardus* (LINNAEUS) (according (MUSIL & VALOCH, 1968 and WOLSAN, 1993)

This is a classical palaeontologic site repeatedly investigated since the beginning of 20th Century. The history of investigation was described in details by MUSIL (1965). Besides of the main section (site 4 by MUSIL), a number of different fissures and caves nearby it was also investigated.

The finds of bears before 1945 was revised by MUSIL (1972) and new materials was discribed by the same author (MUSIL & VALOCH, 1968; MUSIL, 1995). All Biharian bears were designated as *U. deningeri*.

3) **C 718** (Bohemian karst)

Stratigraphy: Late Biharian 2 (FEJFAR & HORACEK, 1990); this is one glacial cycle probably at the end of biharian.

Stratigraphicaly significant taxa from this locality: *Allocricetus bursae* SCHAUB, *Pliomys episcopalis* MEHELY, *Mimomys savini* HINTON, *Pitymys hintoni* KRETZOI, *Pitymys gregaloides* HINTON, *Pitymys schmidtgeni* KRETZOI (according FEJFAR, 1961).

The others species of carnivores from this locality: *Canis mosbachensis* SOERGEL, *Vulpes angustidens* THENIUS, *Mustela palerminea* (PETENYI), *Meles atavus* KORMOS, *Xenocyon lycaonoides* KREETZOI, *Hyaena brevirostris* AYMARD, *Panthera fossilis* (VON REICHENAU), *Panthera gombaszoegensis* KRETZOI, *Felis* sp., *Lynx issiodorensis* (CROIZET & JOBERT), *Homotherium moravicum* (WOLDRICH) (according FEJFAR, 1961, WOLSAN, 1993 and MAZUCH, 1997)

This is a karst filling - relict of an extent cave entrance. It was studied by FEJFAR (1956, 1961 etc.). From this filling exist detailed description of layers and their micromammalian remains, therefore all record of bears collected by Fejfar is stratigraphically fixed.

From this locality two bear species were described: *U. deningeri* and a smaller form, which is usually reported as *U. mediterraneus* (of course, it could be a member of *Ursus* gr. *arctos* sensu MAZZA & RUSTIONY, 1994, in fact). The material is rich. It is partly deposited in Charles University (FEJFAR collection), partly in National Museum (PETRBOK collection) and a few pieces (about 14) in Museum of Bohemian karst in Beroun (LYSENKO collection).

4) **Stranska Skala cave** (Brno)

Stratigraphy: earlier part of Toringian (FEJFAR & HORACEK, 1990) (based on the micromammalian from cave clay)

Stratigraphicaly significant taxa from this locality: *Microtus gregalis* type "*gregaloides*", *Microtus arvalis* type "*arvaloides*",

Dicrostonyx simplicior, *Pliomys episcopalis* (according FEJFAR & HORACEK, 1990)

It is a spacious cave where a large number of bear remains was found just at the surface of deposits. These bears was determinated as *U. deningeri* (MUSIL, SEITEL in litt. ex FEJFAR & HORACEK, 1990). By MUSIL`s opinion (MUSIL in litt.) the bears remains are of the Cromerian age (i.e. the late Biharian), the microfauna obtained from the deposits by HORACEK (in litt.) was apparently of the post-Biharian age.

5) **Chlupacova sluj** (Bohemian karst)

Stratigraphy: toringian (FEJFAR & HORACEK, 1990); in this cave are the interglacial and glacial deposits of Eemian and Weichselian

Interglacial micromammalian: *Microtus arvalis*, *Apodemus* sp., *Glis* sp. (FEJFAR in litt.)

The others species of integlacialy carnivores from this locality: *Vulpes* sp., *Panthera spelaea* (GOLDFUSS), *Crocuta spelaea* (GOLDFUSS) (according MOSTECKY, 1969).

This is a remain of vertical karst cavity. It was discovered during limestone mining at the end of 19th or beginning of 20th century.

The R/W (= Eemian) interglacial bears were studied by MOSTECKY (1963) and determinated as *Ursus arctos taubachensis*. Besides the isolated tooth (e. g. 4x P^4, 5x M^1, 7x M^2, 3x M_1, 2x M_2 and 2x M_3) and postcranial elements (published by MOSTECKY) a nearly complete skull is avaialble from the interglacial layers of the site (HORACEK in litt.). The most of the items were collected in the sixties by J.Peterbok and latter by MOSTECKY. The material is deposited in The National Museum Prague.

The Würmian (= Weichselian) finds are fairly poor. They were identified as *Ursus arctos* ssp. by MOSTECKY (1969). Between these two bear-containing stratas is a considerable time gap from which no bear remains are available (W 1-2) (MOSTECKY, 1969).

6) **Cave "Barova"** (Moravian karst)

Stratigraphy: Upper Toringian (sensu FEJFAR & HORACEK, 1990); Würm glacial (MUSIL, 1959)

This is a typical bear-cave. It was discovered in 1947. The section of the cave bearing a large concentration of cave bear bones was discovered in 1958 during the speleological investigation. The matererial was collected by R. MUSIL.

The most bear remains were in red-brownish (ferruginous) soil (W1-2). Anyhow, the bones were found also in the overlying layers but in much smaller comcentration. Excavated were only the W1-2 remains. Tooth (e. g. 6x P^4, 17x M^1, 22x M^2, 9x P_4, 12x M_1, 28x M_2 and 18x M_3) from this layer were studied by MUSIL (1959). The bears were determinated as *Ursus spelaeus*.

7) **Cave "Sveduv stul"** (Moravian karst)

Stratigraphy: Upper Toringian (sensu FEJFAR & HORACEK, 1990); Würm glacial (MUSIL, 1962)

The others species of carnivores from this locality: *Panthera pardus* (LINNAEUS), *Crocuta spelaea* (GOLDFUSS), *Canis lupus* LINNAEUS, *Vulpes vulpes* (LINNAEUS), *Alopex lagopus* seu *corsac*, *Meles meles* (LINNAEUS) (according MUSIL, 1962).

This is a one of the typical palaeontological localities in Moravian karst. The investigation has begun here at the end of 19th century. This is a typical hyaena-cave. The results of the recent investigation (1953-1955) was published by MUSIL (1962).

The locality provided more than 700 tooth and some bones (not so many). All were dated to the Würmian, covering either W1-2 (+? R/W), W2, W2-3 and W3. The bear remains were found in all the stratas. The largest number of remains come from W1-2 (320 tooth) and W2 (343 tooth). Both *Ursus spelaeus* and *Ursus arctos* were determinated but most of remains belong to cave bear.

Worth of particular interest are some tooth from W1-2 and W2, called "*tooth with simple morphology*". They are assigned to cave bear, but have only main cusps, simple inner field and are mostly without cingulum. These characters states are even here quite a rare, of course.

8) **Cave "Pod hradem"** (Moravian Karst)

Stratigraphy: Upper Toringian (sensu FEJFAR & HORACEK, 1990); Würm glacial (MUSIL, 1965)

Stratigraphicaly significant taxa from this locality: *Citellus citellus* LINNAEUS, *Microtus gregalis* (PALLAS), *Microtus oeconomus* (PALLAS), *Microtus nivalis* (MARTIS) (according MUSIL, 1965)

The others species of carnivores from this locality: *Panthera* spelaea (GOLDFUSS), *Crocuta spelaea* (GOLDFUSS), *Canis lupus* LINNAEUS, *Vulpes vulpes* (LINNAEUS), *Alopex lagopus* (LINNAEUS), *Martes* sp., *Mustela erminea* LINNAEUS, *Mustela nivalis* LINNAEUS, *Mustela* cf. *minuta* (POMEL), *Putorius* cf. *putorius* (LINNAEUS) (according MUSIL, 1965)

The site known since the end of 19th century was newly studied during 1956-1958 by MUSIL (1965).

The Pleistocene layers were subdivided into 5 sections (W1, W1-2, W2, W2-3, W3). All these stratas were fossiliferous, and, in general, quite a large collection of bears was obtained from this locality. The most of remains belong to *Ursus spelaeus*, a few finds (remains of three mandubles) from W_{1-2} were designated as *Ursus arctos priscus*. Teeth and bones were described in details by MUSIL (1965) who compared tham with those of the cave bears from "Barova" cave and "Sveduv stul" and demonstrated morphometric changes during Pleistocene in morphometric patterns of cave bear populations and morphometric differences between separate populations of this species over such a small area as that of the Moravian karst. The morphogenetic analysis of cave bears from cave "Pod hradem" was further undertaken by G. RABEDER (1989).

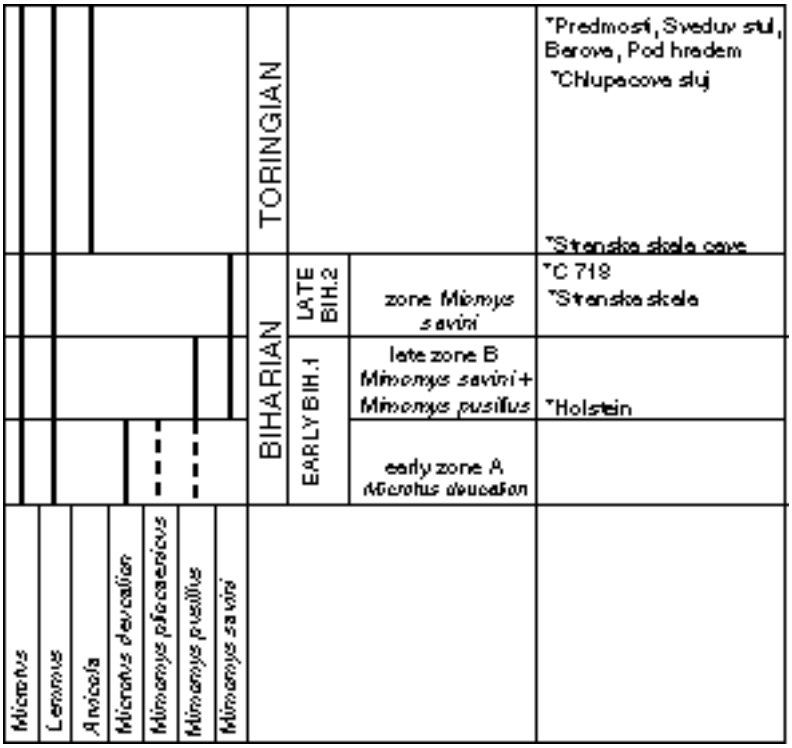
9) **Predmosti near Prerov**

Stratigraphy: Upper Toringian (sensu FEJFAR & HORACEK, 1990); würm (MUSIL, 1965)

This locality ranks among the classical palaeontological and archaeological locality. The records come from an extensive loess deposit very rich in fossil remains (the station of the Mammoth hunters). The bear material was revised by MUSIL (1964).

The former descriptions coidentified the bear material with *Ursus spelaeus*. During revision by MUSIL also a larger

collection of *Ursus arctos priscus* was here identified which come from the end of W2 (or W2-3) or from the begining of W3. MUSIL (1964) undertook a detailed morphological and metrical comparision of this form with the cave bear from the cave "Pod hradem"., "Sveduv stul" and "Barova".



A biostratigraphic table with stratigraphical position of refered localities (the base of the Biharian is a FAD of Microtus) (accordina FEJFAR et HORACEK, 1990)

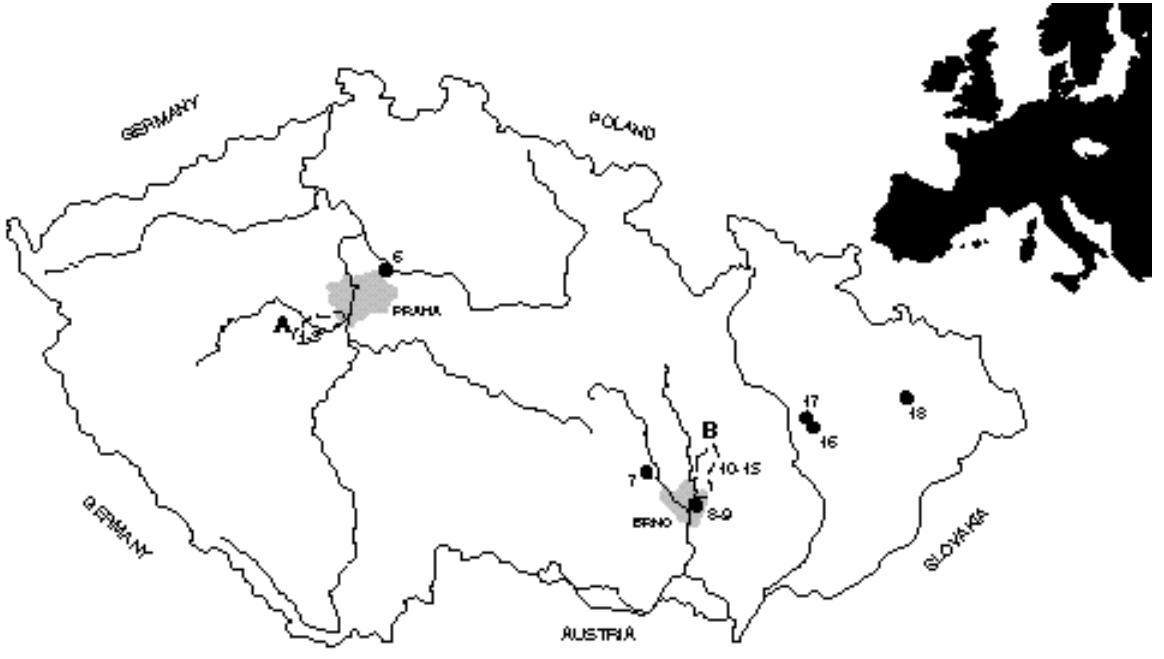


Figure 2. Map of some interesting localities in the Czech Republick:
1 – C 718 (FEJFAR, 1961, +); 2 – Koneprusy caves (FEJFAR in litt., +); 3 – Chlupacova sluj (MOSTECKY, 1963, *); 4 – Chlum IV (FEJFAR, 1961, +); 5 – cave Nad Kacakem (PETRBOK, 1956, *); 6 – Prezletice (FEJFAR, 1993, +); 7 – Lazanky near Tisnov (MUSIL, 1974, +); 8 – Stranska Skala (MUSIL & VALOCH, 1968, +); 9 – Stranska Skala cave (FEJFAR & HORACEK, 1990, *); 10 – cave Sveduv stul (MUSIL, 1962, *); 11 – Vypustek cave (KRIZ, 1893, *); 12 – cave Barova (MUSIL, 1959, *); 13 – Holstejn (MUSIL, 1966, +); 14 – cave Pod hradem (MUSIL, 1966, *); 15 – Sloupske caves (SEITEL, 1998, *); 16 – Tucin (FEJFAR in litt., *); 17 – Predmosti near Prerov (MUSIL, 1964, *); 18 – cave Sipka (MUSIL, 1965, *). + – localities of the Biharian age; * – localities of the Toringian age.
***Ursus* sp. L: 13; *Ursus deningeri*: 1, 2(?), 4, 7, 8, 9; *Ursus "mediterraneus"*: 1, 4, 6; *Ursus* sp. II: 16; *Ursus arctos*: 3 (*taubachensis*), 5, 14, 17 (*priscus*), 10, 18; *Ursus spelaeus*: 5, 10, 11, 12, 14, 15, 17, 18.**

REFERENCES

BAYER, F. (1905). *Fossilia vertebrata Bohemia.* Ceská Akademie cisare Fr. Josefa pro vedy, slovesnost aumeni. 102 pp. Praha. (in czech)

FEJFAR, O. (1956). List of fossil mammals from cave C 718 in Zlaty Kun near Koneprusy. *Vestnik UUG*, **31**: 274-276. Praha. (in czech)

FEJFAR, O. (1961). Review of Quaternary Vertebrata in Czechoslovakia. *Inst. Geol., Prace*, **34**: 108-118.Warszawa.

FEJFAR, O. (1993). Die Fauna aus den limnischen Ablagerungen von Prezletice bei Prag und ihre biochronologische Aussage. *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz*, **40**: 103-113.

FEJFAR, O. & HORACEK, I. (1990). Review of fossil arvicolids (Mammalia, Rodentia) of the Pliocene and Quaternary of Czechoslovakia. *In:* FEJFAR, O. & HEINRICH, W.-D. (eds). *International Symposium Evolution, Phylogeny and Biostratigraphy of Arvicolids (Rodentia, Mammalia)*, pp.: 125-131.

KAFKA, J. (1901). Carnivores (Carnivora) of Bohimia, livinig and fossil. *Archiv pro prirodove - deckeprozkoumání Cech*, **10** (6): 104 pp. (in czech)

KNIES, J. (1891). Primeval finds from Sosuvka cave in Moravia. *Cas. Vl. Mus. Olom*., **7**: 141-148. (in czech)

KNIES, J. (1893). New evidence of existence of diluvial man in Moravia. *Cesky Lid*, **13**: 190-191. (in czech)

KNIES, J. (1929). Primeval Bears in Moravia. *Moravske Noviny*, **10** (12.1). (in czech)

KREJCI, J. (1865). Diluvial age in Bohemia and other Central Europe. Casopis Musea Kral.Ceskeho. (in czech)

KRIZ, M. (1893). Die Fauna der bei Kiritein in Mähren glegenen Vypustekhöhle. Verh. des naturf. Ver. in Brün, 32.

LAUBE (1874). Ueber einen fund diluvialer Thierreste in Elblöss bei Aussig. *Vestnik kral. ceské spol. nauk*, 1874: 16-19.

LOZEK, V. & FEJFAR, O. (1957). A contribution to the question of the Early Pleistocene fauna from the Stranska skala near Brno. *Vestnik UUG*, **32**: 290-294. (in czech)

MASKA, J. (1884). Vorgeschichtliche Funde in Stramberg. Sipkahöhle. *Cas. Vl. Mus. Olom*, **1**.

MASKA, J. (1886). Altertumsfunde zu Stramberg. II. *Cas. Vl. Mus. Olom*, **3**.

MAZUCH, M. (1997). *Felids carnivores (Felidae, Mammalia) in the Pleistocene of the Bohemian karst*. Dipl. Práce, PrF UK, 74 pp. (unpubl.) (in czech)

MOSTECKY, V. (1963). Der pleistozäne Bär *Ursus taubachensis* Rode aus der Schlucht "Chlupacova sluj" bei Koneprusy (Mittelböhmen, unweit beroun). *Sborník Nar. Musea v Praze*, **19** (2): 75-101.

MUSIL, R. (1959). The cave bear from Barova cave. *Acta Musei Moraviae*, **44**: 89-114. Brno. (in czech)

MUSIL, R. (1962). Die Höhle "Sveduv stul", ein typischer Höhlenhyänenhorst. *Anthropos*, **13** (N.S. 5). 97-260. Brno.

MUSIL, R. (1964). Die Braunbären aus dem Ende des letzten Glazials. *Acta musei Moraviae*, **49**: 83-102. Brno.

MUSIL, R. (1965). Aus der Geschichte der Stranska Skala. *Acta Musei Moraviae*, **50**: 75-106. Brno.

MUSIL, R. (1965). Wertung der früheren paläontologischen Funde aus der Sipka-Höhle. *Anthorpos*, **17** (N.S. 9): 127 - 132. Brno.

MUSIL, R. (1966). Die Bärenhöhle Pod Hradem. Die Entwicklung der Hölenbären im letzten Glazial. *Anthropos*, **18** (N. S. 10): 92 pp. Brno.

MUSIL, R. (1966). Holstejn, eine neue altpleistozänen Lokalität in Mähren. *Acta Musei Moraviae, Sci. nat*., **51**: 133-168. Brno.

MUSIL, R. (1968). Neue Ergebnisse der Forschungen an der Lokalität Stranska Skala. *Acta Musei Moraviae, Sci. nat.*, **53**: 139-162. Brno.

MUSIL, R. (1972). Die Bären der Straska Skala. *Anthropos*, **20** (N. S. 12): 107-112. Brno.

MUSIL, R. (1974). Lazanky bei Tisnov-Eine neue Fundstätte der Biharfauna. *Acta Musei Moraviae*, **59**: 87-93. Brno.

MUSIL, R. (1995). Large fauna of talus cone at the Stranska Skala Hill. *Anthropos*, **26** (N. S. 18): 65-83. Brno.

MUSIL, R. & VALOCH, K. (1968). Stránská Skala: its Meaning for pleistocene Studies. *Current Antropology*, **9** (5): 534-539.

PETRBOK, J. (1956). Bohemian karst under investigation until 1950. *Anthropozoikum*, **5** (1955): 9-46. (in czech)

SEITEL, L. (1998). Paleeontological excavations in the Sloup caves (Northern part of the Moravian kars). *Acta Mus. Moraviae, Sci. geol*., **83**: 123-145. Brno. (in czech)

SKUTIL, S. & STEHLIK, A. (1932). Moraviae fauna diluvialis (A. Mammalia). *Prace z palaeoli - thickeho oddeleni Moravskeho Zemskeho Muzea*, **19**: 101-178.

STEHLIK, A. (1929). List of diluvial finds in Western Moravia VI.

WANKEL, J. (1867). Slouperhöhlen und ihre Vorzeit.

WOLDRICH, J. N. (1890). Ueber die diluviale Fauna der Höhlen bei Beraun in Böhmen. Verhandlungen d. k. k. geol. Reichsantstalt.

WOLDRICH, J. N. (1893). *Fossil fauna of "Turske mastale" near Beroun in Bohemia*. Rozpravy cs. Akademie. (in czech)

WOLDRICH, J. N. (1897). Review of vertebrates from "Bohemian massif" during Anthropozoicum. Vestnik kral.ceske spolecnosti nauk, 1-40. (in czech)

WOLSAN, M. (1993). Evolutione des carnivores quaternaires en Europe Centrale dans leur contexte stratigraphique et paleoclimatique. *L`Anthropologie*, **97** (2/3): 203-222. Paris.