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LATE PALAEOLITHIC TO EARLY MESOLITHIC TRANSITION IN THE CARPATHIAN BASIN: A RE-EVALUATION OF THE SZEKSZÁRD-PALÁNK SITE

Attila Király* – Róbert Kertész**

In memoriam Stefan Karol Kozłowski (1938–2022)

Szekszárd-Palánk is one of the handful in situ excavated sites from the Late Glacial period of East-Central Europe which is also supported by radiometric dating. However, the considerable time that has passed since its discovery necessitates a revision, the topic of this paper. The technotypological analogues of the assemblage are Late Epigravettian – Early Mesolithic sites of the Northern Balkans to the south, and Epimagdalenian sites of the Moravian Basin to the north. These analogues, the southern location and northern raw materials of the site support two previous hypotheses: the regional survival of the Epigravettian traditions, and the pivotal role of the Danube in the communication between East-Central Europe and the Balkans in the Late Glacial – Early Postglacial. The site is thus identified as a Final Epigravettian, Late Palaeolithic – Early Mesolithic transitional industry.

Szekszárd-Palánk egyike a késő glaciális néhány eredeti helyzetben feltárt magyarországi megtelepedésének, amit radiometrikus kormeghatározás is alátámaszt. E tanulmányban revízió alá vesszük a lelőhely pattintott kőanyagát, illetve a feltáró, Vértes László ezekre épülő értelmezését, amit a publikáció óta eltelt hosszú idő indokol. A kollekció technotipológiai analógiái dél felé az adriai térség és a Vaskapu késő Epigravettien – korai mezolitikus lelőhelyei, illetve észak felé a csehországi Morva-medence kisszámú Epimagdalénien lelőhelyei felé vezetnek. Az analógiák, a déli elhelyezkedés és az északi nyersanyagok együttes jelensége két jól ismert hipotézist támaszt alá: az Epigravettien tradíciók továbbélését a Balkán északi és a Kárpát-medence déli részén, illetve a Duna elsőrendű szerepét a kommunikációban Közép-Európa és a Balkán között a holocén kezdete körüli időszakban. A lelőhelyet késő Epigravettien, késő paleolitikum – kora mezolitikum átmeneti iparként azonosítjuk.

Keywords: *Late Palaeolithic, Mesolithic, Epigravettian, Carpathian Basin, Szekszárd-Palánk, lithic technology*

Kulcsszavak: *késő paleolitikum, mezolitikum, Epigravettien, Kárpát-medence, Szekszárd-Palánk, pattintott kövek*

Introduction

Szekszárd-Palánk is one of the few known Late Glacial (LG), early Postglacial (PG) archaeological sites in present-day Hungary, thanks to the interdisciplinary research of László Vértes, and his colleagues (Vértes 1962; Vértes 1963; T. Dobosi 2005a). More than six decades have passed since the publication of Vértes's results, and during this time hardly any archaeological material of a similar age has been found in the Carpathian Basin (CB). The reason for this may be the lack of research (S. K. Kozłowski 2001; Eichmann et al. 2010; Marton et al. 2021), in addition, a significant depopulation of the region at the end of the Pleistocene has been hypothesized (Simán 1990; Béres et al. 2021; Lengyel et al. 2021; Magyari et al. 2022). According to this latter theory, the gradual climatic amelioration following the Last Glacial Maximum (LGM) resulted in the migration of Pleistocene cold-adapted megafauna from the CB to the north. Lithic industries

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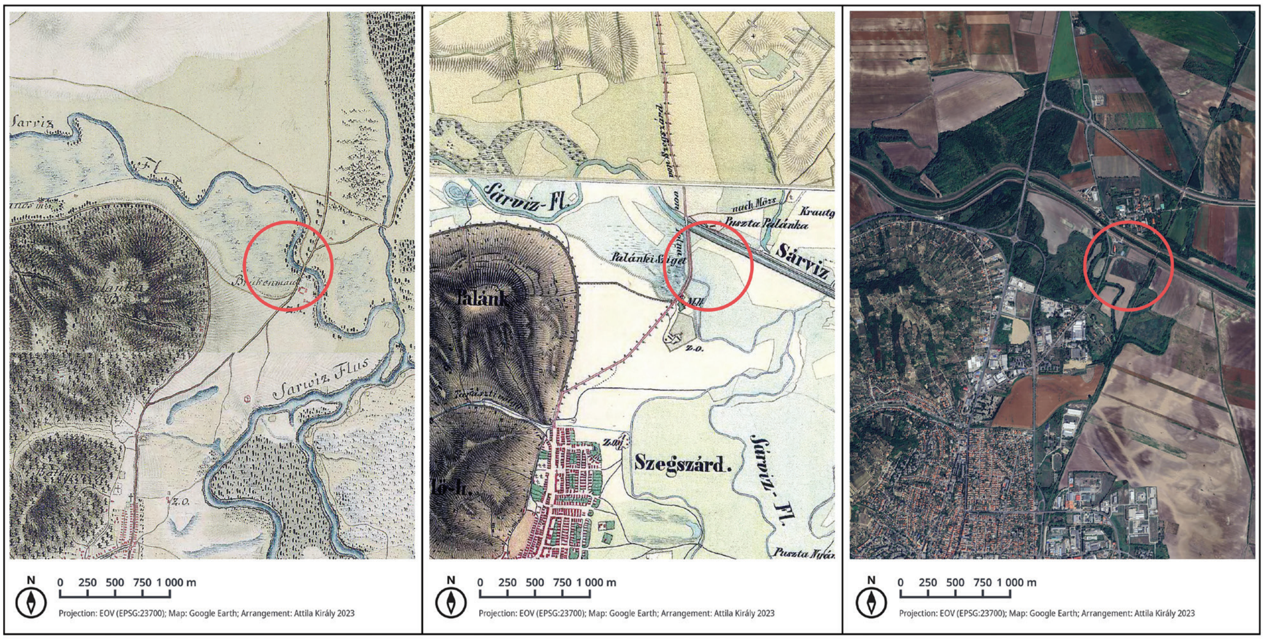

Fig. 1. Szekszárd-Palánk and its surroundings on a satellite image (right) and the maps of the first (1763–87, left) and second (1806–69, middle) military surveys of Hungary (Arcanum Adatbázis Kft. 2004; Arcanum Adatbázis Kft. 2005; Google Earth 2004). Map: Attila Király

1. kép. Szekszárd-Palánk és környezete műholdas felvételen (jobbra), illetve az első (1763–87, balra) és a második (1806–69, középen) katonai felmérések térképein (Arcanum Adatbázis Kft. 2004; Arcanum Adatbázis Kft. 2005; Google Earth). Térkép: Király Attila

of the Late Epigravettian culture (20.0–14.7 ka BP in Lengyel et al. 2021), which specialized in hunting such animals, also disappeared, as the communities that produced the industries, followed the game. In the LG and early PG periods, we only know of a few, mostly poorly dated, sites providing a small number of finds, including Szekszárd-Palánk. The CB became more densely populated later, during the Mesolithic. According to another Hungarian research tradition, two 'cultural phyla' (T. Dobosi 1999, 297) can be identified in the CB after the Pleniglacial (T. Dobosi 1999; T. Dobosi 2009; T. Dobosi 2016). In the Danube Bend and Jászság, a 'younger Epigravettian horizon' (T. Dobosi 2009, 15) was situated on top of the loess, usually highly disturbed. In addition, a few Allerød-age sites, characterized by small artefacts and Mesolithic techniques, but without Mesolithic types, was identified (T. Dobosi 1999).

International research has reconstructed a 'classic' succession of archaeological cultures in the southwestern, western and northern parts of Europe for the period between the end of Gravettian and the beginning of the Mesolithic (Solutréen, Badegoulian, Magdalenian, Azilian, post-Azilian technocomplexes). The same period is covered by the Epigravettian technocomplex in southeastern and Eastern Europe (J. K. Kozłowski 1999; Bracco, Montoya 2015; Borić, Cristiani 2016; Visentin et al. 2016; Naudinot et al. 2017; Tomasso 2017; Tomasso et al. 2018; Jacquier et al. 2020; Łanczont et al. 2021; Maier et al. 2021; Peresani et al. 2021; Fasser et al. 2022; Ruiz-Redondo et al. 2022). The Late Epigravettian is placed between ca. 16–11 ka BP in this latter taxonomy, i.e. to the Bølling-Allerød and Younger Dryas (YD) biozones, and the beginning of the Preboreal, or the last stage of GS-2, GI-1 and GS-1 according to the INTIMATE climate phases (Rasmussen et al. 2006; Rasmussen et al. 2014). The contact zone of the two large cultural domains in East-Central Europe is assumed to be the region of the northern Carpathians, where both Magdalenian and Epigravettian sites are known from the first half of the LG (Kaminská 2016; Wiśniewski et al. 2017; Nerudová, Monik 2019; Monik, Pankowská 2020; Sobkowiak-Tabaka 2020; Łanczont et al. 2021; Lengyel et al. 2021; Bobak et al. 2022). Here, these two lithic traditions may have contributed to the formation of YD technocomplexes, which are characterized by predetermined blade debitage and carefully prepared points (Tanged Point technocomplex or TP, Arch-Backed Point Technocomplex or ABP) (Migal 2007; Kabaciński, Sobkowiak-Tabaka 2010; Burdukiewicz 2011; Valde-Nowak et al. 2013;

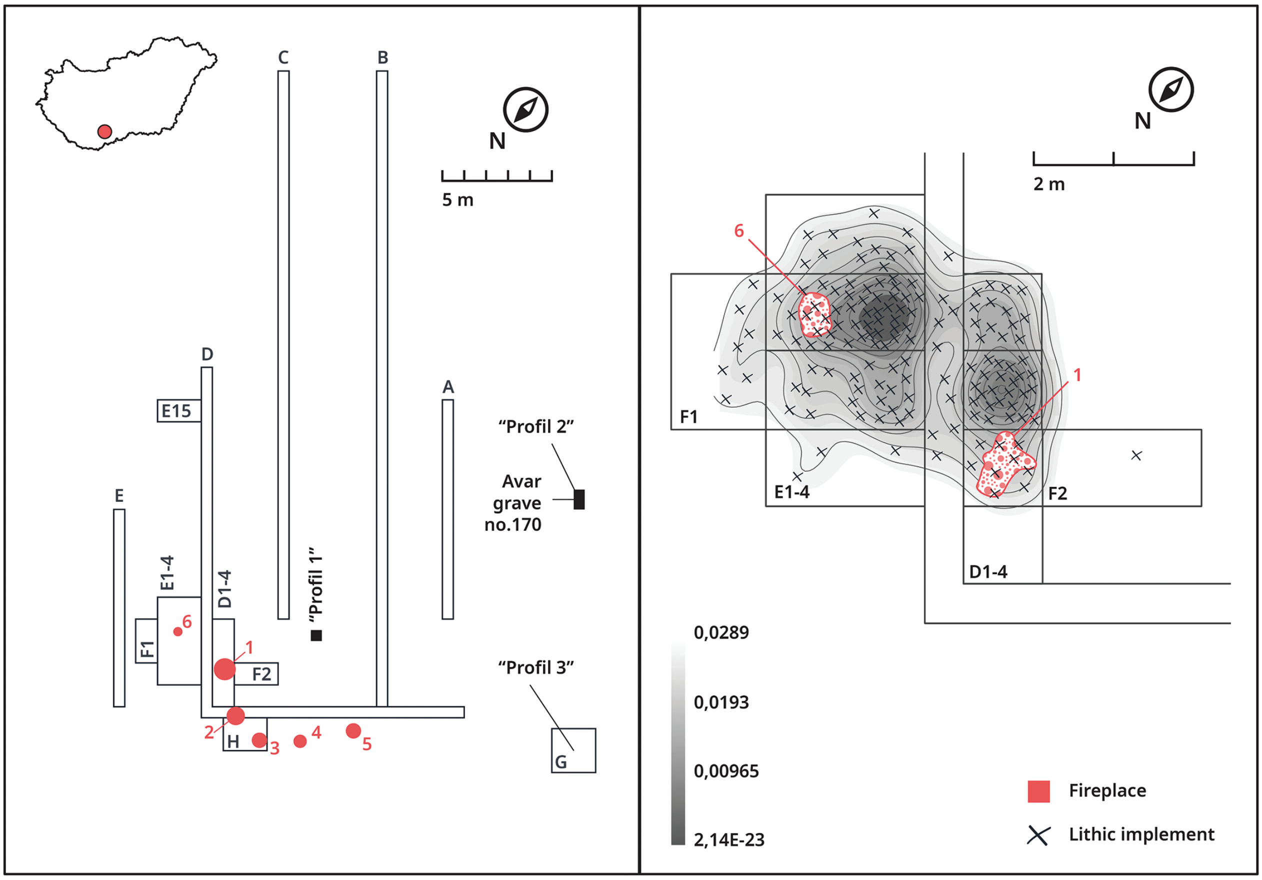

Fig. 2. Szekszárd-Palánk, excavation plans of László Vértes. Left: location of trenches and sections. Trenches (A–H) with black outlines; red spots: features identified as fireplaces; Profiles 1–3: sampling locations used for sediment and malacological studies. Right: plan detail of the excavation. Red spots: features identified as fireplaces; black crosses: knapped stones. The distribution of lithics is also represented by a Kernel density diagram. The surface drawings were made based on Vértes 1962 and the excavation documentation. Kernel diagram and reconstruction: Attila Király
2. kép. Szekszárd-Palánk, Vértes László ásatásainak felszínrajza. Balra: Vértes kutatóárkainak és szelvényeinek elhelyezkedése. Fekete körvonalakkal a kutatóárkok (A–H); vörös foltok: a tűzhelyként azonosított objektumok; profil 1–3: a talajtani és malakológiai vizsgálatokhoz használt mintavételek helyszínei. Jobbra: a feltárás felszínrajzának részlete. Vörös foltok: tűzhelyek; fekete keresztek: pattintott kövek. A kövek eloszlását Kernel-sűrűség-diagram ábrázolja. A felszínrajzok Vértes 1962 és a feltárási dokumentáció alapján készültek. Kernel-diagram és rekonstrukció: Király Attila

Stefański 2017; Ivanovaitė et al. 2020; Monik, Pankowská 2020; Sobkowiak-Tabaka 2020).

In this region, the presence of the contemporaneous Epimagdalenian with a less standardized tool spectrum is limited to a few sites (Nerudová, Neruda 2014; Monik, Pankowská 2020; Połtowicz-Bobak 2020; Reade et al. 2020). South of the CB, in the intensively researched areas of northeastern Italy and western Balkans, the continuation of the Epigravettian technocomplex has been reconstructed even in the early PG. In contrast to the sophisticated northern blade industries, further technological simplification took place here, involving local industries with a diverse typological composition (Mihailović 2001; Dalmeri et al. 2004; Kozłowski, Kaczanowska 2004; Karavanić et al. 2013; Duches et al. 2014; Vukosavljević et al. 2014; Bonsall, Boroneanţ 2016; Tomasso 2016; Peresani et al. 2021; Fasser et al. 2022). To the east of the CB, a similar dichotomy is observed in the second half of the LG, with the TP Technocomplex in the northwestern part of Ukraine, and Epigravettian industries in the south (Zaliznyak 2006; Stepanchuk et al. 2009; Stepanchuk, Sapozhnikov 2010; Zaliznyak 2017).

In this context, Szekszárd-Palánk is situated on the fringes of the two research-historical and cultural regions, with the potential to provide relevant data on the settlement history and landscape use in the CB under the changing climatic conditions in the terminal Pleistocene. If the Palánk site can be dated to this period, its presence can be explained in at least three ways. (1) The former inhabitants leave the CB during the LG following the cold-adapted Pleistocene megafauna, the region becomes largely depopulated and visited only sporadically by small groups from the north-western areas. (2) With similar demographic and mobility conditions, smaller groups visit the area from the south-southeast. (3) The southern CB remains populated after the LGM, its inhabitants adapt to the changing ecological conditions, similarly to the neighbouring northern Balkans. Thus the CB is characterized by a mosaic of cultural changes, illustrated by the investigated occupation. Here, we provide a general presentation of the Szekszárd-Palánk site, comparing our current knowledge with the data available at the time of Vértes. The use of lithic raw materials is detailed in a previously published article (Kertész, Demeter 2019), and the exhaustive technological evaluation will be the subject of another study. We aim to restrain the age, function and role of the occupation on the mobility map of the region.

Previous research

Szekszárd-Palánk (46°22'37.19' N 18°43'18.75' E, 89–91 m asl, name variants: Szekszárd, Palánk, Kispalánk, Béke TSz horticulture, ID: 23379; hereafter: Szekszárd-Palánk or shortly, Palánk) is located in the Danube plain, on the western edge of the Tolnai Sárköz microregion, adjacent to the loess-covered Szekszárd Hills (*Fig. 1*). On the first military survey map of Hungary (1763–87) recording the state before river regulation, Palánk-puszta is a floodplain area dissected by the meanders and marshes of the Sárvíz stream (Vértes 1965, 192; Arcanum Adatbázis Kft. 2004). Due to the renovation of the Sió canal, salvage excavations were carried out in 1957 in the area of the sand pits necessary for the elevation of the levee. Then the site was bounded by a road to the west, a railway to the east, the Sió-Sárvíz canal to the north, and a backwater of the Sárvíz to the south. In addition to prehistoric and Migration-period graves, as well as traces of a medieval settlement, the staff of the Béri Balogh Ádám (later Wosinsky Mór) Museum in Szekszárd, found charcoal stains and knapped stones (Salamon 1958; Salamon 1959; Mészáros 1960; Salamon 1960; Salamon1968; Kiss 1996). Following their report, the specialist of the Hungarian National Museum, László Vértes, excavated the site in three seasons (1957, 1958, 1960). As the area was under active quarrying, the archaeological work took place in stages (Vértes 1957a; Vértes 1957b;

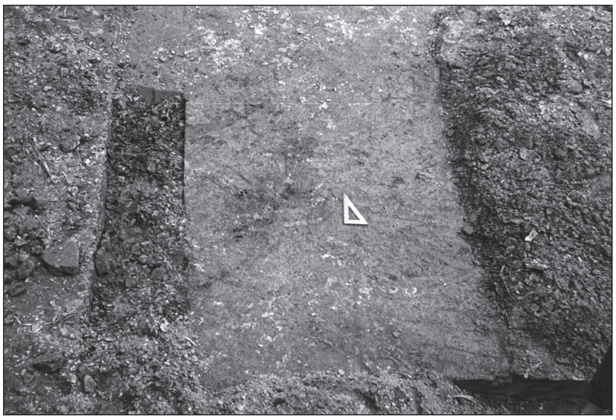

Fig. 3. Szekszárd-Palánk, photo of the stain of fireplace no. 1 during excavation (Vértes 1962, 3b)
3. kép. Szekszárd-Palánk, az 1. sz. tűzhely foltja feltárás közben. Fotó: Vértes 1962, Abb. 3b

Vértes 1958a; Vértes 1958b; Vértes 1958c; Vértes 1959; Vértes 1960a; Vértes 1960b; Vértes 1960c; Vértes 1962; Vértes 1963). After surface collection, Vértes opened five sondages and associated trenches, totalling approx. 80 m^2 (*Fig. 2*). In addition, exploration was carried out in prominent flecks of sediment left above a given mine-cultivation level. Most of the trenches were poor in finds due to destruction by quarrying. Therefore, the original extent of the settlement could not be determined. The finds were concentrated in the vicinity of six features identified as hearths (trenches E1–4, D1–4, F1–2, *Fig. 3*). These reddish burnt patches, situated in an arc, were 50–100 cm in diameter, and 3–8 cm thick, depending on the destruction of the surface, with oval contours, and a lenticular cross-section. There were hardly any finds in their filling, but in their surroundings, there were many knapped lithics, poorly preserved animal bones and roasted fish bones. The larger flakes formed concentrations and the smaller (1–2 mm) pieces were scattered. Most of the latter was recovered by wet-sieving of the so-called cultural layer. In addition, three stratigraphic sondages completed the field work ('Profile 1–3', *Fig. 4*), sedimentological samples were extracted from them, and malacological material was collected according to the sampling levels (Kriván 1960; Kriván 1962).

Stratigraphy, palaeoecology, chronology

Vértes conducted an interdisciplinary study with the help of P. Kriván and L. Pesty (geology), E. Krolopp (malacology), J. Stieber (anthracotomy), E. Krivánné Hutter (palynology), S. Bökönyi, L. Berinkey (ver-

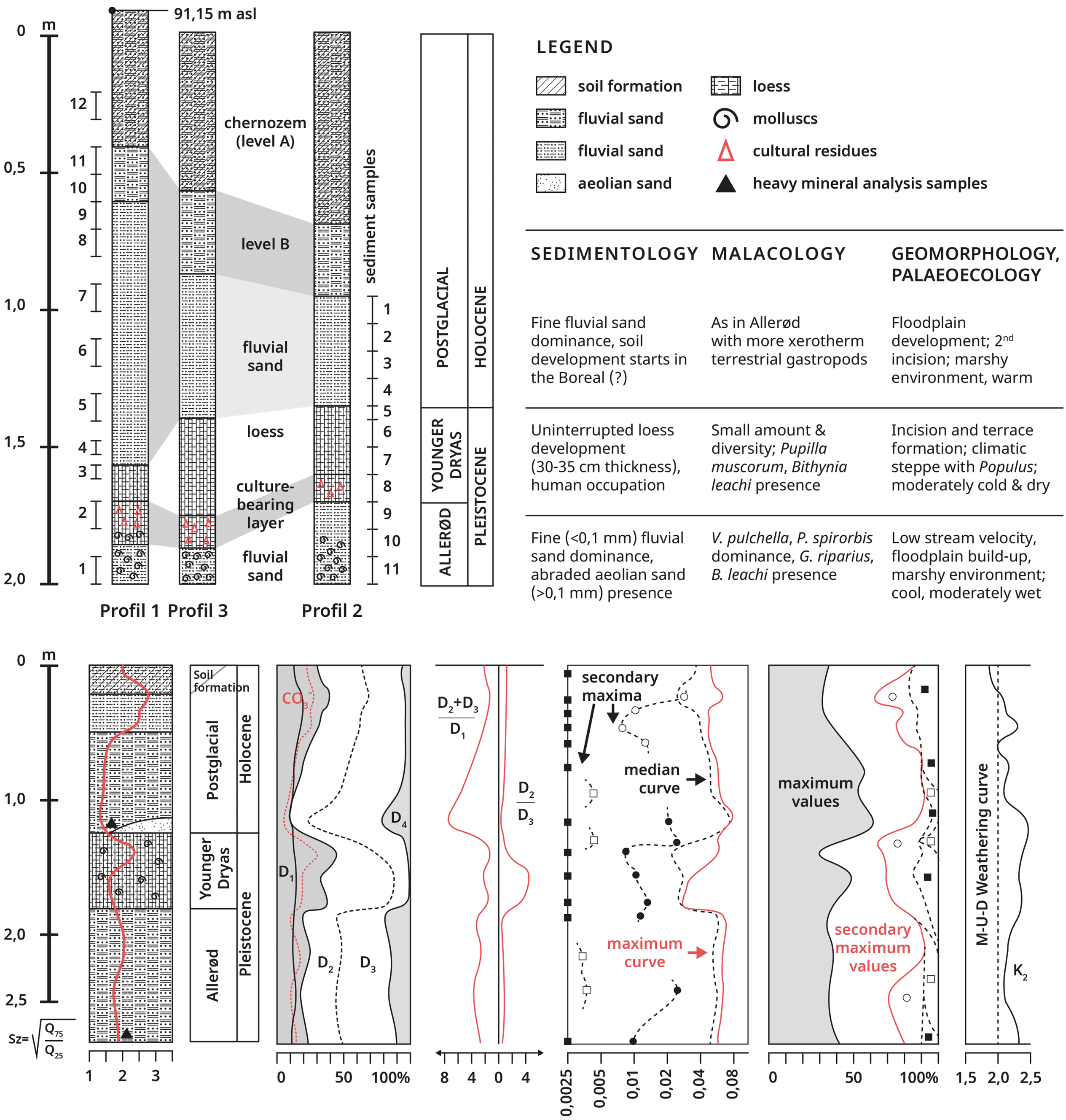

Fig. 4. Results of the Szekszárd-Palánk sediment study. In the upper left section, the three sediment columns with locations of the malacological and sedimentological samples on the graph of Vértes 1962. In the upper right section, the description of the layer formation, mollusc remains, and the reconstructed environmental changes. Below are the results of the petrographic examination of the 1st sediment column in Kriván 1962. Compiled by Attila Király

4. kép. Szekszárd-Palánk üledékvizsgálatainak eredményei. A bal felső szekcióban a három üledékoszlop rétegsora a malakológiai és üledékföldtani mintavételi helyekkel Vértes 1962 publikációjában. A jobb felső szekcióban a rétegsor képződésének leírása, a puhatestű maradványok jellemzése és az ezek alapján rekonstruált környezet-történeti események. Lent az 1. üledékoszlop petrográfiai vizsgálatának eredményei Kriván 1962 grafikonján. Összeállította Király Attila

tebrate fauna), and radiocarbon dating by K. O. Münnich (Kriván 1962; Krolopp 1962; Stieber 1962; Vértes 1962). The sampling locations providing the necessary data were given by Vértes in the excavation logs (Vértes 1960a). Based on their results, the following can be reconstructed (*Fig. 4*) (Vértes 1962). The lower layers of the 'Profil 1–2' sondages were formed by fluvial sand deposited on the Danube II/a terrace (Gábris et al. 2012). The grain size distribution is characteristic of a slow-running watercourse, and the abrasion of the larger fraction (>0.1 mm) is characteristic of aeolian transport – sand was probably carried by the wind into stagnant water in the area. The mollusc fauna belonging to this layer also indicates slow-running waters and wetlands (Krolopp 1962, 1). Sedimentation took place in cooler climatic conditions than today, as evidenced by the dominance of cold-tolerant *Valvata pulchella* Stud (*V. studeri*) and the presence of cold-tolerant *Gyraulus riparius* West and broad-tolerant *Bithynia leachi* species. A 30–35 cm thick loess layer was formed on the fine sand without a stratigraphic hiatus, which was not interrupted by sand infusion, flooding or soil formation in the samples. In the second sample collected at a more low-lying area than the first, some fluvial sediment was found, but here too the loess fraction remains dominant in the grain composition. The general lack of fluvial sediment indicates

Table 1. Szekszárd-Palánk, frequency and weight of find classes by raw material acquisition zones
1. táblázat. Szekszárd-Palánk, tárgyosztályok gyakorisága és súlya nyersanyag-beszerzési zónák szerint

	Raw material zone 0		*Raw material zone 1*		*Raw material zone 2*		*Raw material zone 3*		*Raw material zone 4*		*Total*	
Debitage class	*Pcs*	*Grams*	*Pcs*	*Grams*	*Pcs*	*Grams*	*Pcs*	*Grams*	*Pcs*	*Grams*	*Pcs*	*Grams*
Chunk	–	–	4	33.8	6	21.1	–	–	–	–	10	54.9
Flake	4	10.7	12	31.8	5	13.0	3	16.5	2	16.6	26	88.6
Blade	–	–	5	14.2	3	7.0	2	4.4	–	–	10	25.6
Bladelet	1	0.6	7	4.3	4	2.0	2	0.7	–	–	14	7.6
Microblade	–	–	–	–	3	0.8	–	–	–	–	3	0.8
Chips and shatter	13	19.2	47	62.7	150	136.4	52	26.5	11	15.9	273	260.8
Chunk, use-retouch	–	–	1	6.4	–	–	–	–	–	–	1	6.4
Flake, use-retouch	–	–	7	16.8	12	16.7	2	2.2	–	–	21	35.6
Blade, use-retouch	–	–	1	1.5	6	13.1	3	5.3	–	–	10	19.9
Bladelet, use-retouch	–	–	3	2.1	3	2.1	1	1.8	–	–	7	6.0
Microblade, use-retouch	–	–	–	–	1	0.2	–	–	–	–	1	0.2
Core & core fragment	2	23.5	5	87.9	12	194.4	2	27.7	–	–	21	333.4
Chunk, worked	–	–	4	17.8	5	19.8	–	–	–	–	9	37.6
Flake, worked	1	2.3	12	39.4	46	110.5	16	47.4	8	15.2	83	214.8
Blade, worked	2	5.9	2	8.7	5	9.1	2	4.1	–	–	11	27.8
Bladelet, worked	2	2.2	2	1.8	14	6.5	1	2.1	–	–	19	12.5
Microblade, worked	–	–	–	–	7	1.5	1	0.1	–	–	8	1.6
Lithics total	25	64.5	110	317.5	279	553.3	87	138.8	21	47.7	522	1121.7
Bone fragment	–	–	–	–	–	–	–	–	–	–	1	7.6
Bone artefact	–	–	–	–	–	–	–	–	–	–	1	1.9
Pebble	–	–	–	–	–	–	–	–	–	–	4	189.1
Sandstone fragment	–	–	–	–	–	–	–	–	–	–	3	28.5
Mineral pigment lump	–	–	–	–	–	–	–	–	–	–	8	23.1

dry conditions, when the Danube cut its bed, that is, formed the area into a terrace. The mollusc fauna also suggests a cool and dry but milder climate than the previous glaciations. The amount of shells has been drastically reduced compared to the previous layer, and Pleistocene loess snails also appeared in addition to the broad-tolerant aquatic species typical of wetlands. According to Kriván and Krolopp (Kriván 1962; Krolopp 1962), the narrow species spectrum indicates local accumulation, not reworking – in the latter case, more mollusc species from further away would be present in the sample (Kriván 1960, 65). The artefacts, charcoal and animal remains were enclosed in this loess layer. According to Vértes's description, the 'cultural layer' containing the finds was an average of 13 cm thick. All studied charcoal fragments turned out to be poplars (*Populus* sp.) (Stieber 1962). The small number of poorly preserved bones are the remains of auroch (*Bos primigenius*), red deer (*Cervus elaphus*) and beaver (*Castor fiber*) (Vörös 1987a; Vörös 1987b). The burnt fish bones belong to pike (*Esox lucius*) and carp (*Cyprinidae*). The only radiocarbon date of Palánk was measured on charcoal taken from a fireplace in the loess layer, the age of which is 10,350 ± 500 BP (Hv408) (Vértes 1962; Svingor et al. 2005). The loess had been covered by a thin layer of aeolian sand, which was again followed by fine fluvial sand. The depositional conditions and mollusc fauna of the latter layer were almost identical to those of the lower sand layer. The stratigraphy was closed by a shallow accumulation zone and 20–50 cm thick chernozem soil.

Based on the absolute age in Palánk, Kriván placed the beginning the last Pleistocene Danube downcutting (Terrace II/a) in the LG, thus he considered the age of the lower sand layer Allerød, the loess YD, the upper sand Preboreal, and the closing sedimentation Boreal (Kriván 1960; Kriván 1962). This approach was incompatible with Márton Pécsi's then-dominant relative terrace assignment (Pécsi 1959; Gábris 2013). In Pécsi's system, the II/a terrace was formed in the Holocene, thus the filling of the low floodplain, and the formation of the Palánk sequence in it should have followed after that. This was based on the view that Pleistocene loess was not deposited on the II/a terrace according to what was known before the excavation of Palánk, and the blown sand was thought to be of Boreal age (Gábris 2006; Gábris, Nádor 2007). Following research based on radiometric dating confirmed Kriván's hypothesis, the formation of Terrace II/a began in the Pleistocene. He considered the YD (12.9–11.7 ka cal BP) to be the main downcutting period, but according to our current knowledge, it may have already started after the LGM (ca. 19–17 ka BP), peaked during the Bølling period, and eased into the YD (Gábris et al. 2002; Ujházy et al. 2003; Gábris et al. 2012; Starkel et al. 2015). Gábris et al. (Gábris et al. 2011) observed a similar terrace development in the Danube section near Budapest during the LG. Here, aeolian sand built and destroyed the sedimentary sequences on the higher terrains, and infusion loess (waterlain silt with high loess content, see Lehmkuhl et al. 2018) was deposited in the interdune areas during the LG. The Palánk loess layer may have formed during the last loess accumulation cycle of the CB, which can be dated between ca. 13–11 ka BP (Sümegi et al. 2007; Fuchs et al. 2008; Gábris et al. 2012). In the loess-paleosoil series along the lower Danube, loess of a similar age has been found, which in many cases were also affected by Holocene soil erosion (Marković et al. 2014; Timar-Gabor et al. 2017; Zeeden et al. 2018; Constantin et al. 2019; Sümegi et al. 2019). Since sand, infusion loess and aeolian (true) loess are all known from the samples along the Danube in the region in a similar relative stratigraphic position, new geological studies are required to verify Kriván's layer definition. If we accept the undisturbed accumulation of the layer containing the finds, and the absolute age treated with caution due to the age of the radiocarbon method, its formation can be dated to the YD in the case of loess, and YD to early PG in the case of infusion loess. This is also supported by the characteristics of the fauna and the lithic industry found there, so we consider Kriván's stratigraphic observations to be valid at the moment.

The malacological, pollen and anthracotomy data from Szekszárd-Palánk fit into the paleoecology of the southern CB characterized by a mosaic of different habitats (Hum 2000; Sümegi, Kertész 2001; Sümegi, Krolopp 2002; Jakab et al. 2004; Lócskai et al. 2006; Hupuczi, Sümegi 2010; Marković et al. 2018; Magyari et al. 2019; Puzachenko, Markova 2019; Obreht et al. 2019; Sümegi et al. 2002; Sümegi et al. 2018; Sümegi et al. 2021; Sümegi et al. 2022). During the LG, the climate of the Great Hungarian Plain (GHP) was generally warmer than that of Western Europe. Continental and sub-Mediterranean plant and animal species have been present in the southern GHP at least since the beginning of the LG. The average temperature in July at the time of Allerød is 16–17 °C and in January –2 °C. The mild climate,

Table 2. Szekszárd-Palánk, tool and core types by raw material acquisition zones
2. táblázat. Szekszárd-Palánk, magkövek és eszközök tipológiai megoszlása nyersanyag-beszerzési zónák szerint

	Raw material zone 0		*Raw material zone 1*		*Raw material zone 2*		*Raw material zone 3*		*Raw material zone 4*		*Total*	
Type	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*
Endscrapers total	2	1.6%	5	4.0%	22	17.6%	12	9.6%	6	4.8%	47	37.6%
Endscraper, arched	–	–	2	1.6%	1	0.8%	–	–	–	–	3	2.4%
Endscraper, car-inated atypical	–	–	–	–	4	3.2%	–	–	–	–	4	3.2%
Endscraper, circular	–	–	–	–	1	0.8%	1	0.8%	1	0.8%	3	2.4%
Endscraper, nosed	–	–	–	–	1	0.8%	–	–	–	–	1	0.8%
Endscraper, simple	2	1.6%	2	1.6%	7	5.6%	8	6.4%	3	2.4%	22	17.6%
Endscraper, thumbnail	–	–	–	–	3	2.4%	1	0.8%	1	0.8%	5	4.0%
Endscraper-retouch	–	–	–	–	1	0.8%	–	–	–	–	1	0.8%
Endscraper-si-descraper	–	–	1	0.8%	4	3.2%	2	1.6%	1	0.8%	8	6.4%
Perforators	–	–	1	0.8%	4	3.2%	–	–	–	–	5	4.0%
Burins total	1	0.8%	–	–	5	4.0%	2	1.6%	–	–	8	6.4%
Burin, dihedral	1	0.8%	–	–	3	2.4%	–	–	–	–	4	3.2%
Burin, nucleiforme	–	–	–	–	1	0.8%	–	–	–	–	1	0.8%
Burin, on truncation	–	–	–	–	1	0.8%	1	0.8%	–	–	2	1.6%
Burin, straight	–	–	–	–	–	–	1	0.8%	–	–	1	0.8%
Points total	–	–	1	0.8%	2	1.6%	–	–	–	–	3	2.4%
Point, backed	–	–	–	–	1	0.8%	–	–	–	–	1	0.8%
Point, retouched	–	–	1	0.8%	1	0.8%	–	–	–	–	2	1.6%
Truncated pieces	–	–	–	–	1	0.8%	1	0.8%	–	–	2	1.6%
Retouched pieces total	2	1.6%	7	5.6%	21	16.8%	3	2.4%	–	–	33	26.4%
Retouched, blade	1	0.8%	1	0.8%	2	1.6%	–	–	–	–	4	3.2%
Retouched, bladelet	1	0.8%	–	–	3	2.4%	1	0.8%	–	–	5	4.0%
Retouched, chunk	–	–	1	0.8%	1	0.8%	–	–	–	–	2	1.6%
Retouched, flake	–	–	5	4.0%	13	10.4%	1	0.8%	–	–	19	15.2%
Retouched, microblade	–	–	–	–	1	0.8%	1	0.8%	–	–	2	1.6%
Retouched-truncated	–	–	–	–	1	0.8%	–	–	–	–	1	0.8%

	Raw material zone 0		*Raw material zone 1*		*Raw material zone 2*		*Raw material zone 3*		*Raw material zone 4*		*Total*	
Type	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*
Notched and denticulated pieces	–	–	–	–	3	2.4%	–	–	–	–	3	2.4%
Scaled pieces	–	–	2	1.6%	7	5.6%	–	–	–	–	9	7.2%
Sidescrapers	–	–	1	0.8%	–	–	2	1.6%	2	1.6%	5	4.0%
Geometrics	–	–	–	–	3	2.4%	–	–	–	–	3	2.4%
Backed bladelets	–	–	1	0.8%	6	4.8%	–	–	–	–	7	5.6%
Tools total	5	4.0%	18	14.4%	74	59.2%	20	16.0%	8	6.4%	125	100.0%
Core, fragment	–	–	2	1.4%	–	–	–	–	–	–	2	1.4%
Core, multidirectional	–	–	1	0.7%	2	1.4%	1	0.7%	–	–	4	2.7%
Core, on-edge	–	–	–	–	2	1.4%	–	–	–	–	2	1.4%
Core, opposed	–	–	1	0.7%	3	2.1%	–	–	–	–	4	2.7%
Core, perpendicular	–	–	–	–	3	2.1%	1	0.7%	–	–	4	2.7%
Core, unipolar	1	0.7%	1	0.7%	3	2.1%	–	–	–	–	5	3.4%

increased precipitation and favourable hydrographic features supported forest-steppe vegetation with coniferous and deciduous tree species. Swamps and bogs formed in floodplain areas similar to Palánk. In the cooler and drier YD (average temperature in July 14–16 °C, January –4–6 °C), the spread of woodlands decreased in favour of the grass steppe, but there is no longer a trace of the harsh conditions of the previous loess-forming periods. In the microregion during the YD, low rainfall was probably the main ecological controlling factor, rather than a decrease in temperature (Jakab et al. 2004; Kiss et al. 2015; Magyari et al. 2019; Sümegi et al. 2022). The beginning of the Holocene is indicated by the average temperature which is even higher than before (18 °C in July, –2 °C in January). The Palánk mollusc fauna is characterized by a duality that can also be observed in other parts of the southern GHP, the presence of cold-tolerant (*Bithynia leachi*, *Gyraulus riparius*) and warmth-loving species (*Chondrula tridens*) (Sümegi et al. 2011; Sümegi et al. 2018). Charcoal samples for anthracotomy were collected from fireplaces and showed only the presence of the genus *Populus* (Stieber 1962). Poplar was present in the CB during the late Pleistocene, more widespread in LG warm periods, and it has been part of the lowland forests ever since (Magyari et al. 2010; Sümegi 2011; Feurdean et al. 2012; Magyari et al. 2014). The pollen samples come from Profile 1, from the level of the archaeological findings, they only contained *Gramineae*, unsuitable for a more precise paleoclimatic determination (Vértes 1962). The site is the namesake of the Palánk faunal phase, the earliest example of it, which István Vörös (Vörös 1987a, 83; Vörös 1987b, 93) considers being Preboreal-Boreal, at most Allerød (Vörös 2000, 158, Fig. 10) age. The stratigraphic position of the finds places the beginning of the fauna section at the end of the Pleistocene. Although one or two specimens are known from earlier, beavers and red deer became more wisely distributed in the CB after the LGM (Sommer, Nadachowski 2006; Sommer 2020; Niedziałkowska et al. 2021). Palánk is one of the first regional sites of the auroch in the late Pleistocene (Vörös 1987a; Bartosiewicz 1999).

The age of the archaeological material can be determined with the help of three factors, the absolute age, the stratigraphic position and the age indicators of the accompanying fauna. In the excavation log and reports, Vértes mentions in several cases the collection of charcoal samples for ^{14}C and anthracotomy tests: the dated charcoal sample certainly comes from the fireplace in square D1 (Vértes 1960a). The 10,350 ± 500 BP (Hv408) date was calibrated to 11291 (95.4%) 8743 cal BC or 13240 (95.4%) 10692 cal BP using OxCal 4.4 (Bronk Ramsey 2009) and the IntCal20 atmospheric curve (Reimer et al. 2020). In INTIMATE stratigraphy, it covers the GI-1b, GI-1a, GS-1, and the beginning of the Holocene, i.e. most of the Allerød interstadial, the YD stadial and the first half of the Preboreal (Rasmussen et al. 2014). We believe that the occupation duration was shorter than this interval, and the 500-year standard error warns of the uncertainty of absolute dating of the time. The radiocarbon date can thus only be used as an indicator. The geologist determined the sediment containing the finds to be loess. The stratigraphy and local geomorphology point to an YD age for this loess but the LGM accumulation cannot be ruled out either (if it is indeed loess), as assumed e.g. in the similar contexts of the Budapest-Corvin tér (Ringer, Lengyel 2009) and Szob (Markó 2007) archaeological sites along the Danube. The loose stratigraphic control is offset by the fauna composition. Based on systematic sampling, Krolopp dates the mollusc fauna to the end of the Pleistocene and the beginning of the Holocene (Krolopp 1962). The humble vertebrate fauna collection can also be dated to this age. Three dating sources, independent of cultural artefacts, therefore most likely place the age of the occupation at the end of the Pleistocene, the beginning of the Holocene.

Archaeological material and methods

Vértes reports approx. 500 knapped lithics (Vértes 1962, 162, 180). The provided site map indicates the exact position of several pieces, however, the spatial coordinates of the individual finds were not given (*Fig. 2*). The archaeological material is included in the Prehistoric Collection of the Hungarian National Museum (inv. nos. Pb 59/2–229, Pb 60/1–14 and Pb 60/15.1–15.13). We encountered 539 finds, of which 522 are knapped lithic artefacts (*Table 1*). In addition to the knapped stones, four presumably modified river pebbles, three amorphous sandstone pieces, eight mineral lumps identified by the excavator as a pigment, a bone artefact and a larger piece of bone are included in the inventory. All knapped lithics were included in our raw material study, n_{rm} = 522. Of these, 19 are cores and 2 are core fragments (4.0%), 336 are debitage without macroscopic traces of use or further modification (64.4%), 40 are use-retouched pieces (7.7%), and 125 are modified pieces or tools (24.0%). The technological and typological tests were carried out on n_t = 249 pieces (47%), excluding chips and chunks, which were also separated by Vértes during the inventory.

For the macroscopic identification of the raw material, we used the rich reference material of the Lithoteca of the Hungarian National Museum (T. Biró 2011a). The morphometric, technological and typological studies were also carried out using macroscopic methods. Lithics were determined, described and represented according to the French technological system (Inizan et al. 1999). We call chunks those pieces, which do not have either a dorsal or ventral surface, but core striking platforms and debitage surfaces and the hierarchy between them are not recognizable either. Most of them are broken or split, usually the products anvil techniques. In this study, we call all reduction and splitting techniques in which both an anvil and a hammer are involved anvil techniques, regardless of the ‘severity’, i.e. extent and composition of bipolar-on-anvil stigmata (de la Peña 2015; Király 2020). Chunky flakes are detachments on which a dorsal and ventral surface is recognized, but the surfaces meet at a steep angle (>55°), thus they lack a particularly sharp edge. A blade is a flake that, in its intact condition, is at least 30 mm long, at least twice as wide along its debitage axis, has roughly parallel edges and ridges, and is more than 10 mm wide. Lamellae or bladelets are blades with a width of 6.1–9.9 mm, microblades are under this width, < 6.1 mm. In cases where the original length could not be determined due to breakage or modification, and other characteristics of the blade could not be determined, the blank was defined as a flake. We called those blanks that, after being detached, were further modified (except blade segmentation techniques) to tools. The tool types were determined according to the Upper Palaeolithic typology of de Sonneville-Bordes and Perrot (Sonneville-Bordes, Perrot 1954; Sonneville-Bordes, Perrot 1955; Sonneville-Bordes, Perrot 1956a; Sonneville-Bordes, Perrot 1956b), where we differ from this, we indicate them separately. Here, following the logic of Vértes’ publication (Vértes 1962), we present the lithic raw material utilization, technological and typological characteristics of the collection, as well as the evaluation based on them.

Results

Lithic raw materials

The lithic raw material sources accessible to prehistoric people were classified into acquisition zones (n_{rm} = 522) (*Fig. 5*, *Table 1*, *Table 2*) (Kertész, Demeter 2019), which denote areas increasingly distant from the site (Andrefsky 1994; Beck et al. 2002; Turq 2005; T. Biró 2009a; Mester, Faragó 2013; Mester, Faragó 2019). Apart from the local not knapped river pebbles, Mecsek radiolarites are the raw materials closest to Palánk (zone 1) (T. Biró 2009b; T. Biró et al. 2009; T. Biró et al. 2013). The three Mecsek types shown in

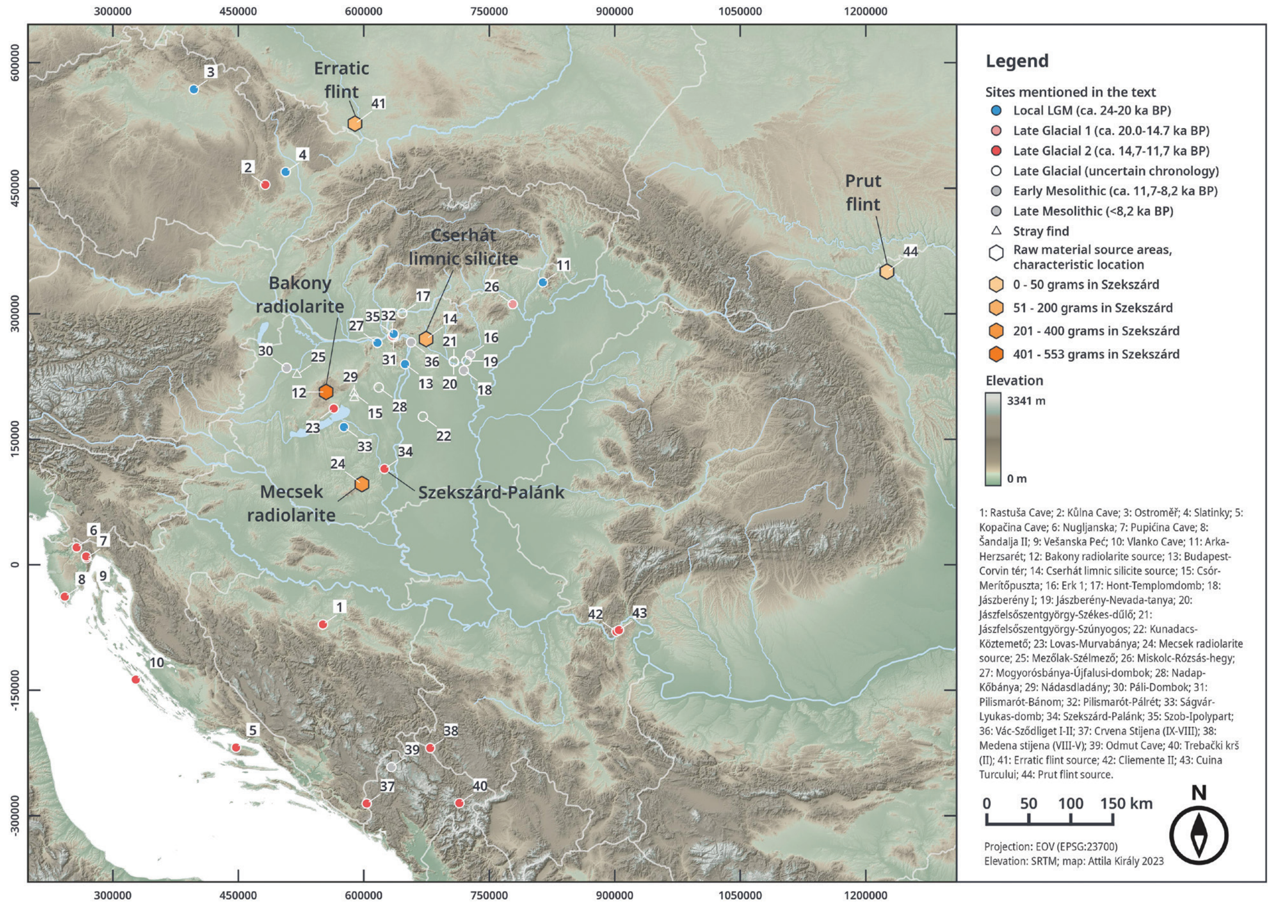

Fig. 5. The archaeological sites mentioned in the article and lithic raw material sources of the Szekszárd-Palánk assemblage. Blue: sites dated to the local Last Glacial Maximum (ca. 24–20 ka BP) period; pink: sites dated to the early Late Glacial (ca. 20.0–14.7 ka BP); red: sites dated to the second half of the Late Glacial (ca. 14.7–11.7 ka BP); black circle: Late Glacial sites of uncertain age; dark grey: Early Mesolithic sites (ca. 11.7–8.2 ka BP); grey: Late Mesolithic sites (<8.2 ka BP); triangle: stray find; hexagon: characteristic location of lithic raw material procurement zones, the intensity of the colour increases proportionally to the amount of raw material present in Szekszárd. Data and arrangement: Attila Király

5. kép. A cikkben említett lelőhelyek és a szekszárd-palánki leletanyag lehetséges kő nyersanyagforrásai. Kék: helyi LGM (kb. 24–20 ka BP) időszakra datált lelőhelyek; rózsaszín: korai késő glaciálisra (kb. 20–14,7 ka BP) datált lelőhelyek; piros: késő glaciális második felére (kb. 14,7–11,7 ka BP) datált lelőhelyek; fekete kör: bizonytalan korú késő glaciális lelőhelyek; sötétszürke: korai mezolit lelőhelyek (kb. 11,7–8,2 ka BP); szürke: késő mezolit lelőhelyek (<8,2 ka BP); háromszög: szórványlelet; hatszög: pattintott kő nyersanyag-beszerzési zónák jellemző előfordulási helye, a szín intenzitása a Szekszárdon jelenlévő nyersanyag mennyiségével arányosan nő. Adatok és térkép: Király Attila

1: Rastuša Cave; 2: Kůlna Cave; 3: Ostroměř; 4: Slatinky; 5: Kopačina Cave; 6: Nugljanska; 7: Pupićina Cave; 8: Šandalja II; 9: Vešanska Peć; 10: Vlanko Cave; 11: Arka-Herzsarét; 12: Bakony radiolarite; 13: Budapest-Corvin tér; 14: Cserhát limnic silicite; 15: Csór-Merítőpuszta; 16: Erk 1; 17: Hont-Templomdomb; 18: Jászberény I; 19: Jászberény-Nevada-tanya; 20: Jászfelsőszentgyörgy-Székes-dűlő; 21: Jászfelsőszentgyörgy-Szúnyogos; 22: Kunadacs-Köztemető; 23: Lovas-Murvabánya; 24: Mecsek radiolarite; 25: Mezőlak-Szélmező; 26: Miskolc-Rózsás-hegy; 27: Mogyorósbánya-Újfalusi-dombok; 28: Nadap-Kőbánya; 29: Nádasdladány; 30: Páli-Dombok; 31: Pilismarót-Bánom; 32: Pilismarót-Pálrét; 33: Ságvár-Lyukas-domb; 34: Szekszárd-Palánk; 35: Szob-Ipolypart; 36: Vác-Sződliget I-II; 37: Crvena Stijena (IX-VIII); 38: Medena stijena (VIII-V); 39: Odmut Cave; 40: Trebački krš (II); 41: Erratic flint source; 42: Cliemente II; 43: Cuina Turcului; 44: Prut flint source.

the figures represent purple, burgundy and grey colour variants. Together, these account for roughly a fifth of the collection (110 pcs; 21.1%) and almost a third of its weight (317.5 g; 28.3%). From zone 1, 3 cores, 12 use-retouched pieces and 20 tools are known. Among the blanks (31 flakes, 8 blades, 12 bladelets), the proportion of flakes is significant, and 8 chunks are of such raw material, including cores. The group of smaller fragments of local raw materials counts only 51 pieces.

The raw material sources of the Bakony Mountains (zone 2) are separated from Palánk by a distance of 100–120 kilometres. The radiolarian flints found in the mountains are of Jurassic age and are available in block, nodule and tabular forms. The Hárskút, Szentgál and Lókút varieties can be distinguished based on their colour and texture (T. Biró et al. 2009). In terms of frequency (279 pcs), weight (49.3%), and modification (12 cores, 22 use-retouched pieces, 77 tools), Bakony radiolarites are the dominant raw material of the collection. Among the blanks (63 flakes, 14 blades, 12 bladelets, 8 microblades), flakes dominate, but the blade component is also significant compared to the other raw materials present at the site. The 17 larger chunks of these raw materials are cores or tools, and 154 smaller fragments are also made of these radiolarites.

Hydrothermal rocks have a varied appearance due to the way they were formed, impeding their sourcing. Limnic silicites, similar to those of the Palánk collection, can be collected 160 kilometres away, in the Cserhát Mountains (zone 3) (Markó 2005). Here mainly tabular occurrences are known in various colours and with inclusions, but limnic silicite pebbles are also found in gravel outcrops at several points of the mountain range (Markó, Kázmér 2004). The 87 pieces (16.7%) from Zone 3 weigh 138.8 grams, which is 12.4% of the weight of all knapped stones. 20 tools, 5 use-retouched pieces and 2 cores were made from these raw materials, Among the blanks, 21 flakes, 7 blades, 4 bladelets and 1 microblade are encountered. The two cores represent the chunk category, and 52 smaller fragments also belong here.

Silesian erratic flint (approx. 400 km distance) and Prut flint (approx. 700 km distance) are the raw materials of the fourth, most distant zone, which usually appear in Gravettian and Epigravettian sites in Hungary (Priskin 2009; T. Dobosi 2010; T. Biró 2011b). Only one tool is made of erratic flint at the site (0.2%; weight 0.7 g), while the Prut raw material is represented by 20 pieces (3.8%; weight 47.6 g). Of these, seven are considered tools, and no core was found. According to our current knowledge, the most likely origin of the so-called 'southern radiolarite' is the territory of Croatia, at a distance which is considered exotic (zone 4) (Kertész, Demeter 2019). We identified only eight southern radiolarite pieces, one core (Pb59/92), one flake (Pb59/155) and six chips. Among the radiolarite finds of unidentifiable origin, there may be other such pieces. Finally, in the case of nineteen further flint and radiolarite pieces (3.6%), the origin could not be established, these are classified in the '0' zone. The non-identifiable group contains the largest proportion of burnt pieces (14 out of 25), in the case of the other raw material zones, the proportion of burnt artefacts is a maximum of 18%. The condition of the assemblage is otherwise fresh, there is hardly any patination on the pieces.

Lithic technology

The average height of the 19 intact cores in the collection is 28 mm, ten specimens show original cortex. Almost all of them are exhausted pieces representing the last phase of reduction, with several striking platforms and debitage surfaces, the few unipolar cores are more of an exception (e.g. Pb59/125, 127, 226; *Fig. 6. 1*, *6. 5*, *6. 6*). The striking platforms were usually formed by a large detachment, therefore they are plain or a subsequent debitage surface was formed on them. Conversely, a debitage surface could also serve as a striking platform in the later stages of the reduction (e.g. Pb59/195; *Fig. 7. 9*). No significant core preparation is observed, although the exhausted state of the cores can prevent identification. The eight platform rejuvenation flakes of local or regional raw material indicate that during reduction the knappers were adjusted from time to time at the angle formed by the striking platforms and detachment surfaces. As a result of the intense reduction, the shape of the cores is mostly 'polyhedral', some specimens with a tapering shape can be said to be pyramidal. The extent of the thirty-three debitage surfaces observed on the cores varies, usually occupying the wider surfaces of the piece (22 cases) or extending to several planes of the core (*semi-tournant*) (7 cases). The pattern of detached negatives is unidirectional (9 cases on 7 cores), opposite (12 cases on 11 cores), perpendicular (2 cases on 2 cores) or multi-directional (10 cases on 6 cores). The largest Hárskút radiolarite core of the sample bears traces of peripheral reduction (Pb59/91; *Fig. 7. 8*). The multi-directional detachment negatives form two debitage surfaces on the front and back of the lens-shaped piece, so the method of exploitation was more superficial than volumetric. This pattern is presumably the result of bipolar-on-anvil core processing, the use of such techniques can be seen in at least half of the cores (10 cases). Obvious examples are pieces with a square silhouette and scaled-damaged edges, on the debitage surfaces of which opposite or multi-directional negatives are seen, and a good part of these negatives have a stepped or hinged termination (e.g. Pb59/126, 199, SZ2; *Fig. 6. 4*; *Fig. 9*).

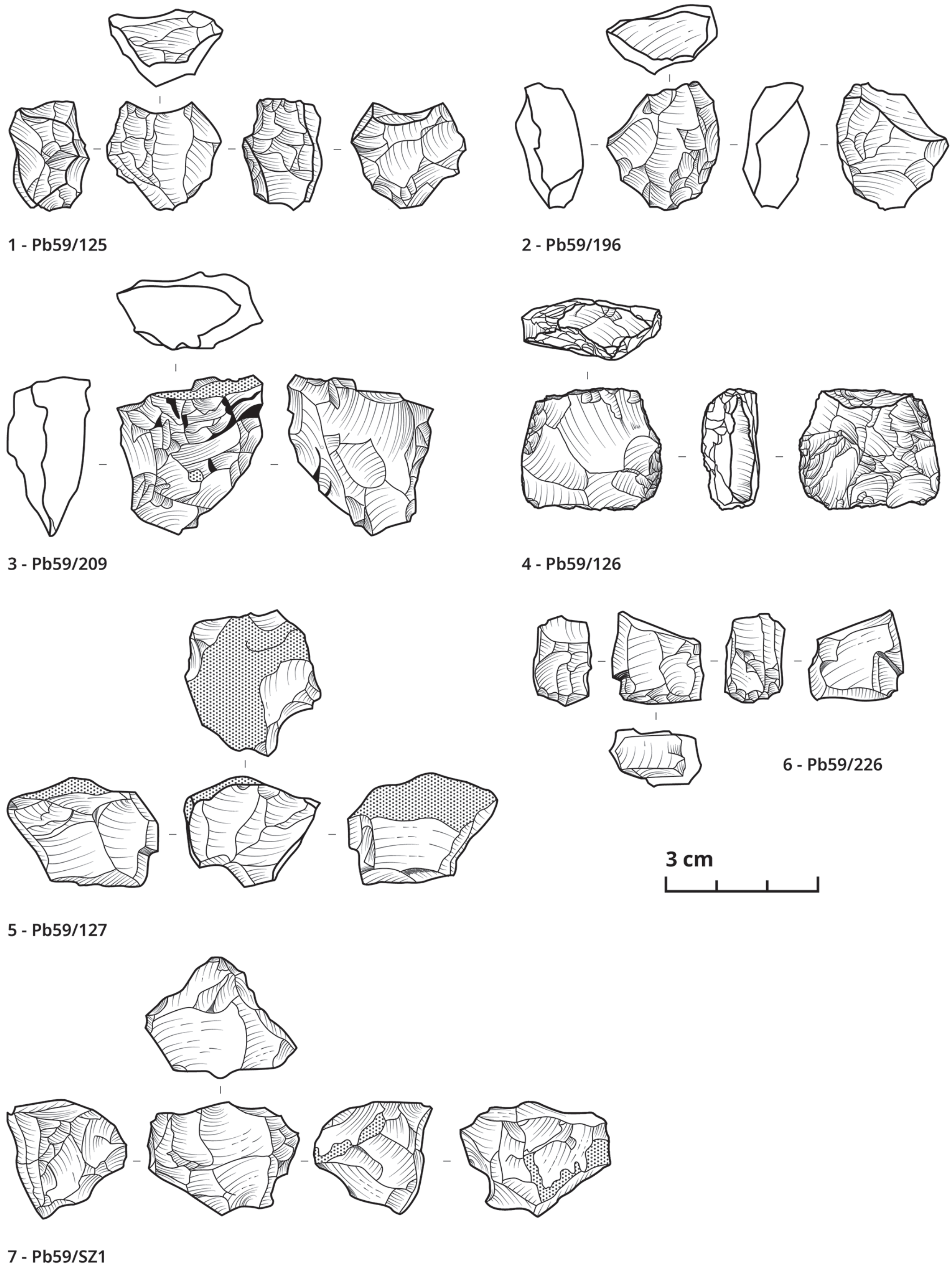

Fig. 6. Szekszárd-Palánk, cores. 1: perpendicular core, Hárskút radiolarite (inv. no. Pb59/125); 2: opposed platform core, Hárskút radiolarite (inv. no. Pb59/196); 3: multi-directional core with anvil technique stigmata, limnic silicite (inv. no. Pb59/209); 4: multi-directional core with anvil technique stigmata, Szentgál radiolarite (inv. no. Pb59/126); 5: unidirectional core, Hárskút radiolarite (inv. no. Pb59/127); 6: opposed platform core, radiolarite of unknown origin (inv. no. Pb59/226); 7: opposed platform core, Szentgál radiolarite (inv. no. Pb59/SZ1). Black dotted area: primary or secondary cortex; black dotted line: use-wear visible for the naked eye. Drawings: Attila Király

6. kép. Szekszárd-Palánk, magkövek. 1: derékszögű magkő, hárskúti radiolarit (ltsz. Pb59/125); 2: ellentétes irányú magkő, hárskúti radiolarit (ltsz. Pb59/196); 3: többirányú magkő üllős technika nyomaival, limnoszilicit (ltsz. Pb59/209); 4: többirányú magkő üllős technikák nyomaival, szentgáli radiolarit (ltsz. Pb59/126); 5: egyirányú magkő, hárskúti radiolarit (ltsz. Pb59/127); 6: ellentétes irányú magkő, ismeretlen eredetű radiolarit (ltsz. Pb59/226); 7: ellentétes irányú magkő, szentgáli radiolarit (ltsz. Pb59/SZ1). Fekete pöttyözött terület: elsődleges vagy másodlagos kéreg; fekete pontozott vonal: szabad szemmel látható használati kopás. Rajz: Király Attila

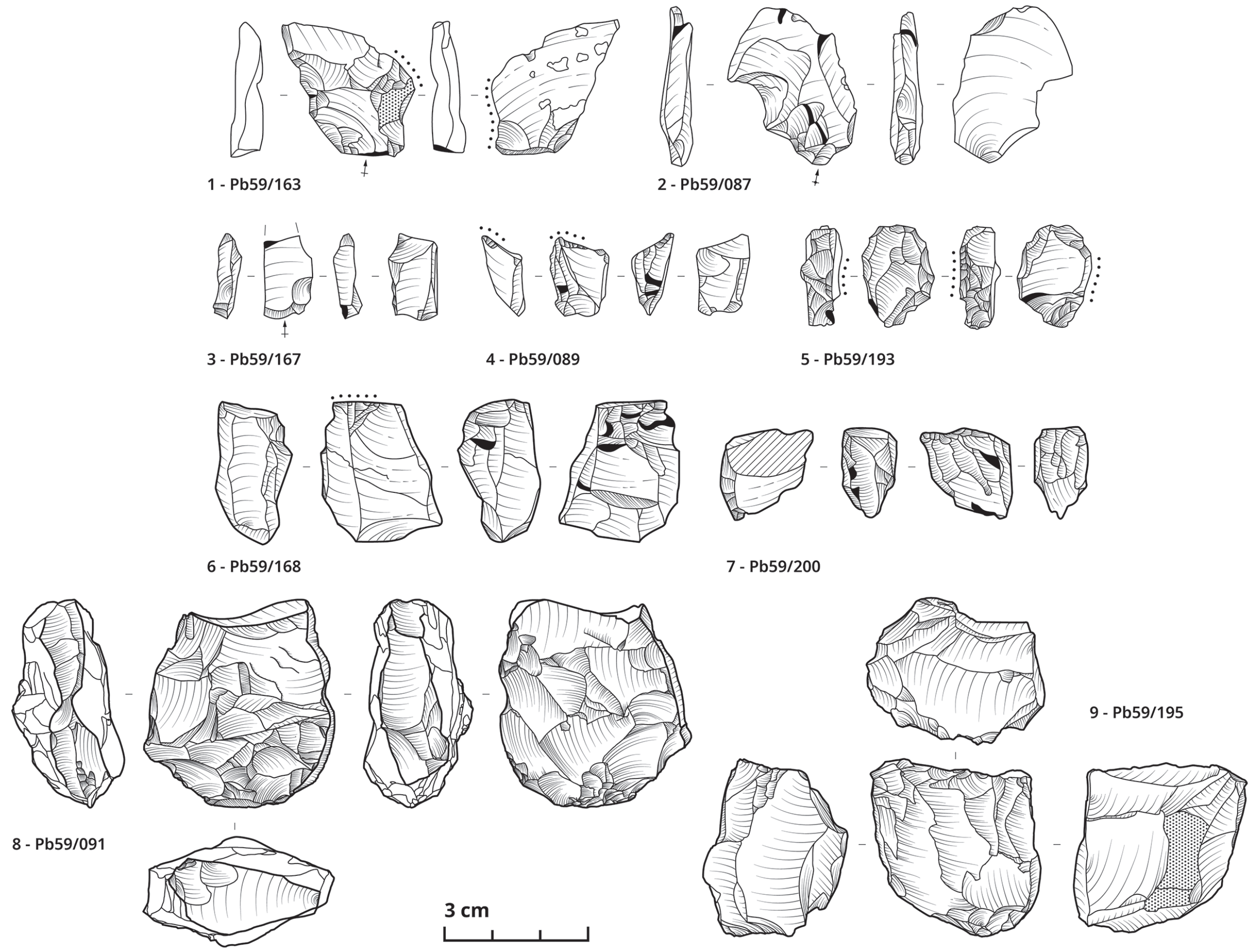

Fig. 7. Szekszárd-Palánk, cores and debitage. 1: flake with anvil technique stigmata and/or edge debitage traces, Szentgál radiolarite (inv. no. Pb59/163); 2: flake with traces of edge debitage, Mecsek radiolarite (inv. no. Pb59/87); 3: mesial fragment of a chunky flake with traces of edge debitage, Hárskút radiolarite (inv. no. Pb59/167); 4: distal fragment of a chunky flake with traces of edge debitage and a perforator, Hárskút radiolarite (inv. no. Pb59/89); 5: flake with anvil technique stigmata and/or edge debitage traces, Szentgál radiolarite (inv. no. Pb59/193); 6: opposed platform core, Mecsek radiolarite (inv. no. Pb59/168); 7: chunk with anvil technique stigmata and/or edge debitage traces, Mecsek radiolarite (inv. no. Pb59/200); 8: anvil core with traces of edge debitage, Szentgál radiolarite (inv. no. Pb59/91); 9: perpendicular (rotated unidirectional) core, Szentgál radiolarite (inv. no. Pb59/195). Black dotted area: primary or secondary cortex; black diagonal lines: cleavage surface; black dotted line: use-wear visible for the naked eye. Drawing: Attila Király

7. kép. Szekszárd-Palánk, magkövek és debitázs. 1: szilánk üllős technika nyomaival és/vagy él-debitázs nyomaival, szentgáli radiolarit (ltsz. Pb59/163); 2: szilánk él-debitázs nyomaival, mecseki radiolarit (ltsz. Pb59/087); 3: tömbszerű szilánk meziális töredéke él-debitázs nyomaival, hárskúti radiolarit (ltsz. Pb59/167); 4: tömbszerű szilánk disztális töredéke él-debitázs nyomaival és fúró kiképzéssel, hárskúti radiolarit (ltsz. Pb59/89); 5: tömbszerű szilánk üllős technika nyomaival és/vagy él-debitázs nyomaival, szentgáli radiolarit (ltsz. Pb59/193); 6: ellentétes irányú magkő, mecseki radiolarit (ltsz. Pb59/168); 7: tömb üllős technika és/vagy él-debitázs nyomaival, mecseki radiolarit (ltsz. Pb59/200); 8: üllős magkő él-debitázs nyomaival, szentgáli radiolarit (ltsz. Pb59/91); 9: derékszögű (elforgatott egyirányú) magkő, szentgáli radiolarit (ltsz. Pb59/195). Fekete pöttyözött terület: elsődleges vagy másodlagos kéreg; fekete átlós vonalak: hasadási felület; fekete pontozott vonal: szabad szemmel látható használati kopás. Rajz: Király Attila

The use of a hard anvil is also indicated by those cases where the core is reduced from one direction frontally or turned (*semi-tournant*), but small fragments break off from the direction opposite to the impact (e.g. Pb59/196, 209, SZ1; *Fig. 6. 2, 6. 3, 6. 7*). Additional evidence of anvil techniques is the flakes and debris with a damaged edge, mostly with an opposite dorsal negative pattern, including the so-called splintered pieces (51 cases).

Flakes and other blanks were also used as cores mainly for bladelets or microblades (e.g. Pb59/87, 89, 124, 146, 163, 193, 200; *Fig. 7. 1, 7. 2, 7. 4, 7. 5, 7. 7*) ('on-edge exploitation' – Flor et al. 2011; Tomasso et al. 2014; Hauck et al. 2017; 'burin-like core' – Visentin et al. 2016). On these specimens, a narrow debitage surface was opened along one of the edges, which was used to extract small bladelets. In the last processing phase of the above-mentioned peripheral core (Pb59/91, *Fig. 7. 8*) blanks were detached from debitage surfaces opened on the two narrow sides of the piece (e.g. Pb59/95, 156, 162, 164, 167, 168, 212; *Fig. 7. 3, 7. 6*).

In the examined sample (n_t = 249), the proportion of flakes and chunky flakes is 52.2% (130 pieces), blades 12.4% (31 pieces), bladelets 16.1% (40 pieces), microblades 3.6 % (9 pcs) including retouched pieces (tools). The industry is microlithic, the lithics have a maximum size of 22–57 mm, and their average length with broken pieces is 21.7 mm, without them 25.0 mm (*Fig. 8*). Cortical flakes and blades indicating the early stages of reduction occur only sporadically (13 cases). The dorsal negative pattern of the detached pieces (n = 210, including tools, without fragments and chips) is unidirectional in 61.0% (128 cases). In the case of laminar elements, this ratio is particularly high (62 cases, 75.0% of all laminar products), while only half of the flakes have this pattern (66 cases, 50.8% of the sherds). Butts are preserved and defined on 111 pieces. In addition to the anvil techniques, flakes were assumed to be detached with a hard hammer, and regular blades with a soft stone hammer (Pelegrin 2000). Flake butts are usually plain (59.0%, 36 out of 61), rarely punctiform or linear (together 17 cases, 27.9%). Conversely, laminar pieces tend to have punctiform (44.4%, 20 out of 45 cases) and linear (26.7%, 12 cases) butts. Other butt types are rare, as core preparation is infrequent; in several cases, scarred bulbs are observed.

We defined three knapping methods in the Sze-

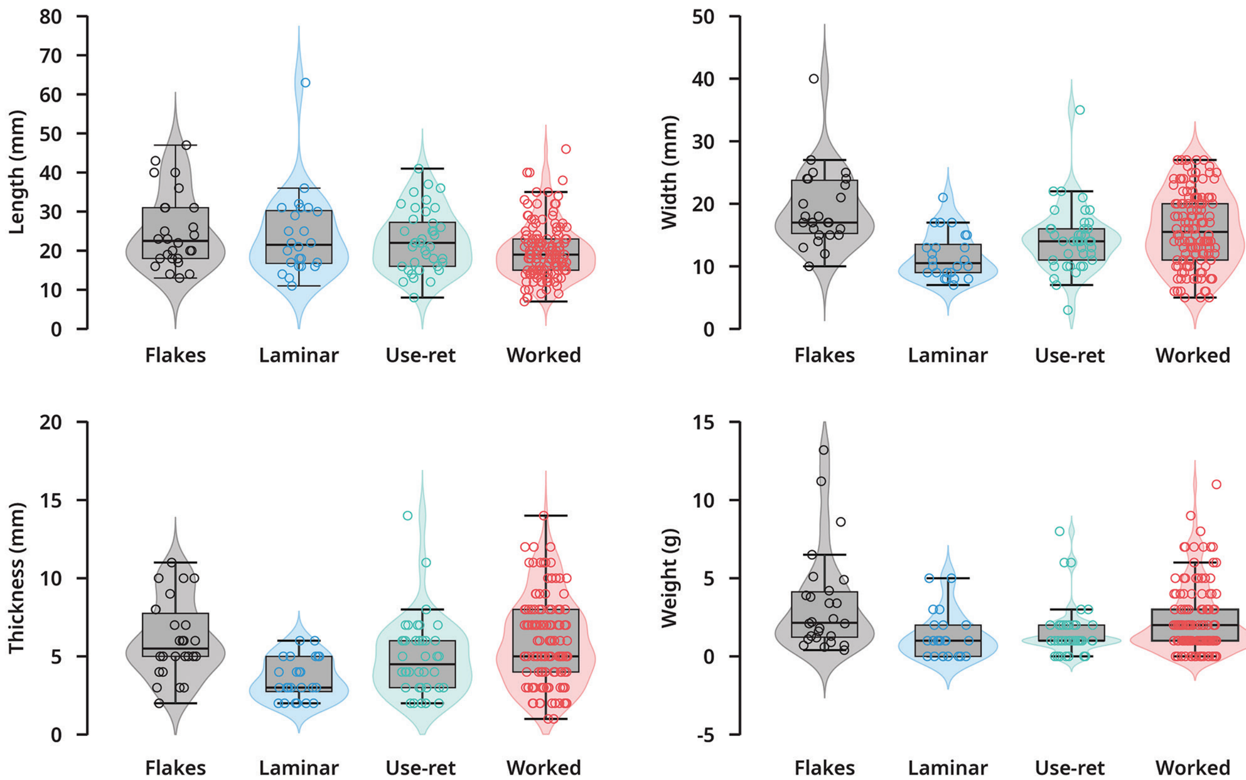

Fig. 8. Szekszárd-Palánk, main metric characteristics of the lithic assemblage by artefact classes. Top left: length, top right: width, bottom left: thickness, bottom right: weight. Flakes: all unworked flakes; laminar: all unworked blades, bladelets, and microblades; use-ret: all chunks, flakes and laminar elements that show visible wear from use; worked: all worked (retouched) chunks, flakes and laminar elements. Graphics: Attila Király

8. kép. Szekszárd-Palánk, a pattintott kőanyag fő méretadatai leletosztályok szerint. Balra fent: hosszúság, jobbra fent: szélesség, balra lent: vastagság, jobbra lent: tömeg. Szilánkok: minden megmunkálatlan szilánk, pengés elemek: minden megmunkálatlan penge, lamella és mikropenge, használati retus: minden törmelék, szilánk és pengés elem, ami szabad szemmel jól érzékelhető használati kopást visel, megmunkált: minden megmunkált (retusált) törmelék, szilánk és pengés elem. Rajz: Király Attila

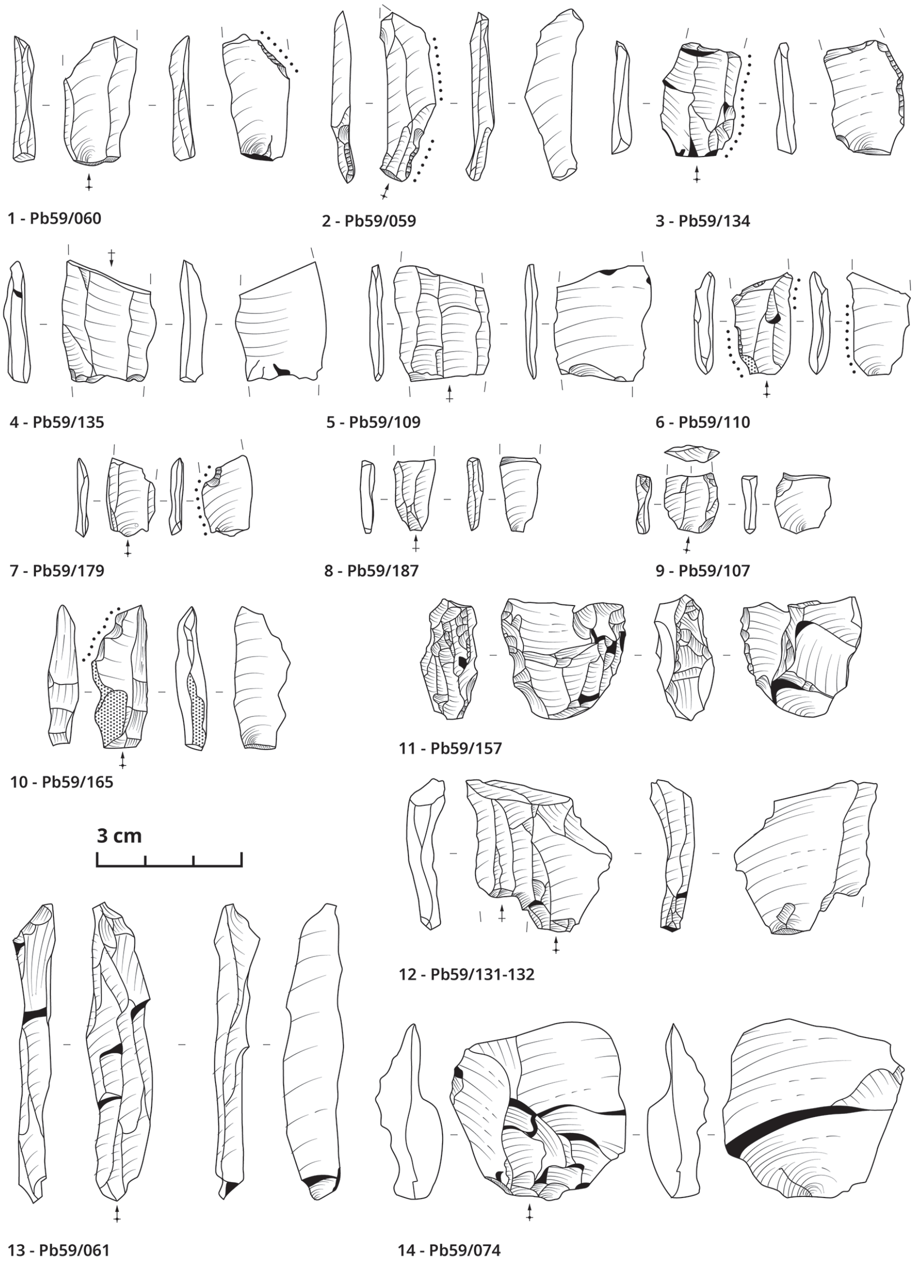

Fig. 9. Szekszárd-Palánk, debitage. 1–2: proximal blade fragments, Mecsek radiolarite (inv. no. Pb59/60, 59); 3: flake, Hárskút radiolarite (inv. no. Pb59/134); 4–5: mesial blade fragments, limnic silicite (inv. no. Pb59/135, 109); 6: proximal blade fragment, Hárskút radiolarite (inv. no. Pb59/110); 7: proximal bladelet fragment, Hárskút radiolarite (inv. no. Pb59/179); 8: bladelet, Szentgál radiolarite (inv. no. Pb59/187); 9: proximal blade fragment (microburin), Mecsek radiolarite (inv. no. Pb59/107); 10: platform edge rejuvenation flake, Mecsek radiolarite (inv. no. Pb59/165); 11: chunk bearing stigmata of anvil techniques (splintered piece), Hárskút radiolarite (inv. no. Pb59/157); 12: a flake and a distal blade fragment conjoined, Mecsek radiolarite (inv. no. Pb59/131, 132); 13: blade, Mecsek radiolarite (inv. no. Pb59/61); 14: flake, limnic silicite (inv. no. Pb59/74). Black dotted line: use-wear visible for the naked eye. Drawing: Attila Király

9. kép. Szekszárd-Palánk, debitázs. 1–2: pengék proximális töredékei, mecseki radiolarit (ltsz. Pb59/60, 59); 3: szilánk, hárskúti radiolarit (ltsz. Pb59/134); 4–5: pengék meziális töredékei, limnoszilicit (ltsz. Pb59/135, 109); 6: penge proximális töredéke, hárskúti radiolarit (ltsz. Pb59/110); 7: lamella proximális töredéke, hárskúti radiolarit (ltsz. Pb59/179); 8: lamella, szentgáli radiolarit (ltsz. Pb59/187); 9: penge proximális töredéke (mikroburin), mecseki radiolarit (ltsz. Pb59/107); 10: peremmegújító szilánk, mecseki radiolarit (ltsz. Pb59/165); 11: üllős technikák nyomait viselő töredék (pikkelyes retusú darab), hárskúti radiolarit (ltsz. Pb59/157); 12: összeillesztett ép szilánk és penge disztális töredéke, mecseki radiolarit (ltsz. Pb59/131, 132); 13: penge, mecseki radiolarit (ltsz. Pb59/61); 14: szilánk, limnoszilicit (ltsz. Pb59/74). Fekete pöttyözött terület: elsődleges vagy másodlagos kéreg; fekete pontozott vonal: szabad szemmel látható használati kopás. Rajz: Király Attila kszárd-Palánk material. The first stages of the *free-hand frontal debitage* (1a) are represented by flakes, blades and fragments whose length exceeds. the average size of the cores in the collection (*Fig. 9*). In the absence of cores in the early phase of reduction, the extent of core shaping and initial platform preparation cannot be. (1b) When applying the frontal method, the striking platforms were renewed, or the core was rotated to open a new platform. The reduction was certainly adapted to the shape of the ever-decreasing size of the cores, and in its advanced phase resulted in both bladelets and small flakes (*Fig. 9*). *Edge debitage* (2) affecting the narrow sides of flakes and chunks was an opportunistic method to produce small blanks. *Anvil methods* (3) could be used as the last stage of reduction, however, traces of anvil use and rotation is observed on the largest core as well, creating the impression of peripheral centripetal debitage.

The relationship between the methods is reconstructed as at least two operational chains. The scarcity of decortication elements indicates that the first phases of core reduction took place outside the site. (1a) Larger initial cores are missing, but the larger blades attest to the presence of regular blade debitage. These larger blades were mostly made of Mecsek radiolarite, which suggests that local raw materials entered the site in the form of larger cores. This would correspond to the distance-decay principle of raw material exploitation. Based on two conjoined Mecsek blanks, parallel, serial detachments can be reconstructed with a hard hammer, which resulted in both flakes and blades (*Fig. 9.12*). (1b) On smaller-sized cores, the reduction continued on striking platforms with right angles or slightly more acute angles, also with parallel, successive detachments, which resulted in bladelets and flakes. With the decrease in core size, the knapping methods did not change significantly. Some smaller cores, based on their pebble cortex, may have entered the reduction process at this stage (e.g. Pb59/198). (1c) Even more opportunistic methods were applied in the late reduction stages, such as the rotation of cores and the opening of new debitage surfaces. Platform preparation was not common in this phase either. (1d) The last stages can be represented by anvil techniques and on-edge debitage aimed at maximum exploitation. (2) *Peripheral reduction* with anvil methods correspond to an earlier step of a second operational chain on the largest core in the collection. This phase was followed by on-edge debitage on the two narrow sides, with the help of a striking platform created for this purpose with one blow.

Lithic typology

Chunks, flakes, blades, bladelets and microblades were all used as supports for tools at the site (*Table 3*). The processing tools were made on flakes and a few larger blades, the preferred supports of the arma-

Table 3. Szekszárd-Palánk, tool types by support type

3. táblázat. Szekszárd-Palánk, magkövek és eszközök tipológiai megoszlása a szupporttípus viszonylatában

	Chunk		*Flake*		*Chunklike flake*		*Blade*		*Bladelet*		*Microblade*		*Total*	
	Pcs	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*	*Pcs*	*Percent*
Endscrapers	2	1,6%	36	28,8%	5	4,0%	4	3,2%	–	–	–	–	47	37,6%
Perforators	–	–	1	0,8%	2	1,6%	1	0,8%	1	0,8%	–	–	5	4,0%
Burins	1	0,8%	–	–	6	4,8%	–	–	1	0,8%	–	–	8	6,4%
Points	–	–	–	–	–	–	–	–	3	2,4%	–	–	3	2,4%
Truncated pieces	–	–	1	0,8%	–	–	1	0,8%		–	–	–	2	1,6%
Retouched pieces	2	1,6%	16	12,8%	3	2,4%	4	3,2%	6	4,8%	2	1,6%	33	26,4%
Notched and denticulated pieces	–	–	1	0,8%	–	–	1	0,8%	1	0,8%	–	–	3	2,4%
Scaled pieces	2	1,6%	4	3,2%	3	2,4%	–	–	–	–	–	–	9	7,2%
Sidescrapers	–	–	5	4,0%	–	–	–	–	–	–	–	–	5	4,0%
Geometrics	–	–	–	–	–	–	–	–	1	0,8%	2	1,6%	3	2,4%
Backed bladelets	–	–	–	–	–	–	–	–	6	4,8%	1	0,8%	7	5,6%
Total	7	5,6%	64	51,2%	19	15,2%	11	8,8%	19	15,2%	5	4,0%	125	100,0%

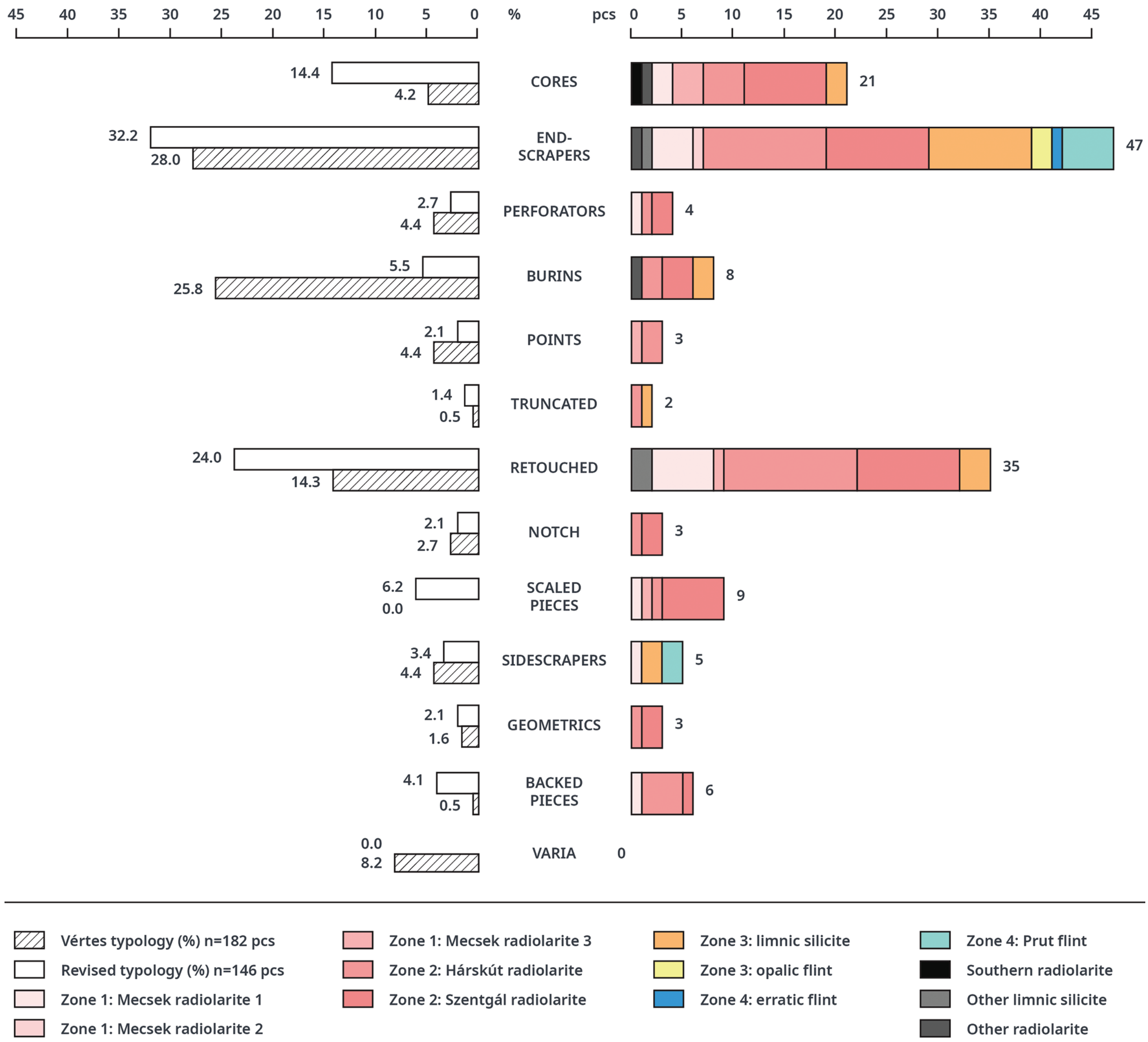

Fig. 10. Szekszárd-Palánk comparative typological graph. On the left side of the graph, we compare the type distribution of László Vértes and this study, according to tool classes, as a percentage of the total amount of tools (n = 182 and n = 146, respectively). On the right side of the graph, the frequency of tool types is presented in our revised sample (n = 146), by raw material. Data: Orsolya Demeter, Róbert Kertész, Attila Király, Vértes 1962. Figure: Attila Király, based on data from this revision and published results (Vértes 1962; Vértes 1965; Kertész, Demeter 2019)
10. kép. Szekszárd-Palánk összehasonlító tipológiai grafikon. A grafikon bal oldalán Vértes László és e revízió típusmegoszlását hasonlítjuk össze, eszközosztályok szerint, a teljes eszközmennyiség százalékában. Ez Vértesnél 182, a mi revíziónkban 146 darab eszköz. A grafikon jobb oldalán a revízió alá vett eszközkészlet darab szerinti megoszlását ábrázoljuk a típuscsoportok között, a nyersanyag viszonylatában. Adatok: Demeter Orsolya, Kertész Róbert, Király Attila, Vértes 1962. Rajz: Király Attila

tures were bladelets and microblades, but not blades. The microburin technique was used on the supports, three of the recognized four microburins served as tool supports. In addition to retouched tools, 40 blanks (1 fragment, 21 flakes, 10 blades, 7 bladelets, 1 microblade) bear use-retouch or damage visible to the naked eye. The proportion of typical tools is 23.9% (125 pieces) to all knapped lithics (n_{rm} = 522), their distribution is shown in *Fig. 10*, compared with the classification published by Vértes.

Concerning processing tools, end-scrapers make up the largest proportion of tools in the entire collection (47 pieces, 37.6%), most of them made on squat flakes (*Table 3, Fig. 11*). Their fronts are slightly curved or fanned, in several cases the retouch continues on the lateral edges, creating thumbnail varie-

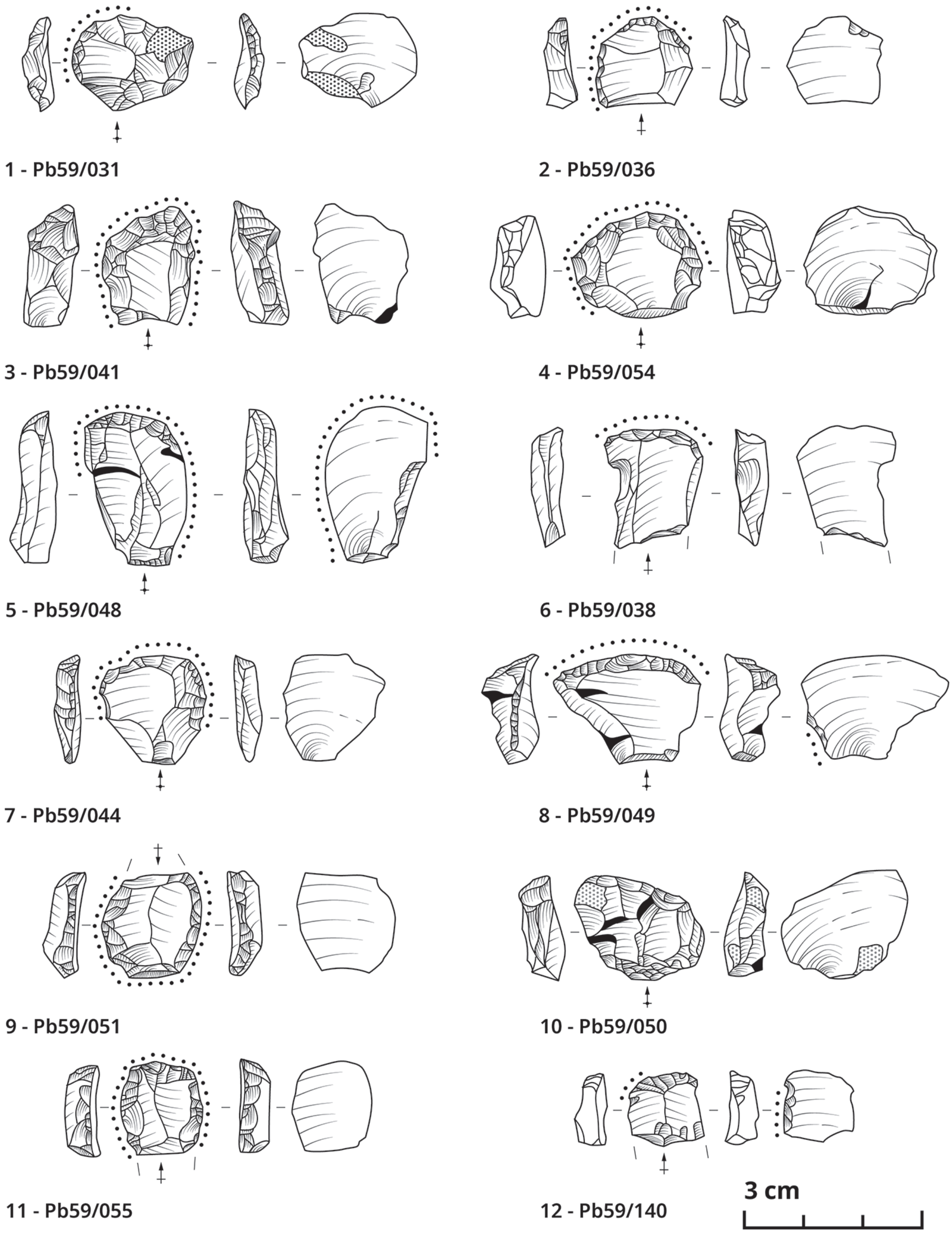

Fig. 11. Szekszárd-Palánk, tools. 1: end-scraper, Szentgál radiolarite (inv. no. Pb59/31); 2: end-scraper, Mecsek radiolarite (inv. no. Pb59/36); 3: end-scraper-sidescraper, opalite flint (inv. no. Pb59/41); 4: end-scraper-sidescraper, Szentgál radiolarite (inv. no. Pb59/54); 5–6: end-scrapers, limnosilicite (inv. no. Pb59/48, 38); 7–8: end-scrapers, Prut flint (inv. no. Pb59/44, 49); 9: end-scraper, limnic silicite (inv. no. Pb59/51); 10: end-scraper, Szentgál radiolarite (inv. no. Pb59/50); 11: end-scraper, Prut flint (inv. no. Pb59/55); 12: end-scraper-retouched piece, Szentgál radiolarite (inv. no. Pb59/140). Red dotted area: thermally altered surface; black dotted area: primary or secondary cortex; black dotted line: use-wear visible for the naked eye. Drawing: Attila Király

11. kép. Szekszárd-Palánk, eszközök. 1: vakaró, szentgáli radiolarit (ltsz. Pb59/31); 2: vakaró, mecseki radiolarit (ltsz. Pb59/36); 3: vakaró-kaparó, opálos kova (ltsz. Pb59/41); 4: vakaró-kaparó, szentgáli radiolarit (ltsz. Pb59/54); 5–6: vakarók, limnoszilicit (ltsz. Pb59/48, 38); 7–8: vakarók, pruti kova (ltsz. Pb59/44, 49); 9: vakaró, limnoszilicit (ltsz. Pb59/51); 10: vakaró, szentgáli radiolarit (ltsz. Pb59/50); 11: vakaró, pruti kova (ltsz. Pb59/55); 12: vakaró-retusált darab, szentgáli radiolarit (ltsz. Pb59/140). Vörös pöttyözött terület: hőhatás nyoma; fekete pöttyözött terület: elsődleges vagy másodlagos kéreg; fekete pontozott vonal: szabad szemmel látható használati kopás. Rajz: Király Attila ties, or end- and sidescraper combinations. The sidescrapers (5 pieces, 4.0%) were made on flakes, with a continuous, regular retouch running along their edges. The five perforators in the collection were also created mainly on chunky flakes. One of the two pieces identified by Vértes as a 'Zinken' was indeed a perforator (Pb59/89), the other was interpreted as a backed-truncated rectangle and was classified as an armature (Pb59/82). The set includes only two notched-retouched pieces and one denticulated bladelet. Our typology differs the most from Vértes's in terms of burins. Against the eight pieces noted here, he lists 42 examples, adding that 'die Stichel sind in der Regel grob, nicht typisch und scheinen zufällige Formen zu sein' (the burins are usually coarsely executed, atypical, and appear to be of random shapes – translated by A. K.) (Vértes 1962, 174). This difference may be due to the fact that the anvil and on-edge reduction methods and their eclectic detachment negative patterns create the effect of burination in several cases. Some of these can be interpreted as burins, but our technological investigation discovered mostly random patterns or on-edge debitage stigmas. More than half of the processing tools with edge retouch (33 pieces, 26.4%) (*Figs. 10–13*) were made on flakes. The retouch is usually light, continuous, short, regular and parallel, in one-third of the cases it is steep, but not backing. A combined bladelet tool (Pb59/102, *Fig. 13. 1*) with a straight truncation at the distal end, can be considered a shouldered piece due to a regular, slightly concave, semi-steep retouch on the proximal and mesial sections of the left dorsal edge. The retouch of the two truncated pieces is irregular, perhaps the result of the anvil technique.

Among armatures (13 pcs), there are seven backed pieces, two proximal fragments, two distal fragments, one intact, one distally and one proximally damaged piece (*Figs. 12–13*). Five bladelets and one microblade are backed from the ventral direction (Pb59/57, 69, 73, 80, 108, 113; *Fig. 13. 5, 13. 8, 13. 13–14*). One Mecsek radiolarite tool is a thick bladelet with crossed backing (Pb59/120, *Fig. 13. 3*). In the case of a bladelet with a partially curved back, the proximal section ends in a tip (Pb59/69). Impact fractures run parallel to the debitage axis on the basal-ventral part and the proximal-mesial section of the ventral right edge. These can result from detachment of the support or subsequent use as a point. Since this cannot be decided, we have identified the piece as a backed bladelet, not as a point. The three geometric microliths of the collection are a rectangular backed-truncated bladelet (Pb59/82, *Fig. 12. 9*), a lunate (Pb59/79, *Fig. 13. 11*), and an atypical triangle (Pb59/78, *Fig. 13. 10*). The latter two have microburin supports, and the fracture marks on their distal ends are partially covered by the alternate backing.

Vértes mentions several Microgravette-like and Gravette points and fragments in his typological description (Vértes 1962, 177). In the case of three specimens, their fractures prevented us to decide whether they ended in a tip, so we classified them as backed bladelets (Vértes 1962, Taf. V/3, Pb59/57, *Fig. 13. 14*; Taf. V/4, Pb59/73, *Fig. 13. 13*; Taf. V/5, Pb59/113, *Fig. 13. 6*). A slender bladelet retouched straight on the left edge is interpreted as a point (Vértes 1962, Taf. V/1, Pb59/58, *Fig. 12. 7*). In the system of Sonneville-Bordes and Perrot (Sonneville-Bordes, Perrot 1956b, 545), the retouch forming the left edge corresponds to the atypical Gravette points: it is steep, but not continuous, extending unevenly, it is short in the mesial section and longer in the distal section. The backing of the other backed pieces in the collection is more uniform, more regular, and better defined. On the mesial-distal section of the right edge, damage shapes the curvature of the tip, probably intentionally, but it cannot be called a proper retouch. According to one definition of the type, the presence of a shaping retouch on the edge opposite the backing is not essential ('…avec *parfois* des retouches supplémentaires…', Sonneville-Bordes, Perrot 1956b, 547, *sometimes* with additional retouch – translated by A. K., our emphasis), especially if the edge is originally convex (Montoya 2002; Bracco, Montoya 2015). Another definition, however, includes the presence of such additional retouch (Demars, Laurent 2000, 100), and as a result, a recent discussion on the CB also regards it as a definitive characteristic (e.g. Lengyel 2016, 51). From a typological point of view, this tool cannot, therefore, be called a Microgravette point in *all* definitions, although the method of its design corresponds to it. Since there is no other representative of this type in the collection, this piece is listed as a backed point.

In Vértes' time, the Tardenoisian was interpreted as a Central and Eastern European archaeological culture, which provided a logical connection between the last Palaeolithic and the first Mesolithic industries (Płonka 2022). The typological markers of the upper phase of this presumed culture were points truncated obliquely at the proximal, distal, or both ends (trapezoids), which are now known by research

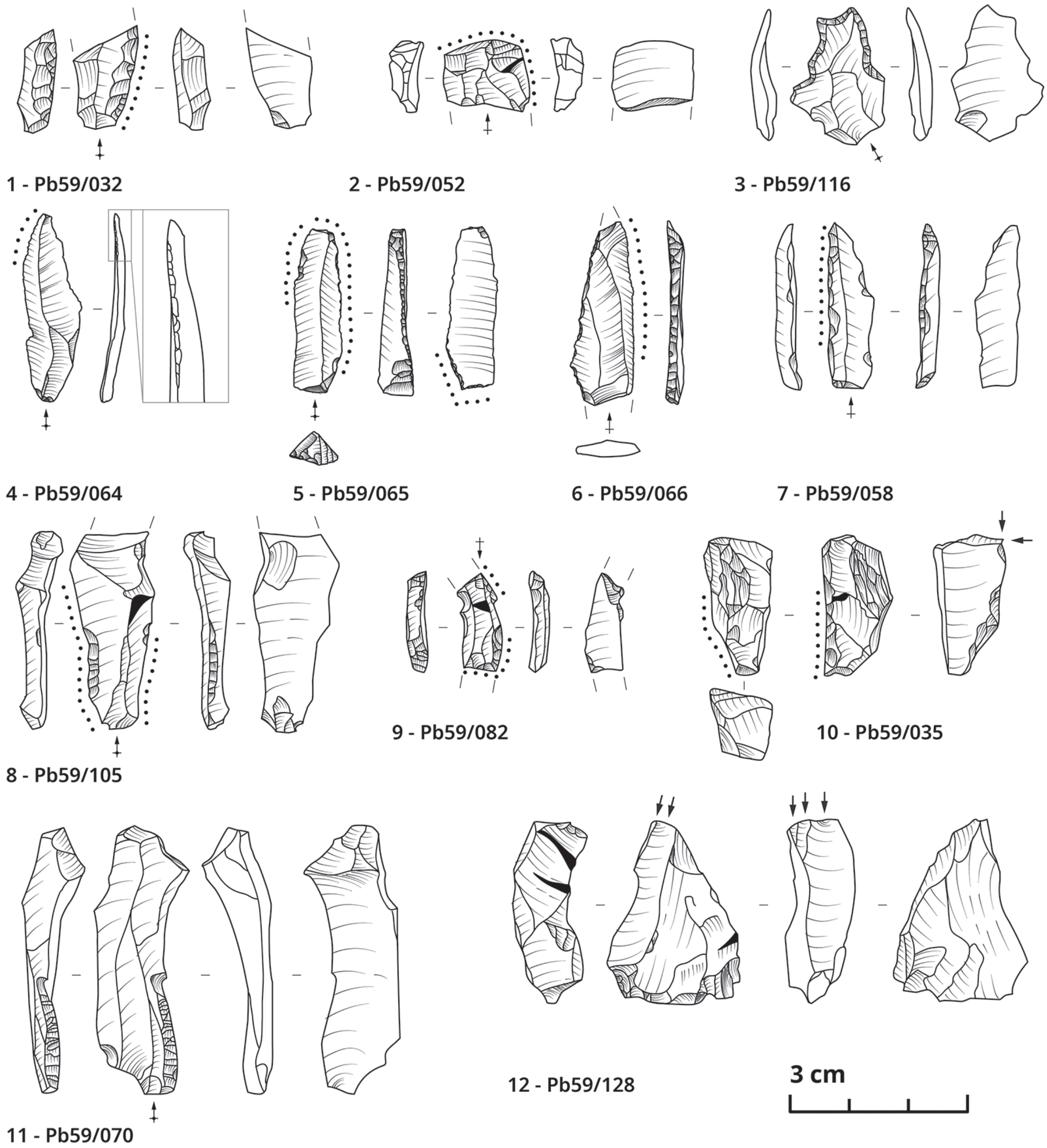

Fig. 12. Szekszárd-Palánk, tools. 1: scraper, Prut flint (inv. no. Pb59/32); 2: end-scraper, Hárskút radiolarite (inv. no. Pb59/52); 3: retouched flake, Szentgál radiolarite (inv. no. Pb59/116); 4: retouched point, Hárskút radiolarite (inv. no. Pb59/64); 5: retouched bladelet (Zinken), unidentified flint (inv. no. Pb59/65); 6: backed point fragment, Hárskút radiolarite (inv. no. Pb59/66); 7: retouched point, Mecsek radiolarite (inv. no. Pb59/58); 8: retouched blade, Szentgál radiolarite (inv. no. Pb59/105); 9: backed-truncated bladelet, rectangle, Hárskút radiolarite (inv. no. Pb59/82); 10: burin on a chunky flake, limnic silicite (inv. no. Pb59/35); 11: scraper, Mecsek radiolarite (inv. no. Pb59/70); 12: burin on a break, Szentgál radiolarite (inv. no. Pb59/128). Black dotted area: primary or secondary cortex; black dotted line: use-wear visible for the naked eye. Drawing: Attila Király

12. kép. Szekszárd-Palánk, eszközök. 1: kaparó, pruti kova (ltsz. Pb59/32); 2: vakaró, hárskúti radiolarit (ltsz. Pb59/52); 3: retusált szilánk, szentgáli radiolarit (ltsz. Pb59/116); 4: retusált hegy, hárskúti radiolarit (ltsz. Pb59/64); 5: retusált lamella (Zinken), azonosítatlan kovaféle (ltsz. Pb59/65); 6: tompított hátú hegy töredéke, hárskúti radiolarit (ltsz. Pb59/66); 7: retusált hegy, mecseki radiolarit (ltsz. Pb59/58); 8: retusált penge, szentgáli radiolarit (ltsz. Pb59/105); 9: csonkított-tompított lamella, téglalap, hárskúti radiolarit (ltsz. Pb59/82); 10: sarkos véső tömbszerű szilánkon, limnoszilicit (ltsz. Pb59/35); 11: kaparó, mecseki radiolarit (ltsz. Pb59/70); 12: véső törésen, szentgáli radiolarit (ltsz. Pb59/128). Fekete pöttyözött terület: elsődleges vagy másodlagos kéreg; fekete pontozott vonal: szabad szemmel látható használati kopás. Rajz: Király Attila

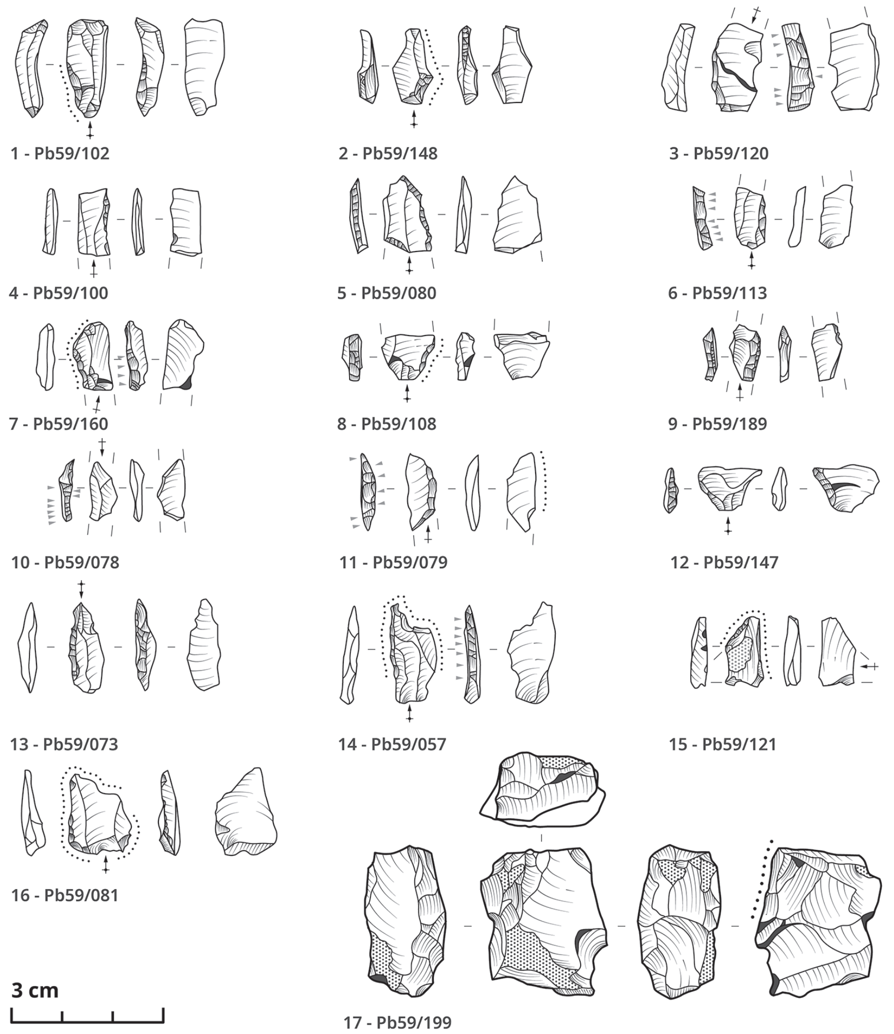

Fig. 13. Szekszárd-Palánk, tools. 1–2: retouched bladelets, Hárskút radiolarite (inv. no. Pb59/102, 148); 3: fragment of an arch-backed blade, Mecsek radiolarite (inv. no. Pb59/120); 4: retouched bladelet, Hárskút radiolarite (inv. no. Pb59/100); 5: retouched point (microburin), Szentgál radiolarite (inv. no. Pb59/80); 6: proximal fragment of backed bladelet, Hárskút radiolarite (inv. no. Pb59/113); 7: retouched (denticulated) bladelet, Szentgál radiolarite (inv. no. Pb59/160); 8: proximal fragment of backed bladelet, Hárskút radiolarite (inv. no. Pb59/108); 9: fragment of a geometric microlith (segment), limnic silicite (inv. no. Pb59/189); 10: fragment of a geometric microlith (triangle) on a microburin support, Szentgál radiolarite (inv. no. Pb59/78); 11: geometric microlite (lunate) on a microburin support, Szentgál radiolarite (inv. no. Pb59/79); 12: flake with inverse retouch, Hárskút radiolarite (inv. no. Pb59/147); 13–14: backed bladelets, Hárskút radiolarite (inv. no. Pb59/73, 57); 15: retouched flake, Szentgál radiolarite (inv. no. Pb59/121); 16: flake with use-retouch (Vértes: Tardenoisien point), Szentgál radiolarite (inv. no. Pb59/81); 17: multi-directional core, limnic silicite (inv. no. Pb59/199). Red dotted area: thermally altered surface; black dotted area: primary or secondary cortex; black dotted line: use-wear visible for the naked eye. Drawing: Attila Király

13. kép. Szekszárd-Palánk, eszközök. 1–2: retusált lamellák, hárskúti radiolarit (ltsz. Pb59/102, 148); 3: ívelten tompított hátú penge töredéke, mecseki radiolarit (ltsz. Pb59/120); 4: retusált lamella, hárskúti radiolarit (ltsz. Pb59/100); 5: retusált hegy (mikroburin), szentgáli radiolarit (ltsz. Pb59/80); 6: tompított hátú lamella proximális töredéke, hárskúti radiolarit (ltsz. Pb59/113); 7: retusált (fogazott) lamella, szentgáli radiolarit (ltsz. Pb59/160); 8: tompított hátú lamella proximális töredéke, hárskúti radiolarit (ltsz. Pb59/108); 9: geometrikus mikrolit (szegmens) töredéke, limnoszilicit (ltsz. Pb59/189); 10: geometrikus mikrolit (háromszög) töredéke mikroburin szupporton, szentgáli radiolarit (ltsz. Pb59/78); 11: geometrikus mikrolit (félhold) mikroburin szupporton, szentgáli radiolarit (ltsz. Pb59/79); 12: inverz retusú szilánk, hárskúti radiolarit (ltsz. Pb59/147); 13–14: tompított hátú lamellák, hárskúti radiolarit (ltsz. Pb59/73, 57); 15: retusált szilánk, szentgáli radiolarit (ltsz. Pb59/121); 16: megmunkálatlan szilánk használati retussal (Vértes: Tardenoisien hegy), szentgáli radiolarit (ltsz. Pb59/81); 17: többirányú magkő, limnoszilicit (ltsz. Pb59/199). Vörös pöttyözött terület: hőhatás nyoma; fekete pöttyözött terület: elsődleges vagy másodlagos kéreg; fekete pontozott vonal: szabad szemmel látható használati kopás. Rajz: Király Attila as Ahrensburgian, Beuronian, Zonhoven points, among others (Dalmeri et al. 2004; Kind 2009; Vermeersch 2015, 51; Płonka 2022). On one of the pieces identified by Vértes as 'Tardenoisian' points, only use-retouch is present at the distal end of the blade fragment (Vértes 1962, Taf. V/10; Pb59/81, *Fig. 13. 16*). A mesial flake fragment with a large thermal crack on the dorsal surface and retouch on the left edge is believed to be a point. The published drawing shows the support rotated 90 degrees to the debitage axis, which may thus appear to be a fragment of an obliquely truncated point (Vértes 1962, Taf. IV/17; Pb59/121, *Fig. 13. 15*). The last 'Tardenoisian' example is a bladelet with abrupt retouch on the right edge, the proximal left part of which shows traces of the microburin technique (Vértes 1962, Taf. V/14; Pb59/80, *Fig. 13. 5*). These traces recall the retouched base typical of Beuronian points, but the similarity, in this case, is only formal (Taute 1973; Kind 2009). The distal end of the bladelet is damaged, but the curvature of the retouched edge can indicate a pointed tip. None of these pieces have been classified by us as points. Of the remaining two points defined by us, one of them is a fragment. The left edge has an angled back formed by regular retouch (Vértes 1962, Taf. V/2; Pb59/66, *Fig. 12. 6*). The other point was made on slender blade support, the left distal edge section was curved with a marginal retouch (Vértes 1962, Taf. IV/20; Pb59/64, *Fig. 12. 4*).

Other artefacts

Four used pebbles, three pieces of sandstone, five hematite and two limonite lumps, as well as fragments of a polished antler tool, were found at the site (*Fig. 14*). The find marked Pb60/14 (*Fig. 14. 1*) is a river pebble measuring 62 × 67 × 31 mm, the surface of which is covered with an almost continuous, thick, yellowish-white patina. Its fan-like silhouette and log shape were shaped by nature - where the patina shows, the original reddish-brown pebble cortex can be observed. Black spots appear on the non-patinated surface of the piece, which are probably traces of burning. Smaller damages and chippings are seen on the left side and along the edges. Traces of multiple hard impacts (battering) are shown on the tapered edge of its lower part. The most noticeable modification of the pebble is the row of straight grooves covering the front and back, but more faint striations can also be discovered along the edges. The Pb59/76 oval-shaped flat metavolcanite pebble (59 × 50 × 6 mm, *Fig. 14. 4*), has slightly worn edges, and its surface is polished quite smooth. Pb59/77 is a tongue-shaped sandstone object (52 × 32 × 9 mm, *Fig. 14. 2*), its surface is probably slightly polished, and spots of red paint material can be seen on its back, which perhaps outlines a grid-like pattern. Its lower part is broken, and its edges are damaged from the upper part to approximately the lower quarter of the sides (battering). A well-defined black spot is visible on the upper right part of the edge, perhaps a sign of burning.

Vértes identifies a flat (43 × 15 × 4.5 mm) tool made of red deer antler, slightly asymmetrical along its longitudinal axis (Pb59/67, *Fig. 14. 3*) as a single-barbed harpoon fragment. Due to its fragmentary state, it cannot be determined with absolute certainty whether the object had barbs. However, based on the find context, the raw material, and the morphological properties, it is likely that the artefact is actually the distal end of a single-barbed harpoon (Karavanić et al. 2013; Borić, Cristiani 2016; Cristiani, Borić 2016). The combined presence of tool stones, painted stones, ocher and bone harpoons is not unprecedented in the region; a combination similar to Palánk is found, among others, in layers 8–10 of Cunia Turcului (Late Palaeolithic/Early Mesolithic, Bln-802, 10,250 ± 200 BP) (Mihailović 2008; Boroneanţ 2011).

Discussion

We presume that the Szekszárd-Palánk camp was a node in an extended land-use network, because the initial phases of core reduction did not take place there, and the management of raw materials points to widespread regional contacts. The high proportion of Bakony radiolarites indicates the strength of these relationships. Lithic production resulted in the maximum utilization of cores, however, local raw materials are better represented in the first stages of reduction with more regulated methods. Raw materials of the second procurement zone are more frequent in the advanced reduction phases, and the remote raw materials arrived at the site as blanks or tools. Tool production was opportunistic as well, the cores mostly show striking platforms without preparation, and with traces of anvil techniques. Larger and smaller blanks were probably made during the same reduction sequence. Flakes and blades range in size from 22 to 55 mm, but small blanks and detachment negatives on cores are more common. Lamellar elements and flakes of various sizes from all raw ma-

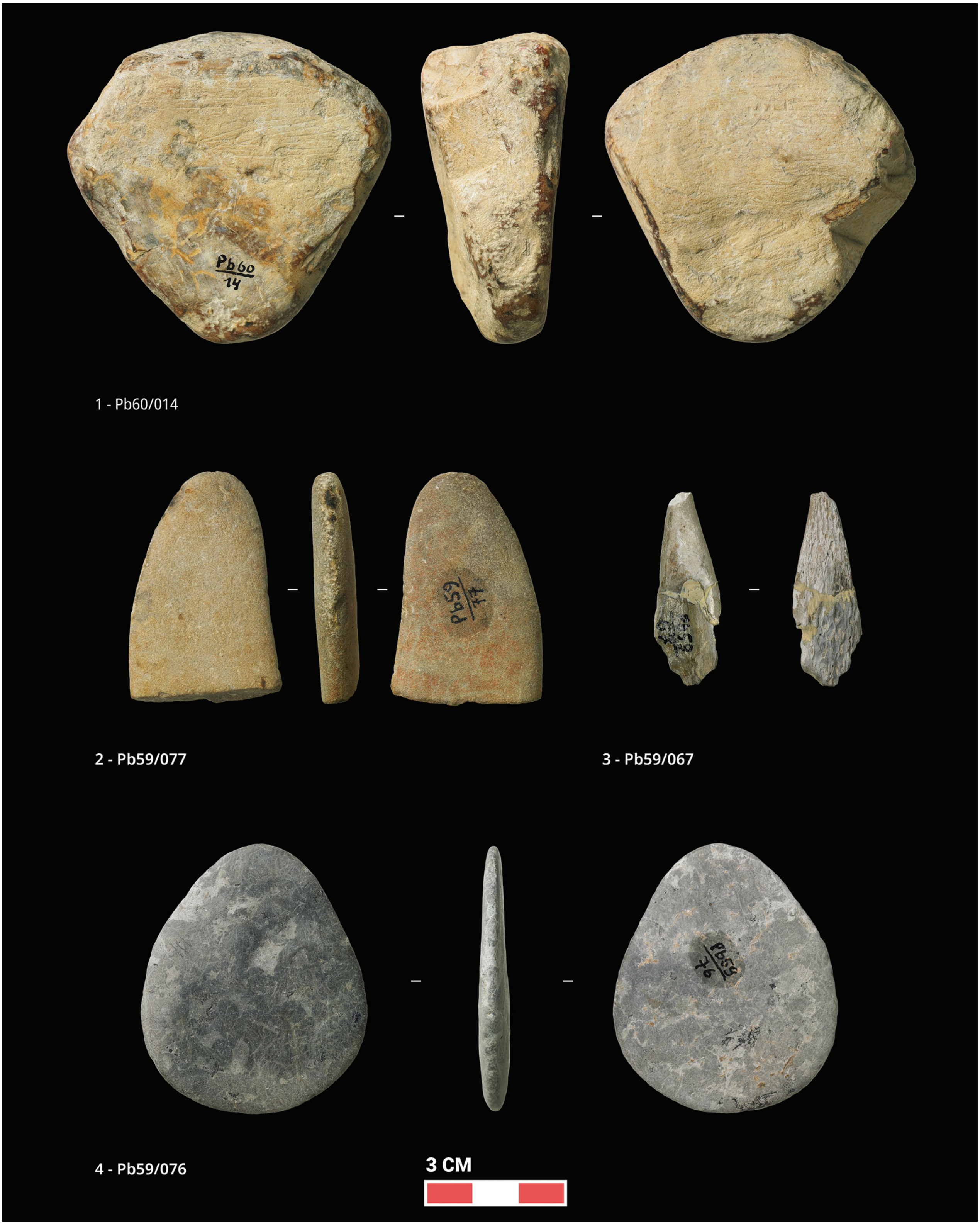

Fig. 14. Szekszárd-Palánk, tools. 1: patinated river pebble with battering marks and incised lines (inv. no. Pb60/14); 2: polished sandstone pebble with traces of red paint (inv. no. Pb59/77); 3: fragment of a harpoon or point made from red deer antlers (lot. no. Pb59/67); 4: polished metamorphic pebble (inv. no. Pb59/76). Photos: Hungarian National Museum

14. kép. Szekszárd-Palánk, eszközök. 1: patinás folyami kavics ütésnyomokkal és karcolásokkal (ltsz. Pb60/14); 2: csiszolt homokkő kavics vörös festék nyomaival (ltsz. Pb59/77); 3: gímszarvas agancsából készített harpuna töredéke (ltsz. Pb59/67); 4: csiszolt metamorfit kavics (ltsz. Pb59/76). Fotók: Magyar Nemzeti Múzeum terials were modified into tools.

The blank shape was determined during tool production rather than debitage. In addition to *ad hoc* tools, end-scrapers and armatures underwent more significant modification. Blades were segmented by microburin techniques besides intentional breakage. One tool class consists of pieces made on small, thicker supports, mainly end-scrapers, the other class contains small armatures, among them, we find backed bladelets, backed and retouched points, and geometric microliths, such as lunates and triangles. A significant proportion of the assemblage is typical tool or use-retouched piece, but poor in types serving as cultural markers. Based on the small, well-made end-scrapers, a straight-backed point reminiscent of a Microgravette, the backed armatures, together with the technological 'simplicity', as well as bone and pebble artefacts and mineral pigments together, the assemblage has a Late Palaeolithic character. However, certain technological traits, such as the microburin technique, as well as the presence of microliths, including geometric pieces (segments, triangles), characterise stone industries of the next epoch, the Early Mesolithic. In view of the above, Szekszárd-Palánk is defined as a Late Epigravettian Late Palaeolithic – Early Mesolithic transitional industry, which is consistent with the published stratigraphy of the site and chronological data. We further our discussion here with site use, regional (CB) and interregional (ECE) comparison, and evaluation.

Site use

Its excavator reconstructed a temporary waterside camp probably occupied in the summer (Vértes 1962). The basis of his assumption was the high proportion of tools among lithics, and the presence of multi-layer fireplaces, which could be cleaned seasonally from the mud of the previous year's flood. We examine these statements further here. The average thickness of the level containing the finds was 13 centimetres, and it showed no internal stratification. This cultural layer has been distinguished only by the vertically uniform scattering of archaeological finds within the loess layer. Apart from a minor fluvial sand intrusion in Profile 2, Kriván emphasizes the uniform accumulation of loess, which is not interrupted by signs of periodic flooding (Kriván 1962, 219). Based on the published stratigraphic data, it cannot be proven that the excavated area was periodically submerged, and thus that it had an impact on human settlement. To reveal the cause of the considerable vertical scattering of finds, new stratigraphic investigations would be needed at the site.

Following recent research in prehistoric pyrotechnology (Mallol et al. 2013; Mentzer 2014; Aldeias et al. 2016; Aldeias 2017; McCauley et al. 2020), the Palánk burnt spots can be interpreted as *in situ* hearths, the original layering of which was barely disturbed by human activity (e.g. sweeping) or subsequent taphonomic effects. However, these layers are not necessarily evidence of repeated use, but correspond to the ideal structure of campfires: white ash, underneath a black layer rich in combustion products, followed by the original surface, which has turned reddish due to the heat. Moving away from the heat source, soil burns less and less, and beyond the lower limit of 200 °C, rubification usually does not occur. The discoloured part of the soil is therefore usually trough-shaped and, depending on the pedological factors, can be detected up to a depth of approximately 6–8 cm from the surface (Aldeias et al. 2016). In an archaeological context, successive fires in the same place can be recognized by macroscopic methods if other types of sediment were deposited between the charcoal layers (Mallol et al. 2013). Isolating multiple firing events within a single burnt charcoal layer is a challenge even with modern microarchaeological methods (Mentzer 2014).

Two of the six burnt spots were examined in more detail (*Fig. 2*). Fireplace 5 appeared as an oval spot with a diameter of half a meter and could be traced to a depth of 12 cm. The bottom of its filling was coloured red, in the middle there was a 2–3 cm thick layer rich in charcoal, the uppermost layer contained little charcoal and was lighter in colour than the layer below. Fireplace 1, also 12 cm thick, was partially destroyed by mining after its discovery (*Fig. 3*). The remaining lower part was structured similarly to Fireplace 5, except it was 1 meter in diameter when it was found. The briefly described Fireplace 6 was a faint phenomenon, half a meter in diameter and 1–2 cm deep. Overall, there is not enough data to prove the repeated use of these features. Vértes' description and the drawing in the excavation log do not allow us to establish that the hearths were deliberately dug into the ground, or they were lit on the surface, and whether they belonged to the same surface level. In any case, in agreement with Vértes' view, Fireplaces 1–4 were located at approximately equal distances from each other, in an arched arrangement, so they probably followed the same spatial organizing principle. The area between them was free of finds, lithics and bones were located in the immediate vicinity of the hearths, but outside them. The technological and typological coherence of the collection further strengthens the assumption that the discovered archaeological phenomena are of the same age, at least in cultural terms.

Szekszárd-Palánk was located at the intersection of the Danube floodplain gallery forests and the more open hilly area, which could ensure a wide range of resource utilization. The location and size of the occupation, the quantity and composition of the find material, the number of hearths and the possible variety of activities indicate that the site was a temporary camp of a small, residentially mobile community (Binford 1980; Kelly 1995; Boschian 2003; Kozłowski, Kaczanowska 2004; Jochim 2006; Kind 2006; Mihailović 2007; Dolukhanov 2009; Grove 2009; Peresani et al. 2011; Pilaar Birch, Miracle 2015; Bertolini et al. 2016; Borić, Cristiani 2016; Neruda 2018; Pilaar Birch, Vander Linden 2018). Relative to the size of the excavated area, few lithics were found. Most of these are tools (23.9% in the 522-piece n_{rm} sample, 50.2% in the 249-piece n_t sample), which, based on the microdebitage and cores, were not all made here, but acquired their final form on the spot, or were curated there. The number of processing tools significantly exceeds. That of armatures, within which end-scrapers dominate. The combined presence of end-scrapers, flat pebbles and mineral pigment can be interpreted as a set of leather working tools (Brandt, Weedman 2002; Dubreuil, Grosman 2009; Cristiani et al. 2012; Trájer 2022). The proportion of armatures within the tools is relatively low (13 pieces, 10.4%). The small size of the armatures and the presence of geometric microliths indicate the use of a bow and arrow, which could have been a solitary hunting weapon suitable for aurochs, red deer and beaver living in the woodlands near the water's edge (J. K. Kozłowski 1999).

Compared to the size and possible functions of the site, the number of mammalian remains is small (NISP = 26), and the preservation is poor, probably due to taphonomic reasons. The proximity of the river, the harpoon fragment and the fish bones indicate the important role of fishing. The exact number of fish bones is unknown, László Berinkey identified 6–8 burnt pike teeth, a carp-like pharyngeal tooth, a fragment of a fish skull and 'many' fin rays (Vértes 1962, 197–198). Based on the body parts represented, the fish were brought to the camp whole, and eventually in the fire. In this case, the ethology of pike and various carp is not suitable for determining the time and methods of fishing (Cristiani, Borić 2016; Wierer et al. 2016). Today, they are fish species that live in stagnant and flowing waters, in both shallow and deep regions, and are accessible throughout the year in Hungary. The deer antler point can be a tool for spear-fishing or harpooning, which corresponds to the method of killing large fish species represented by the pike (Verhart 2000; Horváth, Ilon 2017).

Our interpretation of a seasonal camp resonates with Vértes's conclusions, the only significant difference being that repeated use of the area in a seasonal cycle cannot currently be proven by the structure of hearths and stratification. The composition of stone raw materials indicates intensive mobility between the Transdanubian Mountains and the southern lowlands, and towards long-distance raw material sources. The duality of the landscape use of the Palánk community can be observed. The diverse, partly exotic spectrum of lithic raw materials can be an indicator of mobility following herd animals in this period (Grove 2009; Lengyel 2018; Kegler 2021). At the same time, the small armatures and mammalian fauna composition are evidence of local hunting and fishing (J. K. Kozłowski 1999; Gurova, Bonsall 2014). In a similar dichotomy, the cooler climate of the YD generally supported more open habitats with a mosaic distribution, but the plant and animal remains from Palánk already indicate a deciduous forest and local ecological conditions built in a ribbon-like manner along the river (Magyari et al. 2019).

Szekszárd-Palánk in the context of the Carpathian Basin

One of the factors hampering the discovery of Szekszárd-Palánk's regional connections is the apparent lack of sites in the CB that belong to the LG (14.6–11.7 ka BP) or the early PG period (11.7–9.0 ka BP), based on absolute or relative chronology, and cultural aspects (Simán 1990; T. Dobosi 2005a; Lengyel 2008; Eichmann et al. 2010; Lengyel, Mester 2012; Lengyel 2016; Béres et al. 2021). For this reason, we review sites in a broader chronological context in the following. Chronological-taphonomic revisions of recent years have shown that practically none of the dates younger than 13 ka cal BP of the Palaeolithic sites in Hungary can be considered valid for the cultural phenomena they are supposed to date (T. Dobosi 1993; T. Dobosi 1999; Lengyel, Mester 2012;

Lengyel et al. 2021). The evaluation of sites that were discovered decades ago, appearing since then in reviews of Epipalaeolithic and Mesolithic in the CB, is dubious (Vértes 1965; Kertész 2002; T. Biró 2002; T. Dobosi 2005a). These are small collections without absolute ages, and clear stratigraphy, some of which were lost during the turbulent past century. Discoveries of recent years are yet to be published (Eichmann et al. 2010; Mester et al. 2014; Mester et al. 2015; Gutay et al. 2019; Gutay, Kerékgyártó 2019; Marton et al. 2021).

Among the supposed LG sites (*Fig. 5*), the only radiocarbon date of Nadap was measured from a bone in context, 13,050 ± 70 BP (GrA-16563), however, the stratigraphy, the cultural classification of the finds, and thus their relationship with the date are disputed (T. Dobosi et al. 1988; T. Dobosi, Szántó 2003; Verpoorte 2004; Lengyel, Mester 2012; T. Dobosi 2016; Lengyel et al. 2021). The Epigravettian sites around the town of Pilismarót also have a single radiocarbon date, 13,130 ± 100 BP (Hv-12988) measured from a mollusc shell at one of these sites, Pilismarót-Pálrét (T. Dobosi 2005b). This would date the lower find horizon of all the Pilismarót deposits, which, according to other scientific studies, is dated to the early post-LGM period (the so-called Ságvár phase). However, the radiocarbon sample was contaminated, resulting in a young date. The interpretation of the Arka-Herzsarét site's date of 13,230 ± 85 BP (GrN-4218) measured on charcoal taken from a hearth is also questionable. The sample comes from the lower find level, but the excavator also dated the upper find level with it. He considered the lithics of the two levels to be uniform and mentions the disturbance of the strata of the site by frost (Vértes 1964). This mixing may explain why the scattering of the Arka-Herzsarét dates between 13–18 ka BP (Lengyel 2008). According to new studies, the Lovas pigment mine was certainly used between 13.2–13.8 ka cal BP, during the Allerød (Sajó et al. 2015; Trájer 2022). However, the small find material is uncharacteristic in cultural terms (Lengyel, Mester 2012; Sajó et al. 2015). Among the Early Mesolithic sites of the CB, layer C of the Jászberény I site was dated to the Boreal using mollusc shells: 8,030 ± 250 BP (Deb-1666), the other Early Mesolithic sites do not yet have absolute chronological data (Kertész 2002).

Excavated and published sites dated to the investigated period but without absolute dates in the CB, are Hont-Templomdomb, Vác-Sződliget, Miskolc-Rózsás-hegy, and Pilismarót-Bánom's upper cultural layer. At the already mentioned sites around Pilismarót, two cultural layers were established (T. Dobosi 2005b). The upper layer directly below the humus is dated to the LG, to 'some Dryas' (T. Dobosi 2005b, 35, our English translation). It belongs to the Late Epigravettian in Dobosi's system, best preserved in Pilismarót-Bánom (n = 287 in the upper and lower layers together). In Miskolc-Rózsás-hegy the *in situ* lithic material (n = 222) was deposited in a loessy loam and the brown earth developed in its upper section. Thus, the finds in it can also be dated to the time of the formation of the loess layer. According to the excavator, the loess was accumulated during a period of the LG preceding the YD, which is also confirmed by the technotypological characteristics of the finds (Ringer, Lengyel 2001; Lengyel 2004).

The Vác-Sződliget I and II sites, approx. 200 meters apart, were excavated in 1954 and 1967 (Gábori 1968; Eichmann et al. 2010; Kraus 2011; Kertész, Király 2021; hereafter collectively Vác-Sződliget). The sites were documented on the low terrace of the Danube, close to the former riverbank, between stabilized dunes, disturbed by later earthworks. The 700 lithics in the 1954 excavation were found in the lower part of the humus and on top of the underlying fluvial sand. The finds were collected from the freshly opened sand surface, sifting the quarry backfill and from archaeological trenches. The 1967 excavation of approx. 1,250 finds were collected in similar ways. That year, in addition to the finds, the excavator uncovered stone structures preserved in their original location. The stratigraphic position and the investigations of the finds so far partially place the sites in the Boreal/Early Mesolithic period. However, three double-truncated bladelets (trapezes) can be dated either to the end of the Pleistocene (Dalmeri et al. 2004) or the Late Mesolithic (Marton et al. 2021). In any case, the disturbed context and incomplete documentation of the excavation call for caution regarding the typological evaluation of the artefacts collected with little stratigraphic control and the chronology based on it.

The Hont-Templomdomb site was excavated in 1955, on the former southern terrace of the Ipoly river (Gábori 1956). The artefacts were found in a yellowish-brown sandy layer, which was followed by aeolian sand layers in the trench excavated to a depth of 2.5 meters. 34% of the 573 recovered lithics proved to be tools; no other artefacts or features were observed. The excavator considered the aeolian sand below the find level of Allerød age, and based on its typological features, he defined the find material as Epipalaeolithic, in which he believed to have discovered both local (Epi)Gravettian and northern Swiderian elements. A verification excavation in 2011 confirmed Gábori's stratigraphic observations, but it was not conclusive concerning the Epipalaeolithic classification of the artefacts (Péntek, Zandler 2016).

Based on stratigraphic and typological considerations, the following four sites in the GHP are of LG age, although they may be older than Palánk: Kunadacs-Köztemető, Jászberény-Nevada-tanya, the upper layers in Jászfelsőszentgyörgy-Székes-dűlő and Jászfelsőszentgyörgy-Szúnyogos (T. Dobosi 1993; Kertész 1996a; Kertész 1997; T. Dobosi 1999). A common feature in these is that the finds were identified in the layers below the recent humus: on the top of reddish aeolian sand (Kunadacs-Köztemető), and in the upper part of the brown sandy soil (Jászberény-Nevada-tanya), and on top of the loess (Jászfelsőszentgyörgy-Szúnyogos). The exact age of the finds cannot be established, and they are not culturally distinctive either. Nevertheless, they indicate the presence of human groups in the northern GHP in the last phase of the Pleistocene; this region, the Jászság and the neighbouring southern Heves county show Upper Paleolithic and Mesolithic occupation (Kertész 1993; Kertész 1994; Kertész 1996a; Kertész 1996b; Kertész 2002; Kertész 2005; Gutay, Kerékgyártó 2019; Gutay et al. 2019; Szegedi et al. 2023).

Stray finds in Transdanubian peatlands conclude the list of possible LG cultural remains. The specimen from Csór-Merítőpuszta is lost, so it is only known from publications (Marton et al. 2021). Two other specimens, on the other hand, have been directly dated in recent years. The age of the Nádasdladány piece is 9160–8700 calBC (Poz-25427) (Marton et al. 2021). The harpoon from Mezőlak-Szélmező was made from a compact part of the antler stem of a deer (*Cervidae*), dated 11777–11506 cal BC (DeA-4878) (Horváth, Ilon 2017). In addition to the typological similarities and differences, these finds are good analogies for Palánk in terms of the landscape use of the region, presumably at the same time.

The study of regional connections is also hampered by the unfavourable conditions of the Szekszárd-Palánk sample for technological and typological comparative studies. The original extent of the occupation is unknown, together with the representative value of the collection. There are few intact armatures in the tool assemblage that can be used as cultural markers (Sauer, Riede 2019; Ivanovaitė et al. 2020). Regarding technology, core initiation and the early reduction took place outside the excavated area, as indicated by the few larger blanks. Without exception, the Palánk cores are considered exhausted, erasing traces of earlier, more regular knapping methods of the operational chain, which are more suitable for comparative studies.

The distinct site function of Palánk and the specific paleoecology of the southern CB may result in the processing tool-dominated lithic assemblage slightly different from contemporaneous East-Central European industries. It can be said with great certainty that the site was located in an ecozone different from the northern steppe, the southern mountains (Dalmatia, Croatian Zagorje), but also from the mid-mountains of the CB and the plains of the northern GHP (Magyari et al. 2014; Magyari et al. 2019; Sümegi et al. 2019; Sümegi et al. 2022). Exploiting a different landscape may have required a different set of tools. The relationship between armatures, prey animals and their ecological niches seems to be different from region to region. The few point types in Palánk may be the result of a specific combination of these land-use elements, or insufficient data from the partially excavated site (Jochim 2006; Mihailović 2009; Peresani et al. 2011; Visentin et al. 2016; Hauck et al. 2017; Kitagawa et al. 2018; Serwatka 2018). In the former case, either such tools were not manufactured, or they were removed from the camp. Since we are not aware of any other collection of the same age in the micro-region, we have to leave this question open, and we consider the current typological composition to be representative.

The preponderance of processing equipment is not an unprecedented phenomenon. Vértes and others considered Palánk the survival of the local Ságvárian (Early Epigravettian), dated roughly to the LGM (Gábori 1959; Vértes 1965; T. Dobosi 1972; Lengyel 2010; Markó 2017). Ságvárian is characterized by the use of pebble raw material, which influenced knapping technology and tool typology, i.e. the dominance of end-scrapers on small flakes and blades. In some sites, burins occur in large numbers, a dissimilar trait in comparison to Palánk. At the Szob site, most of the burins are *ad hoc* pieces on breaks (Markó 2007; Lengyel 2011a), and in Ságvár, they also served as cores (Markó 2017). The proportion of backed bladelets varies: there are few of them in Szob and Mogyorósbánya, but many in the eponymous Ságvár. Gravettian armature types are underrepresented (Markó 2007; T. Dobosi 2016; Lengyel

2018). Bakony radiolarites were used to a large extent at Ságvár, just like at Palánk. The opportunistic, intensive core reduction resulting in both flakes and blades, the presence of splintered pieces, the use of soft and hard hammers, and the deliberately small supports are also similar features (Lengyel 2011b; Lengyel 2018). However, the two industries are separated by millennia, rendering their genetic relationship, or the lack of that, speculative.

Among the post-LGM sites listed above, Vác-Sződliget and Hont are comparable to Palánk. Based on the published data, it is not possible to reconstruct the knapping methods used in detail at these sites. In their preliminary study, Eichmann and his colleagues emphasize that flakes prevail among the Vác-Sződliget blanks. Flakes were made from local raw materials, blades from better-quality Transdanubian radiolarite; the numerous splintered pieces can be linked to anvil methods; the microburin technique is present. Unipolar microblade cores, peripheral (anvil?) cores, small arched end-scrapers, and curved backed bladelets are presented on the published plates, together with three trapezes, probably of Late Mesolithic (Eichmann et al. 2010, 221). Overall, the find material is reminiscent of Palánk's, although the latter contains several regular lamellar elements. Another difference is the small number of tools in Vác-Sződliget, as well as the raw material management that relies predominantly on local pebbles. The stratigraphic position of the two sites is different, Palánk was located on the Pleistocene II/a terrace, and Vác-Sződliget can be connected to the early Holocene first terrace.

In the case of Hont-Templomdomb, raw material terms of the original publication are hardly compatible with the present nomenclature, hindering comparison (Gábori 1956). The proportion of tools in the small assemblage is high as in Palánk; based on the published drawings, blades and microblades in the size range comparable to Palánk, were detached from rejuvenated unipolar and bipolar cores. The end-scraper types, some of the backed bladelets and the small number of microlithic tools and burins are also comparable to Palánk. Typological differences are the more points, including proper Microgravettes, thus the use of basal-ventral retouch. A more accurate comparison of the two assemblages requires a revision of the Hont-Templomdomb collection.

Layer C of the Jászberény I site is dated to the Boreal, it is the earliest dated Mesolithic occurrence in Hungary to be compared to Palánk (Kertész 1996a; Kertész 2002). Both sites were located at the intersection of different environments, but Jászberény I was located within the periodically flooded paleo-Zagyva floodplain. The microlithic Jászberény industry used flakes and blades for tool production. Processing tools are dominated by end-scrapers on flakes or squat blades. The armatures are backed points and truncated blades, geometric microliths, among which triangles and segments occur, and also a Sauveterrian point. Most lithics are local, Mátra limnic silicites, and exotic raw materials hardly occur. As expected, the Palánk assemblage differs from the Jászberény I material. There, larger blanks are more frequent, geometric microliths are few, their type spectrum is restricted, and the amount of regional and exotic raw materials is much higher. From a purely technotypological point of view, Palánk, Vác-Sződliget and Jászberény I show the microlithization trend typical of East-Central Europe between the YD and Boreal ages. In these three sites, trends of shrinking raw material acquisition territories, opportunistic core reduction, microlithization and the shift of standardization from debitage to retouch can be observed.

Szekszárd-Palánk in the context of Eastern Central Europe

The interregional comparison is conducted according to the exotic lithic raw materials present at the site (*Fig. 5*). The siliceous raw material deposits along the Prut, located approximately 700 kilometres to the northeast, can be connected to the Podolian Upland, which gradually merges into the Black Sea Lowland in the south. Concerning the YD, in the northern part of this area, local varieties of the TP Technocomplex, traces of the Swiderian and Krasnoselye cultures are known (Zaliznyak 2006; Stepanchuk et al. 2009; Stepanchuk, Sapozhnikov 2010; Łanczont, Madeyska 2011; Anghelinu et al. 2018; Bobak, Połtowicz-Bobak 2018). The different tanged points and the corresponding regularized blade debitage are technologically and typologically different from the Szekszárd-Palánk find (Migal 2007; Stefański 2017; Serwatka 2018). In the Prut and Bistrița valleys, in today's eastern Romania, Anghelinu and his colleagues reconstruct the migration of the Epigravettian during the LG. At the same time, they note that at almost all sites in the region, Epigravettian-type artefacts are known in the uppermost loess, directly below the Holocene soils (Anghelinu et al. 2018, Anghelinu et al. 2021). In the lowland areas of the region east of the Carpathians, regular, prism-shaped blade and lamellar core processing industries are present during this period. In addition to the tools typical of the local Late Epigravettian (LG – early PG), however, the armature here consists of geometric microliths (Dolukhanov, Shilik 2007). The early stages of the Crimean Shan Koba culture are characterized by lunates and double-truncated points or trapezoids, and the use of the microburin technique is also documented (Biagi 2016). Some consider the Bilolisja culture spread in the Danube and Dniester regions to be a part of the Shan Koba, where, in addition to the lunates, arch-backed points and trapezoids also appear (Biagi, Kiosak 2010). Among the armatures of the Rogalik-Tsarnika and Zimovniki facies of the steppe between the Dniester and the Don, we find large-scale trapezoids (Djindjian et al. 2006; Kitagawa et al. 2018).

The Szekszárd-Palánk lithic technology and support preferences differ from those of the industries listed here, and the similarity of the processing tools is limited to the general features of the Late Epigravettian. The Bilolisja culture shares several typological features with the Palánk material, such as the design of end-scrapers made on flakes and blades, the small number and atypical forms of burins, the dominance of lunates, and the presence of arch-backed pieces among the microliths. The only absolute date for the culture is 8900 ± 190 BP (Ki-10886, bone), but its other occurrences may be earlier (Biagi, Kiosak 2010).

There is only one erratic flint end-scraper from beyond the northern range of the Carpathians in the collection, but the significant amount of limnic silicites from northern Hungary indicate this direction of connections. In the Northwestern and Northeastern Carpathian region, local versions of the TP Technocomplex and the ABP Technocomplex are present in the Allerød and YD (S. K. Kozłowski 1999; Kabaciński, Sobkowiak-Tabaka 2010; Burdukiewicz 2011; Valde-Nowak et al. 2013; Stefański 2017; Płonka et al. 2020; Połtowicz-Bobak 2020; Sobkowiak-Tabaka 2020). The technology and typology of the Palánk assemblage are comparable to the ABP industries (Tarnowian, Witowian, Federmesser). Technological similarities are the use of a hard hammer, the light striking platform preparation with one blow, the rotation of the cores during reduction, and the use of small blades and flakes as tool supports (Sulgostowska 2006; Kabaciński, Sobkowiak-Tabaka 2010; Kwiatkowski, Masojć 2011; Valde-Nowak, Kraszewska 2014). The use of the microburin technique is also documented (e.g. Kwiatkowski, Masojć 2011). Typological similarities are the preponderance of end-scrapers made on small, often chunky flakes, the variable frequency of burins in the assemblages, and the small arch-backed or straight-backed tools. The large backed points and truncated-backed pieces featuring ABP (Sobkowiak-Tabaka 2020) are not the characteristics of Palánk material. Most of the ABP sites in the region are poorly dated, and in many cases, they surface finds, thus their evaluation is still problematic. According to the available dates, these mentioned cultures were certainly present in the Northwestern and Northeastern Carpathians during the Allerød and YD periods. In the northern Subcarpathian region, sporadic occurrence of the so-called Epimagdalenian, a continuation of Magdalenian, is encountered in this period (Monik, Pankowská 2020; Połtowicz-Bobak 2020; Reade et al. 2020), mainly from Layers 4–3 of the Kůlna Cave in the Czech Republic (Nerudová, Neruda 2014). This industry is characterized by the frequency of short end-scrapers, the high frequency of backed bladelets within the armatures, and the presence of arch-backed bladelets, small triangles and trapezoids (Valoch 1980; Valoch 1996). Its typology is therefore similar to the Palánk assemblage, except for the small trapezoids.

Due to the presence of southern radiolarites and the geographical location of the site, the question of Szekszárd-Palánk's Balkan connections seems feasible. In the southern regions close to Palánk with similar ecological characteristics (Szerémség/Syrmia, Drávamenti-síkság/Drava Plain, Bácska/Bačka, Bánát/Banat), few reliable archaeological sites are known from the YD and Preboreal periods (Komšo 2006; Šarić 2008; Mihailović et al. 2011; Mihailović 2014; Živaljević et al. 2021). Several sites of the same age in the more distant Balkans and the Adriatic region are located in rock cavities in karst regions, which is a different ecological situation from Palánk. Still, the assemblages show similarities. The Palánk tool manufacturing strategies are comparable to the Late Epigravettian and Early Sauveterrian technologies of the eastern Alpine foreland and the Po plain. By the final stage of the local Epigravettian (13–11 ka BP), core reduction became simple and opportunistic, resulting in both small-sized flakes and blades/bladelets, and the standardization of supports did not occur during reduction, but in the tool-producing phase (Montoya 2002; Montoya 2008; Duches et al. 2014; Tomasso et al. 2014; Tomasso 2016; Naudinot et al. 2017; Duches et al. 2018; Tomasso et al. 2020; Peresani et al. 2021; Ruiz-Redondo et al. 2022). Microburin techniques were known (Duches et al. 2018; Fasser et al. 2022). Lithic technologies described in Early Sauveterrian sites are similar to the methods and their sequence of application observed in Palánk. The presence of 'burinlike cores' on chunks and flakes, centripetal reduction, and anvil techniques in these industries should be highlighted from this perspective. (Broglio et al. 2006; Fontana et al. 2016; Visentin et al. 2016; Wierer et al. 2016). In terms of tool types, common features with contemporaneous industries in northeastern Italy are the presence of small, short and stout end-scrapers, thumbnail end-scrapers, and the use of arch-backed microliths. Shape variability of the armatures is also a similar element. Microgravette-like points, elongated lunates and other arch-backed pieces are present in the Palánk assemblage as well, but the double-backed narrow Sauveterrian points and the double-truncated bladelets (trapezoids) of the Final Epigravettian are missing (Montoya 2008; Peresani et al. 2011; Bertolini et al. 2016; Tomasso 2016; Duches et al. 2018).

There is also a strong technological and typological similarity between the Palánk assemblage and contemporary Balkan industries. In the case of sites covering several periods, layers IX and VIII of Crvena Stijena, layers VIII-V of Medena Stijena, and layer II of Trebački Krš, dated to the Final Epigravettian, can be mentioned as an analogy (Mihailović 2009). The simplification of core reduction methods similar to the Italian cases is attested in the Balkan deposits with a long sequence of layers (Mihailović 2001; Komšo 2006; Mihailović 2009; Karavanić et al. 2013). Detachments were rarely prepared to a significant extent, both hard and soft percussion techniques are present, and the cores are subjected to intensive reduction with single, double opposite or more debitage surfaces. Anvil core techniques were relatively common in some sites (e.g. Šandalja II, Kopačina, Vlanko, Odmut, Climente II) (J. K. Kozłowski, S. K. Kozłowski 1994; Karavanić et al. 2013; Vukosavljević et al. 2014; Bonsall et al. 2016; Vukosavljević, Perhoč 2017). Due to these latter techniques, the proportion of flakes and fragments among the debitage is more pronounced here than in the Italian examples. The microlithization of the toolkit in this region is also associated with the spread of the microburin technique and the intensive transformation of supports (e.g. Mihailović 2001; Vukosavljević et al. 2011). The typological characteristics of the Final Epigravettian of the Balkans are the co-occurrence of squat end-scrapers and thumbnail end-scrapers, geometric microliths (segments and triangles) and arch-backed ('Azilian') points - similar to the Szekszárd-Palánk material (Montet-White, Kozłowski 1983; Komšo, Pellegatti 2007; Mihailović 2008; Mihailović 2009; Boroneanţ 2011; Karavanić et al. 2013; Bonsall et al. 2016). The tool spectrum is similar in this region, but the ratio of each type varies, especially in the case of armature types. Parallel to the increase in the proportion of geometric microliths in the sites with considerable stratigraphy, a gradual decrease in the proportion of Epigravettian armatures – Microgravette points and backed bladelets – can be observed (e.g. Šandalja II, Karavanić et al. 2013). Arch-backed blades and points are hardly found in the toolkits in several instances, and among the geometric microliths, lunates, triangles and trapezoids are unevenly represented from case to case. Moreover, some collections are almost completely devoid of these microliths or the entire group of armatures (e.g. Kopačina – Čečuk 1996; Rastuša – Jovanović et al. 2014; Vešanska Peć, Nugljanska – Komšo, Pellegatti 2007; Vukosavljević, Perhoč 2017). A large number of burins are found in some sites (e.g. Vešanska Peć, Pupicina – Komšo, Pellegatti 2007), in others they are hardly present (Šandalja B – Karavanić et al. 2013; Crvena Stijena – Mihailović 2009; e.g. Vlanko – Vukosavljević et al. 2014). The amount of simple retouched flakes and bladelets is usually high.

In the Iron Gates region, YD archaeological sites are remarkably infrequent, which, according to Bonsall et al. (Bonsall et al. 2016), reflects peculiar ^{14}C sampling rather than the real situation. The Final Epigravettian/Clisurean (Allerød and perhaps YD) and Epipalaeolithic/Early Mesolithic (early Holocene) finds from here provide further strong parallels to Szekszárd-Palánk (Boroneanţ 2011; Bonsall, Boroneanţ 2016; Bonsall et al. 2016; Cârciumaru, Niţu 2018). The most relevant Climente II and Cuina Turcului sites were located next to the Danube, at the intersection of several habitats, which were all visited by the people living there based on the composition of the hunted fauna. Based on nitrogen isotopic analysis of bone harpoons and hooks, fish bones and human remains found in Cunia Turcului, the local ichthyofauna was considered a food source. The lithic industry produced bladelets and small flakes from poorly prepared cores, partly using anvil techniques. The tool type spectrum includes stubby end-scrapers, backed pieces, including bladelets, Gravette and Microgravette points, and arch-backed microliths, such as lunates. Red ocher and hematite lumps, as well as pebbles (and other tools) bearing such pigment, are mentioned in the Cliemente II material (Bonsall et al. 2016).

Thus, the appearance and composition of the find material are fairly similar to the Szekszárd-Palánk assemblage. Differences include the prominence of the ibex in the fauna, the large number of decorated bone tools, especially in the Epipalaeolithic, and the presence of Gravette and Microgravette points among Clisurean finds. However, the definition of the Gravettian elements was based on the typology of Sonneville-Bordes and Perrot, and accordingly, pieces that do not bear a secondary aligning retouch on the basal or the distal section are named Gravette points in the figures (e.g Boroneanţ 1970, Fig. 2).

The reasons for regional differences within the Balkans are disputed (S. K. Kozłowski 2001; Mihailović 2007; Mihailović, Mihailović 2009; Miracle et al. 2010; Mihailović et al. 2011; Gurova, Bonsall 2014; Borić, Cristiani 2016; Hauck et al. 2017; Pilaar Birch, Vander Linden 2018; Mihailović 2021). A prevalent obstacle in their understanding is the small number of well-dated sites, which are usually explained by research-historical developments and taphonomic reasons. It is also challenging to interpret typological diversity that often has a low correlation with environmental changes or geographically defined cultural units. Certain sites in Dalmatia exemplify this situation, where the LG Epigravettian and early Holocene Mesolithic lithic industries are essentially distinguished only by their stratigraphic position (Mihailović 2007; Vukosavljević et al. 2011; Vukosavljević et al. 2014). At the same time, throughout the region, the typological composition of certain assemblages close to each other in time and space differs substantially. This discrepancy can be the result of different site functions, and landscape use including hunting strategies, but often such correlations cannot be recognized in the finds (Nugljanska – Pilaar Birch, Miracle 2015; Crvena Stijena – Mihailović 2009, 96–98; Odmut – Hauck et al. 2017).

Evaluation

The geographical location, age and cultural characteristics of the Szekszárd-Palánk site represent the transition in the taxonomy that divides Europe into two large regions during the LG and early Holocene. In the region to the north and west of the Carpathians, an opportunistic lithic technological approach is encountered during the Bølling-Allerød interstadial. During the YD, on the other hand, specialized blade production methods became common there, resulting in carefully worked points. These armatures were used to kill large herd animals moving in open vegetation (Baales, Street 1996; S. K. Kozłowski 1999; Migal 2007; Kwiatkowski, Masojć 2011; Bracco, Montoya 2015; Naudinot et al. 2017; Serwatka 2018; Tomasso et al. 2018; Jacquier et al. 2020). To the southwest, south and east of the CB, such complex blade technologies are not characteristic in the YD and early Preboreal, but the process of 'technological simplification' or 'Azilianization' continues (S. K. Kozłowski 1999; Mihailović 2001; Duches et al. 2014; Tomasso 2016; J. Peresani et al. 2021). In this period, the tool spectrum is enriched with geometric microliths in addition to earlier Epigravettian types, which in many cases can be related to the afforestation of the region, with its specific prey animals, and the solitary hunting methods suitable for killing them (J. K. Kozłowski 1999; Mihailović 2008; Miracle et al. 2010; Peresani et al. 2011; Karavanić et al. 2013; Duches et al. 2014; Gurova, Bonsall 2014; Bertolini et al. 2016; Bonsall, Boroneanţ 2016; Naudinot et al. 2017; Kitagawa et al. 2018; Jacquier et al. 2020). The Szekszárd-Palánk site is situated between these two regions, with a closer affinity to the southern one in its technology and land-use.

Along the temporal axis, in the light of its stratigraphy and presumed absolute age, Szekszárd-Palánk is Late Palaeolithic, but its geometric microliths already indicate the following Mesolithic epoch. If the assemblage had been found in Holocene sediments, we would define it as Mesolithic industry, which underlines the notion that the Pleistocene-Holocene boundary, at least in the CB, does not necessarily coincide with a taxonomic dividing line between the Palaeolithic and Mesolithic (e.g. Bonsall, Boroneanţ 2016; cf. S. K. Kozłowski 2001; Borić, Cristiani 2016). Along the geographical axis, based on the technological and typological characteristics, the assemblage may belong to the ABP Technocomplex. In this case, it can be defined as a regional unit, which shows typological similarities with the Witowian group in Poland (Bobak, Połtowicz-Bobak 2018; Pyżewicz et al. 2020; Valde-Nowak, Kraszewska 2020) and the Epimagdalenian in the Czech Republic. The use of northern regional and long-distance lithic raw materials can support this classification. Perhaps more compelling arguments are in favour of Szekszárd-Palánk being a representative of the Epigravettian technocomplex known to the south of the site. The knapping methods, flake and chunk components in the debitage, and the tool type spectrum are comparable to Balkan assemblages of the same period, as well as the non-knapped finds. The location of Palánk in southern Transdanubia, as well as the presence of Mecsek and southern radiolarites also bring the material close to the 'southern' Epigravettian taxon. However, the find assemblage is modest and contains few characteristic types that would 'book' the industry on one side or the other. The research-historical reason for this boundary situation may be that the Hungarian archaeological record did not play a decisive role either in the creation or in the discourse of interregional models (Sauer, Riede 2019), due to the paucity of well-dated sites from the LG in the CB. At the current stage of the research, we cannot determine whether the analogies described here have a cultural, ethnic, functional or other meaning. The significance of belonging to the peripheral area of a technocomplex is therefore uncertain for us today.

In our revision, we argue that Szekszárd-Palánk attests to a local tradition with extensive connections. Several LG to early PG sites are known in the literature, which can prove human presence in the CB. These are the so-called upper levels of Jászfelsőszentgyörgy-Szúnyogos, Jászberény-Nevada-tanya, Kunadacs-Köztemető, Pilismarót-Bánom; Hont-Templomdomb, Miskolc-Rózsás-hegy, Jászberény I, and, as a result of more recent research, Erk 1, Páli-Dombok and Lovas. We do not assume a genetic relationship between these sites. Their presence merely supports the fact that the CB could have been inhabited during the LG period, thus we assume the most parsimonious interpretation, a local origin of the Palánk community, which seems to be confirmed by its lithic raw material economy. The intensive use of radiolarites from the Mecsek and Bakony mountains indicates that the Palánk knappers were well aware of, or most familiar with the resources available in Transdanubia in a radius of approximately 120 kilometres. The presence of long-distance raw materials, as well as the northern and southern analogies established earlier, further expand the site's interregional network of connections. It seems that the communication between the areas located on both sides of the Northwestern Carpathians was not interrupted even after the LGM, in which the large river valleys certainly played an important role (Béres et al. 2021; Łanczont et al. 2021).

This assumption does not contradict the theory that the archaeological culture called in Hungarian, Czech, Slovak and Polish research Late Epigravettian (20–16 ka BP) left the CB towards the north following the cold-loving Pleistocene megafauna at the beginning of the LG and contributed to the development of the APB Technocomplex (Anghelinu et al. 2021; Béres et al. 2021; Kaminská 2016; Lengyel et al. 2021; Magyari et al. 2022). We hypothesize that industries similar to the Late and Final Epigravettian industries of the northern Balkans and northern Italy were present in the CB during the LG.

The Palánk lithic assemblage corresponds to the typological definition of the Epigravettian of the CB, according to which it is characterized by the varied armature and the small number or absence of classical Gravettian types (Lengyel 2016; Lengyel 2018). The size of the supports in the Palánk material and the technique of their production differ from those described in the Late Epigravettian in Hungary, and the proportion of exotic lithic raw materials is also smaller. In addition, these sites are earlier than Palánk (Béres et al. 2021; Lengyel et al. 2021). However, our comparative study established considerable similarities between the Late or Final Epigravettian technocomplex in Southeastern Europe and Szekszárd-Palánk, and their assumed age is also similar. This leads to a taxonomic paradox that the Palánk material can be both Late Epigravettian (in the 'southern' sense – i.e. the chipped stone industries called by this name in north-eastern Italy, the Adriatic area and the northern Balkans; GI-1, GS-1 and early PG age) and not (in the 'northern' sense – i.e. due to the apparent relocation of this culture out of the CB in the LG).

More important than the confusing nomenclature, however, is the assumed difference in landscape use assigned to these northern and southern taxa, which can be detected in the different development of their lithic industries. The 'northern' Late Epigravettian may represent the toolkit of highly mobile groups of people who specialized in felling large Pleistocene herd animals such as reindeer, horses and mammoths. As the tundra belt supporting such animals moved northward, these human groups also left the CB (Costamagno et al. 2016; Puzachenko, Markova 2019; Magyari et al. 2022). Conversely, the diverse toolkit of the 'southern' Late Epigravettian was used to manage the diverse fauna of the ecological refugium zones in southern Europe, such as red deer, ibex, wild boar and aurochs (Sommer, Nadachowski 2006; Pilaar Birch, Miracle 2015; Puzachenko, Markova 2019; Sommer 2020). In the CB, the gradual climate change following the LGM resulted in the formation of a mosaic ecosystem with the spread of temperate and boreal forests. As a consequence, conditions similar to the Balkan refugium zones may have developed in the southern part of the basin, which may have favored various adaptations of communities belonging to the 'southern' Epigravettian technocomplex (J. K. Kozłowski 1999; Miracle et al. 2000; Boschian 2003; Bertolini et al. 2016; Duches et al. 2018; Pilaar Birch, Vander Linden 2018; Peresani et al. 2021). In this latter context, Szekszárd-Palánk can be perceived as a settlement of people coming from the south, or groups of local origin that adapted to new environments. Since the site has no direct antecedents in both time and space, neither hypothesis is stronger than the other.

Early Mesolithic sites following the time of Palánk attest to the continuity of settlement in the CB. The techno-typological similarity between the probably partly Preboreal Vác-Sződliget and Palánk is perhaps more than a coincidence and requires further research. In addition, the Palánk microliths represent a logical connection with the early Holocene lithic industries. However, this connection is not necessarily specific either, as the general Central European trends of 'technological simplification' and microlithization seem to be fulfilled in the assemblages of the region. Significant differences can be observed in other characteristics, for example, the lithic raw materials available in the immediate vicinity dominate the Early Mesolithic assemblages.

Taking all of this into account, we define Szekszárd-Palánk as a Late Palaeolithic–Early Mesolithic *transitional industry*. The industry may be of local origin, but in light of the few Hungarian sites of a similar age, it cannot be established that 'local' in this case means the CB or the northern part of the Balkans. However, we do not aim to create another 'culture' based on a single site. The *transitional* indicator shows that in the current research system, the finds bear the characteristics of several archaeological cultural units, from the north and the south, from here and beyond the Pleistocene-Holocene border. With the definition of *industry* instead of 'culture', we draw attention to the fact that the findings of the CB thought to be of a similar age should be subject to revision based on Szekszárd-Palánk, and supplemented with new research if possible. In this way, the vast area between Szekszárd and the borders of Hungary can be integrated into the archaeological and cultural space of Central Europe at the end of the Palaeolithic, and after that, the cultural and cultural taxonomic status of Palánk can be re-examined.

Finally, for the Hungarian archaeological nomenclature of the LG period (Bølling, Allerød, YD) of the CB, we propose the term 'Late Palaeolithic' as the last stage of the Upper Palaeolithic. The term 'Late Upper Palaeolithic' is more complicated (at least in Hungarian), and it is a period already delimited in the international system (EUP–MUP–LUP). The term 'Epigravettian' is now extremely loaded in Hungarian research, and has recently been applied to cultural phenomena of earlier periods (Lengyel et al. 2021). 'Late Glacial' may also be obvious, but it is not an archaeological term, so its use would be not consistent - although it is suitable as a synonym to avoid repetition. Late Palaeolithic is a widely used term in Central Europe, it has a history in Hungarian research (Gábori 1964; Lengyel 2004), it lacks a strong cultural connotation, and fits in the Palaeolithic-based classification. A possible variant is the 'Final Palaeolithic'. We still recommend the apt term 'Mesolithic' as the archaeological epoch name for the PG period between the Palaeolithic and the Neolithic. Within this, the Early Mesolithic corresponds to the Preboreal, and the Middle Mesolithic corresponds to the Boreal periods. Within this period, we do not recommend the distinction between the Epipalaeolithic and Mesolithic industries, as this is based on cultural features that vary from region to region in Europe, and also largely depends on the archaeological evaluation of the eras preceding and following the era.

Summary and conclusions

Szekszárd-Palánk, found in the southern part of the CB, along the middle course of the Danube, is a settlement of an LG, most probably YD age, so far the only excavated, dated and published domestic *in situ* site from this period. The site was explored by László Vértes as part of a rescue excavation between 1957 and 1960 and was examined using methods that were considered thorough at the time. Most of his results can be said to be valid to this day, the revision carried out here differs from his findings mainly in the period of use and in the typology of stone tools. Our detailed technological study complements our knowledge of the site. We summarize our assumptions developed during the revision on a local, regional and interregional scale.

In the ecological mosaic of southern Transdanubia, Palánk is located in an area with versatile potential for exploitation. The pediments of the Szekszárd hills and the meadows bordering the Danube were suitable for hunting, and the ichthyofauna of the surrounding marshland and the river were accessible all year round. The spatial organization of the excavated part of the occupation is uniform, and we consider it an example of residential mobility, where several activities took place. The finds include processing tools, mainly small end-scrapers, which, together with the ocher lumps and pebbles with a polished surface, were probably accessories for leather processing. The proportion of armatures is relatively high (14%), although the number of geometric microliths and backed points is small. The poorly preserved animal bone material consists of the remains of deer, elk, and beaver, as well as burnt fish bones and a harpoon or point made of antlers, which also indicate fishing. The Szekszárd-Palánk lithic industry reflects an opportunistic core reduction strategy, which resulted in the maximum exploitation of the available raw material. The industry attests to a technology characteristic of the last phase of the Epigravettian of Southeastern Europe, and its typological picture is also similar. Types indicating archaeological cultures are poorly represented and varied, so the Palánk assemblage cannot be assigned to a known archaeological taxon. The knapped lithics, the stratigraphy, the faunal material, and the single radiocarbon date together date the site to near the beginning of the Holocene, but still to the Pleistocene age. In the southern and eastern part of the region, this corresponds to the Final Epigravettian or Early Mesolithic (J. K. Kozłowski 1999; S. K. Kozłowski 2001; Bonsall, Boroneanţ 2016; Tomasso 2017; Mihailović 2021; Peresani et al. 2021), and the ABP Technocomplex and Epimagdalenian in the northern part of the region (S. K. Kozłowski 2001; Burdukiewicz 2011; Płonka et al. 2020; Sobkowiak-Tabaka 2020; Nerudová et al. 2021). In the archaeological nomenclature of the CB, there is currently no name for the LG period (14.7–11.7 ka BP), we suggest the term Late Palaeolithic.

Regional connections of Szekszárd-Palánk are attested by the raw material composition of the lithic material. The high proportion of Bakony radiolarites and Cserhát limnic silicites indicate a community familiar with the northern part of the CB. Initial phases of lithic reduction for all raw materials took place outside the site, the small size of the collection and the high proportion of typical tools also indicate that the Palánk spot was an element of a more extensive settlement system. The ecological corridor of the Danube could have been a manifest route, perhaps it is no coincidence that analogues of the assemblage are located along or near the river (Vác-Sződliget, Hont-Templomdomb, Iron Gates). The pigment mine in Lovas may also have been active during the time of the Palánk occupation, close to the raw material sources in Bakony, and the presence of ocher lumps is a possible point of connection between them. Since there are no sites in the CB dated to the YD with certainty, we cannot establish a regional model of landscape use. Currently, a connection is assumed between the mid-mountains of the basin and the more plain regions during the Late Palaeolithic. The former area was certainly suitable for the acquisition of raw materials for tools and paints, and the latter was used for a wide range of environmental exploitation.

In a taxonomic sense, Szekszárd-Palánk plays a connecting role between the Balkans and the Northwest Carpathians. This relationship has a significance that goes beyond nomenclature. The internal structure of the site and its finds fit into the assumed picture of small, mobile groups of the YD. Concerning the southern aspect, due to its geographical location, Palánk had access to the Danube corridor and the Drava Plain. From an ecological point of view, it belonged more to the southern plains than to the Hungarian mid-mountains. The techno-typological features of the industry match the Late Epigravettian in Southeast Europe, and the light presence of southern radiolarites also assumes Balkan connections. The pronounced presence of raw materials from the Cserhát and Bakony mountains, and the erratic and Prut flints point to northern connections. The varied lithic raw material spectrum is characteristic of the Late Palaeolithic and differs from the early Holocene Mesolithic industries of Central Europe and the Balkans, in which, in addition to the simplification of technology, the proportion of long-distance raw materials significantly decreases (J. K. Kozłowski 1999; Sulgostowska 2006; Stefański, Wilczyński 2012; Borić, Cristiani 2016; Vukosavljević, Perhoč 2017). At the same time, the assemblage also carries the technological and typological characteristics of the CB Mesolithic industries form the Boreal and can be interpreted as a partial prototype of them. We, therefore, consider Szekszárd-Palánk to be a Late Palaeolithic–Early Mesolithic *transitional industry*.

With its southern geographic location and raw materials from the northern part of the CB, the site supports all of the three mobility theories raised in the introduction, it can signal northern, southern or local origins. Based on our review, we consider the third theory to be the most plausible. Its presence attests to the cultural mosaic of the CB, with the survival of a local (taxonomically 'southern') Epigravettian tradition (Kertész 1996a; S. K. Kozłowski 2001; Kertész 2002; Tomasso et al. 2020; Mihailović 2021; Ruiz-Redondo et al. 2022). In addition, it exemplifies the prominent role of the Danube in the communication between Central Europe and the Balkans (Borić, Cristiani 2016; Łanczont et al. 2021). In our opinion, the paucity of sites around the Holocene time limit in the CB is the result of research history bias and taphonomic peculiarities and does not reflect the real settlement structure. The LG–Early Holocene archaeological sites discovered in Hungary during the last two decades are located near floodplains, on slightly raised loess or sandy surfaces. The Páli-Dombok site, found in 2014 and almost the same age, was also excavated in such an environment (Mester et al. 2014). Its discovery was due to the attendance of a lithic expert in the general rescue archaeology setting, a previously rare phenomenon. It seems that a better understanding of this period in Hungary depends on time and resources.

REFERENCES

Aldeias, V. 2017: Experimental approaches to archaeological fire features and their behavioral relevance. Current Anthropology 58, 191–205. https://doi.org/10.1086/691210

Aldeias, V., Dibble, H. L., Sandgathe, D., Goldberg, P., McPherron, S. J. P. 2016: How heat alters underlying deposits and implications for archaeological fire features: A controlled experiment. Journal of Archaeological Science 67, 64–79. https://doi.org/10.1016/j.jas.2016.01.016

Andrefsky, W. J. 1994: Raw-material availability and the organization of technology. American Antiquity 59, 21–34. https://doi.org/10.2307/3085499

Anghelinu, M., Händel, M., Niţă, L., Cordoş, C., Veres, D., Hambach, U., Murătoreanu, G., Ciornei, A., Schmidt, C., Sava, T., Mănăilescu, C., Ilie, M., Demay, L., Georgescu, V. 2021: From Gravettian to Epigravettian in the Eastern Carpathians: Insights from the Bistricioara-Lutărie III archaeological site. Quaternary International, The 3rd Conference World of Gravettian Hunters 587–588, 210–229. https://doi.org/10.1016/j.quaint.2020.06.044

Anghelinu, M., Niţă, L., Murătoreanu, G. 2018: Le Gravettien et l'Épigravettien de l'Est de la Roumanie: une réévaluation. L'Anthropologie, Préhistoire de la Roumanie 122, 183–219. https://doi.org/10.1016/j.anthro.2018.03.002

Arcanum Adatbázis Kft. 2004: Az Első Katonai Felmérés 1763–1785 (The First Military Survey, 1763–1785).

Arcanum Adatbázis Kft. 2005: A Második Katonai Felmérés 1806–1869 (The Second Military Survey, 1806–1869).

Baales, M., Street, M. 1996: Hunter-gatherer behavior in a changing Late Glacial landscape: Allerød Archaeology in the Central Rhineland, Germany. Journal of Anthropological Research 52, 281–316. https://doi.org/10.1086/jar.52.3.3630086

Bartosiewicz, L. 1999: Aurochs (Bos primigenius BOJANUS, 1827) in the Holocene of Hungary. In: Weniger, G.-C. (ed.), Archäologie und Biologie des Auerochsen: Wissenschaftliche Schriften des Neanderthal Museums. Mettmann, 103–117.

Beck, C., Taylor, A. K., Jones, G. T., Fadem, C. M., Cook, C. R., Millward, S. A. 2002: Rocks are heavy: Transport costs and Paleoarchaic quarry behavior in the Great Basin. Journal of Anthropological Archaeology 21, 481–507. https://doi.org/10.1016/S0278-4165(02)00007-7

Béres, S., Cserpák, F., Moskal-del Hoyo, M., Repiszky, T., Sázelová, S., Wilczyński, J., Lengyel, G. 2021: Zöld Cave and the Late Epigravettian in Eastern Central Europe. Quaternary International, The 3rd Conference World of Gravettian Hunters 587–588, 158–171. https://doi.org/10.1016/j.quaint.2020.09.050

Bertolini, M., Cristiani, E., Modolo, M., Visentini, P., Romandini, M. 2016: Late Epigravettian and Mesolithic foragers of the eastern Alpine region: Animal exploitation and ornamental strategies at Riparo Biarzo (Northern Italy). Quaternary International, MesoLife: A Mesolithic perspective on Alpine and neighbouring territories 423, 73–91. https://doi.org/10.1016/j.quaint.2015.09.083

Biagi, P. 2016: The last hunter-gatherers of the northern coast of the Black Sea and their role in the Mesolithic of Europe: A view from Crimea. In: Krauß, R., Floss, H. (eds.), Southeast Europe Before Neolithisation. Proceedings of the International Workshop within the Collaborative Research Centres Sfb 1070 'RessourcenKulturen', Schloss Hohentübingen, 9th of May 2014, RessourcenKulturen. Tübingen, 113–131.

Biagi, P., Kiosak, D. 2010: The Mesolithic of the northwestern Pontic region: New AMS dates for the origin and spread of the blade and trapeze industries in southeastern Europe. Eurasia antiqua: Zeitschrift für Archäologie Eurasiens 16, 21–41.

Binford, L. R. 1980: Willow smoke and dogs' tails: Hunter-gatherer settlement systems and archaeological site formation. American Antiquity 45, 4–20. https://doi.org/10.2307/279653

Bobak, D., Łanczont, M., Nowak, A., Mroczek, P., Połtowicz-Bobak, M., Standzikowski, K. 2022: Eastern periphery of the Magdalenian world. Wierzawice 31 hunting campsite (SE Poland). Sprawozdania Archeologiczne 74, 269–297. https://doi.org/10.23858/SA/74.2022.1.2913

Bobak, D., Połtowicz-Bobak, M. 2018: Between Magdalenian and Epigravettian: A contribution to the study of the Palaeolithic on the Polish-Ukrainian border. Materials and Studies on Archaeology of Sub-Carpathian and Volhynian Area 22, 42–53. https://doi.org/10.33402/mdapv.2018-22-42-53

Bonsall, C., Boroneanţ, A. 2016: Lateglacial hunter-gatherers in the Iron Gates: A brief review of the archaeological and chronological evidence. In: Krauß, R., Floss, H. (eds.), Southeast Europe before Neolithisation. Proceedings of the international workshop within the collaborative research centres Sfb 1070 'RessourcenKulturen', Schloss Hohentübingen, 9th of May 2014, RessourcenKulturen. Tübingen, 149–165.

Bonsall, C., Boroneanţ, A., Evatt, A., Soficaru, A., Nica, C., Bartosiewicz, L., Cook, G. T., Higham, T. F. G., Pickard, C. 2016: The 'Clisurean' finds from Climente II cave, Iron Gates, Romania. Quaternary International, MesoLife: A Mesolithic perspective on Alpine and neighbouring territories 423, 303–314. https://doi.org/10.1016/j.quaint.2015.12.017

Borić, D., Cristiani, E. 2016: Social networks and connectivity among the Palaeolithic and Mesolithic foragers of the Balkans and Italy. In: Krauß, R., Floss, H. (eds.), Southeast Europe before Neolithisation. Proceedings of the international workshop within the collaborative research centres Sfb 1070 'RessourcenKulturen', Schloss Hohentübingen, 9th of May 2014, RessourcenKulturen. Tübingen, 73–113.

Boroneanţ, A. 2011: The Mesolithic in Banat. In: Draşovean, F., Jovanović, B., Tasić, N. (eds.), The prehistory of Banat. Vol. 1. The Palaeolithic and Mesolithic. Bucureşti, 103–143.

Boroneanţ, V. 1970: La période épipaléolithique sur la rive roumaine des Portes de Fer du Danube 45, 1–25. https://doi.org/10.1515/prhz.1970.45.1.1

Boschian, G. 2003: Environment and hunters-gatherers mobility in the Northern Adriatic region. Preistoria Alpina 39, 91–102.

Bracco, J.-P., Montoya, C. 2015: Le Paléolithique supérieur en Europe occidentale, de la construction des cadres classiques aux interrogations actuelles. In: Gagnepain, J. (ed.), La Préhistoire de l'Europe Occidentale, un bilan des connaissances à l'aube du IIIe millénaire. Quinson, 75–86.

Brandt, S. A., Weedman, K. 2002: The ethnoarchaeology of hide working and stone tool use in Konso, southern Ethiopia: An introduction. In: Audoin-Rouzeau, F., Beyries, S. (eds.), Le travail du cuir de la préhistoire a nos jours. Antibes, 113–130.

Broglio, A., De Stefani, M., Peresani, M. 2006: I siti mesolitici di cima XII (Altopiano dei Sette Comuni). In: Pessina, A., Visentini, P. (eds.), Preistoria dell'Italia Settentrionale. Studi in ricordo di Bernardino Bagolini. Udine, 43–58.

Bronk Ramsey, C. 2009: Bayesian analysis of radiocarbon dates. Radiocarbon 51, 337–360. https://doi.org/10.1017/S0033822200033865

Burdukiewicz, J. M. 2011: Late Glacial hunter-gatherer reactions to the Younger Dryas cooling event in the southern and eastern Baltic regions of Europe. Quaternary International 242, 302–312. https://doi.org/10.1016/j.quaint.2011.02.013

Cârciumaru, M., Nițu, E.-C. 2018: Redefining the Epigravettian and Epipalaeolithic in the rock shelter of Cuina Turcului (the Iron Gates gorges of the Danube, Romania), with special emphasis on art objects. PALEO. Revue d'archéologie préhistorique 75–97. https://doi.org/10.4000/paleo.4231

Čečuk, B. 1996: Špilja Kopačina kod Donjeg Humca na otoku Braču. Arheološki radovi i rasprave Jugoslavenske akademije znanosti i umjetnosti 12, 13–20.

Constantin, D., Veres, D., Panaiotu, C., Anechitei-Deacu, V., Groza, S. M., Begy, R., Kelemen, S., Buylaert, J.-P., Hambach, U., Marković, S. B., Gerasimenko, N., Timar-Gabor, A. 2019: Luminescence age constraints on the Pleistocene-Holocene transition recorded in loess sequences across SE Europe. Quaternary Geochronology, 15th International Conference on Luminescence and Electron Spin Resonance Dating, 11-15 September 2017, Cape Town, South Africa 49, 71–77. https://doi.org/10.1016/j.quageo.2018.07.011

Costamagno, S., Barshay-Szmidt, C., Kuntz, D., Laroulandie, V., Pétillon, J.-M., Boudadi-Maligne, M., Langlais, M., Mallye, J.-B., Chevallier, A. 2016: Reexamining the timing of reindeer disappearance in southwestern France in the larger context of late glacial faunal turnover. Quaternary International 414, 34–61. https://doi.org/10.1016/j.quaint.2015.11.103

Cristiani, E., Borić, D. 2016: Mesolithic harpoons from Odmut, Montenegro: Chronological, contextual, and techno-functional analyses. Quaternary International, MesoLife: A Mesolithic perspective on Alpine and neighbouring territories 423, 166–192. https://doi.org/10.1016/j.quaint.2015.11.010

Cristiani, E., Lemorini, C., Dalmeri, G. 2012: Ground stone tool production and use in the Late Upper Palaeolithic: The evidence from Riparo Dalmeri (Venetian Prealps, Italy). Journal of Field Archaeology 37, 34–50. https://doi.org/10.1179/0093469011Z.0000000003

Dalmeri, G., Ferrari, S., Peresani, M. 2004: Rise and fall in the utilization of trapezoidal microliths during the Late Upper Palaeolithic in Europe, an overview from the Italian record. In: Terberger, T., Eriksen, B. V. (eds.), Hunters in changing world. Environment and archaeology of the Pleistocene-Holocene transition (ca. 11000–9000 B.C.) in Northern Central Europe. Proceedings of the workshop of the UISPP Commission XXXII, Greifswald, September 2002. Rahden, 243–251.

de la Peña, P. 2015: A qualitative guide to recognize bipolar knapping for flint and quartz. Lithic Technology 40, 1–16. https://doi.org/10.1080/01977261.2015.1123947

Demars, P.-Y., Laurent, P. 2000: Types d'outils lithiques du Paléolithique supérieur en Europe. Paris.

Djindjian, F., Sapozhnikov, I. V., Stepanchuk, V. N., Sapozhnikova, G. 2006: Upper Palaeolithic chronology, cultural facies and economic complexes of the northern black sea area. In: Sanchidián Torti, J. L., Márquez Alcantara, A., Fullola, J.-M. (eds.), La cuenca Mediterranea durante el Paleolitico Superior. Málaga, 46–59.

Dolukhanov, P. 2009: The Mesolithic of East European Plain. In: Dolukhanov, P., Sarson, G. R., Shukurov, A. M. (eds.), The East European Plain on the eve of agriculture, British Archaeological Reports, International Series. Oxford, 23–35. https://doi.org/10.30861/9781407304472

Dolukhanov, P. M., Shilik, K. K. 2007: Environment, sea-level changes, and human migrations in the northern Pontic area during late Pleistocene and Holocene times. In: Yanko-Hombach, V., Gilbert, A. S., Panin, N., Dolukhanov, P. M. (eds.), The Black Sea flood question: Changes in coastline, climate, and human settlement. Dordrecht, 297–318. https://doi.org/10.1007/978-1-4020-5302-3_12

Dubreuil, L., Grosman, L. 2009: Ochre and hide-working at a Natufian burial place. Antiquity 83, 935–954. https://doi.org/10.1017/S0003598X00099269

Duches, R., Avanzini, M., Bassetti, M., Flor, E., Neri, S., Dalmeri, G. 2014: Évolution de la mobilité épigravettienne durant le Dryas récent: quelles nouvelles informations pour l'Italie nord-orientale? In: Naudinot, N., Peresani, M. (eds.), Les groupes culturels de la transition Pléistocène-Holocène entre Atlantique et Adriatique. Paris, 185–203.

Duches, R., Peresani, M., Pasetti, P. 2018: Success of a flexible behavior. Considerations on the manufacture of Late Epigravettian lithic projectile implements according to experimental tests. Archaeological and Anthropological Sciences 10, 1617–1643. https://doi.org/10.1007/s12520-017-0473-x

Eichmann, W. J., Kertész, R., Marton, T. 2010: Mesolithic in the LBK heartland of Transdanubia, Western Hungary. In: Gronenborn, D., Petrasch, J. (eds.), The spread of the Neolithic to Central Europe. International symposium, Mainz 24 June – 26 June 2005. Mainz, 211–235.

Fasser, N., Visentin, D., Fontana, F. 2022: Characterising Late Palaeolithic manufacturing traditions: Backed points production methods in the Late Epigravettian sequence of Riparo Tagliente (NE Italy). Journal of Archaeological Science: Reports 42, 103343. https://doi.org/10.1016/j.jasrep.2022.103343

Feurdean, A., Tămaş, T., Tanţău, I., Fărcaş, S. 2012: Elevational variation in regional vegetation responses to late-glacial climate changes in the Carpathians. Journal of Biogeography 39, 258–271. https://doi.org/10.1111/j.1365-2699.2011.02605.x

Flor, E., Fontana, F., Peresani, M. 2011: Contribution to the study of Sauveterrian technical systems. Technological analysis of the lithic industry from layers AF-AC1 of Romagnano Loc III rockshelter (Trento). Preistoria Alpina 45, 193–219.

Fontana, F., Flor, E., Duches, R. 2016: Technological continuity and discontinuity in the Romagnano Loc III rock shelter (NE Italy) Mesolithic series. Quaternary International, MesoLife: A Mesolithic perspective on Alpine and neighbouring territories 423, 252–265. https://doi.org/10.1016/j.quaint.2015.10.046

Fuchs, M., Rousseau, D.-D., Antoine, P., Hatté, C., Gauthier, C., Marković, S., Zoeller, L. 2008: Chronology of the Last Climatic Cycle (Upper Pleistocene) of the Surduk loess sequence, Vojvodina, Serbia. Boreas 37, 66–73. https://doi.org/10.1111/j.1502-3885.2007.00012.x

Gábori, M. 1956: Az epipaleolitikum lelőhelye Honton. Archaeologiai Értesítő 83, 125–140.

Gábori, M. 1959: A ságvári paleolitikus telep újabb ásatásának eredményei. Archaeologiai Értesítő 86, 3–19.

Gábori, M. 1964: A késői paleolitikum Magyarországon. Budapest.

Gábori, M. 1968: Mesolithischer Zeltgrundriss in Sződliget. Acta Archaeologica Academiae Scientiarum Hungaricae 20, 33–36.

Gábris, G. 2006: A magyarországi folyóteraszok kialakulásának és korbeosztásának magyarázata az oxigénizotóp-sztratigráfia tükrében – Explanation of river terrace formation and chronology in Hungary in the light of oxygen isotope stratigraphy. Földrajzi Közlemények 130, 123–135.

Gábris, G. 2013: A folyóvízi teraszok hazai kutatásának rövid áttekintése – A teraszok kialakulásának és korbeosztásának új magyarázata – Short revue of the hungarian investigations on fluvial terraces and new explication of the formation and time scale of the river terraces. Földrajzi Közlemények 137, 240–247.

Gábris, G., Horváth, E., Novothny, Á., Ruszkiczay-Rüdiger, Z. 2012: Fluvial and aeolian landscape evolution in Hungary – results of the last 20 years research. Netherlands Journal of Geosciences 91, 111–128. https://doi.org/10.1017/S0016774600001530

Gábris, G., Horváth, E., Novothny, Á., Ujházy, K. 2002: History of environmental changes from the Last Glacial period in Hungary. Praehistoria 3, 9–22.

Gábris, G., Krolopp, E., Ujházy, K. 2011: Késő-pleisztocén (késő-glaciális) – holocén környezetváltozás Duna menti homokbuckák komplex vizsgálata alapján. Földtani Közlöny 141, 57–72.

Gábris, G., Nádor, A. 2007: Long-term fluvial archives in Hungary: Response of the Danube and Tisza rivers to tectonic movements and climatic changes during the Quaternary: A review and new synthesis. Quaternary Science Reviews, Global correlation of Late Cenozoic fluvial deposits: IGCP Project No. 449 26, 2758–2782. https://doi.org/10.1016/j.quascirev.2007.06.030

Grove, M. 2009: Hunter-gatherer movement patterns: Causes and constraints. Journal of Anthropological Archaeology 28, 222–233. https://doi.org/10.1016/j.jaa.2009.01.003

Gurova, M., Bonsall, C. 2014: 'Pre-Neolithic' in Southeast Europe: A Bulgarian perspective. Documenta Praehistorica 41, 95–109. https://doi.org/10.4312/dp.41.5

Gutay, M., Gulyás, A. Z., Kerékgyártó, G. 2019: Felső paleolitikus, Epigravettien vadásztelep Jászfényszaru-Szeméttelep I. lelőhelyen. In: Gulyás, A. Z. (ed.), A Jászság Kapuja, Jászfényszaru. Régészeti Tanulmányok Jászfényszaruról. Jászfényszaru, 26–29.

Gutay, M., Kerékgyártó, G. 2019: Erk 1. Mezolitikus lelőhely a Tarna völgyében. Agria – Az egri Dobó István Vármúzeum Évkönyve 52, 35–55.

Hauck, T. C., Nolde, N., Ruka, R., Gjipali, I., Dreier, J., Mayer, N. 2017: After the cold: Epigravettian hunter-gatherers in Blazi Cave (Albania). Quaternary International, Prehistoric hunter-gatherers and farmers in the Adriatic and neighboring regions 450, 150–163. https://doi.org/10.1016/j.quaint.2016.11.045

Horváth, T., Ilon, G. 2017: Mezőlak-Szélmező-Tőzegtelep: egy nem hétköznapi őskori lelőhely – Mezőlak-Szélmező-Peatbog: An unusual prehistoric site. Archeometriai Műhely 14, 143–184.

Hum, L. 2000: A Szekszárd, volt 'Budai úti' téglagyári lösz-paleotalaj sorozat paleoökológiai vizsgálatai. Malakológiai Tájékoztató – Malacological Newsletter 18, 29–50.

Hupuczi, J., Sümegi, P. 2010: The late pleistocene paleoenvironment and paleoclimate of the Madaras section (South Hungary), based on preliminary records from mollusks. Open Geosciences 2, 64–70. https://doi.org/10.2478/v10085-009-0044-1

Inizan, M.-L., Reduron-Ballinger, M., Roche, H., Féblot-Augustins, J. 1999: Technology and terminology of knapped stone: followed by a multilingual vocabulary, Arabic, English, French, German, Greek, Italian, Portuguese, Spanish. Nanterre.

Ivanovaitė, L., Serwatka, K., Hoggard, C. S., Sauer, F., Riede, F. 2020: All these fantastic cultures? Research history and regionalization in the Late Palaeolithic Tanged Point cultures of Eastern Europe. European Journal of Archaeology 23, 162–185. https://doi.org/10.1017/eaa.2019.59

Jacquier, J., Langlais, M., Naudinot, N. 2020: Late Laborian trapezoids: Function and origin of the first transverse projectile tips of Western Europe prehistory. Quaternary International, Cultures of the Pleistocene-Holocene transition in Western Europe 564, 48–60. https://doi.org/10.1016/j.quaint.2020.01.009

Jakab, G., Sümegi, P., Magyari, E. K. 2004: A new paleobotanical method for the description of Late Quaternary organic sediments (Mire-development pathways and palaeoclimatic records from S Hungary). Acta Geologica Hungarica 47, 1–37. https://doi.org/10.1556/AGeol.47.2004.4.4

Jochim, M. 2006: Regional perspectives on Early Mesolithic land use in southwestern Germany. Journal of Anthropological Archaeology, Mesolithic mobility, exchange, and interaction 25, 204–212. https://doi.org/10.1016/j.jaa.2005.11.011

Jovanović, I., Pandžić, I., Miracle, P. T. 2014: Okresana kamena industrija iz pećine Rastuša. The Chipped Stone Industry from Rastuša Cave. Banja Luka.

Kabaciński, J., Sobkowiak-Tabaka, I. 2010: Between East and West: A new site of the Federmessergruppen in Poland. Quartär 57, 139–154.

Kaminská, Ľ. 2016: Gravettian and Epigravettian lithics in Slovakia. Quaternary International, The Lithic Issues of the Gravettian 406, 144–165. https://doi.org/10.1016/j.quaint.2015.08.083

Karavanić, I., Vukosavljević, N., Šošić Klindžić, R., Kurtanjek, D., Zupanić, J. 2013: Litička i koštana industrija epigravetijenskih slojeva Šandalje II kod Pule. Vjesnik za arheologiju i povijest dalmatinsku 106, 7–73.

Kegler, J. F. 2021: Raw material and habitat: The formation of regional habitats during the Late Glacial. Two case Studies: The Neuwied Basin (Rheinland-Pfalz, Germany) and Le Mas d'Azil (Ariège, France). In: Gaudzinski-Windheuser, S., Jöris, O. (eds.), The beef behind all possible pasts: The tandem Festschrift in honour of Elaine Turner and Martin Street, Monographien Des RGZM. Heidelberg, 521–534.

Kelly, R. L. 1995: The foraging spectrum. Diversity in hunter-gatherer lifeways. Washington, DC.

Kertész, R. 1993: Data to the Mesolithic of the Great Hungarian Plain. Tisicum. A Jász-Nagykun-Szolnok Megyei Múzeumok Évkönyve 8, 81–104.

Kertész, R. 1994: Late Mesolithic chipped stone industry from the Site Jásztelek I. In: Lőrinczy, G. (ed.), Von der Steinzeit bis zum Mittelalter. Studien zum 60. Geburtstag von Ottó Trogmayer. Szeged, 23–44.

Kertész, R. 1996a: The Mesolithic in the Great Hungarian Plain: A survey of the evidence. In: Kertész, R., Makkay, J., At the fringes of three worlds: Hunter-gatherers and farmers in the Middle Tisza Valley. Szolnok, 5–34.

Kertész, R. 1996b: A new site of the Northern Hungarian Plain Mesolithic industry in the Jászság Area (Jászberény IV). Tisicum. A Jász-Nagykun-Szolnok Megyei Múzeumok Évkönyve 9, 27–44.

Kertész, R. 1997: Időutazás a Jászságban. Jászkunság – Az MTA Jász-Nagykun-Szolnok Megyei Tudományos Testülete Folyóirata 43, 127–133.

Kertész, R. 2002: Mesolithic hunter-gatherers in the Northwestern part of the Great Hungarian Plain. Praehistoria 3, 281–304.

Kertész, R. 2005: Tarnaörs-Fodor tanya: egy új mezolit lelőhely az Észak-Alföldön. Szolnoki Tudományos Közlemények 9, 1–53.

Kertész, R., Demeter, O. 2019: Contributions to raw material studies of the Transdanubian early Mesolithic lithic industry: Szekszárd-Palánk. Praehistoria New Series 1–2, 121–135.

Kertész, R., Király, A. 2021: Settlement features of the Vác-Sződliget II Mesolithic site (Hungary). Praehistoria New Series 3, 165–191.

Kind, C.-J. 2006: Transport of lithic raw material in the Mesolithic of Southwest Germany. Journal of Anthropological Archaeology, Mesolithic mobility, exchange, and interaction 25, 213–225. https://doi.org/10.1016/j.jaa.2005.11.009

Kind, C.-J. 2009: The Mesolithic in southwest Germany. Preistoria Alpina 44, 137–145.

Király, A. 2020: Üllős kőmegmunkálás – a bőség zavara (Bipolar-on-anvil knapping – confusing abundance). In: Vicze, M., Kovács, G. (eds.), ΜΩΜΟΣ X. Őskoros Kutatók X. Összejövetelének konferenciakötete. Őskori technikák, őskori technológiák, Százhalombatta, 2017. április 6–8. Százhalombatta, 126–151.

Kiss, A. 1996: Das Gräberfeld von Szekszárd-Palánk aus der zweiten Hälfte des 5. Jh. und der ostgotische Fundstoffin Pannonien. Közlemények Zala Megye Múzeumaiból 6, 53–87.

Kiss, T., Hernesz, P., Sümeghy, B., Györgyövics, K., Sipos, G. 2015: The evolution of the Great Hungarian Plain fluvial system: Fluvial processes in a subsiding area from the beginning of the Weichselian. Quaternary International, Climate change and impacts between 8,000 and 60,000 years ago in Central and Eastern Europe 388, 142–155. https://doi.org/10.1016/j.quaint.2014.05.050

Kitagawa, K., Julien, M.-A., Krotova, O., Bessudnov, A. A., Sablin, M. V., Kiosak, D., Leonova, N., Plohenko, B., Patou-Mathis, M. 2018: Glacial and post-glacial adaptations of hunter-gatherers: Investigating the late Upper Paleolithic and Mesolithic subsistence strategies in the southern steppe of Eastern Europe. Quaternary International, Impacts of gradual and abrupt environmental changes on Late glacial to Middle Holocene cultural changes in Europe 465, 192–209. https://doi.org/10.1016/j.quaint.2017.01.005

Komšo, D. 2006: The Mesolithic in Croatia. Opvscvla archaeologica 30, 55–92.

Komšo, D., Pellegatti, P. 2007: The late Epigravettian in Istria. Late Palaeolithic colonization and lithic technology in the Northern Adriatic area. In: Whallon, R. (ed.), Late Paleolithic environments and cultural relations around the Adriatic, BAR International Series. Oxford, 27–39.

Kozłowski, J. K. 1999: Gravettian/Epigravettian sequences in the Balkans: Environment, technologies, hunting strategies and raw material procurement. In: Bailey, G., Adam, E., Perlès, C., Panagopoulou, E., Zachos, K. (eds.), The Palaeolithic archaeology of Greece and adjacent areas. London, 319–329.

Kozlowski, J. K., Kaczanowska, M. 2004: Gravettian/epigravettian sequences in the Balkans and Anatolia. Mediterranean Archaeology and Archaeometry 4, 5–18.

Kozłowski, J. K., Kozłowski, S. K. 1994: Meso- and Neolithic sequence from the Odmut Cave (Montenegro). Warszawa.

Kozłowski, S. K. 1999: Tanged Points complex. In: Kozłowski, S. K., Gurba, J., Zaliznyak, L. (eds.), Tanged Points Cultures in Europe. Lublin, 28–35.

Kozłowski, S. K. 2001: Eco-cultural/stylistic zonation of the Mesolithic/Epipaleolithic in Central Europe. In: Kertész, R., Makkay, J. (eds.), From the Mesolithic to the Neolithic: Proceedings of the international archaeological conference held in the Damjanich Museum of Szolnok, September 22–27, 1996. Budapest, 261–282.

Kraus, D. 2011: Duna környéki epipaleolit és mezolit leletanyagok. (Master's thesis.) Budapest.

Kriván, P. 1960: Duna ártéri szinlőinek kronológiája. Földtani Közlöny 90, 56–72.

Kriván, P. 1962: Chronologie der spätpaläolitischen Siedlung in Szekszárd. Światowit 24, 211–226.

Krolopp, E. 1962: Die Malakofauna der niedrigeren Aueterrasse im Grundprofil von Szekszárd. Światowit 24, 203–210.

Kwiatkowski, K., Masojć, M. 2011: Wandering throughout the late Pleistocene landscape: Evidence for hunting activities of Federmesser groups from south western Poland. Archäologisches Korrespondenzblatt 41.

Łanczont, M., Madeyska, T. 2011: Environmental changes recorded in some important peri- and meta-Carpathian Palaeolithic sites and their chronostratigraphy. Geographia Polonica 84, 81–94. https://doi.org/10.7163/GPol.2011.S1.6

Łanczont, M., Połtowicz-Bobak, M., Bobak, D., Mroczek, P., Nowak, A., Komar, M., Standzikowski, K. 2021: On the edge of eastern and western culture zones in the early Late Pleistocene. Święte 9 – A new epigravettian site in the south-east of Poland. Quaternary International, The 3rd Conference World of Gravettian Hunters 587–588, 172–188. https://doi.org/10.1016/j.quaint.2020.08.028

Lehmkuhl, F., Bösken, J., Hošek, J., Sprafke, T., Marković, S. B., Obreht, I., Hambach, U., Sümegi, P., Thiemann, A., Steffens, S., Lindner, H., Veres, D., Zeeden, C. 2018: Loess distribution and related Quaternary sediments in the Carpathian Basin. Journal of Maps 14, 661–670. https://doi.org/10.1080/17445647.2018.1526720

Lengyel, Gy. 2004: Késő-paleolit telep Miskolc határában (Rózsás-hegy). In: Nagy, E. G., Dani, J., Hajdú, Z. (eds.), ΜΩΜΟΣ II. – Őskoros Kutatók II. Összejövetelének Konferenciakötete. Debrecen, 2000. november 6–8. Debrecen, 11–20.

Lengyel, Gy. 2008: Radiocarbon Dates of the 'Gravettian Entity' in Hungary. Praehistoria 9–10, 241–265.

Lengyel, Gy. 2010: An aspect to the re-evaluation of Ságvár (Lyukas domb) Upper Palaeolithic site. Folia Archaeologica 54, 25–37.

Lengyel, Gy. 2011a: The pebble, the block and the tabular. Lithic raw material use at Ságvár Lyukas-domb Upper Palaeolithic site / A kavics, a blokk és pad. Kő-nyersanyag felhasználás Ságvár-Lyukas-domb felső paleolit telepen. In: T. Biró, K., Markó, A. (eds.), Emlékkönyv Violának. Tanulmányok T. Dobosi Viola tiszteletére. Aeolian Scripts. Papers in Honour of Viola T. Dobosi. Budapest, 93–102.

Lengyel, Gy. 2011b: A pattintási melléktermékek szerepe az őskori emberi tevékénysegek rekonstruálasában – Ságvár-Lyukas-domb kőegyüttesének technológiai vizsgálata. Ősrégészeti Levelek 13, 61–76.

Lengyel, Gy. 2016: Reassessing the Middle and Late Upper Palaeolithic in Hungary. Acta Archaeologica Carpathica 51, 47–66.

Lengyel, Gy. 2018: Lithic analysis of the Middle and Late Upper Palaeolithic in Hungary. Folia Quaternaria 2018, 5–157. https://doi.org/10.4467/21995923FQ.18.001.9819

Lengyel, Gy., Bárány, A., Béres, S., Cserpák, F., Gasparik, M., Major, I., Molnár, M., Nadachowski, A., Nemergut, A., Svoboda, J., Verpoorte, A., Wojtal, P., Wilczyński, J. 2021: The Epigravettian chronology and the human population of eastern Central Europe during MIS2. Quaternary Science Reviews 271, 107187. https://doi.org/10.1016/j.quascirev.2021.107187

Lengyel, Gy., Mester, Zs. 2012: A magyarországi felső paleolitikum 14C dátumai tafonómiai megközelítésben. In: Kolozsi, B. (ed.), ΜΩΜΟΣ IV. – Őskoros Kutatók IV. Összejövetelének Konferenciakötete. Debrecen, 2005. március 22–24. Debrecen, 29–51.

Lócskai, T., Hupuczi, J., Hum, L., Sümegi, P. 2006: Dansgaard-Oeshger ciklusok kimutatása hazai löszszelvényből – The demonstration of Dansgaard-Oeshger cycles Hungarian loess profiles. Malakológiai Tájékoztató – Malacological Newsletter 24, 35–39.

Magyari, E. K., Chapman, J. C., Passmore, D. G., Allen, J. R. M., Huntley, J. P., Huntley, B., Birks, J. 2010: Holocene persistence of wooded steppe in the Great Hungarian Plain. Journal of Biogeography 37, 915–935. https://doi.org/10.1111/j.1365-2699.2009.02261.x

Magyari, E. K., Gasparik, M., Major, I., Lengyel, G., Pál, I., Virág, A., Korponai, J., Haliuc, A., Szabó, Z., Pazonyi, P. 2022: Mammal extinction facilitated biome shift and human population change during the last glacial termination in East-Central Europe. Scientific Reports 12, 6796. https://doi.org/10.1038/s41598-022-10714-x

Magyari, E. K., Kuneš, P., Jakab, G., Sümegi, P., Pelánková, B., Schäbitz, F., Braun, M., Chytrý, M. 2014: Late Pleniglacial vegetation in eastern-central Europe: Are there modern analogues in Siberia? Quaternary Science Reviews 95, 60–79. https://doi.org/10.1016/j.quascirev.2014.04.020

Magyari, E. K., Pál, I., Vincze, I., Veres, D., Jakab, G., Braun, M., Szalai, Z., Szabó, Z., Korponai, J. 2019: Warm Younger Dryas summers and early late glacial spread of temperate deciduous trees in the Pannonian Basin during the last glacial termination (20-9 kyr cal BP). Quaternary Science Reviews 225, 105980. https://doi.org/10.1016/j.quascirev.2019.105980

Maier, A., Stojakowits, P., Mayr, C., Pfeifer, S., Preusser, F., Zolitschka, B., Anghelinu, M., Bobak, D., Duprat-Oualid, F., Einwögerer, T., Hambach, U., Händel, M., Kaminská, L., Kämpf, L., Łanczont, M., Lehmkuhl, F., Ludwig, P., Magyari, E., Mroczek, P., Nemergut, A., Nerudová, Z., Niţă, L., Polanská, M., Połtowicz-Bobak, M., Rius, D., Römer, W., Simon, U., Škrdla, P., Újvári, G., Veres, D. 2021: Cultural evolution and environmental change in Central Europe between 40 and 15 ka. Quaternary International, The Last Glacial Maximum in Europe – State of the Art in Geoscience and Archaeology 581–582, 225–240. https://doi.org/10.1016/j.quaint.2020.09.049

Mallol, C., Hernández, C. M., Cabanes, D., Machado, J., Sistiaga, A., Pérez, L., Galván, B. 2013: Human actions performed on simple combustion structures: An experimental approach to the study of Middle Palaeolithic fire. Quaternary International, Site formation processes in archaeology: Soil and sediment micromorphology. Proceedings of the 14th IWMSM Session 5, Lleida, Spain, July 2012, 3–15. https://doi.org/10.1016/j.quaint.2013.04.009

Markó, A. 2005: Limnokvarcit a Cserhát-hegységben. Archeometriai Műhely 2005, 52–55.

Markó, A. 2007: The Upper Palaeolithic site at Szob. Folia Archaeologica 53, 7–22.

Markó, A. 2017: Use of obsidian during the LGM: Case studies from the Pebble Gravettian in Hungary. Archeometriai Műhely 14, 131–142.

Markó, A., Kázmér, M. 2004: The use of nummulitic chert in the Middle Palaeolithic in Hungary. In: Topical issues of the research of Middle Palaeolithic Period in Central Europe. Tata, 53–64.

Marković, S. B., Sümegi, P., Stevens, T., Schaetzl, R. J., Obreht, I., Chu, W., Buggle, B., Zech, M., Zech, R., Zeeden, C., Gavrilov, M. B., Perić, Z., Svirčev, Z., Lehmkuhl, F. 2018: The Crvenka loess-paleosol sequence: A record of continuous grassland domination in the southern Carpathian Basin during the Late Pleistocene. Palaeogeography, palaeoclimatology, palaeoecology, Eurasian loess records: missing link to a better understanding of Northern hemisphere Pleistocene climate evolution 509, 33–46. https://doi.org/10.1016/j.palaeo.2018.03.019

Marković, S. B., Timar-Gabor, A., Stevens, T., Hambach, U., Popov, D., Tomić, N., Obreht, I., Jovanović, M., Lehmkuhl, F., Kels, H., Marković, R., Gavrilov, M. B. 2014: Environmental dynamics and luminescence chronology from the Orlovat loess–palaeosol sequence (Vojvodina, northern Serbia). Journal of Quaternary Science 29, 189–199. https://doi.org/10.1002/jqs.2693

Marton, T., Kertész, R., Eichmann, W. J. 2021: The Mesolithic research of a decade: Early Holocene settlements in Transdanubia. Hungarian Archaeology 10, 1–14. https://doi.org/10.36338/ha.2021.2.5

McCauley, B., Collard, M., Sandgathe, D. 2020: A cross-cultural survey of on-site fire use by recent hunter-gatherers: Implications for research on Palaeolithic pyrotechnology. Journal of Paleolithic Archaeology 3, 566–584. https://doi.org/10.1007/s41982-020-00052-7

Mentzer, S. M. 2014: Microarchaeological approaches to the identification and interpretation of combustion features in Prehistoric archaeological sites. Journal of Archaeological Method and Theory 21, 616–668. https://doi.org/10.1007/s10816-012-9163-2

Mester, Zs., Faragó, N. 2013: The lithic raw material sources and interregional human contacts in the Northern Carpathian regions: Report and preliminary results of the field surveys. In: Mester, Zs. (ed.), The lithic raw material sources and interregional human contacts in the northern carpathian regions. papers for the project funded by the international Visegrád Fund Standard Grant N° 21110211. Kraków–Budapest, 23–39.

Mester, Zs., Faragó, N. 2019: From Bedrock to Alluvium. Considerations on raw material sources. In: Markó, A., T. Biró, K. (eds.), 12th International Symposium on Knappable Materials. Budapest, 73.

Mester, Zs., Faragó, N., Halbrucker, É., Király, A., Péntek, A. 2015: Páli-Dombok: a régibb kőkor első biztos lelőhelye a Rába völgyében. Arrabona 51, 115–145.

Mester, Zs., Faragó, N., Király, A. 2014: The first in situ Old Stone Age assemblage from the Rába Valley, Northwestern Hungary. Dissertationes Archaeologicae ex Instituto Archaeologico Universitatis de Rolando Eötvös nominatae Ser. 3 2, 351–363. https://doi.org/10.17204/dissarch.2014.351

Mészáros, G. 1960: Szekszárd-Palánk. Régészeti Füzetek 13, 70–71.

Migal, W. 2007: On preferential points of the Final Paleolithic in the Central European Lowland. In: Kobusiewicz, M., Kabaciński, J. (eds.), Studies in the Final Palaeolithic settlement of the Great European Plain. Poznań, 185–200.

Mihailović, D. 2001: Technological decline of the Early Holocene chipped stone industries in South-East Europe. In: Kertész, R., Makkay, J. (eds.), From the Mesolithic to the Neolithic: Proceedings of the international archaeological conference held in the Damjanich Museum of Szolnok, September 22–27, 1996. Budapest, 339–347.

Mihailović, D. 2007: Social aspects of the transition to farming in the Balkans. Documenta Praehistorica 34, 73–89. https://doi.org/10.4312/dp.34.6

Mihailović, D. 2008: Lithic technology and settlement systems of the Final Palaeolithic and Early Mesolithic in the Iron Gates. In: Bonsall, C., Boroneanţ, V., Radovanović, I. (eds.), The Iron Gates in Prehistory: New Perspectives, BAR International Series. Oxford, 11–19.

Mihailović, D. 2009: Upper Palaeolithic and Mesolithic chipped stone industries from Crvena stijena. Belgrade.

Mihailović, D. 2014: Investigations of Middle and Upper Palaeolithic in the Niš basin. In: Mihailović, D. (ed.), Palaeolithic and Mesolithic research in the Central Balkans. Belgrade, 107–121.

Mihailović, D. 2021: The Iron Gates Mesolithic in a regional context. Documenta Praehistorica 48, 54–69. https://doi.org/10.4312/dp.48.2

Mihailović, D., Mihailović, B. 2009: Cultural regionalization in the Palaeolithic of the Middle Danube Basine and Western Balkans. In: Djindjian, F., Kozłowski, J. K., Bicho, N. (eds.), Le Concept de Territoires dans le Paléolithique Supérieur Européen, BAR International Series. Oxford, 93–101.

Mihailović, D., Mihailović, B., Lopičić, M. 2011: The Palaeolithic in Northern Serbia. In: Draşovean, F., Jovanović, B. (eds.), The prehistory of Banat Volume I.: The Palaeolithic and Mesolithic. Bucharest, 77–103.

Miracle, P. T., Galanidou, N., Forenbaher, S. 2000: Pioneers in the hills: Early Mesolithic foragers at Šebrn Abri (Istria, Croatia). European Journal of Archaeology 3, 293–329. https://doi.org/10.1179/146195700807860837

Miracle, P. T., Mauch Lenardić, J., Brajković, D. 2010: Last glacial climates, 'Refugia', and faunal change in Southeastern Europe: Mammalian assemblages from Veternica, Velika pećina, and Vindija caves (Croatia). Quaternary International, Quaternary Changes of Mammalian Communities across and between Continents 212, 137–148. https://doi.org/10.1016/j.quaint.2009.06.003

Monik, M., Pankowská, A. 2020: Settlement patterns of the Late Palaeolithic in Bohemia and Moravia. In: Grimm, S. B., Weber, M.-J., Mevel, L., Sobkowiak-Tabaka, I. (eds.), From the Atlantic to beyond the Bug River. Finding and defining the Federmesser-Gruppen / Azilian. Proceedings of Session A5b (Commission 'The Final Palaeolithic of Northern Eurasia') of the XVIIth UISPP Congress, Burgos, September 2014, RGZM-Tagungen. Mainz, 79–91.

Montet-White, A., Kozłowski, J. K. 1983: Les industries a pointes a dos dans les Balkans. In: La position taxonomique et chronologique des industries a pointes a dos autour de la Mediterranée européenne. Rivista di Scienze Preistoriche 38, 371–399.

Montoya, C. 2002: Les pointes à dos épigravettiennes de Saint-Antoine-Vitrolles (Hautes-Alpes) : diversité typologique ou homogénéité conceptuelle? Bulletin de la Société préhistorique française 99, 275–287. https://doi.org/10.3406/bspf.2002.12657

Montoya, C. 2008: Evolution des concepts de productions lithiques et artistiques à l'Epigravettien récent: analyses de collections des Préalpes de la Vénétie et des Préalpes du sud françaises. In: Mussi, M. (ed.), Il Tardiglaciale in Italia. Lavori in Corso, BAR International Series. Oxford, 43–55.

Naudinot, N., Tomasso, A., Messager, E., Finsinger, W., Ruffaldi, P., Langlais, M. 2017: Between Atlantic and Mediterranean: Changes in technology during the Late Glacial in Western Europe and the climate hypothesis. Quaternary International, The Frison Institute symposium: International perspectives on climate change and archaeology 428, 33–49. https://doi.org/10.1016/j.quaint.2016.01.056

Neruda, P. 2018: Settlement strategies of Palaeolithic and Mesolithic societies in north Moravia and Czech Silesia (Czech Republic). Památky Archeologické 109, 5–36.

Nerudová, Z., Monik, M. 2019: The Epigravettian of Kůlna Cave? A revision of artefacts. Archeologické rozhledy 71, 567–588. https://doi.org/10.35686/AR.2019.23

Nerudová, Z., Neruda, P. 2014: Chronology of the Upper Palaeolithic sequence in the Kůlna Cave (Okr. Blansko/CZ). Archäologisches Korrespondenzblatt 44, 307–325.

Nerudová, Z., Neruda, P., Hamrozi, P. 2021: Statistical and geographical modelling of Moravian (Czech Republic) Late Upper Palaeolithic occupation. Quaternary International, The Last Glacial Maximum in Europe – State of the Art in Geoscience and Archaeology 581–582, 175–189. https://doi.org/10.1016/j.quaint.2020.07.003

Niedziałkowska, M., Doan, K., Górny, M., Sykut, M., Stefaniak, K., Piotrowska, N., Jędrzejewska, B., Ridush, B., Pawełczyk, S., Mackiewicz, P., Schmölcke, U., Kosintsev, P., Makowiecki, D., Charniauski, M., Krasnodębski, D., Rannamäe, E., Saarma, U., Arakelyan, M., Manaseryan, N., Titov, V. V., Hulva, P., Bălăşescu, A., Fyfe, R., Woodbridge, J., Trantalidou, K., Dimitrijević, V., Kovalchuk, O., Wilczyński, J., Obadă, T., Lipecki, G., Arabey, A., Stanković, A. 2021: Winter temperature and forest cover have shaped red deer distribution in Europe and the Ural Mountains since the Late Pleistocene. Journal of Biogeography 48, 147–159. https://doi.org/10.1111/jbi.13989

Obreht, I., Zeeden, C., Hambach, U., Veres, D., Marković, S. B., Lehmkuhl, F. 2019: A critical reevaluation of palaeoclimate proxy records from loess in the Carpathian Basin. Earth-Science Reviews 190, 498–520. https://doi.org/10.1016/j.earscirev.2019.01.020

Pécsi, M. 1959: A magyarországi Duna-völgy kialakulása és felszínalaktana. Budapest.

Pelegrin, J. 2000: Les techniques de débitage laminaire au Tardiglaciaire : critères de diagnose et quelques réflexions. In: Valentin, B., Bodu, P., Christensen, M. (eds.), L'Europe Centrale et Septentrionale au Tardiglaciaire. Actes de la table ronde iInternationale (Nemours, 1997), Mémoires du Musée de Préhistoire d'Île-de-France. Nemours, 73–86.

Péntek, A., Zandler, K. 2016: A Cserhát-hegység és az Ipoly-völgy felső paleolitikus és epipaleolitikus lelőhelyeinek topográfiája. Neograd. A Dornyay Béla Múzeum Évkönyve 39, 122–171.

Peresani, M., Duches, R., Miolo, R., Romandini, M., Ziggiotti, S. 2011: Small specialized hunting sites and their role in Epigravettian subsistence strategies. A case study in Northern Italy. In: Bon, F., Costamagno, S., Valdeyron, N. (eds.), Hunting Camps in Prehistory. Current Archaeological Approaches. Proceedings of the International Symposium, May 13-15 2009 - University Toulouse II - Le Mirail, P@lethnology. Toulouse, 251–266. https://doi.org/10.4000/palethnologie.7773

Peresani, M., Monegato, G., Ravazzi, C., Bertola, S., Margaritora, D., Breda, M., Fontana, A., Fontana, F., Janković, I., Karavanić, I., Komšo, D., Mozzi, P., Pini, R., Furlanetto, G., Maria De Amicis, M. G., Perhoč, Z., Posth, C., Ronchi, L., Rossato, S., Vukosavljević, N., Zerboni, A. 2021: Hunter-gatherers across the great Adriatic-Po region during the Last Glacial Maximum: Environmental and cultural dynamics. Quaternary International, The Last Glacial Maximum in Europe – State of the Art in Geoscience and Archaeology 581–582, 128–163. https://doi.org/10.1016/j.quaint.2020.10.007

Pilaar Birch, S. E., Miracle, P. 2015: Subsistence continuity, change, and environmental adaptation at the site of Nugljanska, Istria, Croatia. Environmental Archaeology 20, 30–40. https://doi.org/10.1179/1749631414Y.0000000051

Pilaar Birch, S. E., Vander Linden, M. 2018: A long hard road… Reviewing the evidence for environmental change and population history in the eastern Adriatic and western Balkans during the Late Pleistocene and Early Holocene. Quaternary International, Impacts of gradual and abrupt environmental changes on Late glacial to Middle Holocene cultural changes in Europe 465, 177–191. https://doi.org/10.1016/j.quaint.2016.12.035

Płonka, T. 2022: The Tardenoisian concept in Polish Mesolithic studies. Sprawozdania Archeologiczne 74, 141–155. https://doi.org/10.23858/SA/74.2022.1.3014

Płonka, T., Bobak, D., Szuta, M. 2020: The dawn of the Mesolithic on the plains of Poland. Journal of World Prehistory 33, 325–383. https://doi.org/10.1007/s10963-020-09146-0

Połtowicz-Bobak, M. 2020: Eastern border of the Magdalenian Culture: an area of settlement or resource gathering? Anthropologie (Brno) 58, 215–226. https://doi.org/10.26720/anthro.20.03.20.1

Priskin, A. 2009: A távolsági nyersanyagok felhasználása a kárpát-medencei felső paleolitikum kései időszakában. In: Ilon, G. (ed.), ΜΩΜΟΣ VI. Őskoros Kutatók VI. Összejövetele. Kőszeg, 2009. március 19–21. Nyersanyagok és kereskedelem. Szombathely, 311–320.

Puzachenko, A. Yu., Markova, A. K. 2019: Evolution of mammal species composition and species richness during the Late Pleistocene – Holocene transition in Europe: A general view at the regional scale. Quaternary International, Late Quaternary Environments: landscapes, biota, humans 530–531, 88–106. https://doi.org/10.1016/j.quaint.2018.12.025

Pyżewicz, K., Grużdź, W., Rozbiegalski, P., Rakoca, A. 2020: Two methods of blade production among Arch-Backed Point Groups – a case study from the Western Polish Lowland. In: Grimm, S. B., Weber, M.-J., Mevel, L., Sobkowiak-Tabaka, I. (eds.), From the Atlantic to beyond the Bug River. Finding and defining the Federmesser-Gruppen / Azilian. Proceedings of Session A5b (Commission 'The Final Palaeolithic of Northern Eurasia') of the XVIIth UISPP Congress, Burgos, September 2014, RGZM-Tagungen. Mainz, 105–119.

Rasmussen, S. O., Andersen, K. K., Svensson, A. M., Steffensen, J. P., Vinther, B. M., Clausen, H. B., Siggaard-Andersen, M.-L., Johnsen, S. J., Larsen, L. B., Dahl-Jensen, D., Bigler, M., Röthlisberger, R., Fischer, H., Goto-Azuma, K., Hansson, M. E., Ruth, U. 2006: A new Greenland ice core chronology for the last glacial termination. Journal of Geophysical Research: Atmospheres 111. https://doi.org/10.1029/2005JD006079

Rasmussen, S. O., Bigler, M., Blockley, S. P., Blunier, T., Buchardt, S. L., Clausen, H. B., Cvijanovic, I., Dahl-Jensen, D., Johnsen, S. J., Fischer, H., Gkinis, V., Guillevic, M., Hoek, W. Z., Lowe, J. J., Pedro, J. B., Popp, T., Seierstad, I. K., Steffensen, J. P., Svensson, A. M., Vallelonga, P., Vinther, B. M., Walker, M. J. C., Wheatley, J. J., Winstrup, M. 2014: A stratigraphic framework for abrupt climatic changes during the Last Glacial period based on three synchronized Greenland ice-core records: refining and extending the INTIMATE event stratigraphy. Quaternary science reviews, dating, synthesis, and interpretation of palaeoclimatic records and model-data integration: Advances of the INTIMATE project (INTegration of Ice core, Marine and TErrestrial records, COST Action ES0907) 106, 14–28. https://doi.org/10.1016/j.quascirev.2014.09.007

Reade, H., Grimm, S. B., Tripp, J. A., Neruda, P., Nerudová, Z., Roblíčková, M., Sayle, K. L., Kearney, R., Brown, S., Douka, K., Higham, T. F. G., Stevens, R. E. 2020: Magdalenian and Epimagdalenian chronology and palaeoenvironments at Kůlna Cave, Moravia, Czech Republic. Archaeological and Anthropological Sciences 13, 4. https://doi.org/10.1007/s12520-020-01254-4

Reimer, P. J., Austin, W. E. N., Bard, E., Bayliss, A., Blackwell, P. G., Ramsey, C. B., Butzin, M., Cheng, H., Edwards, R. L., Friedrich, M., Grootes, P. M., Guilderson, T. P., Hajdas, I., Heaton, T. J., Hogg, A. G., Hughen, K. A., Kromer, B., Manning, S. W., Muscheler, R., Palmer, J. G., Pearson, C., Plicht, J. van der, Reimer, R. W., Richards, D. A., Scott, E. M., Southon, J. R., Turney, C. S. M., Wacker, L., Adolphi, F., Büntgen, U., Capano, M., Fahrni, S. M., Fogtmann-Schulz, A., Friedrich, R., Köhler, P., Kudsk, S., Miyake, F., Olsen, J., Reinig, F., Sakamoto, M., Sookdeo, A., Talamo, S. 2020: The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0–55 cal kBP). Radiocarbon 62, 725–757. https://doi.org/10.1017/RDC.2020.41

Ringer, Á., Lengyel, Gy. 2001: Miskolc-Rózsás-hegy késő-paleolitikus leletei. A Herman Ottó Múzeum Évkönyve 41, 39–61.

Ringer, Á., Lengyel, Gy. 2009: The Upper Palaeolithic site at Budapest Corvin tér. Praehistoria 9–10, 205–211.

Ruiz-Redondo, A., Vukosavljević, N., Tomasso, A., Peresani, M., Davies, W., Vander Linden, M. 2022: Mid and Late Upper Palaeolithic in the Adriatic Basin: Chronology, transitions and human adaptations to a changing landscape. Quaternary Science Reviews 276, 107319. https://doi.org/10.1016/j.quascirev.2021.107319

Sajó, I. E., Kovács, J., Fitzsimmons, K. E., Jáger, V., Lengyel, Gy., Viola, B., Talamo, S., Hublin, J.-J. 2015: Core-shell processing of natural pigment: Upper Palaeolithic red ochre from Lovas, Hungary. PLOS ONE 10, e0131762. https://doi.org/10.1371/journal.pone.0131762

Salamon, Á. 1958: Szekszárd-Palánk. Régészeti Füzetek 10, 36.

Salamon, Á. 1959: Szekszárd-Palánk. Régészeti Füzetek 11, 49.

Salamon, Á. 1960: Szekszárd-Palánk. Régészeti Füzetek 14, 51.

Salamon, Á. 1968: Népvándorláskori temetők Szekszárd-Palánkon – Migration period cemeteries at Szekszárd-Palánk. Szekszárd.

Šarić, J. 2008: Paleolithic and mesolithic finds from profile of the Zemun loess. Starinar 9–27. https://doi.org/10.2298/STA0858009S

Sauer, F., Riede, F. 2019: A critical reassessment of cultural taxonomies in the Central European Late Palaeolithic. Journal of Archaeological Method and Theory 26, 155–184. https://doi.org/10.1007/s10816-018-9368-0

Serwatka, K. 2018: What's your point? Flexible projectile weapon system in the Central European Final Palaeolithic. The case of Swiderian points. Journal of Archaeological Science: Reports 17, 263–278. https://doi.org/10.1016/j.jasrep.2017.10.048

Simán, K. 1990: Population fluctuation in the Carpathian Basin from 50 to 15 thousand years BP. Acta Archaeologica Academiae Scientiarum Hungaricae 42, 15–20.

Sobkowiak-Tabaka, I. 2020: Similar, yet different. The arch-backed piece technocomplex in Poland. In: Grimm, S. B., Weber, M.-J., Mevel, L., Sobkowiak-Tabaka, I. (eds.), From the Atlantic to beyond the Bug River. Finding and defining the Federmesser-Gruppen / Azilian. Proceedings of Session A5b (Commission 'The Final Palaeolithic of Northern Eurasia') of the XVIIth UISPP Congress, Burgos, September 2014, RGZM-Tagungen. Mainz, 119–139.

Sommer, R. S. 2020: Late Pleistocene and Holocene history of mammals in Europe. In: Hackländer, K., Zachos, F. E. (eds.), Mammals of Europe – Past, present, and future. Handbook of the Mammals of Europe. Cham, 83–98. https://doi.org/10.1007/978-3-030-00281-7_3

Sommer, R. S., Nadachowski, A. 2006: Glacial refugia of mammals in Europe: evidence from fossil records. Mammal Review 36, 251–265. https://doi.org/10.1111/j.1365-2907.2006.00093.x

Sonneville-Bordes, D. de, Perrot, J. 1954: Lexique typologique du Paléolithique supérieur. Outillage lithique. I, Grattoirs, II, Outils solutréens. Bulletin de la Société préhistorique française 51, 327–335. https://doi.org/10.3406/bspf.1954.3106

Sonneville-Bordes, D. de, Perrot, J. 1955: Lexique typologique du Paléolithique supérieur, Outillage lithique, III - Outils composites - Perçoirs. Bulletin de la Société préhistorique française 52, 76–79. https://doi.org/10.3406/bspf.1955.3156

Sonneville-Bordes, D. de, Perrot, J. 1956a: Lexique typologique du Paléolithique supérieur: Outillage lithique - IV Burins. Bulletin de la Société préhistorique de France 53, 408–412. https://doi.org/10.3406/bspf.1956.3357

Sonneville-Bordes, D. de, Perrot, J. 1956b: Lexique typologique du Paléolithique supérieur. Outillage lithique (suite et fin) (1), V Outillage à bord abattu - VI Pièces tronquées, VII Lames retouchées - VIII Pièces variées, IX Outillage lamellaire» Pointe azilienne. Bulletin de la Société préhistorique française 53, 547–559. https://doi.org/10.3406/bspf.1956.3374

Starkel, L., Michczyńska, D. J., Gębica, P., Kiss, T., Panin, A., Perşoiu, I. 2015: Climatic fluctuations reflected in the evolution of fluvial systems of Central-Eastern Europe (60–8 ka cal BP). Quaternary International, Climate change and impacts between 8,000 and 60,000 years ago in Central and Eastern Europe 388, 97–118. https://doi.org/10.1016/j.quaint.2015.04.017

Stefański, D. 2017: Tanged Point technocomplex – Swiderian, but what else? New findings from Kraków region, southern Poland. Quartär 64, 241–264. https://doi.org/10.7485/QU64_11

Stefański, D., Wilczyński, J. 2012: Extralocal raw materials in the Swiderian culture: Case study of Kraków-Bieżanów sites. Anthropologie (Brno) 50, 427–442.

Stepanchuk, V. N., Sapozhnikov, I. V., Gladkikh, M. I., Ryzhov, S. N. 2009: Ukrainian Upper Palaeolithic between 40/10.000 BP: Current insights into environmental-climatic change and cultural development. In: Djindjian, F., Kozłowski, J. K., Bicho, N. (eds.), Le Concept de Territoires dans le Paléolithique Supérieur Européen, BAR International Series. Oxford, 63–74.

Stepanchuk, V., Sapozhnikov, I. 2010: The Middle and Upper Pleistocene of Ukraine: A synopsis of Palaeolithic finds with special reference to patterns of peopling and cultural development. Arheologia Moldovei 33, 13–24. https://doi.org/10.11588/amold.2010.0.29738

Stieber, J. 1962: Studien an den Holzkohlenresten aus der spätpaläolitischen Kulturschicht von Szekszárd-Palánk. Światowit 24, 227–230.

Sulgostowska, Z. 2006: Final Palaeolithic societies' mobility in Poland as seen from the distribution of flints. Archaeologia Baltica 7, 36–42.

Sümegi, P. 2011: Modeling the relationship of the Upper Paleolithic communities and the environment of the Carpathian Basin during the Upper Würmian. In: T. Biró, K., Markó, A., Bajnok, K. (eds.), Aeolian scripts: New ideas on the Lithic world. Inventaria Praehistorica Hungariae. Budapest, 181–204.

Sümegi, P., Gulyás, S., Molnár, D., Bozsó, G., Fekete, I., Makó, L., Cseh, P., Molnár, M., Sümegi, B. P., Almond, P., Zeeden, C., Törőcsik, T., Nett, J. J., Markó, A., Lehmkuhl, F. 2021: New chronology and extended palaeoenvironmental data to the 1975 loess profile of Madaras brickyard, South Hungary. Journal of Quaternary Science 36, 1364–1381. https://doi.org/10.1002/jqs.3382

Sümegi, P., Gulyás, S., Molnár, D., Náfrádi, K., Törőcsik, T., Sümegi, B. P., Müller, T., Szilágyi, G., Varga, Z. 2018: Ice Age terrestrial and freshwater gastropod refugia in the Carpathian Basin, Central Europe. In: Ray, S. (ed.), Biological resources of water. London, 45–96. https://doi.org/10.5772/intechopen.71910

Sümegi, P., Kertész, R. 2001: Palaeogeographic characteristics of the Carpathian Basin – an ecological trap during the Early Neolithic? In: Kertész, R., Makkay, J. (eds.), From the Mesolithic to the Neolithic: Proceedings of the international archaeological conference held in the Damjanich Museum of Szolnok, September 22–27, 1996. Budapest, 405–415.

Sümegi, P., Kertész, R., Hertelendi, E. 2002: Environmental change and human adaptation in the Carpathian Basin at the Late Glacial/Postglacial transition. In: Jerem, E., T. Biró, K. (eds.), Proceedings of the 31st International Symposium on Archaeometry. Budapest, 171–177.

Sümegi, P., Krolopp, E. 2002: Quatermalacological analyses for modeling of the Upper Weichselian palaeoenvironmental changes in the Carpathian Basin. Quaternary International, Late Pleistocene and Holocene Investigations in Europe. Internati onal Conference on Past Global Changes (PAGES) 91, 53–63. https://doi.org/10.1016/S1040-6182(01)00102-1

Sümegi, P., Molnár, D., Gulyás, S., Náfrádi, K., Sümegi, B. P., Törőcsik, T., Persaits, G., Molnár, M., Vandenberghe, J., Zhou, L. 2019: High-resolution proxy record of the environmental response to climatic variations during transition MIS3/MIS2 and MIS2 in Central Europe: The loess-paleosol sequence of Katymár brickyard (Hungary). Quaternary International 504, 40–55. https://doi.org/10.1016/j.quaint.2018.03.030

Sümegi, P., Molnar, M., Jakab, G., Persaits, G., Majkut, P., Pall, D. G., Gulyas, S., Jull, A. T., Törcsik, T. 2011: Radiocarbon-Dated Paleoenvironmental Changes on a Lake and Peat Sediment Sequence from the Central Great Hungarian Plain (Central Europe) During the Last 25,000 Years. Radiocarbon 53, 85–97. https://doi.org/10.1017/S0033822200034378

Sümegi, P., Molnár, D., Náfrádi, K., Makó, L., Cseh, P., Törőcsik, T., Molnár, M., Zhou, L. 2022: Vegetation and land snail-based reconstruction of the palaeocological changes in the forest steppe eco-region of the Carpathian Basin during last glacial warming. Global Ecology and Conservation 33, e01976. https://doi.org/10.1016/j.gecco.2021.e01976

Sümegi, P., Molnár, M., Svingor, É., Szántó, Z., Hum, L., Gulyás, S. 2007: Results of radiocarbon analysis of Upper Weichselian loess sequences from Hungary. Radiocarbon 49, 1023–1030. https://doi.org/10.1017/S0033822200042880

Svingor, É., Molnár, M., Szántó, Z. 2005: Radiocarbon data from Upper Paleolithic sites and Late Quaternary paleoecological sites in Hungary. In: Sümegi, P. (ed.), Loess and Upper Paleolithic environment in Hungary. Nagykovácsi, 295–298.

Szegedi, K. I., Major, I., Gulyás, A. Z., Lengyel, Gy. 2023: A new Upper Palaeolithic site in the Northern Great Plain of Hungary. Archaeologiai Értesítő 147, 75–84. https://doi.org/10.1556/0208.2022.00026

Taute, W. 1973: Neue Forschungen zur Chronologie von Spätpaläolithikum und Mesolithikum in Süddeutschland. Archäologische Informationen 2–3, 59–66.

T. Biró, K. 2002: Advances in the study of Early Neolithic lithic materials in Hungary. Antaeus 25, 119–168.

T. Biró, K. 2009a: Methods of lithic raw material characterisation and raw material origins in the Palaeolithic: State of the art in Hungary. In: Djindjian, F., Kozłowski, J. K., Bicho, N. (eds.), Le Concept de Territoires dans le Paléolithique Supérieur Européen, Vol. 3, Session C16, British Archaeological Reports, International Series. Oxford, 111–122.

T. Biró, K. 2009b: Sourcing raw materials for chipped stone artifacts: The state-of-the-art in Hungary and the Carpathian Basin. In: Adams, B., Blades, B. S. (eds.), Lithic materials and Paleolithic societies. Chichester, 47–54. https://doi.org/10.1002/9781444311976.ch4

T. Biró, K. 2011a: Comparative raw material collections in support of petroarchaeological studies: an overview – Összehasonlító nyersanyaggyűjtemények a petroarcheológiai vizsgálatok szolgálatában: áttekintés. In: T. Biró, K., Markó, A. (eds.), Emlékkönyv Violának. Tanulmányok T. Dobosi Viola tiszteletére. Budapest, 225–244.

T. Biró, K. 2011b: Magyarországi kovakőzetek kutatása – Investigation of siliceous rocks in Hungary. Archeometriai Műhely 2011, 211–218.

T. Biró, K., Józsa, S., J. Szabó, K., M. Virág, Z. 2013: Duna: a nagy szállítószalag – Danube: the big prehistoric conveyor belt. Archeometriai Műhely 2013, 33–50.

T. Biró, K., Szilágyi, V., Kasztovszky, Z. 2009: Új adatok a Kárpát-medence régészeti radiolarit forrásainak ismeretéhez – New data on the characterisation of radiolarite sources of the Carpathian Basin. Archeometriai Műhely 2009, 25–44.

T. Dobosi, V. 1972: Mesolithische Fundorte in Ungarn. Alba Regia. Annales Musei Stephani Regis 12, 39–60.

T. Dobosi, V. 1993: Jászfelsőszentgyörgy-Szunyogos, Upper Palaeolithic locality. Tisicum. A Jász-Nagykun-Szolnok Megyei Múzeumok Évkönyve 8, 41–53.

T. Dobosi, V. 1999: Postpleniglacial repeopling of the Hungarian Plain. Folia Quaternaria 70, 297–315

T. Dobosi, V. 2005a: Cadastre of Palaeolithic finds in Hungary. State of art 2005. Communicationes Archaeologicae Hungariae 2005, 49–81.

T. Dobosi, V. 2005b: Gravetti lelőhelyek Pilismarót környékén. Folia Archaeologica 52, 21–47.

T. Dobosi, V. 2009: A hazai felső paleolitikum vázlata. Tisicum. A Jász-Nagykun-Szolnok Megyei Múzeumok Évkönyve 19, 13–29.

T. Dobosi, V. 2010: Prut flint at the top: Esztergom-Gyurgyalag Hungary. In: Gancarski, J. (ed.), Transkarpackie kontakty kulturowe w epoce kamienia, brązu i wczesnej epoce żelaza. Krosno, 99–113.

T. Dobosi, V. 2016: Tradition and modernity in the lithic assemblage of Mogyorósbánya Late Palaeolithic site. Acta Archaeologica Academiae Scientiarum Hungaricae 67, 5–30. https://doi.org/10.1556/072.2016.67.1.1

T. Dobosi, V., Jungbert, B., Ringer, Á., Vörös, I. 1988: Palaeolithic settlement in Nadap. Folia Archaeologica 39, 13–40.

T. Dobosi, V., Szántó, Z. 2003: A gravetti időszak hagyományos és radiokarbon koradatai. Archaeologiai Értesítő 128, 5–16. https://doi.org/10.1556/ArchErt.128.2003.1-2.1

Timar-Gabor, A., Panaiotu, C., Vereş, D., Necula, C., Constantin, D. 2017: The lower Danube loess, new age constraints from luminescence dating, magnetic proxies and isochronous tephra markers. In: Radoane, M., Vespremeanu-Stroe, A. (eds.), Landform dynamics and evolution in Romania, Springer Geography. Cham, 679–697. https://doi.org/10.1007/978-3-319-32589-7_29

Tomasso, A. 2016: Une unité de façade: Évolution des systèmes techniques épigravettiens entre l'Allerød et le Dryas récent au sud des Alpes. Bulletin de la Société préhistorique française 113, 241–264. https://doi.org/10.3406/bspf.2016.14623

Tomasso, A. 2017: L'Épigravettien : variabilité diachronique et géographique. In: Olive, M. (ed.), Campo delle Piane : Un habitat de plein air épigravettien dans la Vallée du Gallero (Abruzzes, Italie centrale), Collection de l'École française de Rome. Rome. https://doi.org/10.4000/books.efr.33297

Tomasso, A., Fat Cheung, C., Fornage-Bontemps, S., Langlais, M., Naudinot, N. 2018: Winter is coming: What happened in western European mountains between 12.9 and 12.6 ka cal. BP (beginning of the GS1). Quaternary International, Impacts of gradual and abrupt environmental changes on Late glacial to Middle Holocene cultural changes in Europe 465, 210–221. https://doi.org/10.1016/j.quaint.2017.12.020

Tomasso, A., Naudinot, N., Binder, D., Grimaldi, S. 2014: Unité et diversité dans l'Épigravettien récent de l'arc liguro-provençal. In: Les groupes culturels de la transition Pléistocène-Holocène entre Atlantique et Adriatique. Paris, 155–184.

Tomasso, A., Serradimigni, M., Ricci, G., Mihailovic, D. 2020: Lost in transition: Between Late Pleistocene and Early Holocene around the Adriatic. Quaternary International, Cultures of the Pleistocene-Holocene transition in Western Europe 564, 3–15. https://doi.org/10.1016/j.quaint.2019.07.033

Trájer, A. J. 2022: Placing of the second oldest red ochre mine in mainland Europe, Lovas, Hungary, to human, paleoenvironmental and paleobiogeographic context. Quaternary Science Reviews 292, 107670. https://doi.org/10.1016/j.quascirev.2022.107670

Turq, A. 2005: Réflexions méthodologiques sur les études de matières premières lithiques. 1 – Des lithothèques au matériel archéologique. PALEO. Revue d'archéologie préhistorique 111–132. https://doi.org/10.4000/paleo.883

Ujházy, K., Gábris, G., Frechen, M. 2003: Ages of periods of sand movement in Hungary determined through luminescence measurements. Quaternary International, Late Quaternary environmental change in African Drylands 111, 91–100. https://doi.org/10.1016/S1040-6182(03)00017-X

Valde-Nowak, P., Kraszewska, A. 2014: Nowa Biała and Sromowce Niżne – Late Palaeolithic Central Carpathian sites with Arched-Backed Points. Acta Archaeologica Carpathica 49, 5–35.

Valde-Nowak, P., Kraszewska, A. 2020: Two Arch-Backed Points varieties in the Northern Carpathians. In: Grimm, S. B., Weber, M.-J., Mevel, L., Sobkowiak-Tabaka, I. (eds.), From the Atlantic to beyond the Bug River. Finding and defining the Federmesser-Gruppen / Azilian. Proceedings of Session A5b (Commission 'The Final Palaeolithic of Northern Eurasia') of the XVIIth UISPP Congress, Burgos, September 2014, RGZM-Tagungen. Mainz, 105–119.

Valde-Nowak, P., Kraszewska, A., Stefański, D. 2013: Arch-Backed and Tanged Point technocomplexes in the North Carpathian zone. Recherches Archéologiques Nouvelle Serie 5–6, 69–85.

Valoch, K. 1980: La fin des temps glaciaires en Moravie (Tchécoslovaquie). L'Anthropologie 84, 380–390, 673–674.

Valoch, K. 1996: Le Paléolithique en Tchéquie et en Slovaquie. Préhistoire de l'Europe. Grenoble.

Verhart, L. B. M. 2000: The function of Mesolithic bone and antler points. Anthropologie et Préhistoire 111, 114–123.

Vermeersch, P. M. 2015: An Ahrensburgian site at Zonhovan-Molenheide (Belgium). Leuven.

Verpoorte, A. 2004: Eastern Central Europe during the Pleniglacial. Antiquity 78, 257–266. https://doi.org/10.1017/S0003598X0011292X

Vértes, L. 1957a: Jelentés a f. hó 11-12-én végzett szekszárdi leletmentő kiszállásról (Report on the salvage inspection in Szekszárd in the 11th-12th of this month). MNM Történeti Múzeum Régészeti Adattár VIII.193/1961 (Ltsz. 5560), 863-05-23/1957 R. Magyar Nemzeti Múzeum, Budapest.

Vértes, L. 1957b: Jelentés a f. hó 26-28-án végzett Szekszárd-Palánk-i őskőkori leletmentő munkáról (Report on the salvage works at the Szekszárd-Palánk palaeolithic site in the 26th-28th of this month). MNM Történeti Múzeum Régészeti Adattár VIII.193/1961 (Ltsz. 5560), 863-05-23/1957 R. Magyar Nemzeti Múzeum, Budapest.

Vértes, L. 1958a: Jelentés mezolit tanyahely leletmentéséről, 1958. május 19. (Report on the salvage excavation of a Mesolithic campsite, May 19 1958). MNM Történeti Múzeum Régészeti Adattár 483.sz.VIII (Ltsz. 4115), 865-08-12/1958 R. Magyar Nemzeti Múzeum, Budapest.

Vértes, L. 1958b: Kiszállási jelentés – Inspection report. MNM Történeti Múzeum Régészeti Adattár VIII.193/1961 (Ltsz. 5560), 863-05-3/1958 R. Magyar Nemzeti Múzeum, Budapest.

Vértes, L. 1958c: Szekszárd-Palánk. Régészeti Füzetek 10, 8.

Vértes, L. 1959: Szekszárd-Palánk. Régészeti Füzetek 11, 10–11.

Vértes, L. 1960a: A szekszárd-palánki legkésőbbi őskőkori telep ásatási naplója – Excavation journal of the final palaeolithic site Szekszárd-Palánk. Wosinsky Mór Megyei Múzeum Régészeti Adattára 393-90. Wosinsky Mór Múzeum, Szekszárd.

Vértes, L. 1960b: Jelentés Vértes Lászlónak 1960. szept. 2–4-én, Szekszárd-Palánkon végzett leletmentő ásatásáról (Report on the salvage excavation of László Vértes at the Szekszárd-Palánk site between the 2nd and 4th of September, 1960). MNM Történeti Múzeum Régészeti Adattár 483.sz.VIII (ltsz. 4115), 863-05-33-1960 R. Magyar Nemzeti Múzeum, Budapest.

Vértes, L. 1960c: Szekszárd-Palánk. Régészeti Füzetek 14, 10.

Vértes, L. 1962: Die Ausgrabungen in Szekszárd-Palánk und die archäologischen Funde. Światowit 24, 159–202.

Vértes, L. 1963: A Szekszárd-palánki jégkorvégi őstelep. A Szekszárdi Balogh Ádám Múzeum Tudományos Füzetei. Szekszárd.

Vértes, L. 1964: Das Jungpaläolithikum von Arka in Nord-Ungarn. Quartär 15–16, 79–132.

Vértes, L. 1965: Az őskőkor és az átmeneti kőkor emlékei Magyarországon. A magyar régészet kézikönyve. Budapest.

Visentin, D., Angelucci, D. E., Berruti, G. L. F., Bertola, S., Leis, M., Marchesini, M., Marvelli, S., Pezzi, M., Rizzoli, E., Thun Hohenstein, U., Ziggiotti, S., Fontana, F. 2016: First evidence of human peopling in the southern Po plain after the LGM: The early Sauveterrian site of Collecchio (Parma, Northern Italy). Preistoria Alpina 48, 115–128.

Vörös, I. 1987a: An auroch's (Bos primigenius boj.) skeleton from the Mesolithic peat-bogs at Kecel-Rózsaberek. Folia Archaeologica 38, 65–88.

Vörös, I. 1987b: Large mammalian faunal changes during the Late Upper Pleistocene and Early Holocene times in the Carpathian Basin. In: Pécsi, M. (ed.), Pleistocene environment in Hungary. Contribution of the INQUA Hungarian National Committee to the XIIth INQUA Congress, Ottawa, Canada, 1987. Budapest, 81–103.

Vörös, I. 2000: Bodrogkeresztúr-Henye, hunted mammals from the Upper Palaeolithic site. In: Bodrogkeresztúr-Henye (NE Hungary), Upper Palaeolithic Site. Budapest, 113–186.

Vukosavljević, N., Perhoč, Z. 2017: Lithic raw material procurement of the Late Epigravettian hunter-gatherers from Kopačina Cave (island of Brač, Dalmatia, Croatia). Quaternary International, Prehistoric hunter-gatherers and farmers in the Adriatic and neighboring regions 450, 164–185. https://doi.org/10.1016/j.quaint.2016.09.017

Vukosavljević, N., Perhoč, Z., Altherr, R. 2014: Pleistocene-Holocene transition in the Vlakno Cave on the island of Dugi otok (Dalmatia, Croatia) – lithic perspective. Prilozi Instituta za arheologiju u Zagrebu 31, 5–72.

Vukosavljević, N., Perhoč, Z., Čečuk, B., Karavanić, I. 2011: Late Glacial knapped stone industry of Kopačina Cave. Vjesnik za arheologiju i povijest dalmatinsku 104, 7–54.

Wierer, U., Betti, L., Gala, M., Tagliacozzo, A., Boscato, P. 2016: Seasonality and function of Mesolithic valley-bottom sites: Results from Galgenbühel/Dos de la Forca, Adige valley (South Tyrol, Italian Alps). Quaternary International, MesoLife: A Mesolithic perspective on Alpine and neighbouring territories 423, 102–122. https://doi.org/10.1016/j.quaint.2015.12.009

Wiśniewski, A., Połtowicz-Bobak, M., Bobak, D., Jary, Z., Moska, P. 2017: The Epigravettian and the Magdalenian in Poland: New chronological data and an old problem. Geochronometria 44, 16–29. https://doi.org/10.1515/geochr-2015-0052

Zaliznyak, L. 2006: The archaeology of the occupation of the East European taiga zone at the turn of the Palaeolithic-Mesolithic. Archaeologia Baltica 7, 94–108.

Zaliznyak, L. 2017: Ovruch version of Eastern European Epigravettian. Arheologia 3–16. https://doi.org/10.15407/archaeologyua2017.01.003

Zeeden, C., Hambach, U., Veres, D., Fitzsimmons, K., Obreht, I., Bösken, J., Lehmkuhl, F. 2018: Millennial scale climate oscillations recorded in the Lower Danube loess over the last glacial period. Palaeogeography, palaeoclimatology, palaeoecology, Eurasian loess records: missing link to a better understanding of Northern hemisphere Pleistocene climate evolution 509, 164–181. https://doi.org/10.1016/j.palaeo.2016.12.029

Živaljević, I., Dimitrijević, V., Jovanović, J., Blagojević, T., Pendić, J., Putica, A., Uzelac, V., Bulatović, J., Spasić, M., Jončić, N., Penezić, K., Anđelić, D., Bajčeta, M., Stefanović, S. 2021: Revealing the 'hidden' Pannonian and Central Balkan Mesolithic: New radiocarbon evidence from Serbia. Quaternary International 574, 52–67. https://doi.org/10.1016/j.quaint.2020.11.043

A KÉSŐ PALEOLITIKUM ÉS KORAI MEZOLITIKUM ÁTMENETE A KÁRPÁT-MEDENCÉBEN: SZEKSZÁRD-PALÁNK LELŐHELY REVÍZIÓJA

Összefoglalás

Szekszárd-Palánk a Kárpát-medence déli részén, a Duna középső folyása mentén talált, minden bizonnyal fiatalabb driász korú megtelepedés, egyelőre az egyetlen feltárt, abszolút módszerekkel datált és publikált hazai *in situ* lelőhely ebből az időszakból. A lelőhelyet Vértes László mentőásatás keretei között tárta fel 1957 és 1960 között, és a korszakban rendkívül alaposnak számító módszerekkel vizsgálta. Eredményeinek nagy része a mai napig érvényesnek mondható, a jelen tanulmányban elvégzett revízió főleg a megtelepedés használati idejében, valamint a kőeszköz-tipológiában tér el megállapításaitól. Részletes technológiai kutatásunk egészíti ki ismereteinket a lelőhelyről. Helyi, regionális és interregionális léptékben foglaljuk össze a revízió során kialakult feltételezéseinket.

A Dél-Dunántúl ökológiai mozaikjában Palánk sokrétűen kiaknázható területen helyezkedett el. A szekszárdi dombok és a Dunát szegélyező ligeterdők pereme a vadászatra volt alkalmas, a környező mocsarak és a folyó halfaunája pedig egész évben hozzáférhető lehetett. A feltárt táborrészlet térbeli szerveződése egységes, a rezidenciális mobilitás példájának tekintjük, ahol többféle tevékenység folyt. A leletanyagban megtalálhatók a feldolgozó eszközök, elsősorban a kis méretű vakarók, melyek a jelen lévő okkerrögökkel és csiszolt felületű kavicsokkal együtt talán bőrfeldolgozás kellékei voltak. Az armatúrák aránya viszonylag magas (14%), bár ezen belül a geometrikus mikrolitok és tompított hátú hegyek száma csekély. A rossz megtartású állatcsontanyagot szarvas, őstulok és hód maradványai alkotják, emellett az égett halcsontok és egy agancsból készült szigony vagy hegy utal a halászatra is. A palánki kőipar opportunisztikus magkőredukciós stratégiát tükröz, ami a rendelkezésre álló nyersanyag maximális kiaknázását eredményezte. Az ipar a délkelet-európai késő Epigravettien utolsó szakaszára jellemző technológiát használt, és tipológiai képe is hasonló. A régészeti kultúrák jelzésére használt típusok mennyi-

sége kicsi és változatos, ezért a palánki kollekció nem rendelhető egyértelműen régészeti taxonhoz. A pattintott kövek, a rétegtan és az egyetlen radiokarbonkoradat együtt a holocén kezdetéhez közel, de még a pleisztocén korra keltezi a lelőhelyet. Ezt az időszakot a térség déli és keleti részén végső Epigravettien vagy korai mezolitikum (J. K. Kozłowski 1999; Kozłowski 2001; Bonsall, Boroneanţ 2016; Tomasso 2017; Mihailović 2021; Peresani et al. 2021), a térség északi részén a Nyeles Hegyek Technokomplex és az Epimagdalénien jellemzi (Kozłowski 2001; Burdukiewicz 2011; Płonka, Bobak, Szuta 2020; Sobkowiak-Tabaka 2020; Nerudova et al. 2021). A Kárpát-medence régészeti nevezéktanában jelenleg nincs neve fiatalabb driászt is felölelő késő glaciális periódusnak (14.7–11.7 ka BP), mi a késő paleolitikumot javasoljuk.

Szekszárd-Palánk élénk regionális kapcsolatait a pattintott kövek nyersanyag-összetétele tanúsítja. A bakonyi radiolaritok és cserháti limnoszilicitek magas aránya egy olyan közösségre utal, amely otthonosan mozgott a Kárpát-medence északi felében. A magkőredukció kezdeti fázisai minden nyersanyag esetében a telepen kívül zajlottak, a kollekció kis mérete és a tipikus eszközök nagy aránya szintén arra utal, hogy a palánki megálló egy kiterjedtebb települési rendszer eleme volt. A Duna ökológiai folyosója kézenfekvő útvonal lehetett, talán nem véletlen, hogy a palánki kőanyag egyik magyarországi analógiája a folyó mentén helyezkedik el (Sződliget). A lovasi festékbánya szintén aktív lehetett a palánki tábor korában, közel a bakonyi nyersanyagforrásokhoz, az okkerrögök jelenléte pedig még egy lehetséges kapcsolódási pont a két lelőhely között, amit a következőkben tesztelni érdemes. Mivel Palánkon és Lovason kívül több lelőhelyet nem tudunk a fiatalabb driászra keltezni a Kárpát-medencében, a tájhasználat regionális modelljét nem tudjuk megalkotni. A jelenlegi információk fényében úgy látszik, a késő paleolitikum idején létezett összeköttetés a középhegységek és a síksági régiók között hazánk területén. Az előbbi régió biztosan alkalmas volt eszköz- és festékanyagok beszerzésére, utóbbin pedig széles körű – nem specializált – környezethasznosítás történt.

Szekszárd-Palánk taxonómiai értelemben összekötő szerepet játszik a Balkán és az Északnyugat-Kárpátok között. A lelőhely belső szerkezete és leletanyaga illik a fiatalabb driász kis méretű, mobilis csoportjainak feltételezett képébe. Földrajzi helyzete okán hozzáfért a Duna menti folyosóhoz és a Dráva menti síksághoz. Ökológiai értelemben inkább a vajdasági területekhez tartozott, mint a magyarországi középhegységek vidékéhez. Az ipar délkelet-európai késő Epigravettien technotipológiai jegyei, a déli radiolaritok jelenléte egyaránt balkáni kapcsolatokat feltételeznek. A cserháti és bakonyi nyersanyagok hangsúlyos jelenléte, az erratikus és pruti kovák, a sződligeti és honti technotipológiai hasonlóságok északi kapcsolatokra utalnak. A változatos nyersanyagspektrum késő paleolit jellemző, elüt Közép-Európa és a Balkán korai holocén mezolitikus iparaitól, melyekben a technológia egyszerűsödése mellett a távolsági nyersanyagok aránya erőteljesen csökken (J. K. Kozłowski 1999; Sulgostowska 2006; Stefański, Wilczyński 2012; Borić, Cristiani 2016; Vukosavljević, Perhoč 2017). A leletanyag ugyanakkor magán hordozza a régió boreális korú mezolitikus iparainak technológiai és tipológiai jellemzőit is, azok részleges előképeként értelmezhető. Szekszárd-Palánkot ezért késő paleolitikum/kora mezolitikum átmeneti iparnak tartjuk.

A lelőhely déli földrajzi helyzetével, a Kárpát-medence északi részéből származó nyersanyagaival a cikkünk bevezetőjében felvetett három mobilitási hipotézis mindegyikét alátámaszthatja. Ezek az elméletek: 1) A Kárpát-medence korábbi lakói a késő glaciális idején a pleisztocén hidegkedvelő megafaunát követve elhagyják a régiót, ami jórészt kiürül, és időszakosan, kisebb csoportok látogatják az északi-nyugati területekről. 2) Hasonló demográfiai és mobilitási viszonyok mellett a kisebb csoportok délről-délkelet felől látogatják a területet. 3) A Kárpát-medence déli része az utolsó glaciális maximumot követően nem néptelenedik el, hanem az észak-balkáni és adriai területekhez hasonlóan lakói alkalmazkodnak a változó ökológiai viszonyokhoz. A régió mozaikos kulturális változásokkal jellemezhető, ennek egyik emléke a vizsgált lelőhely.

Revíziónk alapján mi a harmadik elképzelést tartjuk a legvalószínűbbnek. Jelenléte a Kárpát-medence kulturális mozaikosságának tanújele, benne egy helyi (taxonómiai értelemben déli) Epigravettien tradíció továbbélésével (lásd pl. Kertész 1996a; Kozłowski 2001; Kertész 2002; Tomasso et al. 2020; Mihailović 2021; Ruiz-Redondo et al. 2022). Emellett a Duna kiemelt szerepét példázza Közép-Európa és a Balkán közötti kommunikációban (Borić, Cristiani 2016; Łanczont et al. 2021). A holocén időhatár körüli lelőhelyek alacsony száma a Kárpát-medencében véleményünk szerint kutatástörténeti és tafonómiai sajátosságok eredménye, nem a valós településszerkezetet tükrözi.

Az utóbbi két évtized során felfedezett késő glaciális – kora holocén lelőhelyek Magyarországon árterek közelében, enyhén kiemelkedő löszös vagy homokos felszíneken helyezkednek el. A 2014-ben talált, majdnem a jelzett korú Páli-Dombok is ilyen környezetben került feltárásra. Észlelése annak köszönhető, hogy az általános leletmentő munkálatokban a pattintott kövek tanulmányozásában jártas szakember is részt vett. Korábban ez nem volt jellemző. Úgy tűnik, e korszak jobb megismerése Magyarország területén idő és erőforrások függvénye.