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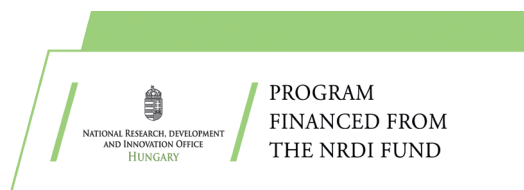
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FROM LOCAL TO MICROREGIONAL AND BEYOND: SPATIAL STRUCTURES IN AND AROUND THE EARLY MEDIEVAL CARPATHIAN BASIN

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31 August–3 September 2022

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TYPOLOGICAL ANALYSIS OF BEADS FROM SELECTED LATE AVAR CEMETERIES

Réka FÜLÖP¹ 

During this study, selected bead material from 172 graves of 17 sites was analysed morphologically. As a result, we created a classification for Late Avar period beads. Compared to earlier Carpathian Basin bead typologies, our approach prioritises the technique of production as the primary factor in classification, with formal characteristics considered secondary. Additionally, the analysis emphasises an overview of the different technological features essential for identifying local bead production. The typology is far from complete and is currently at a research stage but can be expanded with new data.

A tanulmány 17 lelőhely 172 sírjának válogatott gyöngyanyagát vizsgálja morfológiai szempontból, aminek eredményeként a késő avar korra használható osztályozási rendszert kíséreltünk meg kidolgozni. A korábbi Kárpát-medencei gyöngytipológiákhoz képest újdonságnak számít, hogy elsősorban a készítéstechnológia, másodsorban a formai jegyek határozták meg a csoportosítás módját. Az elemzésben emellett nagy hangsúly került a különböző technológiai sajátosságokra, amelyek kulcsfontosságúak a helyi gyöngytermelés felismeréséhez. A megalkotott tipológia messze nem teljes, jelenleg egy kutatási stádiumot képez, de dinamikusan tovább bővíthető újabb adatokkal.

Keywords: *Late Avar Period, classification system, glass beads, Carpathian Basin*

Kulcsszavak: *késő avar kor, tipológia, üveggyöngyök, Kárpát-medence*

Introduction

The archaeological material of the entire Avar Period is characterised by diverse assemblages of glass beads in graves.¹ However, these are not uniform, and one can distinguish between two major groups: those dating to the Early and Middle Avar periods and those from the Late Avar Period. This division is not exclusively chronological but also arises from the emergence of new forms and technologies in the late period which were unknown in the region before. This paper examines this process and the factors responsible for the significant changes occurring in the second half of the Avar period, from the second half of the 7th century. Additionally, we aim to pay an old debt of research by establishing a classification system for Late Avar Period beads.²

The research behind this study involved the analysis of strings of beads from 172 graves of 17 sites and a few stray finds (*Fig. 1*); however, not all graves

with beads from the 17 cemeteries were included. In a round of preliminary selection, only those burials were selected, the finds of which were expected to contain important information about the Late Avar Period; accordingly, while the study contains short references to the Early and Middle Avar periods, these were not an integral part of the analysis. Most processed material comes from five cemeteries (Abony, Kecel, Pilismarót-Basaharc, Halimba, and Üllő), and only a few from each of the rest. The formal, metric, and technological characteristics of 4625 beads and hundreds of fragments were analysed. From a morphological point of view, the selection of samples was based on an intent to examine as many types, colours, and techniques as possible.

The evaluation follows a holistic approach, integrating material from cemeteries from several regions to identify general trends, thus giving a new impulse to the research of Late Avar beads. More complex regional analyses could not be carried

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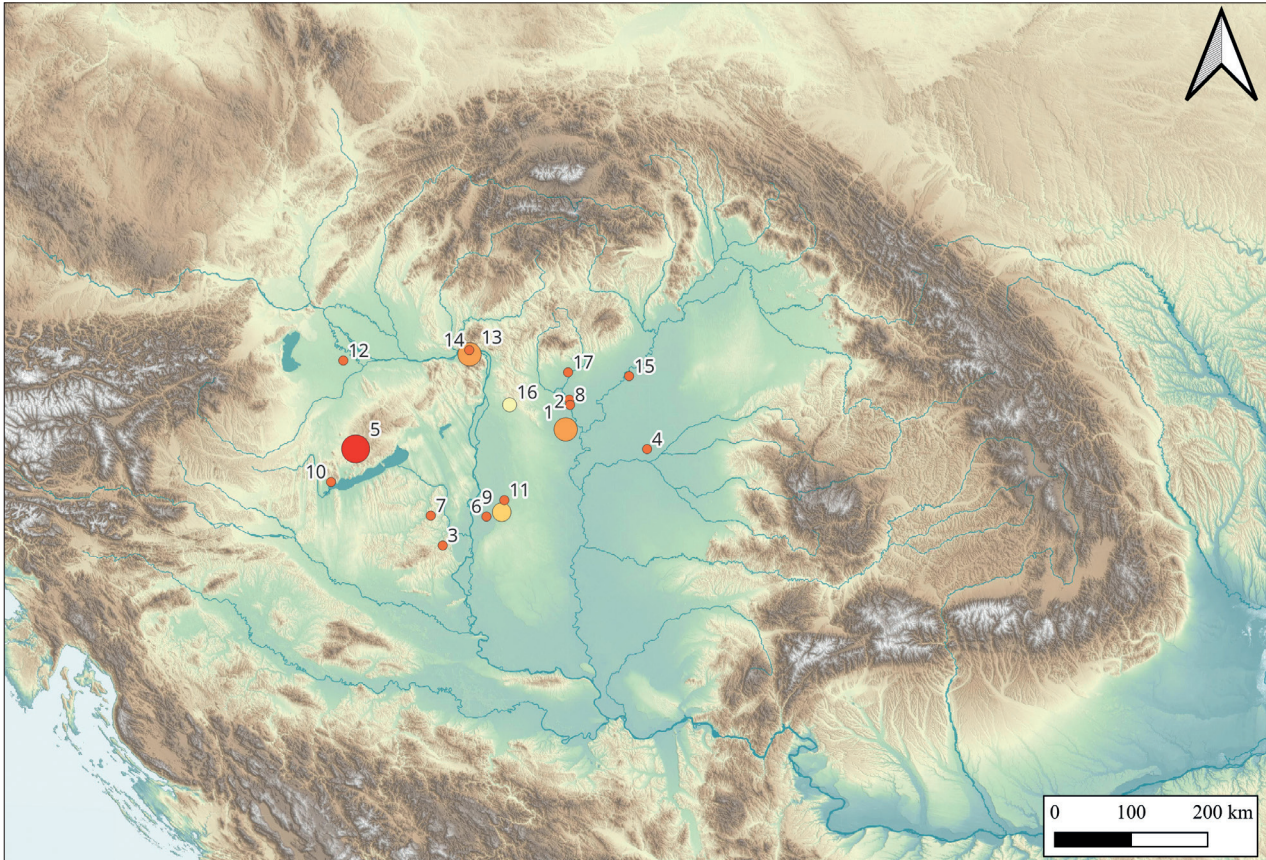


Fig. 1. Location of the sites surveyed (the size of the symbol is proportionate to the number of beads examined)
 1. kép. A vizsgált lelőhelyek elhelyezkedése (a szimbólum mérete a vizsgált gyöngyök mennyiségével arányosan növekszik)

- 1: Abony-Neppel F: field; 2: Alattán-Tulát; 3: Cikó-Fleissig Collection; 4: Dévaványa-Köles-halom; 5: Halimba;
 6: Homokmégy-Halom Hill; 7: Hőgyész-Klimes Street; 8: Jánoshida-Tótképuszta; 9: Kecel-Kiskőrösi Road;
 10: Keszthely-Deák Street; Dobogó; 11: Kiskörös-Pohibuj-Mackó-dűlő; 12: Lébény; 13: Pilismarót-Basaharc;
 14: Szob-Homokok; 15: Tiszafüred-Majoros-halom; 16: Üllő, 17: Visznek-Kecskehegy

out at this research stage, while the presentation of methodological approaches seemed to be a priority. Microregional analyses must be carried out in the future to learn about workshop traditions and develop a more precise chronological framework.

Differences between Early and Late Avar beads

It was clear from the beginning of the research that the difference within the bead finds of the period in focus appear on diverse layers, including wearing style, type, and applied technology (Kovrig 1963, 112–113, 143; Szabó 1969, 46–47). Some important general differences could also be observed between the strings of beads of the first half and the end of the Avar Period. There is a continuity of bead types in the Early and Middle Avar periods. The most characteristic types are eye beads, especially the ones with a reddish background (Fórizs et al. 1999, 87–110).

Beads of this period are more colourful, as well as more uniform and consistent in technological terms, and they come in relatively short strings. Also, the types are more consistently better shaped and the size of similar types is in the same range.³ Ágnes Salamon believes this is because the 6th–7th-century bead fashion originates in the traditions of late antique workshops. In her opinion, the so-called Avar eye beads are not identical to the Merovingian and Lombard beads but cannot be separated from them entirely either, as those are akin to the ones from the Carpathian Basin (Salamon 1977, 241).

Previous hypotheses dated the start of the slow transformation to the last third of the 7th century, when the number of eye beads decreased and the earliest melon seed beads appeared; this latter type had its heyday in the 8th century, taking over the role of eye beads (Pásztor 1995, 79–80; Pásztor 2008, 319). New bead types appeared in the Late Avar

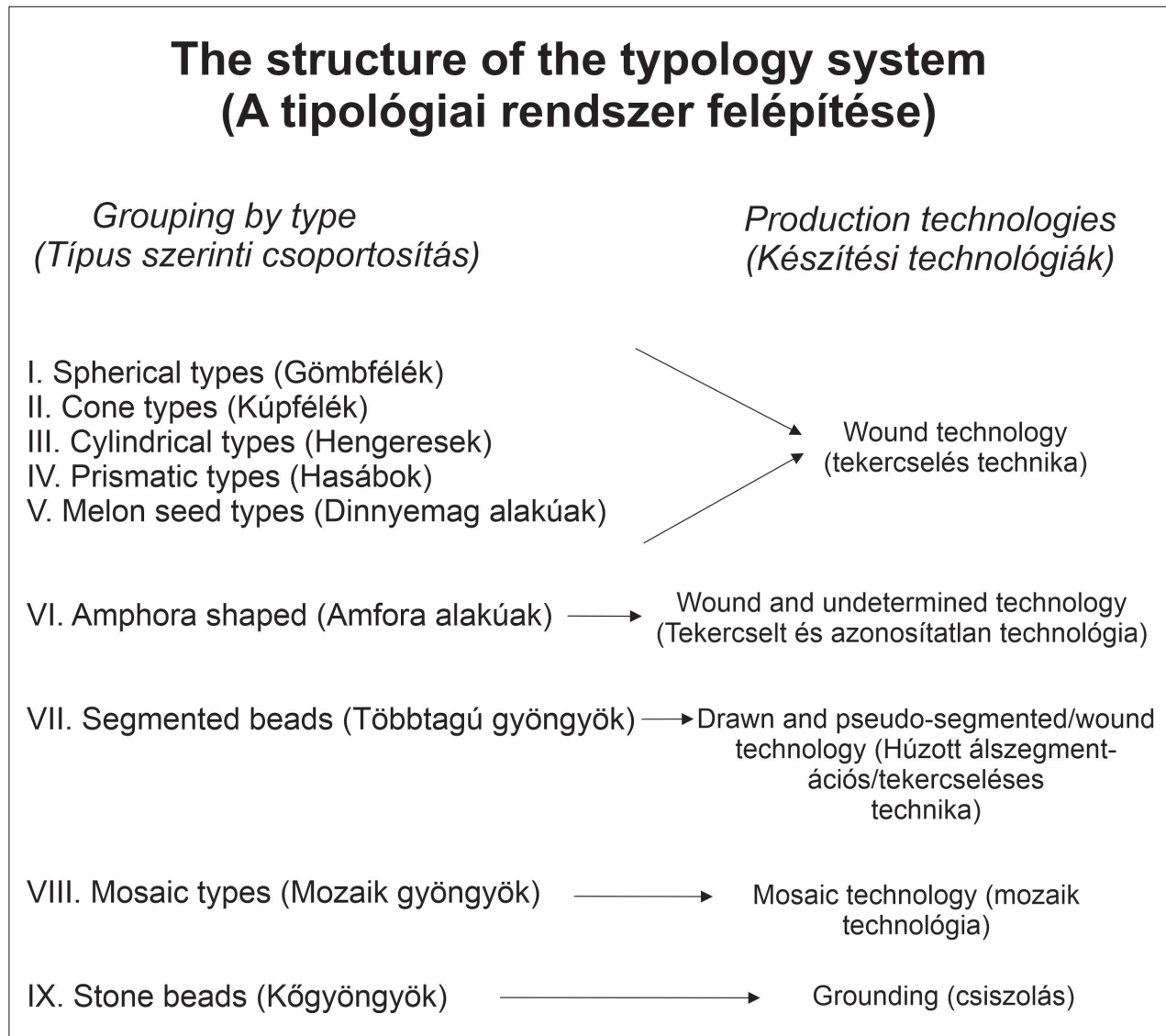


Fig. 2. Structure of the classification system of Late Avar beads
2. kép. Késő avar kori gyöngyök osztályozásának rendszere

Period, such as melon seed beads and new barrel, amphora, millefiori, and segmented bead variants. Late Avar beads are characterised by darker shades and a conspicuously simplified decoration compared to the designs of the previous period. Shape and decoration within a type is not as consistent as in the previous period. For example, when classifying ornaments, the number of eyes adorning a barrel bead is not important because, in many cases, it is not the result of a conscious decision, but something determined by how many fit on the actual bead, and bead sizes also vary randomly. In the first half of the Avar Period, bead types were characterised by varied shapes and colours, which made each bead unique. However, in the Late Avar Period, the differences were mainly technological. The related changes are

not only morphological but – based on the results of Fórizs and Staššiková-Štukovská, Plško (Staššiková-Štukovská, Plško 1997, 259–274; Fórizs et al. 1999, 100–101) – also concern glass types.

Several interpretations of these differences have been born; some find the causes in the changing political-socio-economic relations or an assumed cultural and wear-historical development, which brought about some changes in the fashion of the era (although no specific factors are mentioned, see Pásztor 1996, 195). Therefore, it has remained a question whether the observed transformation is simply a fashion phenomenon or whether there is a more complex process behind it. This paper is an attempt to provide a more comprehensive interpretation of the changes observed in the bead finds and

to investigate the specific events that caused them; their understanding requires a full morphological analysis of the selected beads.

A typological system of Late Avar Period beads

All beads underwent a two-phase processing, starting with their description, followed by a typological classification. Each bead was classified based on its attributes. The description was based on Szilágyi's model (Szilágyi 1994, 77–82): the material, shape, decoration, technical marks, and colour of each bead were examined and coded individually, building up into a numerical code, which enabled us to avoid long descriptions while also enhancing data transparency and comparability. Metric data and the description of both ends of the perforation were also recorded in this phase. In the second, typological phase, all beads were categorised by their common features and classified in the developed typological system. In this respect, two approaches could be adopted: focusing exclusively on shape, as customary in our region (Szilágyi 1994, 88–91; Pásztor 1996, 203–205) or developing a technology-based classification, as considered suitable by international research (Karklins 2012, 63–80; Kidd, Kidd 2012, 42–47). Compared to the typologies used in our region, a much greater emphasis should be placed on technological analysis and technology-based classification; however, our record is unsuitable for making distinctions like Kidd and Kidd and Karklins did, as about 80–90% of the beads known from the Carpathian Basin were produced the same way. Considering cultural and territorial characteristics is crucial when developing a typological system. Therefore 'mixed method' refers to the following approach: beads made by winding (the most common production technique) have been classified by shape into different sub-categories (Fig. 2. I–V) and similarly, beads made of different materials using different techniques (stone, mosaic, and drawn glass beads) have been arranged in separate main groups (Fig. 2. VI–IX).

The main groups were developed by considering three factors: material, technology, and form, as material often determines form and technology and vice versa, resulting in distinct artefacts. Dealing with the three other considered aspects (decoration, colour, and size) was more complex. As colour always counts as a variation, it was not coded. Melon seed beads were also distinguished by size, as their size and form were observed to be connected

– a link not present in the case of spherical beads. Decoration always represents only variation. It must be stressed that the developed typology is not considered complete but reflects the current state of research, and refining type definitions will certainly be necessary in the future in light of new results. Currently, the system holds nine main types (marked by Roman numerals), several subtypes (marked by Arabic numbers), and main variants (marked by letters and Arabic numerals), which may have several sub-variants (not marked). As most beads were shaped individually, each of them is unique, and, as even the most skilled craftsman could not have made all of these tiny objects perfectly identical, they may feature slight differences in shape and decoration. These, as irrelevant, were omitted from the classification criteria, and the developed system incorporates only significant tendencies.

Results of the typological classification

In this part of the paper, the results of the typological analysis are presented by category. Each main group was analysed according to technology, colour, and decoration. We have also tried to give space to chronological issues, among others, although the investigation of these is worth of a separate study. Typochronological analysis is the backbone of research on the period in focus, especially in the context of Late Avar cemeteries, the graves of which typically hold few finds of a considerable dating value. Consequently, the biggest expectation the research of beads has to meet today is specifying bead typochronology to make this find group a suitable tool of dating. However, as beads can also provide multi-faceted results, applying a comprehensive approach to their assessment is fitting.

Spherical beads (Fig. 11: I.1.A-1-I.4)

One of the most common bead shapes of any historical period and the easiest to make. Spherical beads were made by winding. More than a third of the beads examined are spherical, rather uniformly looking, with most pieces belonging to type variants I.1.B, I.3, and I.4. I.2; these appear mainly in the earlier period and are relatively rare in the analysed record. These frequent types are all black and yellow or adorned with yellow eyes and wavy lines against a black background, i.e., bear a simplified decoration. Type variant I.1.B-2 is specific to the bead record of the Halimba cemetery. The shape of these beads is

often clumsy and imperfect. Types I.3 and I.4 have been classified based not only on shape but also on size and the characteristic perforations with a rectangular cross-section, indicating the shape of the iron mandrel used for winding (with a rounded and tapered end and a rectangular-profile upper part). The size of Early and Late Avar spherical beads also differs considerably: while the Early Avar Period record is characterised by large, coloured, ornate beads, in the Late Avar Period, small oblate spherical and melon seed beads are predominant. Type variant I.1.B was often strung together with melon seed and millet bead variants. However, yellow and black melon seed beads were also combined with large biconical and eye beads. Melon seed bead variants appeared first in the second half of the 7th century at the latest (they spread quickly and widely; see Kovrig 1963, 143; Szabó 1969, 47; Pásztor 1996, 199), and remained popular until the end of the Avar Period. Complete strings were strung mainly of spherical and melon seed beads throughout the Avar Period, while other types were usually strung mixed. Compared to the bead record of other periods, the proportion of Avar Period spherical beads is not outstanding, partly because melon-shaped bead variants replaced the earlier types in the last third of the 7th century (Kovrig 1963, 164; Pásztor 1996, 199).

Conical beads (Fig. 11: II.1.A-1–II.2.B-1)

Conical beads were also made by winding up a glass thread on a mandrel and shaping it with a tool. Data on such beads in the Late Avar Period are extremely scarce; they comprise little more than 0.5% of the studied material. Wound beads were rather widespread, but their proportion in the records of the examined cemeteries is low. A.II.1.A-type beads are highly irregular; most have no colouring or decoration, which makes them the perhaps least aesthetic variants, and their shaping shows little care. II.1.A-2-type beads are remarkable for their technological details, as the winding marks are clearly visible on them. Their shaping was certainly conscious, as the glassmith was careful not to heat the glass to the point where the winding threads fuse, thus achieving a more segmented result. As no such beads are known from the early period, this form and technique can be considered Late Avar features. The analysed bead record also contains some biconical beads, but their proportion within the cemeteries is also low, and they were less widespread in the Late than in the first half of the Avar Period. Many such

beads appearing in a Late Avar context are actually earlier pieces that remained in use (for their dating to an earlier period and a discussion of their formal predecessors, see Kovrig 1960, 163; Kovrig 1963, 113; Pásztor 1996, 199; Pásztor 2012, 482).

Cylindrical beads (Figs. 11–12: III.1.A-1–III.5.C)

Cylindrical beads were also made by winding; they represent nearly 5% of the examined record. Common subtypes include III.1.B and III.1.C. Subtypes III.3.A-1 and III.3.A-2, together with melon seed beads, are among the most characteristic Late Avar types but have received much less attention. They are also typical of the latest Avar Period and certainly remained in use until the beginning of the 9th century, as evidenced by several graves where such beads have been found together with melon seed, amphora, mosaic, and metal foil beads (e.g., Pilismarót, Grave 43 and Tiszafüred, Grave 1190). Cylindrical beads come in various sizes and decorations; some are thinner, others smaller or longer. They are relatively roughly shaped, mostly with simple decoration, mainly simple line patterns, diverse wavy line combinations, and often eyes. Cylindrical beads are relatively common even in the territory of Moravia (Staššíková-Štukovská 2017, 369–370). Types III.4 and III.5 follow Late Roman traditions; these were certainly not produced at the end of the Avar Period but earlier and remained in use for a longer period or were obtained by grave plundering. Their proportion in the Late Avar bead record is negligible, corroborating this hypothesis. White and, rarely, blue III.5.C-type beads appear most often in bead-pendant earrings; their proportion in the dataset is also marginal.

Prismatic beads (Fig. 12: IV.A-1–IV.B.2)

All prismatic beads in the analysed record were probably imported to the Carpathian Basin. However, they must be distinguished from the imported beads that appeared from the end of the 8th century onwards (for a case study of this phenomenon see Neri et al. 2019, 1107–1122), which, without exception, are present in the bead record from Late Roman times until the end of the 8th century, but not continuously: typically, each variant appears for only short periods and keeps disappearing and reappearing again and again (regarding the use of beads in chronological interpretation see Čilinská 1966, 158–159; Szabó 1969, 46–47). The workshops where these beads were made – presumably in the Middle East –

had probably been established in the Late Roman Period and remained in operation after the empire was reorganised. The periodic reappearance of these bead types over several centuries may be related to the trade connections established with various communities in the Carpathian Basin, with Byzantium playing a mediating role in commerce. The chronology of these beads is sketchy because they were produced and imported for a long time, and only a detailed analysis could unravel the differences based on which they could be assigned to distinct horizons between the Roman Period and the 8th century. It is difficult to decide whether the pieces from an 8th-century context are traded goods, come from a plundered grave, or remained in use for a long time. Quantitative data cannot help us answer that as the type can be considered rare in the Late Avar Period, its count and distribution being insufficient to hint at active trade. Thus, a chronological classification can only be achieved through a complex analysis involving several periods. These beads are well-shaped, mainly light blue or light green. The vividness of the colours and the good quality and homogeneity of the glass⁴ suggest that they may have been brought to the Carpathian Basin from advanced workshops. Such colours often appear with other, sometimes less well-formed types, perhaps made by remelting and reprocessing imported beads locally.

Melon seed beads (Figs. 12–13: V.1.A-1–V.3.B-4)

This type was the most abundant, with a total of 1,802 intact specimens in the dataset, into which a large number of fragments were not included as it would have been difficult to estimate the original numbers. Even though they represent a distinct major group in the archaeological record of Avars, the typology of melon seed beads is the most unexplored. It is the most heterogeneous main group, which can be divided into several formal and technological subtypes and variants – far from being as uniform as it often appears in bead descriptions.⁵ The melon seed shape was also present in the Roman Period (Kovrig 1963, 164), but did not become as distinctive as in the Late Avar Period. Morphologically, melon seed beads are very varied and bear many marks, indicating that they were not made by highly skilled craftsmen. Type definitions have been made based on formal and technical characteristics, as the two aspects cannot be separated in many cases. As these beads also vary greatly in size, they were classified into three categories: elongated, large-medium, and small. Each was

subdivided into subtypes based on technological characteristics and decoration (ridged, segmented, with crimson hairlines, or metal tubes), which often appear combined; therefore, a distinct sup-type was created for each variation. Size was included in the classification of melon seed beads because of its tendency to determine shape, unlike in the case of spherical beads. The size of melon seed beads varies widely. They are usually monochrome, typically black or dark green, with different shades of blue; they were made mostly of inhomogeneous glass.

This type was made by winding a glass thread around an iron mandrel, compressing it with a tool to create a flat bead resembling a melon seed, and shaping it further with a tool (Staššiková-Štukovská 2017, 367). There is also evidence of unique methods to make melon seed beads, e.g., using metal tubes in the perforation of the beads (*Fig. 3*), a technique discovered during the morphological analysis of mainly fragmented pieces, as the perforation could not be examined in most opaque and intact beads. Interestingly, most beads with a metal tube are melon seed beads, the solution rarely occurring with other types (even type I.1.B), indicating that it is typical to melon seed beads. Altogether, 315 of the 1,802 melon seed beads (more than 17%) had copper tubes – not a relatively high percentage, but considering that almost all fragments had metal tubes, this number may be very distorted as the holes in intact and opaque beads cannot always be examined. Conclusively, metal tube bracing may be present in a considerably higher proportion of melon seed beads. Longitudinal fractures are common in these beads, and the presence of a metal tube would also explain why most fragmentary beads belong to the melon seed group (Frey, Greiff 2009, 375). The fragments are unsuitable for a statistical evaluation; however, the high number of metal tube beads shows that the use of copper tubes was probably widespread in the period. Even though the metal tube disrupts the structure of the glass and makes these types fragile, it has its advantages from an archaeological point of view as, uniquely, the metal promotes the preservation of the original textile threads on which the beads were strung.

The question of the functions of the metal tubes also arises. Having been treated at a specific temperature, copper acquires a red shade; considering no other method was employed in the Late Avar Period to make red glass beads, it cannot be excluded that the copper tube served as colouring, thus achieving



Fig. 3. Metal tubes in the perforations of beads. 1: Abony, Grave 10: the metal tube is longer than the perforation; 2: Abony, Grave 142: a different type of bead with a metal tube; 3: Abony, Grave 146: the copper tube still has its reddish shine; 4: Halimba, Grave 17: dark metal tube in a translucent bead; 5: Halimba, Grave 53: metal tubes in beads of other colours; 6: Kiskőrös, Grave 2: thread preserved by a metal tube; 7: Abony, Grave 287: black remains of the metal tube used for winding; 8: Jánoshida, Grave 141: the characteristic fracture line of metal tube beads; 9–10: Pilismarót, Grave 16 and Keszthely, stray find: corrosion and characteristic reddish colour of the metal tubes; 11: Pilismarót, Grave 22: the high degree of fragmentation of metal tube beads

3. kép. Fémcsövek a gyöngyök furataiban. 1: Az abonyi 10. sírban a gyöngy perforációjánál hosszabb fémcsövet használtak; 2: az abonyi 142. sírnál a technikát más típusú gyöngyön alkalmazták; 3: az abonyi 146. sírnál a fémcső megőrizte vöröses színét; 4: a halimbai 17. sír áttetsző gyöngy fémcsöve sötét színű; 5: a halimbai 53. sírnál a technika más színű gyöngynél is megjelenik; 6: a kiskőrösi 2. sírnál a fémcső megőrizte az eredeti fűző fonalat; 7: az abonyi 287. sírnál a tekercesléshez használt fémcső fekete elszíneződést hagyott; 8: a jánoshidai 141. sír fémcsöves gyöngyeinek jellegzetes törésvonala látható; 9–10: a pilismaróti 16. sírnál és a keszthelyi szórvány gyöngyöknél a jellegzetes vöröses fémcsövek láthatók; 11: a pilismaróti 22. sírnál a fémcsővel ellátott gyöngyökre jellemző a nagyfokú töredezettség

the desired effect using an easy-to-apply technique (Frey, Greiff 2009, 376). However, the theory that the copper tubes were mainly used to the beads for decorative purposes does not explain the presence of such opaque beads as, in their cases, the copper tubes are not visible at all, so adding them seems a waste of material and effort. Could they have another function? Melon seed beads are mainly irregular, slightly deformed, and less finely crafted, showing no sign of a high technical skill of their makers, and exactly that is why the copper tube may have had a practical function. Presumably, glassmiths rolled a copper sheet on a metal rod to facilitate the removal of the beads from the mandrel after winding. The iron rod was needed during winding because it adheres to the glass when hot, so the glass becomes easy to shape, and when the mandrel cools down and shrinks, the beads can be removed with a sharp blow. Although demanding on materials, the use of copper sheets may have partly facilitated the removal of the beads from the iron rod without damage and may have even accelerated the bead-making process slightly (Frey, Greiff 2009, 377). Although the function of the copper tubes in the perforations has remained unidentified, one cannot rule out the possibility that the technique was popular because of its dual function – facilitating an important stage of bead-making and serving as a decorative element. This technology does not seem to have been known in the advanced oriental glass bead workshops of the time. As for the spread of the technique, it seems to have been the most practised in Central Danube Basin; however,

as the topic is poorly researched, one must resort to any opinion cautiously. The technique seems to have appeared earlier in other regions (Frey, Greiff 2009, 373) and became widespread only in the Carpathian Basin in the Late Avar Period. It has remained a question when the Avars started adding copper tubes to their beads. Since the technique appears mostly in melon seed beads, it may be correct to reckon with its use from the emergence of that type.

Another technological detail was observed during the study of melon seed beads. It is commonly called the ‘hairline effect’ by research and appears in the form of crimson hair-thin lines on the beads (Fig. 4). More than 7% of the examined melon seed beads feature traits of this unique technology. As the hairline effect and the copper tube technology sometimes occur on the same bead, the two technologies were not mutually exclusive, which is particularly important because both represent possible methods of imitating a red bead. Hairline effect technology was typical of the Central Danube Basin; it is also widespread in the Avar bead record (Stassiková-Štukovská, Plško 2015b, 279–280).

Melon seed beads first appeared in the last third of the 7th century and remained in use uninterrupted until the end of the Avar Period. Some are known from earlier 7th-century context; however, the examined record does not support Ilona Kovrig’s hypothesis that translucent, small beads with a metal tube core were older than the larger, dark variants (for the dating of melon seed-shaped beads to the last third of the 7th century, see Kovrig, Korek 1960,

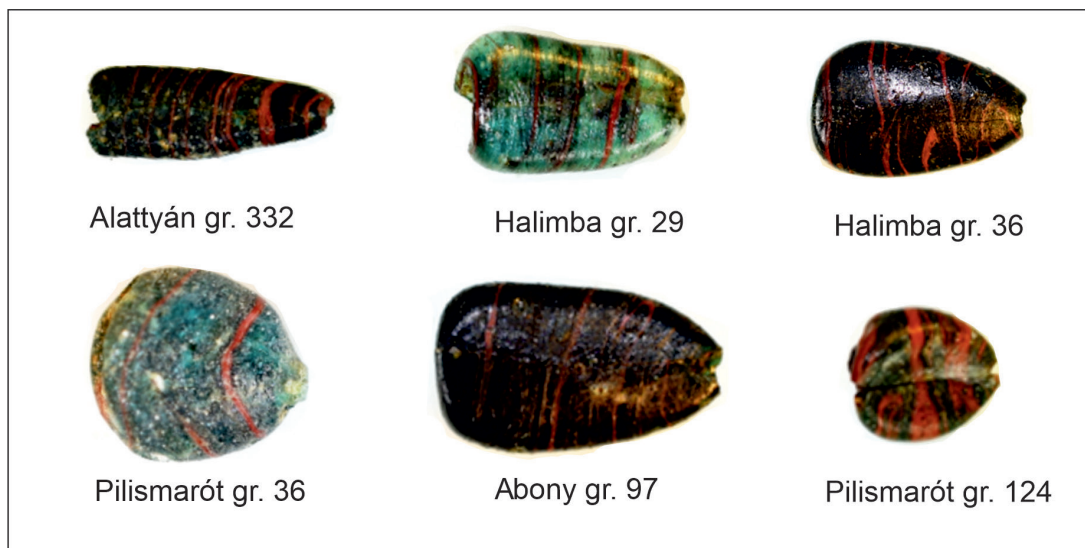


Fig. 4. ‘Hairline effect’ on melon seed beads
4. kép. Hajszálvékony vörös szállak a dinnyemag alakú gyöngyökön

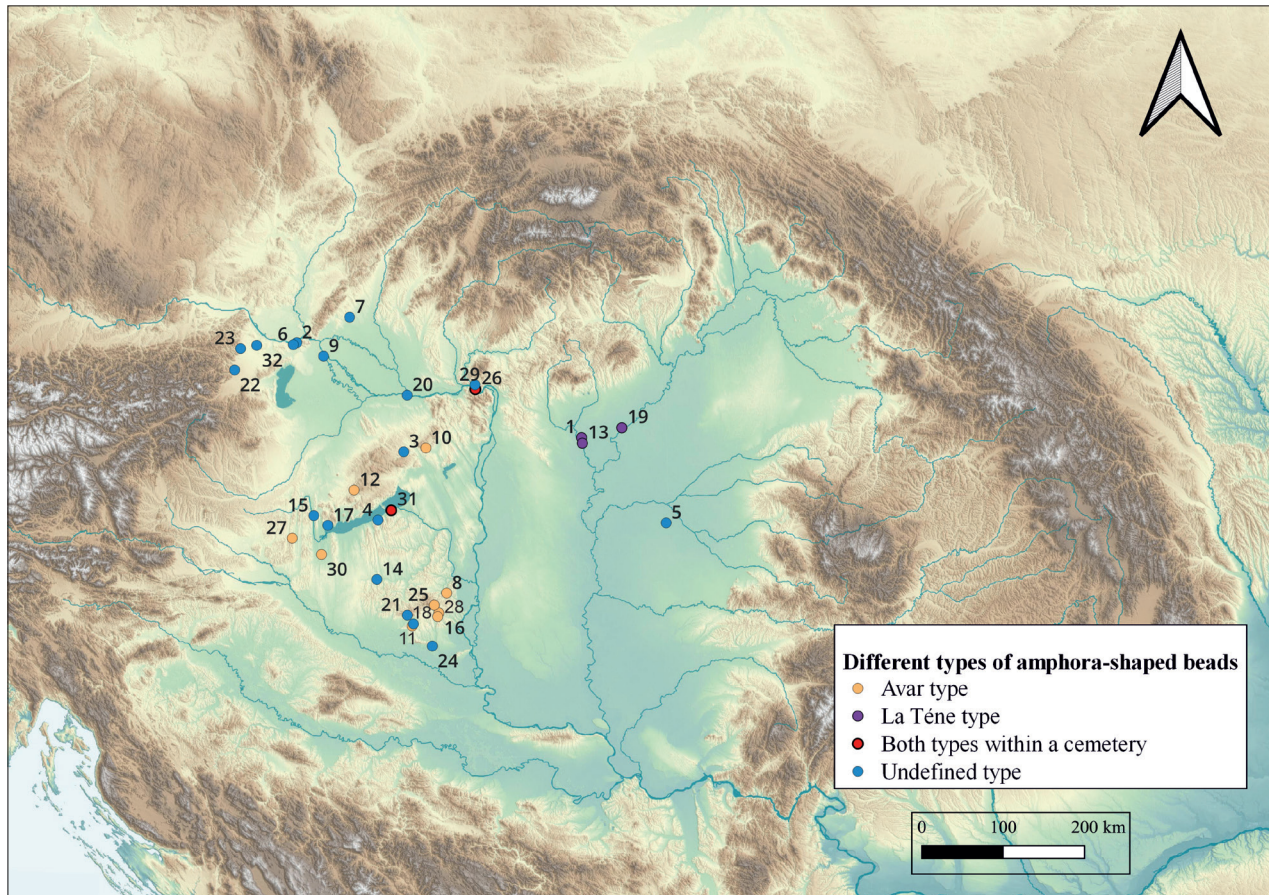


Fig. 5. Spatial distribution of amphora-shaped beads

5. kép. Az amfóra alakú gyöngyök térbeli eloszlása

1: Alattyán, Graves 156, 184, 196, 232, 390, 452, and 522; 2: Bad Deutsch-Altenburg-Ersters Amphitheater; 3: Bakony-csernye-Kun Béla Street, Graves 108 and 109; 4: Balatonőszöd-Temető-dűlő; 5: Békés; 6: Carnuntum; 7: Cifer-Pác, Grave 39; 8: Cikó-Fleissig Collection, Grave 47; 9: Čunovo, Grave 31; 10: Csákberény-Ónodpuszta, Grave 251; 11: Gyód, Graves 19 and 52; 12: Halimba, Graves 29, 58, 128, and 144; 13: Jánoshida, Grave B; 14: Kaposvár, Site 33, Graves 11 and 48; 15: Kehida-Tsz: major, Graves 32, 133, 146, 149, 152, and 156; 16: Kékesd, Grave 139; 17: Keszthely; 18: Keszü-Gyódi Road, Graves A and B; 19: Kisköre, Graves 47 and 154; 20: Komárom-Schiffswert, Grave 83; 21: Kővágószőlős-Kecel-völgy Factory I, Grave I/A; 22: Leobersdorf, Graves 93/b and 114/b; 23: Mödling-Golden Stiege, Graves 420 and 427; 24: Nagyarsány, Graves 68, 69, and 72; 25: Pécsvárad-Góztéglagyár, Graves 9, 15, and 23; 26: Pilismarót-Basaharc, Graves 43, 52, 55, 69, 130, and 176; 27: Söjtör-Petőfi utca, Graves 10, 20, 23, and 33; 28: Szellő, Grave 33; 29: Szob, Graves 75, 100, and 112; 30: Zalakomár, Graves 26a, 43, 96, 116, 190, 229, 230, 240, 250, and 300; 31: Zamárdi-Rétiföldek, Graves 82, 2294, 2357, and 1055; 32: Zwölfaxing, Grave 229 (finds collected from the literature for this research; some require further review and validation)

292, Pl. CII. 4; Kovrig 1963, 164; Pásztor 1996, 199). Her observation may indeed be valid for some cemeteries, but it cannot be accepted as general. No such consistent separation could be observed in the analysed bead record, which only reflects regional or local differences in use. Small, translucent beads with metal tube were not worn separately from their larger, black counterparts in any of the analysed cemeteries. In fact, the presence of metal foil and amphora beads together with these translucent pieces allows for their relatively late dating (see Pilismarót-Basaharc, Grave 43 and Halimba, Grave 17),

indicating that the type was in use for a long time. Melon seed beads are characteristic to the territory of the Avar Khaganate but very rarely appear in graves other than Avars; some are known from Carolingian and Köttlach Culture burials, and slightly more from Moravia (Stassiková-Štukovská 2017, 367). It is reasonable to assume that such beads got to the neighbouring areas of the Avar Khaganate through Avar mediation as traded goods, gifts, or in connection with individual mobility. Dissemination of the related technology or skilled craftspeople moving to the surrounding areas is also possible, but

the centre of production of melon seed beads was in Avar territory. The emergence of the type corroborates the hypotheses on the existence of regional workshops. While the type originates in Roman traditions, it seems to have been present only sporadically outside the Central Danube Region, and its variants were clearly not 'revived' by any of the large glass bead production centres either. Note that most observed technical innovations are typical of melon seed beads, which may hint at a recently established network of small workshops with no established glassworking practice, where different methods were used as each glassmith was experimenting to develop their techniques and their own profile. This experimentation became the tradition of the Avar

bead-making workshops, which continued to operate in the first half of the 9th century, as evidenced by the imported beads in the related assemblages.

Amphora-shaped beads (Fig. 13: VI.A-1–VI.B.3)

Amphora-shaped beads are rare, making up less than 1% of the analysed find material. Their two main sub-types have longitudinal and vertical suspension, respectively. The morphological examination did not only reveal differences in shape between the two but also unravelled that the vertical and longitudinal suspensions were made using diverse technologies. Beads with a vertical perforation were made of better-quality glass, and their colour is also dissimilar to those with a longitudinal suspension.

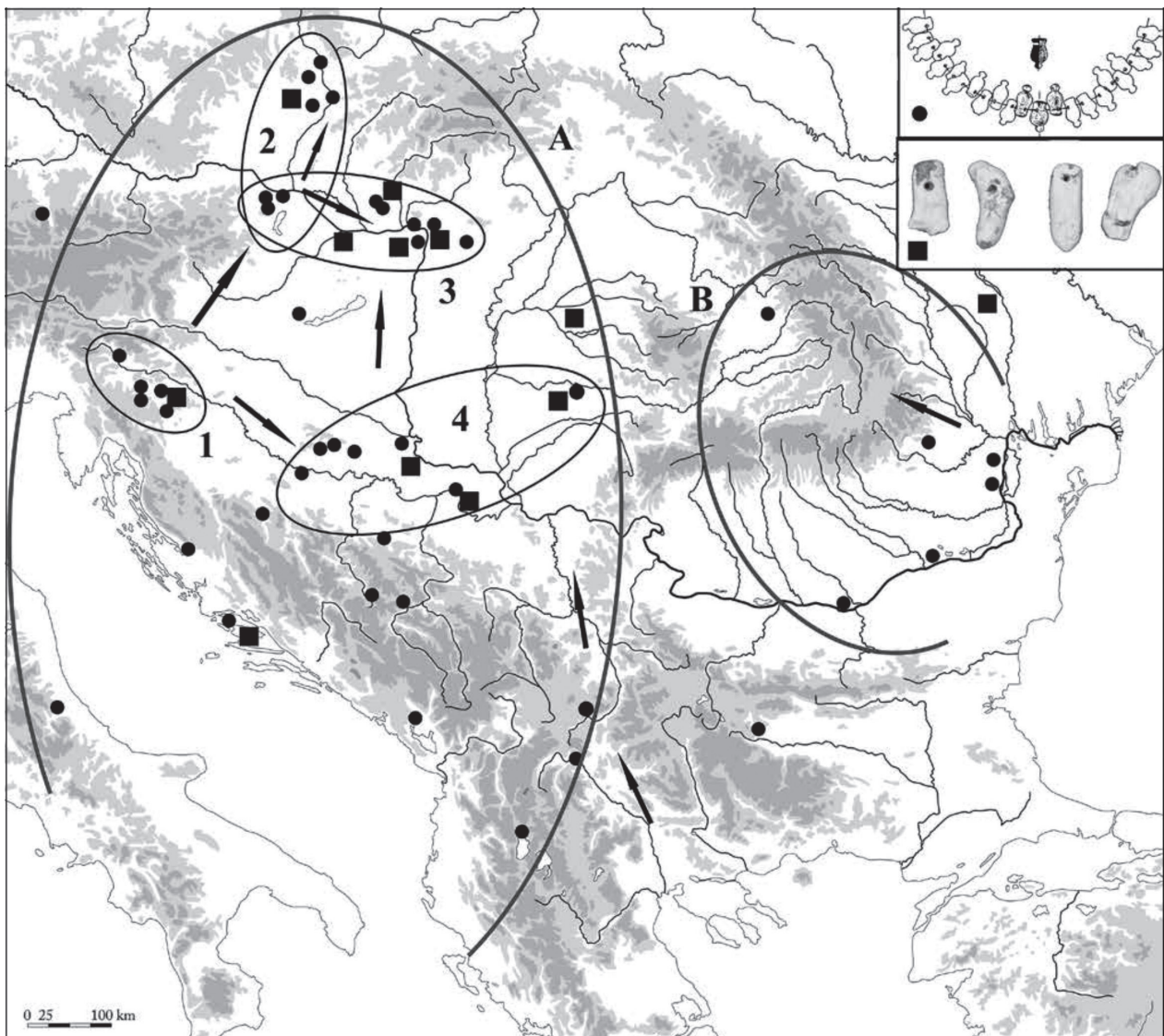


Fig. 6. Distribution of amphora-shaped beads in the La Tène Period (after Rustoiu 2015, Fig. 3). Dots: amphora beads, rectangles: coral beads

6. kép. Az amfora alakú gyöngyök La Tène kori elterjedése (Rustoiu 2015, 3. ábra nyomán). A ponttal jelöltek az amfora gyöngyök, a négyszög alakúak a korall gyöngyök

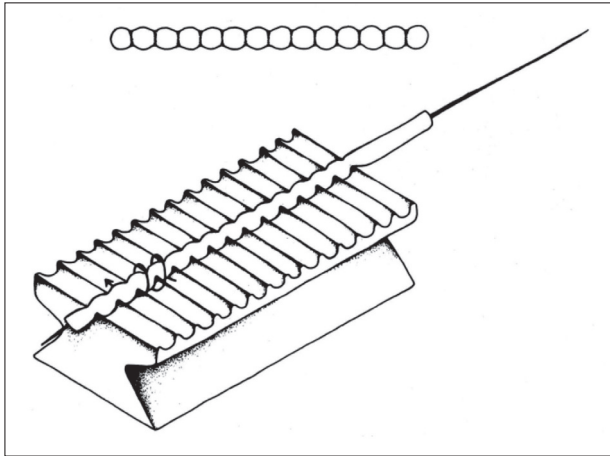


Fig. 7. Segmentation tool (after Spaer 1993, Fig. 4)
7. kép. Szegmentáló eszköz (Spaer 1993, 4. ábra nyomán)

This raises the question of whether could two beads made in such different ways but still having similar appearances have been made by the same workshop. VI.A-type beads are usually translucent, white and light blue, and even the ones from different sites are rather uniform in size. As for the technology, the method applied in their making has yet to be identified. The two perforations are similar and bear no dark discolouration in the perforation that would indicate the use of a mandrel. Therefore, they were possibly made with a tool or mould suitable for making this type of bead (although no related archaeological evidence is known so far). As they were made of quality glass, most pieces are still corrosion-free and in good condition. Morphological studies have proven that VI.A-type beads were not made in the Avar Period but may be evidence of systematic grave plundering during that time, which would explain their low occurrence.

Morphologically, VI.B-type beads do not show much variation in the size of the two perforations, which often feature dark discolouration, indicating the use of a mandrel (when the hot glass is wound over the mandrel, it leaves a thin, dark corrosion layer inside the glass); in some cases, the holes are lined with copper tubes. In summary, such beads were wound and then shaped with a flat or slightly concave tool. The formal subtypes refer to different amphorae. Their number is slightly higher than VI.A-type beads, but they still count as rare finds. Amphora-shaped beads are a phenomenon particular to the period. Avars possibly obtained some La Tène beads by plundering graves⁶ and started wearing them again because of their high quality and unique shape. Prehistoric and Roman artefacts – mostly beads – have been found in many Avar Period

burials (see Kovrig 1963, 113; Rustoiu 2015b, 247–263; Rapan Papeša 2020, 17–31). They strung them into their necklaces and attempted to imitate them using their own techniques – by winding and adding metal tube inserts – as they were unfamiliar with the methods applied in making the original ones. This being the case would raise two important questions: Where did the Avars encounter with the respective La Tène bead types? And does the spatial distribution of Avar amphora beads outline local workshops?

Both Celtic and Avar amphora-shaped beads are known only from two cemeteries, Pilismarót and Zamárdi in the sample, but not from the same grave, less the same bead string – a bead string that includes both has not been discovered yet. Both cemeteries have a Celtic cemetery nearby, and the Celtic artefacts (knives, pots, rings, etc.) in several graves in Pilismarót may be interpreted as evidence of systematic plundering (for grave descriptions see Fettich 1965, 10–89). Thus, one can assume that the Avars found La Tène amphora-shaped beads, and the demand to imitate them probably emerged there. Regarding spatial distribution, the dominance of Transdanubian cemeteries is apparent, and Avar types are known only from this area (Fig. 5), while only Celtic types are known from east of the Danube. A look at the distribution of La Tène amphora-shaped beads reveals a concentration in Central Transdanubia, confirming that the type was known there (Fig. 6). Based on spatial distribution, it is reasonable to assume at least one workshop producing Avar Period amphora-shaped beads in Transdanubia. More distant areas may have been part of the wider area of influence of this workshop, so it is not surprising that Avar beads are also known from Carolingian graves. Currently, no La Tène finds are known from Carolingian cemeteries. Amphora beads could be dated relatively well because the type was in use only for a short time from (especially the second half of) the 8th century until the 930/940s, based on the evidence of Carolingian cemeteries, especially Zalakomár. The appearance of Avar beads in Carolingian cemeteries may prove that Avar workshop traditions persisted to the 9th century (for a more detailed analysis of amphora beads see Szőke 1992, 874–876).

Segmented beads (Fig. 13: VII.1.A–VII.2.B-4)

The largest group of segmented beads comprises diverse foil bead variants (for a more detailed classification of segmented beads, see Stassiková-Štukovská, Plško 2015a, 391, Fig. 1). This main type is divided

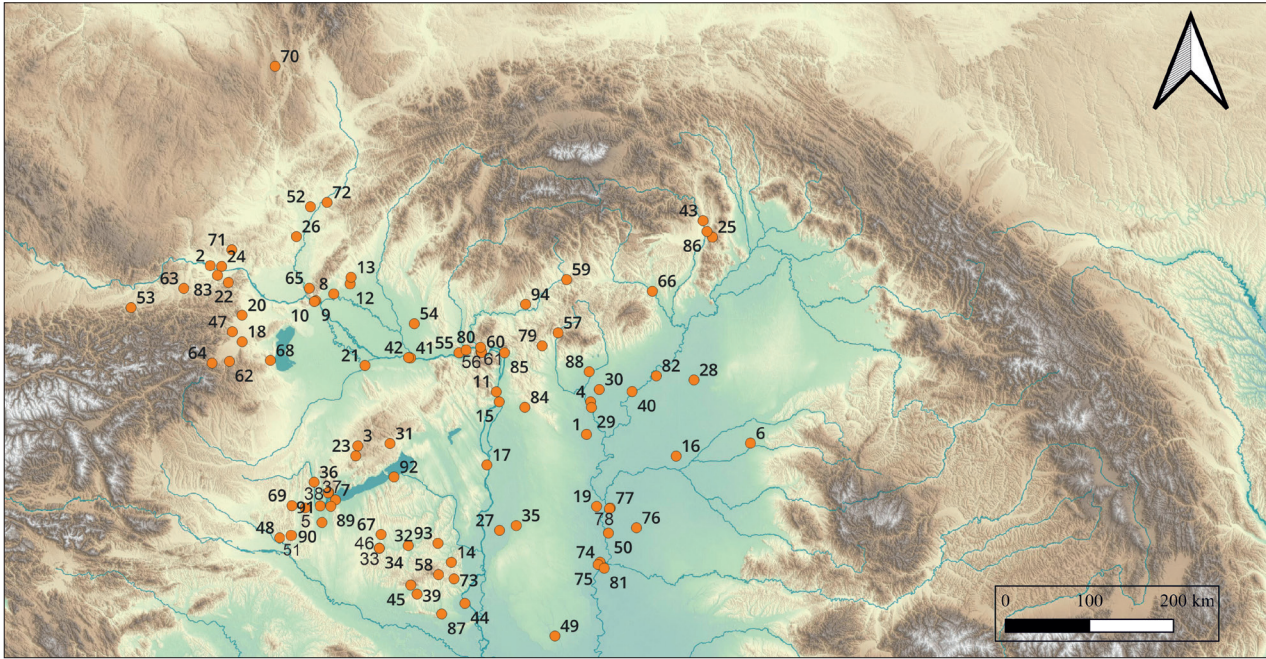


Fig. 8. Distribution of segmented foil beads in the Carpathian Basin

8. kép. A tagolt fóliás gyöngyök elterjedése a Kárpát-medencében⁷

- 1: Abony-Neppel F: field, Graves 88, 90, and 128; 2: Absdorf, Graves 8 and 12; 3: Ajka-7 Akác Street, Graves 3 and 17; 4: Alattyán-Tulát, Graves 386 and 407; 5: Alsórajk-Határi tábla, Grave 21; 6: Ártánd-Kapitány-dűlő, Graves 46, 55, 219, and 260; 7: Balatonberény; 8: Bernolávkovo-Šakoň, Grave 69; 9: Bratislava-Čunovo, Grave 2; 10: Bratislava-Záhorská Bystrica, Grave 94; 11: Budapest-Vöröskereszt Street, Grave 16; 12: Čataj: I- Zemanaské Gejzove, Grave 66; 13: Cifer-Pac I: Nad mlynom I, Graves 100 and 114; 14: Cikó, Graves 78, 110, 115–116, 118–119, 123–124, 135, 138–139, 393, 400, and 532–533; 15: Csepel-Szabadkikötő, Grave 6/b; 16: Dévaványa, Grave 93 and stray find; 17: Dunapentele/Dunaújváros, Graves 3 and 5; 18: Eggendorf am Wagram, Graves 4, 14, 15, 16, 21 and 26; 19: Felgyő-Ürmös tanya, Graves 15, 103, 126, 143, and 159; 20: Guntramsdorf-Annigerstraße, Graves 1 and 3; 21: Győr-Téglavető-dűlő, Grave 363; 22: Hainbuch; 23: Halimba-Belátó-domb, Graves 299, 394, and 395; 24: Hausleiten: Grave 08–09; 25: Hernádsadányi; 26: Hochenau-Hochstetten, Grave 3; 27: Homokmégy-halom; 28: Hortobágy-Árkus, Grave 26; 29: Jánoshida-Tótképuszta; 30: Jászapáti-Nagyállás út, Grave 207; 31: Jutas, Graves 78 and 196; 32: Kapospula, Grave 4; 33: Kaposvár-Road 61, Grave 09; 34: Kapovár-Toponár; 35: Kecel-Határidűlő, Grave 89; 36: Kehida; 37: Keszthely-Fenékpuszta, Graves 22, 1951/6, 1951/20, 1951/24, 1952/56, 1966/53, 1967/87, 1967/97, 1971/15, 1971/43, 1971/46, 1971/54, 1971/63, 1971/85, 1971/83, and 1963/3/9; 38: Keszthely-Gyenesdiás; 39: Keszű-Gyódi Road, Graves A and B; 40: Kisköre-Halastó, Graves 47, 131, and 09; 41: Komárno-Lodenica, Graves 31 and 81; 42: Komárno, Váradího Street, Graves 19 and 24; 43: Košice-Šebastovce; 44: Kölked-Feketekapu B, Graves 127, 234, and 344; 45: Kővágószőlős I: factory, Grave 1/A; 46: Kaposvár-Szili; 47: Leobersdorf, Grave 82; 48: Letenye-Kossuth Lajos Street, Graves 6 and 13; 49: Mali Idoš, Graves 69 and 81; 50: Mártély-Csányi föld, Grave 6; 51: Miklósfá-Halastavak; 52: Mikulčice, obj: 10/V; 53: Mühling, Graves 5, 10, 13, 20, and 26; 54: Nové Zámky I Belohorského Záhrada, Graves 86, 91, 130, 136, 229, and 464; 55: Obid, Grave 11; 56: Štúrovo; 57: Pásztó-Ulmer bánya; 58: Pécsvárad-Góztéglagyár, Grave 11; 59: Prša; 60: Pilismarót-Basaharc, Graves 32, 51, 62, 76, 87, 115, 124, 177, 179, and 256; 61: Pilismarót-Öregek dűlő, Graves 3, 39, 43, and 144; 62: Pitten I, Graves 12, 32–33, 40, 54, 56, 71, 77, 79, 87, 91, 94, 101a, and 111; 63: Pottenbrunn, Graves 11–12, 18, 22, 23, 29, 35b, 38, 41a, 42, 47–49, 53, 55, and 56a; 64: Pottschach, Grave 8; 65: Záhorská Bistrica; 66: Sajószentpéter; 67: Somogyaszaló-Kossuth Street; 68: Sopronkőhida-Teich dűlő, Graves 25, 50, 59, 67, 88, 107, 110, 111, and 115; 69: Söjtör; 70: Staré Město, Graves 2/51, 37/AZ, 47/51, 117/51, 122/51, 141/51, 194/AZ, 195/51, 209/AZ, 212/51, 267/51, 272/AZ, 315/AZ, 1/NS, 54/58 119/49, 171/51, 224/49, 238/49, and 239/49; 71: Steinabrunn, Graves 22, 26, 35, and 52; 72: Skalica, Graves 2, 3, 8, 9, 17, 33, and 37; 73: Szebény I, Graves 138 and 240; 74: Szeged-Fehértó A, Graves 17, 30, 35, 54, 80, 129, 150, 213, 240, 253, 371, and 375; 75: Szeged-Kundomb; 76: Székkutas-Kápolnadűlő, Graves 53, 95, 310, 463, and 494; 77: Szentés-Kaján, Graves 23, 126, 131, 144, 145, 236, and 298; 78: Szentés-Lapistó, Grave 16; 79: Szirák-Degenfeld birtok, Grave 44; 80: Szob-Homokdűlő, Graves 39, 81, 84, 89, 94, 96, 105, 107, and 132; 81: Szőreg-B, Grave 40; 82: Tiszafüred-Majoroshalom, Graves 131, 316, 321, 329, 337, 356, 440, 493, 498, 595, 689, 767, 821, 1125, 1129, 1170, 1186, 1190, 1211, 1231, 1236, and 1267; 83: Tulln, Graves 12, 24, 34, and 84; 84: Üllő; 85: Vác-Kavicsbánya, Grave 296; 86: Valalyky-Všechsvätých, Graves 41/61, 70/83, 74/83, 79/93, 80/83, and 89/84; 87: Villány-Pezsgőgyár, stray find; 88: Visznek-Kecskehegy, Grave 2; 89: Vörs-Papkert B; 90: Zalakomár, Grave 31; 91: Zalavár-Kövecses, Grave 22; 92: Zamárdi-Rétiföldek, Graves 288, 508, 523/b, 748, and 1430; 93: Závod, Graves 24 and 70; 94: Želovce-Fingó, Graves 293, 410, 572, 577, 606, and 650

into two larger sub-types based on technology: VII.1 includes drawn, while VII.2 wound beads. The analysed find material contains 109 metal foil beads, with silver and gold-coloured pieces, obviously precious metal imitations, amongst them (Spaer 1993, 9). The production of segmented beads required high-level technology; they are undecorated and produced in diverse spherical and cylindrical variants (for the type, see Pásztor 2015, 549–550). Their sizes vary widely, depending on how they are divided. They come in gold and silver but often also in shades of blue, purple, green, and white. They were clearly segmented with a tool that allowed the glass tube to be divided into several beads of the same size and shape in a single step (Rodziewicz 1984, 241–243) (Fig. 7). Their distribution similar to mosaic beads' (Fig. 8): Moravian and Köttlach culture cemeteries abound with them, but they are also recovered in numbers from Carolingian graves. In contrast, they count as rare finds in Avar graves and are also sporadic in 10th-century burials (Stassiková-Štukovská 2015b, 371). It has remained a question whether these late occurrences are beads that remained in use since the 9th century or that arrived in the Carpathian Basin through trade as late as the early 10th century. They often appear alongside mosaic beads in necklaces, indicating perhaps a common origin for the two (for segmented and mosaic beads, see in general Szóke 1992, 876–881).

Some segmented beads are less well-formed or regular, which is not typical of drawn beads at all. These pieces were presumably made in the Carpathian Basin, and their makers, unfamiliar with the technique of drawing, tried to imitate the look by

winding. Three basic methods were used to imitate segmented beads. 1, Pressing the sides of a wound bead with a shaping tool while it was still malleable – in most cases, the result was not too aesthetic (see beads 1, 2, and 3 in Fig. 9); 2, making separate wound beads and joining them together by heating – although the beads were better shaped, the members do not fit properly; also, reaching the right temperature during heat binding was difficult as it must have been high enough to allow bonding, but not too high to prevent the complete fusing of the members (see beads 5–8 in Fig. 9); or, rarely, 3, winding several independent beads on a long metal tube. In the latter case, the bead 'segments' are not in contact but are held together by the metal tube (see bead 3 in Fig. 9). This method probably required more precision than the previous two. Although the Avars were unfamiliar with bead drawing (which required a higher-level technological skills than winding), they tried to make beads with a similar appearance using the methods they knew.

Mosaic bead types (Fig. 13: VIII.A–C)

This one is the least organised main type, partly because the very low count of finds classified here did not allow their fine classification and partly because said finds are highly diverse, almost all subtypes having been made using different techniques. Therefore, distinctions were made based solely on technology, without considering shape and decoration, which would be essential for a larger collection. Very few mosaic beads are known from Avar context: the analysed series include only three from graves and a

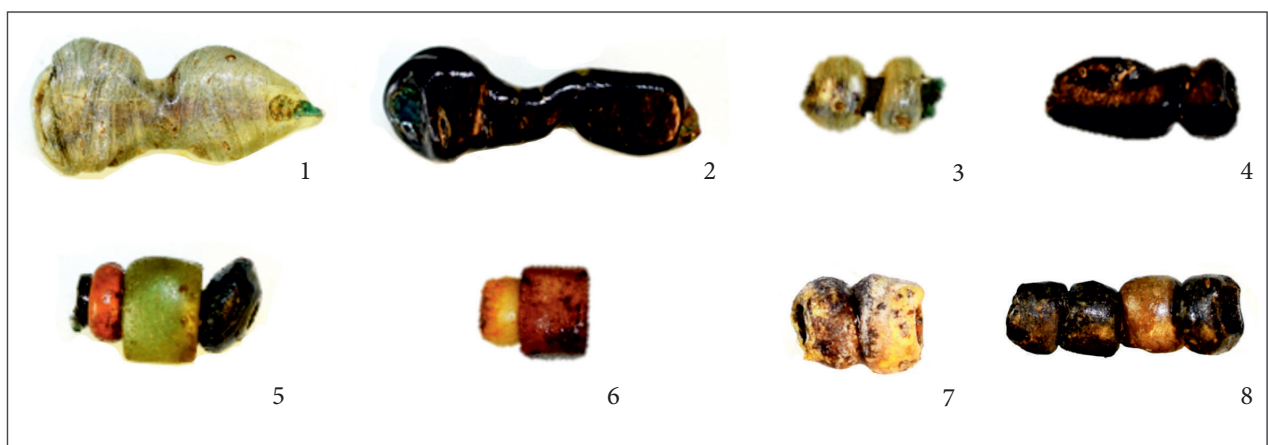


Fig. 9. Imitation of segmentation

9. kép. Tagolt gyöngyök utánzatai

1–2, Pilismarót, Grave 16; 3, Pilismarót, Grave 22; 4, Pilismarót, Grave 24; 5–6, Pilismarót, Grave 39; 7, Abony, Grave 244; 8, Cikó, Grave 366

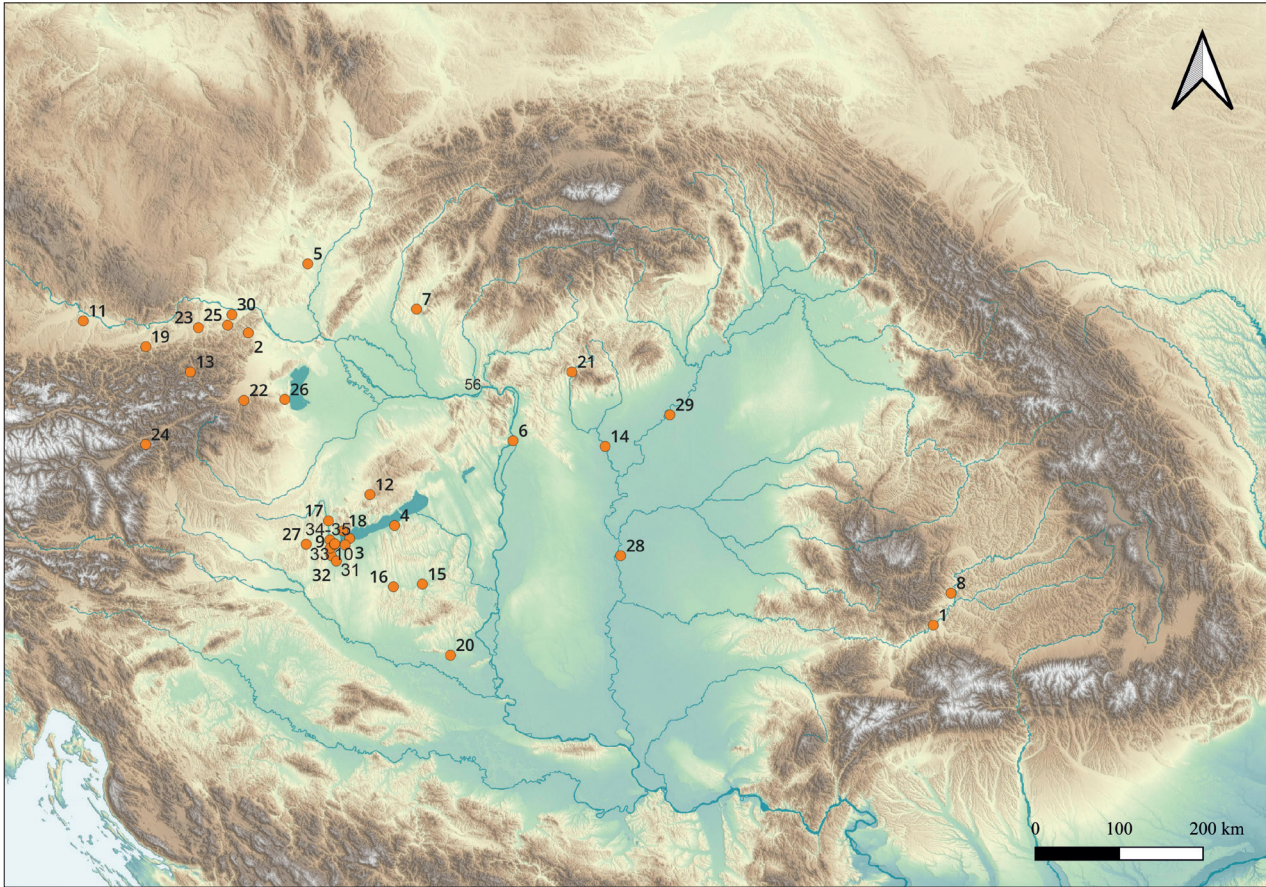


Fig. 10. Distribution of mosaic beads in the Carpathian Basin in the Late Avar Period

10. kép. A mozaikgyöngyök elterjedése a késő avar Kárpát-medencében

1: Alba-Iulia-Stația de Salvare, Grave 46; 2: Auhof, Graves 58, 73, 81, 107, and 114; 3: Balatonberény; 4: Balatonőszöd; 5: Bernhardstal; 6: Budapest-Csepel; 7: Čakajovce, Grave 258; 8: Ciumbrud-Podireu, Grave 7; 9: Esztergályhorvát-Alsóábrándpuszta, Graves 140, 152, and 311; 10: Garabonc-Ófalu I, Graves 24 and 47; 11: Gusen, Grave 139; 12: Halimba, Graves 173 and 394; 13: Hohenberg; 14: Jánoshida, Grave 258; 15: Kapospula, Graves 4 and 7; 16: Kaposvár Street 61, Grave 48; 17: Kehida-Fövényes, Grave 207; 18: Keszthely, stray find; 19: Mühling, Grave 10; 20: Nagyharsány-Szarkás-dűlő; 21: Pásztó; 22: Pitten, Grave 101; 23: Pottenbrunn, Graves 29, 38, 41/b, 42, 53, 91, and 207; 24: Proleb; 25: Sieghartskirchen; 26: Sopronkőhida; 27: Söjtör-Petőfi Street; 28: Szegvár; 29: Tiszafüred-Majoroshalom; 30: Tulln, Grave 24; 31: Vörs-Papkert B, Grave 140; 32: Zalakomár, Graves 193, 333, 339, 519, and 520; 33: Zalasabar-Borjúállás, Graves 95 and 253; 34: Zalavár-Kövecses, Grave 22; 35: Zalavár-Vársziget, Grave 336

stray find necklace (Halimba, Grave 173, Jánoshida, Grave 258, Tiszafüred, Grave 1190, and a stray find from Keszthely). ‘Mosaic bead’ is a collective term for beads built and fused from several elements (Rähländer 2017, 6), such as eye or millefiori beads and those with geometric patterns. The different manufacturing techniques may also indicate different cultural backgrounds. In this respect, it is difficult to say anything specific about Types VIII.B-1 and VIII.B-2, but it cannot be excluded that they originate from the Merovingian cultural sphere, in contrast to Types VIII.A and VIII.C, the chronological position and place of production of which are relatively well-defined.

Mosaic beads have been found mainly in Trans-

danubia (Fig. 10), primarily in Carolingian cemeteries, while only one or two are known from Avar necklaces (They have also been found in similar quantities in the Balkans, see Radičević, Ćirković 2023, Fig. 1). The number of these beads in Avar graves is relatively low, indicating that they were obtained through an intermediate source rather than direct trade. In the early 9th century, they were present in much greater numbers in the Eastern Alpine area and Carolingian cemeteries, which also hints that the Avars obtained these beads indirectly (similarly Szőke 1992, 873–881). Based on the find material of Carolingian cemeteries, the type first appeared in the early 9th century (Szőke 1992, 879). Mosaic beads are recurrently combined with certain other bead types in

necklaces (Andrae 1973), most commonly with foil beads; these common combinations suggest that the beads were not traded individually but in complete strings. Yet, the mosaic beads recovered from Avar burials are not part of recurring combinations. This could be explained by restringing, as illustrated by a necklace from Tiszafüred, Grave 1190, which contains many types characteristic of these combinations but also ones made in the Carpathian Basin instead of Middle Eastern workshops. The necklace contains less well-formed melon seed and truncated conical beads, as well as barrel-shaped ones with yellow decoration, all of which were produced in the region during the Late Avar Period. Thus, different bead types with different cultural backgrounds appear on the same necklace, which can only be explained by restringing, likely a common practice in the period. Since mosaic beads appeared in the late 8th and early 9th century at the earliest, the Tiszafüred necklace also proves that some Late Avar bead types remained in use in the 9th century. However, this find is unique, so it remains a question whether it is evidence of individual mobility or was a gift. If it were a traded good, more similar strings would be known from Avar burials.

Segmented and mosaic beads are discussed here together because of their identical origin and chronological position; international literature also refers to them collectively as ‘Islamic beads’ (e.g., Neri et al, 2019, 1107; Liu 2012, 58–64; Staššíková-Štukovská, Plško, 2015a, 393). An analysis of such beads in Carolingian cemeteries in the Carpathian Basin has outlined that they appeared first in Transdanubia in the 930/940s, while lower-quality segmented beads were still in use even in the second half of the 9th century (Szőke 1992). The spatial distributions of segmented and mosaic beads overlap at several points, but foil beads are known in higher numbers. The production of segmented and mosaic beads continued into the second half of the 9th century, as evidenced by finds from the surrounding areas (Staššíková-Štukovská 2017, 367–372). Similar examples found in the cemeteries of Ciurbrud and Alba Iulia in Romania are also likely to date to the second half of the 9th century (Ferenczi, Dankanits 1959, 611; Gál 2014, 414). In summary, while ‘Islamic’ beads certainly appeared simultaneously in the early 9th century, the time of their going out of fashion has remained a question; their presence in the second half of the 9th and perhaps even in the early 10th century cannot be excluded, but the scarcity of finds renders drawing

chronological conclusions difficult.

Stone beads (Fig. 13: IX.1.A-1-IX.2.B-1)

Very few stone beads have been found in the analysed finds, containing no more than eleven carnelian and two chalcedony pieces. Stone beads were uncommon in the Late Avar Period, and appear only sporadically in the find material of the examined cemeteries. With such a low count, they cannot be considered commercial goods, not at least because their proportion in every cemetery is insignificant, and their scatter does not outline distinctive regions of use. There is no evidence of stone bead production in the period, with glass seeming to be the only material used for producing beads locally by the Avars in the Carpathian Basin during the Late Avar Period. The appearance of stone beads may be related to grave plundering; based on bead types, the known pieces may have been obtained by disturbing Sarmatian graves (this possibility has already been raised in Főrizs et al. 2001, 77; for more about carnelian beads, see Pásztor 2012, 483, Pásztor 2015, 550). Just like prismatic beads, carnelian ones may have been imported into our focus area from time to time; however, one may only find evidence of that via a multiperiod survey.

A general overview of complete bead strings

Bead types have been discussed separately, but it is also important to draw conclusions based on the complete bead strings in light of the included materials, shapes, decorations, colours, technologies, sizes, and combinations. With a few exceptions, all Late Avar Period beads were made of glass. They are typically less well-formed and come in a wider range of sizes than in the previous period, reflecting a fundamental change between the Early and Late Avar periods not only in bead types but also in the shaping of the beads. However, despite the high heterogeneity of types, the find material also reflects a kind of uniformity appearing especially in complete strings. As the many different features appear in many variations but together in the bead strings, the beads concerned were probably made in the same workshop. Large beads (with higher raw material demand) are rare, but the shaping of smaller ones required even more precision; the significant size reduction likely reflects an effort to economize on raw material. Even though Late Avar bead strings are longer than Early Avar ones, they contain considerably less material

than, for example, a shorter necklace of eye beads.

There are many ways to decorate beads, and the techniques applied tell a lot about the tools used and skills mastered by the maker. Decoration choices reflect cultural or personal preferences. Besides, the techniques used for imitating others for various reasons that the makers did not have the knowledge, skills, or tools to continue with the original technique (Råhländer 2018, 11). In the Late Avar Period, the complexity and quality of bead decoration declined significantly and only involved the simplest techniques. Mainly one type, small black barrel-shaped beads, were decorated in different ways, with the differences appearing in the dissimilar thickness of the decorative lines and eyes and their simple execution, which do not reflect high-level craftsmanship. Perhaps one of the most interesting phenomenon observed in the analysed strings of beads is the decline in colour variation with time: while in the Early and Middle Avar Period, multicoloured beads were popular, the colour of the beads became almost uniform in the Late Avar Period, most of them coming in various shades of black, dark green, and dark blue, while of the lighter colours, only yellow was produced. This change likely reflects a lack of technological knowledge rather than an extraordinary change in demand (experimental archaeological research also shows that colouring is one of the most difficult parts of glass processing, see Staššiková-Štukovská et al. 2020). Wearing darker beads was probably not a conscious decision. In addition, there is a visible effort to make beads more colourful by using different techniques (metal tubes in the perforations, hairline effect on the bead body, reusing older beads).

Of the three primary bead-making techniques (winding, drawing, and mosaic), Avars seemingly knew only the simplest (winding); therefore, all other beads must be considered traded items. However, it is essential to examine the beads carefully, as in many cases, one finds marks related to unique innovations in bead-making. New methods were invented to imitate the features of imported beads, even if not perfectly. These methods, which were rarely used in other regions, prove that secondary glass bead processing existed in the Carpathian Basin in the Late Avar Period. The use of region-specific technologies (copper metal tubes, hairline effect) supports the hypothesis that melon seed beads were produced in the area of the Avar Khaganate. These processes could have been developed in the Central Danube Basin and spread with glass bead makers or through trans-

fer of technological knowledge. They also indicate that the region did not have a bead-making tradition but developed its own techniques and style through continuous experimentation. These innovations can be linked with a significant increase in craftsmanship in the 8th century. In this rather large region, a relatively unified glass bead production emerged because it was served by the same glass supply system. Scandinavia and the Balkans were part of a much better supply network (e.g., Illyricum: Neri et al. 2019, 1117–1118; Scandinavia: Callmer, Henderson 1991, 152–153; Sode et al. 2022, 177–179).

In many Late Avar bead necklaces, melon seed, barrel-shaped, yellow and black seed, and small oblate spherical beads appear together. Short strings sometimes include one or two types of beads, while more diverse combinations are more typical of medium and long strings. Another possible reason why one can isolate only trends rather than recurring bead combinations is that some beads were used for a long time and restrung several times. It seems there were no large centres in the Carpathian Basin to systematically produce identical strings of beads, but only several smaller local workshops that used loose combination patterns more freely and tended to string together different types within the bounds of possibility.

Conclusions

The significant difference between the quality of Late Avar glass beads and Early Avar or imported ones has been emphasised throughout the analysis. However, it should also be noted that Late Avar glass bead production in the Carpathian Basin represented a technical development. All imported beads were made in workshops where craftsmen could pass on their knowledge over centuries. Large glassworking centres are characterised by a continuity of know-how over a long period, while in the Carpathian Basin, even a lower level of glassworking represented significant internal development. Recurring attempts were made to copy the forms and technologies of imported beads; as the Avars were unfamiliar with the related techniques, they used their own solutions and innovations to imitate the imported pieces. The technical innovations and the daring to experiment and copy certain elements indicate a dynamic community of craftspeople that continuously adapted to current opportunities and demands. These workshops seem to have remained in operation in the

9th century, as evidenced by the coexistence of 9th-century imported bead types. One cannot expect large-scale bead production in the Late Avar Period, but the existence of many small workshops seems plausible.

At the beginning of the research, we aimed to provide a much broader chronological narrative of the beads, but it has become clear that a holistic approach is unsuitable. A more detailed chronological assessment of glass bead production of a local workshop network is only possible through analysing cemeteries and microregions. Some types, such as amphora-shaped beads, segmented beads with

metal foil, and the characteristic mosaic beads, can be used to build a significantly more precise chronological framework; however, these are specific only to certain regions, and even there do not appear in abundance, especially compared to other types. This study is a morphological overview and an attempt to build a preliminary bead typology for Late Avar beads, but it is far from complete. This system can and will be refined in the future when new information and discoveries will be incorporated, but at the moment, it represents the current state of research.

Notes

- 1 The study has been implemented with the support provided by the Ministry of Innovation and Technology of Hungary from the National Research, Development and Innovation Fund, financed under the TKP2021-NKTA-24 funding scheme.
- 2 Adrien Pásztor's works focus on Early and Middle Avar beads (Pásztor 1996, 195–220), but she has also included Late Avar beads in her cemetery analyses (Pásztor 2018, 255–291).
- 3 The possibility of large-scale production was raised in the case of some bead types, e.g., green prismatic beads, which were present in a similar form and size from the Late Roman period onwards, remaining in use throughout the Sarmatian and Avar periods. Most Avar beads are unlikely to have been mass-produced, even in the Early Avar Period (Pásztor 1996, 206).
- 4 The other locally produced beads found alongside them are often fragmentary and discoloured, although these types are preserved in very good condition. It seems that not only the acidic environment of the soil but also the quality of the glass had a major influence on the condition in which a bead is preserved. In addition, certain stages of deterioration are specific to certain types of glass, which probably relates to the quality of the material; for example, iridescence is characteristic of type IV.A.
- 5 Although the type is usually referred to in the literature as 'melon seed bead,' it would be more professional to use the term 'melon seed bead group' because, unlike the common and widely used term, it expresses that the category does not include only a single bead type but many different shapes and technical variations.
- 6 Kovrig had already noticed that the pieces found in the cemeteries of Alattyán can also be dated to the La Tène Period (see Kovrig 1963, 113).
- 7 This collection is based on current research data obtained through extensive literature review. Some of the data included still require further review and validation. The data collection was conducted by Zsófia Básti.

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Fig. 11. Bead types
11. kép. Gyöngytipusok

*Appendix**Type classifications (Típusbeosztások) (Figs. 11–13)*

I. Spherical beads (Gömbfélék)

1. Spherical beads (Gömb alakú)

A-1. large monochrome (nagy méretű és egyszínű)

B-1. small monochrome (kisméretű és egyszínű)

B-2. small, with eyes (kisméretű, szemekkel)

2. Oblate spherical beads (Lapított gömb alakú)

A-1. monochrome, with a small perforation (egyszínű, kis furattal)

A-2. monochrome, with a wide perforation, disc-shaped (egyszínű, széles furattal, korong alakú)

B-1. with three eyes (3 szemmel)

B-2. with four eyes (4 szemmel)

B-3. with two intersecting wavy lines and three eyes in the middle (2 egymást keresztező hullámvonallal és középen 3 szemmel)

B-4. with two intersecting wavy lines and four eyes in the middle (2 egymást keresztező hullámvonallal és középen 4 szemmel)

B-5. with two intersecting wavy lines (2 egymást keresztező hullámvonallal)

B-6. with one wavy line (1 hullámvonallal)

B-7. with continuous line decoration (vonal-folytatott díszítéssel)

C-1. with four stratified eyes (4 pávaszemmel)

C-2. with two intersecting wavy lines and three stratified eyes in the middle (2 egymást keresztező hullámvonallal közepén 3 pávaszemmel)

D. ribbed (bordázott)

3. Ring-shaped beads with a wide perforation (Gyűrű alakú, széles furattal)

A. with a round perforation (kerek furattal)

B. with a square perforation on one or both sides (négyzetes furattal az egyik, vagy mindkét oldalon)

4. Seed beads with diameter around 5 mm (kölesgyöngyök, átmérőjük 5 mm körüli)

II. Conical beads (Kúpos gyöngyök)

1. Truncated conical (csonkakúpos)

A-1. truncated conical (csonkakúpos)

A-2. wounded truncated conical (tekercselt csonka kúp)

2. Biconical (Bikónikus)

A-1. elongated biconical (hosszú bikónikus)

A-2. elongated biconical with eyes (hosszú bikónikus, szemekkel)

B-1. short biconical (rövid bikónikus)

III. Cylindrical beads (Hengeres típusok)

1. Short cylindrical (rövid hengeres)

A-1. with two intersecting wavy lines and eyes in the middle (két egymást keresztező hullámvonallal és középen szemekkel)

A-2. with two intersecting wavy lines and outlined eyes in the middle (két egymást keresztező hullámvonallal középen szemekkel, és a szem körül körvonallal)

B. monochrome (egyszínű)

C. with crimson hairlines (hajszálvékony vörös szálakkal)

2. Long cylindrical beads (Hosszú hengeres)

A-1. with two intersecting wavy lines and eyes in the middle (két egymást keresztező hullámvonallal, középen szemekkel)

A-2. with a wavy line (egy hullámvonallal)

A-3. with three continuous lines and a wavy line in the middle (három vonal díszsel és egy hullámvonallal a közepén)

3. Barrel-shaped beads with a convex side (Hordó alakú, ívelt oldalú)

A-1. short, with eyes and wavy and continuous lines in different combinations (rövid, szemekkel, hullám- és vonaldíszek különböző kombinációival)

A-2. short, with a continuous drip line (rövid, vonalfolytatott díszsel)

B. elongated monochrome (elnyújtott egyszínű)

4. Long cylindrical beads (Hosszú hengeres)

A-1. narrow monochrome (keskeny egyszínű)

A-2. wide monochrome (széles egyszínű)

5. Oblate cylindrical with convex sides (Lapított, ívelt oldalú hengeres)

A-1. large, lengthwise ribbed (nagy méretű, hosszában bordázott)

A-2. large, grated (nagy méretű, rácsmintával)

B. large monochrome (nagy méretű és egyszínű)

C. small monochrome (kisméretű és egyszínű)

IV. Prismatic beads (Hasábos típusok)

A-1. with a rectangular cross-section (téglalap átmetszetű hasáb)

A-2. with truncated corners and a rectangular



Fig. 12. Bead types
12. kép. Gyöngytípusok



Fig. 13. Bead types
13. kép. Gyöngytípusok

cross-section (lecsapott sarkú, téglalap átmetszetű hasáb)

A-3. cuboctahedral (lecsapott sarkú, kocka alakú)

B-1. with a polygonal cross-section (többszög átmetszetű)

B-2. long and narrow, with a polygonal cross-section (hosszú és keskeny, többszög átmetszetű)

V. Melon seed beads (Dinnyemag alakú gyöngyök)

1. Long melon seed beads (Hosszú dinnyemag alakú gyöngyök)

A-1. narrow, ridged (keskeny gerincelt)

A-2. narrow, ridged, with crimson hairlines (keskeny gerincelt, hajszálvékony vörös szálakkal)

B-1. narrow, both sides indented, segmented (keskeny, két oldalukon benyomkodás, tagoltak)

B-2. narrow, both sides indented, with a metal tube (keskeny két oldalán benyomkodás, fém csővel)

C. wide melon seed (szélesebb dinnyemag alakú)

D-1. small, narrow (kisméretű és keskeny)

D-2. small, narrow with a metal tube (kisméretű keskeny fém csővel)

D-3. small, narrow with crimson hairlines (kisméretű és keskeny, hajszálvékony vörös szálakkal)

2. Large and medium-sized melon seed beads (Nagyobb és közepes méretű dinnyemag alakúak)

A-1. wide, flat (széles és lapos)

A-2. wide, flat, with crimson hairlines (széles és lapos, hajszálvékony vörös szálakkal)

B-1. drop-shaped, ridged (csepp alakú, gerincelt)

B-2. flat, drop-shaped (lapított csepp alakú)

B-3. flat, drop-shaped, with crimson hairlines (lapított csepp alakú lap hajszálvékony vörös szálakkal)

B-4. flat, drop-shaped, with a metal tube (lapított csepp alakúak, fém csővel)

C-1. both sides indented, with crimson hairlines (két oldalán benyomkodás, vörös szálakkal)

C-2. both sides indented, with a metal tube (két oldalán benyomkodás, fém csővel)

3. Small melon seed beads (kisméretűek)

A-1. short and wide (rövid és széles)

A-2. short and wide, with profiled edges (rövid és széles, profilált peremű)

A-3. short and wide, with crimson hairlines (rövid és széles, hajszálvékony vörös szálakkal)

A-4. short and wide, with a metal tube (rövid és széles, fém csővel)

A-5. short and wide, ridged (rövid és széles, gerincelt)

B-1. short, wide, and flat, drop-shaped (rövid és széles, lapított csepp alakú)

B-2. short, wide, and flat, drop-shaped, with a metal tube (rövid és széles, fém csővel, csepp alakú)

B-3. short, wide, and flat, drop-shaped, both sides indented (rövid és széles, két oldalán benyomkodás, csepp alakú)

B-4. short, wide, and flat, drop-shaped, with crimson hairlines (rövid és széles, hajszálvékony vörös szálakkal, csepp alakú)

VI. Amphora-shaped beads (amfora alakú gyöngyök)

A-1. with a vertical suspension (függőleges felfüggesztéssel)

B-1. with a longitudinal suspension, wide belly, short neck, and a distinct base (hosszában felfüggesztett, széles hasú, rövid nyakkal és talppal)

B-2. with a longitudinal suspension, wide belly and long neck, without a distinct base (hosszában felfüggesztett, széles hasú, hosszú nyak és talp nélkül)

B-3. with a longitudinal suspension, wide belly, long neck, and a short base (hosszában felfüggesztett, széles hasú, hosszú nyakú és rövid talppal)

VII. Segmented beads (többtagú gyöngyök)

1. Drawn segmented beads (többtagú gyöngyök húzás technikával)

A. silver foil beads with oblate spherical segments (ezüstfóliás gyöngy, lapított gömb alakú részekkel)

B. gold foil beads with oblate spherical segments (aranyfóliás gyöngy, lapított gömb alakú részekkel)

C. with short, convex cylindrical segments (rövid ívelt oldalú hengeres részekkel)

D. with disc or ring-shaped segments (korong/gyűrű alakú részekkel)

E. blue, with oblate spherical segments (kék gyöngy, lapított gömb alakú részekkel)

- F. black, with oblate spherical segments (fekete gyöngy, lapított gömb alakú részekkel)
- G. two-part, with small oblate spherical segments (kisméretű lapított gömb alakúakból álló kéttagú gyöngyök)
2. Segmented bead imitations (többtagú gyöngyök imitációja)
- A-1. oblate spherical foil beads with eyes (lapított gömb alakú részekből álló fóliás, szemekkel)
- B-1. composed of several beads of the same type (azonos típusú gyöngyökből álló)
- B-2. composed of several beads of the same type, with a metal tube (azonos típusú gyöngyökből álló, fém csővel)
- B-3. irregular, both sides indented, with a metal tube (mindkét oldalukon benyomkodással, fém csővel, szabálytalan alakúak)
- B-4. composed of different types and colours (különböző típusokkal és színekkel)
- VIII. *Millefiori* beads (millefiori gyöngyök)
- A. wounded bead body with moulded mosaic canes (tekerceselt gyöngytestbe olvasztott mozaikrészek)
- B-1. bicolour (két különböző színű üvegből készült)
- B-2. more than one colour, with eyes (különböző színű üvegből készült szemekkel)
- C. short and long cylindrical, more than one colour, with diverse patterns (rövid és hosszú hengeres formájú, többféle üvegből és többféle mintát ábrázoló)
- IX. Stone beads (kőgyöngyök)
1. Carnelian beads (karneol gyöngyök)
- A-1. spherical (gömb alakú)
- B-1. prismatic, with a rectangular cross-section (téglalap átmetszetű hasáb)
- B-2. prismatic with truncated corners and a rectangular cross-section (lecsapott sarkú, téglalap átmetszetű hasáb)
- C-1. cuboctahedral (lecsapott sarkú kocka)
2. Chalcedony beads (kalcedon gyöngyök)
- A-1. spherical (gömb alakú)
- B-1. elongated biconical (nyújtott bikónikus)

KÉSŐ AVAR KORI TEMETŐK GYÖNGYANYAGÁNAK TIPOLÓGIAI ELEMZÉSE

Összefoglalás

A teljes avar korra jellemző, hogy a sírokban gazdag üvegyöngyosorok találhatóak, viszont ezek korántsem egységesek. Két nagyobb csoportot tudunk elkülöníteni: a kora és közép avar korra keltezhetőket és a késő avar koriakat. A felosztás nemcsak kronológiai okokra vezethető vissza, hanem arra is, hogy a kései periódusban új formák, új technológiák jelennek meg, amelyeket korábban a térségben nem használtak. A tanulmány célja, hogy megvizsgáljuk azt a folyamatot, amely kiváltója lehetett a változásnak.

Vizsgálatainkba 17 lelőhely 172 sírjának anyagát vontuk be, néhány szórvány gyöngyosorral kiegészítve (1. kép), azonban az említett temetőkből nem minden gyöngyöt tartalmazó sír került be. Egy előzetes szelekciót alkalmazva csupán azoknak a temetkezéseknek a leleteit vettük alapul, amelyek fontos információt tartalmazhattak a késő avar korról kapcsolatban, így a kora és közép avar koriakat illetően csupán rövid megjegyzésekkel találkozhatunk, de azok nem képezik az elemzés szerves részét. Holisztikus elemzésre törekedtünk, így több régió temetőjének az anyagát vizsgáltuk, mivel általános tendenciák elkülönítését tűztük ki célul.

A gyöngyök vizsgálatánál egy kétfázisos rendszert használtunk: az egyik maga a gyöngyleírás folyamata volt, a másik a típusbeosztás, amelyet a leírások által szétválasztott különböző tulajdonságok szerint végeztünk el. A gyöngyleírás folyamatát a Szilágyi Katalin által kialakított módszerekre alapoztuk (Szilágyi 1994, 75–110), így minden gyöngyöt egyenként vizsgáltunk: anyag, forma, díszítés, készítési technológia és szín szerint. E tulajdonságok alapján minden jellemvonásnak kódot adtunk, így elkerülve a hosszabb leírásokat.

A második fázisa a tipológiánál, hogy a közös tulajdonságok révén csoportosítottuk és rendszerbe helyeztük a gyöngyöket. A tipológiáknál kétfajta elkülönítés ismert: a mi térségünkre jellemző, hogy csak a gyöngyök formáit vesszük alapul, míg a nemzetközi gyöngyutatók a technológiai alapú csoportosítást tartja elfogadottnak. A térségben használt tipológiákhoz képest sokkal inkább technológiai alapon való elkülönítést használtunk, és csupán ezt követték a formai jellemzők. Tehát a főcsoportok kialakítása három tényezőtől: anyag, technológia és forma.

Ezek alapján a megalkotott tipológiai rendszerünkben kilenc főtípust (gömbfélék, kúpfélék, hengerek, hasábok, dinnyemag alakúak, amfora alakúak, többtagúak, mozaikok és kőgyöngyök) és számos altípust határoztunk meg. A római számokkal jelöltek a főcsoportot alkotják, az arab számokkal jelöltek az altípusok, a betűkkel és arab számokkal jelöltek pedig a fővariánsok, amelyeknek számos alvariánsa lehet, azonban ezeket külön nem jelöltük. A gyöngyök többségét egyesével formálták meg, így önmagában minden gyöngy egyedi, ezért csupán a fő tendenciákat próbáltuk csoportosítani.

A tanulmány központi részében a vizsgált leletanyag nyomán elért eredményeket adtuk közre főcsoportonként haladva. Minden főcsoportot a következő aspektusok szerint elemeztünk: technológia, szín, díszítés. A legnagyobb figyelmet a dinnyemag alakú gyöngyök technológiai elemzésére fordítottuk, mert itt számos egyedi eljárásmóddal találkozhattunk, amelyek használata főként regionális sajátosság. Ezek közül is két technikát érdemes kiemelni: a fémcsövek használatát a gyöngyök furataiban (3. kép) és a gyöngytestben megjelenő hajszálvékony vörös szálat (4. kép). Mindkét technológia ugyanazon a gyöngyön is előfordulhat, a kettő nem zárja ki egymást. Ez azért is különösen feltűnő, mert mindkét technológia a vörös szín imitációjának egy lehetséges módszere.

A késő avar kori gyöngyök néhány kivételtől eltekintve üvegből készültek, a néhány kőgyöngy import vagy korábbi korszakok sírjainak rablása révén kerülhetett a gyöngyosorokba. Formai szempontból jellemző, hogy a gyöngyök kevésbé jól megformáltak, méreteik szélesebb skálán mozognak és formáik is nagyon változatosak. Mindez azt jelenti, hogy nemcsak típusok szempontjából látható alapvető eltérés a kora és a késő avar kor között, hanem a gyöngyök megformálásában is. Viszont a jelentős heterogenitás ellenére mégis megfigyelhető egyfajta egységeség is, főleg akkor, ha az egész gyöngyosorokat vesszük figyelembe. A sok különböző tulajdonság számos

variációban, de együttesen jelenik meg a gyöngyosorokban, így azok valószínűleg azonos műhelyben készültek. Nem jellemzők a sok anyagot igénylő nagyméretű darabok, a kisebbek megformázása viszont még nagyobb precizitást igényelt volna. Azt kell feltételeznünk, hogy a méretek jelentős csökkenése mögött az anyagspórolás állhatott. Hiába hosszabbak a gyöngyosorok a kora avar korhoz képest, még így is jóval kevesebb anyagot használtak fel hozzájuk, mint például egy kora avar kori nagyméretű szemesgyöngyökből álló fűzérhez.

Elemzésünkben kitűnik, hogy sokszor hangsúlyozzuk, mennyivel elmarad a késő avar kori üvegyöngyök minősége és technikai kialakítása az import gyöngyökhöz vagy a kora avar korban használtakhoz képest. Azt is hangsúlyoznunk kell azonban, hogy az üveg ilyen szintű megművelése igenis fejlődést jelentett a Kárpát-medencén belül. Az import gyöngyöket mind olyan műhelyekben készítették, ahol a mesterek régóta egymásnak adhatták át tudásukat. Az üveget előállító centrumokban a technikai tudás áramlása figyelhető meg akár évszázadokon keresztül, viszont a Kárpát-medencén belül már az alacsonyabb szintű üvegmegmunkálás is igen magas belső fejlődést jelentett. Folyamatosan próbálkoztak az import gyöngyök formáinak, technológiáinak utánzásával, s annak ellenére, hogy nem ismerték ezeknek a készítési módszerét, az avarok olyan megoldásokat, újításokat alkalmaztak, amelyek segítségével imitálni tudták az import darabokat. A technikai újítások, valamint az, hogy mertek kísérletezni, bizonyos elemeket lemásolni, azt mutatja, hogy egy gyorsan adaptálódó kézműves közösségről lehetett szó, amely igazodott a lehetőségekhez és az igényekhez. Úgy tűnik, hogy a 9. században tovább élhettek ezek a műhelyek, amit alátámaszt az általuk készített gyöngyöknek az erre a századra datálható import gyöngyökkel való együttes megjelenése. A késő avar korban nem számolhatunk a gyöngyök nagy szériában történő gyártásával, hanem sok kisebb műhely létezése tűnik valószínűnek.