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The Aurignacian in northern Bosnia revisited

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Abstract

Northern Bosnia is characterized by a large concentration of Paleolithic open-air sites; among them, 13 were dated as Early Upper Paleolithic or Aurignacian. This paper will consider their discovery, excavation, and publication in the second half of the twentieth century, and will reevaluate previous knowledge of Aurignacian in North Bosnia based on a comparative definition of Aurignacian variability. The analysis of the excavation reports and the other publications demonstrates that some assemblages have undoubtedly Aurignacian characteristics. Published material indicates the presence of classical Aurignacian, while elements of Proto-Aurignacian facies are not detected. Since the sites are mostly concentrated on the banks of the Sava River and its tributaries, the geographical position of northern Bosnia undoubtedly shows potential for different scenarios for the spread of Anatomically Modern Humans along the Southern Peripannonian Zone and the Sava corridor. This paper shows the importance of the study area for future research and opens up further opportunities for investigating alternative routes of the spread of Anatomically Modern Humans towards the west, rather than seeking to confirm the hypothetical corridor.

Keywords: *Northern Bosnia – Pannonian plain – Sava corridor – Aurignacian – Homo sapiens.*

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Introduction

Northern Bosnia includes only a 100 km wide belt, which stretches between the Dinaric Alps in the south, and the Sava River in the north. It is bordered on the west side by the mountains Posara and Kozara, and on the east by the Majevica. In geographical and geomorphological terms, this territory belongs to the southern part of the Pannonian Plain, and its Peri Pannonian belt (Basler 1979b, 331).

Although it covers a relatively narrow area, northern Bosnia abounds with Paleolithic sites. Unlike the neighboring areas (Serbia and Croatia), where cave sites predom-

inate, this territory is characterized by numerous open-air sites (Pandžić 2014, 46). The history of the Paleolithic research of northern Bosnia began in 1949 when the first Paleolithic site was discovered. In the next three decades, abundant surveys and excavations were carried out. By the 1980s, more than 100 sites were discovered, dated to the Middle and Upper Paleolithic (Basler 1979a, 309ff; Pandžić 2014, 27ff). The research on the Paleolithic was resumed in 2006 in cooperation with the University of Cambridge and lasted until 2014. This project resulted in the discovery of 50 new sites (Pandžić 2014, 10).

Even though it has been known for a long time and abundant research has been conducted, the Paleolithic in northern Bosnia was rarely referred to in literature and taken into wider regional studies in consideration of the Middle or Upper Paleolithic in Southeast Europe. The main reason for this can be found in the fact that a large number of these sites were exposed to the effects of erosion, which resulted in disturbed stratigraphy, so most of the sites are missing intact Paleolithic layers (Pandžić 2014, 45).

Even though the existing problems affect the possibilities for interpretation of this area, it is necessary to consider the territory in regional studies. One of the periods that should certainly be considered is the Early Upper Paleolithic or Aurignacian. The existence of sites with typical Aurignacian inventory undoubtedly testifies to the settling of this area by Anatomically Modern Humans (AMH). Since a greater number of northern Bosnian sites are located in the Sava Valley and its tributaries, the Sava corridor arises as one of the potential directions for the spread of AMH as some authors have already suggested (Mihailović 2020, 59; Cortés-Sánchez et al. 2019, 208; Floss et al. 2016).

This paper will try to reconsider the published evidence and to reevaluate previous knowledge of Aurignacian in the region – how the sites were discovered and published in the second half of the twentieth century – in terms of conditions of sites and collections, and to discuss this region based on newer knowledge and interpretations of Aurignacian in Europe. The final aim of this study is to evaluate the potential of northern Bosnia in the broad regional framework of the Early Upper Paleolithic, and to check out the hypothesis of the Sava River Valley corridor as a direction of the spread of AMH.

The Aurignacian in northern Bosnia

According to the published evidence, Aurignacian has been identified at 13 sites in northern Bosnia. All sites are of the open-air type, situated on dominant hills above river valleys: Bosna, Ukrina, Usora, and Vrbas. It has been proposed that this settlement pattern was chosen by Paleolithic communities because of terrain visibility, great hunting potential in river valleys, as well as the abundance of raw materials in the riverbeds (Basler 1980, 97f). All the assemblages interpreted as Aurignacian are presented in the following text, while the positions of the sites are shown in figure 1.

(1) The site of *Brdašce* is located at the Laktaši village, in Vrbas Valley[1]. It was discovered in 1960 during the excavation of the homonymous Bronze Age settlement. Elev-

[1] The numbering of the sites corresponds to the numbers in figure 1.

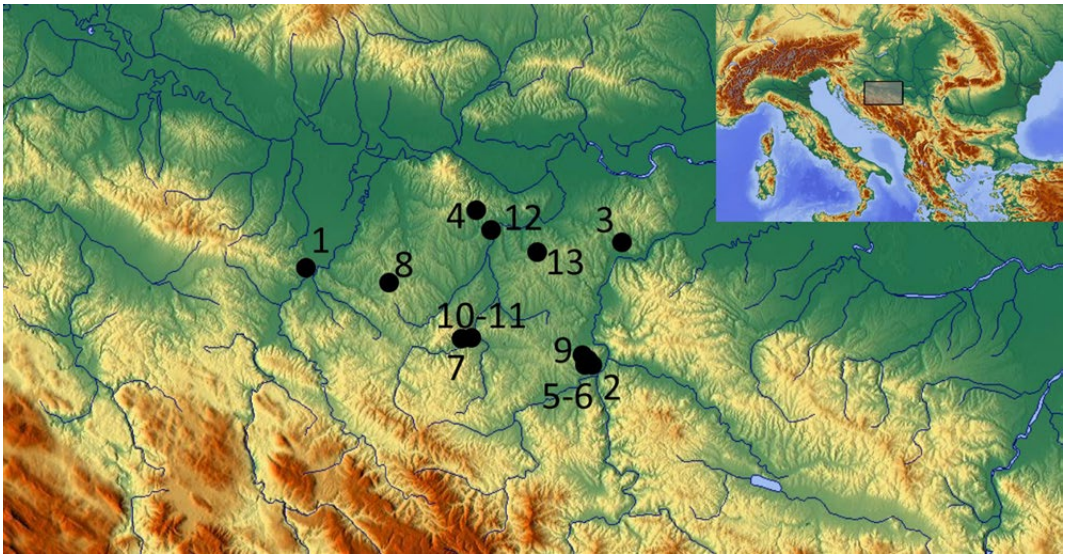

Figure 1. *Aurignacian sites in Northern Bosnia. (1) Brdašce; (2) Crkvine; (3) Danilovića brdo; (4) Dubočko brdo; (5) Hendek; (6) Kamen; (7) Krčevnica; (8) Krndija; (9) Lonđa; (10) Luščić; (11) Mala Gradina; (12) Tučići; (13) Visoko Brdo. Image Credit: https://maps-for-free.com/ and the author.*

en artifacts were recovered from a 0.5 m^2 test pit, at a depth between 1.93 and 2.05 m (Basler 1963/1964 & 1979b). The assemblage has been interpreted as Aurignacian based on the retouch type and undistinguished bulbs on the artifacts (Basler 1963/1964).

(2) The site of *Crkvine* is located at the Makljenovac village near Doboj, at the influx of the Usora into the Bosnia River. In the archaeological literature, it has been known since 1889 as a stratified site with finds dated to the Early Neolithic, Bronze Age, Roman times, and the Middle Age (Basler 1960). In 1955, Paleolithic artifacts were found *in situ* in a dark brown, 8–10 cm thick clay layer and between larger limestone rocks. It has been suggested that the better part of the Paleolithic layer was destroyed by erosion (Basler 1960). According to the excavation reports, all artifacts were uncovered in the southern part of the site. It was assumed that only this part of the site was occupied during the Paleolithic (Basler 1960). The assemblage numbers 276 artifacts, from which 162 were analyzed, including both groups of materials: the finds found in the Paleolithic layer, and those collected in the eroded sediment. Most of them are made of jasper and flint, while a small percentage of the collection is made from sandstone. According to the excavators and published evidence, both Upper Paleolithic and Middle Paleolithic materials were found. The Middle Paleolithic artifacts are represented by a few Levallois flakes (Basler 1957 & 1979b), and the Upper Paleolithic assemblage contains cores with lamellar negatives, blades, bladelets, and burins and has been interpreted as Aurignacian (Basler 1957).

(3) The site of *Danilovića brdo* is located at the village of Podnovlje, in the Bosna Valley. During the excavations in 1959, 1960, and 1963, an area of 48 m² was investigated (Basler 1962a; Belić 1963). It was partially destroyed by erosion (Basler 1979b). Based on the characteristics of the assemblage, Danilovića brdo has been interpreted as a stratified site with layers from the Middle and the Upper Paleolithic or Aurignacian (Basler 1979b). A reevaluation of the assemblage was published in 2017. Based on the technological study, the presence of Middle (11%) and Upper Paleolithic artifacts (40%) has been confirmed. The rest of the assemblage consists of technologically and chronologically non-diagnostic artifacts (Dragosavac 2017).

(4) *Dubočko brdo* is located at the Smrtići village near Derventa. Three Paleolithic artifacts were accidentally discovered there in 1930, and were attributed to the Aurignacian. This material has been neither studied, nor published (Basler 1979b).

(5) *Hendek* is also located at Makljenovac. In 1963, an area of 6 m² was investigated. Paleolithic artifacts are discovered 30 to 40 cm below the surface. Based on the Upper Paleolithic character of the assemblage, such as a typical nosed end-scraper, it has been attributed to the Aurignacian (Basler 1979b).

(6) *Kamen* is the third Paleolithic site at Makljenovac. It was discovered in 1949 during quarrying. In 1951, a rescue operation was carried out that only collected finds from excavated sediments, so that the original position of the artifacts is unknown. A total of 5000 artifacts were discovered and analyzed (Brodar 1953). More than 50 percent of the assemblage are byproducts, which indicates a reduction at the site. The rest of the sample are cores, flakes, blades, and retouched tools (Brodar 1953). It has been proposed that the Paleolithic layers were destroyed by erosion because the assemblage shows mixed characteristics of Middle Paleolithic and Aurignacian, and even some bifacially retouched tools (Brodar 1953; Basler 1953 & 1979b). In the published drawings, a nosed end-scraper, a carinated bladelet core, and an Aurignacian blade were identified, which suggests an Aurignacian attribution (fig. 2/1, 4, and 8).

(7) The site of *Krčevnica* is located at the village of Popovići, near Doboj. It was identified in 1963 during agricultural works. In the next year, an area of 8 m² was excavated. Some 100 artifacts were found and attributed to the Aurignacian, mostly based on the laminar component of assemblages, such as uni-platform and carinated cores (Basler 1973).

(8) The site of *Krndija* is located at the Potočani village, near Odžak. During the 1960 excavation, an area of 16 m² was investigated and it was confirmed that the site was destroyed by agricultural work. The assemblage consists of 14 artifacts, which have been interpreted as Aurignacian, based on an Aurignacian blade (fig. 2/5; Basler 1970).

(9) *Londža* is also located at Makljenovac. It was discovered in 1955 during test trenching. Systematic research was conducted in several campaigns (1961, 1963, and 1965), when an area of 224 m² was excavated (Basler 1979b). The bottom 25 cm part of the 70–80 cm thick deposits contained Mousterian artifacts, while the artifacts in the upper part were Aurignacian (Basler 1979b).

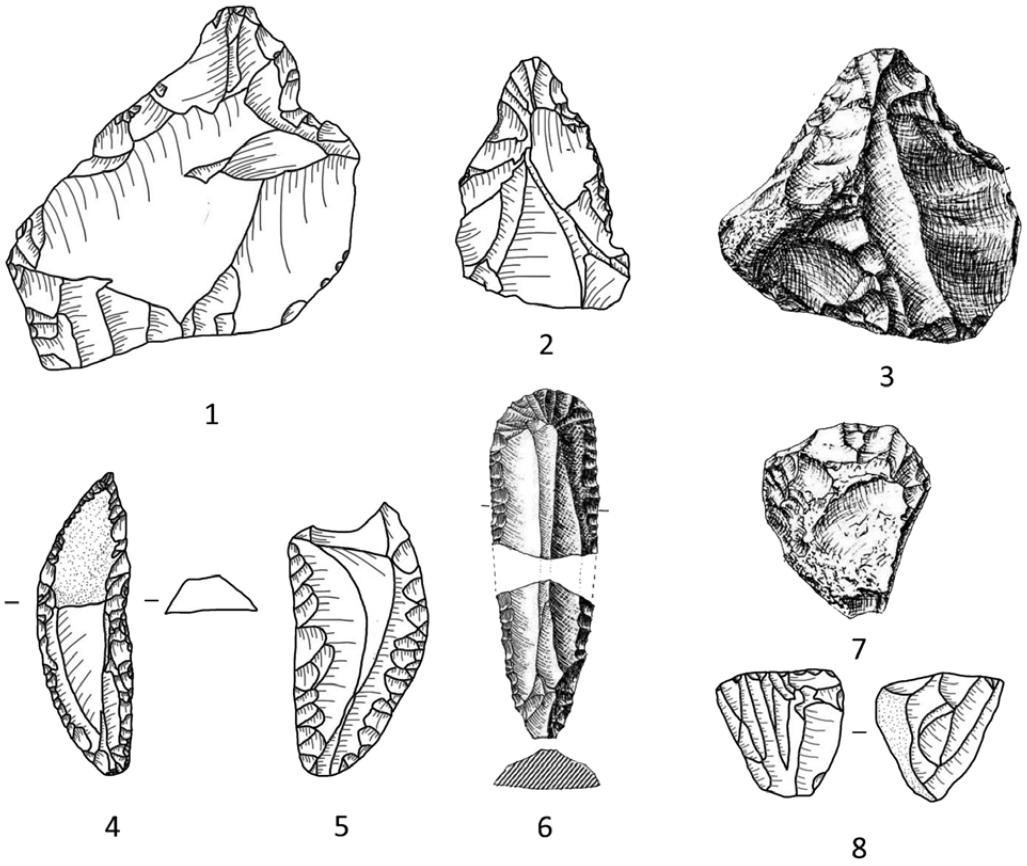

Figure 2. *Typical Aurignacian finds from sites in Northern Bosnia: Kamen (1, 4, and 8); Krndija (5); Luščić (2); Mala Gradina (3, 6, and 7). Image Credit: the author (1, 2, 4, 5, and 8), after Brodar 1953; Basler 1951, 1970 & 1978 (3, 6, and 7).*

(10) The site of *Luščić* is located at the Kulaši village. Systematic archaeological excavations were conducted in 1958 and 1959, when an area of 128 m² was investigated. From layer 3b, 1774 artifacts were recovered at a depth between 85 and 95 cm below the surface. Like all other sites, Luščić also shows disturbed stratigraphy. More than 400 artifacts were analyzed that show the characteristics of the Aurignacian. Thirteen cores were identified in the assemblage, while 22 pieces were interpreted as bladelet cores in the form of scrapers. Flakes dominated (131), while blades (80) and bladelets (70) were also represented. In the group of retouched tools, ten burins, three nosed end-scrapers (fig. 2/2), and four end-scrapers on blades were identified. Bladelets were usually not retouched. Based on the structure of the assemblage, the site has been interpreted as Aurignacian, while some elements of the Gravettian have been recognized too (Basler & Janeković 1961).

(11) *Mala Gradina* is the second Paleolithic site located at the Kulaši village, at the influx of the Mala into the Velika Ukrina River. The site was discovered in 1959 while excavations were conducted between 1961 and 1963. An area of 320 m^2 was investigated. In layer 5, more than 3500 artifacts were discovered (Basler 1978). It is important to note that the stratigraphy of the site was partially disturbed in the Bronze Age. It is possible to distinguish two groups of finds within the assemblage: Middle Paleolithic and Aurignacian, including such typical Aurignacian finds as blades and a nosed end-scraper, end-scrapers, burins as well as retouched blades (fig. 2/3, 6, and 7; Basler 1978). A re-evaluation of part of the assemblage demonstrated that the analyzed blades and bladelets show similar production technology to the other Aurignacian assemblages in the area (Dragosavac 2022).

(12) The site of *Tučići* is located at the Popovići village, near Prnjavor, where Paleolithic artifacts were discovered in Bronze Age tumuli. No details about the size of the assemblage were given in the publication, but based on its contents and on parallels at Mala Gradina, the site has been interpreted as Aurignacian (Basler 1979b).

(13) *Visoko Brdo* is located at the village of Ljupljanica, near Derventa. It was discovered in 1958 when the first archaeological excavations were carried out. Systematic research was conducted in 1970 and 1971. During the excavations, the assemblage of 187 artifacts was divided into two groups: Middle Paleolithic and Aurignacian, the latter consisting of cores, blades, and bladelets. However, no different layers have been distinguished during the excavation (Basler 1962b, 9).

Reevaluation of published evidence on the Aurignacian in northern Bosnia

The reevaluation of published evidence suggests that only five sites show obvious Aurignacian elements: Hendek, Kamen, Mala Gradina in Kulaši, Luščić, and Krndija. These assemblages contain common Aurignacian types such as Aurignacian blades and nosed end-scrapers, leaving no doubts about the existence of Aurignacian in this region.

The rest of the assemblages are questionable. For some of them, there is no description of the finds or other data, such as Dubočko brdo and Tučići. Considering the lack of description of the finds, re-verification of their attribution to Aurignacian is impossible. On the other hand, the description and drawing of the artifacts from the Brdašce assemblage (Basler 1963/1964) show non-diagnostic features.

The rest of the assemblages – Crkvine, Danilovića brdo, Krčevnica, Londa, and Visoko brdo – show Upper Paleolithic elements, but the lack of diagnostic types makes their attribution to the Aurignacian questionable. There are several reasons which make their interpretation more difficult. As it can be seen from the literature, all these northern Bosnian sites have yielded mixed materials as the result of erosion and disturbed stratigraphy. Most assemblages contain Middle and Upper Paleolithic/Aurignacian artifacts, while the assemblage from Luščić contains Aurignacian and a small percentage of Gravettian artifacts. All this is due to erosion, which led earlier researchers to generalized interpretations

and conclusions. Hence, the attribution of the assemblages to the Aurignacian without typical Aurignacian finds is leaving some doubts.

Besides disturbed stratigraphy, publications with insufficient results of technological analysis represent the second major problem in the interpretation of the Aurignacian at these sites. Detailed technological studies have not been conducted for the majority of the assemblages. The information is often given in the form of preliminary reports or is based only on the analysis of part of the assemblages. For example, 1300 out of the 1700 artifacts in the assemblage of Luščić were discarded during the first analysis as culturally and technologically non-diagnostic (Basler & Janeković 1961). Brief publications make impossible the reevaluation of the assemblages from Visoko brdo, Danilovića brdo, Crkvine, Lonđa, and Krčevnica, and thus limit the possibilities of discussion of Aurignacian assemblages (Hendek, Kamen, Mala Gradina, Luščić, and Krndija), because their exact contents and numbers are unknown.

The third major problem in the interpretation of the Aurignacian is the lack of organic material (Basler 1979c, 341). On the one hand, bone points are crucial in Aurignacian interpretations, while on the other hand, they can be radiocarbon dated. The reevaluation of some sites shows that the preservation of organic material was not influenced by soil acidity but by the exposure of finds to erosion, which leaves some hope for future research (Pandžić 2014, 13).

Even though all of these problems limit significantly the possibilities for interpretation of the Aurignacian in northern Bosnia, some conclusions can be drawn. Based on published evidence, typical characteristics of the Proto-Aurginacian are missing from the assemblages in northern Bosnia, e.g., Krems points, Dufour bladelets, and pyramidal cores. That it is not an oversight by earlier researchers is demonstrated by the fact that Đuro Basler (1979c, 341) discussed the lack of 'Krems-Dufour' bladelets back in 1979.[1]

On the other hand, the presence of nosed and carinated end-scrapers, as well as of Aurignacian blades indicate classical Aurignacian facies at northern Bosnian sites. Even though typical Aurignacian finds are not so numerous in the assemblages of northern Bosnia, they are indicative of its attribution. However, both nosed end-scrapers and Aurignacian blades were identified in the earlier and later stages of the Aurignacian. In the earlier stages, blades with Aurignacian retouch are much better represented, while their frequency in the later stages decreases. Contrary to this, the presence of nosed end-scrapers increases in later stages (Bordes 2006; Bordes & Tixier 2002; Moreau et al. 2015). The possibility that northern Bosnian sites can be attributed to the earlier stages is supported by the presence of blades with Aurignacian retouch (at Krndija, Kamen, and Mala Gradina) and nosed-end scrapers (at Kamen, Hendek, Mala Gradina, and Luščić), as well as by the lack of carinated burins which are diagnostic for the evolved stages of Aurignacian (Bordes 2006; Moreau et al. 2015).

[1] He probably meant the characteristics of the Krems-Dufour facies of the Aurignacian, as was the Proto-Aurignacian termed before.

The sites' distribution also corresponds to the proposed Aurignacian settlement dynamic in the Carpathian Basin. It has been suggested that Aurignacian communities occupied open-air sites with the possibility of accessing different ecozones: dry lowland mammoth steppe and the taiga forest in the higher mountain range (Hauck et al. 2018).

The lack of Proto-Aurignacian elements at Bosnian sites could be explained by the hypothesis that the differences between the Proto- and Early Aurignacian are neither technological nor chronological but are a question of adaptive strategies as Batallie et al. (2018) have suggested.

The Sava corridor hypothesis: the Aurignacian of northern Bosnia in regional context

The geographical position of northern Bosnia and confirmed Aurignacian sites allow us to consider this territory in a wider regional context and in the light of the Sava corridor /subalpine/cisalpine hypothesis.

Current archeological evidence (geographical position and dates) suggests that AMH entered Europe from the East, and two corridors of their spread have been proposed so far. The first is the northern one, along the Danube River (Conard & Bolus 2003; Chu 2018). The second is the southern or the Mediterranean corridor (Mellars 2006). The Danube corridor is supported by well-studied and dated Aurignacian sites in the lower, middle, and western Danube regions (Chu 2018). Opposite to that, on the Mediterranean route, sites are concentrated mostly in the western part, extending from northern Italy to the Atlantic coast of northwestern Spain. Sites on the east Mediterranean are not documented. Considering the Adriatic coast of the Balkan Peninsula, Aurignacian sites are absent from the Peloponnese to the northern Adriatic – Istria (Mihailović 2020).

Considering the lack of sites along the Mediterranean as well as the topography of the terrain, several authors proposed the Sava and subalpine/cisalpine corridor (fig. 3; Mihailović 2020; Cortés-Sánchez et al. 2019; Floss et al. 2016). Based on its geographical position, the Sava River Valley forms a natural communication in the east-west direction, connecting the Lower Danube on the east and the Slovenian Alps and northern Italy on the west. By mapping the sites, Floss et al. (2016) advocate that the spread of AMH was more possible along this corridor than along the Mediterranean coast.

When Paul Mellars (2006) proposed the Mediterranean corridor as a potential route for the dispersal of AMH, he suggested that this route was used for the dispersal of Proto-Aurignacian, while the northern – Danube route – was used by Early Aurignacian communities. In this case, as an alternative to the Mediterranean corridor, northern Bosnia does not fit in such hypothesis, because as already has been said, Proto-Aurignacian elements were not identified. Along the cisalpine corridor on the territory between Kozarnika on the east (Tsanova et al. 2011) and the Fumane (Falcucci et al. 2017) on the west, there are no sites that show elements of Proto-Aurignacian.

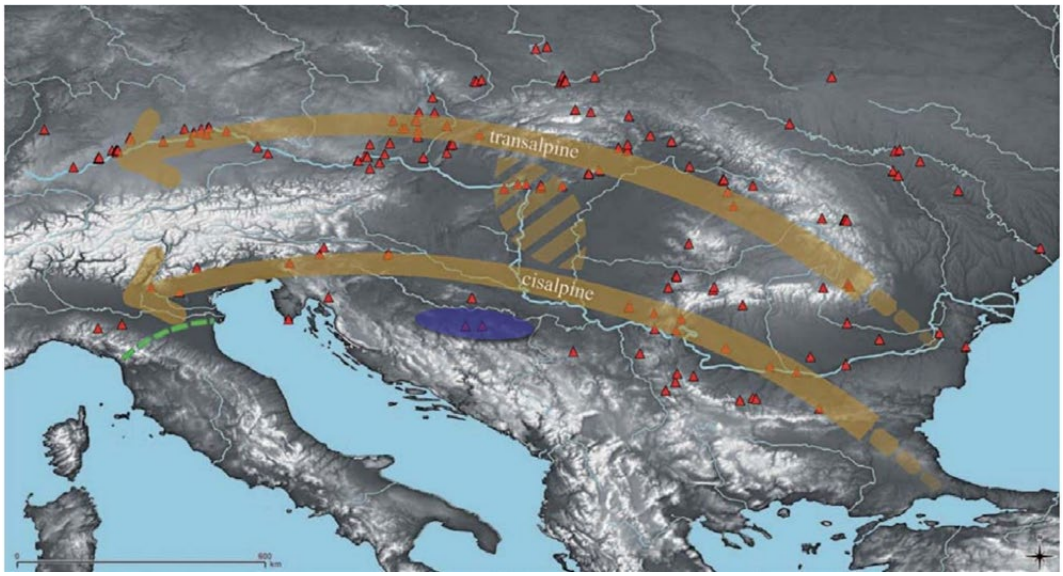

Figure 3. *Trans- and cisalpine passageways of early Modern Human dispersal. The region of Northern Bosnia is highlighted in blue. Image Credit: Floss et al. 2016, 25, fig.14, and the author.*

Figure 4. *Map of the Sava/cisalpine corridor with Aurignacian sites. The numbers correspond to the sites in table 1. Image Credit: https://maps-for-free.com/ and the author.*

Elements of classical Aurignacian such as nosed end-scrapers and Aurignacian blades were recorded in northern Bosnia, as well as along the cisalpine corridor (fig. 4; table 1), and the available radiocarbon dates indicate both earlier and later Aurignacian stages. If we take into consideration that northern Bosnian sites correspond with the early phase of the Aurignacian (according to the lack of carinated burins) and that the cisalpine corridor was used by AMH to spread towards the west, the proposed dating of these sites could be in the period between 39 to 38 ka BP, because of the dates of the sites in the subalpine region (table 1).

No.	Site	Site type	Date (ka BP)	Nosed end-scrapers	Aurignacian blades	References
1	Hendek	open air	/	+		Basler 1979b
2	Kamen	open air	/	+	+	Brodar 1953; Basler 1953; 1979b
3	Mala Gradina	open air	/	+	+	Basler 1978
4	Luščić	open air	/		+	Basler & Janeković 1961
5	Krndija	open air	/	+		Basler 1970
6	Riparo Mochi (unit F)	cave	30.8–29.7; 31.0-30.4; 37.7–36.5; 36.8–35.6		+	Douka et al. 2012; Grimaldi et al. 2014; Tejera & Grimaldi 2015; Kuhn & Stiner 1998
7	Barma Grande	cave	/		+	Mussi et al. 2006
8	Lemignano	open air	/	+		Mussi et al. 2006
9	Grota di Fumane	cave	41.2–40.4; 38.9–37.7	+	+	Falcucci et al. 2020
10	Divlije Babe I	cave	33.12–31.6*			Moreau et al. 2015
11	Potočka Zjalka	cave	37.07–33.6	+	+	Moreau et al. 2015
12	Mokriška jama	cave	38.13–35.64			Moreau et al. 2015
13	Šandalja II	cave	38.67–37.16	+	+	Karavanić 2003; Richards et al. 2015; Mihailović 2020
14	Radovin-Dračice	open air	/	+		Karavanić & Vukosavljević 2019
15	Bukovac, Croatia	cave	~34			Karavanić & Vukosavljević 2019; Karavanić et al. 2018
16	Velika pećina	cave	37.32–35.1			Karavanić et al. 2018
17	Vindija	cave	32.32–3107		+	Karavanić 1995; Deviése et al. 2017
18	Šalitrena pećina	cave	36.67-33.64	+		Marin-Arroyo & Mihailović 2017
19	At	open air	36.4±2.8	+	+	Mihailović 1992; Chu et al. 2014; Nett et al. 2021
20	Crvenka	open air	36.4±2.8	+	+	Mihailović 1992; Chu et al. 2014; Nett et al. 2021
21	Tincova	open air	/	+		Anghelinu et al. 2012; Anghelinu & Niță 2014

No.	Site	Site type	Date (ka BP)	Nosed end-scrapers	Aurignacian blades	References
22	Coşava	open air	/	+	+	Anghelinu et al. 2012; Anghelinu & Niță 2014
23	Românești Dumbrăvița	open air	45.1±4.9; 35.5±3.9		+	Anghelinu et al. 2012; Anghelinu & Niță 2014; Sitlivy et al. 2012
24	Tabula Traiana	cave	40.06–36.34			Borić et al. 2012; Mihailović 2020
25	Bukovac, Serbia	cave	/			Dogandžić et al. 2014
26	Orlovača	cave	/			Dogandžić et al. 2014
27	Baranica	cave	41.18–39.7			Mihailović et al. 2011; Mihailović 2020
28	Kozarnika	cave	43.95–41.00			Mihailović 2020
29	Temnata	cave	39.25–34.8	+	+	Drobniewicz et al. 2000; Tsanova 2008
30	Bacho-Kiro	cave	40.0–35.5		+	Kozlowski et al. 1982; Mihailović 2020
31	Peştera cu Oase	cave	41–39			Anghelinu & Niță 2014
32	Cioclovina Cave	cave	33–32			Anghelinu & Niță 2014
33	Muierii Cave	cave	34–33			Anghelinu & Niță 2014

Table 1. *List of sites along the cisalpine corridor. * Date calibrated using OxCal 4.4 Interface: version170, IntCal20 (Bronk Ramsey 2009; Reimer et al. 2020).*

Without reevaluation, excavations, detailed technological studies, and radiocarbon dating of the sites, the Sava corridor and the proposed dating of northern Bosnia in the Early Upper Paleolithic of Southeast Europe remains only an educated guess.

Conclusion

Early excavations of sites, without developed methodology, the disturbed stratigraphy, and insufficient publications left northern Bosnia inadequately known and rarely referred to in literature, nor considered in regional studies of the Aurignacian in Southeast Europe. Despite the existing problems, this paper briefly reevaluated the available information about Aurignacian sites in northern Bosnia, based on a comparative definition of Aurignacian variability.

Even though there are only elements of the Aurignacian, their existence and geographical position undoubtedly show the potential of this territory for future research. The position of northern Bosnia, i.e., the concentration of sites that yielded Aurignacian material, enables the consideration of different scenarios about the spread of AMH. Even though the Sava corridor/cisalpine corridor could be considered only as an alternative, the hypothesis of this route seems more acceptable with the inclusion of the Aurignacian sites in Northern Bosnia.

The goal of this paper is not to present a conclusive identification of the corridor for the spread of AMH, because it deserves a more detailed study, reevaluation of excavation results, and radiocarbon dating, and thus, it aimed at representing the corridor's potential for future research, as well as of northern Bosnia, a territory which has long been neglected in the archaeological literature.

Acknowledgments

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