

Some Balaton-Lasinja graves from Veszprém-Jutasi út and an outline chronology for the earlier Copper Age in western Hungary

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ABSTRACT – *A handful of new radiocarbon dates from three Balaton-Lasinja culture graves at the site of Veszprém-Jutasi út in western Hungary form the starting point for formal models for late Lengyel and post-Lengyel chronology in that region. The graves date to the later fifth millennium cal BC. They provide the opportunity to put the earlier Copper Age Balaton-Lasinja culture of Transdanubia into its regional and wider context, and to highlight both gradually improving understanding of its character and remaining problems of chronology and classification. The Balaton-Lasinja culture was part of a whole series of regional shifts in settlement and society connected to the end of the Neolithic and the demise of major settlement aggregations which had dominated lifestyles in previous centuries. This study indicates how much further detailed research continues to be needed to get fully to grips with this set of important changes, which run on into the Copper Age. Contrasts are drawn between western and eastern Hungary, and the uncertainties surrounding the chronology of the fourth millennium cal BC, including for the Furchenstich pottery style, are emphasised.*

KEY WORDS – *western Hungary; Late Neolithic and Copper Age; post-Vinča development; Balaton-Lasinja culture; radiocarbon dating; Bayesian chronological modelling*

Nekaj grobov kulture Balaton-Lasinja iz najdišča Veszprem-Jutasi út in oris kronologije starejše bakrene dobe na zahodnem Madžarskem

IZVLEČEK – *Novi radiokarbonski datumi iz treh grobov kulture Balaton-Lasinja v Veszprém-Jutasi út na zahodu Madžarske predstavljajo izhodišče za izdelavo formalnih pozno lengyelskih in postlengyelskih kronoloških modelov v regiji. Grobovi so datirani v pozno peto tisočletje pr. n. št. Omogočajo umestitev zgodnje bakrenodobne Balaton-Lasinja kulture v Transdanubiji v regionalni in širši kontekst in pomagajo pri boljšem razumevanju njenega značaja, kronoloških težav in klasifikacije. Kultura Balaton-Lasinja je del vrste regionalnih poselitvenih in družbenih premikov na koncu neolitika, povezanih z razpadom večjih poselitvenih območij, ki so prevladovala v prejšnjih stoletjih. Študija kaže koliko detajlnih raziskav je še potrebnih, da bi razumeli spremembe, ki so se nadaljevala*

v bakreno dobo. Predstavljamo kontraste med zahodno in vzhodno Madžarsko in opozarjamo na nezanesljivo kronologijo četrtega tisočletja pr. n. št., tudi lončarskega sloga brazdastega vreza.

KLJUČNE BESEDE – *zahodna Madžarska; pozni neolitik in eneolitik; post-Vinča razvoj; lasinjska kultura; radiokarbonsko datiranje; Bayesovo kronološko modeliranje*

Introduction: aims and contexts

This paper presents a handful of new radiocarbon dates from three Balaton-Lasinja culture graves at the site of Veszprém-Jutasi út in western Hungary, as well as a series of formal models for late Lengyel and post-Lengyel chronology of that region based on the small number of existing dates. The graves date to the later fifth millennium cal BC. They provide the opportunity to put the middle Copper Age Balaton-Lasinja culture of Transdanubia into its regional and wider context, and to highlight both gradually improving understanding of its character and remaining problems of chronology and classification. The Balaton-Lasinja culture was part of a whole series of regional shifts in settlement and society connected to the end and aftermath of the Neolithic and to the demise of major settlement aggregations, including tells, which had dominated lifestyles in previous centuries. This study indicates how much further detailed research continues to be needed to get fully to grips with this set of important changes, which run on into the Copper Age. The immediate focus here is on western Hungary, but there are implications for other neighbouring regions as well.

From the Late Neolithic to the Copper Age in western Hungary and beyond

There has long been an imbalance in studies of the Neolithic and the Copper Age in Hungary between its eastern and western parts (*Kalicz 1991; Bánffy 1994*). This applies not least to the end of the Neolithic, broadly in the middle of the fifth millennium cal BC. This period is represented by a series of changes in eastern Hungary that are archaeologically well documented, like the abandonment of tell settlements and the appearance of new pottery styles. A significant shift in subsistence strategy has also been noted, with more reliance on stockbreeding and pastoralism in emerging Early Copper Age communities (*Bánffy 1995*). The Copper Age of eastern Hungary was already well-investigated by the mid-late 1950s (*Kutzián 1955; Banner, Bognár-Kutzián 1961*), and even underpinned by some reliable stratigraphic observations (*Kalicz 1958*). Its presumed cultural and chronological sequence (from

Tiszapolgár to Bodrogkeresztúr to Baden), was established in the early 1960s, but has been severely questioned more recently (*Raczky, Siklósi 2013; Siklósi, Szilágyi 2021*; and see below), allowing considerable overlap between Tiszapolgár and Bodrogkeresztúr.

In contrast, research on the same times in Transdanubia in western Hungary has historically lagged behind. One obvious gap here was between the Late Neolithic Lengyel culture and the Late Copper Age Baden culture. From the 1970s onwards (*Raczky 1974*), the late phase of the long-enduring Lengyel culture, Lengyel III, was seen to persist in the period that was traditionally called the Early Copper Age in the central Carpathian basin, contemporary with Tiszapolgár in the previously accepted cultural scheme for eastern Hungary (*Raczky, Siklósi 2013; Siklósi, Szilágyi 2021*).

Just as there was historically uneven knowledge of Lengyel settlement in Transdanubia – whilst large settlements and cemeteries were found and excavated in east Transdanubia, including the eponymous site (*Wosinsky 1889; 1891*) and a recent site with more than 2000 burials at Alsónyék (*Osztás et al. 2016*), data from the western Lengyel complex is characterised by smaller, dispersed settlements, with almost entirely ‘Sonderbestattungen’ or unusual graves – very little was known about late Lengyel settlement before 1974 (*Raczky 1974*) and more robust settlement data followed only in the 1990s (*Bánffy 1995*), with subsequent insights into changes in subsistence strategy in favour of stockbreeding (*Bánffy 1994; 1995; Barna et al. 2019*). According to current knowledge, the Lengyel III horizon can be divided into two typo-chronological phases, IIIa and IIIb. The latter was taken to represent the gradual adoption of more elements common in the subsequent Balaton-Lasinja culture (*Kalicz 1991; Bánffy 1994*). As part of a larger cultural formation already described in Croatia, Slovenia and eastern Austria, the Balaton-Lasinja culture was initially supposed to be the result of a massive migration into southern Transdanubia (*Kalicz 1969*), based on the work of Josip Korošec (*1958*) who summarised its

principal characteristics in the late 1950s, and on 25 sites of the Lasinja culture published by Stojan Dimitrijević (1961), who considered them to be part of the suite of post-Vinča phenomena.

The Balaton-Lasinja culture

One of the earliest identifications of the Balaton-Lasinja culture resulted from systematic work on the archaeological topography of Hungary in the early 1960s. Volumes 1 and 2 were published on results from the Balaton Uplands in County Veszprém, where surface collections were complemented by small excavations (Bakay et al. 1966; Éri et al. 1969). The similarity of some assemblages to recently published Slovenian and Croatian material led to the definition of the Balaton group in 1969 by Nándor Kalicz, who stressed the dominance of southern traditions in its early phase of its development, while also emphasising central European ties both in the ceramic assemblages and in the metallurgy of its later phase (Kalicz 1969). Soon after, ceramics were already being classified as Balaton-Lasinja I, II and III types (Kalicz 1973). They became Balaton-Lasinja I and Balaton-Lasinja II-III cultures by the early 1980s in a further comprehensive survey, in which Kalicz discussed the dynamics, the cultural connections and the metallurgy of the period (Kalicz 1982). The label of 'Furchenstich' was also proposed for the more recent pottery assemblages in this proposed typo-chronological sequence. Related cultural groups are also known with many different names in adjacent regions (such as Retz-Gajary in Croatia, Bajč-Retz in Slovakia and Mondsee in Austria).

Kalicz went on to distinguish Balaton-Lasinja III as the Protoboleráz horizon, with some sites in eastern Hungary as well (Kalicz 1991; 2001). In this system, Lengyel III was

set to be contemporaneous with Tiszapolgár, and Balaton-Lasinja with Bodrogkeresztúr, in eastern Hungary, and with Ludanice in the north-central part of the Carpathian basin; Furchenstich was seen as parallel to the Hunyadihalom group (Bodrogkeresztúr B). Protoboleráz already marked the emergence of Late Copper Age cultural groupings, such as Boleráz and Baden.

Although meticulous studies of typo-chronology were the principal focus for decades, architecture, settlement structure, burials, subsistence strategy and metallurgy also received attention. Two major types of houses of the Lengyel III and Balaton-Lasinja periods can be distinguished. Bipartite houses, with a larger northern and a smaller southern room, proved to be very characteristic for the period. No tra-

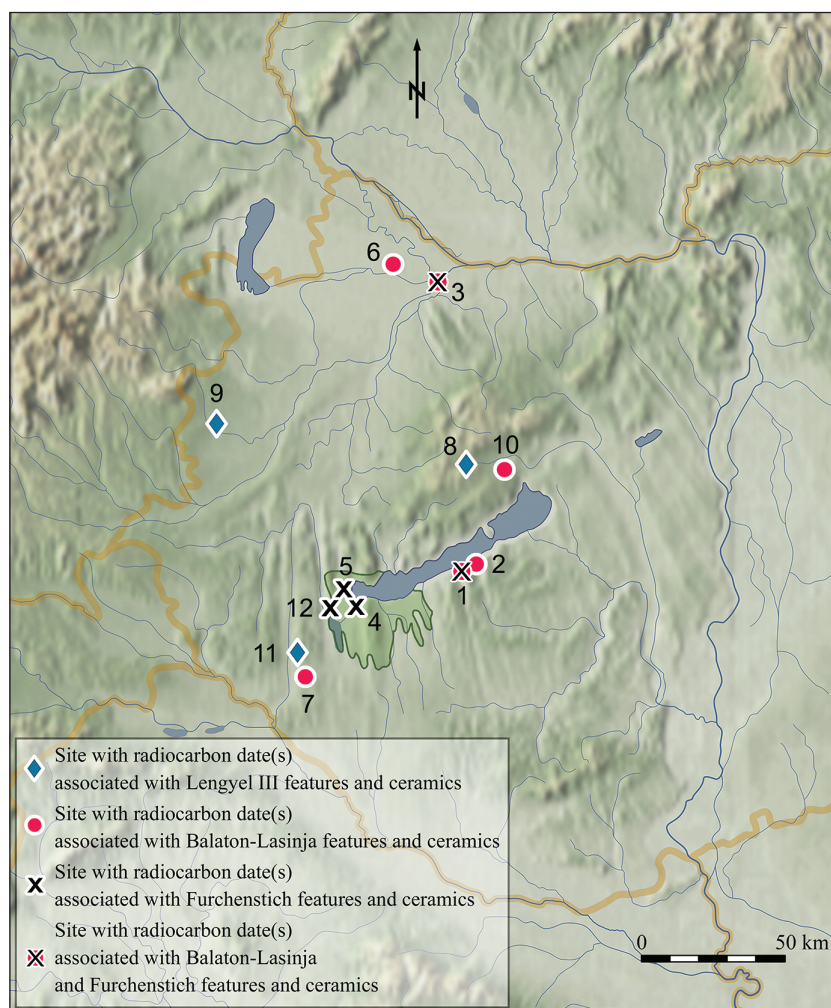


Fig. 1. Radiocarbon dated earlier Copper Age sites in western Hungary: 1 Balatonőszöd-Temetői-dűlő; 2 Balatonszárszó-Kis-erdei-dűlő; 3 Győr-Szabadrétdomb; 4 Keszthely-Fenekpuszta, HalásZRét-Nádgazdaság agyagbányája; 5 Keszthely-Fenekpuszta, Vasúti őrház; 6 Mosonszentmiklós-Pálmajor; 7 Nagykanizsa-Sánc; 8 Szentgál-Teleki dűlő; 9 Szombathely-Metro; 10 Veszprém-Jutasi út; 11 Zalaszentbalázs-Szólóhegyi mező; 12 Zalavár-Mekenye.

ces of internal division and just a single row of postholes in the position of the ridge purlin were observed in other buildings, which were extremely variable in shape and size. Some further constructions are more like Neolithic Lengyel houses with a single cross-row of heavy posts in their interior. Bedding trenches usually mark the walls of the houses. The exceptional visibility of the house plans, comparable only with those of LBK buildings, is due to these features. Different house types were dated to both the late Lengyel and Balaton-Lasinja periods, and no strict architectural sequence could be distinguished (Virág 2003; 2005; Virág, Figler 2007; Oross et al. 2010).

Balaton-Lasinja settlement layouts are clearly looser than those of the densely built-up extended Neolithic sites of the LBK and the Lengyel periods. Small clusters of houses and a limited number of buildings have been discovered at sites such as at Zalavár-Basasziget and Balatonszárszó-Kis-erdei-dűlő (Virág 2003; Oross et al. 2010). Archaeozoological and especially archaeobotanical evidence has remained extremely scarce. In sharp contrast to the extended extramural cemeteries of the earlier phases of the Copper Age in eastern Hungary, only single burials and small grave groups have so far been discovered on contemporaneous Transdanubian sites.

Metallurgy in western Hungary does not present the abundance of large copper axes and the series of other different artefacts known from eastern Hungary that reveal close ties with the Balkans. Attributed to a central European tradition, hooked copper spirals, so-called glass-shaped spirals, and different kinds of copper wire belong to repertoires recovered in the western Carpathian basin. However, the so-called Csáford-Stollhof type gold discs form a very spectacular and characteristic group of objects that have their close counterparts in the adjacent central European regions, sometimes also made from copper, and rarely from silver (Korek 1960; Bóna 1963/1964.33–37; Makkay 1976; Kalicz 1982. 10–16).

The Balaton-Lasinja graves at Veszprém-Jutasi út

During the excavation of the Neolithic and Copper Age site of Veszprém-Jutasi út in 2003, some Balaton-Lasinja graves in the southern and eastern parts of the excavated area were recorded. Settlement features related to the graves could not be observed on the site, although Balaton-Lasinja pottery occurred

in the Lengyel pits, into which Copper Age graves were cut. Balaton-Lasinja pottery was found in a well-defined small area around the graves, and the situation can be interpreted as relating to burial ritual. The scattering of broken vessels into graves is a phenomenon known in other Balaton-Lasinja graves.

Veszprém-Jutasi út (earlier called Felszabadulás út) is a well-known site of the Lengyel culture, entering the literature as the first known settlement of the late Lengyel period (Raczky 1974). The western edge of the site was investigated during the excavation in 2003, and mainly the early stage in the settlement's life (Regenye 2004; 2006; 2007; Regenye, Biró 2014; 2019). Based on previous research, we know that the Lengyel site includes an extended Lengyel III settlement in the eastern direction as well; the centre of the site shifted eastward over time. The Balaton-Lasinja graves were located in a group on the westernmost edge of this large Lengyel III settlement.

The graves excavated in 2003 are mostly dated to the Lengyel culture. Eight burials can be listed here. These graves are located in a group. Four more graves (9, 13, 14, and 15), about 90m away from this group, were interpreted as burials of the Balaton-Lasinja culture (Regenye 2006). One of these, grave 15, an unfurnished burial, was subsequently shown by radiocarbon dating to be of Lengyel date (SUERC-54643; Regenye et al. 2020.Tab. 2).

So only three graves of the Balaton-Lasinja culture are securely recorded. Grave 9 is that of a child (of Infans II age) lying on its right side in a contracted position, the skeleton oriented east-west. Grave 13

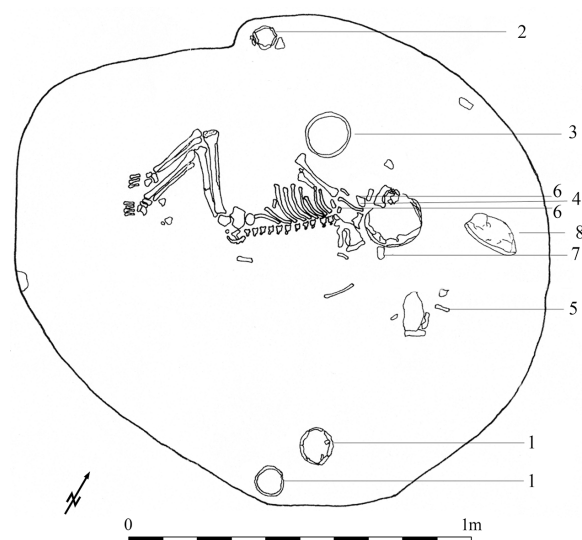


Fig. 2. Veszprém-Jutasi út, grave 9.

is that of an adult man, lying on his right side in a contracted position, his skeleton oriented southwest-northeast. Grave 14 is that of an adult woman (of Maturus-Senilis age, Köhler 2006), her upper body lying in supine position, the legs bending to the left, and skeleton oriented south-southeast-north-northwest.

The grave pit could be observed only in the case of grave 9, which was roughly round, 1.2m in diameter. The other two graves were buried into a Lengyel III pit; the form of the graves could not be determined.

All three burials are inhumations, but their orientation varies. Grave 9 has an east-west layout; the orientation of graves 13 and the 14 varies slightly from south-north. Two of the skeletons (9, 13) lie on their right side and the third turns to the left. The location of the two graves in a pit roughly parallel to each other may suggest a linked burial. Grave 14 was covered with irregular large limestone blocks which extended partly to grave 13. There was a possibility of post-depositional manipulation or disturbance in the case of grave 14, the left arm being separated between the two skeletons and covered by the stones.

Two of the three graves had grave goods. Ceramics, ornaments and several stone implements are included in the child's grave, but only one of the adult graves had a single vessel. Both the composition of the grave goods and their placement in the grave follow Lengyel traditions in the case of the child's grave. One vessel was placed behind the head, two in front of it. At the neck were pieces of shell ornaments, in the form of rectangular flat beads (two intact, with three fragments, with two drilled holes at the top) made from river shells, and an unworked shell. The stone tools were placed around the head: a core in front of the neck, a core-flake behind the head, and a polished basalt axe preform above the head.

Three out of four vessels were in grave 9 (that of the child) and the fourth in one of the two adults, in grave 13. In that grave fill there were two more pots, incomplete pieces of a pedestalled vessel and a jug. These are not included in the grave furniture. Together with the fragments of different pots found in the grave fill beneath the stone deposit and under the legs of grave 14, they may have been placed in the grave as part of the funerary rite.



Fig. 3. Veszprém-Jutasi út, pots from grave 9.

Both the graves had a pedestalled bowl with a bell-shaped base; in grave 9 there were also a biconical bowl and a small cup. The vessels are typical forms of the Transdanubian Copper Age (Kalicz 1995b. 75-76; 2003.14); both the biconical bowl and the bell-shaped pedestal are basic forms, just like the pedestalled bowl in grave 13 (cf. Kalicz 1995a.Fig. 3, 12). The biconical bowl with a short upper part is a frequent type deriving from the Lengyel culture, but the decoration of the upper part, typical of the Balaton-Lasinja culture, is missing here. The bowl on a pedestal ornamented with four drop-shape knobs fits well into the repertoire of both the Balaton-Lasinja (Horváth, Simon 2003.Figs. 21.9,24.3) and the Ludanice culture (Virág 1995.Abb. 2, 10). The little biconical cup is not characteristic of the Balaton-Lasinja culture, lacking decoration or handle.

The four pots found in the two graves show strong Lengyel traditions. The vessel forms are typical of the Balaton-Lasinja culture, but the characteristic channelled decoration is missing. Based on these characteristic features, these ceramics can be related to the material of the north Transdanubian sites.

Radiocarbon dating

New radiocarbon measurements were obtained on three human skeletons from the Balaton-Lasinja graves at Veszprém-Jutasi út as part of the *Times of Their Lives* project (see Acknowledgements, and Table 1).

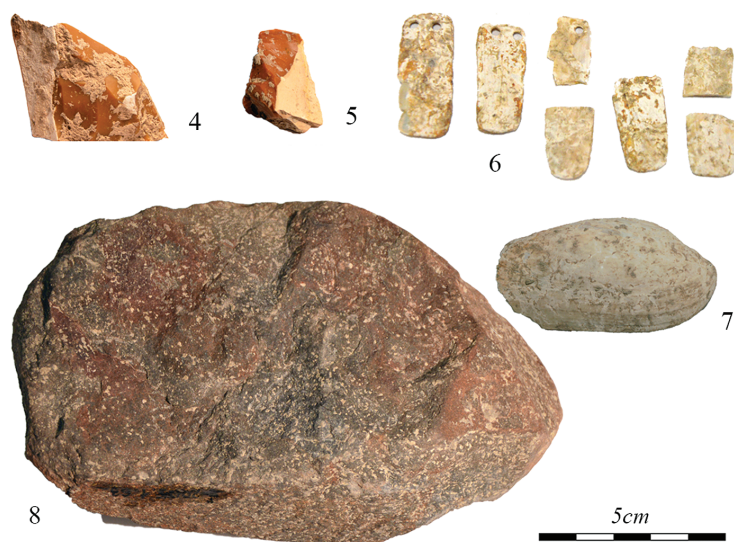


Fig. 4. Veszprém-Jutasi út, lithic artefacts and shell finds from grave 9.

The samples dated at the Curt-Engelhorn-Zentrum Archäometrie (CEZA), Mannheim (sample identifiers 'MAMS'), were prepared by gelatinisation and ultra-filtration (Brown *et al.* 1988), combusted in an elemental analyser, graphitised and dated by Accelerator Mass Spectrometry (AMS) (Kromer *et al.* 2013). The samples dated at the Scottish Universities Environmental Research Centre (sample identifiers 'SUERC'), East Kilbride, were also gelatinised, ultra-

filtered and then graphitised and dated by AMS (Dunbar *et al.* 2016).

These measurements are conventional radiocarbon ages (Stuiver, Polach 1977). At CEZA they have been corrected for fractionation using $\delta^{13}\text{C}$ values measured by AMS. These values can include an element of fractionation introduced during the preparation and measurement of the samples in addition to the natural isotopic composition of the sample, and so they are not suitable for dietary analysis. For this reason, where sufficient material was available, sub-samples of the dated gelatin prepared at MAMS- were analysed for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ using IRMS at the Iso-

trace Facility, University of Otago Chemistry Department, using methods outlined by Beavan Athfield *et al.* (2008.3). At SUERC, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ samples were prepared and analysed from sub-samples of the dated gelatin as described by Kerry Louise Sayle *et al.* (2014), and these $\delta^{13}\text{C}$ values were used for age calculation.

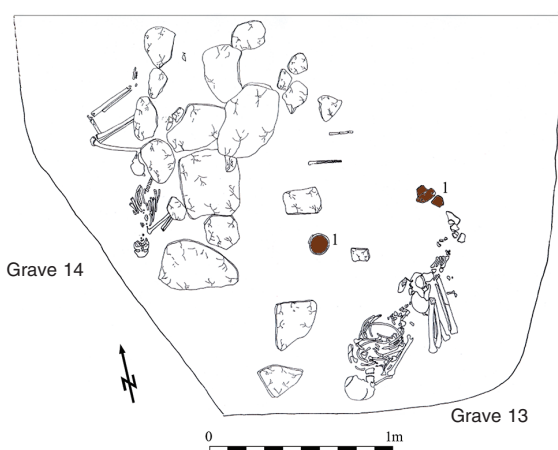


Fig. 5. Veszprém-Jutasi út, graves 13 and 14.

Groups of replicate radiocarbon measurements are available on two skeletons, both of which are statistically inconsistent at the 5% significance level (Ward, Wilson 1978) (Tab. 1). Those for Ve-9 are statistically consistent at the 1% significance level and have been combined before inclusion in the chronological models, but those from Ve-13 are significantly divergent. This degree of replication arises from attempts to resolve some differences between replicate measurements reported in August 2014 by Mannheim (MAMS-21328-41) and East Kilbride (SUERC-54631-4, SUERC-54638-44 and SUERC-54648-9) and is discussed further by Judit Regenye *et al.* (2020.24). Although the $\delta^{13}\text{C}_{\text{AMS}}$ value for MAMS-14829 is unusually depleted, the remaining three measurements are still significantly divergent ($T^* = 22.0$, $T^*(1\%) = 11.3$, $v = 2$) and so, in the absence of contextual information suggesting which results may be in error, we have again incorporated a weighted mean of the results in our modelling.

Details of existing radiocarbon measurements from settlement features associated with ceramics of the Balaton-Lásinja phase are listed in Table 2, those of the preceding Lengyel III ceramic phase in Table 3, and those of the succeeding, related, Furchenstich phase in Table 4.

Laboratory number	Grave/Sample number	Material and context	Radiocarbon Age (BP)	$\delta^{13}\text{C}$ (‰) [AMS]	$\delta^{13}\text{C}$ (‰) [IRMS]	$\delta^{15}\text{N}$ (‰)	C:N ratio
MAMS-21338	Ve-9	Human bone, left femur from 8–9-year-old child inhumation in grave 9 with three diagnostic pottery vessels	5307±33	-18.4			
MAMS-23171	Ve-9	Replicate of MAMS-21338	5406±27	-19.6			
MAMS-14828	Ve-9	Replicate of MAMS-21338	5418±29	-24.7			
^{14}C age: 5384±17 BP, T'=7.4, T'(5%)=6.0, V=2							
SUERC-54641	Ve-13 (i)	Human bone, right femur from 23–40-year-old male inhumation in grave 13 with one diagnostic pottery vessel and cut into feature 348, a settlement pit containing Lengyel III ceramics	5431±33		-19.2±0.2	10.1±0.3	3.2
MAMS-21339-1	Ve-13 (ii)	Replicate of SUERC-54641	5251±21				
MAMS-21339-2	Ve-13 (ii)	Replicate of SUERC-54641	5279±26				
MAMS-14829	Ve-13	Replicate of SUERC-54641	5213±31	-30.4			
^{14}C age: 5281±14 BP, T'=27.9, T'(5%)=7.8, V=3; $\delta^{13}\text{C}$: -19.5±0.1‰, T'=3.1, T'(5%)=3.8, V=1; $\delta^{15}\text{N}$: +10.0±0.12‰, T'=0.1, T'(5%)=3.8, V=1							
SUERC-54642	Ve-14	Human bone from grave 14 with diagnostic sherds in the fill, lying parallel with grave Ve-13 and cut into feature 348, a settlement pit containing Lengyel III ceramics	5384±33		-19.6±0.2	10.0±0.3	3.3

Tab. 1. Radiocarbon and stable isotopic measurements for Balaton-Lásinja graves from Veszprém-Jutasi út.

Radiocarbon calibration and reservoir corrections

Radiocarbon ages from fully terrestrial samples have been calibrated using IntCal20 (Reimer et al. 2020).

The measurement on mussel shell from Balaton-őszöd-Temetői-dűlő (KI-16690) probably has a freshwater reservoir effect derived from the nearby Lake Balaton. Unfortunately, no data are currently available for the freshwater reservoir in the lake, and so we use a value of 540±70 BP as calculated for Sclera Cladovei on the Danube at the Iron Gates (Cook et al. 2001).

Human bone can also exhibit a reservoir age, if people ate foods that did not derive entirely from the terrestrial biosphere. Accurate calibration in this case requires the proportions of different diet-sources in each individual to be estimated. This allows a mixed-source calibration curve to be constructed for each person, which incorporates the aquatic reservoir in the appropriate proportion for that individual. For this reason, source-proportional dietary modelling was undertaken for the dated human skeletons in this study. Existing pairs of radiocarbon measurements on human and animal bone from Neolithic and Copper Age graves in this region, however, are statistically consistent, suggesting that consumption of non-terrestrial foods by the population was probably negligible (Bayliss et al. 2016.Tab. 1; Jakucs et al. 2016.Tab. 1; Raczky, Siklósi 2013. Tab. 1). This does not mean, however, that particular individuals might not have consumed a larger component of freshwater resources.

Proportional dietary analysis for the Balaton-Lásinja skeletons from Veszprém-Jutasi út

The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ isotopic values for burials Ve-13 and Ve-14 are from replicate measurements, and the weighted means (Ward, Wilson 1978) (Tab. 1) have been used in the analysis. As no stable isotopic values have been measured from Ve-9, the proportional diet estimates have been derived from the mean FRUITS (Food Reconstruction Using Isotopic Transferred Signals; Fernandes et al. 2014) estimates for Veszprém burials for which there are stable isotope values (Regenye et al. 2020.Tab. 4a).

The individual mixed-source calibration curve for each of the Veszprém burials incorporates the aquatic reservoir in the proportion suggested by the dietary estimates provided by the Bayesian mixing mo-

Laboratory number	Site	Material and context	Radiocarbon Age (BP)	$\delta^{13}\text{C}$ (‰) [AMS]	$\delta^{13}\text{C}$ (‰) [IRMS]	$\delta^{15}\text{N}$ (‰)	C:N ratio	References
OxA-13784	Balatonszárszó-Kis-erdei-dűlő	Disarticulated <i>Sus scrofa domestica</i> , right ulna, from feature B-5713, internal posthole of house A43	5356±34		-19.8±0.3	9.95±0.4	3.2	Oross et al. 2010:392
deb-13379	Balatonőszöd-Temetői-dűlő	"Pit 1099. Well 1: Grave 70, human (Boleáz) skeletons in fill of the well of the Balaton-Lasinja culture"	4480±70		-20.6			Horváth et al. 2008. Tab. 1
VERA-4806	Balatonőszöd-Temetői-dűlő	Unidentified animal bone from pit B-432	5000±40	-26.8±0.9				Horváth et al. 2014a. Tab. 2
deb-2171	Győr-Szabadirétdomb	Unidentified animal bone from feature 29	5160±60		-20.25			Figler et al. 1997. Tab 2
Bln-1206	Nagykanizsa-Sánc	Sample material and context unknown	4940±?80*					Kalicz 1995a:41
Bln-1207	Nagykanizsa-Sánc	Sample material and context unknown	4990±80					Kalicz 1995a, 41
MAMS-44913	Mosonszentmiklós-Pálmajor	Cattle tibia, found in a closed assemblage including a clay horn which can be played as a musical instrument, several intact vessels and an intact cattle femur squeezed into the horn	5387±25	-21.1			3.2	Bárány, Egyforthcoming

* Bln-1206–7 were published by Kalicz (1995:41), following information from a letter by Hans Quitta, with neither standard deviations, details of the material dated nor contextual information. Kalicz (1982:10) writes that radiocarbon dates for the Balaton-Lasinja culture are between 3040–2980 uncal bc ±80 y. Footnote 38 makes clear that this is based on the dates reported from Nagykanizsa-Sánc in Quitta's letter. We infer from this information that the quoted error on these measurements may have been ±80 BP.

Tab. 2. Radiocarbon and stable isotopic measurements associated with Balaton-Lasinja settlement features.

del FRUITS vβ2.0. FRUITS produces estimates of the mean percentage (and standard deviation) for each of the possible food sources making up the diet for each consumer.

To estimate the relationship between an individual's isotopic profile and the food sources that were likely available, we first create a FRUITS model starting with the 'baseline' isotopic values for foods from the isotopic averages of each likely food source. The FRUITS proportional dietary estimates were modelled on two diet proxies ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) for the average isotopic data and its associated mean error for each of three general food sources – cereals, terrestrial herbivores and omnivores (cattle, sheep, and pigs), and freshwater fish. The cereals baseline used carbon and nitrogen values for archaeobotanical samples of wheat (n=12) and barley (n=6) from Nives Ogrinc and Mihael Budja (2005), and emmer wheat (n=1) and barley (n=3) from Amy Bogaard *et al.* (2013), producing mean cereal values and errors of $-24.6\pm 0.3\%$ ($\delta^{13}\text{C}$) and $+5.0\pm 0.4\%$ ($\delta^{15}\text{N}$). The food baseline data are particularly robust for animal protein sources, as the data are drawn from sites within approximately 1000km of Veszprém-Jutasi út. Baseline values for terrestrial animals (pig, sheep, cow, n=89; $\delta^{13}\text{C}$ $-20.3\pm 0.2\%$ and $\delta^{15}\text{N}$ $+6.9\pm 0.2\%$) are from faunal materials in the Starčevo, Sopot, and Lengyel sites at Alsónyék-Bátaszék (including 27 sets of analyses on terrestrial fauna provided by the Bioarchaeology Workgroup Mainz; Bayliss *et al.* 2016). These values for terrestrial fauna complement mean isotope ranges cited from sites within 250km of our study area (*cf.* Gamarra *et al.* 2018; McClure *et al.* 2020), extending the potential geographical relevance of the baseline terrestrial fauna isotope values in this study. Isotopic values for archaeological freshwater fish were drawn from Olaf Nehlich *et al.* (2010; n= 3), Dušan Borić *et al.* (2004; n=12), and Alexandra Bayliss *et al.* (2016; n=4) and were further supplemented with six sets of carbon and nitrogen values on fish from Alsónyék-Bátaszék, also provided by the Bioarchaeology Workgroup Mainz. This

Laboratory number	Site	Material and context	Radiocarbon Age (BP)	$\delta^{13}\text{C}$ (‰) [IRMS]	References
deb-10274	Szengál-Teleki dűlő	Unidentified animal bone from pit 1, Lengyel III	5530±60	-20.3	Regenye 2011.43
deb-3365	Zalaszentbalázs-Szőlőhegyi mező	Unidentified charcoal from feature 5/2, -45cm	5728±58	-25.3	Bánffy 1995
deb-3378	-//-	Unidentified charcoal from feature 2, -80cm	5767±70	-25.8	Bánffy 1995
deb-3385	-//-	Unidentified charcoal from feature 4/2, -100cm	5720±71	-24.9	Bánffy 1995
deb-3379	-//-	Cattle tibia from feature 4, -85-90cm	5682±57	-21.8	Bánffy 1995
deb-3380	-//-	Cattle from feature 4, -90cm	5614±70	-20.8	Bánffy 1995
deb-8408	Szombathely-Metro	Unidentified animal bone, from foundation trench of house 1	5520±60		Ilon 2004.27, Fig. 26
deb-8486	-//-	Unidentified animal bone, feature 35	5590±60		Ilon 2004. Fig. 26
deb-8518	-//-	Unidentified animal bone, feature 19	5450±90		Ilon 2004. Fig. 26

Tab. 3. Radiocarbon and stable isotopic measurements associated with Lengyel III ceramics.

group of samples provided a final freshwater fish baseline value of $\delta^{13}\text{C}$ of $-21.4\pm 0.2\text{‰}$ and $\delta^{15}\text{N}$ of $+8.7\pm 0.2\text{‰}$.

The FRUITS proportional diet model also uses the metabolic enrichment of stable isotope values that occur in the course of building consumer tissue. This is known as an 'isotopic offset' between diet and consumer. We used an isotopic offset in the FRUITS model of $4.8\pm 0.2\text{‰}$ for $\delta^{13}\text{C}$ (Fernandes et al. 2014), and for $6.0\pm 0.5\text{‰}$ for $\delta^{15}\text{N}$ (O'Connell et al. 2012). The FRUITS dietary model also allows for further

constraints on the calculations from *a priori* observations in the archaeological record and logical considerations. We had observed in a previous dietary analysis of populations at Alsónyék-Bátaszék (Bayliss et al. 2016.40-46) that there was a possibility for the consumption of freshwater resources. We ran tests of the FRUITS model first using no prior information, and then with prior information weighting terrestrial protein over fish. The final version of the FRUITS model was modified, incorporating prior information that the proportion of terrestrial protein was greater than that of cereals which added weight

Lab. number	Site	Material and context	Radiocarbon Age (BP)	$\delta^{13}\text{C}$ (‰) [IRMS]	References
Bln-500	Keszthely-Fenekpuszta, Vasúti őrház	Charcoal (<i>Quercus</i> sp.), from pit Objekt 2, at 1.5m depth. Finds include lots of sherds of Gajary-type assigned by Kalicz (1982.10, fn39) to Balaton-Lasinja II-III group	4780±80		Quitta, Kohl 1969. 241
Bln-501	Keszthely-Fenekpuszta, Halászrét-Nádgazdaság agyagbányája	Charcoal (<i>Quercus</i> sp.), from big, multi-part pit complex. Sample at 1m depth in pit sector 2. Lower part of pit currently below water table. Finds include lots of sherds of Gajary-type assigned by Kalicz (1982.10, fn39) to Balaton-Lasinja II-III group	4890±80		Quitta, Kohl 1969. 242
Bln-502	Zalavár-Mekenye	Charcoal (<i>Abies</i> cf. <i>alba</i> Mill.), from settlement pit 13, lower down in fill at 1m below surface. Finds include white-painted late Lengyel sherds and undecorated sherds and associated copper smelting debris.	5400±80		Quitta, Kohl 1969. 247
KI-16690	Balatonőszöd-Temetői-dűlő	Mussel from pit B-1984	5210±40	-10.3±0.3	Horváth et al. 2014a. Tab. 2
deb-2196	Cyőr-Szabadrétdomb	Unidentified animal bone from feature 251	4650±60	-20.89	Figler et al. 1997. Tab. 2
deb-2194	-//-	Unidentified animal bone from feature 251	4850±60	-19.49	-//-
deb-2178	-//-	Unidentified animal bone from feature 510	4730±60	-20.81	-//-
deb-2213	-//-	Unidentified charcoal from feature 510	4630±60	-26.27	-//-
deb-2095	-//-	Unidentified animal bone from feature 589	4820±60	-20.11	-//-

Tab. 4. Radiocarbon and stable isotopic measurements associated with Furchenstich features and ceramics.

Grave	Sex	Age	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	Cereals	Terrestrial protein	Freshwater fish
Ve-9	Unknown	8–9 years	–	–	48.3±1.1%	50±1.2%	1.7±1.7%
Ve-13	Male	23–40 years	–19.5±0.1*	+10±0.21*	48.4±1.1%	49.9±1.2%	1.7±1.7%
Ve-14	Female	over 40 years	–19.6±0.2*	+10±0.3*	47.9±1.5%	49.9±1.5%	2.2±2.2%

Tab. 5. Proportional dietary estimates for the dated burials from Veszprém-Jutasi út, derived from the FRUITS analysis (*mean of values from Table 1).

to the higher $\delta^{15}\text{N}$ contribution of terrestrial meat in the diet.

The results of the FRUITS analysis for the individuals from Veszprém-Jutasi út indicates the population all had diets that were made up almost entirely of cereals and terrestrial protein, and that freshwater fish are a negligible contribution to the diet (Tab. 5).

Chronological modelling

The Bayesian chronological modelling has been undertaken using the program OxCal v4.4 (Bronk Ramsey 2009). The algorithms used are defined exactly by the brackets and OxCal keywords on the left-hand side of Figures 6 and 8 (<http://c14.arch.ox.ac.uk/>). The posterior density estimates output by the models are shown in black, with the unconstrained calibrated radiocarbon dates shown in outline. The other distributions correspond to aspects of the model. For example, the distribution “start Veszprém Lengyel” (Fig. 6) is the posterior density estimate for the start of Lengyel burial at Veszprém. In the text and tables, the Highest Posterior Density intervals of the posterior density estimates are given *in italics*.

Furnished inhumation burials from Veszprém-Jutasi út

The first model examines the dating of furnished inhumation burials at Veszprém (Fig. 6). Five furnished Lengyel graves have been dated (Regenye et al. 2020.Tab. 2), four of which have been included in the correspondence analysis of Lengyel funerary ceramics (Regenye et al. 2020.Fig. 2). Ve-5 is allocated to phase 2 of that seriation, and ve-2, ve-3, and ve-7 to phase 3. One further, dated but unfurnished, grave appears to belong to this period of activity (Regenye et al. 2020.Fig 5).

The model illustrated in Figure 6 suggests that Lengyel burial at Veszprém began in 4950–4710 cal BC (95% probability; start Veszprém Lengyel) (Fig. 6), probably in 4830–4725 cal BC (68% probability). It ended in 4695–4485 cal BC (95% probability; end Veszprém Lengyel) (Fig. 6), probably in 4670–4575 cal BC (68% probability), having been used for a

period of 30–245 years (95% probability; duration Veszprém Lengyel) (Fig. 7), probably for 65–180 years (68% probability). There was then an extended gap with no furnished burial on the site, which endured for a period of 20–490 years (95% probability; gap Veszprém Lengyel/Balaton-Lasinja) (Fig. 7), probably for 200–435 years (68% probability).

Only three Balaton-Lasinja graves from Veszprém have radiocarbon dates, two of which are furnished with diagnostic pottery. The other has Balaton-Lasinja sherds in the grave fill, and is parallel to one of the furnished graves. The model shown in Figure 6 suggests that this period of burial began in 4565–4160 cal BC (93% probability; start Veszprém Balaton-Lasinja) (Fig. 6) or 4150–4115 cal BC (2% probability), probably in 4370–4180 cal BC (68% probability). It ended in 4235–3575 cal BC (95% probability; end Veszprém Balaton-Lasinja) (Fig. 6), probably in 4215–4010 cal BC (68% probability), having been used for a period of 1–215 years (93% probability; duration Veszprém Balaton-Lasinja) (Fig. 7) or 230–260 years (2% probability), probably for a period of 10–130 years (67% probability) or 155–165 years (1% probability).

The earlier Copper Age in western Hungary

The second model explores the context of the Veszprém cemeteries within the ceramic sequence of the earlier Copper Age in western Hungary (Figs. 8–11).

First, we consider the relationship between the end of Lengyel furnished burial (which is largely restricted to the eastern part of this region) and the start of Lengyel III ceramics, which do not appear in graves and are restricted to settlement contexts. Regenye et al. (2020.Figs. 11–12) present a model for a three-phase seriation of Lengyel graves, which we have recalculated using IntCal20 (Reimer et al. 2020). This suggests that Lengyel furnished burial started to decline in 4770–4560 cal BC (95% probability; start end Lengyel 3) (Fig. 11), probably 4750–4635 cal BC (56% probability) or 4610–4580 cal BC (12% probability), and finally ended by 4605–4460 cal BC (95% probability; end end Lengyel 3) (Fig. 11), probably 4575–4505 cal BC (68% probability).

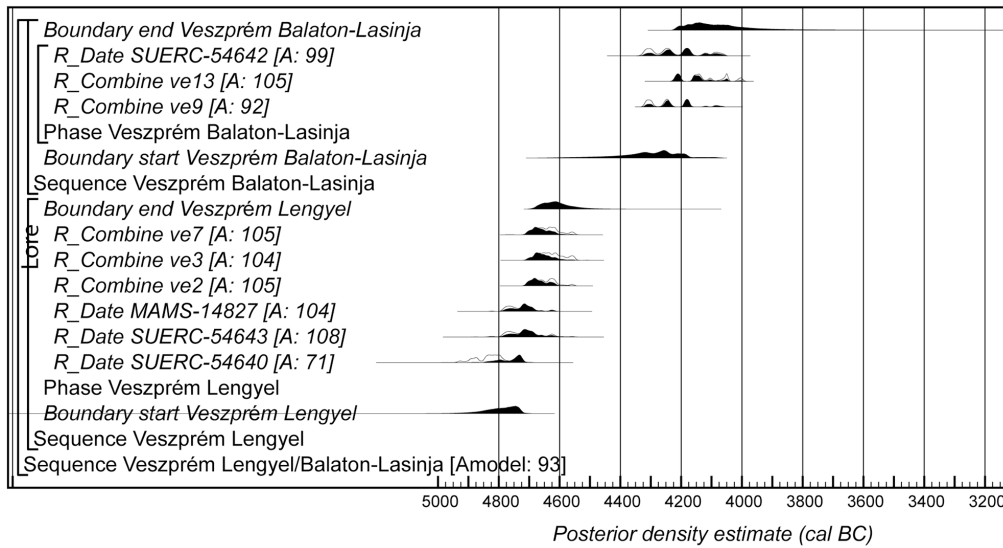


Fig. 6. Probability distributions of dates from inhumation burials at Veszprém-Jutasi út. Each distribution represents the relative probability that an event occurred at a particular time. For each of the dates two distributions have been plotted, one in outline which is the result produced by the scientific evidence alone, and a solid one which is based on the chronological model used. The other distributions correspond to aspects of the model. For example, “start Veszprém Lengyel” is the estimated date when the Lengyel cemetery was initiated. The large square brackets down the left-hand side of the figure along with the OxCal keywords define the overall model exactly.

There may then have been a short gap of -55 – -210 years (95% probability; gap Lengyel furnished graves/Lengyel III; Fig. 10), probably of 30–155 years (68% probability)¹.

The model shown in Figure 8 suggests that Lengyel III ceramics appeared in western Hungary in 4570–4360 cal BC (95% probability; start Lengyel III; Fig. 8), probably in 4490–4390 cal BC (68% probability). They were last used in 4445–4300 cal BC (95% probability; end Lengyel III; Fig. 8), probably in 4415–4335 cal BC (68% probability), having been used for a period of 1–155 years (95% probability; duration Lengyel III) (Fig. 9), probably for 1–70 years (68% probability). This apparently relatively short phase was succeeded by Balaton-Lasinja ceramics, probably with little or no gap: 1–165 years (95% probability; gap Lengyel III/Balaton-Lasinja) (Fig. 10), probably 1–85 years (68% probability).

The model suggests that Balaton-Lasinja pottery first appeared in 4400–4190 cal BC (95% probability; start Balaton-Lasinja) (Fig. 8), probably in 4360–4255 cal BC (68% probability). It ended in 3895–3585 cal BC (95% probability; end Balaton-Lasinja) (Fig. 8), probably in 3790–3625 cal BC (68% probability), having been used for a period of 280–610 years (95% probability; duration Balaton-Lasinja; Fig. 9), probably for 355–540 years (68% probability). This extremely long tradition was succeeded by a related pottery style, the Furchenstich. Again, there was probably little or no gap: 1–275 years (95% probability; gap Balaton-Lasinja/Furchenstich) (Fig. 10), probably 1–140 years (68% probability).

The Furchenstich style first appeared in 3770–3520 cal BC (92% probability; start Furchenstich; Fig. 8) or 3460–3405 cal BC (3% probability), probably

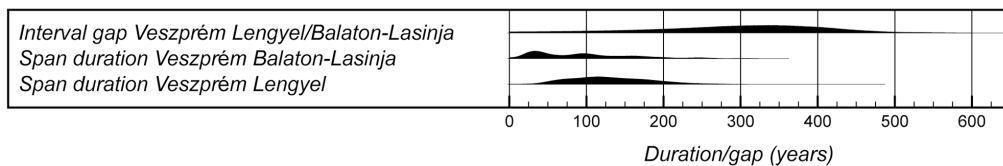


Fig. 7. Probability distributions of the durations of the cemeteries at Veszprém and the interval between them, derived from the models defined in Figure 6.

¹ The negative part of this range reflects the 10% probability that start Lengyel III was before end Lengyel 3, and thus that there was a period of overlap rather than a gap between these ceramic phases. It should be noted that our sample of radiocarbon dates for the Lengyel III phase (Tab. 3) is pitifully small and that these derive from only three sites. In these circumstances, the potential gap may be an artefact of our current dataset.

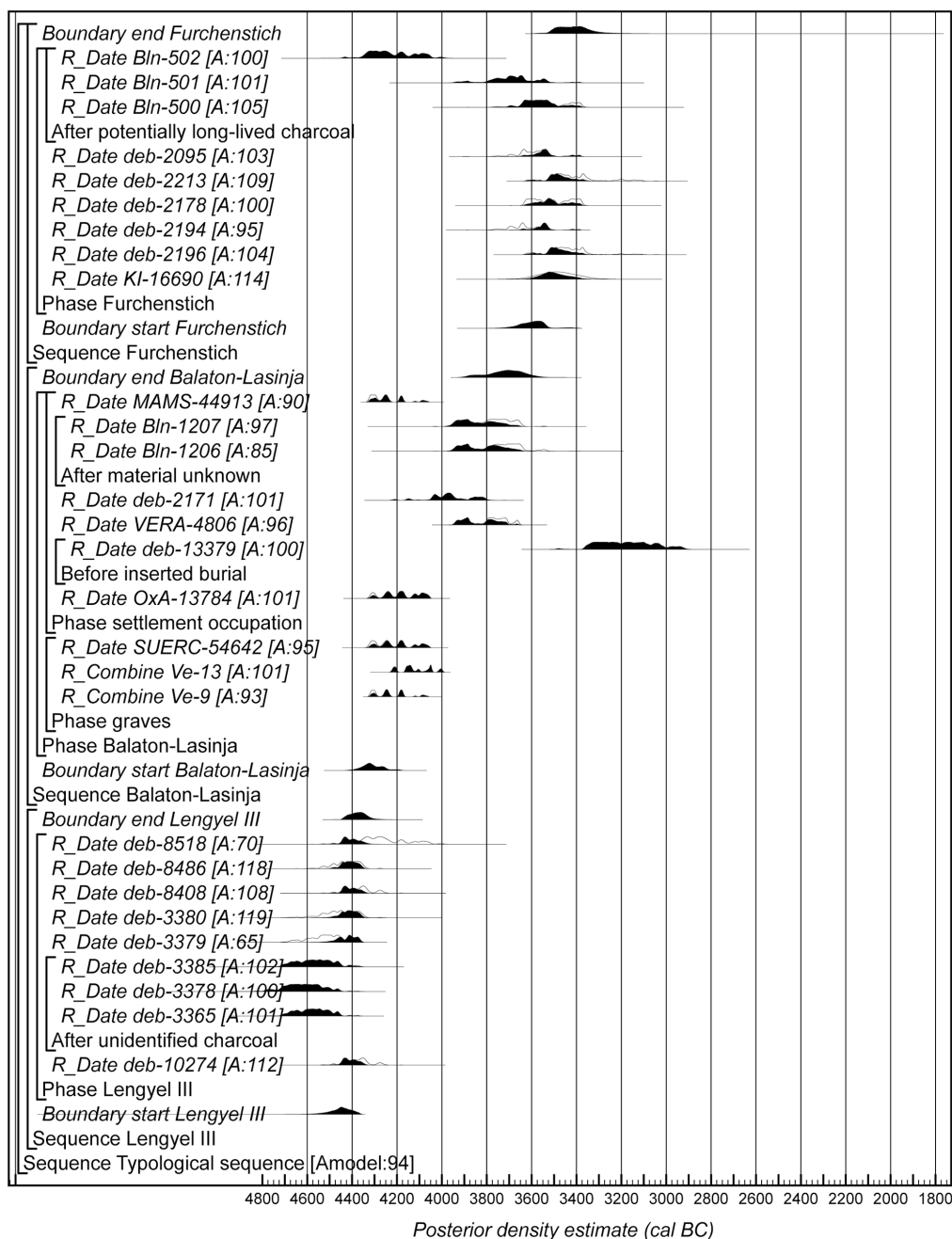


Fig. 8. Probability distributions of dates from the earlier Copper Age ceramic sequence in western Hungary. The format is identical to that of Figure 6. The large square brackets down the left-hand side of the figure along with the OxCal keywords define the overall model exactly.

in 3670–3545 cal BC (68% probability). It ended in 3545–3125 cal BC (95% probability; end Furchenstich) (Fig. 8), probably in 3485–3320 cal BC (68% probability). Overall Furchenstich pottery was used over a period of 1–265 years (95% probability; duration Furchenstich) (Fig. 9), probably for 60–210 years (68% probability). Given the small number of radiocarbon dates currently available associated with the Furchenstich style, this ending may fall within the earlier part of this date range and is then compatible with the suggestion that this ceramic style

was replaced by Boleráz pottery c. 3500 cal BC (Furholt 2008).

Figure 11 illustrates the outline chronology for the earlier Copper Age ceramics in western Hungary. These traditions span more than a thousand years, which brings into sharp relief the small number of radiocarbon dates on which this chronology is based. Nonetheless, it is striking that the Balaton-Lasinja tradition appears to have endured for much longer than the other ceramic styles.

Discussion

Great changes occurred across big swathes of Europe in the mid-fifth millennium cal BC. In the Carpathian basin, the previous system of tells and large agglomerated flat settlements came to an end. In the Vinča orbit, this process had probably begun around 4700 cal BC, as seen for example in the sequence of the Uivar tell in western Romania (Draşovean et al. 2017; Draşovean, Schier 2020; Bayliss et al. 2020). The great tell of Vinča-Belo Brdo itself was probably the latest tell in its area to be abandoned, around 4500 cal BC (Tasić et al. 2016; Whittle et al. 2016). In the Lengyel sphere of Transdanubia and beyond, the major settlement aggregations with substantial houses and large grave groups had also largely ended by the middle of the fifth millennium cal BC (Bánffy et al. 2016; Regenye et al. 2020). The largest known Lengyel aggregation, at Alsónyék-Bátaszék, had reached its peak size around 4700 cal BC, declining steadily from then until probably the 45th century cal BC (Osztás et al. 2016; Bánffy et al.

2016). In the broad, so-called Danubian distribution of the LBK and post-LBK, longhouses and longhouse settlements also largely came to an end in the mid-fifth millennium cal BC. One regional study, in Lower Alsace in the upper Rhine valley, suggests that the last longhouses there belonged to the Rössen phase, dating probably to the 46th–45th centuries cal BC (Denaire et al. 2017). In another region, that of the Polish lowlands, the last longhouses were in use till the turn of the millennium (Czeraniak et al. 2017). These worlds have traditionally been studied by separate research communities, and as a result, while there are plenty of hypotheses about the causes of such changes, there has been little discussion about the convergent timings.

In the aftermath of these changes, a different lifestyle came into existence. This can be broadly characterised by a more dispersed settlement system, the existence of generally smaller settlements (in modern terminology hamlets rather than villages), often smaller groups of graves or cemeteries, less obvious

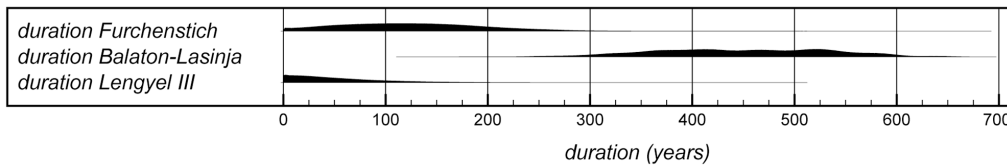


Fig. 9. Probability distributions of the durations of the earlier Copper Age ceramic traditions of western Hungary, derived from the model defined in Figure 8.

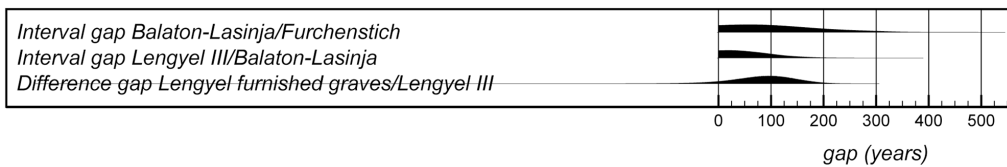


Fig. 10. Probability distributions of the gaps between the earlier Copper Age ceramic traditions of western Hungary, derived from the model defined in Figure 8.

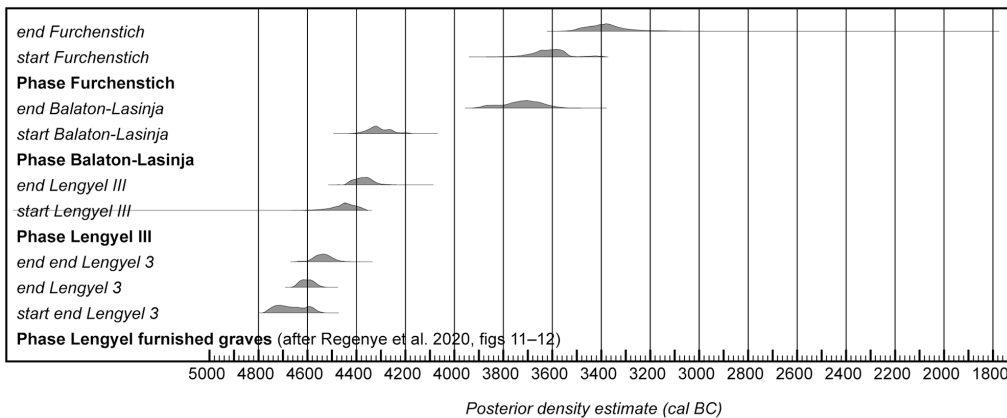


Fig. 11. Probability distributions of the key parameters for the earlier Copper Age ceramic traditions of western Hungary, derived from the models defined in Figure 8 and Regenye et al. (2020.Figs. 11–12; recalculated using IntCal20).

social differentiation, and finally an often less ostentatious material culture (*Parkinson 2006; Yerkes et al. 2009; Siklósi, Szilágyi 2021.585*). There was, however, considerable variability across east-central, central and western Europe, perhaps hardly surprising given the size of the area. In some regions, houses remained a visible and frequently detected feature of settlements, while in others a more elusive pattern of pits and other remains is met with, for example across many parts of the TRB distribution. On the Great Hungarian Plain, cemeteries became a notable feature, seemingly supplanting the graves previously intermingled in tells and flat settlements; the grave ground of Tiszapolgár-Basatanya remains the largest (*Siklósi, Szilágyi 2021*), perhaps serving as some kind of regional centre (*Chapman 2020*). There are signs of differentiation within the grave goods at that cemetery (*Chapman 2020; Sofaer Derevenski 2000*), and further north there has been a long debate about the character of megalithic and related constructions. While a shift to plainer, or less exuberantly decorated, pottery characterises many regional sequences, the increasing appearance of copper and gold should be noted (*Siklósi, Szilágyi 2021.585*), and the production and distribution of jadeitite continued in the second half of the fifth millennium cal BC in western Europe (*Pétrequin et al. 2012*).

From this deliberately broad perspective, the results presented here for Veszprém-Jutasi út and the post-Lengyel sequence in western Hungary contribute in the first place to the better establishment of more robust local and regional detail, mirroring the progress towards the same end being made on the Great Hungarian Plain (*Yerkes et al. 2009; Siklósi, Szilágyi 2021*). It is, however, important to stress the varied quality of the dating samples currently available. The date estimates from Veszprém-Jutasi út and for the regional west Hungarian post-Lengyel sequence (Figs. 6–11) may suggest gradual change from the peak of earlier Lengyel activity (again, as seen at Alsónyék-Bátaszék), and then apparent considerable longevity for the Balaton-Lasinja phenomenon; the estimate for its duration, lasting several centuries (Fig. 9), is particularly striking. Although clearly incomplete and in need of much further research, the settlement record suggests much smaller settlement units than in the Lengyel heyday in Transdanubia, especially in its southeastern part. Interestingly, individual houses may not have been substantially smaller than in Lengyel times, and are archaeologically recognisable and visible. It is hard to quantify settlement density, but Balaton-Lasinja

sites have been recurrent finds in both surveys and rescue excavations and appear to have existed in significant numbers. Finally, the contents of Balaton-Lasinja graves do not obviously suggest major social differentiation, though the presence of gold is again to be noted.

By way of contrast, the situation on the Great Hungarian Plain was different. According to recent analyses (*Raczky, Siklósi 2013; Siklósi, Szilágyi 2021*), the Tiszapolgár and Bodrogkeresztúr ceramic traditions probably overlapped in time, rather than being successive as previously thought; there may also be regional variation within the Plain (*Siklósi, Szilágyi 2021.622*). Associated material, such as heavy copper items and gold ornaments in Bodrogkeresztúr contexts (*Siklósi, Szilágyi 2021.585*), should therefore have been unevenly available or accessible across the communities of the Plain. The cemeteries themselves, though the majority are clearly much smaller than that of Tiszapolgár-Basatanya, are more prominent than those in the Balaton-Lasinja orbit, and might speak for local social differentiation, in the form say of established places for the dead of prominent social status. Date estimates currently available suggest that some of the smaller cemeteries at least were much shorter-lived than the long span originally attributed to Tiszapolgár-Basatanya (*Siklósi, Szilágyi 2021.586*). In these ways potentially less stable than the Balaton-Lasinja phenomenon, the emergent situation on the Plain may have also been shorter-lived than the Balaton-Lasinja sphere, with the Tiszapolgár-Bodrogkeresztúr phenomenon ending by the turn of the millennium (*Siklósi, Szilágyi 2021.619*). A possible contrast of this kind, however, will depend on the chronology of Transdanubia being confirmed and refined in the future.

The existing absolute chronological evidence reinforces earlier assumptions about the use of the Furchenstich pottery style as a phenomenon succeeding the Balaton-Lasinja era in western Hungary. That is, moreover, at a surprisingly late period, virtually in the second third of the fourth millennium cal BC. This conclusion must be tentative, however, until further radiocarbon dates are obtained on short-lived samples associated with Furchenstich pottery from a larger number of sites. Another significant implication is the apparent partial contemporaneity of Furchenstich with the Boleráz-Baden complex, over several centuries. The emergence of the Boleráz-Baden complex has been placed *c.* 3650 cal BC and the expansion of the Boleráz style *c.* 3500 cal

BC in the comprehensive study of Martin Furholt (2008). It must be emphasised here, however, that literally no scientific research targeting problems associated with communities using Furchenstich and related pottery styles has been carried out in Transdanubia in the past two decades. The only exception is probably the long-lasting settlement at Balatonőszöd-Temetői-dűlő where an abundance of features and finds represented the Baden complex, while the earlier Copper Age occupation was only a limited part of the prehistoric assemblage (Horváth et al. 2014a). As a consequence, reliable radiocarbon dates associated with this kind of occupation are scarce. Therefore, only a very tentative picture can be presented of the development and the dynamics of early and mid-fourth millennium cal BC communities in the region. By contrast, large cemeteries of the Boleráz-Baden complex such as from Budakalász-Luppacsárda (Bondár, Raczky 2009) and Pilismarót-Basaharc (Bondár 2015) and extended sites like the afore-mentioned Balatonőszöd-Temetői-dűlő (Horváth et al. 2014b) have been published, including statistically modelled series of radiocarbon dates.

Further research needs therefore to continue to pick away at these local and regional differences within the post-Lengyel and post-Vinča worlds. In the future, we need to expand our focus to neighbouring regions as well. A lot of new data have been obtained during rescue and other excavations in Croatia and Slovenia in the last decade. These have contributed greatly to the refinement of the Neolithic-Copper Age sequence in this region (e.g., Balen, Drnić 2014; Čataj 2014; 2016; 2020; Kramberger 2014; 2020; McClure et al. 2020).

Finally, it is worth considering whether the emerging conditions of the later fifth millennium cal BC, seen here through the particular lens of Veszprém-Jutasi út, contribute to a better understanding of the circumstances in which the previous system of major settlement aggregation came to an end. That process has of course been much debated (among a host of others, see for example, Tringham, Krstić 1990; Chapman 2000; 2020; Tripković 2010; Porčić 2011; Crnobrnja 2011; Müller et al. 2013; Borić 2015; Bánffy et al. 2016; Whittle et al. 2016), and many factors have been suggested. This is not the place to re-air all the issues, but it is an opportunity to reflect briefly on how what came after may enable further insight into some of the processes perhaps at work; a small-scale situation like Veszprém-Jutasi út may be valuable in this quest. Clearly, it is unlikely that the system of major aggregations

just petered out, though it is the case that a gradual decline in numbers at Alsónyék-Bátaszék has been carefully documented (Osztás et al. 2016; Bánffy et al. 2016). It is much more likely that there was something unstable, with high social costs, making the maintenance of prominent places and large aggregations unsustainable in the long run. A favourite idea has been the rise of the individual household at odds with the wider community (for example, Tringham, Krstić 1990; Borić 2015), though the overt evidence for difference is generally hard to find, not helped by the lack of cemeteries in the Vinča culture or by the apparent paucity of signs of violence on the more than 2000 skeletons from Lengyel Alsónyék-Bátaszék (Osztás et al. 2016; Bánffy et al. 2016); successive burnings at the top of Vinča-Belo Brdo (Tasić et al. 2015), or through the sequence at Uivar (Draşovean, Schier 2020), however, should be remembered. Perhaps situations like Veszprém-Jutasi út in Transdanubia help to support the idea of the importance of the single (if not necessarily autonomous) household, showing more individual social units in smaller and potentially simpler social settings. The apparent durability of the Balaton-Lasinja phenomenon may also indicate the success of this resolution of putative former social tensions. The situation on the Great Hungarian Plain, however, as described briefly above, may suggest that competition and local or regional rivalries had not entirely disappeared.

ACKNOWLEDGEMENTS

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