

Signalling on a Small Scale

The Decoration of Armour to Reinforce Legionary Identity at Mušov

Abstract

Recent archaeological research at Mušov-Burgstall in the Czech Republic, a key Roman military site during the Marcomannic Wars, has uncovered three armour scales with unique features. While Roman scale armour was usually left plain, these scales are decorated with embossing. They display a stylized laurel leaf, filled in with three dots representing hobnails. Both elements are known as emblematic symbols of the 10th legion used on legionary stamps. For the first time, these symbols are also seen on armour scales that date to the Marcomannic Wars. This discovery reinforces the importance of symbolism in military attire, highlighting its role in group identity and the need for psychological stability amid uncertainty. The finds contribute to a broader understanding of Roman military equipment, demonstrating not only their functional character but also their symbolic aspects.

Keywords

Marcomannic Wars / Roman army / armour / decoration / legionary identity / social signalling

The site of Mušov-Burgstall (okr. Brno-venkov) in the Czech Republic has yielded a wealth of information on the Roman army in the Middle Danubian area, particularly in relation to the Marcomannic Wars¹. During this tumultuous period, the Roman army, notably Legio X Gemina, strategically used the hilltop as a vantage point in the Barbaricum to establish enduring control over the Marcomannic territory.

During limited field excavations and regular metal detector surveys at this exceptionally large site,

numerous military artefacts have been unearthed. Now primarily used for agriculture, the site has yielded items ranging from spearheads to scabbard fittings, sword belt fittings, and fragments of armour and helmets². Among these finds are various unique artefacts, including three armour scales discovered in early 2024 by R. Šteffel and D. Pavčík, voluntary co-workers of the authors' institute, which are the focus of this contribution³. The copper alloy scales were found using metal detectors during a systematic archaeological survey of the southern slope of the

¹ Komoróczy et al. 2020; Komoróczy/Vlach 2022.

² Komoróczy et al. 2023, 76-103.

³ Institute of Archaeology Brno, inv. nos 10040/14-11/24, 10040/14-13/24 and 10040/14-14/24.

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Fig. 1 The front and back of the three embossed scales from Mušov. – Top left and middle: inv. no. 10040/14-13/24; bottom left and middle: inv. no. 10040/14-11/24; right top and bottom: inv. no. 10040/14-14/24. – (Photo P. Růžičková). – Scale 3:1.

distinctive hill, near the site where earlier excavations uncovered the remains of craft workshops. Although the scales were found in secondary positions

within a disturbed layer, their location and typological characteristics undoubtedly indicate that they are of Roman origin⁴.

Decorated Armour Scales

During the Roman Imperial period, the army used three main types of body armour⁵, all of which have been identified at Mušov-Burgstall: segmented armour (*lorica segmentata*), mail armour made from interconnected metal rings, and scale armour⁶. Various types of scales were concurrently used during the Marcomannic Wars, and a wide variety has been excavated at Mušov-Burgstall, incorporating different shapes, sizes, and hole patterns for connecting them into functional armour⁷.

While many items of Roman military equipment were lavishly decorated⁸, including chest plates used in scale armour, this decoration typically did not extend to the scales themselves⁹. Occasionally, part of the scales was tinned to create visual contrast to the regular copper alloy ones¹⁰. However, Roman scales generally remained plain, devoid of any embossed, engraved, punched or other decorative elements often found on other pieces of militaria¹¹.

The recently discovered scales present a notable departure from this norm. Instead of a plain surface, they feature an embossed decoration at their tips (figs 1-2). This decoration comprises a shape resembling an inverted triangle with three dots positioned within it, one in each corner. A short vertical line extends from the horizontal (top) side of the triangle. Although the embossed area is relatively small, measuring 7 mm in height and 5.5 mm in width, it can be clearly seen by the naked eye.

Two of the scales are almost complete, one still preserving its metal wire used to connect the scales together. The other is more fragmentary, but also includes a metal wire. The scales are small and their original size is 14 mm in length and 9 mm in width with a thickness of 0.25 mm. The holes at the top of the scales have a diameter of 1.5 mm. The sole surviving metal wire to connect the scales together has a rectangular cross-section and is 1 mm wide and 0.3 mm thick.

⁴ Groh 2023, 22-26.

⁵ Fischer 2019, 125-135.

⁶ Tejral 1994; Rajtár 1994.

⁷ Komoróczy 2000.

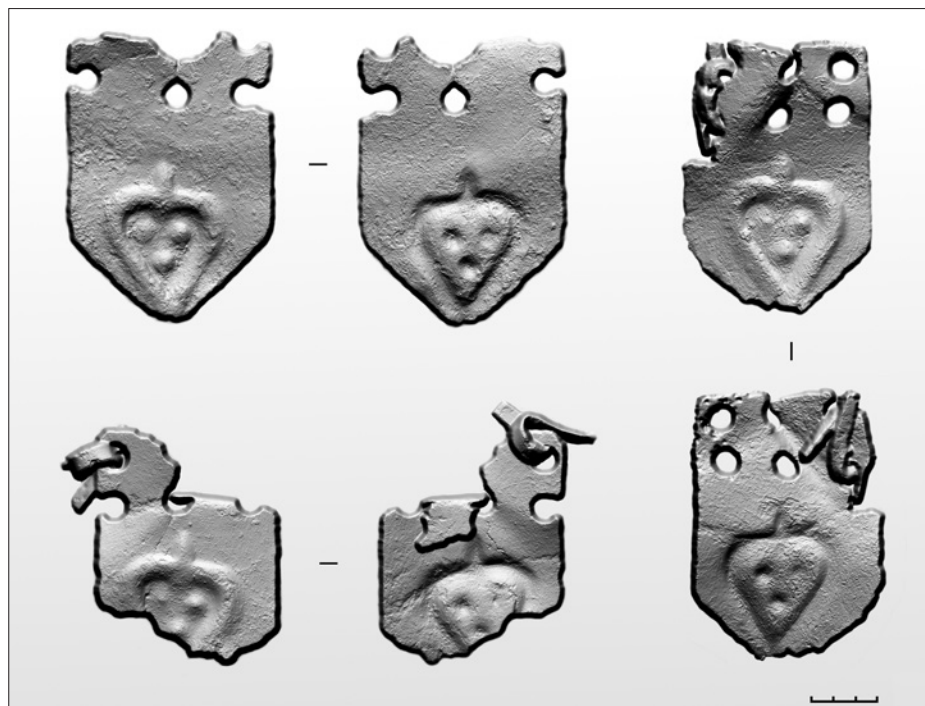
⁸ D'Amato/Negin 2017.

⁹ There is one particular type of decorative scalloped scale that has regularly been identified in the literature as Roman, but this is actually a misidentification and is from the modern period. See Henrich 2013.

¹⁰ Bishop 2023, 48.

¹¹ E. g., Schamper 2015.

Fig. 2 Scan of the three embossed scales from Mušov. – Microscopy: forensic examination system LMI ToolScan (2D and 3D scanning of the surface, BW camera, 3 µm/px resolution, reconstruction of the surface by EDF and photometric stereo – lighting from eight different directions, motorized feed of XY table + sharpening of Z axis, range of XYZ 100 mm). – (Scan M. Kmošek). – Scale 3:1.



Dating

The embossed scales were discovered as surface finds, probably from a plough-disturbed layer, impeding their dating through the direct archaeological context. The majority of Roman military equipment from Mušov-Burgstall belongs typologically to the horizon of the Marcomannic Wars. There are two important clues that indicate that the embossed scales can also be assigned to this horizon.

First, they are of a well-known scale type described in literature¹². This type appears approximately between the mid-2nd and the mid-3rd centuries. Notably, the scales discovered at Schlögen (Bez. Eferding) in Austria represent one of the earlier solidly datable finds¹³, while those from Dura-Europos in Syria are among its latest occurrences¹⁴. Most scales of this type measure around 12 mm in length, 7 mm in width and 0.3 mm in thickness. The main body of the scale is rectangular, ending in a marked triangular tip. The scales have three pairs of vertical holes aligned at the top. The middle pair is used to attach the scale with thread to a textile base garment, while the outer holes are employed to connect the scales to each other in a row. These outer holes receive a small piece of metal wire that function as staples.

The second indication for dating the embossed scales is that Mušov-Burgstall yielded hundreds

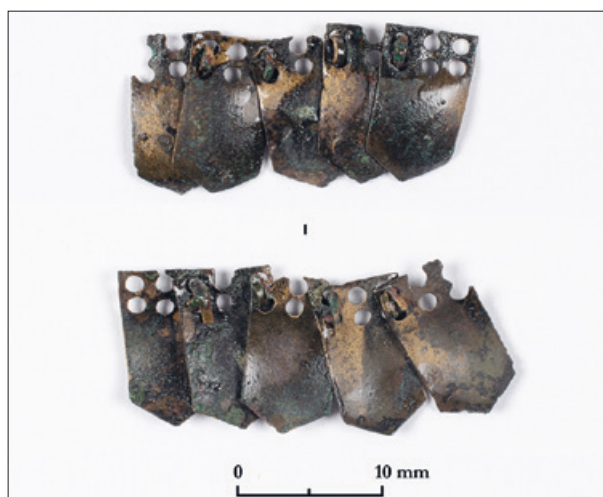


Fig. 3 Some of the many scales of the same type as the embossed scales found in the workshop area of Mušov. – (Photo P. Růžičková). – Scale 2:1.

of scales of this type (fig. 3). These were especially abundant in an area that served as a workshop for the army and can be reliably dated to the period of the Marcomannic Wars¹⁵. Aside from the embossing, the scales from the workshop area are identical in shape, dimension, and elemental composition to the embossed scales (tab. 1; see **Supplementary Material**).

¹² Clemetson 1993; Groh 2023, 22–26.

¹³ Bender/Moosbauer 2003, 14 pl. 2.70.

¹⁴ James 2004, 122 fig. 62.

¹⁵ Komoróczy 2000, 80.

inv. no.	description	Cu	Zn	Sn	Pb	As	Sb
10040/14-13/24	embossed scale	86.0	10.3	2.5	0.72	0.23	0.23
10040/14-11/24	embossed scale	85.3	9.5	4.3	0.44	0.24	0.21
10040/14-11/24	wire	79.3	0.8	19.5	0.23	0.13	0.07
10040/14-14/24	embossed scale	83.7	10.3	4.0	0.46	0.19	0.18
10040/14-14/24	wire	77.4	0.4	21.6	0.43	0.07	0.09
scales workshop area	average of scales (n = 173)	85.3	10.5	2.49	0.56	0.22	0.21

Tab. 1 Results of surface elemental composition analysis (wt %) by ED-XRF benchtop spectrometer ElvaX Pro with Ag X-Ray tube, mode Cu, measuring time 120 s, collimator 1.5 mm.

The scales were all made from brass with tin admixture with trace amounts of lead, arsenic and antimony. Conversely, the wire was made from tin bronze with minor admixture of zinc and trace amounts again of lead, arsenic and antimony. The elemental composition results were acquired by non-destructive surface ED-XRF analysis. This method has its limits considering precise quantification of elemental concentrations due to the presence of corrosion products on the surface, resulting for example in overestimation of tin and lead content and under-

estimation of zinc and copper content. This need to be taken into consideration during interpreting the data. Even so, the results give evidence of virtually identical composition of the three scales and distinctively different composition of the wire considering both alloying elements and trace elements pattern.

The combination of the general occurrence of this scale type and the similarities in elemental composition with the scales from the workshop area allow us to ascertain that the embossed scales can be dated to the period of the Marcomannic Wars, i. e. 166–180 AD.

What is Represented?

The decoration found on the Mušov scales bears a close resemblance to two elements observed on legionary stamps of the *planta pedis* variant. These stamps are found on Roman bricks, tiles and pottery and show a foot- or shoeprint filled with the insignia of the 10th legion: the military unit responsible for their fabrication¹⁶. Multiple examples have been discovered at Mušov¹⁷, although specimens are known from many places where the 10th legion operated, such as Nijmegen (prov. Gelderland) in the Netherlands and Vienna in Austria¹⁸.

During the Marcomannic Wars, the 10th legion was probably one of the main components of the expeditionary army on Mušov. The *planta pedis* stamp of this period has the outline of a pointed shoeprint with the letters LEG X G P F (Legio X Gemina Pia Fidelis). This inscription is often complemented with the depiction of hobnails, represented by small dots distributed over the shoeprint, or with a single leaf positioned at the toe (fig. 4)¹⁹.

The embossed decoration on the Mušov scales must probably be understood as a combination of these two elements. The triangular shape with a small vertical line at the top represents a leaf; even the triangular tip of the scales themselves echoes the shape of the pointed shoeprints. The three dots probably signify the presence of hobnails. Both elements, leaves and hobnails, are intimately associated with the Roman army. Hobnailed shoes were standard issue for Roman soldiers. Written evidence suggests that army identity could be displayed through a variety of paraphernalia, amongst which hobnailed shoes, the military cloak and belt. This means that soldiers dressed only in a tunic would still be recognized as military men by their hobnailed shoes²⁰.

The leaf has been interpreted as a laurel leaf²¹; the Roman symbol for military victory and triumph²², and associated with the power and authority of the emperor²³. The depiction of (laurel) leaves

¹⁶ Kurzmann 2006, 25–26; Neumann 1973, 23–35.

¹⁷ Musil 1993; Komoróczy et al. 2023, 66–67.

¹⁸ E. g., Brunsting/Steures 1997.

¹⁹ Komoróczy et al. 2023, 66; Mosser 2020, 118–120.

²⁰ James 2004, 59–61; Speidel 2011, 9.

²¹ Neumann 1973, 31.

²² Maxfield 1981, 117–118; Töpfer 2011, 40–41.

²³ E. g., Flory 1995.



Fig. 4 *Planta pedis* tile stamps of Legio X Gemina Pia Fidelis (LEG X G P F) from Mušov. These date to the Marcomannic Wars and contain either a leaf at the tip of the shoeprint or show the presence of hobnails. – (Photo P. Růžičková).

is more widely observed on Roman military equipment. These can consist of whole wreaths made from leaves and other plant material²⁴, but also be single leaves, as found on the embossed scales. For example, related to scale armour, single leaves are a recurrent element observed on the lavishly decorated chest plates that helped to open and close the armour at the neck. A good example concerns a chest plate found at Mušov²⁵, featuring single leaves (fig. 5). The central panel depicts the Dioscuri holding the reins

of a horse, while the top panel features an eagle and the bottom panel a bull. The chest plate belonged to the 10th legion, as indicated by a punched graffito reading LEG X and the bull, which was the legion's emblem. Many of the decorative elements have dimensionality resulting from embossing, but there is also additional decoration created by punching marks. The single leaves are made using this technique, which can be observed on the right border of the chest plate.

Occurrence of Embossed Scales

Armour scales featuring embossed decoration are exceedingly rare, with the most comparable example being an unprovenanced find in a private col-

lection (fig. 6). These scales are of the same type as those from Mušov, albeit slightly smaller, measuring approximately 10 mm in length and 7 mm in

²⁴ Schamper 2015, 120.

²⁵ Tejral 2014, 228-229.



Fig. 5 One half of what was originally a set of chest plates that featured on a scale armour. This example from Mušov dates to the Marcomannic Wars and includes a subtle punched decoration of single leaves in the right border. – (Photo P. Růžičková). – Scale 2:3.

width²⁶. Unlike most scales of this type, their tips are not entirely pointed but rather shaped like inverted trapezoids. The embossed decoration depicts the bust of a helmeted Minerva. Notably, multiple scales from this find have survived, allowing for the observation that the embossing was executed uniformly across all scales, likely using the same tool.

Moreover, at the Roman military installation located at the oppidum of Titelberg (ct. Esch-sur-Alzette) in Luxembourg, three relief-decorated objects have been unearthed, unfortunately not yet published²⁷. Although their precise function is not entirely certain, the interpretation of these objects as armour scales is very plausible. Among the three,



Fig. 6 Two of several scales from an unprovenanced find that feature an embossed decoration of a Minerva bust at their tips. Private collection, UK. – (Photo Ph. Groß). – Scale 3:1.

only one is complete, distinguished by only two holes at the top, indicating a different scale type than the one from Mušov. The decoration on these scales includes an embossed line encircling the entire scale and a mid-rib. The two fields created by the mid-rib are filled with diagonal lines. Interestingly, this decorative motif makes the scales resemble feathers, a noteworthy connection as Roman authors occasionally referred to scale armour in literature as *lorica plumata*, or feathered armour²⁸.

The decorative elements discovered at Titelberg bear resemblance to scales found beyond the borders of the Roman Empire, notably in locations such as Israel, Romania, Russia, and Ukraine. The majority of scales with these characteristics from Israel were found at Masada (Southern District) (fig. 7) and date between the second half of the 1st century BC to the Roman siege at 72/73 AD²⁹. These scales typically exhibit an embossed outline and a central medial rib, though they lack the diagonal lines seen in the Titelberg specimens. Some of the Masada scales are more simplified, omitting the embossed outline entirely and featuring only a medial rib. Similar embossed scales, primarily featuring a medial rib and omitting other embellishments, have been discovered in pre-Roman Dacia³⁰, and in Sarmatian contexts³¹.

²⁶ Bishop 2023, 48; Fischer 2019, fig. 216.

²⁷ Personal communication C. Gaeng/J. Metzler, 2019.

²⁸ Sall. hist. 4.65; Amm. 24.4; Iust. 41.2.

²⁹ Stiebel/Magness 2007, 1-2. 52-64 pls 1-2.

³⁰ Beldiman 1989.

³¹ Symonenko 2015, 120-126.



Fig. 7 Scales with an embossed outline and a mid-rib from Masada (Southern District/IL) dating to the 2nd half of the 1st c. BC to the Roman siege at 72/73 AD. – (Photo Superikonoskop, *Armor_Scales_Massada.jpg*, Wikimedia Commons CC-BY-SA 3.0).

Notably, the use of a mid-rib is not observed on Roman scale armour, which could carry implications for the Titelberg find. However, an exception exists with scales featuring a medial rib found in hybrid armour, such as that from Ouddorp (prov. South Holland/NL; **fig. 8**), where the scales are woven into the rings of an underlayer of mail armour³². Although predominantly discovered within the confines of the Roman Empire, it is believed that the origin of this armour might be Thracian³³.

The presence of a medial rib gives the scales a feather-like appearance. Its application, like that of an embossed outline, may be decorative, but it certainly serves a functional role. The embossing of the scales enhances their strength and rigidity without adding weight to the armour.

The functional improvement provided by the embossed decoration on the Mušov scales is evident, as it would have increased their strength compared to undecorated counterparts. Interestingly, many (if not all) of the undecorated scales exhibit a similar strengthening technique akin to embossing, wherein the lower half is given a slightly domed shape. This curvature significantly reinforces these small scales. This also implies that the embossing to decorate the Mušov scales did not require an additional production step. Instead of shaping them into a slight dome, presumably done with a set of dies and a moderate hammer blow, dies featuring the embossed decoration were selected.

Position of the Embossed Mušov Scales

With only three loose scales available, it is impossible to determine where the embossed scales were positioned in the armour. Similarly, it is uncertain whether all scales in the armour were decorated or

if only a portion of them were adorned. The only indirect evidence for their placement comes from unprovenanced scales with Minerva busts that feature embossed scales adjacent to each other, indicating

³² Wijnhoven 2016; 2022, 58-60.

³³ Driehaus 2010, 406-407.

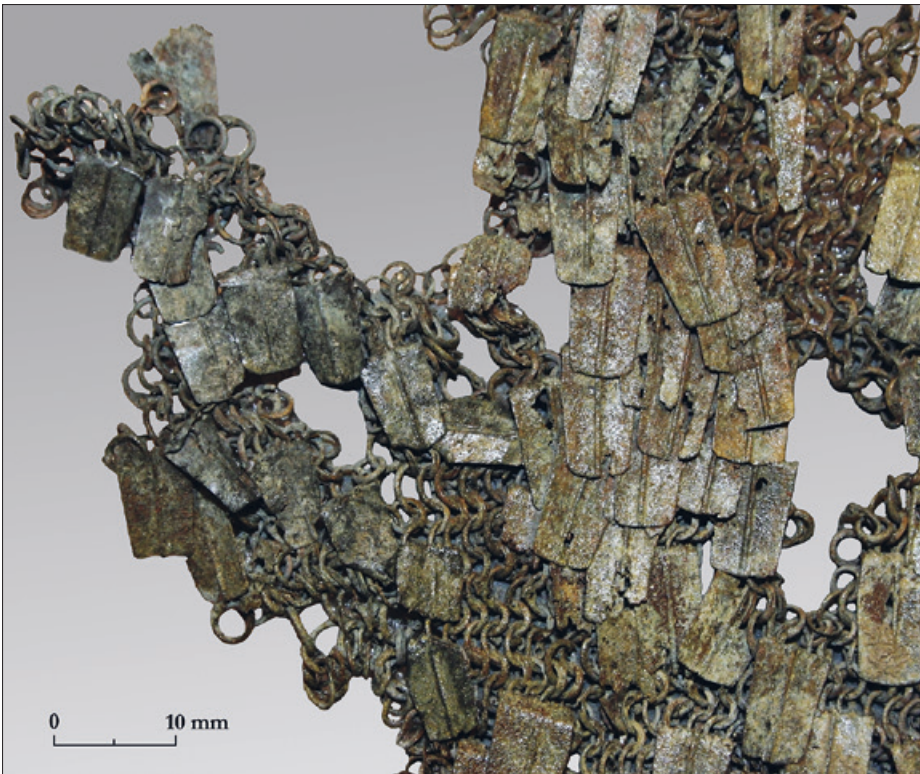


Fig. 8 Hybrid armour consisting of a combination of interwoven mail rings and scales from Ouddorp (prov. South Holland/NL) dating to 70–200 AD. The scales in hybrid armour have a mid-rib. – (Photo M. A. Wijnhoven).

that at least an entire row could potentially consist of decorated scales.

If entire rows were decorated, several hypothetical possibilities can be considered (fig. 9). At the most conservative, embossed scales might have been limited to the lowest row, defining the hem of the armour (fig. 9, b). Conversely, they could have been present

throughout the entire armour (fig. 9, a). Lastly, an intermediate option exists where decorated scales are located in specific sections, forming one or several bands interspersed among regular scales (fig. 9, c-d). Only if new evidence comes to light will it be possible to establish which of these options accurately reflects the arrangement of the embossed scales.

Legionary Identity

It has recently been suggested that the type of scales used for the embossed decoration at Mušov is mainly associated with legionary troops³⁴. Although the database used in this study indeed supports this conclusion, there are various (non-included) finds from auxiliary military installations that speak against such a limited use. Examples of the latter come from Schwechat (Bez. Bruck an der Leitha) in Austria³⁵, Buciumi (jud. Maramureş) in Romania³⁶, and Great Chesters (Northumberland) in the United Kingdom³⁷.

In the case of the decorated Mušov scales, the connection with legionaries cannot only be made by the find spot, a site probably partially built up and

occupied by units of the 10th legion, but also by the iconography and symbolism used in its decoration. It can directly be linked to two of the emblematic elements used by the 10th legion to identify their military unit. The scales themselves most likely date to the Marcomannic Wars, a period when military presence at Mušov was at its peak. The elements used on the scales are prevalent in *planta pedis* stamps of the 10th legion at Vindobona (Vienna/AT), used in military constructions dating around 170 AD³⁸.

So far, only the unprovenanced scales decorated with the bust of Minerva provide the only true equivalent to the embossed Mušov scales (see fig. 6). This may be due to the size and the subtlety of the

³⁴ Groh 2023, 94–95.

³⁵ Maspoli 2023, 292 fig. 104.

³⁶ Popa/Bordi 2016, 63.

³⁷ Scherer 2013.

³⁸ Neumann 1973, 30.

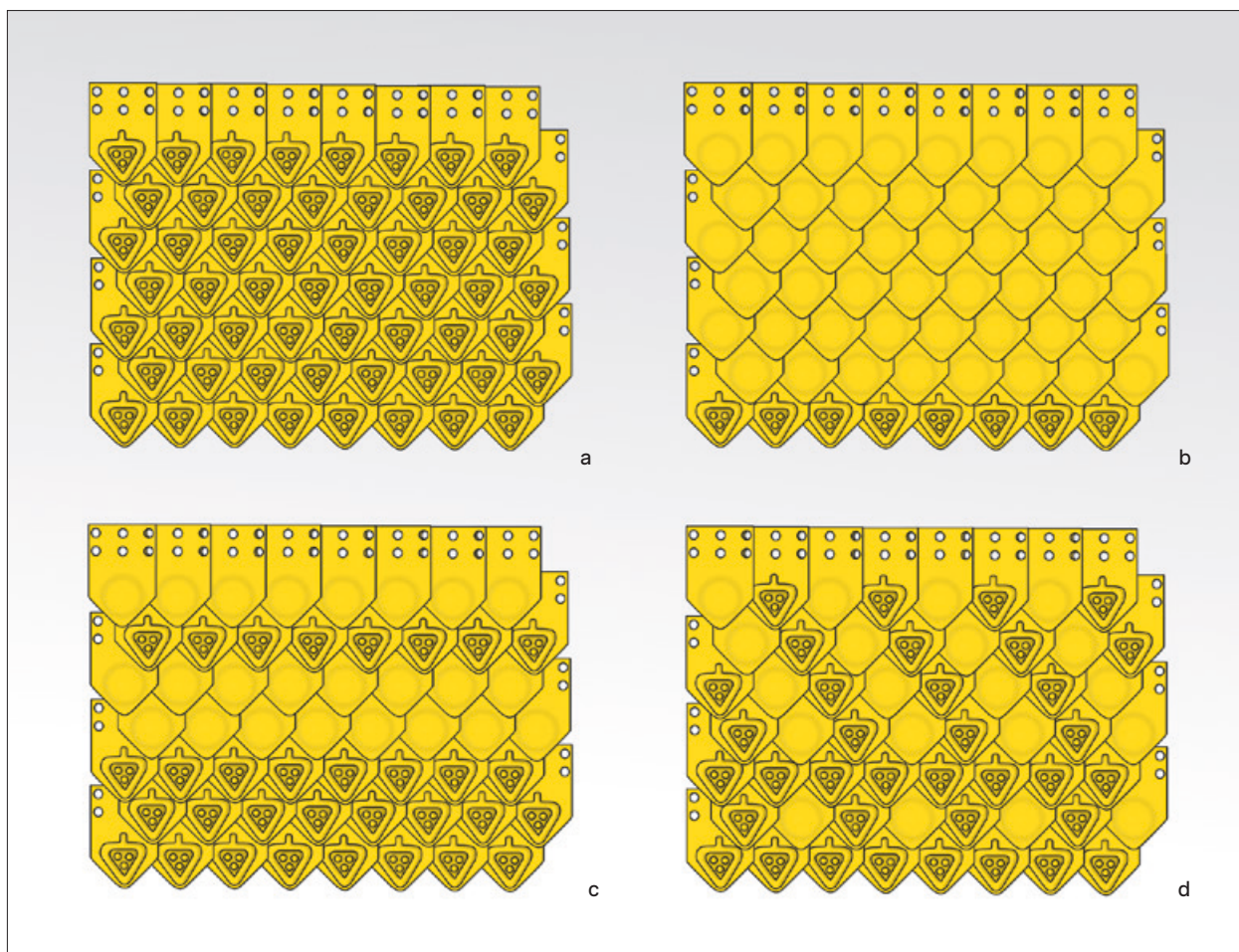


Fig. 9 The exact application of the embossed scales from Mušov cannot be determined. Here are shown some of the hypothetical options: **a** all embossed scales. – **b** embossed scales at the hem. – **c** embossed scales as lines throughout the armour. – **d** embossed scales applied in geometric patterns. – (Drawing M. A. Wijnhoven).

decoration, combined with researchers being unaware of this decoration and therefore not looking for it. With increased awareness of this possibility, more examples may come to light.

Given their similarities, the connection between the decoration of the Mušov scales and legionary emblematic elements offers a possible interpretation of the unprovenanced scales. The image of Minerva was used by another legion, namely Legio I Minervia³⁹. Although it cannot be proven due to the lack of a find spot and archaeological context, it is plausible that the Minerva scales could have belonged to a soldier from that legion.

These examples of decorated scales provide valuable additional insight. While it is well known in sociology and social psychology that clothing is not only functional, but also serves as an essential medium

for defining, constructing, and communicating the identity of individuals and groups⁴⁰, this subject has received almost no attention in the study of military equipment⁴¹. Similarly, there is substantial research demonstrating a link between times of uncertainty and an increased emphasis on group identity and symbolism. The Uncertainty-Identity Theory postulates that individuals are more likely to seek out and strengthen their group identities during periods of uncertainty⁴². This is driven by the need for stability, certainty, and a sense of belonging. Group identity provides a psychological buffer against the anxiety and stress caused by uncertain conditions. Naturally, being a soldier engaged in warfare is fraught with uncertainty. Symbolism plays a key role in reinforcing group identity, and a recent social psychology study has shown it to be effective on various levels⁴³.

³⁹ Eck 2000.

⁴⁰ Davis 1992, 5-6; Roach-Higgins/Eicher 1992.

⁴¹ A notable exception being: Hoss 2014, 47-95.

⁴² Hogg 2007.

⁴³ Callahan/Ledgerwood 2016.

This research concludes that having symbols not only makes the collective of individuals feel more unified but also makes the groups seem more threatening and effective to others.

The symbols employed by the Roman legionaries from Mušov (e. g., the Roman eagle, the legionary bull, the laurel leaf, and hobnailed shoes) all fulfil this role, strengthening social identity while dealing with the uncertainty of warfare. Research into

Roman military equipment consistently reveals that Roman soldiers embraced elaborate attire, with considerable resources devoted to embellishing their gear, full of symbolism⁴⁴. The embossed Mušov scales demonstrate that this symbolic decoration could sometimes also be very subtle; its application being literally »on a small scale«. However, the message conveyed would not have been any less powerful, clearly marking them as members of the 10th legion.

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⁴⁴ E. g., D'Amato/Negin 2017; Wijnhoven 2017.

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Supplementary Material

The supplementary material contains all the ED-XRF measurements (i. e. 173 undecorated scales and the three embossed scales):

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Zusammenfassung

Résumé

Signalisieren in kleinem Maßstab. Rüstungsdekoration zur Stärkung der Legionärsidentität in Mušov

Aktuelle archäologische Forschungen in Mušov-Burgstall in der Tschechischen Republik, einem wichtigen römischen Militärstandort während der Markomannenkriege, haben zwei Schuppenpanzer mit einzigartigen Merkmalen zutage gefördert. Während römische Schuppenpanzer in der Regel undekoriert blieben, sind diese Schuppen mit Prägungen verziert. Sie zeigen ein stilisiertes Lorbeerblatt, das mit drei Punkten gefüllt ist, die Hohnieten darstellen. Beide Elemente sind als emblematische Symbole der 10. Legion bekannt, wie sie auf Legionärsstempeln verwendet wurden. Zum ersten Mal wurden diese Symbole auch auf Panzerschuppen aus der Zeit der Markomannenkriege gefunden. Diese Entdeckung unterstreicht die Bedeutung der Symbolik in der militärischen Bekleidung, ihre Rolle für die Gruppenidentität und das Bedürfnis nach psychologischer Stabilität inmitten von Unsicherheit. Die Funde tragen zu einem breiteren Verständnis der römischen Militärausrüstung bei und zeigen nicht nur ihren funktionalen Charakter, sondern auch ihre symbolischen Aspekte.

Signaler à petite écaille. La décoration des armures pour renforcer l'identité légionnaire à Mušov

Des recherches archéologiques récentes à Mušov-Burgstall en République tchèque, un site militaire romain clé pendant les guerres marcomannes, ont mis au jour deux écailles d'armure présentant des caractéristiques uniques. Alors que l'armure à écailles romaine était généralement laissée unie, ces écailles sont décorées de gaufrage. Elles affichent une feuille de laurier stylisée, remplie de trois points représentant des clous à tête. Ces deux éléments sont connus comme des symboles emblématiques de la 10^e légion utilisés sur les sceaux légionnaires. Pour la première fois, ces symboles sont également observés sur des écailles d'armure datant des guerres marcomannes. Cette découverte renforce l'importance de la symbolique dans l'habillement militaire, mettant en évidence son rôle dans l'identité de groupe et le besoin de stabilité psychologique face à l'incertitude. Les découvertes contribuent à une compréhension plus large de l'équipement militaire romain, démontrant non seulement leur caractère fonctionnel, mais aussi leurs aspects symboliques.

Schlüsselwörter

Mots-clés

Markomannenkriege / römische Armee / Rüstung / Dekoration / Legionärsidentität / soziale Signalwirkung
Guerres marcomanniques / armée romaine / armure / décoration / identité légionnaire / signalisation sociale

