



Contents lists available at ScienceDirect

# Quaternary International

journal homepage: [www.elsevier.com/locate/quaint](http://www.elsevier.com/locate/quaint)

## LBK and Vinča in South-East Transdanubia: Comments on merging, interleaving and diversity

János Jakucs

Institute of Archaeology, Research Centre for the Humanities, Centre of Excellence of the Hungarian Academy of Sciences, 4 Tóth Kálmán Utca, 1097, Budapest, Hungary



### ARTICLE INFO

#### Keywords:

South-east Transdanubia  
Vinča culture  
LBK culture  
Contact zone  
Absolute chronology  
Diversity of material culture

### ABSTRACT

The two fundamental cultural developments of the Danube region in the second half of the 6th millennium cal BC, namely the emergence of the Vinča culture and the formation and spread of the LBK in Central Europe, are among the most contentious issues of European Neolithic archaeology. Although the relationship between the two cultures has often been emphasised, its true nature is yet to be explored. One principal obstacle is the spatial gap: research has yet failed to establish a direct geographic link between Vinča and LBK settlement patterns along the Danube. From this point of view, the discovery of the intense presence of the early Vinča culture in southernmost Transdanubia was particularly significant. In this region, an active zone of contacts between Vinča and LBK type material cultures can be detected from the mid-54th century cal BC. The sites of Szederkény-Kukorica-dűlő, Versend-Gilencsa and Szemely-Irtás in the Southern Baranya Hills (South Hungary) were pivotal in gaining a better understanding of these phenomena. The investigated sites revealed typical longhouse architecture, an emblematic feature of the LBK universe, meanwhile the associated material culture belonged primarily to the Vinča and Ražište styles or revealed their combination with Starčevo and LBK types. The coalescence of different technological traditions and styles in individual objects, creating unique, 'hybrid' solutions, has also been observed. This paper presents various types of phenomena (settlement structure, technology and style, ritual objects, burials) demonstrating movements, mutual influences, the amalgamation of practices, and the diffusion of artefacts in the second half of 6th millennium cal BC.

### 1. Introduction

In the absence of scientific dating methods, certain characteristics of pottery – primarily forms and decorations – used to provide the basis for identifying typo-chronological units, which led to the development of spatial and chronological schemes of 'cultures'. Along with an understanding of Neolithic societies as being sedentary, this approach necessarily favoured the perception of these cultural 'units' as homogeneous (Heitz, 2017). Undoubtedly, this creates apparent uncertainties when one is trying to interpret stylistic plurality within the rigid conceptual framework of 'cultures' or 'phases' in a region, where the pottery practices of traditionally distinct cultural units intermingled. The situation is even more complicated if, in addition to a mingling of different pottery styles, there is an interplay of other factors and practices, previously considered as culturally determined.

Southern Transdanubia has proved to be an illustrative test area for gaining a better understanding of the above phenomena as a result of new discoveries about the second half of the 6th millennium cal BC, made over the past decade. This region was traditionally considered to be the periphery of two major Neolithic archaeological units of Central

Europe and the Northern Balkans in this period: the *Linearbandkeramik* (LBK) and the Vinča cultures. Although Vinča and LBK research advanced separately, they pointed out closely related phenomena. Thus, for instance, most scholars agree in a scenario that sees the roots of both Vinča and LBK at least partially in the populations of the Early Neolithic Starčevo culture, and a considerable population influx to be reckoned with in course of the formation process of both cultures (Chapman, 1981; Kalicz, 1993; Price et al., 2001; Bánffy, 2004; Oross and Bánffy, 2009; Hofmann, 2016; Vuković, 2017). Although the relationship between the two 'cultures' has often been disputed, in most cases this was limited to relative chronological relations, avoiding the issues of broader aspects of social interactions. One principal obstacle was the spatial gap, as it was impossible to establish a direct geographic link between Vinča and LBK settlement patterns in the Danube valley, and mixing has rarely been detected. Large-scale excavations in southern Transdanubia in the past twenty years proved to be essential in this respect, providing a whole new insight into the history of the contact zone of the Balkans and Central Europe in the second half of the 6th millennium cal BC (Marton and Oross, 2012; Jakucs and Voicsek, 2015, 2017; Oross et al., 2016b; Jakucs et al., 2016, 2018). This paper focuses

E-mail address: [Jakucs.Janos@btk.mta.hu](mailto:Jakucs.Janos@btk.mta.hu).

<https://doi.org/10.1016/j.quaint.2020.03.029>

Received 27 January 2020; Received in revised form 16 March 2020; Accepted 18 March 2020

Available online 23 March 2020

1040-6182/ © 2020 Elsevier Ltd and INQUA. All rights reserved.

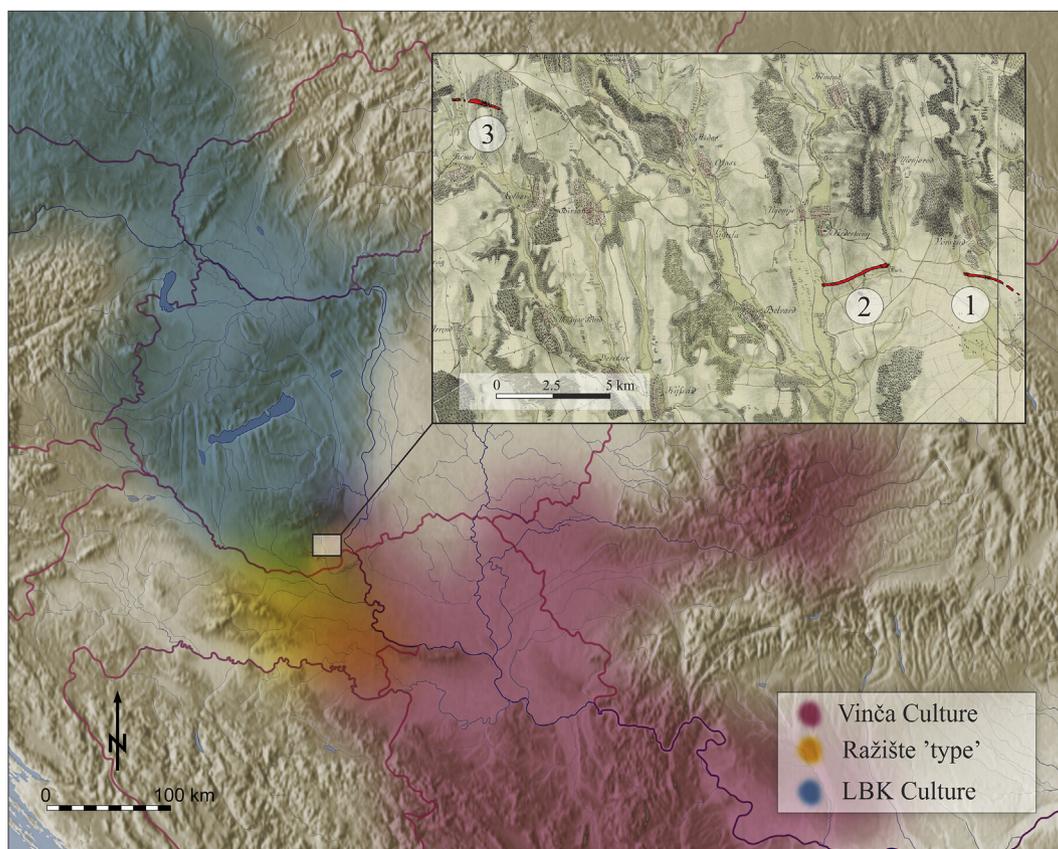


Fig. 1. Map showing the location of Versend-Gilencsa (1), Szederkény-Kukorica-dűlő (2) and Szemely-Irtás (3) and the maximum spatial distributions of the ceramic traditions present in the region in the last centuries of the sixth millennium cal BC.

on Szederkény-Kukorica-dűlő, Versend-Gilencsa, and Szemely-Irtás, the three major Neolithic excavations in the southernmost part of Transdanubia (Fig. 1). While typical longhouses of the 'LBK type' were discovered across all three sites, the picture emerging from the associated material culture is highly unusual in this architectural environment. The pottery finds, and other artefacts recognised as early Vinča- and Ražište-style objects, made up the vast majority of findings in the investigated buildings. In addition to these prevailing styles, Starčevo and LBK elements were also present in varying proportions. The analysis of the finds suggests an active zone of contacts that shows a wide range of combinations: the coexistence of distinct pottery traditions in adjacent households, mixed assemblages, as well as the amalgamation of different ceramic styles at the level of individual objects. The aim of this study is to outline the major stages in the merging of Vinča, Ražište and LBK traditions in southern Transdanubia, utilizing recent results in absolute chronology.

## 2. Remarks on the research history of southern Transdanubia

The first appearance of Starčevo-style material culture in Transdanubia, marking the arrival of pioneering farming communities to this region, can be traced from the 58th century cal BC (Oross et al., 2016a). Early 6th millennium cal BC Neolithic settlements have been documented up to the northern shore of Lake Balaton and in the westernmost part of the Balaton area. Along the Danube, the northernmost Starčevo finds have been recorded in south-east Transdanubia, roughly along the Sárvíz valley in the Tolna Sárköz region (Kalicz, 1990, 2011; Regenye, 2010; Bánffy et al., 2010; Oross et al., 2016a). Recent discoveries prior to a motorway construction in southernmost Transdanubia have revealed a particularly dense settlement network and large site complexes of the Starčevo culture. Alsónyék (Bánffy et al., 2010) in the Tolna Sárköz, and the sites in the vicinity of Lánycsók (Lánycsók-

Bácsfapuszta, Lánycsók-Csata-alja and Lánycsók-Gata-Csotola) in the Southern Baranya Hills (Kalicz, 1990; Vajda-Kiss, 2008; Voicsek, 2010) matches the scale of Starčevo sites in the core area of Slavonia (North Croatia) and Serbia. The formal analysis of the Alsónyék radiocarbon results provides a firm basis for the absolute chronological position of the Starčevo occupation in southern Transdanubia (Oross et al., 2016a). Based on this model, the latest activity in Starčevo settlements can be dated around the end of 56th century cal BC; according to our present understanding, this is the youngest example of 'pure' Starčevo material culture in Transdanubia (Oross et al., 2016a). This date corresponds to the earliest horizon of formative LBK sites (Szentgyörgyvölgy-Pityerdomb, Brunn am Gebirge-Wolfholz, site 2), registered only in the more westward parts of Transdanubia and in the Vienna Basin (Bánffy, 2004; Oross and Bánffy, 2009; Stadler and Kotova, 2019). The first settlements characterised by early LBK pottery styles (Bíňa-Bicske and Milanovce) in the Balaton area and in northern Transdanubia appeared around 5350 cal BC (Oross and Bánffy, 2009; Jakucs et al., 2016; Oross et al., this issue). Although earlier studies hypothesised the presence of early LBK material in the southernmost part of Transdanubia as well (Kalicz, 1993; Oross and Bánffy, 2009), no such sites have ever been discovered southwest of the Mecsek Mountains in the area between the Karasica river and the Danube (Gläser, 1993; Fischer and Hilpert, 2016). The later LBK period is similar in this regard. Sites where the younger LBK's Keszthely-style pottery was found (roughly from the middle of the 53rd century cal BC: Oross et al., 2019) are present only west of the Karasica valley (Kalicz, 1991; Gläser, 1993; Oross and Bánffy, 2009).

Roughly in the same period when the early LBK pottery styles emerged in Transdanubia, fundamental changes took place in the Danube region south of the Drava river. Starčevo-style material culture was replaced by a new entity, the early Vinča 'culture' in Serbia, and by the so-called Ražište type material culture in North-East Croatia



Fig. 2. Layout of the eastern part of the Versend-Gilencsa settlement.

(Marković, 1985; Whittle et al., 2016; Jakucs et al., 2016; Botič, 2018). From the very beginning of systematic research, it has been tentatively suggested that LBK pottery assemblages reflect Vinča influences from the early LBK period on (Makkay, 1978; Pavlů, 1981; Kaufmann, 1991; Kalicz, 1993). Relationships between the Ražište type and the early LBK have also been suggested (Marković, 1985; Horváth, 2006). Although these influences were mainly observed in the Danube valley, the geographical connections between these archaeological entities remained obscure. Along the right (west) bank of the Danube, early LBK material with considerable Vinča ‘impact’ was discovered at *Medina-Margitkert* in the Tolna Sárköz (Kalicz, 1993); however, the closest early Vinča site was documented in the Belgrade area and in the Srem, some 300 km away to the south (Srejović, 1988; Whittle et al., 2016). Along the left (east) bank, in the Bácska/Bačka region, this distance was somewhat smaller, since here the southernmost early LBK assemblage (*Bajszentistván-Szlatina*: Kalicz, 1993) and the northernmost early Vinča site (*Žabalj*: Whittle et al., 2016) were separated by ca. 150 km.

A site on the western side of the Danube, published a few years ago, yielded varying ratios of early Vinča- and LBK-style material in some features, and had a layout and buildings showing LBK characteristics. This was the settlement of *Tolna-Mözs-Közsegi Csádés földek*, near Szekszárd in the Tolna Sárköz area. Three parts of the settlement were excavated; groups of longhouses of a type that is well-known from the LBK world were discovered here (Marton and Oross, 2012). In the southern settlement part, a considerable amount of the pottery shows early Vinča characteristics, although their technological implementation is not identical with those in typical Vinča assemblages. Sherds with a strong resemblance to the latest Starčevo and earlier LBK traditions were also brought to light from here, while the assemblages brought to light in the central and the northern areas of the site contained both early LBK (*Bíňa-Bicske*), *Notenkopf* and early Vinča-style material (Marton and Oross, 2012). In the light of the discoveries made

at Tolna-Mözs, it has been argued that the frequent occurrence of Vinča-type finds in the Tolna Sárköz region indicates that early Vinča sites were possibly present in the Danube region south of the Mecsek Mountains and in the Danube-Drava confluence area as well (Marton and Oross, 2012; Oross et al., this issue).

Recent discoveries made at *Szederkény-Kukorica-dűlő*, *Versend-Gilencsa* and *Szemely-Irtás* in the Southern Baranya Hills proved essential in identifying the contact zone between Vinča and LBK. The large-scale Neolithic settlements, excavated during motorway projects in Baranya County, undoubtedly marked the northernmost presence of the typical early Vinča- and Ražište-type material culture along the right bank of the Danube, in the immediate vicinity of the LBK sites of southern Transdanubia (Jakucs and Voicsek, 2015, 2017; Jakucs et al., 2016). The combination of the Vinča and Ražište ceramic repertoire with longhouse architecture at these sites is of special importance, as this was the first time when the emblematic building type of the LBK was observed outside the LBK ‘world’ (Jakucs and Voicsek, 2015; Jakucs et al., 2016). Lots of attention was paid to this discovery when recent radiocarbon data revealed that the earliest appearance of Vinča material culture in southern Transdanubia coincided with the expansion of the early LBK from Transdanubia towards Central Europe (Jakucs et al., 2016; Whittle et al., 2016; Oross et al., this issue).

### 3. Regional setting and settlement structure

The Neolithic settlements discussed in this article are in the eastern part of Baranya County, south of the Mecsek Mountains, in the area of the Southern Baranya Hills (Fig. 1). The landscape is divided by valleys of small watercourses which flow towards the south. The main watercourse of the region is the Karasica river, which flows directly into the Danube. The large-scale archaeological rescue excavations preceding the construction of the M6 and M60 motorways in southern

Transdanubia started in 2005 and continued until 2008. The trail of the highway in Baranya County passes from northeast to southwest, crossing over several smaller valleys of streams. The Neolithic settlements were detected in the immediate vicinity of these watercourses, on the slightly sloping, small ridges, on the sides of the valleys.

### 3.1. Versend-Gilencsa

The archaeological rescue excavation at Versend-Gilencsa was carried out in 2006–2007. The area excavated along a 1.2 km-long section of the planned motorway totalled over 6.5 ha. The Neolithic site extends over gently sloping ridges, rising on both sides of the Versend stream (Fig. 2). In the eastern house cluster of the Neolithic site, close to the line of the stream, there were numerous traces of north–south oriented longhouses. Although the postholes of these structures were poorly preserved, house plans could be identified from the characteristic long pits flanking the buildings. In this part of the site, at least 21 Neolithic house plans were identified, clearly arranged in at least four rows nearly perpendicular to the streamline. The houses appear to have been built close to each other within a row. In many cases, adjacent buildings had a shared intermediate long pit, suggesting that their construction can most likely be viewed as synchronous events (Jakucs and Voicsek, 2017; Jakucs et al., 2018). Only one Neolithic burial was found here.

The western part of the site, discovered on the other side of the stream, is more densely packed with features of different archaeological periods. Some Neolithic structures can be identified as potential long pits based on their form, but because of later disturbances it was possible to localise only about eight Neolithic house plans, which probably formed one row. However, 24 Neolithic burials came to light in this part of the site, mainly dug into larger pit complexes; these appear to form small groups within the excavated area. The deceased were buried in a crouched position (predominantly on their left sides), but none of the burials yielded any grave goods.

### 3.2. Szederkény-Kukorica-dűlő

The Neolithic site of Szederkény-Kukorica-dűlő is located less than 3 km west of Versend. Rescue excavations were conducted here between 2005 and 2008 (Kovaliczky, 2009; Jakucs and Voicsek, 2015). The site is located on the southern and south-eastern slopes of a low double ridge, 130–140 m above sea level, bounded by the Karasica stream to the west, and by the Monyoród stream to the east and the south. The excavated area was 1700 m long and covered nearly 13.2 ha. The Neolithic features were found in three, clearly distinguishable clusters in the eastern, central and western parts of the excavated area, belonging to three distinct Neolithic settlement units (Fig. 3). (In previous publications these clusters were sometimes called ‘settlement parts’, but according to our present understanding these groups of houses did not belong to one settlement but can rather be interpreted as spatially independent units, which makes the term ‘settlement part’ somewhat misleading. Therefore, they are called ‘clusters’ in the present study.)

The eastern house cluster is located on a low loess plateau rising from the Monyoród stream, bordered to the east by a double ditch, also dated to the Neolithic period. On the other side it is bordered by a depression, possibly a former streambed, which divides the whole excavated area. The middle cluster is located on the eastern part of the plateau which rises on the other side of this depression, and it is separated from the western cluster by an approximately 200 m wide zone where Neolithic features are absent. The western cluster is located on the western side of the same plateau, rising above the floodplain of the Karasica stream.

The building remnants unearthed in all three clusters of the Szederkény site reflect the usual architectural principles of the LBK. In these three clusters a minimum of 66 Neolithic house plans, orientated

northeast–southwest, were reconstructed: 30 in the eastern, 20 in the middle and 16 in the western cluster. The reconstructed house plans are arranged in smaller groups in each cluster, and show a repeating layout, three or four buildings forming a row (Fig. 3).

Fifty graves were uncovered in the three clusters, with the overwhelming majority in the eastern (25) and western (22) ones, and only three in the central one. The graves are located between the houses, and in several cases in the upper layer of the long pits. Only a few burials were accompanied by grave goods. The most noteworthy is Grave 2484 (Fig. 4 b). This burial yielded a black-topped vessel, a stone chisel, a spondylus bracelet and a V-shaped spondylus object. Although similar V-shaped spondylus artefacts are known from Central European LBK graves, the most obvious analogy is from Botoš-Živanićeva dolja, the cemetery of the early Vinča culture in the Vojvodina (Marinković, 2010). The black-topped carinated bowl can also undoubtedly be assigned to the early Vinča-style (Schier, 1996). By contrast, the individual in Grave 237, only a few metres away from Grave 2484, was buried with a pot which shows typical characteristics of the early LBK (Fig. 4 a).

### 3.3. Szemely-Irtás

The site of Szemely-Irtás is northwest of Szederkény, in the western zone of the Southern Baranya Hills. Excavations were undertaken here between 2006 and 2007, in an area of more than 3.5 ha. The Neolithic settlement is located on the top of a ridgeline that narrows from north to south and is bordered by the Szemely-stream from the west, and a smaller watercourse from the east. Outside the excavated area in the southern part of the hillside there is a Lengyel culture settlement and two complexes of circular enclosures, also dated to the Late Neolithic (Bertók and Gáti, 2011).

Although the analysis of the site started only recently, and therefore, available reconstructions of the settlement layout are preliminary, at least 50 potential houses can be hypothesised in the excavated area through the presence of characteristic, paired elongated pits (Fig. 5). The buildings are generally orientated north-south or north-west-southeast, with minor discrepancies. The buildings appear to form two larger, densely built clusters, each with several rows of houses. Nine Neolithic burials came to light in the excavated area, located mainly between the houses or dug into the long pits. The most notable of these is a double grave of a man (Grave 1001) and an infant (Grave 1045), dug into the western long pit of a building on the western periphery of the site. The child's grave yielded a spherical vessel that has a cylindrical neck and is decorated in the younger LBK's Keszthely-style, as well as a spondylus bracelet and 17 spondylus beads (Fig. 141b).

## 4. Absolute chronology

Each of the three sites discussed above has radiocarbon data, in all cases from articulated animal bones or human bones from burials. Szederkény and Versend were included in a large-scale dating programme (*Times of Their Lives*) in the past few years, providing a large amount of AMS radiocarbon data. The individual dates and the details of the chronological models were previously published for both sites (Jakucs et al., 2016, 2018), therefore, these results are only briefly presented here. For Szemely, however, only a few AMS radiocarbon dates are available, in all cases from burials. As they are not suitable for creating formal chronological models comparable to those of the other two sites, these are published here as individual dates (Fig. 6).

A total of 41 radiocarbon measurements are now available from Szederkény (Jakucs et al., 2016). According to the statistical modelling of the data, activities in the Szederkény site began in the mid-54th century cal BC (5360–5305 cal BC with 95% probability; 5340–5315 cal BC with 68% probability) and lasted until the turn of the 53rd–52nd centuries (5210–5165 cal BC with 95% probability; 5200–5180 cal BC with 95% probability). Based on the formal

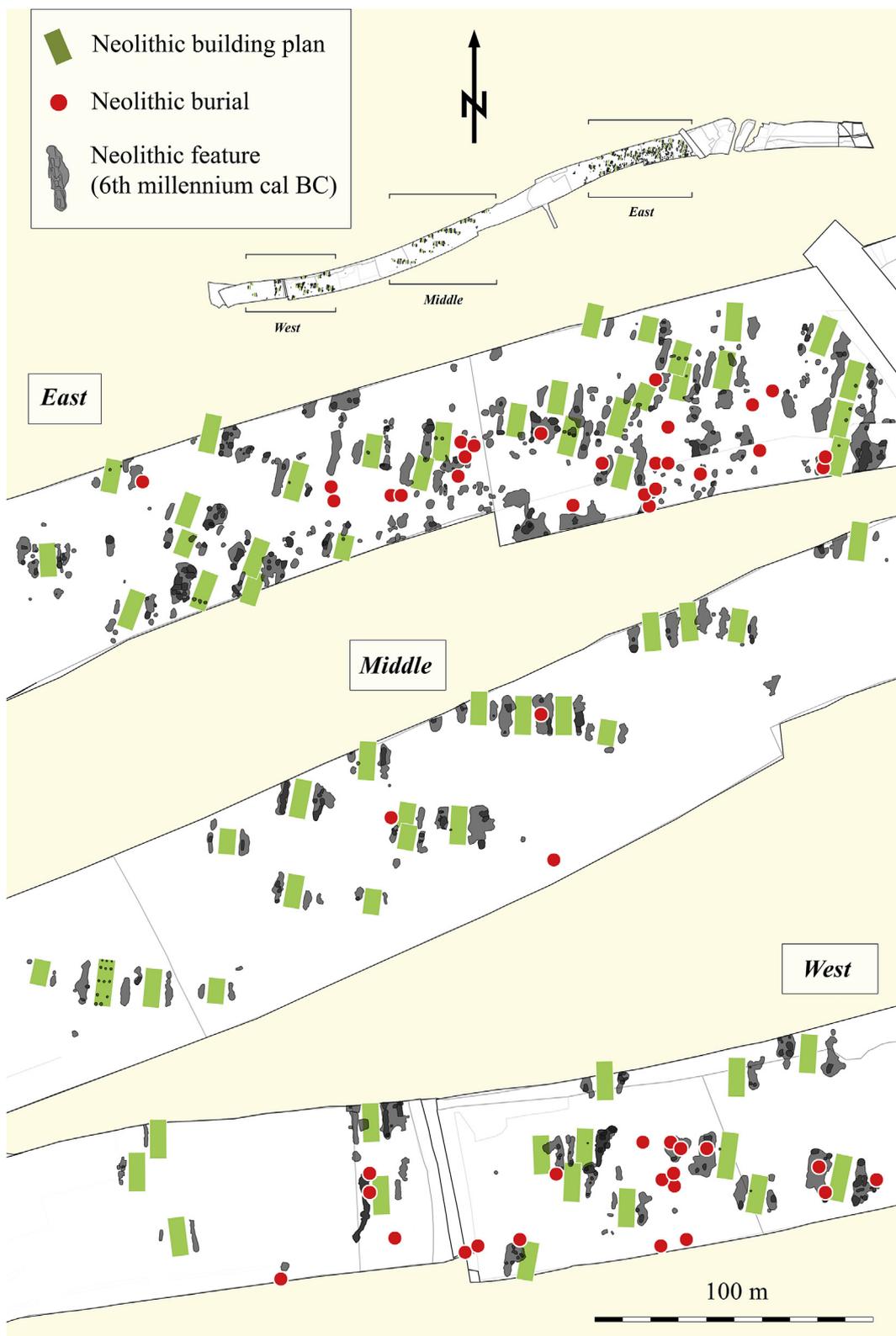


Fig. 3. Layout of the eastern, middle and western settlements of Szederkény-Kukorica-dűlő.

modelling, it was also found that settlement began at approximately the same time in the eastern and western house clusters of Szederkény, while the middle one was established a few decades later (Jakucs et al., 2016).

The radiocarbon dating programme in Versend-Gilencsa primarily concentrated on the eastern cluster of the settlement. A total of 68

radiocarbon measurements are available from the site (Jakucs et al., 2018). According to the formal modelling of the data, the activity in the excavated part of the settlement started almost a hundred years later than in Szederkény, only in the second half or the last third of the 53rd century cal BC (5255–5210 cal BC with 93% probability; 5235–5215 cal BC with 68% probability) and, after a relatively short



Fig. 4. Grave 237 (A) and Grave 2484 (B) in the eastern settlement of Szederkény-Kukorica-dűlő.

development, this part of the settlement was abandoned around the turn of the 53rd–52nd centuries cal BC (5220–5180 with 93% probability; 5210–5195 cal BC with 68% probability).

From Szemely-Irtás only six burials have been radiocarbon dated so far. Obviously, it is impossible to draw definitive conclusions about settlement activities based on these few results (Fig. 6). However, observations made at other sites in southern Transdanubia in general suggest that there are only relatively small chronological differences

between the burials uncovered in the vicinity of buildings and the settlement activity itself (Oross et al., 2016b; Oross et al., this issue; Jakucs et al., 2016, 2018). On the other hand, the chronological framework defined by the radiocarbon dated burials – the late 6th and early 5th millennia cal BC – correspond to the preliminary typological observations made on the pottery material. Two of the dated burials (1001, 1139) still definitely belong to the last two centuries of the 6th millennium cal BC. Although radiocarbon data are not available from

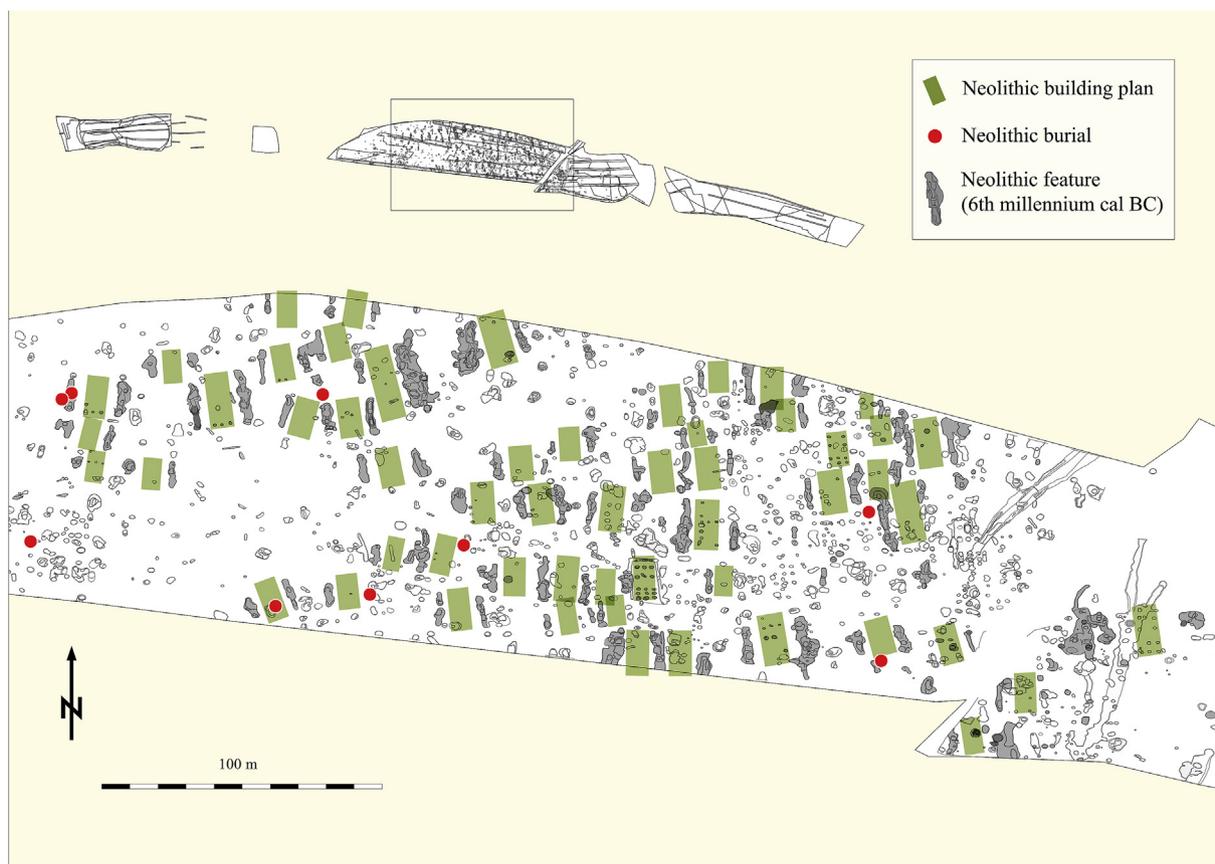


Fig. 5. Layout of the Szemely-Irtás settlement.

here, the child burial in Grave 1045 can be included in this earlier horizon as it was uncovered in the same pit as Grave 1001. The other four burials (627, 883, 1003, 1085) belong to the younger horizon, which is, even at a two-sigma confidence level, dated to the very end of the 6th millennium cal BC or most likely to the first two centuries of the 5th millennium cal BC. However, the two-sigma data do not completely exclude that the two youngest burials (1003, 1085) belong to the Late Neolithic (Sopot or Lengyel cultures) activity.

Given the above arguments, one can hypothesise that Szemely-Irtás is the youngest of the three sites presented in this study. Human activities may have started here at the beginning of the 52nd century cal BC at the latest, and lasted for quite a long period, until the early 5th millennium cal BC.

## 5. Material culture

### 5.1. Pottery styles and figural representations at Szederkény-Kukorica-dűlő (eastern, central and western clusters)

The ceramic style of the early Vinča culture is predominant in the households of the eastern and central clusters of Szederkény-Kukorica-dűlő. The most common forms of ‘fine’ pottery are conical bowls, sharply biconical vessels and bowls with a biconical shoulder line and a short rim (Fig. 7 1, 8–10, 12–13), as well as their pedestalled versions (Fig. 7 3, 5, 7). The outer surfaces are generally dark burnished or mottled; the so-called black-topped firing combined with red painting on the vessels' lower parts is frequently used (Fig. 7 1, 3, 6, 8–10, 12–13); pedestals are also usually covered in a cherry-red slip, polished

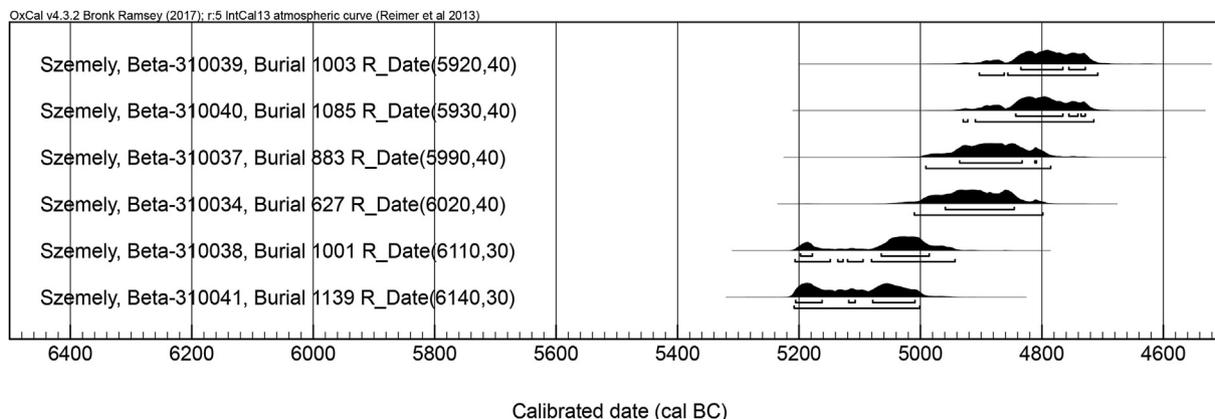
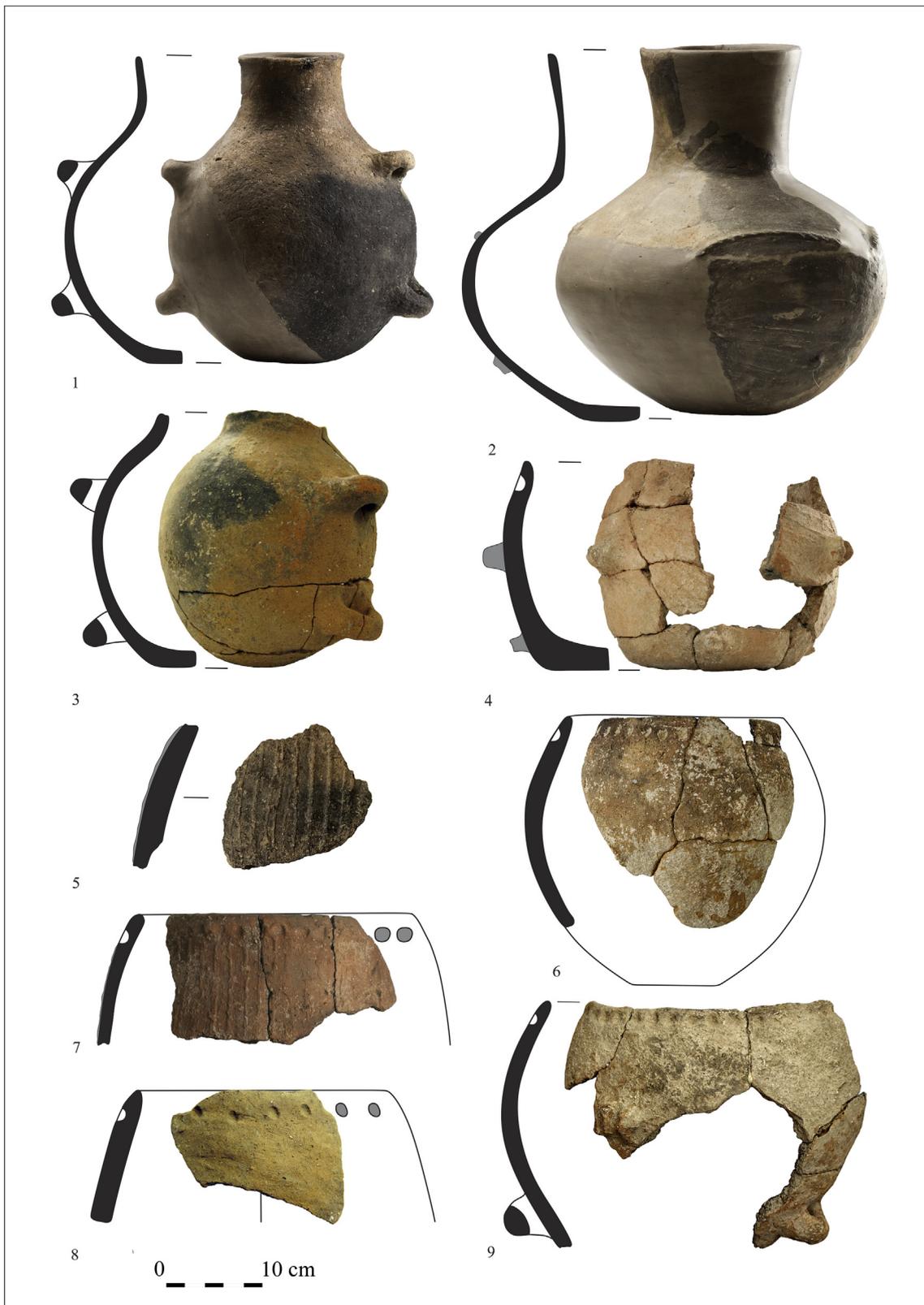


Fig. 6. Probability distribution of dates from burials at Szemely-Irtás.



**Fig. 7.** Typical early Vinča style pottery from the eastern (1–10, 12–13), middle (11), and western settlements (14–17) of Szederkény. 1, 2–House 2/Feature 31; 3–House 16/Feature 316; 4–House H12/Feature 219; 5, 6–House 22/Feature 523; 7, 10–H17/Features 257, 375; 8, 13–House 4/Feature 2423; 9, 12–House 19/Features 374, 386; 11–House 37/Feature 1495; 14, 16, 17–House 51/Features 2768, 2782; 2769 15–House 57/Feature 3075.



**Fig. 8.** Storage jars - coarse ware - from the eastern (1–2, 4–7, 9) and western (3, 8) settlements of Szederkény. 1–House 22/Feature 522; 2–House 17/Feature 375; 3, 8–House 51/Feature 2768; 4–Feature 442; 5, 9–House 19/Features 439, 374-387-427; 6–House 30/Feature 682; 7–House 8/Feature 186.

to a high lustre (Fig. 7 2, 4, 5). The most common decoration is a very shallow, vertical, or oblique form of channelling, applied on the shoulder of the vessels (Fig. 7 1, 5, 7, 8, 12–13). These forms and characteristic technological elements are emblematic features of the

earliest Vinča pottery style (Schier, 1995, 1996; Cahpman, 1981; Jakucs and Voicsek, 2015). Coarse pottery was most often tempered with sand or a mixture of coarse-grained sand and organic matter (chaff), while in only rare cases were the vessels tempered exclusively

with organic substances. The vessels were fired to various shades of brown, although brownish-blackish mottling is also encountered. The pottery was fired at a reduced temperature, indicated by the dark coloured ‘sandwich core’ on the fractured surface, a typical trait of coarse ware from the eastern and central clusters. In this respect there is a significant technological similarity to Early Neolithic Starčevo pottery technology (Szakmány et al., 2006). Storage jars found here include both globular forms and elongated globular, barrel-shaped types, as well as gently biconical vessels with inverted rims (Fig. 8). Amphora-like, necked vessels represent a separate category with an exceptionally wide range of sizes and technological diversity (Fig. 8 1–3). In the eastern settlement cluster, the most frequent decoration of coarse ware is a row of finger impressions under the rim (Fig. 8 4, 6, 8–9) and the organized barbotine (*Schlickwurf*) (Fig. 8 5), often applied simultaneously on the same vessel (Fig. 8 7). Organized barbotine is undoubtedly a continuation of the late Starčevo ceramic tradition (Kalicz, 1993; Pavúk, 2004; Oross, 2007), encountered later both in the early LBK Biňa-Bicske and early Vinča-styles (Lazarovici, 1981; Kalicz, 1993; Schier, 1996; Pavúk, 2004). On the other hand, the row of finger-printing under the rim is virtually lacking in the Starčevo assemblages, and its appearance is clearly linked to the beginning of the middle Neolithic in the Danube region. It is a common feature of early Vinča- (Lazarovici, 1981; Vetnić, 1990; Schier, 1995; Bogdanović, 2006) and Ražište-styles (Marković and Botić, 2008; Jakucs and Voicsek, 2015) but it also appears in the early LBK (Kalicz, 1993; Pavúk, 1997). Juraj Pavúk dated the appearance of this ornamentation to the Milanovce ‘phase’ of the early LBK (Pavúk, 1997, 2004). This decoration is missing from Biňa-Bicske-style assemblages – traditionally considered to be older – in the northern and north-western areas of Transdanubia (Makkay, 1978; Kalicz and Schreiber, 1992; Marton, 2008). However, in southern Transdanubia, and especially at the sites along the Danube, this form of ornamentation was commonly applied from the earliest appearance of Vinča and Biňa-Bicske ceramic styles and remained in use until the beginning of the Late Neolithic (Kalicz, 1993, 1994; Marton and Oross, 2012; Jakucs and Voicsek, 2015, Fig. 7; Oross et al., 2016b). Accordingly, it is more plausible to view this element as indicative of the spatial distribution of a specific pottery tradition than as a sign of chronological differences.

Based on typological features, the majority of the pottery material from the western cluster belongs to the Ražište-style (Marković, 1985; Marković and Botić, 2012). As for the technological characteristics of fine pottery, traditions like those in the eastern and central clusters must have existed here; for instance, the black burnished pottery, the black-topped/red-slipped technique and the red slip on pedestals were equally popular (Fig. 9 3–4, 7–8, 11–12, 17). On the other hand, significant differences should be noted in terms of vessel forms and the system of decoration. Most of the emblematic early Vinča shapes and associated decorations, such as biconical vessels and fine channelling, are virtually absent or were found only in small quantities in the ceramic assemblage of the western cluster. The sharply biconical forms are replaced here by slightly carinated and S-profiled types (Fig. 9 1–7, 14–17); although, as in the case of the eastern and central house clusters, most of the shapes existed in pedestalled versions, too (Fig. 9 11–12). The incised decoration of fine pottery, which is widely used in the Ražište-style, consists primarily of downward curving arch motifs, encircling the vessel's shoulder. This motif uses mostly double (Fig. 9 9, 15, 17) or triple (Fig. 9 13) lines, as well as ribbons filled with stabs (Figs. 1–3, 5, 9, 10, 14, 16).

The storage jars produced in the western house cluster also exhibit some similarities to those from the eastern and central clusters. The ratio of chaff-tempered (with or without coarse sand) vessels and the frequency of organized barbotine (*Schlickwurf*) decoration are significantly reduced in the western cluster. However, finger impression under the rim remained popular.

Although there are households with a completely ‘homogeneous’ pottery style, there are others in each of the three clusters that yielded

fragments not matching the dominant pottery style in the rest of the cluster and are therefore considered ‘foreign’ (Fig. 16). However, in most cases these pieces correspond to the prevailing ceramic style in the immediate neighbourhood. In the area of the eastern and central house clusters, most of these outlier fragments can be associated with the Ražište-style (Fig. 9 14–17). Likewise, though somewhat less frequently, typical early Vinča-style fragments were found in some of the western households (Fig. 7 14–17).

Another group of outlier fragments consists of pieces clearly identified as early LBK style (Fig. 10). In these cases, however, two things must be emphasised. On one hand, such fragments were found in several households in all three clusters regardless of the dominant ceramic style, but only in small quantities (1–3 pieces per households in the vast majority of cases). On the other hand, these pieces are almost exclusively associated with one characteristic type of vessel: spherical necked jars, decorated with a spiraloid meander motif (Fig. 10 3–10). The best example is the one found in Grave 237 (Fig. 4 a). The incised spiral meander motif on storage vessels is probably one of the most widespread features of the early LBK pottery tradition. It has already been documented in the formative phase and it remained popular until the *Notenkopf* ‘period’ (Cladders, 2001; Marton, 2008; Pavúk and Farkas, 2013; Stadler and Kotova, 2019). There are only a few exceptions among these outlier artefacts: a vessel, whose form, technology, and decoration are characteristic of the Biňa-Bicske-style (Fig. 10. 1), and a small piece of a spherical vessel which points to the Milanovce-style (Fig. 10. 2). Both fragments were found in the eastern cluster along with typical early Vinča-style ceramics. In addition, fragments with Malo Korenovo-style characteristics (Težak-Gregl, 1993) were discovered in small numbers, almost exclusively in the western cluster and in connection with Ražište-style ceramics. The Malo Korenovo-style fragments published here represent virtually all the pieces recorded in the Szederkény assemblage so far (Fig. 10 11–14). Two further pieces from the western cluster are typical Keszthely-style (Fig. 10. 15) and late *Notenkopf*/early Želiezovce-style fragments (Fig. 10 16). Although these are certainly not associated with the earliest activity, they indicate that a partial overlap between early and late LBK ceramic styles must be considered.

A remarkably high number of figurines and altar pieces were unearthed at Szederkény, especially when compared to early LBK settlements: a total of 46 figurines and 61 altars were found. These came to light mostly in the eastern house cluster (39 figurines and 51 altars, 84% of the total collection), and only sporadically in the central (6 figurines and 5 altars) and western clusters (1 figurine and 5 altars fragments, mostly atypical legs). The majority of the figurines belong to one single type; they are small, generally 4.5–8 cm tall, cylindrical, only schematically anthropomorphic figurines (Fig. 11 5–6; Jakucs and Voicsek, 2015, Fig. 20). Most of them are fragmented and exhibit signs of secondary burning. Some of them have a modelled element on the backside, which is perhaps an indication of the steatopygous buttocks so common on Early Neolithic Starčevo-style figurines (Fig. 11. 5). This type of less pronounced imagery of steatopygous buttocks, however, appears exclusively among the human representations of the earliest Vinča culture (Vinča-Belo Brdo, 10.3 m, 8.9 m: Vasić, 1936). Close analogies of this figurine type are also known from Transylvania (Ştefan, 2006) and North Croatia (Marković and Botić, 2008).

Anthropomorphic figurines with a more articulated body and an upward looking, triangular face represent a separate and less frequent category; only three of these were found, all of them in the area of the eastern cluster (Fig. 11. 4). This peculiar type appeared in the latest Starčevo-Criş milieu first (Băcuet-Crişan and Virag, 2007; Starnini, 2014), but became widespread only in the early Vinča period (e.g. Vinča-Belo Brdo, between 8.5 m and 9.2 m: Tasić, 1973; Botoş-Živanićeva dolja: Marinković, 2010; Gornea-Căuniţa: Lazarovici, 1979; Şoimuş-La Avicola: Ştefan, 2006; Limba-Bordane: Florescu et al., 2007; Satchinez: Horváth and Draşovean, 2013; Turdaş: Hansen, 2007).

Basically, two different types of altars can be distinguished in the



**Fig. 9.** Typical Ražište style pottery from the eastern (14–17) and western (1–13) settlements of Szederkény. 1–6, 11–12–H51/Feature 2768; 10, 13–House 57/Feature 3075; 7–8, 9–House 62/Feature 3350, 3370; 14–Feature 171; 16–17–House 17/Features 361, 360; 15–House 15/Feature 284.

inventory of Szederkény: triangular and rectangular pieces. The triangular altar with peaked corners is the most frequent type. These are usually decorated with incised linear patterns, occasionally filled with stabs, often with a trace of red painting (Fig. 11. 1–2; Jakucs and Voicsek, 2015, Fig. 151; Fig. 21). Similar triangular pieces are widespread in the early Vinča (A-B1), Karanovo (III/IVA) and early Dudești cultures (Pavúk and Bakamska, 2014). The closest analogies to those found in Szederkény are known primarily from the Vinča culture's

eponymous site and the southern Banat region (Lazarovici, 1979; Stanković, 1986).

The four-legged altar type with a rounded receptacle is also represented by several pieces. They are usually burnt to a brownish colour and almost always show traces of red paint (Fig. 11. 3). Although this type seems to have been common at Szederkény – where they occur almost exclusively in the eastern house cluster from which early Vinča pottery was recovered – similar pieces that could be mentioned here as



**Fig. 10.** Typical LBK style pottery from the eastern (1–6), middle (7–8) and western (9–16) settlements of Szederkény. Bíňa-Bicske style: 1–House 17/Feature 257; Milanovce style: 2–House 4/Feature 2423; general early LBK types: 3–House 2/Feature 31; 4, 6–House 30/Feature 629, 517; 5–House 16/Feature 375; 7–8–House 37/Feature 1565, 1495; 9–House 51/Feature 2768; 10–House 62/Feature 3370; Malo Korenovo style: 11, 12, 14–House 62/Features 3370, 3373; 3379; 13–House 57/Feature 3075; Keszthely style: 15–House 62/Feature 3373; late *Notenkopf*/early Želiezovce style: 16–House 63/Feature 3394.



Fig. 11. Figurines and ‘altar’ pieces from the eastern settlement of Szederkény.

analogies have solely been published from Starčevo contexts (Karmanski, 2005).

5.2. Pottery style and figural representations at Versend-Gilencsa (eastern house cluster)

The analysis of Versend-Gilencsa has so far focused primarily on the radiocarbon dated buildings of the eastern house cluster. One major difference compared to Szederkény-Kukorica-dűlő is that households

with entirely homogeneous pottery style are absent here. In most cases an intensively mixed material was registered, composed of early Vinča-, early LBK-, and typical Starčevo-style pottery.

The early Vinča-style elements of the assemblage are well comparable to similar finds from Szederkény (Fig. 12 2, 4, 7–10; Fig. 13 6–7). The major difference is that here the ratio of typical Vinča-style shapes and technological features is considerably lower, and these are completely absent in certain buildings (Fig. 15; Jakucs and Voicsek, 2017; Jakucs et al., 2018).

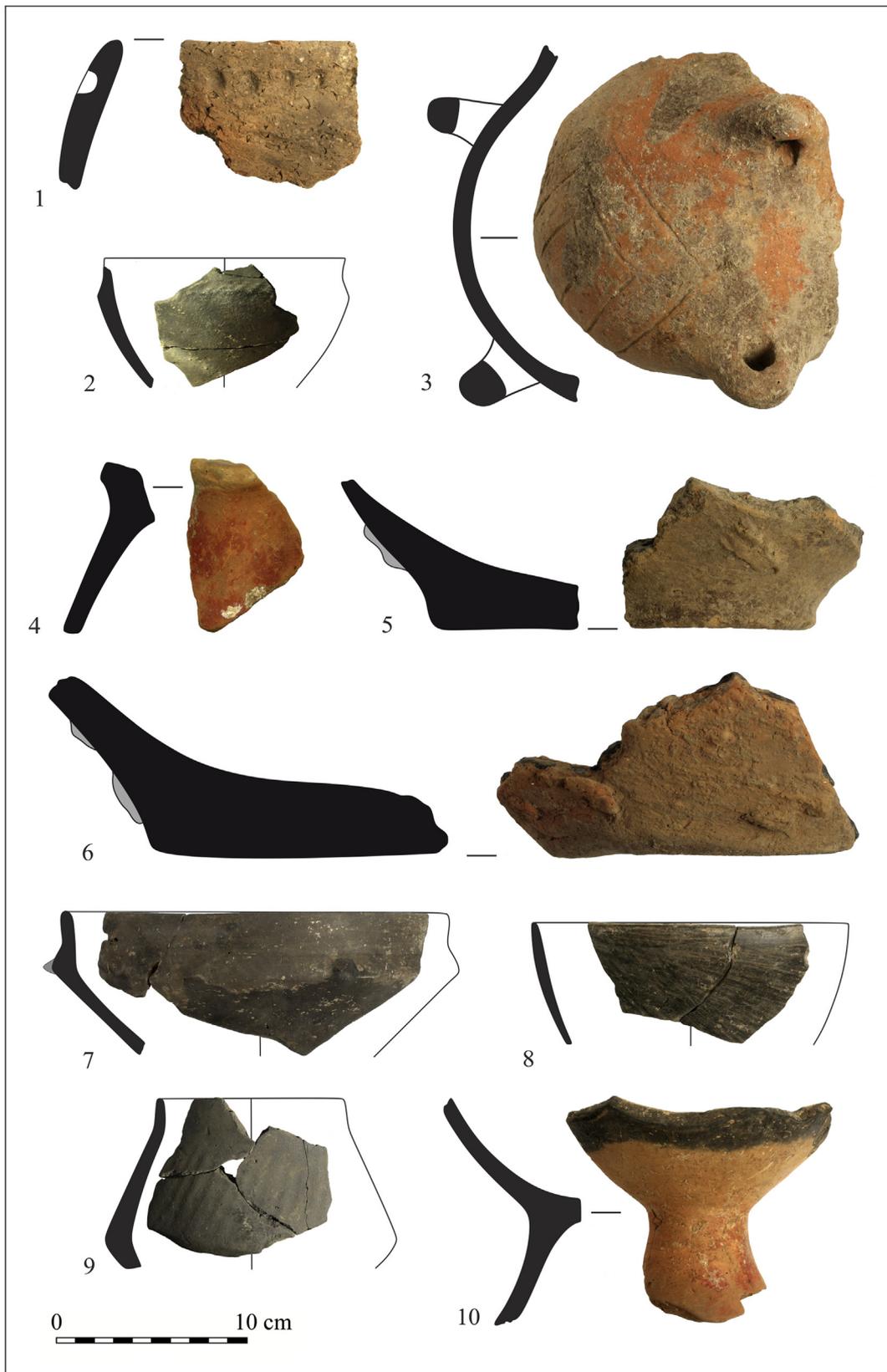


Fig. 12. Pottery material from Versend-Gilencsa. 1-6-House 10/Feature 114; 7-8-House 17/Features 420 413; 9-10-House 18/Feature 414.

Pottery fragments typical for the early LBK-style are present in all households, and the ratio of typical Vinča- and LBK-style pieces is nearly equal in some cases (Jakucs et al., 2018, Fig. 4). The early LBK-style pieces show similarities to those found at Szederkény: most of

them come from large storage jars with a spiral meander motif (Fig. 12. 3; Jakucs and Voicsek, 2017 Fig. 15). Fragments exclusively typical for the Bőna-Bicske style have not been registered so far; some fragments may be tentatively classified as belonging to the Milanovce-style



Fig. 13. Pottery material from Versend-Gilencsa. 1-4-House 12/Feature 362; 5-11-House 15/Features 159, 411 443, 522.

(Fig. 13 5). Among the early LBK-style fragments an emblematic piece has to be noted: a body fragment of a storage jar decorated with an animal head protome (most probably a goat) and an incised spiraloid motif (Fig. 13 4), matched by several analogies in the early LBK universe (Strien, 2013).

The third component of the Versend assemblage consists of fragments that correspond perfectly to the Early Neolithic Starčevo ceramic style in technological, formal and stylistic terms (Fig. 12 5–6; Fig. 13 1–2, 9). As there is no sign of an independent Starčevo settlement in or around the excavated area, stratigraphic contamination can be excluded. Among these fragments there are hemispherical or globular vessels on low ring pedestals (Fig. 13 1) or on a pronounced, thickened base (Fig. 12 5–6, Fig. 13 2), solely tempered with chaff, with decoration made up of irregular blobs of clay applied on the vessel (so-called applied barbotine). These characteristic features can be matched only with the Early Neolithic Starčevo and Körös culture's pottery design (Kalicz, 1990; Oross, 2007).

The material of the settlement features on the western side of the stream have only been a subject of cursory examination so far, thus it is not discussed in this study. However, it is important to note that, according to preliminary observations, predominantly early Vinča-, Ražište- and Malo Korenovo-style ceramics have been reported from this area (Jakucs and Voicsek, 2017).

Only 15 figurine and 8 altar pieces have been brought to light in Versend-Gilencsa. Among the altars, typical fragments are rare, and the collection consists mainly of foot fragments. Similarly to Szederkény, most of the figurines belong to the type with a cylindrical body and a rectangular head, occasionally with symbolic imagery of steatopygous buttocks (Fig. 13 3, 11). The only exception is a seated figurine, unearthed from the western long pit of House 15 (Fig. 13 10). Its body is cylindrical, with a rod-like head that is not separated from the body; the legs and arms have broken off. The mouth and eyes are not depicted, the nose is modelled. The back is decorated with a 'fir branch' motif, and the figurine has distinctively depicted hair on the top of its head. Similar representations have been observed on early LBK figurines found in Aba-Ángyihegy, Balatonszemes-Bagódomb, Vel'ký Grob and Cífer-Pác (Becker, 2011, with further ref.). The significance of a typical early LBK-type figurine in this context cannot be overestimated because a Vinča-style figurine as well as a bowl with a protome, also best matched by Vinča-style analogies (Stanković, 1986; Sapsić and Crnobrnja, 2014), have been uncovered from the very same building (Fig. 13 8).

### 5.3. Pottery style at Szemely-Irtás: preliminary observations

The analysis of the finds uncovered in Szemely-Irtás began only in 2019. Although the observations are preliminary, some of them are worth introducing here. One of the major observations is that the material recovered from the long pits is always a mixture of different pottery styles. Coarse pottery is almost exclusively tempered with sand, while the use of organic material is virtually absent, which is a fundamental difference compared to Szederkény and Versend. Among fine ware, neither typical early Vinča-style (Vinča A) ceramics nor fragments associated with the early LBK styles have been identified in the assemblage examined so far. The ceramic repertoire consists of two main components: Ražište- and Malo Korenovo-style fragments, which, according to the observation so far, are present in roughly equal ratios. The internal typochronology of these pottery styles has not yet been elaborated, however, if the chronological outline proposed by the radiocarbon data is correct, the pottery material of Szemely may represent a late 'pahse' of these styles. In general, the Ražište-style pieces show a techno-typological resemblance to those found at Szederkény (Fig. 14 2-3, 10). Malo Korenovo-style fragments, however, occur at significantly higher rates than at Szederkény and they show a much larger range of typological variability (Fig. 14 5-7, 11). At the same time, late LBK Keszthely-, *Notenkopf*-, and Želiezovce-style fragments

have been found in limited numbers in the surveyed material (Fig. 14 8, 12–13). Based on the observations made so far, their ratio remains small and they were not present in all the examined units. One of the notable examples of these artefacts is a typical Keszthely-style vessel unearthed from Grave 1045 (Fig. 14 1c).

The pottery material also included a few puzzling fragments that cannot be associated with any of the known style groups, although their technology, form, and decoration undoubtedly reflect the styles already known in the region. In addition to some smaller fragments (Fig. 14 9), the most spectacular instance of this 'hybrid' style is a medium-size vessel found inside a roundish pit (Pit 453) in the eastern part of the site, along with several other vessels (Fig. 15 1a–b). This unique piece combines elements from at least three different pottery traditions: the slightly S-profiled shape is typical both for the late LBK Želiezovce style (Marton, 2008) and for the Ražište style or the Sopot culture. The black-topped firing and red-slipped lower part undoubtedly reflect the technology of the Vinča and Ražište styles. The incised decoration, encircling the vessel's shoulder, composed of triple curved lines interrupted with dots, is clearly based on the late *Notenkopf* or early Želiezovce style. The complementary motifs, however, are completely unique. From the same pit, Ražište-style pedestalled vessels (Fig. 15 2), a younger LBK-style spherical pot (Fig. 15. 3) and several storage jars have also been recovered (Fig. 15 4-5).

## 6. Discussion

Since the analysis of the three sites has progressed at different rates, the above remarks must remain preliminary in some cases. However, observations made so far allow us to highlight some of the most intriguing issues, focusing on major cultural processes of the region under study.

The pottery material from the three house clusters of Szederkény-Kukorica-dűlő represent a legacy of potter communities with first-hand knowledge of the 'Vinča way' of pottery making, including all the most distinctive technological features. The spatial distribution of some of these elements, such as the black-topped firing, sets a sharp boundary between the major pottery traditions of the Balkans and those of Central Europe. Other elements, like biconical vessels, organized barbotine (*Sclikwurf*), or finger impressions under the rim, appear to have been more widely disseminated.

According to the absolute chronological models, the material from the eastern cluster of the Szederkény site represents the earliest known occurrence of the already established Vinča ceramic style. However, it predates the early Vinča layers of Vinča-Belo Brdo and Veliko Laole-Belovode only by a few decades (Borić, 2009; Tasić et al., 2015; Jakucs et al., 2016; Whittle et al., 2016). Therefore, the question must be posed how these new results from southernmost Transdanubia contribute to the century-long debate on the emergence of the Vinča 'culture' (Vuković, 2015, 2017 with further ref.). As it has been observed in Szederkény and elsewhere (Leković, 1990; Bogdanović, 2006; Vuković, 2017), many elements of the earliest Vinča pottery style clearly preserve Early Neolithic Starčevo technological traditions (e.g. frequency of chaff-tempering, biconical shapes, presence of reductive core, organized barbotine, etc.). As the Alsónyék Starčevo radiocarbon model has confirmed (Oross et al., 2016a), biconical shapes of the latest Starčevo pottery style – pointed out as the key element of 'vinčanization' (the so-called 'Protovinča' problem: Raczky, 1989; Makkay, 1990; Schier, 1997) – certainly preceded the appearance of the early Vinča style as a 'coherent' entity, and do not reflect upon it. As already shown above, some artefacts associated with ritual practices can also be linked to the Starčevo legacy. Beyond typological similarities it may be even more decisive that these 'ritual' artefacts, produced in large quantities, came to light in almost every household and exhibit a characteristic pattern of fragmentation. All these phenomena suggest a ritual behaviour which is a clear continuation of Early Neolithic traditions (Hansen, 2007; Bánffy, 2019). At the same time, however, fundamental traits of

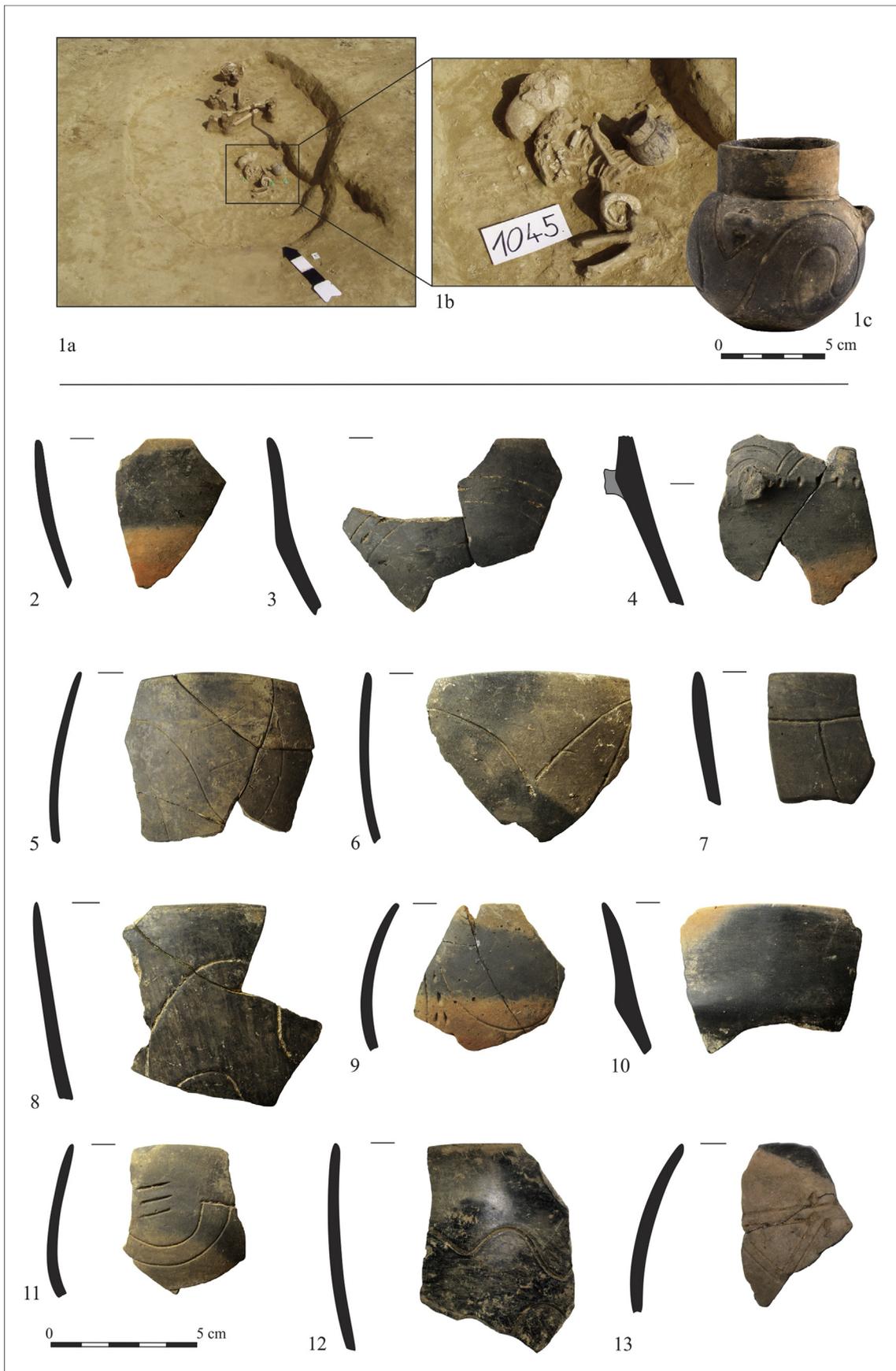


Fig. 14. 1.a–c: Grave 1045 from Szemely-Irtás, accompanied with typical Keszthely-style vessel. 2–13: selected pottery material from different features of Szemely: 2–11–Feature 1243; 12–Feature 646; 13–Featurer 30.

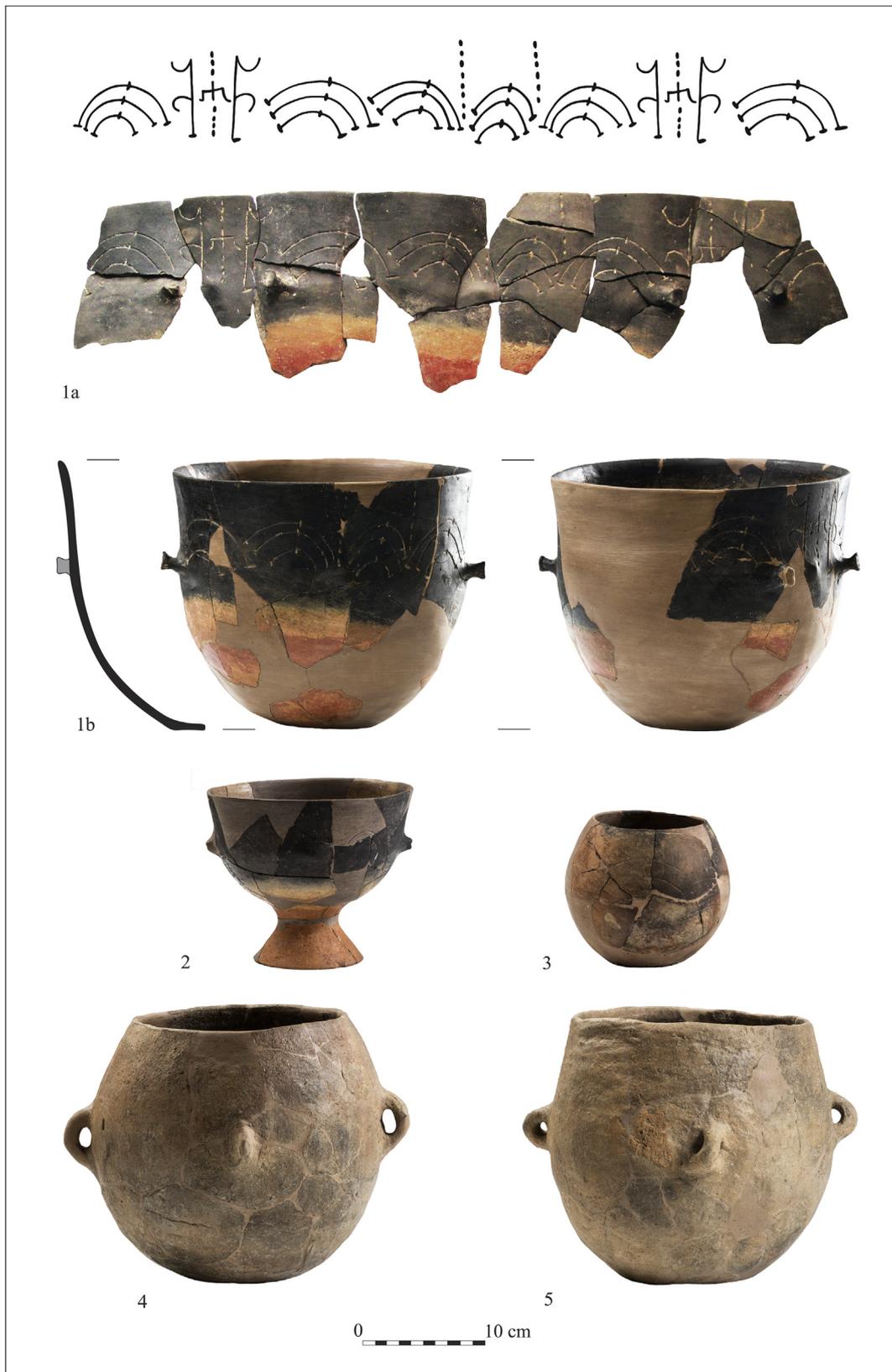


Fig. 15. Szemely-Irtás. Reconstructed vessels from Feature 453.

the early Vinča style (e.g. black-topped/red-slipped technique, finger impressions below the rim, etc.) appeared without any Starčevo antecedents in the mid-54th century cal BC. On the other hand, previously emblematic features of the late Starčevo material culture (e.g. spiraloid

polychrome painting, animal-shaped altars, etc.) disappear almost completely after the 56th century cal BC. Radiocarbon data, suggesting the virtually simultaneous emergence of early Vinča ‘culture’ in the Morava valley, in the Belgrade area, and in southern Transdanubia,



Korenovo style could have appeared in North-West Croatia (Moslavina region and western Slavonia) roughly the same time as the Břina-Bicske and Milanovce styles in central and northern Transdanubia and the early Vinča (Vinča A1) and Ražište styles in eastern and central Slavonia and south-east Transdanubia. Katarina Botić (2018) demonstrated the potential presence of the formative LBK south of the Drava, but Břina-Bicske- or Milanovce-style material has not been detected here. Consequently, there is no contradiction in assuming the appearance of the Malo Korenovo style as a local representative of the early LBK in North-West Croatia from the mid-54th century cal BC. The Vinča, Ražište, Břina-Bicske, and Malo Korenovo styles formulated roughly in the same period but in separate areas of the western Carpathian Basin and the northern Balkans, presumably in different social contexts. Accordingly, it is not surprising that the ceramic repertoire at the sites of this era tend to be more homogeneous, and early LBK (Břina-Bicske, Milanovce, Malo Korenovo) fragments came to light in Szederkény in small numbers. However, Grave 237, accompanied by a typical early LBK-style pot, exemplifies long-lasting social networks that must have existed already at the time of the earliest settlers in Szederkény. The burial was found in the western long pit of House 12, one of the earliest of the Szederkény features, from where only earliest Vinča-style pottery was recovered (Jakucs and Voicsek, 2015, Fig. 11). These ‘outlier’ LBK-style fragments in the assemblage may be the first sign of the evolving – or, reshaping – network of interactions between ‘post-Starčevo’ groups living in different parts of the western Carpathian Basin.

About a hundred years later, the results of this evolving network are evidenced by the assemblage of Versend-Gilencsa from the second half of the 53rd century cal BC. The inventory of the households reveals a mixture of three distinct pottery styles (Fig. 16). Contextual mixing of Starčevo-, early Vinča-, and early LBK-style fragments has been observed several times in south-east Transdanubia. In this respect, Versend is best comparable to Tolna-Mözs-Községi Csádés földek and Medina-Margitkert, located about 50 km to the north along the Danube in the Tolna Sárköz region (Kalicz and Makkay, 1972; Marton and Oross, 2012; Oross et al., this issue). Tolna-Mözs showed a very similar combination of Starčevo-, Vinča-, and early LBK-style ceramics in its southern excavated house cluster (Marton and Oross, 2012). Nevertheless, an essential difference is that in Tolna-Mözs only certain elements of the Vinča ‘package’ could be registered while other, primarily technological features (e.g. black-topped pottery, red slip on pedestals, black burnished ceramics) are completely missing; in Versend-Gilencsa, however, the full range of possibilities is represented. Although some of the Vinča-style vessels could have possibly come from the neighbouring village at Szederkény, but the variety and large number of these fragments precludes them from being ‘imports’ in all cases. This rather suggests that at least some of the artisans in the Versend community were in contact with the same technological and social network as those who lived in the eastern house cluster of the Szederkény site.

The presence of Starčevo-style fragments in Versend point to an important phenomenon. Above all, it must be kept in mind that these fragments represent only a very limited, albeit undoubtedly typical segment of the Starčevo ceramic spectrum. Thus, it would be a serious misjudgement to infer the persistence of the Starčevo ‘culture’ in southern Transdanubia up to this period, and attribute chronological significance to the appearance of these fragments (Strien, 2019). This rather highlights the fact that ‘archaic’ items may exist for a very long time in certain communities, which is primarily a social phenomenon and not a chronological indicator (Nowak, 2004; for further remarks see Bánffy et al., 2018). A plausible hypothesis may be that in some parts of southern Transdanubia, such as the Southern Baranya Hills, and the Sárköz valley and the Tolna Sárköz, there were potters who still adhered to the Starčevo fashion when making certain types of pots during the last decades of the 53rd century cal BC. However, as Versend and Tolna-Mözs demonstrate, these ‘conservative’ artisans lived probably no longer in separate communities but integrated into the society

of newly established settlements.

Based on the above arguments, it is a plausible interpretation that there were potters of at least three different traditions working at the same time in the Versend community, during the brief existence of the settlement. As it was demonstrated in our recent study, households yielding assemblages that were similar in terms of pottery-style-combinations were close to each other spatially, in a densely settled area (Jakucs et al., 2018). This clear patterning suggests that the mixing of styles is not random, but on the contrary, it provides a realistic picture of the stylistic plurality in a given neighbourhood and is strongly suggestive of composite identity within one household. As we have seen, such a mixture of traditions is also possible in the ritual sphere. The combination of early LBK- and early Vinča-type figurines in the same inventory refers not only to the coexistence of different pottery practices, but also to the variability of ritual behaviours.

The diversity of styles and practices is not only spectacular at the household level: the possible combinations are even more varied if one compares the neighbouring settlements of the microregion. This is illustrated by the above observations made in the Szederkény and Versend settlements. Although we know that the activity in the two sites was parallel around the end of the 53rd century cal BC, no similar mixed assemblages could be observed in Szederkény. As we have seen, the proportion of LBK-style pottery remains consistently low in all buildings until the end of the settlement. Likewise, the ‘genuine’ Starčevo-style pottery, as a potential sign of a social group strongly committed to the early Neolithic pottery practices, seems to be an important component in Versend, but not has been registered in Szederkény. Although, the early Neolithic Starčevo heritage is evident in the pottery technology of Szederkény as well, especially in the communities of the eastern and middle settlements. On the other hand, however, no Ražište-style fragments have been found in the eastern house cluster of Versend until now, although we know that this ceramic style was actively used in Szederkény, and also registered on the western side of the Versend stream.

Interpreting the observations made at Szemely-Irtás is much more challenging. First and foremost, an overview of the entire material is required. Based on our present knowledge, the Ražište and Malo Korenovo ceramic styles remained in use in southern Transdanubia after the turn of the 53rd-52nd centuries cal BC and they could have persisted until the beginning of the Late Neolithic. It seems that these were contemporaneous to the later LBK-styles in the more northerly regions of Transdanubia (Keszthely, Notenkopf, Želiezovce) as well as to the beginning of the ‘classical’ Sopot culture (Oross et al., 2016c). The survival of Ražište- and Malo Korenovo-styles into the Vinča B2/C1 period is consistent with earlier assumptions made primarily in south-west Transdanubia and south of the Drava (Marković, 1989; Težak-Gregl, 1993; Regénye, 1998; P. Barna, 2012). Although radiocarbon dates from the burials indicate a long-term activity at the site of Szemely-Irtás, it is unlikely that these styles survived in southern Transdanubia beyond the Vinča B2/C1 period (Fig. 16).

In the case of Szemely, however, not only a ‘simple’ mixture of the known ‘pure’ ceramic styles has been observed, but also the mingling of different ideas on the same object. As the number of these known ‘hybrid’ objects does not yet exceed a few pieces, in the current state of research it is impossible to say whether we are facing a completely new style, or these are rather isolated phenomena. Howsoever, these pieces clearly testify to the amalgamations of symbols and social practices, resulting from stylistic and technological borrowings between potters engaged with different traditions.

## 7. (Instead of) concluding remarks

One of the most intriguing questions raised by the research of these sites concerns the first generation who settled at Szederkény around 5350 cal BC. To what extent did they belong to newly arriving groups, and how did they relate to the locals? The Early Neolithic tradition

reflected in their material culture does not necessarily imply a local (i.e. south Transdanubian) origin. The more than a century-long absolute chronological gap between the latest 'pure' Starčevo style assemblages and the appearance of the first communities with Vinča- Ražište-, and LBK-style material culture suggests that southern Transdanubia was at least partially repopulated during the 55th-54th centuries cal BC (Oross et al., this issue). Recent and ongoing aDNA studies suggest gene-pool shifts as well as continuities within the Carpathian Basin in the middle of the 6th millennium cal BC, between Starčevo and LBK (Szécsényi-Nagy et al., 2015; Oross et al., this issue). Our current image of the material culture indicates that at least parts of the population that inhabited the sites discussed in this paper had stronger local embeddedness. According to the evidence presented here, the groups that established the first households at the Szederkény site maintained long-lasting relationships with other, 'post-Starčevo' groups in Transdanubia right from the birth of the settlement. In western Slavonia and northern Transdanubia, pottery styles of the early LBK (Bíňa-Bicske, Milanovce, Malo Korenovo) emerged from the mid-54th century cal BC at the latest. Fragments of typical early LBK-style vessels were found already in the earliest buildings and burials of Szederkény, otherwise characterised by the early Vinča and Ražište pottery styles; and likewise, typical early Vinča-style pottery is sporadically present at early LBK sites in northern Transdanubia (e.g. Bicske-Galagonyás: Makkay, 1978, Pl. V:1). Connectivity is exemplified both by the early cases of admixture of different pottery styles and by the emblematic longhouse architecture, which, for the past eighty years, has been linked to the LBK 'identity' stronger than the pottery style itself (Last, 2015). As it turned out, however, the distribution of 'LBK-style longhouses' reached far beyond the geographic limits of the LBK material culture (Jakucs and Voicsek, 2015; Botić, 2019), which may shed new light on earlier views on the emergence and spread of this particular type of building. The uniformity of longhouse architecture all over the northern territory of the former Starčevo culture, regardless of the prevalent pottery style, also suggests that these communities were more closely related than previously thought and shared a common heritage in many ways. About a hundred years later, in the second half of 53rd century cal BC, the growing intensity of contacts and the greater mobility between different communities is manifested in the formation of settlements where a much more intense mix of things and practices can be detected. The emergence of such communities may be evidenced by the assemblage of Versend-Gilencsa. The ceramic variability, the presence of Starčevo-, Vinča- and LBK-style artefacts, and the combination of ritual objects at the site suggest the coexistence of social groups with diverse cultural backgrounds and allegiances. However, as the relatively short duration of the Versend settlement suggests, this mingling may have caused difficulties in maintaining the community (Jakucs et al., 2018). The assemblage of Szemely-Irtás already reflects a more stabilised state of these multi-component groups from the turn of 53rd–52nd centuries cal BC. Here the social negotiation of cultural forms and practices resulted in a coalescence of existing traditions, as shown by individual 'hybrid' vessels combining elements of different styles.

The current state of the still ongoing analysis allowed me to introduce only a few major observations about these complex phenomena. However, the evidence suggests profound transformations, population movements, and the amalgamation of artefacts, practices, and customs. The complexity of this 'cultural landscape' is far beyond all previous assumptions and is practically incomprehensible within the traditional conceptual framework of archaeological 'cultures'. Although more research is needed into the underlying social factors of this plurality, the observations presented here offer an opportunity to gain a better understanding of relationships between different groups of the Danube region at the time of the Neolithization of Central Europe.

## Acknowledgments

Most heartfelt thanks are due to NKFIH (formerly OTKA) for funding

our projects, Neolithic communities in the contact zone between the Balkans and Central Europe in the second half of the 6th millennium BC (Újkőkori közösségek a Balkán és Közép-Európa érintkezési övezetében a Kr. e. 6. évezred második felében, grant code: K 112366) and Transforming traditions of material culture. Spatial and temporal patterns in pottery style, production and use during the second half of the 6th millennium cal BC in SE-Transdanubia and beyond (Változó tradíciók. Kerámia stílus, előállítás és használat tér és időbeli mintázatai a Kr.e. 6. évezred második felében a Délkelet Dunántúlon és a környező régiókban, grant code: NKFIH K19/132663). I would like to thank here Zsolt Gallina (Ásatárs Ltd.), Krisztina Somogyi, and Tibor Paluch for their kind permission to publish the Neolithic finds from Szemely-Irtás. Thanks are due to Gergely Kovaliczky, head of the Department of Archaeology in the Janus Pannonius Museum in Pécs, and to all his colleagues in the department for their invaluable help and assistance during my work.

## References

- Băcuț-Crișan, S., Virag, C., 2007. *Plastica Antropomorfa Neolitică Din Nord-Vestul României. Fontes Historiae, Studia in Honorem Demetrii Protease. Complexul Muzeal Bistrița-Năsăud*, pp. 43–59.
- Bánffy, E., 2004. The 6<sup>th</sup> Millennium BC Boundary in Western Transdanubia and its Role in the Central European Neolithic Transition (The Szentgyörgyvölgy-Pityerdomb Settlement) 15 *Varia Archeologica Hungarica*, Budapest.
- Bánffy, E., Bayliss, A., Denaire, A., Gaydarska, B., Hofmann, D., Lefranc, P.H., Jakucs, J., Marić, M., Oross, K., Tasić, N., Whittle, A., 2018. Seeking the Holy Grail: robust chronologies from archaeology and radiocarbon dating combined. *Documenta Praehistorica* 45, 120–136. <https://doi.org/10.4312/dp.45.10>.
- Bánffy, E., 2019. First Farmers of the Carpathian Basin. Changing patterns in subsistence, ritual and monumental figurines. In: *Prehistoric Society Research Paper No. 8. Oxbow Books*.
- Bánffy, E., Marton, T., Osztás, A., 2010. Early neolithic settlement and burials at alsónyék-bátaszék. In: Kozłowski, J.K., Raczky, P. (Eds.), *Neolithization of the Carpathian Basin: Northernmost Distribution of the Starčevo/Körös Culture*. Kraków–Budapest, pp. 37–51.
- Barna, P.J., 2012. Újabb Adatok a DNY-Dunántúl Középső Neolitikuma Időrendjéhez. *New Data on the Chronology of the Middle Neolithic Period of South-Western Transdanubia. MŰMOS V. Debrecen*, pp. 1–20.
- Becker, V., 2011. *Antropomorphe plastik der Westlichen Linearbandkeramik. Saarbrücker Beiträge zur Altertumskunde 83. Dr. Rudolf Habelt Verlag GmbH, Bonn 2011*.
- Bertók, G., Gáti, C.S., 2011. Neue Angaben zur spätneolithischen Siedlungsstruktur in Südosstranubien. *Acta Archaeol. Hung.* 62, 1–18.
- Bogdanović, M., 2006. Early Vinča in Central Serbia. In: Brukner, B., Vorgić, B. (Eds.), *Current Problems of the Transition Period from the Starčevo to the Vinča Period. Zrenjanin, 21–23 October 1996*, pp. 179–196 Zrenjanin.
- Borić, D., 2009. Absolute dating of metallurgical innovations in the Vinča culture of the Balkans. In: Kienlin, T.L., Roberts, B.W. (Eds.), *Metals and Societies. Studies in Honour of Barbara S. Ottaway*, pp. 191–245 Bonn.
- Botić, K., 2018. Middle Neolithic Absolute Dating in North Croatia – New Research 6. *Studia Universitatis Hereditati, Letnik*, pp. 89–100 številka 1.
- Chapman, J., 1981. *The Vinča Culture of South-East Europe: Studies in Chronology, Economy and Society 117 BAR International Series*, Oxford.
- Cladders, M., 2001. *Die Tonware der ältesten Bandkeramik: Untersuchung zur zeitlichen und räumlichen Gliederung. Universitätsforschungen zur prähistorischen Archäologie 72 Habelt, Bonn*.
- Fischer, A.-L., Hilpert, J., 2016. Eine neue verbreitungskarte der Ältesten bandkeramik (LBK I). In: Kerig, T., Nowak, K., Roth, G. (Eds.), *Alles was zählt ... Festschrift für Andreas Zimmermann 285. Universitätsforsch. Prähist. Arch., Bonn*, pp. 109–120.
- Florescu, C., Gligor, M., Mazăre, P., 2007. *Plastic art. In: Florescu, C., Gligor, M., Mazăre, P., Șuteu, C., Varvara, S. (Eds.), A History Lesson: Pottery Manufacturing 8000 Years Ago. Exhibition Catalogue. Alba Iulia*, pp. 94–106.
- Gläser, R., 1993. *Die Linienbandkeramik in Transdanubien. Beiträge zu ihrer Chronologie und Entstehung. Unprinted PhD-Thesis. Ruprecht-Karls-Universität, Heidelberg*.
- Hansen, S., 2007. *Bilder vom Menschen der Steinzeit. Untersuchungen zur anthropomorphen Plastik der Jungsteinzeit und Kupferzeit in Südosteuropa. Archäologie in Eurasien Bd. 20 Mainz*.
- Heitz, C., 2017. Making things, being mobile: pottery as intertwined histories of humans and materials. In: Heitz, C., Stapfer, R. (Eds.), *Mobility and Pottery Production. Archaeological and Anthropological Perspectives*. Sidestone Press, Leiden.
- Hoffman, D., 2016. Keep on walking: the role of migration in Linearbandkeramik life. *Documenta Praehistorica* 43, 235–252.
- Horváth, F., 2006. Comments on the connections between the Vinča complex and the Carpathian Basin. In: Tasić, N., Grozdanov, C. (Eds.), *Homage to Milutin Garašanin*, pp. 309–324 Belgrade.
- Horváth, F., Draşovean, F., 2013. Remarks on the connections between the Banat and the great Hungarian plain at the beginning of the middle neolithic (Satchinez–Alföld linear pottery–esztar–vinča). In: Anders, A., Kulcsár, G. (Eds.), *Moments in Time. Papers Presented to Pál Raczky on His 60<sup>th</sup> Birthday. Prehistoric Studies I, Budapest*, pp. 113–133.

- Jakucs, J., Voicsek, V., 2015. The northernmost distribution of the early Vinča culture in the Danube valley: a preliminary study from Szederkény-Kukorica-dűlő (Baranya County, southern Hungary). *Antaeus* 33, 13–54.
- Jakucs, J., Bánffy, E., Oross, K., Voicsek, V., Bronk Ramsey, C., Dunbar, E., Kromer, B., Bayliss, A., Hofmann, D., Marshall, P., Whittle, A., 2016. Between the Vinča and Linearbandkeramik worlds: the diversity of practices and identities in the 54<sup>th</sup>–53<sup>rd</sup> centuries cal BC in south-west Hungary and beyond. *J. World PreHistory* 29, 267–336.
- Jakucs, J., Voicsek, V., 2017. A Kr. e. 6. évezred második felének új kutatási eredményei Baranya megyében (Recent results in research of the second half of the 6th millennium BC in Baranya County). *Janus Pannonius Múzeum Évkönyve* 54, 133–177.
- Jakucs, J., Oross, K., Bánffy, E., Voicsek, V., Dunbar, E., Reimer, P., Bayliss, A., Marshall, P., Whittle, A., 2018. Rows with the neighbours: the short lives of longhouses at the Neolithic site of Versend-Gilencsa. *Antiquity* 92 (361), 91–117.
- Kaiser, T., Voytek, B., 1983. Sedentism and economic change in the balkan neolithic. *J. Anthropol. Archaeol.* 2 (4), 323–353.
- Kalicz, N., 1990. Frühneolithische Siedlungsfunde aus Südwestungarn 4 IPH, Budapest.
- Kalicz, N., 1991. Die Keszthely-Gruppe der Transdanubischen (Mitteleuropäischen) Linienbandkeramik im Lichte der Ausgrabung in Kustánszeg (Westungarn). pp. 5–32 *CommArchHung.*
- Kalicz, N., 1993. The early phases of the neolithic in western Hungary (Transdanubia). *Poročilo o raziskovanju paleolita, neolita in eneolita v Sloveniji* 21, 85–135.
- Kalicz, N., 1994. A dunántúli (közép-európai) vonaldíszes kerámia legidősebb leletei és a korai Vinča kultúra (Die ältesten Funde der transdanubischen (mitteleuropäischen) Linienbandkeramik und die frühe Vinča-Kultur). In: Lórinczy, G. (Ed.), *A kőkortól a középkorig. Tanulmányok Trogmayer Ottó 60. születésnapjára (Von der Steinzeit bis zum Mittelalter. Studien zum 60. Geburtstag von Ottó Trogmayer)*, pp. 67–84 Szeged.
- Kalicz, N., 2011. Forschung über die Starčevo-Kultur in Südransanubien (Ungarn). In: Botić, K., Kovačević, S., Ložnjak, D., Dizdār, M. (Eds.), *Panonski Prpovijesni Osvitli. Zbornik Radova Posvećenih Korneliji Minichreiter Uz 65. Obljetnicu Života. Institut za arheologiju, Zagreb*, pp. 105–129.
- Kalicz, N., Makkay, J., 1972. Südliche Einflüsse im frühen und mittleren Neolithikum Transdanubiens. In: Fitz, J., Makkay, J. (Eds.), *Die aktuellen Fragen der Bandkeramik. Akten der Pannonia Konferenzen I. A vonaldíszes kerámia időszertől kérdései. Az I. Pannonia konferencia actái*, pp. 93–105 Budapest.
- Kalicz, N., Schreiber, K.R., 1992. Die erste frühneolithische fundstelle in budapest. *Balkanica* 23, 47–76 1992.
- Karmanski, S., 2005. Donja branjevina: a neolithic settlement near deronje in the Vojvodina (Serbia). In: Biagi, P. (Ed.), *Società per la Preistoria e Protostoria della Regione Friuli-Venezia Giulia, Quaderno 10*, (Trieste).
- Kaufmann, D., 1991. Südöstliche Einflüsse in der Linienbandkeramik des Elbe-Saale-Gebietes. *Banatica* 11, 275–295.
- Kovaliczky, G., 2009. Szederkény-Kukorica-dűlő. In: *Régészeti Kutatások Magyarországon 2008 (Archaeological Investigations in Hungary 2008)*, pp. 276–282.
- Last, J., 2015. Longhouse lifestyles in the central European neolithic. In: Fowler, C., Harding, J., Hofmann, D. (Eds.), *The Oxford Handbook of Neolithic Europe*. Oxford University Press, Oxford, pp. 273–289.
- Lazarovic, G.H., 1979. Neolithic Banatului. *BMN IV. (Cluj-Napoca)*.
- Lazarovici, Gh., 1981. Die periodisierung der Vinča kultur in rumänien. *Prähistorische Z.* 56, 169–196.
- Lekovic, V., 1990. The vinčianization of Starčevo culture. In: Srejović, D., Tasic, N. (Eds.), *Vinca and its World. International Symposium. The Danubian Region from 6000 to 3000 B.C.* Belgrade, pp. 67–74.
- Lennei, E., 2004. Erste Anzeichen der Regionalisierung sowie Nachweise von Fernkontakten in der älteren Linearbandkeramik. *Antaeus* 27, 47–60.
- Makkay, J., 1978. Excavations at bicske. I. The early neolithic – the earliest linear band ceramic. *Alba Regia* 16, 9–60.
- Makkay, J., 1990. The protovinča problem – as seen from the northernmost frontier. In: Srejović, D., Tasić, N. (Eds.), *Vinca and its World. International Symposium. The Danubian Region from 6000 to 3000 B.C.* Belgrade, pp. 113–122.
- Marinković, S., 2010. Arheološki materijal sa nalazišta Živanićeva dolja iz zbirke Narodnog Muzeja u Zrenjaninu – vinčanska kultura (The archaeological finds of the site of Živanićeva dolja from the collection of the National Museum of Zrenjanin – vinča culture). *RAD Muzeja Vojvodine* 52, 21–36.
- Marković, Z., 1985. Ražište tip sopske kulture (der ražište-typ der Sopot-kultur). *Arheol. Vestn.* 36, 39–76.
- Marković, Z., 1989. Novi prilozi poznavanju neolita sjeverne Hrvatske. *Neue Beilagen zur Kenntnis des Neolithikums Nordkroatiens. Poročilo* 17, 61–81.
- Marković, Z., 1994. Sjeverna Hrvatska od neolita do brončanog doba. *Problem kontinuiteta stanovništva i kultura sjeverne Hrvatske od ranog neolita do početka brončanog doba (Nordkroatien vom Neolithikum bis zur Anfang der Bronzezeit)*. Koprivnica 1994.
- Marković, Z., Botić, K., 2008. O neolitičkoj keramici iz Novih Perkovaca kod Đakova (Über die neolithische Keramik aus Novi Perkovci bei Đakovo.). *Pril.inst.arheol.zagrebu* 25, 15–32.
- Marković, Z., Botić, K., 2012. Novija razmatranja o nekim aspektima sopske kulture u sjevernoj Hrvatskoj (Neuere Betrachtungen über bestimmte Aspekte der Sopot-Kultur in Nordkroatien). *Pril.inst.arheol.zagrebu* 29, 57–70.
- Marton, T., 2008. Development of pottery style on the LBK settlement of Balatonszárszós-Kis-erdei-dűlő in Hungary. *Acta Terrae Septemcastrensis* 7, 197–216.
- Marton, T., Oross, K., 2012. Siedlungsforschung in linienbandkeramischen Fundorten in Zentral- und Südransanubien – wiege, Peripherie oder beides? In: Kreienbrink, F., Cladders, M., Stäuble, H., Tischendorf, T., Schier, W. (Eds.), *Siedlungsstruktur und Kulturwandel in der Bandkeramik. Beiträge der Internationalen Tagung „Neue Fragen zur Bandkeramik oder alles beim Alten?“ Leipzig* 23. bis 24. September 2010.
- Arbeits- und Forschungsgerichte zur sächsischen Bodendenkmalpflege, Beiheft 25. *Landesamt für Archäologie. Freistaat Sachsen. Dresden*, pp. 220–239.
- Nowak, M., 2004. Is 'pot prehistory' real prehistory? The case of the early LBK. In: Lukes, A., Zvelebil, M. (Eds.), *LBK Dialogues. Studies in the Formation of the Linear Pottery Culture*. BAR, Oxford, pp. 7–15.
- Oross, K., 2007. The pottery from Esecfalva 23. In: Whittle, A. (Ed.), *The Early Neolithic on the Great Hungarian Plain. Investigations of the Körös Culture Site of Esecfalva 23, County Békés 21*. *Varia Archaeologica Hungarica*, Budapest, pp. 491–620.
- Oross, K., Bánffy, E., 2009. Three successive waves of Neolithisation: LBK development in Transdanubia. *Documenta Praehistorica* 36, 175–189.
- Oross, K., Bánffy, E., Osztas, A., Marton, T., Nyerges, É.Á., Köhler, K., Szécsényi-Nagy, A., Alt, K.W., Bronk Ramsey, C., Goslar, T., Kromer, B., Hamilton, D., 2016a. The early days of Neolithic Alsónyék: the Starčevo occupation. *Berichte der Römisch-Germanischen Kommission Bd 94*, 93–122.
- Oross, K., Osztas, A., Marton, T., Nyerges, É.Á., Köhler, K., Gallina, Zs, Somogyi, K., Bánffy, E., Bronk Ramsey, C., Goslar, T., Hamilton, D., 2016b. Longhouse times: dating the Alsónyék LBK settlement. *Berichte der Römisch-Germanischen Kommission Bd. 94*, 123–150.
- Oross, K., Osztas, A., Marton, T., Köhler, K., Ódor, J.G., Szécsényi-Nagy, A., Bánffy, E., Alt, K.W., Bronk Ramsey, C., Kromer, B., Bayliss, A., Hamilton, D., Whittle, A., 2016c. Midlife changes: the Sopot burial ground at Alsónyék. *Bericht der Römisch-Germanischen Kommission Bd 94*, 151–178.
- Oross, K., Simmer, L., Straub, P., 2019. Regionality in fluidity: the Linearbandkeramik site at Keszthely-Lendli Adolf út in western Hungary and its hinterland. In: Bánffy, E., Barna, J.P. (Eds.), „Trans Lacum Pelsonem“ Prehistoric Research in South-Western Hungary (5500–500 BC) 7. *Castellum Pannonicum Pelsonense*, pp. 9–72.
- Oross, K., Cramp, Lucy J. E., Gortva, G., Jakucs, J., Lyublyanovics, K., Marton, T., Serlegi G., Vágvölgyi, B., Whittle A. This issue: 'It's still the same old story': the current southern Transdanubian approach to the Neolithisation process of central Europe.
- Pavůl, I., 1981. Počátky vyplňované pásky v české lineární keramice. (Die Anfänge des gefüllten Bandes in der böhmischen Linearkeramik). *Varia archeologica 2 (Sborník k počt 80. narozenin akademika Jana Filipa)*. *Prähistorica VIII, Praha*, pp. 21–25.
- Pavůk, J., 1997. The Vinča culture and beginning of the linear pottery. In: Lazić, M. (Ed.), *Antidóron: Complexis LXV Annis Dragoslavo Srejović Ab Amicis Collegis Discipulis Oblatum*. Centre for Archaeological Research, Faculty of Philosophy, University of Belgrade, Belgrade, pp. 168–178.
- Pavůk, J., 2004. Early linear pottery culture in Slovakia and the neolithisation of central Europe. In: Lukes, A., Zvelebil, M. (Eds.), *LBK Dialogues. Studies in the Formation of the Linear Pottery Culture*. BAR, Oxford, pp. 71–82.
- Pavůk, J., Farkaš, Z., 2013. Beitrag zur Gliederung der älteren Linearkeramik. In: Anders, A., Kulcsár, G. (Eds.), *Moments in Time. Papers Presented to Pál Raczky on His 60th Birthday*. *Prehistoric Studies I. Budapest 2013*, pp. 213–236.
- Pavůk, J., Bakámska, A., 2014. Typologie und Chronologie der Neolithischen Altärchen auf dem Balkan (Typológia a chronológia neolitických oltárikov na Balkáne). *Slovenská Archaeologia LXII*, 1–78.
- Price, T.D., Bentley, R.A., Luning, J., Gronborn, D., Wahl, J., 2001. Prehistoric human migration in the Linearbandkeramik of central Europe. *Antiquity* 75, 593–603.
- Raczky, P., 1989. Chronological framework of the early and middle neolithic in the tisa region. In: Bökönyi, S. (Ed.), *Neolithic of Southeastern Europe and its Near Eastern Connections*. *Varia Archaeologica Hungarica 2*, Budapest, pp. 233–251.
- Regénye, J., 1998. Some questions concerning the end of the middle neolithic in western Hungary (Transdanubia). In: Draşovean, F. (Ed.), *The Late Neolithic of the Middle Danube Region*, pp. 109–116 Timişoara.
- Regénye, J., 2010. What about the other side: starčevo and LBK settlements north of Lake Balaton. In: Kozłowski, J.K., Raczky, P. (Eds.), *Neolithization of the Carpathian Basin: Northernmost Distribution of the Starčevo/Körös Culture*. Kraków, Budapest, Polish Academy of Arts and Sciences., and Institute of Archaeological Sciences of the Eötvös Loránd University, pp. 53–64.
- Sapsić, M.P., Crnobrnja, A., 2014. Vinčanske Zdele Sa Protoma. *Vinča Bowls with Protoma*. *Starinar* 64, 185–203.
- Schier, W., 1995. Vinča-Studien. Tradition und Innovation im Spätneolithikum des zentralen Balkanraumes am Beispiel der Gefäßkeramik aus Vinča-Belo Brdo. Unprinted PhD-Thesis. Ruprecht-Karls-Universität, Heidelberg.
- Schier, W., 1996. The relative and absolute chronology of Vinča: new evidence from the type site. In: Draşovean, F. (Ed.), *The Vinča Culture, its Role and Cultural Connections*, pp. 141–162 Timişoara.
- Schier, W., 1997. „Proto-Vinča“: zum Übergang von der Starčevo- zur Vinča-Kultur im Südosten des Karpatenbeckens. In: Lazić, M. (Ed.), *Antidóron: Complexis LXV Annis Dragoslavo Srejović Ab Amicis Collegis Discipulis Oblatum*. Centre for Archaeological Research, Faculty of Philosophy, University of Belgrade, Belgrade, pp. 155–166.
- Srejović, D., 1988. The Neolithic of Serbia. *Archaeological Research, Belgrade*, pp. 1948–1988.
- Early neolithic settlement Brunn am Gebirge, wolfholz, site 2 in lower Austria and the origin of the western linear pottery culture (LPC). *Stadler, P., Kotova, N. (Eds.), Beiträge zur Ur- und Frühgeschichte Mitteleuropas* 88.
- Stanković, S., 1986. Žrtvenici i Prosopomorfní Poklopci Iz Vinče (The Altars and Prosopomorphic Lids from Vinča). *Centar Za Arheološka Istraživanja* 7 (Beograd).
- Starnini, E., 2014. Fired Clay. Plastic Figurines of the Körös Culture from the Excavations of the Early Neolithic Sites of the Körös Culture in the Körös Valley, Hungary. 14 *Società per la Preistoria e Protostoria della Regione Friuli-Venezia Giulia Quaderno*.
- Ştefan, C., 2006. Playing with Clay: Anthropomorphic Figurines from Şoiuş-La Avicola (Ferma 2). *Hunedoara County. Dacia* 60, pp. 31–66.
- Strien, H.-C., 2013. Ein Ziegenkopffrom der ältesten Bandkeramik aus Großgartach. In: In: Schrenk, Chr, Wanner, P. (Eds.), *heilbronnica 5. Beiträge zur Stadt- und Regionalgeschichte Quellen und Forschungen zur Geschichte der Stadt Heilbronn 20*.

- Jahrbuch für schwäbisch-fränkische Geschichte 37. pp. 419–424 Heilbronn.
- Strien, H.-C., 2019. 'Robust chronologies' or 'Bayesian illusion'? Some critical remarks on the use of chronological modelling. *Documenta Praehistorica* 46, 204–215.
- Szadmány, G.Y., Gherdán, K., Starnini, E., 2006. Early Neolithic pottery production in Hungary: a comparative archaeometrical study of Körös and Starčevo ceramics. In: *Proceedings of the 34th International Symposium on Archaeometry, Archaeometry 2004 Zaragoza (Spain) 3-7 May 2004*, pp. 549–554.
- Szécsényi-Nagy, A., Brandt, G., Haak, W., Keerl, V., Jakucs, J., Möller-Rieker, S., Köhler, K., Balázs, G.M., Oross, K., Marton, T., Osztás, A., Kiss, V., Fecher, M., Pálfi, G., Molnár, E., Sebők, K., Czene, A., Paluch, T., Šlaus, M., Novak, M., Pečina-Šlaus, N., Ősz, B., Voicsek, V., Somogyi, K., Tóth, G., Kromer, B., Bánffy, E., Alt, K.W., 2015. Tracing the genetic origin of Europe's first farmers reveals insights into their social organization. *Proceedings of The Royal Society B* 282. <https://doi.org/10.1098/rspb.2015.0339>.
- Tasić, N., 1973. *Neolitiska Plastika*. Muzej Grada, Belgrade.
- Tasić, N., Marić, M., Penezić, M.K., Filipović, D., Borojević, K., Borić, D., Russell, N., Reimer, P., Bayliss, A., Barclay, A., Gaydarska, B., Whittle, A., 2015. The end of the affair: formal chronological modelling for the top of the Neolithic tell of Vinča-Belo Brdo. *Antiquity* 89, 1064–1082.
- Težak-Gregl, T., 1993. *Kultúra Linernotrakaste Keramike U Sredisnoj Hrvatskoj. Korenovska Kultúra (The Linear Pottery Culture in Central Croatia. The Korenovo Culture)* 2. Dissertationes et Monographie, Zagreb.
- Vajda-Kiss, O., 2008. Lánycsók-Csata alja. In: *Régészeti Kutatások Magyarországon 2007. Archaeological Investigations in Hungary 2007*, pp. 220–221.
- Vasić, M., 1936. *Preistorijska Vinča IV – Keramika*. (Beograd).
- Vetnić, S., 1990. The earliest settlements of the Vinča culture (Proto-Vinča) in the Morava valley. In: Srejić, D., Tasić, N. (Eds.), *Vinča and its World. International Symposium. The Danubian Region from 6000 to 3000 B. C. Belgrade*, pp. 91–98.
- Voicsek, V., 2010. Lánycsók-gata csatola. In: Kvassay, J. (Ed.), *Évkönyv És Jelentés a Kulturális Örökségvédelmi Szakszolgálat 2008. évi feltárásairól*, pp. 23.
- Vuković, J., 2015. Lost in transition: the problem of early/middle to late neolithic transition in yugoslav/Serbian archaeology of the second half of the 20th century. *Issu. Ethnol. Anthropol.* 10 (3), 651–673.
- Vuković, J., 2017. Erasing boundaries or changing identities? The transition from early/middle to late neolithic, new evidence from southern Serbia. In: Gori, M., Ivanova, M. (Eds.), *Balkan Dialogues: Negotiating Identity between Prehistory and the Present*. Routledge, London, pp. 240–253.
- Whittle, A., Bayliss, A., Barclay, A., Gaydarska, B., Bánffy, E., Borić, D., Draşovean, F., Jakucs, J., Marić, M., Orton, D., Tasić, N., Schier, W., Vander Linden, M., 2016. A Vinča potscape: formal chronological models for Neolithic cultural development in south-east Europe. *Documenta Praehistorica* 43, 1–60.