










# AN OUTSTANDING PRE-SCYTHIAN BURIAL FROM BÜKKÁBRÁNY-KÁLVÁRIA

## EGY KÜLÖNLEGES PRESZKÍTA TEMETKEZÉS BÜKKÁBRÁNY-KÁLVÁRIA LELŐHELYRŐL •

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### Abstract

*The study presents a burial, and its assemblage discovered at Bükkábrány-Kálvária (Borsod-Abaúj-Zemplén County, NE-Hungary) dating to the 9<sup>th</sup>–early 8<sup>th</sup> century BC, along with additional pieces of bronze artefacts collected nearby from a systematic metal detector survey. The grave held the remains of an adult female and an infant. Scientific examinations were carried out to analyse the burial assemblage. In addition to the anthropological and archaeozoological analysis of the human and animal remains, the chemical composition of the recovered gold beads was analysed by ED-XRF spectrometry. The measurement results revealed that the beads were likely to have been made using the same or very similar base material, relatively high silver-containing (14–16 wt%) native gold. The residue adhering to the surface of the antler plate likely contains the remains of a plain weave textile. Cobalt blue, dark green, pink, and natural colour threads forming the finely woven fabric were documented by digital microscope images. CT scans were used to visualise the decoration of the plate in order to preserve the corroded textile remains. Among the stray finds of horse equipment, the cheekpiece was analysed by ED-XRF spectrometry; based on the results, the bit was made of tin bronze with around 9–10 wt% tin content in the original alloy. The archaeological evaluation of the Pre-Scythian finds from Bükkábrány revealed complex cultural interactions between East, North, and West.*

### Kivonat

*A dolgozat egy Bükkábrány-Kálvária (Borsod-Abaúj-Zemplén vármegye) lelőhelyen feltárt, a Kr. e. 9. századra –8. század elejére keltezhető preszkíta sír leletanyagát és a lelőhely szisztematikus fémkeresős kutatásából származó leleteket mutat be. A felnőtt nő és csecsemő maradványait tartalmazó sír mellékletein természettudományos vizsgálatokat végeztünk. A sír embertani- és állatcsont-anyagának vizsgálata mellett az előkerült aranygyöngyök elemösszetételét energia diszperzív röntgen spektrometriával (ED-XRF) elemeztük. A gyöngyök feltehetően ugyanabból vagy igen hasonló alapanyagból, aránylag nagy ezüsttartalmú (14–16 tömeg%) termésaranyból készültek. Az agancslemez felületén lévő lerakódásban nagy valószínűséggel vászonkötésű szövet maradványait azonosítottuk. A finom szövetet alkotó kobaltkék, méregzöld, pink és natúr színű elemi szálakat digitális mikroszkóppal készült képekkel dokumentáltuk. A korrodálódott textilmaradványok megőrzése*

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érdekében a lemez díszítését CT-felvételek segítségével jelenítettük meg. A szórvány lószerszámok közül a fém zablá az ED-XRF módszerrel végzett elemösszetétel analízis alapján ónbronzból készült, az ón aránya az eredeti ötvözetben 9–10 tömeg% körül lehetett. A Bükkábrányban előkerült, preszkíta korú leletanyag régészeti elemzése komplex, keleti, északi és nyugati irányú kulturális kapcsolatokra világított rá.

KEYWORDS: PRE-SCYTHIAN, MEZŐCSÁT CULTURE, FEMALE BURIAL, TEXTILE REMAINS, ANTLER PLATE, HORSE EQUIPMENT, ARCHAEOMETALLURGY, CT IMAGING

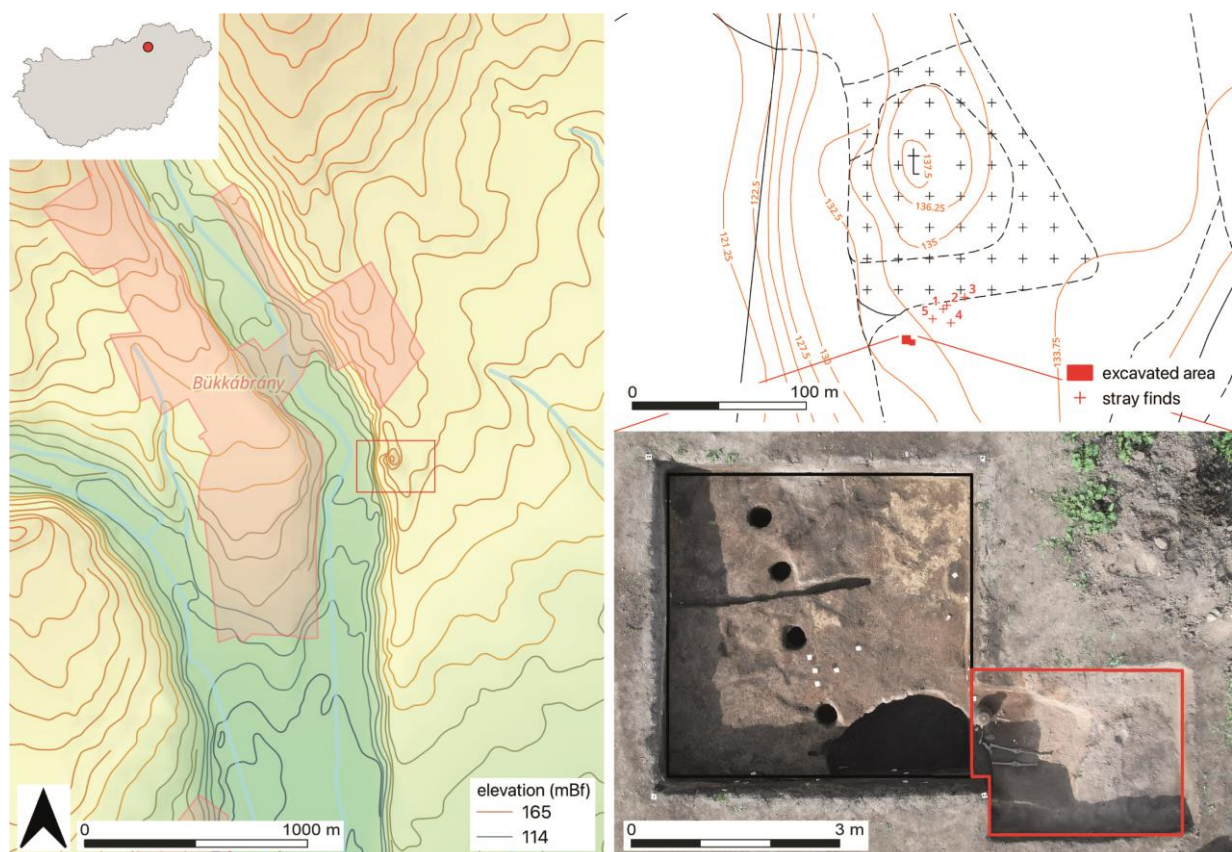
KULCSSZAVAK: PRESZKÍTA, MEZŐCSÁT-KULTÚRA, NŐI TEMETKEZÉS, TEXTILMARADVÁNYOK, AGANCSLEMEZ, LÓSZERSZÁMZAT, ARCHEOMETALLURGIA, CT-KÉPALKOTÁS

## Introduction

The BORBAS project (Borsod Region Bronze Age Settlements) has been investigating Early and Middle Bronze Age settlement networks in the region of the Bükk-Foothill zone and South Borsod Plain since 2012 (Kienlin et al. 2018). The project set out to explore the internal structure of Bronze Age settlements – as a first step – to identify individual households, while seeking to better understand how basic units of habitation functioned in this period. The next level of our enquiry is to map out the relationship between the construction and the use of Bronze Age buildings within a given settlement. Putting all this into a broader perspective, the project aims to contextualise these building

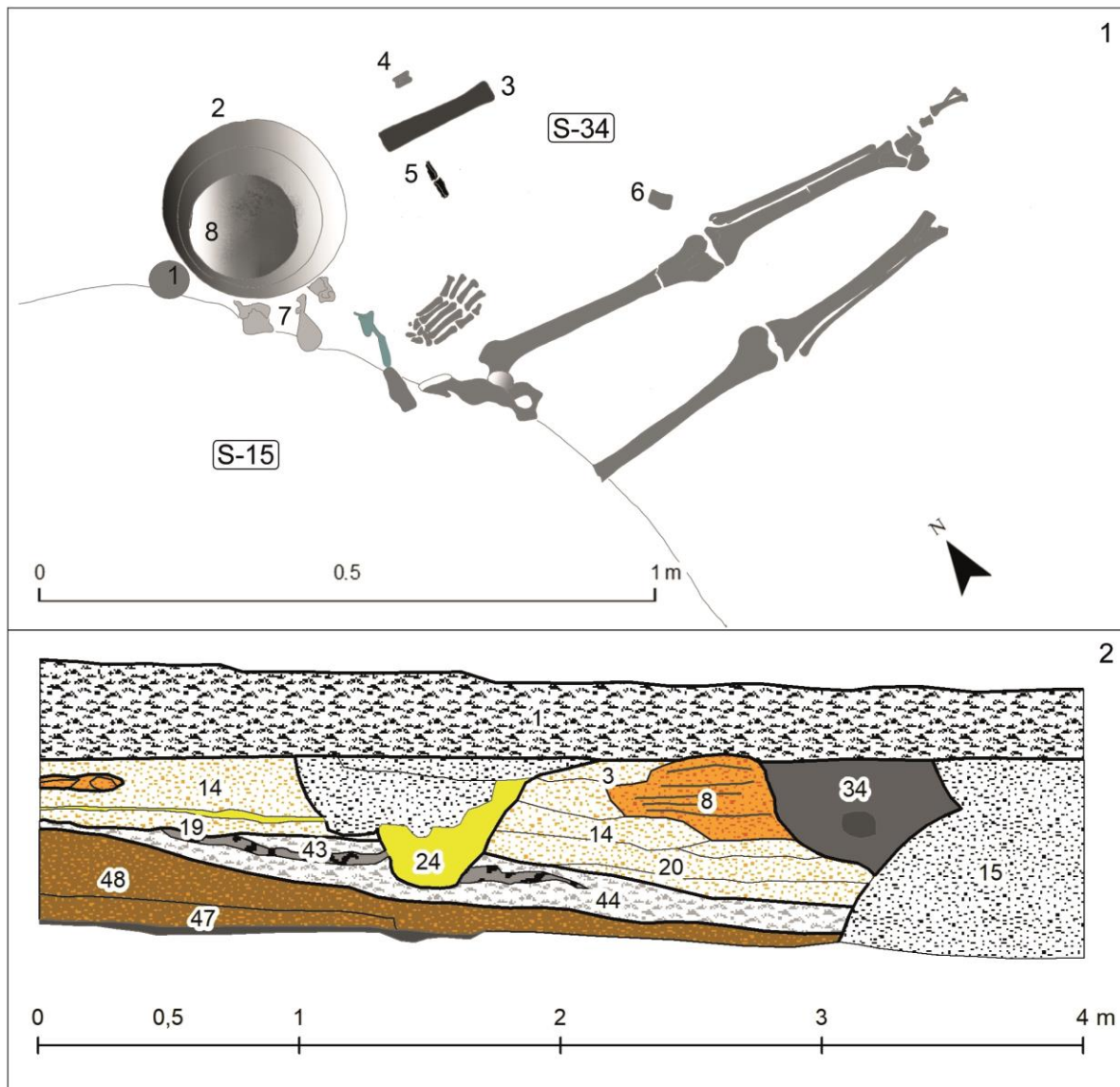
structures in the wider Bronze Age environment and to sketch out the roles of individual settlements within regional economic and social networks. A long-term aim of the project is to take the micro-regional settlement data and place it into the broader context of the Hatvan and Füzesabony habitation network and to examine it in detail against the backdrop of Middle Bronze Age social histories.

Set within this framework, the site of Bükkábrány-Kálvária was investigated between 2021 and 2024 (Fig. 1.). The site was not intact; above the core area of the Bronze Age habitation a modern cemetery was established.



**Fig. 1.:** Location of the site and finds (K. P. Fischl, Z. Hrabák)

**1. ábra:** A lelőhely és a leletek elhelyezkedése (P. Fischl K., Hrabák Z.)



**Fig. 2.:** Bükkábrány–Kálvária, 2/1: plan of the Pre-Scythian burial, 2/2: section drawing of the east wall of the excavation trench, illustrating the Pre-Scythian burial (S34) and the Sarmatian pit (S15) cut into the Bronze Age layer sequence (T. Pusztai)

**2. ábra:** Bükkábrány–Kálvária, 2/1: preszkíta sír alaprajza, 2/2: a szelvény keleti metszétfala a bronzkori rétegsorba vágott preszkíta sír (S34) és szarmata gödör (S15) ábrázolásával (Pusztai T.)

The modern burials were dug into a Bronze Age settlement mound, which was surrounded by a ditch identified by magnetometric survey and confirmed by coring. On top of the surrounding ditch, the Stations of the Cross were installed by the local parish. South and east beyond the modern cemetery's fence, the geophysical survey identified settlement remains beyond the core habitation site; here systematic find collection was also carried out. The aim in this outer settlement area was to investigate one of the better-defined buildings shown on the magnetometry by targeted excavation. Before the excavation, the area was further investigated by coring, which provided evidence for a series of undisturbed Bronze Age occupation layers at a

significant depth. The  $^{14}\text{C}$  dating of the organic residues brought up by the cores supported the Bronze Age dating of the structure.

In August 2022, a trench measuring  $4\text{ m} \times 4\text{ m}$  was opened targeting the NW corner of the previously identified building (Fig. 1). From the west-facing section profile, an intact one-handed cup came to light. This cup was sitting in a fill of a later cut (S34) which was dug into the debris of the Bronze Age building (Fig. 2). During October, another,  $2.8\text{ m} \times 2.2\text{ m}$  trench was opened aiming to investigate this later cut, which produced the Pre-Scythian burial presented in this paper.

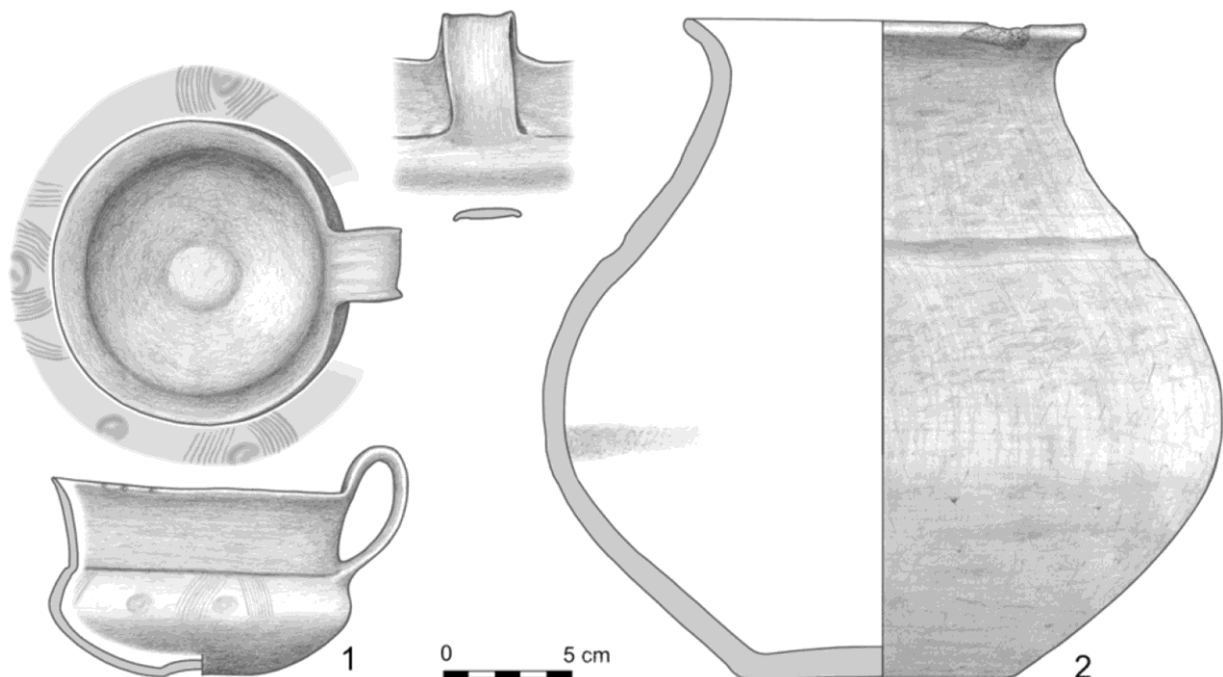
### *The description of the Pre-Scythian burial (S34)*

The grave was cut into the debris layer of a Bronze Age building (S3, S8, S14, S20) containing large amounts of burnt daub. The grave's fill was observable on the surface directly below the plough zone (S1). The grave and the skeleton were oriented W–E. The western section of the grave was disturbed by a pit dating to the Sarmatian period (S15; **Fig. 2.**), destroying the skeleton significantly. Only bones of the pelvis, the left hand and the legs were found more or less intact. The position of the remains suggests that the body was placed in the grave in a supine position. The bones of the feet were disturbed by another cut. An amphora (2 on **Fig. 2/1**) stood north of the pelvis, while west of this vessel lay the above-described one-handed cup (1 on **Fig. 2/1**), which was found and removed earlier during the construction of the section wall. North of the bones of the left hand, and east of the amphora, an antler plate (3 on **Fig. 2/1**) and a sheep astragalus (4 on **Fig. 2/1**) were found. South of the antler plate, the highly corroded remains of an iron object (5 on **Fig. 2/1**) were documented. North of the left patella, a small plate carved from a split wild boar tusk (6 on **Fig. 2/1**) came to light. South of the amphora, between the vessel and the hand bones lay a few fragments of animal bones (7 on **Fig. 2/1**). Furthermore, at the same spot, the remains of an infant were identified (the bones are highlighted in greenish grey on **Fig. 2/1**). When lifting the contents of the grave, 13 pieces of gold

beads came to light from the fill inside the amphora (8 on **Fig. 2/1**).

### *Grave goods*

**No. 1.** A thin-walled, burnished cup fired black with an everted rim, slightly funnelled neck, and a pressed, globular body with an omphalos base, made from a fine clay paste. A wide, high-swung strap handle arches over the rim and attaches to the shoulder. The top of the handle is ornamented by three parallel, shallow channels where its curve joins the rim. The rim opposite the handle is slightly raised. There are three main groups of ornaments on the shoulder, composed of small knobs, which are surrounded by a smoothed-in, shallow, circular channelling and alternately oblique, finely smoothed line bands above them, in a tent-like fashion. Two groups of ornaments are placed at approximately 80° and one opposite to the handle with a further set of finely smoothed bundles of lines on either side of the latter. In the middle of one of the sections between the three panels, there is an additional small knob surrounded by a smoothed-in, shallow, circular channelling, making the pattern asymmetrical. The burnishing of the vessel is outstanding. There are visible signs of wear surrounding the omphalos. The left quarter section of the rim, opposite the handle, is chipped in five places. Height at the rim: 7.8 cm; height at the handle: 9.2 cm; rim diameter: 11.3 cm; largest diameter: 11.8 cm; base diameter: 3 cm; wall thickness: 0.3–0.4 cm (Herman Ottó Museum, HOM, Miskolc – Archaeological Collection inv. no. 2023.25.1., **Fig. 3/1**).



**Fig. 3.:** Ceramic grave goods of the Pre-Scythian burial (L. Gucsi)

**3. ábra:** A preszkíta sír kerámiamellékletei (Gucsi L.)



**Fig. 4.:** Antler plate from the Pre-Scythian burial and details of the decoration (M. Takács)

**4. ábra:** A preszkíta sír agancslemeze és a díszítés részletei (Takács M.)



**Fig. 5.:** Animal bones from the Pre-Scythian burial (P. Hámori, N. Mészáros)

**5. ábra:** A preszkíta sír állatsontmellékletei (Hámori P., Mészáros N.)

**No. 2.** Black, highly burnished thick-walled, therefore, quite heavy amphora without handles and ornamentation. It has an everted rim, a conical neck, and a pressed globular belly. The line where the neck meets the shoulder is accentuated by a horizontal channel. The proportion of temper is high compared to the clay matrix. The process of burnishing left scratch-es on the surface and present on the outer surface and the upper interior segment of the neck. A reddish-brown residue is visible on the interior in a 1.5–2 cm wide band below the line of the belly. A 1.3 cm segment of the rim was chipped before deposition. Height: 25.6 cm; rim diameter: 15.6 cm; largest diameter: 26.4 cm; base diameter: 10.5 cm; wall thickness: 0.6–1 cm (HOM 2023.25.2., **Fig. 3/2**).

**No. 3.** Rectangular antler plate decorated with incised spiral, triangle, net, and dot-and-circle motifs. Soil adhered to the decorated surface alone. Length: 18.2 cm; width: 3.6 cm; thickness: 0.7 cm (HOM 2023.25.3., **Fig. 4/1, Fig. 8/2**).

**No. 4.** Sheep astragalus belonging to the left limb of the animal. Its edges are slightly worn off but otherwise well-preserved. It is yellowish, probably due to being exposed to heat. Greatest length: 2.6 cm (HOM 2023.25.4., **Fig. 5/1**).

**No. 5.** Long, thin, corroded iron object, likely to have been similar to an awl. It perished during lifting. Due to the very poor condition of the remains, it was not possible to subject it to scientific testing.

**No. 6.** Rectangular plate carved from the mandibular canine of a wild boar with its edges intact. Several cutmarks present on the dentin side of the object suggest that it was difficult to work the hard material. There was no indication of use wear on the edges under an optical microscope. Measurements: 3.8 cm × 2.3 cm (HOM 2023.25.5., **Fig. 5/2**).

**No. 7.** Animal bones as remains of food offering. Altogether seven bones were present belonging to at least two cattle and a sheep/goat. Four pieces out of seven were yellowish, probably due to their exposure to heat: a distal epiphysis from the left radius and three carpals of a cattle. The unfused epiphysis of the radius suggests that it belonged to a specimen younger than 3.5–4 years (HOM 2023.25.6., **Fig. 5/3-6**).

The other carpal bone (brownish) and a diaphysis of a long bone also belonged to a cattle but a slightly larger and older specimen. A further caprine bone fragment was identified as a diaphysis of a radius (HOM 2023.25.6., **Fig. 5/7-9**).

**No. 8.** 13 pieces of pressed spherical gold beads were discovered inside the amphora. Individual weight: 0.0286–0.0552 g, mass weight: 0.4763 g, average weight: 0.0366 g. Diameter: 0.4 cm (HOM 2023.25.7., **Fig. 6**).

### ***Finds from the systematic metal detector survey***

Alongside the excavation of the Bronze Age building, a systematic metal detecting survey was also carried out on 18 August 2022 and 28 March 2024. A group of volunteer metal detectorists associated with the National Institute of Archaeology of the Hungarian National Museum led by András Gömöri and assisted by Gábor Bakos conducted a thorough survey covering the area of the Bronze Age settlement site. About 25 m NE of the excavated grave, in an area about 23 m in diameter, four bronze objects were found (The artefacts will be inventoried in the collection of the HOM, 1–5 on **Fig. 1**).



**Fig. 6.:** Gold beads from the Pre-Scythian burial (L. Gucsi, K. P. Fischl)

**6. ábra:** A preszkíta sír aranygyöngyei (Gucsi L., P. Fischl K.)

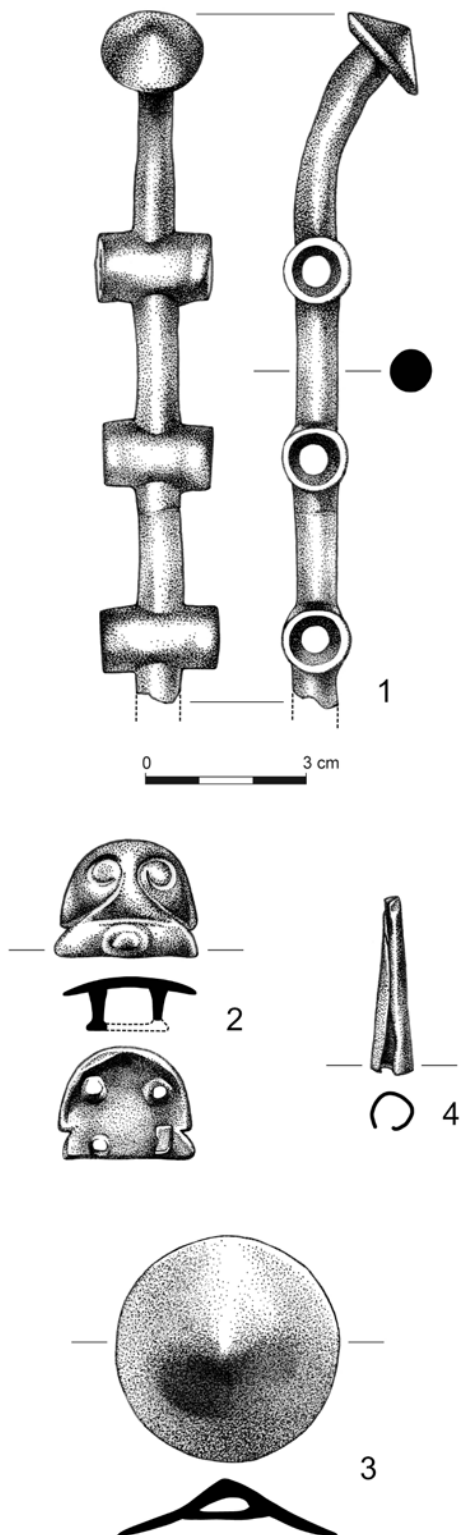
**No. 1.** Conical bronze sheet tutulus. Height: 3.2 cm; diameter at the top: 0.3 cm; diameter at the bottom: 0.7–0.8 cm (5 on **Fig. 1, Fig. 7/4**).

**No. 2.** Two matching fragments of a bronze cheek-piece with three integral cylindrical strap divider units. The object is rod-shaped, its shaft slightly bent at one end and ornamented with a conical knob-like finial. Glued from two pieces, straight end broken off, missing. Length: 12.8 cm; diameter of the shaft: 0.7–0.8 cm; length of the cylindrical units: 1.9 cm; diameter of the holes: 0.7–0.8 cm; diameter of the knob: 1.9 cm (1 and 4 on **Fig. 1, Fig. 7/1**).

**No. 3.** A helmet-shaped bronze strap divider with a decorative plate consisting of a nearly semi-circular upper part and a narrow, trapezoidal lower part. The semi-circular part is decorated with two converging, curved lines starting from the corners, with spiral ends; the centre of the lower part of the plate is decorated with a slightly amorphous oval, concentrically protruding knob. On the reverse, the stumps of four pegs, originally joined by a ring base, have been preserved at varying heights. The remaining tiny stumps suggest that the ring was probably square with rounded corners. Measurements of the plate: 2.4 cm × 2.0 cm; height: 1 cm; diagonal spacing between the pegs: 1.1–1.2 cm; spacing between adjacent pegs: 0.7–0.8 cm (2 on **Fig. 1, Fig. 7/2**).

**No. 4.** Conical cast bronze phalera, slightly concave on the sides with a loop on the back, round in cross-

section. Diameter: 4.1 cm; length of the loop: 1.3 cm (3 on **Fig. 1., Fig. 7/3**).



**Fig. 7.:** Pre-Scythian finds from the systematic metal detector survey (Z. Hrabák)

**7. ábra:** A szisztematikus fémkeresős kutatás preszkíta korú leletei (Hrabák Z.)

### *Physical anthropological examination of the skeletons*

The upper elements of the female skeleton (apart from the sternum) were destroyed by the cut of a later Sarmatian pit. The skeletal remains from the hip bone down were also incomplete. From the left pelvis, only the pubic bone, ischium, and the anterior portion of the ilium were present. On the right side only the pubic bone survived. The sacrum was missing. The long bones of the lower limbs and the patellae were present, however, the proximal third of the right femur was missing. Bones belonging to the left hand and left foot were also found along with a phalanx of the right hand, a tarsal bone and two phalanges of the right foot.

The sexing of the skeleton was carried out according to the method developed by Éry, Kralovánszky & Nemeskéri (1963). Altogether four characteristics could be examined in detail. The subpubic angle, the obturator foramen, and the diameter of the femoral head all showed hyperfeminine attributes, while the linea aspera was undiagnostic. Given the morphology of the pubic symphysis (Meindl et al. 1985) the age of the skeleton could be estimated to over 30 years of age (the symphyseal surface was completely smooth, dorsal and ventral edges were developed). Further, mild degenerative changes present on other joints confirm this assessment, therefore, the biological age of the skeleton could be projected to the second half of the adultus range (perhaps the beginning of the matusus range) to between 30 and 45 years of age.

**Table 1** contains the measurements of long bones, which indicate a height of 150.35 cm for the individual (Sjøvold 1990). In the knee joints, on the margins of the distal articulation surfaces of the femurs and the patellae, a slight edging began to develop, just as around the joint surfaces of the foot bones and the costal notches of the sternum, indicating the presence of mild degenerative osteoarthritis. Enthesal changes could be observed at the muscle attachment regions of the left ischium, the ventral of the pubic bones around the symphysis, the patellae and on the left calcaneus. These alterations could be linked to the advanced age and physical activities carried out by the individual.

The highly fragmentary skeleton of an infant was discovered by the left hand of the woman. Only a piece of the occipital bone, the basilar part survived as part of the skull. From the postcranial skeletons, the left scapula, fragments of vertebrae and ribs, distal half of the right radius, the left tibia and fibula and two metatarsals were present.

**Table 1.:** Measurements of long bones of the lower extremities (in mm)**1. táblázat:** Az alsó végtagok hosszúsontjainak méretei (mm-ben kifejezve)

	Martin No.	Right	Left
Femur	1	-	392
	2	-	388
	6	22	22
	7	22	24
	8	-	28
	9	-	28
	10	-	19
	19	-	40
	21	69	70
Tibia	1	313	315
	1a	319	321
	1b	309	310
	2	295	296
	3	65	66
	6	44	45
	8	22	21
	8a	26	25
	9	17	19
	9a	19	20
	10	65	66
	10b	61	61
Fibula	1	311	313

The distal epiphyses of the tibia and fibula were damaged, therefore the length of these could only be estimated. The length of the tibia was approx. 73 mm, while the fibula measured approx. 71 mm, but their original size could not have been longer by 1–2 mm. The length of the scapula could only be estimated as well to be around 39 mm, its width is 31 mm. These measurements suggest an age between 10 lunar months and 6 months (Kósa 1989; Stloukal & Hanáková 1978).

### *The typological assessment of the grave finds*

The ceramic vessels typically occurring in graves of the Pre-Scythian Mezőcsát culture were classified into three main categories by Tibor Kemenczei. According to this classification, the objects in the

first group reflect the shapes and ornament styles preferred by local Late Bronze Age communities; here Tibor Kemenczei differentiated between Kyjatice and Gáva influences and identified so-called non-culture-specific Late Bronze Age characteristics. As a second group, he distinguished vessels that, in their form and simple decoration (typically consisting of four knobs), although reflecting Late Bronze Age traditions, cannot be specifically linked to the ceramic traditions of local cultures of Eastern Hungary. Instead, they show common characteristics shared by related cultural groups spreading between the Tisza and the western forest-steppe region at the end of the Bronze Age. In his opinion, these vessels can be considered primarily as the products of the Mezőcsát culture. The third group contains objects of foreign origin – Tibor Kemenczei has named the Basarabi–Bosut cultural complex and the forest steppe region as possible origins of some of the vessels. He also considered the continuous manufacture and use of Late Bronze Age ceramic forms during the Early Iron Age in the Carpathian Basin and farther to the east (Kemenczei 2005, 120–121).

Analogues of the shape of the Bükkábrány cup (**Fig. 3/1**) – with an outcurving rim, funnel neck and pressed globular body along with the omphalos base and the tall, arching strap handle – are well-documented in the burials of the Mezőcsát culture in Heves County (Patek 1990, Tab. 7/6, 8/18, 10/1, 14/2, 21/8) and Borsod-Abaúj-Zemplén County (Kemenczei 1988, Fig. 2/5,9, 3/9; Patek 1993, Fig. 28/10, 30/7, 31/28). However, decoration similar to that on the Bükkábrány cup does not appear on these cups. A pattern consisting of groups of alternating, incised oblique lines combined with round pits was the characteristic decorative style of the Mikušovce horizon of the Lusatian cultural complex in its Slovakian area of distribution, i.e. in central and NW part of the country, dating to the Reinecke BD and beginning of the HA1 period (Veliačik 1983, 168–171; Kujovský 2015, 180; Kujovský 2022, 91). This decoration also appears on the shoulders of cups, which feature a sharply profiled body and a handle that does not rise above the rim (e.g. Krásna Ves, Budinský-Krička & Veliačik 1986, Tab. 6/8,15; Diviaky nad Nitricou, Suhajiková-Pivarová 1961, 239 Fig. 1/2; Lehota pod Vtáčnikom, Veliačik 1983, Tab. 9/1; Liptovský Michal, Ibid. Tab. 1/34; Oravský Podzámok, Čaplovič 1987, 51 Fig. 15/5; Dolný Kubín III., Ibid. 101 Fig. 43/1). The Bükkábrány cup, with its softer profile, pressed globular body and handle raised above the rim differs from the basic form of the above-mentioned cups, and represents a later form. It bears a closer resemblance to the softer profiled cups with flared rim, distinct neck, rounded belly, straight base and raised handles of the HA1–HA2 period (Diviaky nad Nitricou horizons I–II), namely the IV-1, V-1 and IV-2 type cups described by



Veliačik (1983, Fig. 7). Among these, type IV-2 cups are distinguished by the retention of archaic decoration on the shoulders, consisting of incised stacks of oblique lines, groups of small lenticular pits and small protrusions. These cups were dated to the HA1 period by Veliačik (1983, 132). The same type of cups was dated to the HA2 period in Ilava based on the chronology of decoration and the chronological position of analogous cups from Polish and Czech Silesia. The authors note that this type was also in use in Silesia in later periods, and as large Late Lusatian cemeteries are still unprocessed in Slovakia, their persistence in this region cannot be excluded either (Benediková et al. 2016, 221, 326) (e.g. Kšinná, Veliačik 1983, Tab. 24/11; Veľké Hoste, *Ibid.* Tab. 25/4; Diviaky nad Nitricou, Veliačik 1991, 153 Fig. 9/14; Krásna Ves, Budinský-Krička & Veliačik 1986, Tab. 10/28; Ilava, Benediková et al. 2016, 221 Fig. 149, Tab. 11/18, 26/10). However, despite the similar shape and decorative style, the pattern of alternating groups of oblique lines combined with single round pits – characteristic on the cups of the Mikušovce horizon and also on the cup from Bükkábrány – does not appear in this form on the aforementioned type IV-2 cups of the HA1–HA2 period, and they do not feature either the omphalos base and the longitudinal channelling of the handle. We were also unable to identify a close equivalent to the Bükkábrány cup among Late Lusatian assemblages in Slovakia dated to the Final Bronze Age (HB) and Hallstatt period (a comparison was made with the published materials of Late Lusatian sites referred by Veliačik 1988, 236–245; Kujovský 2015, 181–184; Kujovský 2022, 93–99). However, it should be noted that a detailed comparison with the Late Lusatian material is complicated by the fact that mainly settlement material and far fewer cemeteries than in the earlier periods are available for comparison. Additionally, after the relatively uniform development of the previous period, the late phase shows disintegration, with the emergence of local groups with distinct characters and different cultural orientations, resulting in a more diverse material (Veliačik 1988, 241).

We identified the closest analogues to the Bükkábrány cup in the Final Bronze Age – Early Iron Age (HB–HC) assemblages of the Lusatian cultural complex in Poland. In the southern region of Greater Poland (SE territory of the Western Greater Poland group of the Lusatian cultural complex, see Gedl 1994, Fig. 1) a characteristic decoration of the profiled cups of the Bronze Age period V (corresponding to the HB period), consists of a combination of vertical or oblique (alternating or unidirectional) groups of lines and single or short rows of lenticular pits. The basic shape of the cups is characterised by an everted rim, curved neck, a pronounced, curved shoulder, a conical lower part, a straight base, and raised handle (e.g. Biernatki,

Krzyżaniak 1963, Fig. 40/3,7, Fig. 108/2,7; Włostowo, Śmigielski 1963, Fig. 42/16; Przemęt, Kihl-Byczkowa 1970, Tab. 12/4; Karzec, Śmigielski 1965, Tab. 15/17). Similar decoration also appears on profiled cups with a pressed globular or rounded lower part and omphalos base, which occur in assemblages dated from the Bronze Age period V to HC (e.g. Dębiczek, Zeylandowa 1968, Tab. 4/24, 7/2; Czarne Piątkowo, Naumowiczówna 1964, Fig. 22/19; Włostowo, Śmigielski 1963, Fig. 42/15; Grabonóg, Durczewski & Śmigielski 1966, Tab. 31/41; Biernatki, Krzyżaniak 1963, Fig. 64/1, 98/3).

In Lower Silesia (on the distribution area of the Silesian Group), during the Bronze Age periods IV and V, the basic form of profiled cups is characterised by an everted rim, pronounced neck, rounded shoulder, conical or slightly pressed globular lower part, straight or omphalos bottom, and raised handle (types I/B and I/C cups by Gediga 1967), similar in shape to the Bükkábrány cup. Variants decorated with alternating, oblique stacks of lines (type I/B3 – e.g. Jordanów Śląski, *Ibid.* Fig. 28/d) and combinations of groups of lines and lenticular pits (types I/B7 and I/C7 – e.g. Jordanów Śląski, *Ibid.* Fig. 11/c, 24/i, 27/d, 42/g, 50/c; Kaszyce Milickie, Fig. 51/c; Suchowice, Fig. 46/p; Przychowa, Fig. 44/e; Wrocław-Osobowice, Fig. 35/k) are typical of the younger period, i.e. the transition between the periods IV and V of the Bronze Age (*Ibid.* 93–100, diagram 8). The author notes that profiled cups often have a burnished, black surface (*Ibid.* 92).

East of the Silesian group, similar cups are also present in the Upper Silesian – Lesser Poland group of the Lusatian cultural complex, especially in the Kraków subgroup, where a number of profiled cups with raised handles, decorated with a pattern of oblique or straight stacks of lines and lenticular pits on the shoulders, can be identified (e.g. Mydlniki, Durczewski 1948, Tab. 50/11, 74/9; Prokocim, Tab. 55/54, 76/5). Two cups from the HB–HC period cemetery at Baczyn, Kraków County, shall be highlighted. The basic form of the cups with everted rims, conical neck, sharply profiled belly, rounded bottom and omphalos base, and short handles slightly raised above the rim differs from the Bükkábrány cup; however, the longitudinal channelling of the handles and the decoration of the shoulders with a combination of short, oblique stacks of lines and smoothed-in small circles show a close affinity with the decoration of the Bükkábrány cup. The cups also feature a burnished, black surface (Prokopowicz-Kraus 1967, Tab. 5/4, 6/2).

Summarizing the above, we can conclude that the closest parallels of the Bükkábrány cup were identified among the HB–HC assemblages of the southern region of Greater Poland, in Lower Silesia and

in the Upper Silesian – Lesser Poland group of the Lusatian cultural complex. The fine material, the unusually thin wall, the almost perfect burnishing and the evenly black colour of the Bükkábrány piece make this cup outstanding in its quality; a representation of high-grade ceramic craftsmanship, which is a further argument in favour of its import character. However, its place of origin within this broad region cannot yet be narrowed down.

It is also relevant to note that a decoration almost identical to that on the Bükkábrány cup and the cups from the Baczyn cemetery appears on another exquisitely crafted vessel from burial 40 at Füzesabony-Ketőshalom, another grave of the Mezőcsát culture. The unique cup, made from a fine clay paste, evenly fired to grey, has a slightly everted rim, a conical neck, a sharply profiled belly, and a rounded lower part with shallow omphalos. The lower stem of its knee-shaped, angular handle is pierced longitudinally and functions as a suction tube. The neck is decorated with fine, smoothed-in horizontal lines along its entire length; the shoulders are decorated with smoothed-in, alternating short, oblique groups of lines separated by shallow circles. The upper part of the handle at the joint of the rim is decorated with multiple parallel lines in “V” form, opposite the handle the belly is decorated with a slightly protruding knob, smoothed into the vessel wall (Patek 1990, Tab. 11/12, Dobó István Castle Museum, Eger – inv. no. 67.3.69). The vessel, based on its pointed handle, was previously associated with the Pre-Scythian finds of the Middle Dniester region (Kemenczei 1981, 80–83; Patek 1990, 72), most probably not taking into account that the lower stem is pierced-through and thus functions as an outlet, which feature is not depicted in the published illustrations (Kemenczei 1981, 82 Fig. 2/7; Patek 1990, Tab. 11/12). In fact, this cup is very similar to the characteristic, often exquisitely crafted “feeding vessels” known from the burials of the Kyjatice culture in the southern region of Central Slovakia, dated in particular to the HB period, and associated mostly with graves of adults (Furmánek & Mitáš 2007; Furmánek et al. 2022, 174 Fig. 216/1–2, 176–178). Type “a” cups described by Furmánek & Mitáš (2007, 96, 108 Fig. 10/a) have a similar shape to the Füzesabony piece resembling an amphora, a knee-shaped angular handle with pierced-through lower stem, the horizontal grooving of the neck is also typical for the decorated pieces, and even the decoration of the shoulder with alternating groups of oblique lines appears on some of them (e.g. Kyjatice, Furmánek et al. 2022, Tab. 7/2, 22/13). However, the pattern consisting of oblique groups of lines separated by circles doesn’t appear in this form on the cups known from Kyjatice context, and it has the closest parallels in the Lusatian cultural milieu (see above, in particular Baczyn, Prokopowicz-Kraus 1967, Tab. 5/4, 6/2). Based on the above we can conclude

that the cup from burial 40 at Füzesabony-Ketőshalom can also be associated with the northern, Kyjatice and Lusatian ceramic traditions.

The amphora (**Fig. 3/2**) – another piece of the Bükkábrány grave furniture – with its black burnished exterior also represents a link to Late Bronze Age ceramic traditions. Its S-profile and the shallow channel emphasising the line of the shoulder is typical among analogous vessels from burial context of the Mezőcsát culture, although in the majority of cases plastic knobs sit on the shoulder (e.g. Kemenczei 1988, Fig. 4/4, Kemenczei 1989, Fig. 6/1, Patek 1990, Tab. 2/5, 6/6 11/10, 23/2, 27/4, Patek 1993, Fig. 27/7, 28/2, 14, 31/30). A similar, undecorated vessel came to light from burial 8 at Sirok-Akasztómály (Patek 1990, Tab. 23/8). Overall, the basic shape of the amphora, characterized by a flared rim, conical neck, and pressed globular body (Kegelhalsgefäß) was a widespread basic form of amphoras among the ceramic repertoire of the Late Bronze Age and Early Iron Age cultures of the Carpathian Basin (e.g. Gáva culture, Transdanubian Urnfield culture, Hallstatt culture). The amphora from Bükkábrány can be considered a simplified, rounded, thick-walled, stubby version based on these models. Similar tendencies in copying models, i.e. reproducing them with a softer, rounded profile and simplified decoration, generally in a smaller and stubby form with thick walls, can be observed in several other cases within the repertoire of the Mezőcsát grave pottery (e.g. Kemenczei 1989, Fig. 6/1, 7/6, 8/1, Patek 1990, Tab. 2/5, 4/5, 13/2, 14/6, 18/1, 19/1, 23/2, Patek 1993, Fig. 30/6). Thus, these vessels most likely can be interpreted as the own products of the Mezőcsát culture. Based on this consideration, the amphora from Bükkábrány belongs to Kemenczei’s above-described second group.

Gold beads (**Fig. 6.**) can occur in a range of different shapes in the assemblages of Pre-Scythian burials and hoards (pressed-spherical, biconical, star-shaped, with three lobes). Tibor Kemenczei considered the pressed-spherical and biconical variants within the same cluster (Kemenczei 2005, 88). Besides the small, pressed-spherical pieces, larger versions are also known from the hoard of Besenyszög-Fokoru (Ibid. 2005, 130–131). Analogous forms made of bronze appear in Late Bronze Age assemblages in the Carpathian Basin but are also present in Early Iron Age contexts east of the Carpathians. Given the uncertainty of their dating, instead, we shall focus on how these ornaments could have been worn since their finding circumstances at Bükkábrány (discovered in the fill inside the amphora) are quite unusual. Gold beads were found in four graves related to the Mezőcsát culture. In 1903, a disturbed inhumation burial was excavated by János Reizner at Szeged-Óthalom. Amongst the grave goods were a decorated antler

plate, two Šarengrad type gold hair-rings (found among the ribs) and further five gold and three bone beads whose position were unknown. Reizner noted that there may have been more gold beads present in the grave originally (Reizner 1904, 81 Fig. 2.; Gallus & Horváth 1939, Tab. 48/6). At Sirok-Akasztómály, female grave 8 contained two gold beads, found behind the skull and at the right clavicle, along with a Šarengrad type gold hair-ring, the grave assemblage also contained a decorated antler plate among others (Patek 1990, 67). Three biconical gold beads were documented in grave 93 accompanying a female burial at Mezőcsát-Hörcsögös. One bead was found at the left leg, another among the ribs on the left side, while yet another west of the single ceramic vessel of the grave, probably in a displaced position due to animal disturbance, as the excavator noted. An amber bead found 5 cm above the right hand, and an antler plate were also part of the grave assemblage among others (Patek 1993, 147). Close to this grave, four cylindrical gold beads were documented in grave 94: one was found by the ribs on the left, another south of the cranium, and further two scattered in the grave's fill, a fragment of an antler plate was also part of the grave goods among others (Ibid. 147). As the above description suggests, there are only a couple of direct analogues that exist of the Bükkábrány gold beads from mortuary contexts. A common feature of all four graves is the presence of antler plates, and in addition to the gold beads, all of them contained other jewellery and/or decorative costume items too, along with the more common food offerings (animal bones and ceramic vessels). Overall, these graves represent the most richly furnished female graves of the culture (Szabó 1969, 75; Metzner-Nebelsick 2002, 439). Gold beads in contrast, occur more frequently in hoards (Kemenczei 2005, 88). The shape of gold beads cannot be linked to a particular period or context; these are generally interpreted as part of a garment or as components of a more elaborate piece of jewellery. However, given their small size, it is likely that they are often not spotted during excavation. The weight of an individual bead is so small (0.0286–0.0552 g), that at Bükkábrány they were left unnoticed even by metal detectors. To interpret their presence inside the vessel, unfortunately the above-mentioned analogues known from funerary situations are not particularly helpful. Their small size indicates that – in this instance – the beads were probably sewn onto some type of textile or either strung onto a string and then placed in the amphora, or the vessel was covered by a piece of cloth with the beads attached to it.

The sheep/goat and cattle bones (Fig. 5/3-9) found in the Bükkábrány grave are likely remains of food offerings – except for the astragalus. These two species represented the majority of animal remains from a total of 70 graves found in eight Mezőcsát

culture cemeteries (Vörös 2015), which may suggest that the meat provision of the society was (mostly) based on keeping ruminants. However, as specific selection in a funerary context is also possible, this should be considered a hypothetical assumption until the archaeozoological material of contemporary settlements associated with the culture is uncovered. Similar conclusions concerning the animal husbandry at the Iron Age sites of Ludányhalászi-Sóderbánya and Salgótarján-Ipari Park II have been drawn (Bartosiewicz & Gál 2010, 117, Fig. 9.2; Tugya 2010, 354 Table 1). Both sites are located about 100 km NW of Bükkábrány. Based on preliminary data, those were associated with the Pre-Scythian and Scythian populations, however, the Pre-Scythian horizon of the sites is not yet sufficiently supported by find assemblages.

The sheep astragalus (Fig. 5/1) with slightly worn edges may have been given to the infant, as examples of three children's burials associated with the Mezőcsát culture imply. Grave 31 at Mezőcsát-Hörcsögös, the burial of an 8-year-old child contained a single, drilled sheep astragalus, while six sheep astragali were placed around the feet of an 8–9 years old child buried in grave 4 at Sirok-Akasztómály (Vörös 2015, 488). Grave 6 of Adács-Mérges-patak (Fodor 1973), the burial of a 7–8-year-old child also yielded a set of nine astragali (unpublished material, Dobó István Castle Museum, Eger – inv. no. A.74.1.10.).

Astragali, either modified (e.g. drilled, carved, etc.) or in intact form, represented items commonly associated with gaming, magic and divination across cultures and geographical regions (e.g. Bartosiewicz 1999; Dandoy 2006). Knucklebones from sheep and goats especially were found in great numbers among ritual deposits dated to the Late Bronze Age and Early Iron Age in the Near East (e.g. Affani 2008). Grave 1 at the Hallstatt Period site of Halimba-Cseres yielded 26 drilled sheep astragali which had been placed to the left foot of a woman aged 25–30 years old (Patek 1993, 88, Fig. 68/1–21). From the Early Iron Age burial chamber at Süttő, 39 pieces of drilled sheep astragali came to light (V. Vadász 1983, 31). The Iron Age cremation burial 236, excavated in the courtyard of the Slovenian Academy of Sciences and Arts in Ljubljana, was lined with several intact astragali (Puš 1971, 71, Tab. 57). Knucklebones also occurred frequently in child burials in the Mediterranean region during Antiquity (Hermay & Dubois 2012). Consequently, the sheep astragalus found in Bükkábrány may have equally represented a toy given to the infant or a symbolic object aimed to bring good luck for both the woman and the child in the afterlife. Its placement among the personal belongings, such as the antler plate and the iron implement (Fig. 2/1), stands as evidence of their meaningful function.

The 4 cm long tusk plate (**Fig. 5/2**) most resembles those small boar tusk plates which, either perforated at their corners or, in undrilled form, were attached to the leather base of boar's tusk helmets in the Mycenaean world, dating to the 17<sup>th</sup>–10<sup>th</sup> century BC (e.g. Castleden 2005, 120–123, Figs. 5.1–5.3). The single plate found in the grave at Bükkábrány could be reconstructed as a decorative element attached to a piece of cloth or an accessory on its own or simply as a sundry exchange item. It might have also represented an object endowed with symbolic meaning, similar to the sheep astragalus, and functioned as a trophy or a protective token, associated with the power of wild boars (Markiewicz & Diakowski 2016). Although working ends were not identified on the tusk plate, its function as a small blade used for cutting textile fibres cannot be excluded either.

The highly corroded, small, rod-shaped iron object (5 on **Fig. 2/1**) found in the grave is most likely to have been an awl based on the find circumstances because the antler plate found near the iron object suggests the presence of a “sewing kit”. First, János Győző Szabó pointed out that in the burials of the Mezőcsát culture, antler plates can be accompanied by bronze needles, iron awls, and bone piercers, which are sometimes found close to each other, and can therefore be reconstructed as a sewing kit based on this find association (Szabó 1969, 75). This idea was also accepted by Gergely Bóka; in his opinion, the antler plate could have served as the cover for a composite object that was used to store needles and piercers. He further notes that in one case, 50 small bronze beads were discovered just beneath the antler plate, supporting the sewing kit hypothesis (Sirok-Akasztómály, grave 5) (Bóka 2012, 152). This combination of antler plates and tools also led Biba Teržan to conclude that they formed parts of sewing kits and, at the same time, raised the possibility that the plates could also have been used as utility tools for weaving and embroidery, such as measuring devices, shuttles, or, in the case of decorated plates, they could also serve as pattern templates (Teržan 2012).

The issue of Pre-Scythian antler plates has been at the forefront of research since the discovery of the first burials associated with the Mezőcsát culture due to their culture-specific nature and dubious function. Due to Gergely Bóka and Biba Teržan's recent overviews (Bóka 2012; Teržan 2012), the history of research will not be discussed here in detail. Instead, in the following section, we compare Bóka's results to our observations regarding the antler plate from Bükkábrány. Gergely Bóka listed 29 antler plates from 28 graves (Bóka 2012, 159, Appendix); this can be complemented by a plate fragment from grave 94 at Mezőcsát-Hörcsögös (Patek 1993, Fig. 25/3, 147), and an antler plate from a female burial associated with the

Mezőcsát culture recently excavated at Veľké Kostolány, Slovakia (Žaár et al. 2024, Fig. 71/3), and the plate from Bükkábrány discussed in this article. This means that 32 plates from 31 graves associated with the Mezőcsát culture are known to date.

Anthropological examinations have shown – where sexing of the skeleton was possible – that antler plates accompanied female burials in particular. The Bükkábrány specimen was also carved from a deer's antler and not from bone as István Vörös pointed out in the case of the other plates (Vörös 2015). The plate was found split along its mid-section. Transverse or longitudinal fractures were observed in nine additional plates (Bóka 2012, 151). It has been shown that antler plates are much more common in graves where the deceased was buried in an extended, supine position than in graves with different burial rites (Ibid. 151); in 23 of the 29 cases in which the skeletal position was observed, the deceased was lying in extended, supine position. It was also observed that in the extended skeleton burials, the bone plates were typically placed around the head or next to the arm, with the only exception of grave 6 in Füzesabony-Kettőshalom, where the plate was found at the feet. It is also typical that the left side is selected when the plate is not found around the head but rather on one of the sides; the only exception being grave 65 at Mezőcsát-Hörcsögös, where it was placed on the right side of the deceased along with the other grave goods (Ibid. 151). These trends are also confirmed by the Bükkábrány grave, where the plate was placed on the left side of a woman who was lying on her back in an extended position, close to her hand.

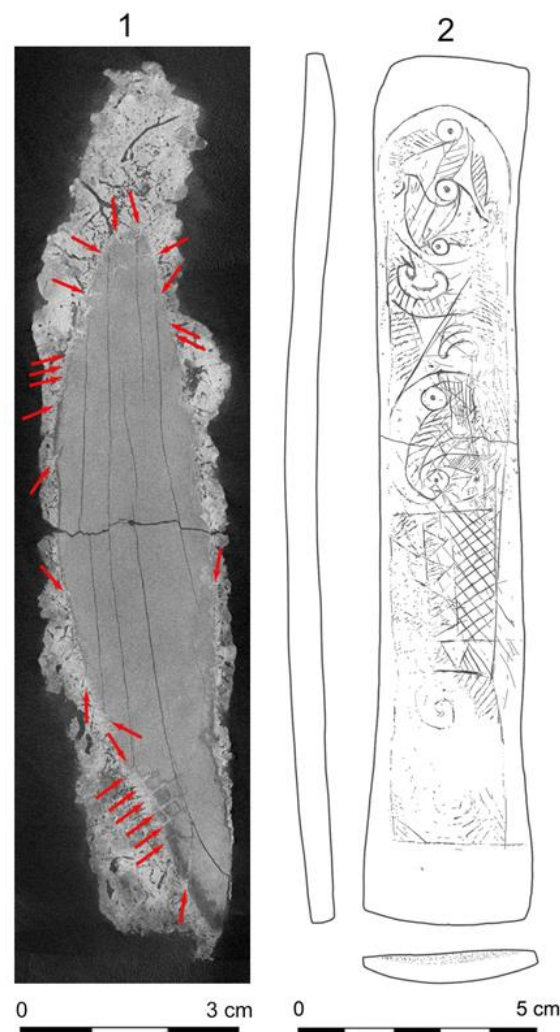
The decoration of the plate was largely indecipherable due to the amount of soil residue adhering to the surface. During the conservation process, in the area where the decayed substance was removed, a semi-circular frame-like line incision became visible, at the opposite end of the plate, a striped motif was identified as part of the decoration (**Fig. 4/2**). Furthermore, the high-resolution images taken during the conservation process made it clear that the lines were made even more pronounced by rubbing some kind of dark pigment into the incisions (**Fig. 4/3**). As it turned out during the conservation, the soil residue contained the remains of a woven piece of textile. Where the deposits were partially removed, the recovered textile fibres were documented; however, to protect and preserve the textile remains and make them available for further examination, the rest of the attached material was left intact on the surface. For this reason, it was crucial to find another, non-destructive method to examine the decoration of the plate.

### *The CT imaging process of the antler plate and the reconstruction of its decoration*

The CT imaging process was conducted in the 3D Laboratory at the University of Miskolc using a YXLON FF35  $\mu$ CT device. The X-ray source was a Y.FXT 190.61 transmission beam tube operated in microfocus mode at 125 kV and 30  $\mu$ A. The detector operating was a Varian 2530HE flat panel detector with the exposition time of 333.33 ms. The level of magnification was 6.67 $\times$ , and over 5000 projections were taken to achieve the best possible results. The total measurement time was around 5.5 h. The reconstructed image was further processed by VGStudio Max 3.3 software. For the graphics reconstruction, the sample was flipped into a vertical position, after which a series of images were taken along the coronal plane of the sample. The slice thickness for the reconstruction was set to 21  $\mu$ m which came from geometrical constraints regarding the FOD (Focal – Object Distance), FDD (Focal – Detector Distance), and the physical pixel size of the above-mentioned detector (139  $\mu$ m).

158 very thin slices cutting the decorated surface of the artefact were suitable to produce a detailed picture of the design. The field of decoration on one end of the plate was surrounded by three incised lines in the shape of a rectangle (base and two sides) closed by a semi-circular line on the fourth, top side. The field of decoration is divided into three zones. The upper segment of the object features a motif consisting of four interlocking spirals, the ends of which are accentuated by dot-and-circle motifs. The 4 outer dot-and-circle motifs are also connected by tangential spirals, resulting in a spiral vortex motif. The same spiral motif is repeated further below, although here the decoration is less regular. Both motifs are framed by a circular line and connected by a straight tangent line. The middle zone is divided into three lengthwise bands filled with a geometric design: two of the bands are filled with rows of incised – perhaps striped – triangles, while the third band is filled with a net-pattern. A row of striped triangles arranged in a perpendicular band joined the three lengthwise bands. At the lower segment of the plate, a seamless spiral meander motif was created by using a pair of incised lines. Some of the dominant motifs were further accentuated with striped infill (**Fig. 8.**).

The decoration of the Bükkábrány plate shows the characteristics of A-B-C pattern groups established by Bóka (2012, Fig. 8): a combination of interlocking spirals, striped triangles, net-pattern and dot-and-circle motifs. The closest analogues of the pattern can be found on the plates from burials 13 and 60 at Füzesabony-Kettőshalom (Patek 1990, Tab. 5/21, 15/13, 28/5, 29/1). The decoration of these plates is also divided into zones, with the spi-



**Fig. 8.:** 8/1: One CT slice of the Pre-Scythian antler plate, the fragments of the incised decoration visible are marked by arrows (one slice displays only a small part of the plate surface due to its slightly curved shape) (T. Bubonyi). 8/2: The ornament of the plate reconstructed using 158 CT slices (L. Gucsi)

**8. ábra:** 8/1: Preszkíta agancslemez CT felvételének egy szelete, a látható mintarészleteket nyilak jelölik (a tárgy enyhén ívelt formája miatt egy szeleten a lemez felületének csak kis része jelenik meg) (Bubonyi T.). 8/2: A lemez díszítésének 158 szelet felhasználásával készült rekonstrukciós rajza (Gucsi L.)

ral being the dominant motif in some zones, while other zones are filled with geometric motifs, including striped triangles. However, the main motif, the spiral vortex composed of four segments depicted on the Bükkábrány piece, does not appear in this form on any other plate. Gergely Bóka has developed his classification based on the principal motifs of the plates, in which “group A” is distinguished by the interlocking spirals as the main motif. The Bükkábrány plate can also be cate-

gorised in this major group on the basis of the repeated depiction of interlocking spirals in different forms. However, because of the unique arrangement of interlocking spirals in a four-segment vortex, it might be regarded as a distinct subgroup. The design is, however, well known from round bronze phalerae and strap dividers of the Pre-Scythian period. Its closest parallel is the circular bronze phalera of the Biharugra depot, on which the four-segment vortex of interlocking spirals and dot-and-circle motifs appears as an engraved design (Gallus & Horváth 1939, Tab. 15/3; Kemenczei 2005, Tab. 14/36). The same motif appears as an openwork decoration on ring-footed, round bronze strap dividers, which we know from the depot of Fügöd (Kemenczei 1988a, Fig. 4/3–5; Kemenczei 2005, Tab. 22/A16–18) and from Pécs, the latter being an uncertain find, presumably from the area of the tumulus cemetery (Gallus & Horváth 1939, Tab. 45/2–3; Kemenczei 2005, Tab. 26/B3–5). A four-segment vortex motif of five interlocking spirals completed with additional concentric circles also appears on an ornamental bronze disc dated to the Pre-Scythian period, a stray find from the area of Osytynjažka in the Middle Dnieper region (Kirovohrad region, Ukraine, Terenožkin 1976, Fig. 39/4, 42/3). The above-mentioned finds were mapped by Carola Metzner-Nebelsick (2002, Fig. 153). As a further close parallel, a horse bit from an unknown location in Hungary can be mentioned, on which the round knob closing the hook is decorated with a three-segment spiral vortex motif consisting of tangential spirals connecting openwork circles (Gallus & Horváth 1939, Tab. 41/1, 47/5).

The so-called “Tangentenkreis” motif, composed of tangent lines connecting circles – which is also recognisable as a building element in the spiral vortex motif –, also appears as a linear pattern on contemporary goldworks, e.g. on conical ornamental discs and the diadem of the Besenyszög-Fokoru hoard (Kemenczei 2005, Tab. 11/8–11) and on a conical ornamental disc, a stray find from Zlaté Moravce, Slovakia (Ibid. Tab. 56/C).

Referring to Aleksei Ivanovič Terenožkin, Tibor Kemenczei asserts that “Tangentenkreis” motif appearing on Pre-Scythian finds of the Carpathian Basin is not of local origin; rather, it can be associated with the art of the Pre-Scythian era of the steppe and North Caucasus region (Terenožkin 1976, 178, 182; Kemenczei 1995, 345; Kemenczei 2005, 90, 109–110, 119). Christopher Pare, however, presents further examples from the Balkans and Asia Minor to illustrate the interregional use of the motif in the Early Iron Age (Pare 1998, 373, 374 Fig. 35).

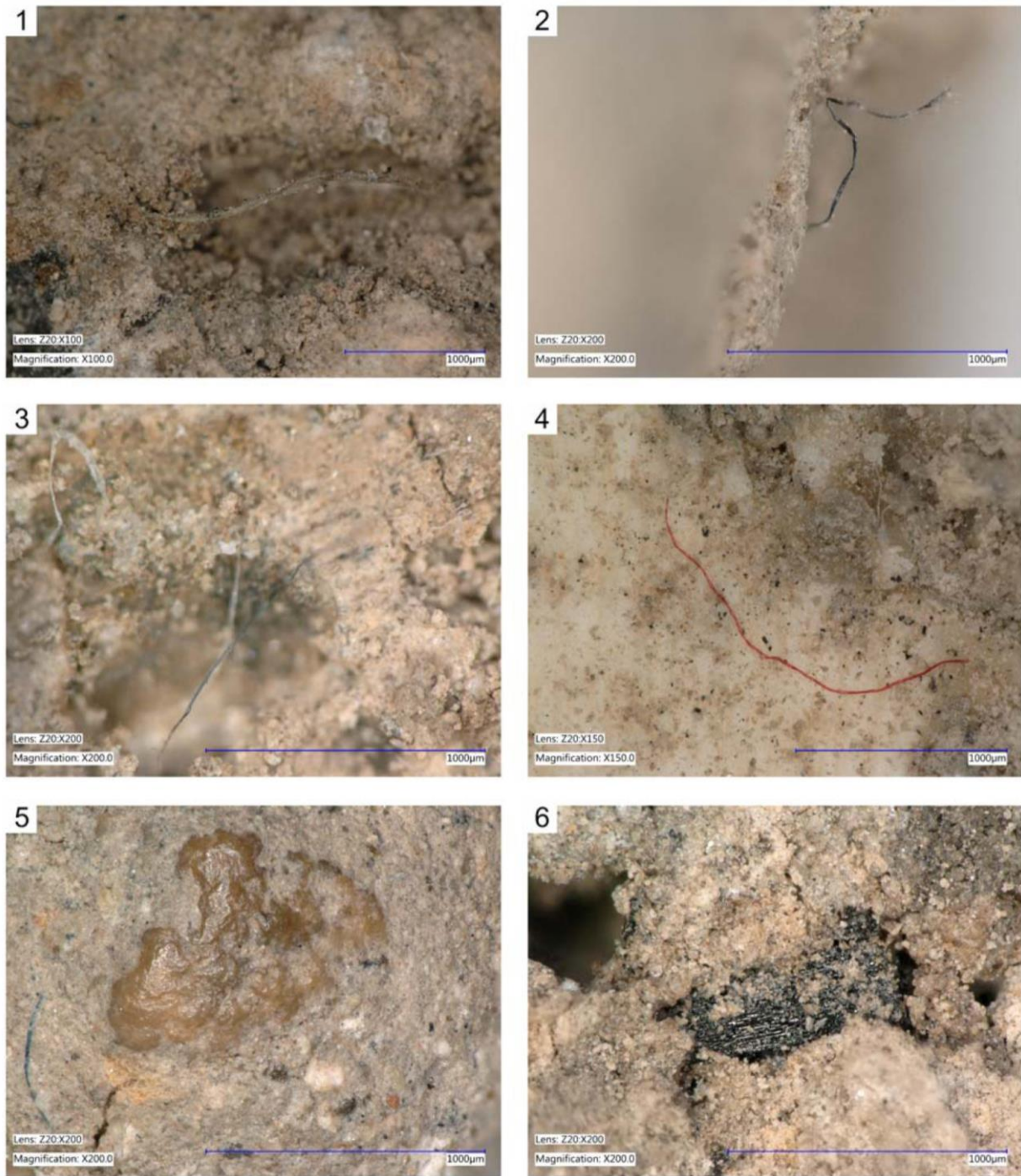
### *Textile remains*

The antler plate was found in the grave with its front panel facing the bottom of the grave, with a thick layer of soil adhering to its decorated surface. The conservation of the artefact and the scientific examination of the residue were carried out in the Conservation Laboratory of the Hungarian National Museum.

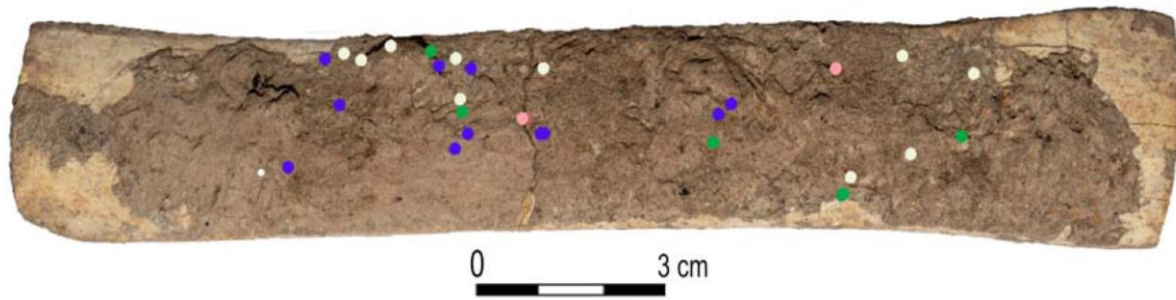
The residue was partly removed in stages, mechanically in a moist environment. During this delicate process, some details emerged that suggested the presence of a textile. It is feasible that the antler plate was either wrapped in some sort of textile, or it contacted the garment or the burial shroud. Remains of a woven construction identified as a plain weave became visible under the hand-held magnifying glass and were even observable to the naked eye. Although the woven structure was difficult to determine in detail even on a high-resolution digital image, the basic warp and weft threads were successfully documented in the residue matrix.

The entire surface of the antler plate was scanned by a NIKON, Eclipse stereo microscope using 20× and 50× magnification, making it evident that the textile remains formed part of a finely woven piece of cloth. A series of fine threads could be distinguished placed at regular intervals on the whole surface of the plate: threads of cobalt blue, dark green, and in some places, pink were identified along with threads of natural colour (Fig. 9/1–4). The threads were documented by a KEYENCE, VHX5000 type digital microscope subject to 100×, 150× and 200× magnification. The individual threads were colour coded according to the colours observed on the textile and projected as an extra layer onto the image (Fig. 10.).

During the conservation process only the threads lying deeper below the surface were registered (alignment, colour, material) to avoid the documentation of potential subsequent contamination. As a result, linen fibres were identified (Fig. 9/1–4). For the identification of threads, the work published by Annette Rast-Eicher (2016) was employed as a key piece of literature. In addition to the textile remains, on a small area, a kind of ochre-coloured residue was also documented which could have been left by the presence of leather (Fig. 9/5). Furthermore, on the entire surface of the plate, a strong presence of chromium oxide green-coloured material was detected under the textile threads (Fig. 9/6). The present data can only be evaluated as preliminary results, as both the textile remains and the other components identified in the deposition require further, more detailed investigation. To protect and preserve the remains, the rest of the material adhered to the surface was left intact.



**Fig. 9.:** Elementary threads and layers observed in the residue on the surface of the antler plate (T. Somfai)  
**9. ábra:** Az agancslemez felszínén lévő lerakásban megfigyelt elemi textilszálak és rétegek (Somfai T.)



**Fig. 10.:** Colour distribution of the elementary threads observed in the residue on the surface of the antler plate (K. Dúzs)

**10. ábra:** Az agancslemez felszínén lévő lerakódásban megfigyelt elemi szálak színbeli eloszlása (Dúzs K.)

### *The typological assessment of the stray finds*

Small conical bronze tutuli, bent from thin bronze sheet (**Fig. 7/4**) are relatively common grave goods in the burials of the Mezőcsát culture and can be interpreted primarily as a costume element (Metzner-Nebelsick 2002, 458–459; Kemenczei 2005, 85). To date, we know their occurrence from 11 graves at six sites. In Füzesabony-Kettőshalom, they appear as a characteristic element of women's costume (graves 13, 22, 23, 29, 62, 63 – Patek 1990). In some cases, they were clustered around the right hand (graves 13, 29, 62), leading János Győző Szabó to suggest that they may have been decorating gloves (Szabó 1969, 75). Carola Metzner-Nebelsick also considers it possible that they were applied to gloves or directly to nails (Metzner-Nebelsick 2002, 459). In other burials they were found in a different position, i.e. in front of the pubic bone (grave 63) or in a pile between the femurs (grave 22), allowing them to be reconstructed as decorations on the hem of a garment or belt. In further five cemeteries of the culture, bronze tutuli were found in children's burials (Füzesabony-Öregdomb, grave 2; Dormánd-Hanyi puszta, grave 3; Mezőcsát-Hörcsögös, grave 95; Szeged-Algyő, 258. kútkörzet, grave 82; and the 100 cm skeletal length indicates that the burial at Csongrád-Vendelhalom is also a child's grave). Their position in the grave was observed in three cases, which suggests that in the case of children, tutuli may have been hung on a necklace or sewn onto the neck of a dress (see also D. Matuz 2000, 144). It is noteworthy that in grave 82 of Algyő, the bronze tutulus was found together with a red deer tooth pendant and a pendant of a tubular bone, interpreted as an amulet, possibly strung on a chain with other items (D. Matuz 2000, Fig. 4, 7/8). A further bronze sheet tutulus was found in the grave of a Maturus II male buried in a crouched position in Želiezovce, Slovakia. The authors noted that the conical tutulus, with a 9 mm × 9.5 mm diameter at the bottom, bent from a 1.3 mm thick sheet, differs

in size and thickness from the smaller, thinner pieces common in burials of the Mezőcsát culture (Ožďáni & Nevizánsky 1996, 261, Fig. 8/2, Fig. 11). In conclusion, bronze tutuli are primarily associated with women and children in Mezőcsát cemeteries, and the way they were worn varied according to age, gender and community customs. It is particularly striking that while in the cemetery of Füzesabony-Kettőshalom, about 40% of the female graves contained bronze tutuli; whereas in the cemetery of Mezőcsát-Hörcsögös with nearly 50 graves, only one child's grave had 2 pieces. The presence of bronze tutuli as costume elements in the late Tumulus culture – early Urnfield period in the Carpathian Basin suggests that their use in the Mezőcsát culture might be traced back to these former, local traditions (D. Matuz 2000, 144; Metzner-Nebelsick 2002, 459; Kemenczei 2005, 85). However, in the Early Iron Age they also appear as decorative elements on belts and clothing in a wider area, such as the Dniester, Dnieper, North Caucasus and Volga-Kama regions (Kemenczei 2005, 85). Their also higher occurrence in the cemeteries of the South-Eastern Pannonian group, particularly in Dalj/Dálya, Croatia, has been attributed to a close relationship with the Mezőcsát culture by Carola Metzner-Nebelsick (2002, 458–459).

The bronze cheekpiece from Bükkábrány (**Fig. 7/1**) belongs to the type with straight shaft and curved end, perforated with three parallel cylindrical strap divider units (uniplanar arrangement), which corresponds to type I in Carola Metzner-Nebelsick's typological system (2002, Fig. 97), and described as Füzesabony type by Tibor Kemenczei (2005, 100–101). This is the most prevalent type of psalia in the Late Urnfield – Early Hallstatt period west of the Carpathians, with a distribution centering in the Carpathian Basin (Metzner-Nebelsick 2002, Fig. 98–99), suggesting that its form may have been developed in workshops in the Carpathian Basin based on eastern models (Kemenczei 2005, 100). Over time several variants were developed, possi-



bly as a result of multiple workshops producing them (five variants: Ia–e, were distinguished by Metzner-Nebelsick 2002, 217). The closest parallel to the Bükkábrány piece is a cheekpiece from grave 3 at Füzesabony-Öregdomb, burial of the Mezőcsát culture, which, apart from the basic form, also show similarities in that the curved end is closed by a larger, hat-shaped finial, and the cylindrical perforations are plain, not featuring a thickened rim or knob ornament (Gallus & Horváth 1939, Tab. 2/1–2; Kemenczei 1989, Fig. 4/2,6). This type was classified in subtype Ib by Metzner-Nebelsick (2002, 508), the uniqueness of which is shown by the fact that only one other piece was included in this group, a stray find from Füzesabony-Öregdomb (Gallus & Horváth 1939, Tab. 5/1–2; Kemenczei 1989, Fig. 6/3,5). This one has a similar basic design but with additional knob decoration on its tubular perforations. In our opinion, the group can be completed by another stray find from an unknown location in Hungary (Gallus & Horváth 1939, Tab. 51/3; Kemenczei 2005, Tab. 50/1). The rest of type I/Füzesabony type cheekpieces differ more significantly in shape compared to the Bükkábrány piece; cheekpieces with plain tubular units are typically complemented with a smaller, knob-like finial (e.g. Dalj/Dálya, Kemenczei 2005, Tab. 8/A3; Batina/Kiskőszeg, Tab. 36/2–3, Tab. 52/A2; Vetis/Vetés, Tab. 39/B1–4; Szanda, Tab. 32/4–5; Hrtkovci, Tab. 54/D2), whereas pieces with a larger finial, typically feature some additional elements such as a thickened rim, small knobs on the tubular units, or a decorated finial (e.g. Dalj/Dálya, *Ibid.* Tab. 8/A4–5; Batina/Kiskőszeg, Tab. 36/1; Dinnyés, Tab. 18/2–3; Sarkad, Tab. 44/B1). Tibor Kemenczei dated the Füzesabony type cheekpieces to the Late Urnfield – Early Hallstatt transition period (Kemenczei 2005, 100), Carola Metzner-Nebelsick dated the type I cheekpieces to the 9<sup>th</sup>–8<sup>th</sup> century BC (Metzner-Nebelsick 2002, Fig. 135). She dated the psalia from grave 3 at Füzesabony-Öregdomb – the closest formal parallel of the Bükkábrány piece – to the late Urnfield period, the 9<sup>th</sup>–early 8<sup>th</sup> century BC (*Ibid.* 283).

The helmet-shaped strap divider (**Fig. 7/2**) is a characteristic element of horse harness of Ponto-Caucasian origin of the Pre-Scythian period (Metzner-Nebelsick 2002, 337–341, 531; Kemenczei 2005, 110). Within the group of strap ornaments, they represent a non-local type in Central Europe, whose parallels can be traced to the Caucasus region, where the bone and antler predecessors of the bronze pieces have been identified. About 40 known specimens of this type have been discovered in the region between the Caucasus and Lower Bavaria. They occur most numerous in the Ciscaucasus and the Kuban region, more sporadically in the steppe and forest steppe between the Dnieper and the Don, and again in higher numbers

in the Carpathian–Danube region (Metzner-Nebelsick 2002, Fig. 157, 531; Reinhold 2007, 75, Liste 267; Skoryj et al. 2016).

Western pieces are distinguished from the Eastern finds by a key structural element: while the vast majority of Eastern pieces feature one or two simple parallel loops on the back, the majority of Central European pieces have four pegs on the back joined by a circular or rectangular ring, enabling them to fasten transverse straps, i.e. use them as strap dividers. This method of fastening can be traced back to local traditions in Central and South-Eastern Europe, suggesting that helmet-shaped strap ornaments were adopted in the Pre-Scythian period, and they were also made locally, based on eastern models, modified to local needs (Metzner-Nebelsick 2002, 337, Fig. 157).

In the Trans-Tisza region (east of Tisza), helmet-shaped strap dividers have been discovered exclusively in hoards so far (Biharugra, Gallus & Horváth 1939, Tab. 15/4, 16/4; Kemenczei 2005, Tab. 14/45; Vetis/Vetés, *Ibid.* Tab. 39/B7). However, the closest formal parallels of the Bükkábrány piece can be found west of the Danube, among the grave goods of those Late Urnfield – Early Hallstatt burials, which are distinguished by the presence of horse harness elements of Ponto-Caucasian origin: in the Batina/Kiskőszeg assemblage (Gallus & Horváth 1939, Tab. 54/5, with a possible interpretation as grave finds: Metzner-Nebelsick 2002, 392, 640, Tab. 37/1), among the grave goods of tumulus burial 15 at Pécs-Jakabhegy (Maráz 1978, Fig. 5), in the Stillfried “hoard”, Lower Austria (Gallus & Horváth 1939, Tab. 72/6–7, reassessed as grave finds: Kaus 1989), among the grave goods of Künzing “grave A”, Lower Bavaria (Metzner-Nebelsick 2005, Fig. 1/7; Deicke 2011, Tab. 1/4), and the tumulus grave of Zábóří nad Labem, Central Bohemia (Richlý 1894, Tab. 51/27). In a different geographical and cultural context, a helmet-shaped strap divider, also a close analogue of the Bükkábrány piece was discovered among the finds of a bronze hoard associated with the Černošles culture near Leliaki, Kyiv Oblast, Ukraine by the Dnieper (Skoryj et al. 2016, Fig. 19/3, 20/3). Since the hoard’s two sets of Füzesabony type cheekpieces and a round, ring-footed strap divider are likewise related to the finds of the Carpathian Basin, the authors consider it possible that the bridle components of the hoard originated from the Carpathian Basin or were made locally, based on western models (*Ibid.* 118–122). Considering the aforementioned, it is plausible that the Bükkábrány piece was produced in the Carpathian Basin, both because of its mounting structure and the spatial distribution of the closest formal parallels of its decorative plate, which are concentrated within and surrounding the Carpathian Basin.

In terms of chronology, the Central European pieces of helmet-shaped strap dividers are present in find assemblages of the 9<sup>th</sup>–8<sup>th</sup> centuries BC, and were no longer in use in the 7<sup>th</sup> century BC (Metzner-Nebelsick 2002, 337–339; Metzner-Nebelsick 2005, 130). The closest formal parallels of the Bükkábrány strap divider are represented by the pieces from Batina/Kiskőszeg, Künzing and Stillfried, they are almost identical in detail. Of these, the find from Künzing was dated to the late Urnfield, HB3 period, the 9<sup>th</sup> century BC (Deicke 2011, 140), meanwhile the Stillfried “depot” represents a later assemblage dated to the early Hallstatt period, the 8<sup>th</sup> century BC (Metzner-Nebelsick 2002, 339). The Batina/Kiskőszeg assemblage cannot be dated more precisely because of its uncertain find circumstances (Ibid. 349).

The conical cast bronze phalera from Bükkábrány is 4.1 cm in diameter with a simple loop on its back (Fig. 7/3). This type of phalera has not yet been found in the funerary context of the Mezőcsát culture. As grave goods, similar-sized round bronze and iron buttons, between 2 and 4.5 cm in diameter, were found, but these are typologically different, having spherical or flattened spherical form and a small, eye-like loop at the back with a narrow, round hole. They are associated with graves of women and children. In those cases where their original position has been observed, they are usually found around the ankle (Füzesabony-Kettőshalom, grave 10, 23, 29, 43, Patek 1990; Füzesabony-Öregdomb, grave 9, Kemenczei 1989, Fig. 5/7–9; Sirok-Akasztómály, grave 8, Patek 1990, Tab. 23/6–7; Mezőcsát-Hörcsögös, grave 94, Patek 1993, Fig. 32/22–24), in one case they were found at the left pelvic bone (Füzesabony-Kettőshalom, grave 63, Patek 1990, Tab. 12/8–9), so they can be interpreted as sewn-on ornament, a costume item. Conical phalerae with longer loops, similar in form to the Bükkábrány piece (type AI phalerae by Metzner-Nebelsick 2002, Fig. 161; Kemenczei 2005, 115), are primarily found in hoards (e.g. Biharugra, Kemenczei 2005, Tab. 15/70–71; Dinnyés, Tab. 19/A12; Prügy, Tab. 27/6–7; Szanda, Tab. 32/8). They are, however, slightly larger, typically 6–8 cm in diameter but sometimes exceeding 14 cm. Although these types of phalerae may be multifunctional, the solid, moulded pieces with longer loops could have been used as ornaments for horse harnesses (Metzner-Nebelsick 2002, 348), this is particularly likely to be the case when they are found together with other elements of horse equipment (Kemenczei 2005, 115). Based on the above, the Bükkábrány piece most likely served as a bridle ornament. A stray find from Füzesabony-Öregdomb, a spherical bronze phalera 8.3 cm in diameter, also suggests that phalerae may have been associated with the burials of the Mezőcsát culture (Kemenczei 1989, Fig. 6/8). Regarding the origins

of the spherical and conical, undecorated round bronze buttons, Tibor Kemenczei noted that such buttons were produced throughout the Late Bronze Age in the Carpathian Basin; therefore, the Early Iron Age pieces may have been made primarily based on local models, although bronze buttons decorating the bridle were also characteristic elements of horse equipment in the North Pontic region (Kemenczei 2005, 115).

### *The archaeometallurgical analyses of metal objects*

To establish the chemical compositions of the artefacts a non-destructive examination was carried out by Energy Dispersive X-ray Fluorescence (ED-XRF) spectrometry with an Oxford Instruments X-MET8000 Expert portable spectrometer at the University of Miskolc. The instrument measures the chemical composition on a few mm diameter of the surface of the sample, which can be significantly reduced using a collimator. The X-ray beam can penetrate to a depth of up to 100–150 µm, but the penetration depth is quite material-dependent. The precision of the measurement is usually of the order of 0.1% and the accuracy is between 0.2 and 1 rel.%, but this also depends on the atomic number, the light elements generally being more difficult to measure.

All 13 gold beads were measured using a “Fundamental Parameter” method (Precious FP) to analyse the elements found in alloys and in particular precious metals. The concentration range for each element is from 0 wt% to 100 wt%. Fundamental parameter methods use a complex mathematical analysis of X-ray fluorescence to calculate the concentrations of elements in the sample. It is less accurate than a similar empirical method, but it is accurate over a much wider range of element concentrations. In some cases, the Alloy\_FP method was also used for comparative measurement information. The concentration range for each element is from 0 wt% to 100 wt%, too. All measurements were taken within 30 seconds. In the first column of **Table 2**, the compositions are listed by the number of each bead. The letters after the numbers indicate different measurement locations or methods. All the values are indicated in percentage by weight.

The measurement results revealed that the beads were likely to have been made using the same or very similar base materials. The values scatter in a narrow range. The base material was gold containing 14–16 wt% silver, 1 wt% copper, and iron below 0.5 wt%. Although in some cases the iron content was relatively high, however, this could have been due to surface contamination as well.

The material of the beads can be relatively high silver-containing native gold, which is often contaminated and mixed with native silver which is

**Table 2.:** Compositions of gold beads (wt%)**2. táblázat:** Az aranygyöngyök elemösszetétele (tömeg%)

No.	Method	Fe	Cu	Ag	Au
1A	Precious_FP	0.28	0.96	13.97	84.78
2A	Precious_FP	0.28	0.89	16.38	82.45
3A	Precious_FP	0.49	0.98	14.61	83.92
4A	Precious_FP	0.54	1.10	18.13	81.23
4B	Precious_FP	0.36	0.96	14.55	84.14
4C	Precious_FP	0.61	0.94	16.81	81.63
5A	Precious_FP	1.32	0.70	16.42	81.55
5B	Alloy_FP	0.68	0.99	14.86	83.46
5C	Alloy_FP	0.48	0.98	15.08	83.47
6A	Precious_FP	0.32	1.04	14.11	84.53
6B	Alloy_FP	0.23	1.05	14.88	83.83
7A	Precious_FP	0.33	1.03	16.23	82.41
8A	Precious_FP	0.62	1.02	14.58	83.79
9A	Precious_FP	0.25	1.04	15.09	83.62
9B	Alloy_FP	0.27	1.08	15.74	82.92
10A	Precious_FP	0.26	0.97	14.06	84.70
11A	Precious_FP	0.26	0.96	14.59	83.98
12A	Precious_FP	0.96	1.09	14.57	83.38
13A	Precious_FP	0.44	1.01	14.86	83.69
13B	Alloy_FP	0.97	1.03	15.76	82.19
13C	Alloy_FP	0.66	0.97	15.58	82.79

very similar in properties and nature. However, the silver content of this native alloy is less than 20 wt%, above which it would be called electrum.

On the surface of the cheekpiece, 28 XRF measurements were carried out (**Table 3**). Several measurements were made on all parts of the object, using the Alloy\_FP method and 30 seconds measuring time in all cases. Due to the geometry of the object, a collimator was used for most of the measurements (except for No. 11, 12, 18, and 23).

The results show that the cheekpiece was made of tin bronze. Among the contaminants remaining in the metal from the copper ore, the arsenic and antimony content is noteworthy. It should be noted that the iron content may be due to inherent contamination of the crystal structure of the metal alloy, but also to surface contamination, even of modern age, which can be detected with a high value, especially on the surface of the fracture.

Based on the chemical components, the only possible alloying element is tin. Its measured values,

which are very high, but with a high standard deviation, reveal two main characteristics.

Firstly, tin is an alloying element and not a coating since it is also measurable in significant amounts on the surface of the fracture. On the other hand, the results indicate that a significant surface tin segregation has occurred. Due to corrosion processes, the surface of bronze objects can usually be expected to be segregated into certain constituents, mainly tin and lead (Orfanou & Rehren 2015, 392; Szabó et al. 2018, 99). The degree of segregation can depend on several parameters, which are influenced by the time elapsed, the composition of the environment, the humidity, and other characteristics, as well as the composition of the alloy, shape, and design of the object. In this case, the surface is relatively large and segmented compared to its volume, but it is not a thin cross-sectional sheet-like object.

A comparative analysis of the chemical composition of the different parts of the cheekpiece fragment shows varying compositions. The analysis of a bronze buckle ring from the Regöly tumulus dated to no earlier than the last third of the 7<sup>th</sup> century BC also showed a similar phenomenon. The authors explain the discrepancy in the measured data by methodological issues, surface alloy enrichment, retention of particles due to imperfect melting, and environmental effects (Szabó et al. 2018). Our measurements further reveals that the corroded surface of the object is most worn on the knob at the end, where the tin content is the lowest. The compositional data from here suggest that the original bronze alloy contains no more than 9–10 wt% tin, which is presumably what would be measured in the inner part of the cross-section of the object if it were cut in half. Such a high tin content suggests a typical composition, as in many regions of Europe (e.g. the British Isles), after the bronze alloys with often higher tin content of the Middle Bronze Age, a ratio of 1/10 tin/copper or 8–10 wt% tin content gradually but increasingly clearly became common over the centuries, as a kind of ideal compositional standard (Tylecote 1992, 18, 30), which varied little, if at all, up to a ratio of 1/8, except in special cases (e.g. bell bronze) until the Roman Age and even the Middle Ages. However, it is also worth noting that bronze containing 9–10 wt% tin is similar in colour to gold (Charalambous & Kassianidou 2012, 302).

### **Discussion and conclusions**

The burial excavated at Bükkábrány-Kálvária held the remains of a female individual between 30–45 years of age placed in the W–E orientated grave in a supine position and an infant between 10 lunar months and 6 months. The grave was cut into the burnt debris of a house established and used during the Middle Bronze Age and significantly disturbed by later cuts. The burial goods that survived in the

**Table 3.: Compositions of the cheekpiece (wt%)****3. táblázat: A zablaldaltag elemösszetétele (tömeg%)**

No.	Measurement location	Fe	Co	Ni	Cu	As	Ag	Sn	Sb	Pb	Bi
1	Concave segment below the knob-like finial	0.13	0.08	0.26	85.12	0.46	0.22	<b>12.54</b>	0.78	0.41	0.00
2	Concave segment below the knob-like finial	0.15	0.12	0.40	81.76	0.83	0.27	<b>15.00</b>	0.88	0.55	0.03
3	Concave segment below the knob-like finial	0.18	0.17	0.57	77.76	1.20	0.29	<b>17.88</b>	1.15	0.63	0.03
4	Concave segment below the knob-like finial	0.08	0.06	0.20	87.18	0.39	0.16	<b>10.89</b>	0.61	0.42	0.00
5	Convex segment below the knob-like finial	0.25	0.26	0.89	67.14	1.49	0.44	<b>26.95</b>	1.64	0.71	0.06
6	Convex segment below the knob-like finial	0.17	0.20	0.81	68.02	1.43	0.45	<b>26.53</b>	1.61	0.61	0.05
7	Convex segment below the knob-like finial	0.22	0.21	0.80	66.88	1.46	0.42	<b>27.51</b>	1.66	0.63	0.04
8	Convex segment below the knob-like finial	0.31	0.23	0.81	64.03	1.39	0.46	<b>30.12</b>	1.74	0.65	0.06
9	Knob-like finial	0.47	0.07	0.21	86.91	0.68	0.16	<b>10.77</b>	0.72	0.00	0.00
10	Cylindrical aperture in middle, concave side	0.40	0.32	0.85	73.25	1.31	0.37	<b>21.53</b>	1.32	0.56	0.04
11	Cylindrical aperture in middle, concave side	0.32	0.27	0.79	73.99	1.24	0.34	<b>21.12</b>	1.28	0.56	0.03
12	Long curved shaft segment, concave side	0.29	0.16	0.58	80.12	1.07	0.27	<b>15.84</b>	0.95	0.47	0.00
13	Long curved shaft segment, concave side	0.26	0.17	0.71	73.68	1.08	0.36	<b>21.91</b>	1.28	0.52	0.03
14	Long curved shaft segment, concave side	0.19	0.25	0.98	70.82	1.46	0.37	<b>23.75</b>	1.42	0.69	0.05
15	Cylindrical aperture by fracture, concave side	0.14	0.07	0.20	86.26	0.34	0.22	<b>11.76</b>	0.73	0.28	0.00
16	Cylindrical aperture by fracture, concave side	0.19	0.14	0.42	79.31	0.82	0.31	<b>17.22</b>	1.05	0.52	0.03
17	Fracture surface	2.64	0.17	0.59	78.49	0.42	0.29	<b>15.97</b>	0.96	0.00	0.00
18	Cylindrical aperture by fracture, convex side	0.43	0.26	0.88	66.66	1.48	0.43	<b>27.34</b>	1.59	0.69	0.04
19	Cylindrical aperture by fracture, convex side	0.51	0.21	0.81	67.27	1.44	0.41	<b>26.95</b>	1.58	0.61	0.04
20	Long curved shaft segment, convex side	0.27	0.19	0.73	72.59	1.26	0.36	<b>22.57</b>	1.34	0.64	0.04
21	Long curved shaft segment, convex side	0.23	0.22	0.77	69.71	1.31	0.38	<b>25.30</b>	1.42	0.63	0.04
22	Cylindrical aperture in middle, convex side	0.48	0.19	0.59	69.98	1.37	0.43	<b>24.57</b>	1.45	0.72	0.06
23	Cylindrical aperture in middle, convex side	0.40	0.13	0.45	78.58	0.98	0.29	<b>17.36</b>	1.07	0.53	0.00
24	Knob-like finial	0.35	0.06	0.18	89.24	0.55	0.15	<b>8.96</b>	0.52	0.00	0.00
25	Knob-like finial	0.17	0.14	0.45	79.45	0.86	0.32	<b>17.04</b>	1.05	0.50	0.00
26	Knob-like finial	1.04	0.08	0.33	79.91	0.63	0.25	<b>16.18</b>	1.00	0.39	0.00
27	Straight shaft segment, side	0.43	0.28	1.10	72.44	1.77	0.38	<b>21.38</b>	1.28	0.00	0.05
28	Fracture surface	3.67	0.15	0.57	74.54	0.44	0.41	<b>18.49</b>	1.14	0.00	0.00

eastern sector of the grave indicate that the finds can be associated with the Pre-Scythian Mezőcsát culture.

The ceramic grave goods of the burial consisted of a likely locally made amphora, a simplified version of a widespread form of the Late Bronze Age – Early Iron Age cultures of the Carpathian Basin, and a decorated cup of outstanding quality, associ-

ated with the Lusatian cultural complex, probably originating from the territory of Poland.

The grave assemblage contained an antler plate, with a soil residue covering its front panel. Its incised ornament, deciphered and made visible by non-destructive CT imagery, has shown a complex ornamentation style. Its main motif, the spiral vortex, represents a so far unique ornamental element incised on an antler plate; however, it does occur on bronze and gold objects of contemporaneous hoards – especially on round elements of horse harness – further evidencing the connection between these artefacts. Attached to the antler plate, in the soil deposition, the remains of a piece of plain weave textile constructed of linen threads dyed to blue, green, pink, and natural colour were detected and documented during conservation. However, further research is required to investigate the textile remains and additional components discovered in the deposit. A corroded iron object, perished during lifting, was most likely an awl and thus probably part of a sewing kit along with the antler plate.

The majority of the animal bones can be interpreted as remains of food offering, belonging to at least two cattle and one sheep/goat. Two pieces: the sheep astragalus and the plate carved from a wild boar tusk warrant more attention. The astragalus can also be interpreted as a child's toy or as an object related to beliefs. The boar tusk plate represents so far, a unique object in the context of the Mezőcsát culture.

The 13 pieces of gold beads were all crafted of natural gold with high silver content concluded by the ED-XRF examinations. The position of the beads within the grave in Bükkábrány was quite unusual: they came from the fill inside of an amphora which suggests that the beads were either threaded onto a string or attached to some kind of textile either covering the orifice of the vessel or placed inside of the amphora.

To place the grave in the wider context of the burials of the Mezőcsát culture, we can conclude that altogether five graves are known where gold beads were found, in all cases along with “sewing kits” (antler plates and needles, awls). This, and the generally higher number of jewellery and decorative costume items of women buried with sewing kits, imply the elevated social status of the deceased, as already pointed out by János Győző Szabó (1969, 75). As certain design patterns appearing on antler plates could be associated with burial groups and therefore interpreted as expressions of identity by local communities (Teržan 2012; Bóka 2012, 150–151), Biba Teržan goes further in terms of interpretation and speculates that those buried with their sewing kit might have been embroiders or weavers, a skill that made them

renowned and respected members of their community and guardians of family identity (Teržan 2012).

Among the cemeteries of the Mezőcsát culture, the Bükkábrány burial appears to be more closely related to some particular cemeteries in Heves County. On the one hand, this manifests itself in the interrelationship of the grave goods. The elaborately made ceramic cup can be associated with the Lusatian cultural complex, and as it was pointed out earlier, ceramics related to the ceramic traditions of the northern mountain regions are markedly present in the cemeteries of Heves County (Patek 1990, 71; Metzner-Nebelsick 1998, 367–373; Metzner-Nebelsick 2023, Fig. 10.2). However, this is the first time that an import from so far north has been assumed. In addition, the closest parallels to the decoration of the antler plate – despite its uniqueness – are known from Füzesabony-Kettőshalom. On the other hand, it is also reflected in the burial rite, since we know graves in Heves County in which the burial rite, the composition of grave goods and their positioning in the grave are almost identical to those in Bükkábrány. In this respect, the closest parallels to the Bükkábrány burial are the graves 23, 29, 60 at Füzesabony-Kettőshalom, graves 2 and 5 at Sirok-Akasztómály, and grave 97 at Maklár-Kospérium which likewise feature a female deceased buried in a W/NW–E/SE orientation, lying in a supine, extended position, with their grave goods placed on their left sides, so that the food offerings (ceramic vessels, meat) were placed next to the head and upper body, and the sewing kit was placed next to the forearm or hand. In all these burials, a flat stone was placed next to the foot. It cannot be excluded either that a stone was also originally part of the set of the grave at Bükkábrány, due to the incomplete nature of the burial. Thirdly, lying at the foothills of the Bükk, the Bükkábrány cemetery is also geographically more closely related to the Heves County cemeteries (along with the sites Bükkábrány-Bánya VIII. and Mezőkeresztes-Cet-halom), separated from the rest of Borsod County cemeteries, which were established closer to the Tisza (Mezőcsát-Hörcsögös, Ároktő-Dongóhalom, Ároktő-Pélypuszta, Tiszakeszi-Szódadomb).

About 25 meters NE of the burial, in a relatively restricted area about 23 m in diameter, four metal objects were found by metal detecting. One bronze tutulus can be interpreted as a decorative costume item or part of personal jewellery; they are relatively common finds in women's and children's graves of the Mezőcsát culture. While three other objects – a cheekpiece, a helmet-shape strap divider, and a round phalera – can be interpreted as part of horse bridle. Pre-Scythian bridle parts are typical elements of contemporary hoards, but no such finds have been discovered so far in the northern area of the Northern Great Hungarian

Plain bordering the mountain region, where the majority of the cemeteries of the Mezőcsát culture – among them the Bükkábrány site – are located (for comparison, see Kemenczei 2005, 129–138). In the burial context of the Mezőcsát culture, however, pieces of horse equipment do occur, even if relatively rarely, with six such burials attributed to the culture so far (Senica, grave 1/42, Romsauer 1999, Fig. 5; Dvorníky-Posádka, Dušek 1961, Fig. 4/12–13; Füzesabony-Öregdomb, grave 1 and 3, Kemenczei 1989, Fig. 3/4–8, Fig. 4/2,4–6,8–10; Mezőcsát-Höröcsögös, grave 52, Patek 1993, Fig. 29/8, Mezőcsát-Höröcsögös, grave excavated in 2010, P. Fischl & Pusztai 2014, Fig. 1/1–2,4–5). Based on these considerations, the metal surface finds can most probably be interpreted as grave goods, suggesting the presence of additional Pre-Scythian graves on the site and placing the single lone burial into a broader context of funerary depositions.

Considering the interrelation of the horse equipment, it can be concluded that the centre of distribution of the Füzesabony type cheekpieces is in the Carpathian Basin and can be considered as a type developed in the Carpathian Basin, based on eastern models. The closest parallel to the Bükkábrány piece was found in grave 3 of Füzesabony-Öregdomb, also associated with the Mezőcsát culture. The helmet-shaped bronze strap divider can probably also be considered a product of a Carpathian Basin work-shop, based on its fastening structure and the distribution area of its closest formal parallels. This type of object has not been found so far in the funerary context of the Mezőcsát culture. Its closest parallels are known from Late Urnfield – Early Hallstatt burials west of the Danube, providing further evidence of the relations between these populations. A similar picture can be drawn when analysing the main motif of the antler plate, the spiral vortex, the basic element of which, the “Tangentenkreis”, was used more widespread, but this particular arrangement in a four-segment spiral vortex appears primarily on finds from the Carpathian Basin.

In conclusion, the Bükkábrány-Kálvária site has yielded a unique burial and stray metal finds, which significantly add to our knowledge of the Mezőcsát culture. The range of grave goods indicates the elevated social status of the deceased, placing both the woman and the child among higher social echelons of the Mezőcsát culture. Stray finds of horse equipment may also indicate the presence of high-ranking male burial(s) in the cemetery. Based on the analogues, the Bükkábrány assemblage – both the grave and the stray metal finds – can be dated to the 9<sup>th</sup>–8<sup>th</sup> century BC, which can most probably be narrowed down to the late Urnfield, HB2–B3 period, to the 9<sup>th</sup>–early 8<sup>th</sup> century BC. The grave discussed here is a good example of

multidisciplinary collaboration: if meaningful dialogue takes place between experts of different fields (in this case archaeozoology, physical anthropology, archaeometallurgy and computer imagery) even an incomplete grave and its assemblage can yield relevant pieces of information.

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