CARINA HASENZAGL*

Fabrics of Late Antique African Red Slip Ware from North Tunisian Production Sites

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African Red Slip Ware (hereafter ARS) was produced between the mid-1st century and the late 7th century AD in the Roman provinces of modern-day Tunisia and Algeria (fig. 1) and is one of the most widely distributed types of Imperial-period and late antique tableware. Abundantly found at excavation sites across the Roman Empire, especially in the Mediterranean, ARS has been central to typochronological analyses and investigations of ancient trade.[1] Yet, while seeking to reconstruct socio-economic phenomena through ARS, its complex classification structure, which also causes inconsistencies in the determination of provenance, has been a scholarly focus for decades.[2]

Classificatory debates are rooted in the history of ARS studies, which developed independently in the 20th century in Tunisia and Algeria, and across the Western and Eastern Mediterranean, and have been influenced by different (national) research trends.[3] Conventionally, ARS is classified into overarching umbrella units A, C, D, E, F, and G, first introduced by Nino Lamboglia and continued ever since (A1, A1/2, A2, A/D, C1, C1/2, C2, C3, C3/4, C4, C5, C/D, D1–D4, C/E, E, F, G, and the so-called continental ARS).[4] Each ARS class relates to certain macroscopic features (e.g., color and quality of the slip, fig. 2), a spectrum of vessel- (fig. 3), decoration-, and lamp types,[5] and/or a broad geographic production region (e.g., North, Central, and South Tunisia or Algeria) composed of several production sites (fig. 1) and workshop units. While products from different workshops within an ARS class (e.g., ARS C) are often typologically indistinguishable, they can be differentiated by petrographic and chemical markers specific to each known (and still unlocated) workshop.[6]

The use of archaeological fabrics to characterize production sites has—when combined with typochronological/stylistic evaluations and archaeometric analyses—proven a valuable additional typological unit for sorting ARS finds.[7] While other (Roman period) table and fine wares may be challenging to analyze under a stereomicroscope, the relatively coarse fabrics of (most) ARS workshops provide characteristics in both texture and inclusion composition that are discernible even at low magnification.

*Ghent University, Department of Archaeology, Carina.Hasenzagl@UGent.be.

[1] E.g., Fentress et al. 2004; Lewit 2011; Bes 2015; Bonifay and Malfitana 2016; Gruber 2025.

[2] Summarized in Hasenzagl forthcoming.

[3] For the beginnings of systematic ARS studies see: Eastern Mediterranean, Waagé 1933; 1948; Western Mediterranean, Lamboglia 1958; 1963; Tunisia and Algeria, Février 1963; Salomonson 1968; 1969.

[4] Lamboglia 1958; 1963; Salomonson 1968; 1969; Atlante I; Bonifay 2004; 2016.

[5] For the most common vessel, lamp, and stamp typologies, see Hayes 1972; 1980; Atlante I; Mackensen 1993; Bonifay 2004; 2016; Ben Moussa 2007; Bussière and Rivel 2015; Cardarelli 2022.

[6] E.g., Mackensen and Schneider 2002; Brun 2007; Bonifay et al. 2012; Baklouti et al. 2014; Capelli et al. 2016; Rêve et al. 2021; Mackensen et al. 2024.

[7] E.g., Capelli et al. 2016; Hasenzagl and Capelli 2019; 2021; Sghaïer et al. 2023.

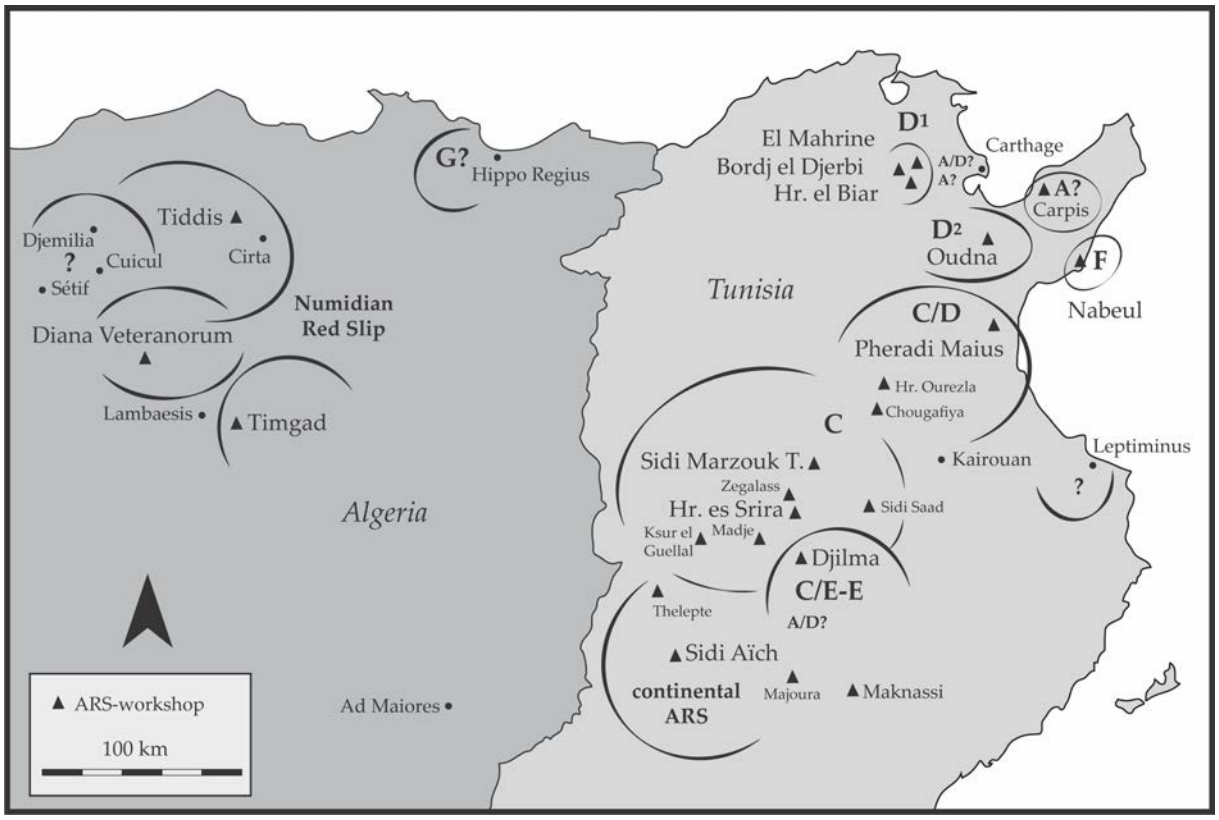


Fig. 1. Tunisian and Algerian ARS workshops, production areas, and ARS classes (illustration: C. Hasenzagl).



Fig. 2. Different ARS productions and their variety of color and slip (photo: S. Diesner/C. Hasenzagl).

The ARS from the North Tunisian production sites (fig. 1) of Bordj el Djerbi (ARS D1), Henchir el Biar (ARS D1), Oudna (ARS D2), and Pheradi Maius (ARS C/D) presented in FACEM was part of a pilot project to classify ARS fabrics and map their distribution at intra-African and Empire-wide consumption sites.[8] Their characterization is mainly based on the survey material of the Dutch archaeologist Jan Willem Salomonson, who prospected ARS potteries in Tunisia in the 1960s and 1970s.[9] Many of these sites, situated in rural villages, estates, and ancient urban centers, had been known since the late 19th or early 20th century, identified by remaining workshop structures, kilns, traces of clay quarries, potters' tools and firing aids (so-called saggars), as well as the innumerable vessels, both finished and misfired, found in the field.[10] Since then, knowledge on the ARS workshops has significantly expanded and more have been localized.[11] Still, most have only been surveyed and not (fully) excavated. Thus, the material Salomonson collected decades ago remains an important source for studying ARS production sites, both in terms of vessel typologies and fabric features.

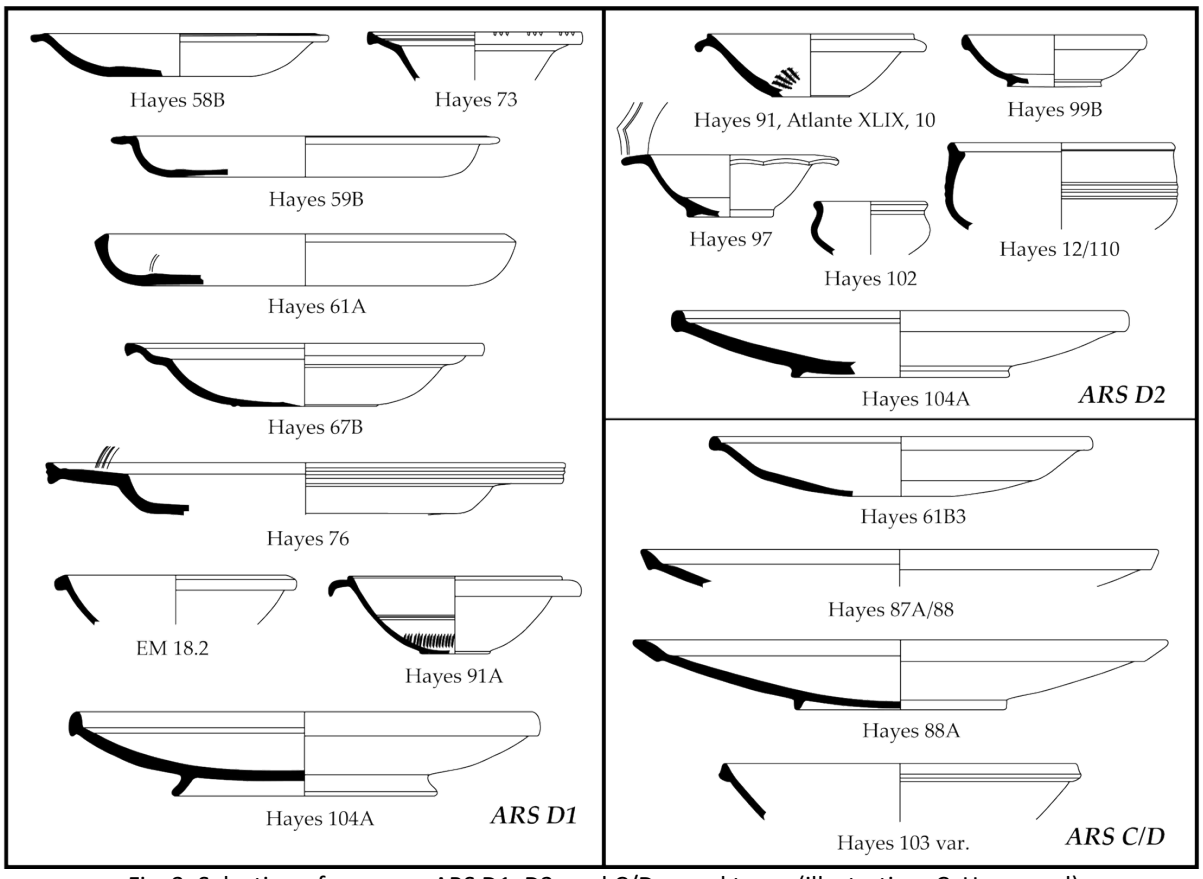


Fig. 3. Selection of common ARS D1, D2, and C/D vessel types (illustration: C. Hasenzagl).

[8] It was part of the author's PhD as well as the PostDoc project (1243424N) "Code Red. A Key to the Reclassification of African Red Slip Ware" funded by the Special Research Fund/Ghent University (BOF) and the Research Foundation Flanders (FWO).

[9] Authorized by the Tunisian Archaeological Service (INP), Salomonson's survey collection was transported to the University of Utrecht (Netherlands), where it was stored until the closure of Utrecht's Archaeological Institute in 1986 and moved to a temporary storage facility. In 2006, it was officially handed over to Ghent University (Belgium) and Prof. Roald Docter. See Docter 2021.

[10] See e.g., Babelon et al. 1893; Gauckler 1897.

[11] For a summarized overview of known workshops, see Mackensen 2019, 35–71.

Pheradi Maius – ARS C/D

In 1961, Salomonson collected 222 diagnostic ARS sherds at Sidi Khalifa/Khelifa (ancient Pheradi Maius).[12] Located near the coast between Hammamet and Sousse (fig. 1), Pheradi Maius is the most important known production center of ARS C/D, a transitional class characterized by a fine-textured fabric and a thin, orange to pinkish-red slip combining the fine appearance of ARS C with vessel forms characteristic of ARS D.[13] Ongoing archaeological investigations in a late antique artisans' quarter have documented kilns used from the 4th to the 7th centuries AD and a broad spectrum of ARS (e.g., Hayes 50B var., Hayes 58B, Hayes 61B–C, Hayes 68, Hayes 79, Hayes 80B, Hayes 86, Hayes 87A, Hayes 87A/88, Hayes 88A–C, Hayes 91 var., Hayes 103 var., Hayes 105 var.) and cooking ware.[14] Pheradi Maius is particularly known for Hayes 61B3, Hayes 87A/88, and Hayes 88 (fig. 3), which were also exported in large quantities. Stamped decoration, common for late antique ARS, is generally scarce in ARS C/D.
In binocular and thin section analyses of Salomonson's survey material, Pheradi Maius' ARS is relatively homogeneous.[15] Its fabrics range from reddish-yellow (Munsell 5YR 6/8) to red (2.5YR 5/8) and are rich in quartz and feldspar, with variable proportions and sorting of brown and black (iron-rich) inclusions, argillaceous rock fragments (that is, the shale and limonitic fragments identified in thin section), and generally rare silver mica (muscovite) and calcareous particles (e.g., microfossils and limestone fragments). Variations in particle number and average size produce slight differences in texture and porosity on the fresh break, with transitions often smooth. In simplified terms, the fabrics (fig. 4) can be described as fine/compact (PH-ARS-1), medium-fine (PH-ARS-2), medium-coarse (PH-ARS-3), and coarse (PH-ARS-4).
Differences among the fabric groups may be chronologically significant. Samples from Salomonson's collection suggest that later forms, such as the 6th-century Hayes 87 and Hayes 88, are made from fabrics PH-ARS-1–PH-ARS-3, whereas PH-ARS-4 is more often (but not exclusively) associated with 4th- and 5th-century types, such as Hayes 61B3 and Hayes 68. The coarser PH-ARS-4 fabric also resembles that of cooking ware that may have been produced as early as the 3rd century AD at Pheradi Maius, continuing until the 7th century.[16]

PH-ARS-1 (fig. 4)
Representative sample: M202/1
Further samples on FACEM: M201/2; M202/3; M202/4; M202/5

PH-ARS-1 has a fine to compact, low-porosity matrix (5–7.5%) with channel-like and irregular (vughy) voids up to 0.25 mm. Inclusions make up approximately 20% of the fabric. Characteristic particles are rust-colored to reddish-brown, elongated to spherical, and subrounded, up to 1.25 mm. Transparent whitish-gray quartz/feldspar grains are dominant, typically subspherical to subrounded, about 0.125 mm. Less frequent are black inclusions, silver mica, and lenticular to platelet-shaped argillaceous rock fragments up to 0.75 mm. Small white calcareous particles and carbonate pseudomorphoses occur only sporadically.

[12] For a detailed presentation of Salomonson's survey at Pheradi Maius, see Hasenzagl 2019, 51–7.
[13] ARS C/D was also produced at Chougafiya and Henchir el Ourezla (fig. 1), both in the Nebhana valley near Pheradi Maius. See Ben Moussa 2017.
[14] See e.g., Bonifay 2004, 49; Ben Moussa 2007, 109–215; Mackensen 2019, 61; Ben Moussa et al. 2020.
[15] Hasenzagl and Capelli 2019.
[16] Ben Moussa 2007, 180–6; See also Hasenzagl and Capelli 2019.

PH-ARS-2 (fig. 4)
Representative sample: M202/6
Further samples on FACEM: M202/7; M202/8; M202/9; M202/10

With approximately 25% inclusions, PH-ARS-2 appears slightly more granular than PH-ARS-1. Voids occur in comparable quantities and shapes to PH-ARS-1. The most notable difference is the generally larger (up to 0.375 mm) and more distinctive colorless, whitish-opaque to greyish quartz/feldspar grains, which are subspherical to subrounded. Other inclusions, including rust-colored to reddish-brown particles, occasional calcareous and argillaceous rock fragments, sparse black inclusions, and silver mica are identical with PH-ARS-1.

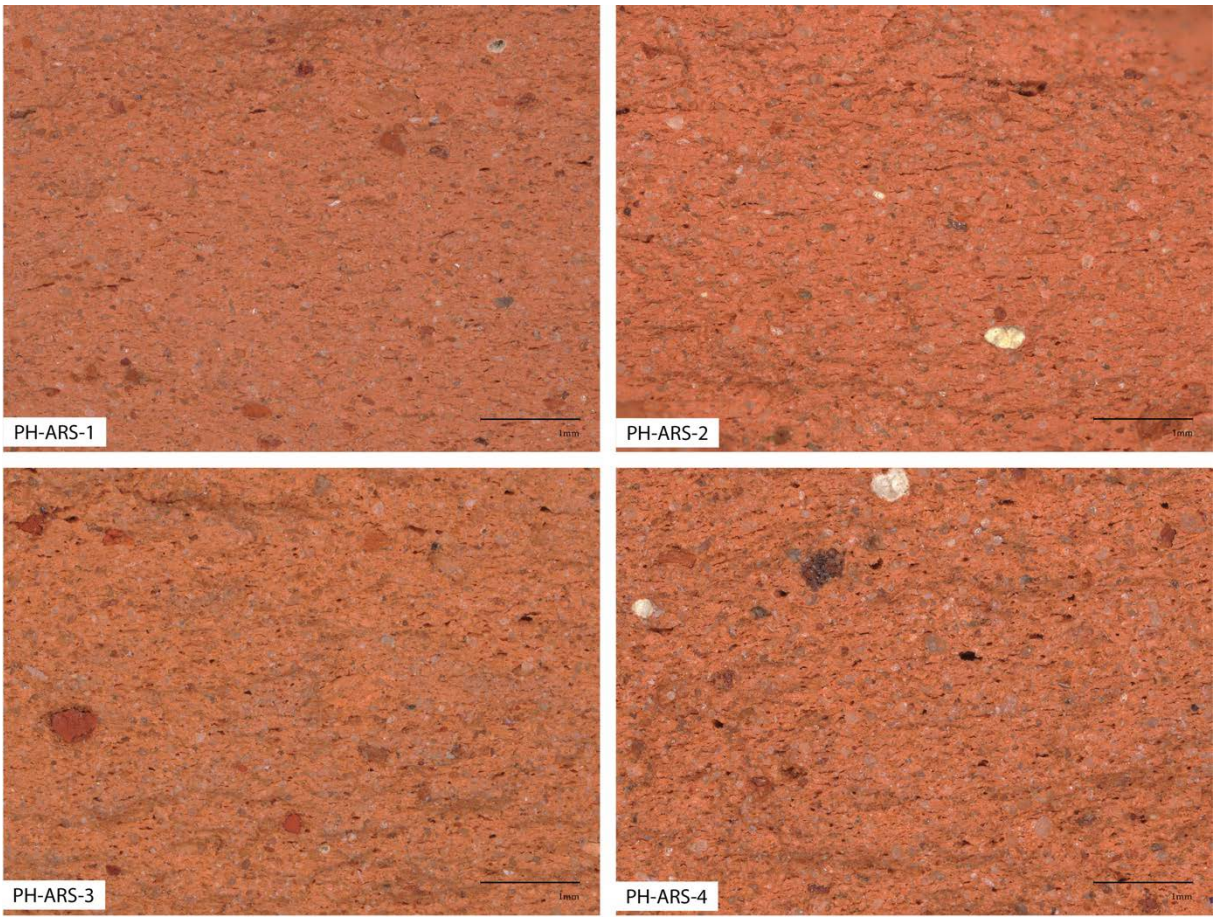


Fig. 4. Pheradi Maius' fabric types documented in Salomonson's survey (photos: C. Hasenzagl, 16x).

PH-ARS-3 (fig. 4)
Representative sample: M202/11
Further samples on FACEM: M202/12; M202/13; M202/14; M202/15

PH-ARS-3 shows an irregular texture with approximately 30% inclusions and higher porosity than PH-ARS-1 and PH-ARS-2. Vughy voids account for about 10% and are generally around 0.125 mm in size. Its most distinctive feature is the numerous rust-colored to reddish-brown, elongated to spherical, subrounded particles, often exceeding 1 mm, together with lenticular

beige argillaceous rock fragments up to 0.75 mm. Small, subspherical to subrounded quartz/feldspar grains, generally ≤0.125 mm, are abundant, while small black and calcareous particles, as well as silver mica, appear only in small quantities.

PH-ARS-4 (fig. 4)
Representative sample: M202/16
Further samples on FACEM: M202/17; M202/18; M202/19; M202/20

PH-ARS-4 is often a shade darker (2.5YR 5/8) than the other PH-fabric types. The proportions of inclusions and voids are comparable, but inclusions are, on average, larger: quartz/feldspar often reach 0.5 mm, and rust-colored to reddish-brown inclusions may exceed 1 mm. Calcareous particles are more visible against the darker matrix but are not more frequent. Black particles and mica occur rarely, while argillaceous rock fragments (up to 0.5 mm) are difficult to distinguish.

The Mejerda potteries – ARS D1

The production centers of El Mahrine, Bordj el Djerbi, and Henchir el Biar (fig. 1), traditionally classified as producers of ARS D1, lie within only a few kilometers of each other along the Mejerda River, south of the ancient Roman city of Thuburbo Minus. Despite their proximity, Salomonson prospected only Bordj el Djerbi and Henchir el Biar in 1968.[17] Since then, all three sites have been extensively investigated, primarily by Michael Mackensen.[18]
The location of the Mejerda potteries, together with the contemporaneity of their main vessel- (fig. 3) and lamp types, including Hayes 58B, Hayes 59A/B, Hayes 61A–B2, Hayes 63, Hayes 67A–C, Hayes 73A/B, Hayes 76A/B, Hayes 91, Hayes 93A/B, EM 18, Hayes 104A–B, stamp styles A(i)–A(iii) and E(i)–E(ii), as well as lamps Atlante VIII A and C, has led to the believe that the three centers belonged to the same *latifundium* following closely related organization and logistics. Production is divided into four phases, extending from c. 320 AD to the mid- or late 7th century AD.[19]
No general macroscopic criteria differentiate the products of the Mejerda potteries, which have an overall pinkish-red tone, varying slip quality (from thin to thick and matt to shiny), and clay colors from reddish-yellow (5YR 6/6–6/8) to light red (2.5YR 6/6). They are understood as one ARS D1 production zone (often collectively referred to as the El Mahrine zone), also sharing petrographic features, i.e., (aeolian) quartz and (plagioclase) feldspar, rust-colored to reddish-brown and black (Fe-rich) particles, calcareous elements (microfossils, carbonate nodules, limestone fragments), and argillaceous (shale and limonite) rock fragments. However, differences in texture and particle composition, especially between Bordj el Djerbi and Henchir el Biar/El Mahrine (fig. 5), can be detected (fig. 5).[20]

[17] The reasons for this are unclear. On Salomonson's survey and research prior to 1968, see summaries in e.g., Mackensen 1993, 25–7; Hasenzagl 2019, 23–4; 32; Mackensen 2019, 58.
[18] Mackensen 1985; 1993; Mackensen and Schneider 2002, 125–27; 136–39; Mackensen 2019, 58–62. See also Ben Moussa 2007, 78-108 for another survey at El Mahrine conducted in 2006.
[19] On the four phases, see Mackensen 1993, 288–301; 366–74; 1998, 31–3. On phase 4 at Henchir el Biar, see also Hasenzagl 2021.
[20] See Hasenzagl and Capelli 2021.

Bordj el Djerbi

The 125 pieces collected by Salomonson at Bordj el Djerbi in 1968, some showing heavy fragmentation, typologically span all four production phases (Hayes 58B, Hayes 59A/B, Hayes 61A/B, Hayes 63, Hayes 67, Hayes 73, Hayes 76B, Hayes 91, Hayes 93A/B, and Hayes 104B, stamp styles Hayes A(i)–A(iii) and E(i)).[21] The ARS was produced in three fabric types: BD-ARS-1, BD-ARS-2, and BD-ARS-3 (fig. 5).[22] These are generally defined by inclusions traceable in all ARS D1 fabrics but differ in texture and grain size. BD-ARS-1 shows distinctive size variation (0.025–1 mm), apparent at first glance, whereas BD-ARS-2 and BD-ARS-3 have a much more granular texture dominated by small to medium-sized quartz/feldspar.
Overall, no clear pattern linking vessel- and fabric types could be identified. Based on the material collected by Salomonson, any vessel form could therefore have been produced in any BD-fabric type during the workshop's production period (4th–7th century AD).

BD-ARS-1 (fig. 5)
Representative sample: M199/1
Further samples on FACEM: M199/2; M199/3; M199/4; M199/5

BD-ARS-1 contains 20–25% poorly sorted inclusions (0.025–1 mm) with larger particles standing out against the compact, smooth matrix. Translucent to whitish or greyish quartz/feldspar inclusions dominate (0.025–0.625 mm). Elongated to spherical rust-colored to reddish-brown grains (up to 1 mm) are also characteristic and occur alongside small (≤ 0.25 mm) black inclusions. Infrequent white to yellowish calcareous particles and foraminifera reach 0.75 mm, while carbonate pseudomorphoses and silver mica are rare. Occasional beige, lenticular argillaceous fragments (≤0.5 mm) blend into the clay matrix. Voids account for 2.5–7.5% and are mainly channel-like or vughy, generally <0.25 mm. In addition, distinctive (rounded) holes mark the loss of large (aeolian) quartz and other inclusions.

BD-ARS-2 (fig. 5)
Representative sample: M199/6
Further samples on FACEM: M199/7; M199/8; M199/9; M199/10

BD-ARS-2 has an irregular and granular texture. Inclusions make up 30–35% of the sherd and are dominated by quartz/feldspar. Their grain sizes range from 0.025 to 1 mm, as in BD-ARS-1, but the average larger, translucent and whitish quartz/feldspar grains make it appear coarser. Vughy and channel-shaped voids (0.025–0.125 mm) account for 10–15%. Inclusions resemble those in BD-ARS-1, but are less distinct in the granular, porous matrix. Rounded calcareous particles and carbonate pseudomorphoses are clearly discernible and more frequent than in BD-ARS-1. Argillaceous rock fragments are sparse but more visible, reaching 0.75 mm. Rust-colored and reddish-brown particles (0.025–0.375 mm) are infrequent, while small black particles and silver mica are barely traceable.

[21] For Salomonson's survey, see Hasenzagl 2019, 23–32. The fragmentation of the pottery found in Bordj el Djerbi was also noticed by Mackensen during the surveys 1997–1999. It was caused by intensive farming and agricultural machines, although the samples collected by Salomonson in 1968 are significantly larger. See Mackensen and Schneider 2002, 125.
[22] Hasenzagl and Capelli 2021.

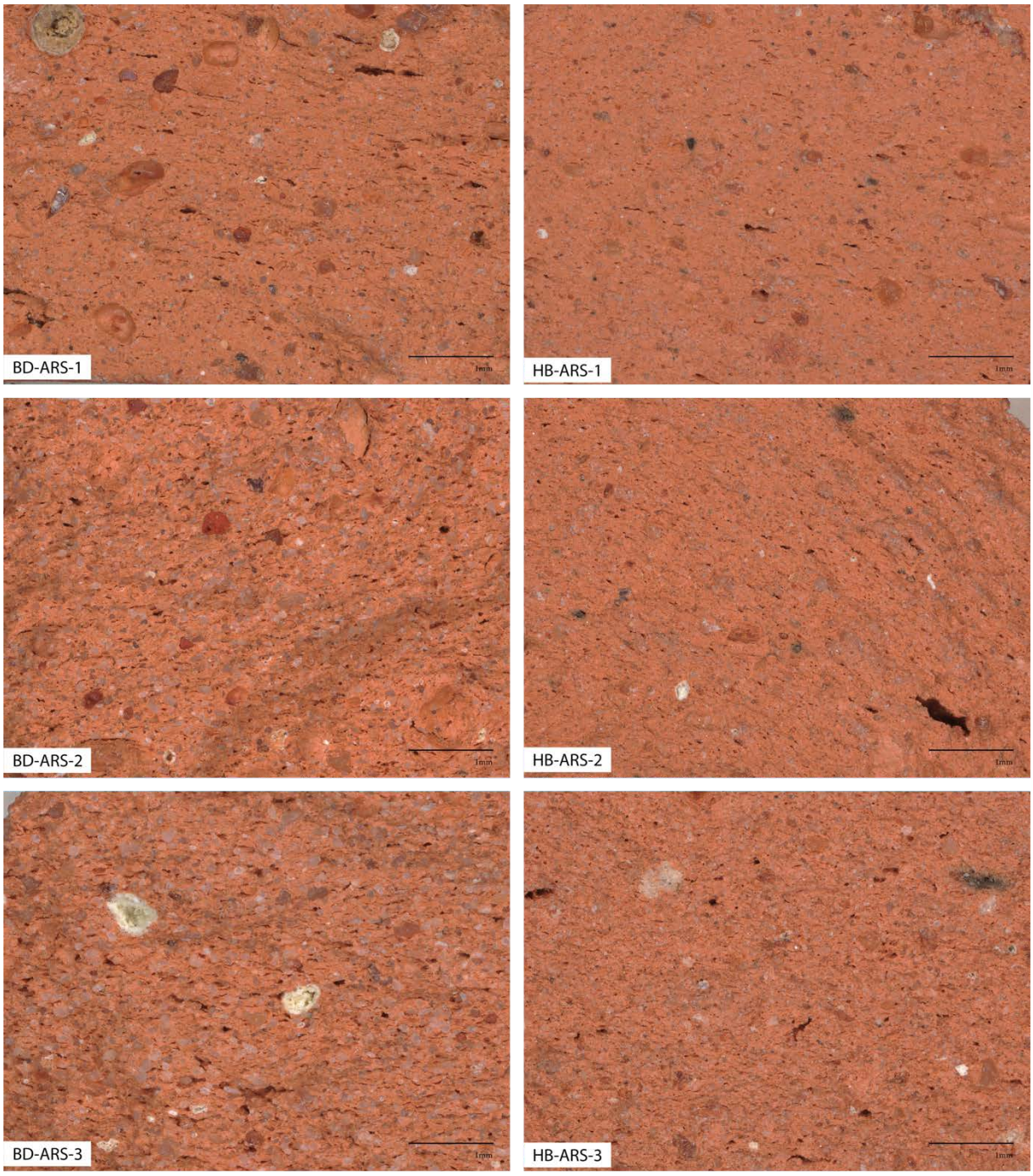


Fig. 5. Bordj el Djerbi's and Henchir el Biar's fabric types in Salomonson's survey. (photos: C. Hasenzagl, 16x).

BD-ARS-3 (fig. 5)
Representative sample: M199/11
Further samples on FACEM: M199/12; M199/13; M199/14; M199/15

BD-ARS-3 has an irregular structure and is riddled with subspherical to subrounded quartz/feldspar grains comprising approximately 40% of the matrix. On average, these grains are larger than those in BD-ARS-2, giving the sherd a particularly coarse texture. Small vughy and channel-shaped voids account for approximately 7.5%. As in BD-ARS-2, the most distinctive inclusions are white to light-yellow calcareous particles, up to 0.625 mm. Rust-

colored/reddish-brown (≤ 1 mm) and small black particles occur in similar amounts to BD-ARS-2 but are less conspicuous in the strongly granular matrix. Argillaceous rock fragments and silver mica are absent or visible only at high magnification.

Henchir el Biar

Salomonson's survey at Henchir el Biar in 1968 yielded 320 diagnostic fragments.[23] They correspond to the repertoire of typical ARS D1 vessel types (Hayes 61A, Hayes 61A/B, Hayes 63, Hayes 67A-C, Hayes 73A/B, Hayes 76A/B, Hayes 91, Hayes 93, EM 18, EM 19, and Hayes 104A, fig. 3). Most striking, however, is the high number of stamp decorations documented by Salomonson.[24]
Microscopically, three ARS fabric types were defined for Henchir el Biar: HB-ARS-1, 2, and 3 (fig. 5).[25] Their inclusions are compositionally identical but differ in abundance and size, producing textures ranging from fine/compact (HB-ARS-1) to fine/granular (HB-ARS-2) and granular (HB-ARS-3). The main textural difference (similar to the BD-fabrics) is the increasing quartz/feldspar content from HB-ARS-1 to HB-ARS-3. At first glance, HB-ARS-1 has no distinctive inclusions, whereas HB-ARS-2 and 3 contain many small- to medium-sized black (blurry-looking) particles that stand out against the granular, quartz-rich matrix. In general, Henchir el Biar's fabrics share characteristics with reference samples from El Mahrine.[26] In particular, HB-ARS-2 is practically indistinguishable from typical El Mahrine fabrics. Because Salomonson's survey material lacks El Mahrine samples, and given the overall similarity of all HB-fabrics, Henchir el Biar and El Mahrine are considered part of the same fabric family (at least until further multidisciplinary studies might allow for a distinction).
As with the finds from Bordj el Djerbi, there is no chronological relationship between fabric types and vessel- or stamp types. It is therefore assumed that all fabrics were present throughout all four production phases, from the 4th to the 7th century AD.

HB-ARS-1 (fig. 5)
Representative sample: M200/1
Further samples on FACEM: M200/2; M200/3; M200/4; M200/5

HB-ARS-1 has a smooth clay matrix and low porosity (5–7.5%) with mainly vughy or channel-like voids. Inclusions account for approximately 20–25% and are generally smaller than 0.5 cm. The most abundant are subspherical to subrounded, translucent to whitish or grayish quartz and feldspar grains (0.025–0.5 mm), with the translucent grains being particularly distinctive. Rust-colored to reddish-brown particles (rarely larger than 0.5 mm) are common and easily visible against the smooth matrix, as are the infrequent calcareous particles and

[23] The 65 pieces published in Hasenzagl 2019, 32–8, were long thought to represent the entire collection of samples from Henchir el Biar. In 2018, however, 255 additional finds from Salomonson's survey at Henchir el Biar appeared in Vianen (Netherlands). See Hasenzagl 2021.
[24] Hasenzagl 2021. See also Mackensen 1993, 463, note 7.
[25] Hasenzagl and Capelli 2021.
[26] 12 representative samples of ARS and a few saggars selected from the reference material deposited at the Centre Camille Jullian, Aix-en-Provence. See also Bonifay et al. 2012, 48–9; Capelli et al. 2016, 305–7.

carbonate pseudomorphoses. Small amounts of black particles (≤ 0.25 mm), argillaceous rock fragments, and silver mica are also present.

HB-ARS-2 (fig. 5)
Representative sample: M200/6
Further samples on FACEM: M200/7; M200/8; M200/9; M200/10

HB-ARS-2 is characterized by a more granular texture than HB-ARS-1, resulting from a higher number and larger dimensions (0.025–0.625mm) of quartz/feldspar grains, which are also the most abundant particles in the HB-ARS-2 fabric. The percentage of inclusions (25–30%), as well as the porosity (10%), is only slightly higher than in HB-ARS-1. Like in HB-ARS-1, reddish-brown particles (≤ 0.5 mm), calcareous inclusions (≤ 0.5 mm) as well as small black grains and silver mica are present in similar amounts.

HB-ARS-3 (fig. 5)
Representative sample: M200/11
Further samples on FACEM: M200/12; M200/13; M200/14; M200/15

HB-ARS-3 shows a more granular texture than HB-ARS-2 and fewer distinctive particles. The higher number of inclusions (30–35%), packed with subspherical/subrounded, translucent to whitish or grayish quartz/feldspar up to 0.625 mm, as well as the higher porosity (10–15%), is the main difference to HB-ARS-2. Overall, HB-ARS-3 is the coarsest of the HB fabrics.

Oudna – ARS D2

The large urban site of Oud(h)na (ancient Uthina) lies about 30 km south of Tunis (fig. 1) and has been archaeologically explored since the 19th century.[27] Oudna is a known ARS D2 production center, active between the 5th and 7th centuries AD, when parts of the city were abandoned and progressively repurposed for ceramic production, with former residential and public spaces incorporated into workshops.[28] At least 15 ARS kilns have been documented and partly excavated, attesting to the production of the leading types Hayes 61B, Hayes 91, Hayes 95–Hayes 99A–D, Hayes 102, Hayes 103, Hayes 12/110, Hayes 104, stamp styles E(i)–E(ii), jugs and Atlante X lamps. Besides typical, widely distributed vessel- (fig. 3) and lamp forms, Oudna's ARS is characterized by a fully covering, relatively thick, smooth and shiny slip, different from that of other North Tunisian sites.
When Salomonson surveyed Oudna in 1968,[29] he collected 73 ARS fragments characterized by a fine-grained fabric containing small, rounded to angular quartz/feldspar grains, rust-colored (iron oxide) particles, black grains, and occasional argillaceous rock fragments (shale and limonite) and silver mica (muscovite). The visibility of these inclusions varies with paste color, which is predominantly reddish-yellow (5YR 6/6 to 5YR 6/8) but sometime shows brownish discoloration, even on exported pieces unrelated to the workshop context, where misfired pieces are more likely to be found. Despite the overall homogeneity of Oudna's tableware,

[27] See e.g., Ben Hassen and Maurin 2004.
[28] Gauckler 1897; Barraud et al. 1998; Bonifay et al. 2004; Dridi 2015. Hypotheses on an earlier ARS production, starting already in the 4th century AD, are controversial. See, e.g., Bonifay 2004, 55; Bonifay et al. 2012, 49–50; Mackensen 2019, 67.
[29] For Salomonson's survey at Oudna, see Hasenzagl 2019, 38–48.

two groups, OU-ARS-1 and OU-ARS-2, can be distinguished. As they differ only in the quantity and ratio of inclusions, they are best understood as subgroups within the same fabric family used for all 5th–7th-century ARS D2 types produced at Oudna.[30]

OU-ARS-1 (fig. 6)
Representative sample: M201/1
Further samples on FACEM: M201/2; M201/3; M201/4; M201/5

OU-ARS-1 has a granular matrix with low porosity (ca. 7.5%) and irregular (vughy) voids up to 0.375 mm. Inclusions comprise about 25% of the fabric and are generally under 1 mm. They are predominantly transparent, whitish to gray, subspherical to subrounded quartz/feldspar grains (up to 0.5 mm), alongside rust-colored and reddish-brown particles (up to 1 mm), especially visible in lighter fragments. Occasional inclusions include black particles and beige to orange argillaceous rock fragments, often lenticular or plate-like. White calcareous particles, foraminifera, carbonate pseudomorphs, and small polygonal silver mica grains are rare.

OU-ARS-2 (fig. 6)
Representative sample: M201/6
Further samples on FACEM: M201/7; M201/8; M201/9; M201/10

OU-ARS-2 contains fewer and mostly smaller (≤ 0.75 mm) inclusions than OU-ARS-1, resulting in a lower temper content of approximately 15% and a more compact matrix with slightly lower porosity (ca. 5%). The inclusions remain identical in nature and composition, with quartz/feldspar as the dominant type. Some inclusions, such as the slate-like argillaceous rock fragments, are also more clearly visible because of the more compact matrix.

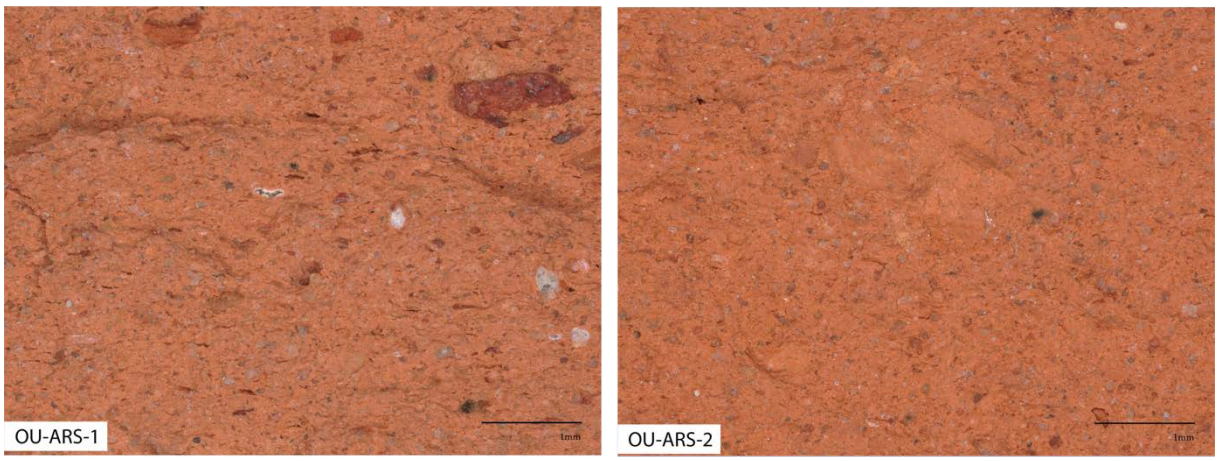


Fig. 6. Oudna's fabric types documented in Salomonson's survey (photos: C. Hasenzagl, 16x).

[30] Minor variations in Oudna's fabrics were also recorded in previous archaeometric studies. Nevertheless, they indicate the use of the same clay deposit(s). See Mackensen and Schneider 2002, 139–41; Brun 2004, 238–40; Bonifay et al. 2012, 49–50; Baklouti et al. 2014, 534–7; Capelli et al. 2016, 307–8.

Outlook and perspectives

The fabric descriptions presented here provide a basis for further comparative research on late antique ARS. Although (minor) variations occur within the fabric spectrum of individual North Tunisian workshops, their overall characteristic features allow the products of each site to be distinguished from those of others, even within the same geographic region. Further integration of archaeological and archaeometric evidence—beyond the material documented by Salomonson—will contribute to an even more nuanced understanding of ARS production and distribution.

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