

THE NEOLITHIZATION OF EASTERN CROATIA AND SOUTHERN TRANSDANUBIA – LITHIC PERSPECTIVE

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A b s t r a c t. The objective of this paper is to show the complexity of Neolithization processes on the basis of lithic industries structure in eastern Croatia and southern Transdanubia. The location of major deposits of siliceous rocks is presented and the procurement systems of these rocks at the most important sites of the Starčevo Culture and of the LBK Formative Phase in the territories in question is discussed. The data obtained in the raw materials and techno-morphological analyses is compared with the taxonomic and socio-economic diversity of the Early Neolithic Cultures.

K e y w o r d s: Starčevo Culture, LBK Formative Phase, siliceous raw materials, lithic production systems, lithic technology

INTRODUCTION

The objective of this work is to describe the process of Neolithization in the territory of the north-western Balkans and its continuation as the first farmer and stock breeders expanded to the territory of Transdanubia. As the process of Neolithization spread to the west and north the initial, Balkan model of neolithization had undergone transformations that resulted from the adaptation to novel environmental conditions, and – to a lesser extent – from contacts with local, pre-Neolithic groups. One of the vital environmental factors was the availability of deposits of new lithic raw materials, which – in turn – caused modification of technological processes and organization of lithic production. Simultaneously, changes took place in subsistence economy, dwelling structures and settlement organization. In terms of taxonomy these changes express the replacement of the Starčevo culture by the LBK and the Sopot culture (Fig. 1).



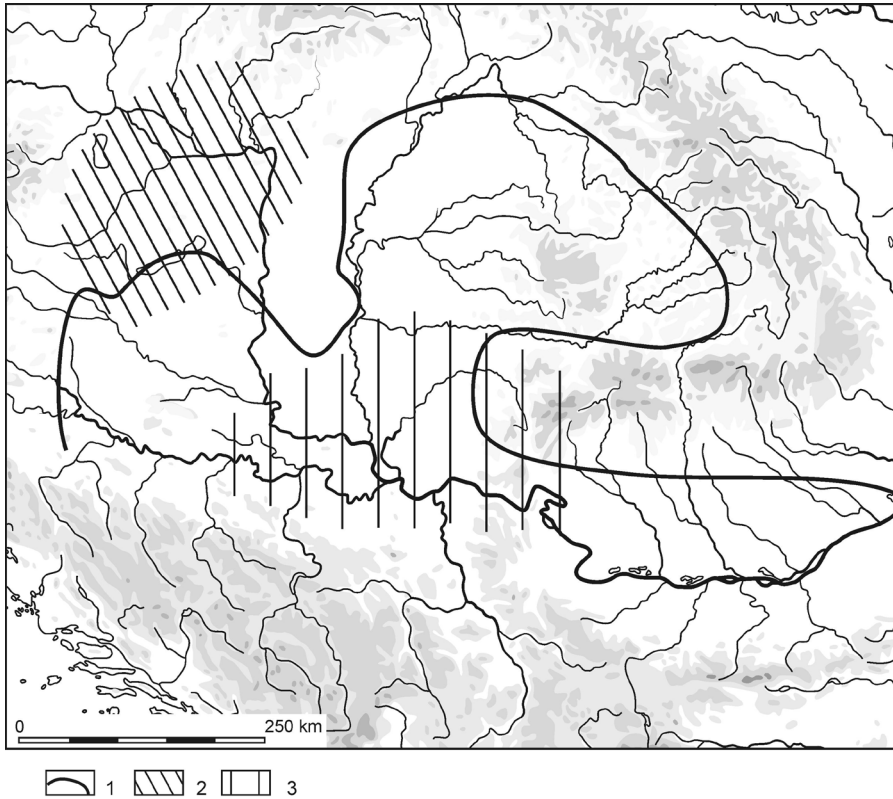


Fig. 1. Map of the Early Neolithic complexes in the Northern Balkans and Transdanubia: 1 – Starčevo-Körös-Criș, 2 – Early Phase of the LBK, 3 – Vinča

RAW MATERIAL SOURCES IN SE EUROPE

Siliceous sediments suitable for production of chipped stone tools are present throughout the SE Europe on different locations (Fig. 2). Those rocks were sedimented during various geological periods, and their chronological analysis was sometimes possible if these remains of fossil micro-organisms indicative of a given period were available.

Dinaric Ophiolite Zone

In the Balkans radiolarite sediments were accumulated in the Ophiolite complex: base, ultrabase and ultramafic intrusives, diabases and effusive eruptive rocks which originated from the ocean crust, as well as siliceous and small-grained clastic sedimentary rocks – chert, silt and Greywacke sandstones (diabase-chert formation) (TIŠLJAR 1994: 219). Usable raw material, chert, also appeared as metasomatic replacement of limestone in different regions in the Balkans (HERAK 1990: 241–248; KARAMATA 2006;

VISHNEVSKAYA et al. 2009). Radiolarites from secondary deposits in the mouths of the Bosna and Vrbas river in this zone were often used.

Northern Bosnia

Another form of siliceous sediments were Upper Cretaceous replacement cherts found in the area between the towns of Doboj and Maglaj (Fig. 2). Geotectonically this area belongs to the Dinaride Ophiolitic Zone (DOZ) which consists of radiolarite, ultramafic rocks, spilite serpentinite and ophiolitic melange. To the north DOZ is in contact with the Sava-Vardar Zone (SVZ) (Geological formations of the active continental margin) composed of Cretaceous-Paleogene melange and turbidite rocks (HRVATOVIĆ 2009).

During the field investigation we discovered two outcrops, one 4 km east of Doboj and the other close to Gračanica, which contain reddish cherts that macroscopically correspond to cherts from the archeological sites in Croatia. The outcrops belong to the greater masses of Upper Cretaceous carbonate rocks which are tectonically in discordant position to the DOZ (HALAMIĆ et al., in preparation).

This material was in extensive use during the Starčevo culture between the Sava, Drava and Danube, unlike Starčevo sites east of the Danube.

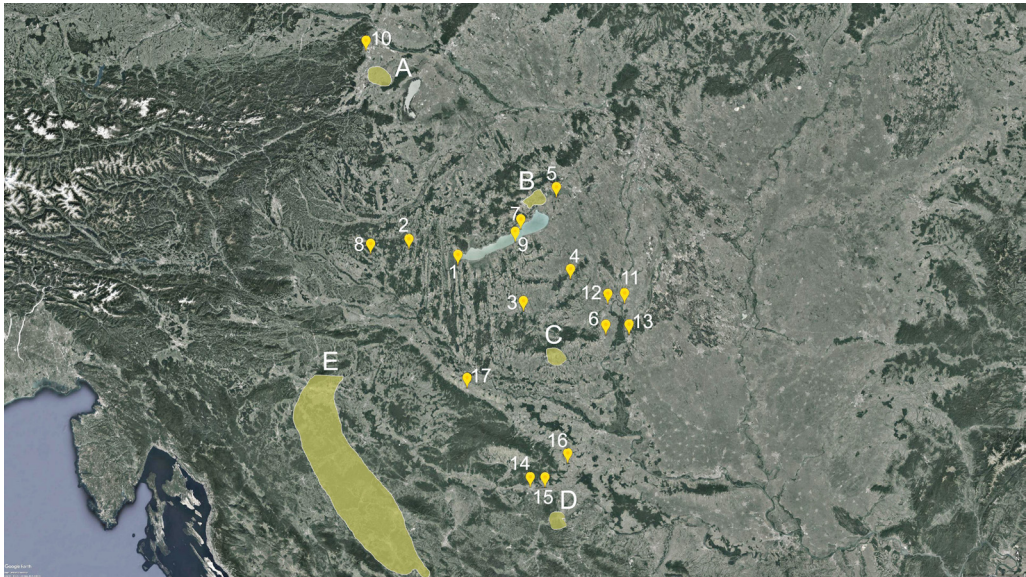


Fig. 2. Map of the sites (1) and main raw material sources (2) in Eastern Croatia and Transdanubia. List of the sites: 1 – Vörs-Máriaasszony-sziget (Starčevo Culture), 2 – Gélienháza-Városrét (Starčevo Culture), 3 – Kaposhomok (Mesolithic), 4 – Regöly (Mesolithic), 5 – Nadasdlaány (Mesolithic), 6 – Alsónyék-bátaszék (Starčevo Culture), 7 – Tihany-Apáti (Starčevo Culture), 8 – Szengyörgyvölgy-Pityerdomb (Starčevo/LBK), 9 – Balatonszárszó-Kis-erdeli dűlő, 10 – Brunn II (Early LBK), 11 – Fajsz-Garadomb (Vinča impact), 12 – Tolnai Mozs (Vinča impact), 13 – Bajaszentivan-Szlatina (Vinča impact), 14 – Slavonski Brod-Galovo (Starčevo Culture), 15 – Zadubravlje (Starčevo Culture), 16 – Ivandvor, 17 – Virovitica-Brekinja. List of raw material sources: A) Vienna basin radiolarites, B) Bakony mountains Szentgál radiolarites, C) Mecsek radiolarites, D) area replacement cherts, E) Central Dinaric Ophiolite Zone – radiolarites

Mecsek Hills

The Mecsek Hills are situated in southern Hungary. The Mesozoic sequence of the eastern Mecsek Mts., is known from the Lower Triassic. Radiolarites were accumulated during the Middle and Upper Jurassic period (HARANGI 1987–1988). Radiolarites of red colour were used as a source of raw material of local importance during the Neolithic (BIRÓ 1998).

Transdanubian Mid-Mountains

Radiolarite desposits concentrate in the Bakony Mountains within the Middle Jurassic formations. Three major regions of occurrence of radiolarites are distinguished (BIRÓ, REGENYE 2003) namely: Szentgál, Úrkút-Eplény, and Hárskút. Traces of prehistoric exploitation have been confirmed in the region of the Tüskovesd-hill near Szentgál. The Szentgáltype radiolarite is a high quality rock and the most frequently used raw material in the Stone Age, especially in the LBK (MATEICIUCOVÁ 2008).

Macroscopically the radiolarites mentioned above differ in colour: the Szentgál radiolarite is mainly red or orange-red, the Úrkút type is as a rule yellowish (possibly mustard colour), sometimes light beige to beige in colour; within the siliceous matrix and in the cortex intrusions of black pigment occur. The Hárskút radiolarite is brown to grey-brown.

Radiolarites (or radiolarian flint) have also been registered in the vicinity of Sümeg in the western part of the Bakony Mountains within the limestones from the end of the Jurassic and beginning of the Cretaceous. These desposits were exploited by mining (BÁCSKAY 1990, 1995).

Despite their high quality the radiolarites from the Bakony Mountains are often difficult to distinguish macroscopically from the radiolarites located further to the north in the Gerecse Mountains. Geochemical analyses show that the radiolarites from the Gerecse Mountains are closer to the radiolarites from the region around Vienna (BIRÓ 2002).

In the Transdanubian Mid-Mountains other raw materials that were mainly used locally also occur such as Upper Cretaceous Tevel type flints from the north-west part of the Bakony Mountains from the region of Nagytevel, and Lower Jurassic spongolites (BIRÓ 1987).

Radiolarites from the Vienna Basin

Within the Jurassic limestones in the neighbourhood of Mauer near Vienna there occur reddish-violet, reddish-brown, grayish green, black and yellowish radiolarites with veins of chalcedony, quartz and carbonates. They were exploited at the LBK sites and in the Lengyel culture (BRANDL, TRNKA 2014).

THE STARČEVO BETWEEN SAVA-DRAVA-DANUBE RIVERS

Starčevo culture is the earliest manifestation of the Neolithic population in the region (HRŠAK, ŠOŠIĆ KLINDŽIĆ 2014). Its connections and relationship with hypothetical, local Mesolithic population are not clear. First of all Mesolithic sites are absent in the region. There are two main possible reasons for this absence: state of research (there were no systematic surveys and excavations always stop at the subsoil level) or the actual low density of population in the region during the Mesolithic. There are few mentions of possible Mesolithic sites (e.g. MALEZ 1979 mentions three sites), but there are no drawings, and the available material does not have Mesolithic characteristics. Very low density of Mesolithic sites is also observed in Transdanubia as we will explain in the following chapters.

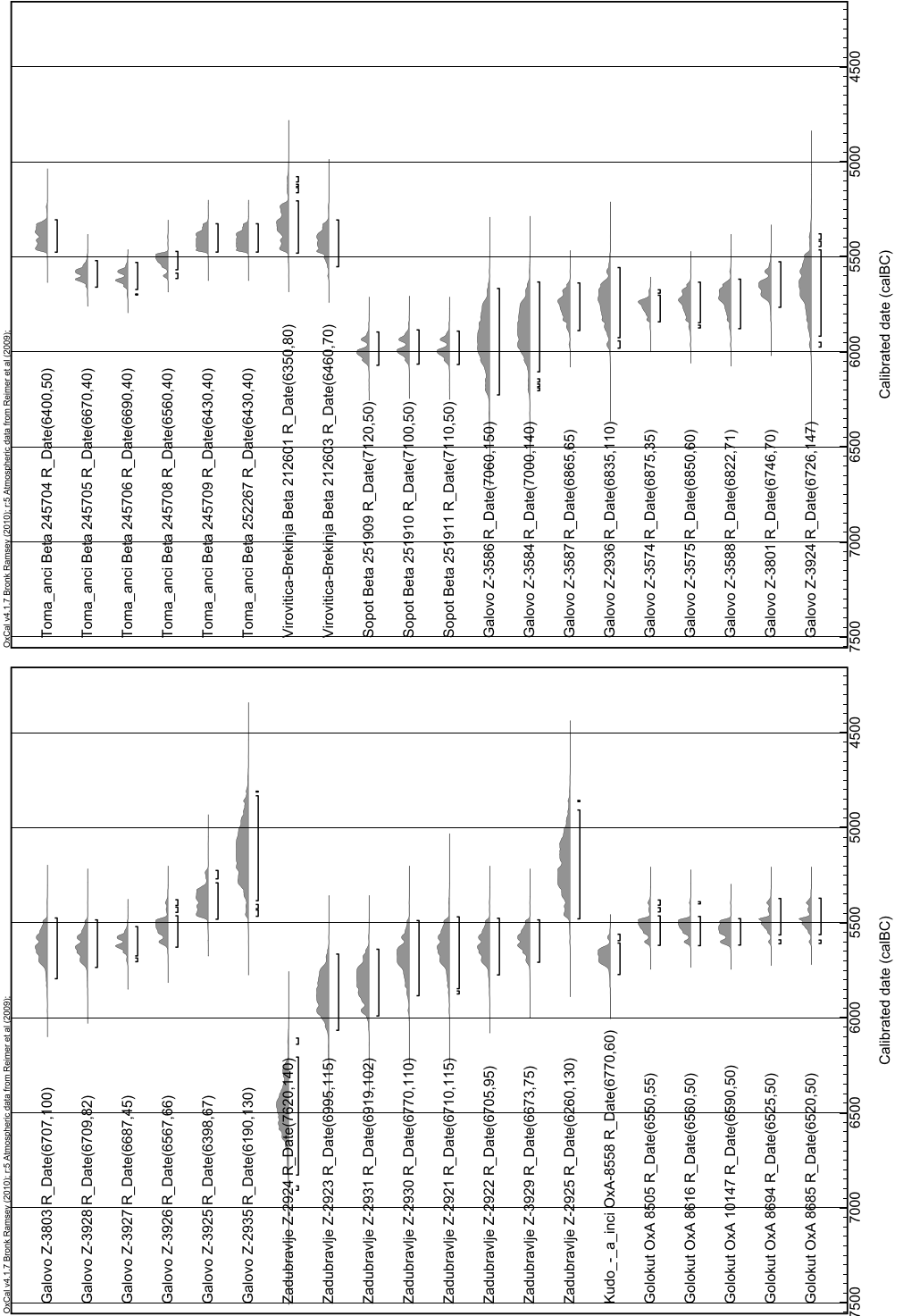
Chronology

¹⁴C dates from the area between the Sava and the Drava and the dates from adjacent areas show discontinuity. In this zone of dense occupation people moved not only along the Sava river, but also from the south along the Bosna river (Fig. 3). These dates suggest that some occupation in these areas – even if not dense – can be traced from the beginning of the 6th millennium BC, more intensive from 5800 cal BC. (VOGEL, WATERBLOCK 1963; GIMBUTAS 1974; WHITTLE et al. 2002, 2005; MINICHREITER, KRAJCAR BRONIĆ 2006; KRZNARIĆ ŠKRIVANKO 2010; BOTIĆ 2016). The location of the settlement and the raw material sources require some redefinition of chronological relationships between the occupation by the Starčevo culture population of the areas north and south of the Sava River.

The existing absolute dates indicate that the Starčevo Culture spanned the period between 6200 and 5400 BC (WHITTLE et al. 2002: 64). In Eastern Croatia (Fig. 3) it is from 5800 to 5400 BC (HRŠAK, ŠOŠIĆ KLINDŽIĆ 2014).

Sites

To date, around 100 archaeological sites of the Starčevo Culture have been identified in the area between the Sava and Drava rivers, but just a few of them have been excavated, while the others have only been recorded in field surveys (MINICHREITER 2007: 14). Around a hundred sites have also been identified in the territory of Serbia, too (NIKOLIĆ 2005: 21). The majority of those settlements consist of a single layer and belong to one phase from a given chronological subdivision. Exceptions in this respect are the settlements of Rudnik and Gladnica (NIKOLIĆ 2005: 57), Vinkovci and Galovo in Slavonski Brod (DIMITRIJEVIĆ 1979; MINICHREITER 2007). The earliest pre-historic settlements were set up on dry land surfaces covered with loess, on the edges of marshland, which stretched in a belt of 1–5 km broad along the left bank of the Sava, to the north from its present-day course (MINICHREITER 2000: 59). Protagonists of the Starčevo Culture established their settlements on high terraces along large river courses (Erdut, Vinkovci, Sarvaš, Vukovar, Slavonski Brod), on low hills on the edges



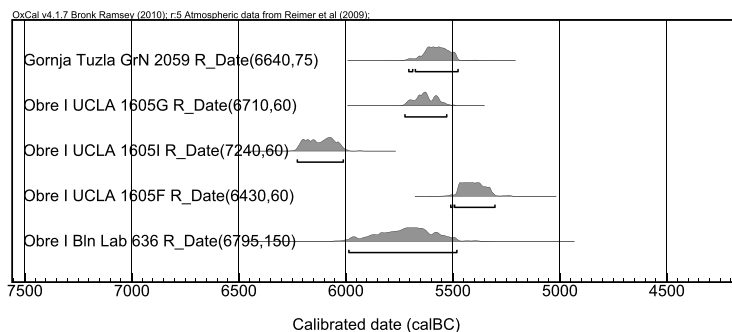


Fig. 3. List of radiocarbon dates for Early Neolithic in Eastern Croatia and neighboring areas

of plains with water courses (Bukovlje, Kneževi Vinogradi, Pepelane, Podgorač) or on slightly elevated locations within plains, near small water courses (for example, Gornja Vrba, Lipovac, Vrpolje, Zadubravlje). The settlements were never isolated, or distant from one another (MINICHREITER 1992: 37). Most of them were grouped along rivers (which corresponds to the *modus vivendi* of the protagonists of the Starčevo Culture and of the Early Neolithic in general): Zadubravlje, Galovo in Slavonski Brod, Igrač on the bank of the Sava; Virovitica on the Drava; Ivandvor, Tomašanci near the River Vuka; Vinkovci on the Bosut; Šagovina Cernička (Šumetlica, the Trnava brook). These patterns have been identified on the basis of analysis of around 60 Starčevo Culture sites (MINICHREITER 2007: 26). The relative dating in the territory of Croatia is done using the periodization by Dimitrijević (DIMITRIJEVIĆ 1979). The Starčevo Culture sites excavated recently in the surroundings of Đakovo (5 settlements of the Starčevo Culture have been excavated in the corridor Vc: Sredanci, Tomašanci, Stari Perkovci, Novi Perkovci, Selci Đakovački – Kaznica-Rutak) and Virovitica all belong to the later phases of the Starčevo Culture, based on pottery finds and absolute dates (SEKELJ IVANČAN, BALEN 2006; HRŠAK, PAVLOVIĆ 2007; LELEKOVIĆ 2008; GEROMETTA 2009).

Raw material was obtained almost exclusively from present day Bosnia, from the area around present day town of Dobož. Sources are 30–50 km away from the settlements on the Sava, where production took place. From there, all other sites could be easily reached, which is evidenced by lithic assemblages. The exploited raw material is red-colour good quality Upper Cretaceous replacement chert. It was procured and transported to the sites close to the Sava river even though good quality radiolarite pebbles could easily be collected in the mouth of the Bosna river (ŠOŠIĆ KLINDŽIĆ 2010). This suggests that the Starčevo culture appeared simultaneously on the Sava-Drava river and in the Northern and Central Bosnia. Tradition of raw material exploitation and tool production remains the same throughout the entire span of the Starčevo culture between the Sava and the Drava, just as pottery tradition remained the same for several hundreds years (SPATARO 2010). With the end of Starčevo culture stops the use of replacement cherts in the interfluvium. Later Neolithic populations used mainly radiolarite pebbles eroded from Ophiolite zone.

Methods of lithic production and distribution

So far, lithic material was analysed from following Starčevo sites in the interfluvium – Slavonski Brod-Galovo, Zadubravlje, Đakovo Ivandvor, Vinkovci, Virovitica-Brekinja, Tomašanci-Palača and Šagovina Cernička (ŠOŠIĆ KLINDŽIĆ 2010). Based on the presence of debitage categories on a certain site we can assume different activities concerning lithic production were in place (Tab. 1). On Zadubravlje and Slavonski Brod-Galovo we have evidence of all phases of production while on Šagovina Cernička there is no evidence of in-situ production. On sites like Đakovo-Ivandvor and Virovitica Brekinja there are evidence of flake and blade production but not initial core preparation and processing (Tab. 1). The assemblage displayed a small quantity of chunks which testified: a) the skill of the knappers and b) the quality of the raw material. Zadubravlje and Slavonski Brod – Galovo functioned as centers of distribution of raw material, more precisely replacement chert, which was collected in Northern Bosnia (Fig. 2). These replacement cherts are of Upper Cretaceous period (HALAMIĆ et al., in preparation), red-coloured and of good chipping qualities. Those settlements undoubtedly had numerous other functions, but one of the most important was the production of cores, primarily, blade cores. Raw material was obtained during periodic trips in-search of raw materials to Northern Bosnia. The inhabitants were very selective in their choice of raw material. Even though the Sava river-bed was rich in siliceous pebbles and in the Ophiolite and Sava-Vardar zones (HRVATOVIĆ 2006) primary radiolarite were abundant, the first choice for these people was the replacement cherts of very good chipping quality. The criteria for the selection could be various – the knowledge of the source, tradition, good chipping quality, distinctive and attractive appearance, suitable size, the possibility of easy exploitation. The Sava river flooded quite frequently, several times a year, and because of that the river-bed could not be approached nor the river crossed (RUBIĆ 1953). We can assume that in such periods, between two expeditions, the inhabitants used raw material they could collect locally, in the river-beds of smaller rivers and brooks, as well as on the surface. The alluvial drifts of the Sava river carried chert and radiolarite pebbles which could be collected on the surface. So far it has been hard to decide whether cores and other products made of river pebbles were also distributed to other settlements, since the raw material is similar and available in various localities. In the Zadubravlje and Slavonski Brod-Galovo, the raw material was reduced into cores and blades and distributed to the other sites (Đakovo-Ivandvor, Virovitica-Brekinja, Tomašanci-Palača, Šagovina Cernička, Vinkovci) north, to the west and to the east – Virovitica (ŠOŠIĆ KLINDŽIĆ 2010). The range of the distribution of this raw material is yet to be established. The sites of Slavonski Brod Galovo and Zadubravlje display all the phases of production. The dominant raw material was silicified replacement cherts of Upper Cretaceous age. Around 70% of the artifacts were made on that chert (with the exception of the site Virovitica-Brekinja (Tab. 2) On the basis of current analyses, we have established that people returned to these localities several times and that sites were occupied for prolonged periods of time. Return to the same place, especially if location was good, near

Table 1. Quantity of lithic production categories on Starčevo sites in Sava-Drava-Danube interfluvie

Type	Zadubravlje		Galovo		Šagovina Cernička		Virovitica-Brekinja		Tomašanci- Palača		Đakovo- Ivandvor		Vinkovci	
	quantity	%	quantity	%	quantity	%	quantity	%	quantity	%	quantity	%	quantity	%
Pebbles	0	0	0	0	0	0	0	0	0	0	2	0.22		
Precores	0	0	5	0.2	0	0	0	0	0	0	0	0		
Corticated flakes	1002	24.3	690	25.1	3	4.8	14	5.5	0	0	29	3.24	13	6.28
Corticated blades	205	5.0	110	4.0	0	0	2	0.8	0	0	5	0.56	3	1.45
Flakes	1531	37.2	835	29.5	21	33.3	151	59.2	15	25.9	402	44.87	89	43
Blades	739	17.9	724	26.4	35	55.6	66	25.9	36	62.1	376	41.96	76	36.71
Cores	118	2.9	149	5.4	0	0	10	3.9	4	6.9	44	4.91	13	6.28
Technical categories	44	1.1	97	3.5	0	0	4	1.6	0	0	18	2.01	11	5.31
Chunks	480	11.7	136	5.0	4	6.3	8	3.1	3	5.2	20	2.23	2	0.97
Total	4119	100.0	2746	100.0	63	100.0	255	100.0	58	100.0	896	100	207	100

Table 2. Quantity of replacement chert in the lithic assemblage of Starčevo sites in Sava-Drava-Danube interfluve

Site	Percentage of Upper Cretaceous replacement cherts in the assemblage
Šagovina Cernička	66.70%
Virovitica-Brekinja	3.90%
Slavonski Brod-Galovo	69.40%
Zadubravlje-Dužine	65.30%
Đakovo-Ivandvor	77.70%
Tomašanci-Palača	76.90%
Vinkovci	71.00%

a river or a major communication route, was quite frequent among the Early Neolithic population. Moreover, a certain respect towards ancestors was displayed, i.e. avoidance of their potential remains when new settlements were set up. In a number of features in Galovo and Zadubravlje the assemblages could be characterized as workshop waste based primarily on the amount of cortical blades and flakes (around 30% on both sites comprise cortical blades and flakes – Tab. 1). A workshop type of assemblage is a term used for assemblages containing more than 500 artefacts in one feature (BALCER 1995: 75), and refers to both the waste which was directly linked with a workshop as well as to the artefacts produced in a workshop. Some artefacts from a workshop were frequently swept into an adjacent pit. In the consequence there is sometimes no evidence of the existence of a workshop on the surface (BALCER 1995: 78).

The distribution of finds inside features as well as the structure of the assemblages, indicate that pits were not locations where the production took place. The sites of Zadubravlje and Galovo show all the typical characteristics of sites with intensive production. The number of tools in the two assemblages was relatively small (7% and 7.9%). Raw material was brought to a site where it was shaped into cores; then blades and flakes were split off. Part of the prepared cores were stored for later use or were later taken to settlements which participated in the exchange system. The blocs of raw material were of greater size than the commonly found river pebbles, which was evidenced by the dimensions of the flakes and blade-like flakes, some of which were up to 15 cm long.

Initially, cortical flakes were detached. A large number of cortical blade-like flakes indicates the stage of core preparation. Blade size differed depending on the stage of core reduction. Although blade size varied the length/width ratio remained the same. At Slavonski Brod-Galovo blades are between 22 mm and 63 mm, at Đakovo-Ivandvor 16 mm to 55 mm, and at Zadubravlje blade length is between 15 mm to 46 mm. The most numerous group of cores were blade cores. Some of the cores were “exhausted”, while some of them could still be chipped. The latter were probably used as stock for the inhabitants of Galovo and Zadubravlje, or were the cores which, for various reasons, never reached their end-users. Flakes and blades from platform renewal i.e. core retrimming evidence full cycle of reduction as needed (found at Slavonski Brod-

Galovo, Zadubravlje and Đakovo-Ivandvor). After the core orientation was changed flakes were detached from a new platform. Some cores have vertical platforms, but not as a rule. The cores were carefully prepared; cores for blades were mostly conical or wedge shaped. The type of the raw material resulted in the presence of “tabular” cores. Tabular cores were found in Zadubravlje, Slavonski Brod-Galovo and Đakovo-Ivandvor. Those cores had much greater width than thickness, covered with cortex on two sides, and scars on lateral sides. Decorticated cores of all types were fully exhausted, especially at sites which are not workshop sites but settlements where cores were processed in several episodes. The inhabitants of the Starčevo culture settlements did not process cores in a complete reduction sequence but continued reduction as needed (KACZANOWSKA, KOZŁOWSKI 2008).

From production sites (Slavonski Brod-Galovo and Zadubravlje), cores, blanks and finished tool were distributed to other sites in Eastern Croatia – Tomašinci-Palača, Đakovo-Ivandvor, Vinkovci, Šagovina Cernička. At other sites there is no evidence of preliminary preparation (precores and cortical flakes are absent); at some sites (Šagovina Cernička) cores are absent (Tab. 1). On the basis of production methods we can distinguish two types of sites: partial production sites (such as Ivandvor for example), and consumption settlements.

By analogy with central areas of the Starčevo culture, we could assume that cores were not exhausted in a single reduction episode, but that the knappers detached as many blades as needed at a given moment, and stored the core for later use and reducing size of blades because is the results of the reduction of the size of a core (standard deviation of core lengths is between 6.2–8). This means that blades were not “goods” that was stored and saved for future use, but cores. Such practice was possible because the raw material was good quality and easily worked. The structure of the assemblage from the site of Virovitica-Brekinja, also indicates that this site belongs to this group, but was not in a system of exchange. The raw material from Virovitica-Brekinja, even though macroscopically similar, does not belong to the group of replacement cherts used on other sites. Analysis showed that raw material used are radiolarites and radiolarian cherts (ŠOŠIĆ KLINDŽIĆ 2010). Probably Virovitica-Brekinja belonged to some other system of exchange and supply. The inhabitants of Virovitica-Brekinja, just like the inhabitants of other settlements from this group, sometimes shaped cores from locally available raw material. A small quantity of local pebbles was used when needed. Such exploitation method is recorded at all settlements in this group. It is important to mention that, even though core preparation was only sporadic, all the cores – those obtained by exchange and cores made on-site, were very carefully processed and well-exhausted which is confirmed by flakes from platform rejuvenation.

The settlements where cores or production waste is absent show the highest percentage of tools. To the settlements of this type belong Tomašinci-Palača and Šagovina Cernička. At the site of Šagovina Cernička no cores were found, while three were found in Tomašinci-Palača. In the assemblages of both settlements, the dominant artefacts were blades (Tab. 1). Dominant retouched blades in the tool kit and predominance

of replacement chert in the assemblage also show typical characteristics of Starčevo culture lithics between Sava, Drava and Danube rivers.

Tool composition varies depending on the type of settlement. Typology is similar: laterally retouched blades predominate, followed by endscrapers on blades, truncations and trapezes (Figs 4, 5). At sites in the Sava-Drava interfluvium trapezes were made by breaking. The microburin technique has not been registered. Method of production of trapezes is similar to that in Transdanubia (breaking, no microburin technique present), while laterally retouched pieces are less frequent.

After the Starčevo Culture in Eastern Croatia

After the Starčevo culture raw materials, technology and typology of lithic artifact become different. In the territory of the present day Eastern Croatia the Sopot culture appears after the Starčevo. The most striking change was in the use of the dominant raw material. The characteristic silicified red limestone almost completely disappears, river pebbles and quartz were used and various types of locally obtainable radiolarites and siliceous rock become the dominant raw material (even though the beginning of these changes was detectable already at the end of the Starčevo culture). The number of blades decreased, i.e. the percentage of blade tools, while the number of end-scrapers increased (ŠOŠIĆ, KARAVANIĆ 2004). A break in communication was possible; the Sopot culture was present only in the northernmost regions of the right bank of the Sava, and so far there is no evidence that this culture spread to southern regions. Thus far, analyses have been conducted only for a small number of the sites, but a significant change is still noticeable in comparison to earlier periods.

On the western edges of Eastern Croatia there are occurrences of a “local version” of the LBK – Korenovo culture, and at the eastern edges of the Vinča culture. These cultures could also be, to some extent, contemporaneous with later phases of the Starčevo culture, but the true nature of these relations and possible mutual influences are yet to be determined. Both the LBK and the Vinča appear in these territories in their later phases.

On the basis of the structure of lithic assemblage in settlements, we could distinguish different settlement types. The types of settlement depend on the structure of an assemblage, i.e. the proportion of artifact categories from different stages of operational chains. We could assume that settlements communicated and exchanged products. Thus at some sites all the production stages were represented, and some other sites are user sites only.

THE STARČEVO CULTURE IN SOUTHERN TRANSDANUBIA

In the interfluvium of the Drava and the Danube Starčevo culture settlement occurs mainly south of the Balaton Lake. The number of sites in this territory is much smaller than in the interfluvium of the Drava and the Sava rivers (KALICZ 2010). E. BÁNFFY (2004) wants to see the cause of the smaller density of settlement in unfavourable environmental conditions, first of all the presence of boggy and waterlogged terrains.

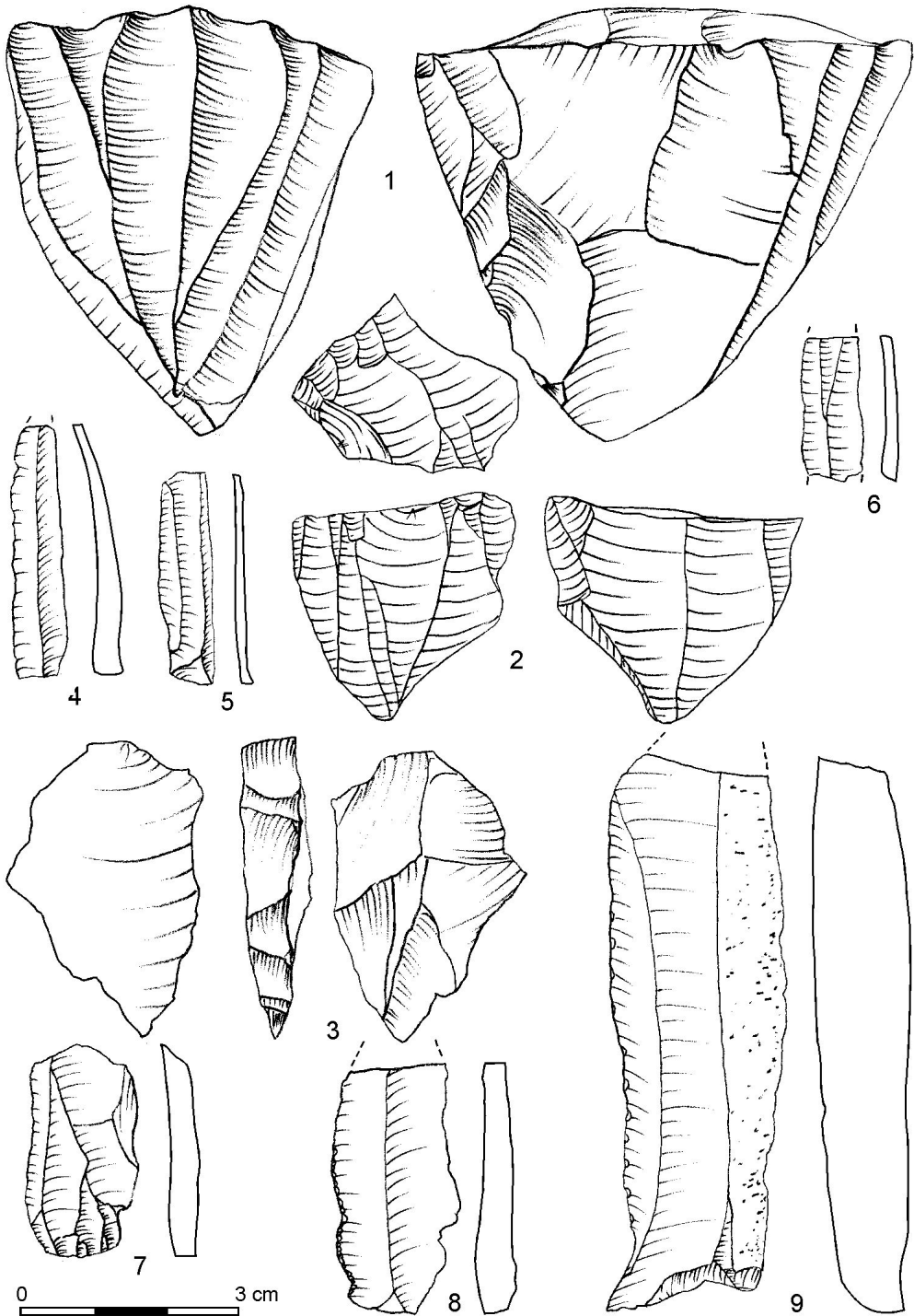


Fig. 4. Slavonski Brod-Galovo: 1, 2 – cores, 3 – tablet, 4–9 – blades

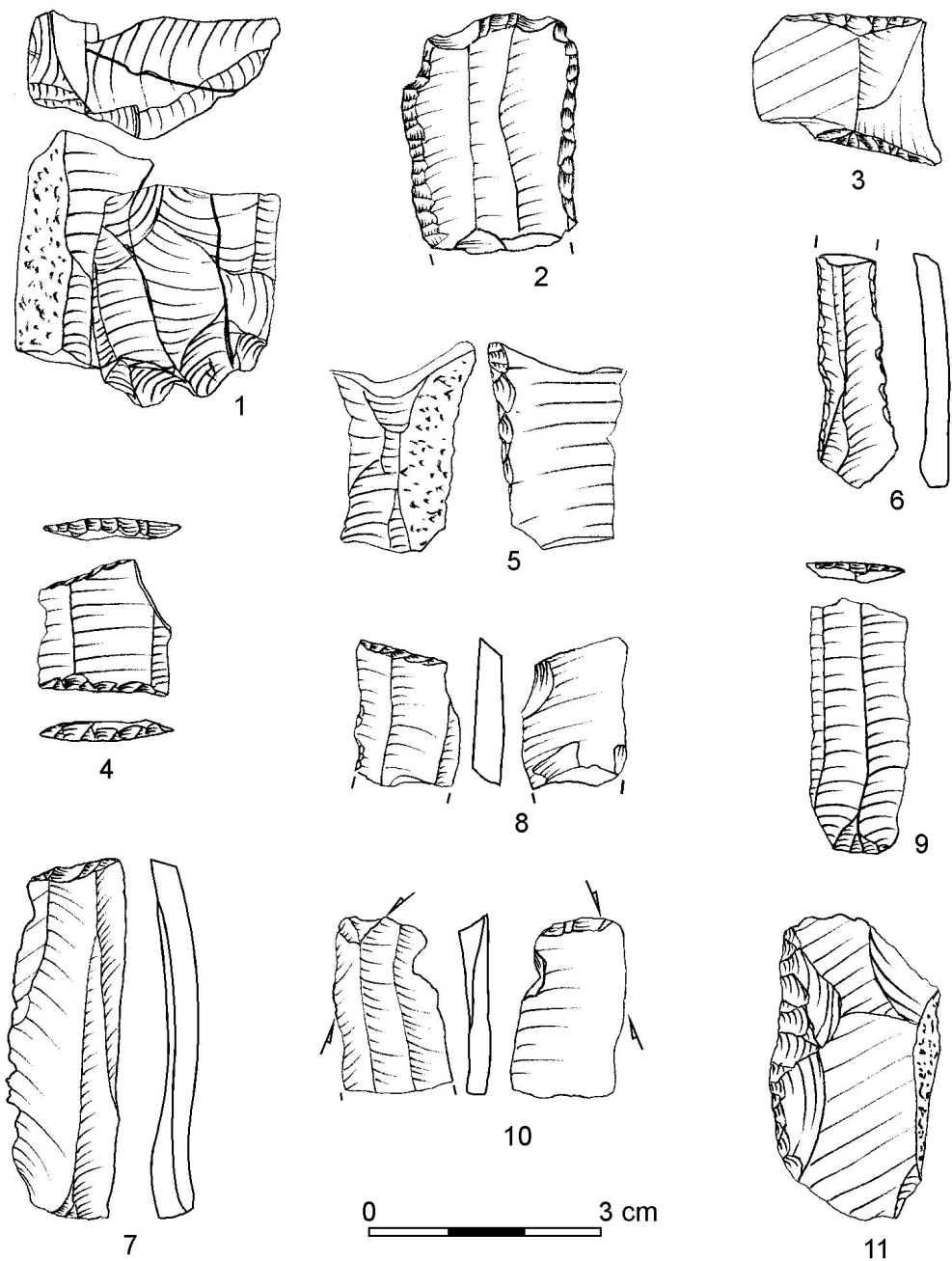


Fig. 5. Slavonski Brod-Galovo: 1 – refitted core, 2 – end-scrapers, 3, 4 – trapezes, 5, 6 – retouched blades, 7–9 – truncations, 10 – sickle blade, 11 – side-scraper

The Mesolithic of Transdanubia is represented by a small number of, mainly, surface sites without stratigraphical context or possibility of establishing their absolute chronology. This situation is only partially caused by the state of investigations in view of the fact that such a phenomenon is recorded across the northern Balkans and the entire Carpathian Basin. The supposition that traces of Mesolithic settlement were buried beneath alluvial deposits has so far found no confirmation. The few registered Mesolithic sites represent the Early Phase of this period, while the number of sites that in terms of typology could be ascribed to the Late Mesolithic is very small (EICHMANN et al. 2010).

The relatively small number of presumed Mesolithic sites E. BÁNFFY explains by the rise of the water table of the Balaton Lake in later periods and, consequently, the submergence of hypothetical Mesolithic sites. In such unfavourable environment the groups of hunters and the groups of farmers – as E. BÁNFFY suggests – these groups interacted. This interaction, allegedly, is to be documented by trapezes that occur at Starčevo Culture sites such as Vörs and Gellénháza, and were also surface-collected at open sites in the Kapos river valley and in the Vázsony basin in the Balaton Highland. E. BÁNFFY claims that these trapezes are due to Mesolithic connections. However, it should be remembered that the chronology of these surface finds is uncertain (cf. mixed finds from Meneshely on fig. 2 in REGENYE 2010). As yet only two surface sites are known in Transdanubia that furnished supposed Late Mesolithic components, namely: Kaposhomok and Regöly 2 (EICHMANN et al. 2010). But they have not provided radiocarbon dates, and – in addition – are in all likelihood a mixture of the Early and the Late Mesolithic components (KRAUSS, FLASS 2016). The only Mesolithic artefacts in Transdanubia with C-14 determinations are stray finds of harpoons from Nadasdlaány and Csór-Merítöpuszt, which provided the dates of 9100–9000 cal. BP i.e. from the very beginning of the Mesolithic (KACZANOWSKA, KOZŁOWSKI 2014).

The presence of trapezes cannot be accepted as valid evidence of contacts between the population of farmers and that of foragers in view of the fact that the two groups employed different production techniques (the microburin technique and the technique of blade breaking), and – moreover – used trapezes for different tasks (for example arrowheads in the mesolithic and sickle inserts or cutting tools in the Neolithic when trapezes were occasionally used as projectile points – KACZANOWSKA et al. 2011, see also MATEICIUCOVÁ 2008). In addition, the increased component of *Corylus* pollen just before the Early Neolithic (BÁNFFY 2004: 13) was not the effect of more intensive human activity but – in all likelihood – was due to the rhythm of environmental changes in the term of Mesolithic to Neolithic and effect of specific environments. E. BÁNFFY (2004) points to the greater importance of fishing and water birds hunting registered at the Starčevo Culture sites. However, this does not so much attest to contacts with Mesolithic population but, rather, to adaptation to environmental conditions in Transdanubia. Similar adaptation is also seen in the northern part of Alföld in the Late Körös Culture e.g. at the site of Ibrany (KACZANOWSKA, KOZŁOWSKI 2010; KOVÁCS et al. 2010).

The supposition that the Mesolithic population in Transdanubia monopolized access to radiolarite deposits (first of all at Szentgál, possibly also at Urkút-Eplény) has

not been confirmed by the presence of Mesolithic points of extraction of these raw materials. I. MATEICIUCOVÁ (2008), too, says that the sites in the vicinity of radiolarite deposits in Transdanubia (Vöröstó, Mentshely, Bakonytamási, Koroncó, Románd) are not homogeneous, but contain as well LBK artefacts (see also: DOBOSI 1972).

Up to 1990 thirteen Starčevo culture sites had been known from Transdanubia (KALICZ 1990). In 2001 their number reached 18 (KALICZ 2001, Fig. 2), among them an important position belongs to the site of Vörs-Máriaasszony-sziget, dated at the spiraloid phase B. The inhabitants of this settlement procured mezolocal radiolarites (Szentgál type) from southern Bakony area (55–60 km). Polished and ground stone tools were produced mostly from Permian sandstones from the eastern part of the Balaton Highland (BIRÓ 2002).

The chipped stone inventory at Vörs-Máriaasszony-sziget, although consisting of only 126 specimens (BIRÓ 2002: table 5), contained cores in advanced stages of reduction (8.7% – Fig. 6: 1–3), blades (15%) and flakes. The presence of all technological groups documents on-site manufacture.

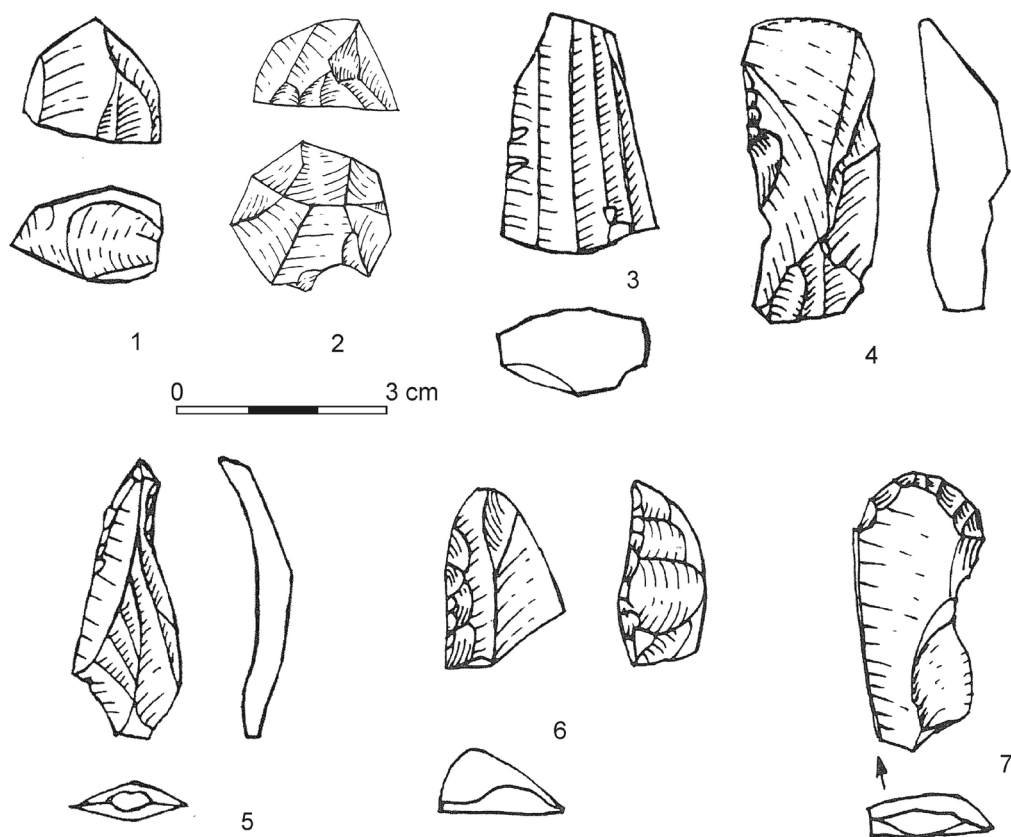


Fig. 6. Vörs-Máriaasszony sziget: 1–3 – cores, 4–6 – laterally retouched blades, 7 – end-scraper (acc. to N. KALICZ et al 2002)

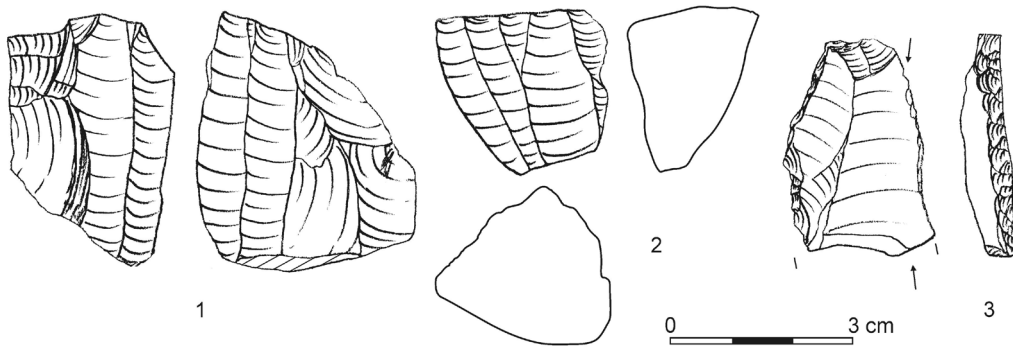


Fig. 7. Gellénháza-Városrét: 1, 2 – cores, 3 – laterally retouched flake

The proportion of tools was relatively high (13.5% – acc. to BIRÓ 2002); among the tools side-scrapers and laterally retouched flakes (Fig. 6: 4–6) were the most numerous, accompanied by end-scrapers (Fig. 6: 7) and truncations. On the other hand “classical trapezes” were absent. The group of ground stone tools was relatively large, among them BIRÓ (2002) mentions “trapeziform chisels”, grinders and polishers.

Another important Starčevo Culture site in Transdanubia is Gellénháza-Városrét (SIMON 1992; BIRÓ, SIMON 2003; HORVÁTH, SIMON 2003), dated, too, at the spiraloid phase B. The material totalled 1414 artefacts of which only 85 specimens belonged to homogeneous Starčevo assemblages; 52 specimens, that were not part of these assemblages, were, too, attributed to the Starčevo Culture (BIRÓ, SIMON 2003). The most important raw materials used for production were Szentgál radiolarites and other radiolarites from the Transdanubian Mid-Mountains. Extralocal raw materials were represented by single specimens from greenschist and from Slavonsky Brod radiolarites. The coring technique was based on single-platform cores (Fig. 7: 2) also with lateral preparation (Fig. 7: 1) from which regular blades, up to 42 mm long, were detached (see pit 38/92; BIRÓ, SIMON 2003: Pl. 1). The tool inventory consisted of only 9 specimens: 5 specimens on blades and 4 on flakes namely, specimens with lateral retouch (Fig. 7: 3), truncations, an end-scrapers, and a perforator. The presence of burins (BIRÓ, SIMON 2003: Pl. II, 1–5) is doubtful; these were probably accidental specimens. In some features at this site Starčevo finds co-occured with LBK materials (KACZANOWSKA, KOZŁOWSKI 2014: Fig. 4).

The third site attributed to the Starčevo Culture which provided a large series of lithic artefacts is Alsónyék-bátaszék (BÁNFFY et al. 2010), also dated at the spiraloid phase B. All the technological categories were represented: from regular conical blade cores, numerous flakes – among others from core reduction – to regular blades. Retouched tools were represented by end-scrapers, truncations including double specimens, perforators and trapezes. The artefacts were made, mainly, from radiolarites from the Mecsek Mountains i.e. from a distance of about 30 km. Szentgál type radiolarites were less frequent. Several specimens were made on obsidian from Tokai Mts. (BÁNFFY 2014). The use of obsidian makes this site different from other sites

in Transdanubia or Croatia, but closer to the Early Phase of the Starčevo Culture in Voivodina (Donja Branjevina – 4 specimens; ŠARIĆ 2005).

Unlike at the sites in the Drava and Sava interfluvium at the sites in Transdanubia situated in the vicinity of deposits a full cycle of production took place; but the role of these sites in the mobility and management of specific raw materials is not known. Possibly, some sites played a role in the distribution of Szentgál radiolarite. On the north side of the Balaton Lake small Starčevo sites were recorded (e.g. Tihany Apáti – 7 artefacts). These were brief camps possibly connected with the procurement of raw materials (REGENYE 2010).

THE FORMATIVE PHASE OF THE LBK BETWEEN THE DANUBE AND THE DRAVA

The end of the Starčevo Culture and the transition to the LBK had been linked to the so-called Medina type (KALICZ, MAKKAY 1977) which turned out to be a mixture of materials of the late phase of the Starčevo Culture and the developed phase of the LBK. At present the gap between two cultures is filled by the site of Szentgyörgyvölgy-Pityerdomb which some researches identify with the formative phase of the LBK (e.g. BÁNFFY 2004, 2005). A large number of radiocarbon dates place this site in the interval between 5480 and 5340 cal BC. These dates indicate the Late Phase of the Starčevo Culture, at the same time, could be later than the earliest dates for the LBK from the territory of Lower Austria (5670–5450 cal BC, STADLER, KOTOVA 2010).

The site of Szentgyörgyvölgy-Pityerdomb was excavated over an area of 1000 sq metres. A total of 710 lithic artefacts were discovered in long pits associated with over-ground dwellings. Each pit contained up to 70 artefacts. In the chipped stone industry the most important raw material was Szentgál type radiolarite; the proportion of other radiolarites and Becsehely type flint was small. Flakes accounted for about 50% of the inventory. The high ratio of flakes is the evidence of on-site production – although on a limited scale. Small blades (Fig. 8: 1, 2) were detached from single-platform cores with a flat flaking surface (BIRÓ 2005: fig. 6.2). Splintered technique was also employed. The proportion of retouched tools was relatively high (16%) and included numerous end-scrapers (Fig. 8: 3, 4, 6, 7), and truncations (Fig. 8: 8–10) (20% each group). Trapezes (Fig. 8: 11), retouched blades (Fig. 8: 12, 13) and sickle inserts were also recorded (BIRÓ 2001, we are grateful to Dr. K. T. BIRÓ for the access to the collections).

While ceramics at the site shows mainly Starčevo elements, and linear decorations are only 0.5% in the total ceramic inventory (BÁNFFY 2014), chipped stones – on the other hand – show novel tendencies such as the increased index of end-scrapers and truncations.

Another model of the formation of the LBK further north in the Neusiedler See basin, is represented by the oldest site in the Brunn complex (Brunn II – STADLER, KOTOVA 2010). Ceramics from Brunn II is characterized by thick-walled pottery, which resembles more closely “the oldest Starčevo-Körös Culture in Croatia, which was

tempered with much organic admixture” (STADLER, KOTOVA 2010: 339). On the other hand, thin-walled and painted ware, which appears in the late phase of the Starčevo Culture in southern Transdanubia, is absent. Ceramic forms at Brunn II include pedestal and bomb-shaped vessels i.e. types typical of the Starčevo Culture. Plastic decorations predominate, also occasional *barbotino* motifs; there are no linear decorations. Of interest is the presence of 23 sherds of vessels (on the total of 1800) that could be imports from the complex of the Late Phase of the Starčevo Culture from southern Transdanubia (STADLER, KOTOVA 2010).

The lithic micro- and mediolithic industry at Brunn II, that exploited mainly Transdanubian radiolarites was supplemented by radiolarites from the neighbourhood of

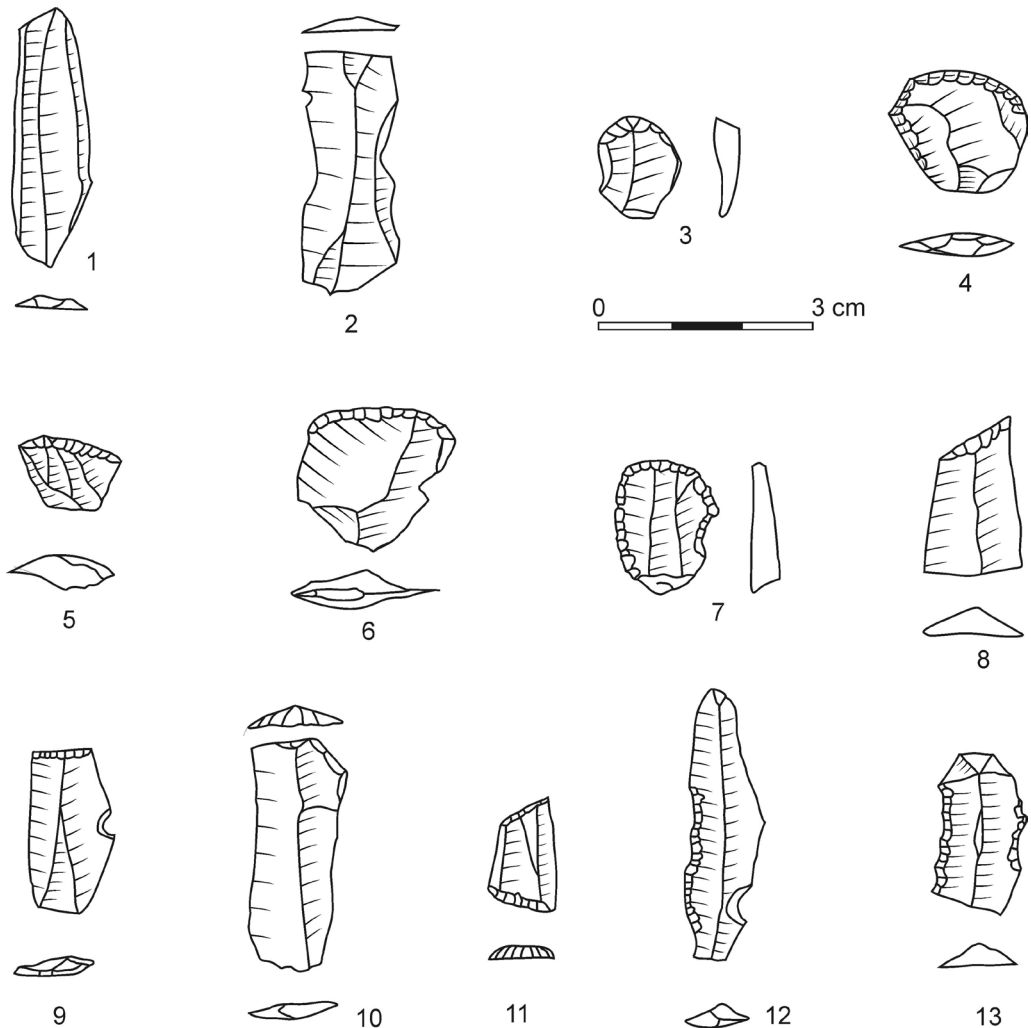


Fig. 8. Szentgörgyvölgy-Pityerdomb: 1, 2 – blades, 3–7 – end-scrapers, 8–10 – retouched truncations, 11 – trapeze, 12, 13 – laterally retouched blades (acc to K. BIRÓ 2005)

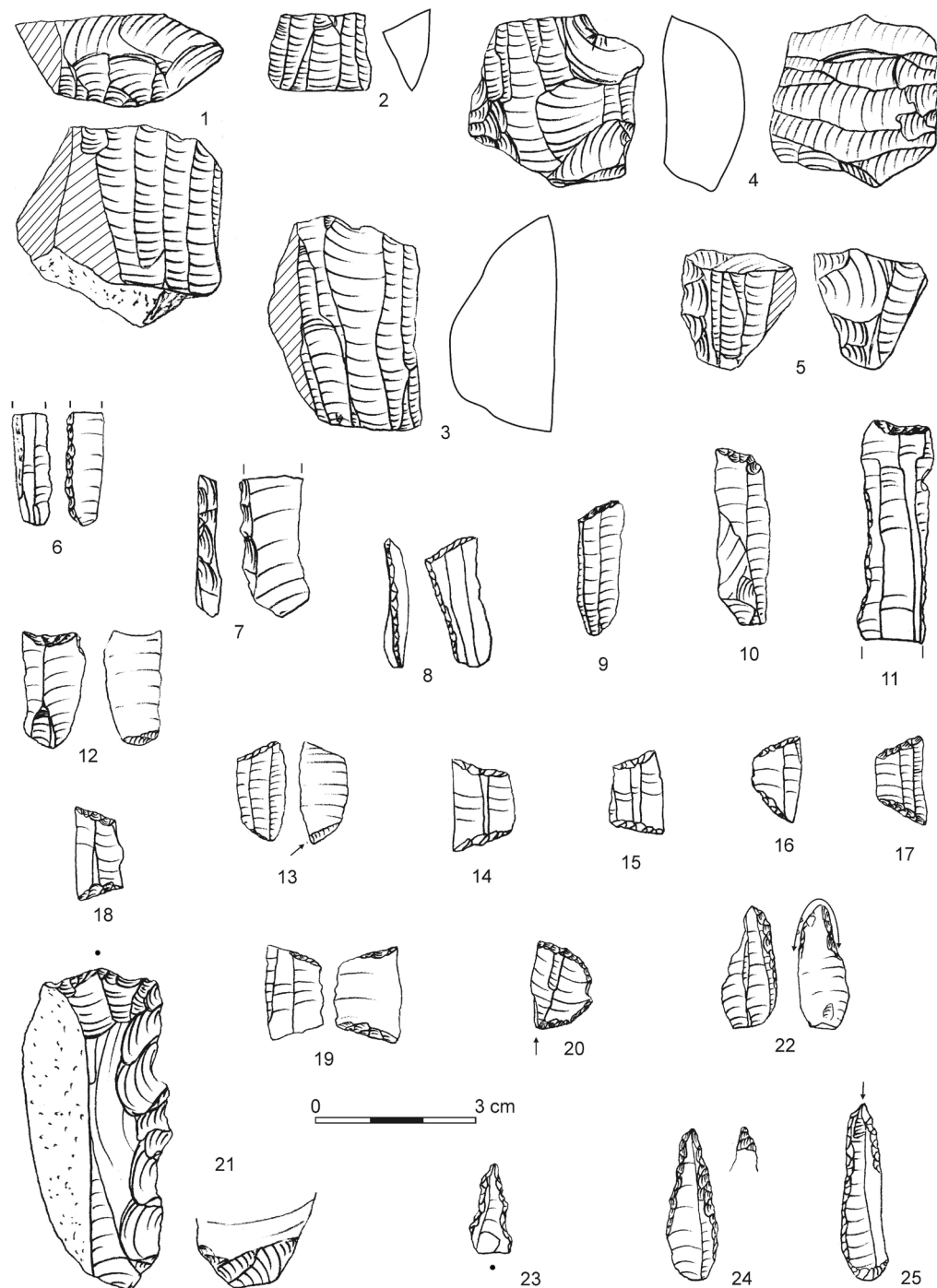


Fig. 9. Brunn II: 1, 2 – single platform cores, 3, 4 – double platform cores, 5 – core with postero-lateral crest, 6–8 – backed pieces, 9–12 – retouched truncations, 13–20 – trapezes, 21 – denticulated tool, 22–25 – perforators (excavations by P. STADLER)

Vienna. This industry does not show links with local Mesolithic traditions. The shifting of production to sites resembles the situation recorded at Starčevo Culture sites between the Drava and the Sava rivers. Core reduction was conducted on-site starting from the preliminary stage when the platform was prepared (Fig. 9: 1, 2); in the advanced phase frequently the second platform – opposite (Fig. 9: 3) or perpendicular (Fig. 9: 4) – was prepared. In the advanced stage of reduction lateral trimming edges or posterolateral crests were shaped (Fig. 9: 5).

The tool inventory differs from the Later Mesolithic assemblages, first of all, in having different technological features (collections of the Natural History Museum in Vienna; we are grateful to Dr. P. STADLER for the access to these collections). The possible Mesolithic component could be only two backed pieces (Fig. 9: 6, 7) and one with an angulated back (Fig. 9: 8). The dissimilarities between the formative phase of the LBK and the Starčevo culture are, first of all, the small proportion of tools with lateral retouch. Truncations (Fig. 9: 9–12) and trapezes (Fig. 9: 13–20) are the most numerous group. Whereas notched-denticulated tools (Fig. 9: 21), retouched blades, perforators (Fig. 9: 22–25) and end-scrapers are less important.

The south-eastern part of Transdanubia in the post-Starčevo period remained under the influence of the Vinča Culture. The best examples are, first of all, the site of Tolnai-Mozs, and – probably – also the sites of Bajaszentistvan-Szlatina, Fajsz-Garadomb and Szentlorind (MARTON, OROSS 2012). Ceramics at these sites show Vinča elements such as vessels with flaring mouth, biconical vessels, bowls on cylindrical and broad pedestalls, with decorations of grooves and “unpolierte Muster”, also incised lines and triangles (MARTON, OROSS 2012: fig. 6). Regretfully, we have no data concerning the lithic industry from Transdanubian assemblages with Vinča stylistic elements. The Vinča impact marked at ALPC sites in the southern part of the Alföld where chipped stone industry shows a high ratio of end-scrapers (e.g. at the site of Maroslele-Pana – KACZANOWSKA et al. 2010: fig. 5 and KACZANOWSKA et al. 2011).

Further development of chipped stone industries in the LBK in Transdanubia, according to T. MARTON and K. OROSS (2009), does not show essential changes except the increase in blade size, and a higher frequency of end-scrapers starting from the Notenkopf phase (Fig. 10). A good example of this evolution is the sequence of LBK occupation phases at the site of Balatonszárszó-Kis-erdéli dűlő (MARTON, OROSS 2009).

CONCLUSIONS

The conclusions consist in remarks on various aspects of early Neolithic material remains and other manifestations such as houses, lithics, chronology, raw material used.

With the expansion of the Early Neolithic to the west and north of the initial Balkan centers and the increasing distance from them, the model described above had undergone changes when the new arrivals adapted to particular ecological habitat in North-Eastern Croatia and Transdanubia. However, between Transdanubia and North-Eastern

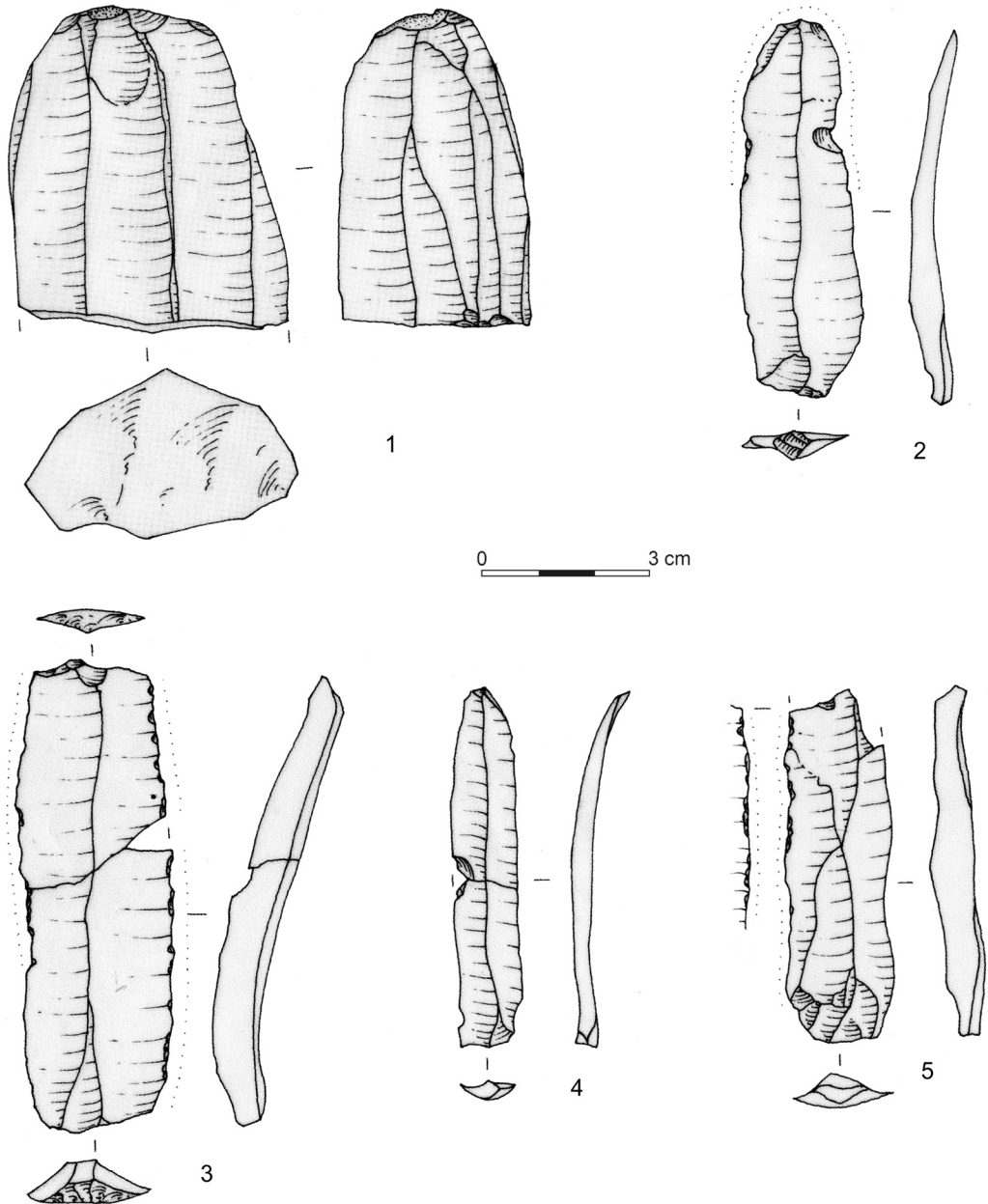


Fig. 10. Balatonszárszó-Kis-erdely dűlő: 1 – core, 2–5 – blades (acc. to T. MARTON, K. OROSS 2009)

Croatia there are some significant differences in lithic production. Deposits of new raw materials were identified and exploited. The modifications consisted, among others, in a gradual transfer of lithic production to settlement areas or even to individual houses. Availability of local raw materials which provided smaller concretions caused that

smaller blades were produced in Transdanubia. In the Sava Drava interfluvial production of small blades was a choice not a necessity. At the same time, the adaptation to novel environment involved changes in subsistence economy manifested in a different tool-kit; notably: lateral retouches were gradually abandoned and tools with transversal retouch dominated. In Eastern Croatia lateral retouch still predominated.

In the territory of Transdanubia, both southern and northern, Mesolithic settlement was sporadic. Especially rare was the Late Mesolithic which was identified among the materials from surface collections from Regöly 2 and Kaposhomok, possibly also Szödliget (EICHMAN et al. 2010) mainly on the basis of analogies with the Late Mesolithic from the territory of Germany. Mesolithic in the territory of present day eastern Croatia is absent. Because of this, Eastern Croatia and Transdanubia were open to the expansion of the Starčevo culture.

The lithic industry registered at Starčevo sites in southern Transdanubia shows some differences in comparison with the industry of this culture in the territory of eastern Croatia. The dissimilarities were, probably, not the effect of interaction between the new Neolithic arrivals and Mesolithic population but, rather, the effect of adaptation to local environmental conditions, the type of available raw materials and, consequently, modifications in the economy of Early Neolithic groups.

Raw materials

Starčevo culture groups in the territory of Transdanubia exploited raw materials such as radiolarites from the Mecsek Mountains, possibly mesolocal raw materials from the northern side of the Balaton Lake, mainly Szentgál type radiolarites and other radiolarites from Transdanubian mid-mountains. Various sources of radiolarites occur north of the main distribution of the Starčevo culture, thus these rocks must have been obtained by trips in search of raw materials. As we have explained in Chapter 4 the use of Szentgál type radiolarite, also by the few Mesolithic groups, by no means confirms the hypothesis proposed by I. MATEICIUCOVÁ (2003) and E. BÁNFFY (2014) which claims that Mesolithic groups had sole access to deposits of this radiolarite and distributed it among Neolithic population. In the period of the formation of the LBK in Transdanubia no major changes in the use of raw materials took place. The most important raw material was Szentgál type radiolarite. Further to north-west in the region of the Neusiedler See, at the site of Brunn II Szentgál radiolarite accounts for 56% of the raw materials whereas radiolarites from the vicinity of Vienna are only 37% of the inventory. Radiolarites from the Bakony Mountains at Brunn II – or at least part of them – were not worked on-site which is evidenced by a high proportion of blades and tools. Local radiolarites from around Vienna are represented by numerous flakes which confirms that these rocks were worked in an on-site full cycle of processing.

In Eastern Croatia, red silicified limestones of Upper Cretaceous age were the most popular raw material. They originate from the area *ca.* 40 km south of the Sava river. Beside these limestones radiolarite river pebbles available in the Sava river bed were also used.

One of the most characteristic features of lithic industries of early Neolithic complexes was the use of non-local raw material distributed over a wide area (KACZANOWSKA, KOZŁOWSKI 2008: 12). Among them, the most important was the so-called “Balkan flint”. Artefacts made from Balkan flint were found in the region from the Tračka valley to the upper Tisa river (KACZANOWSKA, KOZŁOWSKI 2008: 12). In the territory covered in this paper, Balkan flint occurred rarely.

Individual blades made from Balkan flint were found in eastern Croatia at the sites of Vinkovci Na Ma, Tomašanci-Palača 1 and Kaznica-Rutak. It should be stressed that in the central zone of the Starčevo culture e.g. in Serbia (e.g. Donja Branjevina – SARIĆ 2005, Golokut – KACZANOWSKA, KOZŁOWSKI 1984–1985) “Balkan” flint is more frequent. However, in view of the fact that in the north-eastern Balkans there are several areas with outcrops of this flint (ŠARIĆ 2002) to correlate particular artefacts with specific deposit areas is not possible.

Obsidian, which is also an extralocal raw material, occurs as individual specimens at sites in the central area of the Starčevo culture (e.g. at Golokut – 3 obsidian artefacts among 26 chipped stone artefacts – KACZANOWSKA, KOZŁOWSKI 1984–1985; Donja Branjevina – 4 specimens, ŠARIĆ 2005). In the territory of Transdanubia, too, several obsidian artefacts were registered at the site of Alsónyék-bátaszék (BÁNYFY et al. 2010). In all likelihood, these artefacts found their way to Transdanubia through the Körös culture. In the territory of eastern Croatia we do not know so far obsidian artefacts associated with the Starčevo culture.

Production systems and lithic technology

The relation between locations of production and places where lithic artefacts were utilized differs in the various areas occupied by Starčevo culture population. In the central zone of the distribution of this culture extraction points and workshops producing blades were distinctly separate from the sites where blades were used and modified into tools. This model is evidenced by the high proportion of blades and tools at settlements with, at the same time, a low frequency of flakes especially cores. In eastern Croatia the situation was different: some sites focused on production and distribution, at some other settlements early phases of production were absent, and some were user settlements to which final blades or tools were supplied. We base this on the amount of production categories present on a certain site (Tab. 1).

The lithic industry of the Starčevo culture derived from the Early Neolithic tradition of the southern and central Balkans. The Balkan tradition was associated with off-site production which caused that lithic artefacts at settlements were few while blades and completed tools were commonly found. The few cores found in settlements were reduced in several episodes as needed. Such an organization of lithic production was the effect of appearance of specialized knappers, highly skilled in stone processing by means, among others, of the pressure technique which enabled to obtain long blades. In addition, specialized makers of stone blanks could have played a vital role in the distribution of raw materials. The Early Balkan Neolithic

was characterized by the predominance of extralocal raw materials such as “Balkan” flint and obsidian.

At the Starčevo culture sites in southern Transdanubia that we know so far, lithic production seems to have been carried out within settlements, but on a small scale. The transfer of production from specialized workshops to settlements and, in particular, the re-orientation of production to individual household clusters, is typical of the LBK beginning from its formative phase. A similar process can be seen in the period of the transition from the Körös culture to the ALPC (RACZKY et al. 2010).

Across the Starčevo culture distribution the blade technique dominated. We can see, however, that in the Central Balkan region of the Starčevo culture complete blades are up to 79 mm long, while at some sites such as Donja Branjevina or Golokut fragments occur of blades that initially were more than 100 mm long. In the northwestern zone of the Starčevo culture blade size is smaller: for example at Galovo blades are between 22 mm and 63 mm, at Ivandvor 16 to 55 mm, and at Zadubravlje blade length is between 15 mm to 46 mm. As a rule, blades were detached from single-platform cores, although at, for example, Ivandvor double-platform cores were also used. Blades were split off using the indirect percussion technique which is evidenced by types of blade butts (at Ivandvor mainly butts shaped by a single blow – 55.9%, whereas at Zadubravlje and Galovo faceted butts predominated – 46.9% and 41.1% respectively).

The existence of long blades, unlike at central Balkan sites, was not common in the Transdanubian Neolithic, nor in the neighbouring regions which were not inhabited by the carriers of the Körös culture (BÁCSKAY, SIMAN 1987: 126).

In the formative phase of the LBK blade size further diminished (possibly as the effect of adaptation to new raw materials) e.g. at Szentgyörgyvölgy-Piterdomb the average length of blanks is only 20 mm (BIRÓ 2005). Flat single-platform cores predominate. At Brunn II the average length of blades is 28.4 mm, but the presence of larger blade tools (length in the interval between 39.5 mm to 65 mm) indicates the use of larger blanks (MATEICIUCOVÁ 2008). The difference in blank size is related to the initial size of single-platform cores whose reduction was a complex procedure, namely: by means of change-of-orientation. Double-platform cores were made and secondary lateral or postero-lateral preparation was employed. As a result, a better use was made of raw material nodules. This is a common feature of all Starčevo sites mentioned in the text.

With the expansion of the Starčevo culture to the north the proportion of blade tools with lateral retouch decreased and these tools were replaced by transversally retouched tools. In the interfluvium of the Drava and the Sava rivers vital differences are registered between sites such as Ivandvor where lateral retouch is almost absent, and sites such as Galovo and Zadubravlje where laterally retouched blades are 22.2% and 23.8% respectively and are the most numerous tool group. The inventories from these sites include as well trapezes, end-scrapers, perforators and flake tools.

In the formative phase of the LBK in southern Transdanubia which is represented, for example, at the site of Szentgyörgyvölgy-Piterdomb, truncations predominate (about 35%), followed by denticulated-notched tools (about 10%), also trapezes, end-scrapers

and retouched blades (5% each group) (MATEJICUOVÁ 2008). At Brunn II a the largest group are, too, truncations (23.7%), but trapezes are more frequent (23.7%), while end-scrapers are less numerous (10.5%). As the LBK expansion advanced to the territories of Moravia and Slovakia the frequency of end-scrapers increased while that of truncations dropped.

Subsistence economy

The basis of subsistence economy both in the Starčevo culture as well as in the LBK were agriculture and stock-breeding. Ovicaprids were the most important animals which constituted part of the Near East Neolithic package, less common were cattle and pigs. Changes occurred already in the Starčevo culture and consisted in the replacement of ovicaprids by cattle. At the sites such as Divostin, Golokut, and Starčevo the frequency of cattle is higher than that of sheep/goat (LAZIC 1988). But at other Starčevo culture sites e.g. Ludos-Budzak, Lanycsok the proportion of ovicaprids is high. Some researchers believe that the agroecological barrier caused the drop in the frequency of sheep/goat. E. BÁNFFY explains this decrease by long snowy winters that made the breeding of ovicaprids difficult. However, at the sites of the early phase of the LBK in Austria ovicaprids played a major role (Strögen, Rosenberg, Brunn 1, Brunn 3). It was only in the Želiezovce and the Notenkopf phases of the LBK that cattle became most important (Šturovo, Pulkau, Ratzendorf, Gnadendorf) (SCHMITZBERGER 2010).

At some sites of the Starčevo culture, especially in the territory of the Central Balkans game dominated over bred animals (e.g. Biserna Obala, Golokut – LAZIC 1988). Such proportions cannot be the effect of interaction with the Mesolithic population but, rather, indicate flexibility of subsistence economy that adapted to local environmental conditions. A similar phenomenon was registered at the northern periphery of the Körös culture (KOVÁCS et al. 2010). In the LBK, on the contrary, the frequency of remains of wild animals is 10% maximum, which confirms a stable model of stock-breeding economy (SCHMITZBERGER 2010).

Dwelling structures

The most conspicuous change from the cultures of the Early Balkan Neolithic to the LBK was in the type of house structure. A small, rectangular house with mud walls and small posts, with a room with posts in the interior was replaced by an elongated, rectangular post house. In the Balkan houses the very light saddle roof was, as a rule, supported by walls, whereas in the LBK the saddle roof was supported by three or four rows of solid posts (LENNEIS 1997). The change in the house structure was the effect of adaptation to climatic conditions (heavy snowfalls in snowy winters) and environmental conditions (availability of timber in forest environment). We cannot concur with E. BÁNFFY (2004) who wants to associate changes in house structure with contacts with Mesolithic population. The only Mesolithic dwelling structures in the Carpathian Basin are light, circular in shape e.g. at Jaszág (KERTÉSZ et al. 1994).

From the formative phase of the LBK at Szentgyörgyvölgy-Piterdomb two post houses with the roofs supported by three rows of posts are known (BÁNFFY 2014). At Brunn IIa, whose radiometric chronology is earlier than that of Szentgyörgyvölgy-Piterdomb, long post houses also occur. We can thus, assert that the basic change in house structure between the Starčevo culture and the LBK took place in the territory of Transdanubia and Lower Austria.

The Starčevo culture in the Sava-Drava interfluvium had mostly pit houses; there is little evidence of overground structures. Remains of an overground house were found at the site of Vinkovci (DIZDAR, KRZNARIĆ ŠKRIVNAKO 2000). From other sites we have evidence of circular or semicircular dugout dwelling structures.

FINAL REMARKS

Neolithization is a complex process. From the point of view of taxonomy this was not a linear development, but the “new” and the “old” units could have existed simultaneously, making up a mosaic of interacting communities. The expansion of the Neolithic was not limited to the south-north direction but sometimes had the nature of a “frog’s leap” evidenced, among others, by the dates from Brunn II. A very limited participation of local pre-Neolithic communities in the process of Neolithization cannot be ruled out.

ACKNOWLEDGMENTS. Thanks are due to the NCN (Polish National Research Center) – grant no 2015/19/B/HS3/00477, for financial support of this research. Part of research was conducted in the frames of the project Flint materials, technology and adaptation in the Stone Age Croatia by Croatian Ministry of Science, Education and Sports and grants through Croatian-Polish bilateral agreements. We express our gratitude to Krešimir Rončević for figures 4 and 5 and Josip Halamić for geological analysis.

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