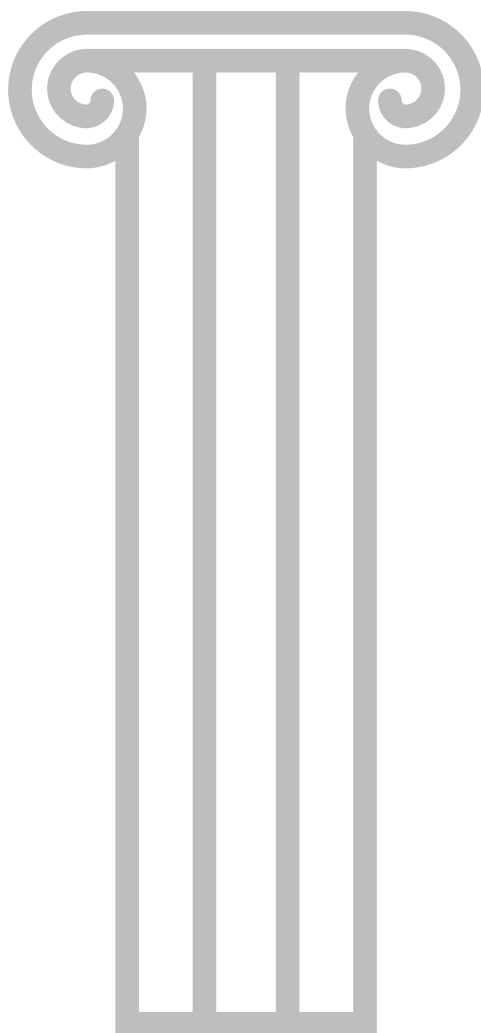


TISICUM

A JÁSZ-NAGYKUN-SZOLNOK MEGYEI MÚZEUMOK ÉVKÖNYVE XXIX.



SZOLNOK
2021

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On the Selection of Bronze Axes: The 1st Late Bronze Age Hoard from Törökszentmiklós-Morotva köz-dűlő

Introduction

The study introduces a new Late Bronze Age axe hoard from Morotva köz-dűlő (Jász-Nagykun-Szolnok County, Hungary). It also discusses some topics that can be related to this assemblage such as the selection of objects in hoards, the interpretation of typo-chronological patterns, connections during the Br D–Ha A1 in the territory of Eastern Hungary and the characterization of technological and use-wear traits of deposited objects.

The assemblage was found in 30 March 2018, through a metal detector survey, followed by an excavation, led by Péter Mali, Damjanich János Museum, Department of Archaeology. The exact topographical position of the hoard is at a multi-period site, which lies in the northern direction from a town called Törökszentmiklós. It is called the Morotva köz-dűlő, which is situated on the northern and north-eastern part of this area that originally stood in a wetland landscape surrounded by the Dees-ér and Kis-morotva in the 19th century before the regulation of the Tisza River (Fig. 1).¹

The assemblage consists of three socketed axes and one winged axe. In addition to these finds, a pure plano-convex ingot hoard (2nd) was also found here, which will be discussed in a separate study. The context of the 1st hoard was not preserved due to ploughing, which also left serious damages on the bronze objects. The axes were found close to each other. Three of them were near to the surface (ca. Nos. 1, 3–4), and one (No. 2) was excavated ca. 20 cm below it (Fig. 1.1–5, Pl. 1–4). This artefact also showed quite intense damage traces in the guise of sharp impacts, which strongly indicates plough damages.² As no settlement feature was excavated in the vicinity of the axe, it is possible to be in a secondary position.

Catalogue³

1. socketed axe (Inv. No. 2018.27.1.4): Socketed axe with thick collar and a loop. The object is decorated with cast V-shaped ribs on both wider sides. Damages caused by ploughing can be seen on one of the wider sides (Pl. 1/1.a). Remains of the casting jet is visible on the loop's top. The blade is hammered on all sides. The edge is sharpened (Pl. 1/1.b.2,

1.b.3) and it shows two recent impacts (Pl. 1/1.b.1, 1.b.4) and micro-dents (Pl. 1/1.b.2, 1.b.3). A slight mismatch defect can be observed along the narrow sides. L. 158.70 mm, Di. (socket) 34.29×28.81 mm, W. (w.s. rim) 48.51 mm, W. (w.s. rim with loop) 57.71 mm, W. (w.s. below the rim) 41.40 mm, W. (w.s. blade-socket interface) 37.80 mm, W. (n.s. rim) 38.98 mm, W. (n.s. below the rim) 31.98 mm, W. (n.s. blade-socket interface) 16.55 mm, Th. (w.s. rim) 5.89–5.76 mm, Th. (n.s. rim) 8.37 mm, L. (cutting edge) 52.27 mm, D. (socket) 73.24 mm, We. 509.8 g. *Finished product, used, deposited in intact, usable state* (Pl. 1).

2. socketed axe (Inv. No. 2018.27.1.3): Socketed axe with thick collar and a loop. The object is decorated with cast V-shaped ribs on both wider sides. The remains of a casting jet is visible on the top of the loop. Many impacts caused by the ploughing are visible on the wider sides (Pl. 2/2.a, 2.b). Its blade is hammered from all sides. The edge is sharpened (Pl. 2/2.b.1, 2.b.2) and shows small micro dents (Pl. 2/2.b.1, 2.b.2, 2.b.3, 2.b.4). L. 161.1 mm, Di. (socket) 33.91×28.91 mm, W. (w.s. rim) 49.17 mm, W. (w.s. rim with loop) 56.52 mm, W. (w.s. below the rim) 41.78 mm, W. (w.s. blade-socket interface) 37.20 mm, W. (n.s. rim) 37.68 mm, W. (n.s. below the rim) 31.89 mm, W. (n.s. blade-socket interface) 16 mm, Th. (w.s. rim) 4.92–5.87 mm, Th. (n.s. rim) 7.94 mm, L. of the cutting edge 52.58 mm, D. (socket) 52.59 mm, We. 491.7 g. *Finished product, used, deposited in intact, usable state* (Pl. 2).

3. socketed axe (Inv. No. 2018.27.1.2): Socketed axe with thick collar and a loop. The axe is decorated with one horizontal and three V-shaped ribs. Cast curved ribs are visible along its narrow sides. A recent impact can be observed on one of the wider sides (Pl. 3/3.b). The axe shows mismatch and shrinkage defects (Pl. 3/3.a, 3.b.1). The blade is hammered, which can be seen along the narrow sides. A hole is visible along the narrow side (Pl. 3/3.c). The edge is fragmented (Pl. 3/3.b.2). L. 165.81 mm, Di. (socket) 37.87×31.20 mm, W. (w.s. rim) 52.48 mm, W. (w.s. rim with loop) 60.55 mm, W. (w.s. below the rim) 45.43 mm, W. (w.s. blade-socket interface) 42.59 mm, W. (n.s. rim) 42.25 mm, W. (n.s. below the rim) 34.04 mm, W. (n.s. blade-socket interface) 20.18 mm, Th. (w.s. rim) 6.28–7.08 mm, Th. (n.s. rim) 9.17 mm, L. of the cutting edge 62.14 mm, D. (socket) ca. 82.55 mm (with mud inside), We. ca. 515.1 (with mud inside) g. *Finished product, deposited in intact, usable state* (Pl. 3).

4. winged axe (Inv. No. 2018.27.1.1): Small winged axe with straight butt-end and narrow blade. One of the wings was folded out (Pl. 4/4.b). The blade and the cutting edge is hammered, sharpened, showing micro dents (Pl. 4/4.a.1). Recent damages are visible on the wings (Pl. 4/4.c). The cutting edge also shows asymmetry (Pl. 4/4.a, 4.b). L. 131.07 mm, W. (w.s. butt-end) 27.67 mm, W. (w.s. wings) 28.79 mm, W. (w.s. blade) 23.54 mm, W. (w.s. cutting edge) 28.92 mm, W. (n.s. butt-end) 3.61 mm, W. (n.s. wings) 31.71 mm, W. (n.s. blade) 10.62 mm, We. 2107 g. *Finished product, used, deposited in usable intact state* (Pl. 4).

1 MADARAS 2006. 305.

2 TARBAY 2017. Fig. 9.3.

3 The documentation was carried out by the aid of high-resolution photographs and a dnt DigiMicro mobile camera. L. (Length), Di. (Diameter), W. (Width), Th. (Thickness), D. (Depth), We. (Weight), w.s. (wider sides), n.s. (narrow sides).



Fig. 1: 1. Topographical position of the site; 2. Topographical position of the site on the Map of the 2nd Military Survey of the Austro-Hungarian Empire

A Uniform Selection

The macroscopic character of the Törökszentmiklós axes is uniform. All objects are finished products. Their casting jets have been removed, and the casting seams along their narrow sides were grinded and polished, too. The axes' blades were carefully hammered as well, which is more visible from the narrow sides (e.g. Pl. 1/1.c–1.d, Pl. 2/2.c–2.d), Pl. 3/3.c–3.d, Pl. 4/4.c–4.d). It is important to note that the blades were particularly well formed because the craftsmen polished the hammered surface smooth. As a result, the hammer impacts are barely noticeable on the objects (Pl. 1/1.a–1.b, Pl. 2/2.a–2.b, Pl. 3/3.a–3.b, Pl. 4/4.a–4.b). On some specimens, even microscopic traces of sharpening can be identified (Pl. 1/1.b.2, 1.b.3, Pl. 2/2.b.1, 2.b.2, Pl. 4/4.a.1). All four axes are good quality casts, as they show only common defects (e.g. mismatch, shrinkage) (e.g. Pl. 3/3.a, 3.c, 3.b.1) that did not affect the usability of the objects. It is crucial to highlight that there are evident technological similarities between these axes. The casting jets were removed from the top of the loop (Pl. 1/1.e, Pl. 2/2.e, Pl. 3/3.e), suggesting that these tools had an identical mould design. Moreover, the dimensions of the cast rib patterns on No. 1 and No. 2 socketed axes correlate (Fig. 3). This similarity indicates that the two axes were made in the same workshop, either with identical moulds or after a same model.

Probably all four axes were used. However, use-wear traces were only visible on three specimens (Nos. 1–2, 4): micro dents (Pl. 1/1.b.2, Pl. 1/1.b.3, Pl. 2/2.b.1, 2.b.2, 2.b.3, 2.b.4, Pl. 4/4.a.1), asymmetry (Pl. 4/4.a, 4.b). Unfortunately, the edge of No. 3 was too fragmented to detect evident traces of use (Pl. 3/3.b.2). It must be emphasized that none of these axes reached the end of their use-life because tools as all of them were still quite functional during the act of deposition.⁴

The axes were found in a secondary position on a field under cultivation. Almost all of them showed evident traces of plough damages, such as sharp and wide impacts (Pl. 1/1.a, Pl. 2/2.a, 2.b, 2.d, Pl. 3/3.b, Pl. 4/4.c) or large V-shaped impacts (Pl. 1/1.a, 1.b, 1.b.1, 1.b.4). Modern damages caused the crushing of No. 2 axe's socket (Pl. 2.2.b) and the bending of No. 4 axe's wing (Pl. 4/4.c). Consequently, the axes were probably not intentionally manipulated during the act of deposition.

The results of the macroscopic observations imply that all objects were finished, usable products, taken out of circulation during the early stage of their use-life and they were deposited in an intact state without manipulation. It is important to highlight that the casting method of these axes were similar. Two of them were made with identical moulds or model, probably in the same workshop (Fig. 4).

4 The asymmetry observed on the winged axe (No. 4) can be the trace of intense use, but it still has a long blade compared to the evidently overused specimen from Szolnok. See MOZSOLICS 1985. Pl. 221.3.

Typo-chronological evaluation

Transylvanian type socketed axes (Nos. 1–2)

Two socketed axes (Pl. 1–2) belong to the so called 'Transylvanian type'.⁵ The main characteristics of these axes are the thick collar and the double V-shaped cast ribs along their wider sides. Similar axes were classified by Mircea Rusu as A variant, which appeared first in the Br D period (sub-variants A1–3) and were also present in the Ha A, when they stylistically changed (sub-variants A4–5).⁶ The exact stylistic parallels of the Törökszentmiklós axes are hard to determine due to the quality of published illustrations in the literature. Based on those finds that seem to be securely related to these artefacts, the Törökszentmiklós finds can be dated between the Br D and Ha A1 periods (Appendix, List 1).⁷ The distribution of most parallels primary covers the territory of Transylvania.⁸ Fine examples for these Romanian finds are the intentionally broken socketed axes from the 2nd Șpălnaca hoard (Fig. 5.4–5). In East Hungary, a further example is known from Gyula-Pikó gát.⁹ The westernmost parallel was found in an axe hoard that lacks archaeological context, in Bad Kreuznach, Germany.¹⁰

Socketed axe with V-shaped ribs (No. 3)

The socket axe No. 3 is rare and part of a common stylistic group at the same time (Pl. 3). What makes this axe special is the curved ribs along its narrow sides, which is rarely combined with the rib pattern visible on its wider sides.¹¹ Its exact parallels are scarce (Appendix, List 2). A comparable axe with much slimmer body can be mentioned from the Brodski Varoš hoard (Phase II/Br D–Ha A1).¹² Another Northern Croatian hoard from Budinščina (Phase II/Br D–Ha A1) also contains a fragmented specimen, similar to the one from Törökszentmiklós.¹³ An axe with identical size is known from the Čeremošiče hoard, Slovenia, dated to Horizon 2 (Ha A).¹⁴ A comparable axe can be mentioned from the Křepice settlement (Czech Republic) too.¹⁵ Notable that a quite similar socketed axe without loop was found in an uncertain hoard from

5 ROSKA 1938. 154. Fig. 1.; MOZSOLICS 1973. 39–41.; MOZSOLICS 1985. 34–35.; KACSÓ 2010. 3–36.

6 RUSU 1966. 8–9. Fig. 1.

7 SOROCEANU-SZABÓ 2001. 220.

8 SOROCEANU-SZABÓ 2001. 220–221.

9 SOROCEANU-SZABÓ 2001. 219. Fig. 2.3.

10 KIBBERT 1984. 122. Pl. 43.560.

11 This combination can be observed on larger and smaller axes with different patterns. Examples can be mentioned from different territories of Central Europe without completeness between the Br D and Ha A1 periods: Abaújszántó, Gușterita 2, Harsány, Hollern, Miskolc-Avas, Püspökhatvan, Pravčice 2, Sânpetru German, Vajdácscsa, Valea lui Mihai 1. KEMENCZEI 1968. Pl. 2.1.; MOZSOLICS 1973. Pl. 46.10, Pl. 51.6.; MAYER 1977. Pl. 76.1047.; PETRESCU-DÎMBOVIȚA 1978. Pl. 106.73, Pl. 135B.19.; KEMENCZEI 1984. Pl. 47a.7.; MOZSOLICS 1985. Pl. 139.14, Pl. 206.19.; SALAȘ 2005. Pl. 249B.1.

12 VINSKI-GASPARINI 1973. Pl. 61.2.

13 VINSKI-GASPARINI 1973. 212. Pl. 78.14.

14 MÜLLER-KARPE 1959. 280. Pl. 134.1.; ČERCE-ŠINKOVEC 1995. 138–146.

15 ŘÍHOVSKÝ 1992. 222. Pl. 57.824.

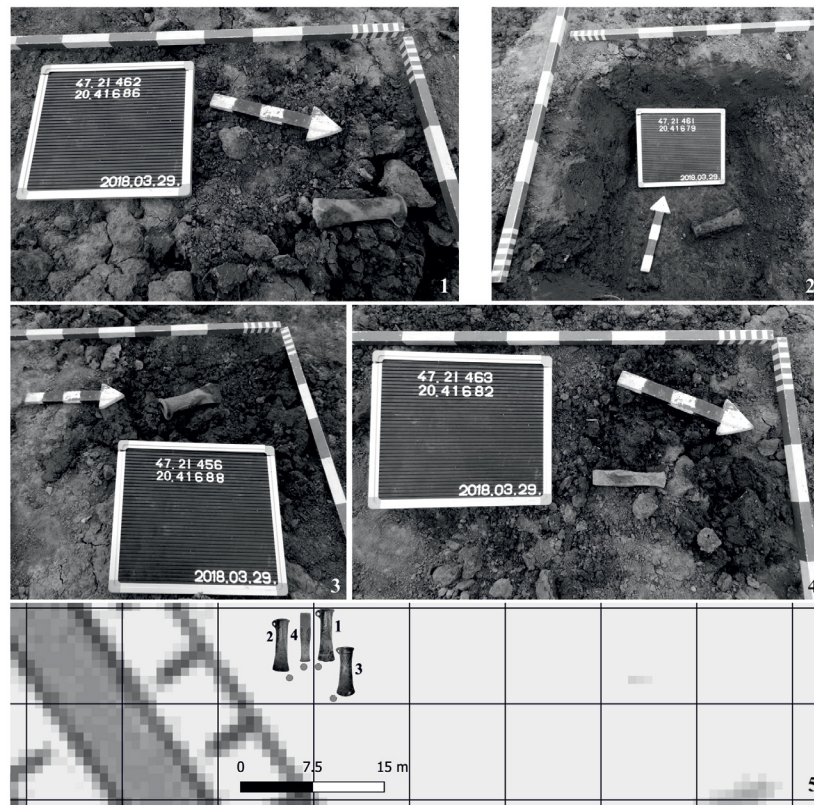


Fig. 2: 1–4. The 1st hoard from Törökszentmiklós; 5. Distribution of the finds (Photos: P. Mali)

Steinhaus-Traunleiten, Austria.¹⁶ The Ha A1 Szentgálóskér hoard from Transdanubia also contains a socketed axe without a loop and a special decoration, which resembles to the Törökszentmiklós find (Fig. 5.1). Notable that this hoard also contains Transylvanian type socketed axes like the Nos. 1–2 finds (Fig. 5.2).¹⁷

If only the rib decoration on the wider sides are considered, the number of parallels shows an increase, as this pattern combination is present on various socketed axes (Appendix, List 2). Here, these socketed axes were analysed by cluster analysis in Past software (Fig. 6),¹⁸ based on their most characteristic formal and decorative elements (Fig. 6.A1–D6), which can be securely identified on figures in the literature. The cluster analysis indicates that these axes can be arranged into several groups. Beside a unique find (Szentgálóskér No. 1) (Fig. 5.1), two main groups can be outlined, which are classifiable into at least 6 subgroups based on the typo-chronological features of the axes (Fig. 6.1–6). The cluster analysis clearly shows what can be considered as the most common design. These are the socketed axes with or without loops, which have straight ribs along their narrow sides and a simple or elongated triple triangle on their wider sides (Fig. 6.3–4). The individualistic nature of the

Törökszentmiklós socketed axe is also quite clear, as it belongs to the 1st minor group and lacks stylistically identical parallels (Fig. 6.1). In addition to the Törökszentmiklós axe, other individualistic minor groups and unique axes are present within the material (Fig. 6.2, 5–6).

By considering the spatial distribution of the groups, additional conclusions can be drawn. Only a handful of these axes are known from North-Eastern and Eastern Hungary or from the territory of Transylvania, Ukraine, Southern Italy, and Slovakia. The majority appeared in Transdanubia and its adjacent regions, as well as in the Northern Balkans (Fig. 7).¹⁹ Based on the distribution of the groups, it can be concluded that most of the style variants was present in Southern Transdanubia and the Northern Balkans. Here not only all the design groups can be found, but the quantity of the deposited axes is also higher than in other regions. Moreover, co-deposition of axes that belong to different groups can be observed here. Such a pattern can reflect on the possibility that the invention of this design happened in this region. Mainly Group 4 and sporadically specimens from Group 1, 2 and 5 are present in other territories. Based on the cluster analysis the Törökszentmiklós axe can be related to Group 1, which is sporadically present in the North-Western Balkans.

For the relative chronological position of these style groups, some uncertainties may arise due to the incompatibility of the local Carpathian

16 MAYER 1977. 190. Pl. 74.1032.; zu ERBACH 1985. Pl. 100.3.; zu ERBACH 1986. 181.

17 MOZSOLICS 1985. 194–195. Pl. 111.8, 14.

18 The too fragmented specimens (e.g. Punitovci) or axes published with low quality illustrations were not included in the analysis.

19 GAVRANOVIĆ-JAŠAREVIĆ 2016. 105.

chronological schemes.²⁰ Most axes were deposited in the Br D–Ha A1 (Phase II) or Ha A1 (Kurd Horizon).²¹ In case of 7 axes, later deposition can be seen: Donja Bebrina, Javornik (Ha A2), Čermožiše (Ha A),²² region of Mezőkővesd (Ha B1),²³ Cămin (Ha B2),²⁴ Manduria (prima età del ferro),²⁵ Peggau (Ha B3).²⁶ Except the find from Cămin, which clearly bears a later design, all of these axes have counterparts from the Br D–Ha A1 (Fig. 8). Consequently, these finds could have been manufactured around the Br D–Ha A1, used or accumulated for a longer period before their deposition.

Winged axe (No. 4)

The winged axe from Törökszentmiklós has centrally placed wings (*mittelständiges Lappenbeil*), a straight butt-end and a straight and narrow blade. Despite these well-definable typological traits, its exact parallels are hard to determine because the technological phenomena strongly affects the shape of this tool group. Usage shortens their blade, the butt-end is influenced by casting defects, the type of the pouring cup and the intensity of the post-cast treatment. The distribution of similar winged axes shows no specific concentration. They are present in the territory of Hungary (Nadap: Ha A1, Sárazsadány: Ha A1, Szolnok: Ha A1),²⁷ Austria (Enzenkirchen, Höhnhart),²⁸ Croatia (Bizovac, Phase II)²⁹ and Germany ('Bad Bergzabern').³⁰ The geographically closest parallel can be found in the Szolnok hoard.³¹ Based on the chronological position of the parallels, the Törökszentmiklós winged axe can be dated to the Ha A1 (Kurd Horizon).



Fig. 3: The correlating dimensions of the No. 1 and No. 2 socketed axes (Photos: J. G. Tarbay)

An Axe Hoard and Beyond

The four axes were deposited in a topographically prominent area – suitable for establishing a settlement – surrounded by the backwater system of the Tisza River. Although the context of the hoard was destroyed by agricultural work, the in-depth analysis of the finds allows us to tell a lot about their deposition. Here, the selection of the objects, their cultural connections and place within the Br D–Ha A1 deposition system of the territory of East Hungary will be discussed.

The Selection of Objects

The axes selected to the Törökszentmiklós hoard show a uniform picture. All of them were finished products with well-identifiable manufacturing traces. Casting defects observed on these axes are common and most likely did not affected their functional features. As they are large and heavy casts with a relatively fine quality, it is very much likely that an experienced bronze-smith has casted them. Moreover, a large amount of working time was invested in their post-cast treatment. These axes were further manufactured with much care, resulting not only in functional, but also aesthetically pleasing products. It is also important to underline that two of the axes (Nos. 1–2) show close similarities in their dimensions, pointing to the possibility that they were originating from the same workshop. As finished products, all axes were suitable for use. In case of those three specimens (Nos. 1–2, 4) that were suitable for

20 The Croatian, Serbian and Slovenian schemes tend to parallel their local hoard phases with multiple Reinecke/Müller-Karpe phases, reflecting rather on the entire chronological sequence of each hoard (e.g. Phase II/Br D–Ha A1) than the exact time of deposition. VASIĆ 1981.; VINSKI-GASPARINI 1973.; VINSKI-GASPARINI 1983.; TURK 1995. On the contrary, the Hungarian, Romanian and Slovakian systems parallel their phases with shorter Reinecke/Müller-Karpe periods, which usually correlate with the hoards' time of deposition, regardless of the longer chronological sequence that can be observed in these assemblages (e.g. Kurd Horizon – Ha A1). PETRESCU-DÎMBOVIȚA 1978. 85–97.; MOZSOLICS 1985.; MOZSOLICS 2000. The Peggau hoard calls the attention to another methodological problem. This find is dominated by Br D–Ha A objects, but the hoard's time of deposition was carried out around the Ha B3 (940–810 BC) based on radiocarbon dates. See WEIHS 2004. 42. 94–100. Pl. 17.137, 139.

21 GAVRANOVIĆ–JAŠAREVIĆ 2016. 106.

22 MÜLLER-KARPE 1959. 280. Pl. 134.1.; ČERCE–ŠINKOVEC 1995. 138–146.

23 MOZSOLICS 1985. Pl. 53.6.

24 PETRESCU-DÎMBOVIȚA 1978. 148. Pl. 254D.7.

25 CARANCINI 1984. 158. Pl. 123.3787.

26 WEIHS 2004. 42. 94–100. Pl. 17.137, 139.

27 MOZSOLICS 1985. 151, 184, 197–198. Pl. 169.3, Pl. 221.3.; MAKAY 2006. Pl. 15.119.

28 zu ERBACH 1985. Pl. 89.3, 7.; zu ERBACH 1986. 31, 63.

29 VINSKI-GASPARINI 1973. 212. Pl. 38.4.

30 KIBBERT 1984. 43. Pl. 4.59.

31 MOZSOLICS 1985. 197–198. Pl. 221.3.

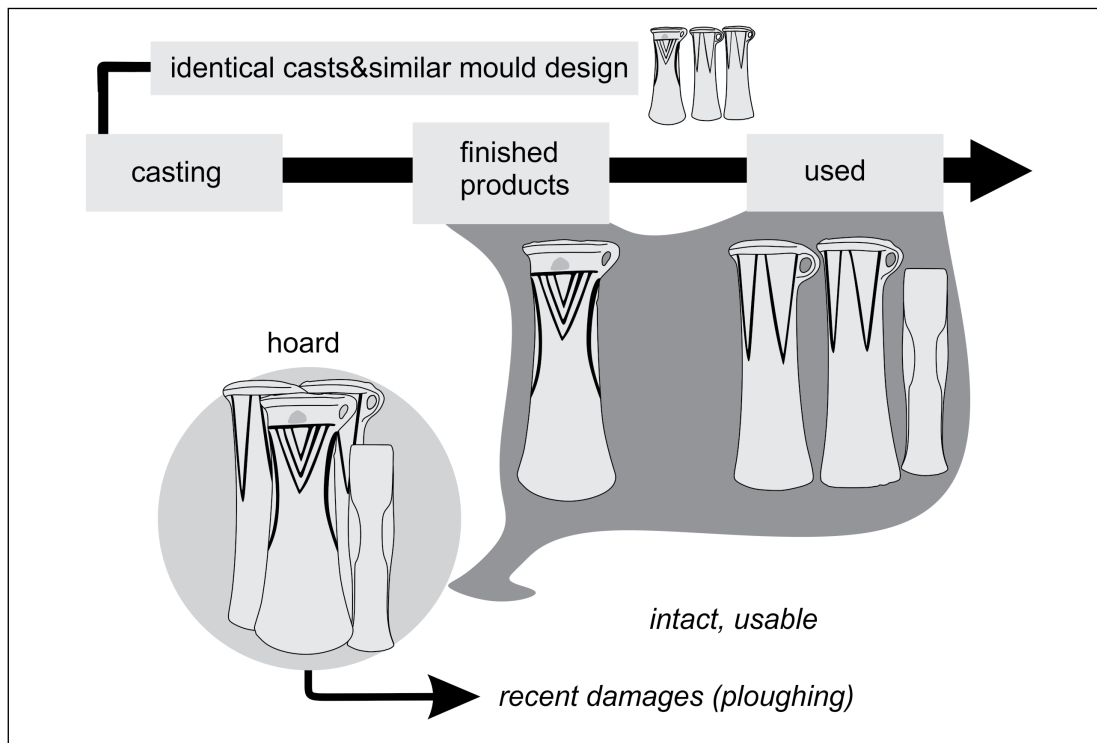


Fig. 4: The selection of objects according to the results of the macroscopic observations (Graphic: J. G. Tarbay)

analysis, macroscopic traces confirmed their use. It must be emphasized that the selection of these axes did not happen at the end of their use-life, since all of them were very much functional, intact, and reversible (Fig. 4).

Connections

The archaeological distribution of the related finds was a surprising result, as they are originating from distant areas. The spatial distribution of the parallels of the socketed axe with V-shaped ribs (No. 3) shows that similar tools were used in Southern Transdanubia and the Northern Balkans. Except the finds from Szolnok and Sárazsadány, the winged axe (No. 4) also seems to be more related to the Western Carpathian Basin and its adjacent areas. In contrast, Nos. 1–2 socketed axes show strong relations to Transylvania. In connection with the Špálnaca 2 hoard should be emphasized that it contains the combination of No. 1–3 socketed axes (Fig. 5.4–5),³² referring to deeper connections between these assemblages. This distribution pattern raises the possibility that the studied axes may not originated from this territory or even if they were locally produced, their maker/makers followed distant styles. From a perspective of cultural background, the appearance of 'foreign elements' in the Törökszentmiklós hoard resonate well with the model of the Pre-Gáva pottery style (ca. Br D–Ha A1; 1400–1250 BC based on the Polgár 29 and Tiszabura sites), which incorporated many local and far away style elements, especially from the territories of Transdanubia.³³

In other words, the heterogeneity of styles during this era can also be observed among metal products, to which fine examples are the axes from the Törökszentmiklós hoard.

Relative Chronology

The relative chronological position of the axe hoard can be dated to the Br D–Ha A1. Its time of deposition was most likely during the Ha A1 or Kurd Horizon according to Amália Mozsolics's scheme.³⁴ The presence of Br D elements in this hoard is supported by some parallels and the 'archaic design' of the Transylvanian type axes. In case of such 'overlapping' and 'long' chronological patterns, different explanations can be described: 1.) The finds may not have belonged to one hoard (multiple deposition, deposition of individual finds). This is an obvious possibility, which may arise by assemblages disturbed by modern agricultural work. However, the fact that they were found close to each other argues for their togetherness. (Fig. 2.5). 2.) The hoard was collected for a long period of time or multiple depositions were carried out at the same place in the framework of different events. 3.) Long lasting metallurgical tradition reflects on the design of these axes. These questions will be further addressed by a correspondence analysis in the next section.

Between Hoarding Traditions

An important question is how to interpret the Törökszentmiklós finds within the depositional customs of the region and era. Between the Br D and Ha A1 periods, characteristic deposition traditions can be seen

32 DUMITERSCU 1938. Fig. 4.9.; PETRESCU-DÎMBOVIȚA 1978. 127–131.

33 V. SZABÓ 2017. 242–248, Fig. 7.

34 MOZSOLICS 1985. 78–82.



Fig. 5: Stylistically related finds of the Törökszentmiklós hoard's socketed axes: 1–2. Szentgáloskér; 3. Kurd; 4–5. Špálnaca II (Hungarian National Museum) (Photos: J. G. Tarbay)

in the Eastern Carpathian Basin. Here, the deposition phenomena of the North Hungarian Mountains and the Great Hungarian Plain will be in focus. According to Amália Mozsolics's scheme, during this time two chronologically overlapping older horizons (Ópályi, Aranyos, Br D) and a younger one (Kurd, Ha A1) can be identified based on stylistic evolution and artefact combinations.³⁵

³⁵ MOZSOLICS 1973. 105–106.; PETRESCU-DÎMBOVIȚA 1978, 88–93.; MOZSOLICS 1985, 11–82.; KOBAL' 2000, 14–72.

The published finds of these horizons served as a database for a correspondence analysis carried out by Past software.³⁶ First, it is important to discuss the data handling process. All horizons included uncertain hoards (overall 47),³⁷ which were excluded from the database. Ceramic

³⁶ MOZSOLICS 1973.; MOZSOLICS 1985.

³⁷ Assemblages published selectively, hoards with highly insecure context, unreconstructible composition, incomplete hoards, mixture of multiple assemblages etc.

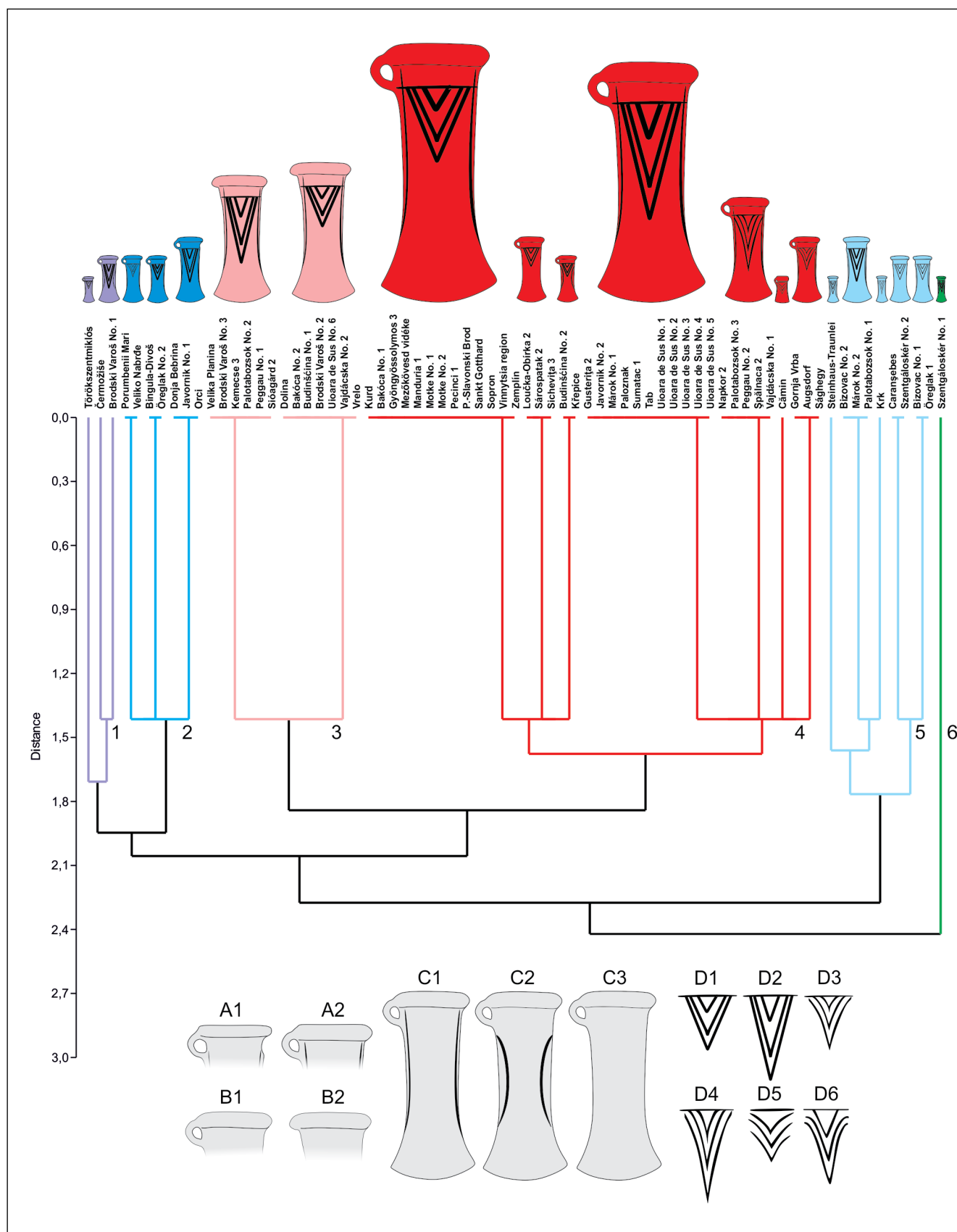


Fig. 6: Cluster analysis of stylistically related finds to the No. 3 socketed axe (Euclidean) (List 2)

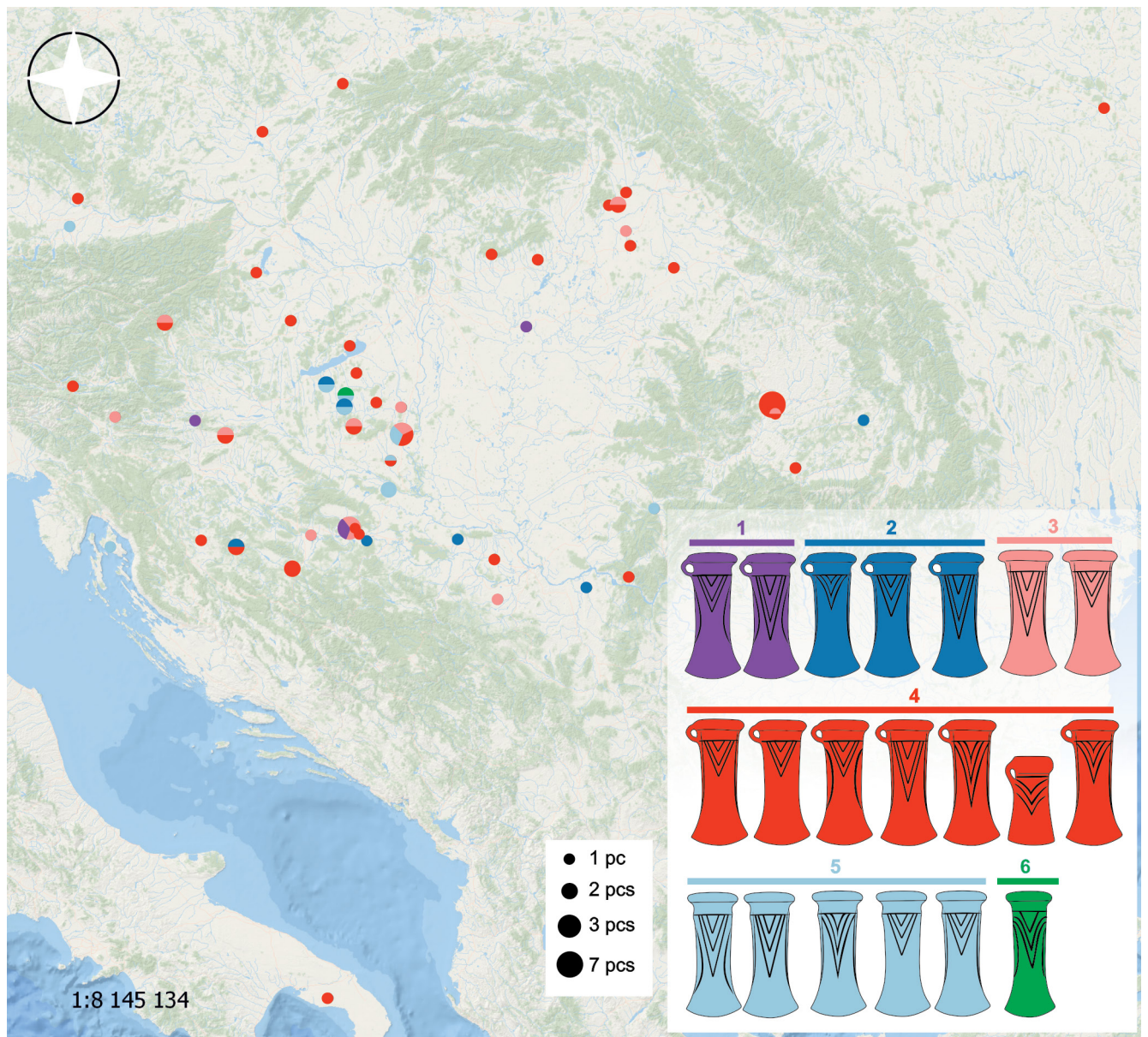


Fig. 7: Distribution of the six main style groups of related finds of the No. 3 socketed axe (List 2)

vessels were not included either, because they were the ‘container’ and not the ‘content’ of these hoards. Extreme values were also left out like some of the rare types (e.g. shaft-hole axes,³⁸ hammer-axes,³⁹ helmets and helmet parts)⁴⁰ or the 1st Debrecen hoard⁴¹ that contains hundreds of ornaments. Pure gold hoards (Nyíregyháza-Petőfi Street, Rozsály),⁴² as well as a pure disc-butted axe hoards (e.g. Kispalád 2)⁴³

and assemblages containing several of the above types (e.g. Ajak 1: 38 pcs, Hajdúház 18: pcs)⁴⁴ were also excluded. All beads were identified as 1 object despite of their number. The analysis was done in a setting, where all uninformative rows/columns has been removed. Thus overall, 92 hoards were analysed (23 pcs Ópályi, 18 pcs Aranyos, 51 pcs Kurd and Br D–Ha A1).

The results visualize well the model of Amália Mozsolics,⁴⁵ but also points out some finer details and interrelations. In Fig. 9, different overlapping hoard groups can be identified:

38 Abaujszántó, Tiszabecs. MOZSOLICS 1973. 116, 182, Pl. 51.2, Pl. 52.1.

39 Ajak 1, Csegöld. MOZSOLICS 1973. 117, 125–126, Pl. 36.8, Pl. 37A.5.

40 Keresztéte, Mezőnyárad, Kurtyán. MOZSOLICS 1985. 135, Pl. 150.9.; HELLEBRANDT 1996. 183, Fig. 9.6.; B. HELLEBRANDT 1999. Fig. 4.1.

41 MOZSOLICS 1985. 110.

42 MOZSOLICS 1973. 201–202, 204–205.

43 MOZSOLICS 1973. 147.

44 MOZSOLICS 1973. 117, 140.

45 See MOZSOLICS 1973. 12–115.; MOZSOLICS 1985. 11–82.

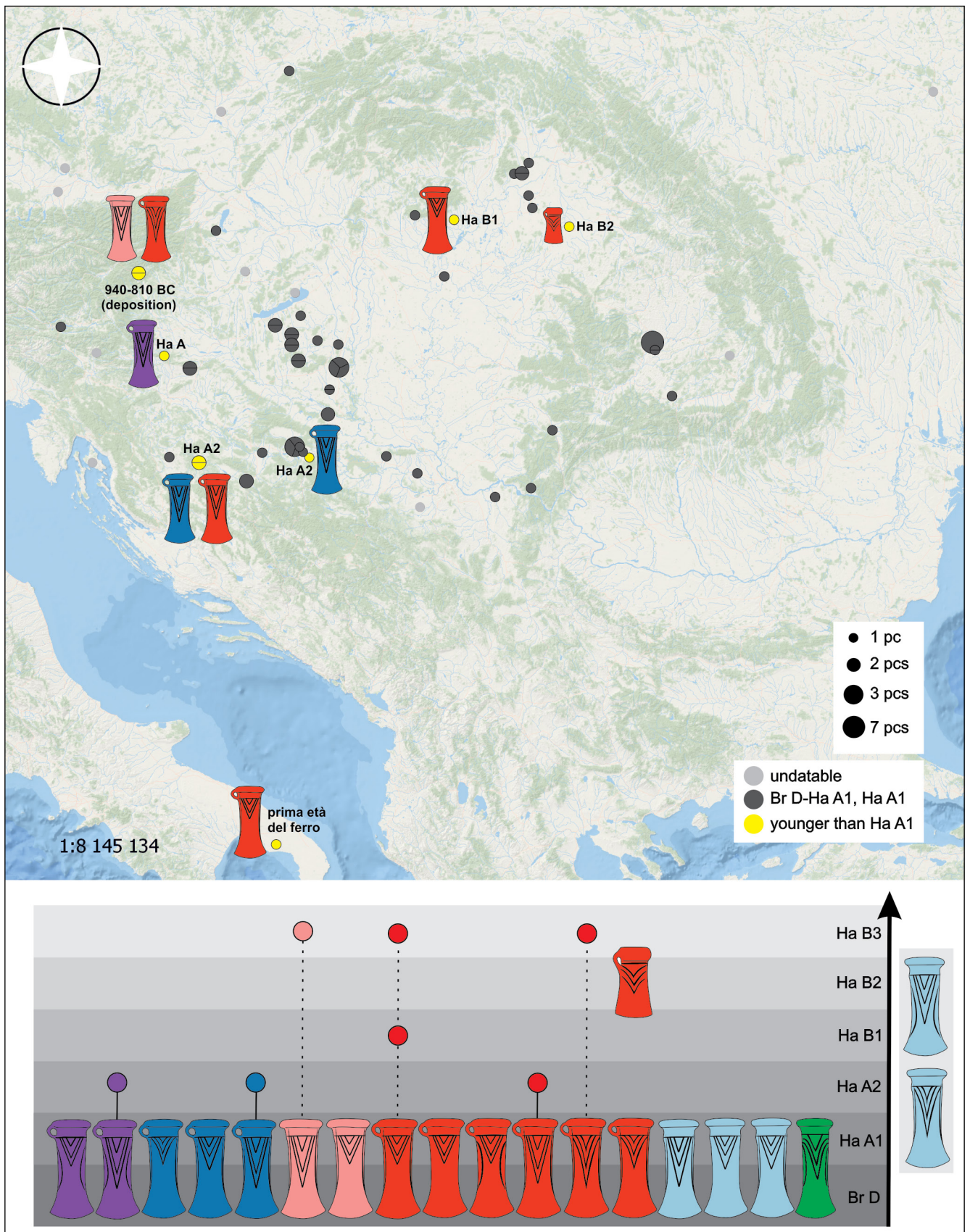


Fig. 8: Distribution of the later deposited axes among the parallels of No. 3 and the chronological position of the style group (List. 2)

A.) Hoards with heterogeneous composition, including several different types (e.g. *raw materials, winged-axes, daggers, socketed axes, sickles, palstaves, chisels, hammers, knives, saws, fibulae, belts, sheet bands/diadems, torques, pins, rivets, cheek pieces*). Quantitatively these are dominated by raw materials, socketed axes and sickles. With a few exceptions, mostly Kurd hoards (i.e. hoard deposited in the Ha A1) belong to this group. Some finds are dominated by *gold jewellery and swords*. This group includes Kurd and Aranyos finds.⁴⁶

B.) The next group includes hoards with spearheads and different ornament types (*arm spirals, arm/leg spirals, spiral sheet tubes, bronze vessels, razors, two-armed axes*). It is a more diverse group, which includes assemblages from the Aranyos, Kurd and Ópályi Horizons as well.

C.) Group C is dominated by *rings and disc-butted axes*. In this case, the horizons also showed overlapping. Disc-butted axes were primary characteristic to finds dated to the Ópályi Horizon, while rings were rather typical to the Kurd Horizon.

In addition, small heterogeneous groups can also be found like hoards with multiple *phalerae* and *knobs*. Based on the results of the correspondence analysis, three main deposition traditions can be identified, which generally support the theory of Amália Mozsolics on these hoard groups in the territory of Eastern Hungary.⁴⁷ However, as I have already mentioned, the overlapping between the different groups are quite dominant, especially in case of group B and C. This could refer to two possibilities: 1. The re-dating/re-grouping of some of these hoards should be taken into account in future analyses, 2. Certain selection patterns in hoarding may have been present for a longer period of time (e.g. selection of rings or knobs/phalerae etc.).

Here, the main goal of the correspondence analysis was to provide a better visualization for the local deposition trends that can be observed between the Br D and Ha A1, to which the Törökszentmiklós hoard is related. A crucial question is the place of this hoard within the local deposition systems during the above-mentioned periods. The results support the typo-chronological investigation, i.e. the hoard was deposited in the Kurd Horizon. On Fig. 9, it is noticeable that the Törökszentmiklós hoard is correlating with Group A, which is dominated by the Kurd assemblages.

This can be further supported by the dispersion and quantity of different axe types in hoards from the territory of Eastern Hungary, between the Br D and Ha A1. During this period, eight different type of axes can be found in hoards: *socketed axes, disc-butted axes, winged axes, palstaves, two-armed axes, shaft-holes axes, hammer-axes and flanged axes*.⁴⁸ On Fig. 10, the quantity of these objects in securely dated hoards can be seen. Socketed axes, disc-butted axes and winged-axes are dominant, while the rest of them is scarce. A chronological trend is also observable. In the Br D, disc-butted axes are the most

common.⁴⁹ In addition to this type, two-armed axes, hammer-axes and archaic weapons like shaft-hole axes are also present.⁵⁰ In the Ha A1, the number of these objects drastically decreased, while other types (socketed axes, winged axes and palstaves) became more common, replacing the older 'axe set'.⁵¹ The increased presence of socketed and winged axes also support the idea that the Törökszentmiklós hoard belonged to this hoard group and could have been deposited during this period.

The only uncharacteristic feature of the Törökszentmiklós assemblage is the fact that it is a pure axe hoard, which is not usual in this area. Not counting hoards containing solely disc-butted axes, only a few pure socketed axe hoards are known between the Br D and Ha A1 periods. In Eastern Hungary one example can be mentioned from Bodrogkeresztúr-Kastély köz 1 (Br D).⁵² The rest of these finds were unearthed in the territories of Transcarpathia⁵³ and Romania.⁵⁴ The number of these assemblages is not large, but it could point out the possibility that the aspect of selection may also have a 'foreign' nature.

Conclusions

The pure axe hoard from Törökszentmiklós is a fine example for the rich deposition patterns between the Br D and Ha A1 period. Some of the finds show stylistic connections with the metallurgical tradition of the Br D. However, their deposition was most likely in the Ha A1 based on the following arguments: 1. typo-chronological characteristics of the finds, 2. combination with winged axes that are more common in the Ha A1, 3. correspondence analysis sorted the Törökszentmiklós hoard to Group A which is dominated by Ha A1 hoards. The macroscopic observation revealed a uniform deposition pattern regarding the technological character of the finds. All of them were finished, usable products, which were taken out of circulation around the early stage of their use-life and were deposited in intact state without any kind of manipulation. It is important to highlight that the socketed axes had similarities within their casting method, and two of them were most likely made with an identical mould or model in the same workshop. One of the most surprising feature of this hoard is its 'foreign' character. It is a pure axe hoard, which is rather common east of the hoard's region. The related finds of the hoard are originating from distant areas: Transylvania, Transdanubia and the Northern Balkans. This distribution pattern suggests the non-local nature of these axes and requests further archaeometallurgical characterization and fine comparison of these objects with their parallels. Based on our current results, two hypotheses can be formulated: 1.) The axes from Törökszentmiklós were made in a distant region and were brought here as the result of

46 It should be noted that there are several pure gold ornament hoards in the Ópályi Horizon. These finds did not appear on the diagram since they have been excluded from analysis.

47 MOZSOLICS 1973. 12–115.; MOZSOLICS 1985. 11–82.

48 MOZSOLICS 1973.; MOZSOLICS 1985.

49 MOZSOLICS 1973. 14, 21–22.; MOZSOLICS 1985. 19.

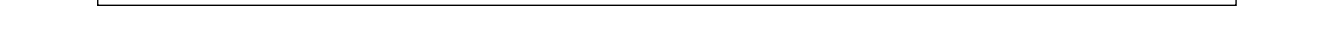
50 MOZSOLICS 1973. 12, 14, 22–24.

51 MOZSOLICS 1973. 36–41.; MOZSOLICS 1985. 30–36.

52 MOZSOLICS 1985. 100. Pl. 20.

53 Uzhhorod 3 (Br D), Beregovo 6 (Ha A1), Ung region 2 (Br D). KOBAL' 2000. 74–75, 97, 101. Pl. 17J, Pl. 26D, Pl. 72C.

54 e.g. Iablanța 2 (Ha A1), Petroșani 2 (Ha A1), Suciu de Jos 1 (Br D), Uroi-Dealul Uroiului (Br D). PETRESCU-DÎMOBVIȚA 1978. 107–108, 122, 124, 136. Pl. 47.C, Pl. 51A, Pl. 119B, Pl. 129B, Pl. 214A.



different cultural processes and their selection for deposition (pure axe hoard) was also followed by a 'foreign concept'. 2.) Local metalworkers adopted 'foreign' tool designs. Whichever hypothesis is true, the co-appearance of these axes fit well to the diversified cultural phenomena during the Br D–Ha A1.

Acknowledgement

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Appendix

List of parallels⁵⁵

List 1. Socketed axes (Nos. 1–2)⁵⁶

1. Aiud (RO) h. (Ha A1): PETRESCU-DÎMBOVIȚA 1977. 80–81.
2. Bad Kreuznach (DE) u. axe h.: KIBBERT 1984. 122. Pl. 43.560.
3. Bežanija (RS) h. (Stufe II/Br D–Ha A): ГАРАШАНИН 1973. 639. Pl. 82.
4. Gyula-Pikó gát (HU) h. (Ha A): SOROCEANU–SZABÓ 2001. 219. Fig. 2.3.
5. Draja de Jos (RO) h. (Br D): ALEXANDRESCU 1966. R 15d.23.; PETRESCU-DÎMBOVIȚA 1978. 111–112.
6. Șpălnaca 2 (RO) h. (Ha A1): PETRESCU-DÎMBOVIȚA 1978. 127–131. (Fig. 5.4–5).
7. 'Slovakia' st.: NOVOTNÁ 1970. 71. Pl. 26.463.
8. Zlatna 3 (RO) h. (Ha A1): BERCIU – POPA 1965. 72. Fig. 1.2.; PETRESCU-DÎMBOVIȚA 1978. 135–136. Pl. 211A.1.
9. Valea lui Mihai (RO) h. (Br D): ZOLTAI 1911. 29. Fig. 3.; ZOLTAI 1915. 127.; MOZSOLICS 1973. 131–132. Pl. 46.7.
10. Valea Largă (RO) h. (Br D): ROSKA 1929. 291. 298. Fig. 52.6.; ROSKA 1942. 176. Fig. 209.6.; MOZSOLICS 1973. 156. Pl. 75.6.; PETRESCU-DÎMBOVIȚA 1978. 108. Pl. 51B.1.

List 2. Socketed axes with one horizontal rib, three V ribs, and straight side ribs (No. 3)⁵⁷

1. Augsdorf (AT) h. (Ha A1): MÜLLER-KARPE 1959. 278. Pl. 129.3.; MAYER 1977. 192. Pl. 76.1051.
2. Bakóca (HU) h. (Ha A1): MOZSOLICS 1985. 88–90. Pl. 87.3–4.
3. Bingula-Divoš (RS) h. (Stufe II/Br D–Ha A): VINSKI-GASPARINI 1973. 211. Pl. 84.26.
4. Bizovac (HR) h. (Phase II/Br D–Ha A1): VINSKI-GASPARINI 1973. 212. Pl. 36.4–5.
5. Budinščina (HR) h. (Phase II/Br D–Ha A1): VINSKI-GASPARINI 1973. 212. Pl. 78.1, 14.
6. Brodski Varoš (HR) h. (Phase II/Br D–Ha A1): VINSKI-GASPARINI 1973. 212. Pl. 61.2, Pl. 62.5, 13.
7. Caranșebes (RO) h. (Ha A1): JOVANOVIĆ 2011. 56. Pl. 6.50.
8. Cămin (RO) h. (Ha B2): PETRESCU-DÎMBOVIȚA 1977. 141. Pl. 344.10.; PETRESCU-DÎMBOVIȚA 1978. 148. Pl. 254D.7.
9. Čermožiše (SI) h. (Horizon II/Ha A): MÜLLER-KARPE 1959. 280. Pl. 134.1.; ČERCE–ŠINKOVEC 1995. 138–146.
10. Dolina na Savi (HR) h. (Phase II/Br D–Ha A1): SCHAUER 1974. 100. Fig. 3.1.
11. Donja Bebrina (HR) h. (Phase III/Ha A2): VINSKI-GASPARINI 1973. 213. Pl. 94.11.
12. Gornja Vrba (HR) h. (Phase II/Br D–Ha A1): VINSKI-GASPARINI 1973. 214. Pl. 50.11.
13. Gyöngyössolymos 3 (HU) h. (Ha A1): KEMENCZEI 1972. 134. Pl. 3.1.
14. Gușterița 2 (RO) h. (Ha A1): PETRESCU-DÎMBOVIȚA 1978. 120–122. Pl. 105.47.
15. Javornik (HR) h. (Phase III/Ha A2): VINSKI-GASPARINI 1973. 215. Pl. 98.1–2.
16. Kemecse 3 (HU) h. (Ha A1): MOZSOLICS 1985. 132–134. Pl. 183.14.
17. Kurd (HU) h. (Ha A1): HAMPEL 1895. Pl. 1.8.; MOZSOLICS 1985. 141.
18. Křepice (CZ) st. from a se.: ŘÍHOVSKÝ 1992. 222. Pl. 57.824.

⁵⁵ Abbreviations of countries: AT = Austria, BA = Bosnia and Hercegovina, DE = Germany, CZ = Czech Republic, HR = Croatia, RO = Romania. Abbreviations of context: u. = uncertain, h. = hoard, st. = stray find, se. = settlement.

⁵⁶ The list only contains those axes, of which published illustration is suitable to differentiate the rib decorations from the emphasized triangular-shaped motif.

⁵⁷ The list only contains those axes, of which fine typological features can be well identified based on publications. Highly fragmented finds and objects published with contradict illustrations (e.g. Sălaj) were not included in the list. DUMITRESCU 1941. 133–134. Fig. 1.2.; PETRESCU-DÎMBOVIȚA 1978. 126. Pl. 132.D.2. Fragments that could have belong to this group. See VIDOVIĆ 1989. 455–457. Pl. 4.9.; SZATHMÁRI 1991. Fig. 2.1.; BORIĆ 1997. 46. Pl. 5.48.; CLAUSING 2004. 68. Fig. 5.21.; KÖNIG 2004. 212–213. Pl. 6B.2.; CIUGUDEAN–LUCA–GEORGESCU 2006. 21. Pl. 25.1.; JOVANOVIĆ 2010. 86. Pl. 16.86.

19. Krk (HR) st.: BURŠIĆ-MATIJAŠIĆ 2011. 73–75. Fig. 1.
20. Loučka-Obírka 2 (CZ) h. (Ha A1): ČIZMÁŘ – SALAŠ 2009. Fig. 4.4.
21. Mezőkövesd vidéke (HU) h. (Ha B1): MOZSOLICS 2000. 56–57. Pl. 53.6.
22. 'Manduria' 1 (IT) h. (prima età del ferro): CARANCINI 1984. 152, 158. Pl. 124.3787.
23. Márok (HU) h. (Ha A1): MOZSOLICS 1985. 146–149. Pl. 90.8, 10.
24. Motke (BA) h. (Stufe II/Ha A1): KÖNIG 2004. 211–212. Pl. 25.13–14.
25. Napkor, Piripucpuszta 2 (HU) h. (Ha A1): KEMENCZEI 1966. 13. Pl. 1.1.; MOZSOLICS 1985. 158.
26. Orci (HU) h. (Ha A1): HAMPEL 1886. Pl. 117.3.; MOZSOLICS 1985. 165–166.
27. Öreglak (HU) h. (Ha A1): MOZSOLICS 1985. 163–165. Pl. 76.12, Pl. 77.1.
28. Palotabozsok (HU) h. (Ha A1): HAMPEL 1886. Pl. 98.2, 8, 11.; MOZSOLICS 1985. 166–168. Pl. 70.6.
29. Paloznak (HU) st.: PATEK 1968. 135. Pl. 66.4.
30. Pećinci 1 (RO) h. (Stufe II/Br D–Ha A): МИЛОШЕВИЋ 1960. 156. Pl. 1.9.
31. Peggau (AT) h. (Br D–Ha A, deposition: Ha B3, 940–810 BC): WEIHS 2004. 42. Pl. 17.137, 139.
32. Podcrkavlje-Slavonski Brod (HR) h. (Phase II/Br D–Ha A1): VINSKI-GASPARINI 1973. 217. Pl. 67.3.
33. Punitovci (HR) h. (Phase II/Br D–Ha A1): VINSKI-GASPARINI 1980. Pl. 1.6.
34. Porumbenii Mari (RO) st.: CRIȘAN 1993. 247. Pl. 9.14.
35. Sankt Gotthard im Mühlkreis (AT) st.: KNEIDINGER 1959. 28. Fig. 8.6.
36. Șpálnaca 2 (RO) h. (Ha A1): DUMITERSCU 1938. Fig. 4.9.; PETRESCU-DÎMBOVIȚA 1978. 127–131.
37. Sághegy (HU) st. from se.: PATEK 1968, Pl. 31.5.
38. Sárospatak 2 (HU) h. (Ha A1): B. HELLEBRANDT 1986. 5. Fig. 3.9.
39. Sichevîța 3 (RO) h. (Ha A1): SOROCEANU 1995. Fig. 2.11.
40. Sióagárd 2 (HU) h. (Ha A1): MOZSOLICS 1985. 186. Pl. 42.8.
41. Sopron (HU) h. (Ha A1): MOZSOLICS 1985. 187. Pl. 135.2.
42. Steinhaus-Traunleiten (AT) u. h.: MAYER 1977. 190. Pl. 74.1032.; zu ERBACH 1985. Pl. 100.3.; zu ERBACH 1986. 181.
43. Šumatac 1 (BA) h. (Stufe II/Ha A1): KÖNIG 2004. 219–222. Pl. 8.3.
44. Szentgáloskér (HU) h. (Ha A1): MOZSOLICS 1985. 194–195. Pl. 111.18, 6 (Fig. 5.1).
45. Tab (HU) h. (Ha A1): MOZSOLICS 1985. 199. Pl. 116.5.
46. Uioara de Sus (HU) h. (Ha A1): PETRESCU-DÎMBOVIȚA 1978. 132–135. Pl. 163.64, 66–68, 71, 79, Pl. 164.88.
47. Vajdácaska (HU) h. (Ha A1): KEMENCZEI 1981. 151. Pl. 2.1, 4.; MOZSOLICS 1985. 210–211. Pl. 206.22.
48. Velika Planina (SI) st.: ŠINKOVEC 1995. 60. Pl. 14.81.
49. Veliko Nabrđe (HR) h. (Phase II/Br D–Ha A1): Pl. VINSKI-GASPARINI 1973. 222. Pl. 46.1.
50. Vinnytsia region (UA) st.: КЛОЧКО – КОЗЫМЕЧКО 2017. 183. Fig. 3.
51. Vrelo (BO) st.: GAVRANOVIĆ – JAŠAREVIĆ 2016. 105. Fig. 1.1.
52. Zemplín (SK) h. (Ha A1): GAŠAJ 1982. 276. Pl. 3.2.; FURMÁNEK 2006. 25–26. Pl. 58.13.

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A bronzbalták szelekciójáról: az 1. késő bronzkori depó Törökszentmiklós-Morotva köz-dűlőről

A tanulmány egy szárnyasbaltából és három tokosbaltából álló, új kincsleletet mutat be, mely 2018-ban ásatás során került elő Törökszentmiklós-Morotva köz-dűlőn (1–2. kép). A négy balta technológiai szempontból késztermékként határozható meg. Finom méretadatai alapján két példány (1–2. tábla) ugyanabból a műhelyből származhat, megegyező öntőformában vagy modell alapján készítették őket (3. kép). Nagy valószínűség szerint mind a négyet használták deponálásuk előtt, ugyanakkor erre utaló nyomok csak három darabon voltak megfigyelhetők. Fontos jellemzőjük, hogy deponálásuk idejében egyik se érte el életciklusának a végét, alapvetően használható állapotban vonták ki őket a hétköznapi világából. Két balta (1–2. tábla) az ún. erdélyi típusú tokosbalták körével ápol kapcsolatot, relatív kronológiai szempontból a Br D és Ha A1 periódusok leletanyagával rokoníthatjuk őket. Hasonló stílusú eszközök elsősorban Erdélyben kerültek elő, de feltűnnek Kelet-Magyarország, sőt szórányosan még Nyugat-Európa területén is. A harmadik V és íves bordákkal díszített tokosbalta (3. tábla) egyedi felépítésű, kevés szoros párhuzammal bír, melyek elsősorban az Észak-Balkán és a Dunántúl területéről ismertek. Klaszteranalízis alapján ez a törökszentmiklói balta egy szélesebb körben elterjedt stíluscsoportba sorolható, mely leginkább a fent említett területeken fordult elő a legnagyobb számban és változatosságban (6–8. kép). A tárgy relatív kronológiai szempontból szintén a Br D és Ha A1-es idősakkal hozható összefüggésbe. A 4. közép szárnyállású balta (4. tábla) a 'helyi' szolnoki darab, illetve több dunántúli, ausztriai és horvátországi példány alapján a Ha A1-re keltezhető. A depóegyüttes elemzése alapján összességében elmondhatjuk, hogy a szétszántott együttes szelekciós mintázata homogén készítéstechnológiai és használati szempontból (4. kép). Kapcsolatrendszerük alapvetően távoli régiók felé, elsősorban a Dunántúl, Erdély és az Észak-Balkán irányába mutat, mely mintázat jól rezonál a leletegyüttes időrendileg párhuzamba állítható Pre-Gáva kerámiastílus (Br D–Ha A1, 1400–1250 BC) kerámia anyagában leírt stíluskeveredéssel. A tisztán baltákból álló deponálási mintázat egyedinek mondható ebben a régióban, egy kelet-magyarországi leletegyüttest leszámítva, hasonló depókat elsősorban Kárpátalja és Erdély területén láthatunk ebben az időszakban. A törökszentmiklói depó tipológiai szelekciója az Északi-középhegység és Alföld Br D és Ha A1 deponálási rendszerein belül (Ópályi, Aranyos és Kurd horizontok), korrespondenciaanalízis alapján (9. kép), elsősorban a Kurd horizonthoz köthető együttesekkel mutat kapcsolatot, ezért valószínűleg deponálási idejére is ekkor kerülhetett sor. Ezt támasztja alá a tokosbalták és szárnyasbalták mennyiségi megjelenése is, ami szintén a Ha 1-re mutat (10. kép).

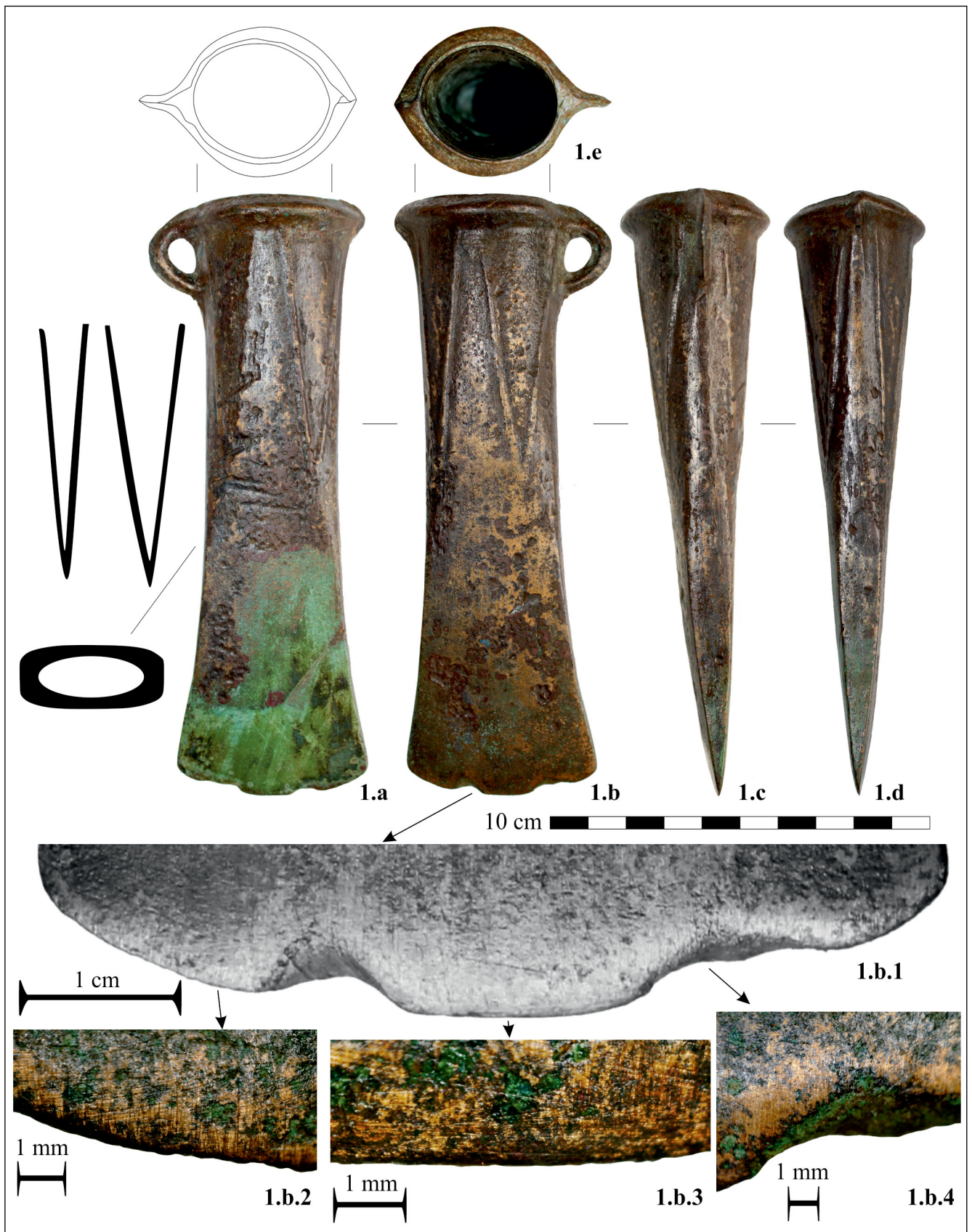


Plate 1: 1.a–e. Socketed axe from the 1st Törökszentmiklós hoard (No. 1); 1.b.1, 1.b.4. recent damages on the blade; 1.b.2–3. sharpening traces and micro dents along the cutting edge (Photos&Micrographs: J. G. Tarbay)



Plate 2: 2.a-2. Socketed axe from the 1st Törökszentmiklós hoard (No. 2); 1.b.1-2. Sharpening traces and micro dents along the cutting edge; 1.b.3-4. A notch on the cutting edge (Photos&Micrographs: J. G. Tarbay)

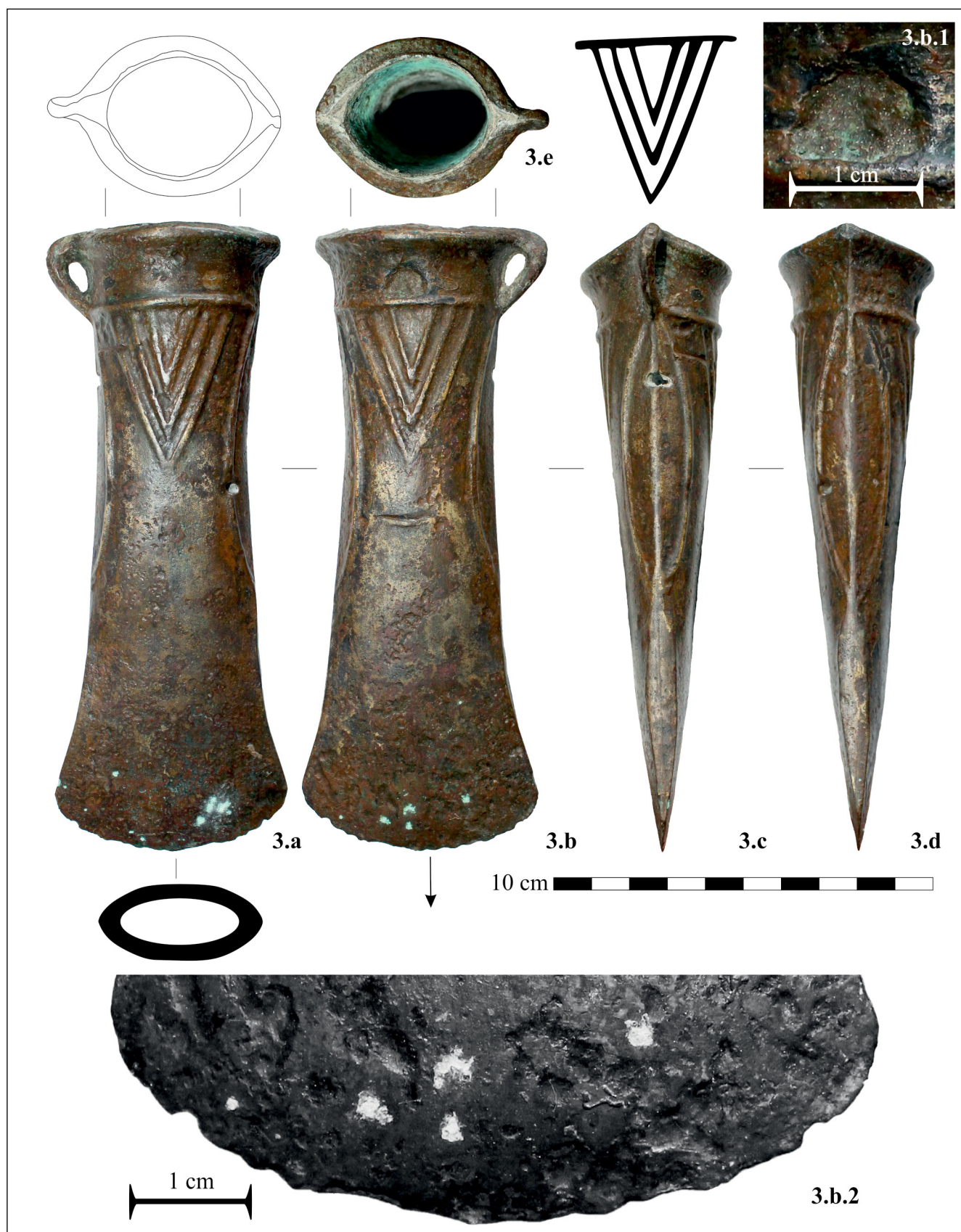


Plate 3: 3.a-d. Socketed axe from the 1st Törökszentmiklós hoard (No. 3); 3.b.1. Shrinkage defect; 3.b.2. Fragmented cutting edge (Photos&Micrographs: J. G. Tarbay)



Plate 4: 4.a-d. Winged axe from the 1st Törökszentmiklós hoard (No. 4); 4.a.1. Sharpening traces and micro dents along the cutting edge (Photos&Micrographs: J. G. Tarbay)

