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The woolly rhinoceros (*Coelodonta antiquitatis*) from Râșteț Cave (Bihor County)

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Tribute to Iosif Viehmann's memory

Abstract. The woolly rhinoceros (*Coelodonta antiquitatis*) is a frequent presence in large mammals' assemblages specific to the cold stages of the last two glacial stages of Europe (Riss-Würm/Saale-Weichsel). This rhinoceros is well known due to the discovery of relatively complete skeletons, but also thanks to exceptional mummified fossils such as those from the ozokerite of Starunia (former Polish, nowadays Ukraine) and from the Siberian permafrost. In our country, the discoveries relate exclusively to isolated skeletal

pieces, overwhelmingly in open-air sites. Discoveries from underground karst (potholes, caves) are rare. In this context, the paper focuses on a fragmentary innominate recovered from the Râșteț Cave, near Vașcău town, in Codru Moma Mountains (part of the Apuseni Mountains). Such a bone is relatively rare in Romania, which is why we considered it worth to report. It concerns an old find that belongs to the late speleologist from Cluj, Dr. Iosif Viehmann.

Keywords: woolly rhino, innominate, Late Pleistocene, Bihor County, Romania.

Introduction

Among the large mammals specific of the Middle-Upper Pleistocene cold episodes in Europe (e.g. the woolly mammoth *Mammuthus primigenius* [Blumenbach, 1799], the Irisk elk *Megaloceros giganteus* [Blumenbach, 1799], the steppe bison *Bison priscus* Bojanus, 1827, etc.), the woolly rhinoceros (*Coelodonta antiquitatis* [Blumenbach, 1799] = *Rhinoceros lenensis* Pallas, 1773 = *Rhinoceros tichorhinus* Fischer, 1811] was a relatively frequent presence in Romania too.

It was an unevenly toed (perissodactyl) mammal, well adapted to cold climate, with a large body covered by long fur. The physiognomy and anatomy of this rhinoceros are well known thanks to some Paleolithic parietal paintings found in various caves, but mainly to some exceptionally well-preserved carcasses. Thus, in some regions, such as Siberia, extremely well-preserved mummified corpses have been discovered in permafrost (Boeskorov et al. 2011, Belyaev et al. 2023), which allowed the study of its past diets, parasites, palaeopathology, etc. In our country, mummified corpses of these rhinoceroses like the ones found embedded in ozocerites as those at Starunia (former Poland, nowadays Ukraine; Niezabitowski 1914, Nowak et al. 1930, Kubiak 2009, Kowalski 2000; Kubiak & Drygant 2005) have not been discovered to date, although Romania is a territory where occurrences of ozokerite and asphalt related to altered petroleum accumulations are reported from various localities (Popescu-Voitești 1943,

Paraschiv 1975). Partial skeletons have not proved to be frequent finds either, being limited to reports from Galați (Sficlea 1960) or Brăila (Apostol 1970).

On the other hand, this rhinoceros has been documented by isolated bones and teeth reported from a considerable number of localities spread throughout the Romanian territory (Codrea 2005). Most of the discoveries refer to *plein-air* environments, the largest part related to river terrace deposits (e.g. Koch 1891, 1900, Phleps 1926, Papadopol & Barbu 1933, Liteanu & Ghenea 1966, Apostol 1967, Jurcsák 1970, 1974, Macarovici & Costeski 1973, Băcăuanu 1978, Kovács 1981, Rădulescu & Samson 1985, Terzea 1986, Codrea & Gherdan 1990, Codrea & Botoș 1995, Codrea & Diaconu 2003, Codrea 2005, etc.) or loess accumulations (e.g. Koch 1891, 1900, Phleps 1926, Radulesco et al. 1965, Alimen et al. 1968, Rădulescu & Samson 1971, 1985, Codrea et al. 1996, Păunescu 2001, etc.). The occurrences related to karst (potholes, caves) are rare (e.g. Bombiță 1954, Dumitrescu et al. 1963, 1967, Terzea 1987, Codrea & Lazár 1994, Codrea 2005, and references therein). The presence of woolly rhinoceros' bones in those places can be explained either by the transport by water streams into the karst underground (i.e. hydrotaphonomy), or possibly they were carried inside by the large carnivores such as hyenas (*Crocuta crocuta spelaea* Goldfuss, 1823), although usually the rhinoceros' bone remains collected so far in our country do not provide arguments for this scenario. The contributions of hyenas to the taphocoenosis are clearly demonstrated by the discovery of a hyena den in a non-karstic context at Râpa, in Bihor County, in which rhinoceros' bones (especially originating from young specimens) were brought inside by these carnivores, exposing specific bite marks (Csák 1978). Such a find remains so far unique in our country.

In this context, the discovery of an innominate bone in the Râșteț Cave (Apuseni Mountains, Bihor County) is of interest because of its karstic environment. The first visits to this cave are of an older date (we have a written document about a visit on August 10, 1958) and the study of this bone has involved a number of professionals in the field of vertebrate paleontology. Thus, the piece was studied by Constantin Rădulescu and Petre-Mihai Samson

(holographic correspondence dated Bucharest, 5 May and 31 May 1961, respectively) and Tiberiu Jurcsák (idem, dated 6, 28, 29 March, 21 May, 5 June 1960, and 11 May 1961). We have access to all these documents due to our late colleague Iosif 'Pepi' Viehmann, who discovered the bone and donated it to the geological museum of the 'Babeș-Bolyai' University of Cluj-Napoca and made the related documents available to us.

Geological setting and age

The Râșteț Cave, in fact a cave-pothole, is in north-western Romania, near the village Câmp, a small locality in the vicinity of Vașcău town (ca. 2.5 km in straight line, on western direction), in Bihor County (northwestern Romania), in the Codru Moma Mountains (part of the Apuseni Mountains) (Fig. 1). In the Romanian caves' catalogue it is numbered as 3615/1 as 'Peștera din Dealul Râștetului' (Goran 1982). The cave is situated in Râșteț Hill, at 540 m absolute altitude and 170 m relative altitude from the neighboring riverbed. It was completely explored and mapped in 1985 by Gábor Halasi, Oszkar Honigesz, Tiberiu Tulucan and Ladislau Groh (Groh et al. 1977-1978).

From a geological viewpoint, the cave's area belongs to 'Tisza Megaunit' in the Northern Apuseni Mountains' region, more precisely to the Inner Dacides (Săndulescu 1980). These concern three units: the basal Bihor Unit (former 'Bihor Autohtonous', in Ianovici et al. 1976), overlaid by the Codru Nappes System (Bleahu et al. 1994) and the uppermost Biharia Nappes System (Balintoni 1994). This orogenic structure was erected in the mid-Cretaceous tectonic phase ('Austrian', in Săndulescu 1980).

The cave is excavated in the carbonate deposits belonging to the Codru Nappes System, in the Upper Codru zone (Northern Bačka-Upper Codru zone) of this system, where in dominance are Triassic limestones (Bleahu et al. 1979, 1994). More precisely, it is positioned in the uppermost position of the succession, in the Colești Nappe. In this nappe, the Upper Carnian-Norian reef limestones originating from a carbonate platform environment, with pelagic influences of

Dachstein type (with corals and sponges) are remarkable. These limestones are overlaid by Rhaetian loferite sequences of Dachstein limestones with megalodonts (*Conchodon*; Panin et al. 1982; Bleahu et al. 1994).

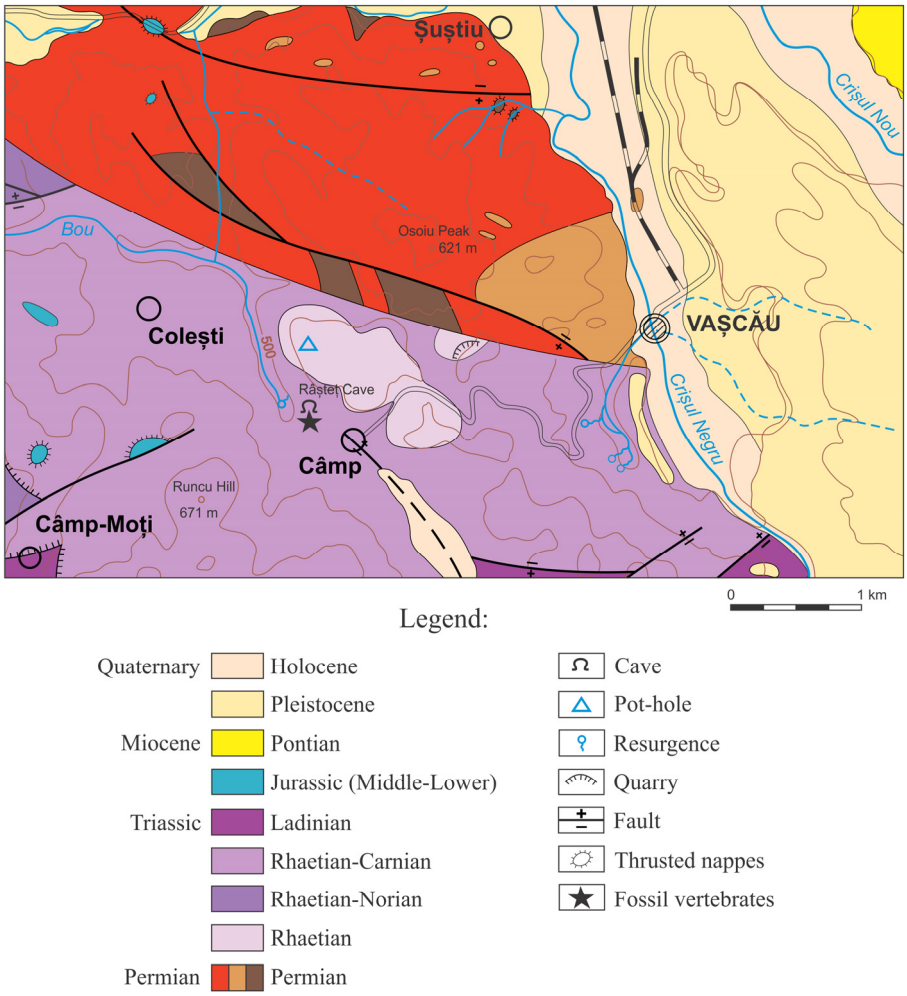

Fig. 1: Location of Râșteț Cave on the geological map (simplified, after Geological map of Romania, 1: 50000, *folio* 55 d Vașcău L-34-57-D).

The innominate fragment was collected by the late speleologist Iosif Viehmann directly from the crust covering the cave floor. There were not mentioned any other vertebrate bones around, therefore an assemblage cannot be sketched. However, we may presume that the rhinoceros was Late Pleistocene.

Material and methods

Only a single damaged innominate was available for this study, deposited in the Museum of Paleontology-Stratigraphy of "Babeș-Bolyai" University in Cluj-Napoca, with inventory number V 1010.

The bone in question was discovered heavily encrusted by calcium carbonate. The calcareous crust, whose thickness reached 1.2-2 cm in some portions, could be removed for the most part mechanically, with usual laboratory instruments (chisels and hammer), except for some fragile portions such as the upper extremity of the iliac palette or the region of the pubic symphysis, where the crust has a greater adherence and where its removal did not offer many additional elements of observation. The cleaning works were done in the laboratory of the Speleological Institute 'Emil Racoviță' in the years '60 of the last century by Petre-Mihai Samson and Constantin Rădulescu.

The photographs were captured in with a SONY ® DSC – RX 100M5 WW 605351 with ZEISS lens 1,8-2,8/8,8-25,7 camera in the Laboratory of Paleotheriology and Quaternary Geology at "Babeș-Bolyai" University in Cluj-Napoca. The text-figures were composed by one of the authors (CF) with the support of Dr. Alexandru Solomon.

The nomenclature of the morphological elements in the description of the bone and the measurements agree with the works of Borsuk-Białynicka (1973) and Mazza (1988).

Institutional abbreviations: PSMUBB - Museum of Paleontology-Stratigraphy of Babeș-Bolyai University in Cluj-Napoca.

Systematic paleontology

Order Perissodactyla Owen, 1848

Family Rhinocerotidae Gray, 1821

Subfamily Rhinocerotinae Gray, 1821

Tribe Rhinocerotini Gray, 1821

Subtribe Rhinocerotina Gray, 1821

Genus *Coelodonta* Bronn, 1837

Coelodonta antiquitatis (Blumenbach, 1799)

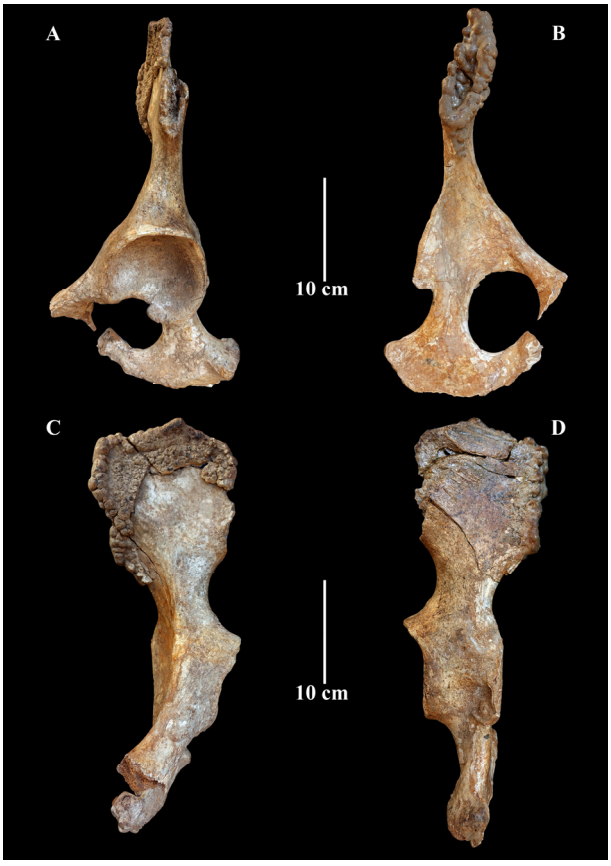

Fig. 2: *Coelodonta antiquitatis*, left innominate, Râșteț Cave (PSMUBB V 1010): A – B, lateral views; C – ventral view; D – dorsal view.

Material: nearly complete left innominate, with damaged iliac portions (PSMUBB V 1010).

Description. The material attributed to this species is represented by an almost complete left innominate, but with a damaged iliac crest, incomplete and heavily encrusted with filings of carbonate material. The bone is also broken around the *foramen obturatum*, the break having a recent aspect, probably the result of defective manipulation of the bone. For this reason, several measurements originate from the data taken decades ago by Costin Rădulescu and Petre-Mihai Samson, which remained in manuscript.

The calcareous crust, whose thickness reached 15-20 mm in some parts, could be removed for the most part, except for certain fragile portions such as the upper end of the iliac blade or the region of the pubic symphysis, where the crust in question was extremely adherent to the bone.

The morphology is in concordance with the one already described by Borsuk-Białynicka (1973). Although heavenly broken, a slight concavity of the iliac crest margin can be noticed in the preserved portion. On the same portion, a concavity can be observed also on the dorsal face of the ilium. The neck is short, with sharp dorso-medial border, subtriangular in cross-section. The acetabulum is deep, with a slight subcircular contour. Its margins are uplifted, forming a surrounding prominence. The rugosities for *m. gemelli* are clearly visible, but one may presume that this portion of the bone was too deeply influenced by the interventions for removing the carbonaceous crust. The ischium is rather short and triangular in cross section. The ischiatic tuberosity is big, with well-expressed rugosities for the insertions of *m. biceps femoris*. The *foramen obturatum* has an oval outline.

Measurements (mm)

Lateral length	+ 450
Height of the shaft of the ilium	68
Breadth of the shaft of the ilium	38

Outer length of the acetabula	115
Inner length of the acetabula	105
Length of the *foramen obturatum*	85
Antero-posterior diameter of *foramen obturatum*	105
Distance from the iliac crest to the outer margin of the acetabula	247
Length of the ischium (from the middle of acetabula)	174
Transverse diameter of the acetabular ramus of ischium	40
Transverse diameter of ischium *	118
Length of the pubian symphysis*	164.5
Distance from the middle of the pubian symphysis to *foramen obturatum**	22

* Measurements taken in the 1960s by the paleontologists Constantin Rădulescu and Petre-Mihai Samson at the 'Emil Racoviță' Speleological Institute Bucharest.

Comparisons and discussions

In his extensive study of rhinoceroses from Western Europe, Guérin (1980) makes no reference to the anatomy and sizes of the pelvic bones, probably considering such bones to be less diagnostic and rarely complete and well fossilized. This is also the situation in the Râșteț Cave: the bone suffered old damage, evidenced by the calcium carbonate crust covering those broken portions. If we add to this the recent damage due to careless handling, mentioned above in the text, we conclude that we have a fossil of mediocre quality available for study. However, given the rarity of this bone in the fossil inventories of the various excavations or in the repertories of different museum collections that gather fortuitous finds in our country, one may consider it worthwhile to specify the few data that can be extracted. In addition, this is the single evidence supporting the presence of this large Pleistocene herbivore around the Râșteț Cave and the Codru Moma Mountains in general. This find issued in the published list of the distribution of the woolly rhinoceros in Romania (Codrea 2005).

However, other paleontologists have paid attention to the innominate bones of fossil rhinoceros (e.g. Borsuk-Białynicka 1973, Mazza 1988), so several comparisons become possible. The assignation of the pelvic bone to the woolly rhinoceros is possible and reliable thanks to the data published by Borsuk-Białynicka (1973). Comparisons show that the Râșteț fossil is morphologically and size-wise close to the data published by her.

Costin Rădulescu and Petre-Mihai Samson (unpublished manuscript) had on their disposal a fragmentary innominate originating probably from the Merk's rhinoceros *Stephanorhinus kirchbergensis* (Jäger, 1839). They did not specify the locality of origin of the fossil, but we may think that it was possibly a material found in the Bârsa sedimentary basin. They underline that "*overall, the piece is similar in morphology to the Râșteț innominate*", "*but a closer comparison shows some significant differences*". More precisely, they refer to the "*less developed ischial spine and the deeper and narrower caudal notch of the cotyloid cavity. The latter conformation is determined by the development of the lunar facet of the ischial branch, which projects into the obturator foramen*."

Concluding remarks

The fragmentary woolly rhinoceros' innominate bone from the Râșteț Cave is valuable because of the rarity of such a bone in our country.

On the other hand, the existence of this bone on the cave floor confirms what we have already mentioned (Codrea & Lazár 1994), namely the ability of this large herbivore to cross mountain barriers. Undoubtedly, the Apuseni Mountains did not put obstacles in the trails followed by this rhinoceros, which, with its robust physiognomy managed to overcome them, as in the Codru Moma Mountains, where the moderate altitudes did not allow the development of glaciers in Middle-Late Pleistocene.

We considered that the data concerning this find deserves to be brought to the attention of professional paleontologists and all those interested in Quaternary megafauna from the Carpathian caves.

Acknowledgements

This contribution is a tribute to the memory of our late colleagues: researcher dr. Iosif 'Pepi' Viehmann ("Emil Racoviță" Speleological Institute, Cluj-Napoca branch), the discoverer of the bone and donor of this fossil to the Museum of Paleontology-Stratigraphy at the "Babeș-Bolyai" University, Cluj-Napoca, and researchers dr. Constantin 'Costin' Rădulescu and dr. Petre-Mihai Samson ("Emil Racoviță" Speleological Institute, Bucharest), who gave to one of us (VAC) some unpublished data about this find. Dr. geologist engineer Alexandru Solomon (Târgu Mureș Natural Sciences Museum) is acknowledged with thanks for his support in editing Fig. 2.

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