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Late Bronze Age stamp-seals with negative impressions of seeds from Eastern Hungary

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Abstract

The study of plant imprints has a long history in archaeobotany and it became an essential tool for reconstructing the agricultural practices of the past. However, in some cases these imprints are deliberately structured in a way that may suggest interpreting them as symbols, and therefore understanding their manner of organization would help us to reflect on the way people thought about their plants. This applies to the four stamp-seals that I present here. Three of them were found at Berettyóújfalú-Papp-zug and one was found at Baks-Temetőpart. Each seal is dated to the Gáva period and has negatives of seeds on its active face. This study deals with the identification of the seed negatives and the possibilities of interpreting them.

Introduction

Berettyóújfalú-Papp-zug is situated on the eastern part of the Great Hungarian Plain, in Hajdú-Bihar County, on the former northern bank of the Berettyó River. Among others a middle-sized settlement of the Late Bronze Age Gáva period was excavated here by the Institute of Archaeological Sciences at the Eötvös Loránd University as a rescue excavation in 2015.[1] Three of the stamp-seals presented here were collected from a single pit of this settlement *(Fig. 1)*.

Baks-Temetőpart is located on the southern part of the Great Hungarian Plain, in Csongrád County, on the right bank of the Tisza River. Here, a segment of a large, Late Bronze Age Gáva period settlement was excavated by the Institute of Archaeological Sciences at the Eötvös Loránd University during a planned excavation in 2007.[2] The fourth stamp-seal presented here was found in a pit of this settlement. All the four stamp-seals have negatives of seeds on their active face *(Fig. 1)*.

The study of plant imprints in archaeological material started in Hungary in the 1970s and had an important role understanding past agricultural strategies.[3] A large proportion of plant imprints were produced accidentally or intentionally for a practical purpose (for example the use of plant parts as temper). These imprints provide useful information on plant cultivation, processing and other use of plants. On the other hand, there are plant imprints which were produced and organized deliberately. Plant parts were not used as raw material but as something that was needed to be preserved and exhibited for a certain reason. The stamp-seals presented in this paper belong to the latter category. The negatives of seeds are situated

1 Füzesi et al. 2016, 223–224.
2 V. Szabó 2011, 92–93.
3 Gyulai 1996a, 258–259.

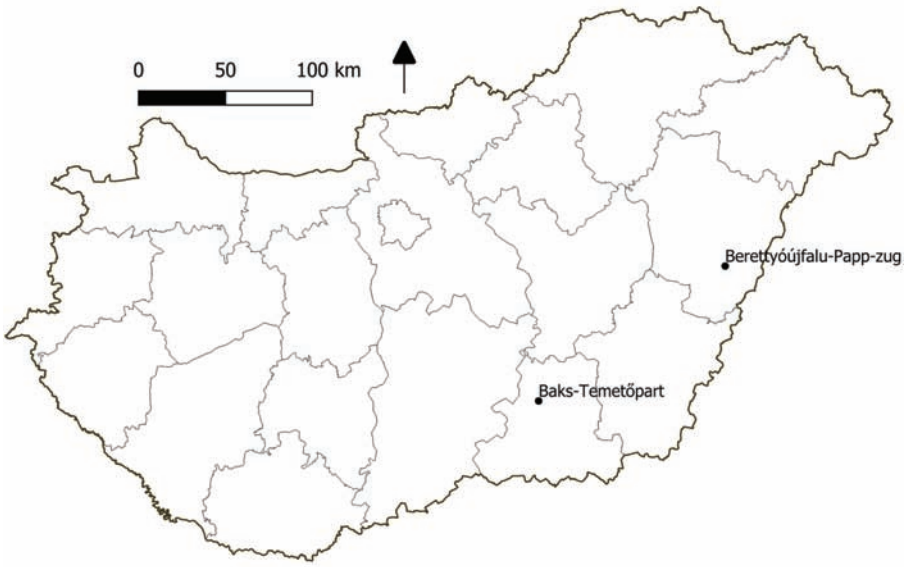

Fig. 1. The location of Berettyóújfalú-Papp-zug and Baks-Temetőpart.

predominantly on the active faces of the stamp-seals, so their main aim was to stamp and make a mark on a surface. In this case the seed negatives were not only organized spatially but also according to species. It is clearly visible to the naked eye that these negatives belong to at least three different plant species, and each of the stamp-seals is characterized by the seed negatives of one species. The main question is which species are represented and what the idea was behind the grouping of species.

Material

Berettyóújfalú-Papp-zug

1. Stamp-seal *(Fig. 2.1)*: Handmade clay stamp-seal tempered with grog and sand. The surface colour is brown, light brown with dark grey spots. The base is nearly oval with one rectangular shaped end. Its handle is arched, narrow and runs longitudinally between the two ends. The active face is covered densely but not wholly with negatives of seeds. No negatives were found on the other parts of the stamp-seal. L.: 69 mm; W.: 32 mm; H.: 25 mm.[4]

2. Stamp-seal *(Fig. 2.2)*: Handmade clay stamp-seal tempered with grog and sand. The surface colour is brown, light brown and red with dark grey spots. The base is oval with a rounded, narrow handle that runs longitudinally between the two ends. The whole area of the active face is covered with negatives of seeds. Negatives were also found on the upper parts and on the handle. L.: 66 mm; W.: 45 mm; H.: 34 mm.

3. Stamp-seal *(Fig. 2.3)*: Handmade clay stamp-seal tempered with grog and sand. The surface colour is light brown, grey and dark grey. The base is oval with a semi-oval, narrow handle that runs longitudinally between the two ends. The whole area of the active face is covered with negatives of seeds. Negatives were also found on the upper parts and on the handle. L.: 59 mm; W.: 34 mm; H.: 31 mm.

4 Abbreviations: L.: long; W.: width; H.: height.

Baks-Temetőpart

4. Stamp-seal *(Fig.2.4)*: Handmade clay stamp-seal tempered with grog and sand. The surface colour is light grey with dark grey and light brown spots. The base is oval with a semi-oval, narrow handle that runs longitudinally between the two ends. The active face is covered densely but not wholly with negatives of seeds. No negatives were found on the other parts of the stamp-seal. L.: 63 mm; W.: 38 mm; H.: 27 mm.

The design of the four stamp-seals reflects a common concept. Their shape and size are similar and so is the arrangement of the seed negatives. They are also broadly formed and rough. It is clear that the person creating them put little effort into these pieces. Once the approximate shape was achieved, the active face was formed by pressing to a flat surface. Then the seeds were impressed into the clay, which left behind their negatives after firing.

Fig. 2. Stamp-seals: 1–3 – Berettyóújfalú-Papp-zug, 4 – Baks-Temetőpart.

Three similar stamp-seals were found in two Gáva period burials at Taktabáj-Erdőalja, although no description was published on the making of their active faces.[5] A corresponding shape of stamp-seals is also well known from the Hatvan period.[6]

Methods

First the stamp-seals were examined with the naked eye, magnifying glass and binocular stereo microscope in order to determine the spread of seed negatives on the surfaces. For the identification and documentation of seed negatives, positive silicon rubber and modelling clay casts were made.

For the silicon rubber casts, I used Rubosil SR-20 two component (RTV-2) pourable silicone with Rubosil K catalyst. The silicon rubber casts were durable and handy to work with during identification and documentation, but their positives of seeds were less detailed, and, in some case, it was impossible to remove them from the stamp-seals without splitting. On the other hand, modelling clay casts were more detailed, but more difficult to work with, as they were soft and vulnerable.

Both cast types were examined and documented with a binocular stereo microscope.[7] For the identification of cereal negatives, Stefania Jacomet's criteria[8] were adopted and in all other cases different seed atlases were used.[9]

Results

Although some seed negatives retained their original sizes more than charred seeds, it is still difficult to identify them because only a few morphological characteristics are observable.[10]

On stamp-seal no. 1 *(Fig. 2.1)* 149 pieces of seed negatives were found altogether. Only 8 of them could be identified surely as millet *(Panicum miliaceum L.)* based on the shape and size of the embryo, the lateral depression or the different sizes of the dorsal and ventral half in cross-section *(Fig. 3.1–3.3)*. All the 141 pieces of the remaining seed negatives were circular or slightly oval in shape, but other morphological characteristics were not visible. Based on their sizes (1–2 mm) they might be negatives of millet and therefore they were identified as cf. *Panicum miliaceum L.*

On stamp-seal no. 2 *(Fig. 2.2)* 353 negatives of seeds could be observed. 324 of them were situated on the active face, while 27 negatives were on the handle and the top of the stamp-seal. These 27 negatives and other 228 were identified as wheat/barley *(Triticum/Hordeum sp.)*. They were 4.8–6 mm long, ellipsoid, but lacked the sufficient morphological characteristics for closer identification. In 12 cases it was only possible to describe the seed negatives as cereals, and 10 of them as *Poaceae sp.* 74 of the seed negatives were identified as barley *(Hordeum vulgare L.)*.

5 Kemenczei 1984, 164–165, pl. CLVIII. 6–7, CLXI. 4.
6 Dani 1999, 113, 116.
7 ZEISS SteREO Discovery.V8: zoom (zoom range 6.3–80×) stereomicroscope; Camera: ZEISS AxioCam MRc5 (5MP); Software: ZEISS AxioVision version 4.9.1; (KMOP-4.2.1/B-10-2011-0002).
8 Jacomet 2006.
9 Bojnanský – Fargašová 2007; Schermann 1967.
10 Gyulai 1996a, 259.

Their identification was based on their convex ventral and dorsal surfaces, the shallow and V-shaped ventral groove, and the longitudinal ridges on the dorsal surface *(Fig. 3.4–6)*.

On stamp-seal no. 3 *(Fig. 2.3)* 705 negatives of seeds were found. 676 of them were placed on the active face, while 29 were on the handle and top of the stamp-seal. On the active face two negatives were identified as *cf. Panicum miliaceum* and 4 as *Triticum/Hordeum*. The remaining 699 negatives of seeds could only be identified as *Poaceae sp.* Two slightly different forms could be distinguished. Most of them are ellipsoid, biconvex, 1.1–1.5 mm long and have a long hilum on the ventral surface *(Fig. 3.7,8)*. A few are somewhat longer (1.5–2 mm), broadly ellipsoid and biconvex *(Fig. 3.9,10)*.

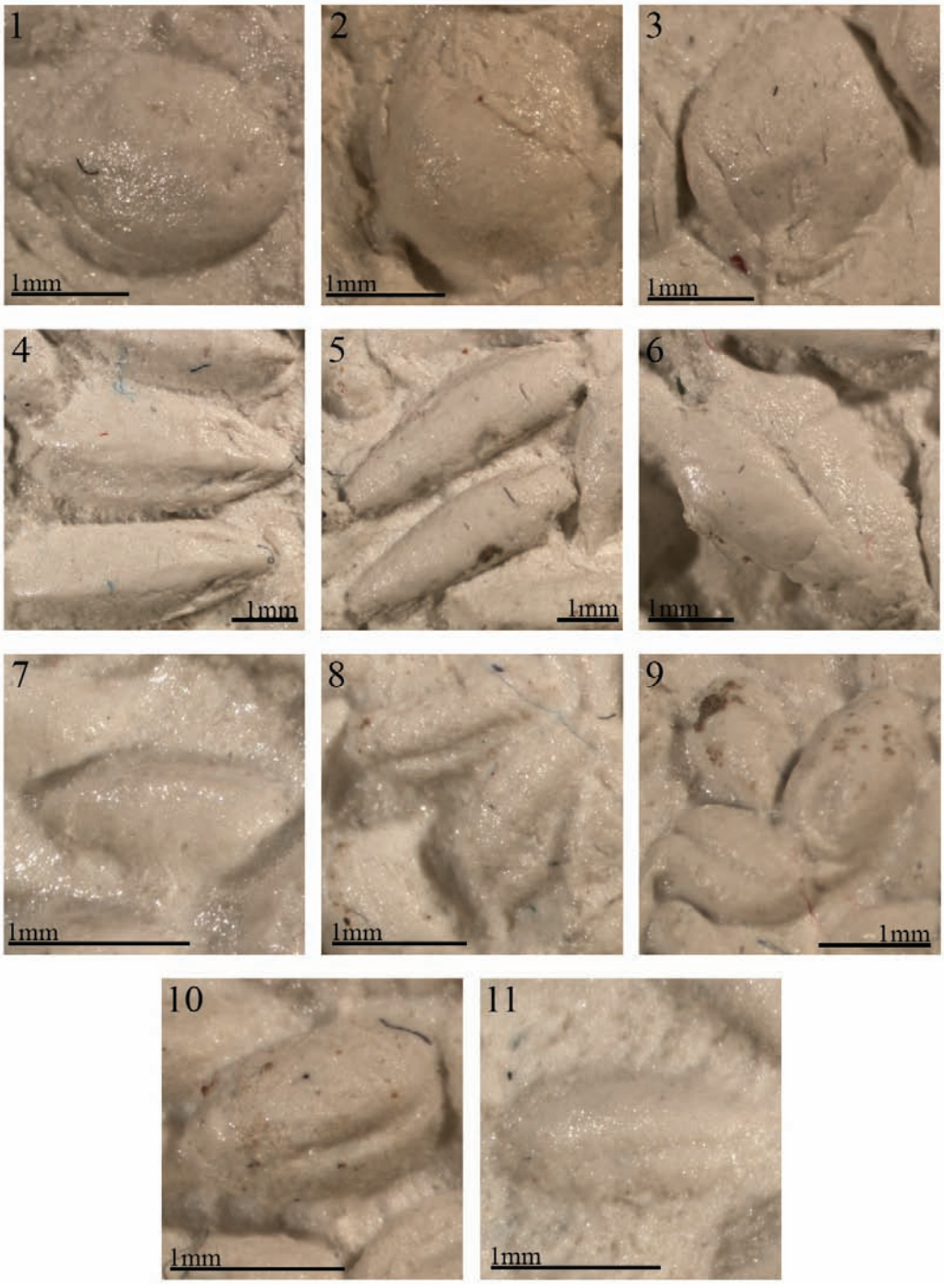

Fig. 3. Negative impressions of seeds 1–3 – *Panicum miliaceum*, 4–6 – *Hordeum vulgare*, 7–11 – *Poaceae sp.*

On stamp-seal no. 4 *(Fig. 2.4)* 411 negatives of seeds were found. All of them were situated on the active face. One negative could be identified as *Triticum/Hordeum*. The other 410 seed negatives could only be identified as *Poaceae sp.* They are similar to ones on the third stamp-seal, although it should be noted that these negatives are shallower and therefore it is more difficult to note the characteristics *(Fig. 3.11)*.

Discussion

The four stamp-seals share a common concept and the fact, that three of them came from the same context also affirms this statement. Their practical shape and their poor fabrication are identical as well. The vast majority of seed negatives were placed on the active face of the stamp-seals in order to leave their mark during application. The negatives were produced intentionally, and therefore the choice of different species might reflect on how Late Bronze Age people thought about plants and how they categorized them.

Although it was impossible to identify all of the seed negatives on a species level, it is plausible that certain species were selected to be placed on particular stamp-seals. It is likely that only millet seeds were impressed to the active face of stamp-seal no. 1. The explanation of stamp-seal no. 2 is more complex. A third of the negatives were from barley, but the most of them were identified only as *Triticum/Hordeum*. On the one hand these negatives might have been from barley as well, while on the other hand it is possible that they were from wheat (for example spelt). The few negatives that could be only identified as *Poaceae sp.* could be present as weed contamination. The stamp-seal from Baks-Temetőpart and one of the stamp-seals from Berettyóújfalu-Papp-zug have similar negatives of seeds. In this case, at least two species of *Poaceae* were present on each stamp-seal. On the whole, it seems that limited species were chosen to be placed on certain stamp-seals.

The question is why these particular species were chosen and what one can assume based on their organization. First of all, it should be noted that the seed negatives of single stamp-seals differ greatly from each other in their size and shape. Leaving easily distinguishable marks could be one reason behind choosing these species. To go even further one must take the role of these species in Late Bronze Age economy and life into consideration.

Millet tolerates immoderate weather conditions well such as poor soils, droughts and heat.[11] It has a short vegetation period which allows to avoid the late frosts and diminish the impact of crop failure. It is usually consumed as porridge or beer.[12] It was cultivated sporadically in Hungary since the Neolithic; however, it became one of the most significant crops in the Late Bronze Age.[13] It is also often considered to be the popular crop of herders, which is a relevant aspect since the significance and prestige of cattle increased in the Gáva period. [14]

Barley is one of the oldest cultivated plants and a Neolithic founder crop. It tolerates poor soils, dry conditions and even salinity. It is suitable for forage, porridge, bread and beer.[15] Barley was the most dominant crop at the Gáva period settlement of Poroszló-Aponhát.[16]

11 Zohary – Hopf 2000, 83.
12 Kneisel 2015, 176.
13 Gyulai 1996b, 173.
14 V. Szabó 2017, 250-252.
15 Zohary – Hopf 2000, 59; Gyulai 1996b, 174.
16 Gyulai 2001, 111–112.

Poaceae species are generally present in archaeobotanical materials as weeds of cereals. They were inevitably harvested together with cereals, and therefore their seeds were removed from the cereal storages during the crop-processing sequence. Nonetheless, archaeobotanical data suggests that some *Poaceae* species (e. g. *Echinochloa crus-galli (L.) Beauv*) might have been gathered for consumption and there are recent ethnographical examples of gathering them as well.[17] The seed negatives found on the two stamp-seals do not correspond to the *Poaceae* species that are considered to be gathered in the Late Bronze Age.

Two stamp seals from Berettyóújfalu-Papp-zug were characterized by the seed negatives of cereal crops that were dominant in the Gáva period. Apart from the importance in economy, the two species have a number of distinct properties. Barley has wider utilization, while millet grows faster which is favourable agricultural systems that put great emphasis on herding cattle. The two species require different conditions and techniques and they were cultivated on separate fields simultaneously and harvested at different times.

Comparing these two stamp-seals with the ones from Berettyóújfalu-Papp-zug and Baks-Temetőpart, that have *Poaceae sp.* seed negatives, reveals another aspect of distinction. Unlike barley and millet, harvesting weeds like *Poaceae* species is not the purpose of plant cultivation, and their unwanted seeds must be separated after harvest. Hence, the stamp-seals with barley and millet negatives represent the product of the crop-processing, while the stamp-seals with *Poaceae sp.* negatives represent the by-product of the same sequence.

Summary

The seed negatives of four stamp-seals were analysed using different methods. On each stamp-seal the negatives of one dominant plant species were found. On one of them only seed negatives of millet were identified and on another one mainly barley was found. Two stamp-seals were characterized by *Poaceae sp.* Although the reason behind choosing these species remains unclear, some general assumptions can be made. All of them are related to cultivation in different ways. Barley and millet are two important cereal crops of the Gáva period. Many of their properties are dissimilar, and they were cultivated separately. One may assume that different ideas were also associated with them. While barley and millet are the products of crop-processing, *Poacea*e species are by-products. In light of this, the four stamp-seals may also represent the stages of the crop-processing sequence.

	Stamp-seal-1	*Stamp-seal-2*	*Stamp-seal-3*	*Stamp-seal-4*
Poaceae sp.		10	699	410
Cereals		12		
cf. Panicum miliaceum L.	141		2	
Panicum miliaceum L.	8			
Triticum/Hordeum sp.		255	4	1
Hordeum vulgare L.		78		
All negatives	149	351	705	411

Fig. 4. Summary of results.

17 Gyulai 2010, 261, 270.

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