



STUDIES OF PLANT IMPRESSIONS PRESERVED ON DAUB EXCAVATED AT THE ARCHAEOLOGICAL SITES OF THE WESTERN DESERT IN THE AREA OF NABTA PLAYA AND BARGAT EL-SHAB

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A b s t r a c t. The archaeological and archaeobotanical research conducted in southern part in the Western Desert in Egypt included efforts at identifying the plant material preserved in daub. The samples selected for this type of analysis were taken from site E-05-1 in Bargat El-Shab. This site were occupied seasonally by nomadic people from the beginning of the Holocene. The study provide very little data on plant remains preserved in daub and confirms application of grass, as a temper added to clay before firing or drying.

K e y w o r d s: archaeobotany, plant imprint, pottery, wild grass, southern Egypt

INTRODUCTION

In the past, clay was an essential resource used by prehistoric communities from at least the beginning of the Neolithic. It had wide-ranging applications, including in the production of ceramics, loom weights (spindle whorls) or figurines, as a coating for the walls of in-ground features and above-ground structures, and as a sealing material (daub) for buildings, furnaces, etc. To produce clay paste, temper was added to raw clay. It could have been larger mineral grains, chamotte, and/or an organic admixture. The last may have included fragments of fresh plants added to the clay. When the clay would dry in the sun and wind, or during the process of firing, the organic tissues would decompose, leaving permanent plant impressions in the daub. The preserved impressions are both



positives and negatives. In some cases, apart from impressions, remains of organic tissue can be found preserved in clay, which have survived to our times in the form of burnt or dried specimens preserved to a greater or lesser degree (for example MAGID, KRZYWIŃSKI 1995; WILLCOX, FORNITE 1999; NEWTON 2004; LITYŃSKA-ZAJĄC, WASYLIKOWA 2005: 44, 296–298; RAUBA-BUKOWSKA 2014; MOSKAL-DEL HOYO et al. 2017).

It is worth noting that studies involving identification of plant impressions in ceramics, daub and mudbricks have been carried out in Sudan and Egypt, among other places (KLICHOWSKA 1984; MAGID 1989, 1995, 2001; STEMLER 1990; LITYŃSKA 1994; THANHEISER 1999; MARINOVA et al. 2012), including those with the participation of Polish archaeobotanists (WASYLIKOWA, LITYŃSKA-ZAJĄC 2012 and literature cited therein).

The research presented here has been focused on the identification of plant material used as temper added to clay from the site of Bargat el Shab. For comparison, archaeobotanical data from the site in Nabta Playa are recalled (MAGID 2001).

THE SITES

The archaeological and archaeobotanical research conducted in the Western Desert in the area of Nabta Playa and Bargat El-Shab (Fig. 1) included efforts at identifying the plant material preserved in daub.¹ The samples selected for this type of analysis were taken from site E-05-1 in Bargat El-Shab.

Bargat El-Shab ('mountain of shining stones') is situated in the southern part of the Egyptian Western Desert, around 150 km west of the Nile Valley (at the height of Abu Simbal) and about 20 km south of Gebel Nabta. On the northern foothills of the mountain, or rather of the Bargat massif, there is basin of a seasonal paleolake, or playa. In the early and middle Holocene, this reservoir was fed with rainwater flowing from the mountain and the surrounding plateaus. At the beginning of this century, a concentration of artefacts on the eastern shore of the playa was discovered and designated as site E-05-1. The site lies within a vast erosional monadnock and occupies an area of around 4 ha. Over the course of several seasons of excavations carried out at this site, a number of research trenches were opened, including Trenches 2 (E-05-1/2) and 5 (E-05-1/5) discussed in this paper. Trench E-05-1/2 was located on one of two distinct culminations (northern culmination) of the erosional monadnock mentioned above, while trench E-05-1/5 was located at its southern end (Fig. 2). Discovered within trench E-05-1/2 were the remains of more than a dozen pits and

¹ In 1972, the Combined Prehistoric Expedition (an international excavation group) began research in the Western Desert, which continues to this day. Excavation works were carried out in the vicinity of paleolake basins (so-called playa), including in the area of Bir Sahara, Bir Tarfawi, Bir Kiseiba and Nabta Playa (SCHILD, WENDORF 2001). The research conducted at several sites in the Nabta Playa basin (including sites E-77-1 and E-94-3 mentioned in that study) proved especially valuable, and it was summarized in an extensive monograph by F. Wendorf, R. Schild and colleagues (WENDORF et al. 2001). In 2005–2006 and 2011–2012, within the scope of the Combined Prehistoric Expedition, research was launched in the area of the Bargat El-Shab basin at the early Holocene site E-05-1. This research was continued in 2017–2019 as part of a separate project of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences (PAN) (BOBROWSKI et al. 2010, 2021).

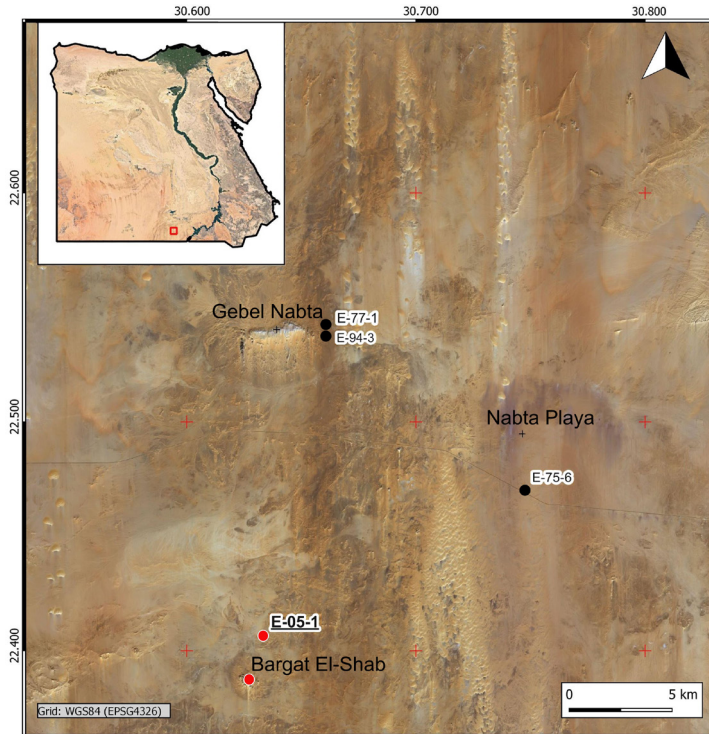


Fig. 1. Locations of the sites at Bargat El-Shab, Gebel Nabta and Nabta Playa

hearths as well as a tomb containing a child burial. Most of the pits, including Pit 2, Pit 4, Pit 7, Pit 12 and Pit 16 discussed in this paper, were of an oval or circular shape and had a characteristic bell-shaped cross-section. Originally, these were probably storage pits, and some of them were later reused as waste pits. A significant amount of archaeological material was recorded both in the uniform layer within the trench and in the fills of the pits, including daub as well as plant and bone remains. The entire cluster of features can be associated with multiple episodes of occupation by hunter-gatherer communities during the humid interphase of El Nabta/Al Jerar, as indicated above all by a series of absolute dates (BOBROWSKI et al. 2020, 2021). This interphase, which dates to 8050–7300 Ca BP and closes the early Holocene, was the time of the local climatic optimum in the Western Desert (SCHILD, WENDORF 2013; BOBROWSKI et al. 2021). A similar concentration of features was registered within trench E-05-1/5. The trench was opened on the south-west edge of the site in connection with the largest tumulus in the Bargat El-Shab area, which was most likely associated with the settlement of Middle Holocene pastoral communities. Once the undisturbed soil level was reached, remains of pits and wells were observed below the stone-earth embankment, and based on the discovered artefacts and the absolute dating of feature fills they can be associated with older Early Holocene settlement, falling within the humid El Nabta/Al Jerar interphase (BOBROWSKI et al. 2021). The presence of clay products within archaeological features and in their vicinity at site

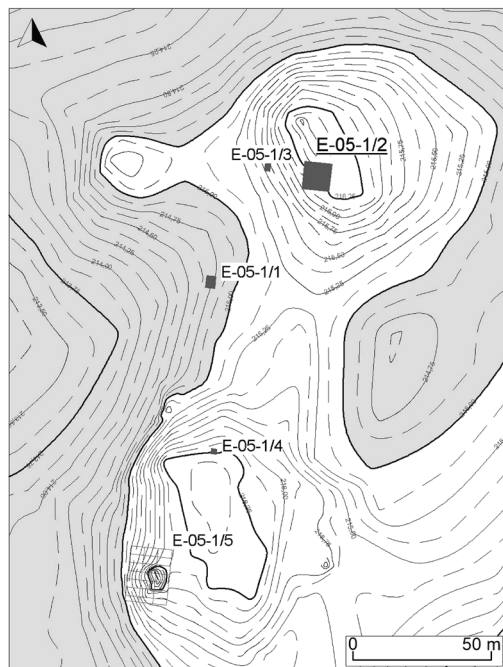


Fig. 2. Bargat El-Shab, site E-05-1. Altimetry map with the locations of trenches

E-05-1, including ceramics and daub, is not surprising. During the humid El Nabta/Al Jerar interphase, favourable climatic conditions, and therefore much richer vegetation, encouraged much more permanent settlement than in the earlier stages of the Early Holocene in the Western Desert. Local communities still maintaining a hunter-gatherer economy led a semi-sedentary lifestyle, as evidenced by extensive settlements recorded in the Western Desert, with the remains of residential features, wells, graves, and last but not least storage pits (e.g. KRÓLIK, SCHILD 2001; TAYLOR 2001; BOBROWSKI et al. 2021). More permanent settlement favoured the accumulation of food supplies, which may have been stored in purposely created storage pits and other places (LITYŃSKA-ZAJĄC, WASYLIKOWA 2005: 48).

MATERIAL AND METHODS

In 2017, three fragments of daub excavated from the southern (S) section of Pit 4 at a depth of 0–15 cm at trench E-05-1/2 were studied. During the 2019 excavation season, another attempt was made to mark any traces of plant matter preserved in daub excavated from trenches E-05-1/2 and E-05-1/5.

In 2019, lumps of daub were separated from the ceramics and selected for analysis by Dr hab. Agnieszka Mączyńska of the Archaeological Museum in Poznań. The number of preserved pieces of dried clay was relatively small, with only 57 fragments preserved in 17 samples. The vast majority of them were found in trench E-05-1/2,

and only four pieces in E-05-1/5. They were small lumps with a maximum size of 2 to 5 cm, brittle, heavily perforated, in most cases light-coloured and most often with significantly damaged surfaces, probably due to aeolian erosion.

The daub was analysed in a field laboratory using only a 5-power magnifier. Photos were taken with a digital microscope (Levenhuk DTX 90) at magnification ranging from 10× to 300×. As far as the process of determining traces of plant matter preserved in daub and ceramics is concerned, we need to point out a major issue: there has been no opportunity to observe the impressions in a professional laboratory with the use of appropriate research equipment (cf. for example STEMLER 1990; MAGID, KRZYWINSKI 1995; LITYŃSKA-ZAJĄC, WASYLIKOWA 2005: 44, 296–298). This is due to the inability to obtain consent to export the material for purposes of scientific study, even on a temporary basis.

RESULTS

In a sample from square meter XVIII/40 at trench E-05-1/2 (originating from a layer about 5 cm below the modern surface), very small fragments of charcoal in the form of dust were found in one of four excavated lumps (Fig. 3). Due to the size of the fragments (CHABAL et al. 1999; LITYŃSKA-ZAJĄC, WASYLIKOWA 2005: 276), as well as their state of preservation, these specimens remained undetermined. Another two pieces of clay were found in pit 12 at a depth of 10–15 cm, and in one of them a negative impression of a caryopsis of an undefined Poaceae indet. grass was preserved (Fig. 4). The impression has a relatively wide outline and parallel side walls. It is rounded at the top and tapers wedge-like towards the base. The caryopsis is about 2.7 mm in length and about 1.0 mm in width, and it is widest in the lower part.

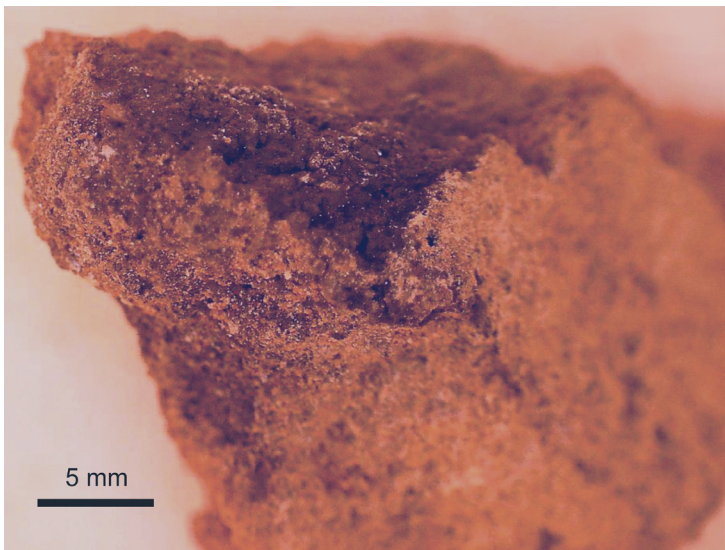


Fig. 3. Bargat El-Shab, trench E-05-1/2, square XVIII/40. Fragment of daub with preserved charcoal dust

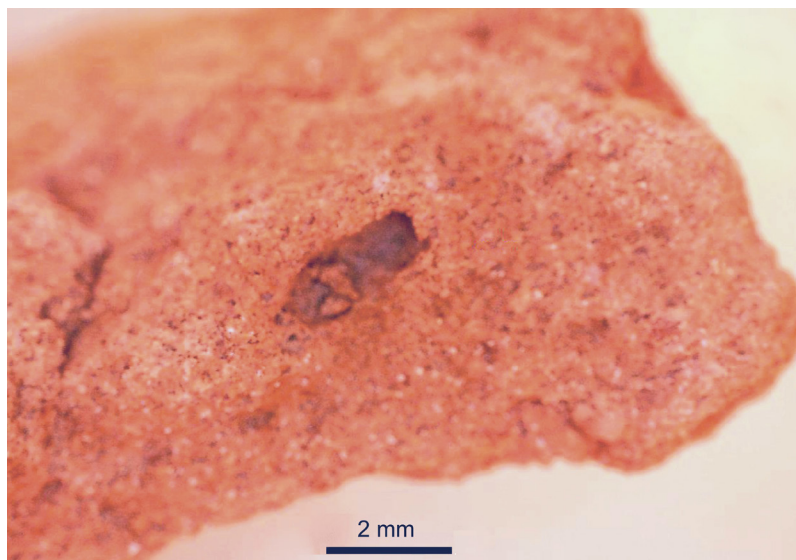


Fig. 4. Bargat El-Shab, trench E-05-1/2, Pit 4. Impression of a caryopsis of Poaceae indet. grass

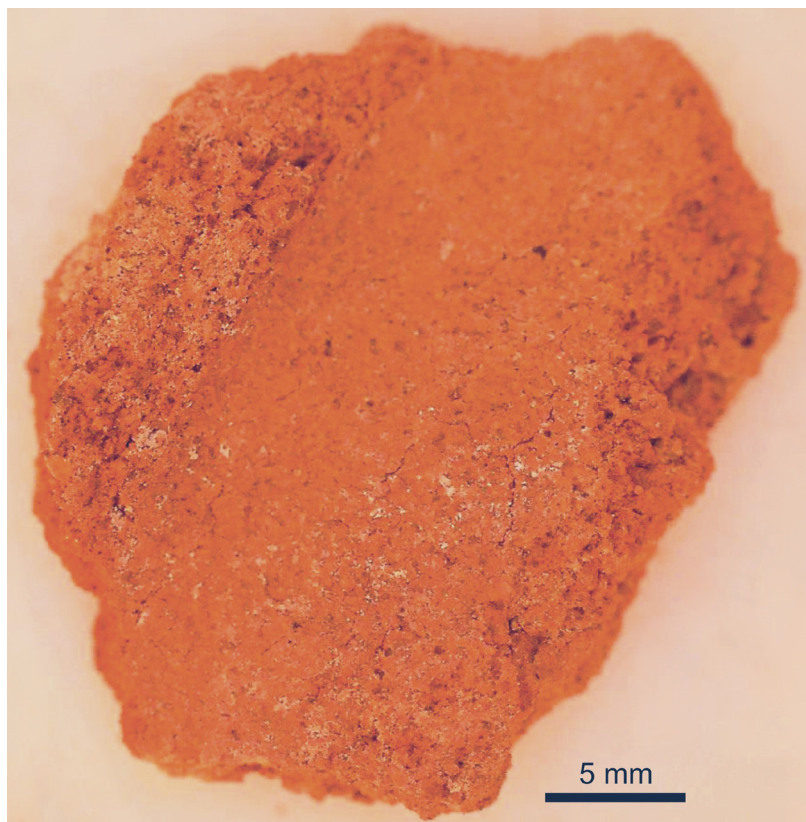


Fig. 5. Bargat El-Shab, trench E-05-1/2, Pit 3. Impression of a branch

The second piece revealed traces of a structural element, preserved in the form of a wide, recessed impression running through the centre of the daub lump. The specimen has a smooth surface (Fig. 5). We cannot rule out the possibility that it is an impression of a branch, but taxonomic identification is impossible.

Three daub lumps from Pit 4 (Table 1) were studied. The surfaces of these pieces were heavily perforated. A negative circular impression with a diameter of about 0.7 mm was discovered on one of the lumps. However, it did not bear any other traces, for example characteristic of a seed shell, so we cannot conclusively determine whether the impression is of plant origin, such as an unidentified fruit or seed, or we are dealing with the remains of a fine-grained mineral admixture. The remains of a braiding, probably made from blades of Poaceae grass, were observed on one of the pieces.

Fragments of ceramics with organic admixture were found about 20 km north of site E-05-1 at Bargat El-Shab, at sites E-94-3 and E-E77-1, east of Gebel Nabta (see Fig. 1). The cluster of these two sites was dated to the Middle Holocene Ru'at El Baqar interphase of the Late Neolithic, based on a series of radiocarbon dates (WENDORF, SCHILD 2001). This humid interphase is associated with the migrations of pastoral communities in the Western Desert and dates to 6500–5800 cal BP (SCHILD, WENDORF 2013: fig. 3). Impressions of caryopses of *Panicum turgidum* and *Setaria* sp. were discovered on two such sherds (MAGID 2001: 607–608, fig. 22.1, 22.2)

Table 1. Description of samples from trenches E-05-1/2 and E-05-1/5

Site	Location	Feature no.	Feature type	Part	Depth (cm)	Number of daub pieces
E-05-1/2		2	pit		75–80	1
E-05-1/2		4	pit		0–15	3
E-05-1/2		7	hearth		0–5	8
E-05-1/2		12	pit		10–15	2
E-05-1/2		12	pit	N	0–5	1
E-05-1/2		16	pit		5–10	2
E-05-1/2		4A	pit		top	1
E-05-1/2	XIV/38				0–5	7
E-05-1/2	XIV/38				5–10	3
E-05-1/2	XV/39				0–5	2
E-05-1/2	XVI/38				5–10	9
E-05-1/2	XVIII/38				0–5	1
E-05-1/2	XVIII/40				0–5	4
E-05-1/2	XVIII/40				5–10	1
E-05-1/2	XX38				0–5	1
E-05-1/2	XX38				5–10	3
E-05-1/2	XX39				10–15	7
E-05-1/5	XV/39				5–10	4

DISCUSSION

The results of the study of plant impressions from sites E-94-3 and E-E77-1 in Nabta Playa and E-05-1 in Bargat El-Shab provide very little data on plant remains preserved in daub and ceramics. The only impressions identified were those of caryopses of *Panicum turgidum* and *Setaria* sp., and of caryopses and spikelets of unidentified Poaceae indet. (grass).

The occurrence of grass remains, preserved in the form of charred caryopses or spikelets and their fragments, has been confirmed at site E-75-6 in Nabta Playa (WASYLIKOWA 1997, 2001) and trench E-05-1/2 in Bargat El-Shab, among other places (BOBROWSKI et al. 2020; LITYŃSKA-ZAJĄC, SKRZYŃSKI 2021). They belonged to *Echinochloa colona*, *Panicum turgidum*, *Sorghum bicolor* subsp. *Arundinaceum*, *Bracharia* sp., *Digitaria* sp., cf. *Setaria* sp., cf. *Urochloa* sp., Paniceae indet., and various morphological types identified only up to the level of the Poaceae indet. family. The presence of the remains of these species in the subfossil material suggests that they constituted important elements of the landscape at that time and were part of many different plant communities. In addition, the caryopses of many of these species could have been harvested for consumption (LITYŃSKA-ZAJĄC, SKRZYŃSKI 2021; see also WASYLIKOWA 1997, 2001; WASYLIKOWA, DAHLBERG 1998: 29). The most important plant used by the nomadic peoples seasonally exploiting the vicinity of the studied lakes was *Sorghum bicolor* subsp. *arundinaceum*. This grass could have been harvested from the wild, and it may have provided abundant harvests during periods of high yield. Observations of charred remains preserved mainly at site E-75-6 in Nabta Playa, but also at Bargat El-Shab in smaller amounts, also suggest occasional cultivation of a non-domesticated form of sorghum (WASYLIKOWA 1997, 2001; WASYLIKOWA, MITKA 1998; LITYŃSKA-ZAJĄC, SKRZYŃSKI 2021). The study of daub from Nabta Playa and Bargat El-Shab confirms yet another application of grass, as a temper added to clay before firing or drying. Possible traces of branches suggest that the clay could have been used as a sealing element for a wooden structure.

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