KHASHM AL-'ARFA: AN EARLY NEOLITHIC ENCAMPMENT IN THE EASTERN JAFR BASIN, SOUTHERN JORDAN

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1. Introduction

Since the first season in 2009, Phase 3 of the Jafr Basin Prehistoric Project (JBPP) has addressed the issue of the history of water use in the arid periphery. A series of general surveys makes it increasingly clear that the Neolithic Jafr Basin had a variety of water catchment facilities, and that the development of water exploitation technology in the arid periphery sustained the process of pastoral nomadization (Fujii 2007a, 2007b, 2010, 2013, n.d.).

An additional result of the surveys is the discovery of Khashm al-'Arfa, a small-scale Neolithic encampment in the eastern Jafr Basin. The excavation, which took place in summer 2013, suggested that the site accommodated a small group of early pastoral nomads. It is possible that they were involved in the construction and management of the cistern-type of Neolithic barrage, examples of which are dotted across the same area (Fujii *et al*. this volume). Given this, it would follow that the encampment and surrounding barrages combined to form a structural complex essential for the establishment of early pastoral nomadism. This report summarizes the results of our investigations at this unique site and briefly discusses its archaeological implications.

2. Site and Site Setting

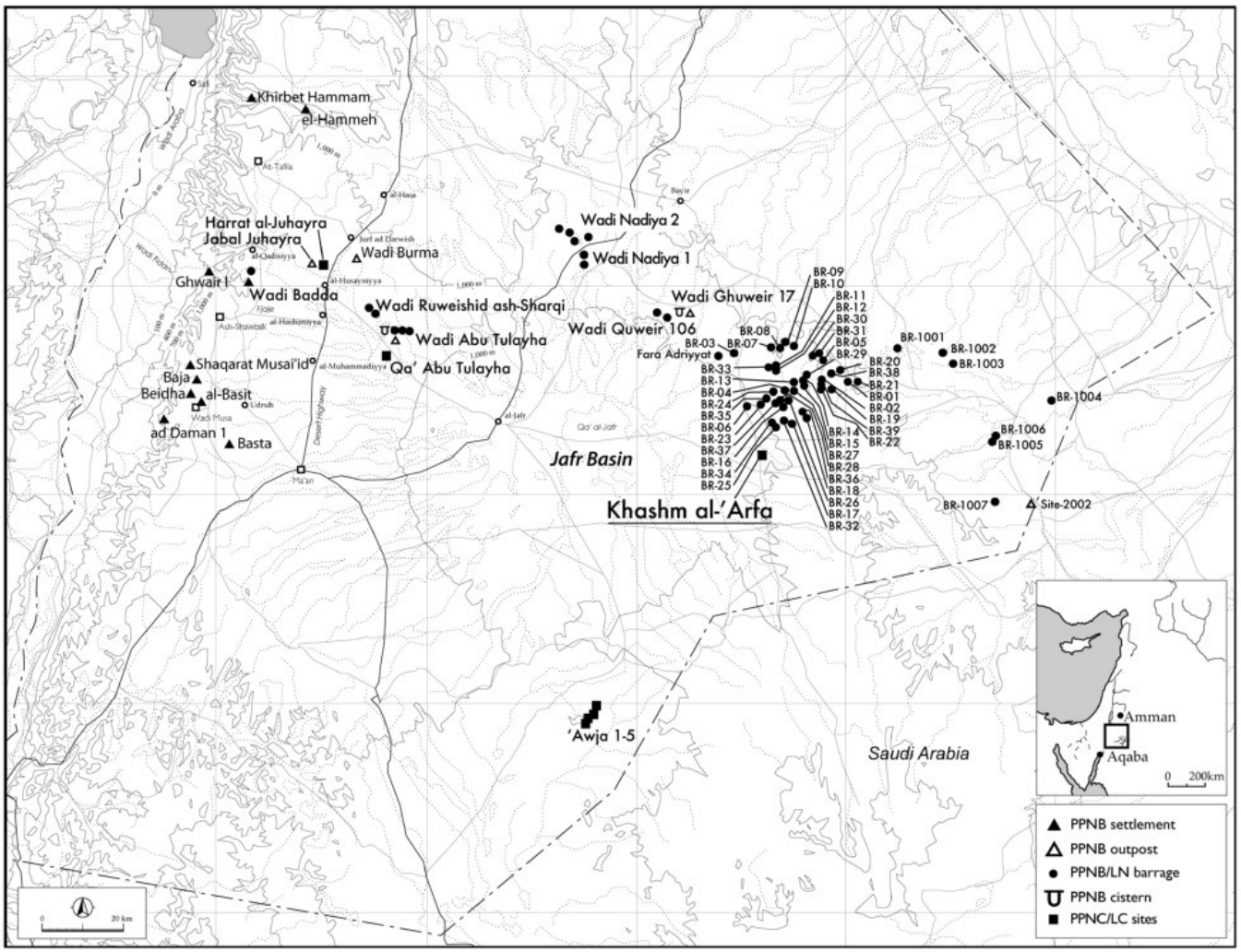
Khashm al-'Arfa is located in hilly limestone terrain fringing the eastern edge of the Jafr Basin **(Fig. 1)**. The site is far from traditionally settled areas in southern Jordan, being *ca* 140 km east of Wadi Musa, *ca* 65 km east even of al-Jafr in the center of the basin, but only *ca* 35 km north of the Saudi border. In terms of topography, it occupies the lower edge of a north-facing gentle slope, adjacent to a major track connecting the basin with the border area to the east **(Figs. 2 and 3)**.

The site was found by chance during our barrage survey in March 2013 and was provisionally registered as JF-1301 in our site registration code system. The excavation took place over two weeks in September that same year. The site proved to represent a small encampment of early pastoral nomads dated, on the basis of several C-14 dates and comparative studies of diagnostic finds, to the Late Pre-Pottery Neolithic B (hereafter LPPNB) - Pre-Pottery Neolithic C (hereafter PPNC) transition. Though small in scale and temporary in nature, this is the first post-PPNB settlement to be discovered in southern Jordan, let alone the Jafr Basin.

The setting of Khashm al-'Arfa is the same as that of the other Jafr sites, being characterized by a hyper arid climate with an average annual rainfall of less than 50 mm and consequently poor vegetation. Understandably, no traditional settlements exist and local land use has been limited to sporadic pasturing, taking advantage of perennial shrubs dotted in wadi beds and the appearance of annual grasses in early spring. The discovery of an early Neolithic encampment (and the supposedly contemporary barrages described elsewhere in this volume) was therefore all the more unexpected and requires yet another reassessment of the archaeological potential of the Neolithic Jafr Basin.

3. The Excavation

The site was identified through the presence

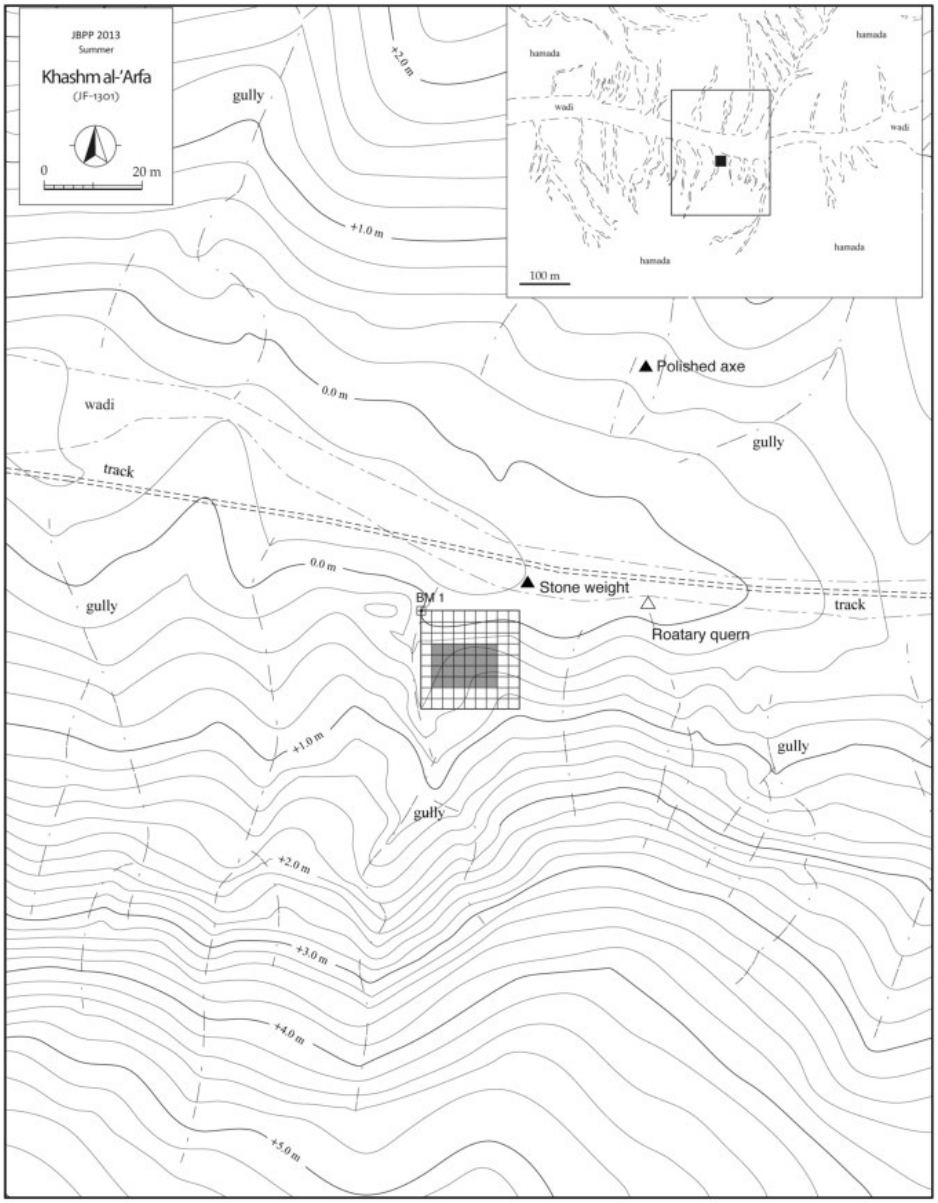


1. Khashm al-'Arfa: location and surrounding sites.

2. Khashm al-'Arfa: aerial view (looking SE).

of a few intermittent wall alignments protruding from the modern ground surface and flint artifacts scattered round them. Prior to the excavation, we set up an arbitrary benchmark (30º13.772 N, 036º54.282 E; elevation 912 m asl) at the north-western corner of the site and laid out a 2 x 2 m grid over the whole area of the flint scatter (*ca* 0.03 ha in total area). We then carried out an intensive surface survey of the eighty-one squares thus laid out. In addition, we undertook a less intensive surface survey within a 100-m radius of the grid.

The excavation took place in the central twenty-four squares where the wall alignments were exposed. The excavated area totaled 96 m2, being a little less than 30 % of the extent of the flint scatter. The site stratigraphy is as follows: Layer 1 or the surface layer (*ca* 3 - 5 cm thick) consists of light buff, loose silty - sand deposits including heavily abraded flint and limestone pebbles; Layer 2 (*ca* 5 - 7 cm thick) consists of buff, somewhat compact silty - sand deposits including a reduced frequency of similar pebbles;



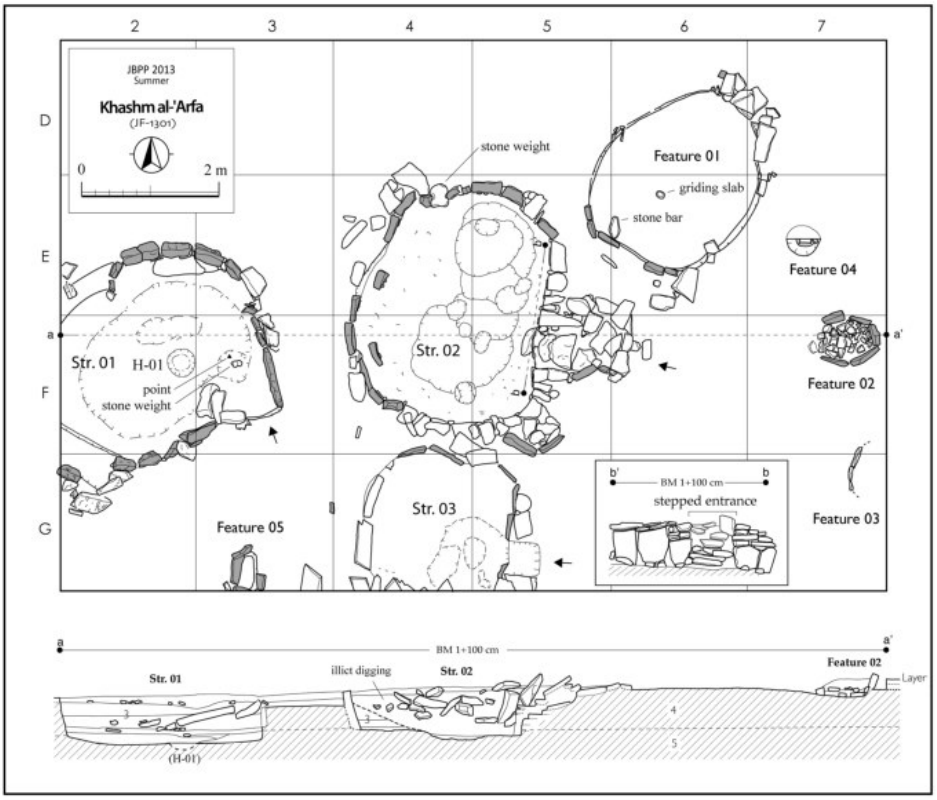
3. Khashm al-'Arfa: contour map.

Layer 3 (*ca* 60 - 70 cm thick) is a generic term for the fill deposits within the structural remains and includes a lot of fallen stones and a variety of aeolian and fluvial deposits; Layer 4 (*ca* 50 - 60 cm thick) consists of reddish buff, compact silty - sand deposits including small fragments of chalky limestone. The excavated features were dug into, or constructed on, the upper surface of Layer 4. The underlying chalky limestone layer (Layer 5) was partly exposed in the floors of the semi-subterranean structures. Evidence suggests that low-quality limestone slabs, which covered this layer, were used as the main construction material for the structures.

The excavation revealed three semi-subterranean masonry structures and five small surface features, which combined to form a small structural complex facing east or south-east **(Figs. 4 and 5)**. Surface observations suggest that the excavated complex represents almost the entirety of the encampment. Thus, it is tentatively concluded that the encampment comprises a single complex and has a total area of *ca* 0.01 ha. A brief description of each component follows below.

Structure 01

Structure 01 is located at the western edge of the excavated area. As noted above, it was found

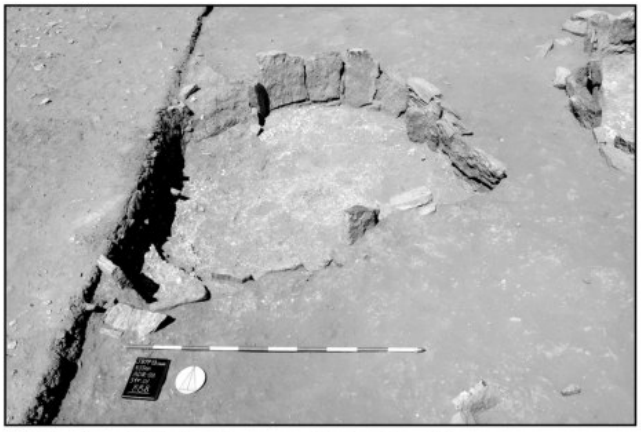


4. Khashm al-'Arfa: plan and section of the structural complex.

5. Khashm al-'Arfa: general view of the structural complex (looking NE).

partly protruding from the ground surface when we located the site. The excavation demonstrated that the exposed wall alignments represent an oblong semi-subterranean structure, which measured *ca* 4 m on its longer ENE - WSW axis, *ca* 2.5 m on its shorter NNW - SSE axis and had a maximum floor depth of *ca* 0.6 m **(Fig. 6)**. A single row and course of upright limestone slabs up to *ca* 0.7 m high constituted the wall; no unequivocal evidence for upper courses was found. A shallow depression in the center of the floor probably was probably where limestone slabs were detached from the upper surface of the chalky limestone layer. As is usual with such simple semi-subterranean structures, no clear evidence for a superstructure was found. Thus, thatched or tent-like roofing is conceivable, although neither postholes nor pillar bases were observed on the floor.

The structure consisted of a single room, with an entrance-like gap in the wall at the south-east corner. The floor utilized the chalky limestone layer (Layer 5) without any special treatment. A small hearth *ca* 40 cm in diameter and *ca* 10 cm deep was found roughly in the center of the shallow depression. What interested us was the south-western corner, where a remarkable irregularity of the wall and difference in the elevation of the floor were noted. Both these observations suggest that the corner collapsed at some point and was then reconstructed, extending the floor somewhat to the south-west in the process. The floor deposits included several diagnostic artifacts, including a small



6. Khashm al-'Arfa: Structure 01 (looking N).

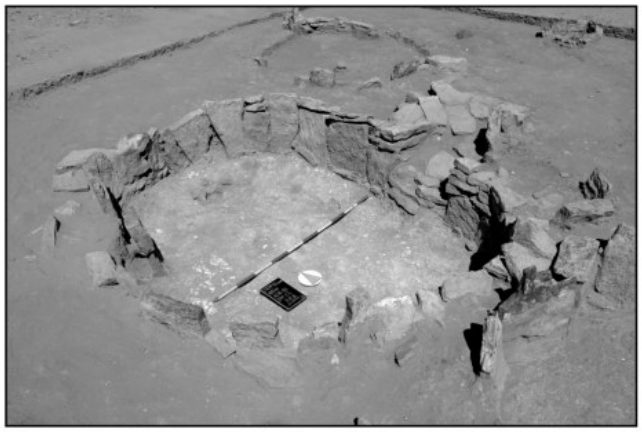
7. Khashm al-'Arfa: in situ finds from Structure 01 (looking E).

bilaterally notched stone weight **(Fig. 7; Fig. 22:13)** and a spearhead **(Fig. 7; Fig. 19:16).**

Structure 02

This structure occupied the center of the excavation area and was surrounded by the other structures and features. As with the neighboring Structure 01, it was also partly exposed when we located the site. Excavation confirmed that the exposed wall alignments form an oblong, semi-subterranean structure measuring *ca* 3.5 m on the longer axis, *ca* 2.5 m on the shorter axis and *ca* 0.6 m in floor depth **(Fig. 8)**. Again, the upright slab wall technique was used for the construction of the foundation course. The slabs used for the semi-subterranean retaining wall were *ca* 0.4 - 0.6 m high in most cases, but a few longer slabs up to *ca* 0.9 m high were also present. Many of them still retained unweathered chalky limestone cortex (similar to the floor material) on their surface, suggesting that they were detached from the upper surface of Layer 5.

What differed from Structure 01 was the existence of upper courses, which used a header or stretcher bond **(Fig. 9)**. The volume of fallen stone around the wall suggests that it originally had an above-ground height of *ca* 0.5 m. It follows that the structure was equipped with a low masonry wall between a thatched or tent-like roof and the semi-subterranean retaining wall. Another difference between the two structures is the orientation of the main axis. Unlike Structure 01, Structure 02 has a



8. Khashm al-'Arfa: Structure 02 (looking NE).

9. Khashm al-'Arfa: the southern wall of Structure 02 (looking NE).

main axis running NNE - SSW. An even more important difference concerns the presence of a stepped entrance *ca* 1.5 m long that was incorporated into the middle of the eastern wall. Though fallen in most cases, two rows of upright slabs lined both sides of the entrance. In

addition, a small external feature was attached to the south-east corner of the structure. This surface feature was both paved and lined with limestone slabs, suggesting its use as a storage compartment for firewood or similar. This series of noteworthy differences between Structures 01 and 02 strongly suggests that the latter was a core component of the complex.

In terms of typology, this structure was also of single-room type. No hearth was found, but irregular depressions left by a large looters' pit were noted across the floor. Once again, several diagnostic artifacts were found. Of special interest is a bilaterally notched stone weight, a hallmark of the Jafr Neolithic, which was reused as building material and incorporated into the above-ground masonry wall at the north-western corner of the structure **(Fig. 10; Fig. 22:12).**

Structure 03

Structure 03 is located at the central southern edge of the excavation area, abutting the southern wall of Structure 02. It has a floor area *ca* 2.5 m by *ca* 2 m and a floor depth of *ca* 0.4 m **(Fig. 11)**. It is a smaller version of Structure 02, sharing a similar plan and orientation with the main structure. It also bears some resemblance to Structure 01, in the sense that it is devoid of any clear evidence for an above-ground masonry wall and that a narrow slope, instead of a stepped entrance, is incorporated into - in this case - the eastern wall. This suggests that the complex consisted of a main feature (Structure 02) and two subsidiary components (Structures 01 and 03). No hearth was found, but a small number of flint artifacts were recovered from fill layers and floor deposits.

Small Features

The excavation revealed five small features, four of which were clustered in the frontal space of Structure 02, the core of the complex. Though different in the way it combined with other structures, the remaining small feature (Feature 05) likewise occupied the frontal space of Structure 01. This recurring layout was probably a response to the strong north-westerly prevailing wind (Fujii 2014) that, more specifically, may have been aimed at preventing smoke from the features from entering neighboring structures. The five features all have a round to oval plan but vary in dimensions. All of them are surface features with a shallow depression in the center, being lined - in most cases - with upright limestone slabs *ca* 10 - 20 cm high.

Feature 01 is the largest of the five, having a floor area of *ca* 2.5 m by *ca* 2.2 m and a floor depth of *ca* 0.2 m. It was seriously disturbed, with the original upright slab wall being preserved at the south-western corner only. Though superficially resembling the three structures, a series of key differences - *viz*. shallow floor depth, inferior construction quality, absence of an entrance or entrance-like slope, and the scarcity of small finds - clearly indicate that this feature had a different function. Its use as a temporary hut

10. Khashm al-'Arfa: in situ find from Structure 02 (looking S).

11. Khashm al-'Arfa: Structure 03 (looking E).

or workshop would be conceivable. No hearth was found, but a stone bar and a grinding slab were found *in situ* on the floor **(Fig. 12).**

Feature 02 is much smaller in size, measuring *ca* 80 cm by *ca* 60 cm in floor area and *ca* 10 cm in floor depth. It contained ashy deposits ca 12 - 15 cm thick in its base **(Fig. 13)**. Thus, it was probably used as an outdoor hearth. These deposits were covered with some small limestone cobbles, which may have been deposited in the hearth to prevent the ash from dispersing. Though poorly preserved, the remaining three features resembled Feature 02 in many respects, including the presence of ashy deposits **(figs. 14 - 16)**.

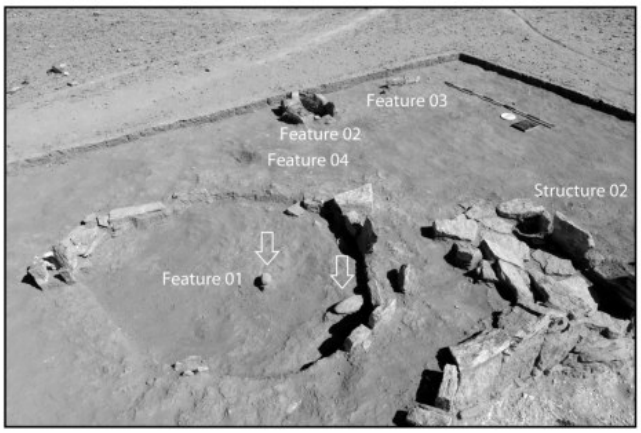
To summarize, the five small features fall into two categories: a hut- or workshop-like feature (Feature 01) and four outdoor hearths (Features 02 - 05). The frequency of open-air heaths is a correlate of the scarcity of internal hearths, again suggesting that the encampment was temporary in nature.

4. Small Finds

Small finds from Khashm al-'Arfa are limited to chipped stone artifacts, ground stone implements and faunal remains only. Other categories of artifacts, such as adornments or bone tools, were not found. The paucity of small finds again attests to the temporary nature of the encampment and the high mobility of the group concerned.

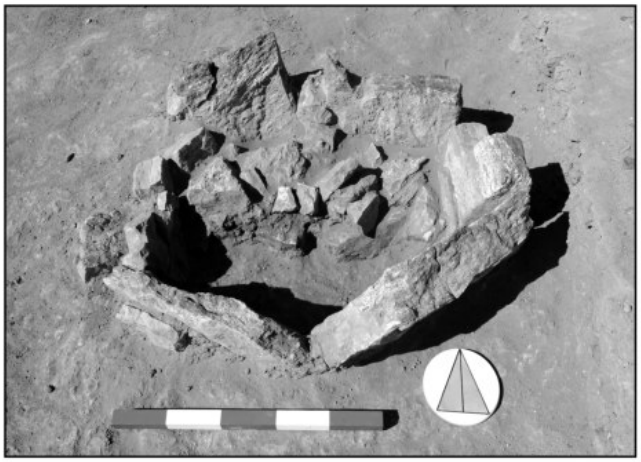
Chipped Flint / Calcite Artifacts

Aside from four hammer stones and one Levallois core, a total of 1,855 chipped stone artifacts were recovered from the surface survey and excavation **(Table 1)**. All were made of flint or calcite; no obsidian products were found. Since a detailed analysis is still in progress (Nagaya in prep.), the following description will

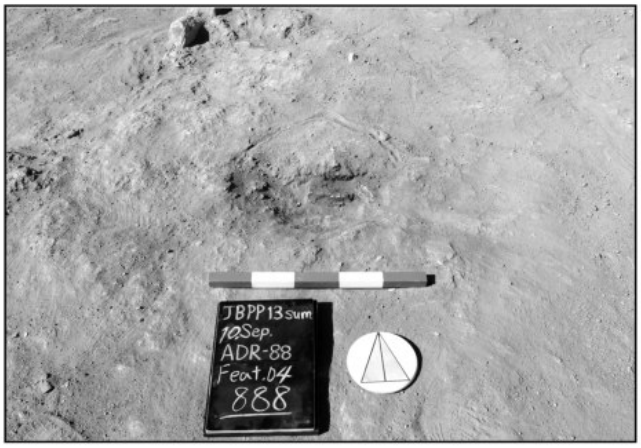


12. Khashm al-'Arfa: Feature 01and its surrounding features (looking SE).

14. Khashm al-'Arfa: Feature 03 (looking NW).



13. Khashm al-'Arfa: Feature 02 (looking N).



15. Khashm al-'Arfa: Feature 04 (looking N).

16. Khashm al-'Arfa: Feature 05 (looking SE).

Table 1 : Inventory of chipped stone artifacts from Khashm al-'Arfa..

Categories	N	*%*
Cores	18	*1.0*
Debitages	1,722	*92.8*
Tools	115	*6.2*
Total	1,855	*100.0*
Hammer sotones	4	-
Palaeolithic artfiact	1	-
Total	1,860	-

deal with the general aspects of the assemblage.

The core class (total of 18 examples) is dominated by opposed platform cores **(Fig. 18:1-2)**, which include two naviform-type examples **(Fig. 18:3-4).** In addition, single-platform **(Fig. 18:5)**, multi-platform **(Fig. 18:6)** and change of orientation cores **(Fig. 18:7-8)** are present in small numbers. The scarcity of naviform cores is suggestive of a final or post-PPNB date for the assemblage. Incidentally, the absence of calcite cores (and scarcity of calcite debitage) indicates that most, if not all, of the calcite tools described below were brought to the site as finished or part-finished products.

The debitage class (1,722 pieces) comprises unmodified blades / flakes / bladelets, crested blades, core rejuvenation flakes, burin spalls **(Fig. 20:5-6)** and chips / chunks. The first group is thought to include a certain quantity of tool blanks without secondary retouch. The blade / flake ratio is 4 : 6. Thus, the assemblage can be regarded as being slightly flake-oriented, which accords well with the frequency of flake cores. The scarcity of primary elements retaining original cortex suggests that the initial stage of core preparation took place elsewhere, probably near a remote flint outcrop - a likely assumption when we consider that no high quality flint nodules are available around the site.

The tool class (115 samples) is dominated by retouched and / or utilised blades / flakes (45.2 %), burins (21.7 %) and points / spearheads (14.8 %). These three major categories account for more than 80 % of the total, with other tool types representing only a few percent or less **(Table 2)**. The first group is marked by snapped blades with a finely retouched or utilised lateral edge **(Fig. 21:8-9**). The second group is dominated by angle burins on a snapped or truncated end **(Fig. 20:9-13; Fig. 21:1-3)**, but transverse or dihedral burins on a pointed end are also included to a lesser extent **(Fig. 21:4-6)**. A predominance of burins with elongated burin scars, together with a high frequency of long burin spalls, is characteristic of the so-called 'burin sites' (Betts *et al*. 2013; Rollefson 1988) peculiar to the Jordanian badia during the Neolithic. This raises the possibility that standardized burin spalls were systematically produced as tool blanks for pointed implements such as drills (Finlayson and Betts 1990). Nevertheless, neither raw material nor finished pierced beads were found at the encampment. The point / spearhead class is dominated by Amuq-type points **(Fig. 19:2, 6, 8, 10, 14-15)**, but other types - including foliate spearheads **(Fig. 19:16-17)** - also occur in considerable numbers. A high frequency of hunting weapons appears to have been the norm during the Jafr Pastoral Neolithic, indicating that hunting was still a major subsistence activity for the earliest pastoral nomads as well as for earlier pastoral transhumants (Hongo *et al*. 2013).

17. Khashm al-'Arfa: selected chipped stone artifacts.

The tool kit also includes a small number of bifacial tools **(Fig. 17:1-4; Fig. 19:18-20; Fig. 20:1)**, scrapers **(Fig. 17:5-6; Fig. 20:2-4)**, notches / denticulates and borers. The bifacial tools comprise diagonally pressure-flaked examples and normal products, both of which are reminiscent of Late Neolithic Tuwailan assemblages in the Negev highlands to the south-west (Goring-Morris *et al.* 1994). They were probably used as knives, but it is also conceivable that the finer examples were imported as prestige items.

To summarize, the assemblage is of an eclectic nature, containing both typical PPNB components such as Amuq-type points and post-PPNB elements such as finely retouched bifacial knives. In this sense, it can probably be defined as transitional between the two periods. Suggestive in this regard is the stratified flint assemblage of Dhuweila in the Azraq Basin (Betts 1998: 59-119). In terms of its character, the Khashm assemblage appears to fall into an intermediate period between Dhuwayla hStage 1 (marked by typical PPNB elements) and Dhuweila Stage 2 (characterized by the presence of Herzliya / Nizzanim points, transverse arrowheads and tile knives). As mentioned below, this chronological perspective accords well with C-14 dates from the two sites.

Ground Stone Artifacts

The ground stone assemblage consists of a dozen grinding slabs, three bilaterally notched stone weights and a diagonally truncated stone bar. Neither querns nor stone vessels were found. Most of the ground stone objects are made of limestone or sandstone, but the stone weights include one flint example.

The grinding slabs are palm-sized, measuring *ca* 10 - 15 cm long, *ca* 7 - 11 cm wide, *ca* 2 - 7 cm thick and *ca* 0.3 - 1.4 kg in weight **(Fig. 22:1-10).** Most of them have an oblong or semi-rectangular plan, being equipped with a slightly convex dorsal surface and a flat working surface. Small pits and / or linear striations can be seen on the working surfaces of several samples, suggesting their use as smashing and / or grinding tools. The frequency of grinding slabs may correlate with levels of plant food exploitation. Of note is the absence of their lower counterparts (with the exception of three small fragments and a rotary quern described below), which contrasts with the PPNB agro-pastoral outposts where a variety of querns were used in combination with similar grinding slabs (e.g. Fujii 2008: figs 16, 29). This contrast probably means that heavy-duty querns were replaced with unmodified natural stones or exposed bedrock over the course of pastoral nomadization. The disappearance, or at least reduced use, of querns despite the continuous use of grinding slabs suggests that plant foods played a decreasing role amongst the earliest pastoral nomads in the Jafr Basin. As mentioned below, the absence of botanical remains also argues for this assumption.

Bilaterally notched stone weights made of limestone or flint are amongst the hallmarks of the Jafr Pastoral Neolithic and have been reported from every PPNB settlement and barrage known to date in the basin (e.g. Fujii 2007a: fig. 16; Fujii 2009: fig. 19, nos 7-9; Fujii, Adachi *et al.* 2011: figs 32-33; Fujii and Adachi 2012: fig.

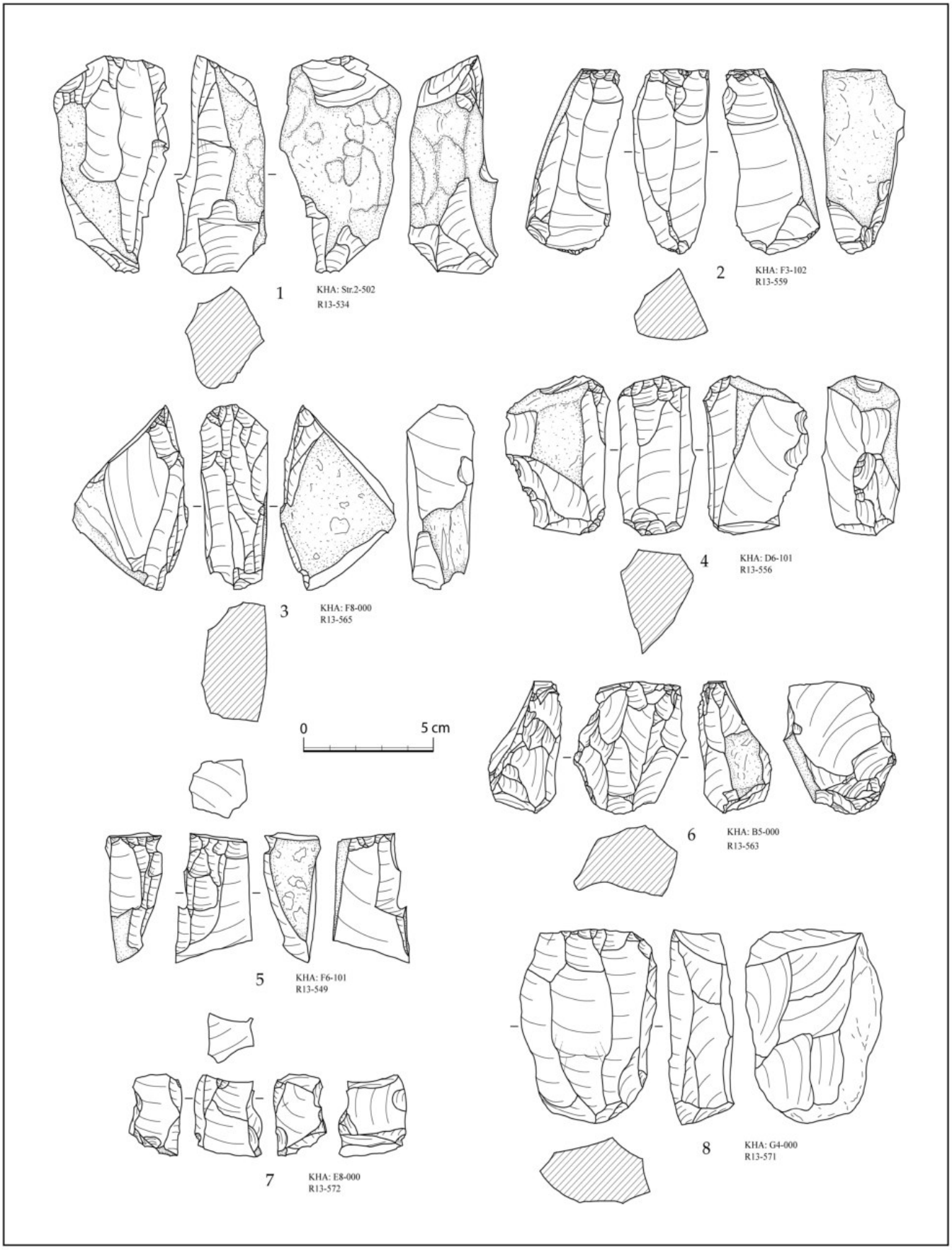
Table 2 : Inventory of tool classes from Khashm al-'Arfa.

Tool types	lint		Calcite		Total	
	N	%	N	%	N	%
Scrapers	2	*2.0*	0	*0.0*	2	*1.7*
Burins	25	*25.0*	0	*0.0*	25	*21.7*
Notches	5	*5.0*	0	*0.0*	5	*4.3*
Denticulate	1	*1.0*	0	*0.0*	1	*0.9*
Borers	2	*2.0*	0	*0.0*	2	*1.7*
Points/spearheads	14	*14.0*	3	*20.0*	17	*14.8*
Rod	0	*0.0*	1	*6.7*	1	*0.9*
Truncation	0	*0.0*	1	*6.7*	1	*0.9*
Retouched/used blades/flakes	42	*42.0*	10	*66.7*	52	*45.2*
Fine bifacial knives	2	*2.0*	0	*0.0*	2	*1.7*
Bifacial knives	2	*2.0*	0	*0.0*	2	*1.7*
Bifacial tools	3	*3.0*	0	*0.0*	3	*2.6*
Unidentified	2	*2.0*	0	*0.0*	2	*1.7*
Total	100	*100.0*	15	*100.0*	115	*100.0*

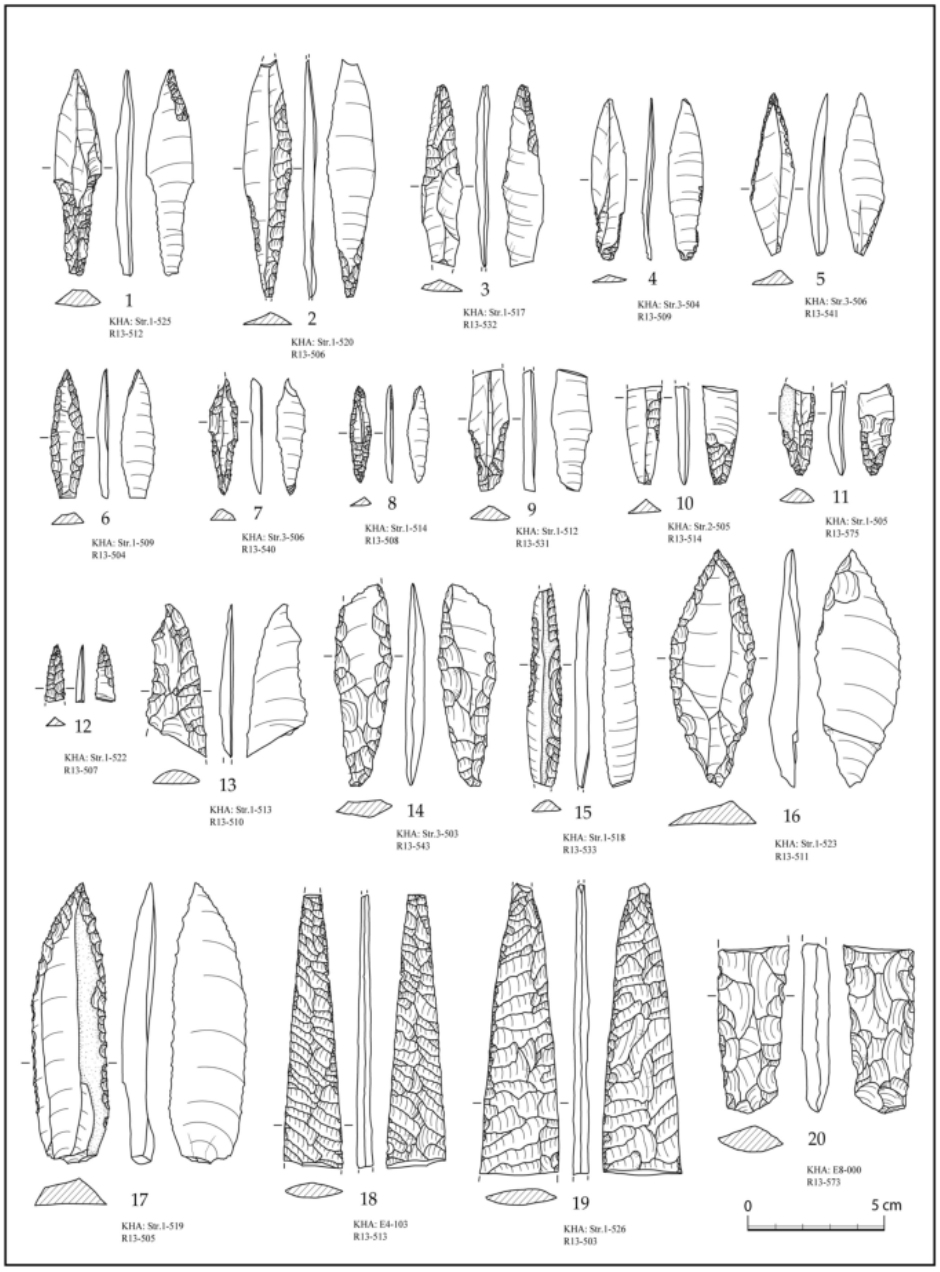
34, nos 1-2 and 4; Fujii, Adachi *et al*. 2013: fig. 24, nos 7-8; Fujii, Quintero *et al*. 2011: fig. 28, no 1). The three stone weights from Khashm al-'Arfa, two from the excavation area **(Fig. 22:12-13)** and one from a point *ca* 22 m ENE of BM-1 **(Fig. 3; Fig. 22:14)**, can be regarded as extensions of this tradition, but a remarkable reduction in size differentiates them from earlier examples. (While the PPNB examples are usually more than 50 cm long and weigh no less than 50 kg, later examples are much smaller and lighter). This contrast indicates that stone weights became smaller over the course of pastoral nomadization, a phenomenon that has parallels with the disappearance of querns. Incidentally, stone weights from the cistern-type barrages located around the encampment are also small in size, suggesting contemporaneity between the two (Fujii *et al*. this volume).

Diagonally-truncated stone bars made of limestone or flint are another hallmark of the Jafr Pastoral Neolithic, and many examples have been found at PPNB sites (e.g. Fujii 2008: fig. 31, nos 1-2; Fujii 2009: fig. 19, nos 1-3; Fujii, Adachi *et al*. 2012: fig. 34, no 3; Fujii, Adachi *et al*. 2013: fig. 17, no 8; Fujii, Quintero *et al*. 2011: fig. 27, nos 5-8). The find from Feature 01 can be taken as a less standardized form of the earlier examples (FIG. 22:15). This heavy-duty tool, *ca* 34 cm long and *ca* 4.8 kg in weight, was probably used for digging the large pits for the semi-subterranean structures and for detaching slabs of building material from the upper surface of Layer 5. The edge damage at both ends is also suggestive of such use.

In addition, a small polished axe made -



18. Khashm al-'Arfa: chipped stone artifacts (Cores).

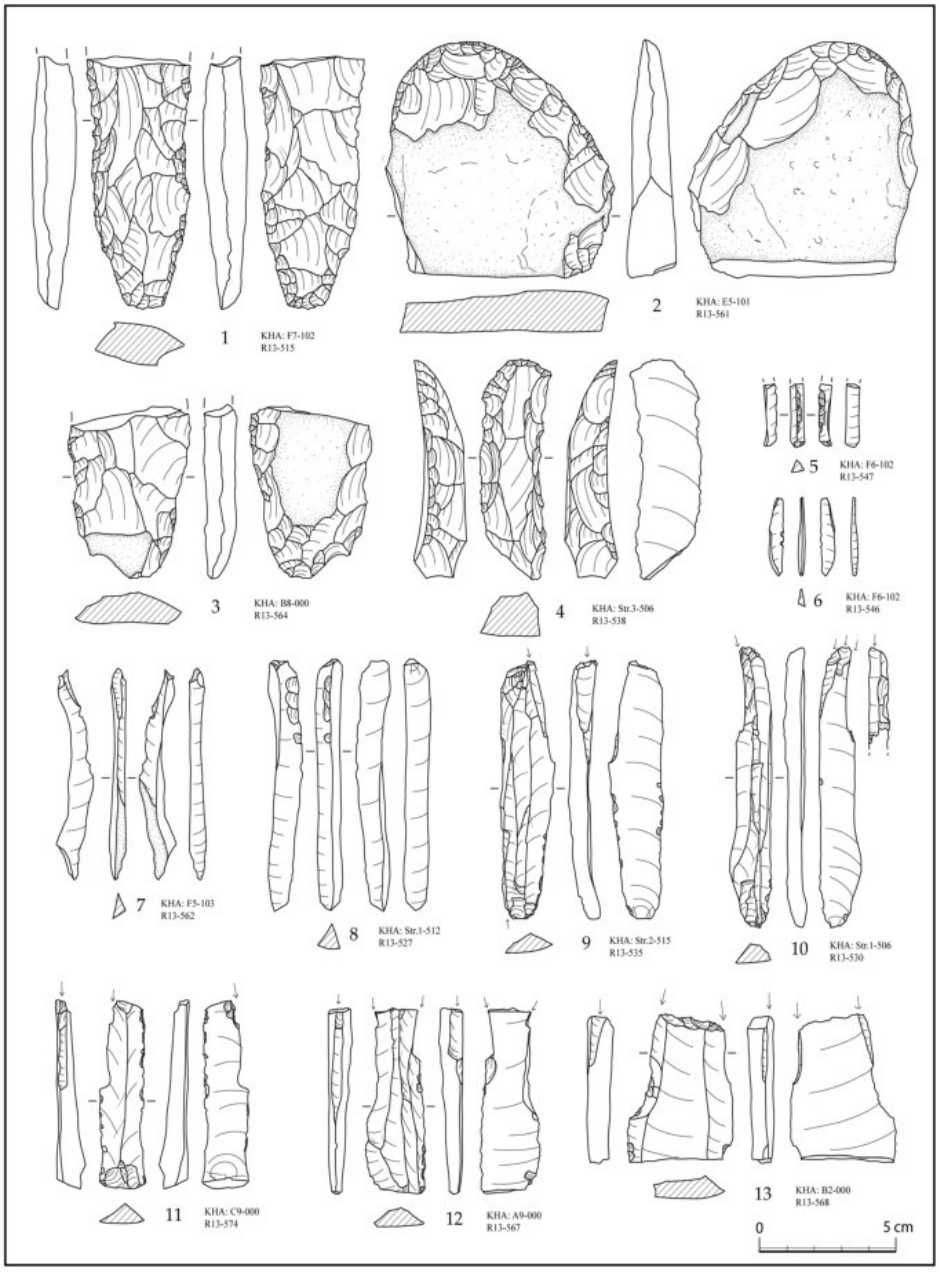


19. Khashm al-'Arfa: chipped stone artifacts (points/spearheads, knives).

probably - of chlorite schist was found at a point *ca* 70 m NE of BM-1 **(Fig. 3; Fig. 22:11).** This stray find derived, most likely, from the neighboring encampment. It has remarkable edge damage, suggesting that tree cutting and / or timber processing took place around the site, in an area that is now very poor in vegetation. Other stray finds include a small rotary quern fragment made of porous basalt, which was found at a point *ca* 45 m east of BM-1 **(Fig. 3)**. However, it is apparently of later date and has no direct relationship with the Neolithic encampment.

Faunal / Botanical Remains

A few bags of faunal remains were recovered from the three structures. Their analysis is currently in progress and is expected to provide valuable insights into hunting and herd management strategies at the encampment. In contrast, no botanical remains were recovered despite the flotation of a total of 86 litres of floor and hearth deposits (Nasu 2013). This again suggests that, unlike at the M - LPPNB agro-pastoral outpost of Wadi Abu Tulayha (Hongo *et al*. 2013), use of plant foods at this remote



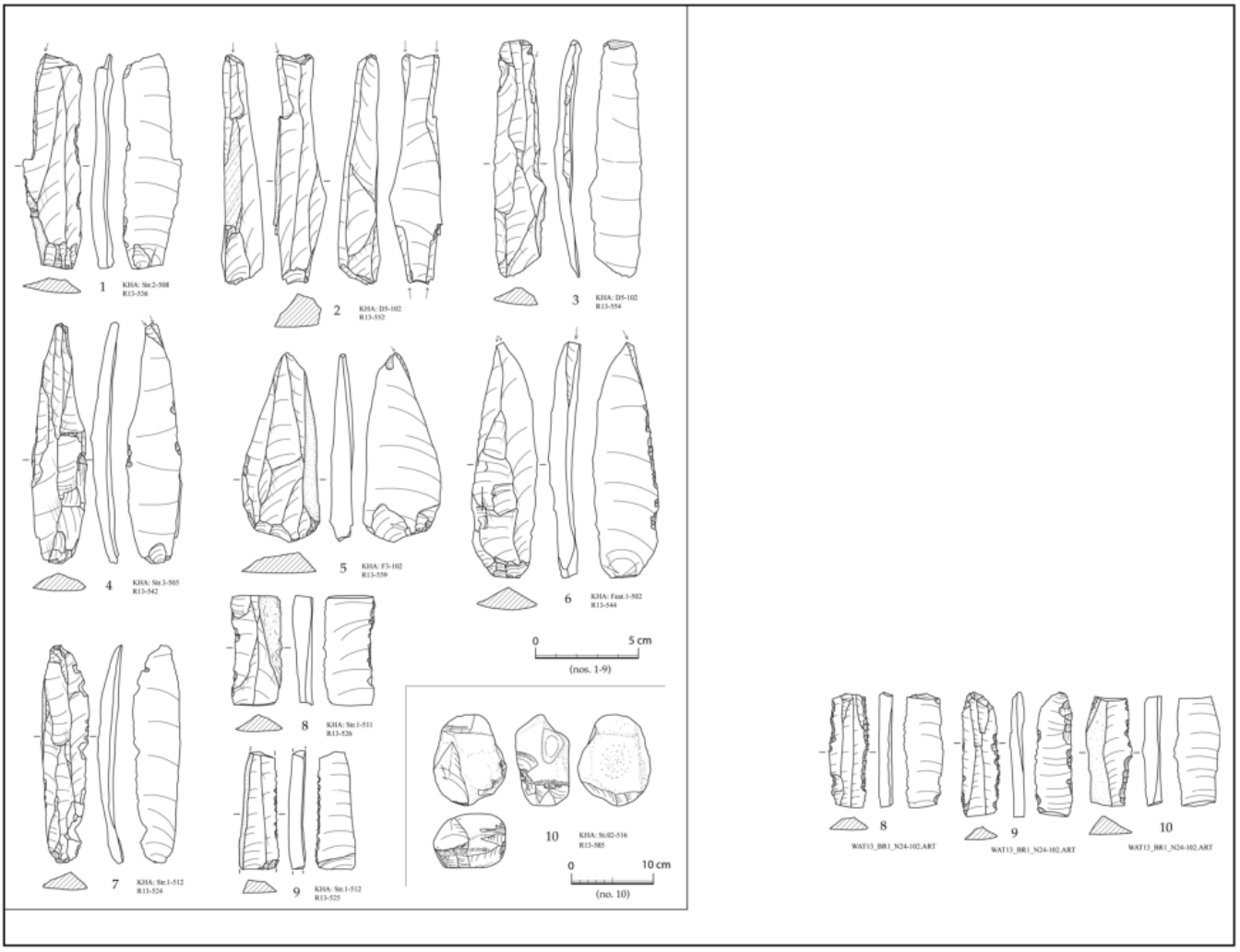
20. Khashm al-'Arfa: chipped stone artifacts (knives, scrapers, burin spalls, burins).

encampment of early pastoral nomads was very limited, if not nil.

5. Discussion

The site is relatively easy to date. All of the six C-14 dates converge on a short time span (*ca* 9,100 - 8,700 cal. BP), clearly indicating that the site falls into a transitional phase between the LPPNB (*ca* 9,500 - 8,900 cal. BP) and the PPNC (*ca* 8,900 - 8,300 cal. BP) **(Fig. 23)**. As noted above, the chipped stone assemblage was also characterised by an eclectic mix of typical PPNB and post-PPNB elements. The same was true of the ground stone artifacts, which inherited the PPNB tradition but exhibited a tendency towards remarkable size reduction. This all strongly suggests that the encampment was occupied in the transitional decades between the LPPNB and PPNC. To date, no contemporary settlements have been reported in the Jordanian *badia.* The site is therefore highly important in the sense that it provides a first glimpse into the very earliest stage of pastoral nomadization.

Similarly, the functional identification of



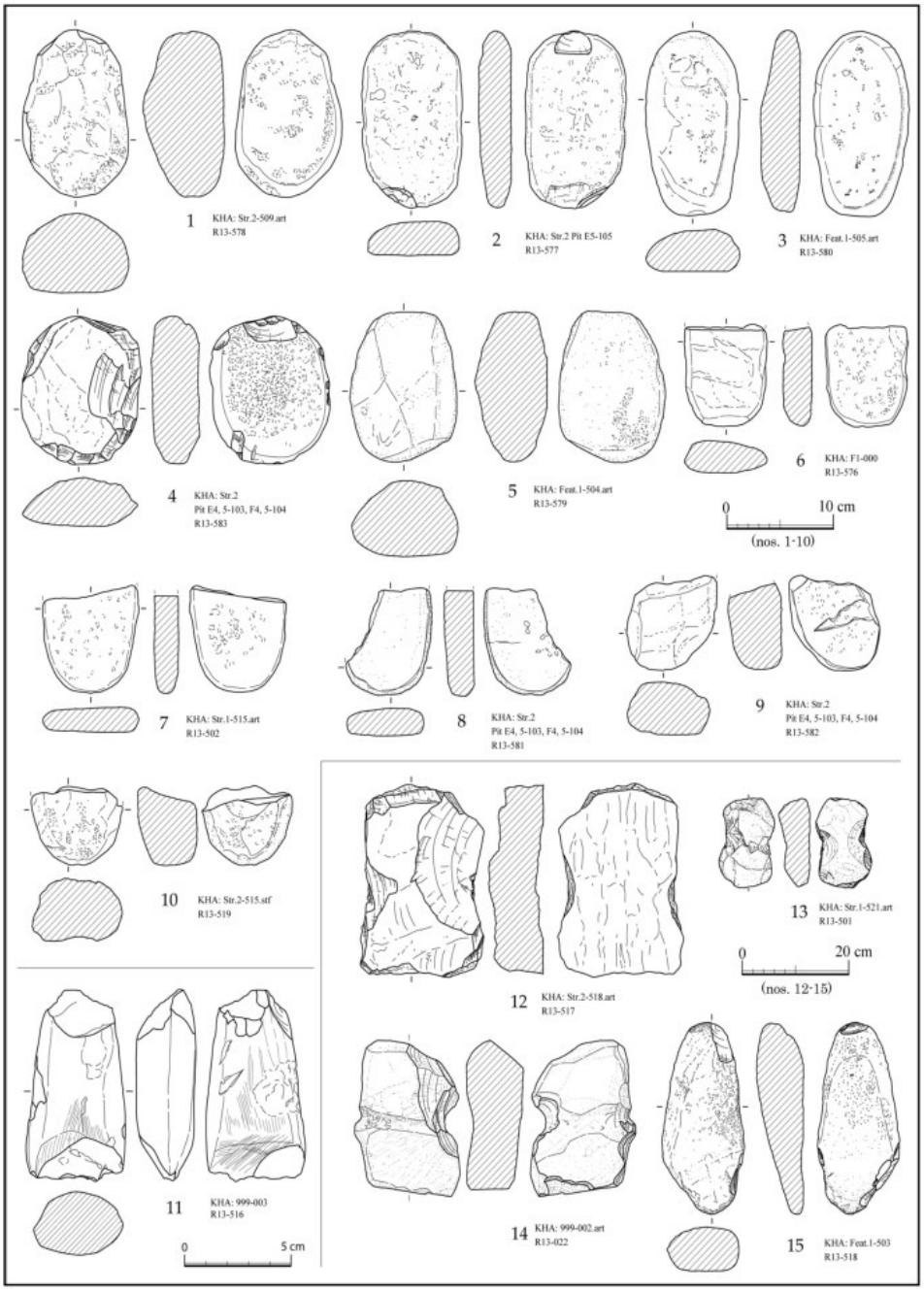
21.Khashm al-'Arfa: chipped stone artifacts (burins, retouched/used blades, hammer stone).

the site presents few difficulties. In view of the harsh site setting, the small site size, the shallow anthropogenic deposits, the simple site composition and the limited range of small finds, the site can be defined as the temporary encampment of a small-scale, highly mobile group. The question is whether the group represents local hunter-foragers or early pastoral nomads. This question is not easy to answer, however, because the faunal analysis is still ongoing. Nevertheless, we can argue that the site bears some resemblance to the PPNB agro-pastoral outposts in terms of both structural remains and small finds. It can, therefore, plausibly be regarded as their direct descendant. Given this, it would be reasonable to assume that the group inherited livestock from the agro-pastoral outposts. The existence of contemporary barrages within the same area also casts doubt on the hunter-forager hypothesis, being in favor of the nomad hypothesis. The frequency of hunting weapons is normal for the Jafr Pastoral Neolithic (e.g. Fujii 2009; Fujii, Quintero *et al*. 2011); it is unremarkable that the small encampment was still involved in hunting.

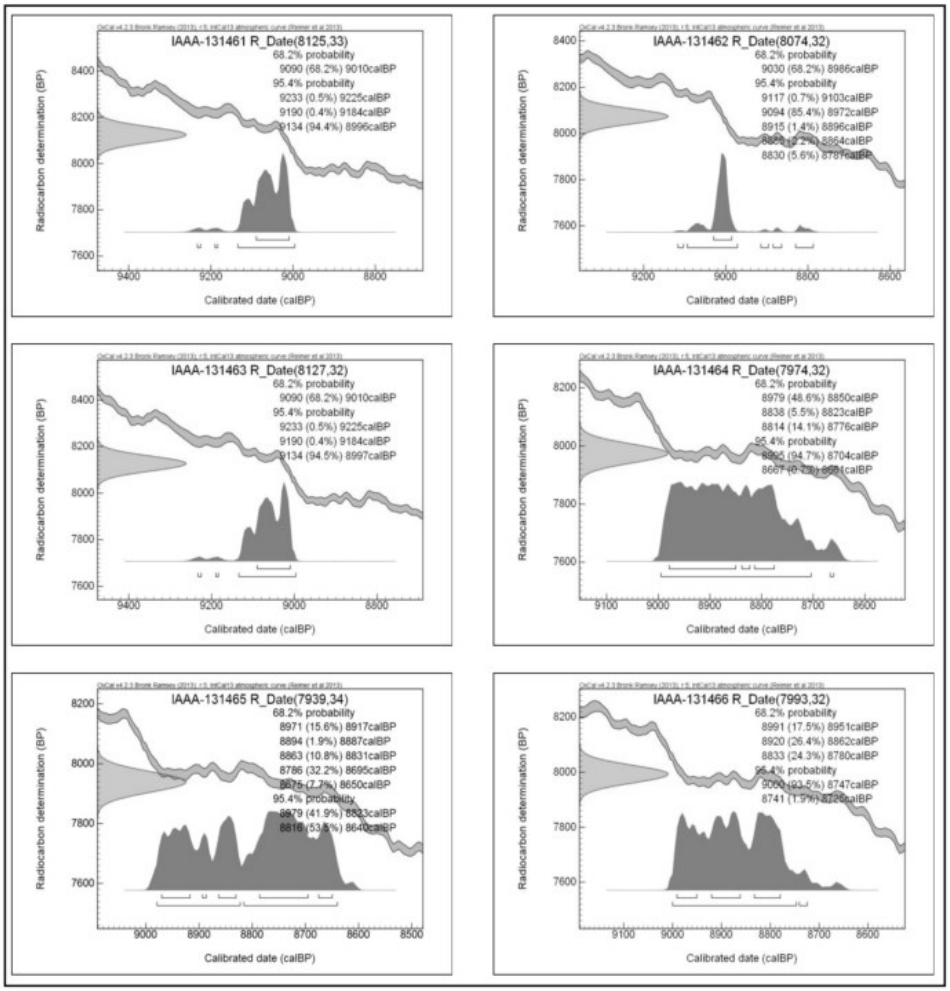
The above discussions lead to the conclusion that the site represents a temporary encampment of early pastoral nomads who immediately succeeded PPNB pastoral transhumants. The replacement of fixed agro-pastoral outposts in favour of a temporary encampment attests to the shift in life style. The series of noteworthy phenomena - *viz.* reduction in site size and artifact variety, disappearance of querns (despite the continued use of grinding slabs), size reduction of stone weights and absence of botanical remains - can all be understood as responses to increased group mobility. The scale and contents

of the excavated structural complex suggest that the early pastoral nomads formed a small group consisting of a few core families or an extended family. This is important when thinking about the basic unit of their social organization.

It is also worth noting that the group constructed stone-built structures even at a temporary encampment. This probably means that the earliest pastoral nomads did not yet reside in tents in the strict sense of the word. The apparent absence of residential tents likely reflects the fact that pastoral nomadism had only just started in the Jafr Basin at this stage. The semi-subterranean masonry structures were probably equipped with a thatched or tent-like superstructure, and would only later be supplanted by tents. In fact, no settlements post-dating the encampment at Khashm al-'Arfa have been identified in the Jafr Basin to date. The structural complex at Khashm al-'Arfa is highly significant in the sense that it illustrates the ordinary life of the earliest pastoral nomads immediately prior to the 'Tent Age'.



22. Khashm al-'Arfa: groundstone artifacts..



23. Khashm al-'Arfa: C-14 dates.

To conclude, a brief comment should be made about the relationship of the encampment with the cistern-type barrages dotted across the same area (Fujii *et al*. this volume). It is possible that the encampment was among their operating components, because similar stone weights are shared between the two. If this were the case, it would follow that the Neolithic population in the Jafr Basin abandoned the management of a fixed agro-pastoral outpost and its ancillary facilities, such as large-scale basin-irrigation barrages, and gradually shifted to a higher-mobility way of life sustained by small encampments and anthropogenic watering places. This working hypothesis is all the more worth testing because it has the potential to shed new light on the process of pastoral nomadization from the viewpoint of both settlement patterns and the history of water use. The small encampment of Khashm al-'Arfa (and the nearby cistern-type barrages) provide a key with which to start unlocking the issue.

6. Concluding Remarks

It is generally accepted that post-PPNB culture is of critical importance in tracing the process of pastoral nomadization in the southern Levant. However, our sources of information regarding this issue have been limited to extramural, non-residential installations, such as open sanctuaries (Fujii, Adachi *et al*. 2013; Fujii, Yamafuji *et al*. 2012) and barrages (Fujii 2010, 2013); no settlement data has been incorporated into the arguments. This is precisely because the archaeological visibility of residential space declined drastically in inverse proportion to the increase in group mobility. The small encampment at Khashm al-'Arfa has shed new light on the ordinary life of the earliest pastoral nomads. In this sense, it is highly important and requires further in-depth study. We would like

to continue our efforts towards a comprehensive understanding of the formation processes of the *badia* world as another dimension of Near Eastern history.

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