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Missing Link:
Early Roman textiles and Norican-Pannonian female dress from Potzneusiedl, Austria

Abstract
Cremation was the most widespread burial tradition during the Early Roman period in the provinces of *Noricum* and *Pannonia*, thus leaving a gap in the archaeological record of in situ dress components, including the textiles. In this context, the fist century CE inhumation burials from Potzneusiedl, eastern Austria, are unique, representing the only known inhumations from this period and region. Additionally, some of the women's in situ brooches carry textile remains belonging to their clothing. Their analysis provided interesting technical and functional information. The textiles demonstrate both La Tène as well as Roman characteristics, representing a missing link between the periods. The locations and microstratigraphy of the textiles also reveal how the garments were worn, and this is comparable with the pictorial evidence on the large number of tombstones of the area from the first to second century CE.

Keywords: Roman textiles, Roman dress, Norican-Pannonian costume, provincial Rome

Introduction
In the first century CE, the provinces *Noricum* and *Pannonia* in Central Europe became part of the Roman Empire. However, the local population, particularly the women did not fully adopt Roman-Italic material culture, as is evident by their clothing depicted on many tombs. These show a distinct costume that was not common in the contemporary Roman-Italic area after it had been romanised. The burials of Potzneusiedl, situated in the later Roman province Pannonia and today's Burgenland in eastern Austria, contain some of the earliest archaeological evidence of the so-called Norican-Pannonian female costume (German: *norisch-pannonische Frauentracht*) – a form of dress particularly common in this region that still showed characteristics from the Iron Age. One example is the peplos dress, a rectangular or tubular piece of fabric fastened on the shoulders with two brooches, suggesting that the women retained these pre-Roman clothing traditions even after the area became part of the Roman Empire. The textile fragments from Potzneusiedl were all attached to the brooches. Therefore, they provide a rare insight into the clothing fabrics of this period of transition from the Iron Age to the Roman era. Thus, the aim was to gain much needed textile data for this period and region, and to compare Potzneusiedl's textile qualities with those known from other Early Roman sites in the regions of Noricum and Pannonia and the earlier La Tène period. Furthermore, the focus also lay on the question of textile functions – especially in regard to how the garments were worn – and whether the findings can be compared to the clothing depicted on the numerous Norican-Pannonian tombstones.

Methodology
The methodology for the analysis and description of the textiles followed the standard procedure as established within the European community of textile archaeologists in the last decades (for example, Gillis and Nosch 2007; Gleba 2012; Bender Jørgensen and Grömer 2013; Grömer 2014; Andersson Strand

et al. 2022). This included the visualisation of the microstratigraphy as established by the Bavarian heritage authorities (BLfD) (Nowak-Böck and Voß 2015). The textiles in question were analysed by the authors using a digital microscope (DinoLite). Due to the state of preservation and the small size of some textiles, it was not possible to determine all features. Fibre analysis using a Scanning Electron Microscope was carried out in cooperation with the Central Research Labs at the Natural History Museum Vienna. Due to the state of preservation, fibre identification was not possible for every piece.

The context information as given by the in situ evidence in the inhumation graves was analysed in detail as in similar studies (Grömer 2014, 110–117), which in this case concerns the fibula with its function of fastening a garment, the technical analysis of the textile, its microstratigraphy, and its special context, enabling possible identifications of the garments. Biological information, such as the age of the deceased, was not available at the time of study.

Pictorial evidence of the same period (first to second century Noricum and Pannonia) helped to broaden the understanding of the garment types and how they were worn, such as where exactly the brooches were pinned. One must be aware that the depictions follow certain rules within the society and a direct comparison between the placement patterns in the graves and the depictions might not be foolproof. These depictions are of idealised individuals and costumes (Paetz gen. Schieck 2012, 86), showing how people wanted to present themselves rather than documenting what they wore in daily life. These sources are slightly later than Potzneusiedl's burials, meaning that the costumes could differ.

Interpretations of the clothing worn in the burials must also be treated with caution. Since the burial is a special event, it is certainly possible that the deceased wore special, representative clothing that was not used in everyday life, but demonstrated the individual's status in society, or how this status was perceived by the remaining members of the community who buried the deceased, and presented them in an idealised manner (Grömer 1014, 117–119; Gugl and Hinker 2020, 101).

To compare the thread diameters of the analysed textiles in a broader cultural context, statistics were recorded for threads from first to third centuries CE Austria (Grömer 2014) and threads from the La Tène period (450 BCE to first century BCE) in Austria (Grömer 2014), the Czech Republic and Slovakia (Belanová-Štolcová 2012), and Switzerland (Rast-Eicher 2008). As the threads from Potzneusiedl most likely derive from the pinned clothing, it was methodologically necessary to additionally compare the diameters of the said threads with threads from similar contexts: on the underside of fibulae deposited on the body on burial. Other textiles may have been placed with the dead as body wrappings or packaging, and therefore cannot be securely documented as clothing textiles. Even if a textile derives from a burial context, it is possible that they could be part of body wrappings or packaging for burial goods, which might have different technical characteristics from clothing textiles. Not many textiles on fibulae are known from the Roman period.This is mainly due to the tradition of cremation burials. Although the textiles found on, for example, pins must be interpreted with caution, experiments have shown that these textiles can withstand the cremation process (Grömer 2020), meaning that these threads could very well have belonged to the pinned garment.

The site of Potzneusiedl

The Roman province Pannonia (running between the Danube in the north from modern western Hungary and eastern Austria to the northern parts of Croatia, parts of Slovenia, Bosnia and Herzegovina, and Serbia) was one of the provinces established by the Romans in the mid-first century CE, in Tiberian-Claudian times. The burial site of Potzneusiedl lies approximately 15 km south of the Danube and belongs to the hinterland of Carnuntum.

Since the 1930s, stray finds from the Roman period have been made in the area of Potzneusiedl, eventually leading to the rescue excavation of a cemetery in 2011. This revealed 47 cremation and 31 inhumation burials, the latter representing the earliest and best-preserved burials known from Roman north-western Pannonia (preliminary summary in: Formato 2021, 113–118 with fig. 13). The earlier graves can be dated to the Tiberian period (14 to 37 CE), and in addition to the fibulae in the so-called *Trachtlage* (in situ position), some pottery finds also point to pre-Roman (Late La Tène) components (Formato et al. in print; Formato, Workshop AG Römerzeit, in preparation; Formato, conference Iași, in preparation). Since 2019, Lucia Clara Formato has been leading this interdisciplinary project at the Austrian Academy of Sciences at the department of the Austrian Archaeological Institute. The archaeozoological material was analysed by Konstantina Saliari (Natural History Museum Vienna) (Saliari et al., in preparation). Ancient DNA analyses were carried out by Angela Mötsch and Stephan Schiffels through the Department of Archaeogenetics at the Max Planck Institute for Evolutionary Anthropology (Leipzig, Germany) within the framework of the

Grave	Object	Ply		Twist direction		Twist angle		Thread diameter (mm)		Weave type	Thread count/cm		Fibre
99	518	single	single	z	s	<20°	<20°	0.6–0.8	0.6–0.8	tabby	~10	~10	-
	519												
101	351	single	single	s	s	20–30°	10–20°	0.4–0.5	0.4–0.5	tabby	~10	~10	wool
	352												
215	408	single		z		40–50°		1.3		single thread	-		-
215	409	single	single	s	s	20–30°	20–30°	0.5–0.7	0.5–0.7	tabby	8–10	7–10	wool
	410												
240	297	-	single	-	s	-	20–30°	~0.6	0.5–0.6	tabby	-	-	plant fibre

Table 1: Analysed features of the textiles from Potzneusiedl

ERC grant MICROSCOPE (project no. 851511). The anthropological analysis of both the inhumation and cremation burials was the responsibility of Kristin von Heyking and Franziska Schreil from AnthroArch GbR (Grafrath, D). Silvia Wiesinger and Andreas Heiss at the Austrian Archaeological Institute (Vienna) were commissioned to analyse the botanical remains. The analysis of the terra sigillata was carried out by Silvia Radbauer and that of the coins by Kathrin Siegl (both Austrian Archaeological Institute, Vienna).

Among the inhumation burials, four (99, 101, 215, 240) contained textile remains with a total of five different textiles (table 1), all adhering to fibulae. Typical for female dress, these fibulae were all found in pairs – one on each shoulder – with the exception of an additional disc fibula in burial 215 lying in the middle area of the chest.

Since the basis for dating the graves with textile remains is the subject of another article (Formato et al. 2022), the dating of the individual graves will only be briefly mentioned here. The focus will then lie on the individual types of fibulae found in the graves. Graves 240 and 99 are to be placed in the Tiberian-Claudian period. In grave 240 (Tiberian [from 20/30 CE] to Claudian), two Norican-Pannonian winged brooches type Almgren 238c lay on the shoulder area of the deceased. One of the fibulae is almost complete, while only a fragment of the perforated pin catch from the second fibula was preserved. Two Norican-Pannonian wing fibulae type Almgren 238c were also found in grave 99. The individual in grave 101 would have been buried in the Claudian to Early Flavian period. The enclosed strongly profiled brooches of type Almgren 68 were in use from the Tiberian to the Early Flavian period, in the Eastern Alpine region partly also until the Late Flavian period. Grave 215 was built at the same time as grave 101. Grave 215 is especially interesting because it contained two Norican-Pannonian wing fibulae of different types (type Almgren 238c and type Almgren 238e). In addition, a disc brooch type Riha 7.2/type Feugère 24a was found on the chest area (Formato et al. in print).

The textiles

All of the analysed threads from Potzneusiedl (table 1) are single yarn and most are s-spun, except for the z-spun single thread on object 408, as well as the threads of one system on 518 and 519. The spin angles vary from 10° to 40 or 50°. The lower value may be due to the poor preservation conditions, whereas

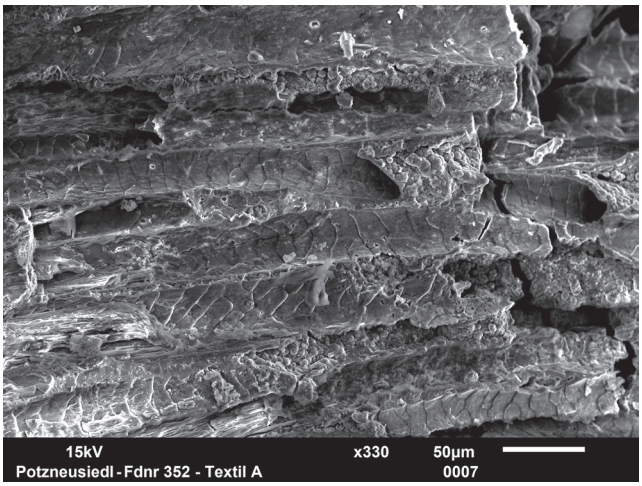

Fig. 1: SEM image of fibula 352 with clearly visible cuticles indicating sheep's wool (Image: Kayleigh Saunderson)

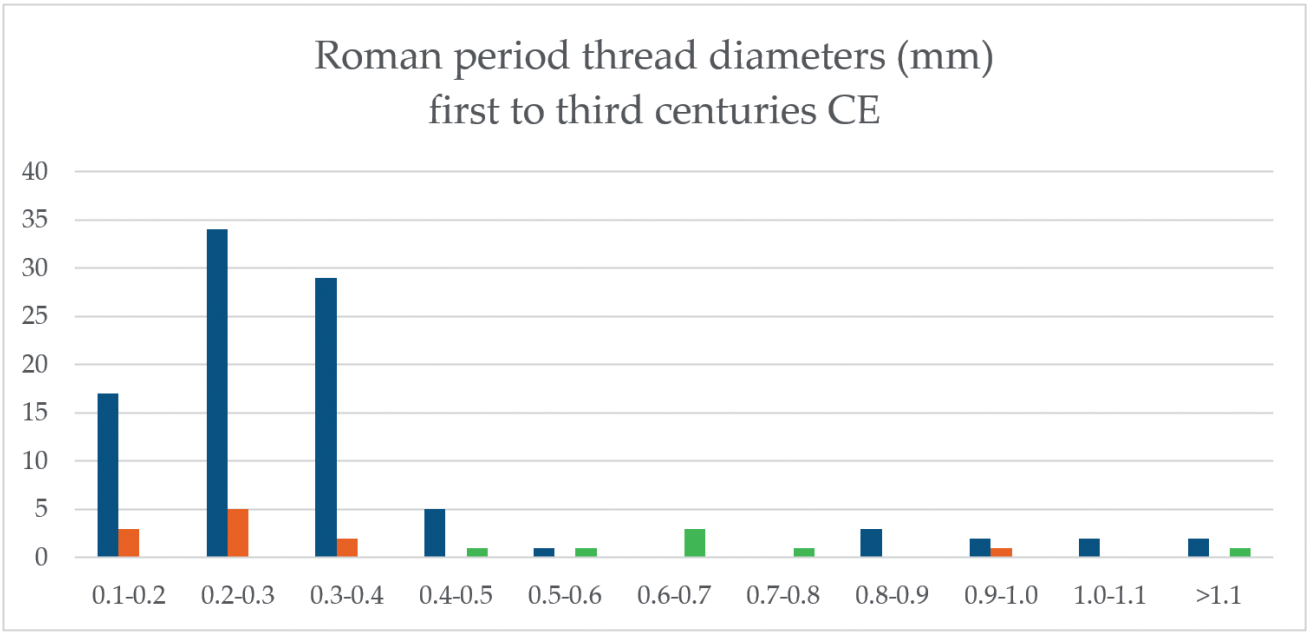

Fig. 2: Graph showing the distribution of Roman thread diameters. Blue: All thread diameters from the Roman period (excluding Late Antiquity), showing a smaller spectrum and thinner threads (based on finds from Austria, not including Potzneusiedl), N = 95, $\bar{x}$ = 0.31 mm; Red: Thread diameters from pinned garments of the same period, N= 11, $\bar{x}$ = 0.21 mm; Green: Threads from Potzneusiedl (Image: Kayleigh Saunderson)

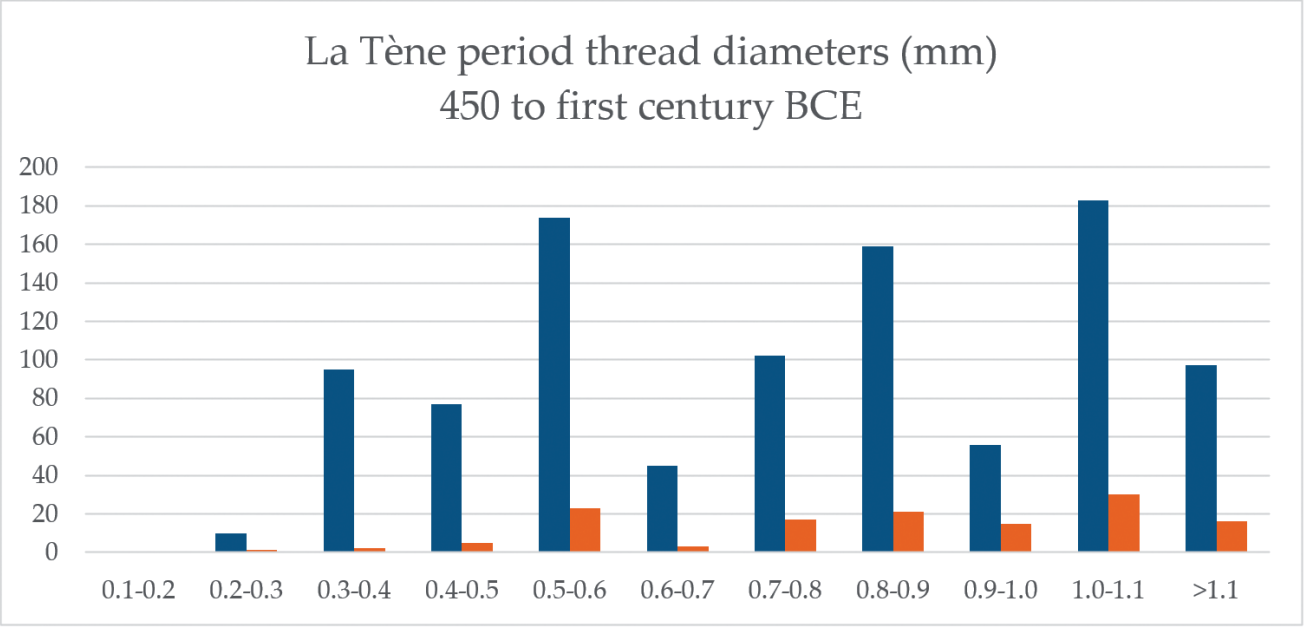

Fig. 3: Graph showing the distribution of Late Iron Age thread diameters. Blue: All thread diameters from the Late Iron Age La Tène period, showing a larger spectrum and thicker threads (based on finds from Austria, Czech Republic, Slovakia, and Switzerland), N = 998, $\bar{x}$ = 0.78 mm; Red: Thread diameters from La Tène period pinned garments, N = 133, $\bar{x}$ = 1,03 mm (Image: Kayleigh Saunderson)

the upper value is a single outlier. Most are 30°. The single thread on 408 is an outlier with 40–50°. The documented thread diameters lie between 0.4 and 0.8 mm, again with 408 as an outlier with a diameter of 1.3 mm. Owing to the small size of most fragments, the density of the weaves – all tabbies – was difficult to identify with precision. Only the threads on 409/410 were preserved well enough to be counted over a length of more than 1 cm, showing densities of 8–10 and 7–10 threads per cm. The densities of the textiles on 518/519 and 351/352 are approximately 10 threads per cm.

It was also possible to identify plant fibres in one case (object 297) and sheep's wool from two textiles (on 351/352, see fig. 1; 409/410). Some fragments were not fully mineralised and appeared off-white in colour with no visible dyes, though this does not mean that this represents the original colour.

Contemporary textile finds (first to third centuries CE) from Austria are quite rare but derive from various contexts. Some textiles are known from the settlement on Magdalensberg, Carinthia (Grömer 2009), others from a hoard in Deutschkreutz, Burgenland (Grömer 2007) and some even from graves. As previously noted, the common burial custom is that of cremation, which very rarely leave textile remains behind – some were also found attached to wing fibulae: from Mantrach (showing strong traces of burning), Eichberg and Kerschbaum, all in Styria (Grömer and Sedlmayer 2012, 155–163) and Salzburg-Linzertor (Grömer 2014, 272). Early Roman textiles are also known from the later province of *Germania Superior*. For example, 100 textile fragments have been found in a Roman legionary camp in Mainz, Rhineland-Palatinate, dating to around 5 BCE, some of which can be interpreted as technical textiles, but perhaps also as garments (Mitschke 2013).

The tabby weaves as well as their thread counts are typical for the currently-known textiles of the first to second centuries CE from the Roman provinces (Grömer 2014, figs. 17 and 19). The threads from Potzneusiedl are thicker, with a large part of the known threads from the first to third centuries (fig. 2) being 0.2–0.3 mm in diameter (most thicker threads derive from military contexts) (Grömer 2014, fig. 18). Based on the current record, the amount of s- and z-spun yarns is quite balanced among Roman textiles from Austria, with a slight tendency towards more z-spun threads. Fabrics with z-spun yarns in one system and s-spun in the other are also known. These statistics stand out from Late Iron Age threads (fig. 3), which were thicker and mostly z-spun (Grömer 2014, 38). S-spun threads in the Roman period have been associated with imports from the southern provinces, where s-spun threads

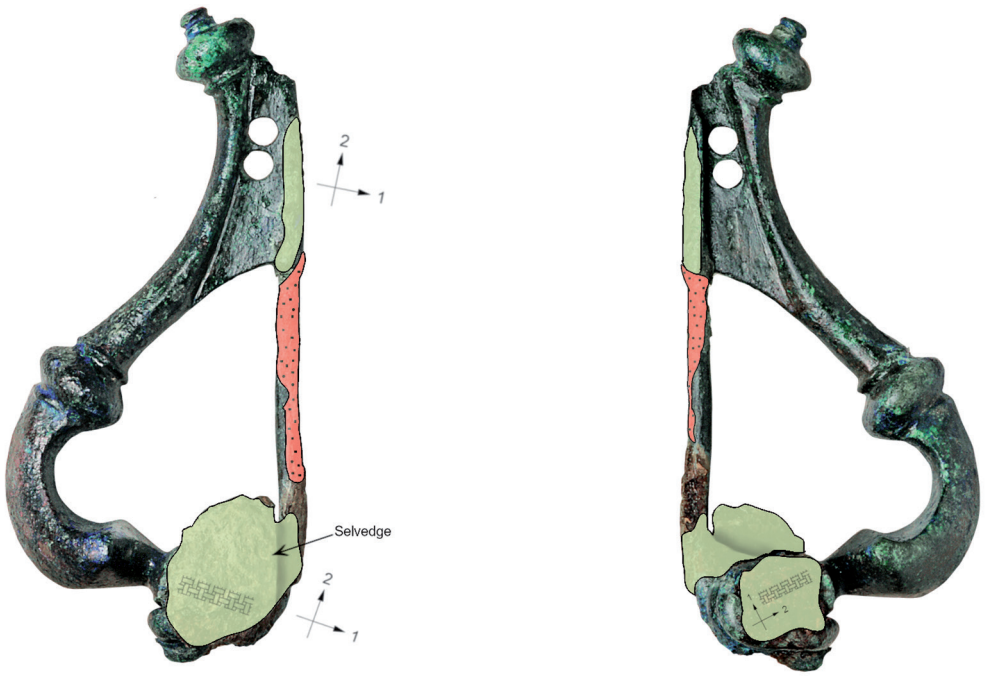

Fig. 4: Location of the textile (yellow) and the skin (red) on fibula 352 (Image: Stefan Schwarz)

were more common (Bender Jørgensen 1992, 128). Antoinette Rast-Eicher has suggested that the Roman province Pannonia could also be part of this area, based on finds from Croatia, where the s-spinning tradition could have been acquired through connections over trade routes (Rast-Eicher 2008, 168). In the case of Potzneusiedl, acculturation is the more plausible explanation for this change in spin direction, since the thread diameters match the Late Iron Age textile tradition. In both periods, the thread diameters most likely belonging to pinned garments coincide with these statistics. Therefore, the transition from the Iron Age to the Roman period is clearly visible in the textiles from Potzneusiedl, showing characteristics of both cultures. In the following, possible interpretations for the textiles are presented.

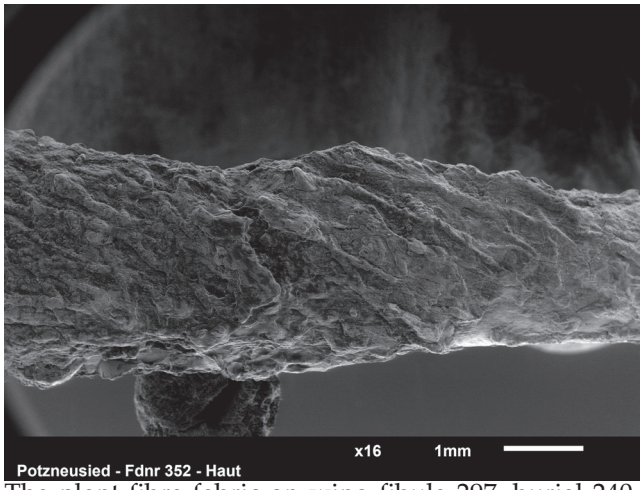

Fig. 5: Remains of human skin on fibula 352's pin under the scanning electron microscope (Image: Kayleigh Saunderson)

Graves 99 and 240

Wing fibulae 518 and 519 from grave 99 carried the same textile with s- and z-spun threads on both their springs, 518's pin and foot, as well as 519's head. The pin, in particular, indicates that this probably represents a piece of clothing fastened by the brooches. The plant-fibre fabric on wing fibula 297, burial 240, was quite small. In this case, it was not possible to interpret whether it could have been part of a garment or body wrapping.

Fig. 6: Excavation photo of burial 215 with fibulae 408 (left), 409 (right), and 410 (centre) (Image: Slawomir Konik/BDA)

Grave 101

The strongly profiled fibula 352 from grave 101 is of particular interest (fig. 4). A single layer of a wool tabby textile is located on the spring and the pin catch. Between these fragments, there are remains of skin (fig. 5) adhering to the underside of the pin. The fact that the skin is only located on this side of the pin – across its whole length – indicates that it is probably not animal skin (leather) that might have been used to protect the fabric from the heavy brooches. The pore pattern is rather difficult to identify due to the narrow and rounded fragment, although human skin seems more likely than that of a goat or cow. Taking these observations and the location of the pin on the body into account, this is probably the skin of the human individual's chest. Additionally, on the fragments on the spring, which fully cover the sides, a small piece of the fabric's selvedge could be identified. These findings suggest that this piece of clothing was gathered with the fibula and worn directly on the skin without an undergarment. Additionally, this garment was pinned together at its edges without overlapping them. The other fibula in this burial (351) carries a further, small fragment of the same textile on its spring.

Grave 215

Grave 215 contained two wing fibulae on the shoulders (number 408 right, 409 left) and one disc fibula in the middle of the woman's chest, right below her neck (410) (fig. 6).

The springs on the wing fibulae carry small fragments of textiles. 408 carried a very poorly preserved, thicker thread, the function of which could not be determined. The fragments on 409's bow and foot, however, allowed for further examination. This wool textile shows at least two folds in this area (fig. 7 left). The threads on 410 are very poorly preserved, preventing the identification of the fibre material, yet it was possible to determine that the textile on the front side's centre (fig. 7 right) was most likely the same fabric as the textile on 409. The microstratigraphy is not quite clear, however. On the rear side of 410, also in the centre, there is some mineralised, black organic material – possibly textile, but the structure was not visible. It seems as if organic material (the textile?) protrudes through a hole in the middle of the fibula, which will be the subject of further analysis that could offer new interpretations for the textile.

Additionally, fibula 410 carried many mineralised negatives of maggot puparia, especially on its rear side, which are to be attributed to the decomposition of the body (Formato et al. 2022, 111).

The Norican-Pannonian costume

Within the Norican-Pannonian area, throughout the first and second centuries CE, women were depicted on tombstones wearing specific costumes, distinct from other regions of the Empire. The first to define this specific women's costume in detail was Jochen Garbsch (Garbsch 1965; 1985). He characterised it as a sleeveless dress resembling a peplos, worn over a long-sleeved undergarment and often fastened by two quite large wing fibulae (fig. 8). The dress was often gathered with a belt with three hanging straps, decorated with elaborate fittings. There is evidence from Oberdrauberg, Lower Austria, that suggests a repp band belt as carrier material for the bronze fittings (Grömer and Gostenčnik 2009).

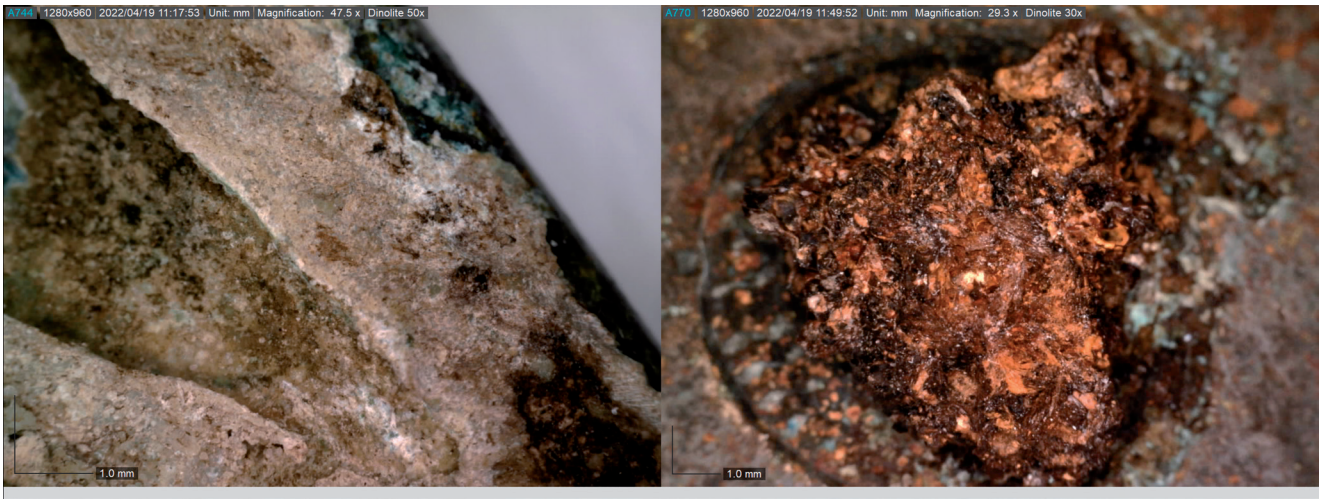

Fig. 7: Left: x50 magnification of the folds (pleats?) of the textile on fibula 409 (image: K. Saunderson); right: x30 magnification of the textile on the front surface of fibula 410 (Image: Kayleigh Saunderson; using a DinoLite digital microscope)

More recent studies on over 1,500 known portraits on tombstones in the provinces of Noricum and Pannonia were carried out by Ursula Rothe (Rothe 2012; 2013a/b) in the course of the research project *DressID – Dress and Identities in the Roman Empire*. Her studies revealed that there was in fact a large variety of women's dress in this area, including a range of regional styles (Rothe 2012, 173). As the basis for the widespread Norican-Pannonian costume, she lists a long-sleeved undergarment, sometimes clasped with a brooch in the middle; an overgarment clasped by large fibulae on the shoulders; a cloak/cape; and various types of headgear along with jewellery, mostly worn by older women. A fresco from Brunn am Gebirge, Lower Austria, shows features that are not visible on the reliefs, due to the preserved colours and their variations: a long-sleeved undergarment (white), a short-sleeved overdress (red), and a dark red skirt or sleeveless dress beneath it, visible just above the heels (Rothe 2012, 180–181). This suggests that the undergarment consisted of two pieces: probably a tunic and a separate skirt (Rothe 2013b, 189).

There are also many burial goods from the provinces Noricum and Pannonia that mirror the dress components depicted on the tombstones – paired fibula found together with belt fittings and belt clasps. Usually they come from cremation graves, laid into the grave as burial goods – sometimes even in a burnt state, as they were "worn" by the corpse during the cremation on the pyre and were afterwards collected and buried. Here especially the finds from Potzneusiedl add important data as they come from inhumation graves (Formato 2021, 113–117; Formato, conference Iași, in preparation) where textiles are still attached.

Graves 101 and 215 in the context of pictorial sources

In the case of fibula 352, with textile on the two ends of the fibula (and a selvedge) as well as human skin in between, the organic remains could indicate that the fabric represents the peplos that was worn without the fabric overlapping on the shoulders – with the borders at a distance of multiple centimetres from each other. This coincides well with some depictions on tombstones, clearly showing that the fabric did not overlap and was pinned close to its selvedges (LUPA 727 – Sárszentmiklós, 1315 – Seggauberg, fig. 9), thus also explaining the location of 352's selvedge.

Although most women on the reliefs are shown wearing an underdress, some seem to be only wearing a peplos without sleeves (Rothe 2012, 181; LUPA 920 – Sankt Georgen am Sandhof; 1160 – Sankt Johann ob Hohenburg; and perhaps also 3217 – Sankt Donat; all displayed as "girls", Rothe 2013b, 190–191). While the lack of an underdress on the relief could be attributed to the artist's detail or the preservation, this could still represent the clothes from burial 101, which might have been worn in hot weather. Otherwise, an undergarment could have been present but simply not preserved, or the brooches shifted upwards in position together with the peplos, thus no longer

Fig. 8: Reconstructed Norican girl's costume based on a relief presumably from Zollfeld, Carinthia (LUPA 923) (Image: Karina Grömer)

Fig. 9: Stele of a Norican "girl" wearing a pleated peplos fastened close to its edges over a long-sleeved undergarment; found in Seggauberg, Styria, dated to 100–160 CE; Schloss Seggau (Image: Ortolf Harl, LUPA 1315-3)

touching the undergarment (Formato et al. 2022, 111). Another reason for the peplos being worn without an undergarment could be due to mortuary processes, making it much easier to clothe a deceased person in a rectangular piece of fabric than a dress with tight sleeves.

Some images show the typical fibulae on the shoulders along with a third worn in the middle of the woman's chest (Rothe 2012, 180; LUPA 714 and 734 – Dunaújváros, 760 and 3182 – Szentendre, 3863 – Szomód, fig. 10), appearing to fasten the undergarment worn under the peplos, which partly covers the fibula in Szentendre 3182. Interestingly, all known reliefs showing undergarments fastened with a small disc fibula derive from modern day Hungary, ergo the province of Pannonia, indicating that this type of clothing was specific to this province, which Potzneusiedl was also a part of. These depicted costumes could very well represent those worn in Potzneusiedl burial 215, where the same fabric was attached to the disc fibula and one of the wing fibula. Thus, this textile likely represents the peplos, which was worn over an undergarment clasped by the disc fibula. The folds on this wing fibula could indicate that the peplos was pleated, which can also be seen on reliefs (LUPA 1315 – Seggauberg, fig. 9).

Conclusion

The technical features of the textiles from Potzneusiedl neither fully correspond with those of the Late Iron Age nor the Roman era. The s-spun threads indicate

Fig. 10: Stele of a Pannonian woman wearing a peplos over an undergarment that is fastened with a disc fibula in the middle; found in Szomód, Komárom-Esztergom; Budapest – Magyar Nemzeti Múzeum (Image: Ortolf Harl, LUPA 3863-5)

Roman influences from the southern provinces and the thicker thread diameters suggest lingering textile traditions from the La Tène period. Thus, these finds from this period of cultural transition indicate that the change in textile craft was gradual, though additional data is needed to further explore this phenomenon. These retained traditions with roots in the Iron Age are also noticeable in the Norican-Pannonian women's costumes, as evidenced by the reliefs. The textile fragments on the analysed brooches offered many hints on how these garments could have been worn, which can further be successfully compared with many of the portraits on the gravestones: a peplos garment that is pinned close to the fabric's selvedges without overlapping, perhaps worn without an undergarment, and a maybe-pleated peplos worn over an undergarment, which is fastened by a disc fibula in the middle. The distribution of pictorial evidence for wearing the small disc fibulae also indicates that this costume variation was specific to the province of Pannonia.

Thus, these findings provide valuable data thanks

to the rare inhumation contexts and the positions of the textiles, expanding our knowledge on textile traditions and clothing as well as its correspondence with contemporary pictorial sources.

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