
Sumio Fujii 

Kanazawa

LATE NEOLITHIC CULTURAL
LANDSCAPE IN THE AL-JAFR BASIN,
SOUTHERN JORDAN:
A BRIEF REVIEW IN CONTEXT

Abstract: The Late Neolithic cultural landscape in southern Jordan was poorly understood due to the deficiency of basic information. However, recent investigations are improving this situation. A good example is provided by the discovery of a Jericho IX pottery assemblage at Munqata'a near Tafileh, which offers a glimpse into the influence of an exotic culture on the post-PPNB cultural landscape in southern Jordan. However, things are different in the al-Jafr Basin to the east, where a new adaptation strategy to cope with increasing aridification was sought within the context of the traditional PPNB outpost culture. The difference in cultural landscapes between the east and the west in this period ushers in the era of 'the desert and the sown.' In preparation for future comparative study, this paper briefly reviews past research outcomes in the basin and discusses the Late Neolithic cultural landscape at the arid margin of southern Jordan.

Keywords: al-Jafr Basin; Late Neolithic; Khashm 'Arfa; Jabal Juhayra; 'Awja sites

Introduction

Sandwiched between the prosperous Pre-Pottery Neolithic B (hereafter PPNB) and Chalcolithic, the Late Neolithic (hereafter LN) has been less well studied in southern Jordan. However, this is simply because available

research data were very limited. Recent investigations are bringing dramatic change to this situation. A good example is provided by the discovery of a Jericho IX pottery assemblage at Munqata'a near Tafileh (Kołodziejczyk *et al.* 2018; Kołodziejczyk 2019), which offers a breakthrough for exploring how the direct or indirect influence of an exotic culture was involved in the post-PPNB socio-cultural reorganization in southern Jordan. In contrast to this stands the al-Jafr Basin to the east, where a new adaptation strategy to cope with increasing aridification was sought within the context of the traditional PPNB outpost culture. The coexistence of these two distinct cultural entities ushers in the era of *the desert and the sown* (Bell 1907). In this sense, the difference in cultural landscapes between the east and the west during the LN holds a key to deciphering the subsequent history in southern Jordan. In preparation for future comparative study, this paper briefly reviews our past research outcomes in the basin according to site type and, on this basis, discusses the overall picture of the Late Neolithic cultural landscape in the arid margin of southern Jordan.

Settlements/Encampments

To date, the following two dwelling sites, Khashm 'Arfa and Jabal Juhayra Layer 2, have been excavated at the eastern and western edges of the basin, respectively (Pl. 1). Both of these are in a dry environment, small-sized, and short-lived, suggesting that initial pastoral nomads derived from PPNB pastoral transhumants were involved in their operation. As described below, the scarcity of artifacts in terms of number and variety also supports this interpretation.

Khashm 'Arfa

Khashm 'Arfa is a small campsite found by chance in the hilly terrain that fringes the eastern edge of the basin. Our rescue excavation undertaken in September 2013 revealed a small-scale structural complex that consists of three semi-subterranean structures (Units 01-03) and five slab-lined oval features (Fujii, Adachi, Yamafuji *et al.* 2017a; Fujii 2018) (Pl. 2: 1, 3: 1). The total area of the exposed complex was *c.* 50 square meters. Given that surface finds were concentrated in and around it, it is likely that the original encampment was not very different in scale from it.

The semi-subterranean structures, the cores of the complex, had a rectangular plan with rounded corners, measuring *c.* 2-4×2-2.5m in floor area and up to *c.* 0.6m in floor depth. They were lined with upright limestone

slabs and equipped with a narrow, stepped or sloping entrance opening to the east. In addition to a few small hearths, a certain number of artifacts centering on flint tools were found *in situ* on the floor. Thus, the structures were probably used as simple dwellings roofed with a soft material such as twigs and leather. Meanwhile, with the only exception of Feature 01 at the northeastern corner of the complex, the oval features were up to *c.* 1m long in major axis and contained coal-black ash only. They differ in both plan and contents from the indoor hearths and possibly had some special function.

Aside from sporadic faunal remains, small finds were limited to chipped and ground stone artifacts only. The flint assemblage was eclectic in character, containing both typical PPNB components such as naviform cores and Amuq type points (Pl. 3: 2-4), and post-PPNB elements represented by large bifacial tools (Pl. 3: 5-6). Meanwhile, the ground stone assemblage centered on limestone products and included three bilaterally-notched stone weights (Pl. 3: 7-9) and a diagonally truncated stone bar (Pl. 3: 10) in addition to a dozen grinding implements. Neither stone vessels nor adornments, let alone pottery, were attested.

This small encampment can be dated on the basis of six C-14 dates converging on a time range of 7100-6700 calBC and on the basis of the eclectic character of the flint assemblage, to the Late PPNB/PPNC transitional phase or the very beginning of the Jafr LN¹ (Fujii, Adachi, Yamafuji *et al.* 2017a, fig. 23). The excavation provided a glimpse into the process of LN small campsites gradually replacing PPNB outpost complexes such as Wadi Abu Tulayha with the advance of pastoral nomadization (Fujii 2013).

Jabal Juhayra (Layer 2)

Jabal Juhayra is a small-scale extinct volcanic hill at the northwestern corner of the basin, behind Jurf Darwish. The site of Jabal Juhayra occupies the southern slope of a small gully that dissects its southeastern flank. The excavations took place over five seasons from 2014 to 2016 and revealed a total of six rockshelter dwellings containing two cultural layers (Pl. 2: 2). We are concerned here with the Layer 2 rockshelter settlement, which was accompanied by a dozen miscellaneous open-air features including several anthropogenic waterholes (Fujii 2015, 2017a, 2018; Fujii, Adachi, Nagaya

¹ Since it is still difficult to distinguish between the PPNC and the LN in the al-Jafr Basin, our previous synthesis collectively treated them as the Jafr LN (Fujii 2013). This paper follows this periodization.

2018, 2019). The total area of this structural complex measured *c.* 200 square meters, but the rockshelter settlement itself had almost the same area as the encampment of Khashm ‘Arfa.

The six rockshelter dwellings measured *c.* 2-4.5m in frontage, *c.* 0.5-3m in depth, and up to *c.* 2-3m in preserved ceiling height, being equipped with a low masonry wall *c.* 0.5m high, probably a protect wall against wind and wild animals, at their opening (Pl. 3: 11). However, their internal space was entirely empty, and no small features were incorporated. They seemingly looked like *ad hoc* corrals or storage, but the occurrence of a large number of flint artifacts and the existence of ashy deposits proved they were used as temporary dwellings of initial pastoral nomads.

Here again, small finds were limited to flint artifacts, grinding implements, and faunal remains only. However, the details of each assemblage contrasted with those of Khashm ‘Arfa. To begin with, the flint assemblage was clearly flake-oriented and dominated by irregular knives often with a cortical dorsal surface (Pl. 3: 12-16). These rather *ad hoc* tools, also called cortical knives, can be regarded as a proto-type of tabular scrapers that are thought to have been used for multiple purposes including butchering, hide-working, and/or wool-shearing of livestock (Rosen 1997: 74). The predominance of the cortical knives is inextricably linked to the disappearance of hunting weapons, suggesting that livestock herding entirely replaced hunting of wildlife. Such a drastic change extends to the ground stone assemblage as well, and bilaterally-notched stone weights and diagonally truncated limestone bars, both characteristic of the Khashm ‘Arfa ground stone assemblage, were no longer included. Both facts clearly indicate a complete departure from the PPNB lithic tradition (and probably lifestyle) still persisting at Ksham ‘Arfa.

Six C-14 dates converge on a limited time range around 5000-4700 calBC,² indicating that the Layer 2 rockshelter settlement dates back to the final phase of the LN or the LN/Chalcolithic transitional stage (Fujii, Adachi, Nagaya 2018, Table 2). The contents of small finds, especially the predominance of the cortical knives, accord with this chronological perspective. This unique site highlights the acceleration of pastoral nomadization during the second half of the LN.

Water-catchment facilities

Following the discovery of PPNB barrages and cisterns in the western half of the basin (Fujii 2010a, 2010b), our subsequent surveys located a few

² Table 2 in Fujii *et al.* 2018 mistyped the dates as *calBC*, but *calBP* is correct.

dozen water-catchment facilities in its eastern half, especially in the hilly terrain north of Khashm ‘Arfa (Fujii 2017b). They differed from the PPNB counterparts in many aspects (Pl. 4). To begin with, they were separated from the settlement and no longer constituted a compact outpost complex such as Wadi Abu Tulayha. Second, unlike the PPNB barrages and cisterns both constructed across or beside a small wadi, they usually occupied a bottom of a shallow depression encompassed by gentle slopes. Third, partly for this reason, they had a cistern-like closed plan and, at the same time, were equipped with barrage-like long guiding walls, thereby taking on a barrage/cistern fusion form as a whole.

Their date is unclear because the absence of C-14 dates and the scarcity of *in situ* finds make it difficult to access. The only clue is provided by bilaterally-notched stone weights and diagonally truncated stone bars, both of which were incorporated into barrage walls as converted construction materials probably with some ritualistic significance (Pl. 4: 1-4). The same custom has been confirmed at the PPNB barrages as well, but it is noteworthy that the artifacts from the fusion-type barrages are much smaller in size than the PPNB counterparts and have much more in common with those from the LN encampment of Khashm ‘Arfa (Fujii 2013: fig. 13). Thus, it is highly possible that the fusion-type barrages were combined with surrounding contemporary campsites such as Khashm ‘Arfa to form a loosely organized complex. It appears, however, that such a complex did not continue to exist for a long time. The research outcomes at the Final LN rockshelter settlement of Jabal Juhayra suggest that the full-scale water-use strategy inherited from the PPNB outpost complex was replaced by a simple method during the second half of the LN.

Open Sanctuaries

The linear-settlement-shaped open-air sanctuary, also called *pseudo-settlement*, is another landmark of the Jafr LN (Fujii 2013: 70-77). This unique structural complex is formed through a continuous lateral connection of a homogeneous unit, also called *pseudo-house*, that combines a square to rectangular structure and a small round feature. In terms of technology, it is characterized by a two-rowed, upright-slab wall technique inherited from the Badia PPNB settlements around the southern Levant. The reason why we define this type structural complex as *pseudo-settlement* is that: first, it is isolated in a dryland far from the sedentary cultural sphere; and, second, it seemingly takes on the appearance of a real settlement but, in fact, lacks

any traces of everyday life. In fact, with only a few exceptions mentioned below, it is completely empty and includes neither hearths nor any kind of artifacts despite its large scale. In this sense, the pseudo-settlement can be understood as a symbolic form of linear settlements characteristic of the Jordanian Badia PPNB (Fujii 2014a). In view of the endless connection of the homogeneous pseudo-houses with a tomb-like small feature, one possible interpretation is that the pseudo-settlement was used for some group ritual, probably ritual for authorizing the succession of the position of a group leader and thereby maintaining group ties (Fujii 2013: 77). To date, the following several examples have been attested in and around the basin.

Harrat Juhayra 0³

This large-scale, single-period site is located at the northwestern corner of the basin, on a tongue-shaped lava plateau that extends eastward from the foot of Jabal Juhayra mentioned above. The excavation undertaken in 2004 revealed a typical pseudo-settlement *c.* 500m in total length, which stretched first in the NE-SW, then the N-S, and finally the NW-SE directions on the flat hilltop (Pl. 2: 3, 5: 1) (Fujii 2005).

The series of unique traits peculiar to the pseudo-settlement – an isolated location in a dryland, two-rowed upright slab wall technique, homogeneous units all consisting of a square to rectangular structure and a small round feature, their endless connection in a lateral direction, and the absence of traces of everyday life – was observed. What sets this pseudo-settlement apart from the others is that several freestanding pseudo-houses are dotted around its northern edge. It appears that they were followed by, first, a few loosely connected pseudo-houses, and, then, truly connected ones. The development of the linear complex in the observers' right to left direction is corroborated by the wall-sharing relationships between any two adjacent connected units. Thus, it would follow that this pseudo-settlement started with the freestanding Juhayra 0 type units (characterized by their vertically long plan and a horizontally long rear compartment), through the loosely connected Juhayra I type units (marked by their square plan and the rear compartment inherited from the Juhayra 0 type units), and developed into the truly connected Juhayra II type units (equipped with a quadrant compartment at their rear right corner and a few rectilinear features at

³ Our previous report referred to this site simply as Harrat Juhayra (Fujii 2005), but this paper renames it as Harrat Juhayra 0 to avoid confusion with Harrat Juhayra 1-3 recently found in the same area (Fujii, Adachi and Nagaya forthcoming).

the opposite corner). This typological sequence provides a key to seriating the following pseudo-settlements in a chronological order.

Qa' Abu Tulayha

The site of Qa' Abu Tulayha is located in the middle of a gently undulating, flint-strewn desert that covers the northwestern part of the basin. This is a large-scale stratified site, quite uncommon in drylands in southern Jordan, containing two post-PPNB cultural layers. The excavations took place over five seasons from 1997 to 2001, when a pseudo-settlement was found for the first time underneath Early Bronze Age structures (Fujii 2000, 2001).

This pseudo-settlement is *c.* 180m in total length and composed of three long segments that are aligned in the NE-SW direction with two large and small gaps in between (Pl. 2: 4, 5: 2). Here again, the wall-sharing relationship between any two adjacent units indicated the southwestward extension of the linear complex, but each unit changed into the Tulayha type equipped with rear left features only. There is little doubt that this site immediately followed Harrat Juhayra 0.

This pseudo-settlement exceptionally yielded a heavy-duty flint tool from Unit C of the Northern Complex, which was probably used for digging a shallow foundation ditch for the two-rowed upright slab wall. In addition, a vaguely delineated hearth was found at the central floor of Unit E of the Central Complex. It contained a small amount of charcoal remains, which provided a C-14 date falling within the first half of the LN (6032-5837 calBC). This means, conversely, that the Harrat Juhayra 0 pseudo-settlement dates further back to the very beginning of the LN.

'Awja Sites

The 'Awja Sites are located in a sand desert near the border with Saudi Arabia, consisting of five small-scale open sanctuaries (i.e. 'Awja 1-5) dotted within a radius of 2km. The excavations undertaken during 2011-2012 confirmed a variety of pseudo-settlements ranging in date and style from their initial forms to the final ones (Fujii, Adachi, Yamafuji *et al.* 2012; Fujii, Adachi, Endo *et al.* 2013).

What appears the earliest is a freestanding pseudo-house found at 'Awja 2 (Pl. 5: 3). In view of its square plan with a rear, horizontally long compartment, this structure probably falls under an intermediate form between the Juhayra 0 and I types pseudo-houses. A short pseudo-settlement

at 'Awja 5 is its connected form, bearing a strong resemblance to the Northern Complex of the Harrat Juhayra 0 pseudo-settlement (Pl. 2: 5, 5: 4).

Complex I at 'Awja 1 (Pl. 2: 6, 5: 5) is the highlight of the excavations. This elaborate pseudo-settlement, measuring *c.* 18m in total length, was accompanied by a total of eight slab-lined features representing large and small feline animals (Fujii 2014b). Parallel examples have been reported from several LN open sanctuaries in the Negev and Sinai (e.g. Yogev 1984; Goring-Morris 1993; Eddy and Wendorf 1999; Avner 2002). The widespread distribution of these unique artistic representations suggests that a homogeneous nomadic culture covered the drylands east and west of the Lower Jordan Valley. In terms of typology, this pseudo-settlement shows the following three new trends: 1) the reduction in lateral connection and a consequent decrease in total length of a complex; 2) the typological change from a vertically long or square unit to a horizontally long one; and 3) the simplification of the general layout of the indoor space.

Complex II at the same site inherits these new trends, and two short pseudo-settlements are composed of only two simple units, respectively (Pl. 2: 7, 5: 6). The trends are enhanced even further at 'Awja 4, where two slightly skewed, completely empty units are connected to form a short and stepped complex (Pl. 2: 8, 5: 7). It is this shortened pseudo-settlement type that is common in the Negev and Sinai (e.g. Eddy and Wendorf 1999, fig. 3-34, 3-42). Our recent investigation in northern Hijaz has also confirmed three parallel examples at the Wadi Ghubai Sites *c.* 50km north of Tabuk (Fujii, al-Mansoor *et al.* forthcoming).

Discussion

The above review has revealed that the LN sites in the al-Jafr Basin were much more diverse in contents than expected. The following discussion explores the overall picture of the LN cultural landscape in the basin in light of the presented research outcomes.

A key to the issue is the mutual relationship among the three major components (i.e. settlements, barrages, and open sanctuaries) and its diachronic transition, but it is not easy to approach them because available datasets are still patchy. However, one thing we could say is that the LN remote encampment of Khasm 'Arfa and its surrounding fusion-type barrages were potentially combined to form a unified cultural entity, as suggested above. This is all the more likely because the preceding PPNB outpost complexes had a similar combination, albeit different in scale and degree of aggregation

(Fujii 2013: 55-69). Thus, it is safe to say that the initial LN encampment represents a simplified form of the PPNB outpost-size settlement (Pl. 6). In fact, the final units at Wadi Abu Tulayha show a tendency to diminish in size and become less standardized in general plan, bridging the typological gap with the three sub-rectangular dwellings at Khashm 'Arfa (Fujii 2006). The same is also true of barrages. As suggested by the existence of a transitional example at Wadi Nadiya 2 (Fujii, Adachi, Endo *et al.* 2013), the LN fusion-type barrage can probably be regarded as an integrated form of the PPNB barrage and cistern.

Taken together, it can be said that while the PPNB cultural landscape in the basin is characterized by the tight combination of the three major components (i.e. a fixed outpost-size settlement, a basin-irrigation barrage, and a pit-type cistern), the first half of the LN landscape is marked by a loose combination of their subsequent forms (i.e. a small encampment and a fusion-type barrage). The transition between the two landscapes probably mirrors a shift in lifestyle from short-distance livestock herding around a fixed outpost to initial pastoral nomadism migrating in a wide territory.

What followed this transitional cultural landscape is the combination of the rockshelter settlement and the small waterholes at Jabal Juhayra. Even though a nearly two millennia gap intervenes between the two, the difference is great and suggestive of a remarkable change in lifestyle. Noteworthy in this respect is the fact that the blade-oriented flint assemblage centering on hunting weapons was entirely replaced by a flake assemblage dominated by cortical knives. Assuming that the latter assemblage was intended for exploitation of livestock resource including secondary products such as wool, the dramatic change in flint tool typology during the second half of the LN could be understood as reflecting eventual departure from the traditional PPNB outpost culture and subsequent acceleration of pastoral nomadization.

The above discussion has suggested that the LN cultural landscape in the al-Jafr Basin falls broadly into the early and late halves in terms of settlement patterns and water-use strategies. The remaining question is how the pseudo-settlements, the third key component of the LN cultural landscape, were concerned with the change in real life represented by the other two components, but it is difficult to specify which pseudo-settlement corresponded to which settlement. It is nearly certain, however, that the standard type pseudo-settlements such as Harrat Juhayra 0 and Qa' Abu Tulayha were roughly contemporary with the initial LN encampment/barrage complex of Khashm 'Arfa, whereas the shortened pseudo-settlements

such as 'Awja 1 and 4 were coeval with the final LN complex at Jabal Juhayra. If so, it would follow that in synchronism with the settlement, the pseudo-settlement were also downsized and segmented during the second half of the LN. This tendency deserves further study as it potentially corresponds to the egalitarianism based on the segmentary lineage system, a unique characteristic of the nomadic society (e.g. Sahlins 1961; Peters 1990).

Concluding remarks

The above review and discussion have shed new light on the overall picture and its diachronic transition of the LN cultural landscape in the al-Jafr Basin. It is our present understanding that while its first half is characterized by a loose combination of a small encampment, a fusion-type barrage, and a standard type pseudo-settlement, the latter half is marked by an even looser combination of their simplified, deteriorated, or segmented forms. Significantly, while the early landscape slightly recalls the PPNB outpost complex, the later one has much more in common with more nomadic landscapes from the Chalcolithic onward. In this sense, the diachronic transition of the LN cultural landscape holds a key to tracing the formation process of full-fledged nomadic society in southern Jordan. However, a comprehensive discussion of this sort is required to incorporate increasing research data from the east and west areas of the basin (e.g. Betts *et al.* 2013; Rollefson 2013; Abu-Azizeh *et al.* 2014; Rollefson *et al.* 2014; Gebel 2016; Kołodziejczyk 2018 and 2019). This short paper would hopefully serve as an information platform for promoting the integration.

Acknowledgements

This paper is our response to the suggestive oral presentation by Dr. Piotr Kołodziejczyk and his colleagues at the international symposium held in Jagiellonian University on 7-9 June 2019. We would like to thank them for offering us a precious opportunity to learn the current information of the Polish expedition in southern Jordan. Our thanks go as well to all the participants and two anonymous reviewers, whose comments and questions were very useful for clarification of our points. It should also be added that this study was financially supported by the Japan Society for the Promotion of Science (the Grant-in-Aid for Scientific Research [S], No. 25220402 and 19H05592).

References

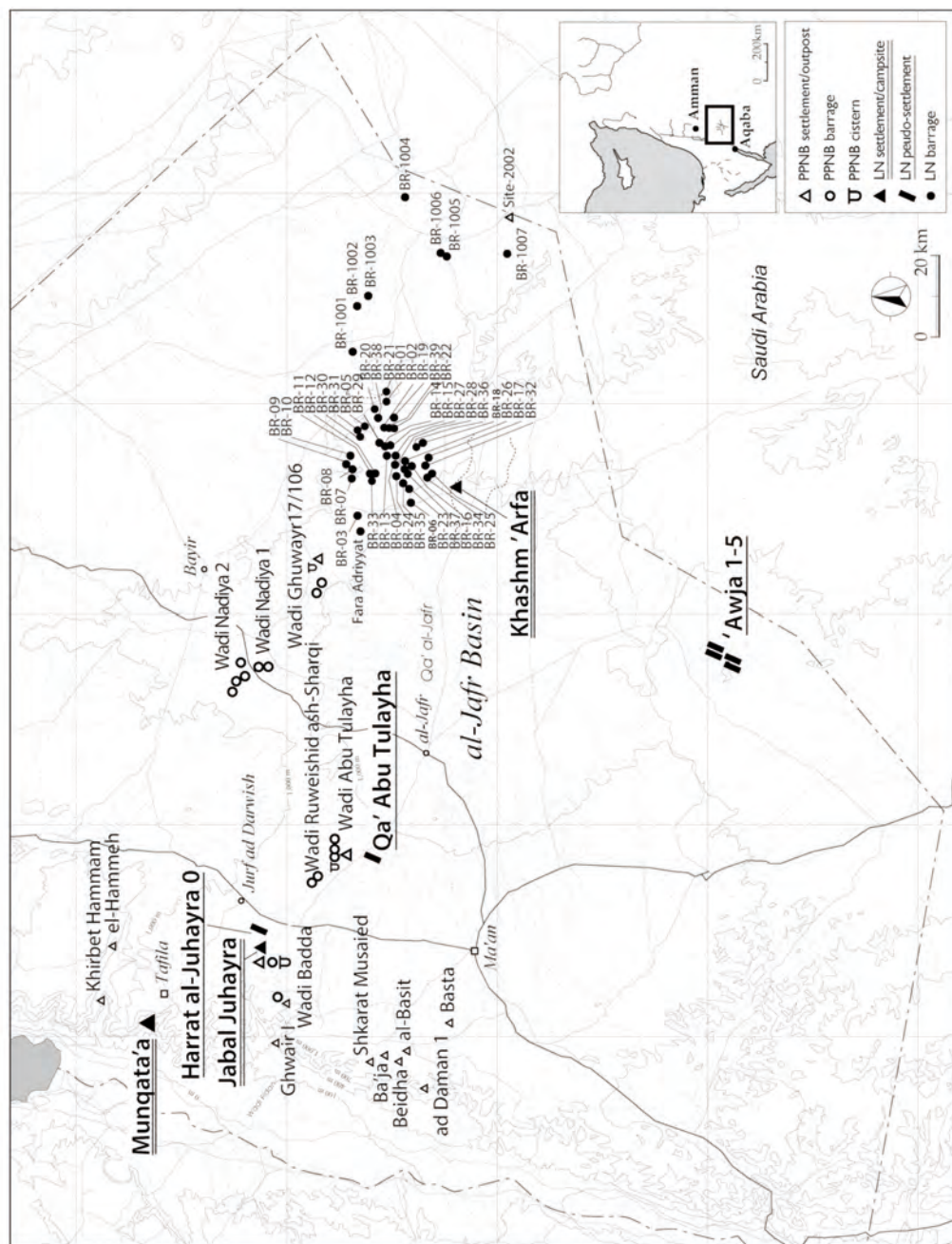
- Avner U. 2002.** *Studies in the Material and Spiritual Culture of the Negev and Sinai Populations, during the 6th-3rd Millennia B.C.* Ph. D. Thesis, Hebrew University. Jerusalem.
- Abu-Azizeh W., Tarawneh M., Abudanah F. and Al-Salameen A. 2014.** Variability within consistency: Cairns and funerary practices of the Late Neolithic/Early Chalcolithic in the al-Thulaythuwa area, southern Jordan. *Levant* 46/2, 161-185. <https://doi.org/10.1179/0075891414Z.000000000040>.
- Bell G. L. 1907.** *The Desert and the Sown: The Syrian Adventures of the Female Lawrence of Arabia.* London.
- Betts A. V. G., Cropper D., Martin L. and McCartney C. 2013.** *The Late Prehistory of the Badia: Excavations and Surveys in Eastern Jordan*, vol. 2. Oxford.
- Eddy F. W. and Wendorf F. 1999.** *An Archaeological Investigation of the Central Sinai, Egypt.* Boulder.
- Fujii S. 2000.** Qa' Abu Tulayha West: An interim report of the 1999 season. *ADAJ* (Annual of the Department of Antiquities of Jordan) 44, 149-171.
- Fujii S. 2001.** Qa' Abu Tulayha West, 2000: An interim report of the fourth season. *ADAJ* 45, 15-39.
- Fujii S. 2005.** Harrat al-Juhayra pseudo-settlement: A preliminary report of the al-Jafr Basin Prehistoric Project, 2004. *ADAJ* 49, 57-70.
- Fujii S. 2006.** Wadi Abu Tulayha: A preliminary report of the 2005 spring and summer excavation seasons of the Jafr Basin Prehistoric Project, Phase 2. *ADAJ* 50: 9-31.
- Fujii S. 2010a.** A comprehensive review of Neolithic water catchment facilities in the Jafr Basin, southern Jordan: A preliminary report of the Jafr Basin Prehistoric Project (Phase 3), 2009. *ADAJ* 54, 371-386.
- Fujii S. 2010b.** Domestication of runoff water: Current evidence and new perspectives from the Jafr pastoral Neolithic. *Neo-Lithics* 2/10, 14-32.
- Fujii S. 2013.** Chronology of the Jafr prehistory and protohistory: A key to the process of pastoral nomadization in the southern Levant. *Syria* 90, 49-125. <https://doi.org/10.4000/syria.1723>.
- Fujii S. 2014a.** Make-believe playhouses at Wadi Burma East: A cognitive approach to the Neolithic unilinear settlement in the Jafr Basin, southern Jordan. In B. Finlayson and C. Makarewicz (eds.) *Settlement, Survey and Stone. Essays on Near Eastern Prehistory in Honour of Gary Rollefson*, 101-116. Berlin.

- Fujii S. 2014b.** Mosaic representations of feline animals: New finding at 'Awja 1, a Late Neolithic open sanctuary in southern Jordan. *Proceedings of the 9th International Congress of Archaeology of the Ancient Near East*, vol. 3, 549-559. Wiesbaden.
- Fujii S. 2015.** Rescue excavations at Jabal Juhayra a stratified Neolithic settlement in the al-Jafr Basin. *Neo-Lithics* 1/15, 23-33.
- Fujii S. 2017a.** Subsequent excavations at the Neolithic Rockshelter settlement at Jabal Juhayra (al-Jafr Basin, Jordan). *Neo-Lithics* 2/17, 3-14.
- Fujii S. 2017b.** A preliminary report on the Neolithic barrage surveys in the eastern Jafr, 2013-2014. *ADAJ* 5, 585-599.
- Fujii S. 2018.** Badia Neolithization in southern Jordan: A brief review from current research in the Jafr Basin. In Al-Salameen, Z. M. and Tarawneh, M. B. (eds) *Refereed Proceedings of the First Conference on the Archaeology and Tourism of the Maan Governorate, 3rd- 4th October, 2017, Petra-Jordan*, 105-124. Maan.
- Fujii S., Adachi T., Endo H. and Yamafuji M. 2013.** 'Awja sites: Supplementary investigations of Neolithic open sanctuaries in southernmost Jordan. *ADAJ* 57, 337-358.
- Fujii S., Adachi T., Endo H., Yamafuji M., Arimatsu Y. and Nagaya K. 2013.** Excavations at Wadi Nadiya 2 and supplementary investigations of the Jafr Neolithic barrage system. *ADAJ* 57, 373-398.
- Fujii S., Adachi T. and Nagaya K. 2018.** Jabal Juhayra, 2014-2015: Excavations of the post-PPNB Layer. *ADAJ* 59, 193-215.
- Fujii S., Adachi T. and Nagaya K. 2019.** Jabal Juhayra, 2015-2016: Excavations of the Layer 3 (Pre-Pottery Neolithic B) Settlement. *ADAJ* 60.
- Fujii S., Adachi T. and Nagaya K. forthcoming.** Harrat Juhayra 2: Excavations at a Chalcolithic dettlement in the al-Jafr Basin, southern Jordan. *ADAJ* 62.
- Fujii S., Adachi T., Yamafuji M. and Nagaya K. 2012.** 'Awja 1-3: Neolithic and Chalcolithic open sanctuaries in southernmost Jordan. *ADAJ* 56, 171-185.
- Fujii S., Adachi T., Yamafuji M. and Nagaya K. 2017a.** Hashm al-'Arfa: An early Neolithic encampment in the eastern Jafr Basin, southern Jordan. *ADAJ* 58, 567-584.

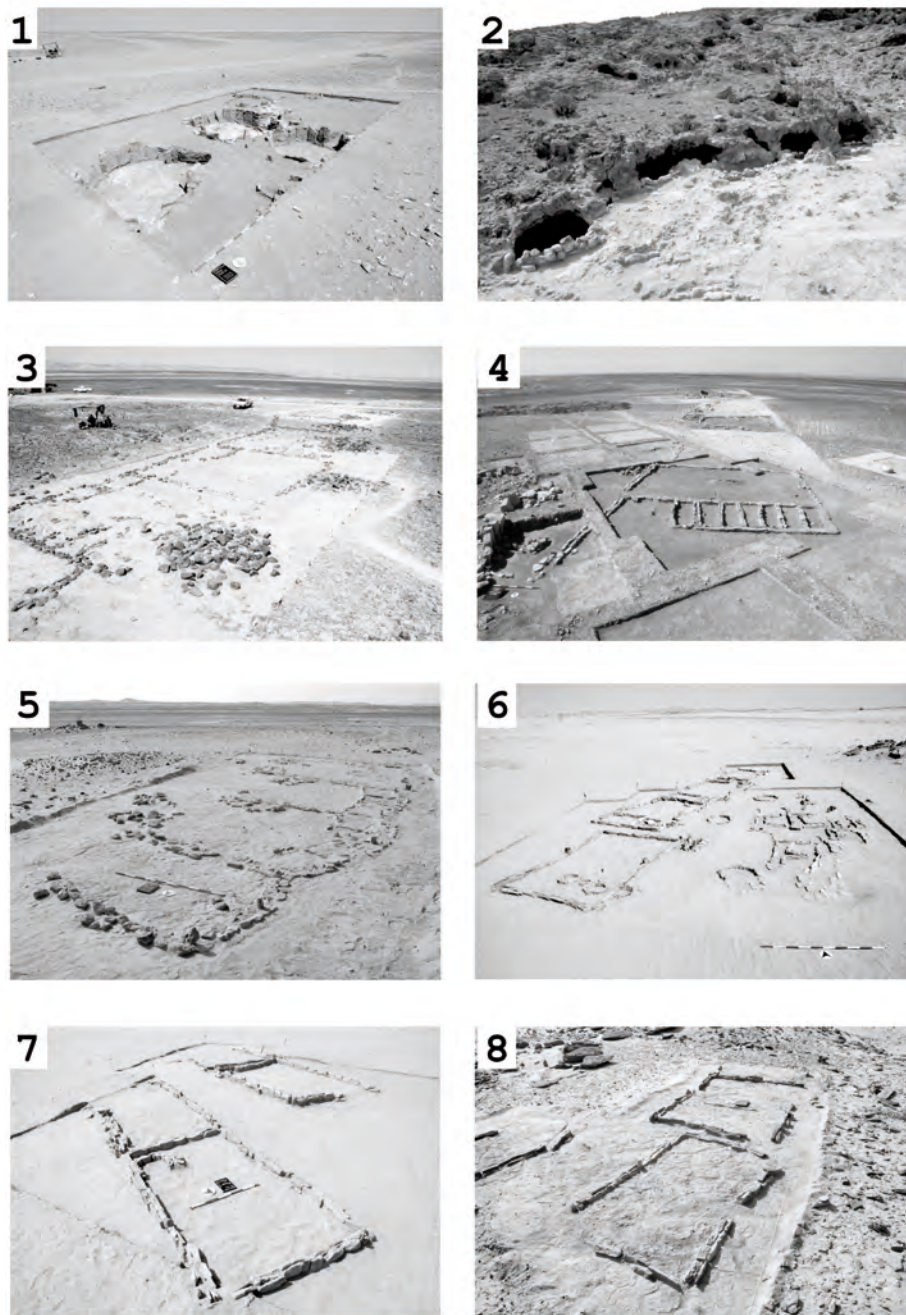
- Fujii S., Adachi T., Yamafuji M. and Nagaya K. 2017b.** A preliminary report on the Neolithic barrage surveys in the eastern Jafr, 2013-2014. *ADAJ* 58, 585-599.
- Fujii S., al-Mansoor A., Adachi T. and Nagaya K. forthcoming.** A preliminary report on the excavations at Wadi Muharraq and Wadi Ghubai sites in NW Arabia. *Atlal: The Journal of Saudi Arabian Archaeology*.
- Gebel H. G. K. 2016.** The socio-hydraulic formations of oasis life in NW Arabia : The 5th millennium BCE shepherd environs of Rajajil, Rasif and Qulban Beni Murra. In M. Luciani (ed.) *The Archaeology of North Arabia: Oases and Landscapes*, 79-113. Vienna.
- Goring-Morris A. N. 1993.** From foraging to herding in the Negev and Sinai: The early to late Neolithic transition. *Paléorient* 19/1, 65-89. <https://doi.org/10.3406/paleo.1993.4584>.
- Kołodziejczyk P. 2019.** HLC Project 2014-2019. Research activity of Jagiellonian University in southern Jordan. In P. Kołodziejczyk (ed.) *Discovering Edom: Polish Archaeological Activity in Southern Jordan*, 31-49. Krakow. <https://doi.org/10.33547/DiscEdom2019.02>.
- Kołodziejczyk P., Nowak M., Wasilewski M., Witkowska B., Karmowski J., Czarnowicz M., Brzeska-Zastawna A., Zakrzeńska J., Radziwiłko K. and Kościuk J. 2018.** HLC Project 2017: Jagiellonian University excavations in southern Jordan. *Polish Archaeology in the Mediterranean* 27/1, 379-416. <https://doi.org/10.5604/01.3001.0013.2011>.
- Peters E. L. 1990.** *The Bedouin of Cyrenaica: Studies in Personal and Corporate Power*. Cambridge. <https://doi.org/10.1017/CBO9780511598357>.
- Rollefson G. O. 2013.** Late Neolithic aggregation patterns in Jordan's Eastern Badia. *Syria* 90, 211-230. <https://doi.org/10.4000/syria.1803>.
- Rollefson G., Rowan Y. and Wasse A. 2014.** Late Neolithic colonization of the Eastern Badia of Jordan. *Levant* 46/2, 285-301. <https://doi.org/10.1179/0075891414Z.000000000046>.
- Rosen S. A. 1997.** *Lithics after the Stone Age: A Handbook of Stone Tools from the Levant*. London.
- Sahlins M. 1961.** The segmentary lineage: An organization of predatory expansion. *American Anthropologist* 63, 322-343. <https://doi.org/10.1525/aa.1961.63.2.02a00050>.

Yogev O. 1983. A fifth millennium B.C.E. sanctuary in the 'Uvda Valley.
Qadomoniot 16/4, 118-132.

Sumio Fujii
Institute of Human and Social Sciences
Kanazawa University, Japan
fujiikun@staff.kanazawa-u.ac.jp

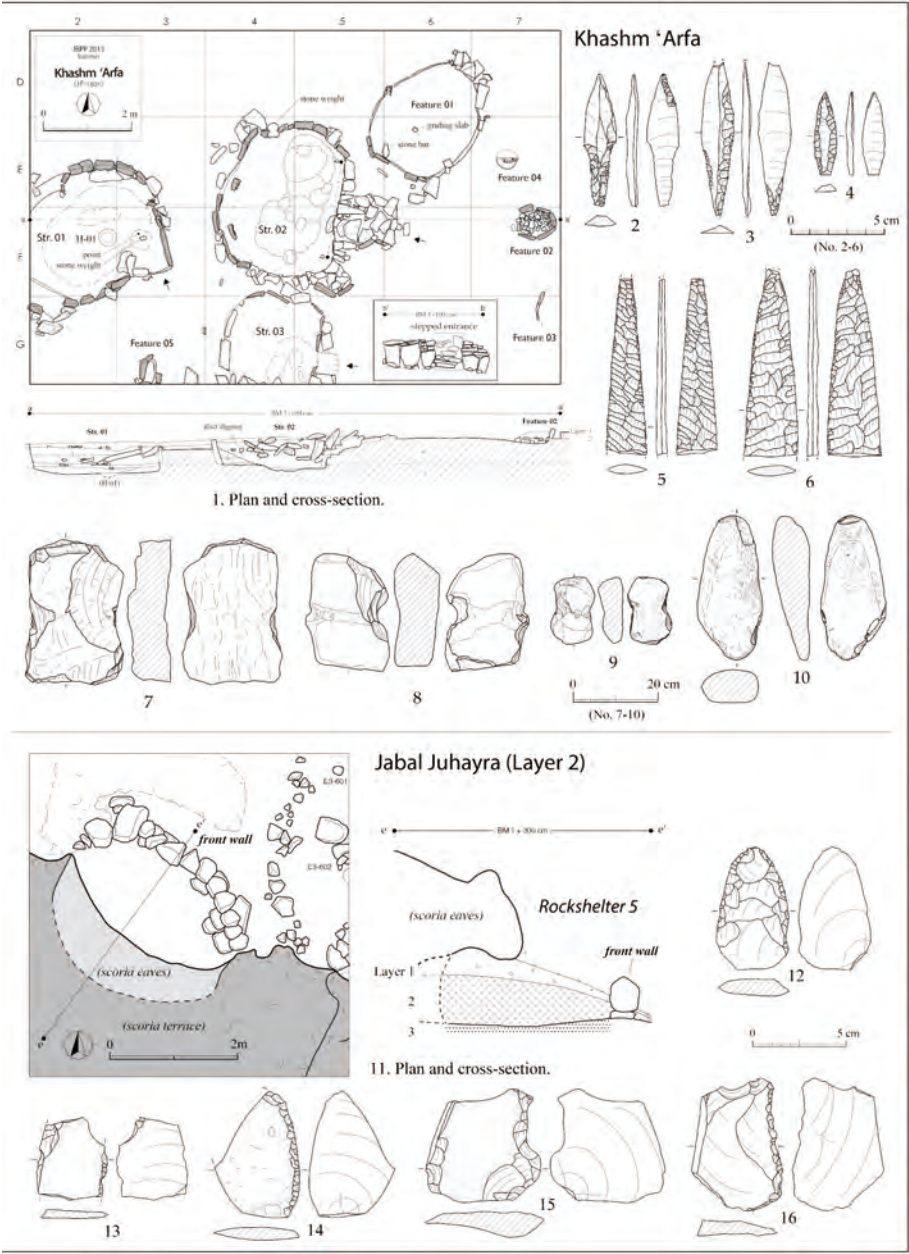


Pl. 1. Neolithic sites in and around the al-Jafr Basin

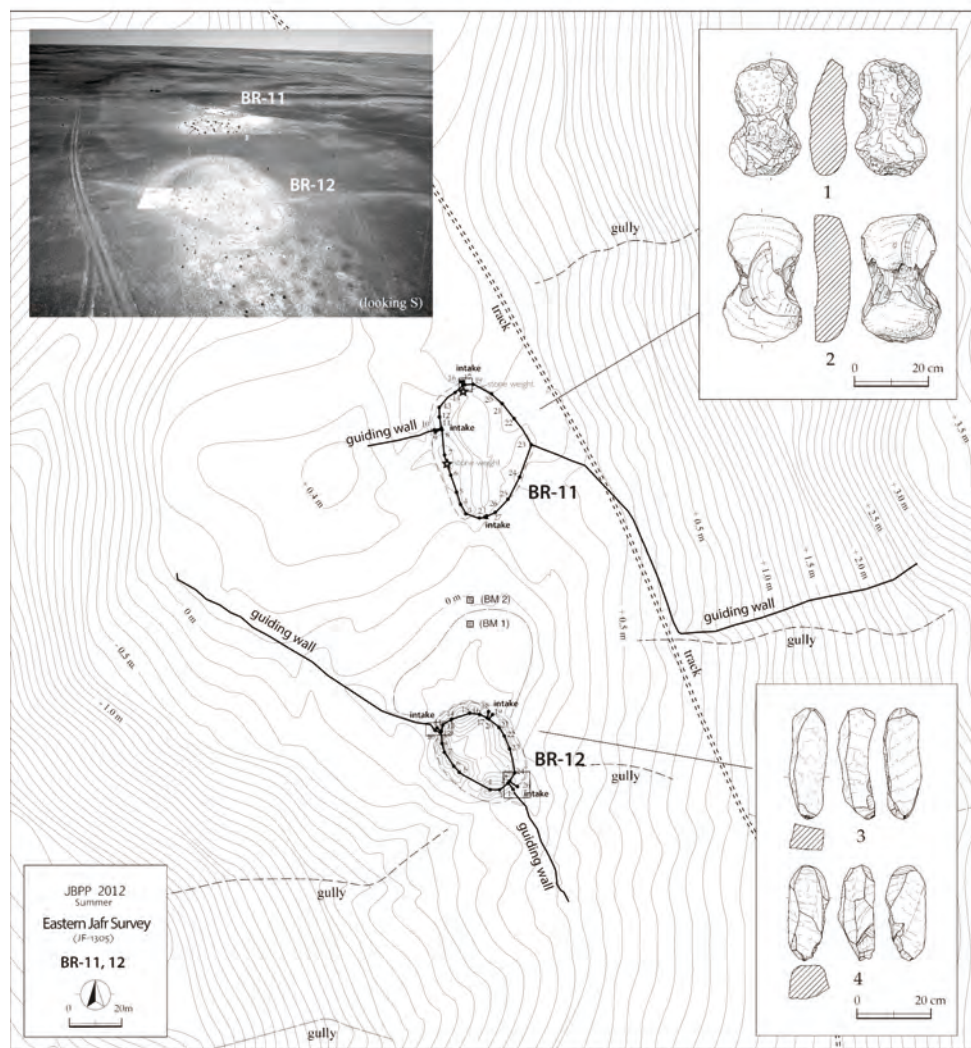


Pl. 2. Late Neolithic settlements and open sanctuaries in the al-Jafr Basin:

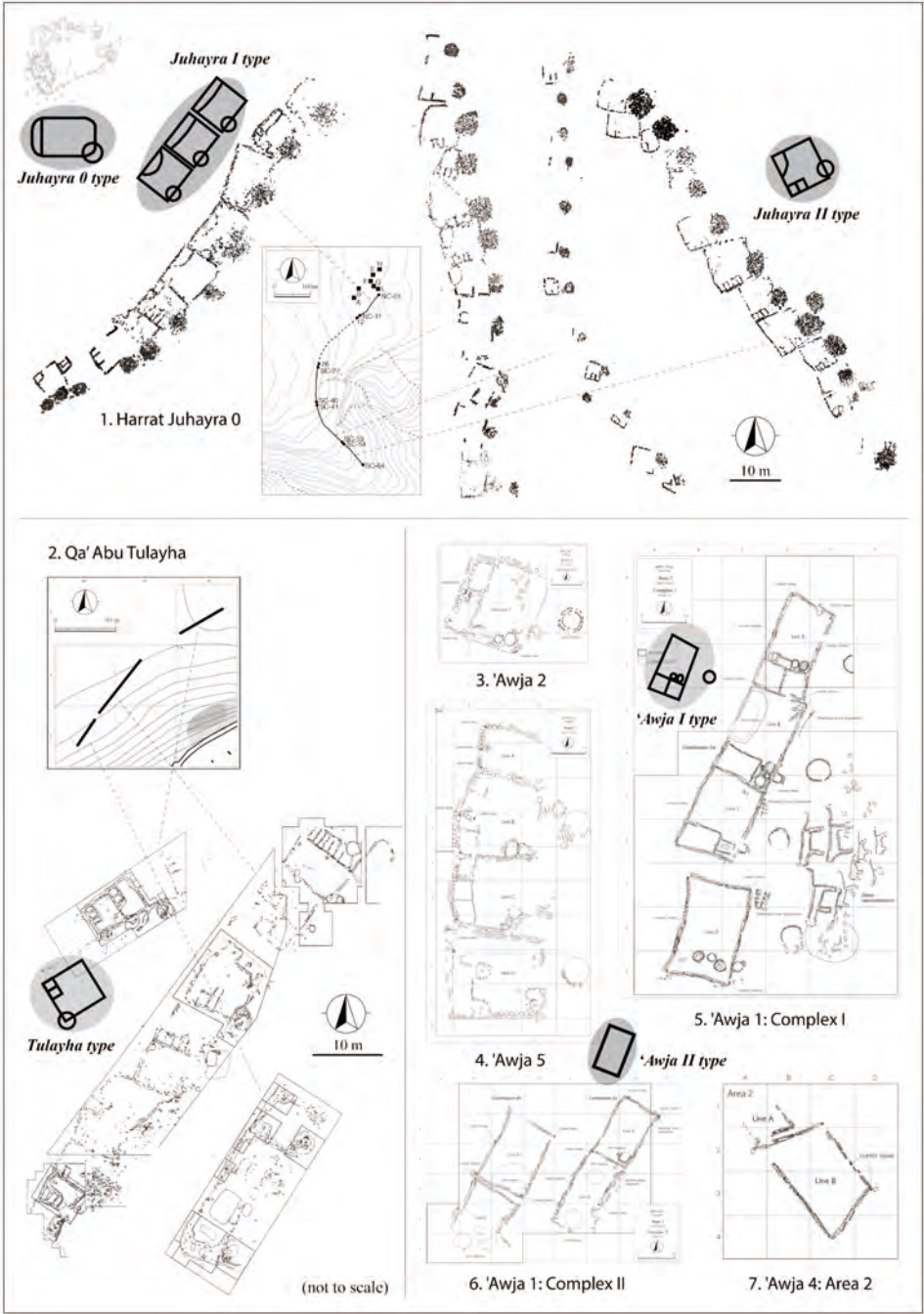
- 2: 1. Khashm 'Arfa encampment (looking NE)
- 2: 2. Jabal Juhayra rockshelter settlement (looking SW)
- 2: 3. Harrat Juhayra 0 pseudo-settlement (looking N)
- 2: 4. Qa' Abu Tulaya pseudo-settlement (looking SW)
- 2: 5. 'Awja 5 pseudo-settlement (looking SE)
- 2: 6. 'Awja 1, Complex I pseudo-settlement (looking N)
- 2: 7. 'Awja 1, Complex II pseudo-settlement (looking SW)
- 2: 8. 'Awja 4, Area 1 pseudo-settlement (looking SES)



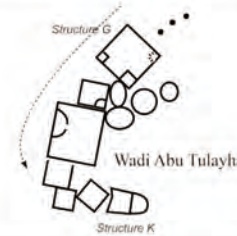
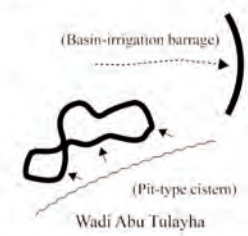
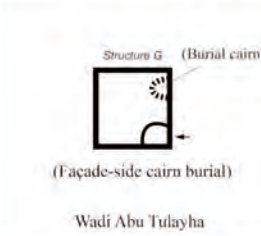
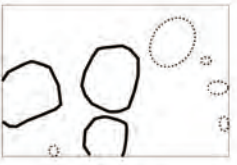



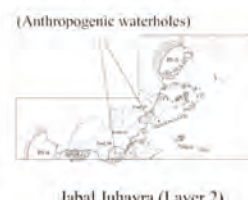
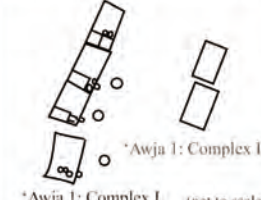
Pl. 3. Late Neolithic settlements in the al-Jafr Basin



Pl. 4. Late Neolithic fusion-type barrages in the al-Jafr Basin



Pl. 5. Late Neolithic open sanctuaries in the al-Jafr Basin

	Settlement	Water-catchment facility	Open sanctuary
PPNB	 <p>Structure G</p> <p>Wadi Abu Tulayha</p> <p>Structure K</p>	 <p>(Basin-irrigation barrage)</p> <p>(Pit-type cistern)</p> <p>Wadi Abu Tulayha</p>	 <p>Structure G (Burial cairn)</p> <p>(Façade-side cairn burial)</p> <p>Wadi Abu Tulayha</p>
(Early)	 <p>Khashm 'Arfa</p>	 <p>Easem Jafr Barrage 11, 12 etc.</p>	 <p>Harrat Juhayra Qa' Abu Tulayha</p>
LN	 <p>RS-1</p> <p>RS-2</p> <p>RS-3/4</p> <p>RS-5</p> <p>RS-6</p> <p>Jabal Juhayra (Layer 2)</p>	 <p>(Anthropogenic waterholes)</p> <p>Jabal Juhayra (Layer 2)</p>	 <p>*Awja 1: Complex II</p> <p>*Awja 1: Complex I (not to scale)</p>

Pl. 6. Comparisons of the PPNB and LN cultural landscapes