

## THE FLINT ASSEMBLAGE FROM KHIRBAT EL-‘UMDAN, BET SHEMESH

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### INTRODUCTION

The excavations at Khirbat el-‘Umdan (see Be’eri, this volume) yielded a small assemblage of 277 flint artifacts. The assemblage can be attributed to the Late Chalcolithic period, with only a few intrusive Palaeolithic pieces. It represents an on-site flint knapping industry that focused on the production of expedient flake tools, together with evidence for the use of formal tools, especially sickle blades.

The excavated sediment was sieved, as is reflected, for example, in the presence of microliths. The small number of chips, however, points to a certain bias in the collection of the small lithic components; this may be the reason for the relatively high frequency of tools, which is not characteristic of well-sieved assemblages (Table 1). The small number of chips may be the result of post-depositional processes that affected the site and carried away the smallest and lightest lithic elements.

#### *Raw Material*

Four raw materials were discerned: gray flint; brecciated flint; semitranslucent brown flint; and wax gray flint. All but the semitranslucent brown flint can be found as pebbles and nodules in the local outcrops of the Meshash Formation, or in the local wadis. The few primary elements of semitranslucent brown flint had a white thin chalky cortex, indicating that the nodules were extracted from rock outcrops rather than collected. The suitability of these raw materials for knapping varies; fine-grained gray flint is homogenous and ideal for knapping; brecciated flint is fine-grained, but contains cracks and impurities that make it less desirable; semitranslucent brown flint is also of good quality, but with flaws and cracks; and wax gray flint occurs either as relatively small nodules or within brecciated flint.

Other types of raw material included non-homogenous, medium quality flint in various shades of brown and gray with occasional limestone veins, and small numbers of beige and dark brown fine-grained flints. A single sickle blade made on non-local banded gray flint is worth noting (see below). Two flakes and two retouched pieces that are covered with dark orange or white patina are intrusive, and point to an earlier Paleolithic activity.

**Table 1. General Counts**

Type	N	%
<i>Debitage</i>		
Primary elements	12	7.3
Flakes	104	63.4
Blades	24	14.6
Bladelets	7	4.3
Burin spalls	3	1.8
Ridge blades	2	1.2
Core tablets	2	1.2
CTEs	9	5.5
Axe spall	1	0.6
<i>Total Debitage</i>	164	99.9
<i>Debris</i>		
Chips	10	18.5
Chunks	44	81.5
<i>Total Debris</i>	54	100.0
Debitage	164	59.2
Debris	54	19.5
Tools	37	13.4
Cores	22	7.9
<i>Total</i>	277	100.0

## THE FLINT ASSEMBLAGE

### *Cores*

The majority of the cores are small (length <5 cm), bearing many removal scars and nearly devoid of cortex, attesting to their extensive exploitation. The low frequency of core tablets and other core trimming elements indicates that maintenance of cores during the knapping process was kept to a minimum. While primary elements are present in the assemblage, their modest frequency may indicate that the initial stages of core preparation took place elsewhere, near the raw material sources. One tested nodule of brecciated flint is exceptional in this regard.

Cores with a single striking platform are the dominant type (n = 9); they bear evidence for the production of flakes (n = 7; Fig. 1:1, 2), or flakes and bladelets (N = 2; Fig. 1:3). Fewer cores (n = 5) had two striking platforms and were used for detaching flakes (n = 3), flakes and bladelets (n = 1; Fig. 1:4) and blades/bladelets (n = 1). Most of them seem to originate in exhausted single platform cores, with the newdebitage surfaces set perpendicular to the original ones. Also found were fragments of flake cores, four polyhedral flake cores for producing flakes and two cores for producing flakes and bladelets. The absence of blade cores is notable.

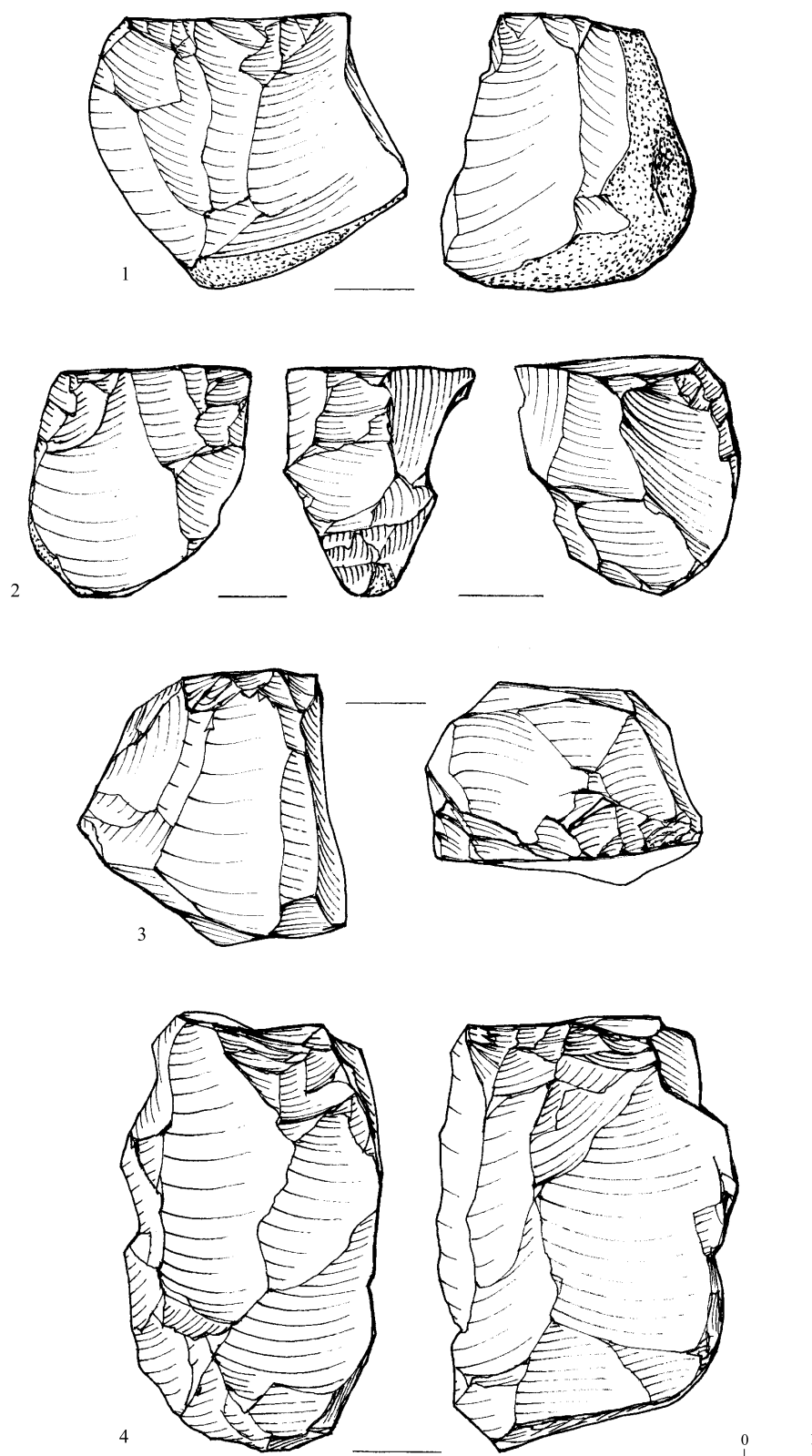


Fig. 1. Single platform cores for flakes (1, 2); single platform core for blades (3); and core for flakes and bladelets (4).

**Table 2. Cores by Debitage and Raw Material**

	Flakes	Mixed	Blade/ Bladelets	Total
Brecciated	4	1		5
Gray	4	2		6
Wax gray	3			3
Translucent brown	1	1	1	3
Other	5			5
<i>Total</i>	<i>17</i>	<i>4</i>	<i>1</i>	<i>22</i>

Flake cores were made of both high quality gray flint and inferior raw materials. But, as for the manufacture of blades and bladelets, the composition of the core group reflects a preference for high-quality flint: mixed flake/bladelet cores and pure blade/bladelet cores were made solely on gray or translucent brown flint, while brecciated flint was avoided (Table 2). It seems that translucent brown flint was reserved for the production of blades and bladelets. The only flake core made of translucent brown flint is broken, and probably results from an attempt to exploit what was originally a blade/bladelet core.

### *Waste Products*

The presence of waste products of all types, together with their high frequency, indicates on-site knapping activity. There is a clear preference for the manufacture of flakes, as they outnumber blades in a ratio of 4.4:1, or, if combined with bladelets, in a ratio of 3.3:1. Most flakes are small (length <3 cm). They were made from nearly all the flint types represented in the assemblage, as reflected also in the core group. Most of the blades are short (length <5 cm) and wide, and were probably detached accidentally during flake removal. They were not favored over flakes as blanks for making expedient tools. Blades with parallel lateral edges and regular triangular/trapezoidal cross sections are few, and occur only as fragments.

Bladelets were produced in two different reduction sequences. Some were produced as a final stage in the exploitation of flake cores, hence the presence of mixed flake/bladelet cores. Bladelets of semitranslucent brown flint, however, were the target blanks of a separate reduction sequence. This raw material was knapped using a soft hammer, resulting in narrow, slightly curved products. In addition to bladelets, two blades were found, both in the same context (L111, B1034; see Be'eri, this volume), suggesting that they derived from the same knapping event. One core-trimming element (Fig. 1:2) derived from a similar sequence.

### *Tools*

The tools can be divided into two groups: expedient tools, comprising 75% of the tool assemblage, and formal tools (Table 3). The first were made mostly on flakes or thick blades, including primary elements and core trimming elements, whereas the latter were made either on thin narrow blades, or were core tools. Thus, the majority of the cores and

**Table 3. Flint Tool Frequencies**

Type	N	%
Burins	2	5.4
Endscrapers	2	5.4
Sidescrapers	3	8.1
Massive scrapers	2	5.4
Notches and denticulates	5	13.5
Retouched flakes	7	18.9
Retouched blades	3	8.1
Multiple tools	2	5.4
Borer	1	2.7
Backed and serated blades	3	8.1
Microliths	2	5.4
Sickle blades	3	8.1
Bifacial tools	2	5.4
<i>Total</i>	<i>37</i>	<i>99.9</i>

of the waste products relate to the production of the expedient tools, while evidence for the production of formal tools is disproportionally limited, indicating that it may have taken place elsewhere.

*Burins.*— The two possible burins were made on natural breaks. However, there is little evidence for intentional burin production in the Chalcolithic.

*Microliths.*— One micro-endscraper of translucent flint (Fig. 2:1) was found, in addition to a bladelet made on semitranslucent brown flint that has fine retouch along its right edge.

*Scrapers.*— Two endscrapers were found; one was made on a dark brown flint flake (Fig. 2:2) and the other on a thick gray flint flake; the latter may be classified as carinated scraper, and could have served as a bladelet core. Of the two massive scrapers, one was made on gray flint (Fig. 2:3) and the other was shaped on wax gray flint embedded within a large flake of brecciated flint. The sidescrapers include one double item on gray flint and two items on brecciated flint. Of the later, one has a ridge and heavy pecking signs on its dorsal face, and could be a hammerstone fragment.

*Notches and Denticulates.*— The four notched items include one double notch on a thick flake, a notch on the distal end of a gray-brown flint blade, and two notches on flakes that are partially covered with cortex. The denticulate was made on a gray flint chunk.

*Retouched Flakes and Blades.*— Among the retouched flakes were one core-trimming element (Fig. 2:4) and two primary elements, while the retouched blades included one

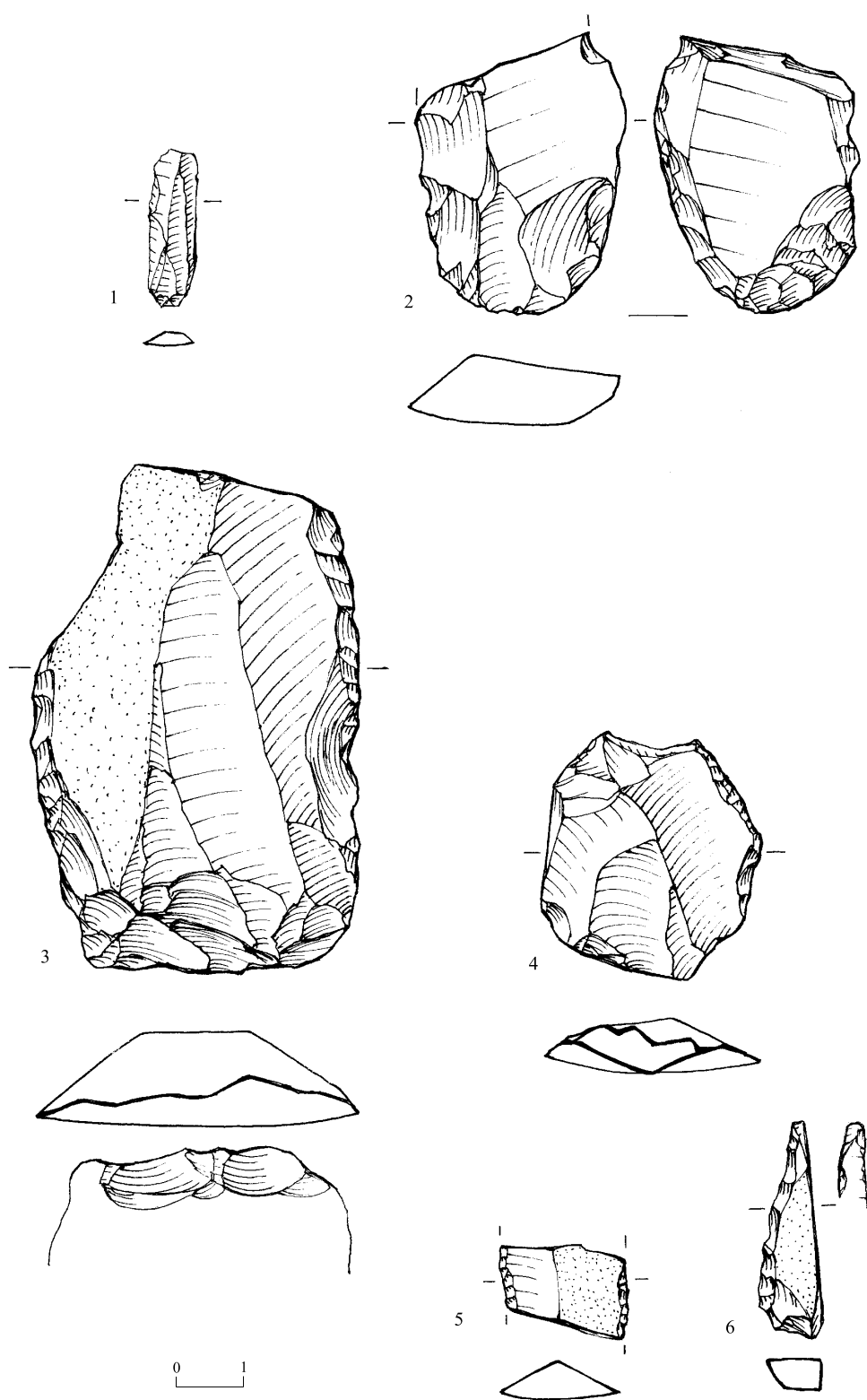


Fig. 2. Microlith (1); scrapers (2, 3); retouched flake (4); retouched blade (5); borer (6).

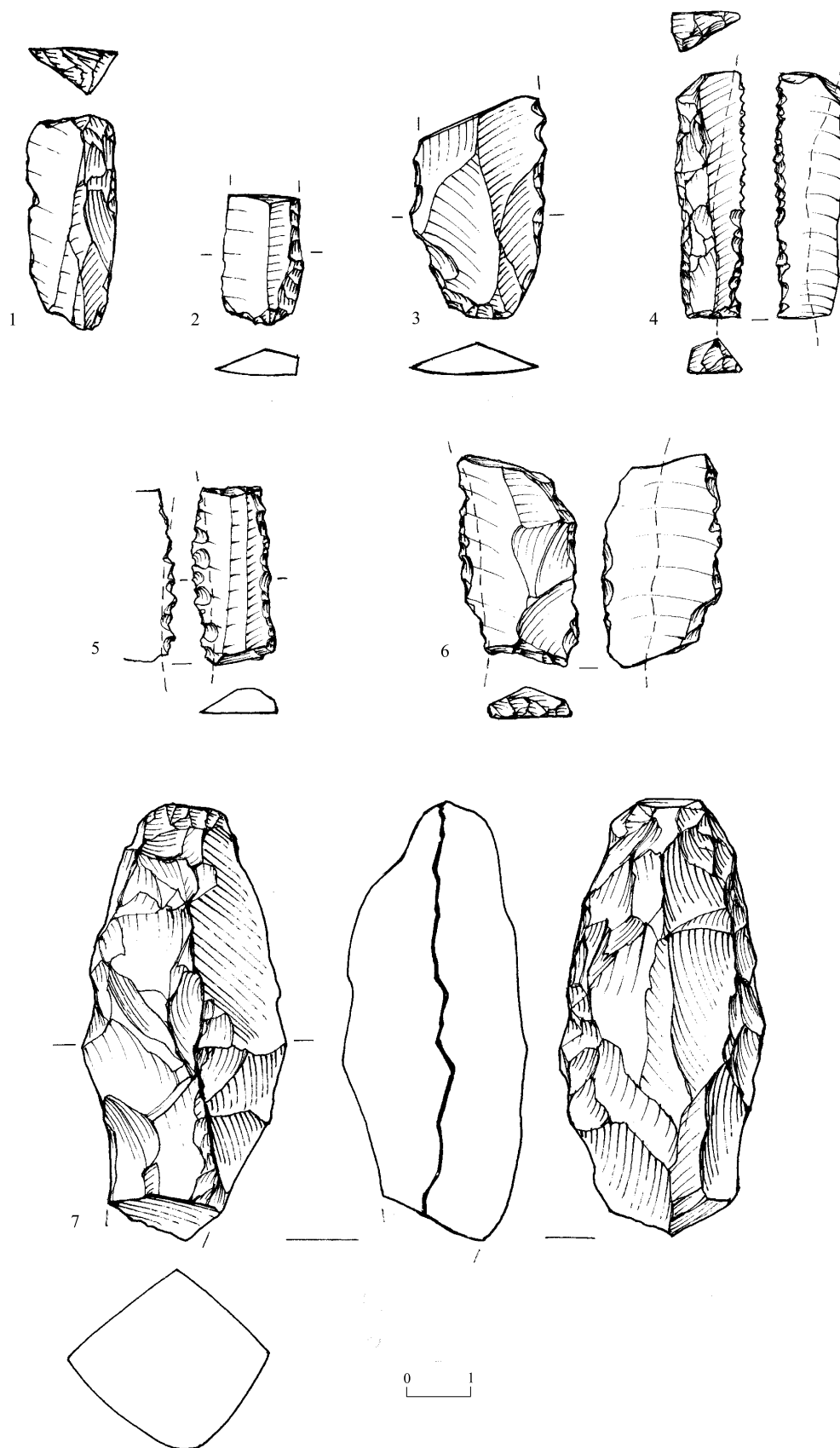


Fig. 3. Backed blades (1-3); sickle blades (4-6); and a bifacial tool (7).

primary element (Fig. 2:5). One flake and one blade are double retouched. The intensity of the retouch varies, but it rarely exceeds 1.5 cm in length. Two retouched pieces—a blade and a flake—are highly patinated and are probably of Paleolithic date.

*Multiple Tools.*— Two such tools were retrieved: an endscraper made on a thick primary flake, with a possible dihedral burin on its proximal end, and a triangular sidescraper with additional retouch.

*Borer.*— Made on gray flint, the borer (Fig. 2:6) may be included among the formal tools due to its intensive and regular retouch. Its fragmentary state does not allow to identify the blank on which it was made, but it was probably a blade.

*Backed Blades.*— Two backed blades made of gray flint (Figs. 3:1, 2) were found; one was truncated. Given their size and triangular cross section, they may have served as sickle blades. One blade, truncated on both ends and finely serrated along one edge, is the only item to be made on spotted brown flint (Fig. 3:3). Although it is not backed and has no gloss, it is clearly related to the sickle-blade group and belongs to the formal tool group.

*Sickle Blades.*— The three sickle blades are typical of the Late Chalcolithic period (Fig. 3:4–6). They are backed and truncated on both ends; two (Fig. 3:4, 5) were finely denticulated. All show gloss on both faces. They were made on fine-grained gray, banded gray, and beige flints, respectively. Banded gray flint is non-local and otherwise not documented in the assemblage (see *Conclusions*, below).

*Bifacial Tools.*— Two bifacial tools were found. One is an axe made on brecciated flint (Fig. 3:7), and the other is a small unfinished tool made of wax gray flint, with one face still covered with cortex (c. 40%); this item is perhaps a discoid core. No polished bifacial tools were found, but their use at the site is indicated by a single polished axe spall, the by-product of recycling such tools.

## CONCLUSIONS

The flint assemblage from Bet Shemesh is typical of Late Chalcolithic settlements, presenting technological traits that resemble those from sites such as Gerar (Gilead, Hershman and Marder 1995). Sickle blades, as well as backed and serrated blades, form the largest group among the formal tools, attesting to their importance in the economy of the local agricultural community. These are accompanied by bifacial tools, probably related to wood working, and by a large repertoire of locally made expedient tools that must have been used in a variety of tasks. Bifacial tools are far less frequent here than at nearby Ḥorbat Zūr, which is located c. 12 km southeast of Bet Shemesh, supporting the conclusion that these tools were exploited for site-specific tasks (Eirikh-Rose et al. 2017:199).



The raw material composition of the sickle blade group and of the related truncated blades deserves attention. Half of them were made from locally-available high-quality gray flint, and the rest were made of rare beige and spotted brown flints, as well as non-local banded gray flint. Banded flint sickle blades were reported from other sites in the Shephelah, e.g., Kh. ‘Aliya East and Ḥorbat ‘Illit B (Hermon 2008:67; Milevski et al. 2013:121), as well as from the central coastal plain (Brink et al. 2016). They were probably imported to the region as finished products from the northern Negev, where they are abundant. A specialized workshop for the production of sickle blades of banded flint was found in Be’er Sheva’ (Gilead et al. 2004; Gilead, Davidzon and Vardi 2010). The excavation at Ḥorbat ‘Illit B in Ha-Ela Valley uncovered the remains of a Late Chalcolithic flint workshop that specialized in producing sickle blades and microliths (Milevski et al. 2013); however, these sickle blades were made on dark brown flint, which was not found in our assemblage. The high frequency of sickle blades made of gray flint in our assemblage, and the absence of evidence for on-site blade manufacture, could therefore suggest that gray flint blades were produced in a similar specialized local in the vicinity of our site. Unfortunately, the assemblage is too small to ascertain this suggestion.

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