

# NOOTRICAE PRAEHISTORICAE 43

Brussels

2023



*Inhoudstafel - Inhaltsverzeichnis - Table des matières*

Erwin MEYLEMANS, Yves PERDAEN, Anton ERVYNCK & Geert VYNCKIER Een spits met weerhaken, uit dierlijk materiaal, uit de Dijle te Mechelen (Prov. Antwerpen, BE)	5-8
Michel FOURNY & Michel VAN ASSCHE Le « Bois d'Orival » à Nivelles, un important ensemble du premier faciès lithique du Michelsberg (Prov. du Brabant wallon, BE)	9-28
Gunther NOENS, Thierry VAN NESTE, Rani EVAERT, Joachim ROZEK, Sander VAN DE VELDE & Pieter LALOO Gerichte steentijdprospectie in en rondom het Puyenbkestadion te Belsele (Prov. Oost-Vlaanderen, BE): een kritische reflectie	29-42
Hélène ROUGIER, Isabelle CREVECOEUR, Marie DECERF, Cécile JUNGELS & Patrick SEMAL Mise au jour d'une nouvelle partie de la collection de François Beaufays (dit « l'Horloger ») contenant des vestiges humains de Spy (Prov. de Namur, BE)	43-51
Tristan DEDRIE, Grégory ABRAMS, Camille PIRONNEAU, Stéphane PIRSON, Kévin DI MODICA & Isabelle DE GROOTE Preliminary report on the faunal remains from layer 1B-GRH at Scladina Cave (Prov. Namur, BE)	53-64
Christian FRÉBUTTE, Julien DENAYER & Jean-Marc MARION Nouveau programme de recherches et de sauvegarde consacré au complexe mégalithique de Wéris (Durbuy, prov. de Luxembourg, BE)	65-86
Inhoudstafel - Inhaltsverzeichnis - Table des matières - Table of content	87

# Preliminary report on the faunal remains from layer 1B-GRH at Scladina Cave (Prov. Namur, BE)

Tristan DEDRIE, Grégory ABRAMS, Camille PIRONNEAU,  
Stéphane PIRSON, Kévin DI MODICA & Isabelle DE GROOTE

## 1. Introduction

Experts have noted the speleological importance of the general area around Scladina Cave since the beginning of the twentieth century. Saint-Paul and Sous-Saint-Paul for example, two caves in the immediate vicinity and connected to Scladina, were discovered during a prospection started in 1949. Subsequently, the Saint-Paul cave was excavated from 1951 onward, and the Sous-Saint-Paul cave, located under the former and connected through a chimney, from 1953 on (Otte, 1992; Otte *et al.*, 1998; Bonjean, 1998: 9; Pirson *et al.*, 2018: 372).

Scladina Cave was discovered in the spring of 1971 during further prospection and given its titular name by amateur archaeologists from the *Cercle Archéologique Sclaynois* (C.A.S.). Between 1971 and 1977, the C.A.S. performed excavations reaching 15 to 20 m into the cave, eventually discovering artefacts at a depth of approximately two meters (Otte, 1992; Otte *et al.*, 1998; Bonjean, 1998: 10; Pirson *et al.*, 2018: 372; Bonjean *et al.*, 2011: 324). Aware of the importance of these finds, professional archaeologists were contacted. In the summer of 1978, the research group for prehistory from the University of Liège commenced excavations led by Marcel Otte in collaboration with the C.A.S. (Otte, 1992; Otte *et al.*, 1998; Bonjean, 1998: 10; Pirson *et al.*, 2018: 372; Bonjean *et al.*, 2011: 324). From 1978 onward, multidisciplinary research was performed in the cave and on the excavated material. Currently, the permanent excavation is led by the "Espace muséal d'Andenne" (EMA) in close collaboration with several institutions such as the Agence wallonne du Patrimoine (AWaP).

Ongoing excavations and research on layer 1B-GRH (sedimentary unit 1B-GRI) have created a need for taxonomic and taphonomic data on the faunal remains. The current report includes results from a master's dissertation by T. Dedrie, re-examined by the aforementioned in light of the present publication, and new data.

## 2. Site

The village of Sclayn is situated on the right bank of the Meuse River in the Namur Province of Belgium and is part of the Municipality of Andenne. Scladina is located in the Fond des Vaux valley, south of the village centre (Fig. 1). Through the valley runs the Ri de Pontainne, a small and partially subterranean stream which empties into the Meuse River at Sclayn. Scladina is located in the western face of the Fond des Vaux valley, made up of Carboniferous limestone formed during the Visean (Bonjean, 1998: 10; Pirson *et al.*, 2018: 370). The cave opening faces east and opens up about 30 m above the alluvial plain of the valley, at around 138 m T.A.W., and seven meters below the top of the western face of the valley. The flattened top of the western face of the valley forms an interfluvium between the Meuse River and Fond des Vaux valley. At present, excavations have reached 40 m into the cave (Pirson *et al.*, 2018: 370).

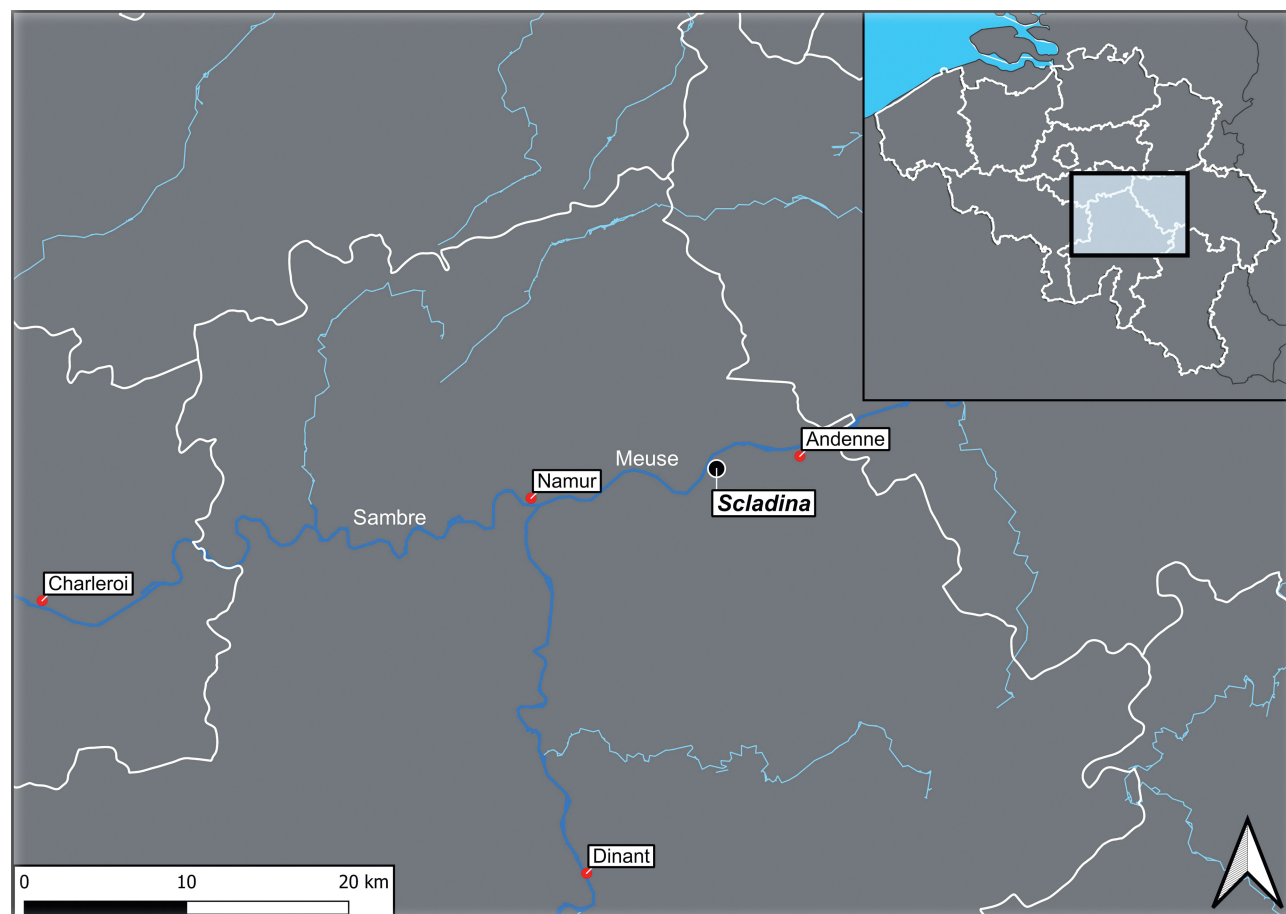


Fig. 1 – Location of Scladina cave on the right bank of the Meuse river.

### 3. Stratigraphy

The stratigraphy at Scladina consists of 28 sedimentary units and 120 layers (Pirson, 2007: fig. IX.27; Pirson *et al.*, 2008: 72; Pirson, 2014: 50). The main archaeologically significant layers at the site are unit 5 and unit 1A, where major Mousterian occupations were identified, evidenced by the more than 18 000 artefacts found (Bonjean *et al.*, 2011: 325326 & 329). Additionally, mandibular and maxillary remains, as well as isolated teeth of a juvenile Neanderthal were found within units 4A-CHE and 4A-POC (Toussaint *et al.*, 1998: 738; Toussaint & Bonjean, 2014).

Slope processes play an important role in the stratigraphic formation of the cave deposits, and Pirson noted the importance of debris flow and runoff at Scladina. Material deposited in front of the cave entrance, in combination with silt of aeolian origin, was transported into the cave through the aforementioned processes. These processes also caused the redistribution of bones and artefacts either inside the cave, or from the cave terrace into the cave (Pirson, 2007: 356; Pirson *et al.*, 2008: 75).

Layer 1B-GRH, part of unit 1B-GRI (Fig. 2), was identified during the stratigraphic revision performed by Pirson (2007) as part of his PhD research and was originally part of sedimentary unit 1B from the former stratigraphy. Radiocarbon dating of a tooth from *Crocota crocuta spelaea* dates this layer to around 43.150 +950/-700 BP. The whole sedimentary unit 1B-GRI was correlated to MIS 3 and the Middle Pleniglacial (Pirson, 2007: 323 & 345; Pirson *et al.*, 2008, 2014; Bonjean *et al.*, 2013: 241). Pirson (2007) describes the layer as possessing a fine-grained silty matrix, most likely of aeolian origin, and containing limestone clast. These limestone clasts originated from the cave walls and porch and were transported and dispersed in the cave through debris flow and runoff (Pirson, 2007: 279

& 356; Pirson, 2014). Pebbles and sand are also present, originating from the Meuse alluvial terrace preserved on the plateau (Pirson, 2007: 279 & 356). Layer 1B-GRH, in general, has not been the subject of further research, apart from radiocarbon dating. The only available research that briefly deals with this layer remains the PhD study by Pirson (2007).

#### 4. Material and methods

This study analysed macrofaunal remains from layer 1B-GRH excavated between 2007 and 2018. Only remains directly correlated to layer 1B-GRH were included in this analysis. Remains only linked to sedimentary unit 1B-GRI or where provenance was disputed, were omitted. The choice was also made to primarily focus on the specimens which were spatially documented in detail during the excavations, and thus were given X, Y, Z coordinates in relation to their location within the excavation square. Remains lacking these coordinates were identified after removal from their original location or during sieving, and were not included in this preliminary research. A total of 464 specimens were analysed during this preliminary study.

Observations were performed through a low magnification hand-lens (10x) and a Motic K500P binocular stereoscope (6.4x & 40x), equipped with a Schott KL200 external cold light source. A small number of specimens were also analysed using a Zeiss Axio Zoom V16 (up to 112x) and with a PlanNeoFluar Z 1.0x led ring attached. A Zeiss Axiocam 305 was used to take micrographs and Zeiss ZEN core 3.4 software was used for digital imaging and analysis. Basic descriptive statistics were used during the processing of the data using Microsoft Excel. Results in this publication are reported here as frequencies of observations and their proportions.

The taxonomical analysis mainly consisted of specimen identification, siding and ageing. Identifications included documenting the species, the anatomical element, bone type, specific bone and landmarks. The portion, meaning proximal or distal end, or shaft, was also noted when possible. Bone fragments were identified as representing the anterior, posterior, medial or distal side of the bone when the presence of landmarks permitted this identification. Specimens were sided and age was determined when possible. Age was recorded as juvenile, adult or old adult following Stiner's (1998) three-age system. Identifications were mainly performed through the use of available literature (Barone, 1976; Guérin & Patou-Mathis, 1996; Hillson, 2005; Lavocat, 1966; Prat, 1970; Pales & Lambert, 1971; Schmid, 1972), photographic reference material (ArchéoZoo, s.d.; U-M Museum of Zoology, s.d.), the paleontological reference collection located at the Department of Geology and the morphological reference collection at the Department of Veterinary Medicine at Ghent University. G. Abrams provided reference material for

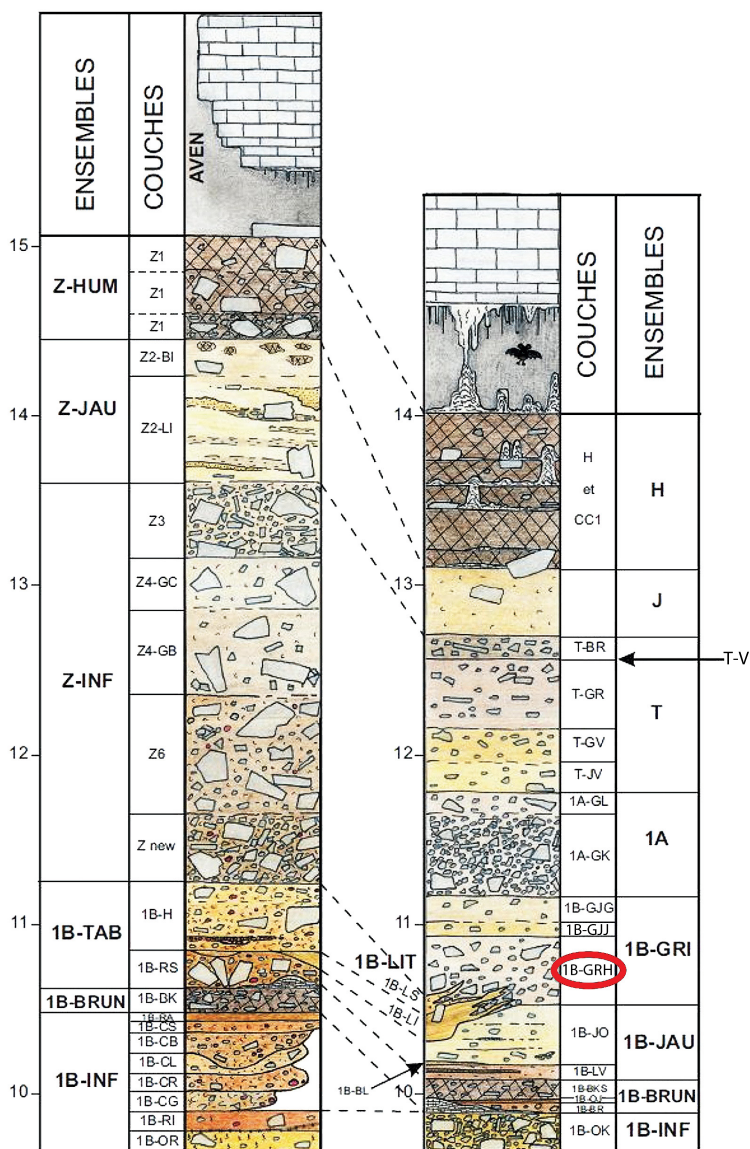


Fig. 2 – Upper stratigraphic sequence at Scladina cave, layer 1B-GRH is marked (Pirson, 2007: 253, IX.27; edited).

reindeer and roe deer. Number of Specimens (NSP), Number of Identifiable Specimens (NISP) and Minimum Number of Individuals (MNI), all basic counting units used in the field of zooarchaeology, were used to quantify the results.

The taphonomic analysis examined bone weathering, staining, bone breakage, abrasion, and several forms of bone surface modifications, as well as the presence of flake scars and discolouration linked to burning. Additionally, a size measurement and a surface readability score were added to provide metadata to the observations. Specimens smaller than two centimetres or with exceptionally bad surface readability and teeth, due to different taphonomic properties compared to bones, were excluded for taphonomic analysis. However, taxonomic data was recorded if possible.

Bone weathering was studied following Behrensmeyer (1978) and the adapted system for karstic environments developed by Zunino *et al.* (2012). The presence of cracking, flaking and desquamation were documented.

A six-category system was used to assess the coverage of either black and/or brown-red staining on the bone surface. 0 represented no staining in this case, while 5 represented 80-100% coverage.

Mainly long bones were included in the analysis of bone breakage, with fresh or dry bone breakage determined following the methods proposed by Villa & Mahieu (1991). Additionally, shaft circumference was recorded following Bunn (1981; 1983).

Abrasion and edge rounding were documented following the scaled system proposed by Davies *et al.* (1989) but adapted to better suit the appearance of abrasion on bone. Edge rounding was thus documented as sharp, rounded, worn or smooth; while abrasion was noted as no abrasion, minor or major abrasion.

To describe the location of several kinds of bone surface modifications, the tooth mark classification by Andrews & Fernández-Jalvo (1997; Fernández-Jalvo & Andrews, 2016) based on the terminology by Binford (1981) was expanded upon and adapted. This allowed for the description of pits, perforations, linear marks and their location, without immediately inferring the involved actor or process. Afterwards, the taphonomic actor/process was identified based on mark morphology and, when possible, microtopography. Actors/processes involved in the creation of modifications were identified based on available literature (Andrews & Cook, 1985; Binford, 1981; Bunn, 1981; Blumenschine, 1988; 1995; Lyman, 1994; Potts & Shipman, 1981; Fischer, 1995; Fernández-Jalvo & Andrews, 2016). Flake scars on bone edges were also documented and linked, where possible, to the taphonomic actors involved.

When discolouration or alteration by burning was present, burning stages by Costamagno *et al.* (2009) were used to document the degree of burning.

### 5. State of preservation and identifiability

All 464 specimens were excavated in a disarticulated state, except for two specimens with dental remains still attached to the maxilla or mandible. Teeth represented 39.2% (n = 182) of the studied assemblage, while other skeletal remains represented 60.8% (n = 282).

Of the 464 remains, 67.7% (n = 314) were reported as fragmented, 2.1% (n = 10) as almost complete and 30.2% (n = 140) as complete. Of the complete specimens, only 19 were bones (n = 19/140, 13.6%). These autopodial bones stand in contrast to the 121 teeth (n = 121/140, 86.4%), which comprise the rest of the complete specimens.

The studied assemblage is characterised by a low taxonomic identifiability. Only 46.3% (n = 215) specimens could be identified to the family level at a minimum, primarily based on dentition (81.3%, n = 175/215). Additionally, surface readability and the identification of taphonomic marks were complicated due to the predominating traces of heavy abrasion, caused during the site's formation, as will be discussed further down.

## 6. Faunal spectrum

The preliminary faunal spectrum in layer 1B-GRH consists of 12 taxa, of which 10 were identified at the species level. Of the studied assemblage, 249 specimens (53.7 %) remain unidentified (Tab. 1).

Herbivores are represented by 8 taxa: *Coelodonta antiquitatis*, *Cervus elaphus*, *Rangifer tarandus*, *Megaloceros giganteus*, *Equus* sp. and *Rupicapra rupicapra*, in addition to undetermined *Bovinae* and *Cervidae*. Woolly rhinoceros (*Coelodonta antiquitatis*, Blumenbach, 1799) was represented by two subadult individuals, based on dentition. Cervids present in the assemblage include red deer (*Cervus elaphus*, Linnaeus, 1758), reindeer (*Rangifer tarandus*, Linnaeus, 1758) and giant deer (*Megaloceros giganteus*, Blumenbach, 1799), in addition to four specimens belonging to undetermined *Cervidae* (Goldfuss, 1820). Bovids in the assemblage are chamois (*Rupicapra rupicapra*, de Blainville, 1816) and undetermined *Bovinae* (Gray, 1821), each represented by a minimum of one individual. Remains of *Equus* sp. (Linnaeus, 1758) are most abundant among the herbivore assemblage with 26 specimens and a minimum of 4 individuals, one juvenile, two adults and one old adult.

Carnivorans are represented by 4 taxa: *Crocota crocota spelaea*, *Canis lupus*, *V. vulpes* and *Ursus* spp. The cave hyena or Pleistocene spotted hyena (*Crocota crocota spelaea*, Goldfuss, 1823) was represented by a minimum of two individuals, one juvenile and one adult. During an inspection of the sieved material, multiple deciduous cave hyena teeth were also identified, but these were not analysed during this preliminary study due to the absence of precise spatial attribution within layer 1B-GRH. The implication of this fact will be discussed further. The wolf (*Canis Lupus*, Linnaeus, 1758) is only identified based on one lower premolar, as is the red fox (*Vulpes vulpes*, Linnaeus, 1758). Ursids were specifically categorised as *Ursus* sp. (Linnaeus, 1758) for this publication, as the fragmentation and preservation impeded the identification of either cave bear (*Ursus spelaeus*, Rosenmüller, 1794) or brown bear (*Ursus arctos*, Linnaeus, 1758) based on the cranial and post-cranial skeleton. Evidence from the teeth only suggested the presence of *Ursus spelaeus*. Ursid remains were by far the most represented in the studied assemblage with 155 remains (72 %, n=155/215). A minimum of four juveniles, seven adults and one old adult were identified. Based on the tripolar mortality model by Stiner (1990) the population identified in this preliminary study belongs to the normal non-violent attrition family (disease, malnourishment, hibernation deaths etc.) and deaths by random predation (by carnivores and possibly humans). Although these results need to be nuanced due to the small size of the analysed assemblage and other unaccounted factors, this will be expanded upon further down. Two individuals are considered to be male, due to the presence of two baculum remains.

The faunal spectrum suggests an open steppe environment through the presence of woolly rhinoceros, horses, reindeer and cave hyenas (Guérin & Patou-Mathis, 1996; Lavocat, 1966; Prat, 1970). The presence of bovines, red deer, giant deer and wolf is an indication of steppe-woodland, although these species are known to be highly adaptable. Modern chamois inhabit mountainous and rocky regions but are known to descend to lower

Species	NISP	%NISP	MNI	%MNI
<i>C. antiquitatis</i>	7	3 %	2	7 %
Woolly rhinoceros				
<i>C. elaphus</i>	3	1 %	1	3 %
Red deer				
<i>R. tarandus</i>	3	1 %	1	3 %
Reindeer				
<i>Equus</i> sp.	26	12 %	4	14 %
Horse				
<i>M. giganteus</i>	1	0 %	1	3 %
Giant deer				
<i>R. rupicapra</i>	1	0 %	1	3 %
Chamois				
<i>Bovinae</i>	4	2 %	1	3 %
Bovines				
<i>Cervidae</i>	4	2 %	1	3 %
Cervids				
<i>Subtotal Herbivores</i>	49	23 %	12	41 %
<i>C. crocota</i>	7	3 %	2	7 %
Pleistocene spotted hyena				
<i>C. lupus</i>	1	0 %	1	3 %
Pleistocene wolf				
<i>Ursus</i> spp.	155	72 %	12	41 %
Ursids				
<i>V. vulpes</i>	3	1 %	1	3 %
Red fox				
<i>Subtotal Carnivorans</i>	166	77 %	16	55 %
Total identified specimens	215			
Total unidentified specimens	249			
<i>Number of specimens</i>	464			

Tab. 1 – Breakdown of NISP and MNI for the identified taxa.

altitudes during winter or cold periods, which might explain their presence in the Fond des Vaux valley (Patou-Mathis, 1998: 300). This interpretation of the paleoenvironment is also supported by previous palynological studies by Bastin (1992) on the former stratigraphy; and by Damblon et Court-Picon (Pirson, 2007; Pirson *et al.*, 2008), which reconstructed a cold steppe environment, with a very low presence of tree pollen (under 5 %) (Pirson, 2007: 332; Pirson *et al.*, 2008: 80).

### 7. Site formation and the accumulation of bone

In total 244 specimens (52.6 %) were analysed during the taphonomic analysis, disregarding 220 (47.4 %) teeth and specimens deemed too small for aforementioned reasons.

Slope processes, particularly debris flows and surface run-off, were identified as the main modes of deposition for 1B-GRH during the stratigraphical study by Pirson (2007: 295). First and foremost, material from outside the cave could thus have been transported and deposited inside, as evidenced by the presence of pebbles primarily found in the Meuse alluvial terrace on the plateau. In addition, material deposited near the cave porch or in the cave could also have been reworked and redistributed, as is the case for the limestone clasts mainly originating from the area of the cave entrance (Pirson, 2007: 279 & 356).

Almost all remains showed marks associated with abrasion, caused by the abrasive contact between bone and sediment during movement or transport. Of the 244 specimens, 30.3 % (n = 74) showed signs of major abrasion with a highly polished and deeply eroded surface. 65.6 % (n = 160) were affected by minor abrasion with a loss of surface texture and the possible presence of linear marks with a “comet-like” shape (d’Errico *et al.*, 1984; Fernández-Jalvo & Andrews, 2016: 29). This is consistent with experimental work where bones subjected to movement in a fine sand and/or silty matrix, as in 1B-GRH, mostly show moderate abrasion (Fernández-Jalvo & Andrews, 2016: 170). Only 4.1 % (n = 10) showed no sign of abrasion or obscured a clear assessment of abrasion. Clear identification of the processes responsible for these marks is difficult. Figure 3 shows marks on a specimen affected by multiple taphonomic processes, including abrasion, trampling, weathering etc. (Fig. 3).

This predominance of abrasion complicated the identification of other taphonomic marks and processes. Rounding, a taphonomic mark that can be caused by a multitude of processes like trampling, digestion and abrasion, could only clearly be attested to the latter due to its ubiquitous presence. The assessment of bone weathering following Behrensmeyer (1978) and Zunino *et al.* (2012) can be seen in Tab. 2. Weathering manifests in cracking and flaking of bones, followed by the loss of cortical bone tissue. Based on the assessment 89.3 % (n = 218/244) fall into the slightly weathered stages (Tab. 2). Although a prevalence of low amounts of weathering is possible with quick deposition, there is a possibility that the results are skewed. Best practice during the analysis of bone weathering dictates the use of a sufficiently large surface (at least 1 cm<sup>2</sup>) unaffected by physical taphonomic damage (Behrensmeyer, 1978: 152). As at least 95.9 % (n = 234/244) of bones were affected by abrasion, causing the obscuring or removal of surface cracking and flaking, this influenced the assessment of weathering and most likely produced results where severe weathering is underrepresented.

Black staining, likely caused by manganese dioxide, was present on 93.0 % (n = 227/244) of the remains, in most cases in the form of dendritic patterns, while 14.3 % (n = 35/244) showed the presence of brown-red staining. Significant was the overlap of both types of staining in some specimens, possibly indicating a primary deposition of remains where the brown-red staining forms, after which they are reworked and/or transported into the cave, where the overlapping black staining starts to form and overlap.

Faunal occupation of the cave is also a cause for bone accumulation. All carnivorans identified at the site are known bone accumulators, albeit through different processes, some of which leave taphonomic marks on the bones. Trampling marks, linear marks caused by animal movement inducing localised contact between stone/sediment and



**Fig. 3** – Specimen Sc2012-371-2 affected by rounding on the bone fracture and abrasion in the form of polishing and loss of surface texture. Multiple striations are visible, most likely caused by trampling. Black staining is also present along superficial cracks on the bone surface (Micrograph by Éva Halbrucker).



bone, are present on 47.1 % (n = 115/244) of the remains. Tooth marks, caused by carnivore gnawing, are represented on 25.4 % (n = 62/244) of the remains, while marks associated with carnivore digestion are present on only four remains (1.6 %).

Both ursids, the most represented species in the assemblage (NISP = 155; MNI = 12), and cave hyenas are most likely the main bone accumulators in the cave. Ursids, and especially *Ursus spelaeus* are known to use caves as hibernation dens. Many of the ursid remains can thus be attributed to juvenile, adult and older adults that succumbed during hibernation. Additionally, ursids can be responsible for some trampling marks due to movement throughout the cave or moving remains out of the way (Germonpré & Sablin, 2001: 224-225).

However, as briefly indicated based on the tripolar mortality model by Stiner (1990), predation or at least scavenging of ursids is also likely. Six of 21 skeletal specimens attributed to ursids were affected by tooth marks. Tooth marks further appear on horse specimens, cave hyenas and unidentified specimens.

The taphonomic agents that most likely caused these marks are cave hyenas. The presence of a juvenile individual in the assemblage opens up the possibility for the use of the cave as a hyena den. The preliminary identification of deciduous hyena carnassials in the sieved material only strengthens this possibility but should be confirmed. The digested bones (n=4) can also be linked to this species. However, it is possible that many bones affected by carnivores and especially digestion remain unstudied by this preliminary analysis, as these are mainly very small fragments identified through sieving, and not spatially documented.

Finally, bone breakage was assessed on 47 long bone specimens. Less than half of the shaft

	<i>Weathering stage</i>	<i>NISP</i>	<i>%NISP</i>
Light weathering	WS 0	43	17,6 %
	WS 1	145	59,4 %
	WS 2	30	12,3 %
Significant weathering	WS 3	17	7,0 %
	WS 4	6	2,5 %
	WS 5	0	0,0 %
	N/A	3	1,2 %

**Tab. 2** – Breakdown of the representation of different weathering stages on the remains.

circumference remained in 29 specimens (61.7%), five specimens (10.6%) had more than half the circumference remaining and 13 specimens (27.7%) preserved the full circumference. Additionally, 53 fractures were analysed, identifying 66.0% (n = 35) dry bone fractures and 34.0% (n = 18) fresh bone fractures. A multitude of marks are represented in all of these long bones, but no strong correlations could be made, as, for example, tooth marks appear in combination with both dry and fresh bone fractures, as do trampling marks etc. The large incidence of long bone specimens with less than half the circumference could be associated with the debris flow as an energetic mode of deposition, resulting in a larger degree of comminution.



Fig. 4 – Specimen Sc2013-518-3: an oblique cut mark runs across the surface.

### 8. Anthropogenic marks

Anthropogenic marks were scarce in the studied assemblage and their identification was complicated due to the effects of abrasion and abundant presence of trampling marks. Only six specimens (n = 6/244; 2.5%) showed the presence of possible cut marks, V-shaped linear marks caused by the unintentional contact of stone tools with bone. Of these six specimens, only two could definitively be identified as cut marks based on microtopography, location, size etc. Both specimens are rib fragments of an unidentified species and possibly occurred during the removal of meat from the carcass. It is unclear if the remains originated outside the cave (Fig. 4 & 5).

None of the bone fractures were directly correlated to human activity, due to the absence of secondary traces like percussion marks, striations, arcuate edges etc. No other anthropogenic marks could be identified. As such, evidence and information on human presence in the cave's environment based on the faunal assemblage remains scarce.

### 9. Conclusion

The studied assemblage can be characterised as badly preserved and with low taxonomical identifiability regarding the skeletal remains. Taphonomic identifiability is negatively influenced due to the ubiquitous presence of abrasion on the remains, possibly caused by the sedimentary dynamics involving slope processes, with complex phases of reworking and deposition mainly through debris flows and surface run-off. The dental remains offer valuable taxonomical information in lieu of the skeletal remains.

**Fig. 5** – Specimen Sc2015-65-2: four oblique cut marks run across the bone surface. The marks are abraded towards the center of the bone surface.



The faunal spectrum reinforces the palynological data (Bastin, 1992; Pirson, 2007; Pirson *et al.*, 2008) in the paleoenvironmental reconstruction of unit 1B-GRH. The taxa present indicate the presence of a cold steppe environment, possibly interspersed with scarce woodland.

Both ursids and Pleistocene spotted hyenas accumulated bones in the cave. In the case of ursids, this was caused by hibernation deaths, while spotted hyenas likely added prey animals to the assemblage. The cave was possibly used as a den by spotted hyenas, but further research is needed to reinforce this hypothesis.

Specimens with anthropogenic marks are rare. Only two rib fragments bear definitive cut marks, while no other indisputable anthropogenic marks were identified. Evidence and information on human presence remains scarce.

More research is needed on the rest of the assemblage to draw definitive conclusions. Although preservation is not ideal, taphonomic marks can be identified, as can taxonomic information be derived from the teeth, and in some cases, skeletal remains. Specimens where accurate spatial information (within the excavation square) is absent and the sieved material should be checked or incorporated to an extent, as the case of the deciduous hyena teeth has shown valuable information can be overlooked.

#### *Acknowledgements*

We want to thank Éva Halbrucker (Ghent University) for making micrographs and her help in utilising the Zeiss Axio Zoom.V16.

## References

- ANDREWS P. & COOK J., 1985. Natural Modifications to Bones in a Temperate Setting. *Man*, 20/4: 675-691.
- ANDREWS P. & FERNÁNDEZ-JALVO Y., 1997. Surface modifications of the Sima de los Huesos fossil humans. *Journal of Human Evolution*, 33: 191-217.
- BARONE R., 1976. *Anatomie compare des mammifères domestiques. Tome 1. Ostéologie*. Vigot, Paris.
- BASTIN B., 1992. Analyse pollinique des sédiments détritiques, des coprolithes et des concrétions stalagmitiques du site préhistorique de la grotte Scladina (Province de Namur, Belgique). In: Otte M. (ed.), *Recherches aux grottes de Sclayn. Volume 1. Le contexte*, Études et Recherches Archéologiques de l'Université de Liège (ERAUL), 27, Liège: 59-77.
- BEHRENSMEYER A. K., 1978. Taphonomic and ecologic information from bone weathering. *Paleobiology*, 4/2: 150-162.
- BINFORD L. R., 1981. *Bones. Ancient Men and Modern Myths*. Academic Press, New York.
- BLUMENBACH J. F., 1799. *Abbildungen naturhistorischer Gegenstände*. H. Dieterich, Göttingen.
- BLUMENSCHINE R. J., 1988. An experimental model of the timing of hominid and carnivore influence on archaeological bone assemblages. *Journal of Archaeological Science*, 15: 483-502.
- BLUMENSCHINE R. J., 1995. Percussion marks, tooth marks and the experimental determinations of the timing of hominid and carnivore access to long bones at FLK *Zinjanthropus*, Olduvai Gorge, Tanzania. *Journal of Human Evolution*, 29: 21-51.
- BONJEAN D., 1998. Situation géographique et historique. In: Otte M., Patou-Mathis M. & Bonjean D. (ed.), *Recherches aux grottes de Sclayn. Volume 2. L'archéologie*, Études et Recherches Archéologiques de l'Université de Liège (ERAUL), 79, Liège: 9-14.
- BONJEAN D., DI MODICA K., ABRAMS G., PIRSON S. & OTTE M., 2011. La grotte *Scladina* : bilan 1971-2011. In: Toussaint M., Di Modica K. & Pirson S. (ed.), *Le Paléolithique moyen en Belgique. Mélanges Marguerite Ullrich-Closset*, Bulletin de la Société royale belge d'Études géologiques et archéologiques 'Les Chercheurs de la Wallonie', Hors-série, 4 – Études et Recherches archéologiques de l'Université de Liège (ERAUL), 128, Liège: 323-334.
- BONJEAN D., ABRAMS G., DI MODICA K. & PIRSON S., 2013. Andenne/Sclayn : la grotte *Scladina*, nouvelles datations au radiocarbon. *Chronique de l'Archéologie wallonne*, 20: 241-244.
- BUNN H. T., 1981. Archaeological evidence for meat-eating by Plio-Pleistocene hominids from Koobi Fora and Olduvai Gorge. *Nature*, 29: 574-577.
- BUNN H.T., 1982. *Meat-eating and human evolution: studies on the diet and subsistence patterns of Plio-Pleistocene hominids in East Africa*. PhD, Department of Anthropology, University of California, Berkeley: 2 vol., 514 p.
- BUNN H. T., 1983. Comparative analysis of modern bone assemblages from a San hunter-gatherer camp in the Kalahari Desert, Botswana, and from a spotted hyaena den near Nairobi, Kenya. In: Clutton-Brock J. & Grigson C. (ed.), *Animals and Archaeology. 1. Hunters and Their Prey*, BAR, International Series, 163, BAR Publishing, Oxford: 143-148.
- DAVIES D., POWELL E. & STANTON R., 1989. Taphonomic signature as a function of environmental process: Shells and shell beds in a hurricane-influenced inlet on the Texas coast. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 72: 317-356.
- D'ERRICO F., GIACOBINI G. & PUECH P. F., 1984. Varnish replicas. A new method for the study of worked bone surfaces. *Ossa*, 9/11: 29-51.
- DUCROTAY DE BLAINVILLE H. M., 1816. Prodrome d'une nouvelle distribution systématique du règne animal. *Bulletin des Sciences par la Société Philomatique de Paris*, Année 1816, vol. 8 : 105-124.
- FERNÁNDEZ-JALVO Y. & ANDREWS P., 2016. *Atlas of Taphonomic Identifications*. Springer, Dordrecht.
- FISCHER J. W., 1995. Bone Surface Modifications in Zooarchaeology. *Journal of Archaeological Method and Theory*, 2/1: 7-68.
- GERMONPRÉ M. & SABLIN M. V., 2001. The cave bear (*Ursus spelaeus*) from Goyet, Belgium. The bear den in Chamber B (bone horizon 4). *Bulletin de l'Institut royal des Sciences naturelles de Belgique. Sciences de la Terre*, 71 : 209-233.

GOLDFUSS G. A. 1823. Osteologische Beiträge zur Kenntnis verschiedener Säugethiere der Vorwelt. VI. Ueber die Hölen-Hyäne (*Hyaena spelaea*). *Nova Acta Physico-Medica Academiae Caesararum Leopoldino-Carolinae Naturae Curiosorum*, 3/2: 456-490.

GUERIN C. & PATOU-MATHIS M., 1996. *Les grands mammifères plio-pléistocènes d'Europe*. Masson, Paris.

HILLSON S., 2005. *Teeth*. Cambridge University Press, Cambridge.

LAVOCAT R., 1966. *Atlas de Préhistoire. Tome III. Faunes et flores préhistoriques de l'Europe occidentale*. Coll. "L'Homme et ses origines", Éditions N. Boubée, Paris.

LINNAEUS C., 1758. *Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Editio decima, reformata, Tomus 1*. Laurentius Salvius, Stockholm.

LYMANN R. L., 1994. *Vertebrate Taphonomy*. Cambridge University Press, Cambridge.

PALES L. & LAMBERT C., 1971. *Atlas ostéologique pour servir à l'identification des mammifères du quaternaire*. CNRS Éditions, Paris.

PATOU-MATHIS M., 1998. Les espèces chassées et consommées par l'homme en couche 5. In: Otte M., Patou-Mathis M. & Bonjean D. (ed.), *Recherches aux grottes de Sclayn. Volume 2. L'Archéologie, Études et Recherches Archéologiques de l'Université de Liège (ERAUL)*, 79, Liège: 297-310.

PIRSON S., 2007. *Contribution à l'étude des dépôts d'entrée de grotte en Belgique au Pléistocène supérieur. Stratigraphie, sédimentogenèse et paléoenvironnement*. PhD, University of Liège & Royal Belgian Institute of Natural Sciences, Liège-Brussels.

PIRSON S., 2014. The stratigraphic sequence of Scladina Cave. In: Toussaint M. & Bonjean D. (ed.), *The Scladina I-4A Juvenile Neandertal (Andenne, Belgium). Palaeoanthropology and Context*, Études et Recherches Archéologiques de l'Université de Liège (ERAUL), 134, Andenne: 49-68.

PIRSON S., COURT-PICON M., HAESAERTS P., BONJEAN D. & DAMBLON F., 2008. New data on geology, anthracology and palynology from the Scladina cave Pleistocene sequence: preliminary results. *Memoirs of the Geological Survey of Belgium*, 55: 7-93.

PIRSON S., TOUSSAINT M., BONJEAN D. & DI MODICA K., 2018. Spy and Scladina Caves: A Neandertal's Story. In: Demoulin A. (ed.), *Landscapes and Landforms of Belgium and Luxembourg*. Springer International Publishing: 357-383.

POTTS R. & SHIPMAN P., 1981. Cut marks made by stone tools from Olduvai Gorge, Tanzania. *Nature*, 291: 577-580.

PRAT F., 1970. *Quelques mammifères pléistocènes. Odontologie, ostéologie*. Institute for Quaternary, University of Bordeaux, Bordeaux.

SCHMID E., 1972. *Atlas of Animal Bones - Tierknochenatlas*. Elsevier Publishing Company, Amsterdam.

STINER M., 1998. Mortality analysis of Pleistocene bears and its paleoanthropological relevance. *Journal of Human Evolution*, 34 : 303-326.

TOUSSAINT M., OTTE M., BONJEAN D., BOCHERENS H., FALGUÈRES C. & YOKOYAMA Y., 1998. Les restes humains néandertaliens immatures de la couche 4A de la grotte Scladina (Andenne, Belgique). *Sciences de la terre et des planètes*, 326: 737-742.

VILLA P. & MAHIEU E., 1991. Breakage patterns of human long bones. *Journal of Human Evolution*, 21/1: 27-48.

ZUNINO M., PAVIA M., FERNÁNDEZ-LOPEZ S.R. & PAVIA G., 2012. Taphonomic analysis of the Lower Pleistocene Pirro Nord fossil locality (Pirro 10 site, Puglia, Southern Italy): a depositional model for vertebrate assemblages in a karstic environment. *Palaios*, 27: 3-18.

#### Websites

ArchéoZoo, s.d. *ArchéoZoothèque*. Accessed 18/04/2023 via <https://www.archeozoo.org/archeozoothèque/>

U-M Museum of Zoology, s.d. *Animal Diversity Web*. Accessed 18/04/2023 via <https://animaldiversity.org/>

### Abstract

Ongoing research on layer 1B-GRH at Scladina Cave in the Namur province of Belgium prompted the need for more in-depth zooarchaeological and taphonomic data on the faunal remains. This preliminary study analysed spatially documented specimens from the excavations undertaken between 2007 and 2018 and recorded many taxonomic and taphonomic features. Due to the preliminary nature of this study, care should be taken when extrapolating hypotheses to layer 1B-GRH at large. Taxonomic data indicated the presence of a cold steppe environment, possibly interspersed with scarce woodland. Taphonomic identifications were complicated due to the ubiquitous presence of abrasion, linked to debris flows and surface run-off during site formation. Both ursids and Pleistocene spotted hyenas occupied the cave as a den. Only two anthropogenic cut marks were identified. Further research is needed to provide definitive information.

*Keywords:* Scladina (Prov. Namur, BE), Middle Pleniglacial, MIS 3, zooarchaeology, taphonomy.

### Samenvatting

Lopend onderzoek naar laag 1B-GRH in Scladina, grot van Sclayn, in de provincie Namen, België, leidden tot een noodzaak aan zoöarcheologische en tafonomische gegevens over de faunaresten. Deze voorstudie analyseerde ruimtelijk gedocumenteerde specimens van de opgravingen die plaatsvonden tussen 2007 en 2018 en analyseerde verschillende taxonomische en tafonomische kenmerken. Vanwege de voorlopige aard van deze studie is voorzichtigheid geboden bij het extrapoleren van hypotheses naar laag 1B-GRH als geheel. Taxonomische gegevens wezen op de aanwezigheid van een koude steppeomgeving, mogelijk afgewisseld met schaars bos. Tafonomische identificaties werden bemoeilijkt door de algemene aanwezigheid van slijtage, gekoppeld aan puinstromen en afspoeling tijdens de vorming van de vindplaats. Zowel ursiden als Pleistocene gevlekte hyena's gebruikten de grot als hol. Er werden slechts twee antropogene snijsporen gevonden. Verder onderzoek is nodig om definitieve informatie te verkrijgen.

*Sleutelwoorden:* Scladina (prov. Namen, BE), Midden-Pleniglaciaal, MIS 3, zooarcheologie, tafonomie.

Tristan DEDRIE  
GRÉGORY ABRAMS  
Camille PIRONNEAU  
Isabelle DE GROOTE  
ArcheOs, Research Laboratory for Biological Anthropology  
Department of Archaeology  
Ghent University  
Sint-Pietersnieuwstraat, 35  
BE-9000 Gent  
*tristan.dedrie@ugent.be*  
*camille.pironneau@ugent.be*  
*isabelle.degroote@ugent.be*  
*gregory.abrams@ugent.be*

Grégory ABRAMS  
Kévin DI MODICA  
Centre archéologique de la grotte Scladina  
Espace Muséal d'Andenne  
339D, rue Fond des Vaux  
BE-5300 Sclayn (Andenne)  
*gregory.abrams@ema.museum*  
*kevin.dimodica@ema.museum*

Stéphane PIRSON  
Service public de Wallonie  
Agence wallone du Patrimoine (AWaP)  
Direction d'appui scientifique et technique  
1, rue des Brigades d'Irlande  
BE-5100 Jambes  
*stephane.pirson@awap.be*