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# Rural Ceramic Production Unveiled? A Petrographic Analysis of Early Islamic Mold-Decorated Buff Ware from the Be'er Sheva' Valley

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This paper delves into the intriguing Early Islamic mold-decorated Buff Ware jugs found in the rural Negev region, shedding light on the broader phenomenon of imitations, in general and particularly, within the context of a rural farmstead situated on the southern bank of Naḥal Be'er Sheva'. To accomplish this, we analyzed petrographically 22 sherds from nine sites spanning various geographic areas within modern-day Israel, aiming to reveal invaluable insights into mold-decorated Buff Ware production and distribution. The primary objectives of this study were twofold: first, to explore the degree of centralization in mold-decorated Buff Ware production, and second, to determine whether some of these vessels were manufactured locally within rural settlements, alongside their production in large urban centers such as Ramla.

*Keywords: Negev, Early Islamic period, mold-decorated Buff Ware, petrography, Beer Sheva Valley, rural, pottery production*

## Introduction

It is commonly assumed that the primary motive behind craft imitations and locally made products emulating imported materials or ware is cost-saving, while maintaining the prestigious appearance of a luxurious artifact. This may be accomplished by substituting a costly material with an inexpensive one that provides the same visual effect, such as applying fresco and molded stucco to imitate marble. Such traditions, which began as a cost-effective solution of using inexpensive materials to represent luxurious ones, became in themselves a mark of social rank and status, evolving into independent art forms and styles executed by trained specialized artisans and craftsmen (Haug and Hielscher 2022).

Imitation by reproducing original forms using a different material was observed among Early Islamic ceramic cooking pots/bowls. Though they were made of a different material

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than the originals, these imitations managed to retain not only the form of the original prototype but also the thermal properties of its material, steatite/soapstone—an ideal material for cookware, which was commonly used for cooking pots during this period (Magness 2010). Steatite/soapstone cooking pots from South Arabia (Parker 1999) were considered a luxury item and a symbol of culinary practices deeply rooted in specific ethnic traditions (Donnelly 2016). Imitating these pots' shape preserved a profound ancestral connection to these traditions.

Another form of imitation used materials and forms similar to those of the original products, while manufacturing the substitutes elsewhere. For example, in the Byzantine period, concurrent with the development of a flourishing diverse international market for exquisite fine tableware, a local Levantine production-line emerged. These locally crafted tableware followed the form of the imported ware, yet differed in fabric composition and quality of the surface slip (Yangaki et al. 2008). Likewise, in the Islamic period, there were local imitations of Chinese porcelain and Egyptian luster ware (Hallett 1990; Taxel 2014). Though imitations and not imports, these vessels remained relatively rare luxury items, likely in use by civil and military elite.

The Early Islamic mold-decorated Buff Ware jugs presented below were twice removed from the original: first, clay was used to imitate elaborately decorated metal vessels (Walmsley 2001; 2013:54; Magness 2010), and then, local wares replaced vessels that were otherwise imported from distant regions. While the substitution of metal with clay had no doubt budgetary reasons, it may have also been influenced by social changes (Walmsley 2001), or perhaps inspired by the desire to observe Muslim religious law (Mulder 2014). The locally produced imitations were identical in form and design to those produced in urban centers and workshops in Central Asia, closer to the cultural center of the Abbasid capital. Below we present yet a third form of emulation, where a rural workshop produced vessels imitating the mold-decorated jugs produced in the ancient urban centers.

## The Be'er Sheva' Valley in the Early Islamic Period

The transition from the Byzantine to the Umayyad period has been a pivotal topic in research over the past two decades (see, e.g., Magness 2003; Taxel 2018; Tepper et al. 2018), with studies examining issues of continuity and density of settlements, the makeup of society and the nature of the transition. Although Be'er Sheva' thrived as a prominent urban center during the Byzantine period, it ceased to function as such during the Early Islamic period, standing mostly abandoned. Farmsteads emerged on the city's outskirts, at a distance of a few kilometers, and also in remote desert regions (Peretz 2015; Eisenberg-Degen and Kobrin 2016; Tchekhanovets, Lehavi and Shaked 2021). However, this pattern of settlement proved ephemeral, with the newly established farmsteads also falling into abandonment by the late eighth or early ninth century (Magness 2003:216). One such site was recently excavated southeast of ancient Be'er Sheva', on the southern bank of Naḥal Be'er Sheva' (Fig. 1; Eisenberg-Degen 2017). The farmstead expanded over time, comprising at its

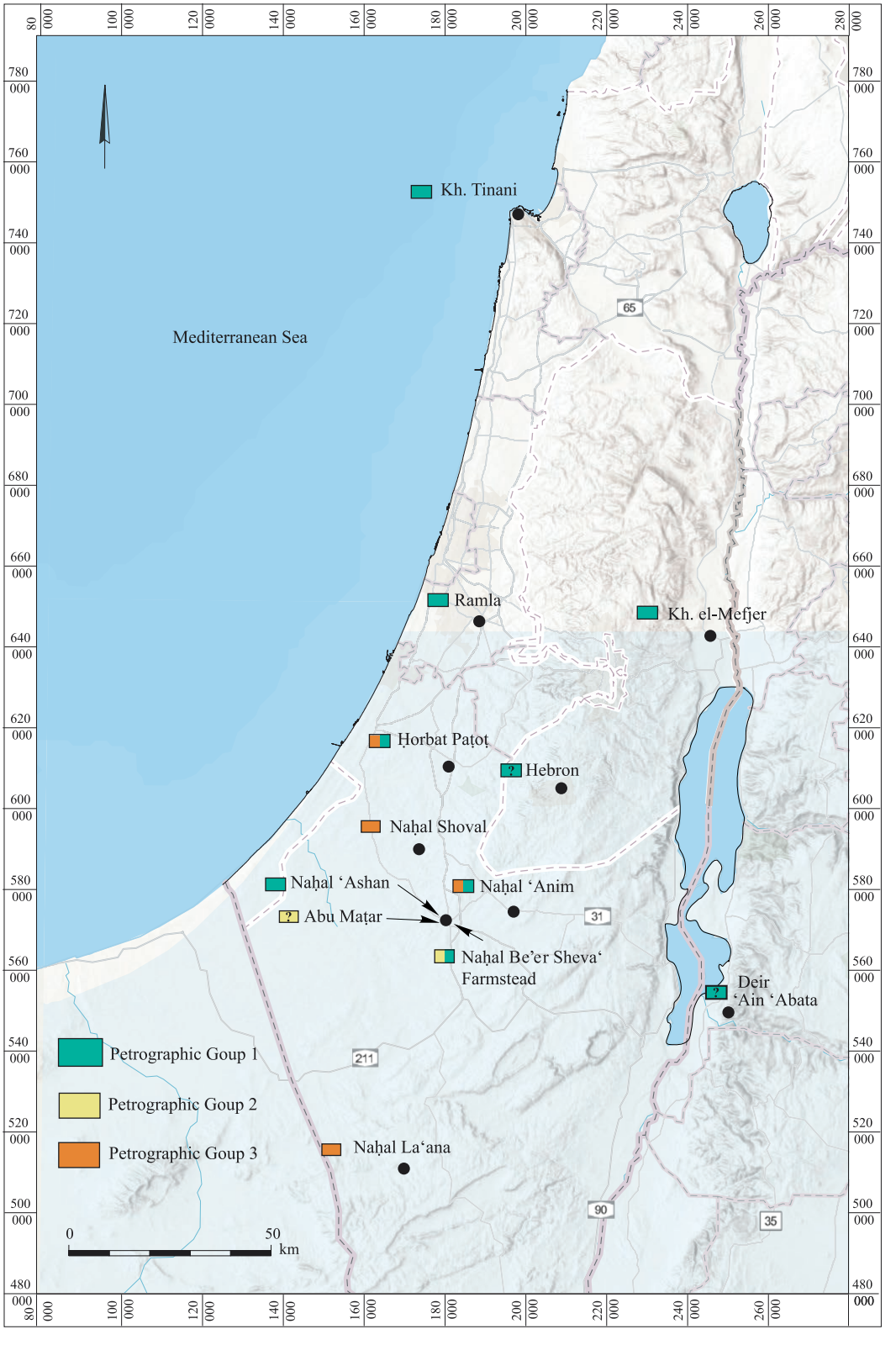


Fig. 1. Sites mentioned in the article, and petrographic results of the sampled jugs; the arrows point to the location of the three sites (illustration: I. Taxel and I. Azoulay).

peak a single complex of two cojoined courtyards surrounded by rooms. The mollusks and botanical finds point toward commercial connections with the northeastern Shephelah region in one direction and with the southwest and Egypt in another. Material finds include a steatite/soapstone bowl, a late eighth–early ninth-century Abbasid bronze coin (IAA Reg. No. 168182), almond-shaped mold-made lamps with similarly shaped bases and long tongue-shaped handles, a single sherd of a glazed bowl and a variety of plain Buff Ware and mold-decorated Buff Ware jugs. A varied assemblage of Fine Islamic Ware (hereafter FIW) was also found at the site.

The mold-decorated Buff Ware jugs bear a variety of decorations, all of which are compositions of densely arranged geometric designs and vegetal motifs forming continuous and repeating patterns of varying combinations, such as leaves and rhomboids, palm leaves in rhomboids, irregular hexagonal intervals with stars or circles, triangles and circles, stars and a net design (Fig. 2). Examples of the leaves and rhomboids pattern, the most common of these compositions, were found at a number of sites besides the Be'er Sheva' farmstead, including Ramla (Kletter 2005), Khirbat el-Mefjer (Whitcomb 1988) and Naḥal Shoval (Abadi-Reiss 2017) (see, e.g., Figs. 3, 4).

Fig. 2. Sampled Buff Ware from the Naḥal Be'er Sheva' farmstead (see Table 1:1–4) (photography: C. Amit).

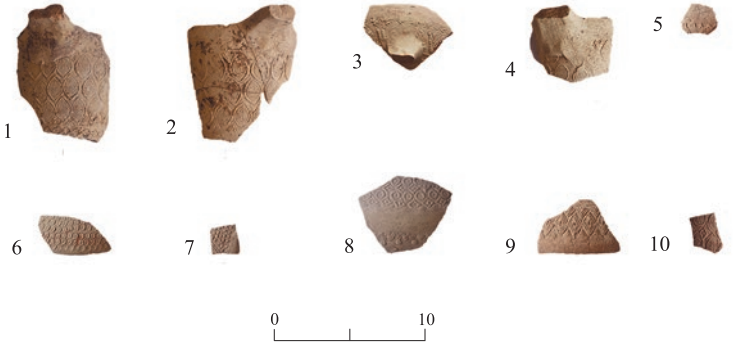


Fig. 3. Sampled Buff Ware vessels from Negev sites and from Khirbat Tinani: (1, 2) Khirbat Tinani; (3, 4) Ḥorbat Paṭoṭ; (5) Naḥal 'Ashan; (6, 8) Naḥal Shoval; (7, 9) Naḥal 'Anim; (10) Naḥal La'ana (see Table 1) (photography: D. Eisenberg-Degen).

Fig. 4. Sampled Buff Ware from Khirbat el-Mefjer (Table 1:15–19) (photography: D. Gazit).

Among the mold-decorated jugs recovered from the Be'er Sheva' farmstead, we noted two distinct fabric types: one buff-colored and the other, pink or light red. All vessels were white-slipped, but the slip is more pronounced on the ones with the light red fabric. These sherds motivated the provenance study of this ware.

## Early Islamic Buff Ware

Early Islamic Buff Ware, occasionally termed "Cream Ware" and originally termed "Mafjar Ware" after Baramki and Hamilton's excavations in the 1930s and 1940s at Khirbat el-Mefjer (Baramki 1944), is a widespread ware found at sites in Central Asia, modern-day Iraq, Iran, Afghanistan, Syria, Jordan and Israel, and in northern Sinai (Cytryn-Silverman 2001; Walmsley 2001; Mulder 2014; Makowski and Chyla 2024). The category of Buff/Cream Ware encompasses a diverse array of ceramics, showcasing the evolving aesthetic taste of Early Islamic society of southern Bilad esh-Sham. The porous body of the unglazed Buff Ware vessels effectively helped keep liquids cool in hot and arid environments (Mulder 2014). Buff Ware includes jars, jugs, pilgrim flasks and bowls with an off-white, pale-yellow, light-brown or greenish/pinkish tinge, which can be divided into three groups: (1) vessels with thick walls and either no surface treatment or decorated with incised lines, circles and applied knobs resembling turbans; (2) vessels with thin walls and an incised surface (Walmsley 2001; Vincenz 2008:119–120); and (3) mold-decorated jars, jugs, bowls and lamps (Makowski and Chyla 2024: Group ICW C). In excavated sites in modern-day Iran, in addition to these, Buff Ware assemblages include cups and plates. In neighboring regions, the undecorated Buff Ware is dated to the second half of the seventh–tenth/eleventh centuries, the incised Buff Ware, to the late eighth–tenth/eleventh centuries, and the mold-decorated ware, to the ninth century, continuing into the Fatimid period with a variation on

its designs (Walmsley 2001; Stacey 2004). At sites in modern-day Israel, the appearance of the first two groups is commonly dated to the Umayyad period through the Abbasid period, while the mold-decorated group serves as an indicator of the Abbasid period alone (Vincenz 2008; Cytryn-Silverman 2010:106), appearing in the late eighth century. However, it may be prudent to reassess the dates of the latter, as evidence suggests that mold-decorated Buff Ware in southern Bilad esh-Sham was inspired by Central Asian prototypes, which seem to have emerged only as late as the ninth century (see, e.g., Mulder 2014).

The most commonly recorded mold-decorated ware types recovered at sites in modern-day Israel are lamps and jugs, though there are also juglets and flasks (Segal 2023). At the Early Islamic sites excavated in the Be'er Sheva' Valley, only lamps and jugs decorated by molds have been unearthed; however, this typological breakdown may be somewhat biased due to the difficulty in distinguishing a jug body sherd from that of a bowl. This is particularly complex as the body of the jug is made of two bowls joined together, and sherds are often automatically assumed to be part of a jug while they actually belonged to bowls.

Mold-decorated jugs were made in sections: the upper and lower parts of the body were initially thrown as bowls, and these were then lightly pressed into a mold decorated with a composition of tightly patterned geometric and vegetal designs (Cytryn-Silverman 2013; Mulder 2014; Kohn-Tavor 2017). The bowls were then connected to each other with the application of a clay band over the joint, forming a globular body. The neck, usually long and wide, was made separately, decorated and connected to the body in a similar way. A small hole was cut with a knife in the center of the top of the upper bowl for the application of the neck. A strainer was commonly added (Fig. 2:1). The strainer likely helped keep debris and insects from falling into the jug and contaminating its content. Using this technique of producing the jugs in separate parts and connecting them later resulted in slightly asymmetrical vessels, with a design that was at times of uneven depth or too shallow to be easily recognizable. The flat disk base was also often decorated. The handle, running from the rim to the shoulder, could be plain or mold-decorated and often had a 'turban' thumb rest—a clay application on the upper part of the handle made of one to three stacked rounded or pointed bits of clay (termed "turban" due to the similarity in shape; Baramki 1944; Whitcomb 1988).

Mold-decorated Buff Ware is found throughout the Early Islamic world and commonly recovered from sites in modern-day Israel. Molds were revealed in several excavations at Ramla and possibly also at Lod (Rosen-Ayalon and Eitan 1969; Frierman 1975: No. 70; Cytryn-Silverman 2010:106–107, Pl. 9.12:6; Elisha and Torgë 2014; Kohn-Tavor 2017:39; Torgë 2017), and at Gane Ḥammat (Tiberias; Oren 1971), indicating local production at these sites. Mulder (2014) points out that mold-decorated ware did not necessarily demand a high level of artisanship, as molds could be traded. With ready-made molds, decorated vessels could be produced by people with basic pottery skills. Based on the ceramic assemblage from the farmstead excavated at Naḥal Be'er Sheva', we suggest that another mold-decorated Buff Ware workshop existed in the northern Negev.

Previous provenance analyses of this ware included the petrography of four jugs from Tell Rumeida (Tel Ḥevron) (Ben-Shlomo 2018). Ben-Shlomo could not point to a specific provenance but identified the raw material as originating in the Lower Cretaceous formations, concluding that the jugs were not produced in Hebron. Holmqvist conducted geochemical ED-XRF and SEM-EDS analyses on a single vessel from Abu Maṭar, which was decorated with mold-made floral and geometric patterns (Holmqvist 2019:56, Fig. 5.21), concluding that the composition of its patterns indicated a provenance in the Negev (Holmqvist 2019:119). She also suggested that at least one production center of this ware operated in the vicinity of Jericho (Holmqvist 2019:129); however, this suggestion considers the initial discovery of an abundance of this ware at Khirbat el-Mefjer and does not rely on detailed provenance analyses. Høserich (2012) petrographically analyzed three sherds from Deir ʻAin ʻAbata in Jordan and concluded that the inclusions are consistent with local production; however, similar inclusions are also found in Syrian and Iraqi wares, deeming the composition nondiagnostic for determining regional provenance. Yuval Goren analyzed petrographically several mold-decorated Buff Ware samples from sites in northern Sinai and suggested a provenance in the Israeli coastal plain (see Cytryn-Silverman 2001).

## Sampled Mold-Decorated Buff Ware Vessels

Twenty-two mold-decorated Buff Ware vessels were sampled for petrographic analysis (Table 1). Apart from the sites of Ramla and Khirbat el-Mefjer, where mold-decorated Buff Ware is abundant, the majority of samples in this study were sourced from farmsteads and small hamlets, where only a limited number of examples were unearthed. Two samples were recovered at khirbat Tinani, on the Carmel Coast.[2]

Our selection includes four vessels (Table 1:1–4; Fig. 2) from the Naḥal Be'er Sheva' farmstead, on the southeastern outskirts of modern Be'er Sheva', and eight samples (Table 1:5–12) from sites extending from the Negev Highlands in the south to the southern Shephelah in the north (Fig. 3), as detailed below.

Sample 5 is from Naḥal ʻAshan (Eisenberg-Degen and Kobrin 2016), a farmstead on the northwestern outskirts of the city of Be'er Sheva'. The farmstead consists of a single structure with rooms surrounding a courtyard. Two construction phases were noted, both dated to the eighth century based on an almond-shaped lamp with a tongue-shaped handle, high-necked storage jars, a post-reform Umayyad *fals* (IAA Reg. No. 154639) from the first half of the eighth century and the lack of typical Byzantine forms and glazed ware. Also FIW was found at this site, as in the Naḥal Be'er Sheva' farmstead, though with fewer variations.

[2] Although this site extends well beyond the Be'er Sheva' Valley, the primary focus of the article, the data from Khirbat Tinani enhances our understanding of the geographic concentration of this ware's production.

Two samples (Table 1:6, 7) were taken from the site of Naḥal Shoval, a small hamlet with a number of units, situated in the Be'er Sheva' Valley, 15 km north of Be'er Sheva'. The pottery assemblage included a variety of glazed bowls and a wide range of FIW bowls. Alongside the mold-decorated Buff Ware jugs were flasks, some of which were mold-decorated. The excavators dated the assemblage and hamlet to the ninth–eleventh centuries (Abadi-Reiss 2017; pers. comm.).

Two samples (Table 1:8, 9) originated at Naḥal 'Anim, on the eastern edge of the Be'er Sheva' Valley toward the Hebron anticline. This farmstead consists of two conjoined courtyards surrounded by rooms. The ceramic assemblage includes tear-shaped lamps with small knob handles, FIW cups and long-necked storage jars, dating the farm to the late seventh–mid-ninth centuries (Fraiberg 2017).

One sample (Table 1:10) was collected as a surface find at Naḥal La'ana in the Negev Highlands, a large farmstead with over two dozen rooms. The site was not excavated, and other ceramic surface finds date to several periods, including Roman, Byzantine, Early Islamic and Ottoman. The Early Islamic material contains also FIW and a few glazed sherds (authors' personal obsvservation).

Two samples (Table 1:11, 12) were from Ḥorbat Paṭoṭ, near Qiryat Gat, a hamlet with a number of structures. Two construction phases where distinguished, the first dated to the Byzantine period and the second, to the Early Islamic period. The finds included a steatite/soapstone bowl. The latest glass finds dated to the eighth–tenth centuries (Yegorov 2017).

Two additional samples (Table 1:13, 14) from Khirbat Tinani, near the coast of Haifa, were recovered in the fill of a cave. They were part of a larger sherd assemblage with dates ranging from the Byzantine period through the Middle Ages. Pottery ascribed to the Early Islamic period includes black burnished bowls with incised decorations and a zoomorphic vessel (Yavor 1999).

To establish a comprehensive comparison, we carefully analyzed all samples alongside mold-decorated Buff Ware samples from Khirbat el-Mefjer (Table 1:15–19; Fig. 4) and Ramla (Table 1:20–22).[3] These two sites are renowned for their substantial examples of Buff Ware, with Ramla being particularly known as a production site for Buff Ware vessels. This comparative approach allowed us to gain valuable insights into the distribution and potential trade networks of mold-decorated Buff Ware in the region and to determine a possible manufacturing area in the northern Negev.

## Petrographic Results

Petrographic analysis was used to characterize the samples' raw materials. Thin sections were prepared in the petrographic laboratory of the Israel Antiquities Authority and examined using common petrographic methods and descriptive procedure (e.g., Reedy 2008:1–3;

[3] The samples from Khirbat el-Mefjer are derived from Baramki's excavations.

**Table 1. Inventory and Results of Petrographically Analyzed Mold-Decorated Buff Ware Jugs, According to Sites**

| Sample No. | Site | Basket; IAA Reg. No. | Locus | Petrographic Group | Fig./Reference |
|---|---|---|---|---|---|
| 1 | Naḥal Be'er Sheva' | 1353/16 | 190 | 1 | 2:3 |
| 2 | | 1353/12 | 190 | 2 | |
| 3 | | 1356/4 | 199 | 2 | 2:2 |
| 4 | | 1357/2 | 204 | 1 | 2:1 |
| 5 | Naḥal 'Ashan | 5040/1 | | 1 | 3:5 |
| 6 | Naḥal Shoval | 1042/3 | | 3? | 3:8 |
| 7 | | 1077/1 | | 3 | 3:6 |
| 8 | Naḥal 'Anim | 1069 | | 3 | 3:9 |
| 9 | | 1135/5 | 149 | 1 | 3:7 |
| 10 | Naḥal La'ana | C2 | | 3 | 3:10 |
| 11 | Ḥorbat Paṭoṭ | 1001 | 102 | 1 | 3:4 |
| 12 | | 1013 | 104 | 3 | 3:3 |
| 13 | Khirbat Tinani | 1026/1; 1997-275 | | 1 | 3:1 |
| 14 | | 1048/29; 1997-2760 | | 1 | 3:2 |
| 15 | Khirbat el-Mefjer | M368<br>40-1468/4 | | 1 | 4:1 |
| 16 | | M147A<br>40-1468/1 | | 1 | 4:3 |
| 17 | | M207C<br>40-1468/7 | | 1? | 4:5 |
| 18 | | M.P.42<br>40-1468/2 | | 1 | 4:4 |
| 19 | | M207B<br>40-1468/3 | | 1 | 4:2 |
| 20 | Ramla (A-7083) | 1129 | 137 | 1 | Torgë 2017: Pl. 13:14 |
| 21 | | 1178 | 141 | 1 | Torgë 2017: Pl. 13:13 |
| 22 | | 1144 | 137 | 1 | Torgë 2017: Pl. 13:15 |

Quinn 2022), using a Zeiss AXIO Scope.A1 microscope. The samples were divided into three petrographic groups (Table 1).

*Group 1*

The samples in this group are characterized by a light-cream to green hue and a calcareous, usually non-active matrix that had lost its optical features, resulting in a milky appearance. In certain samples, the matrix exhibits heterogeneous characteristics, transitioning from calcareous to somewhat ferruginous properties, or from active to non-active patches (e.g., Table 1:18). Notably, a calcareous slip applied to the clay body of these samples is observed in the thin sections (Fig. 5). Additionally, in certain cases, the slip close to the surface

was exposed to high fire, resulting in a dark, non-active material. The silt-sized fraction comprises c. 10–15% of the paste and is composed mainly of quartz grains, as well as a considerable amount of silt to fine sand-sized feldspars, a few biotite mica laths and oxyhornblende grains. Opaques of c. 50–200 µm are also common, including ferruginous silty nodules, which appear in most of the samples. The sand-sized nonplastic components make up c. 10% of the paste and constitute mainly fine well-sorted quartz grains of 200–300 µm, with a rare occurrence of coarser grains of up to 700 µm. Feldspar grains, including microcline, also appear occasionally, as well as calcareous rock fragments, and rarely, chert fragments and quartz geodes (Figs. 6; 7).

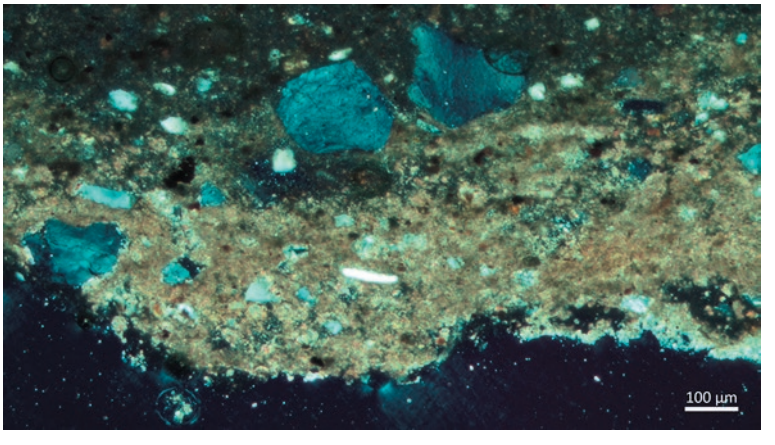


Fig. 5. Photomicrograph of Buff Ware from the Naḥal Be'er Sheva' farmstead (Table 1:1, Group 1; Fig. 2:3). Calcareous slip applied to the clay body (XLP = crossed polarized light; photography: A. Cohen-Weinberger).

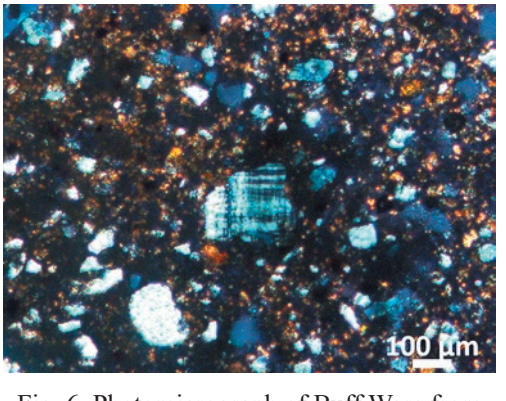


Fig. 6. Photomicrograph of Buff Ware from the Naḥal Be'er Sheva' farmstead (Table 1:4, Group 1; Fig. 2:1). Quartz and feldspar grains embedded in silty matrix (XPL= crossed polarized light; photography: A. Cohen-Weinberger).

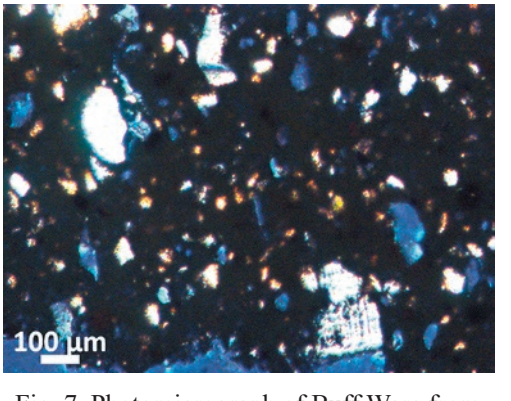


Fig. 7. Photomicrograph of Buff Ware from Ramla (Table 1:20; Group 1). Quartz and feldspar grains embedded in silty matrix (XPL= crossed polarized light; photography: A. Cohen-Weinberger).

*Group 2*

The samples in this group are characterized by a light-red hue and a homogeneous, optically active, slightly calcareous matrix. A few discrete foraminifera appear in the matrix, and rarely also ferruginous silty nodules. The silt-sized fraction constitutes approximately 10% of the paste and is composed primarily of quartz grains. Additionally, there is a significant presence of feldspars and heavy mineral grains, including zircon and biotite. The sand-sized nonplastic components comprise c. 10% of the paste and constitute medium sorted quartz grains of 200–500 µm; rounded, poorly sorted calcareous rock fragments ≤ 2 mm; fine feldspar grains (of up to c. 200 µm) and, rarely, also chert fragments (Fig. 8). A thin light-colored calcareous slip applied to the body of these samples is observed in the thin sections.

*Group 3*

The samples in this group are characterized by a light-red hue and ferruginous silty matrix. The silt-sized fraction is unevenly distributed, comprising up to 10% of the paste and is made up primarily of quartz grains. The sand-sized nonplastic components constitute c. 10% of the paste, including well-sorted quartz grains ≤ 300 µm and a few fine calcareous rock fragments (Fig. 9). A thin light-colored slip applied to the body of these samples is observed in the thin sections.

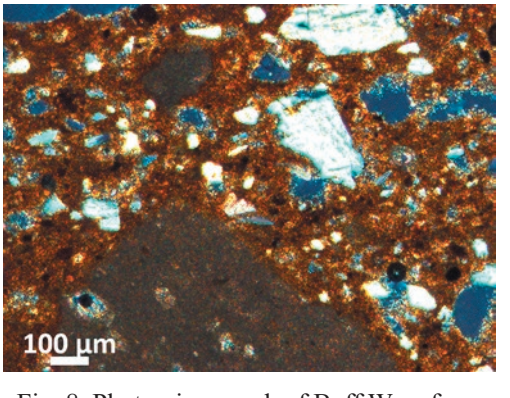


Fig. 8. Photomicrograph of Buff Ware from the Naḥal Be'er Sheva' farmstead (Table 1:3; Group 2; Fig. 2:2). Quartz grains and coarse calcareous rock fragments embedded in silty matrix (XPL= crossed polarized light; photography: A. Cohen-Weinberger).

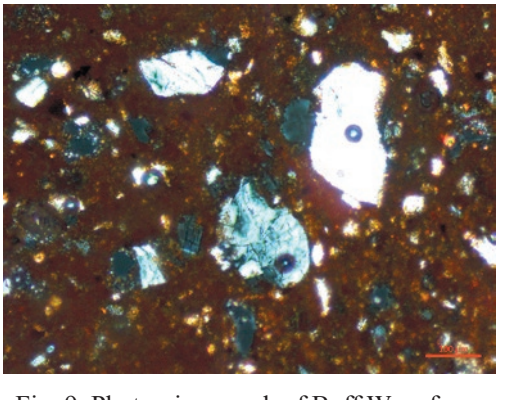

Fig. 9. Photomicrograph of Buff Ware from Naḥal Shoval (Table 1:7; Group 3; Fig. 3:6). Sand-sized quartz grains embedded in ferruginous silty matrix (XPL= crossed polarized light; photography: A. Cohen-Weinberger).

## Interpretation of the Petrographic Results

The striking similarity and uniformity of the raw materials used for all the sampled mold-decorated Buff Ware vessels is evident. All three petrographic groups share common characteristics and feature a silty matrix. The silt-sized fraction comprises 10–15% of all groups, which also display comparable sand-sized quartz grains, comprising approximately 10% of the paste. The silt in each petrographic group indicates that the source of these raw materials is most likely soils. Silt is an aeolian contribution to many soils in Israel (see, e.g., Yaalon and Ganor 1973; Wieder and Adan-Bayewitz 2002) and other neighboring regions, such as Jordan (*Ministry of Agriculture, the Hashemite Kingdom of Jordan* 1994; Cordova 2007). The challenge of distinguishing between different silty soils and determining their provenances is often met by defining the various characteristics of their matrix and nonplastic inclusions (e.g., Gilead and Goren 1989; Goren 2002; Cheng, Mason and Shen 2023). We observed several differences between the three groups. The most pronounced distinction between them lies in their matrix composition: Group 1 exhibits a calcareous, milky, non-active matrix or heterogeneous matrix in certain samples; Group 2 displays a homogeneous, optically active, slightly calcareous matrix; and Group 3 features a homogeneous ferruginous matrix. Quartz grains are the predominant sand-sized particles in all groups, while Group 2 contains also a substantial amount of coarse calcareous rock fragments and a few discrete foraminifera. Based on these noted differences, in the following section we will discuss and interpret the provenance of each of the groups.

### *Group 1: Coastal Plain*

Sand-sized quartz grains and significant amounts of feldspars are prominent components of coastal sands in the Southern Levant (see, e.g., Nir 1989). The coastal plain and the Shephelah valleys are characterized by accumulative brown grumusols (vertisols) and residual dark-brown soils (Yaalon and Ganor 1966; Dan et al. 1972; *Ministry of Agriculture* 1973; Wieder and Gvirtzman 1999; Singer 2007). These soils are derived from sand and aeolian or alluvial silty clay sediments and are therefore a likely source of the raw material.

Previous petrographic studies of pottery from sites located in the coastal plain, including ceramics derived from production sites and kilns (e.g., from the late Byzantine kilns at Yavne), suggest similar raw materials (e.g., Goren, Finkelstein and Na'aman 2004; Cohen-Weinberger, Szanton and Uziel 2017).[4] The vessels associated with Group 1 may have been manufactured at various locations in the general area of the coastal plain, such as Ramla. The samples from Khirbat el-Mefjer (Nos. 15–19), Ramla (Nos. 20–22), the Be'er Sheva' Valley farmstead (Nos. 1, 4), Naḥal 'Ashan (No. 5), Khirbat Tinani (Nos. 13, 14) and Ḥorbat Paṭoṭ (No. 11) belong to this group and display highly similar petrographic characteristics,

[4] The kilns from the ceramic workshop at Yavne and their products are currently under study by one of the authors (A.C.-W.).

providing strong evidence of a common manufacturing area and technological tradition. Hence, a common manufacturing area in the coastal plain is suggested for all these samples. The heterogenous composition of the clay matrix of several Group 1 samples may be the result of two or more different clayey raw materials being intentionally mixed.

Previous studies of the Buff Ware vessels have also indicated an abundance of fine quartz grains as nonplastic components (Ben-Shlomo 2018; Holmqvist 2019). Based on the published results and photomicrographs of the mold-decorated Buff Ware samples from Tell Rumeida, Deir ‘Ain ‘Abata in Jordan and northern Sinai (Ben-Shlomo 2018; Høserich 2012; Cytryn-Silverman 2001, respectively; Fig. 1), we may presume that they also belong to Group 1.[5] When considering the mold-decorated Buff Ware from Khirbat el-Mefjer, it is crucial to highlight the absence of published ceramic petrographic studies conducted on sites in the Jericho area. The only notable study on this matter was carried out by Michniewicz (2009), wherein it was discovered that all the analyzed ceramics were crafted from non-local materials, sourced at a distance away from their respective provenience. Hence, the geological data stand as the primary indicator of potential raw materials available for ceramic production in the region. A geological assessment of this region (Horowitz 2001; Begin and Sneh 2018) indicates that the Pleistocene Samra and Faẓa’el Formations consist of calcareous sandstone with no quartz, and silt and sand grains, respectively, but there is no detailed description of the sand composition.

*Group 2: Be’er Sheva‘ Valley or Northern Negev*

This group, distinguished by its slightly calcareous silty matrix, has been identified as loess soil, based on a substantial body of previous research and studies (see, e.g., Cohen-Weinberger and Goren 2004; Goren, Finkelstein and Na’aman 2004). Two samples (Nos. 2, 3) from the Be’er Sheva‘ farmstead site belong to this group. The resemblance of this group to loess soils, the homogeneity of the matrix and the presence of coarse calcareous rock fragments in the vessels distinguish it from Group 1. Thin sections of loess-made vessels from various sites located in the Be’er Sheva‘ Valley frequently reveal coarse calcareous rock fragments (e.g., Gilead and Goren 1989). While most previous petrographic studies of ceramics from sites in the Be’er Sheva‘ Valley pertain to the Chalcolithic period and do not mention sand-sized quartz grains, it is worth noting that these are present in the Pliocene Pleshet Formation and the Quaternary sand dunes, which cover this valley extensively (Zilberman 2018). Hence, it can be inferred that during the Islamic period, these sands were likely utilized as temper in ceramic production. However, the same petrographic characteristics of loess with sand-sized quartz grains are found in other loessial areas in the northern Negev as well.[6]

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[5] Grey and Politis (2023:97) suggested that elaborately decorated mold-relief jugs from Kh. Sheikh ‘Isa in Jordan were imported from Syria or Ramla.

[6] The same raw material is observed, for example, in thin sections of pottery from a Byzantine kiln at Merkaz Shapira (Permit No. A-7140; unpublished) and at many other kiln sites in the western Negev (Goren, Finkelstein and Na’aman 2004).

*Group 3: Coastal Plain or Shephelah*

Similarly to Group 1, the presence of sand-sized quartz grains suggests a likely provenance in the coastal plain or the Shephelah areas. A specific soil type could not be determined.

## Discussion and Conclusions

This study unveils the introduction of the prominent ceramic mold-decorated Buff Ware style into the rural scenery of the Negev during the Abbasid period. Originating in a rich Early Islamic-period tradition stretching across Mesopotamia, northern Syria and Iran, this ceramic group finds its place in the Negev landscape. Due to the limited size of the excavated sites—farmsteads and hamlets—only sparse amounts of Buff Ware pottery were unearthed at each location, underscoring the need for further excavations and subsequent publications to deepen our understanding of the cultural intricacies within this region. Initially, excavators dated numerous Negev sites to the eighth century; however, a reevaluation of this timeline may be necessary considering evidence indicating that mold-decorated Buff Ware was influenced by Central Asian prototypes, which emerged later, starting in the ninth century (Mulder 2014).

While Walmsley (2001) suggested that the rising popularity of mold-decorated Buff Ware vessels may signify arapid replacement of FIW, possibly linked to social shifts or changing tastes, our findings present a different perspective. We observed that both FIW and mold-decorated jars coexist in the Negev Early Islamic sites. Hence, the transition from FIW to mold-decorated jars seems to have transpired gradually over time.

The petrographic and archaeological evidence indicated that mold-decorated Buff Ware vessels were made in production areas along the coastal plain (Group 1), with one recognized at Ramla and possibly another at Lod. The products were then distributed to markets and sites farther away. The petrographic finds indicate that the source of Group 1 was extremely widespread with its products traded to regions as far as Khirbat Tinani, near the coast of Haifa, Be'er Sheva' in the south, and Khirbat el-Mefjer in the Jordan Valley.

Two vessels from the Naḥal Be'er Sheva' farmstead (Nos. 3, 4; Group 2) and several more from other sites (Nos. 6–8, 10, 12; Group 3) differ from the typical buff/cream-colored ware by their reddish hue and less precise decoration. It is however important to consider that this ware was traditionally covered with a light slip, which would have masked the underlying red hue. Group 3, which likely represents a different workshop, was found at sites extending from Naḥal La'ana in the Negev Highlands to Ḥorbat Paṭoṭ—currently the northernmost of these sites.

The two samples from the Be'er Sheva' farmstead (Group 2) represent an imitation of the mold-decorated Buff Ware vessels in the Negev area, using local loess soil as raw material. The presence of Buff Ware associated with both Groups 1 and 2 at the Be'er Sheva' farmstead adds complexity to the picture. It suggests that while there may have been a nearby production center (Group 2), the inhabitants did not rely solely on its products, raising the possibility that the vessels of Group 2 may have been manufactured in a different area of the

northern Negev rather than within the Be'er Sheva' Valley. This implies that vessels from both groups are of non-local origin. Vessels originating in two distinct workshops are noted also at the Abbasid-period sites Naḥal 'Anim and Ḥorbat Paṭoṭ. The Naḥal Be'er Sheva' and Naḥal 'Anim sites are both farmsteads with a small number of residences; therefore, their direct contact with distant regions was likely more limited than that of a hamlet, such as Ḥorbat Paṭoṭ, occupied by a larger population. Though this in itself is not sufficient proof that different wares from several workshops were sold in the same markets, it does raise this possibility. The first appearance of mold-decorated Buff Ware in the southern regions may be viewed as "a cultural influence stemming from the Abbasid caliphate" (Mulder 2014). Its rapid proliferation across numerous sites suggests that it was likely produced at several production sites, as indicated by our findings. The identification of a locally made mold-decorated Buff Ware imitation points not only to strong connections of the farmstead and hamlets with the central production centers and culture, but also to the existence of a pottery workshop that operated in the northern Negev, perhaps in the Be'er Sheva' region—one whose operators had the basic know-how of producing mold-decorated Buff Ware (even if the mold itself was imported from a different workshop).

The emergence of locally produced imitations in the consumer market must have resulted from the increase of local demand but also likely derived from the suppliers' desire to offer affordable versions of luxurious imported ware of the urban centers such as Ramla. The existence of such a workshop hints at a yet unrecognized Abbasid production center in the south and emphasizes the role of the urban center as a sought-after model of material culture. Yet this fabric (Group 2) was not found at other nearby sites, such as Naḥal 'Ashan or Naḥal 'Anim, which would have likely relied on the same local markets. The presence of several examples of a distinct ceramic ware, originating in various regions, at a single archaeological site is a phenomenon observed across various historical periods, which can be attributed to a multitude of reasons. The coexistence of imported mold-decorated Buff Ware from coastal areas alongside presumably locally made versions at the same site may have been the result of several factors, including economic considerations, such as costs-reduction efforts. Another possibility is that the vessel was purchased primarily for the goods it contained (Seligman 2020). The difference in shapes and fabrics of vessels of the same class may have indicated their different origins—for example, wine and other commodities were traded in Gazan and Ashqelonian jars, which may have been typologically distinguishable (Mayerson 1992). In the case of the mold-decorated Buff Ware, the similarity in form, decoration and color (i.e., the addition of a white slip to the red-colored ware) may have indicated that if these vessels were traded for their contents, the traded products they contained were not unique but rather all of a similar quality.

If the identification of the mold-decorated jugs use as water containers is correct, then in this case, the vessels may have reflected fashionabilty and prestige. Residue analysis may help solve this dilemma in the future.

## Summary

This study represents the first step toward an awaited comprehensive provenance study of the mold-decorated Buff Ware. The growing number of discoveries of such vessels in recent excavations in Israel and Jordan (see, e.g., Waliszewski 2001; Hoffman 2019; Peretz 2020; Grey and Politis 2023:97–99) underscores the importance of a thorough research of their distribution and production patterns.

Moreover, the petrographic analysis of the mold-decorated Buff Ware vessels revealed a consistent composition across all samples, characterized by a predominance of silt and sand-sized quartz grains. This consistency echoes findings from previous studies on mold-decorated Buff Ware from various sites, including Tell Rumeida, sites in northern Sinai and Deir ‘Ain ‘Abata in Jordan (Ben-Shlomo 2018; Cytryn-Silverman 2001; Høserich 2012, respectively). These results emphasize the importance of employing additional provenance analytical techniques to unravel whether this uniformity stems from a broad dispersal of mold-decorated Buff Ware primarily originating in one production hub, possibly located in coastal Israel (e.g., Ramla). Alternatively, it raises the possibility that the influence of the Abbasid caliphate ceramic traditions extended to the selection of similar raw materials for mold-decorated Buff Ware production across diverse sites. Further analyses will aid in identifying also other significant production centers, such as the one uncovered in the Negev during the current study.

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