

CHRONOLOGY OF THE MIDDLE PALEOLITHIC IN THE CARPATHIAN AREA – PAST AND PRESENT

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Rezumat: *Munții Carpați din spațiul României prezintă un număr considerabil de peșteri active și fosile cu un potențial arheologic ridicat pentru perioada paleolitică. Dacă în statisticile din anul 1976 era înregistrat un număr de 1.884 de peșteri, recent, în anul 2019, sunt menționate aproximativ 12.000 de peșteri, dintre care 2.908 peșteri sunt fosile și au depuneri sedimentare ce pot păstra indicii privind activitățile antropice. Dintre toate acestea, doar aproximativ 10 peșteri au beneficiat de cercetări arheologice sistematice. Peșterile în care au fost identificate mărturiile din Paleoliticul mijlociu păreau, până de curând, concentrate în zona Carpaților Meridionali, însă rezultatele obținute recent în zona carstică din Cheile Vârghișului, Munții Perșani (Carpații Orientali), atrag atenția asupra necesității extinderii cercetărilor arheologice în întreaga zonă a Munților Carpați din zona României.*

Abstract: *The Romanian Carpathians have a considerable number of active and fossil caves, with a high archaeological potential for the Paleolithic period. If in the statistics of 1976, a number of 1.884 caves were recorded, recently, in 2019, approximately 12.000 caves are mentioned, of which 2.908 are fossils and have sedimentary packages that can archive human activity. From all these, only about 10 caves have benefited from systematic archaeological research. Caves with evidence from the Middle Paleolithic seemed, until recently, to be concentrated in the Southern Carpathians, but the results obtained recently from the karst of the Vârghiș Gorge, the Perșani Mountains (Eastern Carpathians), draw attention to the necessity to expand archaeological research in the entire area of the Romanian Carpathians.*

The history of cave research in the Carpathian area

The identification and research of the Middle Paleolithic in the Carpathian area is due to the archaeologist Márton Roska (1880–1961), as well as the first chronological dating, based on the stratigraphic position, the description of the lithic material and the faunal associations¹. The Roska stage was continued by Constantin S. Nicolăescu-Plopșor (1900–1968), considered the founder of the Romanian archaeological school of Paleolithic research. The most famous caves were identified and

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¹ ROSKA 1925.

researched by the team coordinated by C. S. Nicolăescu-Plopșor in the 50s and 60s of the last century. Nicolăescu-Plopșor had the same approach as M. Roska in his chronological dating, but he also used the opportunities offered by interdisciplinary research². C. S. Nicolăescu-Plopșor adopted the Alpine geochronological scheme and considered that the Middle Paleolithic in the Carpathian area evolved from the beginning of Würm I to the end of Würm II³. This chronological framework allowed the definition of a Late Middle Paleolithic, partly contemporary with the Aurignacian technocomplex, a hypothesis also taken over by the students of C. S. Nicolaescu-Plopșor, Florea Mogoșanu (1929–1986), Alexandru Păunescu (1931–2003) and Maria Bitiri. The discovery in 1952 of the skull from the Muierilor Cave, during the excavations carried out by C. S. Nicolăescu-Plopșor, attributed to *Homo sapiens*, associated with lithic material characteristic for the Middle Paleolithic, seemed to support the particular evolution of the Middle Paleolithic in the Romanian Carpathians⁴.

The new regional geochronological scheme

In the 70s of the last century the necessary samples for pollen analyses were collected by Marin Cârciușmaru from all the Paleolithic sites researched by C. S. Nicolăescu-Plopșor and his disciples. Caves with lithic material attributed to the Middle Paleolithic represented the backbone of this endeavor. The results were the basis for the creation of an own scheme of paleoclimate evolution in the Upper Pleistocene in Romania⁵ and seemed to confirm the short chronology of the Middle Paleolithic in the Carpathian area. The arguments provided by M. Cârciușmaru's studies were the basis for the foundation of a so-called "Carpathian facies": "*Son individualisation comme faciès à part repose sur le caractère techno-typologique de l'inventaire lithique avec sa combinaison de caractères d'éclatement, lamellaires et bifaciaux, sa position chronologique transitoire du Paléolithique moyen vers le Paléolithique supérieur, la prédominance des roches locales (quartzite, diorite, etc.) comme matières premières*"⁶.

Application of the ¹⁴C method – past and present

The first application of the ¹⁴C method in Paleolithic/Prehistoric Archeology in Romania was carried out in 1968, the year of the disappearance of the archaeologist C. S. Nicolaescu Plopșor. It was a bone sample-*Ursus spelaeus*, evaluated at the "V. I. Vernadsky" Institute of Geochemistry and Analytical Chemistry Academy of Sciences, USSR, Moscow and published in "Radiocarbon Magazine", Vol. 10, No. 2, 1968. It is mentioned that the sample comes from the excavations realized in 1951, from the Muierilor Cave, coordinated by C. S. Nicolăescu-Plopșor, and it was associated with quartzite lithic material. The age obtained is >29000 (Mo-105), but the results were communicated in the Romanian archaeological environment only recently⁷.

² NICOLĂESCU-PLOPȘOR 1957.

³ NICOLĂESCU-PLOPȘOR 1961.

⁴ NICOLĂESCU-PLOPȘOR 1961.

⁵ CÂRCIUȘMARU 1980.

⁶ CÂRCIUȘMARU, PLEȘA 2004, p. 226.

⁷ COSAC 2006.

In fact, in the 70s and 80s of the last century, discussions were opened regarding the application of the ^{14}C method to Paleolithic sites. The initiator of the dating program was the American anthropologist Kenneth Honea, who initially worked as archaeologist at the National Academy of Sciences (USA)⁸, later as anthropologist at Northern Illinois University (USA). K. Honea was present in Romania, in 1977 – 1978, 1982 – 1983, 1984 and 1987 within the “Vasile Pârvan” Institute of Archeology. His activity is known to us from published studies⁹, but particularly from the archive of the former Department of State Security, accessible in the Archive of the National Council for the Study of Security Archives, as well as from the general documents regarding the research activity of the “Vasile Pârvan” Institute of Archeology, but also from the file of the archaeologist who was initially responsible for coordinating Honea’s activity in Romania¹⁰.

The ^{14}C dating program started in 1977, when samples were taken from the Paleolithic site of Ripiceni Izvor, located on a terrace of the Prut river, during the excavations carried out under the coordination of Al. Păunescu, “to determine in the laboratories of the aM SUA... the first samples for the Carbon 14 bombardment of objects”¹¹, but also in the Netherlands¹², and later samples were taken from the main caves in the area of the Southern Carpathians: Bordul Mare, Gura Cheii-Râșnov and Boroșteni. Regarding the first two sites, it was a matter of a post-excavation sampling, by cleaning the profiles and opening the boxes.

The results obtained and their interpretation led to the emergence of a scientific dispute, between K. Honea and the archaeologist Al. Păunescu, the coordinator of his activity in Romania, because “these refuted some assumptions previously communicated by the Romanian researcher”¹³, a fact which is reflected by the publication in separate studies of the ages obtained and of cultural associations¹⁴. The dispute is amply reflected in the notes provided by the informative sources from the “Vasile Pârvan” Institute of Archaeology and they draw attention to a reality which was not reflected in the scientific studies, regarding the method of taking the samples, their transportation, the existence of possible additional contaminations post sampling¹⁵.

This stage of the chronological evaluation was followed by the resumption of research in the caves of Ohaba Ponor, Curată, Spurcată, Liliacilor, Coacăzei, Gura Cheii-Râșnov, under the coordination of Al. Păunescu, and Boroșteni, under the coordination of M. Cârțumaru.

The results obtained (Table 1):

– Gura Cheii Cave (Râșnoavei Gorge, Brașov county). It was researched by

⁸ HONEA 1984a, p. 51.

⁹ HONEA 1981; HONEA 1982; HONEA 1984a; HONEA 1984b; HONEA 1986; HONEA 1991; HONEA 1993.

¹⁰ ACNSAS, *Referitor la Învățăământul Superior, Institutul de Arheologie*, Dosar nr. 10948, vol. 13, 15; ACNSAS, *Dosar personal al „Păun”*, Dosar nr. 302829, vol. 1, 2.

¹¹ ACNSAS, *Dosar personal al „Păun”*, Dosar nr. 302829, vol. 1, f. 8.

¹² ACNSAS, *Dosar personal al „Păun”*, Dosar nr. 302829, vol. 1, f. 17.

¹³ ACNSAS, *Dosar personal al „Păun”*, Dosar nr. 302829, vol. 1, f. 17

¹⁴ HONEA 1984a; PĂUNESCU 1984.

¹⁵ ACNSAS, *Referitor la Învățăământul Superior, Institutul de Arheologie*, Dosar nr. 10948, vol. 13, f. 291, vol. 15, f. 116–117.

Alfred Prox (1934 – 1935), C. S. Nicolaescu-Plopsor (1959), Al. Păunescu (1983 – 1985) and M. Cârциumaru (2007). A first sample, taken in 1982, with a content of burnt organic material (GrN–11619) sparked a series of discussions between Al. Păunescu and K. Honea. The reason was the placement of the sample in relation to the habitation level¹⁶. Four other samples were taken in the years 1983 – 1985 (GrN–13008, GrN–13009, GrN–14620, GrN–13010) by Al. Păunescu¹⁷.

– Mare Cave/Lilieciilor/Bădichii (Peștera village, Dealul Bisericii, Bran-Drăgoslavele depression, Brașov county). It was researched by a team under the coordination of C. S. Nicolaescu-Plopșor (1957 – 1958), later by Al. Păunescu (1984 – 1985, 1988, 1998) and M. Cârциumaru (2009 – 2010). Only one sample, collected by Al. Păunescu in 1985¹⁸, was dated (GrN –14618).

– Coacăzii Cave/Coacăzei Cave/from Coacăzii Valley (Gaura Sbârциoarei, Bran-Drăgoslavele depression, Brașov county). The first research was carried out by A. Prox (1934), C. S. Nicolaescu-Plopșor (1958), Al. Păunescu (1984 – 1985) and M. Cârциumaru (2008). Al. Păunescu collected two samples during his research, GrN–14642 and GrN–16141, the first sample, with burnt organic material, indicated an erroneous age, and the second sample, from bone, provided an age considered correct¹⁹.

– Bordul Mare Cave (Ohaba Ponor village, Pui commune, Hunedoara county). The site was investigated by M. Roska (1923 – 1929), C. S. Nicolaescu-Plopșor (1954, 1955), Al. Păunescu (1983, 1986, 1993) and M. Cârциumaru (2009, 2010, 2011). All the currently known samples are based on burnt organic material, charcoal and bone. Two samples were taken in 1982²⁰ and estimated in the Honea stage²¹ (1984), GrN–11618 and GrN–11617, and the rest (GrA–6036, GrN–12676 and GrN–14626), taken by Al. Păunescu in 1994²². The ages obtained, with one exception, are at the limit of the estimation possibilities of the method.

– Curată Cave (Nandru village, Peștișu Mic commune, Hunedoara county). It was, initially, researched during the pioneering period of prehistoric archeology in Transylvania, by Zsofia Torma (1877 and 1879 – 1880), and after by Jozsef Mallasz (1932), C. S. Nicolăescu-Plopșor (1955, 1956) and Al. Păunescu (1997, 1998). Ten radiocarbon dating were made, all samples being collected by Al. Păunescu in his excavation campaigns. We notice an obvious contradiction between the ages indicated by the bone samples (GrN–23407, GrA–13948, GrN–24221, GrN–24222, GrN–24223, GrN–24224) and those on burnt organic material (GrN–24326, GrA–13249, GrA–13250) and in the situations where different samples were dated from the same level, the differences are notable (GrN–24222/GrN–24326, GrN–24223/ GrA–13249, GrN–24224/GrA–13250). The ages obtained on the bone are at the limit of the dating possibilities of the method, and those on burnt organic material are imprecise.

– Spurcată Cave (placed in the proximity of the Curată Cave). The first

¹⁶ PĂUNESCU 1984, p. 237; HONEA 1984a, p. 56.

¹⁷ PĂUNESCU 1991, p. 13.

¹⁸ PĂUNESCU 2001, p. 323.

¹⁹ PĂUNESCU 2001, p. 334.

²⁰ PĂUNESCU 1984, p. 237.

²¹ HONEA 1984a.

²² PĂUNESCU 2001, p. 397.

excavations were carried out by Jozsef Mallasz (1932), followed by C. S. Nicolăescu-Plopşor (1955, 1956) and Al. Păunescu (1986, 1994). Two samples were collected and dated, the first in 1986 and the second in 1994. Only the result provided by sample GrN14622 is considered correct by Al. Păunescu²³.

– Cioarei Cave (Boroştieni village, Peştişani commune, Gorj county). It was first researched by C. S. Nicolăescu-Plopşor in 1954, followed by M. Cârciumaru and M. Bitiri, and later only by M. Cârciumaru, between 1979 and 2001. For the Middle Paleolithic, there are 11 radiocarbon dating, six were collected in 1983 and were published by K. Honea in 1986²⁴ (GrN-13005, GrN-13000, GrN-13001, GrN-13002, GrN-13003, GrN-13004), and the rest, collected in 1985, were published in 1993²⁵ (GrN-15046, GrN-15052, GrN-15053, GrN-15054, GrN-15048). All dated samples contained organic material only²⁶, and the obtained radiocarbon ages are at the limit of the method.

After 2007, only in the case of two sites were collected bone samples associated with materials attributed to the Middle Paleolithic:

– Muierilor Cave (Baia de Fier), Main Gallery, bone samples resulting from the research carried out under the coordination of C. S. Nicolăescu-Plopşor in the period 1950–1953, Middle Paleolithic cultural context. Results: 40960 +/-450 uncal BP (OxA-16381), 47500 +/-900 uncal BP (OxA-16380), 42700 +/-550 uncal BP (OxA-16382), 40850 +/-450 uncal BP (OxA-15530)²⁷.

– Hoţilor Cave (Băile Herculane), bone sample was collected, but there are no data about the archaeological research from which it resulted and the laboratory where it was evaluated. We believe that it is the excavation coordinated by Fl. Mogoşanu, in the period 1968–1971; cultural context, Middle Paleolithic. Results: 27,400 ±500 BP (uncal BP-uncalibrated), 32,024 ±500 BP (cal BP-calibrated)²⁸. The chronological estimation of the Middle Paleolithic from the Muierilor Cave suggests the need to re-evaluate the concept of retarded/delayed Mousterian and the result from the Hoţilor Cave cannot be brought into discussion, as an evaluation of new evidence is needed in order to confirm/deny the result. At this moment, from our point of view, the Hotilor Cave is the only one researched by C. S. Nicolăescu-Plopşor and Fl. Mogoşanu, which has a sedimentary reserve that can provide additional information, according to current standards in paleolithic archeology research.

Present and perspectives

Since 2014, under our coordination, a series of caves from the Vârghiş Gorge, Perşani Mountains (Harghita county) have been researched. This area was developed by the Vârghiş, a right affluent of the Cormoş (river which flows into the Olt valley on the right side), in its lower sector, when passing through the calcareous formations accumulated in the second half of the Jurassic. The karstification process

²³ PĂUNESCU 2001, p. 264.

²⁴ HONEA 1986.

²⁵ HONEA 1993.

²⁶ HONEA 1986, p. 327.

²⁷ DOBOŞ 2017, p. 6.

²⁸ ALEXANDRESCU *et alii* 2011, p. 18.

started at the beginning of the Quaternary and evolved in several stages that led to the individualization of 4 karst levels, in which more than 122 caves were identified²⁹.

Chronological estimation of the presence of the Middle Paleolithic in the karst area of the Vârghişului Gorge raises a number of problems. For radiocarbon dating, charcoal and bone samples from Abri 122/1200 were processed at the Hertelendi Laboratory in Debrecen, Hungary, while the Mare Cave and the Gabor Cave samples were analyzed at the National Institute of Physics and Nuclear Engineering “Horia Hulubei” from Bucharest. The results show quite confusing time intervals, of infinite/close ages³⁰. The bone samples, mainly belonging to herbivores, provided ages estimated at the upper limit of the method, while charcoal samples, from the same archaeological contexts, provided younger ages³¹ (**Table 2**).

The argument for resuming these chronological values is provided by the situation in Abri 122, where IRSL and OSL samples from the lower half of the profile (250–260 cm), associated to archaeological materials, provided the following ages: 71 ± 7 ka (BT 1416 IRSL PM), 106 ± 11 ka (BT 1416 OSL), 124 ± 16 ka (BT 1415 IRSL PM), 123 ± 21 ka (BT 1415 IRSL FS), 141 ± 12 ka (BT 1415 OSL)³².

Discussions

The Romanian archaeologists gave *stricto senso* value to the results obtained by the radiocarbon method, in the total absence of collaboration with the specialists of the laboratories where the samples were dated and they estimated both the period of sedimentation of the layers associated or not with the archaeological materials attributed to the Middle Paleolithic, as well as the age of the occupational stages from the caves. The minimum radiocarbon ages were considered the *post quem* limit, and the maximum, the *ante quem* limit, even in the situation where they had two such ages. All these discussions were conducted in the obvious absence of questions related to the composition of the dated samples (charcoal, burnt bone, herbivore/carnivore bone), and possible post-depositional contamination or occurred during sampling.

Moreover, until recently, no new sites were researched to bring an additional degree of credibility. It should be mentioned that the ¹⁴C method was applied, at that stage, mainly to charcoal or burnt bone samples, with the exception of the Cioarei Cave, hence the apparent contradiction with the results from the other caves, as well as the departure from the accepted chronological pattern for the general evolution of the Middle Paleolithic; the credibility of the estimated age is questionable³³. It should be mentioned that the entire chronology of the Middle Paleolithic in the Carpathian area is based, in the overwhelming majority, on the results obtained in the Honea stage, namely the 80s of the last century.

It is true that archaeological research was resumed in sites researched previously, in the Gura Cheii Cave (Râşnoavei Gorge, author M. Cârciumaru–2007), Mare/

²⁹ MURATOREANU *et alii* 2015.

³⁰ COSAC *et alii* 2021, p. 33.

³¹ COSAC *et alii* 2022, p. 66–67.

³² COSAC *et alii* 2021.

³³ DOBOŞ 2017, p. 8.

Lilieciilor/Bădichii Cave (Peștera village, Church Hill, Bran-Drăgoslavele Depression, author M. Cârciuamaru–2009–2010, Coacăzii/Coacăzei Cave/from Coacăzii valley/Sbârcioara Hole (Bran-Drăgoslavele Depression, author M. Cârciuamaru–2008), but, unfortunately, no ^{14}C samples from anthropogenic agglomerations were collected and dated³⁴.

Apparently, no solid chronology can be built for the Middle Palaeolithic assemblages and sediment samples in the Vârghiș karst system based on radiocarbon dating of charcoal samples, and the obvious cause seems to be the post-depositional contamination of the samples. Also, the collagen scarcity in bone remains and age of samples near or beyond the limit of the radiocarbon dating method raise significant obstacles to a reliable chronology system. At the same time, more information to compile an articulated chronological picture could soon become available by involving other methods, such as OSL and ISL³⁵. A series of recent determinations using these methods showed surprisingly early dating that could push the age of the presence of the first people in the karst system of Vârghiș to 100 kyr.

BIBLIOGRAPHY

ALEXANDRESCU *et alii* 2011 – E. Alexandrescu, A. Olariu, G. Skog, K. Stentstrom, *Observații cronologice asupra musterianului de la Peștera Hoților, Băile Herculane*, Buletinul Muzeului „Teohari Antonescu” 17/13 (2011), p. 9–19.

ACNSAS – Arhiva Consiliului Național pentru Studierea Arhivelor Securității, *Referitor la Învățămintul Superior*, Institutul de Arheologie, Dosar nr. 10948, vol. 13, 15.

ACNSAS – Arhiva Consiliului Național pentru Studierea Arhivelor Securității, *Dosar personal al „Păun”*, Dosar nr. 302829, vol. 1, 2.

CÂRCIUMARU 1980 – M. Cârciuamaru, *Mediul geografic în Pleistocenul superior și culturile paleolitice din România*, București, 1980.

CÂRCIUMARU, PLEȘA 2004 – M. Cârciuamaru, M. Pleșa, *Le paléolithique moyen tardif en Roumanie*, in: E. Fülöp, J. Cseh (eds.), *Topical Issues of Middle Palaeolithic period in Central Europe*, Tata, 2004, p. 221–232.

CÂRCIUMARU *et alii* 2010 – M. Cârciuamaru, E. C. Nițu, R. Dobrescu, R. Ștefănescu, *Paleoliticul din județul Brașov*, Târgoviște, 2010.

COSAC 2006 – M. Cosac, *Une réévaluation du contexte des découvertes d'ossements humains de la galerie M de la grotte Muierilor à Baia de Fier*, Annales d'Université Valahia Târgoviște (Section d'Archéologie et d'Histoire) 6–7 (2005–2006), p. 99–205.

COSAC *et alii* 2017 – M. Cosac, G. Murătoareanu, D. Vereș, L. Niță, Chr. Schmidt, U. Hambach, A. Radu, R. Cuculici, D. L. Buzea, M. Mărgărit, V. Dumitrașcu, Ș. Vasile, A. Petculescu, *Multi-proxy archaeological investigations of a Middle Palaeolithic occupation context in Eastern Transylvania, Romania*, Quaternary International 485 (2017), p. 115–130.

COSAC *et alii* 2021 – M. Cosac, G. Murătoareanu, D. Vereș, L. Niță, Chr. Schmidt, U. Hambach, A. Radu, R. Cuculici, D. L. Buzea, D. Ștefan, M. Mărgărit, Ș. Vasile, V. Dumitrașcu, M. Robu, A. Petculescu, T. Sava, V. Georgescu, G. Șerbănescu, I. Geambașu, *Recent archaeological researches in the Vârghiș gorges karst area (Eastern Carpathians, Romania). A synthesis of the 2014–2020 campaigns*, Scripta Praehistorica Miscellanea in Honorem Mariae Bitiri Dedicata, MCA S.N. 17 (2021), Târgoviște, p. 325–350.

COSAC *et alii* 2022 – M. Cosac, G. Murătoareanu, D. Ștefan, D. L. Buzea, *First humans in*

³⁴ CÂRCIUMARU *et alii* 2010.

³⁵ COSAC *et alii* 2017; VEREȘ *et alii* 2017.

the South-Eastern Carpathians. Mountains and Caves, in: V. Sîrbu, D. Ştefan, M. M. Ştefan (eds.), *HIDDEN LANDSCAPES. The Lost Roads, Borders and Battlefields of the South-Eastern Carpathians*, Târgovişte, 2022, p. 59–74.

DOBOŞ 2017 – A. Doboş, *The Middle Palaeolithic research in Romania. Past an current issue*, MCA S.N. 12 (2017), p. 5–14.

HONEA 1981 – K. Honea, *New Romanian Radiocarbon Dates: Middle Palaeolithic, Mesolithic, Neolithic*, *American Journal of Archaeology* 8/4 (1981), p. 483–486.

HONEA 1982 – K. Honea, *Noi date radiocarbon: Ripiceni Izvor şi Ostrovul Corbului*, SCIVA 33/2 (1982), p. 216–221.

HONEA 1984a – K. Honea, *Cronologia paleoliticului mijlociu şi superior în România: implicaţiile rezultatelor actuale ale datării cu carbon radioactiv*, *Revista Muzeelor şi Monumentelor* 3 (1984), p. 51–68.

HONEA 1984a – K. Honea, *Chronometry of the Romanian Middle and Upper Paleolithic: implications of Current Radiocarbon Dating results*, *Dacia* N.S. 17/1–2 (1984), p. 23–39.

HONEA 1984b – K. Honea, *Rezultatele preliminare de datare cu carbon radioactiv privind Paleoliticul mijlociu din peştera Cioarei de la Boroşteni (jud. Gorj) şi Paleoliticul superior timpuriu de la Mitoc Malu Galben (jud. Botoşani)*, SCIVA 37/4 (1986), p. 326–332.

HONEA 1991 – K. Honea, *Perspective of the Romanian Paleolithic*, in: V. Chirică, D. Monah (eds.), *Le Paléolithique et le Néolithique de la Roumanie en contexte européen*, IV, *Bibliotheca Archaeologica Iassiensis*, Iaşi, 1991, p. 7–15.

HONEA 1991 – K. Honea, *Southeast Charentian Technocomplex in Romania: Boroşteni, Cioarei Cave, Gorj County; Radiometric Values*, in: J. Pavúk (ed.), *Actes du XIIe Congrès International du Sciences Préhistorique et Protohistorique*, Bratislava, 1993, p. 66–72.

MURĂTOREANU et alii 2015 – G. Murătoreanu, R. Cuculici, M. Cosac, A. Radu, L. Niţă, D. Vereş, D. L. Buzea, *Potenţialul arheologic al carstului din Cheiele Vârghişului-Munţii Perşani. Etape preliminare în realizarea unui Sistem Informaţional Geografic*, *Arheovest. Interdisciplinari-tate în Arheologie* III/2 (2015), p. 591–603.

NICOLĂESCU-PLOPŞOR 1957 – C. S. Nicolăescu-Plopşor, *Le Paléolithique dans la R. P. Roumaine a la lumière des recherches*, *Dacia* N.S. 1 (1957), p. 41–60.

NICOLĂESCU-PLOPŞOR 1961 – C. S. Nicolăescu-Plopşor, *Geochronology of the Paleolithic in Romania*, *Dacia* N.S. 5 (1961), p. 5–19.

PĂUNESCU 1984 – Al. Păunescu, *Cronologia paleoliticului şi mezoliticului din România în contextul paleoliticului central-est şi sud european*, SCIVA 35/3 (1984), p. 235–265.

PĂUNESCU 1991 – Al. Păunescu, *Paleoliticul de la Gura Cheii-Râşnov şi unele consideraţii privind cronologia locuirilor paleolitice din sud-estul Transilvaniei*, SCIVA 42/1–2 (1991), p. 5–20.

PĂUNESCU 2001 – Al. Păunescu, *Paleoliticul şi mezoliticul din spaţiul transilvan, Bucureşti*, 2001.

ROSKA 1925 – M. Roska, *Rapport préliminaire sur les fouilles archéologiques de l'anne 1925*, *Dacia* II (1925), p. 404–409.

VEREŞ et alii 2017 – D. Vereş, M. Cosac, Chr. Schmidt, G. Murătoreanu, C. Hubay, S. Wulf, D. Karátson, *New chronological constraints for Middle Palaeolithic (MIS 6/5–3) cave sequences in Eastern Transylvania, Romania*, *Quaternary International* 2017, <http://dx.doi.org/10.1016/j.quaint.2017.07.015>.

Table 1

Site/type of research	Research campaigns	Archaeological context	Dating protocol	Sampling/dating year	Code	Age uncal BP	Sample type	References
Gura Cheii – Râșnov Cave/ excavation	Alfred Prox 1934–1935 Nicolăescu – Plopșor 1959 Păunescu 1983–1985 Cârciumaru 2007	Middle Paleolithic	CR	1982	GrN–11619	29.700 +1.700/–1.400	charcoal	Honea, 1984 Păunescu, 1984
			CR	1983/1984	GrN–13008	30.450 ±300	bone	Păunescu 1991
			CR	1983/1984	GrN–13009	33.300 ±900	bone, charcoal	Păunescu 1991
			CR	1983–1985/2001	GrN–14620	28.900 +2.400/–1.800	bone, charcoal	Păunescu 2001
			CR	1983–1985/2001	GrN–13010	44.900 +1.800/-	charcoal	Păunescu 2001
Mare/ Liliacilor Cave/ excavation	C.S. Nicolăescu – Plopșor 1957–1958 Păunescu 1984–1985, 1988, 1989 Cârciumaru 2009–2010	Middle Paleolithic	CR	1984–1985, 1988, 1989?/2001	GrN 14618	38700 ± 850	bone	Păunescu 2001
Coacăzei Cave/ excavation	Nicolăescu – Plopșor 1958 Păunescu 1984–1985 Cârciumaru 2008	Middle Paleolithic	CR	1984–1985/2001	GrN 14642	15710 ± 310	charcoal	Păunescu 2001
					GrN 16141	34400 ± 500	bone	Păunescu 2001
Bordul Mare Cave/ excavation	Roska 1923–1929 Nicolăescu – Plopșor 1954, 1955 Păunescu 1983, 1986, 1993	Middle Paleolithic	CR	1982	GrN–11617	>41.000	charcoal	Honea, 1984 Păunescu, 1984
					GrN–11618	39.200 +4.500/–2.900	charcoal	
			CR	1986, 1993/2001	GrA – 6036	>40.000	charcoal, bone	Păunescu, 2001
			CR	1986, 1993/2001	GrN–12676	43.600 +2.800/–2.100	charcoal, bone	Păunescu, 2001
			CR	1986, 1993/2001	GrN–14626	45.500 +3.500/–2.400	bone	Păunescu, 2001

Site/type of research	Research campaigns	Archaeological context	Dating protocol	Sampling/dating year	Code	Age uncal BP	Sample type	References
Curată Cave/ excavation	Zsofia Torma 1877, 1879–1880 Jozsef Mallasz 1932 C.S. Nicolăescu – Ploșor 1955, 1956 Al. Păunescu 1997, 1998	Middle Paleolithic	CR	1997/2001	GrN 23406	> 47800	bone, charcoal	Păunescu 2001
			CR	1997/2001	GrN 23407	> 45000	bone	Păunescu 2001
			CR	1998/2001	GrA 13948	40800 +1050/- 930	bone	Păunescu 2001
			CR	1998/2001	GrN 24221	44600 +1900/ – 1500	bone	Păunescu 2001
			CR	1998/2001	GrN 24222	+ 4200 / – 2700	bone	Păunescu 2001
					GrN 24326	> 31700	charcoal	Păunescu 2001
			CR	1998/2001	GrN–24223	>36300	bone	Păunescu 2001
					GrA 13249	29940 +420 / – 400	charcoal	Păunescu 2001
			CR	1998/2001	GrN 24224	>39600	bone	Păunescu 2001
GrA 13250	28250 +350 / – 530	charcoal			Păunescu 2001			
Spurcată Cave/ excavation	Nicolăescu – Ploșor, Păunescu 1955–1956 Păunescu 1986, 1994	Middle Paleolithic	CR	1986/2001	GrN 14622	30.000 +1900 / – 1500	bone	Păunescu 2001

Site/type of research	Research campaigns	Archaeological context	Dating protocol	Sampling/dating year	Code	Age uncal BP	Sample type	References
Muierii Cave/ excavation	Nicolăescu – Ploșor 1950–1953	Middle Paleolithic	CR	1952/1968	Mo 105	>29000	bone – <i>Ursus spelaeus</i>	Cosac 2006
			CR	1952/ 2000	GrN 16977	42560 + 1310/ – 1120	bone	Păunescu 2000
			CR	1952/ 2006	OxA 15530	40850 +/- 450	bone	Soficaru <i>et alii</i> 2006
			AMS	1950–1953/ 2009	OxA 16381	40950 +/- 450	bone	Doboș <i>et alii</i> 2009
			AMS	1950–1953/ 2009	OxA 16380	47500 +/- 900	bone	Doboș <i>et alii</i> 2009
			AMS	1950–1953/ 2009	OxA 16382	42700 +/- 550	bone	Doboș <i>et alii</i> 2009
			AMS	1950–1953/ 2009	OxA 15530	40850 +/- 450	bone	Doboș <i>et alii</i> 2009
Boroșteni Cave/ excavation	C.S. Nicolăescu – Ploșor 1954 M. Cârциumaru, M.Bitiri/ M. Cârциumaru 1979–2001	Middle Paleolithic?	CR	1983/1983	GrN 13005	37750 +/- 950	bone	Honea, 1986
			CR	1983/1983	GrN 13000	>46000	bone	Honea, 1986
			CR	1983/1983	GrN 13001	43000 +1300/ – 1100	bone	Honea, 1986
			CR	1983/1983	GrN 13002	49500 +3200/ – 1100	bone	Honea, 1986
			CR	1983/1983	GrN 13003	>50000	bone	Honea, 1986
			CR	1983/1983	GrN 13004	>45000	bone	Honea, 1986

Site/type of research	Research campaigns	Archaeological context	Dating protocol	Sampling/dating year	Code	Age uncal BP	Sample type	References
			CR	1985/?	GrN 15046	50900 +4400/ - 2800	bone	Honea, 1993
			CR	1985/?	GrN 15052	47200 +2900/ - 2100	bone	Honea, 1993
			CR	1985/?	GrN 15053	48900 +2100/ - 1700	?	Honea, 1993
			CR	1985/?	GrN 15054	48000 +1800/ - 1500	bone	Honea, 1993
			CR	1985/?	GrN 15048	51900 +5300/ - 3200	bone	Honea, 1993
Hoților Cave/ excavation		Middle Paleolithic?	CR	1968–1970, 1972?/ 2011	?	27.400±500	bone	Alexandrescu <i>et alii</i> 2011

Table 2

Site	Sampling depth	Code	Age uncal BP	Sample type
Abri 122	27–37 cm	DeA–8904	>42,200	bone (<i>Bison</i>)
	260 cm	DeA–5868	>43,400	tooth (<i>Ursus sp</i>)
	250 cm	DeA–24660	13,503±74	charcoal
	260 cm	DeA–5957	38,900±1100	charcoal
	264 cm	DeA–24856	22,696±277	charcoal
Gabor Cave	90–100 cm	RoAMS 1010.97	43,547±1316	bone
Mare Cave	119 cm	RoAMS 1548.97	59,654±5478	bone
	150 cm	RoAMS 1549.97	56,699±3069	bone
	170 cm	RoAMS 1551.97	57,297±3051	bone