

TEN YEARS OF EXCAVATION AT THE EARLY NEOLITHIC SITE OF KHURAYSĀN (AZ ZARQĀ', JORDAN)

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Abstract

KHuraysān is an Early Neolithic site located in Az Zarqā', Jordan. The site has been excavated by a Spanish team since 2014. Several occupation levels, between 9000 and 6800 cal BC, have been documented. In the oldest level, corresponding to the end of the Pre-Pottery Neolithic A (PPNA), small subterranean oval huts were constructed. Around 8800 BC, the first signs of transition towards the PPNB are observed, with the presence of bipolar knapping, larger projectile points, and constructions with straight walls and right angles. Between 8500 and 8200 cal BC, in the Early PPNB, rectangular houses, which are adjacent to one another, with rounded corners were built with floors covered with lime mortar. Around 8200 cal BC, at the beginning of the Middle PPNB, houses were constructed with rectangular morphology, and the floors were covered with lime plaster. Throughout this sequence, an intensification in goat exploitation is observed, likely linked to their domestication, while pulses were consumed regularly.

Keywords

KHuraysān, Neolithic, Architecture, Agriculture, Livestock, Jordan

Introduction

KHuraysān (or Kharaysin, as it was named by the Australian team that discovered it) is situated in the municipality of Al Qunayyah, Az Zarqā' Governorate (32°12'25.08"N, 35°59'38.28"E), on the banks of the Az Zarqā' River, 40 kilometres north of 'Ammān (Fig. 1).

The archaeological site was discovered in

1984 by J.W. Hanbury-Tenison and his team during surveys conducted in the Jarash region and was attributed to the Pre-Pottery Neolithic B period (Hanbury-Tenison 1986; Edwards and Thorpe 1986). In 1989, Juan Fernández-Tresguerres conducted a sounding in the upper part of the site, just north of the road connecting Jarash and Az Zarqā', uncovering a Pottery Neolithic level superimposed on a Pre-Pottery Neolithic level. In 2014, another Spanish team initiated excavations at the site (Ibáñez *et al.* 2021), with ten successive excavation campaigns conducted between 2014 and 2024, except for a break in 2020 due to the COVID-19 pandemic. Excavations between 2014 and 2022 focused on areas A, B, and C. In 2016, a sounding was initiated in area D. However, due to the landowner's restriction on continued excavations in zones A, B, and C, we shifted our work to zone E in 2023. In 2024, we commenced detailed stratigraphic control on a 50-metre-long section, up to 3 metres in height, exposed during bulldozer activities (Figs. 2, 3).

KHuraysān is a slope site. Successive occupations were distributed along the incline, with habitation structures arranged on terraces running perpendicular to the slope. Each subsequent occupation phase established new terraces atop the previous ones (Monik *et al.* 2018).

Zone A

In this area, structures belonging to various occupation phases were documented after the removal of the surface sediment layer (Fig. 4). In the central area, within band 100, squares H, I, and J, three oval huts buried in the terrain



1. Map with KHuraysān (Kharaysin) and other Neolithic sites.

were discovered, corresponding to the earliest occupation phases of the site (Fig. 5). In H100, two of these superimposed huts are identified (Fig. 6). From the upper hut (structure 1), the north wall is preserved, associated with remains of a lime-plaster floor. Beneath it, we documented another oval hut with a packed-

earth floor, designated as structure 2 (Figs. 6, 7). This hut is dated between 9237 and 8830 cal BC, at the end of the Pre-Pottery Neolithic A (PPNA) period. Both huts were affected by two subsequent circular pits from the Middle Pre-Pottery Neolithic B (MPPNB) period.

In squares IJ100, we documented another

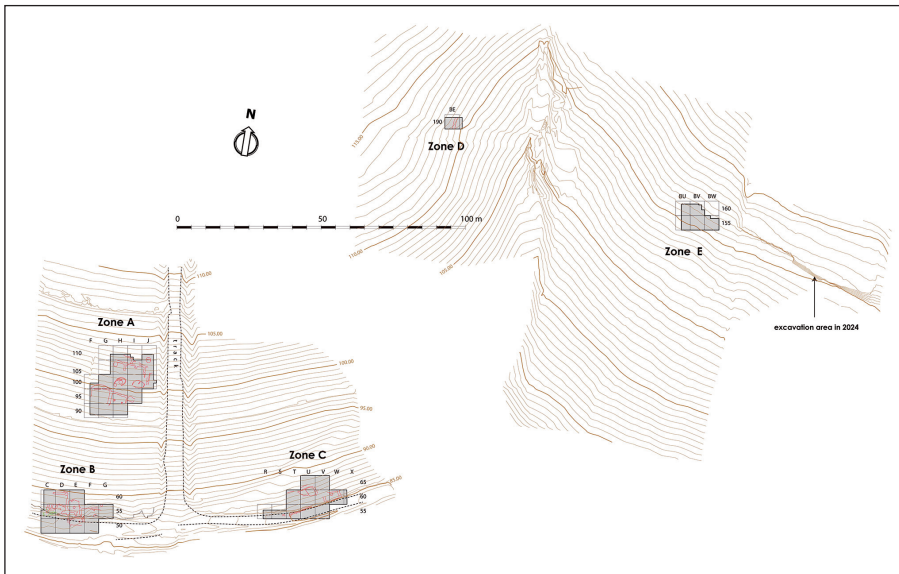


2. The site with the location of the excavation areas.

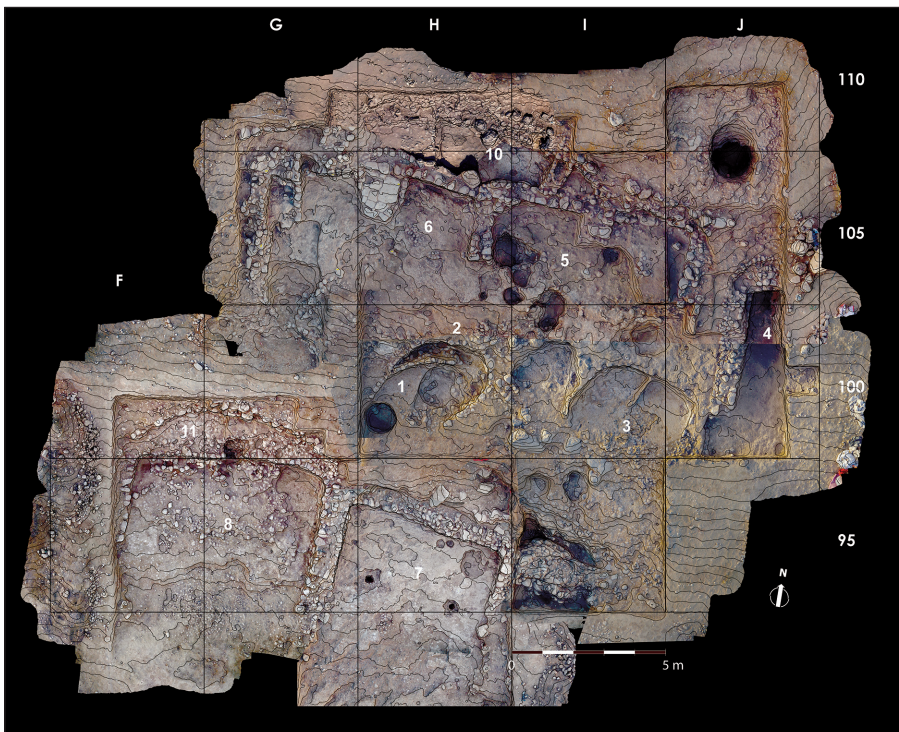
buried hut (structure 3), with a morphology between oval and rectangular (**Fig. 8**). The internal surface is divided into two rooms by a narrow mud wall. The western room is interpreted as an oven or hearth, as the floor was covered by a set of thermally altered cobblestones. The floor of the main room was covered by a layer of lime plaster, which extended up the walls as a coating. The circular pit filled with stones observed in the main room was likely a hearth. A portion of the lime floor around the hearth was painted with red

pigment. Two radiocarbon dates obtained from charcoal fragments place this structure between 9111 and 8629 cal BC. Huts 1 and 3 are likely contemporaneous (**Fig. 9**) and slightly later than hut 2.

In bands 105 and 95, two alignments of rectangular structures with lime-mortar floors were documented, dated to the MPPNB, with radiocarbon dates between 8160 and 7594 cal BC. The two lines of structures are parallel and located 10m apart (**Fig. 10**). The northern walls of the structures are perpendicular to the slope of



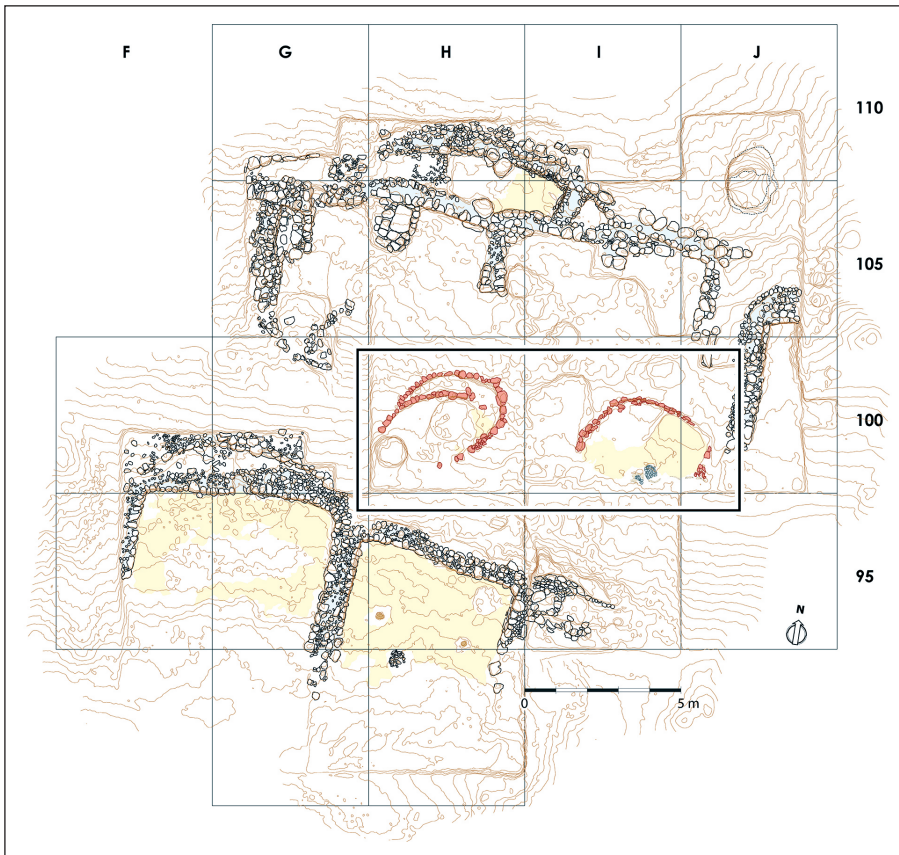
3. Topography of the site with the excavation areas.



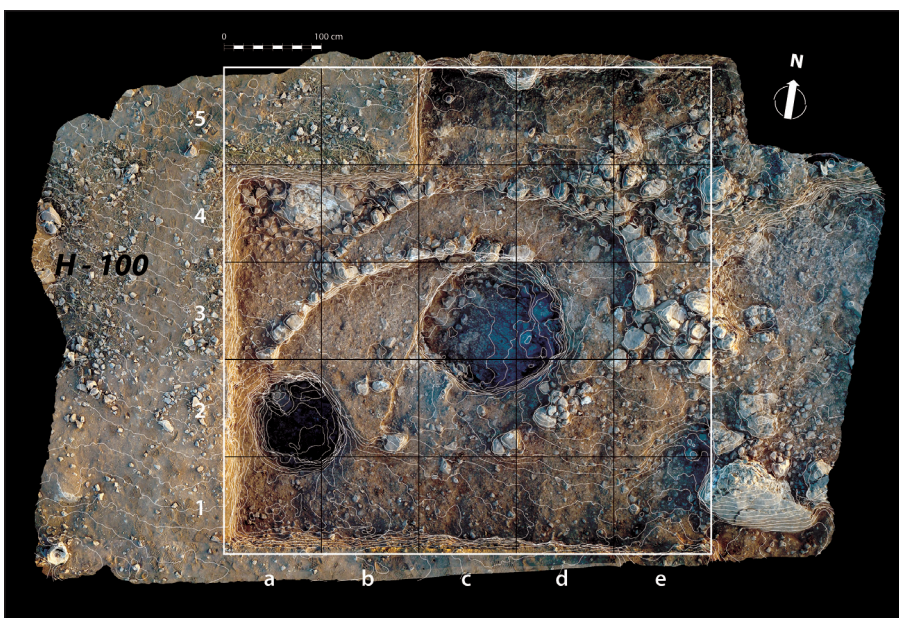
4. Orthophotography of zone A.

the terrain. The southern parts of the structures were destroyed by slope erosion. It is likely that both lines of structures are contemporaneous and reflect the organization of houses in the MPPNB. The houses were arranged adjacent to one another, sharing the north-south wall, with the northern part of the house buried in

the slope and the southern part freestanding. Circulation and access to the houses would have been from the south. In the northern line, three structures are distinguishable (**Fig. 11**). In the southern alignment, two houses sharing a wall in GH 90-95 are discernible (**Fig. 12**). Beneath these two houses, another larger rectangular



5. Plan of zone A.



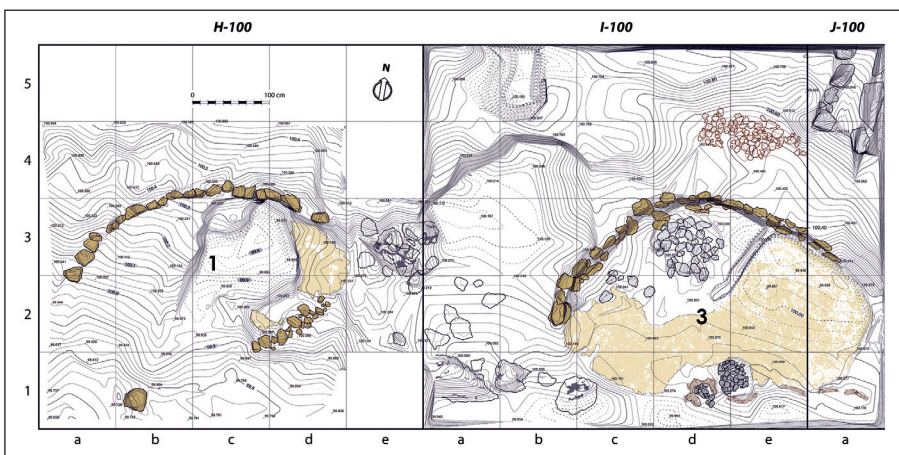
6. Orthophotography of structures 1 and 2.



7. View of structures 1 and 2.



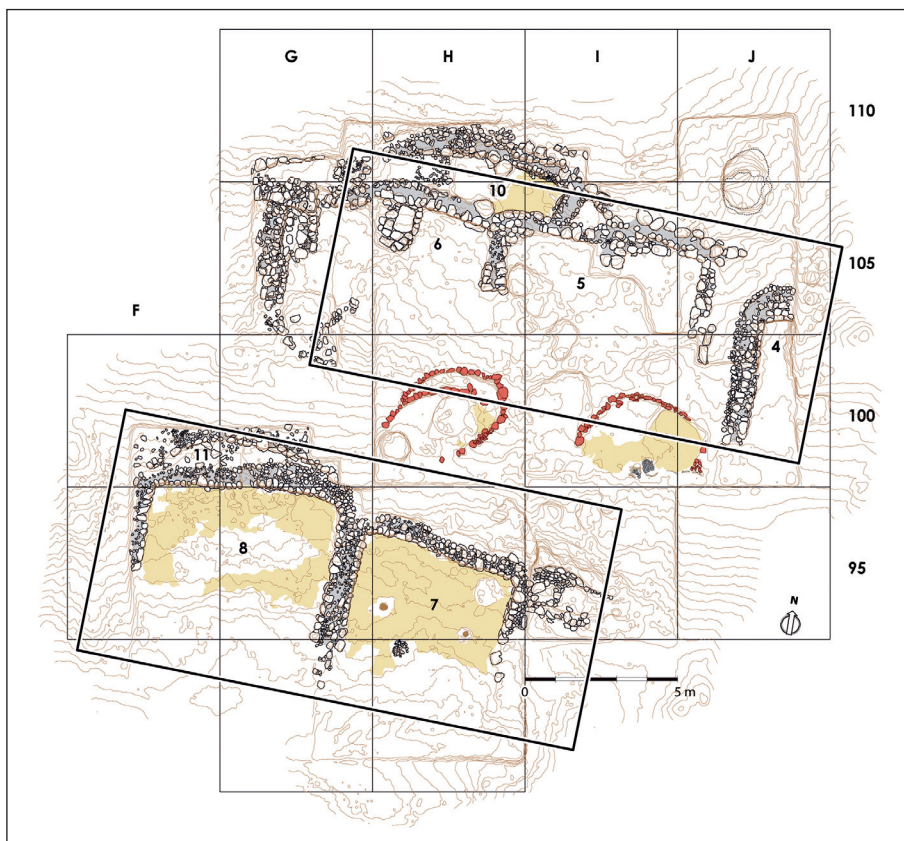
8. Overhead view of structure 3.



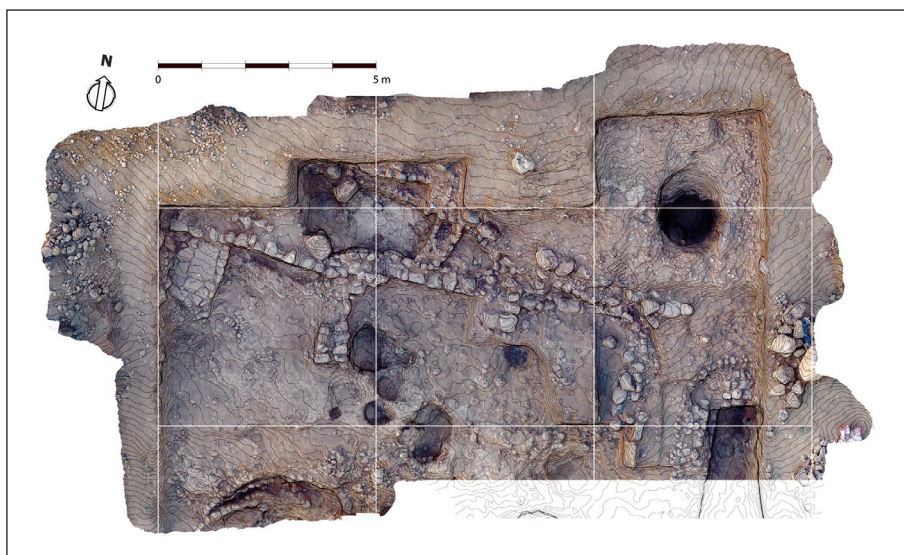
9. Structures 1 and 3.

structure was found (**Fig. 13**), measuring 8m on the north-south axis and 7m on the east-west axis (structure 9). The floor, covered with lime mortar, has two post holes that were part of the roof support system. Additional posts, embedded in the side walls, also served to support the roof. This house is also dated to the Middle PPNB, between 8202 and 7764 cal BC, although it slightly predates the two houses superimposed on it.

To summarize, in zone A, we have identified four architectural levels. Hut 2, an oval and buried structure with a packed-earth floor, corresponds to the oldest level, dated to the end of the PPNA, *ca.* 9000 cal BC. Huts 1 and 3 represent the part of the transition level between PPNA and PPNB, dated to *ca.* 8800 cal BC, with architectural forms evolving towards rectangular morphologies and lime-mortar floors. Level 3 is attributed to the MPPNB, with



10. Lines of structures in zone A, Middle PPNB.



11. Orthophotography of the northern line of structures.

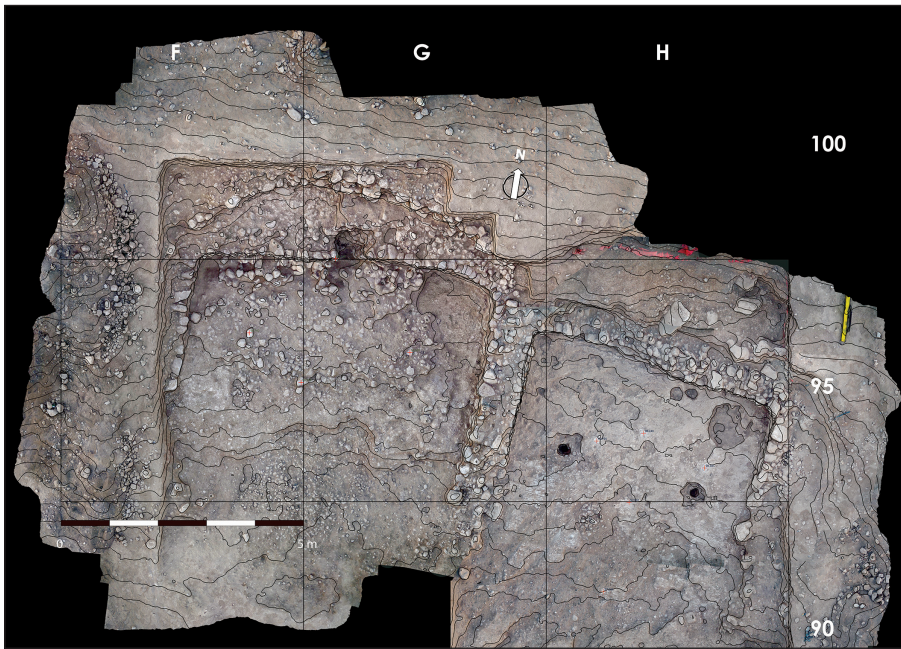
dates around 8000 cal BC, including structure 9, a large rectangular house with a lime-plaster floor. Level 4, also dated to the MPPNB, around 7800 cal BC, consists of two parallel lines of square houses.

Zone B

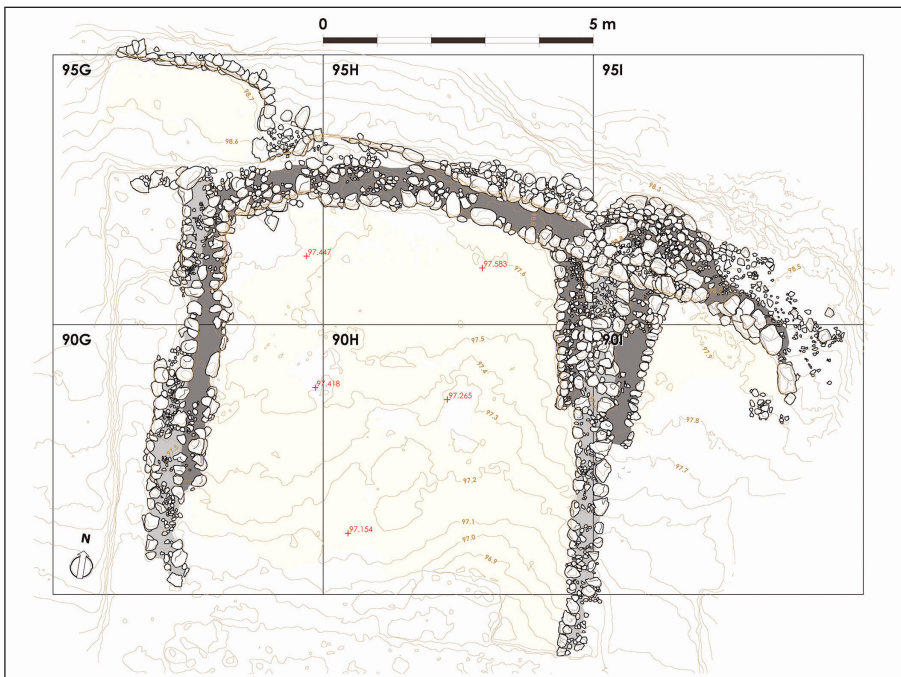
In zone B, we have distinguished four superimposed architectural levels (Figs. 14, 15). After excavating the surface levels, in squares BC/55–60 we found the remains of two superimposed rectangular houses with lime

floors, dated between 8248 and 7786 cal BC, in the MPPNB. They have a width (east-west axis) of 6m, while their length is incomplete due to erosion on the southern part caused by the slope.

Below this architectural level, we documented an older level dated to the EPPNB, dating between 8500 and 8300 cal BC (Figs. 16, 17). This level consists of the remains of five domestic structures (structures 15, 16, 17, 18, 19, and 20). Within structure 15, only the remains of the lime floor in the northern



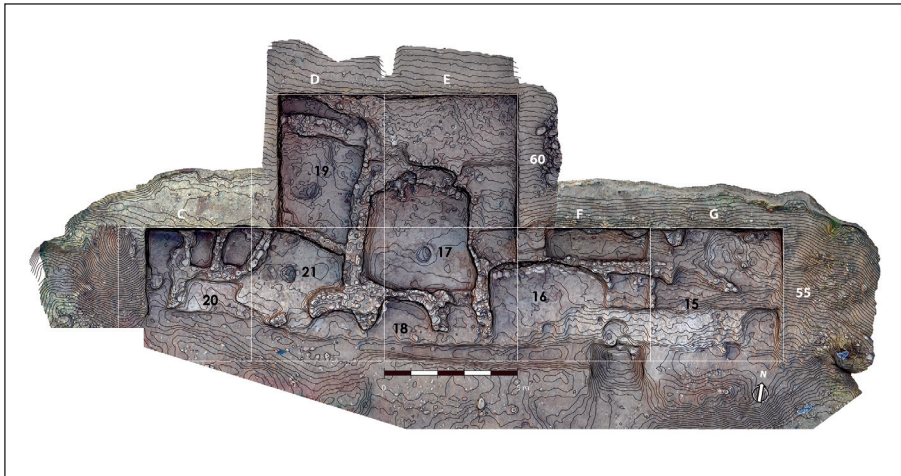
12. Orthophotography of the southern line of structures.



13. Plan of structure 9.

limit of the house and a part of the NW wall are preserved. These remains border another domestic structure to the west, of which the northern half is preserved (structure 16). The morphology of this structure is rectangular, although the NE corner is rounded. The floor is covered with lime mortar, where a circular

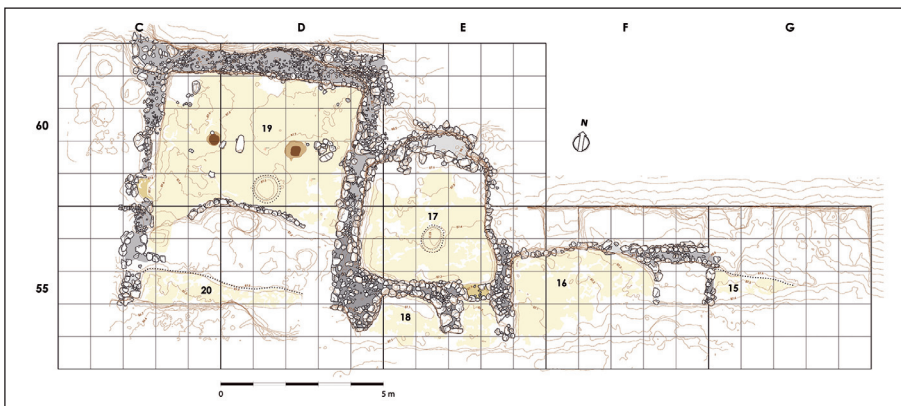
pit hearth is located at the southern limit of the preserved part. The western wall of structure 16 is shared with structure 17, located farther west. Structure 17 is a house with a rectangular shape, but it features rounded corners and a slightly sinuous eastern wall. The floor is also covered with lime mortar, except for the northern third,



14. Orthophotography of zone B in 2018.



15. Orthophotography of zone B in 2021.



16. Plan of the Early PPNB structure level.

where it consists of packed earth. A circular basin hearth is positioned in the centre of the room, in the part covered by lime mortar. The entrance is in the SE corner and is accessed via a short corridor, which opens into another space, structure 18, of which only a small part is preserved. To the west of structure 17 is structure 19 (**Fig. 18**), a larger domestic building (36m²), with a completely rectangular layout. The roof was supported by two wooden posts located in the centre of the room and by posts embedded

in the walls. The floor was originally covered with lime mortar, which was preserved in some areas at the time of excavation. A basin hearth filled with ashes is located near one of the post holes that supported the roof. The entrance to the building was through a narrow door with steps, positioned in the southern part of the western wall. This house was burned prior to its abandonment, leaving diverse objects on the floor, such as a grinding stone in a position for use and various human remains. Three



17. View of zone B in 2021.



18. Structure 19.

skulls were embedded in the western wall (**Fig. 19**), while in a square pit located in the NW corner of the house, the remains of at least five individuals were found. To the south, this house, structure 19, bordered another house, structure 20, of which only the northern part is preserved, extending about one metre along the north/south axis. The shape of the structure is rectangular with rounded corners, and its floor is covered with lime mortar. A polygonal structure (structure 21) was built over this group of houses (see **Fig. 14**). It consists of two rooms at different levels, connected by a door and a step. The basin hearth is located in the upper room. Structure 21 cuts through structure 19 and overlaps structure 20. It is dated between 8300 and 8000 cal BC, during the transition between Early and Middle PPNB.

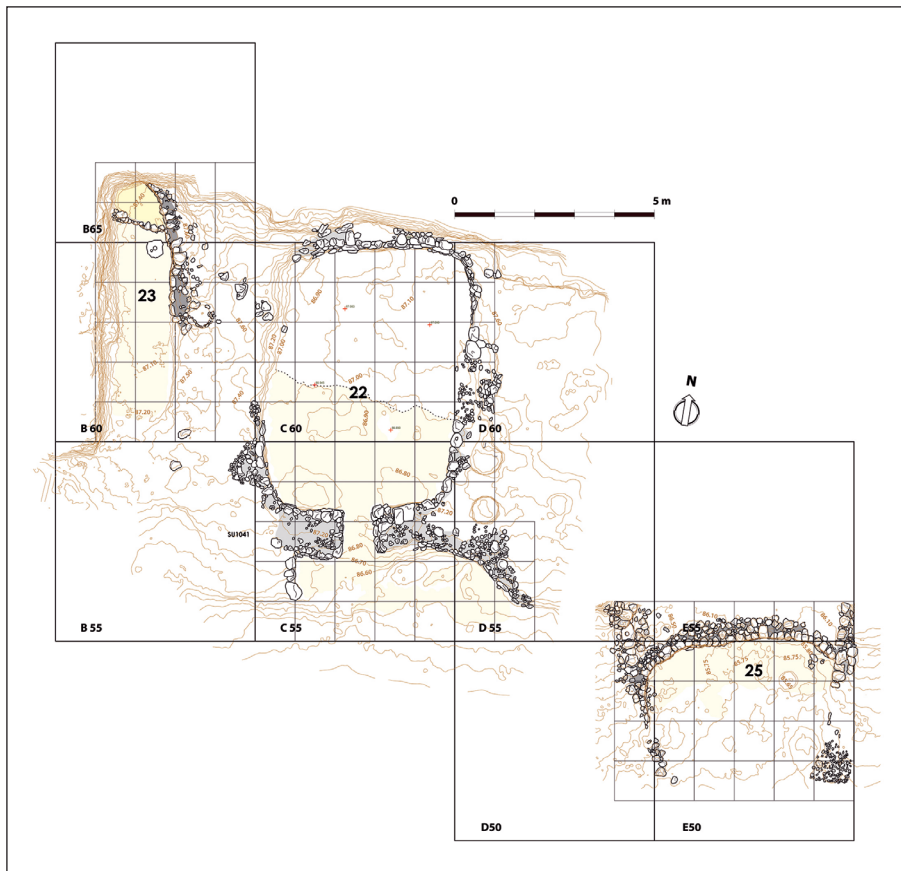
Thus, the EPPNB house level consists of a series of nearly rectangular structures with rounded corners, built adjacent to one another. The house complex was constructed with its northern section embedded within the natural slope, while the southern part would have been freestanding. The floors of the houses were covered with lime mortar and featured basin hearths. Within this complex, one of the houses, structure 19, stands out due to its distinctive morphology, which is completely square and larger than the other structures. This house was burned before the abandonment, and it contained

numerous human remains. The presence of the ancestral remains suggest that the inhabitants of this house likely held a certain authority within the community.

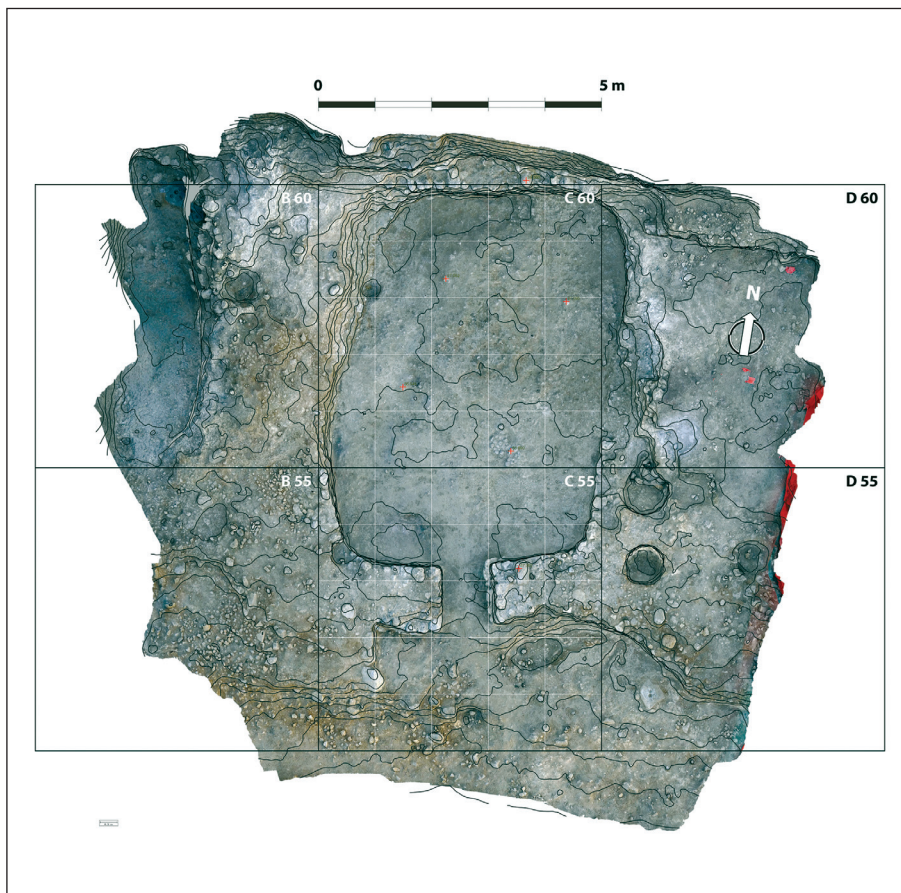
Beneath this EPPNB level, we discovered another architectural level comprising three buildings (**Fig. 20**). This level is dated between 8800 and 8500 cal BC and it corresponds to a transitional phase between the Final PPNA and the Early PPNB. These structures are subterranean. Building 22 consists of two rooms connected by a 1m-long corridor (**Figs. 21, 22**). The southern room was partially truncated by a bulldozer in its southern part. A curved wall to the NE and a straight wall with an orthogonal angle in the NW are preserved. On the packed-earth floor, we found a stone slab with a cup-mark. Two burials were discovered in this room. To the north, the corridor leads to a large rectangular room of 35m², with rounded corners. A circular basin hearth is set into the packed-earth floor. Structure 23 is also a subterranean house, of which the eastern part has been uncovered, as the rest lies beneath a field where excavation permission has not been obtained (**Fig. 23**). In its southern area, it has an elevated platform. Similar to the previous building, a stone slab with a cup-mark is embedded in the packed-earth floor. Structure 24 is located to the west (**Fig. 24**). It is delineated by two straight walls extending northward, beneath the structures of



19. Skulls embedded in the wall of structure 19.



20. Plan of structures from the PPNA/PPNB Transition level.



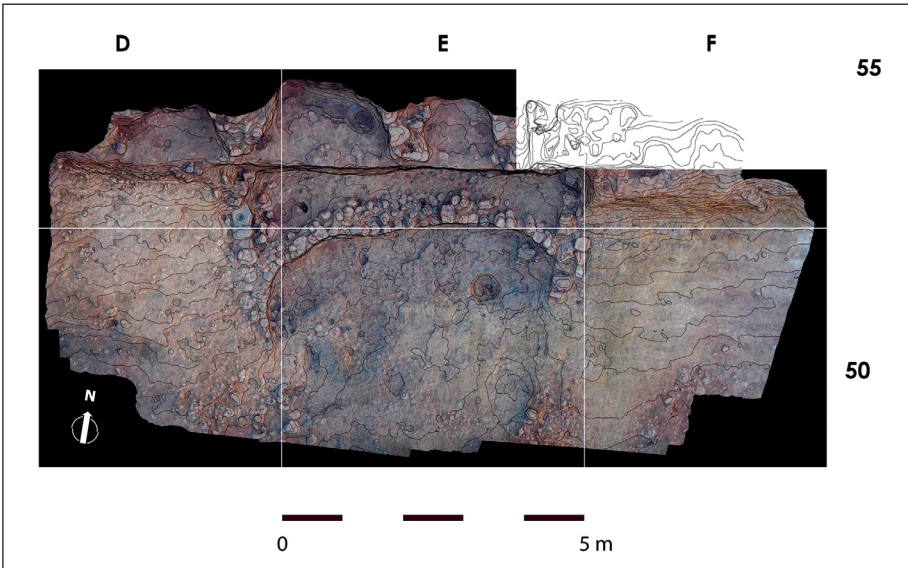
21. Orthophotography of structure 22.



22. View from the north of structure 22.



23. View of structures 23 (left) and 24 (right).



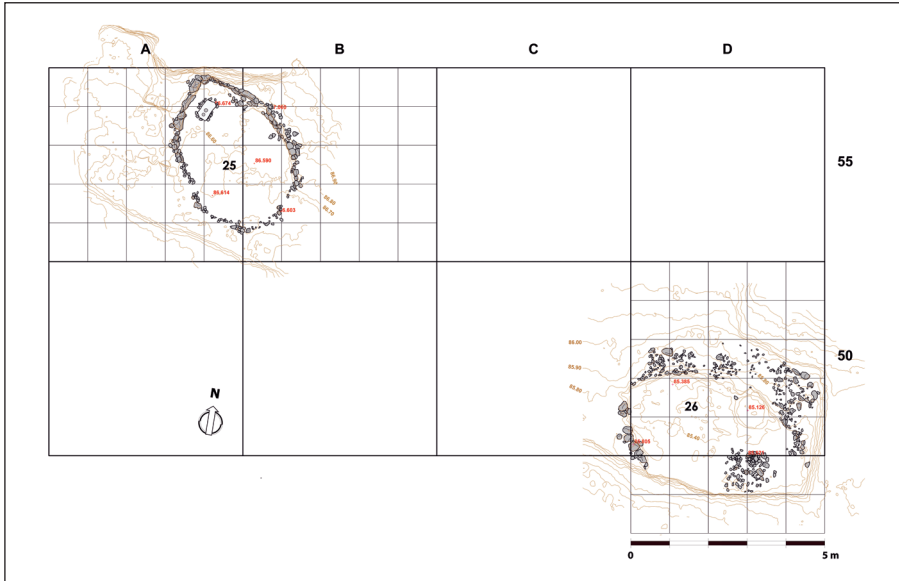
24. Structure 25.

the EPPNB level. To the north, the structure is bounded by a wall perpendicular to the two lateral ones, with curved ends. The southern part of the structure was destroyed by slope erosion.

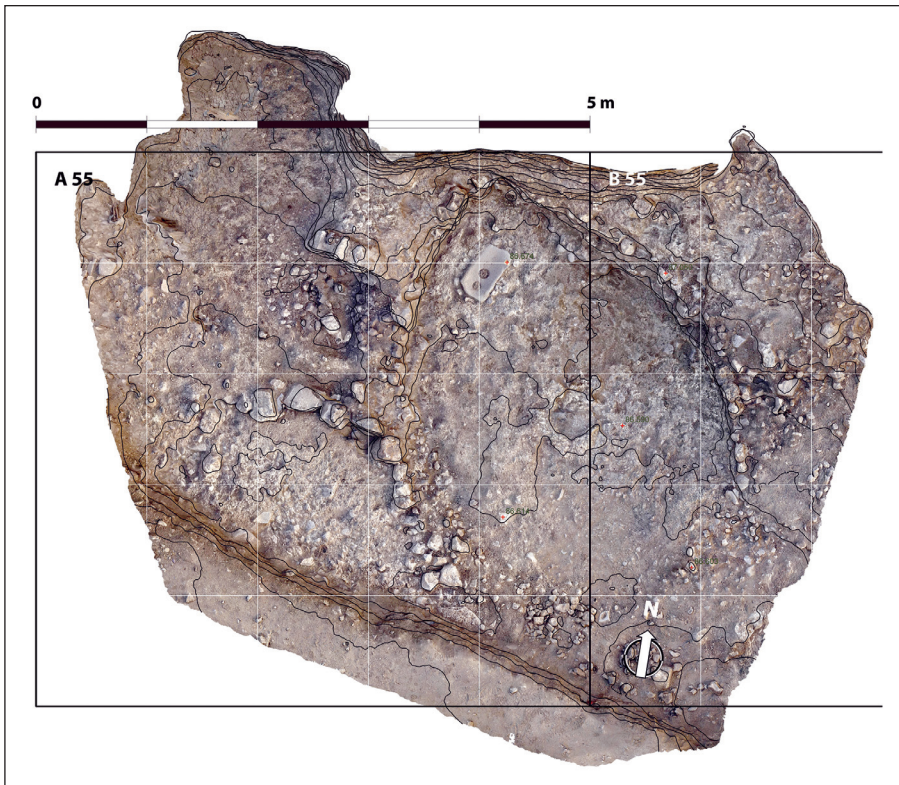
The transitional level between PPNA and PPNB features a series of constructions where curved forms blend with straight lines and orthogonal angles. Interior spaces increase considerably in size compared to the previous period at the end of the PPNA. The buildings

are subterranean and organized parallel to each other, though not contiguous.

In the oldest level of zone B, we discovered two oval huts, dated between 9235 and 8776 cal BC, at the end of the PPNA (**Fig. 25**). Structure 25 is a subterranean oval hut measuring approximately 4m by 3m (**Fig. 26**). The floor is made of packed earth, where a stone slab with a cup-mark is inserted. Structure 26 has similar dimensions and is also a subterranean oval hut.



25. Plan of the oval structures in zone B.



26. Orthophotography of structure 25.

Zone C

In this area, we found the remains of two rectangular structures built on the surface, dated to the MPPNB, between 8000 and 7600 cal BC (**Fig. 27**). The northern part of structure 27 is preserved in squares VW60, while the southern part was destroyed by a bulldozer. Two successive lime-mortar floors and two burials inside the house were documented. Structure 28 preserves the northern and eastern walls of a rectangular house with a lime-mortar floor, in squares TUV60 and U65. Two rooms were identified in the preserved part of the house, divided by a small mud wall. The floor of the western room was decorated with red paintings. The painted floor was extracted, restored, and is now displayed in the Museum of Archaeology at the ‘Ammān Citadel.

Zone D

Zone D is located in Squares BE 190–195, where we dug a trench 6x4m in size in 2017. In the first layer of the excavation, we found a wall 90cm wide. A secondary burial with indications of cremation (Iriarte *et al.* 2020; Santana *et al.* 2020) was excavated near the wall, in the east. We continued excavating to the north of the wall, where we reached a floor of compacted clay corresponding to a previous architectural level. The burnt human remains of the burial were radiocarbon dated, yielding a chronology of 7058 to 6825 cal BC.

Zone E

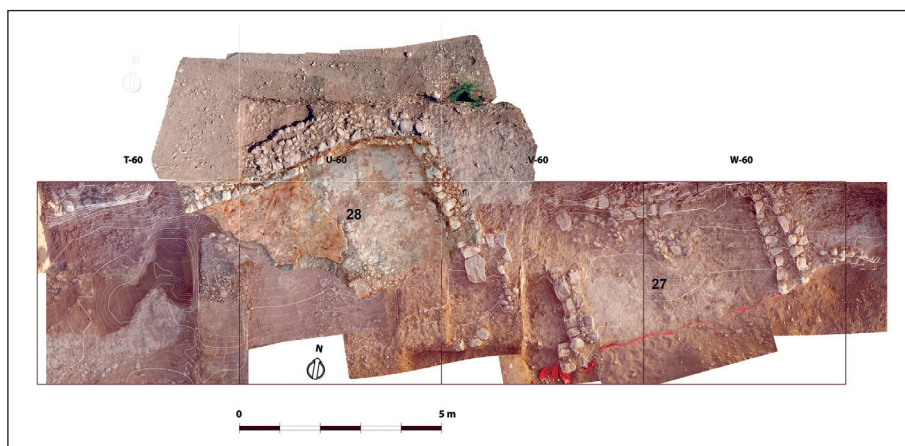
In 2023, we excavated in area E, located to the northeast of the areas A, B, and C and to the east of area D. The excavation was carried out in the squares BS, BT, BU/55, and 60. A partially semi-sunken square-shaped building

was discovered (**Fig. 28**). Part of the north and east walls of the house were preserved. The floor was covered with lime plaster, and two successive lime-plaster floors were identified. The upper floor was painted red, with the colour preserved in the eastern part of the house, while the lower floor was unpainted. The fireplace, a round pit, was full of ashes. A posthole surrounded by stones was detected at the west of the fireplace. This level is dated in the second half of the 8th millennium cal BC.

A sunken room was discovered in square BV55, measuring 4x2m. The periphery was constructed with vertical slabs at the base, topped with smaller stones. The floor was made of clay. This room was filled with rubble, consisting of stones and fragments of pottery, which were part of large storage receptacles. A sickle blade, tentatively dated to the Yarmoukian period, was found among the rubble debris. Several pounding and milling tools were found on the room’s floor. Based on these findings, we provisionally attribute this room to the Yarmoukian period.

Plant and Faunal Remains

The preliminary analysis of plant remains at KHuraysān offers insights into plant subsistence strategies during the LPPNA–MPPNB occupation in NW Jordan. The archaeobotanical assemblage includes seeds, chaff, nutshell fragments, amorphous residues, culm nodes, stems, and animal pellets. Among the identified remains, pulses are dominant, mostly represented by lentils (*Lens culinaris*) and faba beans (*Vicia faba*). Possible chickpea (*Cicer* type), grass pea (*Lathyrus* type *cicera*, *L.* type *inconspicuus*), pea (*cf.* *Pisum* sp.) and vetches



27. Structures in zone C.

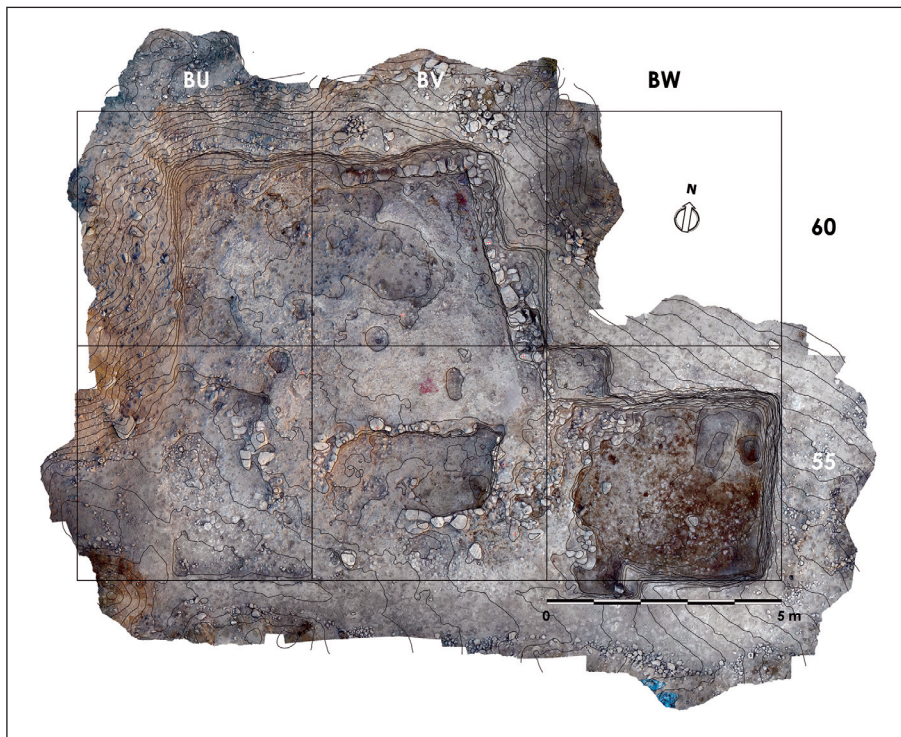
(*Vicia ervilia*, *V. sativa*) were also recorded. Although three glume bases were found, cereal are mainly represented by grains, though in low quantities. Despite the high fragmentation rate, barley (*Hordeum vulgare*) and wheat, including einkorn (*Triticum monococcum*), are attested. Fruits are dominated by fig achenes (*Ficus carica*), but this result needs to be nuanced due to the high number of seeds per fruit. The samples also contain numerous nutshell fragments of pistachio (*Pistacia* sp.), some of *Prunus/Amygdalus* sp., and other pieces of unidentified nutshells. Grape pips (*Vitis vinifera*) are also present. The archaeobotanical material from KHuraysān is particularly rich and provides valuable information about plant cultivation, processing and consumption during the Early Neolithic period in northwest Jordan. These preliminary results suggest that, as in other contemporary southern Levantine sites, particularly in the Lower Galilee, crop exploitation was mostly oriented toward pulses. However, the diet was not limited to lentils, peas, chickpeas and faba beans; the inhabitants also collected fruits such as figs and likely used wild palatable plants.

Regarding faunal remains, the assemblages are dominated by goats and gazelles, followed by bovines (wild or domestic cattle), suids (wild or domestic pig), and small carnivores such as

foxes (*Vulpes* sp.) and wild cats (*Felis silvestris*). When considering the main animal groups (goat, gazelle, equids, suids, bovines, small carnivores, hares, and birds), their relevance evolves through time. Gazelles, cattle, and small game dominate the spectra of faunal remains during the Late PPNA and PPNA/PPNB transition. From the EPPNB, the consumption of goats clearly increases, becoming dominant during the MPPNB and even more important during the Late PPNB. Most probably, the rise in goat exploitation during the EPPNB indicates the first herding of goats. During the Late PPNB, the analysis of zone E indicates that goat exploitation is still dominant, but suids are more often present than before and gazelle hunting becomes very marginal.

Material culture

The majority of the knapped stone industry was produced in flint, ranging in colours from beige, brown, and grey to the more prevalent purple and pink varieties. Obsidian from Anatolia was also used, albeit in marginal quantities. During the Final PPNA, knapping techniques focused on the production of unidirectional blades and bladelets, as well as flakes (Fig. 29). Among the retouched tools, retouched flakes and blades and further burins and denticulates



28. Orthophotography of zone E.

are prominent. Sickie blades, although in low number, and small, tanged projectile points were also documented. In the transitional period between PPNA and PPNB, starting around 8800 cal BC, alongside the aforementioned knapping techniques resting on unidirectional core exploitation, bidirectional blade cores began to appear. Projectile points became more abundant, with a wide variety of forms documented, including types with lateral notches and short tangs (**Fig. 30**). The set of retouched

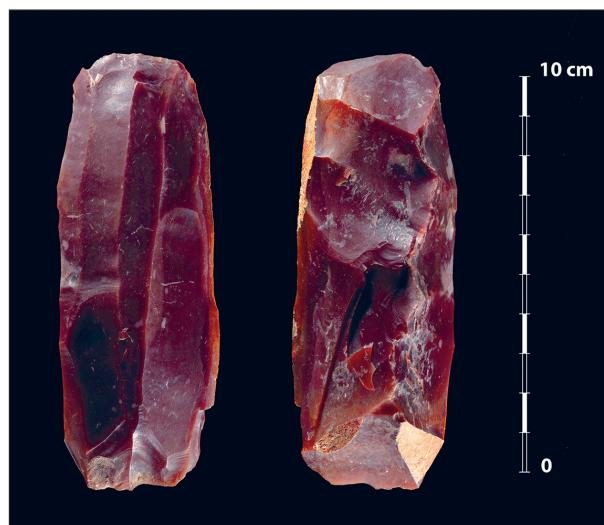


29. Unipolar core.



30. Projectile points.

tools comprises scrapers, burins, borers, laterally retouched blades and flakes (often with shallow retouch), as well as bifacial flint adzes and tranche axes. It is during this transitional period that the presence of Anatolian obsidian is most notable, accounting for almost 2% of the general assemblage. Obsidian appears in small quantities, with regular bladelets and small flakes predominating, often being recycled to the last fragments. In the EPPNB, from 8500 cal BC onwards, the bidirectional knapping technique became dominant with larger blades becoming overall targeted products (**Fig. 31**). Projectile points and sickie blades become more common, where a standardization in projectile point types is apparent, focusing on the production of Jericho points. These characteristics of the EPPNB industry continue into the MPPNB. During this period, with a dedicated and dominant bidirectional production of blades, flint was also used to create figurines representing human bodies, which are associated with the funerary context (Ibáñez *et al.* 2020) (**Fig. 32**).



31. Bidirectional core.

Milling and pounding tools are abundant at the site. In the earliest levels, before 8400 cal BC, rectangular stone slabs were inserted into the packed earth floors of the houses (**Fig. 33**). The slabs feature a cup-mark that was used to crush legumes with a stone pestle, while the

flat surface of the slab was used for grinding. From the Early PPNB onwards, the slabs with cup-marks are replaced by hand mills, where grinding was carried out with a smaller stone in a back-and-forth motion (**Fig. 34**).

The bone industry is also well represented, especially in the PPNA and PPNA/PPNB Transition levels, with the appearance of needles, awls, and spatulas. Among the small finds, the presence of fired clay figurines and necklace

beads stands out, with shell beads dominating in the early periods, while stone beads become more common from the PPNB onwards. In zone E, dated to the second half of the 8th millennium cal BC, the use of fossils decorated with incised lines is observed (**Fig. 35**).

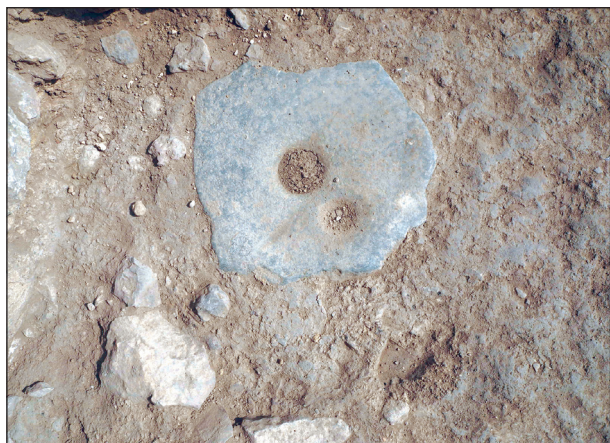
Conclusions

KHuraysān presents a broad sequence of occupations between 9000 and 6800 cal



32. Flint figurines.

BC, starting from the end of the PPNA. The transition levels between the PPNA and PPNB, dating between 8800 and 8500 cal BC, are especially significant, as this is a very poorly documented period that is only beginning to be understood through excavations carried out in the desert region of Badia (Bartl 2018; Fujii 2024). This evidence from KHuraysān indicates that the transition between PPNA and



33. Stone slab with cup-mark inserted in the packed earth floor in structure 23.



34. Grinding stone found in use position in structure 19.



35. Decorated fossil found in zone E.

PPNB was occurring at such early dates not only in the Jordanian desert regions but also in the highlands with a Mediterranean climate. The dates when this transition occurred are not very distant from those observed in the Euphrates area (Stordeur 2015), leading us to believe that the changes that gave rise to the Neolithic occurred almost simultaneously in distant regions, reflecting a high degree of interregional connectivity during this period (Ibáñez *et al.* 2018).

KHuraysān also plays a key role in understanding the advances in architecture that occurred at the origins of the Neolithic, showcasing the shift from small subterranean oval huts to large rectangular houses built above the ground. The site also provides insights into the origins of agriculture and animal husbandry, with evidence indicating that the settlement's subsistence strategy was centred on the exploitation of pulses and goats.

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