

# A NEW REFERENCE OF URSUS DENINGEROIDES IN LOWER AUSTRIA

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## Abstract

The small and primitive cave bear species *Ursus deningeroides* Mottl 1964 was determined during the revision of the fossil fauna remains located in a small cave in the south of Vienna. This established the third site of this enigmatic species. Similarities to the type locality Repolust cave can be seen in the appearance of the remains of porcupine (*Hystrix vinogradovi*), the large-sized horse *Equus cf. mosbachensis* and *Sus scrofa*. Furthermore this implies the same geological age for both faunas.

## Samenvatting

De kleine en primitieve grottenberensoort *Ursus deningeroides* Mottl 1964 is gevonden tijdens de revisie van de fossiele fauna uit een kleine grot in het zuiden van Wenen. Hiermee is de derde vindplaats van deze mysterieuze soort vastgelegd. Overeenkomsten met de type localiteit Repolust grot kunnen worden gezien in het voorkomen van de overblijfselen van stekelvarken (*Hystrix vinogradovi*), het grote paard *Equus cf. mosbachensis* en *Sus scrofa*. Ook impliceert dit een gelijke geologische leeftijd voor beide fauna's.

## TYPE LOCALITY

The taxon of *Ursus deningeroides* was established in the literature by Maria Mottl (1964). The relatively small and primeval bear remains of the Repolust cave in the Grazer mountain area (Styria, Austria) was described as *Ursus spelaeus deningeroides* n.ssp. based on the assumption that these cave bears lived at the same time as the bears of the „Drachenhöhle“ of Mixnitz. Maria Mottl (1967) specified the chronological position by the assumption that the interglacial character of the accompanying fauna (especially porcupine and bear) indicates the Riss/Würm-interglacial.

Later revisors (Döppes & Rabeder, 1997) positioned the remains of the Repolust cave to *Ursus deningeri*. Furthermore they hypothesized that the fauna of this cave is correlated to the late Middle Pleistocene, because of the accompanying fauna (for example *Canis mosbachensis*, *Equus cf. mosbachensis*) and the low evolutionary level of the cave bears.

## THE SECOND SITE

In the years 1977-1979 and 2001-2005 (Pohar 1981, Pohar *et al.* 2003) an excavation took place in the small cave “Herkova jama” close to Radlje ob Drava (Slovenia). Numerous remains of a small and primeval cave bear were recovered, which resembled the material of the Repolust cave in evolutionary level and dimension so much, that the same taxonomical position for both faunas is assumed. Therefore both Ursidae-populations are associated to the species *Ursus deningeroides*.

In comparison to the classical Deningeri-bears from Mosbach or Hundsheim the small dimensions of the Repolust-bears are unexplained. A reduction in size of high Alpine cave bears is interpreted as an adaption to the life in this area (Rabeder *et al.* 2008) but the Repolust cave and the Herkova jama are located at the relatively low altitude of about 520 meters.

## THE GROTTE OF AZÉ I (BURGUNDY, FRANCE)

In the fossil faunas of the famous Grotte d'Azé 1 near Mâcon (Burgundy, France) the bear remains are dominating. The sites Azé 1-1 to 1-4 are located in a corridor and are partly separated by sinter “curtains”. Argant (1991) described bear-fauna of Azé 1-3 as *Ursus deningeroides* because of the small dimensions and the primeval character. Due to the Uranium-Thorium dating of the sinter that sealed the corridor between the site Azé 1-2 and Azé 1-3, the fauna of Azé 1-3 must be older than 190.000 years (Barriquand *et al.* 2011). Following differences arose after a direct comparison of the *Ursus deningeroides*-faunas from the Repolust cave and the Herkova jama (Frischauf *et al.* 2013):

The teeth and metapodial bones of Azé 1-3 are explicitly (ca. 4-5%) bigger than the equivalent elements of the Repolust and Herkova fauna.

The evolutionary level of the 4<sup>th</sup> premolars is of a much lower level in Azé 1-3 than in the typically *deningeroides*-faunas of the Repolust cave and of the Herkova jama.

The cave bear remains from Azé 1-3 are to be assigned to the *U. deningeri* group. They are bigger and more primeval and therefore not part of the *U. deningeroides* taxa but hypothetically they are eligible as an ancestor of these.

## THE THIRD SITE

The detection of the third site was a surprise because the remains of *Ursus deningeroides* were not recovered at a new excavation but detected within a revision of the long known fossil fauna of the “Flatzer Tropfsteinhöhle” (Dripstone cave of Flatz). The object of a project funded by the Lower Austrian government is the revision of several Lower Austrian cave faunas including the fauna of the small Flatzer cave in the municipality of Ternitz (district Neunkirchen, Lower

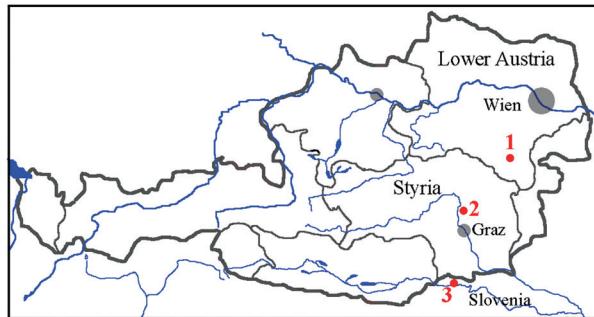


Figure 1: Map of Austria with sites of *Ursus deningeroides*  
1 Dripstone cave of Flatz, 2 Repolust cave, 3 Herkova jama  
Basics: Flatzer Tropfsteinhöhle (syn.: Langes Loch) Austrian cave register nr. 1861/1  
Position: 47° 56' 56" N, 16° 1' 15" E, altitude: 585m, length of cave: 90m, altitude difference: 14m  
Geology: Steinalm limestone (Middle Triassic)  
Excavations: 1904 to 1906 by a local group of people („Die Bergfreunde“). There is no information about the layer sequence.

Figuur 1: Kaart van Oostenrijk met vindplaatsen van *Ursus deningeroides*. 1. Druipsteengrot van Flatz, 2. Repolust grot, 3. Herkova jama. Gegevens: Flatzer Tropfsteinhöhle (syn.: Langes Loch) Oostenrijks grottenregistratie nr. 1861/1. Positie: 47° 56' 56" N, 16° 1' 15" E, hoogte: 585m, lengte van de grot: 90m, verschil in hoogte: 14m  
Geologie: Steinalm kalksteen (Midden-Trias)

Opgravingen: 1904 tot 1906 door een lokale groep mensen („Die Bergfreunde“). Er is geen informatie over de volgorde van de lagen.

Austria, see Fig. 1). The fossils of this cave are stored in two collection: the Lower Austrian State Museum of St. Pölten and the municipal museum of Neunkirchen.

The first processing of the fauna was made by E. Thenius (1949) and was based on the material that has been stored at the Lower Austrian State Museum of St. Pölten. New insights could be gained by later studies on the material of Neunkirchen.

Although there has been no information about the find spot of the fossils, Thenius was able to separate three different chronological fauna levels by examining the conservation status of the teeth and bones:

unit 1: Holocene remains of wild and domestic animals

unit 2: Late Pleistocene bones and teeth of the typical cave bear and cave lion as well as *Vulpes*, *Martes*, *Meles*, *Cervus*, *Capreolus*, *Bison*, *Bos* and *Marmota*.

unit 3: heavy and strong fossilized bones with gnawing marks: a primitive cave bear ("*Ursus* cfr. *Spelaeus*", possibly related to *U. deningeri*) furthermore deer and bison.

It was a big surprise when we found a mandible of a porcupine within the material of the municipal museum of Neunkirchen. Furthermore the conspicuous gnawing traces, which Thenius already noticed, could be identified as life traces. Thus an analogy can be seen in the fauna of the Repolust cave where remains of *Hystrix* were also found (Mottl, 1964, 1967). Instantly suspicion was raised that the small *Ursus deningeroides* also existed in the Flatzer fauna. The comparison of the dimensions and morphology of the mandibles, teeth and metapodial bones as well as the comparison of the other cave bear remains with the same characteristic conservation (relatively heavy fossilized with auburn and black spots) confirmed all suspicions.

## SYSTEMATIC DESCRIPTION

*Ursus deningeroides* Mottl, 1964

1964 *Ursus spelaeus deningeroides* n.ssp. Mottl (1964)  
1997 *Ursus deningeri* Döppes & Rabeder (1997)  
2003 *Ursus deningeroides* Pohar & al. (2003)

## MATERIAL

Following elements are assigned to the taxa because of the dimension, morphology and the conservation status of the bones and the enamel:

1 maxillare, 1 mandible with both branches, 1 mandible dex, 1 mandible fragment, 14 incisors, 5 canines, 4 premolars, 14 molars, 4 autopodial bones, 1 metapodial bone, 9 phalanges

The Pleistocene fauna of the Flatzer cave can be dated back to two clearly different periods. The bones from the older period are coloured characteristic-yellow to auburn with brownish and black encrustations and are more heavily fossilized which can be recognized in the heavier specific weight. Some of the remains suggest that they are younger. They are shaded gray to light brown and are without the auburn and black spots, furthermore they are clearly bigger and most likely belong to *Ursus ingressus* Rabeder et al. 2004.

The auburn and black spotted mandibles and teeth are of consistently smaller dimensions and the teeth show a primeval character (s. tab. 1-4) that is also typical for *Ursus deningeroides* of the Repolust and Herkova cave. The most obvious differences to the typical cave bears can be detected in the incisors.

**i2 inf:** the ursid material of the Flatzer cave contains three well preserved i2 inf. The mesial cusp, named "mesoconid" (Rabeder 1999) is only low or not developed on two of them (Fl-N32 and Fl-N34). The assigned morphotype is defined as "d/s" (deningeri/spelaeus transition form) or "d" (deningeri) because they are dominating *Ursus deningeri* and *U. deningeroides* whereas they are absent at the *U. spelaeus* group (Rabeder 1999: 78, tab. 50).

The third i2 inf. (Fl-N37) is bigger and has a pronounced mesoconid what is equal to morphotype "s" (spelaeus), see Fig. 2.

Because the i2 inf. of *Ursus ingressus*, *U. spealeus eremus* and *Ursus ladinicus* from the sites Gamssulzen cave, Schwabenreith cave and Conturines cave are only "s" morphotypes, the morphology ensures that the two smaller i2 inf. from Flatzer belong to the "deningeri-form".

**i3 inf:** The differences of the third lower incisors are similar prominent. The lingual surface of typical cave bears is structured by vertically running enamel edges (mesial and distal edge) and furrows (sulcus mesialis and s. distalis) (morphotype C and D) whereas these features are low developed or missing on the teeth of *U. deningeroides* (morphotype A and B). The three smaller i3 inf. of the Flatzer cave (morphotype A and B) correspond with the level of the Repolust and Herkova jama cave. The bigger i3 inf. (inv.nr. Fl-10) complies with the typical *U. spelaeus*-group, because it belongs to the C morphotype (see Fig. 3).

## Premolars

The two mandibles where the bone structure between the canine and the p4 is present, have no alveole for another premolar so the dentition formula is 3113. On the maxillary fragment an alveole for the p3 cannot be identified clearly.

**P4 inf. + P4 sup.:** The premolars show only primeval morphotypes. The p4 inf.-type B1 (with paraconid but without metaconid) appears only very seldom at the typically cave bears. The same applies for morphotype "A" and "A/B" on the upper premolars.

Peculiar is the relatively long but small shape of the two p4 inf. But they might originate from one individual.

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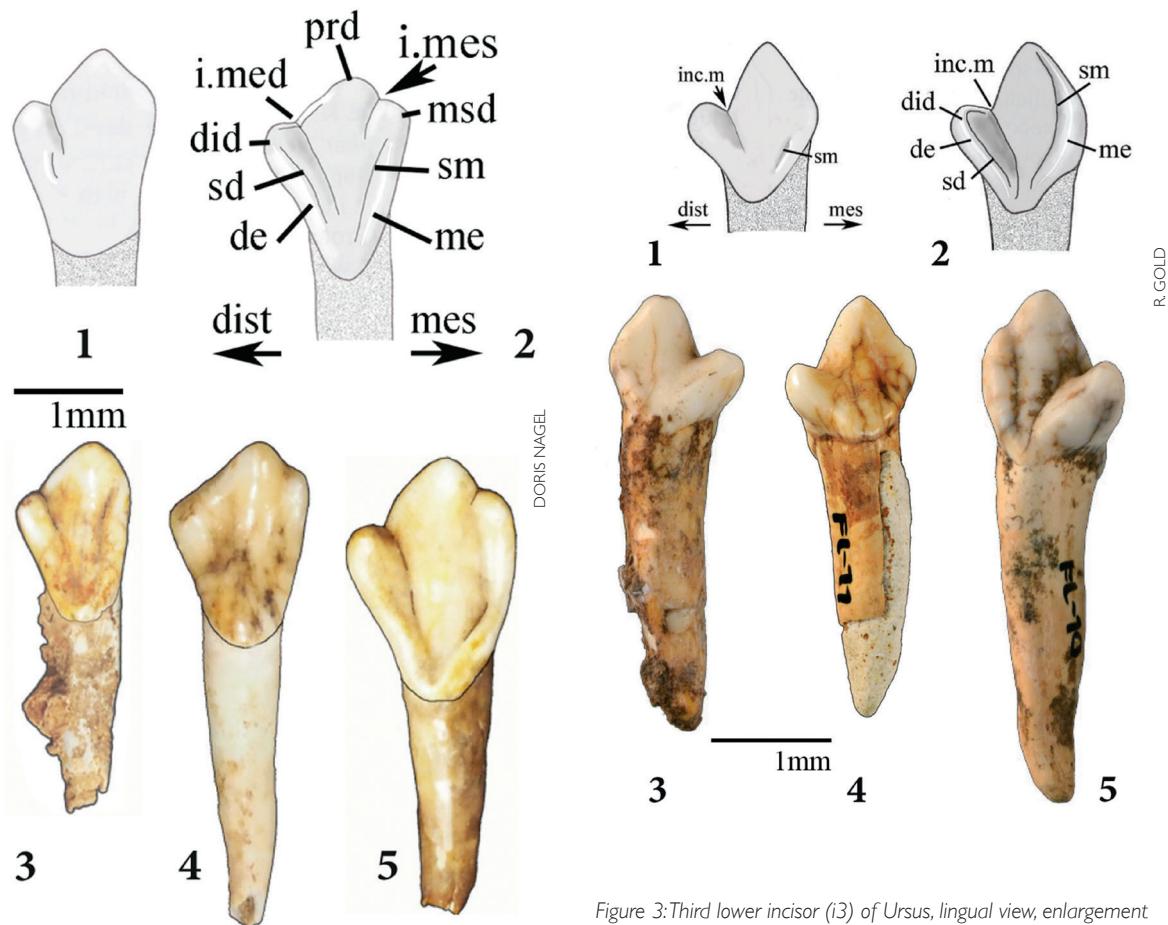


Figure 2: Second lower incisors (i2) from Middle and Late Pleistocene bears of the Flatzer dripstone cave, lingual view, enlargement 1,5x

1-2: schematic drawings of the lingual side (after Rabeder, 1999). 1: morphotype "d", 2: morphotype "s"

3: i2 sin Fl-N34 U. deningeroides Mottl, 1964 (morphotype "d")

4: i2 sin Fl-N32 U. deningeroides Mottl, 1964 (morphotype "d/s")

5: i2 sin Fl-N17 U. ingressus Rabeder et al. 2004 (morphotype "s")

Abbreviations: de: distal edge, did: distoconid, dist: distal, inc.med:

incisura media, inc. mes: incisura mesialis, me: mesial edge, mes:

mesial, msd: mesoconid, prd: protoconid, sd: sulcus distalis, sm: sulcus

mesialis

Figuur 2: Tweede onderkaakssnijtanden (i2) van midden- en laat-pleistocene beren uit de druipsteengrot van Flatz. Linguaal aanzicht, 1,5x vergroting

1-2: schematische tekeningen van de linguale zijde (naar Rabeder, 1999). 1: Morphotype "d", 2: morphotype "s"

3: i2 sin Fl-N34 U. deningeroides Mottl, 1964 (morphotype "d")

4: i2 sin Fl-N32 U. deningeroides Mottl, 1964 (morphotype "d/s")

5: i2 sin Fl-N17 U. ingressus Rabeder et al. 2004 (morphotype "s")

Afkortingen: de: distale zijde, did: distoconid, dist: distaal, inc.med:

incisura media, inc. mes: incisura mesialis, me: mesiale zijde, mes:

mesiaal, msd: mesoconid, prd: protoconid, sd: sulcus distalis, sm: sulcus

mesialis

### Molars

The rare recorded molars are relatively small and morphologically primeval. Fig. 4. shows the differences between the M2 sup. of both *Ursus*-species particularly clear. The M2 sup. of *Ursus cf. ingressus* has significantly more cusps than the smaller M2 in the maxillary fragment (F1-2).

### SYSTEMATIC POSITION

The taxonomic position of the smaller bear teeth from the Flatzer cave is based on the dimensions and on the primitive occlusal pattern of the teeth in particular of the i2 inf., i3 inf. and the M2 sup.

Figure 3: Third lower incisor (i3) of Ursus, lingual view, enlargement 1,5x

1-2: schematic drawings of the lingual side (after Rabeder, 1999). 1: morphotype A (sin), 2: morphotype D (sin)

3-5: three i3 inf of Ursus from Dripstone cave of Flatz, collection of Stadtmuseum Neunkirchen

1: i3 dex Fl-N29, Ursus deningeroides

2: i3 sin Fl-N29, Ursus deningeroides

3: i3 dex Fl-N29, Ursus cf. ingressus

Abbreviations: de: distal edge, did: distoconid, dist: distal, inc.m: incisura media, me: mesial edge, prd: protoconid, sl: sulcus lateralis, sm: sulcus mesialis

Figuur 3: Derde onderkaakssnijtand (i3) van Ursus, linguaal aanzicht, vergroting 1,5x

1-2: schematische tekeningen van de linguale zijde (naar Rabeder, 1999). 1: morphotype A (sin), 2: morphotype D (sin).

3-5: drie i3 inf van Ursus uit de druipsteengrot van Flatz, collectie van Stadtmuseum Neunkirchen

1: i3 dex Fl-N29, Ursus deningeroides

2: i3 sin Fl-N29, Ursus deningeroides

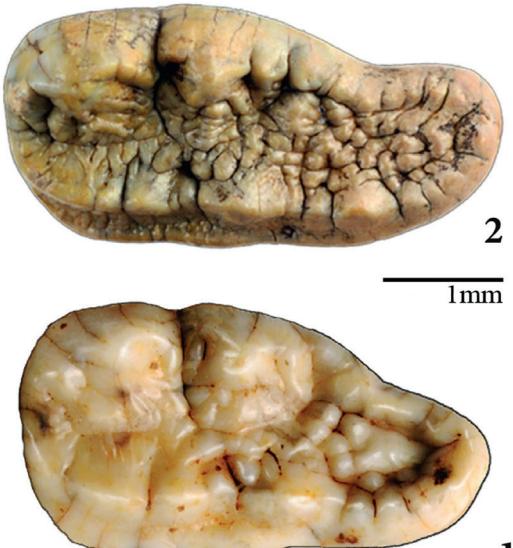
3: i3 dex Fl-N29, Ursus cf. ingressus

Afkortingen: de: distale zijde, did: distoconid, dist: distaal, inc.m: incisura media, me: mesiale zijde, prd: protoconid, sl: sulcus lateralis, sm: sulcus mesialis

### ASSOCIATED FAUNA

Due to the typical conservation status (yellow with russet and black crust), following taxa can be considered to be contemporaneous:

- *Ursus deningeroides* Mottl 1964
- *Equus cf. mosbachensis* Reichenau, 1903 (1 incisor, 11 cheek teeth, 1 coffin bone with gnawing marks)
- Rhinocerotide indet. (fragment of molar)
- *Sus scrofa* L. (2 incisors)
- *Dama* sp. (1 fragment of antler, molars)
- *Cervus elaphus* L. (fragments of antlers partly with gnawing marks of *Hystrix*)
- ?*Bison/Bos* sp.
- *Hystrix vinogradovi* Argyropulo, 1941 (1 mandible



## CHRONOLOGY

There is no radiometric dating but Thenius (1949) assumed that the vertebrate remains of the Flatzer dripstone cave belong to three different periods:

Holocene: domestic and wild birds and mammals

Late Pleistocene: cave bears, cave lion (*Panthera leo spelaea*), *Martes*, *Meles*, *Vulpes*, *Cervus*, *Capreolus*, *Bison*, *Bos*, *Marmota*, *Lepus*

Middle Pleistocene?: “*Ursus cf. spelaeus*” (=*Ursus deningeroides*), *Cervus elaphus*, Bovidae indet.

Due to the existing material we are of the opinion that the fossil vertebrate remains originate from three different stages of the Pleistocene:

**Late Glacial period (OIS2):** *Marmota marmota*, small carnivores (*Martes*, *Meles*, *Vulpes*) remains of marmots are often found in Alpine caves but they are not from the cave bear period but from the much younger cold period most probable the Late Glacial. There are plenty of Alpine caves (including the Merkenstein cave close to Flatz) with sometimes massive presence of boreo-Alpine elements like *Lemmus*, *Dicrostonyx*, *Microtus nivalis*, *Lepus timidus*, *Lagopus*, *Marmota* etc. that are assigned to the Late Glacial (about 20-12ka BP) by radiometric dating (Döppes & Rabeder 1997). *Spalax* does not belong to this fauna association but is an interglacial element.

**Middle Wurmian (OIS3):** cave bears (likely *Ursus ingressus*), cave lion (*Panthera leo spelaea*), ?small carnivores (*Martes*, *Meles*, *Vulpes*). The chronological affiliation of cave bear and cave lion remains arises from the same conservation status. *U. ingressus* probably migrated to Middle Europe about 50.000 years ago and became extinct 29.000 ago.

The conservation status of the small carnivores remains (*Martes*, *Meles*, *Vulpes*) positions them into the Middle Wurmian as well.

- dex with p4-m3, 3 I sup, gnawing traces, see Fig.5)
- *Spalax leucodon* Nordmann, 1840 (1 mandible)
- The remains of *Ursus cf. ingressus*, *Panthera leo spelaea* may be definitely younger (Late Pleistocene). Not clearly assignable are the remains of *Martes*, *Meles*, *Vulpes*, *Bison* and *Bos*.

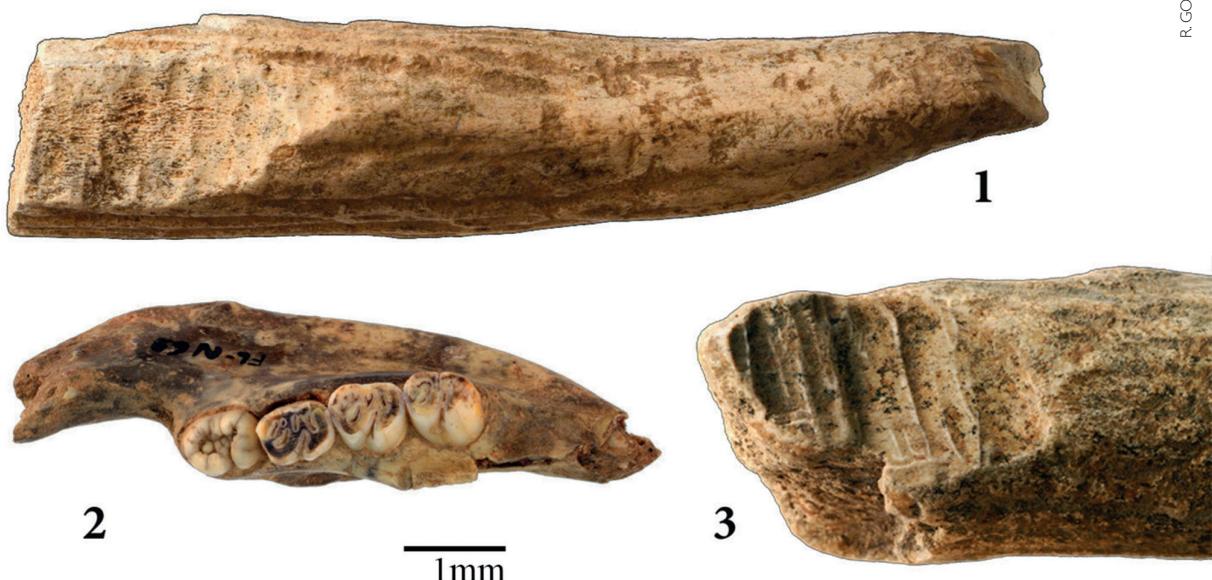


Fig. 5. Middle Pleistocene remains and traces of porcupine from the dripstone cave of Flatz

1: antler fragment Fl-xx of *Cervus elaphus* with gnawing marks of porcupine, natural size

2: mandible dex (Fl- N69) of the porcupine *Hystrix vinogradovi Argyropulo*, 19xx (1,5x)

3: enlarged picture of gnawing marks of porcupine on an antler fragment (Fl-xx) of *Cervus elaphus* (1,5x)

Midden-pleistocene overblijfselen en sporen van stekelvarkens uit de druijsteengrot van Flatz

1: Geweifragment Fl-xx van *Cervus elaphus* met knaagsporen van stekelvarkens, ware grootte.

2: Rechter onderkaak (Fl- N69) van het stekelvarken *Hystrix vinogradovi Argyropulo*, 19xx (1,5x vergroting).

3: Vergrote foto van knaagsporen van een stekelvarken op een geweifragment (Fl-xx) van *Cervus elaphus* (1,5x vergroting)

	inv. nr.	element	side	condylar length	C-m3	p4-m3	p4-m2	m1-3	m1-m2	height below m1
FIN9+14	mandible	sin	fr	fr	fr	fr	fr	57,9	37,8	
Fl-N45	mandible	sin	fr	fr	94,6)	70,8	78,4	54,8	fr	
Fl-N45	mandible	dex	fr	167	(95,3	(72,2	78,7	54,5	ca. 52,8	
Fl-N46	mandible	dex	298	178	90,3)	(66,8	75,3)	(52,0	64	

Table 1: Measurements of mandibles of *Ursus deningeroides* from the dripstone cave of Flatz

Tabel 1: Afmetingen van onderkaken van *Ursus deningeroides* uit de druipsteengrot van Flatz

coll.	inv. nr.	element	side	length	width	height	morpho-type
NK	Fl-N37	i1 inf	sin	5,1	7,3	25,7	B
NK	Fl-N38	i1 inf	dex	5,3	7,5	27,3	A
NK	Fl-N36	i1 inf	sin	5,4	7,5	26,5	A
NK	Fl-N39	i1 inf	sin	5,6	7,7	28,4	A
NK	Fl-N28	I1,2 sup	dex	9,5	9,8	>30,0	d2
NK	Fl-N33	I1,2 sup	dex	7,8	10,7	≥25,7	d0
NK	Fl-N31	i2 inf	sin	8,9	9,7	≥31,0	worn
NK	Fl-N32	i2 inf	sin	8,4	9,1	29,8	d/s
NK	Fl-N34	i2 inf	sin	8,5	10,6	fr	d
NK	Fl-N11	i3 inf	sin	11,3	10,4	35,3	A
NK	Fl-N12	i3 inf	sin	11,5	10,7	≥32,0	B
NK	Fl-N29	i3 inf	dex	11,5	10,2	36,4	A
NK	Fl-N9	I3 sup	sin	17,4	13,1	46,1	0
NK	Fl-N128	I3 sup	sin	16,2	worn	worn	0

Table 2: Measurements and morphotypes of incisors of *Ursus deningeroides* from the dripstone cave of Flatz

Tabel 2: Afmetingen en morphotype van snijtanden van *Ursus deningeroides* uit de druipsteengrot van Flatz

inv. nr.	element	side	length	width	width	morpho-type
Fl-N4	p4inf	dex	15,7	8,3	8,3	B1
Fl-N45	p4-md	sin	15,4	8,2	8,2	B1
Fl-N11	P4sup	sin	17,7	12,5	12,5	A
Fl-2	P4-mx	dex	18,5	13,1	13,1	A/B
Fl-N18	m1inf	dex	27,5	14,3	14,3	A/B
Fl-N45	m1-md	dex	27,1	12,7	12,7	worn
Fl-N45	m1-md	sin	26,6	13,1	13,1	worn
Fl-N9+14	m1-md	sin	28,3	13,5	13,5	worn
Fl-N69	M1sup	dex	24,5	17,6	17,6	-
Fl-4	M1sup	dex	25,2	18,0	18,0	-
Fl-2	M1-mx	sin	25,4	17,9	17,9	-
Fl-N3	m2inf	dex	25,5	17,6	17,6	worn
Fl-5	m2inf	dex	26,1	15,2	15,2	B
Fl-N45	m2-md	dex	27,9	16,3	16,3	worn
Fl-N45	m2-md	sin	28,2	18,4	18,4	worn
Fl-N9+14	m2-md	sin	29,6	18,2	18,0	B
Fl-2	M2-mx	sin	39,1	20,6	20,6	B1
Fl-N19	m3inf	dex	24,5	17,6	17,6	-
Fl-6	m3inf	dex	24,8	18,8	18,8	-
Fl-N45	m3-md	dex	24,2	18,0	18,0	-

Table 4: Measurements and morphotypes of cheek teeth of *Ursus deningeroides* from the dripstone cave of Flatz (md: in mandible; mx: in maxilla)

Tabel 4: Afmetingen en morphotypes van kiezen van *Ursus deningeroides* uit de druipsteengrot van Flatz (md: in onderkaak; mx: in bovenkaak)

coll.	inv. nr.	element	length of crown	width of crown	length of root	width of root	sex
NK	Fl-45	Cinf-md.	22,4	15,4	-	-	♀
NK	Fl-N13	caninus	24,4	18,3	27,8	17,3	♂
NK	Fl-N22	caninus	ca. 23,6	16,0	24,8	17,8	♀
NK	Fl-N45	Cinf-md.	21,9	16,2	-	-	♀
NK	Fl-N5	caninus	20,7	14,5	21,8	14,5	♀

Table 3: Measurements and morphotypes of canines of *Ursus deningeroides* from the dripstone cave of Flatz

Tabel 3: Afmetingen en morphotypes van hoektanden van *Ursus deningeroides* van de druipsteengrot van Flatz

inv. nr.	element	side	length	pw	pd	swd	sdd	dew	dw	dd
Fl-15	mt2	dex	59,4	11,8	22,5	11,5	8,4	17,4	15,3	13,8

Table 5: Measurements of a metatarsal bone of Ursus deningeroides from the dripstone cave of Flatz

Tabel 5: Afmetingen van een metatarsale van Ursus deningeroides uit de druipsteengrot van Flatz

### Warm period of Middle Pleistocene (OIS7 or OIS5?):

*Ursus deningeroides*, *Sus scrofa*, *Hystrix vinogradovi*, *Spalax leucodon*, *Equus cf. mosbachensis*, *Cervus elaphus*, *Dama dama*.

The summary of this community primarily bases on the great similarity of the Middle Pleistocene fauna from the Repolust cave (Mottl, 1967, Döppes & Rabeder 1997). The gnawing marks of the porcupines indicate that they inhabited the surroundings of the cave simultaneous with the Cervidae and Equidae. Porcupines nowadays have a tropical to subtropical distribution and therefore they are classified, also for the Pleistocene, as indicators for a warm climate.

*Spalax leucodon*, *Sus scrofa* and *Dama* sp. are also elements with an interglacial character.

The similarities to the Repolust-fauna indicates that *Ursus deningeroides* also belongs to this fauna association. Based on the primeval characteristics of those bears but also of the horses a Middle Pleistocene age is to assume.

*Ursus deningeroides* Mottl differs from *U. deningeri* from Reichenau in the clearly smaller dimensions and in the higher evolutionary level of the premolars (Rabeder et al. 2011, Frischauft et al. 2013). The material of the Flatzer dripstone cave is too rare to determine the evolutionary level. A strong argument that those bears are closely related to *U. deningeroides* from the Repolust cave and for a contemporaneous existence is offered by the associated fauna.

Porcupine remains from Middle and Late Pleistocene sediments of Middle Europe are very conspicuous because of their recent distribution which led to the name “*Hystrix horizon*” (Mottl, 1967). This is characterized by the simultaneous appearance of *Hystrix*, a big horse, a small primeval “*deningeri*”-like bear as well as interglacial elements such as *Sus scrofa* and *Spalax*- similar to the Flatzer fauna. As typical faunas of the *Hystrix-horizon* Mottl (1967) and Janossy (1986) instance the Lambrecht-Kálmán cave, Tarkö-rock shelter and Poroslyuk (Hungary). Janossy (1986) named the *Hystrix-horizon* “Varbó”-phase and associate it chronologically into the beginning of the Late Pleistocene. Indeed it is not clear whether the “*Hystrix*-faunas” of Hungary, Austria and Slovenia are contemporaneous because interglacials of the Late Middle Pleistocene are possible too.

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