

Supplementary materials

Death and Depths: Exploring Early Fifth Millennium BCE Ritual Performance in Har Sifsof Cave, Upper Galilee (Israel)

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Fieldwork methodology

Fieldwork encompassed three sequential stages: cave mapping, an archaeological survey of the cave, and small-scale excavation.

Cave mapping

Soon after its discovery and prior to archaeological investigation, the cave underwent mapping by the Israeli Cave Research Center (ICRC), headed by SY. The mapping used standard speleological methods, utilizing Leica Disto 3D and Disto X310 for measuring distance and inclination, as well as prismatic compass Suunto KB-14 for azimuth measurements. The recorded data was manually drawn and used to sketch planar maps, profiles, and cross sections, employing a 1:200 scale, mapping grade -5C- (Dasher 1994; Ellis 1976). Areas of specific archaeological interest were later mapped at scales of 1:100 and 1:50 to achieve enhanced resolution. The final cartography was done using Adobe Illustrator software (**Fig. 1**). Subsequent to the standard cave mapping, a SLAM-based (Simultaneous Localization and Mapping) LiDAR (Light Detection and Ranging) scan was done in the cave and its surroundings, resulting in a 3D point-cloud of the cave structure (Ullman *et al.* 2023).

Cave survey

The archaeological survey within the cave spanned four days during the summer of 2016. The survey was headed by UD and MU. Its methodology included systematic coverage and documentation of the entire cave area, encompassing inaccessible locations. Each area within the cave was thoroughly examined by teams consisting of three to six surveyors. The recording of each designated area entailed a comprehensive description of its spatial extent and speleological and archaeological ‘contents’, with particular emphasis on the state of preservation of archaeological materials and potential post-depositional processes. The primary focus was surface retrieval of all artifact and ecofact categories, including pottery, chipped flint implements, groundstone tools, bones, and other finds. In the case of pottery, predominantly diagnostic sherds were collected. The findings were collected based on spatially defined localities, designated ‘collection units’ or ‘baskets’ and sequentially numbered (B.101, B.102... etc.), that were marked on the cave map (**Fig. 1**). Architectural elements encountered during the survey were subjected to a detailed description, measurement, and photographic documentation. All collected materials underwent labeling and careful wrapping as close as possible to the place of their location to ensure their safe transportation to the cave entrance. Findings were later cleaned, stabilized, registered and analyzed in the laboratory.

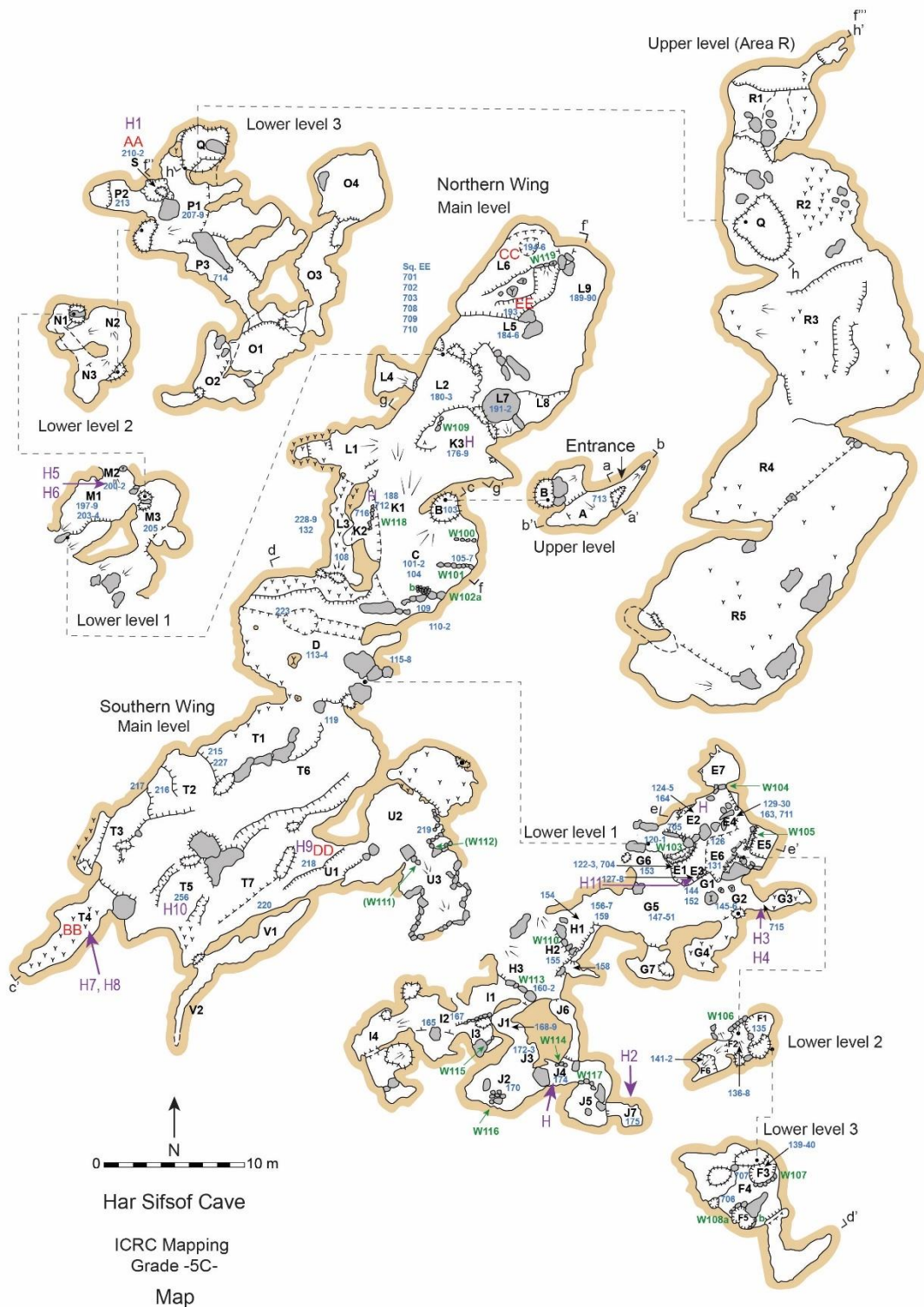


Figure 1: Har Sifsof Cave, planar view. Black – space designations; red – excavation areas; green – architectural elements; purple – human remains. Mapping by SY, Y. Zissu, N. Sagi, and MU (ICRC), 2016.

Excavation

The excavation, which spanned three days in February 2017, was primarily targeted at several locations where the retrieval of human bones required small-scale removal of sediments. All excavation areas were small (less than 2 sq m) and delineated based on cave morphology. Sq. AA was excavated at the location of Individual H1, at the lowest point in the cave at the bottom of Area S2. Sq. BB was excavated at the location of individuals H7 and H8, in the southwestern extremity of the cave, Area T4. Sq. DD was excavated at the location of individual H9, in Area U1 (**Fig. 2**). Other human remains were retrieved during the survey before the excavation (see below).

Additionally, two small excavation areas, designated as Sq. CC and Sq. EE, each measuring 1×1 m, were positioned at the main level of the northern wing in Area L6 and L5, respectively. Sq. CC was dug in a water-washed area, where numerous small-sized chipped flint items were observed. Sq. EE was placed at a concentration of charred grains and wood charcoals that were detected on the cave floor (**Fig. 2**). Both squares were excavated to a depth of 15 cm.

The excavation units, 'baskets' (B.1001, B.1002... etc.), were excavated to a depth ranging between 5-10 cm. Each unit's contents were collected and placed into plastic bags, with proper labeling corresponding to their respective basket numbers, before being removed from the cave. Once outside the cave, the excavated sediments underwent wet sieving, utilizing a 2 mm mesh. The material obtained from this process was then manually sorted in the laboratory. Charred seeds and wood charcoal were manually sampled during the excavation of Sq. EE.

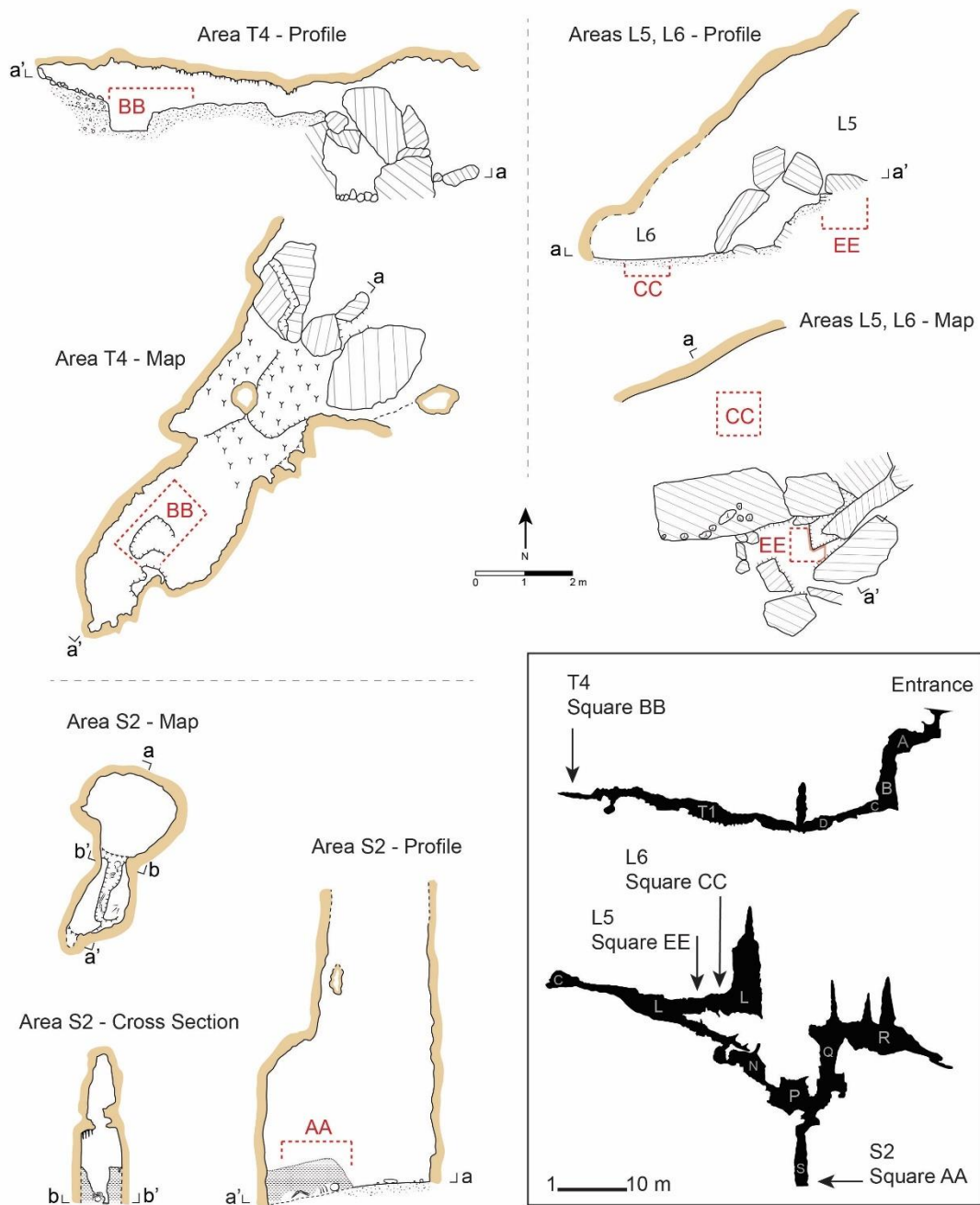


Figure 2: Four excavation areas at Har Sifsof Cave, AA, BB, CC, and DD (top and left-bottom), with dashed red lines marking the excavation extent. The square's locations are indicated on the cave profiles (right bottom).

Survey and excavation basket lists

Table 1: Survey basket list. For specific baskets location, see code map (Fig. 1)			
Basket	Area	Content	Comments
101	C	Faunal remains	Next to W101
102	C	Pottery	Next to W101
103	B	Faunal remains	The base of Shaft B
104	C	Flint	
105	C	Pottery	A niche in the bedrock at the east side of Chamber C
106	C	Faunal remains	Above the east side of W101
107	C	Pottery	Above the east side of W101
108	L3	Stone tool	
109	C	Pottery	South of W102a
110	C-D	Pottery	
111	C-D	Faunal remains	
112	C-D	Flint	
113	D	Pottery	
114	D	Faunal remains	
115	D-E	Pottery	
116	D-E	Pottery	
117	D-E	Faunal remains	
118	D-E	Bone tool	
119	D-E	Pottery	
120	D-E	Pottery	
121	D-E	Faunal remains	
122	E1	Pottery	
123	E1	Faunal remains	
124	E2	Pottery	
125	E2	Human remains	
126	E	Pottery	
127	E3	Pottery	
128	E3	Human remains	
129	E4	Pottery	
130	E4	Faunal remains	
131	E6	Pottery	
132	L3	Metal bowl	
133	Canceled		
134	Canceled		
135	F1	Pottery	
136	F2	Pottery	
137	F2	Faunal remains	
138	F2	Ground stone tool	
139	F3	Pottery	
140	F3	Ground stone tool	
141	E6-F6	Pottery	A sub-vertical passage connecting Areas E6 and F6
142	E6-F6	Human remains	A sub-vertical passage connecting Areas E6 and F6

143	G1	Shell	
144	G1	Flint	
145	G2	Pottery	
146	G2	Human remains	
147	G5	Flint	
148	G5	Pottery	
149	G5	Faunal remains	
150	G5	Bone tool	
151	G5	Bone tool	
152	G1	Flint	
153	G6	Pottery	
154	H1	Pottery	
155	H2	Pottery	
156	G-H	Pottery	
157	G-H	Faunal remains	
158	H2	Ground stone tool	
159	G-H	Flint	
160	H3	Pottery	
161	H3	Flint	
162	H3	Faunal remains	
163	E4	Ground stone tool	
164	E2	Flint	
165	I2	Pottery	
166	Canceled		
167	I2	Faunal remains	
168	J1	Flint	
169	J1	Pottery	
170	J2	Pottery	
171	J3	Pottery	
172	J3	Charcoal	
173	J3	Flint	
174	J4	Human remains	
175	J7	Human remains	
176	K3	Pottery	
177	K3	Human remains	
178	K3	Ground stone tool	
179	K3	Flint	
180	L2	Pottery	
181	L2	Faunal remains	
182	L2	Flint	
183	L2	Ground stone tool	
184	L5	Pottery	
185	L5	Flint	
186	L5	Faunal remains	
187	Canceled		
188	K1	Flint	

189	L9	Faunal remains	
190	L9	Flint	
191	L7	Faunal remains	
192	L7	Flint	
193	L5	Bead	
194	L6	Flint	
195	L6	Micro fauna remains	
196	L6	Beads	
197	M1	Pottery	
198	M1	Faunal remains	
199	M1	Flint	
200	M2	Flint	
201	M2	Human remains	
202	M2	Pottery	
203	M1	Ground stone tool	
204	M1	Ground stone tool	
205	M3	Pottery	
206	P3	Pottery	
207	P1	Pottery	
208	P1	Flint	
209	P1	Faunal remains	
210	S1	Ground stone tool	At the top of Shaft S
211	S1	Charcoal	At the top of Shaft S
212	S2	Flint	
213	P2	Flint	
214	R3	Ground stone tool	On a talus of loose clay sediments
215	T1	Pottery	
216	T2	Pottery	
217	T2	Pottery	
218	U1	Pottery	
219	U2	Pottery	
220	T7	Pottery	
221	R3	Faunal remains	On a talus of loose clay sediments
222	R3	Flint	On a talus of loose clay sediments
223	D	Flint	
224	Surface	Flint	A few meters north of the cave entrance
225	Surface	Ground stone tool	A few meters north of the cave entrance
226	R3	Flint	On a talus of loose clay sediments
227	T1	Faunal remains	
228	L3	Pottery	
229	L3	Flint	
230-250	Canceled		
251	U1	Human remains	
252	U1	Pottery	
253	U1	Charcoal	
254	U2	Faunal remains	

255	U1	Pottery	
256	T5	Human remains	
257	T1	Flint	
701	Sq. EE	Sediment sample	Sediment samples with charred botanical materials
702	Sq. EE	Sediment sample	Sediment samples with charred botanical materials
703	Sq. EE	Sediment sample	Sediment samples with charred botanical materials
704	E	Sediment sample	Sediment sample with wood charcoal and ash
705	E2	Faunal remains	
706	F4	Faunal remains	
707	F4	Sediment sample	Sediment sample with wood charcoal
708	Sq. EE	Sediment sample	Wood charcoal
709	Sq. EE	Sediment sample	Charred grains
710	Sq. EE	Sediment sample	Sediment samples with charred botanical materials
711	E4	Sediment sample	Sediment sample with wood charcoal and ash
712	K1	Human remains	Two long bones
713	A	Flint	
714	P3	Flint	
715	G3	Human remains	
716	K2	Human remains	

Table 2: Excavation basket list			
Square (Area)	Basket	Elevation*	Description
AA (S2)	1001	-	Removal of wet clay sediments covering parts of the articulated human skeleton. Sediment color dark-brown.
AA (S2)	1002	-	Wet clay sediments were removed between the skeleton's bones; upper sediments dark brown and yellowish sediments appeared beneath them. Plenty of tiny charcoal fragments found in the yellowish sediment. Collecting the skeleton bones.
AA (S2)	1003	-	Microfauna remains from a muddy surface adjacent to the skeleton.
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BB (T4)	2001	10.00-9.95	Removal of calcified sediments and crumbly speleothems. Several broken human bones were collected from the surface, most of them partly consolidated within the floor speleothems.
BB (T4)	2002	9.95-9.90	Removal of a human long bone and skull fragments, partially consolidated in the floor speleothems.
BB (T4)	2003	9.90-9.80	Removal of pelvis fragments, skull fragments, and other bone fragments. The amount of speleothem content decreased, and loos sediments increased.
BB (T4)	2004	9.80-9.75	A hard layer of consolidated grey material (speleothems), on it and below it, were fragments of human bones. Small cavities between small stones below a grey hardened layer.
BB (T4)	2005	9.75-9.55	Digging into a decaying grey breccia, mixed with small stones. Retrieval of human long bones, a mandible fragment, and other human bones. Hardened grey breccia on the southern side of the digging area, while on its northern side, more human bones revealed in the soft-crumbly gray material.
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CC (L6)	3001	10.00-9.95	Digging the northern part of the square to level it to the elevation of the southern part. Chipped flint items and some microfauna bones on the surface. Sediment is dark, moist, and loose.
CC (L6)	3002	9.95-9.90	Moist, loose dark sediment containing chipped flint items and gravel. Some large stones uncovered at the southeastern corner of the square.
CC (L6)	3003	9.90-9.85	Moist, loose dark sediment, plenty of tiny charcoal fragments, and some larger. At the bottom of the spit, sediments become more compact and contain chipped flint items, pottery sherds, and microfauna remains.
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DD (U1)	4001	-	Surface collection of human bones next to a large, tilted boulder.
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EE (L5)	5001	10.00-9.85	Excavation of dark and moist clay sediment, containing plenty of charred cereal grains, fragments of wood charcoal, and some microfauna remains. Beneath it some medium-sized pottery sherds.

* Each excavation area was established with an independent arbitrary benchmark.

Archaeological assemblages

The following report includes a comprehensive analysis of the archaeological assemblages, encompassing materials derived from the survey and the excavation. Selected data are presented in the main text.

Architectural elements

Nineteen architectural elements were documented in the cave, comprising retaining walls and diverse constructed modifications. Most of these elements were constructed in the cave's southern wing, while a smaller number was found in the northern wing (**Fig. 1, Table 3**). These features were used to divide spaces, delineate activity areas or passages (**Fig. 3.a**), and level and support chamber floors (**Fig. 3. b, c**). Other walls facilitate movement in vertical passages between different levels to overcome steep inclinations (**Fig. 3.d**).

All the architectural elements within the cave were constructed using undressed stones locally found in the cave. There is no evidence for the use of bonding materials. The walls' height ranges from 0.25 to 2.7 m, consisting of one to thirteen courses, primarily made of medium-sized stones, although small and large stones were also used. Wall length ranges from 0.6 to 3.9 m. The spatial distribution of the architectural elements generally follows the higher concentrations of material remains from the early 5th millennium BCE.



Figure 3: Architectural elements in the cave: (a) W110 between Areas H1 and H2; (b) W109 in Area K3; (c) W101 in Chamber C; (d) W103 on the west side of Chamber E.

Table 3: Architectural elements								
Wall	Location (Area)	Length (m)	Width (m)	Hight (m)	Courses	Stone sizes (cm)	Function	Fig.
W100	C	2.14	-	0.25	1-3	48×32×23 10×18×17	The first in a series of walls that level the floor of Chamber C	-
W101	C	3.9	-	0.7	3-4	38×15 17×17×10	The second in a series of walls that level the floor of Chamber C	3.c
W102a	C	-	0.55	0.4-0.75	1-2	80×40×30 30×15×8	The third in a series of walls that level the floor of Chamber C, (together with W102b). With the cave wall, it forms a small chamber (chamber area 2.4×2 m)	-
W102b	C	2.9	2.9	0.3	1-3	30×20×15	A pile of stones. An extension to wall W102a that stretches towards the center of Chamber C	-
W103	D-E	2	1.2	1.25	4-6	60×45×20 25×20×13	A retaining wall that defines and adjusts the vertical passage between Chamber D and Chamber E	3.d
W104	E7	0.6	0.3	0.45	2	60×20×40 30×10×15	A low partition wall, laid across the opening of Chamber E7	-
W105	E5	2	-	0.8	5	50×36×25 16×8	Defines and construct Chamber E5 (chamber area 2.2×1.3 m)	-
W106	E-F2	1.35	-	2.7	13	30×20 36×16	Retaining wall that defines and adjusts the vertical passage between Chamber E and Chamber F2	-
W107	F3	-	0.35	0.2-0.5	1-2	58×30×30 25×25×20	Delineates the upper circumference of a natural low niche (niche depth 0.5-0.8 m, area 1.9×1.5 m)	-
W108a	F5	1	0.3	0.35	1-2	25×25×30 65×33×30	Delineates the northern circumference of a natural low niche (niche depth 1 m, area 1.5×1 m)	-
W108b	F5	0.85	0.3	0.6	4	35×15×19	Located on a small bedrock bulge above Niche F5. Fills a crack in the cave wall	-
W109	K3	2	-	1	4-5	45×20×20 22×22×15	Retaining wall that levels and supports the floor of Chamber K3, at its west (towering over Chamber L)	3.b

W110	H1-H2	1.5	0.6	0.55	1-3	55×30×15 60×25×20	Partition/retaining wall, stretches across the cave passage and define Chamber H2-H3 from the east (chamber area 3×3 m, height 1.2)	3.a
W111 (?)	U3	1	-	1.9	-	100×60 15×15	Pile of stones cleared from the center of the slope, and defines its western side	-
W112 (?)	U3	1	-	1.2	-	70×40×12	Pile of stones cleared from the center of the slope, and defines its eastern side	-
W113	H3-I1	1	-	0.9	4	75×25×20 60×25	Delineate the south-western side of space H3	-
W114	J4	0.7	-	0.7	2-3	17×10×20 79×70	Partly blocking a low passage at the floor of Area J3	-
W115	I3	0.5	-	0.5	-	15×15×15	Stone cluster blockage	-
W116	J2	0.8	-	0.8	-	15×11×15	Pile of stones. Possibly a result of clearance of the central part of Chamber J2	-
W117	J5	0.85	0.7	0.80	4-6	17×10×20 20×11×20	Defines the northern side of Chamber J5	-
W118	K3	2	-	0.3	1	50×20×20	Defines the western end of Chamber C, in proximity to a steep drop in the floor	-
W119	L6-M2	0.8	-	0.5	3	30×20×12	Prevents sediments slide from Area L6 to Passage M2	-

Pottery

Pottery is the predominant category of archaeological materials uncovered in the cave. Except for a few pottery fragments retrieved during the excavation of Sq. EE, all pottery sherds were recovered during the survey. Found in numerous cave spaces, the pottery displays evidence of onsite breakage but lacks signs of wear and rounding, suggesting minimal movement from original deposition locations due to sediment transport and trampling. The early 5th millennium pottery is typically handcrafted and fired at low temperatures, and thus absorbs moisture and salts from the damp cave environment. As a result, most sherds are fragile and crumbled when removed, and some of them sustained damage during transportation to the laboratory, even though they were carefully packed in the cave. Descriptions and photographing of pottery were therefore taken in the field during collection to minimize the loss of information. The ceramic assemblage was treated, and partly restored, at the Conservation Laboratory, Institute of

Archaeology, The Hebrew University of Jerusalem. Pottery was typologically classified via comparisons to contemporaneous assemblages from sites in northern Israel (e.g., Garfinkel 1999: Fig. 93, 159-186; Getzov *et al.* 2009: Fig. 2.33, 66-68; Gopher & Eyal 2012: Fig. 9.1, 342-343).

Two small pottery vessels (**Fig. 4: 1,12**) and one medium-size bowl (**Fig. 4: 17**) were found intact, while the rest of the pottery assemblage was recovered as medium to large fragments. Due to onsite breakage and dispersal (above), it is difficult to accurately assess the Minimal Number of Vessels (MNV) deposited in the cave. Based on the spatial distribution of diagnostic sherds, as well as their typology, size, color of fabric, and decoration, the MNV is estimated at 67, with an assessed possible deviation of 20-30 percent. **Table 4** provides a breakdown of the assemblage according to various cave spaces.

Table 4: HSC pottery MNV. Breakdown according to activity areas. Be = Beige; Bl = Black; Br = Brown; Re = Red; and RB = Red-Brown.		
Area	MNV	Description
C	2	- Jar - Knob handle
Passages between Chambers C and D	2	- Winding-strap handle, flat base, RB slip - Flat base, Bl slip
D	1	- Winding-strap handle, flat base
Passages between Chambers D and E	2	- Rounded bowl - Winding-strap handle, flat base
E1, E3, E6	6	- Carinated bowl, miniature (complete) - Rounded bowl - Splayed-sided bowl - Lug handle, flat base, Br slip - Loop handle, flat base, Be slip - Winding-strap handle, flat base, Be slip
F1	1	- Jar (Bow-neck?)
F2	2	- Holemouth jar, square rim - Jar, inner Re slip
F3	3	- Deep bowl - Holemouth jar (brown fabric) - Flat base (gray fabric)
G2	1	- Winding-strap handle, flat base
G5, G6, G-H	3	- Bow-neck Jar, Flat base (?) - Calice - Ring base
H1	3	- Bowl - Jar - Unidentified
H2, H3	10	- Carinated bowl (low carination) - Rounded bowl - Cup (pointed base) - Bow-neck Jar - Bow-neck Jar - Bow-neck Jar - Small bow-neck Jar - Churn, double-handle - Churn, rounded handles - Flat base with handles stumps
I2	5	- Bowl

		<ul style="list-style-type: none"> - Bowl - Bow-neck Jar - Everted rim jar - Holemouth jar
J1, J2, J3	2	<ul style="list-style-type: none"> - Bow-neck Jar - Bow-neck Jar
K3	3	<ul style="list-style-type: none"> - Deep bowl - Bow-neck Jar - Bow-neck Jar
L2	7	<ul style="list-style-type: none"> - Bowl - Splayed-sided bowl - Deep bowl - Bow-neck Jar - Bow-neck Jar - Everted rim jar - Holemouth jar/ Bowl
L3	1	<ul style="list-style-type: none"> - Holemouth jar
L5	4	<ul style="list-style-type: none"> - Splayed-sided bowl - Jar (Bow-neck?) - Holemouth jar - Churn
M1, M2	2	<ul style="list-style-type: none"> - Bow-neck Jar - Holemouth jar/ Bowl
P1	1	<ul style="list-style-type: none"> - Deep bowl
P3	1	<ul style="list-style-type: none"> - Deep bowl (complete)
T1	1	<ul style="list-style-type: none"> - Bow-neck Jar
T2	1	<ul style="list-style-type: none"> - Cup with inner knob handles (complete)
T7	1	<ul style="list-style-type: none"> - Lug handle
U1	2	<ul style="list-style-type: none"> - Bow-neck Jar - Holemouth jar
U2	1	<ul style="list-style-type: none"> - Winding-strap handle
Total MNV	67	

The pottery in HSC is characterized by thick-walled vessels with medium to large temper. Vessel categories include cups, bowls, necked jars, holemouth jars, churns and chalices, all typical components in early 5th millennium BCE assemblages. Other vessel categories common in contemporary sites but missing in HSC are pithoi, kraters, and basins. Vessel types recorded are cups, including a small cylindrical vessel with an inner knob handle and another vessel with a pointed base; a miniature bowl; splayed-sided (V-shape) bowls; deep rounded bowls; bowls with carination on their lower part; a pedestal bowl (chalice) (**Fig. 4**); bow-neck jars; everted rim jars (**Fig. 5**); holemouth jars with pointed or square rim (**Fig. 6**). In addition, there are several churns in the assemblage, identified through typical handles of the pointed edge; it is unclear whether flat bases with loop handles attached represent the other end of a churn or a bowl with a low handle, also known from contemporary assemblages (Ullman *et al.* 2024). In this study, however, they are categorized as churns (**Fig. 6**).

The strap handle with widening attachments to the body dominates the handle fragments in the assemblage. Also present are loop and pierced handles, which tend to have triangular profiles and cross-sections. Knob handles are scarce (**Fig. 7**). Bases are usually flat or shaped as a rough

disk, with many having a 'bulb' on the inner side (**Fig. 8**). It is estimated that over 80% of the vessels had brown-red slip on their outer side, but this slip (which can also be applied to the inner part) is commonly removed due to local environmental conditions. Relatively few items have dark grey-blackish outer slip. Also found is a narrow strip of red-brown paint on the inner rim of small/medium-sized vessels (sometimes referred to as 'lipstick' decoration). Some jars are painted with broad red stripes, and a few vessels have rope decorations at the neck-shoulder joint or slightly below it.

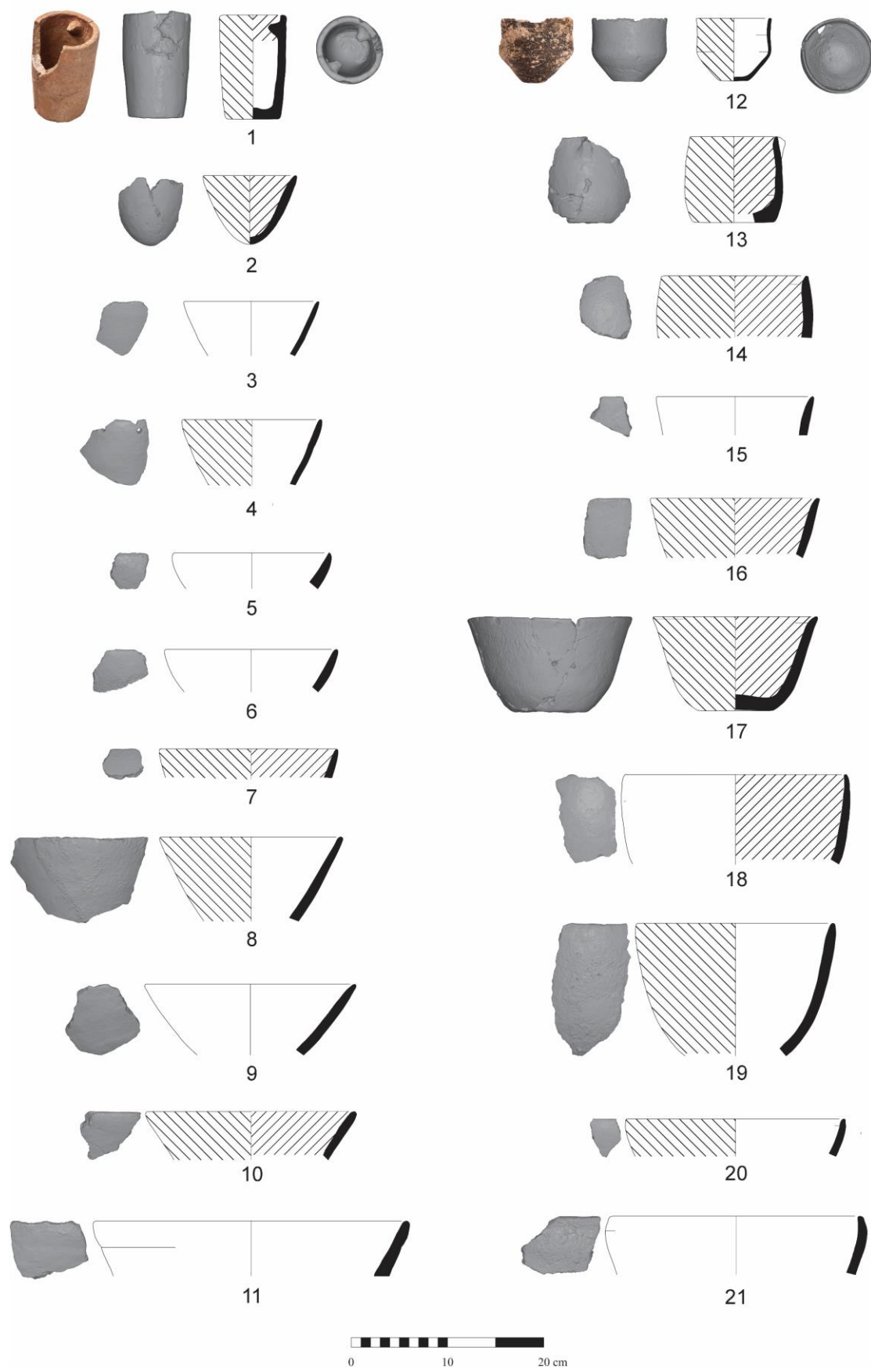


Figure 4: Pottery assemblage – Cups and Bowls.

Table 5: Details for Figure 4 – Pottery assemblage – Cups and bowls			
#	Area	Basket	Type
1	T2	217	Cup, cylindrical, flat base, inner knobs
2	H3	160	Cup, pointed base
3	L2	180	Bowl, splayed-sided
4	I2	165	Bowl, splayed-sided
5	H3	160	Bowl, splayed-sided
6	M1	197	Bowl, splayed-sided
7	I2	165	Bowl, splayed-sided
8	L5	184	Bowl, splayed-sided
9	L2	180	Bowl, splayed-sided
10	E3	127	Bowl, splayed-sided
11	L2	180	Bowl, splayed-sided
12	E3	127	Bowl, carinated lower part, miniature
13	H3	160	Bowl, carinated lower part
14	L2	180	Bowl, deep
15	K3	176	Bowl, deep
16	F3	139	Bowl, deep
17	P3	206	Bowl, deep
18	I2	165	Bowl, deep
19	P1	207	Bowl, deep
20	E3	127	Bowl, rounded wall, upright rim
21	D-E	115	Bowl, rounded wall, upright rim

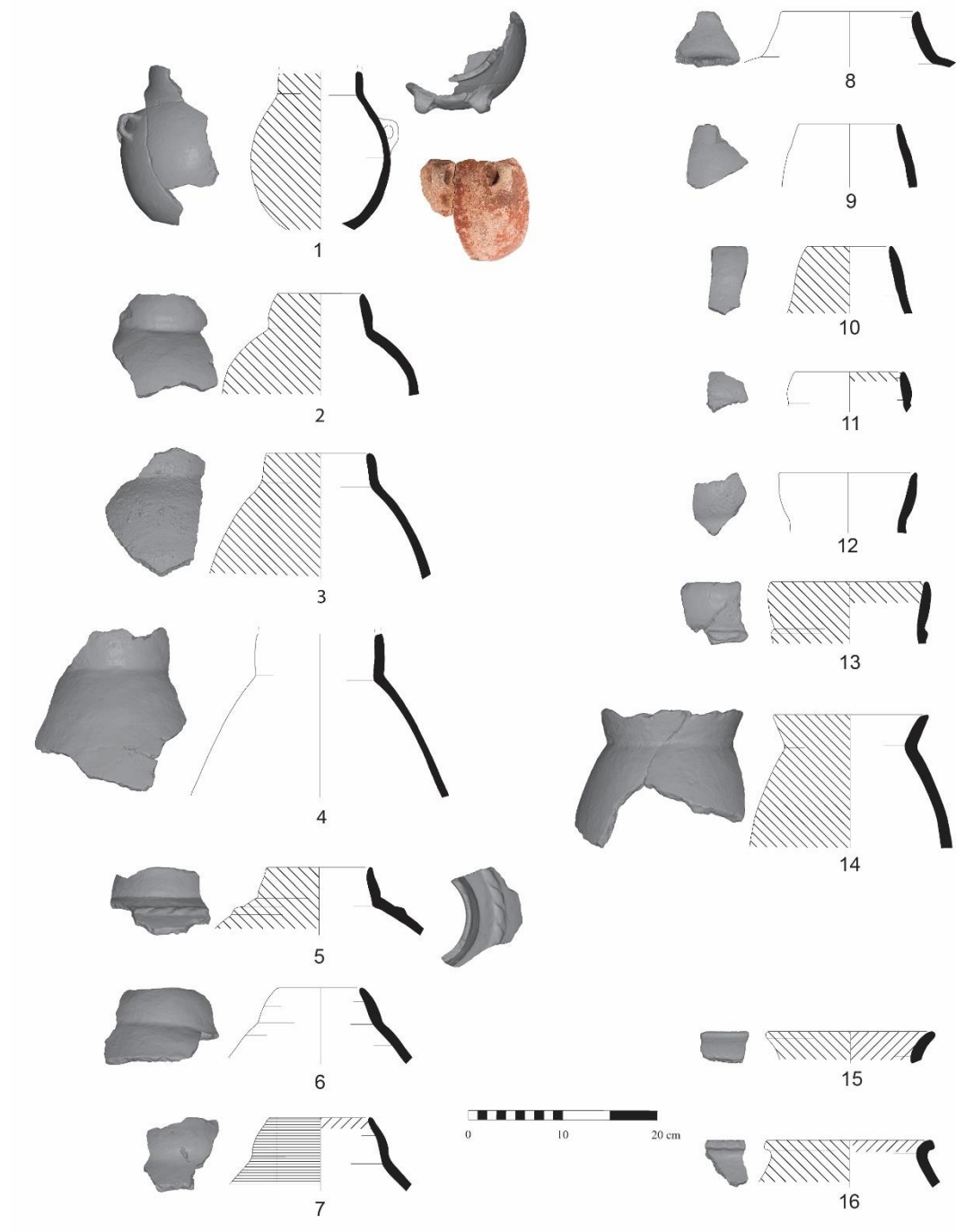


Figure 5: Pottery assemblage – Jars.

#	Area	Basket	Type
1	H3	160	Multi-handle, bow-neck-like jar
2	J3	171	Bow-neck jar
3	J1	169	Bow-neck jar
4	U1	218	Bow-neck jar
5	H2	155	Bow-neck jar
6	L2	180	Bow-neck jar
7	H2	155	Bow-neck jar
8	K3	176	Bow-neck jar
9	I2	165	Bow-neck jar
10	G5	148	Bow-neck jar
11	T1	215	Bow-neck jar
12	K3	176	Bow-neck jar
13	H3	160	Bow-neck jar
14	L2	180	Bow-neck jar
15	L2	180	Everted rim jar
16	I2	165	Everted rim jar

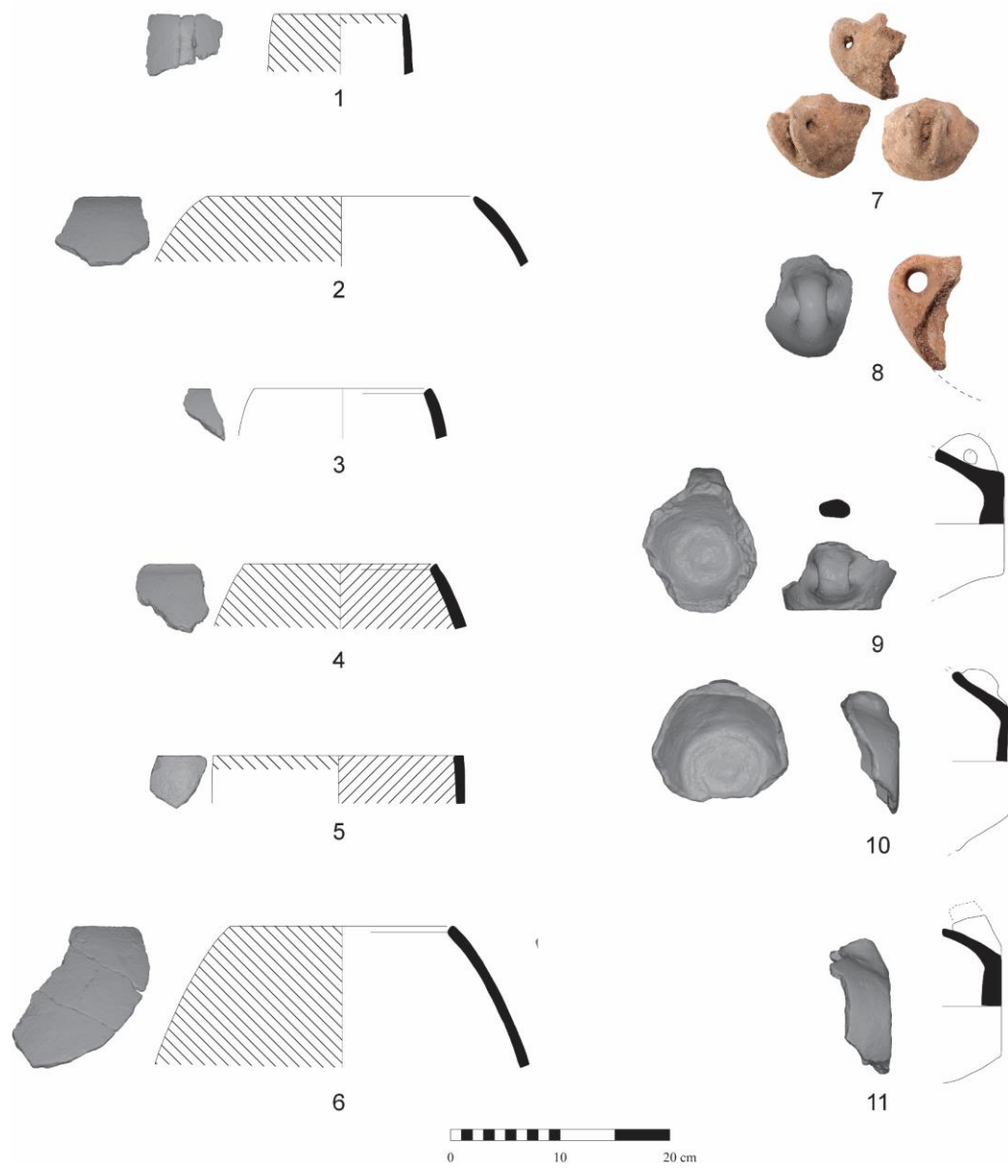


Figure 6: Pottery assemblage – Holemouth Jars and Churns.

Table 7: Details for Figure 6 – Pottery assemblage – Holemouth Jars and Churns			
#	Area	Basket	Type
1	F3	139	Holemouth jar, pointed rim
2	I2	165	Holemouth jar, pointed rim
3	L5	184	Holemouth jar, square rim
4	F2	136	Holemouth jar, square rim
5	L3	228	Holemouth jar, square rim
6	U1	255	Holemouth jar, square rim
7	H2	155	Churn, double-handle
8	H2	155	Churn, rounded handle
9	L5	184	Churn?
10	T2	216	Churn?
11	H2	155	Churn?

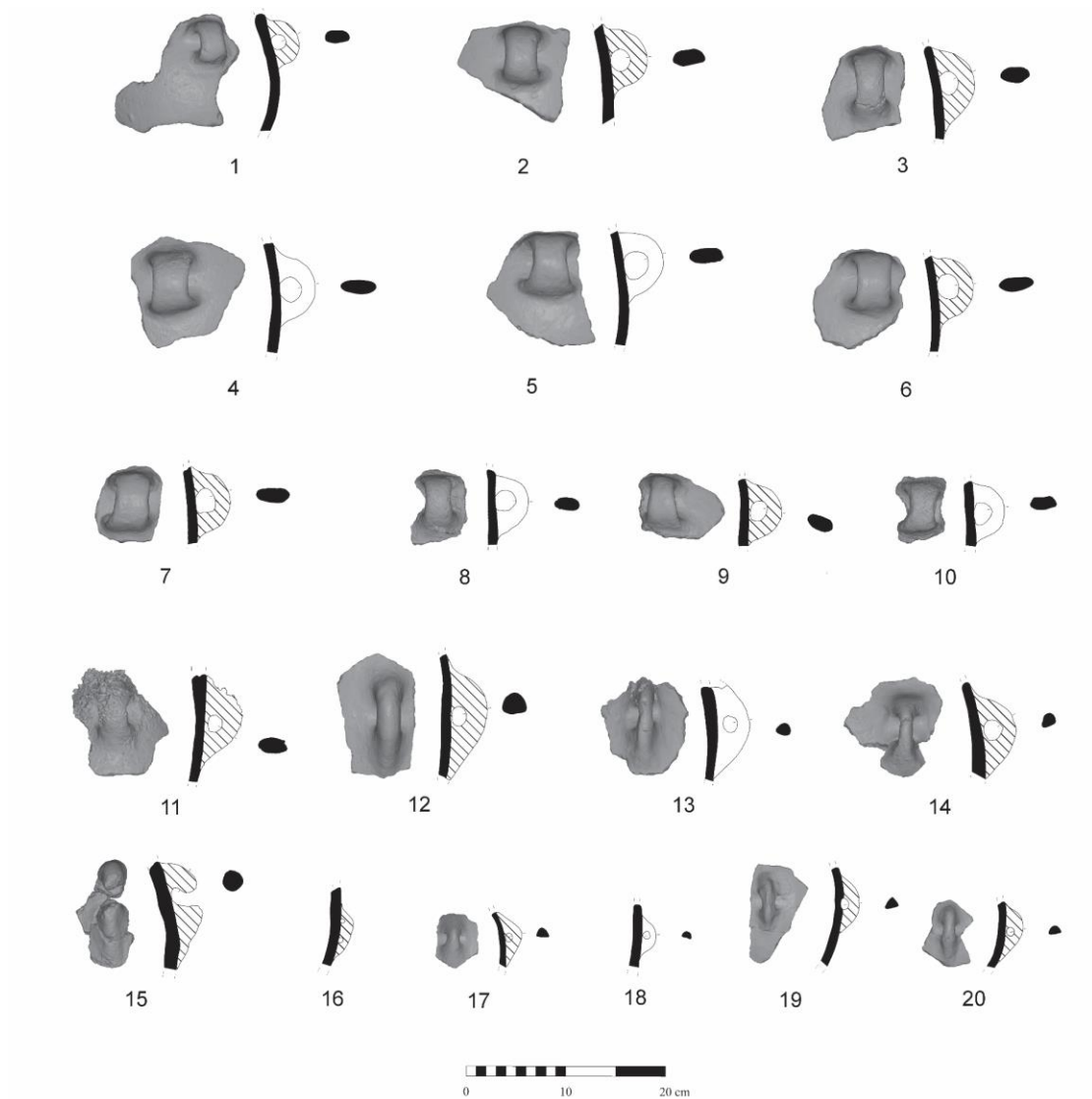


Figure 7: Pottery assemblage – Handles.

Table 8: Details for Figure 7 – Pottery assemblage – Handles			
#	Area	Basket	Type
1	J3	171	Strap handle
2	F1	135	Strap handle
3	L2	180	Strap handle
4	L2	180	Strap handle
5	H2	155	Strap handle
6	L5	184	Strap handle
7	H2	155	Strap handle
8	K3	176	Strap handle
9	F1	135	Strap handle
10	G2	145	Strap handle
11	M1	197	Large loop handle
12	E2	124	Large loop handle
13	G5	148	Large loop handle
14	K3	176	Large loop handle
15	E2	124	Large loop handle
16	L5	184	Double pierced handle
17	I2	165	Pierced handle
18	T7	220	Pierced handle
19	H3	160	Pierced handle
20	E2	124	Pierced handle

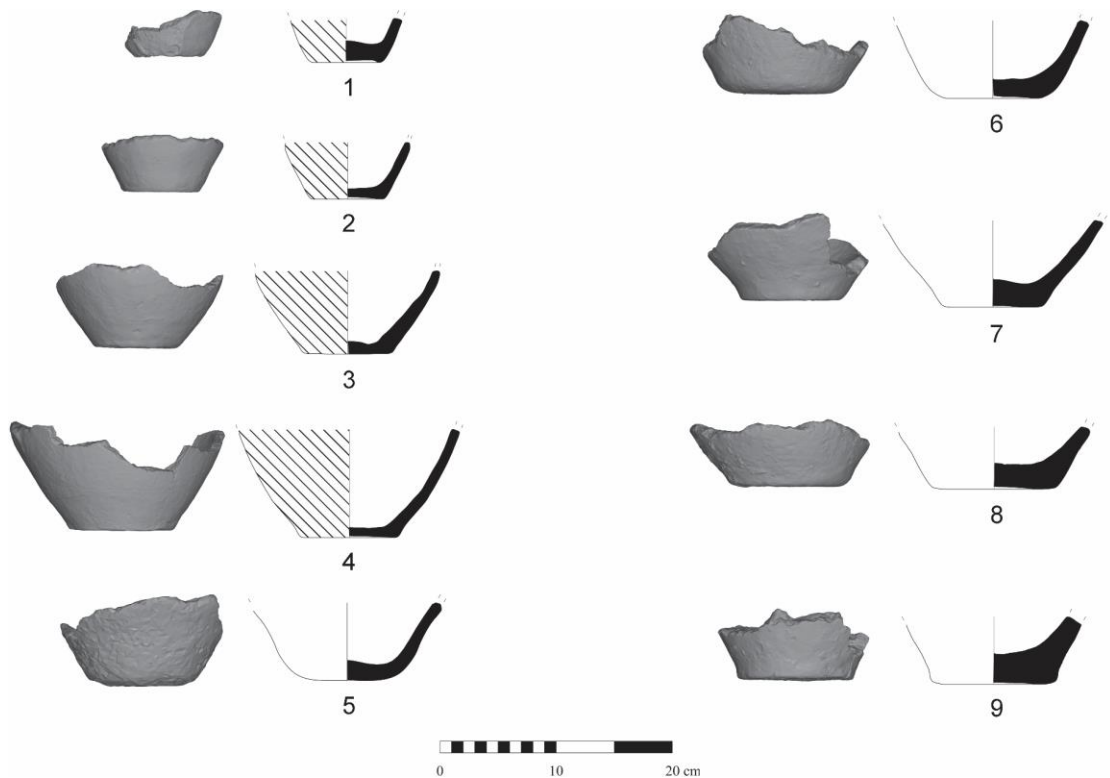


Figure 8: Pottery assemblage – Bases.

#	Area	Basket	Type
1	G5	148	Flat Base
2	I2	165	Flat base
3	I2	165	Flat base
4	J2	170	Flat base
5	H1	154	Flat base
6	L2	180	Flat base
7	L2	180	Flat base
8	L2	180	Flat base
9	U1	252	Flat base

Lithics

Two distinct patterns of flint deposits were encountered during the survey of HSC: scattered deposition of singular artifacts, mostly tools; and concentrated deposition of knapped debitage. The latter was limited to the main hall of the northern wing (Space K-L) and adjacent galleries (R1-R5), and was particularly associated with the water-washed area of L6, where hundreds of flints were observed during the survey. As a result, the excavation included a 1×1 m sounding in this area (Sq. CC), intended to inspect the formation and composition of this flint concentration.

All in all, 2003 items were retrieved from Sq. CC and surrounding areas of the northern wing (including Gallery R), compared to 24 items collected as scattered artifacts in other parts of the cave, mainly from the southern wing. The flint in the northern wing (including Sq. CC) was clearly redeposited and washed, comprising of (mainly) small items associated with sediment taluses and water conduits. The source of both water and sediment in this part of the cave is clearly from the subaerial surface, penetrating into the cave space through the main opening as well as through currently-blocked high chimneys and cracks. It was therefore suggested that the redeposited flints from the northern wing reflect secondary deposition sourced in external flint scatters, that indeed can be seen on the surface of the southern slope of Har Sifsof outside the cave (see Ullman *et al.* 2023 for details).

The clear depositional distinction between the two mechanisms described above is reflected in the typo-technological breakdown of the assemblages collected from the northern wing and southern wing. In the northern wing, the dominant category is chunks (n=950, 47.9%), followed by chips (n=525, 26.5%), and flakes (n=234, 11.8%). Conversely, tools comprise a relatively small number (n=65, 3.3%) of the assemblage. In contrast, in the southern wing, tools emerge as the dominant category (n=12, 50.0%), followed by flakes (n=6, 25.0%). Additionally, in the southern wing, there are three blades, a chip, a bladelet, and a sizeable thinning flake from a bifacial tool (**Table 10**).

Type	Southern Wing and Chamber C		Northern Wing		Gallery R (Areas R1-R5)		Total	
	n	%	n	%	n	%	n	%
Primary Element	0	0.0	57	2.9	1	4.3	58	2.9
Flake	6	25.0	234	11.8	4	17.4	244	12.0
Blade	3	12.5	26	1.3	2	8.7	30	1.5
Bladelet	1	4.2	32	1.6	0	0.0	33	1.6
Core Trimming Element	0	0.0	24	1.2	2	8.7	26	1.3
Core Tablet	0	0.0	1	0.1	0	0.0	1	0.0
Overpass	0	0.0	6	0.3	1	4.3	7	0.3
Ridge Blade	0	0.0	1	0.1	0	0.0	1	0.0
Burin Spall	0	0.0	2	0.1	0	0.0	2	0.1
Bifacial Spall	0	0.0	0	0.0	2	8.7	2	0.1
Bifacial Thinning Flake	1	4.2	25	1.3	0	0.0	26	1.3
Total Debitage	11	-	408	-	12	-	430	-
Chunk	0	0.0	950	48.0	5	21.7	955	47.1
Chip*	1	4.2	525	26.5	2	8.7	528	26.1
Total Debris	1	-	1475	-	7	-	1483	-
Core	0	0.0	25	1.3	0	0.0	25	1.2
Tool	12	50.0	65	3.3	4	17.4	81	4.0
Hammer Stone	0	0.0	0	0.0	0	0.0	0	0.0
Intrusive	0	0.0	7	0.4	0	0.0	7	0.3
Total	24	100	1980	100	23	100	2027	100

* Chips are pieces that are shorter than 1.5 cm and having a ventral face

The assemblage from the northern wing, particularly from L6 (Sq. CC), displays a high diversity in the color, patination, and raw materials, including yellow, grey, grey with nummulites, grey with tiny black dots, dark red, and black variants. Patination is frequent and varies in thickness, indicating that some items were exposed on the surface for different durations. The level of preservation also varies significantly, with some items appearing relatively fresh, others slightly eroded, and some heavily eroded and rounded. Items range from complete to broken or shattered. Several items show signs of burning, and a few are covered with carbonate crust. All in all, it appears that most items found in the northern wing are redeposited flint originating from outside the cave, although it is possible that the larger and more fresh items represent onsite deposition.

The southern wing assemblage is characterized by a dominance of tools (n=12), six of which are sickle blades (Tables 10 and 11, Fig. 11:1-6). Among them, four are narrow blades, backed by abrupt retouch or naturally backed, with fine denticulation on their active side and triangular cross-section, of the type characterizing Chalcolithic sickle blades (Rosen 1997; Vardi 2011).

Interestingly, all four have a triangular planar shape, designed explicitly for hafting at the end of a sickle (**Fig. 11:3-6**). Sickle-end blades are relatively rare in late prehistoric sites in the southern Levant (Gopher *et al.* 2001; Rosen 1997). In Chalcolithic sites, the ratio between end-blades and mid-blades of sickle blades ranges from 1:5 to 1:12 (Vardi 2011). Thus, the relative abundance of end-blades in HSC stands out. The end sickle blades of HSC exhibit sheen on both the dorsal and ventral sides. Their dimensions vary slightly, with length ranging from 51 to 72 mm, width ranging from 16 to 18 mm, and thickness ranging from 7 to 8 mm. Similar sickle blades were found in contemporaneous settlement sites such as Nahal Zehora I (Barkai & Gopher 2012a: Fig. 20.13: 2-3), Tel Tsaf (Dag & Garfinkel 2007: Fig. 5: 1, 4, 5, 7); and Tel Ali Ib (Garfinkel 1992: Fig. 209: 9). Parallels can also be found in Peqi'in Cave, although it remains unclear whether they belong to the early or late phase of activity in this cave (Getzov 2013: Fig. 7.1: 1, 2, 4, 7-9).

One of the six sickle blades found in the southern wing corresponds with a characteristic type in Middle Chalcolithic (and earlier) sites, referred to as Type C/D by Gopher (1989: 95). Type C/D sickle blades are typically rectangular, backed, and truncated with abrupt retouch (**Fig. 11:2**). Parallels for this type can be found in Nahal Zehora I and II (Barkai & Gopher, 2012a, b: Fig. 20.16: 3, 4; Fig. 19.25: 4, 5), and Kh. 'Uza layers 18, 17, and 16 (Getzov *et al.* 2009: Fig. 2.45: 1-3; Fig. 2.47: 3, 4; Fig. 2.52: 4-7). The sixth sickle blade from the southern wing is a truncated blade, exhibiting a sheen on its ventral side (**Fig. 11:1**).

Other tools from the southern wing include a small awl featuring delicate retouch on a bladelet blank (**Fig. 10:3**); a truncation made on a massive-retouched blade, it is proximally broken (minimal length of 98 mm), and is 44 mm wide and 18 mm thick (**Fig. 10:5**); a truncation on a broken bulky blade; a large cortical retouched blade, 117 mm long, 33 mm wide, and 9 mm thick. Its right side is fully retouched by a scalar to semi-abrupt retouch, and its cortical side bears multiple parallel incisions (**Fig. 10:1**); a finely-retouched blade, broken on both ends (**Fig. 10:2**); and a retouched broken blade.

While most chipped flint items were likely to be deliberately placed in the southern wing, it is possible that several tiny items found there (a chip and a bladelet) were unintentionally re-deposited through movement in the cave, with the heavy mud sticking to the hands, feet, and equipment.

A few chipped flint tools from the northern wing are also worth mentioning. In Area K3 a large overpass of blades core was found, 93 mm long, 33 mm wide, and 11 mm thick, it is fresh with sharp ridges (**Fig. 9:3**). In Area K1, a 116 mm long, 23 mm wide, and 9 mm thick curved blade was found. Its ridges and edges are fresh and sharp (**Fig. 9:1**). Three sickle blades were retrieved

from Area L6 in the northern wing. The first is a Type C/D sickle blade with no gloss signs. The other two are small segments of sickle blades with back fashioned by abrupt retouch. In Area L5 a chisel was found, it is heavily worn with rounded edges and a broken end. It is 22 mm wide and 17 mm thick, made of yellowish flint (**Fig. 10:4**). Such chisels are typical to the Late Neolithic and all stages of the chalcolithic period, such as Yir'on East (Uziel *et al.* 2007: 60) and Tel Tsaf (Dag & Garfinkel 2007: Fig. 9: 1-4).

Type	Southern Wing and Chamber C		Northern Wing		Gallery R (Areas R1-R5)		Total	
	n	%	n	%	n	%	n	%
Arrowhead	0	0.0	0	0.0	0	0.0	0	0.0
Sickle Blade	6	50.0	3	4.6	0	0.0	9	11.1
Bifacial	0	0.0	1	1.5	0	0.0	1	1.2
Scraper	0	0.0	3	4.6	1	25.0	4	4.9
Burin	0	0.0	6	9.2	0	0.0	6	7.4
Awl	1	0.0	5	7.7	0	0.0	5	6.2
Borer	0	8.3	7	10.8	0	0.0	8	9.9
Notches and Denticulate	0	0.0	16	24.6	1	25.0	17	21.0
Truncation	1	8.3	0	0.0	0	0.0	1	1.2
Retouched Flake	0	0.0	12	18.5	1	25.0	13	16.0
Retouched Blade	2	8.3	4	6.2	1	25.0	7	8.6
Retouched Bladelet	1	8.3	1	1.5	0	0.0	2	2.5
Retouched Piece	0	0.0	2	3.1	0	0.0	2	2.5
Backed Blade	0	8.3	1	1.5	0	0.0	1	1.2
Multiple Tool	1	8.3	4	6.2	0	0.0	5	6.2
Varia	0	0.0	0	0.0	0	0.0	0	0.0
Total	12	100	65	100	4	100	81	100

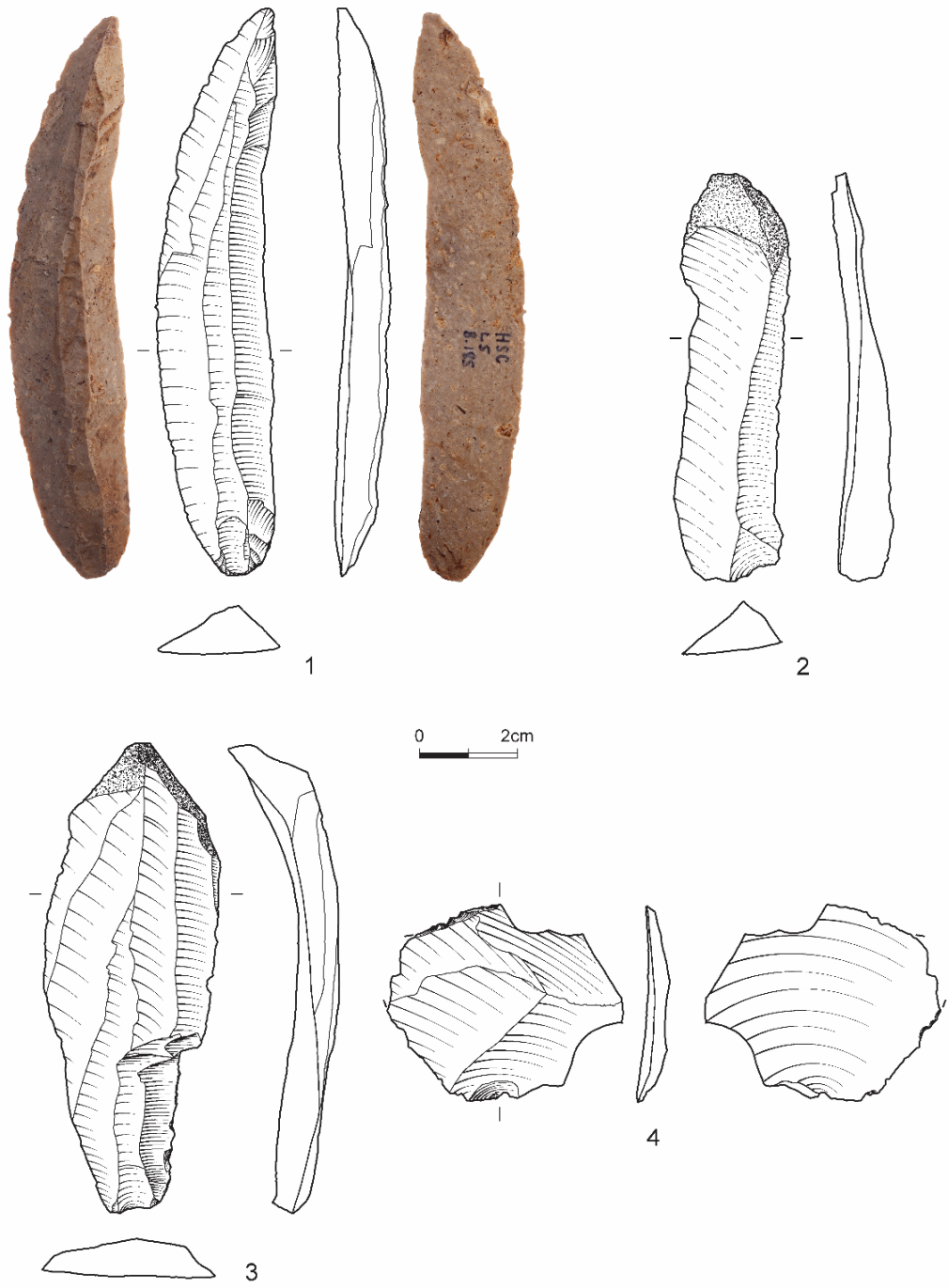


Figure 9: Lithics: (1-2) blades; (3) overpass; (4) bifacial thinning flake.

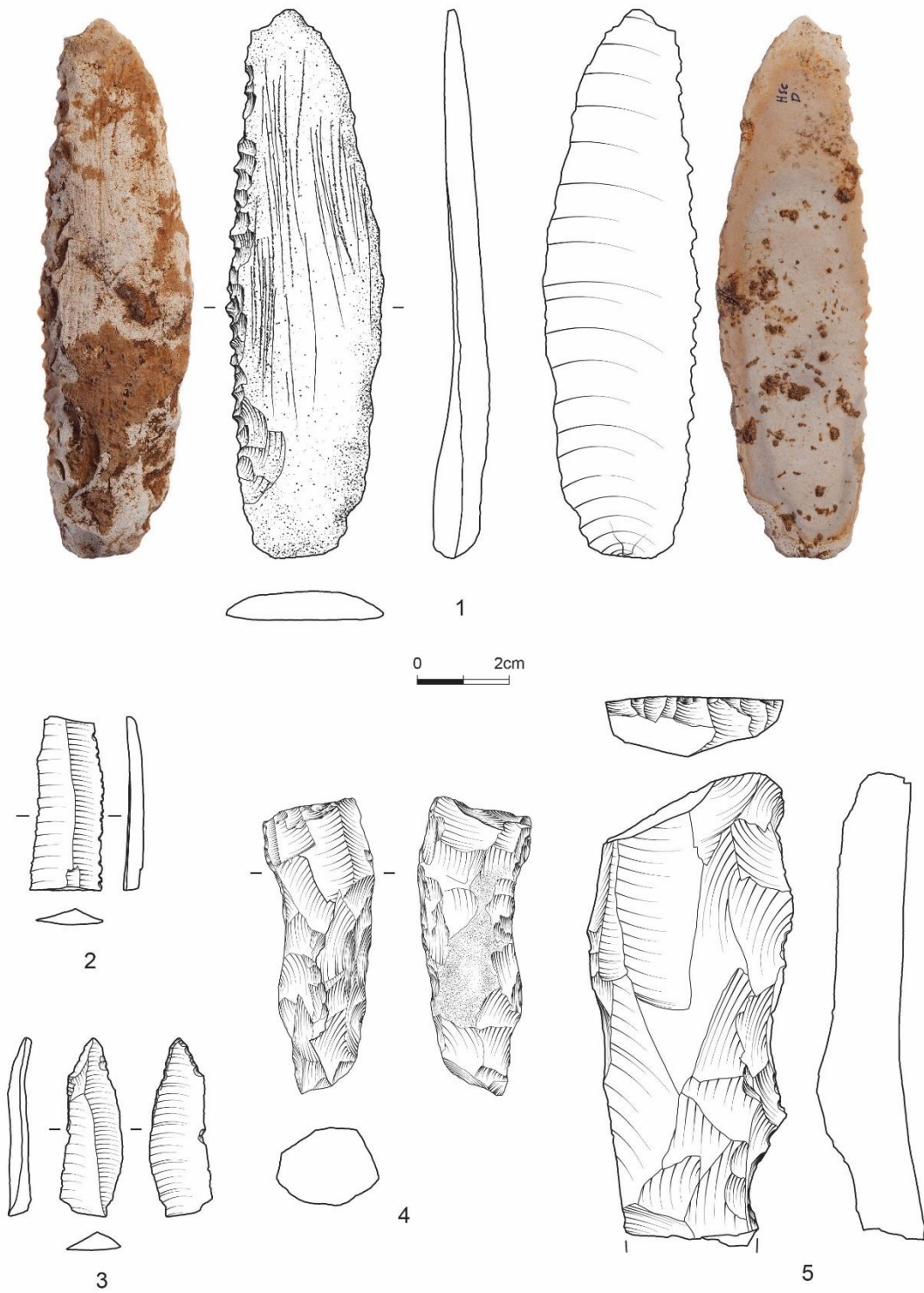


Figure 10: Lithics: (1-2) retouched blades; (3) awl; (4) chisel; (5) truncation on retouched blade.

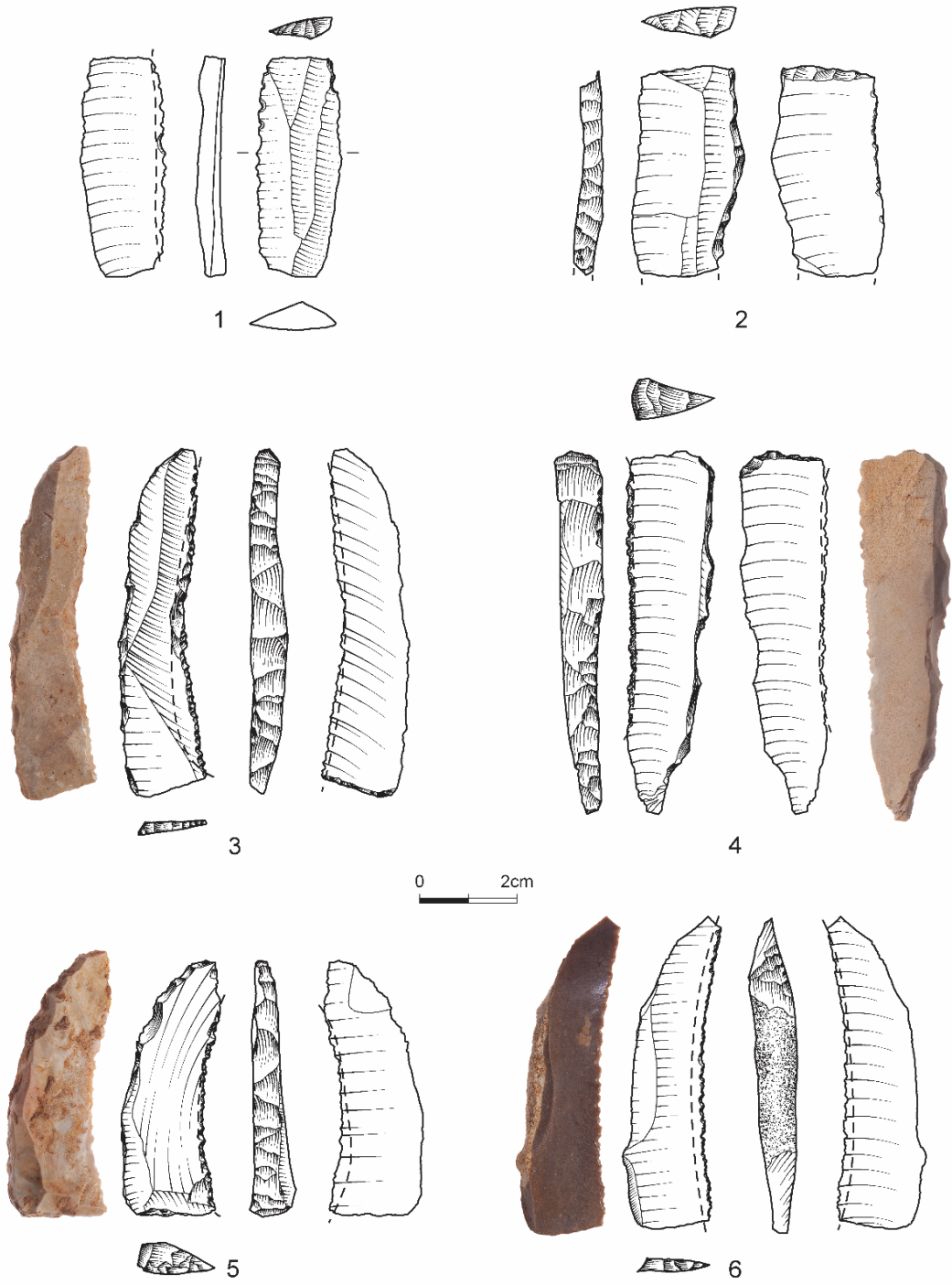


Figure 11: Lithics: (1) sickle blade; (2) sickle blade, type C/D; (3-6) triangle sickle blades.

Table 12: Lithics - Details for Figures 9, 10 and 11			
#	Area	Basket	Type
Figure 9			
1	L5	185	Blade
2	G5	147	Blade
3	K1	188	Overpass
4	E2	164	Bifacial thinning flake
Figure 10			
1	D	223	Retouched blade
2	H3	161	Retouched blade
3	D	223	Awl
4	L5	185	Chisel
5	G5	147	Truncation on a retouched blade
Figure 11			
1	D	223	Sickel blade
2	G5	151	Sickel blade type C/D
3	T1	257	Triangle sickle blade
4	J3	173	Triangle sickle blade
5	G5	147	Triangle sickle blade
6	G1	144	Triangle sickle blade

Groundstone tools

The groundstone assemblage is small (n=13) and diverse (**Figs. 12-13, Table 13**). It includes two solid high-pedestaled stone chalices (**Fig. 13:2-3**); a bowl (**Fig. 13:1**); a flaked disk (**Fig. 13:4**); two processors (**Fig. 12:4-5**); four lower grinding slabs, two of them fragmented (**Fig. 12:6-7**), and two complete (**Fig. 12:8**). One of the two complete grinding slabs, found in area L4, was left in the cave and is not illustrated here); two pebbles – one of them polished (**Fig. 12:2-3**); and a chunk (**Fig. 12:1**). Ten items are made of basalt, one of limestone, and the other two of unidentified raw materials. According to [Levitte & Sneh \(2013\)](#), the local lithology of Har Sifsof is of Upper Cenomanian dolomite of the Sakhnin formation. In tandem, our field observations noted the abundance of unworked basalt chunks on the surface. These are presumably remnants of the Pliocene Dalton basalt, currently extending ca. 2.5 kilometers east of the site ([Levitte & Sneh 2013](#)).

HSC groundstone tool types are generally common in south Levantine late prehistoric sites ([Rosenberg 2011](#), and references therein), with the exception of the solid high-pedestal basalt bowls, that are considered a *fossile directeur* for the late 6th-early 5th millennia BCE ([Getzov et al. 2022](#)). In addition to the two high-pedestal bowls found in HSC, a fragment of this tool type was found on the surface, ca. 50 m west of the cave entrance.

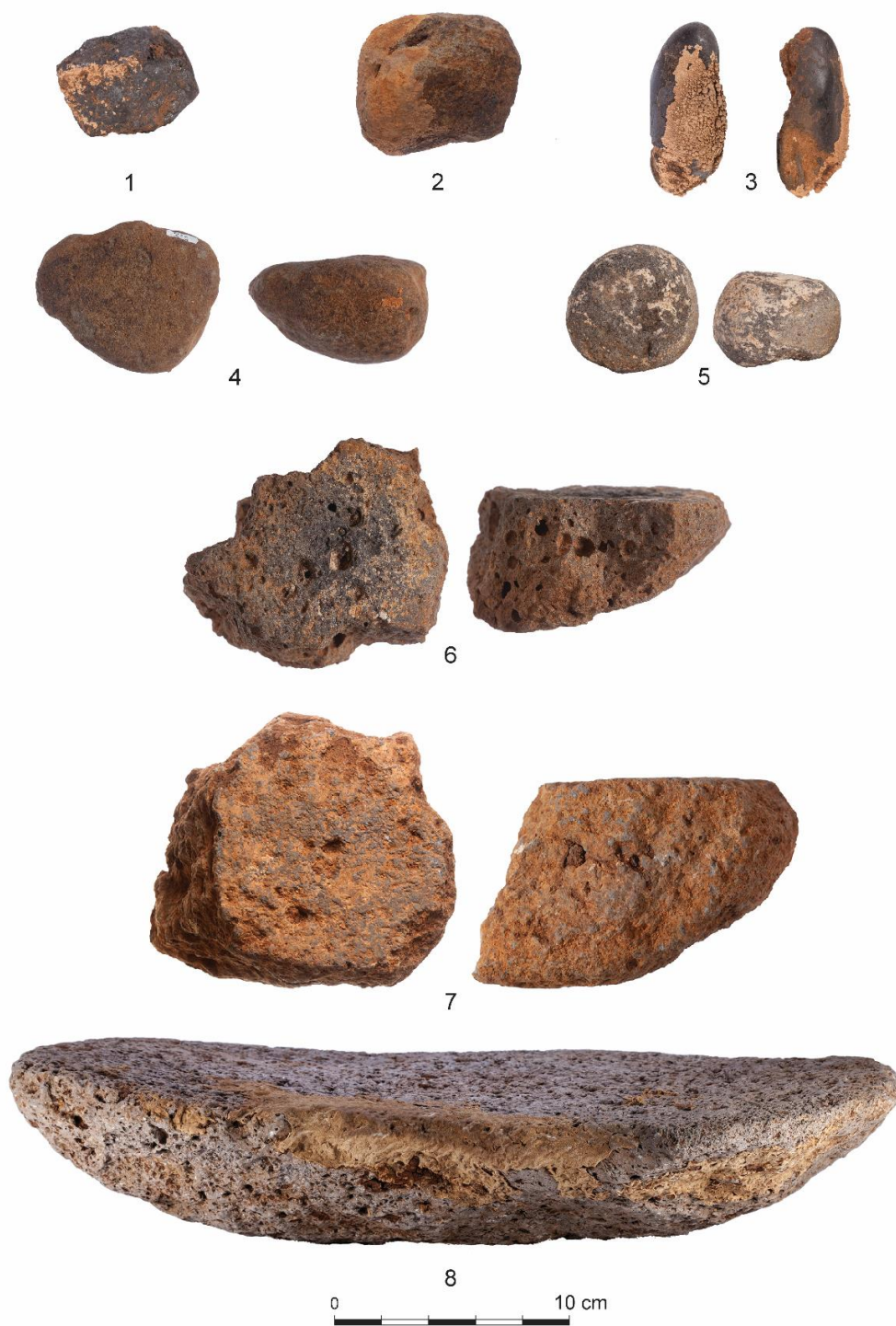


Figure 12: Groundstone tools: (1) chunk; (2) pebble; (3) polished pebble; (4-5) processors; (6-8) lower grinding slabs.



Figure 13: Groundstone tools: (1) bowl; (2-3) solid high-pedestal basalt bowls; (4) flaked disk.

Table 13: Groundstone tools – Details for Figures 12 and 13								
#	Area	Basket	Type	Raw material	Preservation	Length * mm	Width mm	Thickness mm
Figure 12								
1	K3	178	Chunk	Unknown	Complete	55	43	42
2	L5	-	Pebble	Basalt	Complete	69	50	45
3	S1	210	Polished pebble	Unknown	Complete	78	35	30
4	R3	214	Processor	Basalt	Complete	74	60	46
5	F2	138	Processor	Basalt	Complete	58	56	39
6	M1	204	Lower grinding stone	Basalt	Fragment	-	-	54
7	L2	183	Lower grinding stone	Basalt	Fragment	-	-	78
8	H2	158	Lower grinding stone	Basalt - purposive	Complete	440	220	80
Figure 13								
1	L3	108	Bowl	Basalt - purposive	Fragment	-	-	30
2	M1	203	Solid high-pedestal stone bowl	Basalt	Complete	158	135 bowl diameter; 99 leg diameter	-
3	F3	140	Solid high-pedestal stone bowl	Basalt	Broken	(155)	110	3
4	E4	163	Flaked disk	Limestone	Complete	80	75	23
* For broken or fragmented items, measurements of minimal dimensions were taken and placed in brackets to illustrate the scale size of the item								

Bone tools

A small assemblage of five bone tools was retrieved from HSC. Four bone points were found during the survey, while a fragment of a perforated plaque was uncovered during the excavation of Sq. EE (**Fig. 14, Table 14**). The points were fashioned from the long bones of (unidentified) medium-sized mammals. Such tools are commonly linked to activities associated with hide working (LeMonie 1997: 36, 51), although other uses are possible, including in basketry and carpentry (Gopher *et al.* 2012b). Points constitute the predominant bone tool type in the Late Neolithic and Early-Middle Chalcolithic and are found at sites such as Nahal Zehora (Gopher *et al.* 2012b), Nahal Saflul (Getzov 2015), Enot Kokhav (Getzov 2016), and Peqi'in Cave early phase (Getzov 2013; Raban-Gerstel & Bar-Oz 2013).

The perforated plaque from Area L6 is a small fragment of a tool of unclear shape. Although it exhibits similarities to a tool category recently defined by Sukenik *et al.* (2020) as threading implements, it does not perfectly align with objects belonging to that category. The item design is reminiscent of a perforated ivory plaque unearthed in Peqi'in Cave and identified as a brooch (Raban-Gerstel & Bar-Oz 2013).



Figure 14: Bone tools: (1-4) points; (5) perforated plaque fragment.

#	Type	Basket	Area	Bone type	Taxa	Preservation	Length* mm	Width mm
1	Point	118	D-E	Long bone	-	Distally and proximally broken	(39)	8×4
2	Point	-	D	Long bone	-	Proximally broken	(68)	9×4.5
3	Point	150	G5	Tibia (left) proximal shaft	caprine	Distally and proximally broken	(70)	12×8
4	Point	151	G5	Metacarpal	Ovis	Complete	139	9×7
5	Perforated plaque	5001	EE	Bone	-	Fragment	(21)	8

* For broken or fragmented items, measurements of minimal dimensions were taken and placed in brackets to illustrate the scale size of the item

Beads and shells

Five beads were found in HSC (**Fig. 15, Table 15**). Despite their limited quantity, they exhibit notable diversity in shape, color, and raw material, which includes flint, a non-local green stone, and teeth. Contemporary bead assemblages, relatively small but highly diverse, are found in the early phase of Peqi'in Cave (Shalem *et al.* 2013: 50), Kh. 'Uza (Getzov *et al.* 2009: 99-100), and Nahal Zehora sites (Gopher *et al.* 2012a: 1248-1250). At Tel Tsaf, thousands of beads were found within the context of intramural burials (Garfinkel *et al.* 2020). One unworked shell of *Glycymeris nummaria* was discovered in Area G1 in HSC. This taxon is abundantly found in the broadly-contemporaneous assemblages of Nahal Betzet II (Bar-Yosef Mayer 1997) and Nahal Zehora I (Bar-Yosef Mayer 2012).



Figure 15: Beads.

#	Basket	Area	Color	material	Diameter mm	Width mm
1	-	E4	Green	Unknown	13	6.5
2	193	L5	Black	Tooth	5×7	7.5
3	196	L6	Black	Flint?	9	3
4	196	L6	Brown	Unknown	3	1
5	3003	CC	Black/Beige	Flint? (cortical)	13	5

Botanical remains

Botanical remains comprise two distinct types: charred grains and concentrations of wood charcoal. Grains were observed only in area L5, specifically within one niche between several large boulders (Sq. EE). This accumulation, which contains hundreds of seeds, is composed solely of cereal grains (as yet unidentified). Small (< 2 cm each) remnants of wood charcoal are scattered across the cave floor in multiple locations, including areas E3, E4, F4, G, G5, H, H1, H2, H3, I, I1, J3, and L5. These are likely to be associated with artificial illumination, either by small open fires or torches (compare Medina-Alcaide *et al.* 2021).

Faunal remains

Only twelve identified large mammal remains were found in HSC. These included caprine (*Capra cf. Capra hircus* or *Ovis cf. Ovis aries*), suid (*Sus scrofa*), fox (*Vulpes vulpes*) and equid (*Equus cf. asinus*) bones. One of the specimens, the equid radius from K2 bore carnivore tooth marks (**Table 16**). The meager remains do not suggest systematic bone accumulation in the cave by humans or other agents.

Area	Genus	Element	Comments
E	<i>Capra/Ovis</i>	Humerus	Distal fused
	<i>Sus</i>	Humerus	Proximal unfused
K2	<i>Equus</i>	Radius	Carnivore gnawing
	<i>Capra/Ovis</i>	Ulna	Proximal fused
	<i>Capra/Ovis</i>	Sacrum	
	<i>Bos</i>	Central 4th tarsal	
F	<i>Vulpes</i>	Tibia	Distal fused
	<i>Vulpes</i>	Femur	Distal fused
	<i>Vulpes</i>	Mandible	
	<i>Vulpes</i>	Mandible	
	<i>Sus</i>	Femur	
I5	<i>Capra/Ovis</i>	Vertebra, cervical	Unfused

Human remains

Human remains in HSC were found as complete or nearly complete skeletons, located in some of the cave's most remote locations, and as isolated bones in other spaces. The minimum number of individuals (MNI) is estimated at 11.

Individual H1 – Area S2 (Sq. AA)

Location: At the bottom of Shaft S, the lowest point in the cave (**Figs. 2, 16**).

General: The skeleton of H1 was found in articulation, lying on the back. The skeletal remains included a complete skull, mandible, pelvis, sacrum, thoracic vertebra T11 and T12, lumbar

vertebra 1-5, axis and atlas (C1 and 2), left humerus, right & left femora, right & left tibia, right & left fibula, left patella.

Estimation of age at death: According to the closure degree of the proximal epiphysis of the femur and humerus, the open sutures, minor/moderate attrition (slight exposure of the dentin, phase D), and the eruption of all 3rd molar teeth, the age at death was estimated to be 20-25 years (Lovejoy 1985; White & Folkens 2005).

Sex estimation: The morphology of the skull, mandible, and pelvis, which included a lack of supraorbital ridges, the sharp rim of the superior orbital border, the frontal bossing, the wide subpubic angle, and wide sciatic notch, indicated H1 was a female (Sella Tunis *et al.* 2017; White & Folkens 2005).

Estimated height: According to the length of the humerus and femur, H1 was between 143 and 150 cm.

Pathology: An unhealed depressed fracture caused by a sharp object was evident in the middle part of the frontal bone. The external plate was pushed into the cranial cavity. This trauma was probably the cause of death of H1.

In addition, oral health was relatively good, with mild periodontitis in the upper and lower jaws, caries in the lower left M3, and calculus. Osteoarthritic lesions were identified in the right superior articular facets of S1 and inferior articular facet of L5. Periostitis was observed in the leg bones (tibia and fibula) and in the distal right femur.

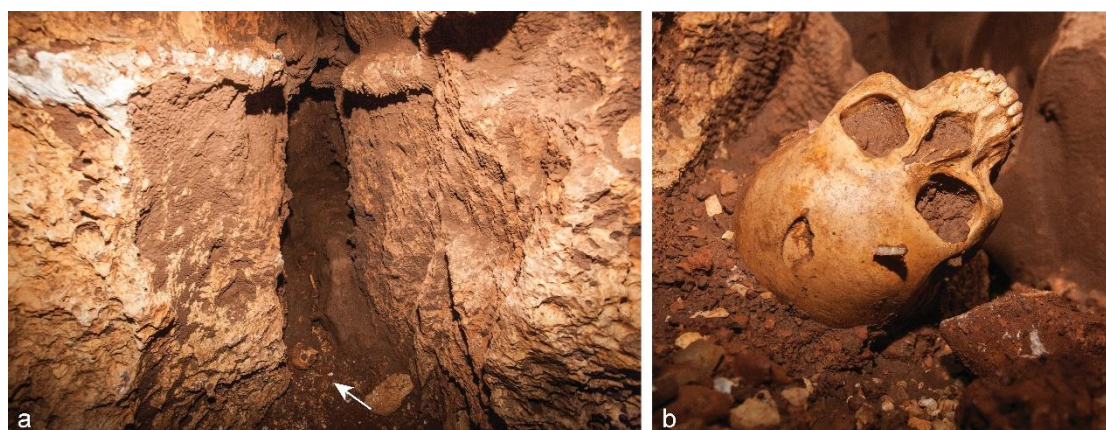


Figure 16: Individual H1, a primary burial of a young woman: (a) the complete articulated skeleton laying along a natural fissure at the bottom of Shaft S; (b) a closeup photo of the skull, note the unhealed depressed fracture in the middle of the frontal bone.

Individual H2 – Area J7, B.175

Location: A narrow fissure at the far end of Area J maze of tight passages (**Fig. 17**).

General: The skeleton of H2 was found as a cluster of well-preserved bones in a secondary deposition, some bones lying on top of each other and some sliding in the cracks between the small and medium-sized stones that make up the floor of this small space. H2 is represented by a temporal bone, fragments of the occipital bone, orbit, and the maxilla (left canine, left premolars, first and second molars and erupted third molar), the right humerus and the head and fragment of the shaft of the left one, the right ulna, the right radius, a fragment of the left ulna, few metacarpals bones and distal phalanges, left pelvis and a fragment of the right ilium, right and left femora, and a fragment of the right fibula (without the distal end), a fragment of the left distal fibula, right calcaneus and a fragment of the left one, left talus, left cuneiform, few right metatarsals, lumbar vertebra, and two thoracic vertebrae.

Estimated height: According to the femur and humerus, the height of H2 was between 160 and 166 cm.

Estimation of age at death: According to teeth attrition (phase B1) and closure of epiphysis of long bones, H2 was a young adult between 16 and 20 years old.

Sex estimation: The narrow sciatic notch indicated that H2 was a male.

Pathology: Large osteophyte at the proximal end of third left metacarpals.



Figure 17: Some of the bones of Individual H2, within a small gap between boulders and the cave walls.

Individuals H7 and H8 – Area T4 (Sq. BB)

Location: A low, narrow dead-end passage branching off Hall T with active small stalactites at its ceiling.

General: H7 and H8's skeletal remains were discovered intermixed on the cave floor in a deteriorated condition. The bones, fragmented and worn, were embedded within moist sediment and speleothem fragments, many partially consolidated in hardened deposits. A minimum number of two adult individuals were identified in this area. Since the skeletal remains recovered were mixed, some skeletal remains could not be affiliated with a specific individual. These included isolated upper teeth (first incisor and canine), a fragment of distal ulna, shaft of a right humerus, head mid-shaft of a femur, distal half of a left tibia, a fragment of the ilium, and a shaft of the radius with a healed trauma.

Individual H7

H7 is represented by a partial skull, including the temporal and occipital bones and a fragment of the parietal bone, and mandible fragments (left and right molar regions).

Estimation of age at death: According to the wear pattern, H7 was between 20 and 30 years old.

Oral pathologies: Periodontitis at M3, including an abscess, and the presence of calculus were identified.

Individual H8

H8 is represented by a fragment of the left mandible with the three molar teeth and a fragment of the right mandible with the second molar tooth.

Estimation of age at death: According to the wear pattern, H8 was between 35 and 40 years old.

Individuals H3 and H4 – Area G3, B.146

Location: A small, dead-end muddy passage behind a screen of speleothems.

General: The skeletal remains of H3 and H4 were discovered intermingled within the muddy clayish sediment of the passage floor. Two individuals were identified according to differences in the developmental stage of the skeletal remains.

An adult individual (H3) was represented by fragments of the calvaria (partial bone and frontal bone), a fragment of a rib, the left proximal femur, a fragment of the right femoral shaft, fragments of the left and right tibia, a clavicle, a fragment of the right scapula, fragments of

fibula and phalanx. Gnawing marks were observed on the fibula and tibia of H3; the small size of the marks and their U-shaped cross-section (**Fig. 18**) indicate they were made by a small rodent, possibly of an Apodemus or spiny mice, two species that are currently active in the cave. An additional young individual (H4) was represented by a vertebra, sacrum, pubis, and several teeth (2nd incisor and 1st molar).

Estimation of age at death: The age of H3 was estimated according to the closure of the epiphysis of the proximal femur between 20 and 25 years. The age of H4 was estimated according to the dental development and the fusion of the pelvic girdle. According to the dentition, the age at death was estimated as 8 ± 2 years. This was verified by the fusion of the ischiopubic ramus and the unfused ischial tuberosity (between 5 and 14 years).

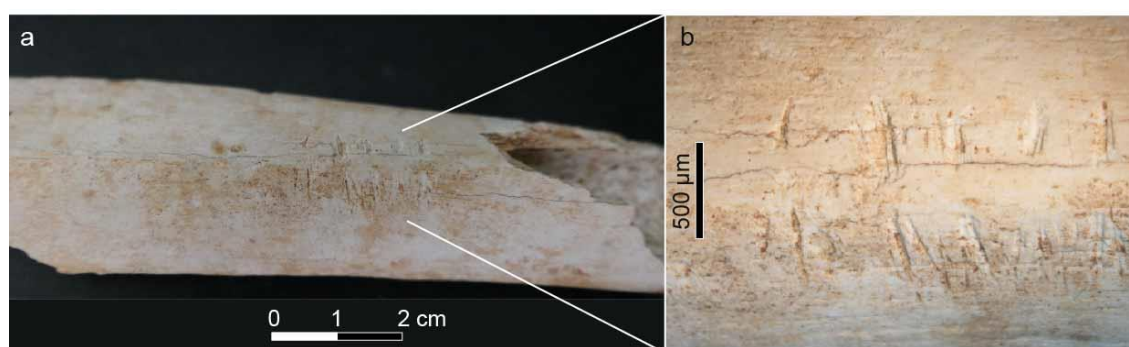


Figure 18: Tibia of H3 with gnawing marks of a small rodent.

Individuals H5 and H6 – Area M2, B.201

Location: A low passage located beneath the floor of the main level of the northern wing (Hall L) and leading to the lower levels.

General: Scattered bones of H5 and H6 were found on the damp space floor. A minimum of two adults were identified according to the number of maxillae (two left hemi-maxilla).

Individual H5

H5 is represented by skull fragments, including frontal, parietal, and temporal bones and right and left maxilla.

Sex estimation: The rounded rim of the superior orbital border and the pronounced temporal line indicated that H5 was a male.

Estimation of age at death: The third molar erupted, and the attrition level of the teeth (type G) indicated H5 was between 35 and 40 years old.

Oral pathologies: Oral pathologies included an upper left M1 broken and worn and an upper left premolar and third molar with caries.

Individual H6

H6 is represented by fragments of the skull, the left maxilla, and the left mandible.

Estimation of age at death: According to the wear pattern (type E), H6 was between 24 and 30 years old.

Oral Pathologies: Caries in M1.

Individual H9 – Area U1, B.251 (Sq. DD)

Location: A passage between Areas T and U.

General: Skeleton H9 consists of a few bones found under a large, tilted flat boulder. It is represented by a right hemi-mandible (three molars, two premolars, and the canine), two isolated lower first incisors, and the left second molar, a fragment of the right maxilla and isolated upper right canine, and incisors. In addition, fragments of the skull and upper rim of orbit and fragments of the post-cranial skeleton, including the clavicle and ulna, the shaft of the right and left fibula, and proximal phalanges, were associated with this individual.

Estimation of age at death: According to the wear pattern, H9 was between 18 and 22 years old.

Sex estimation: The rounded superior rim of the orbit indicates a male.

Individual H10 – Area T5, B.256

Skeleton H10 consists of a few bones found scattered on the cave floor. This is an adult individual represented by a metacarpal, proximal phalanges, medial phalanges, a rib fragment, and a fragment of the radius shaft.

Individual H11 – Area E3, B.128

Skeleton H11 consists of a few bones found scattered on the cave floor. This is an adult individual represented by the proximal half of the femur, a fracture of the femoral shaft, and a fragment of the right distal ulna.

Skeletal remains that could not be affiliated with a specific individual:

Area E2, B.125: Bone fragments of the left femur, sacrum, ilium and pelvis. All belong to an adult over 18 years old (defined based on the morphology of the sacrum).

Area E6-F6, B.142: Fragment of a parietal bone.

Area J4, B.174: Shaft of an ulna.

Area K1, B. 712: Fragments of shafts of two long bones.

Area K3, B.177: A second proximal phalange.

Summary

The estimated minimum number of individuals is 11. Among them, ten are adults, and one is a child (ca. 8 years old). Sex was estimated for four individuals: three males and one female. The female suffered from a head trauma, which probably caused her death. An additional healed trauma condition was identified in the radius of individual H7 or H8. Oral pathologies are common among HSC skeletal remains, including caries, dental attrition, and periodontitis.

Radiocarbon dating

Five samples were sent for radiocarbon dating to the Radiocarbon Dating Lab at the Center for Applied Isotope Studies, The University of Georgia, USA. These included four human bone samples originating from Areas G3, J7, S2, and T4, and a single cereal grain from the grain concentration in Area L5. Samples J7 and S2 contained datable collagen, while the lack of preserved collagen in the samples from G3 and T4 dictated the dating of the bone bioapatite. The grain and collagen samples form a tight cluster of dates, at a range of ca. 4950-4720 cal. BCE (**Fig. 19, Table 17**). This range correlates well with the time of the material-cultural remains found in the cave.

In contrast, the bioapatite dates are much older, and do not accord with the archaeological evidence in HSC. Radiocarbon dating of bioapatite can be problematic in humid environments, although in tested cases, bioapatite samples tended to be younger than their ‘true’ age ([Zazzo & Saliège 2011](#)). Based on the cultural homogeneity of the remains from HSC, it is suspected that the bioapatite dates are erroneous.

UGAMS #	Sample source	Material	$\sigma^{13}\text{C}, \text{‰}$	$\sigma^{15}\text{C}, \text{‰}$	C/N	^{14}C age years, BP	\bar{x}	pMC	\bar{x}
54619	Cereal grain (Sq. EE, Area L5)	Grain	-22.96	3.08	21.0	5940	25	47.72	0.14
54620	H1 (Sq. AA, Area S2)	Collagen	-19.77	7.62	3.24	5930	30	47.81	0.16
54621	H2 (Area J7)	Collagen	-19.40	7.30	3.26	5990	25	47.43	0.14
54622	H7/H8 (Sq. BB, Area T4)	Bioapatite	-12.86	n/a	n/a	6930	30	42.18	0.14
54623	H3 (Area G3)	Bioapatite	-10.98	n/a	n/a	7130	30	41.14	0.14

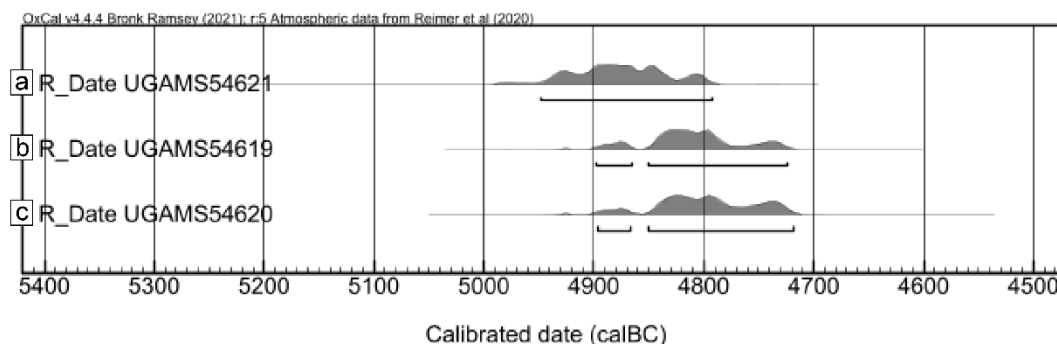


Figure 19: Probability distribution of radiocarbon dates: (a) collagen sample of human bone, J7; (b) grain sample from Sq. EE (Area L5); (c) collagen sample of human bone, Sq. AA (Area S2). (Calibration following Reimer et al. 2020; Bronk Ramsey 2021).

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