Excavations at the Late Epipalaeolithic Site of Shubayqa 1

Richter, Tobias; Bode, Leslie; House, Michael; Iversen, Rune; Otaegui, Amaia Arranz; Saehle, Ingeborg; Thaarup, Guenever; Tvede, Marie-Louise; Yeomans, Lisa

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Richter, Bode, House, Iversen, Arranz Otaegui, Saehle, Thaarup, Tvede, Yeomans
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Bernbeck, Pollock, Öğüt
Monjukli Depe
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Kafafi, Rolleston, Douglas, Lash
‘Ain Ghazal

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Editorial

The sky is falling, still. In his Introduction chapter of the 1998 book The Prehistoric Archaeology of Jordan, Don Henry noted that the number of publications in all venues pertaining to all periods of Jordanian prehistory had zoomed to an average of 14 per year between 1980-1986, noting that this was “a nearly four-fold increase … over the whole decade of the 1970’s” (Henry 1998: 1). Over the past couple of decades the pace of research and publication for the entire Levant has started to reach unmanageable proportions for authors attempting to make sense of newly available information, and this is becoming particularly difficult in the case of projects dealing with the 12th-4th millennia. Certainly we would all benefit from a constantly updated central repository of new publications, suitably tagged with keywords, but how such an institution could be developed and maintained is a daunting problem. Geneviève Dollfus of Paléorient has foreseen these needs; in recent years, she has laid the foundations for such a data base, and we should think about supporting its implementation.

Gary O. Rollefson and Hans Georg K. Gebel

Introducion

Shubayqa 1 is a hitherto little known Natufian site situated in the northern Badia region of eastern Jordan (Fig. 1). The site was first identified during survey in 1993 (Betts 1993; 1998: 25-26) followed by a brief excavation in 1996. This initial test excavation revealed part of a structure with a paved floor, buried by in situ deposits teeming with lithic artefacts and faunal remains (Fig. 2). In October and November 2012 a team from the University of Copenhagen returned to Shubayqa 1 to carry out larger scale excavations as part of the Shubayqa Archaeological Project (see http://shubayqa.ccrs.ku.dk/) and the Epipalaeolithic Foragers in Azraq Project.

One of the key aims of the Shubayqa Archaeological Projects is to investigate the relationship between the Younger Dryas event (ca. 12,800-11,500 BP) and cultural developments during the Late Epipalaeolithic occupation in the semi-arid to arid ‘marginal zone’ in the southern Levant. The cooler and drier conditions that marked the beginning of the Younger Dryas have been seen as an influential factor in the expansion of Natufian populations from the Mediterranean ‘core zone’ into the marginal, more arid fringe (Bar-Yosef 1995; Bar-Yosef and Belfer-Cohen 2000, 2002; Bar-Yosef and Meadow 1995; Byrd 2005; Moore and Hillman 1992). At the same time, it has been suggested that the Younger Dryas forced sedentary Natufian groups into the cultivation of cereals to compensate for the loss of wild stands in areas adjacent to existing settlements (Hillman 1996; Hillman et al. 1989, 2001; Moore 1991, 2000).

Fieldwork at Shubayqa 1 was conceptualized to test these ideas through the examination of a seemingly well preserved Natufian site situated in the semi-arid to arid
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zone. Simultaneously, fieldwork at the site and in the wider Shubayqa area aims to provide a more detailed reconstruction of local environmental conditions during the Younger Dryas to better understand the effects of global climatic change on the local scale. Finally, Shubayqa 1 offers an opportunity to provide other evidence for the character of late Epipalaeolithic societies in the Azraq Basin that are known from only two excavated sites so far (Betts 1991, 1998; Garrard 1991).

Although the fieldwork carried out during this season focused primarily on Shubayqa 1, we also carried out a brief reconnaissance survey of the surrounding area to situate the site within its local landscape.

The Site

Shubayqa 1 is situated in the northwestern part of the Jordanian Badia. It lies to the immediate north of the Qa’ Shubayqa, a 12 km² large dry lake fed by the Wadis Rajil and al-Burraqyeh from the west and the Wadis Salma, Ghaysan and al-Hamra al Shamali from the east. The temporary lake that forms during the rain-fall season in the Qa’ Shubayqa is a continuation of the Wadi Rajil that drains out of the Qa’ Shubayqa in the southeast and continues to flow southward towards the Azraq Oasis. With its seasonal flooding the Qa’ Shubayqa is still an attractive grazing area for Bedouin groups during the spring (according to local informants). It seems likely that the area may have been a more stable or even permanent body of water under more favourable climatic conditions. The availability of water in the area under past environmental conditions is an area of future research. Today the Shubayqa area is situated at the edge of the Irano-Turanian vegetation zone which rings Jebel Druze. Average mean annual rainfall is between 80-100 mm with most rainfall occurring in the winter.

The site of Shubayqa 1 sits in the southwestern corner of the abandoned Islamic village of Khirbet Shubayqa. It lies at an elevation of 740 meters above sea level and consists of a ca. 2000 m² roughly circular mound that rises 2.5-3 meters above the surrounding area (Figs. 3 and 4). Basalt blocks of various sizes are strewn across the surface and there are various historic walls and structures associated with the mound. An Islamic burial cairn was built on the summit of the mound (local informants have told us that this is ca. 70 years old). A north-south running field wall with a short east-west terminus that partially encloses the burial cairn was presumably constructed at the same time. To the southwest and west lie two rectangular, collapsed buildings, which probably form part of the main occupation phase of Khirbet Shubayqa. The surface of the mound is littered with chipped stone artefacts and small bone fragments. Six mortars — two double and four single mortars — made on large basalt mortars are the most obvious of a large number of ground stone artefacts. The 1996 trial trench at Shubayqa 1 showing part of a semi-circular wall and flagstone pavement (courtesy of L. Martin).
artefacts spread across the same area (Fig. 5). Traces of possible buried, semi-circular walls can be seen on the surface in various locations.

**Area A**

The initial aim of the excavation was to relocate and delineate the 1996 excavation trench using archive photographs and observations on the ground. Using the photographs the old trench was easily identified and Area A laid out accordingly. The original trench had collapsed at some time in the past sixteen years. It was filled by a loose, soft deposit that contained abundant chipped stone, ground stone and faunal remains. We considered the material that filled the 1996 trench to be residual and therefore removed it relatively swiftly to establish the...
previous limits of excavation. The removal of the fill revealed features visible on the 1996 photographs: part of a semi-circular wall constructed of basalt uprights and a paved floor built using flat basalt flagstones (Figs. 2 and 6a). Since the end of the 1996 excavation and before the collapse of the trench, this pavement was partially disturbed. At least one large pavement stone had been pulled up and moved aside and remained at an inclined angle at the bottom of the trench (Fig. 6a, bottom left).

Having delineated the 1996 limit of excavation the next task was to expand Area A to further reveal the remains of the semi-circular structure. This necessitated the removal of large quantities of loose basalt boulders to the east of the 1996 excavation trench, not only to allow for the continuation of excavation, but also to prevent them from collapsing into the deeper, old trench. Following the removal of these blocks a possible alignment of stones and some flat-lying basalt flagstones were encountered in K26-27 and L26-27. It was however unclear whether this represented a deflated stone structure or just a coincidental alignment of stones, given that the area exposed was quite small. Recording and removal of this structure allowed further excavation of in situ deposits. These consisted of a series of dark grayish brown deposits that contained abundant chipped stone, faunal remains and ground stone, as well as other items of material culture. Further excavations revealed the top of the return wall of the already partially exposed structure, indicating that some of these deposits fill the interior of a semi-circular building. This structure measures 4 m in diameter with walls constructed of upright-standing basalt stones (Fig. 6b).

A circular, stone-lined pit of as yet unknown function was exposed at the northern limit of excavation in squares J-K 26 (Fig. 6c). The fills contained many burnt stones at the top and abundant charred plant remains in an ash-rich sedimentary matrix throughout. The circular stone lining was rebuilt at least once in the same position, suggesting continuity of function. This would seem to rule out accidental burning of a storage pit, suggesting instead that burning was an integral part of the feature’s function. While the feature could be a hearth, it is also possible that it may have been used as a roasting pit. Further work on the archaeobotanical material should provide us with a better idea of this feature’s function.

Excavations in Area A concluded ca. 30 cm above the suspected floor level of the semi-circular structure. This will be the focus of renewed excavations in the next season.

Area B

This area was opened up to the north of Area A, separated from it by a 1 m wide baulk (Fig. 3). It initially measured 4 x 3 m and targeted in situ archaeological deposits. Surface artefacts, in particular chipped and ground stone, were encountered in large numbers already on the surface and in the topsoil. They were closely associated with three boulder-mortars situated in the vicinity of the excavation area. The first ten centimeters of topsoil contained occasional pieces of early Islamic ceramics, as well as some isolated early and late Neolithic projectile points. The majority of the lithic assemblage however had a distinct late Epipalaeolithic character. Chipped and ground stone artefacts, as well as animal bones, continued to be recovered in abundance as the area was further reduced. Beneath two midden deposits, 50 cm below modern surface, excavations revealed a flagstone paved area in J22-24 (Fig. 7a). This prompted the expansion of the excavation area by two meters to the east, enlarging the total area to 6 x 3 m. Eventually the stone pavement was exposed across the entire eastern half of the area (covering squares J-L 22-24). The pavement consisted of large basalt flagstones. One mortar and several grinding stones were incorporated into the pavement. A hearth was also exposed in K22 (Fig. 7d). Strewn across the pavement were numerous smaller ground stone artefacts and several pavement stones and worked ground stones showed traces of ochre pigment. In addition, three disarticulated sets of human remains were recovered. The first were the highly fragmented and isolated remains of an adult individual consisting of a fragmented upper segment of cranium, part of one clavicle and two broken parts of an ulna and radius, as well as other not yet identified elements (Fig. 7c). At the eastern edge of the excavation area the disarticulated remains of one infant and one adult were found concentrated in one area. A medium sized basalt slab had either been placed or dropped on top of these individuals. The infant remains include vertebrae, ribs, skull fragments, finger digits and teeth buds. The remains of the adult consist of skull fragments. Towards the end of the excavation season the articulated remains of another infant were found after cleaning the south section of the baulk between Area A and B (Fig. 7b). This necessitated the cutting back of the section to fully expose and recover these remains. The dentition suggests that these are the remains of a less than 6 month old infant, which lay on its right side in a crouched position. A lump of ochre was found in close association with the left hand. For an infant burial it appeared very well preserved with cranial fragments, ribs, vertebrae and most upper and lower limb elements present. The burial was found beneath a phase of pavement repair, suggesting that flagstones were lifted at times and burials placed beneath them. Indeed, this burial was cut into an earlier infant burial, which we were unable to excavate this season due to time constraints.

Area C

The presence of a suspected semi-circular wall visible on the surface in the northern part of the site prompted the opening of a small sondage here to investigate the full extent of the site. Excavations revealed a 50 cm deep sequence of deposits and showed that the align-
Fig. 6  Post-excavation plan of Area A: a) view of the re-excavated 1996 trench; b) end of season overview of Area A; c) stone-lined feature.
Fig. 7 Post-excavation plan of Area B: a) end of season overview looking southwest; b) infant burial; c) disarticulated human remains of an adult strewn over several ground stone artefacts; d) hearth with ground stone artefacts incorporated into the pavement.
ment of stones observed on the surface is indeed part of an as yet unidentified structure (Fig. 8). At the bottom of the sondage a compact earthen surface was exposed. This was covered by a soft brown silt (possibly aeolian), with rare finds. On top of this deposit was a finds-rich mid-brownish-grey midden deposit, which contained dense concentrations of charcoal. Chipped stone artefacts suggest that this area also forms part of the Natufian occupation. Two further leveling and compacted occupation deposits were situated above this midden deposit. Excavations in Area C showed that archaeological deposits and features are present in this area, warranting further investigations in this northern part of the site. The sondage also showed that Shubayqa 1 is considerably larger and potentially more complex than hitherto assumed, with occupation deposits and architecture extending this far to the north.

Finds

A wide range of material culture, fauna and botanical remains were recovered from the excavations (Fig. 9). Chipped stone and animal bones constitute the majority of the remains. The raw material used for chipping stone exhibits great variability. The majority of the assemblage consists of light to mid-grayish types of flint that are commonly found in the limestone areas of the Azraq Basin further south. There are also some red and pinkish varieties, which are known from sources to the south, southwest and west. A somewhat rarer category includes more translucent, fine-grained varieties of flint of unknown origin. There are also examples of chalcedony, sources of which exist to the east of the Azraq Oasis (Betts 1998: 34). No obsidian was found. The chipped stone appears to be a predominantly flake orientated industry. Few blades and bladelets were observed with many small flakes dominating the debitage. Microburins exist, but do not appear to be very common. Cores are very small and exhibit signs of extensive reduction. Bladelet cores appear to be rare. Burins and splintered pieces are common and can be miniature-sized. Primary pieces of debitage are very rare and there are few crested blades or other initial core preparation pieces that would suggest blade or bladelet production. Retouched artefacts include scrapers, backed bladelets, truncations, notches / denticulates and simple retouched flakes. As can be expected, geometric microliths are common and are dominated by lunates. Lunates are generally short – even very short – and are backed using abrupt, bipolar and Helwan retouch. The smallest variety of lunates appear to be usually backed using bipolar or abrupt retouch, but not Helwan. The lunates suggest a late Natufian date. Sickle-blades are rare. The Shubayqa 1 chipped stone assemblage appears to be comparable to the Khallat ‘Anaza material (Betts 1998: 16-19), where the microburin technique was also rare, flakes and bladelets were equally represented, and the toolkit was dominated by Helwan and abruptly / bipolar ba-
cked, short lunates. The main difference appears to be in the cores, with Shubayqa 1 having more flake cores, splintered pieces and burins. Two key factors contributed to the character of the Shubayqa 1 assemblage. One is the distance between the site to the nearest raw material sources. The nearest flint raw material to Shubayqa 1 is located between 70-90 km to the south and southwest, while chalcedony can be found east of Azraq, 80 km south of Shubayqa. Transporting material over these considerable distances to the Qa’ Shubayqa clearly affected the size and amounts of material that people were able to transport and resulted in maximal reuse of any available raw material. The second factor that influenced the character of the assemblage was settlement pattern. With architecture, burials and heavy-duty ground stone tools (see below) Shubayqa 1 appears to have been occupied intensively and for prolonged periods. The prolonged occupation of this one locality, coupled with the scarcity of locally available flint, would have demanded a high degree of exploiting whatever raw material was at hand. The Shubayqa 1 raw material economy therefore appears to be an interesting aspect that requires further careful investigation.

Ground stone was found in abundance at Shubayqa 1. In addition to seven basalt-boulder mortars the excavations recovered more than 300 individual pieces of worked basalt. The mortars, six of which were found on the surface, consist of two double mortars and five deep single mortars. The remainder of the ground stone assemblage consists of grinding slabs, slabs with cupholes, numerous vessel fragments, pestles, handstones, pounders, one grooved stone and various fragments and miscellaneous pieces (Fig. 9: Material culture from the excavations at Shubayqa 1. 1: Basalt hammerstone with circular incision, 2, 4: Basalt handstones, 3: Basalt stone plug, 5-9: Bone points, 10: Polished and incised bone, 11: Incised stone, 12: Limestone ring fragment, 13: Polished basalt stone with parallel incisions, 14: Basalt stone ring, 15: Basalt stone ring with parallel incisions.)
Fig. 10  Chipped stone from Shubayqa 3 (1-11) and Shubayqa 6 (12-24). 1-3: Helwan Lunates, 4-5: Broken Helwan Lunates, 6-7: Helwan retouched bladelets, 8: Retouched bladelet, 9-10: Backed bladelets, 11: Single platform core, 12-17: Drills, 18: Broken el-Khiam point, 19: Backed bladelet, 20: Retouched blade, 21: Burin, 22-23: Bladelets, 24: Single platform core.

1-4, 12-15). All the ground stone was made using basalt, which is hardly surprising given its abundance in the local environment. Instances of ochre staining were observed on some pieces, suggesting that some were used to process pigments. Similar to other sites it is likely that the ground stone was employed in many different tasks, ranging from hide working and mineral grinding to processing plant foods (Dubreuil 2004). Further, more intensive study of the assemblage is necessary to investigate the frequency of different uses.

There are several other worked stone objects, including stone rings (made from both basalt and limestone), as well as a number of incised objects (Fig. 9, 11-15). The latter include one polished pebble incised with two crossed lines and a hammerstone with a circular incision around one end. Other rare objects include a number of beads made from stone, bone and marine shell. All the shell beads recovered to date were made from *dentalium* shells, indicating that the site was linked into long-distance exchange networks. A small number of bone tools were also recovered. These include several points (Fig. 9: 5-10), as well as an incised piece of bone, possibly the fragment of a handle (Fig. 9: 10).

Faunal preservation is generally good and the assemblage is considerable in size, especially in comparison to other late Epipalaeolithic sites in the Azraq Basin. It consists of many small, highly fragmented pieces, suggesting intensive carcass processing for marrow and grease. The species identified to date include gazelle, caprines and small equids, hare, fox, tortoise and a wide range of birds. Gazelle is particularly abundant and dominates the assemblage. The presence of caprines is intriguing, as these have rarely
been documented in such early assemblages in eastern Jordan, having previously been thought to be introduced as domestic livestock during the early Neolithic (Garrard et al. 1996).

Charred plant remains were recovered from multiple contexts at the site. By far the densest concentration was found in the circular stone-lined feature in Area A, but other deposits also produced significant amounts. Both seeds and charred wood were found. The former include wild barley (*Hordeum spontaneum*) and sedges (*Cyperaceae*), while the latter include tamarisk (*Tamarix* sp.), Chenopodiaceae and ash (*Fraxinus* sp.). This assemblage, which is currently being analysed, represents the first substantial archaeobotanical assemblage from any Natufian site in eastern Jordan. It promises outstanding insights into the palaeoenvironment and plant economy of the Late Epipalaeolithic in the Badia and beyond.

**Survey**

In addition to excavations we carried out a brief reconnaissance survey in the area surrounding the site. This focused in particular on the early Islamic village of Khirbet Shubayqa. The preliminary results of the village survey will be reported elsewhere (Richter and Tarboush in preparation). Here we want to briefly draw attention to two additional prehistoric sites visited during the reconnaissance work.

Shubayqa 3 is a Natufian site situated on a low hill at the southeastern edge of the Qa’ Shubayqa overlooking the dry lake. The site was first reported by Betts (1998) as a Late Natufian site. We successfully relocated this site during this season and carried out a brief surface collection. Shubayqa 3 consists of a surface scatter of chipped stone artefacts, faunal remains, and ground stone artefacts that spreads over an area of 5000-6000 m². To the west the site is delineated by later enclosures and two burial cairns (of which one was robbed recently) while the lithic scatter petered out gradually in all other directions. The site is slightly disturbed by modern tracks to the north, south and east. One possible circular structure was noted during the walkover. Surface material was collected from a single north-south transect, 80 meters long and 2 m wide. This resulted in a collection of 395 chipped stone artefacts (see Table 1, Fig. 10). Ground stone artefacts were also ubiquitous on the surface but were not collected at this stage. Although bladelets were numerous in this assemblage, flakes were represented in almost equal numbers. Both bladelet and flake cores were present. Betts (1998) suggested that the site was probably late Natufian, but this was based on a limited surface collection. The 2012 surface collection produced a number of long and wide Helwan lunates (Fig. 10: 1-5), which seem to suggest an early Natufian date for the occupation.

As part of the survey of Khirbet Shubayqa we also located a hitherto unknown prehistoric site. It is situated at the southeastern corner of the abandoned early Islamic village on a low mound at the edge of the Qa’ Shubayqa, ca. 1 km east of Shubayqa 1. It is comparable in size and appearance to Shubayqa 1. A rectangular building, probably dating to the early Islamic occupation, and a burial cairn were built on top of the mound. Chipped stone artefacts spread across an area of ca. 2000 m². In places it seems to be retained by a semi-circular stone alignment, which could represent part of a buried structure. Although one grinding stone was seen lying ca. 50 m to the west of the site, there was no ground stone visible on the surface of the mound itself. A surface collection at the site yielded 244 pieces of chipped stone (Table 2, Fig. 10) and 6 fragments of greenstone. The collection contained a significant number of bladelets and small flakes, but only few cores were found. Amongst the retouched pieces was one broken el-Khiam point (Fig. 10: 18)

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<tr>
<th>Table 1</th>
<th>Chipped stone from Shubayqa 3.</th>
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<tr>
<td>Cores</td>
<td>3</td>
</tr>
<tr>
<td>Chips &amp; Chunks</td>
<td>31</td>
</tr>
<tr>
<td>Debitage</td>
<td>113</td>
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<tr>
<td>Retouched Pieces</td>
<td>97</td>
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<tr>
<td>Total</td>
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</tr>
<tr>
<td>Retouched</td>
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<tr>
<td>Scrapers</td>
<td>2</td>
</tr>
<tr>
<td>Perforators</td>
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<td>10</td>
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<tr>
<td>Notches</td>
<td>13</td>
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<tr>
<td>Denticulates</td>
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<tr>
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<tr>
<td>Projectile Points</td>
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<tr>
<td>Microliths</td>
<td>1</td>
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<td>Splintered Pieces</td>
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<td>Splintered Pieces</td>
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<td>Retouched flakes</td>
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and ten perforators (Fig. 10: 12-17), together with many notches, retouched flakes and retouched/backed bladelets. On the basis of the overall technology and the single el-Khiam point it can be tentatively suggested that this site may date to the PPNA. The presence of many drills and greenstone fragments suggests that greenstone bead production may have been important at this site. The nearest greenstone source is located ca. 150 km southwest of the Qa Shubayqa to the west of Wadi el-Jilat. Following on from Betts’ (1993) survey of the Qa Shubayqa we have labeled this site Shubayqa 6. Further excavations at this site are necessary to confirm the initial assessment of age and function.

Conclusion

This inaugural fieldwork season of the Shubayqa Archaeological Project demonstrated that Shubayqa 1 is a site with interesting research potential. Excavations have shown that it is a multi-phased, complex Late Epipalaeolithic Natufian site. It combines many features that are more commonly associated with Natufian sites in the Mediterranean ‘core zone’, including architecture, heavy-duty ground stone tools, plant exploitation and human burials. Shubayqa 1 today sits at the edge of the Irano-Turanian vegetation zone and the 100 mm average annual precipitation boundary. Both Betts (1998) and Moore et al. (2000) have described the Jebel Druze as a Mediterranean zone ‘island’ poking out of sea of steppe and desert. Moore et al. (2000; Moore and Hillman 1992) have hypothesized how the climatic and environmental change of the Younger Dryas affected the size and distribution of these vegetation zones. Shubayqa 1 can shed further light on these issues and also help us to better understand the impact of the Younger Dryas climatic episode in relation to changing settlement patterns, subsistence practices and cultural dynamics of the terminal Pleistocene in southwest Asia.

The Younger Dryas has been seen by many scholars as a key climatic event that forced Late Epipalaeolithic societies to lower dense population numbers in the Mediterranean Zone by expanding into more arid and marginal areas, and by taking up the cultivation of cereals and other plants to compensate for the loss of natural habitats (Bar-Yosef 1995; Bar-Yosef and Belfer-Cohen 2000, 2002; Bar-Yosef and Meadow 1995; Moore and Hillman 1992; Moore 2000; Henry 1989, 1995). The presence of a possible early Natufian site (Shubayqa 3) and a PPNA site (Shubayqa 6) affords us an opportunity to examine the transition from gathering and hunting to the early aceramic Neolithic in the Harra in much better detail. We hope that further surveys in the Qa Shubayqa area and excavations at all of the sites discovered so far will shed some new light on this crucial time frame.

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Tobias Richter
Department for Cross-Cultural and Regional Studies
University of Copenhagen
richter@hum.ku.dk (corresponding author)

Leslie Bode
Department of Archaeology
University of Nottingham

Michael House
Department for Cross-Cultural and Regional Studies
University of Copenhagen

Rune Iversen
SAXO Institute
University of Copenhagen

Amaia Arranz Otaegui
Universidad del Pais Vasco-Euskal Herriko Unibertsitatea (UPV-EHU)
Departamento de Geografía, Prehistoria y Arqueología

Ingeborg Saehle
SAXO Institute
University of Copenhagen

Guenever Thaarup
Department for Cross-Cultural and Regional Studies
University of Copenhagen

Marie-Louise Tvede
SAXO Institute
University of Copenhagen

Lisa Yeomans
Department for Cross-Cultural and Regional Studies
University of Copenhagen
References

Bar-Yosef O.

Bar-Yosef O. and Belfer-Cohen A.


Bar-Yosef O. and Meadow R.H.

Betts A.V.G.


Byrd B.F.

Dubreuil L.

Garrard A.N.

Garrard A.N., Colledge S.M. and Martin L.

Henry D.O.


Hillman G.
1996 Late Pleistocene changes in wild plant food available to hunter-gatherers of the northern Fertile Crescent: Possible preludes to cereal cultivation. In D. Harris (ed.), The Origins and Spread of Agriculture and Pastoralism in Eurasia: 159-203. London: UCL Press.

Hillman G., Colledge S.M. and Harris D.R.

Hillman G., Hedges R., Moore A., Colledge S., Pettitt P.

Moore A.M.T.


Moore A.M.T. and Hillman G.C.

Moore A.M.T., Hillman G. and Legge A.J.

Richter T. and Tarboush M.


Wadi Hammeh 27, an Early Natufian Settlement at Pella in Jordan is a detailed report on one of the most important Natufian sites to have emerged in the past thirty years and an integrated analysis and interpretation of subsistence strategies, settlement patterns and ritual life in one of the world's earliest village communities. The 14,000-year-old settlement of Wadi Hammeh 27 is one of the most spectacular sites of its kind, featuring one of the largest, most complex pre-Neolithic buildings yet discovered in the Middle East, an unparalleled series of artefact caches and activity areas, and a rich corpus of late Ice Age art pieces.

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