

A UNIQUE TYPE OF SILK IN THE ARCHAEOLOGICAL HERITAGE OF THE HUNGARIAN CONQUEST PERIOD AND SOME REMARKS ON THE USE OF SILK*

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In 2016, during a rescue excavation a 10th c. graveyard recovered at the Derecske-Nagymező-dűlő in Eastern part of Hungary. One grave of the cemetery (Feature 643) was furnished with typical metal finds of this period. On the surface of some metal finds, many textile remain conserved. The textile remains mainly were silk fabrics. Among the silk remnants are examples of both types of weft-faced compound weaves; we could identify weft-faced compound twill (*samite*) fragments and weft-faced compound tabby (*taqueté*) remains too. Besides these remnants, the *taqueté* is rare in the 10th c. archaeological heritage of the Carpathian Basin. The parallels of these polychrome silk *taqueté* finds are known from the Middle East.

Keywords: Carpathian basin, Hungarian Conquest Period, Early Medieval commerce and trade routes, archaeological textiles, Byzantine archaeology, Islamic archaeology.

INTRODUCTION

The silk trade and the booty of the Western raids of Old Hungarians (AD 895–955)

Written sources have recorded that Hungarians, preceding the Conquest, had been present in the Early Mediaeval slave market in Eastern Europe. They often spent the money they got for people captured in Etelköz and sold in Crimea on silk (*Zimonyi 2016*, 339). When the early Hungarians (Magyars) moved into the Carpathian Basin at the end of the 9th c. (around AD 895), they continued on with their previous lifestyle. After the conquest of the Great Hungarian Plain, Old Hungarians often led plundering raids to Europe. According to written sources, they had many opportunities to get hold of such goods during their military campaigns to Western and Southwestern Europe in the first half of the 10th c., and to Southeastern Europe in the middle third of the 10th c. AD (*Bloch 1989*, 8–14). The sources suggest that the most valuable booties for Old Hungarians in these military campaigns – besides prisoners – were clothes and items made of silk, silver coins, and objects made of silver and gold. A detailed description by Abbot Leo Marscianus clearly illustrates the high proportion of textiles within the plunder of the Hungarian military raids (see *Bollók et al. 2009*, 148, 149).

The research history of the 9–11th c. textile finds in the Carpathian Basin

In the archaeology of the Hungarian Conquest period, the analysis of organic remains with modern scientific techniques has sparked increasing interest in the past decades. Despite being a rare find – and mostly only fragmentarily preserved – organic remains are a prosperous source of data, but we know mainly metal objects from the 10th c. archaeological heritage of the Carpathian Basin because organic remains represent only a minute percentage of the archaeological finds from the 10th–11th c. of the Carpathian Basin. The poor preservation of the organic materials due to the soil- and climate conditions. Archaeologists have generally failed to consider the technical features of the textile remnants when identifying contemporary garments and textiles (a detailed research history see in *Bollók et al. 2009*). In scholarly publications, hypotheses about the pattern of over- and undergarments were based on the position of the metal mounts (for example *Nepper 1993*), but Béla Kürti, one of the outstanding experts of 10th c. women's clothing in the Hungarian archaeology, came to a conclusion not long ago that the tailoring pattern of a dress cannot be reconstructed based on the arrangement of metal mounts (*Kürti 1996*).

Textile fragments were also found in some other archaeological sites. Sándor Rejtő conducted the

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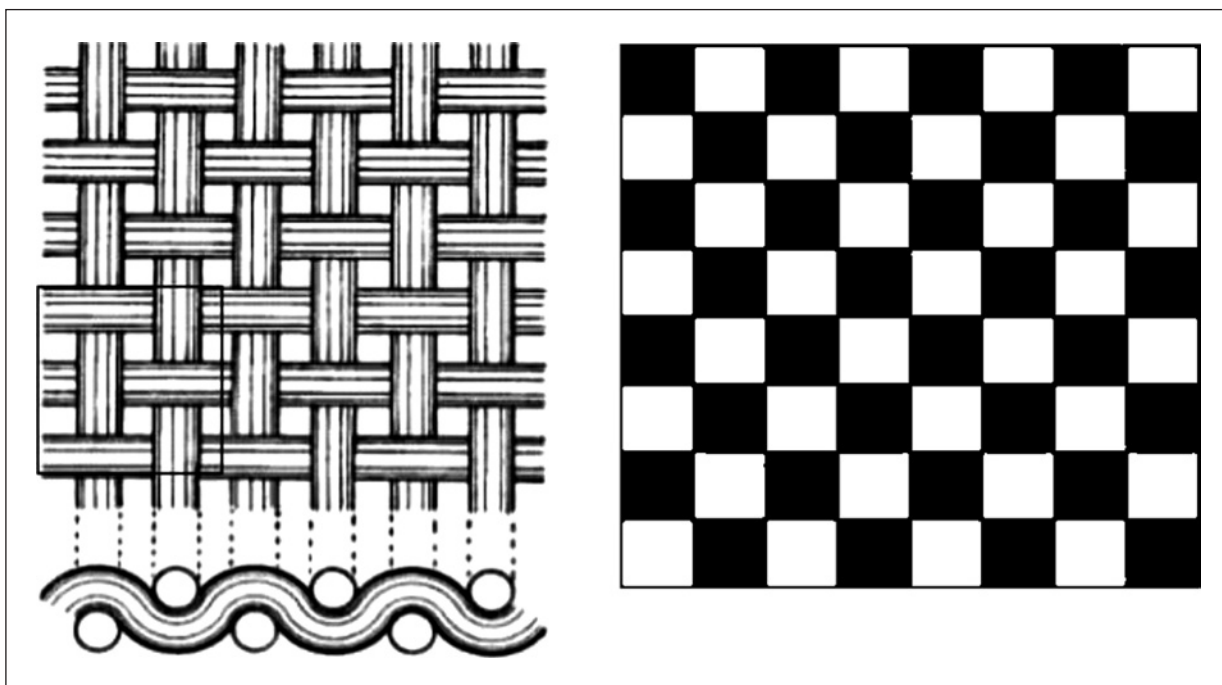


Fig. 1. Plain weave (tabby) structure (source: <https://textilelearner.net>).

first scientific early medieval textile examination on the Technological University of Budapest he did this at the request of A. Nyáry (1904, 54). Then, after a long time, the textile remains of the Rovinka cemetery in Slovakia were analysed in 1962 by J. Janovský (1962). Finally, the systematic research of Conquest Period textile remnants only began in 1971 with the analysis of finds from the excavation at Szabadkígyós-Pálliget plot, directed by Csanád Bálint and Márta T. Knotik (Bálint 1971; Knotik 1971). Csanád Bálint was also the first to draw attention to the fundamental importance of the disintegrated, small fragments of clothing buried with the dead and their position in relation to metal objects found with them. In 1973 the publication of the analysis of the various wool, linen and silk found in the chieftain's grave from Zemplín (Budinský-Krička/Fettich 1973).

Another ground-breaking step was done by a team of researchers, who comprehensively analysed the large textile piece recovered from a grave in Fonyód (Nagy et al. 2009). To this date, the most comprehensive collection of textile finds from the Carpathian Basin was also published by this team. Based on historical data, the authors comprehensively studied the use of silk in the context of the Hungarian population and the period of the Conquest. They found Eastern and Byzantine parallels, which was a significant contribution (Bollók et al. 2009).

The last significant step was the excavations at the Derecske-Nagymező-dűlő site where a considerable amount of textiles were excavated; these finds just partly published yet (Berta et al. 2018).

THE TEXTILE FINDS FROM THE 10TH C. IN THE CARPATHIAN BASIN AND THE ROLE OF THE OLD HUNGARIANS IN THE TRANSEUROPEAN TRADE

After the latest research, we have data on more than 280 textile remnants gathered from the Old Hungarians' archaeological heritage in the Carpathian Basin in the 10th–11th c. from the literature on the subject. More than one-third of these finds were already analysed by various microscopical methods, like Scanning Electron Microscopy, Light Microscopy and mostly portable digital microscopes. Two-thirds of the analysed textile finds are linen, and these fragments are woven in simple, balanced plain weave so-called tabby (Fig. 1; 2: 1; Básti/Harangi 2021, 25; Bollók et al. 2009, 154; Harangi 2021, 8, 9).

Most of the silk finds recovered thus far were *samite*. Sometimes several fragments were found in the same graves. The silk fragments make up ca. thirty percent of all the textile remnants. Most of the pieces examined belong technically to the

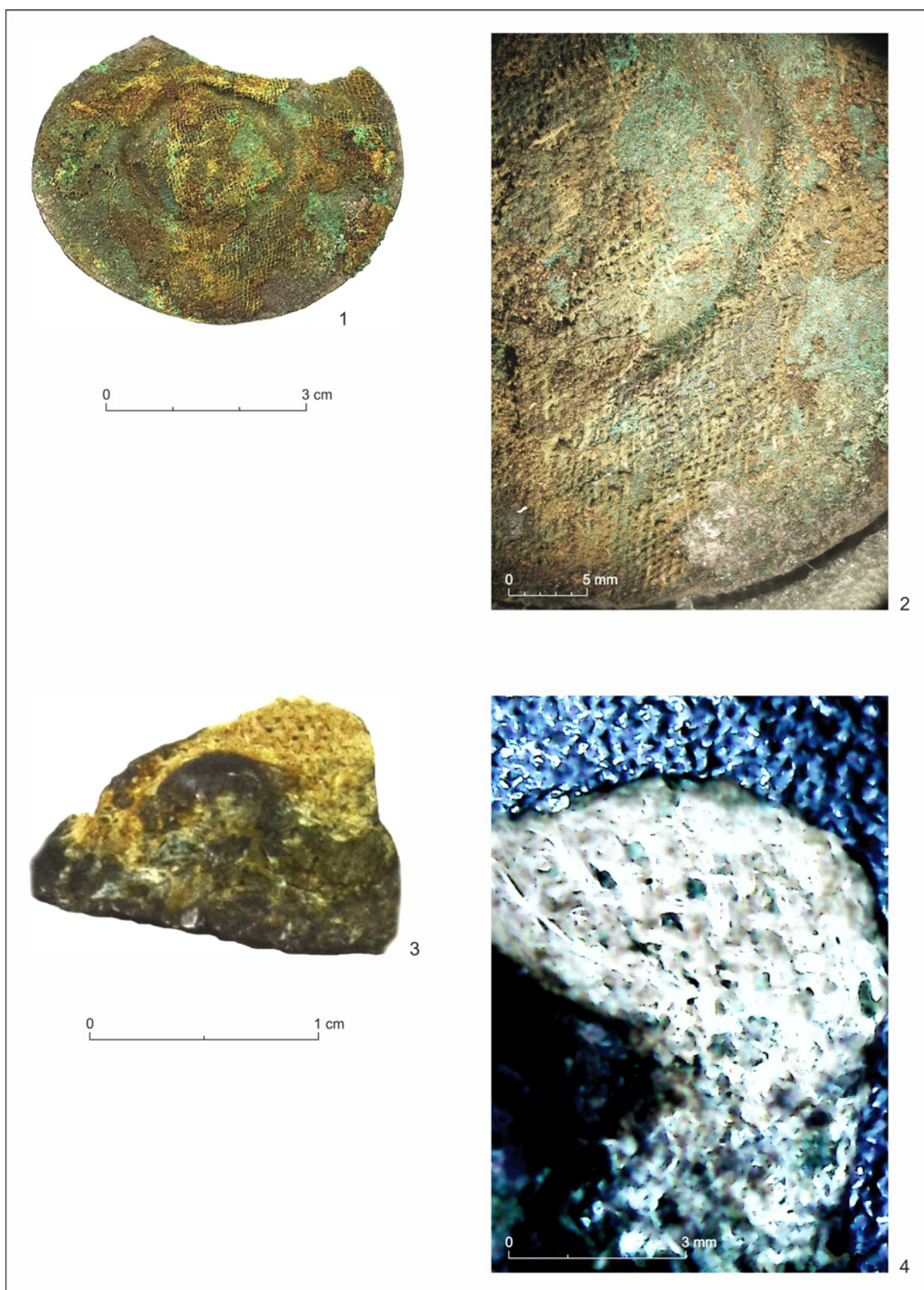


Fig. 2. Derecske-Nagymező-dűlő site, the Grave 643. Plain weave (tabby) linen fragments (photo A. Türk).

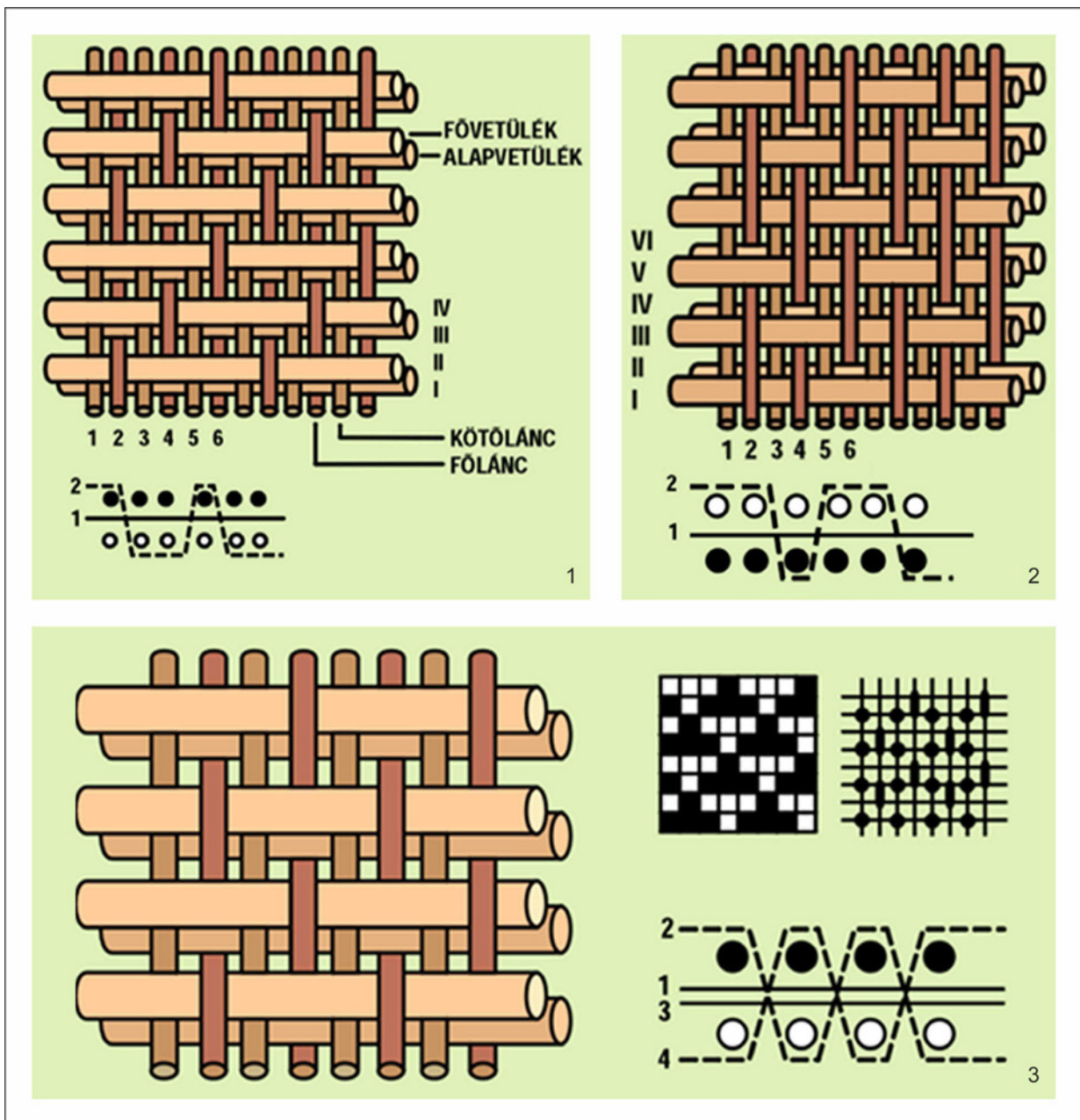


Fig. 3. Structure of the weft-faced compound weaves. 1, 2 – Weft-faced compound twill (*samite*); 3 – Weft-faced compound tabby (*taqueté*; after Berta et al. 2018).

weft-faced compound twill group of textiles (Fig. 3: 1, 2). The remnants have one binding warp and two main warps with two wefts in general. The binding warp and one weft are bind in weft twill on the face of the textile. The remnants are small size, only 2–3 cm in size, these are in very fragile state (Bollók et al. 2009, 154). The more precise classification of the *samite* textiles could not be made. The fabric's colour and pattern very rarely observed, because the dyestuffs have deteriorated, turning the material into brown (Fig. 4). However,

we view that the threads used for weaving make it likely that those were of different colours. These analytical deficiencies do not affect the definition of the closer technical origin of the remnants (Bollók et al. 2009, 152, 153). The *samite* fabrics were woven on or draw looms. These wide silks made in the imperial manufactories. On the looms two weavers and two draw boys worked together to handle the width (Endrei 2000, 168; Muthesius 1997). Earlier, the Hungarian researchers thought these *samite* silks had Byzantine origin (Bollók et

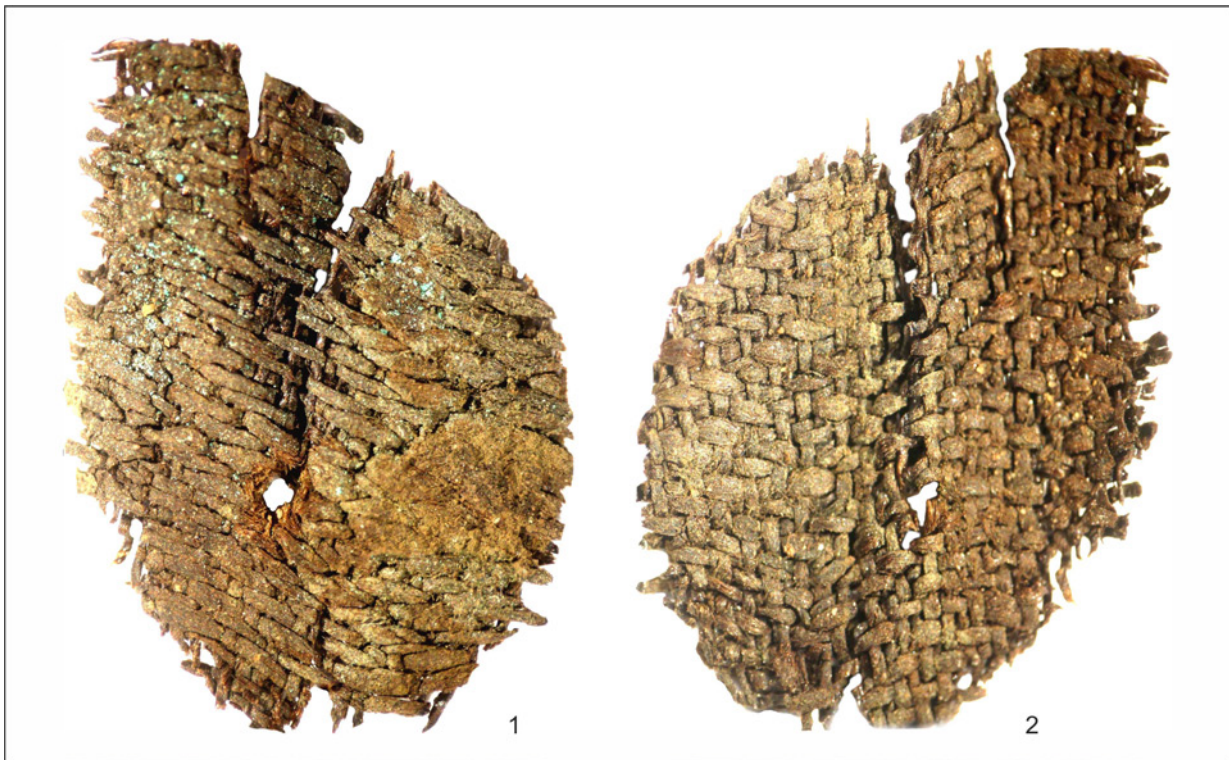


Fig. 4. Derecske-Nagymező-dűlő site, the Grave 643. Weft-faced compound twill (*samite*; photo A. Türk).

al. 2009, 156). Kristýna Urbanová in 2009 drew the attention of the silk finds (*samite*) from Streda nad Bodrogom and their origin from the Middle East (Urbanová 2009, 357). These facts and the written sources suggest that the early Hungarians connected to the Transeuropean trade between the Samanid territories and the Hispanian Peninsula (Polgár 2019, 123, 124). This is also confirmed by the fact that we know of silks from the graves of the earlier Old Hungarian settlement territory or the graves of the early Hungarians who remained in the east (Stashenkov 2020, 74, fig. 147), some of these silks may have originated in the region of the post-Sasanian Iran, like the famous silk remnants from Sineglazovo (Fig. 11; Ierusalimskaia 1969). The *samite* weaving technique was prevalent in China, Central Asia and the Byzantium, and this type of silk was widespread in Eastern Europe in the 10th c. AD. Some *samite* fragments are known from this territory (i.e., the Volga – Ural region), for example, from a cemetery at Bolshie Tygani (Valiulina/Eniosova/Orfinskaia 2018, 45, 46), a site that might be connected to the Old Hungarians who had remained in the East. These silk remains, together with other metal finds (including decorative horse harness rosette mounts) clearly indicate that both Hungarian communities – the ones who stayed in Eastern Europe and the ones who moved

to the Carpathian Basin – got involved in Early Mediaeval international commerce (Komar 2018, 196). The graves of the Subbótsi-horizon, representing the archaeological record of Old Hungarians in the Dnieper – Dniester region in the 9th c. AD, often contain *samite* remains and other luxury items. These finds, with some not-yet-published *samite* fragments from Slobodzeia amongst them (about the cemetery see Shcherbakova/Tashchi/Telnov 2008), provide us with undisputable evidence of Old Hungarians contributing significantly to the international commerce as early as in the 9th c. AD, preceding the conquest of the Carpathian Basin (Fig. 5). This picture corresponds with the one outlined by Arabic sources (Polgár 2019, 122, 123, 274–290).

Unique silk finds in the archaeological heritage of the 10th c. Carpathian Basin

In the last decade, a new type of silk could be recognised in the archaeological heritage of the Old Hungarians. The weft-faced compound tabby (*taqueté*) technique (Fig. 3: 3) was observed first at Tarpa in Hungary in 2012 and then at Derecske in 2016. Both archaeological sites are in Eastern Hungary (Fig. 6). We know some *taqueté* textile

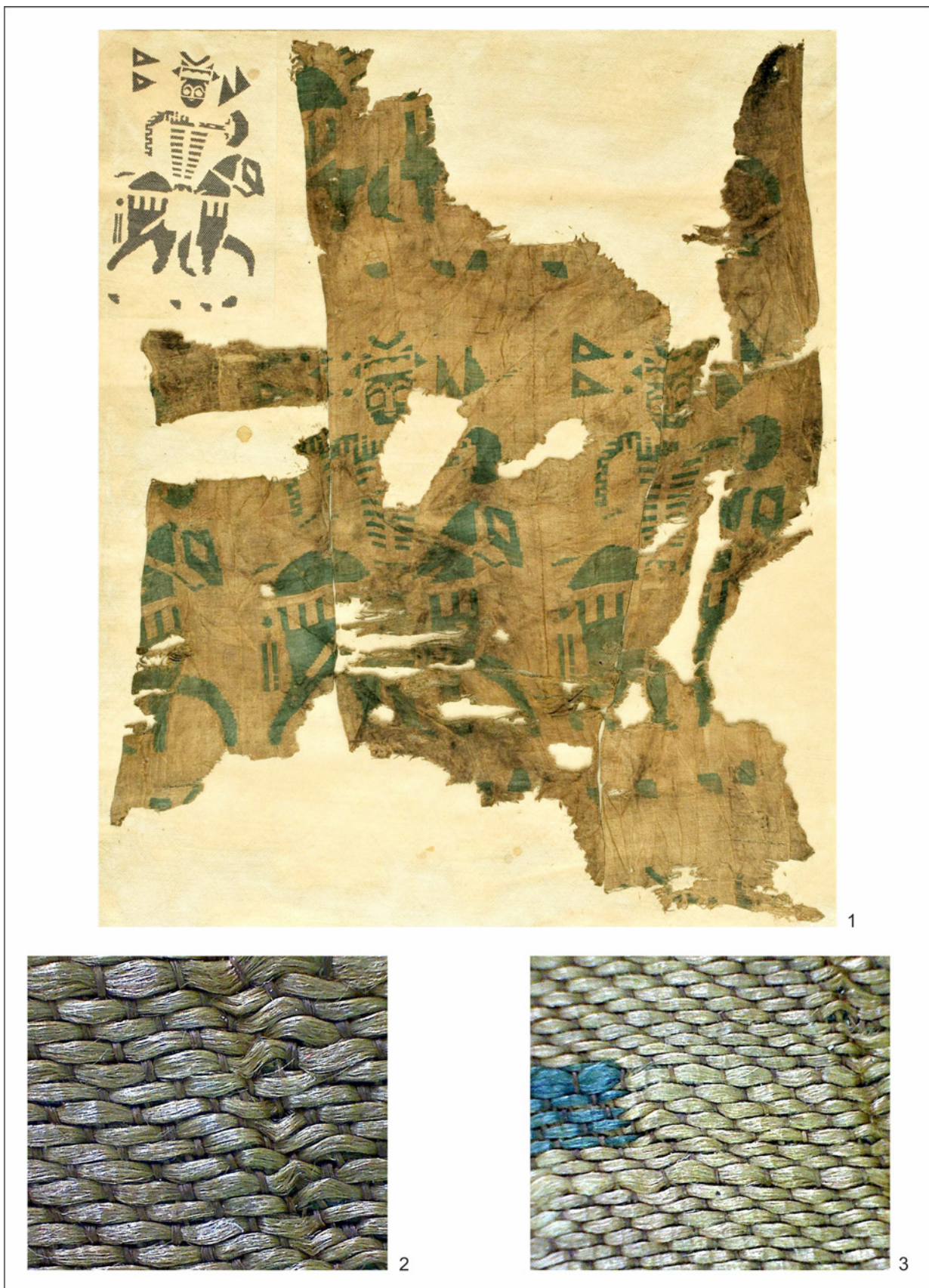


Fig. 5. Sineglazovo, Russia. Post-Sasanian weft-faced compound twill (*samite*; photo S. G. Botalov).

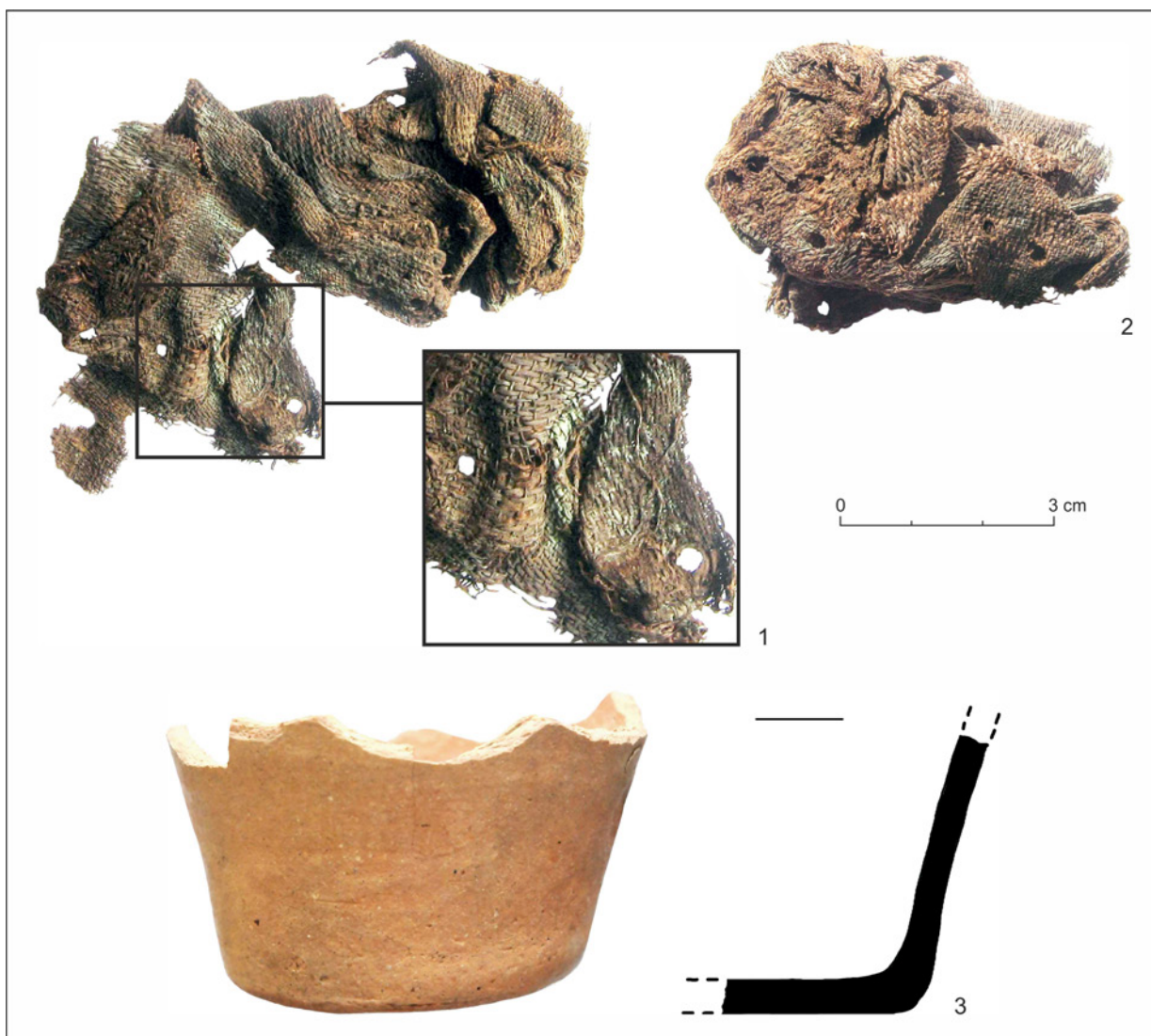


Fig. 6. Slobodzia (Pridnestrovian Moldavian Republic), Subbotsi-horizon, second half of 9th c. AD, the Grave 38. Byzantine weft-faced compound twill (*samite*) and fragment of an amphora-like jar (photo A. Türk).

from the Late Antique Period in the Eastern Mediterranean; however, for fabrics made primarily of wool. We know some *taqueté* made from silk and wool from the territory of Xinjiang, Central Asia and the Eastern Mediterranean area; Zhao Feng thinks this type of silks originated from those textiles, which were the imitations of Chinese *jin* silks (Feng 2004b, 69–73). Regarding the period under study, polychrome silk *taqueté* finds are known from Rayy in Iran (Fig. 12). This town was the Buyid territory at this time (Mackie 2015, 140, 151–155). Similar finds known too from Eastern Mediterranean area Egypt (Orfinskaia/Tolmacheva 2019, fig. 2) and the present-day Israel (Shamir/Baginski 2012, 5, 6, fig. 8–11) These facts suggest that the *taqueté* fragments from the Carpathian

Basin originate from the Islamic world, maybe closer from the Buyid textile manufacture centres. It is not a coincidence that these silks were found in eastern Hungary, from where we know most of the Islamic dirhams (Kovács 2011).

A small geometric pattern could be observed on one of the *taqueté* fragments from Derecske site (Berta et al. 2018, 30; Türk/Harangi/Nagy 2020, 144), which is an infrequent occurrence in the period of the Hungarian Conquest (Fig. 7). A fragment with a similar polychrome decoration was found the last time in 1875 at the Nagyteremia site, but it has been destroyed to this day. Two dyes were identified on a fragment from Derecske: blue and red. These were popular colours in our period, but they can rarely be observed in Hungary.

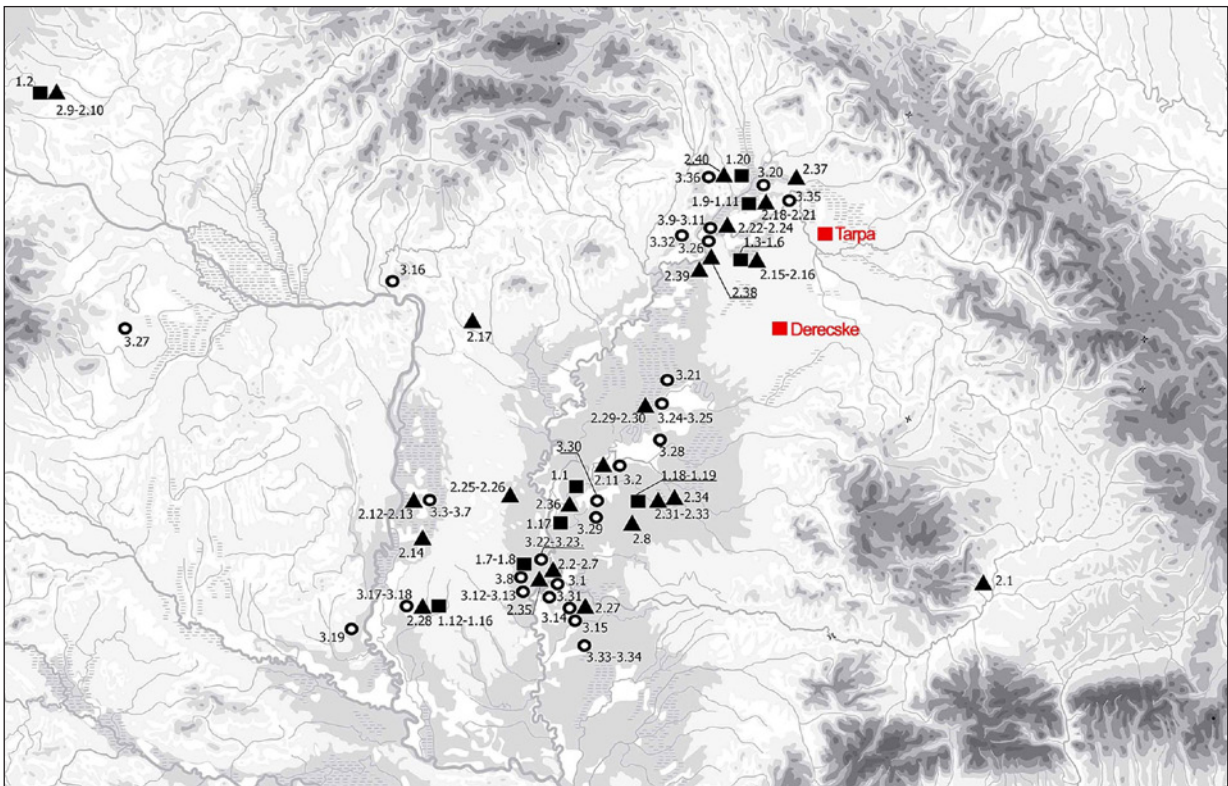


Fig. 7. Map of the previously known textile finds in the archaeological heritage of the Carpathian Basin (10th–11th c.) and the new *taqueté* finds (Tarpa and Derecske). Legend: ■ – silk; ▲ – tabby; ○ – unidentifiable (modified after Bollók *et al.* 2009).

Silks from the Grave 643 at Derecske-Nagymező-dűlő site

Most textile pieces survived because they were protected by the silver discs placed on the upper body (Fig. 13). Due to their excellent preservation and fast and professional conservation, the textile fragments could be separated from the discs and kept intact (Fig. 14). These silver discs were the ornaments of the outer garment (Berta *et al.* 2018, 30; Türk/Harangi/Nagy 2020, 144). The rhomboid mounts, with a tiny piece of silk preserved (Fig. 8), suggest that silk also had a role in the undergarment design (Berta *et al.* 2018, 32; Türk/Harangi/Nagy 2020, 144, 145). The mount was fastened to the silk by piercing its spikes through the textile and flattening the ends. Several analogies of the application of that simple fastening method are known both from the cemetery at Fonyód (Nagy *et al.* 2009, fig. 4.4) and the eastern territories, e.g., the mounts in grave no. 7 in burial mound no. 7 in the Prosvet I. cemetery (Stashenkov 2020, 74, 75, fig. 147; 148) and the silk remains from Slobodzeia (Fig. 5).

Theoretically, there are two possibilities: the silk was used only for the hem of the garment or for the whole garment. Among the archaeologi-

cal finds from the Carpathian Basin, dating from the period of the Hungarian Conquest, there are examples of both: garment with silk hem (Kőhegyi/Knotik 1982, 196–200) and whole garment made of silk (Nagy 2009). Other parallels exist between Eastern Europe and the Northern Caucasus region in the 8th to 10th c. (Fig. 15). The same points apply to the upper garment, fragments of which were of a different type of silk, preserved on the back sides of the silver alloy discs. A piece of linen remained on the front side of one of the discs, which suggests that the whole upper garment was made probably of linen, and only the hem of the garment was silk. The discs were fitted on the hem with sewing holes punched through the plates (Berta *et al.* 2018, 11, 15, fig. 3; Türk/Harangi/Nagy 2020, 145).

Footwear with silk decoration from the 10th c.

The tiny (only a few millimetres large) pieces of textile preserved on the backside of one of the fittings of the foot-gear are particularly important (Fig. 9), as it demonstrates that the upper side of the foot-gears was also lined with silk (Berta *et al.* 2018, 15).



Fig. 8. Rayy, Iran. Polychrome silk *taqueté* remnants (source: <https://www.clevelandart.org>).



Fig. 9. Derecske-Nagymező-dűlő site, the Grave 643. Weft-faced compound tabby (*taqueté*) fragment (after Berta *et al.* 2018). Scale: a – 1; b – 2, 3.

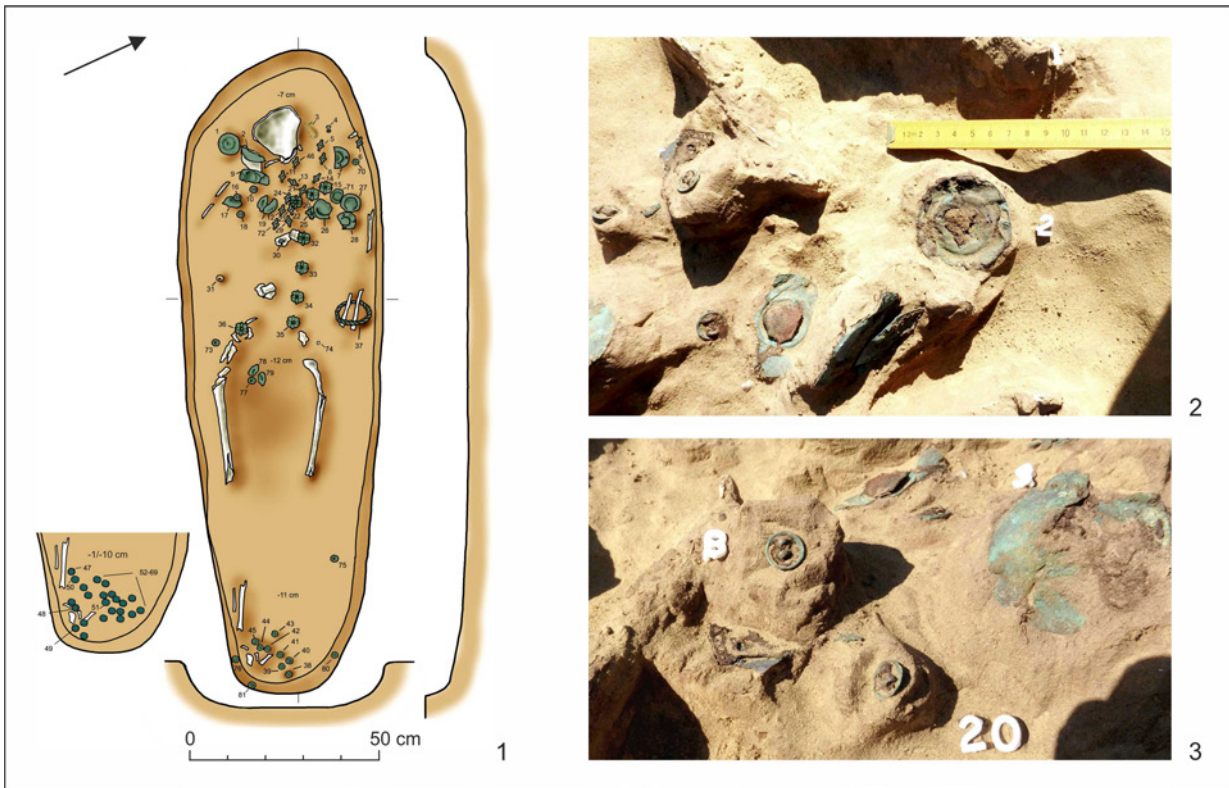


Fig. 10. Derecske-Nagymező-dűlő site, the Grave 643. 1 – plan of the grave; 2, 3 – silk remnants in connection with the metal mounts (after Berta et al. 2018).

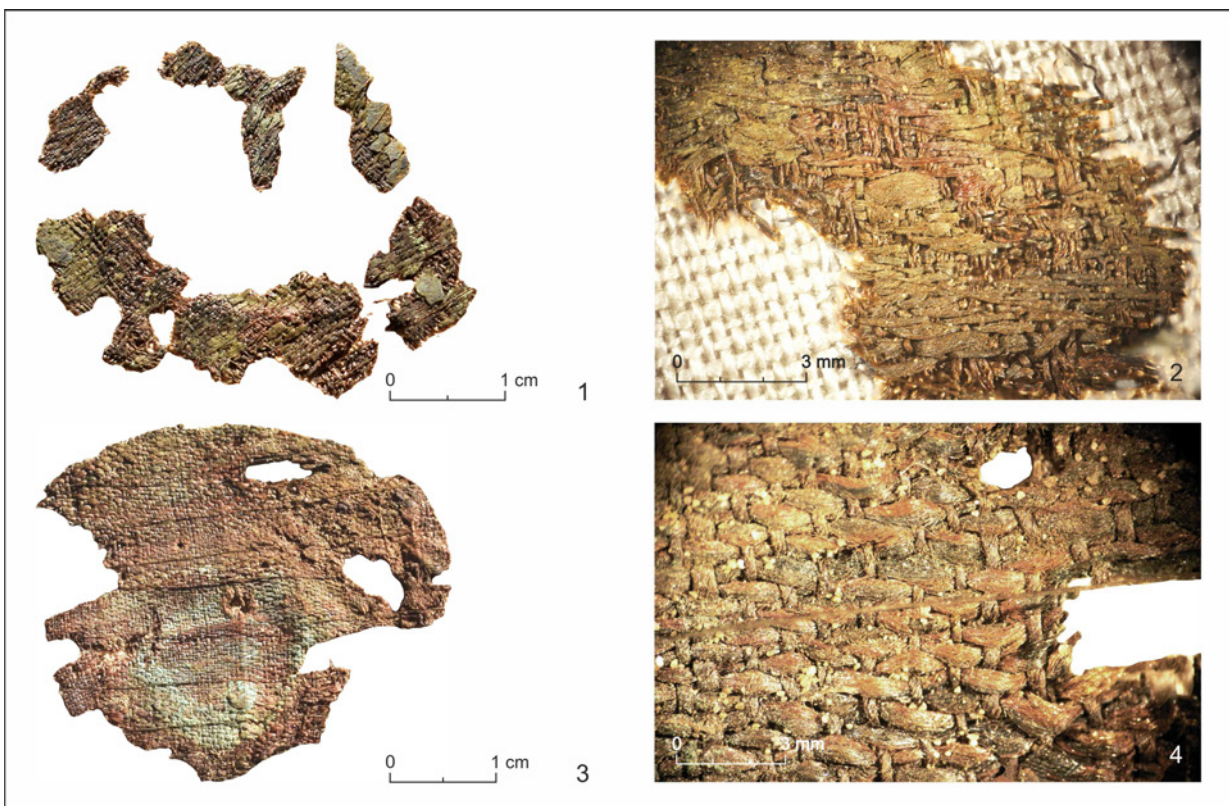


Fig. 11. Derecske-Nagymező-dűlő site, the Grave 643. 1, 2 – separated *samite* fragments; 3, 4 – separated *taqueté* fragments (after Berta et al. 2018).



Fig. 12. Derecske-Nagymező-dűlő site, the Grave 643. Rhomboid silver mount with silk fragment (after *Berta et al.* 2018).

Silk lined foot-gears without fittings are known mainly from China and Central Asia (Fig. 16), these finds dating from the 7th to 12th c. (*Feng* 2004a; 2012, 246, fig. 5: 52; *Türk/Harangi/Nagy* 2020, 145; *Watt/Wardwell* 2004, 46–48, 87–90). From the region of the Northern Caucasus (Fig. 17), we know of such footgear, of which were edged or partly lined with silk, but not the top of the feet (*Ierusalimskaia* 2012, fig. 54a; 116; *Türk/Harangi/Nagy* 2020, 145). The closest parallel of the footwear from Derecske is known from an Oghuz grave from the Bogoliubovka, Southern part of Russia (Fig. 16: 3). This fragment of boots is also decorated with silk and metal mounts (*Matiushko* 2014, 622; *Türk/Harangi/Nagy* 2020, 145).

Regarding finds from the Conquest period associated with the Hungarian population, the lining and decorating of shoes with silk is not unprecedented. Ukrainian archaeologists have documented and observed in detail the case of Grave 2 at Dmitrovka (*Maievska* 2011), one of the Subbotsi-type sites (second half of 9th c. AD) associated with the Hungarian settlement territory in the so-called Etelköz, wherein the 9th-c. settled the Old Hungarians before the Carpathian Basin, along the Dnieper and Dniester River (*Komar* 2018).

This tiny fragment from a footwear fitting demonstrates that even the smallest piece of organic remains can be highly informative. Therefore, a great



1



2

Fig. 13. 1 – Early mediaeval caftan made of silk from Moschevaia Balka, Russia (after *Ierusalimskaia* 2012); 2 – Early mediaeval caftan made of linen with silk hems from the collection of the Metropolitan Museum of Arts, New York (source: <https://www.metmuseum.org>).

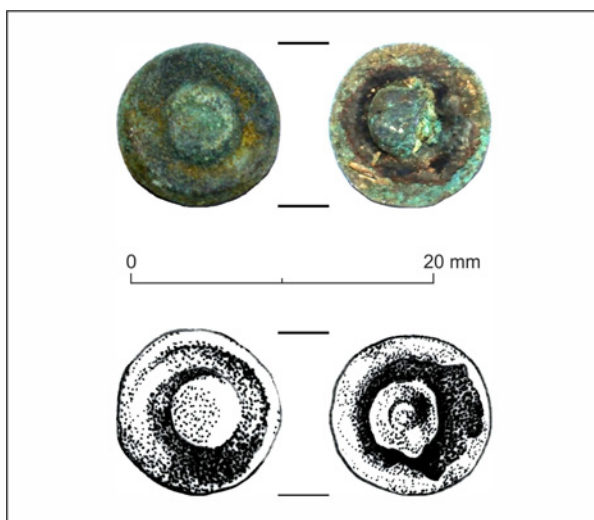


Fig. 14. Derecske-Nagymező-dűlő site, the Grave 643. Footgear mount with silk fragment (after *Berta et al. 2018*).

deal of attention is required when excavating graves, and professional conservation is also indispensable – best done by a conservator, who is ideally on-site and takes part in the excavation of the tomb (*Türk/Harangyi/Nagy 2020, 145*).

SUMMARY

Some of the written sources about the Magyar raids in Western- and Southwestern Europe originated mainly from the first half of the 10th c. suggest that the most valuable booties for Old Hungarians in these military campaigns – besides prisoners and slaves – were clothes and items from silk, silver coins and precious metal objects (*Bloch 1989, 8–14; Kovács 1989; 2011; Kristó 1995, 259–261; Türk/Harangyi/Nagy 2020, 145*).

These products were buried in the graves of Old Hungarians later in the Carpathian Basin in the 10th c.



Fig. 15. Parallels of the silk-lined footgear. 1 – China (source: <https://www.arctic.de/en/>); 2 – Dmitrovka (after *Maievskaja 2011*); 3 – Bogoliubovka (after *Matiushko 2014*).

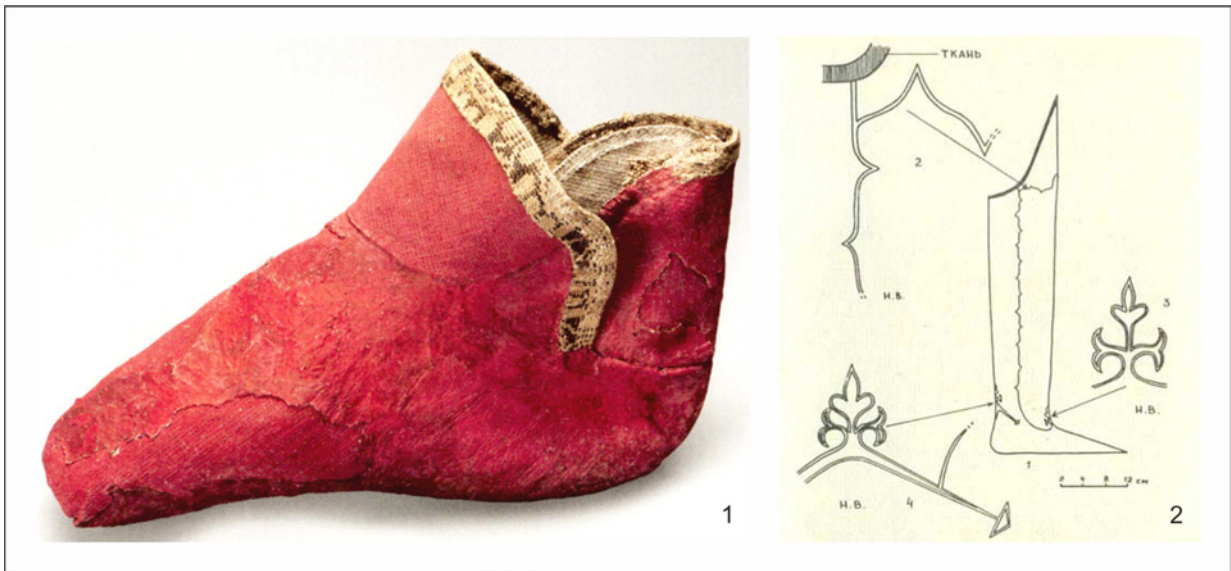


Fig. 16. Parallels of the silk-lined footgear from the Northern Caucasus, Russia. 1 – Moschevaia Balka (after *Ierusalimskaia* 2012); 2 – Chasaut (after *Kuznetsov* 1992).

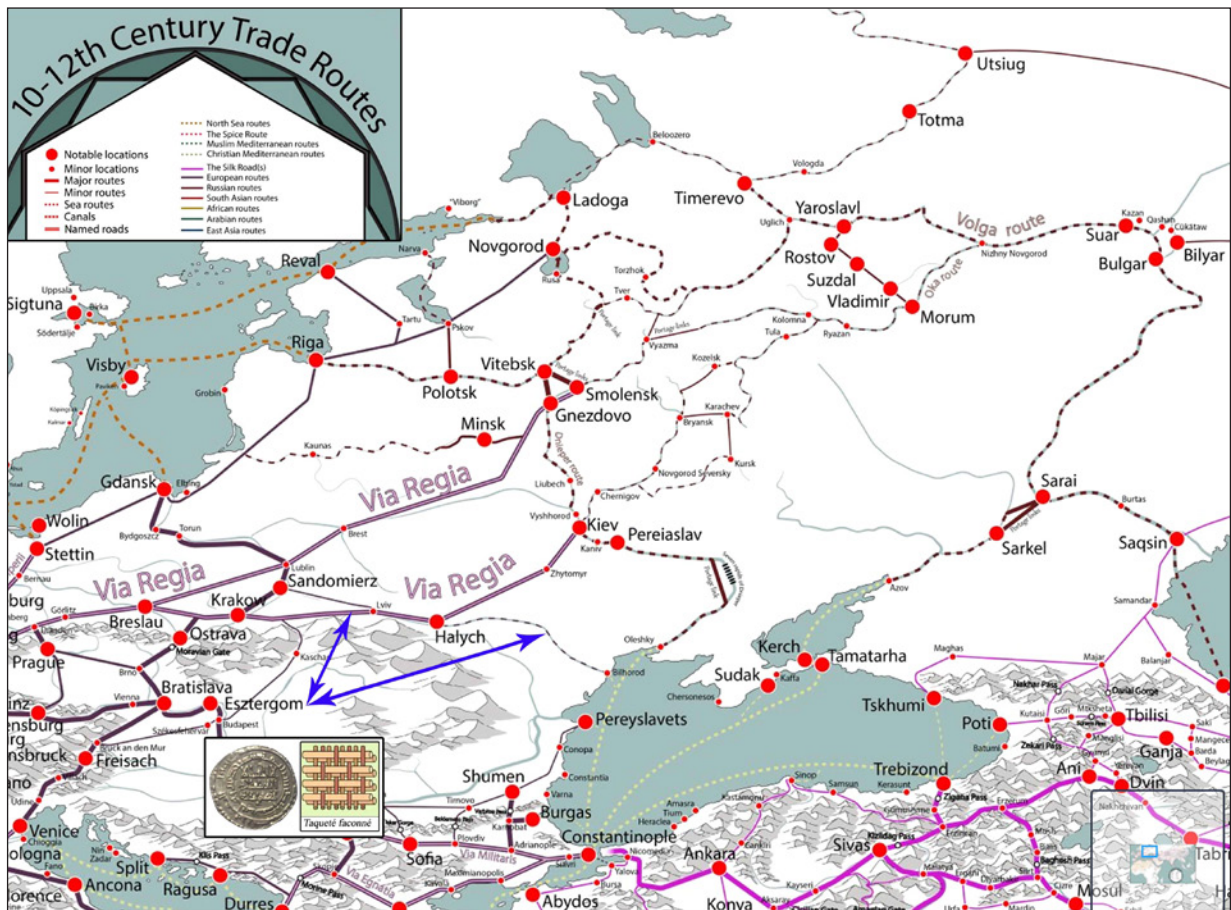


Fig. 17. Hypothetic medieval trade route network in Eastern Europe with 10th-c. silk *taqueté* and dirham finds in the Carpathian Basin (using as a basic source: <https://merchantmachine.co.uk/>).

We know several graves and cemeteries among them that are extremely rich in silver objects. These graves, under metal objects, often small fragments of textiles – often silk fragments – were discovered (Bálint 1991, 108, 109; Türk/Harangyi/Nagy 2020, 146). During the excavations, it usually needs a considerable effort to save these fragments, although these small textile remnants are rich data sources. Unquestionably silk was always an imported product for Old Hungarians.

Regarding materials from the 10th c., two categories of textiles can be identified up until now: linen and silk find. Their different weaving patterns could also be identified. Most of the silk finds recovered so far have been *samite*, almost without exception, demonstrating that this was a generally widespread type of fabric. These weft-faced compound twill silks are well known from Western European treasuries (Muthesius 1997). These facts and the archaeological heritage of the 10th c. in the Carpathian Basin (such as the solitary grave at Fonyód in Southwest Hungary) confirmed that these silks could be the plunder of the Western raids (Nagy et al. 2009).

The newly recognised type of silk, the *taqueté* (about this type of silk see: Becker 1986, 84–89; Feng 2004b, 69–73; 2014, 51, 52; Kuhn 2012, 27–30; Linschied 2016, 20), are absent from Western Europe, or the famous Viking finds in Northern Europe. We think that based on the arguments set out above, this type of textile has arrived in the Carpathian Basin from the Near East on the routes of the Transeuropean commerce (Fig. 10; about the 10th-c. Carpathian Basin and the international exchange, see Polgár 2019, 274–290). All this suggests that Hungarians had access to different sources of silk in the 10th c. besides their Western raids, but their role is not negligible. The new type of silk sites is situated in North-Eastern Hungary, the same region from where the most 10th-c. finds originates, too, and we believe it is not accidental and surprising. The dirhams and the *taqueté* silk finds suggest that Old Hungarians kept their trade contacts with Central Asia even after their conquest in the Carpathian Basin in AD 895 (Türk/Harangyi/Nagy 2020, 146) until the middle of 10th c. AD.

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Jedinečný typ hodvábu v archeologickom dedičstve obdobia maďarských výbojov a niekoľko poznámok k používaniu hodvábu

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SÚHRN

V roku 2016 bola počas záchranných výskumov pred výstavbou diaľnice M35 medzi Debrecínom a Berettyóújfalu objavená rozsiahla polykulturná lokalita v Derecske-Nagymező-dűlő, ktorej súčasťou bolo pohrebisko z 10. stor. Jeden z hrobov (objekt 643) obsahoval typické nálezy tohto obdobia, t. j. liate náušnice zo striebornej zliatiny s koráľkovými radovými príveskami, pozlátané kovania šiat, kovania obuvi, štvorcové, tzv. „opaskové“ kovania, náramok z točeného drôtu vyrobený zo zliatiny medi, ako aj gombíky. Na povrchu bohatých kovových nálezov sa zachovalo množstvo textílií, hlavne hodváb. Vďaka vynikajúcej zachovanosti a rýchlej profesionálnej konzervácii sa textilné fragmenty dali oddeliť od kovov a uchovať ich neporušené. Existujú príklady oboch typov zložených väzieb s útkovým lícom. Identifikované boli fragmenty

útkového zloženého kepru (*samite*), ktoré dominujú medzi textilnými materiálmi v období uhorských výbojov, a zachovalo sa aj útkovo zložené *tabby* (*taqueté*). Okrem týchto zvyškov je *taqueté* v archeologickom dedičstve Karpatskej kotliny z 10. stor. vzácnym nálezom.

Paralely týchto nálezov polychrómovaného hodvábu *taqueté* sú známe z Blízkeho východu, najmä z obdobia Buyid Rayy v Iráne a z rôznych nálezísk v Izraeli a Egypte. Tento typ hodvábu bol v Európe oveľa menej bežný ako *samite*. Zložený *tabby* hodváb s útkovou väzbou sa neobjavuje v súboroch západnej Európy ani medzi známymi nálezmi Vikingov v severnej Európe. Všetky tieto skutočnosti naznačujú, že Maďari mali v 10. stor. prístup k iným zdrojom hodvábu ako obyvatelia západnej alebo severnej Európy.

- Obr. 1. Štruktúra jednoduchej plátrovej väzby (zdroj: <https://textilelearner.net>).
- Obr. 2. Derecske-Nagymező-dűlő, hrob 643. Fragmenty ľanového plátna (foto A. Türk).
- Obr. 3. Štruktúra útkových väzieb. 1, 2 – zložený keper s útkovým lícom (*samite*); 3 – útkovo zložené plátno (*taqueté*; podľa Berta et al. 2018).
- Obr. 4. Derecske-Nagymező-dűlő, hrob 643. Zložený keper s útkovým lícom (*samite*; foto A. Türk).
- Obr. 5. Sineglazovo, Rusko. Postsásánsky útkový zložený keper (*samite*; foto S. G. Botalov).
- Obr. 6. Slobozia (Podnesterská moldavská republika), horizont Subbotsi, druhá polovica 9. stor., hrob 38. Byzantský útkový zložený keper (*samite*) a fragment amforovitého džbánku (foto A. Türk).
- Obr. 7. Mapa doteraz známych textilných nálezov z Karpatskej kotliny (10.–11. stor.) a nových nálezov *taqueté* (Tarpa a Derecske). Legenda: ■ – hodváb; ▲ – plátno; ○ – neidentifikovateľné (upravené podľa Bollók et al. 2009).
- Obr. 8. Rayy, Irán. Zvyšky polychrómovaného hodvábu *taqueté* (zdroj: <https://www.clevelandart.org>).
- Obr. 9. Derecske-Nagymező-dűlő, hrob 643. Fragment zložených útkových pláten (*taqueté*; podľa Berta et al. 2018). Mierka: a – 1; b – 2, 3.

- Obr. 10. Derecske-Nagymező-dűlő, hrob 643. 1 – pôdorys hrobu; 2, 3 – zvyšky hodvábu v súvislosti s kovovými paspartami (podľa Berta et al. 2018).
- Obr. 11. Derecske-Nagymező-dűlő, hrob 643. 1, 2 – oddeľené fragmenty *samite*; 3, 4 – oddelené fragmenty *taqueté* (podľa Berta et al. 2018).
- Obr. 12. Derecske-Nagymező-dűlő, hrob 643. Strieborná kosoštvorcová pasparta s fragmentom hodvábu (podľa Berta et al. 2018).
- Obr. 13. 1 – ranostredoveký kaftan z ľanu s hodvábnym lemom z lokality Moščevaja Balka, Rusko (podľa *Jerusalimskaia* 2012); 2 – ranostredoveký kaftan vyrobený z hodvábu zo zbierky Metropolitan Museum of Arts, New York (zdroj: <https://www.metmuseum.org>).
- Obr. 14. Derecske-Nagymező-dűlő, hrob 643. Obuv s fragmentom hodvábu (podľa Berta et al. 2018).
- Obr. 15. Paralely obuvi podšitej hodvábnom. 1 – Čína (zdroj: <https://www.arctic.de/en>); 2 – Dmitrovka (podľa *Matiushko* 2011); 3 – Bogoliubovka (podľa *Matiushko* 2014).
- Obr. 16. Paralely obuvi podšitej hodvábnom zo severného Kaukazu v Rusku. 1 – Moschevaia Balka (podľa *Jerusalimskaia* 2012); 2 – Chasaut (podľa *Kuznetsov* 1992).
- Obr. 17. Hypotetická stredoveká sieť obchodných ciest vo východnej Európe s nálezmi hodvábu *taqueté* a dirhamu z 10. stor. v Karpatskej kotline (zdroj: <https://merchantmachine.co.uk>).

