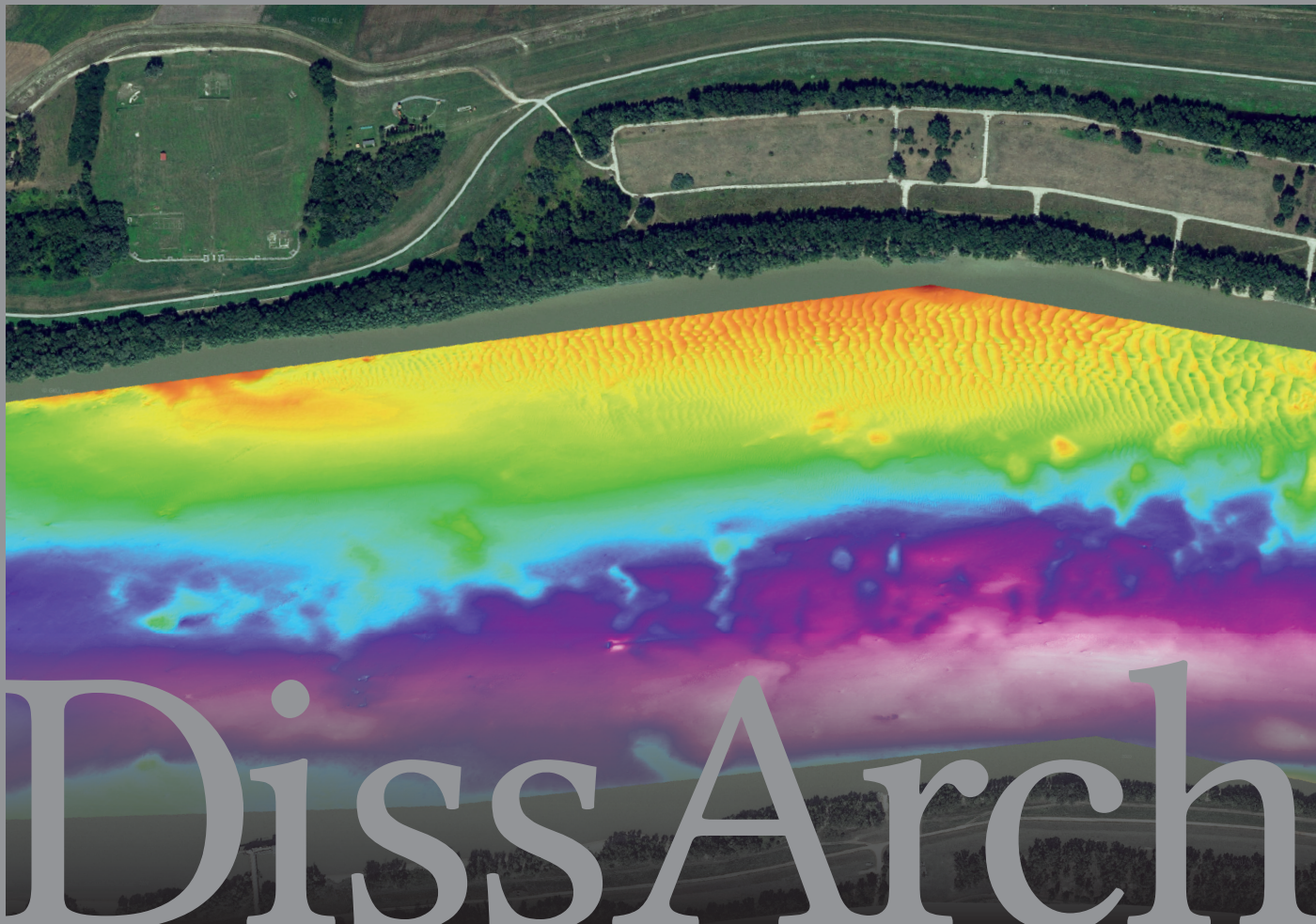


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Pots for a purpose?

Interdisciplinary analysis of small amphorae from the Late Bronze Age cemeteries of Maklár (Northeast Hungary)

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Abstract: At the beginning of the Late Bronze Age (c. 1500 BC), the so-called Tumulus culture/phenomenon emerged across large parts of Central Europe, including the Great Hungarian Plain. In this region, profound changes occurred, including the abandonment of *tell* settlements, the emergence of new pottery styles and settlement organisation, and transformations in burial practices. Two contemporaneous cremation cemeteries dating to this period are known from the northern Great Hungarian Plain: Maklár-Nagyvér II and Maklár-Kospérüm. These sites are dated to c. 1500–1300/1200 BC (Br B2–C/D) and comprise both urn burials and scattered cremation graves containing diverse sets of vessels.

Among the most distinctive vessel forms is a group of small amphorae, represented by a range of shapes and decorative schemes at both sites. This paper presents a comprehensive analysis of these vessels, all of which exhibit traces of secondary burning. In addition to traditional archaeological and anthropological approaches, thin-section petrography and X-ray powder diffraction were employed to investigate their raw materials and firing history.

The results indicate that small amphorae were used throughout the entire Tumulus period and were deposited in the graves of both adults and children. Macroscopic observations suggest secondary burning, most probably on the funerary pyre during cremation, while raw material analyses indicate exposure to temperatures of approximately 850–900°C. All vessels were manufactured from broadly similar sandy clays, although minor compositional variations point to the involvement of multiple producers.

Keywords: Bronze Age, Carpathian Basin, Tumulus culture, funerary archaeology, pottery analysis, raw materials

Introduction

At the beginning of the Hungarian Late Bronze Age, around 1500 BC, the Tumulus culture/phenomenon appeared across Central Europe, including most of the Carpathian Basin.¹ On the Great Hungarian Plain, the onset of this period is associated with the abandonment of long-lived Middle Bronze Age *tell*

1 REMÉNYI 2005; FISCHL *et al.* 2013; MAKAROWICZ 2017; ILON 2019.

settlements—according to Hungarian chronology—and with substantial changes in the archaeological record, notably in pottery styles and metal artefact types.² Several factors may have contributed to this transition on the Great Hungarian Plain, including the development of local populations, a certain degree of migration from the west, climatic change, and shifts in subsistence practices (diet).³

In the northern Great Hungarian Plain, this period spans approximately 1500–1300/1200 BC (Br B2–C/D). During this time, cremation became the predominant burial rite, although inhumation continued to be practised.⁴ Despite its wide geographical distribution, the Tumulus culture/phenomenon is characterised by a combination of shared features and pronounced regional variability, reflecting the existence of multiple social groups.⁵ Such regional differences in burial rite and pottery style can be observed not only at a supra-regional scale but also within present-day Hungary and even within the Great Hungarian Plain itself.⁶ For instance, large stone- or earth-built burial mounds containing multiple interments are absent from the Great Hungarian Plain; instead, large cemeteries comprising sometimes several hundred burials are attested.⁷ Unlike monumental burial mounds, these cremation or biritual cemeteries are generally interpreted as burial grounds of complete communities rather than of a social elite.⁸



Fig. 1. The position of Maklár in Hungary and the two analysed cemeteries in its surroundings.

2 FISCHL *et al.* 2013; MAKAROWICZ 2017; KIENLIN *et al.* 2018.

3 HAJDU 2012; DEMÉNY *et al.* 2019; CAVAZZUTI *et al.* 2025.

4 CSÁNYI 1980; CSÁNYI 2019; FISCHL *et al.* 2013; CAVAZZUTI *et al.* 2022; SØRENSEN – REBAY-SALISBURY 2023.

5 VANDKILDE 2007; KRISTIANSEN 2014; MAKAROWICZ 2017.

6 KOVÁCS 1965.

7 KOVÁCS 1975; CSÁNYI 1980; FÜLÖP – VÁCZI 2014; MENGYÁN – HRABÁK 2023; P. FISCHL – FÜLÖP *in press*.

8 CAVAZZUTI *et al.* 2022, 61.

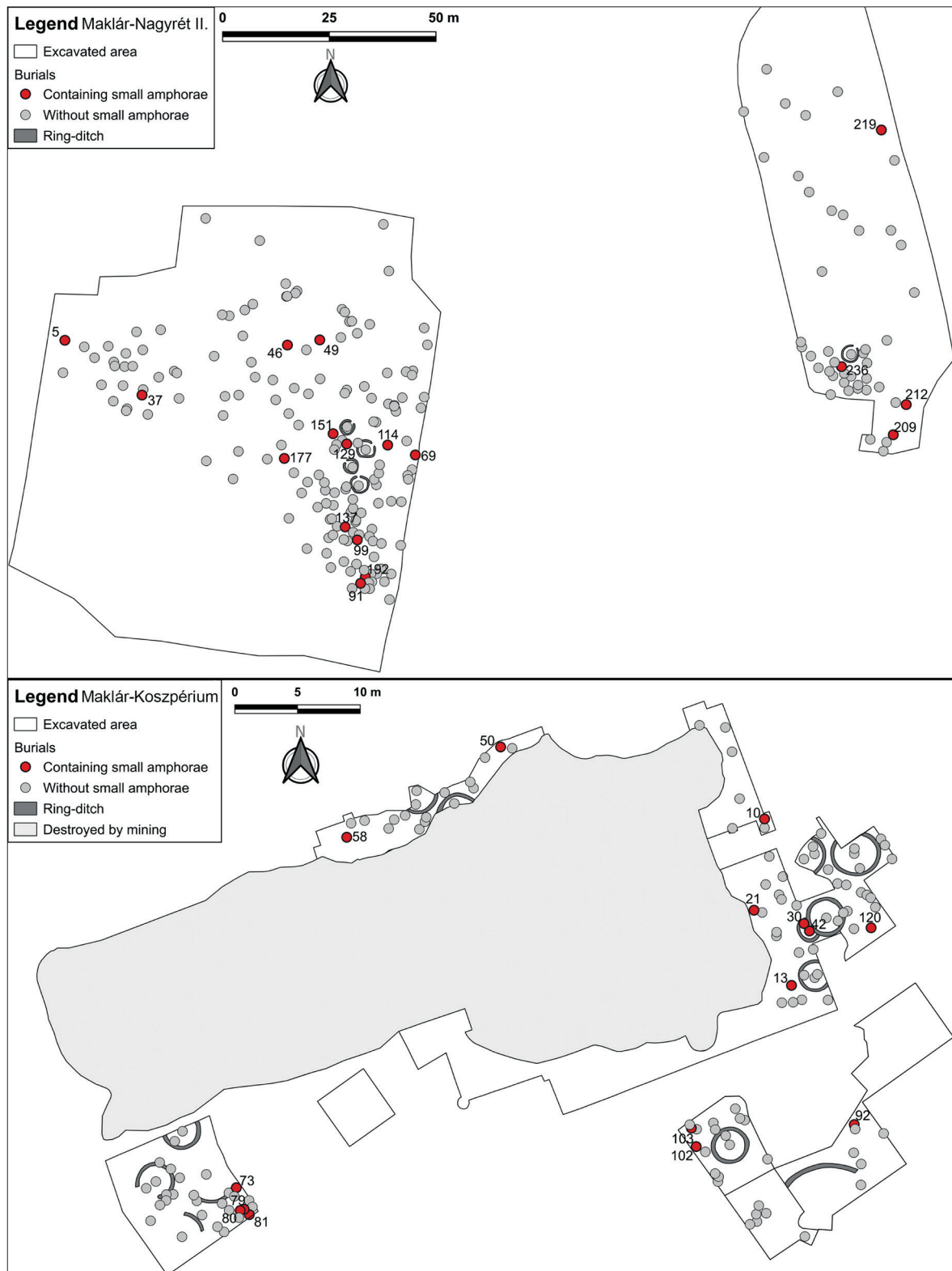


Fig. 2. Above: survey map of the Maklár-Nagyrét II cemetery; Below: survey map of the Maklár-Kospérűm cemetery. With red marking for the graves containing small amphorae.

In the Bronze Age, increasing social inequality led to the development of hierarchical societies structured, among other factors, around social status and individual and group identity.⁹ Individu-

⁹ BRÜCK 2009, 11; SØRENSEN 2013.

als were embedded within complex social frameworks, and the expression of status, identity, and kinship was likely of considerable importance. As a result, social position and gender were often conspicuously displayed in burial contexts. Men and women were typically furnished with different categories of artefacts, including weaponry, tools and clothing accessories.¹⁰ Graves of Tumulus period men and boys may contain swords, spearheads, axes, and tools such as razors, tweezers and fishhooks, whereas women and girls were more commonly equipped with bracelets, pins, pendants, beads, and other items of jewellery.¹¹

Such gender differentiation is also observable at sites on the Great Hungarian Plain. However, artefacts recovered from cremation graves are frequently damaged or melted by fire, and it must be borne in mind that not all objects placed on the pyre were necessarily collected together with the cremated human remains.¹² These burial practices reflect local and regional cultural identities, social status, and affiliation with particular gender or social groups.¹³ Moreover, the type and quantity of grave goods may have depended on a range of factors, including the choices of individuals and/or close relatives (for example, family members), community traditions, and the social status of the deceased.¹⁴ Comparable regional variability can also be observed in the funerary rites themselves, including the use of inhumation or cremation and grave orientation.¹⁵

For example, pottery was less frequently deposited in graves in many parts of Central Europe than in the Carpathian Basin.¹⁶ Where pottery does occur in graves, it is generally not gender-specific,¹⁷ with the notable exception of miniature vessels, which are frequently associated with children's burials.¹⁸ At the cemetery of Pitten in eastern Austria, for example, pottery vessels appear to have been primarily linked to feasting or offerings rather than to the deceased individual directly.¹⁹ Furthermore, individuals under the age of 20 were less frequently buried with pottery, while women and girls were more often accompanied by ceramic vessels than men.²⁰ Flat graves are less likely to contain pottery than burial mounds, whereas age and gender do not appear to have been decisive factors in this regard.²¹ It is notable that specialised nursing vessels dating to the period after the Tumulus culture (c. 1200–600 BC) have been identified in present-day Austria, southern Germany, and the Czech Republic, both in settlements and in the graves of young women and children.²² Lipid residue analyses indicate that these vessels were used for feeding young children.²³

Within the administrative area of Maklár on the northern Great Hungarian Plain, two roughly contemporaneous cremation cemeteries are known (Fig. 1). Both are dated to the Br B2–C/D phases (c. 1500–1300/1200 BC). Maklár-Nagyrét II comprises 210 burials, while Maklár-Kospérüm, located

10 KRISTIANSEN 1998; VANDKILDE 2007, 131; MAKAROWICZ 2017.

11 TROGMAYER 1965; TREHERNE 1995; KOVÁCS 1996; KRISTIANSEN 1998; KOVÁCS 2000; VANDKILDE 2007, 131; HARDING 2008.

12 FÜLÖP 2019, 299–301.

13 TREHERNE 1995; SØRENSEN 1997; VANDKILDE 2007; BÖSEL 2008.

14 BRÜCK 2004.

15 VANDKILDE 2007; FALKENSTEIN 2012; CAVAZZUTI *et al.* 2022; SØRENSEN – REBAY-SALISBURY 2023; PÁSZTOR *et al.* 2023, 100.

16 VANDKILDE 2007; SØRENSEN – REBAY 2007, 69.

17 SØRENSEN – REBAY 2008, 170.

18 FÜLÖP 2016.

19 SØRENSEN – REBAY 2008, 169.

20 SØRENSEN – REBAY 2008, 169–170.

21 SØRENSEN – REBAY 2008, 170.

22 REBAY-SALISBURY *et al.* 2021.

23 REBAY-SALISBURY *et al.* 2021, 116–118.

approximately 1.5 km away, contains 121 graves. During the period in focus, this area functioned as a contact zone between the Tumulus and Piliny societies,²⁴ a circumstance clearly reflected in the material culture, which incorporates both Tumulus- and Piliny-style artefacts and design elements, particularly in the ceramic assemblages.²⁵

The present study focuses on a specific vessel type, the so-called small amphorae, recovered from graves in these two cemeteries. All examples were subjected to detailed analysis, as each displays traces of secondary burning, potentially indicative of a particular role within the funerary rite. The aims of this research are to elucidate the archaeological and anthropological contexts of these vessels, to examine their raw materials and tempering practices, and to assess the temperatures to which they were exposed. In addition, the study seeks to identify similarities and differences in raw material selection and to characterise the nature of secondary burning through analytical methods. Raw materials and thermal effects were investigated using thin-section petrography and X-ray powder diffraction (XRPD).

The sites and the burial rites

Maklár-Nagyret II

The site of Maklár-Nagyret II is situated on a small plateau approximately 600 m from the Eger Stream (Fig. 1). Excavations conducted in 2021, 2022, and 2024 revealed a Bronze Age cemetery and an associated settlement, comprising 210 cremation graves and 63 settlement features (Fig. 2). The settlement lay to the north of the cemetery and consisted primarily of pits and two ditches. The cemetery itself was excavated in two main areas; however, further graves were identified between these areas and to the east, while its northern, eastern and southern limits were also established (Fig. 2).²⁶

Of the 210 graves, 112 were urn burials and 95 were scattered cremation burials, while no human remains were recovered from three features. In addition, five scattered cremation graves were enclosed by circular ditches, each surrounding a single central burial.²⁷ Grave goods, including clothing accessories such as bronze jewellery and glass beads, were recovered from among the cremated human remains. These artefacts were mostly secondarily burnt, indicating that they had been placed on the funerary pyre during cremation. A stone shaft-hole axe was also recovered from Grave 98, deposited beside the human remains;²⁸ this object likewise shows evidence of exposure to fire on the pyre.²⁹

Most grave pits were shallow and consequently disturbed by later agricultural activity. On the basis of relative chronology, the cemetery can be dated to approximately 1500–1300/1200 BC (Br B2–C/D).

Urn burials typically comprised a ceramic container for the cremated remains, most commonly an amphora-shaped vessel or a pot. These urns were usually covered by a bowl, and additional vessels—such as cups, bowls and small amphorae—were sometimes placed within the grave. In most scattered cremation burials, the human remains were deposited directly into the grave pit without a non-organic container. In a small number of cases, however, the compact arrangement of the remains suggests the former presence of an organic container, such as a leather or textile bag. The precise number of such burials cannot be determined, as later disturbance may have displaced the remains from their original position.

24 KEMENCZEI 1964; KEMENCZEI 1965; CAVAZZUTI *et al.* 2025, Fig. 1.

25 KEMENCZEI 1984; KÓSA 2015, 198–199.

26 MENGYÁN – HRABÁK 2023.

27 MENGYÁN – HRABÁK 2023.

28 MENGYÁN *et al.* 2024.

29 MENGYÁN *et al.* 2024.

Ceramic vessels were generally placed in the immediate vicinity of the cremated remains or around the urns (Fig. 3). In most cases, small amphorae were positioned directly beside the human remains or next to the urn (Tab. 1). These vessels were most frequently placed in the western (Graves 5, 49, 177, and 212) or southern (Graves 46, 114, 129, and 209) parts of the grave pit, as well as in the eastern part in three cases (Graves 69, 137, and 238); only one vessel was found in the northern part of a grave pit. In Grave 49, the small amphora was recovered beneath the urn, suggesting that it was among the first grave goods deposited (Fig. 3.2). In Grave 129, the vessel was positioned close to the south-western side of the cremated remains, with another vessel placed on the opposite side of the heap of cremains (Fig. 3.1). In Grave 209, the small amphora was located approximately 10 cm south of the cremated remains (Fig. 3.3).

Maklár-Kospérium

The Maklár-Kospérium cemetery lies on the right bank of the Eger Stream, approximately 1.5 km south-east of the Nagyrét II site (Fig. 1). Excavations carried out in 1960 and 1962 by János Győző Szabó uncovered 121 Bronze Age cremation burials, although the central part of the cemetery had already been destroyed by sand extraction.³⁰

Of the 121 features, 80 were urn burials, 28 were scattered cremation graves, and 13 contained no human remains. In addition, 13 scattered cremation graves were enclosed by circular ditches. In most cases, these ditches surrounded a single central scattered cremation burial, although additional graves were occasionally located within the same enclosure (Fig. 2). Bronze artefacts—primarily jewellery such as pins, bracelets, and pendants—were recovered from among the cremated remains and were generally secondarily burnt, indicating their placement on the pyre during cremation. A bronze dagger and a stone axe with a shaft hole made of Burgenland basalt/basanite were recovered from Grave 41.³¹

The grave pits were relatively shallow and had been disturbed by agricultural activity. On the basis of the associated finds, the cemetery can be dated to approximately 1500–1300/1200 BC (Br B2–C/D).

Urn burials comprised a ceramic vessel—most often an amphora-shaped vessel or a pot—serving as a container for the cremated remains. These urns were typically covered by a bowl, and additional vessels, including bowls, cups and small amphorae, were sometimes placed in the grave, probably containing liquids, food or other valued offerings. These vessels were usually positioned around the urn rather than inside it. In scattered cremation graves, the human remains were deposited directly into the grave pit, although organic containers such as leather or textile bags may have been used in some cases.

Although only a limited number of excavation photographs are available, some examples provide insight into vessel placement (in or around the human remains and/or the urn; see Fig. 3). In Grave 80, a small amphora was placed on top of the urn (Fig. 3.5), while another miniature vessel was positioned on the opposite side (Fig. 3.4). This arrangement suggests that the small amphora may have been among the final offerings deposited in the grave. In Grave 42, a scattered cremation burial, a small amphora was placed near the cremated remains together with other grave goods (Fig. 3.6). In general, small amphorae were positioned either beside the cremated remains or next to the urn, although more precise spatial observations are not possible for all graves due to the limited documentation (lack of grave photographs) and the lack of reliable orientation data (Tab. 2).

³⁰ SZABÓ 1963.

³¹ MENGYÁN *et al.* 2024.

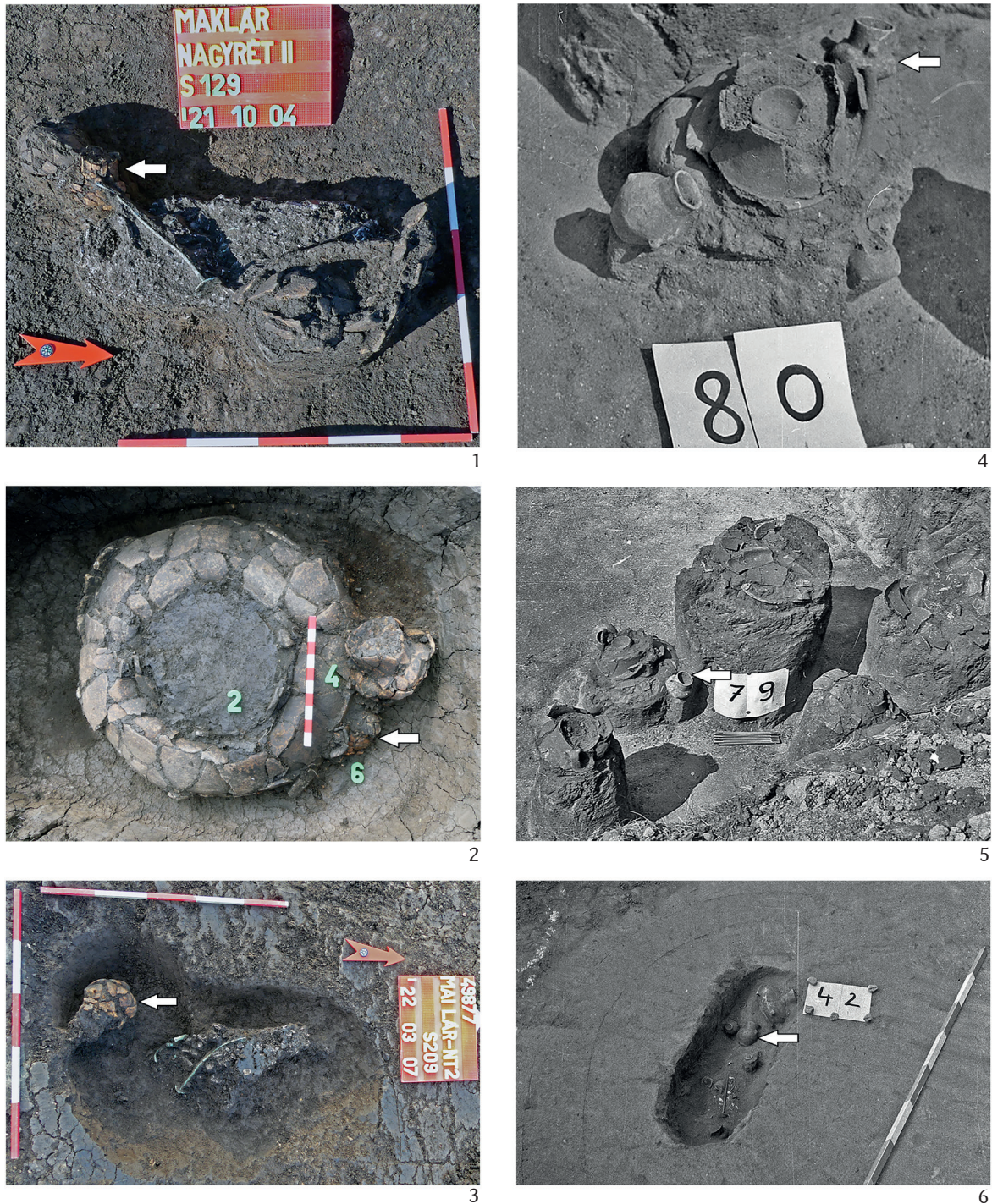


Fig. 3. Graves with small amphorae (field photos) with arrows marking the vessels in each image. Maklár-Nagyréti II: 1 – S129, 2 – S49, 3 – S209; Maklár-Kospérűm: 4 – S80, 5 – S79, 6 – S42.

Archaeological and anthropological context

Maklár-Nagyréti II

In the Maklár-Nagyréti II cemetery, a total of 17 small amphorae were identified in 17 individual graves out of the 210 documented burials (Figs 4–5). This corresponds to approximately 8% of the graves at the site. It should be noted that post-depositional disturbance may slightly affect this proportion, as heavily disturbed graves often yielded only a small number of unidentifiable pottery sherds.

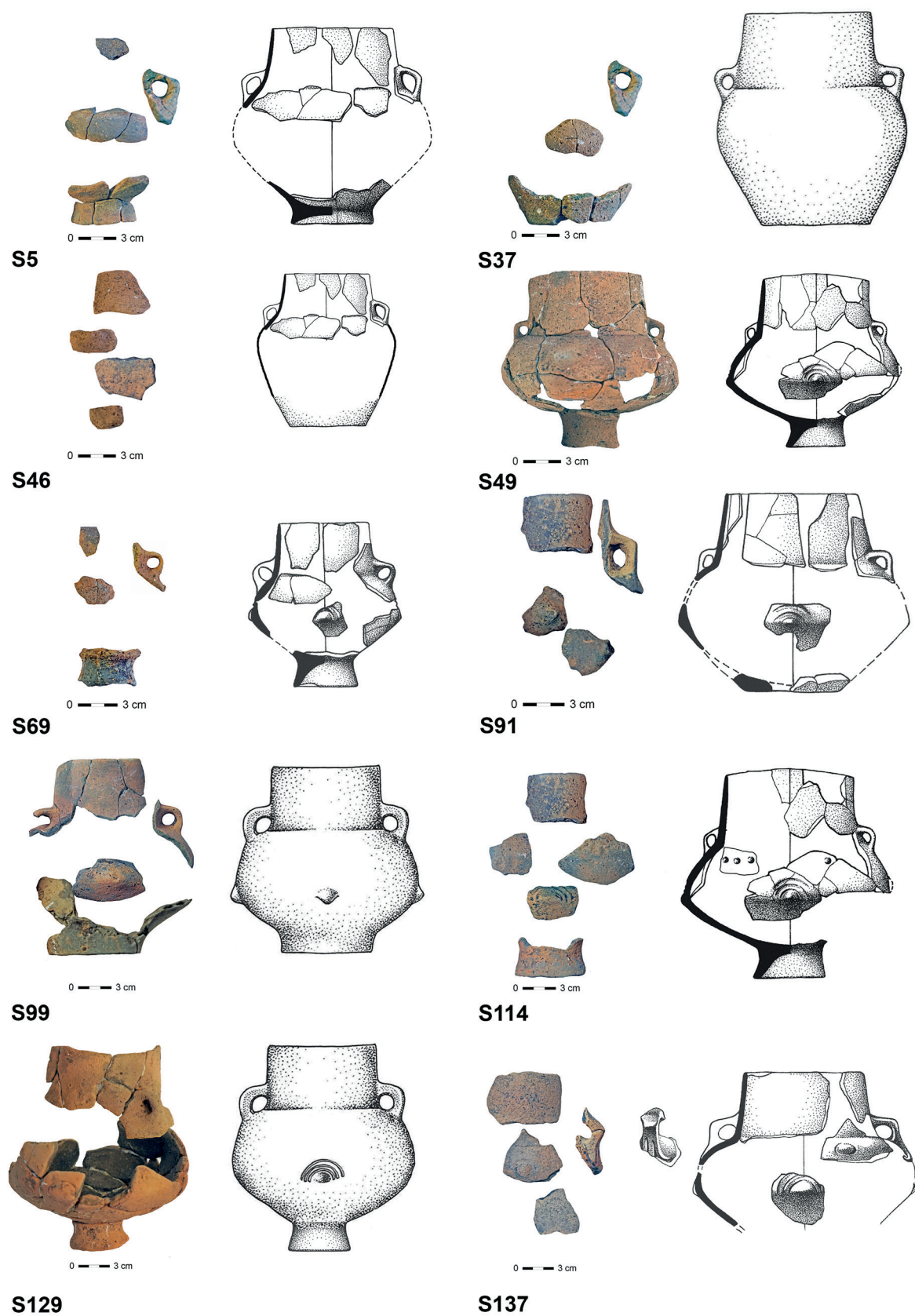


Fig. 4. Photo and drawings of small amphorae from the Maklár-Kospérium cemetery, Graves S5, S37, S46, S49, S69, S91, S99, S114, S129, S137.

In five cases (Graves 5, 49, 91, 137, and 238), biological sex determination suggests that the deceased were female (Tab. 1). Age-at-death analysis indicates that five burials belonged to individuals in the *infans* I–II age categories (Graves 37, 46, 114, 177 and 212). One individual was identified as *juvenis* (Grave 151), one as a young adult (Grave 69), and eight as adults (Graves 5, 49, 91, 99, 129, 137, 192, and 238). In the cases of Graves 209 and 219, sex and age-at-death determinations were not possible.

Bronze grave goods were present in several of these burials and included bracelets, spiral tubes, horse-shoe-shaped pendants, pins, rings, wires and buttons (Tab. 1). In addition, two ceramic beads were recovered from Grave 129, while glass beads were found in Graves 5, 49, 69, 91 and 137. Two urn burials (Graves 46 and 177) and three scattered cremation graves (Graves 37, 114 and 219) contained no grave goods other than pottery.

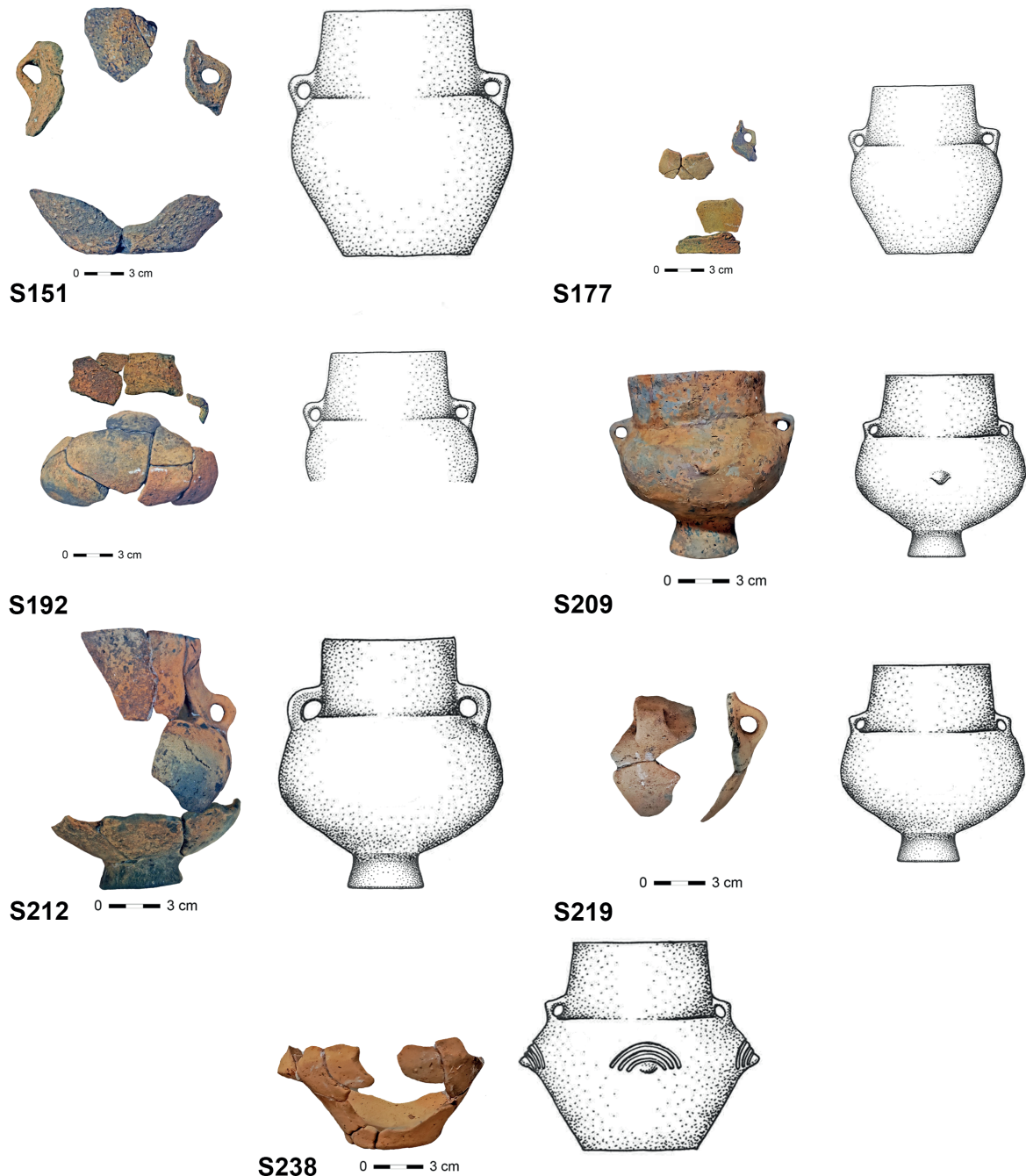


Fig. 5. Photo and drawings of small amphorae from the Maklár-Kospérium cemetery, Graves S151, S177, S192, S209, S212, S219, S238.

With regard to burial rite, nine of the graves containing small amphorae were urn burials, while eight were scattered cremation graves. This distribution indicates that the presence of small amphorae was not dependent on burial rite and other type of grave goods.

Maklár-Kospérium

In the Maklár-Kospérium cemetery, 16 small amphorae were recovered from a total of 121 graves, meaning that approximately 13% of the burials contained a specimen of this vessel type (Figs 6–7). In addition, a miniature vessel was identified in Grave 58 (see S58 on Fig. 6). One small amphora, recovered from Grave 42, originated from a burial enclosed by a circular ditch, which may indicate a distinctive status or role for the deceased individual (Fig. 3.6).

Anthropological data are available for only a limited number of burials from this cemetery, as most of the human remains were already missing at the time of analysis. Graves 80 and 81 were suitable for analysis. In both cases, age-at-death assessment indicates that the individuals were children: approximately 2.5–3.5 years old in Grave 80 and 4–6 years old in Grave 81 (Tab. 2).

Bronze grave goods recovered from graves containing small amphorae include rings, pins, arm- or leg-spirals, horseshoe-shaped pendants, spiral tubes, an awl, buttons, and wires. No ceramic or glass beads were recorded in these graves.

Of the 16 graves containing small amphorae at Maklár-Kospérium, 14 were urn burials and two were scattered cremation graves, suggesting a stronger association between small amphorae and urn burials at this site. However, it should be emphasised that urn burials constitute a higher proportion of the cemetery as a whole (approximately 66%) compared with Maklár-Nagyvér II (approximately 53%). It is also important to note that both cemeteries have been only partially excavated.

Typology and style of small amphorae in Maklár

Pottery style, vessel shape, and decorative elements serve multiple functions, including the communication of social groups, identity, and interaction between communities.³² They may also carry symbolic meanings and provide information relevant to relative chronology. Stylistic traits can spread through various mechanisms that do not necessarily require close social interaction, such as population movement, indirect contact, acculturation, or cultural syncretism.³³ Compared with other aspects of ceramic production—such as raw material selection or forming techniques—style is generally more susceptible to change.³⁴

The small amphorae from the Maklár cemeteries can be divided into four typological categories based on formal characteristics (Fig. 8). All types share several common features, including straight necks and rims and two handles positioned on the shoulder. Type 1 vessels are characterised by a biconical body and a straight or slightly narrowing neck (Fig. 8.1). This type can be further subdivided according to the presence (Nagyvér II: Graves 91, 137, 238; Kospérium: Grave 13) or absence (Kospérium: Graves 18, 30, 79, 102) of a foot ring.

Type 2 vessels have an elongated, barrel-shaped body (Fig. 8.2). Within this type, two variants can again be distinguished based on the presence (Nagyvér II: Graves 5, 99; Kospérium: Graves 10, 42) or absence (Nagyvér II: Graves 37, 46, 151, 177; Kospérium: Graves 21, 50, 73, 81, 103, 120) of a foot ring, although the base of the vessel from Grave 192 at Nagyvér II was not preserved.

32 WOBST 1977; WIESSNER 1983; MACDONALD 1990; PLOG 1990; HEGMON 1992.

33 WOBST 1977; WIESSNER 1983; HEGMON 1992; PARE 1998; DIETRICH 2015.

34 HEGMON 1992; KREITER 2007; SOLNAY 2021; SOLNAY *et al.* 2025.

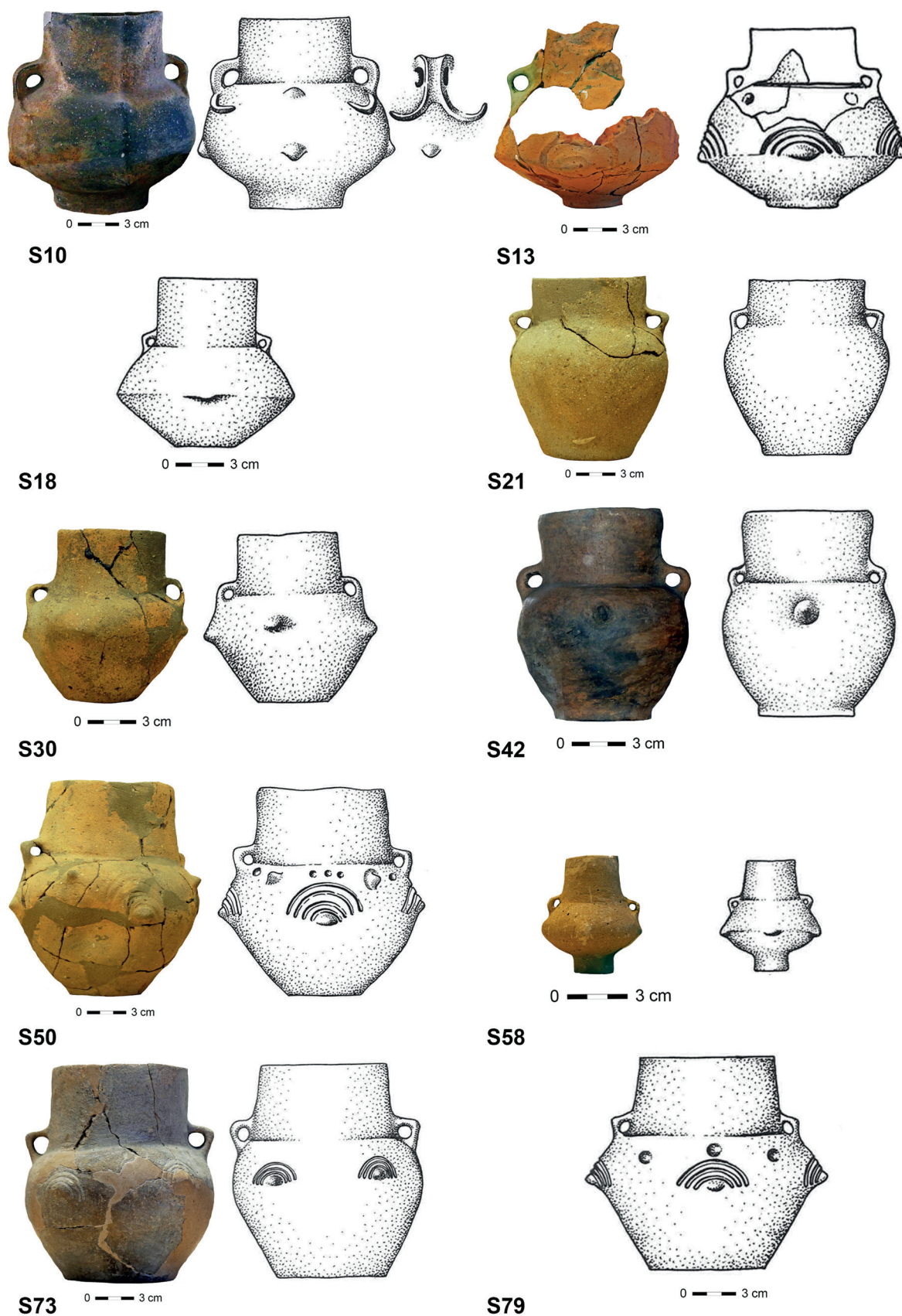


Fig. 6. Photo and drawings of small amphorae from the Maklár-Nagyret II cemetery, Graves S10, S13, S18, S21, S30, S42, S50, S58, S73, S79.

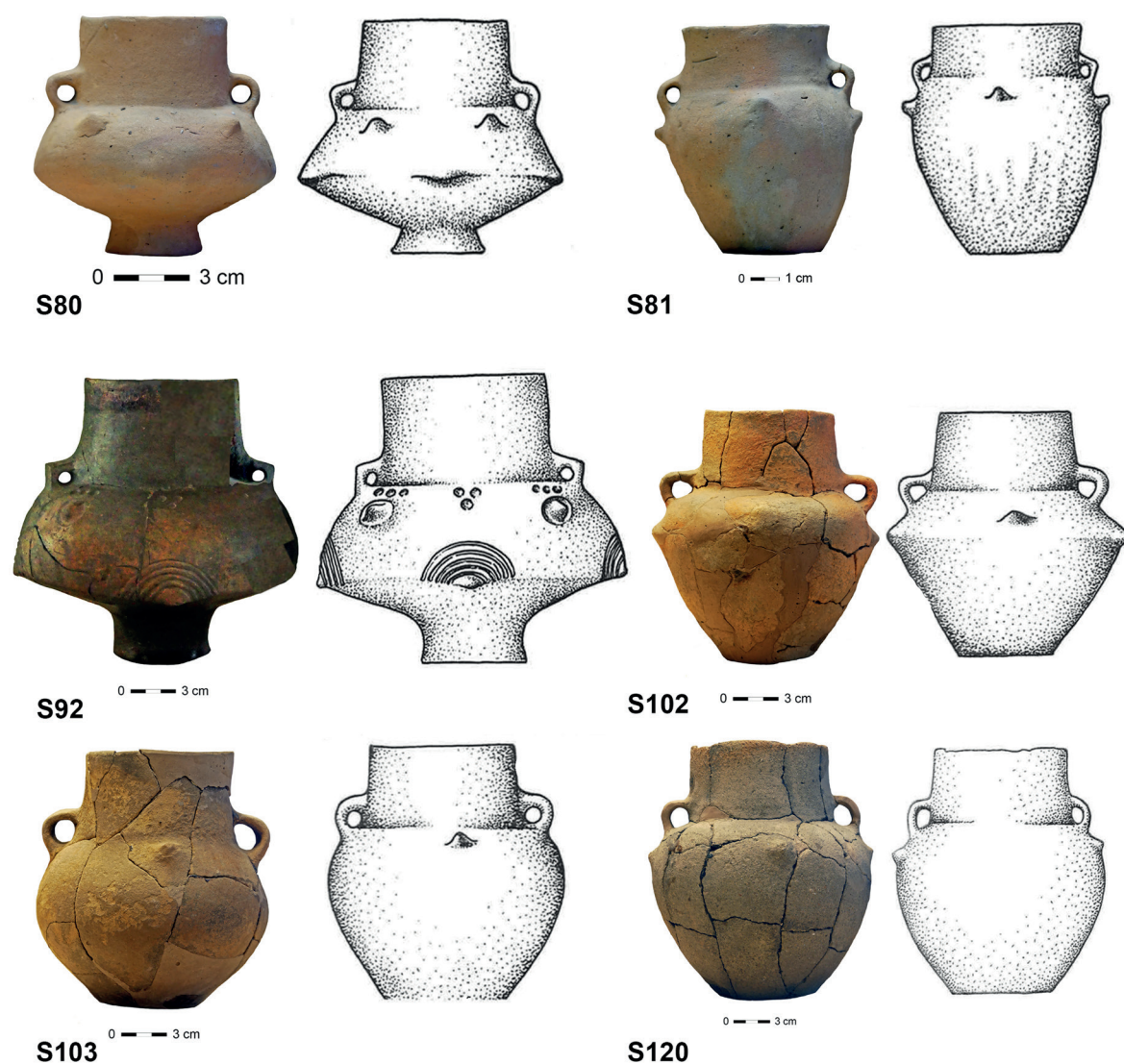


Fig. 7. Photo and drawings of small amphorae from the Maklár-Nagyrét II cemetery, Graves S80, S81, S92, S102, S103, S120.

Type 3 vessels (Kospérium: Graves 58, 92) are distinguished by a sharply tapering base and a bi-conical body (Fig. 8.3).

Type 4 vessels (Nagyrét II: Graves 49, 69, 114, 129, 209, 212, 219; Kospérium: Grave 80) are characterised by a globular body and a pedestal foot (Fig. 8.4). The principal difference between Types 3 and 4 lies in the overall body shape, which is biconical in Type 3 and globular in Type 4, combined with the presence of a pedestal in the latter.

The height of the small amphorae ranges from 9 to 21 cm, excluding a miniature example, which measures only 5.2 cm.

The most common decorative elements are simple bosses and bosses framed by triple arched lines from above, typically positioned on the belly of the vessels (Figs 8–9). These elements may occur individually or in combination (for the latter, see S137 in Fig. 4, S50 in Fig. 6, and S92 in Fig. 7). Lentil knobs are also present on several vessels, usually located on the upper part of the belly below the shoulder. In addition, applied anchor motifs appear on a small number of vessels, positioned at the junction of the handles and the vessel body (see S137 in Fig. 4, S50 in Fig. 6, and Fig. 8).

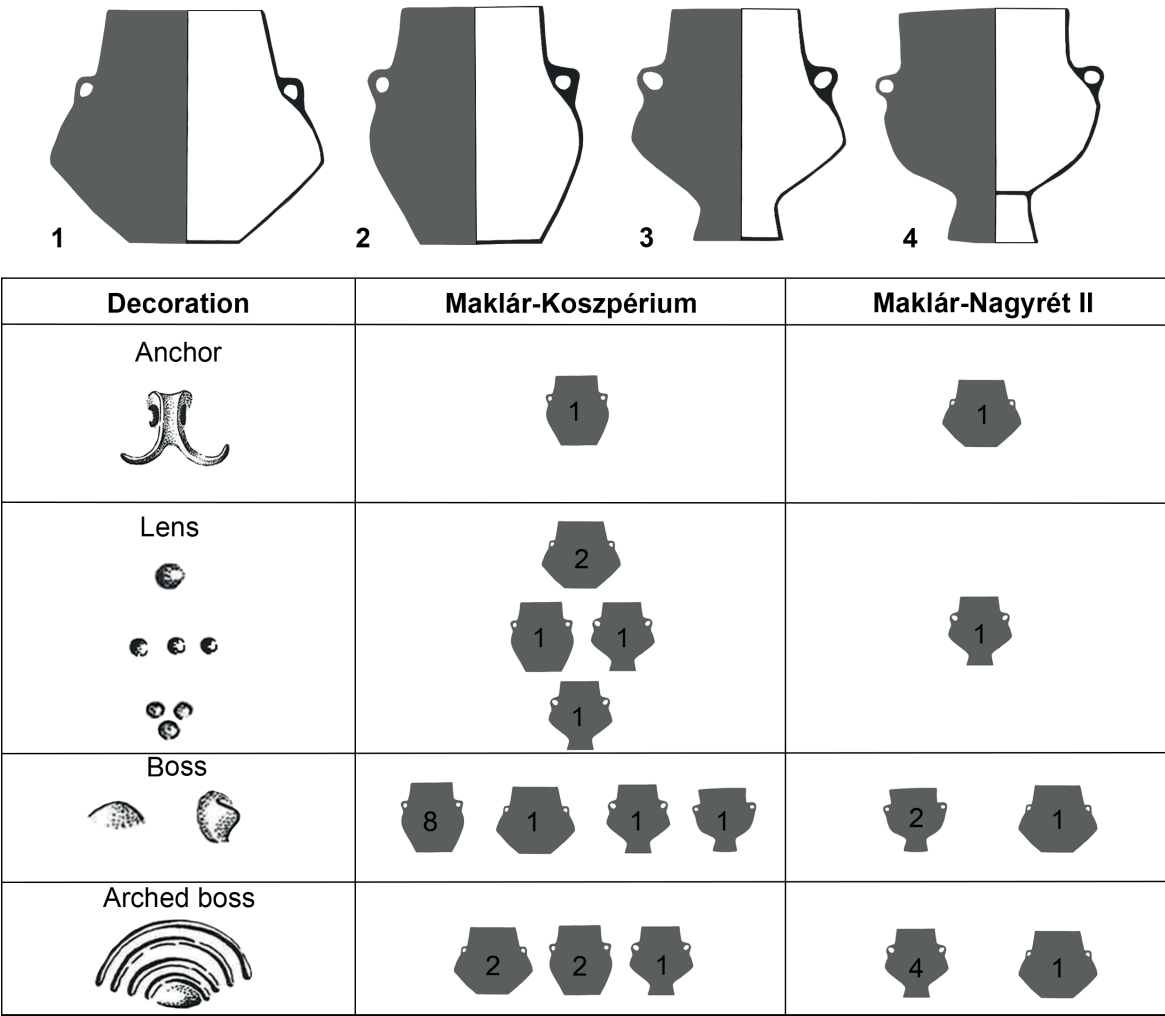


Fig. 8. Small amphorae in Maklár: formal variants and decorations.

Bosses, arched bosses, and lentil knobs are common motifs in the Middle and Late Bronze Age of the Carpathian Basin.³⁵ Applied anchor ornaments, by contrast, are more characteristic of the pottery of the Middle Bronze Age Hatvan culture in north-eastern Hungary³⁶ and occur only rarely in ceramic assemblages attributed to the Tumulus culture.³⁷

Clear differences can be observed in the distribution of typological groups between the two Maklár cemeteries. At Maklár-Kospérium, Type 2 vessels are the most common, accompanied by five examples of Type 1, two of Type 3, and a single specimen of Type 4 (Fig. 9). In contrast, at Maklár-Nagyvér II, Types 2 and 4 are equally frequent, with seven examples each, while three vessels belong to Type 1 and none to Type 3.

With regard to decoration, the small amphorae from Maklár-Kospérium appear to be more richly ornamented than those from Maklár-Nagyvér II (Fig. 9). This observation should be treated with caution, however, as the Nagyvér II vessels are generally more fragmented, which may hinder the identification of decorative elements. At Maklár-Kospérium, bosses are the most frequent decorative motif (11 examples), followed by lentil knobs (5 examples) and arched bosses (5 examples). At

35 KEMENCZEI 1964; KEMENCZEI 1965; BÓNA 1975; P. FISCHL 2006.

36 HEGMON 1992; KREITER 2007; SOLNAY 2021; SOLNAY *et al.* 2025.

37 SÁNTA 2009.

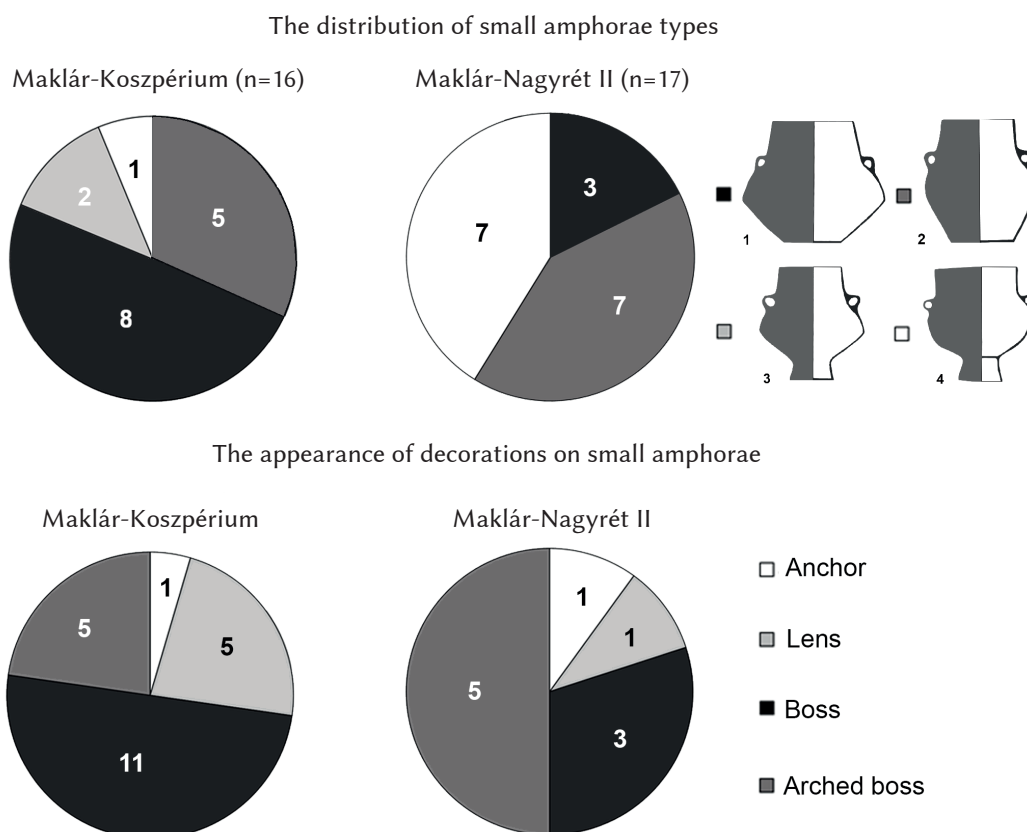


Fig. 9. Distribution of small amphorae decoration variants.

Maklár-Nagyvér II, arched bosses (5 examples) and simple bosses (3 examples) are most common. Notably, applied anchor ornaments occur on one vessel from each cemetery, appearing on a Type 1 vessel at Nagyvér II and on a Type 2 vessel at Maklár-Kospérium (Fig. 9).

Chronology

Based on associated grave goods, including both pottery vessels and metal artefacts, the graves analysed in this study can be assigned to the Br B2–C/D phases, broadly dated to approximately 1500–1300/1200 BC. More precise relative dating is not possible on typological grounds alone. Two graves—Maklár-Kospérium S10 and Maklár-Nagyvér II S137—contained small amphorae with applied anchor ornaments, a motif with clear antecedents in Middle Bronze Age Hatvan culture pottery.³⁸ These vessels may therefore be slightly earlier examples within the overall chronological range.

To refine the chronological framework, AMS radiocarbon dating was carried out on material from the Maklár cemeteries. Six graves containing small amphorae were dated: Graves 80 and 81 from Maklár-Kospérium, and Graves 5, 49, 137, and 209 from Maklár-Nagyvér II. In all cases, cremated bone samples were analysed at the Isotoptech Zrt. laboratory in Debrecen, Hungary.³⁹ The resulting radiocarbon determinations were calibrated using OxCal v. 4.4.4 and the IntCal20 atmospheric calibration curve, with calibrated ranges rounded to five years.⁴⁰

At Maklár-Nagyvér II, three of the dated graves fall within the earlier part of the Tumulus period. Grave 49 yielded a calibrated date of 1505–1405 cal BC, while Grave 209 dates to 1535–1425 cal BC

³⁸ KALICZ 1968; P. FISCHL 2006; MENGYÁN 2019.

³⁹ MOLNÁR *et al.* 2013; MAJOR *et al.* 2019.

⁴⁰ REIMER *et al.* 2020.

(Fig. 10). Grave 5 spans a broader interval, covering much of the Tumulus period (1500–1305 cal BC), whereas Grave 137 appears slightly later, with a calibrated range of 1435–1285 cal BC at 95.4% probability. It should be noted that, in the case of Grave 137, the radiocarbon date does not fully correspond with the relative chronological assessment based on material culture.

The radiocarbon dates from Maklár-Kozspérüm indicate a somewhat later horizon. Grave 80 dates to 1400–1220 cal BC, while Grave 81 produced a calibrated range of 1375–1120 cal BC, both at 95.4% probability. Taken together, the available radiocarbon evidence indicates that small amphorae were deposited in graves at Maklár over a prolonged period, spanning approximately 1535–1120 cal BC (95.4% probability) (Fig. 10).

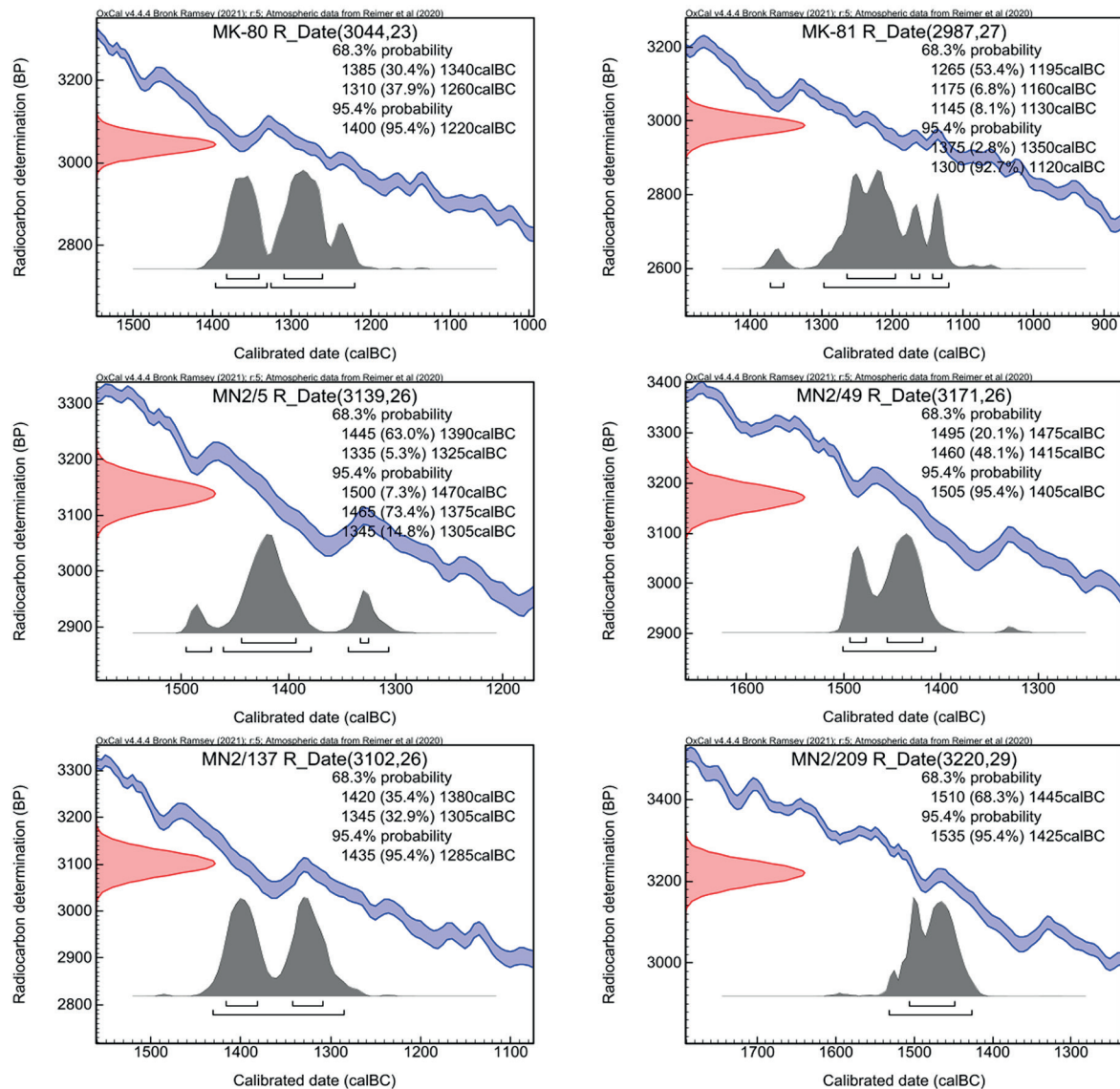


Fig. 10. Radiocarbon dates from graves with small amphorae. Maklár-Kozspérüm: S80, S81, Maklár-Nagy-rét II: S5, S49, S137, S209.

Raw materials

In contrast to stylistic features, the selection of raw materials and tempering practices tends to be more conservative components of pottery traditions in general and is therefore more resistant to

change.⁴¹ Such technological choices are often transmitted across generations and may reflect socially bounded traditions among producers.⁴² As a result, the analysis of raw materials and temper can provide valuable insights into technological practices, organisation of production and social relationships among (not necessarily specialised) craftsman.

From the assemblage analysed in this study, seven small amphorae were selected for thin-section petrographic analysis: six from Maklár-Nagyrét II (Graves 5, 49, 99, 129, 212, and 238) and one from Maklár-Kospérium (Grave 13). At Maklár-Nagyrét II, samples were chosen to represent different typological categories and spatial locations within the cemetery. Where possible, vessels were selected from grave assemblages containing multiple pottery vessels in order to allow comparison of raw materials within the same burial context. The ceramic assemblage from Maklár-Kospérium had been restored using modern clay, which excluded the possibility of destructive sampling; consequently, only a single small amphorae vessel from this cemetery was available for petrographic analysis.

Petrographic analysis was carried out at the Archaeometry Laboratory of the Hungarian National Museum with the aim of characterising raw material selection, clay preparation, and tempering practices. Observations were conducted using Nikon Eclipse LV100ND and Leica DM2700 P polarising microscopes. The identification and semi-quantitative evaluation of non-plastic inclusions followed the guidelines established by the Prehistoric Ceramic Research Group.⁴³

The petrographic composition of the analysed vessels is summarised in Table 3. Due to secondary burning, the observations on their raw material should be treated with caution. All samples were manufactured from lean, sandy clays containing predominantly very fine and fine non-plastic inclusions. The most common inclusions are quartz, feldspars (both plagioclase and alkali feldspar), muscovite mica, biotite, and volcanic rock fragments (Figs 11–12). The fabric of the vessels is generally well to moderately sorted, with medium-sized inclusions occurring only rarely. Coarse inclusions were observed in only one sample, and very coarse inclusions were absent from all analysed vessels.

The overall composition of the fabrics suggests a predominantly local origin for the raw materials, owing to the volcanic rock fragments (rhyolite and dacite tuffs, pumice and volcanic glass). The sandy component of the clays is most likely naturally occurring rather than the result of deliberate tempering, although it is possible that larger rock fragments were removed during clay preparation. There is no evidence to suggest that the clays were subjected to levigation or systematic sieving. Close similarities were observed between the raw materials of the vessels from Maklár-Nagyrét II Grave 238 and Maklár-Kospérium Grave 13, as well as between those from Maklár-Nagyrét II Graves 129 and 209 (Figs 11–12).

It must be emphasized that one sample, the small amphora from Grave 99 at Maklár-Nagyrét II, contains a small amount (approximately 5%) of grog (crushed ceramics) temper.

Firing and secondary burning

Before addressing firing technology, it must be underlined that all small amphorae from the Maklár cemeteries exhibit traces of secondary burning. This secondary exposure to heat complicates the reconstruction of primary firing conditions, as mineral phases may be altered, original diffraction peaks may disappear, and new secondary phases may form.

Macroscopic observation indicates that most vessels display moderate to heavy secondary burning, typically manifested as reddish or greyish discolouration of the surface. Five vessels from the Maklár-

41 GOSSELAIN 1999; GOSSELAIN 2000; STARK *et al.* 2000; GOSSELAIN – LIVINGSTONE SMITH 2005.

42 RYE 1976.

43 PCRG 2010; QUINN 2013.

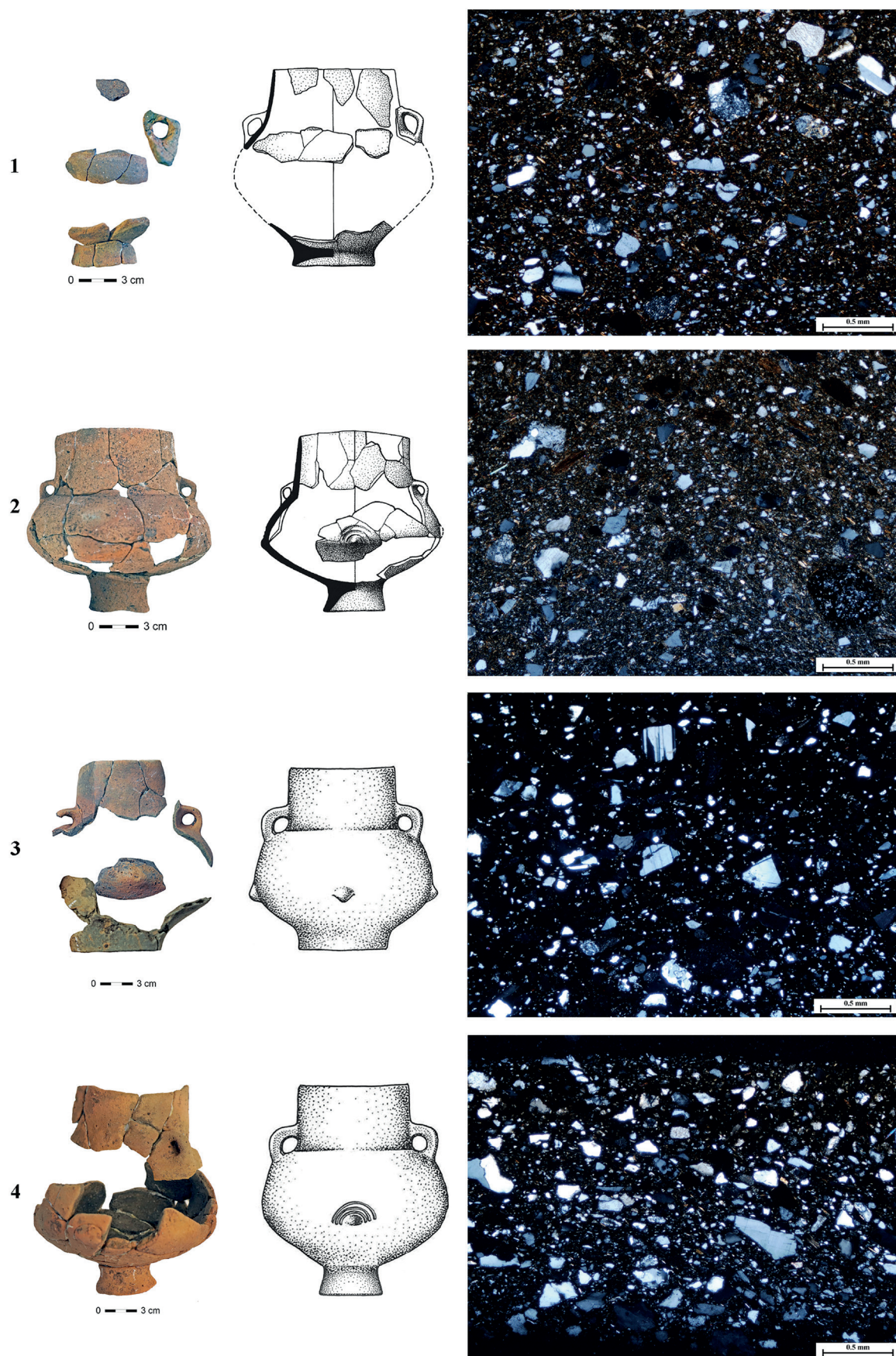


Fig. 11. Raw materials of small amphorae. 1 – Maklár-Nagyret II S5, 2 – Maklár-Nagyret II S49, 3 – Maklár-Nagyret II S99, 4 – Maklár-Nagyret II S129.

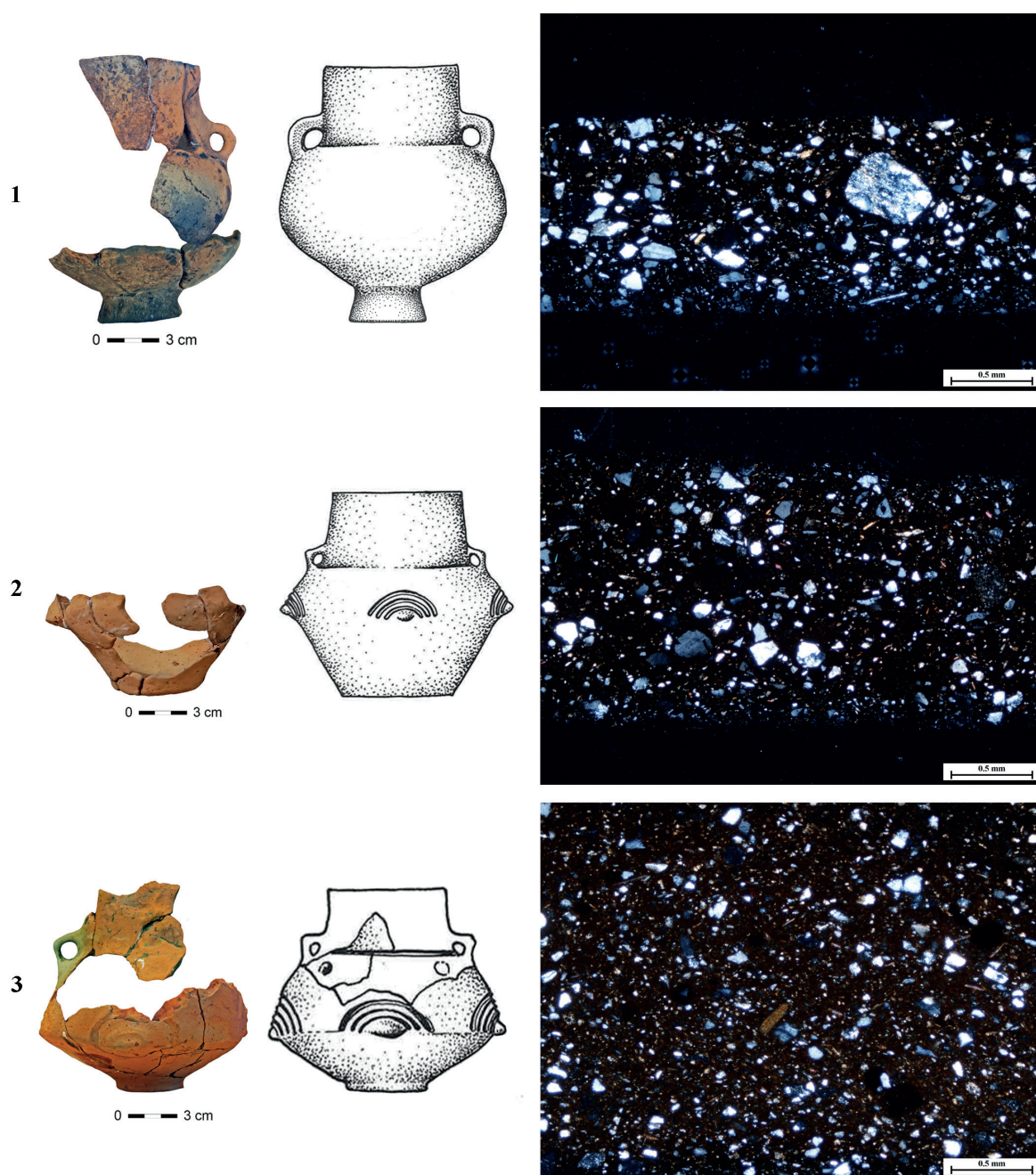


Fig. 12. Raw materials of small amphorae. 1 – Maklár-Nagyrét II S212, 2 – Maklár-Nagyrét II S238, Maklár-Kospérium S13.

Kospérium cemetery (Graves 10, 42, 73, 92, and 120) show only slight evidence of secondary burning; these largely retained their original colour, although partial red, yellow or pale discolouration is visible on their surfaces. Experimental studies suggest that such alterations may result from exposure to temperatures of approximately 650–800°C for a relatively short duration. These vessels may therefore have been positioned farther from the core of the pyre or displaced accidentally during the cremation process.⁴⁴

Several vessels exhibit deformation, most likely caused by prolonged exposure to high temperatures in combination with mechanical stress. Taken together, these macroscopic traces indicate

⁴⁴ GUCSI 2020, 227–228.

moderate to heavy secondary burning, most probably resulting from placement on the funerary pyre during cremation. Experimental archaeological studies suggest that moderate secondary burning is typically associated with temperatures of approximately 800–1000°C.⁴⁵ In the context of a funerary pyre, however, artefacts may shift position during combustion, resulting in variable heat exposure over time.⁴⁶

Heat effects were further assessed by polarising microscopy during petrographic analysis. Optical activity of the clay matrix may indicate exposure to temperatures of approximately 800–850°C or lower,⁴⁷ whereas higher temperatures may lead to optical inactivity and changes in mineralogical composition. In the Maklár assemblage, moderate optical activity was observed in three samples (Nagyvér II Graves 5, 49 and 129), weak optical activity in two samples (Nagyvér II Grave 212 and Maklár-Kozspérium Grave 13), and complete optical inactivity in two samples (Nagyvér II Graves 99 and 238).

Four vessels were subjected to X-ray powder diffraction (XRPD) analysis: Nagyvér II Graves 49, 129, and 238 and Maklár-Kozspérium Grave 13. Samples from Graves 49 and 129 were selected because they showed less intense secondary burning, whereas the vessels from Nagyvér II Grave 238 and Maklár-Kozspérium Grave 13 displayed higher porosity, suggesting stronger heat impact. XRPD analyses were carried out at the Institute of Exploration Geosciences, University of Miskolc, using a Bruker D8 Discover diffractometer (40 kV, 40 mA, Cu K α radiation) equipped with a LynxEye XE-T position-sensitive detector and a Göbel mirror. Qualitative phase identification was performed using DiffracPlus EVA software and the ICDD PDF2-2005 database. This method offers a detailed mineralogical characterisation and may yield data on how the vessels were fired.⁴⁸

The XRPD results identified quartz and feldspars (alkali feldspar and plagioclase) in all analysed samples (Fig. 13). Illite/muscovite peaks, which overlap in the diffractograms, were detected in three samples (Nagyvér II: Graves 49 and 129, and Kozspérium: Grave 13).⁴⁹ The presence of these phases indicates exposure to temperatures below approximately 850–900°C.⁵⁰ By contrast, the absence of illite/muscovite peaks in combination with optical inactivity in the sample from Nagyvér II Grave 238 suggests exposure to higher temperatures, or maybe to longer duration of the heat effect. This interpretation is consistent with the pronounced macroscopic evidence for secondary burning observed on this vessel.

Discussion

A total of 17 small amphorae were recovered from Maklár-Nagyvér II and 16 from Maklár-Kozspérium. Radiocarbon dating demonstrates that the deposition of these vessels spans the entire Tumulus period, with calibrated dates ranging between approximately 1535 and 1120 cal BC. No clear spatial patterning was observed in their distribution within either cemetery. Small amphorae occur in both urn burials and scattered cremation graves and are present across different grave groups, indicating that their use was not restricted to a particular burial rite or cemetery sector.

Typological analysis allowed the identification of four formal categories. Minor differences in the frequency of types were observed between the two cemeteries: Types 1 and 2 are most common

45 GUCSI 2020, 227.

46 FÜLÖP 2019, 301; FÜLÖP 2025.

47 MANIATIS *et al.* 1984; BELFIORE *et al.* 2007; QUINN 2013.

48 MAGETTI 1982; GLIOZZO 2020.

49 GLIOZZO 2020, 260.

50 GLIOZZO 2020.

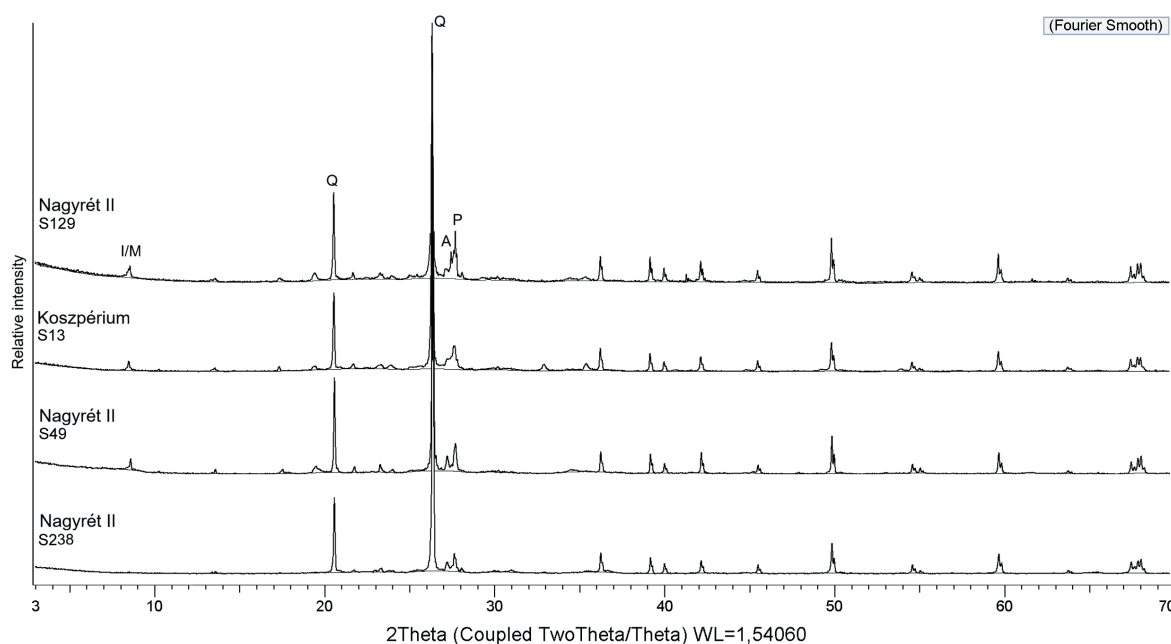


Fig. 13. Diffractograms of small amphorae from Maklár-Nagyvér II: S49, S129, S238 and Maklár-Kospérüm: S13 (major peaks marked: I/M – illite/muscovite, Q – quartz, A – alkali feldspar, P – plagioclase).

at Maklár-Kospérüm, whereas Types 2 and 4 dominate at Maklár-Nagyvér II, where Type 3 is absent. Decorative schemes are broadly comparable at the two sites, although vessels from Maklár-Kospérüm appear more frequently ornamented. This pattern may partly reflect differential preservation, as the vessels from Maklár-Nagyvér II are generally more fragmented. The occurrence of applied anchor ornaments on one vessel from each cemetery suggests continuity with earlier Middle Bronze Age pottery traditions.

With regard to funerary practice, small amphorae were typically placed beside the cremated remains or adjacent to the urn. In one case, a vessel was positioned beneath the urn, suggesting early deposition within the grave, while in another instance a small amphora was placed on top of the urn, implying deposition at a late stage of the burial ritual.

Small amphorae co-occur with a wide range of grave goods, including bronze ornaments, glass beads and, more rarely, pottery beads, although some burials containing these vessels lack additional artefacts beyond pottery. The presence of blue glass beads in several graves is noteworthy, as such items are often associated with high-status female burials during the Tumulus period in Central Europe.⁵¹

All small amphorae from both cemeteries display traces of secondary burning, indicating placement on the funerary pyre during cremation. Among the ceramic assemblages at Maklár, small amphorae represent the vessel type most consistently affected by secondary burning. Petrographic and XRPD analyses indicate that some vessels were exposed to temperatures below approximately 850–900°C, whereas others experienced higher or more prolonged heat exposure. These results are consistent with experimental archaeological observations.⁵² Future controlled experiments may allow the differentiation between the traces and impacts of slight, moderate, and intense secondary burning.

The relatively small size of the vessels, combined with their biconical or globular body forms and straight rims, suggests several potential functions, including the short-term storage,⁵³ the transport of

51 VARBERG *et al.* 2016; MENGYÁN – HRABÁK 2023.

52 GUCSI 2020, 227.

53 BLITZ 1993, 84; SKIBO 1992.

small quantities of liquids and other substances,⁵⁴ or the containment of valuable goods. It is possible that small amphorae held liquids, foodstuffs, or other precious materials that formed part of the funerary ritual or were symbolically linked to the identity of the deceased. Future residue or lipid analyses may help to clarify the original contents of these vessels and their role within mortuary practices.

The raw materials of the small amphorae from the Maklár cemeteries are broadly similar and predominantly sandy, containing mainly very fine and fine non-plastic inclusions. Minor compositional differences, variable quantity of mineral inclusions, can nevertheless be observed. For example, the vessel from Grave 99 at Maklár-Nagyret II was tempered with grog. Low proportions of grog temper have also been identified in the pottery record of other sites attributed to the Tumulus culture.⁵⁵ Given the very small quantity observed in this case, the addition of grog is unlikely to have had any appreciable effect on the physical properties of the clay and may instead reflect the cultural or habitual choices of individual producers.⁵⁶ Overall, the raw material evidence does not suggest standardised or specialised production; rather, the vessels were most probably produced by several different individuals.⁵⁷ These observations will gain further interpretative value once the technological analyses of the complete pottery record of the Maklár cemeteries are available. It should also be borne in mind that all vessels were secondarily burnt, meaning that their raw materials may have been modified by heat exposure, for example through changes in the optical properties of the clay matrix or the appearance or disappearance of specific mineral phases.

During the Tumulus period, small amphorae occurred in cemeteries comparable to those at Maklár, but they are also known from settlement contexts. In funerary assemblages, small amphorae have not been identified at Jánoshida-Berek⁵⁸ or Megyaszó-Halom-oldal dűlő,⁵⁹ while only a limited number of examples are known from the cemeteries of Tiszafüred-Majoroshalom,⁶⁰ Mezőcsát-Hörösögös,⁶¹ and Jobbágyi-hosszú-dűlő⁶² (Fig. 14). It should be noted, however, that most of these cemeteries have not been fully excavated, and that the Jánoshida-Berek site has not yet been completely published. In addition, isolated examples have been reported from the Igrici-Matata cremation cemetery⁶³ and from the wider area of Szentes,⁶⁴ while a further miniature vessel is known from a cremation grave at Üröm-Magyar-Bolgár barátság TSz.⁶⁵

On the southern Great Hungarian Plain, at sites such as Szeged-Bogárczó,⁶⁶ Kiskundorozsma,⁶⁷ and the biritual cemetery of Tápé,⁶⁸ small amphorae occur predominantly in inhumation graves, although they are also present in cremation burials. In these cases, the vessels may have fulfilled a similar function during the funerary process in both burial rites. A further example is known from a pottery deposit

54 HENRICKSON – McDONALD 1983, 634; SMITH 1988, 914.

55 KREITER 2007, 138–140.

56 KREITER 2006.

57 PEACOCK 1982.

58 CSÁNYI 1980; CSÁNYI 2019.

59 KÓSA 2015.

60 KOVÁCS 1975.

61 HÄNSEL – KALICZ 1986.

62 FÜLÖP – VÁCZI 2016, 6. kép.

63 KALICZ 1958, I. tábla 3.

64 NAGY 2005, Fig. 1.1, Fig. 4.1–2, Fig. 5.11, Fig. 10.1, 2, 8, 9.

65 MALI 2021, 125. tábla 25.

66 FOLTINY 1957, Taf. 3.7, 4.14.

67 FOLTINY 1957, Taf. 5. 4, 6, 9.

68 TROGMAYER 1975.

discovered in a pit in the settlement of Domaszék-Börcsök-tanya,⁶⁹ and interpreted as the remains of a communal activity, such as feasting.⁷⁰ As many of these finds have been published only as drawings, traces of secondary burning cannot be assessed on the basis of the available publications.

Another relevant analogy comes from the Budapest-Nagytétény-Érdliget cemetery in central Hungary,⁷¹ where a secondarily burnt small amphora was recovered from Grave 151. Although this burial was described as an inhumation,⁷² no human remains were identified in the grave pit; instead, charcoal, ash and daub-like fragments were recorded, suggesting that fire may have played a role in the funerary rite.⁷³

Small amphorae are also known from the territory of today's eastern Slovakia,⁷⁴ for example from Salka⁷⁵ and Dunajská Lužná (Nové Košariská)⁷⁶ where they occur in both cemetery and settlement contexts.⁷⁷ A recently published example was recovered from the rich grave of a woman on the left bank of the Danube at Šamorín, časť Šámot–Hruškový.⁷⁸ The decoration of this vessel differs from those of the Great Hungarian Plain, and it does not show evidence of moderate or heavy secondary burning.⁷⁹ Comparable vessels are also known from Austria, for example Wetzleinsdorf.⁸⁰ Moreover, small amphorae appear in both cemeteries and settlements of the Tumulus period in the Czech Republic.⁸¹ While most vessel shapes resemble closely those known from the Great Hungarian Plain, their decoration scheme is somewhat different and more varied.⁸² In some cases, semi-arched bosses are present, but most examples are decorated with incised lines forming complex geometric compositions.⁸³ The different design elements are characteristic of that region and support the existence of marked regional diversity in pottery styles during the Tumulus period (Fig. 14). By contrast, small amphorae from Slovakia tend to be less elaborately decorated, most commonly featuring knobs and bosses, completed occasionally with incised lines and dots (Fig. 14). The decoration of small amphorae from the Great Hungarian Plain is comparatively more homogeneous and broadly similar to the Slovakian examples (Fig. 14).

The widespread appearance of this vessel type points to connections and shared or closely related traditions across Central Europe during the Tumulus period, despite considerable geographical distances and the presence of distinct regional groups. Importantly, the use of small amphorae does not appear to have been dependent on burial rite or the type and amount of grave goods, as they occur in both cremation and inhumation graves, and are also known from settlement contexts. In a few cases, such as at Tápé, small amphorae are present in both burial types within the same cemetery.⁸⁴ In addition such vessels appeared in graves of children and adults, as well as women and men.

69 SÁNTA 2020, 11. kép 6.

70 SÁNTA 2020, 153–154.

71 SZILAS 2017.

72 SZILAS 2017, Fig. 19.

73 SZILAS 2017, 235; GUCSI 2023, 407.

74 FURMÁNEK *et al.* 1999.

75 TOČÍK 1964; GODIŠ – HARUŠTIAK 2020a; GODIŠ – HARUŠTIAK 2020b.

76 GODIŠ – HARUŠTIAK 2020b, Obr. 10–11.

77 BENKOVSKY-PIVOVAROVÁ 2015.

78 GODIŠ – HARUŠTIAK 2020a.

79 GODIŠ – HARUŠTIAK 2020a, Tab. 1.3.

80 WILLVONSEDER 1937, Taf. 54.2.

81 LUBOŠ 2008; BENKOVSKY-PIVOVAROVÁ 2015.

82 LUBOŠ 2008.

83 LUBOŠ 2008, Obr. 55.

84 TROGMAYER 1975.

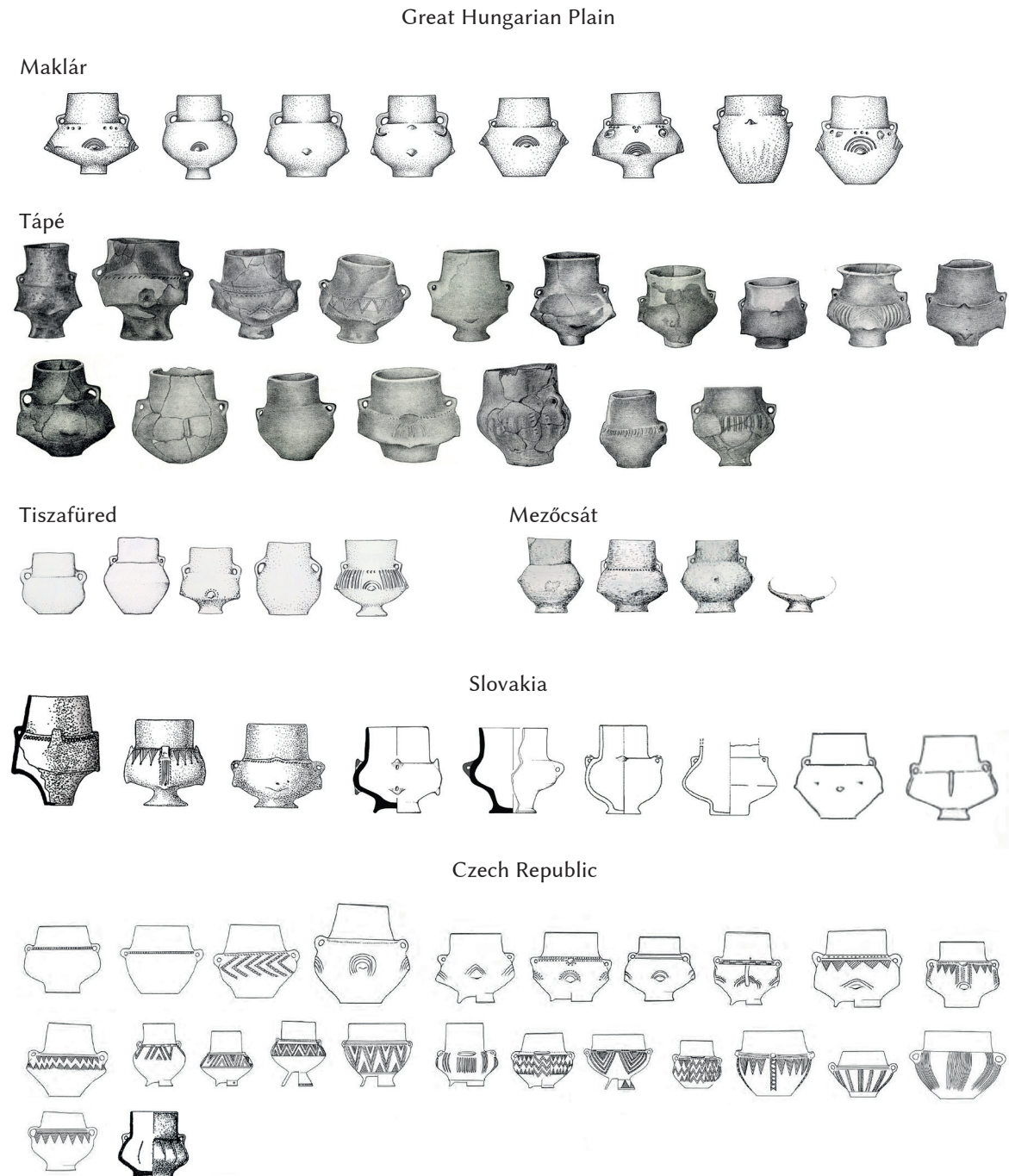


Fig. 14. Small amphorae typical to the Great Hungarian Plain from the sites of Maklár, Tápé (after TROGMAYER 1975), Tiszafüred-Majoroshalom (after KOVÁCS 1975), Mezőcsát-Hörcsögös (after HÄNSEL – KALICZ 1986), and from several sites in Slovakia (drawings after FURMÁNEK *et al.* 1999; TOČÍK 1964; GODIŠ – HARUŠTIAK 2020a; GODIŠ – HARUŠTIAK 2020b; BENKOVSKY-PIVOVAROVÁ 2015) and the Czech Republic (after LUBOŠ 2008; BENKOVSKY-PIVOVAROVÁ 2015).

In north-eastern Hungary and south-eastern Slovakia, small amphorae continue to appear after the Tumulus period, during the late Piliny phase, which may indicate the persistence or transformation of this tradition within funerary practice.⁸⁵ Although most vessel shapes and decorative schemes differ from their Tumulus period counterparts and are more characteristic of late Piliny pottery styles, continuity is nevertheless suggested. For example, in the cremation cemetery of Gelej-Kaná-

85 FURMÁNEK *et al.* 2016; P. FISCHL – GUCSI 2023.

lis dűlő, dated to the Br D–Ha A1 period,⁸⁶ A3-type small amphorae were more frequently placed on the pyre than vessels of other types.⁸⁷ In addition to Gelej, a small amphora has also been identified in a late Piliny burial at the Mezőnagymihály-Nagyecsér-Észak cemetery.⁸⁸

According to G. Sánta, small amphorae represent a characteristic vessel form of the Tumulus period but are not suitable for precise relative dating.⁸⁹ The radiocarbon dates obtained from the Maklár cemeteries support this assessment. These vessels were used during the Br D–Ha A1 period across the Great Hungarian Plain.⁹⁰

Conclusions

In the Tumulus period cemeteries discovered at Maklár, small amphorae occur in four distinct morphological types and display a range of decorative elements, including simple and arched bosses, lentil knobs and, more rarely, applied anchor ornaments. All examples from both cemeteries exhibit traces of secondary burning, most plausibly resulting from placement on the funerary pyre during cremation. This consistent exposure to fire suggests that small amphorae played a specific role within the mortuary ritual, potentially as containers for liquids, foodstuffs, or other valuable substances associated with the deceased or with the funerary ceremony itself.

Analysis of the raw materials indicates that the vessels were manufactured from sandy clays, with only minor compositional differences. This and the presence of grog temper in a single sample suggests production by several producers rather than standardised manufacture. The effects of secondary heating below approximately 850–900°C are evident in the vessels from Maklár-Nagyret II Graves 5, 49, and 129, as well as Maklár-Koszpérium Grave 13, whereas vessels from Maklár-Nagyret II Graves 99 and 238 appear to have been exposed to higher and/or more prolonged heat. Radiocarbon dating indicates that small amphorae were deposited between approximately 1535 and 1120 cal BC, demonstrating that this vessel type was used in funerary contexts throughout the entire Tumulus period. Comparable vessels also occur after this period, in late Piliny culture cemeteries dated to the Br D–Ha A1 phases, suggesting the continuation of this tradition.

During the Tumulus period, this vessel type was present in the territory of present-day Slovakia, Austria, and the Czech Republic. Their wide distribution points to connections and shared or closely related traditions in ceramic use and funerary practice across these regions, linking different communities and social groups.

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86 P. FISCHL – GUCSI 2023; P. FISCHL *et al.* 2023, Fig. 11.9.

87 P. FISCHL – GUCSI 2023, 439.

88 P. FISCHL – HAJDU 2017, 5. kép 3.

89 SÁNTA 2020, 139.

90 SÁNTA 2020, 139; TROGMAYER 1963, Taf. 8.1; V. SZABÓ 2004, 5. kép 7.

material and by László Paja (University of Szeged) for Maklár-Nagyrét II. The drawings of the Maklár-Nagyrét II pottery were prepared by Zita Hrabák (Hungarian National Museum).

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Tab. 1. Data of burials containing small amphorae at Maklár-Nagytrét II.

Grave no.	Burial rite	Age of death	Sex	Grave goods				Absolute date		Position in grave
				Pottery	Bronze	Glass bead	Clay bead	68.3% (cal BC)	95.4% (cal BC)	
5	urn	adult (23–X)	woman	urn, bowl, cup	spiral-tubes, 2 pins, 1 ring	1	–	1445–1325	1500–1305	next to the urn (western side)
37	scattered cremation	infantia 1–2	–	1	–	–	–	–	–	closely next to the human remains
46	urn	infantia 1–2	–	urn	–	–	–	–	–	next to the urn (southern side)
49	urn	adult (23–X)	woman	urn, bowl, cup	spiral-tubes	4	–	1495–1415	1505–1405	under the urn (western side)
69	urn	young adult (17–30)	–	urn, bowl	1 spiral pin, 1 horseshoe-shaped pendant, spiral-tubes	1	–	–	–	closely next to the urn (eastern side)
91	urn	adult (23–X)	woman	urn, bowl, cup	1 bracelet	7	–	–	–	next to the urn
99	scattered cremation	adult (23–X)	–	1	2 pins, spiral-tube	–	–	–	–	closely next to the human remains
114	scattered cremation	infantia 1	–	–	–	–	–	–	–	at the southern side of the human remains, next to a cup
129	scattered cremation	adult (23–X)	–	3	2 bracelets, 1 pin, 2 horseshoe-shaped pendants, 1 spiral-ring, 2 ring fragments, spiral-tubes	–	2	–	–	closely next to the human remains (southwest)
137	urn	adult (30–X)	woman	urn, 3 bowls, cup	1 pin, 1 button, 1 wire	7	–	1420–1305	1435–1285	next to the urn (eastern side) ▶

► Grave no.	Burial rite	Age of death	Sex	Grave goods		Absolute date		Position in grave	
				Pottery	Bronze	Glass bead	Clay bead		68.3% (cal BC)
151	scattered cremation	juvenis (15–22)	–	urn, bowl	1 pin	–	–	–	10 cm away from the human remains
177	urn	infantia 1–2	–	urn, bowl	–	–	–	–	next to the urn (western side)
192	scattered cremation	adult (23–X)	–	1	1 ribbed bracelet	–	–	–	next to the human remains (northern side)
209	scattered cremation	–	–	1	1 pin, 2 bracelets, spiral-tubes	–	–	1510–1445 1535–1425	10 cm away from the cremated remains (south)
212	urn	infantia 1	–	2	1 pin, 3 horse-hoe-shaped pendants, 1 ring, wire,	–	–	–	next to the urn (western side)
219	scattered cremation	–	–	1	–	–	–	–	next to the human remains
238	urn	adult (23–39)	woman	urn, bowl, cup	fragments	–	–	–	next to the urn (eastern side)

Tab. 2. Basic data of graves containing small amphorae at Maklár-Kospérüm.

Grave no.	Burial rite	Age of death	Sex	Grave goods				Absolute date		Position in grave
				Pottery	Bronze	Glass bead	Clay bead	68.3% (cal BC)	95.4% (cal BC)	
13	urn	–	–	urn		–	–	–	–	unknown
18	urn	–	–	urn, 2 bowls, cup		–	–	–	–	next to the urn
21	urn	–	–	urn, 2 cups	pin?	–	–	–	–	next to cups
30	urn	–	–	urn, 2 bowls, pot	ring	–	–	–	–	
42	scattered cremation	–	–	2 cups, bowl	2 rings, 2 pins, 2 spiral arm-guard, 2 horseshoe-shaped pendants	–	–	–	–	next to the human remains
50	urn	–	–	urn, cup	spiral-tube, pin, button, wire	–	–	–	–	unknown
58	scattered cremation	–	–	1		–	–	–	–	unknown
73	urn	–	–	urn, cup		–	–	–	–	unknown
79	urn	–	–	urn, 2 bowls		–	–	–	–	unknown
80	urn	2.5–3.5	–	urn, 3 bowls, cup, miniature vessel	2 rings	–	–	1385–1260	1400–1220	on the urn
81	urn	4–6	–	urn, bowl, cup		–	–	1265–1130	1375–1120	next to the urn
92	urn	–	–	urn	wire, spiral-tube, button	–	–	–	–	slightly on the urn
102	urn	–	–	1		–	–	–	–	unknown
103	urn	–	–	1		–	–	–	–	unknown

Tab. 3. Composition of the analysed small amphorae from Maklár. (VF-very fine, F-fine, M-medium, C-coarse, VC-very coarse, ARF-argillaceous rock fragment).

Sample ID	Total (%)	VF	F	M	C	VC	Max. size (cm)	Average inclusion size (cm)	Temper	Optical activity	Type of inclusions
Nagyréti II S5	29	24	5	<1	0	0	0.68	<0.05	–	moderate	quartz, feldspars, muscovite, biotite, volcanic rock fragments, ARF (<1%), zircon, apatite, zoisite, opaque minerals
Nagyréti II S49	18	13	4	1	0	0	0.91	<0.12	–	moderate	quartz, feldspars, biotite, muscovite, volcanic rock fragments, ARF (<1%), phyllite, zircon, rutile, opaque minerals
Nagyréti II S99	22	18	3	1	0	0	0.74	<0.1	grog (5%)	absent	quartz, feldspars, biotite, muscovite, volcanic rock fragments, ARF (<1%), phyllite, zircon, rutile, apatite, opaque minerals
Nagyréti II S129	31	22	7	2	0	0	0.54	<0.15	–	moderate	quartz, feldspars, biotite, muscovite, volcanic rock fragments, phyllite, ARF (<1%), zircon, rutile, zoisite, opaque minerals
Nagyréti II S212	31	21	8	2	0	0	0.49	<0.2	–	weak	quartz, feldspars, biotite, muscovite, volcanic rock fragments, ARF (<1%), zircon, rutile, zoisite, opaque minerals
Nagyréti II S238	30	20	7	3	0	0	0.22	<0.15	–	absent	quartz, feldspars, biotite, muscovite, volcanic rock fragments, ARF (<1%), phyllite, zircon, rutile, zoisite, opaque minerals
Köszpériumi S13	15	10	4	1	0	0	0.58	<0.05	–	weak	quartz, feldspars, biotite, muscovite, volcanic rock fragments, ARF (<1%), phyllite, zircon, rutile, apatite, opaque minerals