

A MULTIDISCIPLINARY STUDY ON THE LANGOBARD PERIOD CEMETERY OF SZÓLÁD IN PANNONIA

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The assumed migration of the Langobards across an extensive geographic area as reconstructed from the literary sources, and their settlement in Late Antique Italy, has always fascinated scholars because it encapsulates and illustrates the essence of the Late Antique transformation – namely the encounter and interaction between the Late Antique Roman and the Barbarian world.¹ In that sense, the history and the migration of the Langobards is particularly suitable for modelling this process and its study can lead to a better understanding in general of the migrations of the Migration Period. Also, the memory and legacy of the Langobard kingdom in Italy is one of the major threads in the colourful tapestry of European culture, as can be illustrated with several examples.² Many issues connected to the Langobards presence in Pannonia can be re-assessed.³ These include the process of how Pannonia was occupied, the origins and identity of the different Langobard groups arriving to Pannonia, the interaction between the immigrants and the local Romanised and Germanic populations, as well as the Langobards relation to the provincial economy, the remnants of the Roman cultural landscape and the Late Antique settlement structure.⁴ The goal of the Szólád research project is to gain a better understanding of the political, economic, social and cultural changes, as well as ethnic integration in 6th century Pannonia.⁵ Who exactly were these people called Langobards that appeared in Pannonia?

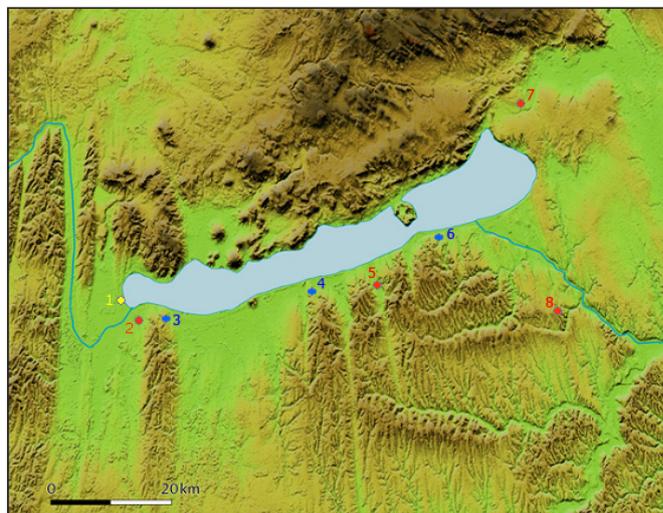


Fig. 1: Map of the Lombard cemeteries and settlements around the lake Balaton (Photo by Uta von Freeden)

A closer look at the archaeological assemblages and burial customs associated with the Langobards reveal a wide variety of cultural contacts both with the Mediterranean and Western Europe. These links can, at most, only be demonstrated between Thuringia, the Czech Basin, Moravia, Lower Austria and Pannonia (e.g. Thuringian-type pots, pear-shaped vessels, wooden grave constructions).⁶ While some artefact types (pottery and costume accessories) suggest a migration of the Thuringians rather than the Langobards, based on their distribution in the Czech-Moravian lands and Pannonia,⁷ the cemeteries in Thuringia do not reflect a population decline. If we accept this as the place of origin for the migration, we may, at most, only assume the migration of smaller groups such as military leaders and their retinue.⁸ The elite established its power over the conquered territories and created the economic organisation necessary for supplying its needs.⁹

¹ JARNUT 1982; POHL 2001, 60–69.

² CHRISTIE 1995; BÓNA 2009, 169–218.

³ BARBIERA 2005; VIDA 2008c, 343–362; VIDA 2014, 55–72. PETERS ET ALIA 2014, 337–360.

⁴ HAKENBECK 2011b, 62–63; For the problems of chronology and identity before and after 568 see: KONCZ 2015, 315–340; About the transformation of the Late Antique landscapes in Pannonia: VIRÁGOS 2007, 213–240.

⁵ VON FREEDEN–VIDA 2007, 359–384; VON FREEDEN 2008a, 399–413; VON FREEDEN 2008b, 318–323.

⁶ TEJRAL 2002, 313–358; TEJRAL 2005, 103ff.

⁷ TEJRAL 2005, 103ff.;

⁸ QUAST 2005, 93–110.

⁹ QUAST 2008, 361–375.



Fig. 2: After the removal of the humus, the Grave 13 is ringed by a circular ditch (Photo by Tivadar Vida).



Fig. 3: The excavated section of the cemetery in 2005 (Photo by Tivadar Vida)

The cultural and economic transformations along a similar trajectory in the newly occupied territory are reflected in the archaeological record by the gradual appearance of a uniform material culture. In other words, the artefacts do not reflect ethnicity, but rather reflect that a particular territory had been pulled under the control of a new group. At the same time, several artefacts occurring in the Central Danube Basin and Italy have their counterparts in the Rhine region too, and can therefore hardly be cited as evidence for a Langobard migration.¹⁰

The interpretation of archaeological artefacts as ethnic markers has been fiercely challenged in the past decade on methodological grounds. Previously, scholars identified possible tribal areas and migration routes from their reading of the sources. Next, they assumed that various artefacts such as the jewellery and costume accessories used in the tribal territory were distinctive to that particular people; in other words, they were markers of ethnicity. This approach also meant that the distribution of certain artefact types was seen as outlining an ethnic territory and their occurrence was used for determining the ethnic identity of individuals too.¹¹ This circular argumentation, which constrained Migration Period studies and interpretations for so long, is obviously no longer tenable because more recent historical and archaeological research has provided ample evidence for heterogeneous and very diverse origins of early medieval peoples.¹²

The scanty literary sources and the archaeological record, which cannot be reconciled with the former, as well as traditional archaeological interpretations, are inadequate for explaining the Langobard migration. Faced with this situation, the archaeologist's typical reaction is to find a site with the hope that its excavation might resolve the problem.¹³

THE CEMETERY IN SZÓLÁD

In 2005, the research team of the Institute of Archaeology of the Hungarian Academy of Sciences (led by Tivadar Vida) began the investigation of the 6th century cemetery at Szólád in cooperation with the Römisch-Germanische Kommission des Deutschen Archäologischen Instituts in Frankfurt (led by Uta von Freeden and from 2010 by Daniel Winger). Later the project was joined by the Anthropological Institute of the Johannes Gutenberg-Universität Mainz (led by Kurt W. Alt from 2008 and from 2010 Corina Knipper) to conduct the physical anthropological, genetic and isotope analyses. The main goal of the research project

¹⁰ FRIEDRICH 2002, 175–190; QUAST 2008, 361–375; For a new archaeometrical analysis see: HORVÁTH 2006, 49–66.

¹¹ HAKENBECK 2011.

¹² BRATHER 2004; FEHR 2010.

¹³ Aquincum: NAGY 2012, 141–174; Gyirmót: TOMKA 2008, 31–43; Ménfőcsanak: VADAY 2015, 163–264; Szeleste (2012): Excavation of Katalin Ildikó Pap, Szombathely. VIDA 2014, 55–72; VIDA 2014, 55–72.

was a comprehensive archaeological and integrative anthropological study of a Migration Period population of the Carpathian Basin.¹⁴

The cemetery lies on the western side of a hill overlooking a north-south bay of Lake Balaton. Most of the Langobard burial grounds in Pannonia are located near former Roman villas, forts and camps, and the Szólád cemetery is no exception, lying near a Roman villa. The community's settlement probably lay by the foot of the hill, on a terrace beside the bay. The first grave came to light during the rescue excavation preceding the construction of the M7 Motorway. The cemetery was first mapped by archaeomagnetic surveys.

BURIAL CUSTOMS

Possible origins and cultural identity of the community using the Szólád cemetery are indicated by the burial customs and the grave goods. Our knowledge has been substantially enriched regarding the period's archaeological material and funerary practices.¹⁵ After the removal of the humus, the soil stains outlined forty-five graves, including six graves ringed by a circular ditch and two graves enclosed by a rectangular ditch. Grave ditches of this kind were not previously found in Pannonia (probably owing to earlier excavation techniques involving the investigation of area with narrow trial trenches). The comparably round grave ditches known from Merovingian cemeteries¹⁶ are usually interpreted as an indication of a burial mound raised over the grave of high-status individuals. Interestingly enough, comparable rectangular grave ditches have only been reported from Gaul in Saint-Vit¹⁷ and Britain in Burton Farm,¹⁸ both former provinces of the Roman Empire, and from Hiddestorf, Lower Saxony dated to the 6th century.¹⁹ These rectangular grave structures possibly imitated Late Antique burials.

Some of the burials in Szólád also contained some kinds of wooden structures. As shown by the intact timbers of an unlooted grave and the broken logs of a looted burial, the burial chamber was covered with wooden logs (so-called *Absatzgrab*). These structures are comparable to the burial chambers known from Western Merovingian Europe and contemporary Pannonia (Szentendre etc.) too. This burial type also survived in Italy, where in some cases the wooden logs were replaced by stone and

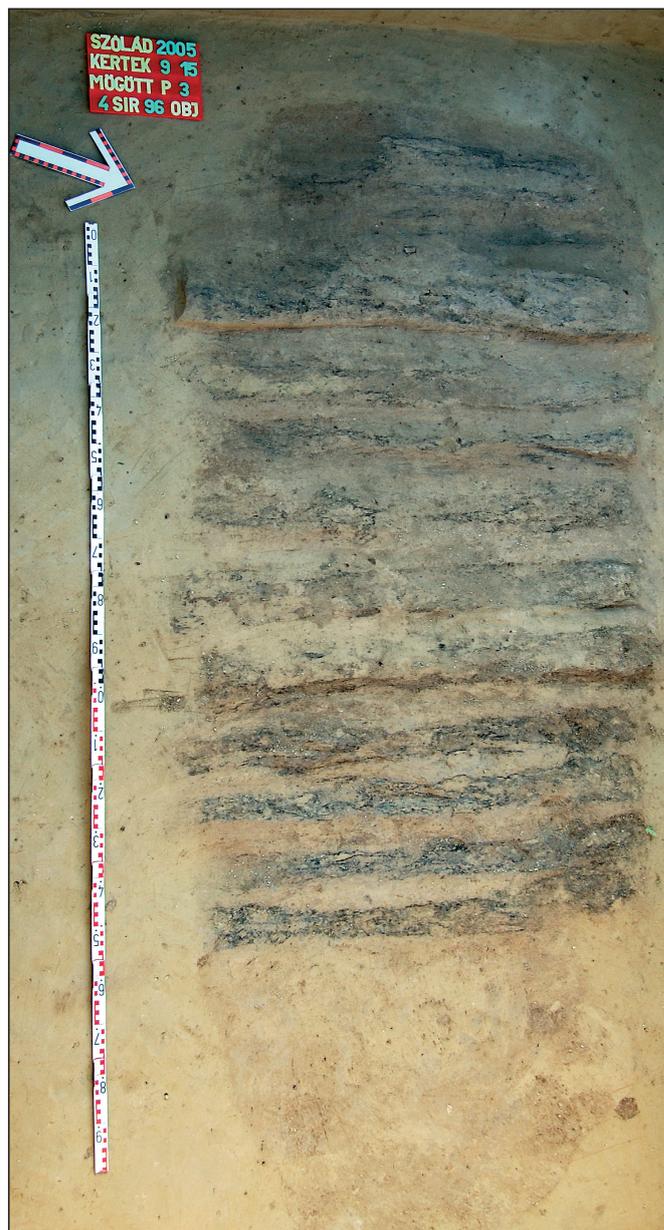


Fig. 4: The burial chamber in Grave 4 was covered with wooden logs, the intact timbers show an unlooted grave (Photo by Uta von Freeden)

¹⁴ VON FREEDEN-VIDA 2007, 359–384; VON FREEDEN-VIDA-WINGER 2016, 186–190. <https://www.dainst.org/documents/10180/2009603/eDAI-F2016-1s.pdf>

¹⁵ VON FREEDEN 2008a, pp. 399–413; VON FREEDEN 2008b, 318–323; VON FREEDEN 2008c, 247–255.

¹⁶ SUDHOFF 1999.

¹⁷ PASSARD-URLACHER 2003, 143.

¹⁸ WEBSTER-BRUNNING 2004, 54.

¹⁹ WINGER-BARTELT 2016, 111–131.

the ‘chamber’ was covered with stone slabs (as at Castel Trosino).²⁰ Most graves contained dug-out log coffins.²¹ A few burials yielded the remains of plank coffins, reflecting a cultural background with different funerary customs.

The good soil conditions in Szólád also offered a unique and excellent opportunity for documenting wooden vessels. The remains of these vessels appeared as brownish soil stains in the yellow loess soil.²² In Grave 38, for example, we found animal ribs and eggs, the remains of a food offering, placed on a wooden platter.

Grave 6 contained boar tusks which could have adorned a helmet once, parallels of which are known from the Bavarian lands (Peigen).²³ Although depictions of helmets with boar tusks are not known within the Merovingian world, the Early Byzantine bricks in the walls of Vinica, Kale Gradište church show images of soldiers (Josua and Kaleb) wearing helmets of this type, perhaps portrayals of Germanic mercenaries.²⁴

Despite the testimony of the written sources, there were no finds indicating a belief in Christianity at Szólád.²⁵ Moreover almost every burial contained food and drink offerings as shown by the animal bones and clay vessels uncovered in the graves, conforming to pagan customs.

The archaeozoological assessment of the animal bones revealed that many different species such as chicken, duck, goat, sheep, pig and fish were all part of the diet.²⁶ One of the goals of the project was the reconstruction of the community’s diet and the former vegetation of the area by pollen analysis.²⁷

A STRONGLY HIERARCHICAL SOCIETY: FINDS AND BURIALS

The cemetery contained forty-five graves, sixteen of which were the burials of adult men. The grave goods suggested that boys and juveniles had been interred in seven graves, and the anthropological analyses



Fig. 5: The 4 meters deep Grave 6 contained boar tusks, which had once adorned a helmet, whose parallels are known from Bavaria. (Photo by Tivadar Vida and Fanni Dénes)



Fig. 6: Gilded bronze belt buckle and shield shaped belt mount from the Grave 6 at Szólád (Photo by Fanni Dénes)

²⁰ MENGARELLI 1902, p. 21, Fig. 17–18.

²¹ VON FREEDEN 2008a, 399–413

²² VON FREEDEN 2008a, 399–413.

²³ VON FREEDEN–LEHMANN 2006, 30 and Taf. 6.

²⁴ MIKULČIĆ 2002, 259 and Abb. 150.

²⁵ About Christianity and Christian objects from the Langobard period: VIDA 2016, 93–106.

²⁶ Dr. Erika Gál archaeozoologist (Institut of Archaeology, Research Centre for Humanities, Hungarian Academy of Sciences)

²⁷ Prof. Dr. Pál Sümegei (University of Szeged, Department of Geology and Paleontology) therefore conducted a systematic sampling in the Szólád cemetery’s broader area.

revealed that four graves without any grave goods had been male burials too. Males were buried in a well-defined cluster in the middle/wester part of the cemetery, while the female burials (ten adult women and two young girls) lay around the male graves in a semi-circle in the south-western part. The number of child and infant burials was surprisingly high – possibly due to the careful excavation technique.

The number of weapons deposited in the graves is unusually high compared to other burial grounds in Pannonia. Every male burial contained a weapon, and the simultaneous occurrence of a *spatha* (a long, double-edged sword), a spear and a shield was quite common.²⁸ *Spathas* were especially frequent, deposited in about 60% of the male burials, reflecting a strong military organisation (and, indirectly, the military nature of Langobard society). The same proportion is 10% among the Franks, 17% among the Saxons and 23% among the Alemanni.²⁹ In my view, the weapons in the burials of the Szólád cemetery were not merely symbols reflecting the social status of the deceased, as assumed by Heinrich Härke in the case of Anglo-Saxon burials, but were artefacts indicating that the deceased had in fact been a warrior.³⁰

The highest-ranking individual was buried in a 5 m deep grave enclosed by circular ditch with a diameter of 10 m. The grave-diggers of antiquity (and modern archaeologists too!) had to remove a total of 22 m³ of earth. A horse was deposited above the burial chamber. The grave of the 60 years old man had been plundered; all that remained of his grave goods were a broken *spatha*, a pair of scales and a broken vessel. The scales were used for weighing precious metals (coins or unworked metal) and it thus reflects the possession of precious metals not only in the Carpathian Basin, but also in the Merovingian Europe. One unique find from the grave was the wooden sheath of the *spatha*, which was covered with textile and jarosite, a natural mineral.³¹

The female burials generally contained four brooches typical for the period's female costume. Bow brooches were hung from the belt (67%). Parallels to the S-shaped brooches are known from both Pannonia and today's southern Germany, as well as from Italy. The technological and decorative traits of the S-shaped brooches and the bow brooches with a rectangular head plate suggest that these jewellery items represent the emerging phase of the so-called Pannonian-Italian style, an independent phase of local Pannonian metalwork.³² Combs were often deposited in the graves, both in male and female burials.

In addition to vessels of northern origin, the grave pottery from Szólád includes local Pannonia wares, such as stamped vessels, and spouted vessels with smoothed-in decoration.³³ The community's contacts



Fig. 7: The 4,5 meters deep grave 13 with the tree remnants of the grave chamber (Photo by Tivadar Vida)

²⁸ VON FREEDEN 2008a, 399–413.

²⁹ SIEGMUND 1998.

³⁰ HÄRKE 1992, 97–146.

³¹ VON FREEDEN 2008b, 321, Kat. 123/4.

³² HORVÁTH 2006, 49–66.

³³ PÁNCZÉL-BAJNOK et al. 2014, XI./1, 1–12.

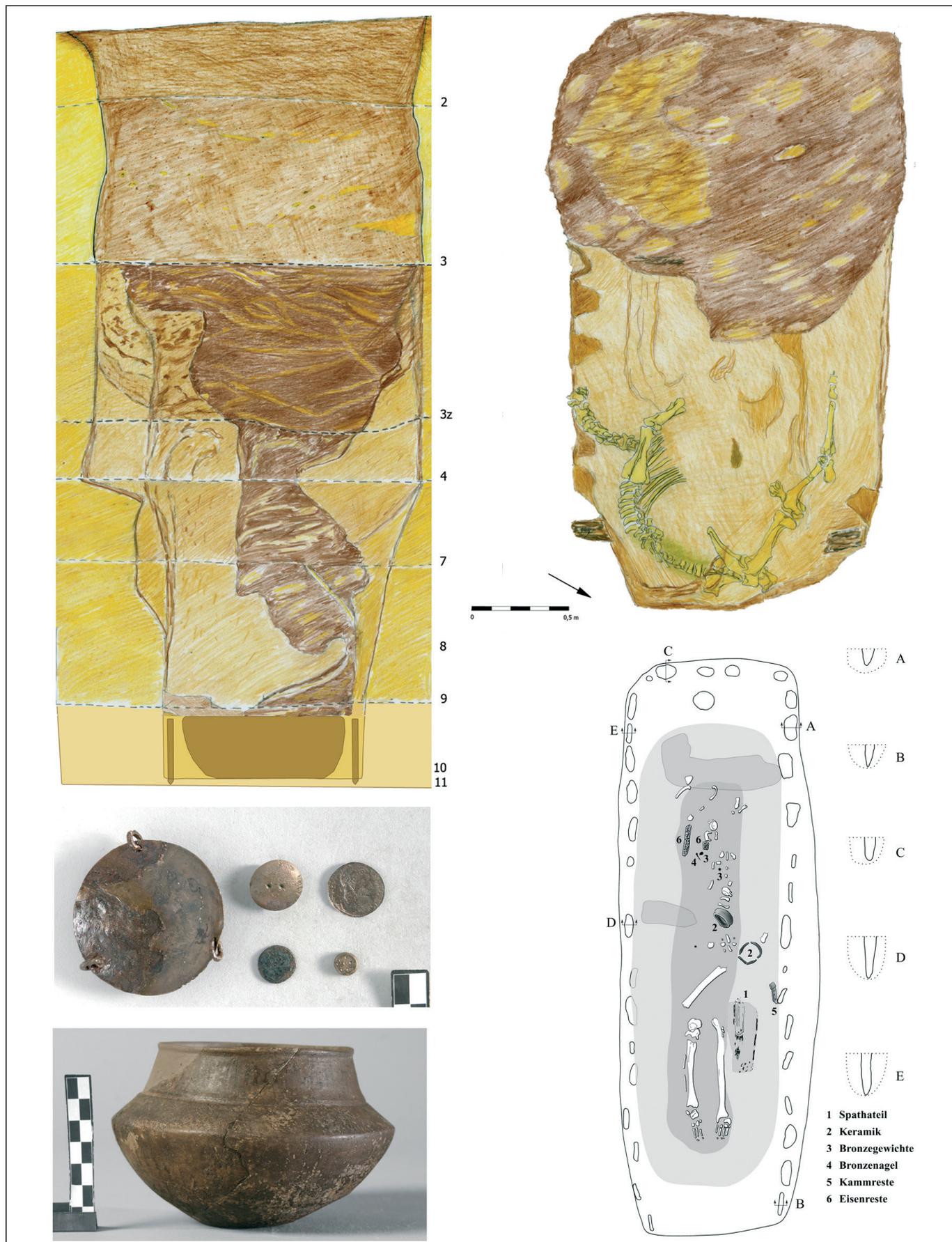


Fig. 8: The 4,5 meters deep grave 13 with a horse skeleton, weighing weights and Thuringian type pottery (Photo by Uta von Freedon)



Fig. 9: Lances from the cemetery of Szólád
(Photo by Fanni Dénes)

with faraway regions are reflected by finds of an ivory ring³⁴ from Grave 38 and the fragments of a Mediterranean glass chalice from Grave 30. One of the graves contained the burial of a woman laid to rest in a wooden plank coffin, whose single grave good was a bronze bracelet on her left arm, conforming to Romanized costume and burial custom. This custom has been observed among the Romanized populations of the eastern Alpine region and the Mediterranean. The woman probably came from one of the surviving Late Roman communities. The strontium isotope analyses of this individual indeed show a very different background compared with the other individuals.³⁵

NEW MULTIDISCIPLINARY SCIENTIFIC METHODS

Physical anthropological, ancient DNA (aDNA) and isotope analyses offered many new possibilities for a better understanding of this community.³⁶ Our main research questions were as follows: Did the individuals buried in the cemetery from the Langobard period at Szólád have the same biological background or ancestry? Can the foreign archaeological habitus also be seen in different natural scientific analysis? If so, can immigrants of the first generation be securely identified alongside smaller family groups migrating together or could aDNA analyses indicate genetic heterogeneity? Did non-local individuals arrive from the same region and did the community readily accept “foreigners”? Can migration-induced stress markers be identified, and was there a greater proportion of inter-personal



Fig. 10/1-2: Gilded silver brooches (bow fibula and S-shaped brooch) with stone inlay from female grave no. 21.
(Photo by Fanni Dénes)

³⁴ VON FREEDEN 2008b, 323.

³⁵ PETERS et al. 2014, 337-360.

³⁶ GEARY 2014, 1-8; ALT et al. 2014, 1-14.

violence, indications of nutritional stress or of poor health conditions?

OSTEOLOGY

The proportion of the sexes in the Szólád cemetery reflected, in itself, an unusual community compared to the other Migration Period populations: male burials were clustered in the cemetery's western part and the female burials lay around them forming a semicircle. Child burials formed two clusters in the cemetery's northern and southern parts. The osteological examination of the male and female skeletons was aimed at determining the cemetery's demographics and the population's health conditions. 43% of the individuals had died before reaching adulthood, a child mortality rate that is similar to other Migration Period proportions in Europe. It also showed the general trend in its situation of earlier deaths of females compared to males. Skull fractures were exclusively noted in male burials: in three cases, the wounds had healed, but in a fourth case, it led to death.³⁷

The cranial length-breadth indices showed a dominance of long-headed individuals (Ind. 4, 11, 17, 22, 24, 27, 28, 43 and 44), while three could be classified as medium-headed (Ind. 3, 25 and 45), and four were short-headed. The latter group was made up of four females (Ind. 9, 19 and 30) and one male (Ind. 5). Given that the Late Antique cemeteries of Pannonia are generally characterised by a short-headed population, the low number of short-headed individuals at Szólád suggested that the greater part of the community was not of local origin. Morphological consistency observed in rare dental characteristics indicates possible close kinship relations between the individuals with double-rooted canines (Ind. 20, 30, 31) and the individuals with persisting teeth and maleruption (Ind. 14 and 37).

DNA ANALYSIS

The mitochondrial DNA (mt-DNA) profiles of 28 out of 38 analysed individuals were successfully replicated. The reproduced data of 28 individuals exhibited a high variability of mitochondrial haplotypes. The mtDNA profiles based on the paleogenetic analysis of tooth samples reflected a heterogeneous range of lineages since twenty-two types were identified. In addition to the H, U, J, HV, T2 and I haplogroups, which are presently common across Europe, we also identified the N1a and N1b haplogroups, which today are more frequent in the Near East.³⁸

Individuals 13 and 22 shared the same lineage of haplogroup (N1b2). Individuals 14 and 8 as well as 13 and 22 may have been related, while for individuals 11 and 42, maternal relations such as uncle and nephew or cousins are possible, considering the time span during which the cemetery was in use. Yet, the occurrence of identical haplotypes by chance cannot be excluded entirely, although it can be viewed as unlikely due to the archaeological context and the low frequencies among modern-day populations. The haplotypes identified in the Szólád cemetery point beyond the smaller region and reflect a European community of heterogeneous make-up. A possible maternal lineage could be assumed in the case of several pairs of burials, but only in the case of more rare haplotypes can we be quite certain of a genetic relation. Considering the short use of the cemetery, the grave pairs with an identical haplotype suggested a possible pair of siblings in one case and an uncle-nephew relation in another.



*Comb with case from Grave 12 in Szólád
(Photo by Fanni Dénes)*

³⁷ ALT et al. 2014, 1–14.

³⁸ ALT et al. 2014, 1–14.

DIETARY HABITS

The correlation between social standing and diet is quite obvious because the amount and quality of food available to an individual was essentially determined by the place of residence, social status and personal wealth. In some cases, the study of dietary customs does offer possibilities for identifying personal mobility and for the study of the lifeways of individuals of different social standing or wealth. In addition

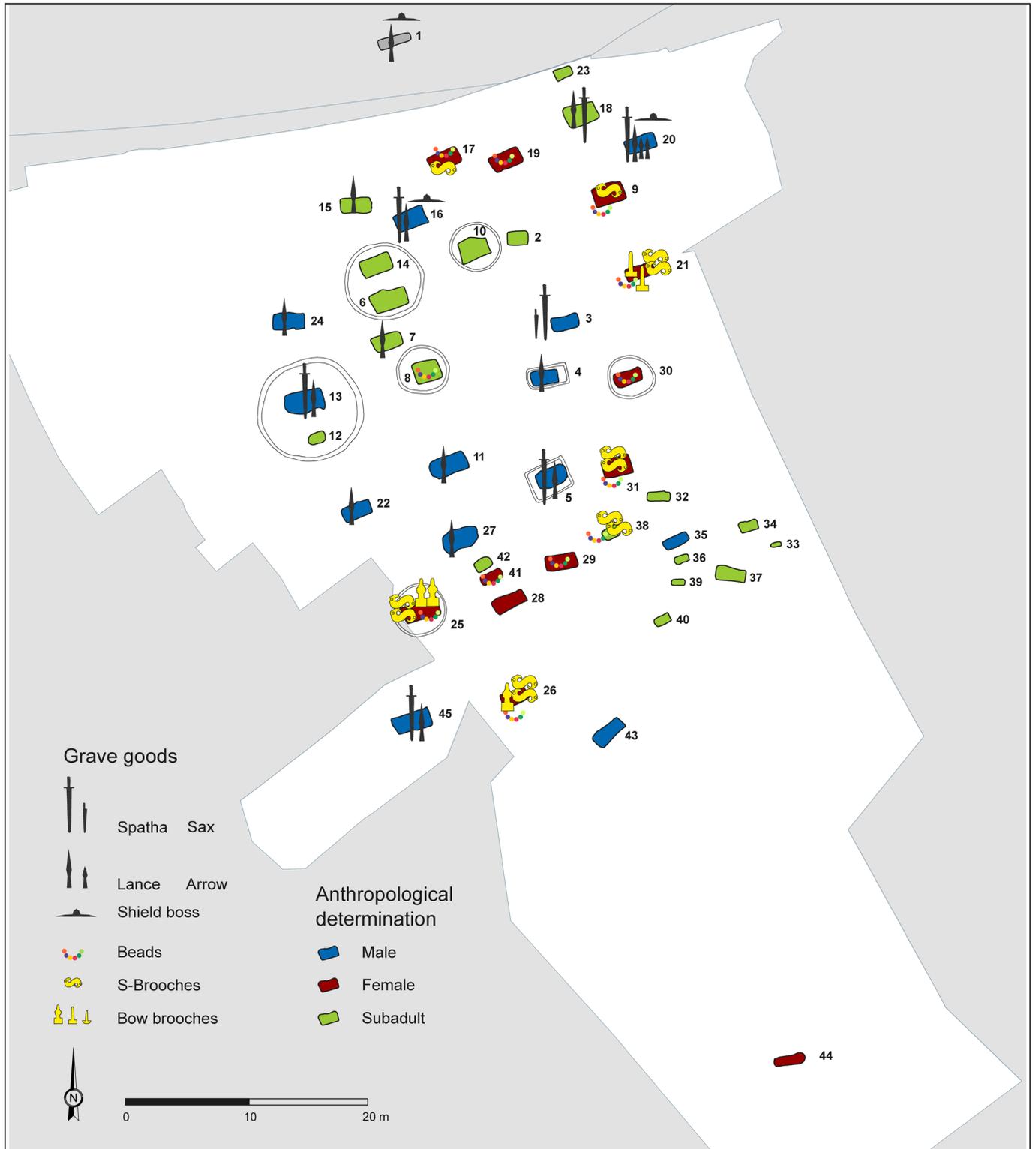


Fig. 12: Plan of the cemetery at Szólád with the locations of selected grave goods. The colours of the graves symbolise the anthropological sex and age determinations (Graphics by U. v. Freeden, D. Peters, C. Knipper)

<https://doi.org/10.1371/journal.pone.0110793.g002>

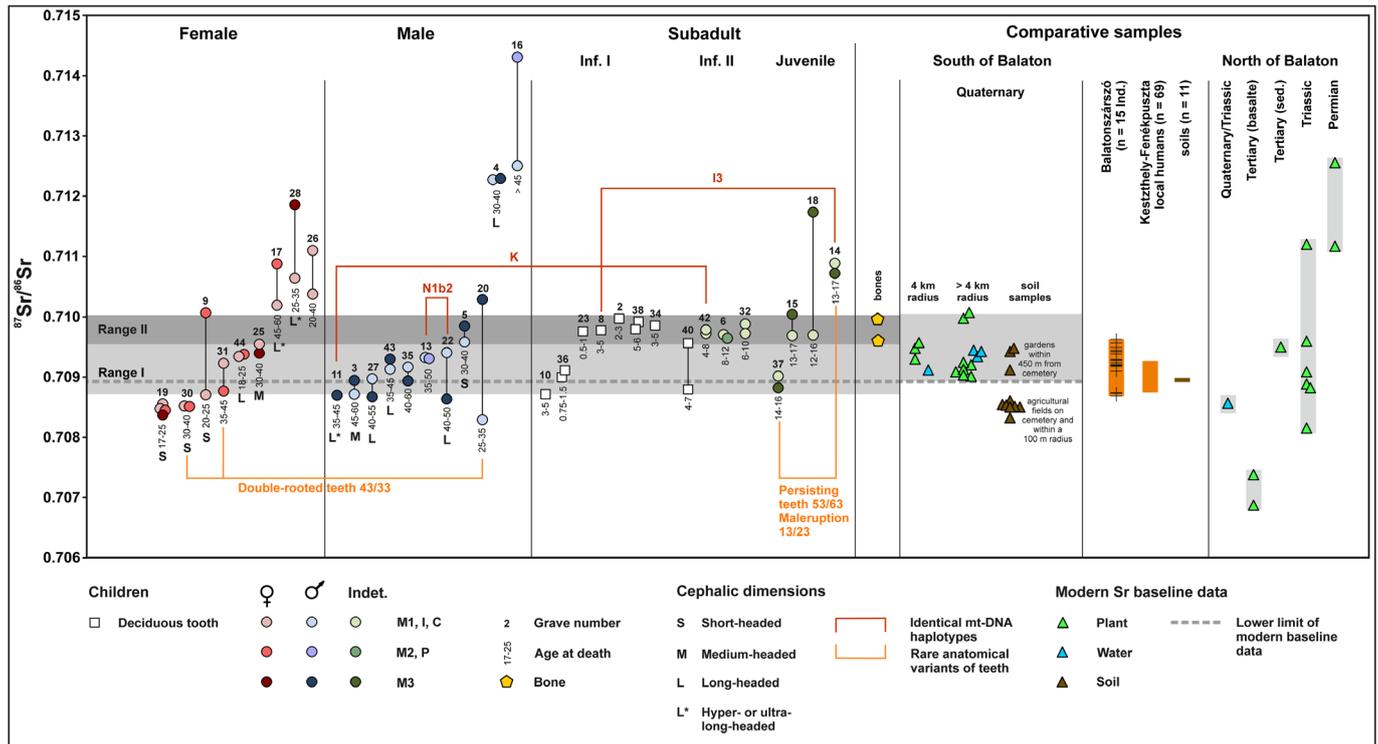


Fig. 13: $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of human tooth enamel and bone from the cemetery at Szólád in comparison to modern vegetation, water, and soil samples (Graphics by C. Knipper) <https://doi.org/10.1371/journal.pone.0110793.g004>

to the assessment of the archaeobotanical and archaeozoological samples, dietary habits can also be studied through stable isotopes of carbon and nitrogen found in the skeletal remains of the deceased. Carbon ratios ($\delta^{13}\text{C}$) are determined by the photosynthesis type of plants and also indicate the role of terrestrial and aquatic foods in the diet. The carbon isotope ratios of some individuals buried at Szólád indicate the regular consumption of millet.³⁹

The higher a living organism's place in the food chain, the higher nitrogen isotope values ($\delta^{15}\text{N}$) can be observed in its body. The $\delta^{15}\text{N}$ values of a small group of males interred with their weapons (Ind. 5, 11, 13, 24, 35 and 45) indicated that they had consumed higher amounts of animal protein than the community's other members. At the same time, a similar correlation between social status and animal protein consumption could not always be demonstrated in the case of females – for example, one of the females interred with a lavish array of grave goods had consumed very little animal-derived protein. Curiously enough, both the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values do not clearly reflect high freshwater fish consumption, despite the proximity of Lake Balaton. Nitrogen isotope values reflecting nursing could be demonstrated in the case of three infants (Ind. 2, 36 and 39), while in the case of other small children, the values reflected that they had already been weaned (Ind. 8, 10, 34 and 38).



Fig. 14: The excavated female grave no. 21 (Photo by Uta von Freeden)

³⁹ ALT et al. 2014, 1–14.

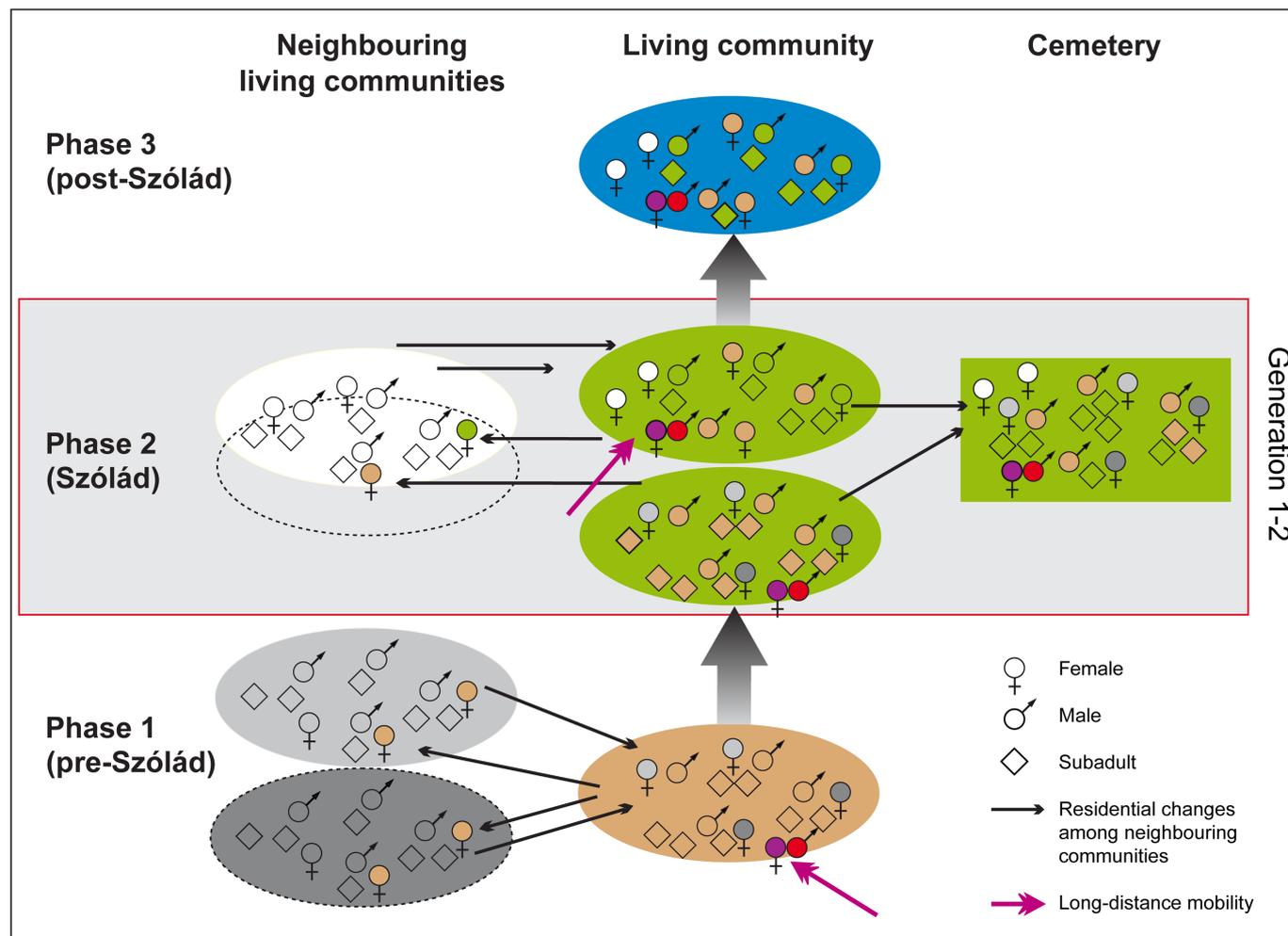


Fig. 15: Model of the Szólád community's residential changes and occupation of the cemetery (Graphics by D. Peters, C. Knipper) <https://doi.org/10.1371/journal.pone.0110793.g006>

STRONTIUM AND MOBILITY

Strontium isotope studies have been employed for assessing mobility since the 1980s. Strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) are typical for particular geologic environments from which the trace element is incorporated into human and animal bone tissues through consumed water and plants. $^{87}\text{Sr}/^{86}\text{Sr}$ isotopes are conserved in tooth enamel during early childhood and retain an isotope signature of the geographic/geological environment in which an individual had spent his/her childhood. Bones, however, are continuously remodelled and thus strontium isotope ratios reflect the environment where the individual spent the last few years of his/her life.⁴⁰ $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of archaeological bones, however, often reflect local signals because of diagenetic alteration rather than indicating the deceased individual's residency during adulthood.

First, samples were taken from the local soil, water and vegetation to determine local strontium isotope levels. The examination of the sixty-six tooth enamel samples taken from thirty-five individuals interred in the Szólád cemetery yielded $^{87}\text{Sr}/^{86}\text{Sr}$ values of 0.70829 and 0.71431 with an interesting distribution pattern among the males, females and children. As it turned out, most the children and adolescents appear to have been born locally, although some differences could be noted between the strontium levels of the early and late mineralising teeth, which may indicate childhood mobility (Ind. 16, 18, 28). The 12–16-year-old individual interred in Grave 18 had a third molar with a non-local signature and an incisor with a Szólád-compatible strontium ratio, suggesting a death soon after the arrival to Szólád because otherwise the molar,

⁴⁰ ALT et al. 2014, 1–14.

which was still developing, would also have reflected the less radiogenic Szólád soil signature. This as well points to a highly mobile community.

The burials of males equipped with weapons and lavishly furnished female burials indicate that the Szólád cemetery was used by a community made up of smaller groups of individuals enjoying a similar social status, each with its own internal hierarchy. The adults in the Szólád cemetery were not born locally and both the data of males and females reflect multiple places of origin. Interestingly, the strontium data of the females reflect a greater diversity than that of the males, suggesting a greater mobility among women and possibly corresponding with patrilocal mating patterns.

SUMMARY

The unusual distribution of strontium isotope values among men and women, and subadult individuals, and their comparison with the local reference values based on samples from the soil and vegetation in the Szólád area, suggests a three-phase process in the settlement of the Szólád community. This model reflects the arrival to Szólád of a patrilocal community that accepted “strangers” into their midst, which then moved away after one generation. This is supported by the local isotope values of many children and the fact that none of the adults interred in the Szólád cemetery had been born locally.⁴¹ The brief use of the cemetery is also confirmed by the chronology of the archaeological material. The dynamics of how the cemetery was used, as revealed by the isotope analyses, agree with the hypothesis that the Langobards occupied Szólád only briefly, possibly for one generation only. This is also reflected in the distribution of mtDNA haplotypes, which suggests that few individuals of the same family had died while the cemetery was used. It would appear that the territory had been occupied for a span of twenty years because there are few genetically related individuals among the interred.

The results of the analyses described in the foregoing offer a more accurate picture of the origins, mobility and make-up of the Szólád community, as well as of their population, kinship status, and local and supra-regional contacts than what can be gleaned from the textual historical sources and archaeological record. The results of these projects are certainly an inspiration for similar studies in the future in order to better understand the peoples of the Migration Period, their daily life, and their efforts to blend Late Antique traditions with their own Barbarian culture, whereby they also contributed to shaping the modern cultural make-up of Europe.

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